Montana's 2015 State Water Plan

A watershed approach for meeting current demands & the needs of future generations

1 Water Supply and Demand

⇦ TOPICS ⇨

CRITICAL ⇦ ISSUES ⇨

- 1.1 Support Water Use Efficiency & Water Conservation
- 1.2 Improve & Expand Efforts to Quantify Surface Water Supplies & Availability
- 1.3 Increase Flexibility to Manage Available Water Supplies Through Storage & Rehabilitation of Existing Infrastructure
- 1.4 Integrate Natural Storage to Benefit Water Supplies & Ecosystems
- 1.5 Support & Expand Existing Drought Preparedness & Planning Efforts

RECOMMENDED ⇦ ACTIONS ⇨

1.1 Support Water Use Effiency & Water Conservation
- Quantify the effects associated with changes in irrigation methodologies.
- Assist landowners with controlling discharge from uncontrolled flowing wells.
- Support research on innovative water management & conservation strategies.
- Analyze the water right implications & lessons learned from the land application of treated municipal wastewater.
- Support implementation of water conservation incentives & measures that are adaptable to local conditions.
- Encourage the development of community wells as an alternative to individual wells.

1.2 Improve & Expand Efforts to Quantify Surface Water Supplies & Availability
- Conduct a basin-wide physical water availability assessment in the Upper Missouri Basin.
- Build on lessons learned to conduct physical water availability assessments in other basins.
- Identify & evaluate the opportunities & challenges that will influence water supply & demand over the next 20 years.

1.3 Increase Flexibility to Manage Available Water Supplies Through Storage & Rehabilitation of Existing Infrastructure
- Evaluate the policies governing the operation of state & federal reservoirs.
- Explore opportunities to increase the storage capacity of existing state & federal reservoirs.
- Explore the opportunities & challenges of securing contract water from federal storage projects.
- Provide cost-share funding for upgrading & rehabilitating existing water conveyance infrastructure.
- Develop public-private partnerships & innovative funding strategies for storage projects.
- Identify basins where high spring flows are physically & legally available for storage.
- Provide cost-share funding for developing additional water storage infrastructure.

1.4 Integrate Natural Storage to Benefit Water Supplies & Ecosystems
- Explore the water right implications of integrating natural storage & artificial aquifer recharge into Montana's water use administration.
- Develop a pilot project to quantify the benefits of natural storage.
- Investigate the feasibility of using the natural storage capacity of wetlands, riparian areas, or floodplains to enhance water management.
- Investigate the feasibility & potential for using aquifer storage & recovery tools to meet local water needs.

1.5 Support & Expand Existing Drought Preparedness & Planning Efforts
- Support the development of drought management plans in small to medium size watersheds.
- Assess potential threats to the state's water supply & economy resulting from extended periods of drought & increased climate variability.
- Support research in drought monitoring & forecasting.
- Conduct climate risk assessments for each of Montana's water planning basins.

2 Water Use Administration

- 2.1 Complete an Accurate & Enforceable Water Rights Adjudication
- 2.2 Enforce Against Illegal Water Use
- 2.3 Provide Sufficient Information, Legal & Administrative Capacity to Minimize Adverse Effects During Times of Water Scarcity
- 2.4 Analyze Additional Opportunities & Challenges for Using Water Marketing, Mitigation, & Banking as Tools for Meeting New Demands
- 2.5 Complete all Outstanding Tribal & Federal Compacts & Work Closely with Federal Partners to Better Manage Federal Water Projects

2.1 Complete an Accurate & Enforceable Water Rights Adjudication
- Continue funding of both the Water Court & the DNRC efforts to complete the current adjudication process.
- Evaluate & develop processes to ensure water rights are accurately & consistently defined across Montana.
- Create a plan for post adjudication of water distribution, management, & enforcement roles.

2.2 Enforce Against Illegal Water Use
- Improve current administrative process for bringing enforcement action against illegal water use.
- Support a water rights dispute mediation unit to provide an administrative alternative to traditional water rights litigation.
- Improve the efficiency of establishing water distribution projects based upon Water Court decrees.
- Promote consistent legal & professional measurement & distribution of water under decree.
- Clarify how decrees within subbasins will be administered when a water rights dispute arises between water users in adjacent basins.

2.3 Provide Sufficient Information, & Legal & Administrative Capacity to Minimize Adverse Effects During Times of Water Scarcity
- Provide legal & administrative mechanisms that enable water users to reduce water use without the risk of abandonment.
- Assess the water right implications & potential adverse effects of allowing a water right holder to change their period of use.

2.4 Analyze Additional Opportunities & Challenges for Using Water Marketing, Mitigation, & Banking as Tools for Meeting New Demands
- Assess the opportunities, & challenges of using water marketing, mitigation, & banking as tools for meeting new demands.
- Create well-managed systems that offer economic development opportunities to market, transfer & lease water.

2.5 Complete all Outstanding Tribal & Federal Compacts & Work Closely with Federal Partners to Better Manage Federal Water Projects
- Continue to support & implement all adopted reserved water right compacts.
- Remain actively engaged with adjacent states & Canada to protect Montana's interest through the implementation of treaties & compacts.

3 Water Information

- 3.1 Support Improvements to the Montana Water Information System
- 3.2 Inventory of Consumptive & Non-Cosumptive Uses
- 3.3 Monitor Water Supply & Distribution
- 3.4 Improve & Expand Efforts to Quantify Groundwater Supplies & Availability
- 3.5 Improve Conjunctive Management of Surface Water & Groundwater

⇦ TOPICS ⇨

CRITICAL ⇦ ISSUES ⇨

RECOMMENDED ⇦ ACTIONS ⇨

3.1 Support Improvements to the Montana Water Information System

- Provide the State Library with resources to develop new water related data sets, interactive applications, & maps.
- Update the Montana Spatial Data Infrastructure (MSDI) Hydrography Framework
- Develop a process for transmitting water data generated by local, state & federal agencies, & watershed groups to the State Library.
- Work with the U.S.G.S.on the development of StreamStats.
- Improve the spatial representation of points of diversion (PODs) & places of use (POUs) associated with water rights.

3.2 Inventory of Consumptive & Non-Consumptive Uses

- Acquire the best information available on current consumptive & non-consumptive water use in Montana.
- Develop the capability to calculate consumptive use (ET) using available information generated from NASA's Landsat Program.
- Explore the development of standard practices for evaluating consumptive use (ET) from analysis of Landsat imagery.
- Provide technical assistance & incentives to water users to measure water at or near the point of diversion.

3.3 Monitor Water Supply & Distribution

- Expand the funding base for the USGS Co-Op Program beyond traditional state & federal agency partners.
- Develop a network of 100 state operated real-time stream gages on smaller streams & tributaries not monitored by the USGS.
- Support expanded collection snowpack & soil moisture condition data.

3.4 Improve & Expand Efforts to Quantify Groundwater Supplies & Availability

- Reassess the criteria used in selecting studies conducted under MBMG's Groundwater Assessment & Groundwater Investigation Programs
- Provide funding to MBMG's Groundwater Characterization Program (GWCP).
- Provide funding to expand MBMG's Groundwater Monitoring Program.

3.5 Improve Conjunctive Management of Surface Water & Groundwater

- Support funding for the MBMG's Groundwater Investigation Program.
- Identify options for mitigation or aquifer recharge plans to offset impacts of groundwater use on surface water.
- Investigate the availability & the potential for the diversion of high spring surface water flows for aquifer recharge.
- Investigate the design of aquifer storage & recovery projects to optimize water use while protecting existing water users.

