GREAT SALT LAKE ADVISORY COUNCIL

Water Strategies for Great Salt Lake

Legal Analysis and Review of Select Water Strategies for Great Salt Lake

Strategy No. 1: Allow irrigators or other water users to send unneeded water downstream without being penalized or risk losing their water rights.

The Issue: Presently, Utah Water Law discourages conservation of water by penalizing water right owners who do not use the full quantity of their water rights, providing no incentive for users to use less water. Water in Utah is owned by the public and governed by the Prior Appropriation Doctrine. Developed in the 19th century to advance western settlement and resolve disputes between competing parties, the Prior Appropriation Doctrine's primary function is to promote and manage the use of scarce, and therefore valuable, water resources. The law discourages wasting water and conditions the issuance of water rights on the requirement that water be put to use in a way that benefits society, commonly known as "beneficial use."

The State owns all water resources in trust for its citizens. Water rights are granted as a conditional property interest, protected by the priority of appropriation and the non-impairment doctrine. Water rights, once perfected by application to beneficial use, are limited to the quantities of water historically diverted and historically depleted by use. Return flows to the system must be maintained to avoid impairing other water users who rely on return flows in satisfaction of their water rights.

Water rights are administered through the Utah Division of Water Rights (State Engineer). An appropriator may change the nature of use, point of diversion and place of use, among others by filing a change application with the State Engineer. Such a change of use will be approved, subject to prior rights, so long as the historic diversion, depletion, and return flows remain the same. The State may impose conditions on the requested use to protect other water rights from being impaired.

Because of the scarcity of water in Utah, the law favors the continued beneficial use of the water. If an appropriator ceases to use all of the water appropriated, all or the unused portion of the water right will be forfeit for non-use and the water re-allocated to others who will place the water to beneficial use. In that context, Utah's application of the prior appropriation doctrine is not conducive to conservation, as it tends to take the conserved water away from the party that conserved it, as it is assumed that they no longer need the water.

Accordingly, appropriators who invest in conservation often are unable to benefit from the investment, as they do not retain a legal right to market, sell, or control any of the water "conserved" through those activities. Without an incentive to conserve, few water users see the advantage of investing in conservation efforts.

The vast majority of Utah's water resources are already appropriated for use. Additionally, future supply is anticipated to both diminish and become more irregular. At the same time, Utah faces a multitude of growing and pressing demands, including increased pressure on the Great Salt Lake. Water conservation efforts will be a cornerstone strategy to meeting the realities of the future and "stretching" Utah's limited water supply. Establishing a legal right to conserved water provides the incentive to engage in these efforts. A right to conserved water is a fundamental prerequisite to successfully implementing the strategies outlined in this Report, as well as meeting numerous other State water policy objectives.

To optimize the State's water resources, Utah law will need to expand its notion of what constitutes a beneficial use of water to enable and encourage conservation and provide a legal right for a water user who invests in conservation and gains in efficiency, to benefit from that investment.

For the purposes of this Report, conserved water is understood to be the difference between the amount of water historically depleted by the authorized use, and the reduced depletion achieved by implementation of conservation measures. A "conserved water right" is the legal right to use conserved water for some other beneficial use.

Conclusion: To incentivize water conservation activities, Utah must modify its definition of beneficial use to allow water owners to retain a legal right to control conserved water and to protect conserved water from forfeiture.

Tools and Techniques	
Legal	Expand the concept of beneficial use to include a right to retain the water conserved and avoid forfeiting conserved water back to the system.
Hydrological	See Strategy No. 12: Quantifying Conserved Water and Strategy No. 3: Shepherding Water.
Financial	Promote the simultaneous development of more efficient water market tools as a forum to place a value on conserved water rights and therefore build support for their recognition under the law.
Technical	See Strategy No. 12: Quantifying Conserved Water.
Political	If re-allocated to environmental uses, a right to use conserved water is an alternative to a politically unpopular and disfavored public trust lawsuit.
Administrative	See Strategy No. 12: Quantifying Conserved Water and Strategy No. 3: Shepherding Water.

Impacts, Barriers, and Considerations	
Legal	Water rights are legally protected from impairment from other users. Recognizing a legal right to conserved water, if not appropriately quantified and conditioned, could impair downstream water rights by depriving them of access to water they have relied on to satisfy their water rights.
Hydrological	If conserved water rights are not accurately quantified, there is a risk of expanding water rights and depleting more water from system than used under the original use. Further, financial incentives to quantify and market conserved water rights may encourage speculators to attempt to revive long-dormant or forfeited water rights in an effort to participate in the conservation market, which could result in even greater depletions than currently exist. Care must be taken to ensure that only valid existing water rights, whether or not in authorized non-use status, are available for conservation.
Financial	Modifying surface interference standards to mirror groundwater standards and require water right holders to use reasonable means of diversion may require water users to make expensive modifications that will require additional public or other funding.
Technical	Understanding and quantifying the amount of water actually consumed by a use will require verifiable data gained through an increased use of meters, telemetry, and other tools to assess depletion. See Strategy No. 12: Quantifying Conserved Water.
Political	Expanding the concept of beneficial use to to include the right to retained control over conserved water is a dramatic change to Utah law and will require significant political will and education to gain public acceptance.
Administrative	Additional resources for the State Engineer may be needed to assess and regulate conserved water rights.

Options for Future Action	
Legal	Supplement Utah Code Ann. § 73-1-3 with a new statute to allow for a water right to conserved water (that is, the difference between actual depletion and the authorized rate of depletion). Make complimentary changes to the Utah Code Ann. § 73-3-3 and § 73-3-8 Change Application statutes to require the pertinent information needed to quantify the amount of conserved water available to dedicate to a conserved water right. Once quantified and approved, a Request to Segregate can be filed to administratively monitor and track the conserved water right.
Hydrological	Addressed under other sections of the Report (such as, Strategy No. 3: Shepherding Water).
Financial	Continue to support water marketing efforts, like the water banking statute under Utah Code Ann. § 73-31 et seq. Begin to explore the creation of a fund to fund the purchase or lease of conserved water rights.
Technical	Addressed under Strategy No. 12: Quantifying Conserved Water.
Political	Care must be taken to emphasize the benefits of a conserved water right and retaining local control of the right to avoid perceptions that a specific sector of the water community is being targeted. Education is needed to inform water users their water rights are currently limited by actual use and they do not own the water up to their duty value diversion.
Administrative	Addressed under Strategy No. 12: Quantifying Conserved Water and Strategy No. 3: Shepherding Water.

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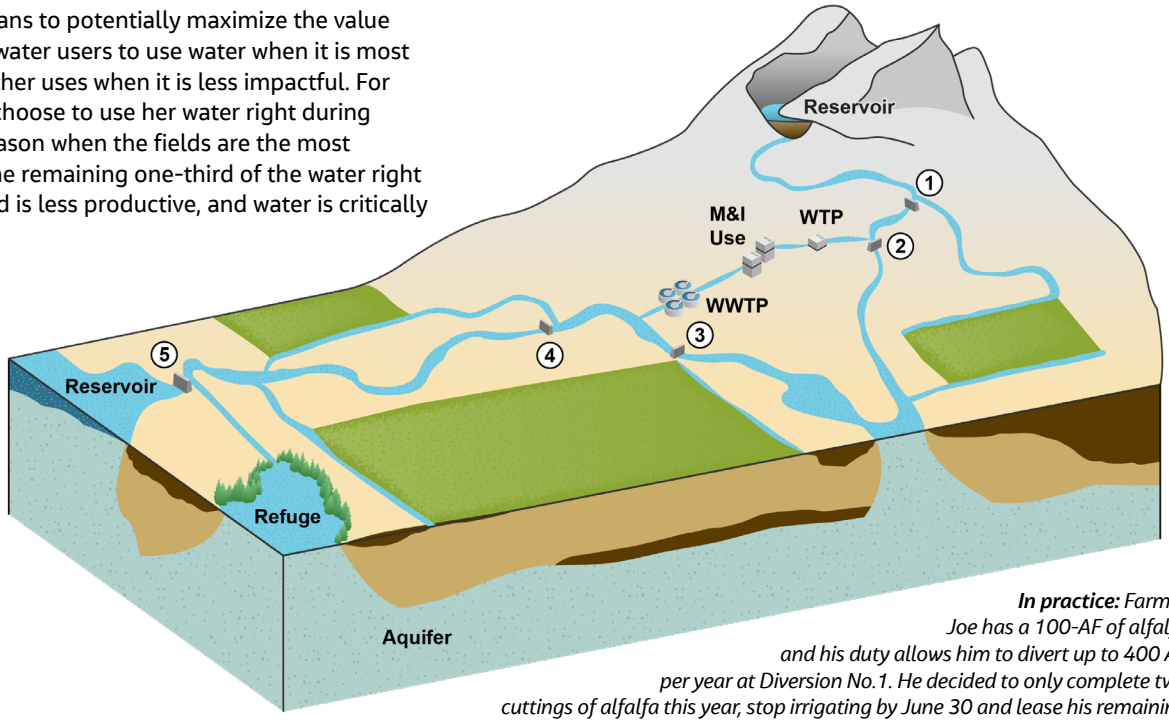
Strategy No. 2: Authorize split season leases such as where a portion of the water right is used for irrigation for part of the irrigation season, and then the remainder of the water right is made available for instream use during the same calendar year.