4 Ecological Health & Environment

- 4.1 Provide Sufficient Protection for Instream Flows Within the Prior Appropiation Framework to Maintain Aquatic & Riparian Systems
- 4.2 Support Proactive, Coordinated Efforts to Reduce Invasive Species & Protect Endangered Species in Montana

4.1 Provide Sufficient Protection for Instream Flows Within the Prior Appropriation Framework to Maintain Aquatic and Riparian Systems

- Ensure the change process for instream flow/fishery water rights is consistent with the change process for all other beneficial uses.
- Recognize & document the importance of connectivity within stream and riparian systems.
- Support research to determine the hydrological conditions needed to maintain the natural ecological functions of Montana's rivers & streams.

4.2 Support Proactive, Coordinated Efforts to Reduce Invasive Species & Protect Endangered Species in Montana

- Promote voluntary programs that preserve the flexibility of landowners into Endangered Species Act protection & recovery programs.
- Support local & agency coordination efforts to implement invasive species protection programs.

5 Collaborative Water Planning & Coordination

- 5.1 Expand Support for Basin & Community Based Watershed Planning
- 5.2 Encourage Collaboration, Coordination, & Communication across Local, State, Federal & Tribal Governments
- 5.3 Develop a Plan to Deliver Water Related Training, Education & Outreach

5.1 Expand Support for Basin & Community Based Watershed Planning

- Provide funding to convene the Basin Advisory Councils to evaluate, update & implement the recommendations adopted in the State Water Plan.
- Provide funds to support local efforts to implement state & basin plan recommendations.
- Build on the work of the statewide organizations such as the Montana Association of Conservation Districts & the Montana Watershed Coordination Council to local natural resource planning.

5.2 Encourage Collaboration, Coordination, & Communication across Local, State, Federal & Tribal Governments

- Improve interaction and communication between water users, watershed groups, technical specialists, & policy makers at all levels of government.
- Encourage land management agencies to include potential impacts to water supplies in their management decisions.

5.3 Develop a Plan to Deliver Water Related Training, Education & Outreach

- Expand on current efforts to create & deliver public awareness and training programs.
- Develop an easily navigable webpage or portal that provides up to date information on Montana's water resources.

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Date: March 16, 2022

To: Montana Water Policy Interim Committee

From: Paul Azevedo, Bureau Chief
Water Management Bureau, Department of Natural Resources & Conservation

Subject: 2022 Update on State Water Plan Implementation Activities

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The 2015 Montana State Water Plan contains sixty-eight recommendations intended to guide Montana water policy and management over the near, intermediate, and long-term. These recommendations were developed from input provided by four regional river basin councils, private individuals, and local, state, tribal, and federal resource managers. This document summarizes State Water Plan implementation activities as of January 2022.

Recommendations: Progress Snapshot

- ✓ 6 – Completed
- ✓ 55 – Initiated or soon to be initiated
- ✓ 7 – No activity

The sixty-eight recommendations are divided into the following five topic headings.

1. Water Supply and Demand,
2. Water Use Administration,
3. Water Information,
4. Ecological Health and Environment, and
5. Collaborative Water Planning and Coordination.

Under each topic heading are tables labeled with the critical issues identified during the planning process and the recommended actions to address the issue. The recommendations are roughly prioritized into short, intermediate, and long-term timeframes. These timeframes refer to the elapsed time after 2015 when work should be initiated on the recommendation.

Each table also includes a reference to one, or more, of the seven Key Challenges identified by stakeholders participating in DNRC's current Comprehensive Review of Water Administration and Management. Going forward, the Comprehensive Review will provide a strategic framework for implementing recommendations found in the State Water Plan. The Notes column of each table provides in-depth information on implementation of activities to-date.

All recommendations contained in the State Water Plan are subject to the existing institutional and legal framework for water use in Montana as provided for by the Montana Constitution, prior appropriation doctrine, and Montana Water Use Act. Full implementation of some recommendations may require the Legislature to amend the Montana Water Use Act.

1.0 Water Supply and Demand

Water supply across Montana is controlled by the variability in seasonal temperature and precipitation. As a result, coping with supply and demand imbalances is a constant feature of water management in Montana.

1.1 Support Water Use Efficiency and Water Conservation

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Support both site-specific investigations and long-term monitoring studies to quantify the effects associated with changes in irrigation methodologies and improvements to water distribution systems. b) Support state and federal programs that assist landowners with controlling discharge from uncontrolled flowing wells.		No activities as of January 2022. Initiated. See Note 1.
Intermediate-term 2-6 Years a) Support the efforts of State agencies, universities, and others to identify and pursue research on innovative water management and conservation strategies that are tailored to local needs and conditions. b) DNRC will analyze the water right implications and lessons learned from the land application of treated municipal wastewater.		In Progress. See Note 2. No activities as of January 2022.
Long-term 6-10 Years a) Support the implementation of water conservation incentives and measures that are adaptable to the needs of local conditions, individual watersheds and municipalities. b) The State of Montana should offer incentives that encourage the development of community wells as an alternative to individual wells for domestic water supplies.	#3-Changes, Mitigation & Exceptions & #4-Drought Management #3-Changes, Mitigation & Exceptions	See Note 3 for related work.

1.2 Improve and Expand Efforts to Quantify Surface Water Supplies and Availability

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) DNRC will work with local water users and other government agencies to conduct a basin-wide physical water availability and water management assessment in the Upper Missouri Basin.		Completed. See Note 4
Intermediate-term 2-6 Years a) Build upon the lessons learned from the Upper Missouri Basin water availability and water management assessment to conduct similar studies in other basins. b) Invest in the capacity to identify and evaluate the opportunities and challenges posed by large scale forces that will influence water supply and demand over the next twenty years.		In Progress. See Note 5 Ongoing. See Note 6

1.3 Increase Flexibility to Manage Available Water Supplies Through Storage and Rehabilitation of Existing Infrastructure

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Work with state and federal reservoir operators to evaluate policies and purposes that consider multiple benefits and provide additional water to meet other beneficial uses if water is legally available and without jeopardizing the original authorized use of the reservoir. b) Explore opportunities to increase the storage capacity of existing state and federal reservoirs where feasible and modify infrastructure to enable more efficient operations. c) Explore the opportunities and challenges of securing contract water from federal projects such as Hungry Horse, Canyon Ferry, Tiber, Clark Canyon and Yellowtail Reservoirs to provide water for mitigating the effects of new appropriations. d) Work with the Legislature to make funding available to share in the cost of upgrading and rehabilitating existing water conveyance infrastructure. The state will work with willing stakeholders to develop public-private partnerships and innovative funding	#3-Changes, Mitigation & Exceptions & #4-Drought Management #3-Changes, Mitigation & Exceptions & #4-Drought Management #3-Changes, Mitigation & Exceptions & #4-Drought Management #3-Changes, Mitigation & Exceptions & #4-Drought Management	See Note 7 for related work.

Recommendations	Comprehensive Water Review Key Challenges	Notes
strategies for projects that cannot be completed within the state's current funding programs. e) Work with willing stakeholders to identify basins where high spring flows are physically and legally available for storage.	#3-Changes, Mitigation & Exceptions & #4-Drought Management	
Long-term 6-10 Years *a)* Work with the Legislature to make funding available to share in the cost of developing additional water storage infrastructure. The state will work with willing stakeholders to develop public-private partnerships and innovative funding strategies for projects that cannot be completed within the state's current funding programs	#3-Changes, Mitigation & Exceptions & #4-Drought Management	See Note 8 for related work.