The Issue: Water rights are traditionally issued according to a specific period of use. For example, irrigation rights are generally issued from sometime in March or April through the end of October. Domestic water rights are issued for year-round uses. Presently, water rights must be used throughout the period of use at the same location to maintain the validity of the water right. A split season use would allow a water user to file a Change Application to "split" their season of use and make sequential use of the water at another location.

Administered through the Utah State Engineer, water rights in Utah are hyper-defined property rights. Water rights have a specific source of water, point of diversion, season of use, place of use, and, most importantly, the prescribed beneficial use, including the volume of water allowed to be diverted and consumed by the use. To use water differently, a water right holder must file an administrative Change Application with the State Engineer. The State may impose conditions on the requested use to protect other water rights from being impaired.

Split season leases are a means to potentially maximize the value of a water right by allowing water users to use water when it is most impactful and dedicate to other uses when it is less impactful. For example, an irrigator could choose to use her water right during the first two-thirds of the season when the fields are the most productive and then lease the remaining one-third of the water right for instream flows when yield is less productive, and water is critically needed for instream flows.

Much of the legal and administrative infrastructure already exists to facilitate split season uses. The primary issue needing to be addressed to facilitate a split season use of water is a technical analysis to ensure changing to a split season use will not result in expansion of a water right and increased depletions from the water system.



In practice: *Farmer Joe has a 100-AF of alfalfa and his duty allows him to divert up to 400 AF per year at Diversion No.1. He decided to only complete two cuttings of alfalfa this year, stop irrigating by June 30 and lease his remaining annual water right to the public water system at Diversion No. 2 to augment its summer outdoor watering supplies or to the refuge at Diversion No. 5 to supplement waters needed for fall bird migrations.*

Conclusion: Split season Change Applications are now authorized by law. Such an arrangement enables the shared use of water resources rather than promoting the "buy and dry" approach that has been prevalent in the West. It will require careful determination of depletions and shepherding of the water from the original place of use to the intended place of the split season use without adversely impacting other water rights. Distribution by the State Engineer's staff will be key to the implementation of split season Change Applications and may require additional financial support either in the form of appropriations or passing the costs of distribution on to the split season water users. Split season uses complement water banking and can be an effective tool to enable a shared sequential use of water on voluntary market-based transactions among willing water users.

Tools and Techniques	
Legal	House Bill 130 was signed into law on May 5, 2020 allowing water right holder the ability to file a Change Application to use their water right sequentially within the same season of use.
Hydrological	The water user will need to cease diversions at a set time and allow the water to remain in the system. Division of Water Rights will need to ensure this water reaches its destination contracted for use.
Financial	Increased measurement capacity and participation in the split season market will facilitate inflows to the lake.
Technical	Accurate quantification of diversions and actual depletion is necessary to ensure flows are accurately accounted for.
Political	Care should be taken to maintain the current political consensus.
Administrative	The current administrative framework facilitates split season uses but may require some changes in distribution policy.

Impacts, Barriers, and Considerations	
Legal	Shepherding is the key constraint and requires care to ensure other water rights are not impaired.
Hydrological	Ensuring that contracted for split season flows remain in the system is the key challenge.
Financial	Increased costs are likely to be borne by other parties, unless stakeholders directly participate in the market.
Technical	The challenges are primarily shepherding and measurement of water.
Political	This issue is currently settled, but buy-in needs to be maintained.
Administrative	The State Engineer should assist with shepherding and technical issues.

Options for Future Action	
Legal	Increase instream and environmental flows as late season uses for split season changes.
Hydrological	Focus on strategies to increase actual instream and environmental flows.
Financial	Direct financial participation in the split season market will have a direct impact on the lake.
Technical	Improvements in measurement, monitoring, shepherding, and depletion analysis will improve efficiency.
Political	Ensure stakeholders remain engaged and are bought into the process.
Administrative	Offer assistance to the State Engineer and lobby for increased budget appropriations.

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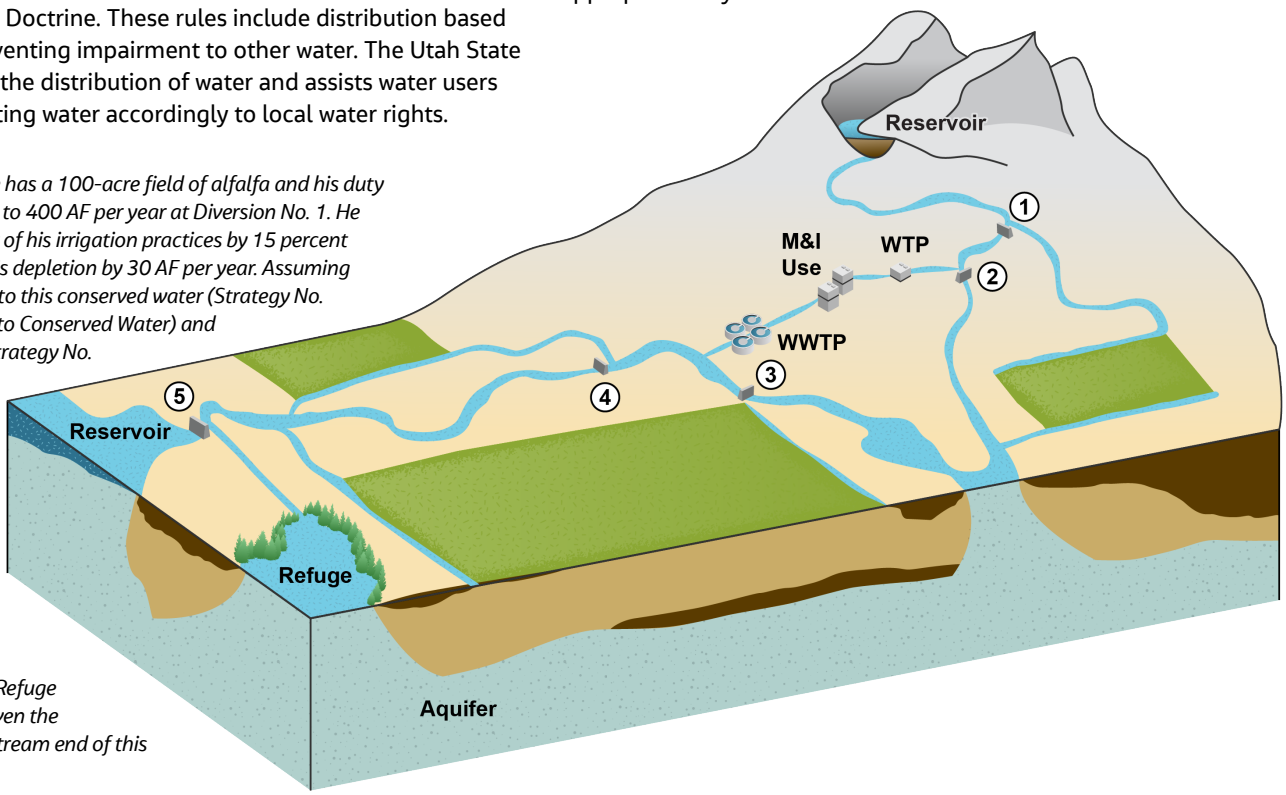
Strategy No. 3: Develop and implement other measures to supply water to the Great Salt Lake primarily by ensuring that water conserved upstream makes it to the Great Salt Lake.

The Issue: Physically distributing and allocating water in a manner that complies with Water Law is a complex task. At its core, the Prior Appropriation Doctrine serves two primary purposes: 1) putting water to use in priority; and 2) prospectively ordering curtailment in times of shortage to protect the rights of senior priority rights to receive their water supply before others may have access to the source.

To ensure water right holders physically receive water in conformance with their water right, water rights are "shepherded" through a watershed subject to specific rules and practices set by the Prior Appropriation Doctrine. These rules include distribution based on priority and preventing impairment to other water. The Utah State Engineer regulates the distribution of water and assists water users in physically allocating water accordingly to local water rights.