1.4 Integrate Natural Storage to Benefit Water Supplies and Ecosystems

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) DNRC will explore the water right implications of integrating natural storage and artificial aquifer recharge into Montana's water use administration.		Completed. See Note 9
b) DNRC will work with stakeholders to identify and develop at least one pilot project to quantify the capacity and explore the water right implications of using natural storage to enhance water supplies in smaller watersheds.		Completed. See Note 10
Intermediate-term 2-6 Years a) DNRC will work with stakeholders to investigate the feasibility, cost effectiveness, and water right implications of using the natural storage capacity of wetlands, riparian areas, or floodplains to enhance water management in a smaller watershed.	#3-Changes, Mitigation & Exceptions.	See Note 11 for related work.
b) DNRC will work with stakeholders and the Montana Bureau of Mines and Geology to investigate the feasibility and potential for using aquifer storage and recovery tools to meet local water needs.	#3-Changes, Mitigation & Exceptions.	

1.5 Support and Expand Existing Drought Preparedness and Planning Efforts

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Support the development of drought management plans in small to medium size watersheds.	#4-Drought Management	See Note 12 for related work.
b) Assess potential threats to the state's water supply and economy resulting from extended periods of drought and increased climate variability by partnering with appropriate state and federal agencies to conduct one climate risk assessment pilot study in one of the four planning basins.	#4-Drought Management	See Note 13 for related work.
Intermediate-term 2-6 Years a) Support University and college programs, including the Montana Climate Office, involvement in drought monitoring and forecasting in order to increase the lead-time for Montana water users and managers to prepare for times of water scarcity.	#4-Drought Management	See Note 14 for related work.
b) Build upon the lessons learned from the climate risk assessment pilot study identified above and conduct similar studies in the remaining basins.		No activity as of January 2022

2.0 Water Use Administration

An accurate understanding of water use is critical to Montana's ability to protect existing water rights while meeting new demands through the water right change process or new appropriations of surface water and groundwater.

The existence of unused and overstated claims in the DNRC water rights database may hinder new development in some basins by making water legally unavailable for use. In some cases, a water right may remain unused for a period of time due to economic forces. In other cases, an appropriator may have filed a water right, but later abandoned their plans to put the water to a beneficial use. Water right administration needs to reflect actual demands and supply on specific sources.

2.1 Complete an Accurate and Enforceable Water Rights Adjudication

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Continue funding of both the Water Court and the DNRC efforts to complete the current adjudication process at the necessary level of staffing to meet legislatively established benchmarks.		Initiated. See Note 15
Intermediate-term 2-6 Years a) The DNRC and the Water Court should work with stakeholders to evaluate and develop processes to ensure water rights are accurately and consistently defined across Montana.	#1-Final Decree Transition	See Note 16 for related work.
Long-term 6-10 Years a) Create a plan for transitioning the state, including the DNRC, the Water Court, and the District Courts, to post adjudication water distribution, management, and enforcement roles.	#1-Final Decree Transition	See Note 17 for related work.

2.2 Enforce Against Illegal Water Use

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Examine and recommend changes to improve the current administrative process for bringing enforcement action against illegal water use.	#1-Final Decree Transition & #3-Changes, Mitigation & Exemptions.	
b) DNRC and the Water Court should create, and the Legislature should actively fund a water rights dispute mediation unit to provide an administrative alternative to traditional water rights litigation. Training in dispute resolution and mediation should be available to all water commissioners.	#1-Final Decree Transition & #3-Changes, Mitigation & Exemptions.	See Note 18 for related work.
c) Review the procedures for establishing water distribution projects based upon Water Court decrees to improve the efficiency of that process.	#1-Final Decree Transition & #3-Changes, Mitigation & Exemptions.	See Note 19 for related work.

Recommendations	Comprehensive Water Review Key Challenges	Notes
d) Promote consistent legal and professional measurement and distribution of water under decree by requiring commissioners to complete the DNRC training (MCA 85-5-111) and create a certification process with annual renewals.	#3-Changes, Mitigation & Exemptions.	See Note 20 for related work.
Long-term 6-10 Years a) Clarify how decrees within subbasins of major adjudicated basins will be administered when a water rights dispute arises between water users in adjacent basins	#1-Final Decree Transition & #3-Changes, Mitigation & Exemptions.	See Note 21 for related work.

2.3 Provide Sufficient Information, and Legal and Administrative Capacity to Minimize Adverse Effects during Times of Water Scarcity

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Drought planning efforts must include legal and administrative mechanisms that enable water users to reduce water use without the risk of abandonment and allow for the water savings to be protected.	#4-Drought Management	
b) Assess the water right implications and potential adverse effects of allowing a water right holder to change their period of use to adapt to changing runoff and growing seasons.	#3-Changes, Mitigation, & Exemptions & #4-Drought Management.	See Note 22 for related work.

2.4 Analyze Additional Opportunities and Challenges for Using Water Marketing, Mitigation, and Banking as Tools for Meeting New Demands

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Assess the opportunities, challenges, water right implications, and potential adverse effects of using water marketing, mitigation, and banking as tools for meeting new demands.	#3-Changes, Mitigation, & Exemption.	
b) Create well-managed systems that offer economic development opportunities to market, transfer and lease water and build public awareness of water marketing opportunities.	#3-Changes, Mitigation, & Exemption.	See Note 23 for related work.

2.5 Complete all Outstanding Tribal and Federal Compacts and Work Closely with Federal Partners to Better Manage Federal Water Projects

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Continue to support and implement all adopted compacts. The state and the state's Congressional delegation must continue working with the tribes and the Departments of Justice and Interior to complete all the federal and tribal water compacts still in process.		In progress and ongoing. See Note 24
b) Montana must remain actively engaged in an ongoing dialogue with adjacent states and Canada to protect Montana's interest through the implementation of treaties and compacts that affect Montana's water resources.		In progress and ongoing. See Note 25

3.0 Water Information

Water resource issues are multi-faceted and often highly localized. Understanding and resolving them requires ready access to up-to-date information. Improved measurement and monitoring of water use will support the state's ability to determine when water is physically and legally available to meet new demands, while protecting existing water rights. Improved access to integrated water information will also support the work of water managers to distribute water by priority.

3.1 Support Improvements to the Montana Water Information System

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Provide the State Library with additional staff resources dedicated to the development of new water resource related data sets, interactive applications, and maps.		Initiated. See Note 26
b) DNRC will work with the State Library to develop a systematic workflow for revising the Montana Spatial Data Infrastructure (MSDI) Hydrography Framework based on the US Geological Survey National Hydrography Dataset (NHD).		Completed. See Note 27
c) Develop a process for transmitting water data generated by local, state and federal agencies, and watershed groups to the State Library for inclusion in the WIS in a consistent and timely fashion.	#4-Drought Management	
d) Continue working with the U.S. Geological Survey on the development of StreamStats—an interactive Web-based map application for providing streamflow statistics on streams and rivers with limited hydrologic information.		Completed. See Note 28
Intermediate-term 2-6 Years a) Improve the spatial representation of points of diversion (PODs) and places of use (POUs) associated with water rights and make this improved representation available through the Water Information System (WIS).	#6-Update WRQS, & #7-Update Water Division Website	See Note 29

3.2 Inventory of Consumptive and Non-Consumptive Uses

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Invest in the resources necessary to acquire the best information available on current consumptive and non-consumptive water use in Montana. This includes accurate information on the extent and distribution of irrigated lands, crop types, and irrigation system types.	#3-Changes, Mitigation, & Exemption.	Initiated. See Note 30 for related work

Recommendations	Comprehensive Water Review Key Challenges	Notes
b) Develop the capability to use Geographic Information System (GIS) technology and specialized agricultural engineering software to calculate the amount of water consumed by plants (evapotranspiration) using available information generated from NASA's Landsat Program.	#3-Changes, Mitigation, & Exemption.	Initiated. See Note 31 for related work.
c) Explore the development of standard practices for evaluating consumptive use from analysis of Landsat imagery.	#3-Changes, Mitigation, & Exemption.	
d) Provide technical assistance and incentives to water users to measure water at or near the point of diversion from a ditch, stream, or wellhead.	#3-Changes, Mitigation, & Exemption.	