In practice: *Farmer Joe has a 100-acre field of alfalfa and his duty allows him to divert up to 400 AF per year at Diversion No. 1. He improves the efficiency of his irrigation practices by 15 percent and is able to reduce his depletion by 30 AF per year. Assuming Farmer Joe has a right to this conserved water (Strategy No. 1: Recognizing a Right to Conserved Water) and is able to quantify it (Strategy No. 12: Quantifying Conserved Water), Strategy No. 3: Shepherding Water could enable him to lease and shepherd the conserved water to the public water system at Diversion No. 2, Farmer Jane at Diversion No. 4, to the Refuge at Diversion No. 5, or even the Reservoir at the downstream end of this stream reach.*

Water rights are based on beneficial use. Currently, Utah law primarily recognizes consumptive uses of water. Using water for instream flows has now gained legal acceptance as a beneficial use, but in Utah, the right to use water for instream flows is limited to two State agencies and fishing groups, but only in very limited circumstances. Under the Prior Appropriation Doctrine any water allowed to bypass the upstream appropriator's point of diversion is available for diversion by the next appropriator downstream in priority, in satisfaction of their water right. For water intended for the Great Salt Lake to reach the lake and not be consumed by junior users, instream flows must be shepherded under the Prior Appropriation system.



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Conclusion: To ensure water rights intended for Great Salt Lake uses reach the lake, instream flow rights must be treated with equal dignity as other appropriated rights, and protected from diversion by intervening water users, to ensure the water gets to its intended place of use.

Perhaps a specific statutory section addressing instream flow change application to move water to Great Salt Lake would provide the legal basis to prevent diversion of instream flows by intervening appropriators.

Tools and Techniques	
Legal	Expand definition of beneficial use to include water rights for instream flows. Extend to instream flow water rights a priority date like other water rights to ensure it can be shepherded through the watershed.
Hydrological	See Technical section in this table.
Financial	Water markets should continue to be supported as a means for non-traditional interests to access water while still maintaining the economic benefit with water right holder. Public monies or a fund may be needed to garner sufficient purchasing power to lease or buy instream flows for the Lake.
Technical	Currently, to quantify an instream flow, a water user needs to have measuring devices at the original points of diversion and a system or means of redirecting water back to the natural stream source.
Political	A coalition may be needed to lobby for greater instream flows to Great Salt Lake.
Administrative	Once recognized and quantified, the State Engineer can distribute instream flow rights like any other water right through its administrative distribution systems.

Impacts, Barriers, and Considerations	
Legal	Utah Code Ann. § 73-3-30 is limited and an inflexible tool for recognizing instream flows. Senate Bill 26 –Water Banking Amendments is more flexible but will require a water bank with the Great Salt Lake within its designated watershed. §73- 3-3 and §73-3-8 may need to be amended to redefine what constitutes interference in an instream flow context.
Hydrological	The amount of water needed to make a meaningful impact to Great Salt Lake levels is significant. As there are no currently unused water rights available for the Great Salt Lake, other sources, such as conservation with the needed changes in State Law, will have to be developed.
Financial	Installing the necessary metering to measure and distribute instream flows will be expensive.
Technical	Extensive meters and measuring devices will be needed to distribute and monitor instream flows.
Political	Instream flows continue to be a politically sensitive topic in Utah and will require significant political will to gain widespread support and participation.
Administrative	Additional resources for distribution systems/staff are needed to distribute additional instream flows.

Options for Future Action	
Legal	Create a new statute that allows for protecting instream flows from diversion from intervening water users to ensure that instream flow can be shepherded from their prior point of diversion to the desired new place of use. This might be accomplished by enacting a new statute addressing change applications for instream flows intended for Great Salt Lake.
Hydrological	Optimize instream flows by coordinating and consolidating instream flows for numerous purposes.
Financial	Promote the greater creation of water markets to allow for lake users to access water for the Great Salt Lake.
Technical	The State Engineer will most likely need to require each Change Application seeking to move or distribute an instream flow to have multiple measuring devices. Eventually the Great Salt Lake Watershed will have sufficient measuring devices to have a watershed-level understanding of flows and water availability. This will allow the State Engineer to have much greater ability to control and monitor the system to the efficacy of instream flows.
Political	Advocating to protect an instream flow to ensure its delivery to Great Salt Lake and prevent its diversion and use by intervening water users will take political will to meet the needs of Great Salt Lake.
Administrative	The administrative infrastructure to shepherd an instream flow already exists but should be bolstered with additional support to the State Engineer's Distribution Office.

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Strategy No. 4: Meter all secondary water, thereby creating a financial incentive to conserve secondary water and allow more water to reach the Great Salt Lake.

The Issue: Secondary water systems are non-potable (that is, untreated) water systems that deliver water for outdoor use. These systems are distinct from potable (that is, treated) water systems and run the gamut from rudimentary earthen canals to sophisticated piped systems. Secondary systems are often used or installed to reduce the amount of water needed to be treated and distributed through potable systems.

Secondary irrigation systems have been targeted as a potential source of significant water savings, due to perceived inefficiencies and over-use of water. Improved measurement or metering of secondary water use have revealed that many water users over-apply water to their yards and gardens. Once metered, water users and water managers can know how much water secondary systems are actually using. Through pricing and other means, wasteful outdoor watering practices can be curtailed, and the water conserved can be stretched to meet expanding demand or applied to other uses, if only on a temporary basis. This measure will thereby delay development of additional water supplies or could, with proper incentives, be dedicated to instream flows for the Great Salt Lake.

Secondary metering can be expensive to install, and metering capabilities vary greatly depending on system configurations and water quality conditions. For example, metering is difficult in water with high turbidity rates. For older established secondary systems, retrofitting the system with secondary meters is difficult and can be prohibitively expensive. Water savings from secondary metering are generally under the control of the system operator and are used to meet existing or anticipated future system demands. It is not anticipated that secondary metering will create a large block of water available for Great Salt Lake, however, some water might be made available, even on a temporary basis, with additional incentives.

Senate Bill (SB) 51 adopted in 2020, SB 51 provides $10,000,000 in loans for to assist water systems with the installation of meters. Secondary metering is still expensive to install on new systems, and in some cases prohibitively expensive to retrofit established systems. One estimate puts the cost at up to $400 million.

A Typical Urban Secondary Water Diversion with a Flow Meter Only at the Diversion, Salt Lake County, Utah

Conclusion: : It is well understood that un-metered secondary water use does not promote efficiency or sustainability by water users and secondary metering has been demonstrated to lower water use when implemented. Secondary metering is an important tool for consideration as the State of Utah pursues Municipal and Industrial (M&I) water conservation throughout the State. The challenge facing the State is primarily one of funding the cost associated with installing meters on every secondary connection in the State. The State should consider funding an economic and engineering study to evaluate how best to implement measures to conserve water in secondary systems. This would likely involve a solution that would include some level of metering combined with other alternatives.

Tools and Techniques	
Legal	Senate Bill (SB) 51 requires meters on some secondary systems for new buildout, reporting of metered water, and assessments and reports on the feasibility of other systems.
Hydrological	The State should evaluate other methodologies for measuring secondary water use, such as evolving remote sensing technology.
Financial	Estimated costs to install meters on all secondary systems is in the range of $400 million dollars. Although the Legislature appropriated $10,000,000 to provide loans for the installation of secondary metering, much more financial assistance will be required to achieve the goal of metering all secondary connections.
Technical	The State could investigate tools for measuring secondary water use that are less expensive than meters. The State should continue its efforts to improve data collection for secondary water use.
Political	There is substantial political momentum for secondary metering. However, it is important that the State continue to evaluate the economics of secondary metering versus other options for conserving water.
Administrative	Administration, operation and maintenance of secondary metering programs remains with operator.

Impacts, Barriers, and Considerations	
Hydrological	Defining the quantity of secondary water use can be challenging, especially when secondary water systems include both urban outdoor water users and agricultural users.
Financial	The true cost of installing secondary meters on all secondary connections is unknown. However, better data on the extent of secondary water use is being gathered by providers, and that will aid in understanding the costs involved in accomplishing this goal.
Technical	Inexpensive meters may not always reliably operate in unfiltered secondary systems. Meters that operate more effectively in secondary systems that have poor quality water often cost in the thousands of dollars, putting metering out of reach without outside financial assistance. Manufacturers may not want to warrant their products without a guarantee of a certain level of water quality. This may then impact a water system's financing options.
Political	There is existing will to implement some form of mandatory secondary water metering. It is likely that the full economic impact is not well understood. The Utah Legislature should commission additional studies to fully understand the impact and benefits of mandatory secondary metering.
Administrative	A critical mass of water suppliers within Utah will need to install meters on their secondary systems. This will require a large capital investment. It is not likely that they will make this decision without significant investment from the State and confirmation that it is the most economical option.