3.3 Monitor Water Supply and Distribution

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years		
a) Expand the funding base for the USGS Co-Op Program beyond traditional state and federal agency partners by educating local organizations and private entities on the purpose and need for stream gages.		Initiated. See Note 32
b) Begin to develop a network of 100 state operated permanent, year-round stream gages to gather and distribute real-time streamflow information on smaller streams and tributaries not monitored through the USGS Co-Op Program.		Initiated. See Note 33
c) Encourage support of all existing sites and further expansion of the NRCS's SNOTEL and SCAN systems to provide actionable and long-term water supply and soil moisture condition data.	#3-Changes, Mitigation, & Exemptions & #4-Drought Management	Initiated. See Note 34.

3.4 Improve and Expand Efforts to Quantify Groundwater Supplies and Availability

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) The Montana Bureau of Mines and Geology's (MBMG's) Groundwater Steering Committee should re-assess the criteria used in selecting studies conducted under both the Groundwater Assessment and Groundwater Investigation Programs to better reflect critical needs and statewide priorities.		Completed See Note 35
Intermediate-term 2-6 Years a) Provide additional funding to MBMG's Groundwater Characterization Program (GWCP) for the purpose of completing reconnaissance level inventories of groundwater resources in the remaining GWCP characterization areas. b) Provide necessary funding to expand MBMG's Groundwater Monitoring Program for the purpose of adding dedicated monitoring wells to characterize trends in groundwater levels		No action as of January 2022. See Note 36 No action as of January 2022. See Note 37

3.5 Improve Conjunctive Management of Surface Water and Groundwater

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Support continued funding for the MBMG's Groundwater Investigation Program to ensure that aquifer information and modeling tools necessary to implement conjunctive management are available.		Initiated. See Note 38
b) Identify options for mitigation or aquifer recharge plans to offset impacts of groundwater use on surface water.	#3-Changes, Mitigation, & Exemptions.	Initiated. See Note 39
c) Investigate the availability and the potential for the diversion of high spring surface water flows for aquifer recharge.	#3-Changes, Mitigation, & Exemptions.	
d) Investigate the design of aquifer storage and recovery projects to optimize water use while protecting existing water users.	#3-Changes, Mitigation, & Exemptions.	

4.0 ECOLOGICAL HEALTH AND ENVIRONMENT RECOMMEDATIONS

Montana's aquatic systems, lakes and rivers, and associated biological resources, support our quality of life, provide clean drinking water, and support Montana's recreation and tourism economy. The availability of water in the appropriate quantity, quality, timing and duration is necessary to ensure the health of our water-dependent ecosystems. The state should pursue proactive policies and management practices to meet the needs of aquatic ecosystems within the prior appropriation system in order to sustain the health of these valuable natural systems as Montana's economy grows.

4.1 Provide Sufficient Protection for Instream Flows Within the Prior Appropriation Framework to Maintain Aquatic and Riparian Systems

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Ensure that the change of use process for instream flow/fishery water rights is consistent with the change process for all other beneficial uses. Steps would include a requirement that the applicant show they will not adversely affect other water right holders, the allowance of both temporary and permanent changes, and a broader recognition that instream flow rights should be enforced in priority.	#3-Changes, Mitigation, & Exemptions.	
b) Recognize and document the importance of connectivity within stream and riparian systems. Efforts should be made to restore connectivity and habitat where needed within the prior appropriation doctrine.		No activity as of January 2022.
c) Support research to determine the frequency, magnitude, timing and duration of high flows and low flows needed to maintain the natural ecological functions of rivers, stream and habitats across the state.		No activity as of January 2022.

4.2 Support Proactive, Coordinated Efforts to Reduce Invasive Species and Protect Endangered Species in Montana

Recommendations	Comprehensive Water Review Key Challenges	Notes
a) Promote the use of voluntary programs that preserve the flexibility of landowners to manage their operations as the preferred method for handling Endangered Species Act protection and recovery programs.		Initiated. See Note 40
b) Support local and agency coordination efforts to implement invasive species protection programs		Initiated. See Note 41

5.0 COLLABORATIVE WATER PLANNING AND COORDINATION

Water management in Montana occurs at a variety of scales: watershed, sub-basin, basin, regional and statewide. Many local, state, federal, tribal agencies and organizations are involved in the distribution, protection and/or measurement of Montana's water resources. Effective coordination and collaboration of all stakeholders increases communication, improves efficiencies, and leverages technical and financial resources.

5.1 Expand Support for Basin and Community Based Watershed Planning

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Provide funding to periodically convene the Basin Advisory Councils to evaluate, update and implement the recommendations adopted in the State Water Plan.		Initiated. See Note 42
Intermediate-term 2-6 Years a) Create a dedicated and sustainable source of funds to support technical, organizational and operational capacity of local watersheds to assist in water management and drought planning, education and outreach, and the coordination of local efforts to implement state and basin plan recommendations.	#4-Drought Management	Initiated. See Note 43 for related work.
b) Build on the work of the statewide organizations such as the Montana Association of Conservation Districts and the Montana Watershed Coordination Council to provide financial, technical, and educational assistance to increase the organizational capacities of community-based watershed groups and Conservation Districts.	#4-Drought Management	See Note 44 for related work

5.2 Encourage Collaboration, Coordination, and Communication across Local, State, and Federal Agencies and Tribal Governments

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years a) Address watershed, sub-basin and basin wide water management issues through increased interaction and communication between water users, watershed groups, technical specialists, and policy makers at all levels of government.	#3-Changes, Mitigation, & Exemptions & #5-Stakeholder Engagement, Outreach & Education.	See Note 45 for related work.

Recommendations	Comprehensive Water Review Key Challenges	Notes
Intermediate-term 2-6 Years a) Encourage land management agencies to include potential impacts to water supplies in their management decisions. This could include forest vegetation management and the restoration of natural features such as riparian areas and wetlands that act to slow runoff and promote groundwater recharge	#3-Changes, Mitigation, & Exemptions & #4 Drought Plan Upate	See Note 46 for related work.