Options for Future Action	
Legal	Revise land use ordinances to consider the value of water to the community and incentivize water conservation. Require new developments to include water saving landscaping and secondary meters on all new connections to secondary water systems. Require accounting of secondary water use as part of current system water use reporting.
Hydrological	Continue to improve data on secondary use. Actual conservation of secondary water could be accomplished through metering or other options such as smart weather-based irrigation controllers, soil sensors, and remote sensing.
Financial	The State should develop guidelines to determine which types and sizes of systems should install secondary meters and which systems should explore other options.
Technical	Problems of metering unfiltered water are significant. Options include some level of filtering or evaluating other technologies to reduce secondary water use. The State should initiate an economic and engineering study to evaluate how best to implement measures to conserve water in secondary systems.
Political	A blanket regulatory ruling mandating secondary metering may be expensive and not address the best approach for each individual water supplier.
Administrative	Division of Water Rights could require all water suppliers to provide accurate reports of water use within their systems. The method for acquiring this data could be left to the individual water supplier. If the data is not provided or if it is not of the quality needed, the Legislature could then mandate secondary water metering.

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Strategy No. 5: Increase the efficiency of residential, commercial, institutional, and agricultural systems (water conservation), which would result in more surface water in streams for delivery to Great Salt Lake.

The Issue: The concepts of Municipal and Industrial (M&I) water conservation are generally understood, proven water conservation practices are available, and excellent recommendations to improve M&I water conservation have been proposed. However, a central challenge for implementation, is educating and incentivizing (rather than mandating) water users, managers, and policy makers to adopt the required changes and investments. A driver for change is needed.

The effort and investment in implementing M&I water conservation measures is generally commensurate to how water is valued. The value of water and the methods to conserve that water are complex and are unique to each community. Communities generally approach water conservation with unique assumptions regarding:

1. Existing and potentially conserved water is but one asset in any public drinking water system's water portfolio,
2. A public drinking water system (and its water portfolio) is a required and an assumed service for any community, and
3. The value of water to a community is unique to its service area and typically does not include downstream uses.

How each community frames these assumptions often shapes their approach to water conservation.

Another challenge in M&I water conservation is that future water supply reliability, downstream beneficial uses and the value of water may not be fully integrated into water management decisions and water conservation practices. It is a question of the balance between reliability and economics. Water supply reliability is often tied to the next large water supply project; however, additional conserved water can also be considered a new water supply. While conserved water is not "new" water, it can stretch existing supplies, and depending on the conservation measures, it may be less costly than new supplies. If the value of conserved water is not understood or the cost is too high, water systems will often seek other less costly options to increase the reliability of their water supplies.

Conservation of Municipal and Industrial Water Supplies is a Critical Component of Sustainable Water Management

Conclusion: The State of Utah should continue to pursue M&I conservation throughout the State. Conserved M&I water should be used to reduce demand and stretch existing water supplies, which will reduce the need for the development of new water supply programs and indirectly increase the flow of water into the lake. In addition to changes in water rights, laws that incentivize water conservation and allow water rights holders to benefit from conserving water should be driven by consideration of the full economic implications of water management decisions and the value of water in a drainage basin or watershed. An integrated (water) resource management plan (IRP) process provides a means to evaluate the costs and value of water conservation in the context of managing a water system's entire water portfolio, achieving a community's vision for the future, and considering the true value of water. An IRP would provide decision-makers, including water users, with information on how water conservation can deliver desired outcomes with the highest return on investment; thereby, helping provide a basis for economic incentives for implementation.

Tools and Techniques	
Legal	The State of Utah has water supply requirements for M&I uses and has recommended water conservation practices and Region-specific water conservation goals for the years 2030, 2040, and 2065.
Hydrological	Various agencies already work to quantify and manage available M&I water supplies according to demands and applicable water rights.
Financial	Water systems already invest in water conservation according to their system's priorities and their understanding of the value of water to the community and downstream uses.
Technical	Water users and managers generally understand the concepts of M&I water conservation, proven water conservation practices are available, and excellent recommendations to improve M&I water conservation have been proposed. New Statewide regional water conservation goals are in place.
Political	Awareness of the need and benefits of water conservation are increasingly being understood and a part of policy discussions.
Administrative	Conservancy districts and public community water systems have water conservation plans in place.

Impacts, Barriers, and Considerations	
Legal	M&I duties and minimum sizing requirements may serve to disincentivize additional water conservation. Reducing M&I duty demand could increase the quantity of water available for conservation. M&I conservation could help increase lake levels, but only if the conserved water can be effectively shepherded to the lake in an way that does not also interfere with other vested water rights. Land use ordinances may not adequately consider the value of water.
Hydrological	As a result of existing water rights laws, M&I water conservation may not translate to increased streamflow. Climate change could impact water supply availability and reliability, thus serving as a potential driver for increased water conservation to augment existing supplies.
Financial	The value of water is often not fully incorporated into water management decisions. Water conservation will become more expensive; thus, the highest economic use of conserved water may remain in the community.
Technical	Quantifying water use and water conservation is challenging. Implementing water conservation measures can have unintended consequences if not carefully considered.
Political	Education and incentives will be required for effective and efficient investments in water conservation.
Administrative	Water conservation is generally a local endeavor. It may not be fully integrated into a community's planning and management objectives and truly reflecting the value of water.

Options for Future Action	
Legal	Change laws to shepherd conserved water to the lake or other downstream uses. Revise land use ordinances to incentivize water conservation, require installation of less water intensive landscaping, and consider rate adjustments to more fully recognize the value and cost of water to the community.
Hydrological	Evaluate the benefits and costs of water conservation in light of the value of water not just to the community but also downstream uses. Consider implementing water conservation as a means to counter the potential consequences of climate change upon the reliability of the water supply.
Financial	Offer incentives to conserve and use water more economically. Study the feasibility, benefits, and impacts of a more open water market that incentivizes water users to optimize the value, productivity, and benefits of their water.
Technical	Invest in developing, demonstrating to, and educating water users about the benefits and practice of successfully implementing water conservation practices. Improve quantification of M&I water supplies, depletions, the amounts of conserved water, and the most efficient methods for conserving water.
Political	Increase Statewide education on the benefits of water conservation and incentives for implementation.
Administrative	Work cooperatively with Utah's water districts and stakeholders.

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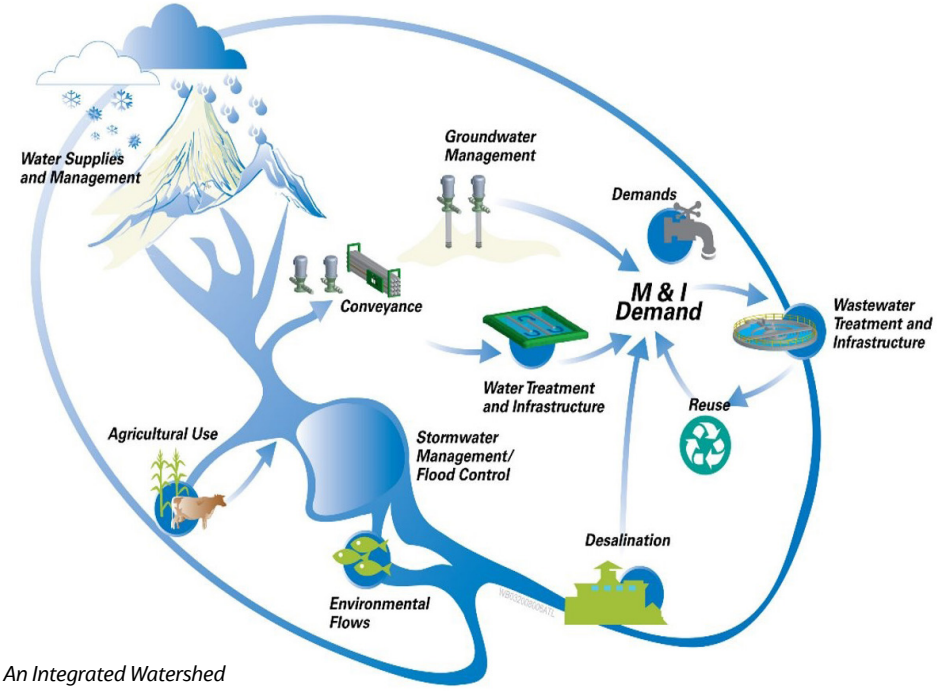
Strategy No. 6: Incorporate best management practices for water conservation at the watershed scale into policy making decisions.

The Issue: There are numerous best management practices for water conservation that have been and are being developed for and implemented by Municipal and Industrial (M&I) and agricultural water users. Many are already being implemented in Utah. The technologies used, their costs, their performance, and the value derived from their implementation vary widely depending upon the application and, perhaps most importantly, the objectives of the individual water users or managers who are implementing them within their service area.