5.3 Develop a Plan to Deliver Water Related Training, Education and Outreach

Recommendations	Comprehensive Water Review Key Challenges	Notes
Short-term 0-2 Years DNRC will expand on current efforts to create and deliver public awareness and training programs, working through the Montana Watercourse, Conservation Districts, Water Quality Districts, municipalities and community-based watershed groups that provide information on a) Water efficiency and hydrology related topics: b) Water Rights Administration: c) Adjudication and Tribal and Federal Compacts progress and outcomes d) How to access water data through the Water Information System e) Technical trainings, assistance and incentives to support voluntary water measurement programs f) Educate local organizations and private entities on the value, purpose, and need for stream gages, as well as how and where to access the data.	#5-Stakeholder Engagement, Outreach & Education.	Initiated. See Note 47 for related work
Intermediate-term 2-6 Years a) Develop an easily navigable webpage or portal that provides public information on water contracting/ leasing opportunities and for identifying all the elements of a water right including: ownership, beneficial use, point of diversion, place and period of use	#7-Update Water Division Website	

Note 1

1. 2015 - Fox Hills Flowing Well Project. The Richland County Conservation District (CD) received a $75,000 DNRC Planning Grant from the Renewable Resource Grant and Loan Program to complete an inventory of uncontrolled wells in the Fox Hills Aquifer. A final report completed in 2016 described the inventory results for 102 flowing wells located in Richland County.
    a. 2019 – Richland County CD received $493,585 through HB7 (66th Legislature) to begin the process of controlling and/or remediating flowing wells in the Fox Hills Aquifer.
    b. 2022 – Fox Hills Aquifer Project was delayed due to COVID and change of CD staff. Richland County CD has contacted landowners and sent out letters explaining the project. They are developing an individual work plain for each landowner and doing site visits

Note 2

1. 2015 – DNRC hosted a workshop on estimating evapotranspiration using remote sensing and surface-energy balance methods. http://dnrc.mt.gov/divisions/water/management/training-education/may-29-2015-workshop-on-estimating-evapotranspiration-using-remote-sensing-and-surface-energy-balance-methods
2. 2015 - DNRC hosted a technical meeting on enhancing streamflows through shallow aquifer recharge. http://dnrc.mt.gov/divisions/water/management/training-education/enhancing-streamflows-through-shallow-aquifer-recharge

   2018 – DNRC partnered with the Montana Water Center at MSU to host two technical workshops on irrigation efficiency. Workshops led to the development, and 2020 publication of "Evaluating Irrigation Efficiency: Toward a Sustainable Water Future for Montana."

Note 3

1. 2017 - DNRC worked with several state and federal partners, including the EPA, to plan and deliver a Drought and Water Loss workshop for public water utilities in Lewistown, MT, September 2017.
2. 2019 - DNRC supported development of the Gallatin River Task Force's *Big Sky Water Conservation Program and the Waterwise Landscaping Guide*. https://www.gallatinrivertaskforce.org/wp-content/uploads/2019/03/1806_GRTF_NativePlantingGuide_5x8_WEB-1.pdf
3. 2020 – DNRC partnered with Montana Rural Water Systems Inc to develop an Integrated Water Resource Planning and Management Guide for Montana Municipalities. http://dnrc.mt.gov/divisions/water/management/docs/integrated-water-resources-planning-and-management-iwrp2021.pdf
4. DNRC has worked and is working with several irrigation districts, water users associations and private ditch companies to assess canal/ditch seepage. Completed and on-going work has been done with Tongue & Yellowstone Irrigation District, Yellowstone Irrigation District, Hysham Irrigation District, Kinsey Irrigation District, Hammond Irrigation District, Park Branch Canal Water Users Association, Paradise Canal Water Users Association and Dry Creek Canal Company. This work focuses on seepage measurements, gaging, and groundwater investigation of canal and ditch systems. These studies aim to aid the managers of these ditch and canal systems by providing them the data they need to operate their system best given local hydrology. This work

includes collaboration with the Yellowstone River Conservation District Council and local NRCS offices.

Note 4

1. Upper Missouri Basin Study – DNRC completed a cooperative effort with U.S. Bureau of Reclamation on the Upper Missouri Basin Study. The Study was released on August 26, 2021.

Note 5

1. 2022 – Lolo Creek Watershed Assessment. The Lolo Project was the first project of a new State-wide series of water resources investigations to characterize the hydrology and water use of small to mid-sized Montana watersheds. The Lolo Project combines past DNRC experience from conducting similar watershed studies since 1997 with modern modeling and data analysis techniques. The lesson learned from the Lolo Project will provide a template for the application of new methods, modeling, and datasets to future WMB investigations.
2. 2017 – St. Mary River Milk River Basin Study - DNRC entered into a cooperative agreement with U.S. Bureau of Reclamation to update the 2012 St. Mary River Milk River Basin Study. Target completion date is September 2022.
3. 2016 - DNRC conducted a short-term study designed to test novel approaches of measuring runoff characteristics and total watershed yield from ephemeral stream systems in central and eastern Montana. The study was somewhat successful in corroborating existing methodologies developed by the USGS and NRCS. The study was curtailed due to staff and resource constraints, and the extreme variability and aerial extent of the watersheds of its intended use. Future efforts will likely be conducted through state-of-the-art Remote Sensing methodologies, which are highly applicable to such a vast, unexamined region. Future efforts will aid DNRC in the permitting of stock reservoirs and other water rights in ephemeral drainages, and in the accounting and permitting of stock reservoirs in CM Russell National Wildlife Refuge in support of CMR Water Rights Compact implementation.
4. 2019 - DNRC in partnership with the Lewis & Clark County Water Quality District initiated a study to monitor groundwater, surface water, and water quality during multiple water years and to develop a conceptual model of how current agricultural practices and groundwater use from residential subdivisions may be affecting groundwater levels and surface water flows in the project area. Target completion date is 2024.
5. 2021 - Upper Yellowstone Watershed Study – DNRC is working with the MT FWP, USFS, USDA-NRCS, MBMG, NPS and Upper Yellowstone Watershed Group to conduct a watershed-scale study in the Upper Yellowstone Watershed. The Upper Yellowstone Watershed Study will continue a series of state-wide water resource investigations to characterize the hydrology and water use of a watershed. This study will build on the previous DNRC Lolo Creek Project and the on-going DNRC Teton River Project. The project will follow a systematic approach for watershed studies that the DNRC has continued to refine and implement throughout Montana over the years. Partial funding ($120,000) is provide by a grant from the U.S. Bureau of Reclamation's WaterSMART Program. Target completion date for the Upper Yellowstone Study is December 2024.

Note 6

1. March 2018 - Montana Water Summit – Water is a Changing West. This two-day event examined the forces shaping Montana's water resources now and into the future. The Summit

theme, Water in a Changing West, highlighted the impacts of climate change, economic development and population growth on Montana's water quantity and quality.

2. 2020 – Montana Water Summit – At the Confluence of Land and Water. This two-day event brought together Montana's from a variety of backgrounds to discuss the integrated and increasingly complex link between Montana's land and water resources.

Note 7

1. Federal reservoirs – USBR is analyzing the feasibility of increasing the storage capacity of Fresno Reservoir near Havre. This analysis is being done in conjunction with a Safety of Dams analysis USBR is conducting on Fresno Dam.
2. State reservoirs - State Water Projects Bureau has reviewed the feasibility of increasing reservoir storage at East Fork of Rock Creek and Frenchman Reservoirs and is reviewing the feasibility of increasing storage at Painted Rocks Reservoir.

Note 8

1. DNRC's State Water Project Bureau has spent $10 million since 2015 upgrading state owned water project infrastructure. DNRC's Conservation and Resource Development Division has provided $6.2 million to irrigation related projects since 2015.

Note 9

1. 2016 – DNRC issued final guidelines associated with stream and wetland restoration projects. http://dnrc.mt.gov/divisions/water/water-rights/docs/new-appropriations/stream-wetland-restoration-water-right-guidance-04-16.pdf.
2. 2020 – DNRC provided information on natural storage to the Water Policy Interim Committee (WPIC) on July 13, 2020. https://leg.mt.gov/content/Committees/Interim/2019-2020/Water-Policy/Meetings/July-2020/Exhibits/July13/Exhibit8.pdf

Note 10

1. DNRC provided $20,000 in funding to Montana Bureau of Mines and Geology to monitor a shallow aquifer recharge project implemented in the Centennial Valley and upper Blacktail Deer Creek watersheds in southwest Montana. Project was completed in the Spring of 2020.
2. DNRC is developing monitoring protocols for similar projects with the aim of enhancing shallow aquifer recharge and stream flows. Target completion date is July 2022.