Conservation practices can be, and have been, implemented very effectively. The value in conserving water; however, is relative. It depends upon the individual and scale in which it is implemented. It depends upon the objectives, the value of the conserved water and the direct and indirect benefits derived from conserving by those implementing the practices. The power of water conservation begins with the individual but can multiply exponentially when implemented and assessed in the aggregate. A challenge lies in understanding the value of conserving water when it is implemented at scale; a driver for change is needed. If understood, water users and managers can better understand their true area of influence and the true consequences, good and bad, from water management decisions. If understood, they and policy makers can make more informed decisions about how and where to invest limited resources to maximize the benefits, productivity, and growth that water provides to our communities.



An Integrated Watershed

Conclusion: An evidence-based policy to address watershed scale implementation of water conservation measures will require an inclusive and collaborative process to evaluate pertinent demand-side and supply side management options. An integrated approach is recommended to consider the costs, the opportunities and return on investment from water conservation at a basin or watershed scale. An integrated (water) resource management plan (IRP) not only enables water users, water managers, and policy makers to evaluate the consequences and benefits from implementation of water conservation practices at scale, but to evaluate them in the context of "one water", or the full hydrologic cycle. It enables a top to bottom and integrated approach to managing surface and groundwater supplies, M&I and agricultural uses, storm water, wastewater, and water reuse. Consideration of water conservation practices alone will not achieve that. An IRP can and should be completed to "incorporate best management practices for water conservation at the watershed scale into policy making decisions" and realize the future envisioned by our communities.

Tools and Techniques	
Legal	Existing laws allow water conservation at the watershed scale and development of an IRP. Existing strategies recommend water planning based upon IRP principles. HCR 10 encourages Utah Department of Natural Resources (UDNR) and Utah Department of Environmental Quality (UDEQ) to "engage with stakeholders to develop recommendations for policy and other solutions to ensure adequate water flows to Great Salt Lake and its wetlands". HB 166 provides a means for creation of a Great Salt Lake Watershed Council.
Hydrological	Public water systems already invest in planning for their individual systems. The Great Salt Lake Advisory Council (GSLAC) has developed an initial Great Salt Lake Integrated Model of the lake and its watershed for use in an IRP process.
Financial	Conservancy districts and public community water systems already invest in planning for their individual service areas. The GSLAC is actively seeking funding for integrated water resource management at the Great Salt Lake Watershed scale.
Technical	The GSLAC has developed an initial Great Salt Lake Integrated Model of the lake and its watershed for use in an IRP process.
Political	The GSLAC has served as an important forum to facilitate communication and collaboration among stakeholders representing users of water in the Great Salt Lake's Watershed.
Administrative	The Legislature recently funded a new Great Salt Lake Coordinator position within the UDNR to facilitate communication and collaboration among State agencies and lake stakeholders.

Impacts, Barriers, and Considerations	
Legal	No legal barriers were identified to evaluate best management practices at a watershed scale. Legal barriers for implementation of potential strategies are described in the other strategies. An IRP could help evaluate the benefits and impacts from implementing other strategies.
Hydrological	Accuracy of planning will depend upon the accuracy of available information.
Financial	The cost of a Great Salt Lake Watershed IRP could be significant.
Technical	A Great Salt Lake Watershed IRP would be complex both technically and politically.
Political	There would need to be agreement between political entities to proceed with an IRP.
Administrative	There would need to be agreement between political entities to proceed with an IRP.

Options for Future Action	
Legal	State-level support and funding will be critical to complete a comprehensive IRP that spans the Great Salt Lake Watershed.
Hydrological	Develop an IRP for the Great Salt Lake Watershed. Begin efforts to identify data needs and collaborate with partners to acquire improved data for planning efforts. A Great Salt Lake Watershed Council may be a good vehicle to bring these various stakeholders to the table.
Financial	Develop a cooperative funding effort for the IRP.
Technical	Develop an IRP for the Great Salt Lake Watershed. A broad spectrum of technical experts will be necessary for a Great Salt Lake IRP. Continue to validate and develop the Great Salt Lake Integrated Water Resources Management Model (GSLIM) for use in the IRP.
Political	Legislative support and engagement from State entities will be necessary. A new Great Salt Lake Watershed Council may be a good means of facilitating collaboration across the watershed.
Administrative	The GSLAC (or a new Great Salt Lake Watershed Council) could take the lead in developing a Great Salt Lake Watershed IRP; however, this approach will require a cooperative partnership among various governmental and private stakeholders to achieve an IRP for Great Salt Lake.

GREAT SALT LAKE ADVISORY COUNCIL

Water Strategies for Great Salt Lake

Legal Analysis and Review of Select Water Strategies for Great Salt Lake

Strategy No. 7: Expand the ability to purchase or otherwise acquire water for instream flow uses to entities other than State agencies.

Strategy No. 10: Expand State agency acquisition of water with appropriated funds, or acquisition of water rights by gift, donation, lease, or other arrangements.

The Issue: Currently, Utah law only allows the Division of Wildlife Resources (DWiR), Division of Parks and Recreation (DPR), and fishing groups to acquire rights to instream flow. The ability of fishing groups to dedicate water to instream flow is limited to habitat of certain species and other constraints.

Strategy No. 7 may require new legislation to enable other water users to participate in instream flow efforts, whereas Strategy 10 contains broad existing authority, but without adequate funding. The use of this authority has been limited to situations where donated water rights have been made available for instream flow use.

Strategy No. 7 will require building coalitions among stakeholders to generate the necessary political will to expand the universe of water users who could hold instream flow rights, as well as the filing of instream flow change applications and shepherding this water to its intended destination.

Agency stakeholders could serve in a variety of roles. For instance, DWiR and DPR personnel can share expertise for how they have handled the water right acquisition and Change Application processes. Other agencies have expertise relating to the importance of historic flow regimes to the Great Salt Lake ecosystems. Some agencies, such as the DWiR, could also be allowed to acquire water rights directly and change to instream flow under the amended statute.

Non-profit/citizen group stakeholders could serve an important role in helping to create a demand for water rights to be purchased and subsequently transferred to instream flow use. These stakeholders could also help in the drafting stage, as they would be some of the key entities given the new ability to acquire water rights. The amendments would be structured to encourage these entities to seek out water rights for purchase and strive not to make the process overly burdensome.

Acquiring water to maintain instream flow will be an important mechanism for protecting flows to Great Salt Lake

Conclusion: Strategy No. 7 will require legislation to expand the universe of stakeholders who can hold and manage water for instream flow. It will involve coordinating between multiple stakeholders in the drafting stage of any new legislation, as well as during the implementation stage when conveying water rights and filing Change Applications. Strategy No.10 would involve testing the limits of existing authority and building the political will to provide adequate funding to the agencies to enable them to effectively use their existing authority.

Tools and Techniques	
Legal	There is an existing framework and process to acquire water rights and transfer to instream flow.
Hydrological	Increasing instream flows in Great Salt Lake tributaries should augment total amount of water entering the lake over time, but only if the flows can be shepherded past intervening diverters who might otherwise divert and use water left in the stream for their own benefit. Shepherding is therefore a major factor in providing for increased flows to the lake.
Financial	Funding from State resources and conservation/advocacy organizations.
Technical	There is existing expertise available from agency personnel and researchers at Utah universities.
Political	Coalition building can create consensus regarding the expansion of who may hold instream rights.
Administrative	Currently authorized agencies can be encouraged to expand the acquisition of instream rights to support Great Salt Lake habitats.

Impacts, Barriers, and Considerations	
Legal	An individual has the present ability to purchase a water right and donate it to one of the State agencies for instream flow purposes. New authority for individuals is needed through the means of a water bank and/or utilization of split season change applications. This would allow the water of the individual donors to be used for instream flows on a temporary basis without losing title by donating the water to the State. Leasing is a possibility under current law. Fishing groups are limited in their ability to dedicate water to instream flows, and the authority that does exist is cumbersome to use and of limited application. This is due to there being no current method for them to shepherd water beyond the next point of diversion downstream.
Hydrological	Water left instream will need to be shepherded to ultimately make it to the Great Salt Lake (Strategy No. 3: Shepherding Water).
Financial	The acquisition of instream water rights requires the purchase of water rights and contracting with agencies and/or Non-Governmental Organizations (NGOs), where applicable. Funding sources will need to be identified.
Technical	Instream flow amounts will need to be quantified and shepherded through the system.
Political	There are political barriers to amending statute to allow other entities to acquire instream flow rights for expanded purposes.
Administrative	Agencies are reluctant to put the State in the middle of potential disputes among water users over access to water left in the stream for environmental purposes.