Note 11

1. 2015 – DNRC provided $5,000 in match funding for MSU graduate student Danika Holmes' research project to analyze the potential for shallow aquifer recharge in the Musselshell River Basin. Additional funding was provided by the National Institute for Water Resources. The project was completed in May, 2016, with development of a professional paper *A Geospatial Approach for Identifying and Exploring Potential Natural Water Storage Sites.* Water 2017, 9(8), 585.
2. 2020 – DNRC continues to work with a variety of state, regional and national organizations, including the Nature Conservancy, National Wildlife Federation, Blackfeet tribe and local watershed groups to install and study the impacts of beaver dam analogs as potential natural storage mechanisms for small stream systems.
3. 2020 - DNRC completed a cooperative effort with U.S. Bureau of Reclamation on the Upper Missouri Basin Study. One element of the study was to consider options to improve operations

and infrastructure to supply adequate water in the future. The study looked at two scenarios of potential groundwater infiltration and storage.

a. Beaverhead Watershed - One adaptation strategy initially investigated was the use of the East Bench Canal to recharge shallow aquifer storage in the lower Beaverhead Valley for later withdrawal to ease late-season irrigation water shortages through supplemental groundwater pumping. The strategy was not pursued further because initial model runs indicated that there are only short, infrequent periods of time when water is available to recharge groundwater. Typically, during spring runoff when water is most likely to be available, all flow above senior rights is needed to fill Clark Canyon Reservoir. The few years when this water is available tend to be higher flow years when late-season supplemental groundwater pumping is less likely to be needed. Due to the nature of the aquifer and relatively short distances from the Beaverhead River, little aquifer recharge water was modeled to be carried over from one season to the next.
b. Gallatin Watershed - Assuming that high capacity wells drilled into Gallatin Valley aquifers would be the direct water source for increased domestic water demand, a strategy of using an infiltration basin to offset depletions, and thus potential impacts to existing surface water right, was evaluated. In this strategy the source aquifer would be recharged with surface water during times of higher flow or through existing water rights purchases. This evaluation was undertaken at the basin scale, using a single infiltration site, and looked at flows in the Gallatin River. It did not consider potential mitigation requirements at local streams or other constraints for location siting. Given the physical and legal challenges associate with this strategy aquifer recharge might be developed incrementally through coordinated, dispersed recharge areas throughout the Greater Gallatin Valley, rather than as a single large facility. Mitigation facilities would likely be sited in areas of the valley where aquifer conditions and other factors are most conducive.

Note 12

1. 2015 - The Missouri Headwaters Basin in southwest Montana was selected for a national demonstration project. The National Drought Resilience Partnership (NDRP) is a collaborative of federal and state agencies, NGOs and watershed stakeholders. DNRC led the efforts with EPA to deliver technical, human and financial resources to launch local planning efforts and help address drought in southwest Montana. Several of the watershed groups have continued to monitor water supply conditions and develop local drought plans.
2. 2015 – 2022 - DNRC provided $146,6000 to Soil and Water Conservation Districts of Montana to increase capacity and technical support for watershed groups and conservation districts in the Clark Fork Basin.
3. 2016 – DNRC requested a bill that would enable a water user to participate in a voluntary diversion reduction associated with a local drought management plan without risking abandonment for non-use. Bill was tabled at the request of the sponsor.
4. 2017 – DNRC received a $200,000 WaterSMART Grant from the Bureau of Reclamation to provide capacity to local watershed groups in the Upper Missouri Basin to develop local and Regional Drought Management Plans for the Upper Missouri Basins. The plan and contract have been completed and accepted by USBOR in 2021. This pass-through funding was critical for the support of local planning efforts in the Missouri Headwaters Basin.

5. 2020 - DNRC is facilitating the development of River Conditions Tools (RCTs) websites in multiple watersheds throughout the state. The RCTs provide a range of data and information, such as flow, temperature, and drought management trigger locations, and they are being developed in partnership with the U.S. Fish & Wildlife Service, Montana State University, and several local watershed groups. RCTs have been developed for, or in the process of being developed for the following watersheds:
    a. Upper Missouri Basin
    b. Big Horn River
    c. Upper Yellowstone
    d. Shields River
    e. Clarks Fork of the Yellowstone River
    f. Rock Creek (near Red Lodge)
6. 2021 – DNRC initiated a watershed-scale study in the Upper Yellowstone Watershed in cooperation with MT FWP, USFS, USDA-NRCS, MBMG, NPS and Upper Yellowstone Watershed Group. The study will support the efforts of basin stakeholders to understand water availability and water use in order to identify, evaluate and enact local drought adaptation and response strategies. Target completion date is December 2024.

Note 13

1. DNRC and the U.S. Bureau of Reclamation conducted a climate change analysis for the Upper Missouri River basin as part of a West Wide Climate Risk Impact Assessment (WWCRA). The WWCRA analyzed how the federal, state and private water and power infrastructure will perform over a range of projected climate change scenarios for sub-watersheds in the Missouri River Headwaters. In addition, temperature and precipitation data sets were used to develop estimates of crop irrigation requirements and reservoir evaporation for projected future climate scenarios.
2. 2017 – Montana Climate Risk Assessment. Montana Institute on Ecosystems at Montana State University. https://montanaclimate.org/
3. 2020 Montana Drought Plan Update – DNRC is leading the first update of the Montana Drought Plan since 1995. DNRC is partnering with a diverse group of stakeholders that includes the public, local, state, university, federal and tribal representatives, and experts. The project is funded through $100,000 allocated by the 2019 MT legislature. These funds were leveraged to secure an additional $200,000 from the BUREC through a Water Smart Grant. Tentative project completion date of fall 2023.
4. 2020 - Climate Change and Human Health in Montana: A Special Report of the Montana Climate Assessment. Montana Institute on Ecosystems at Montana State University. https://montanaclimate.org/
5. DNRC provides ongoing staff support Governor's Drought & Water Supply Advisory Committee (DWSAC). http://dnrc.mt.gov/divisions/water/drought-management
6. DNRC coordinates local, state, and federal partners that provide input to the Governor's Drought & Water Supply Advisory Committee as well as the US Drought Monitor.

Note 14

1. 2020 – DNRC is collaborating with the Montana Climate Office (University of Montana). The Climate Office is actively developing a dense network of fully instrumented weather stations

(Montana Mesonet), with 75 installed around the state and over 200 planned for installation in the Upper Missouri River Basin. DNRC is taking an active role in siting decisions for the planned stations to ensure the availability of reliable meteorological data in an easily accessible format into the future.

Note 15

1) 2016 - The 64th Legislature provided $2.14 million/year through 2028 for the Water Court and DNRC to complete the state's general stream adjudication process by June 30, 2025. The Legislature also established the following benchmarks for DNRC to meet.
    a) the department shall reexamine 10,000 verified claims by June 30, 2017;
    b) the department shall reexamine 30,000 verified claims by June 30, 2019;
    c) the department shall reexamine 65,000 verified claims by June 30, 2022;
    d) the department shall reexamine 85,000 verified claims by June 30, 2023; and
    e) the department shall reexamine 95,000 verified claims by June 30, 2024.

Note 16

1. 2017 – HB110 (65th Legislature) allowed for certain previously unfiled water rights to be brought into the adjudication process to be accurately and consistently defined.
2. 2020 – This is an ongoing process involving the Water Court and DNRC.