Options for Future Action	
Legal	Develop amendments that would allow other State agencies and NGOs to acquire water rights for instream flow purposes. Develop amendments to recognize other authorized reasons for changing a water right to instream flow use. Expand the authority to file instream flow change applications to private parties who wish to convert a consumptive right to a non-consumptive instream flow right on a temporary or permanent basis.
Hydrological	Shepherd the approved instream flows to ensure that they reach the lake (Strategy No. 3: Shepherding Water).
Financial	Investigate and develop potential sources of funding.
Technical	Train agency employees to assess and quantify instream flow water rights.
Political	Build coalitions to improve the validity and efficacy of instream and environmental flows.
Administrative	Facilitate and encourage water right transactions leading to instream flow transfers and public outreach and stakeholder education.

GREAT SALT LAKE ADVISORY COUNCIL

Water Strategies for Great Salt Lake

Legal Analysis and Review of Select Water Strategies for Great Salt Lake

Strategy No. 8: Increase the water use efficiency of agriculture by increased efficiency of irrigation systems leaving more surface water in the streams for possible delivery to Great Salt Lake.

The Issue: Approximately 82 percent of water use in the State of Utah is used in agricultural applications. Allowed seasonal diversion volumes for irrigation water rights are determined by the Division of Water Rights (DWRi) on the basis of the irrigation area described in the water right and the allowed irrigation duty, which varies depending upon climate conditions throughout the State. The assumed irrigation depletion for each irrigation water right is defined by the DWRi as the volume of water that is potentially consumed as evapotranspiration during beneficial use for irrigation on the basis of the most consumptive crop which can be grown on the limited acreage, usually alfalfa.

Prior Appropriation Doctrine provides that any saved or conserved water will be forfeited due to lack of use. This leads to two results: 1) users are not incentivized to conserve because they will forfeit their right to any amount of water saved; and 2) salvaged water cannot be transferred to a use elsewhere, or changed to instream use, without first showing that the same quantity of water is not relied upon by downstream users.

There is simply little to no economic incentive for agricultural water rights holders to conserve or improve efficiency in the context of downstream beneficial uses. Since water rights holders cannot benefit from the efficient use of their water, there is little incentive to make improvements and agricultural producers will continue to use older, less efficient practices.

Center Pivot Sprinkler System (top) and Center Pivot System fitted with Mobile Drip Irrigation in an Alfalfa Field (bottom)

Photo credit: Barber et al. 2020

Conclusion: : The Utah Legislature should pass legislation to allow water rights holders to maintain rights to the water they conserve (Strategy No. 1), develop methods that enable water users and water managers to accurately quantify actual water depletion and manage their water rights by depletion (Strategy No. 12), and incentivize agricultural water users to conserve (Strategy Nos. 2, 3, 7, and 10). This will allow individual agricultural water right holders to make defensible, market-driven decisions that optimize use of their water supply, maximize their water's productivity, maintain, or increase their agricultural production, and possibly result in more instream flow. Continued investment, improved flexibility and market-driven incentives will benefit the individual agricultural producer and, if implemented widely, could result in significant volumes of conserved water to benefit downstream beneficial uses.

ClydeSnow Jacobs

Tools and Techniques	
Legal	Recognizing a right to and quantifying conserved water and providing mechanisms to shepherd water are important legal tools that could be developed to incentivize agricultural water conservation.
Hydrological	An integrated water resources planning process could be used to better understand the available water supplies, water demands, optimize benefits, and minimize impacts from water use, and maximize return on investment across a basin or watershed. A Great Salt Lake Watershed Council could facilitate this process.
Financial	Investment will be needed for planning, study, and implementation. Market-driven incentives, such as the water banking and split season change applications, are important to this effort.
Technical	Existing practices and strategies can be evaluated and optimized for implementation in Utah. New criteria should be developed to help guide prioritization of available funds.
Political	Ongoing education efforts on the value of water and importance of instream flows and a healthy Great Salt Lake are critical for efficient and effective implementation.
Administrative	Leadership and coordination between stakeholders will be key in this effort.

Impacts, Barriers, and Considerations	
Legal	Utah Water Laws do not provide an incentive for agricultural water conservation.
Hydrological	There may be unintended consequences from changing irrigation practice. Climate change could reduce future supplies and negatively impact reliability.
Financial	There is little economic incentive to implement agricultural water conservation. Significant funding will be required for new infrastructure and administration of agricultural water conservation practices.
Technical	Quantification of water supplies and depleted and conserved water is critical to improving water conservation.
Political	Changing Utah Water Law will require significant political leadership and will to change the status quo.
Administrative	Coordination with all stakeholders will be the key to success for this effort.

Options for Future Action	
Legal	Recognizing a right to and quantifying conserved water and providing mechanisms to shepherd water are important legal tools that could be developed to incentivize agricultural water conservation.
Hydrological	Evaluate the effects of a changing climate on water supply, and the potential for cloud seeding to increase the available snowpack to boost water supplies.
Financial	Invest in planning efforts to improve future water management. Implement market-driven solutions to incentivize water conservation, such as, water banking and split season change applications. Provide funds for continued optimization of agricultural water management.
Technical	Invest in tools to improve the State's planning capabilities
Political	Invest in educational activities to increase awareness of the benefits of a healthy Great Salt Lake.
Administrative	Improve coordination between stakeholders to increase the likelihood of success.

GREAT SALT LAKE ADVISORY COUNCIL

Water Strategies for Great Salt Lake

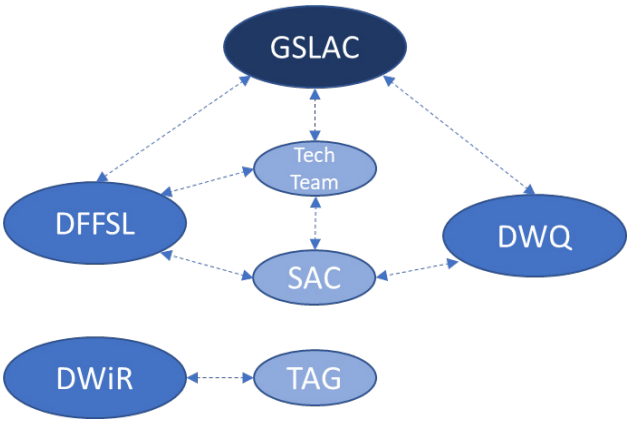
Legal Analysis and Review of Select Water Strategies for Great Salt Lake

Strategy No. 9: Improve coordination between State agencies that have the authority to make decisions affecting Great Salt Lake.

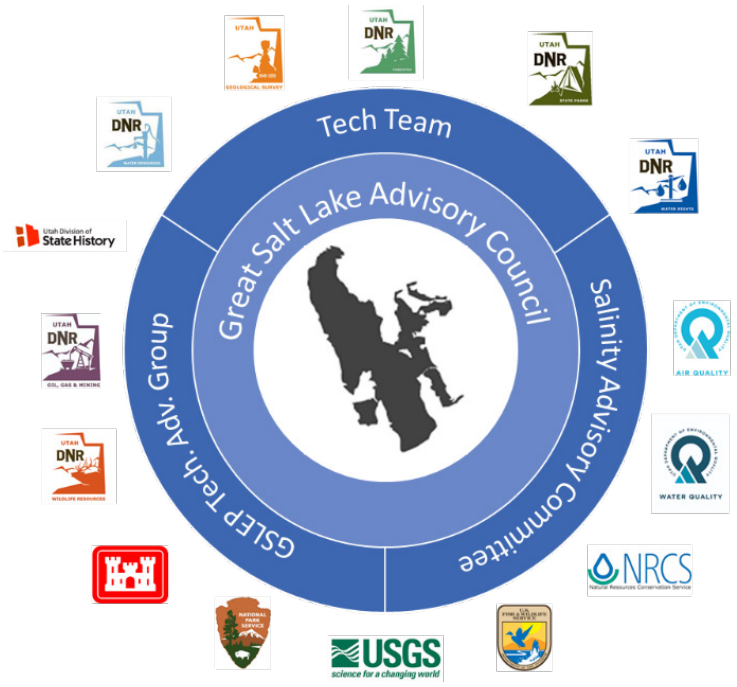
The Issue: A challenge in the State's mission to manage and protect the resources and uses of Great Salt Lake is coordinating the mandates, efforts and investments of numerous State and Federal agencies whose mission it is to do so. Organizational structures are often complicated, but they must consistently align with their core mission; ambiguity, inefficiencies, and contradictions can result if they do not.

Fostering collaborative efforts among the agencies that are responsive to the needs and interests of the lake's stakeholders adds further complexity to the efforts of each individual agency, but even more so for the agencies in aggregate. Integrating the agencies' mission for Great Salt Lake with the mandates, needs, and decisions made by the myriad of agencies and stakeholders within the lake's watershed further compounds the challenges to serve this mission.

Improved leadership and coordination between agencies and improved legal or regulatory mechanisms that facilitate agencies to work directly with others could improve decision-making, capitalize upon opportunities, and help to better protect the lake's resources.