Note 17

1. 2019 – HJ40 (66th Legislature) instructed the Water Policy Interim Committee (WPIC) to conduct a study on the future of the Montana Water Court and report back to the 2021 (67th) Legislature.
2. 2020 – Water Policy Interim Committee (WPIC) published HJ40: Prospects for the Future of the Water Court, August 2020, Final Report to the 67th Montana Legislature.

Note 18

1. §85-5-111 MCA Instructs DNRC, in cooperation with the Montana supreme court, the Montana water courts, the district courts of Montana, the Montana university system, and other appropriate state and federal agencies to develop an educational program for water commissioners and mediators. DNRC formed a task group and worked with the Montana Water Bar to develop a mediation program. The work remains unfinished.

Note 19

1. 2019 – DNRC develop the guidebook *"Water Distribution in Montana: A Guide for Water Commissioners, Water Users, and District Courts".* This guide offers practical steps for water distribution in Montana. It includes best practices for water commissioners, district court clerks, district court judges and water users as well as useful references to Montana law and frequently asked questions. The guidebook is available in both hard copy and electronic formats.

Note 20

1. 2017 – Two bills sponsored by the Legislative Water Policy Interim Committee before the 65th legislative session requiring training for water commissioners and clarifying the way water commissioners are appointed. (MCA 85-5-111(2) and 85-5-101(1)).
2. 2019 – DNRC working with Water Commissioners, Judges, and District Clerks developed the guidebook *"Water Distribution in Montana: A Guide for Water Commissioners, Water Users, and*

District Courts". This guide offers practical steps for water distribution in Montana. It includes best practices for water commissioners, district court clerks, district court judges and water users as well as useful references to Montana law and frequently asked questions. The guidebook is available in both hard copy and electronic formats.

3. DNRC conducts 3 – 4 water commissioner trainings every year. Additional trainings are conducted upon request.
4. DNRC is expanding its outreach to water commissioners and District Courts by supporting, day-to-day administration of decrees, decree enforcement and on-the-ground problem solving.

Note 21

1. DNRC Adjudication Bureau currently develops enforcement projects when directed by the District Court.

Note 22

1. 2020 - This issue was studied by the 2020 Water Policy Interim Committee (WPIC). Results are found in Climate and Water Rights, August 1, 2020, Water Policy Interim Committee. https://leg.mt.gov/content/Committees/Interim/2019-2020/Water-Policy/Meetings/Sept-2020/Climate-whitepaper-final-FINAL-comments.pdf

Note 23

1. DNRC has developed information on marketing water rights http://dnrc.mt.gov/divisions/water/water-rights/marketing-water-rights

Note 24

1. Montana has 18 water compacts for federal reserved water rights including seven with tribal reservation communities and eleven with federal agencies. DNRC is working with Montana stakeholders, tribal Governments', and the federal government to implement each compact.

Note 25

1. The Yellowstone River Compact – DNRC is one of three Commissioners on the Yellowstone River Compact Commission. DNRC also has a representative on the Compact Technical Advisory Committee.
2. Apportionment of water between the U.S. and Canada – Article VI of the 1909 Boundary Waters Treaty provides the framework for apportioning the flows of St. Mary and Milk rivers between the U.S. and Canada. The Accredited Officers for each country (U.S. Geological Survey and Water Survy of Canada) are responsible for computing the available natural flow of the St. Mary River and Milk River and monitoring the apportionment of this flow between the United States and Canada. DNRC is an active participant in the St. Mary and Milk River Technical Working Group that investigates improving the apportionment procedures.
3. 2021 – The International Joint Commission launched the International St. Mary and Milk Rivers Study. The Study will explore options to improve access to apportioned waters by each country, in recognition of climate change and challenges to apportionment since the original 1921 Order was issued. The effort includes a desire to achieve long-term resilience in accessing the shared waters of the St. Mary and Milk Rivers. DNRC will be an active participant in the Study's Government Forum and several of the technical working groups.

Note 26

1. 2015 – The State Library received permanent funding for 1 FTE in the Water Information System Program.
2. 2020 – The State Library hired two GIS technicians.

Note 27

1. DNRC has provided $26,000 to the Montana State Library to update the resolution and accuracy of the National Hydrography Data Set (NHD) in Montana. Initial funds were used to develop the workflow and process associated tasks necessary to update the NHD. Funds were used to update the NHD in parts of the Yellowstone, Beaverhead, and Musselshell drainages. This work was completed in 2017. The contract was extended in 2018 to identify stock watering ponds and other small impoundments on the CMR Wildlife Refuge in support of the CMR Water Compact. This contract was completed in March 2020. The State Library is currently operating in maintenance mode only, updating the NHD as needs come up.
2. Since 2019, a major effort of the Water Information System has been statewide lidar (in progress). High-resolution, high-accuracy elevation data derived from lidar will improve NHD mapping and allow it to be done in a more consistent fashion—hydrography and elevation data will spatially align.

Note 28

1. StreamStats in Montana and Wyoming. https://www.usgs.gov/centers/wyoming-montana-water-science-center/science/streamstats-montana-and-wyoming.

Note 29

1. 2020 – Centroid data of the Place of Use (POU) and Point of Diversion (POD) can be viewed on the Water Information System (WIS) website. https://msl.mt.gov/geoinfo/water_information_system/water_rights

Note 30

1. 2016 – DNRC received $40,522 from the USGS Water Use Data and Research Program to improve water use information for Montana's public supply sector. DNRC worked with a contractor to administer surveys to all of Montana's approximately 716 public water systems, resulting in a response rate of 21%. The water use information collected improves estimates of public supply water use at the county level in Montana and will be used to support local water planning, management, and research
2. 2017 – DNRC received $60,000 from the USGS Water Use Data and Research Program to improve water use information for Montana's irrigated agriculture. DNRC worked with the University of Montana and USGS to compile surface a database of irrigated fields, irrigation method, and volumetric surface water withdrawals for 14 irrigation systems. DNRC used the USGS SSEBop algorithm to estimate ET and crop water consumption for these study areas and calculate system irrigation efficiency and improve GIS information related to irrigation in these areas.
3. 2019 – DNRC received $21,620 from the department's Conservation and Resource Development Division for the development of a pilot study to develop an automated system to map irrigated agriculture. This study focused on the Mission, Sun, and Lower Yellowstone river valleys, and produced promising results indicating the feasibility of automatically mapping changes in irrigated agriculture from 1986 to present.

4. 2021 – DNRC received $95,329 from the USGS Water Use Data and Research Program to map the extent and distribution of Montana's irrigation-equipped farmland. The objective of this project is to develop a reliable, precise, and comprehensive accounting of irrigated lands in Montana using Geographic Information Systems (GIS). This data will be appropriate for use by in-state stakeholders, DNRC, federal agencies (e.g. USGS, USDA), and researchers.

Note 31

1. 2017 - DNRC hired a full-time hydrologist to develop the department's expertise in remote sensing and measurement of evapotranspiration. This hydrologist is working with the Desert Research Institute (DRI), NASA and University of Montana to develop open-source applications for identification of the specific location and geographic extent of irrigated lands in Montana, estimation of historic and current monthly ET, and consumptive use for watersheds in Montana.
2. 2020 - DNRC is collaborating and participating in the OpenET project (etdata.org) which aims to provide easily accessible satellite-based estimates of evapotranspiration (ET).
3. 2020 - DNRC is collaborating with University of Montana and the Desert Research Institute to develop methods to automatically map irrigation on an annual basis using NASA Landsat data. Information generated from this project will be produced in a format that is readily integrated into GIS databases and available for use by in-state stakeholders, DNRC, federal agencies (e.g. USGS, USDA), and researchers.

Note 32

1. 2019 – The 66th Legislature passed SB32 establishing a Stream Gage Oversight Working Group within the Governor's Drought and Water Supply Advisory Committee (§2-15-3308 MCA. DNRC serves as Co-Chair of the Stream Gage Oversight Working Group. http://dnrc.mt.gov/divisions/water/drought-management/drought-committee/stream-gage-oversight-work-group.

Note 33

1. DNRC Stream Gage Program – DNRC building a network of real-time stream gages to collect and disseminate surface-water data in Montana. As of January 2022, approximately 30 gages have been installed on streams and tributaries not monitored by the USGS monitoring network. Hydrologic information generated through the network supports DNRC's administration of the Montana Water Use Act, including new appropriations, change applications, decree enforcement, and implementation of federal water right compacts. Data collected by these real-time stream gages are also utilized by other state and federal agencies, water commissioners, city municipalities, fisheries managers, recreationists, and the public. Gages installed to monitor stream flows and reservoir levels at state owned reservoirs enhance reservoir management and operations. All streamflow information generated by the available at DNRC Stream Gage Program.

Note 34

1. 2020 –The Montana Climate Office has funding to develop a dense network of fully instrumented weather stations (Montana Mesonet), with 75 installed around the state and over 200 planned for installation in the Upper Missouri River Basin. DNRC is taking an active role in siting decisions for the planned stations to ensure the availability of reliable meteorological data in an easily accessible format into the future. The Climate Office will be the aggregator of the sensor data and distribute it to the public via the Montana Mesoneta web site.

Note 35

1. 2017 – The Groundwater Assessment Program Steering Committee revised the nominating process and ranking criteria for prospective projects under the Ground Water Investigation Program (GWIP). The revised process solicits more input from the ex-officio members and provides an opportunity for GWIP project sponsors to provide commentary at a public meeting.

Note 36

1. There has been no legislative action on this recommendation as of January 2022. MBMG's Ground Water Characterization Program (GWCP) is funded through state special funds and has incurred revenue shortfalls every year since FY14.

Note 37

1. There has been no legislative action on this recommendation as of January 2022. MBMG's Ground Water Monitoring Program (GMCP) is funded through state special funds and has incurred revenue shortfalls every year since FY14.
2. In 2020 and 2021 MBMG received funding through the USGS National Ground Water Monitoring Program to add two new dedicated groundwater monitoring sites and replace two damaged sites.
3. MBMG has partnered with DNRC, Dept. of Agriculture, MT Climate Office, local water quality districts (Lewis and Clark, Gallatin, Missoula), and Conservation Districts (Sheridan and Dawson) to expand groundwater monitoring sites.

Note 38

1. 2019 – 65th Legislative Session passed HB341 providing $250,000 in funding for the GWIP program each year through the 2023 Biennium.
2. 2020 – DNRC received $50,000 from the USGS Water Use Data and Research Program to sync two existing water databases (DNRC's Water Rights Information System and MBMG's Groundwater Information Center). This will facilitate the exchange of water use and groundwater data and allow hydrologists to make accurate estimates of groundwater withdrawals.

Note 39

1. 2019 – DNRC received $49,939 from department's Reclamation and Developments Grants Program to conduct pilot project examining the potential for a groundwater modeling web application to provide both the WRD and water users with a better understanding of the potential impacts of a proposed well. The web application provides a user-friendly platform where a user can input the information about a proposed well and generate results for aquifer drawdown and stream depletion for potential projects. The pilot project was developed for aquifers in the Billings and Kalispell areas. WRD is currently conducting user acceptance testing of the web application.

Note 40

1. DNRC provides ongoing support to the Big Hole Basin's Drought Management Plan and Grayling Recovery.

Note 41

The Aquatic Invasive Species Bureau in the MT Department of Fish Wildlife & Parks leads Montana's aquatic invasive species efforts https://cleandraindry.mt.gov/

Note 42

1. 2015 – DNRC submitted a budget request for a $140,000 annual increase in operating budget to support the Basin Advisory Councils and interim planning activities associated with the implementation and review of the state water plan. The request was denied.
2. 2017 – DNRC submitted a budget request for a $200,000 annual increase in operating budget to support the Basin Advisory Councils and interim planning activities associated with the implementation and review of the state water plan. The request was denied.
3. 2019 – DNRC submitted a budget request for a $32,000 annual increase in operating budget to support the Basin Advisory Councils. The request was denied.

Note 43

1. 2015 - The 64th Montana Legislature allocated $200,000 to DNRC's Conservation and Resource Development Division for Watershed Management Grants. Grants of up to $20,000 are used for watershed related planning and management activities which conserve, manage, develop, or protect the state renewable resources and/or support the implementation and development of the state water plan.
2. 2020 – Since 2015, DNRC's Conservation and Resource Development Division has provided over $727,000 in Watershed Management Grants.

Note 44

1. DNRC provides ongoing financial and technical support to the Montana Association of Conservation Districts and the Montana Watershed Coordination Council.

Note 45

1. 2018 – Montana Water Summit - Water in a Changing West. This two-day event highlighted the impacts of climate change, economic development and population growth on Montana's water quantity and quality.
2. 2020 – Montana Water Summit – At the Confluence of Land and Water. This two-day event brought together Montana's from a variety of backgrounds to discuss the integrated and increasingly complex link between Montana's land and water resources.

Note 46

1. 2020 – Montana Water Summit – At the Confluence of Land and Water. This two-day event brought together Montana's from a variety of backgrounds to discuss the integrated and increasingly complex link between Montana's land and water resources.

Note 47

1. The Montana Watercourse is no longer in operation. Some of the activities of the Watercourse have moved to the Montana Water Center and others have been continued by DNRC and other partners.
2. Since 2015 DNRC and other organizations have developed and distributed public outreach material and information on the following topics:
    - The importance of stream gages:
        1. Measuring Montana's Streams. GIS Story Map focusing on stream gage funding and local watershed stories about how they use the stream gage data. http://storymaps.arcgis.com/stories/cad16fffea8942a48b3d0d6caabd636a

2. Inside a Real-Time Stream Gage – Video. http://mediaserver.dnrc.mt.gov/Inside_a_Real-Time_Stream_Gage_final.mp4
3. Montana Real-Time Stream Flow Gages
4. DNRC Stream Gage Program – Podcast. http://mediaserver.dnrc.mt.gov/podcast_2018-07-30_Norberg.mp3

- *"Water Distribution in Montana: A Guide for Water Commissioners, Water Users, and District Courts".* http://dnrc.mt.gov/WatrDistrGuideLowRes.pdf
- Historical Beneficial Use Explained – Video. https://www.youtube.com/watch?v=pmDP8jeHzaE
- Water Rights workshops for Realtors across the state.
- Who Does What with Montana's Water? - A guide on the role of local, state, and federal agencies in water management.
- A series of 10 water information fact sheets
- Water right basics
- The process to obtain water for new or expanded uses,
- DNRC's improved/simplified change process,
- The process for filing an objection to an application for a new, expanded, or changed use of water.
- DNRC continues to develop short videos, and printed materials on a variety of topics including water measurement, water supply planning, water distribution, and others.
- Materials, videos and other resources from technical meetings and workshops/conferences are posted on the DNRC website after each event.
- All new material is distributed to key organizations for inclusion in constituent newsletters. In addition, materials are highlighted on social media posts.