Interactions and Great Salt Lake Centric Groups are Illustrated



Conclusion: The existing organizational structure is already facilitating coordination among State and Federal agencies; in fact, it has improved significantly even in the last 5 to 10 years. However, there is only a recently emerging policy to support the health of Great Salt Lake and efforts are still impeded by a fragmented regulatory regime and a lack of funding to advance this new policy. Existing organizational structure should be evaluated and amended to better align the mandates, efforts, and investments of agencies with the State's policy for Great Salt Lake. The GSLAC should capitalize upon opportunities to collaborate among State agencies. The formation of a new Great Salt Lake Watershed Council to work in concert with the GSLAC could be an effective means of connecting a broader stakeholder group, including major water diverters from tributary sources, with the numerous other stakeholders within the lake's watershed.

Tools and Techniques	
Legal	There are numerous agencies with individual mandates for managing and protecting various resources and uses of Great Salt Lake.
Hydrological	The GSLAC and State agencies have recently begun integrating the hydrology of the various basins of Great Salt Lake's Watershed with the lake to understand the effects of multi-jurisdictional water management decisions.
Financial	Ongoing Great Salt Lake research and management activities are funded via numerous, disparate sources. Funding is generally inadequate in meeting the needs.
Technical	There is significant interest in understanding the complexity of Great Salt Lake. Existing groups harness available expertise to identify, oversee, and complete technical studies.
Political	HCR 10 (2019) provides a driver to maintain Great Salt Lake. There are numerous existing efforts to communicate the challenges and risks that Great Salt Lake faces with the greater water community and State of Utah.
Administrative	Various groups and a new Great Salt Lake Coordinator currently serve to coordinate the efforts of State and Federal agencies. The Great Salt Lake Comprehensive Management Plan provides guidance to agencies and stakeholders.

Impacts, Barriers, and Considerations	
Legal	State and federal agencies often have different mandates and conflicting goals when it comes to Great Salt Lake. Continued efforts are required to collaborate among agencies to achieve common goals of improving and preserving the health of the lake, its ecosystem, its economic contribution to the State, and improving overall public health. Otherwise, agency mandates may result in conflicting outcomes.
Hydrological	Natural drainage features, political boundaries, and service areas have naturally resulted in segregated water resource management efforts across the watershed and with Great Salt Lake.
Financial	The costs of needed research, monitoring, and planning efforts exceed available funds.
Technical	A fragmented regulatory regime can lead to ambiguity, inefficiencies, contradictions, and inadvertently contribute to and even exacerbate some challenges in protecting the lake.
Political	Existing water rights and water management practice have impeded connectivity of water users in the watershed to Great Salt Lake. Separate collaborative efforts at Great Salt Lake and within individual drainage basins and water service areas serve as a successful model going forward.
Administrative	HCR 10 has provided new clarity to agencies protecting and managing Great Salt Lake. Connectivity between organizations representing Great Salt Lake and those from its watershed is lacking. The existing organizational structure can be challenging, but these challenges may be overcome by creating a collaborative process that invites and encourages cooperation and fosters communication among the agencies to achieve common goals.

Options for Future Action	
Legal	Assess and amend the existing organizational structure to ensure alignment with State policy for Great Salt Lake. Amend regulations to authorize/encourage collaboration among agencies with regard to decisions affecting the Great Salt Lake.
Hydrological	Improve collaboration with water users and managers within the watershed to integrate water resources management across basin boundaries, capitalize upon opportunities that provide mutual benefit and better achieve cross-basin objectives.
Financial	Funding for managing Great Salt Lake and its watershed should be commensurate to the opportunities that could be realized and the potential risks that must be managed and mitigated.
Technical	An integrated water resources plan should be developed for the Great Salt Lake Watershed to facilitate an inclusive and collaborative process for ensuring adequate water flows to Great Salt Lake.
Political	The GSLAC should investigate if formation of a Great Salt Lake Watershed Council is warranted to facilitate coordination and implementation of State policy among a wide group of stakeholders that would include the GSLAC, major water diverters, and those with environmental and economic interests to help frame water policy affecting the lake. The State should assess the stakeholders within the lake's watershed and develop a plan to improve their connectivity to the lake.
Administrative	Fully cooperate with the Great Salt Lake Coordinator to capitalize upon the benefits the role can provide. Leverage the GSLAC's existing influence and relationships to institute systemic changes that encourage agencies to collaborate more often when making decisions that affect Great Salt Lake ecosystems.

GREAT SALT LAKE ADVISORY COUNCIL

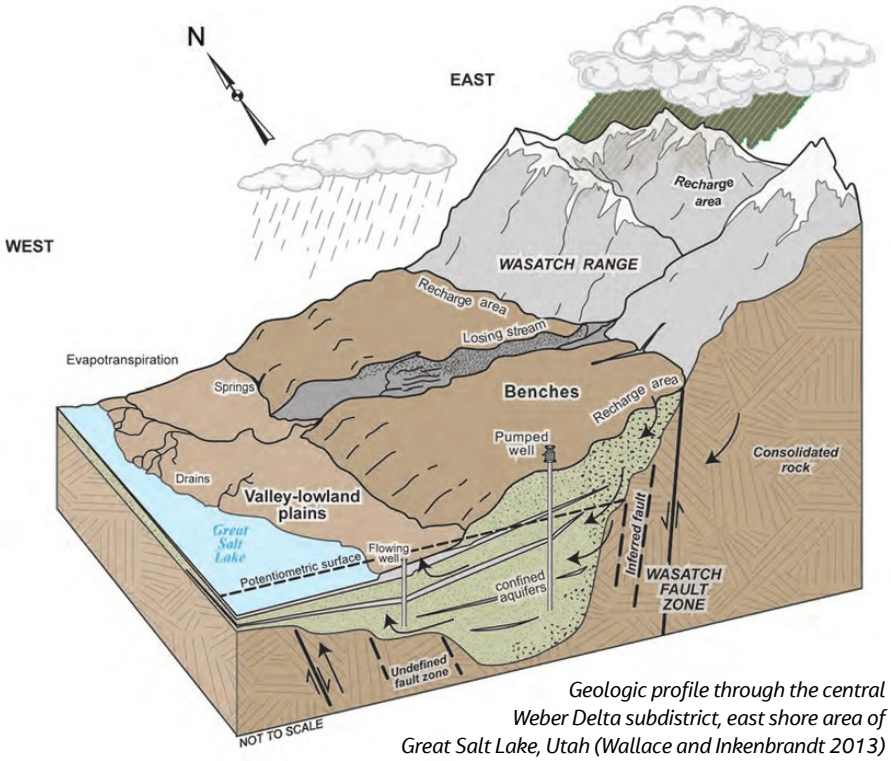
Water Strategies for Great Salt Lake

Legal Analysis and Review of Select Water Strategies for Great Salt Lake

Strategy No. 11: Protect groundwater levels beneath the Great Salt Lake and the broader Great Salt Lake basin from pumping that can affect surface hydrology.

The Issue: Groundwater contributions from Great Salt Lake's watershed are an important component of the lake's water balance and a variable influencing lake water levels. Lake water levels are in turn an important variable influencing groundwater levels and quality adjacent to the lake. As such, this strategy addresses potential methods and approaches to ensure that groundwater levels in and around Great Salt Lake are protected and sustained. This is a wide-reaching strategy and will require participation from nearly all the stakeholders surrounding the lake in order to achieve cognizable benefits. However, there are also options to target individual basins and isolated aquifers, if any exist, that will ensure groundwater withdrawals are sustainable.

Utah has several mechanisms for addressing groundwater levels and ensuring that withdrawals do not exceed the inflow. The maximum amount of water that can be withdrawn without reducing water levels is called the safe yield. The safe yield is calculated by creating a water budget which determines the current quantity of water withdrawn from the aquifer (withdrawals) and also the amount of water that flows into the aquifer (the recharge rate). The goal is to limit withdrawals to a level that is below the recharge rate. However, in many instances the rate of withdrawal often exceeds the rate of recharge. In such cases the aquifer is being "mined" and existing withdrawals are unsustainable.



Geologic profile through the central Weber Delta subdistrict, east shore area of Great Salt Lake, Utah (Wallace and Inkenbrandt 2013)

Conclusion: Protecting groundwater inflows to Great Salt Lake not only helps maintain lake water levels but also helps maintain existing groundwater rights (both quantity and quality) for water users adjacent to Great Salt Lake. Protection of groundwater levels surrounding the Great Salt Lake, either through existing Prior Appropriation tools or through the adoption of a groundwater management plan (GMP), will ensure stable rates of groundwater infiltration into and groundwater levels adjacent to the lake.

Likewise, ensuring that surrounding groundwater basins are limited to safe yields will also improve surface water sources. The net effect of this effort is that lake levels will be maintained, and groundwater contributions or users will not be impaired or irreparably damaged.

Tools and Techniques	
Legal	A GMP may be adopted to limit withdrawals from aquifers surrounding the lake to safe yields.
Hydrological	Limiting groundwater withdrawals to less than the recharge rate creates a safe yield.
Financial	This strategy may require additional Division of Water Rights (DWRi) personnel to administer, such as a Great Salt Lake Commissioner.
Technical	Additional basin-wide groundwater studies are required to determine safe yields.
Political	The municipalities surrounding the lake will need to coordinate and cooperate on groundwater withdrawals.
Administrative	The lake is surrounded by several water right administrative areas, which will need to coordinate and cooperate regarding administration of the lake and groundwater levels.

Impacts, Barriers, and Considerations	
Legal	The current framework is already in place to adopt a GMP, but substantial outreach will be required to achieve consensus.
Hydrological	A study of the interactions of groundwater basins within the watershed and Great Salt Lake is needed to understand potential consequences and benefits from different management decisions. The groundwater users surrounding the lake will need to understand that a GMP may result in decreased diversions under certain circumstances and conditions.
Financial	A holistic study of groundwater impacts on the lake is necessary to ascertain a safe yield and understand potential consequences of decisions. This will require funding to conduct.
Technical	A holistic groundwater study will need to be done to incorporate all relevant information into a comprehensive document. The contribution of groundwater to Great Salt Lake is still not fully understood.
Political	Outreach to adjacent municipalities and groundwater users is necessary to obtain buy-in.
Administrative	Coordination among differing administrative areas may be difficult to achieve due to varying water needs and development goals.

Options for Future Action	
Legal	Expansion of the current GMP mechanism to accommodate lake-specific goals and needs.
Hydrological	Need to better characterize groundwater interactions across the watershed and with Great Salt Lake to better understand the consequences and benefits of integrating groundwater management among basins and the lake. Establish minimum lake levels to be achieved through a combination of strategies.
Financial	Funding of groundwater studies and the position of a Great Salt Lake Commissioner.
Technical	A holistic groundwater and water resource study on impacts to lake levels.
Political	Public hearings and open houses to present and explain the GMP concept.
Administrative	Facilitate discussions with DWRi to foster communication and coordination among water right administrative areas and enforcement capabilities and development of a Great Salt Lake GMP.

GREAT SALT LAKE ADVISORY COUNCIL

Water Strategies for Great Salt Lake

Legal Analysis and Review of Select Water Strategies for Great Salt Lake

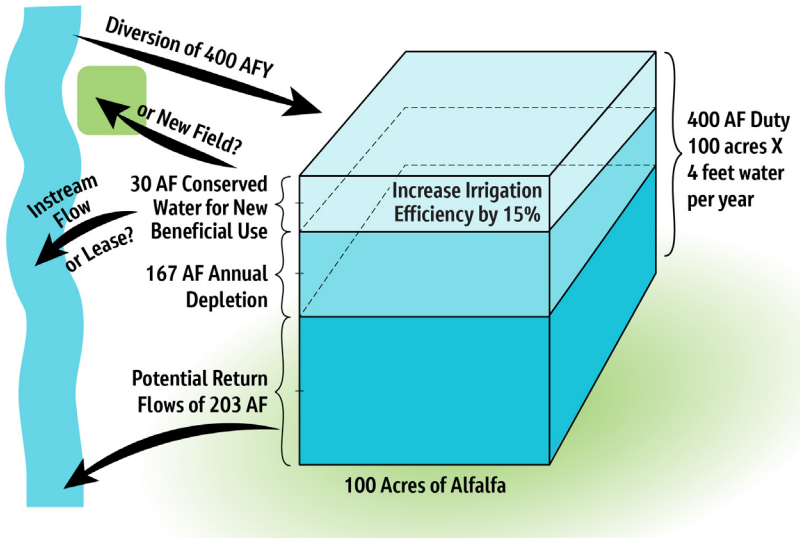
Strategy No. 12: Determine consumptive-use coefficients, such as evaporation and transpiration, for various water applications to improve efficiency by returning water back into the hydrologic cycle, which could result in more water reaching Great Salt Lake.

The Issue: Once a legal right to conserved water is recognized under Utah law, it is next necessary to quantify how much water is available to dedicate to the conserved right. Recognizing the extent of a conserved water right requires both technical and legal analysis. The determination and use of consumptive-use coefficients gets at the heart of quantifying the actual amount of water depleted, thus defining the scope of a conserved water right.

A technical analysis is needed to determine the actual amount of water a beneficial use depletes from the water system. This is often called a depletion analysis. An accurate depletion analysis considers a number of factors. Evolving technologies are allowing water users to collect useful data faster and less expensively.

A legal analysis establishes the amount of water legally available to allocate to a conserved water right. This includes assessing the legal limits of the existing right (duty) against the results of the depletion analysis. A legal analysis may further limit or condition the amount of conserved water recognized to protect other water users from impairment or implement public policy priorities.

Sister States use an administrative process similar to Utah's Change Application proceedings to collect and review a depletion analysis, determine the amount of water available for a conserved water right, conduct an impairment analysis, and set any conditions for use.



In Practice: *If Farmer Joe were to improve the efficiency of his irrigation practices on this field by 15 percent, he has the potential of conserving 30 AF per year. Depletion accounting would be needed to document the actual depletion of applied water and the volume of conserved water available for a different beneficial use. If Farmer Joe had a right to this conserved water (via Strategy No. 1: Recognizing a Right to Conserved Water), the conserved water could then potentially be used for irrigation on additional land (via Change Application), for instream use, or potential lease to downstream water users (via Strategy No. 2: Split Season Leasing and Strategy No. 3: Shepherding Water).*

Conclusion: If a right to conserved water is recognized under law, quantifying the amount of water available to dedicate to a conserved water right will require a nuanced legal and technical analysis. Depletion accounting is essentially the technical mechanism needed to quantify efficiencies, better manage water supplies and to allocate a right to conserved water.

Based on how sister States have approached the matter, Utah's Change Application process may be an efficient, already-existing forum to quantify and condition Utah conserved water rights.

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Tools and Techniques	
Legal	An impairment analysis is typically conducted to determine whether the recognition of a Change Application (such as, a conserved water right) will impair other water rights, and if so, can the impairment be reasonably mitigated to allow the use of conserved water to occur.
Hydrological	See Technical tools below in this table.
Financial	A functioning and active water market will help incentivize the creation and use of conserved rights and should be studied and piloted. Publicly funded efforts may be needed to conduct the necessary experiments to determine what efforts best fit Utah's unique needs.
Technical	Improving the assessment of depletion amounts will require quantifying the actual amount of water depleted by the beneficial use compared with the duty value authorized for the use. Utah is currently validating recommended ground-based and remote sensing methods for agricultural depletion accounting in Utah.
Political	The quantification of conserved water can be a means to enact State water policy goals, such as dedicating a portion of conserved water rights to instream flow uses like Oregon.
Administrative	Administrative processes are often used to quantify the amount of water available to allocate toward a conserved water right. An administrative process is also where State agencies can condition the use of water to ensure water is used within approved limitations.

Impacts, Barriers, and Considerations	
Legal	Downstream water users have vested rights to the continued receipt of return flows from upstream water users. The loss of returns flows constitutes interference and may be enjoined if it cannot be mitigated.
Hydrological	Optimization of agricultural water use through depletion accounting could, in some instances, increase actual depletion in the system and reduce return flows to the system.
Financial	Funding is needed to better understand actual depletion throughout Utah, develop and implement methods for depletion accounting, and create market drivers that incentivize implementation of agricultural water conservation practices. May need to provide funding to downstream water users adapting to less available flow.
Technical	There is currently a lack of information on depletions that would enable the State to accurately measure and track depletions versus the existing duty.
Political	Utah water users have not agreed on acceptable depletion accounting methodologies.
Administrative	Quantifying a conserved water right is going to require significant State Engineer resources.

Options for Future Action	
Hydrological	Develop methods to quantify, report, and validate actual depletion.
Financial	Consider means to fund further development and implementation of depletion accounting methods. Link subsidies to optimization of water use via new selection criteria to improve agricultural production and participation in means to augment surface water supplies for downstream uses.
Technical	Improve quantification of meteorology, groundwater and surface water conditions, diversions, and actual water depletions. Validate recommended depletion accounting methods through implementation of a robust case study in Utah.
Political	Capitalize on existing momentum to move to depletion-based water right, like the efforts of the Legislative Agricultural Water Optimization Task Force.
Administrative	Provide funding and guidance to the Utah State Engineer in how to administer the Change Application process to account for a conserved water right.