



City of Meridian, Public Works Department

2023 Water Conservation Plan

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SECTION 1 - EXECUTIVE SUMMARY

Understanding the water supply picture in the Treasure Valley is complex. There is a significant difference in the supply and use of surface water (streams, lakes, reservoirs, etc.) and groundwater (underground water in aquifers). Understanding where these two types of water come from and how they are used is critical when discussing water conservation strategies.

Meridian Idaho is a community situated in a high desert location that historically receives about 12 inches of precipitation per year. The native landscape is sparse, mostly treeless, and the summers are generally hot and dry. The construction of water storage dams and irrigation canals have allowed surface water from the Boise River watershed to be delivered throughout the area, including virtually all land in the past, present, and future city limits of Meridian. This surface water supply has enabled the development of vast agriculture, industry, and housing in the Treasure Valley. In Meridian, surface water is utilized to supply the majority of irrigation needs.

The City relies exclusively on groundwater for its municipal drinking water source. This groundwater is thought to be replenished from the combined effects of leaking canals, long-term flood irrigation, and predominantly natural recharge. As of 2023, the City operates and maintains 25 wells that pump approximately 4.2 billion gallons of groundwater annually. The City has monitored water levels in the aquifer system over the last several decades and has not found any statistically significant decline that would indicate water is being used faster than recharge is occurring.

In summary, the City of Meridian has not experienced groundwater supply shortages, and future groundwater supplies appear to be assured for many years. Although groundwater is plentiful, surface water used for irrigation supply can be a finite resource depending on the year.

This plan serves to document current and future water supply and demand projections. The plan captures what conservation measures have been completed to date. The plan also highlights future actions that may be implemented in light of more significant or prolonged ground or surface water shortages.

Water conservation has many tangible benefits including:

- Decreasing the reliance on finding new sources of water supply
- Delaying or reducing future capital investments for water and wastewater
- Reducing operation and maintenance costs for water and wastewater
- Improving supply reliability



SECTION 2 - PLAN PURPOSE AND SCOPE

The overriding purpose of implementing a water conservation plan is to preserve, protect, and extend the useful life of the City's current water supplies by reducing per-capita water consumption. This oversight and water use management will help ensure an ample supply of clean, safe, affordable water is available for current and future City residents. Additionally, studying water consumption and conservation impacts can help define and adjust limits for the current water supply.

Plan Elements

This plan includes four basic elements:

- Study area characteristics
- Analysis of historical and projected water demand
- Water supply
- Past, current, and future conservation measures and recommendations

Plan Term

The overall plan should be re-evaluated and updated every five years in conjunction with the regular master planning effort; however, specific conservation actions should take place or be evaluated annually or even on shorter schedules if appropriate.

The initial plan was first created in 2011. The 2023 update serves as the first major update of the plan.

Groundwater vs. Surface Water

The City of Meridian currently uses groundwater as its only source of potable (drinkable) water for residents. Surface water is provided in most part by irrigation districts and is utilized primarily for landscape irrigation and agriculture. This plan encourages the conservation of both groundwater and surface water.



Plan Data

For this update, data readily available was assembled from current records. The most current [Water Master Plan](#) was referenced for other analysis or forecasting and should be consulted for more detailed information or explanation of how data is gathered, assembled, and analyzed.

Plan Development and Public Participation

The goals, objectives, guidance, and determination of appropriate conservation measures for the City were developed cooperatively in 2011 by a Water Conservation Plan Working Group composed of citizens, business representatives, and City staff. Working Group members were sought out through website advertisement, outreach activities, and individual contacts. City staff made specific efforts to ensure that different groups of customers were represented. This 2023 update was conducted by City Public Works staff in different groups and divisions: Water, Wastewater, and Engineering.

Conservation Plan Goals

Meridian Water Conservation Plan Goals were developed by the 2011 Working Group with input over several weeks and multiple workshops. They were:

- Ensure an adequate, sustainable, and reliable supply of water at a reasonable cost for current and future needs of the community.
- Promote environmentally and economically sound use of available water resources.
- Protect and preserve water resources through leadership, research, cooperation with other stakeholders, and education.
- Prepare for drought and water emergencies.

Conservation Plan Objectives

The 2011 Working Group also developed specific objectives in line with plan goals that could be used to guide what conservation actions would potentially be recommended. These plan Objectives are listed and updated below.

- Objectives Completed
 - Establish an ongoing water conservation education program for the Meridian community by 2013.
 - Education is shared on the City's website, on the City's social media pages, and in the City's e-newsletter.
 - Reduce Meridian customer potable water per capita use by 3% by 2015, in addition to the reduction achieved by the addition of more customers who use surface water for irrigation.
 - Meridian customer potable water was reduced by 12% by or before 2015.
 - Gather hydrogeologic data and develop a realistic working model of the aquifer system around Meridian by 2013. Develop fresh water supply projections (sustainable aquifer yield) by 2015.
 - The City worked with the Idaho Department of Water Resources and the United States Geological Survey on a regional model that is complete and ready to use.
 -
 - Establish cooperative relationships with surface water providers by 2013.
 - The City continues to strengthen its relationships with surface water providers.
- Objectives Not Completed
 - Evaluate and report on the effectiveness of the Water Conservation Plan to the community annually; share experiences, discuss lessons learned, generate public involvement, and get feedback.
 - The City is incorporating the Water Conservation Plan into the Water Master Plan, which is updated every five years, making this objective more attainable. The Plan may be accessed on the website year-round and via outreach (e.g., social media, newsletters) on an as-needed basis.
 - Provide leadership by convening stakeholders within the Lower Boise Watershed and developing a water conservation partnership by 2015.
 - This objective is in progress; the original position over water conservation, the Environmental Programs Manager, no longer exists.
- Objectives No Longer Relevant (Cancelled)
 - Reclaim and reuse 80% of Meridian's wastewater by 2030.
 - The City has been a leader in the effort to recycle water; however, federal discharge permit requirements have removed economic incentives to expand the reuse program. Currently, between 1-3% of the City's wastewater is reclaimed.

SECTION 3 - AREA & WATER CHARACTERISTICS

Physical Setting

The City of Meridian is located in Southwestern Idaho approximately 32 miles east of the Oregon border and approximately 110 miles north of the Nevada border. The City is named for Idaho's principle meridian used for the initial survey of the state.

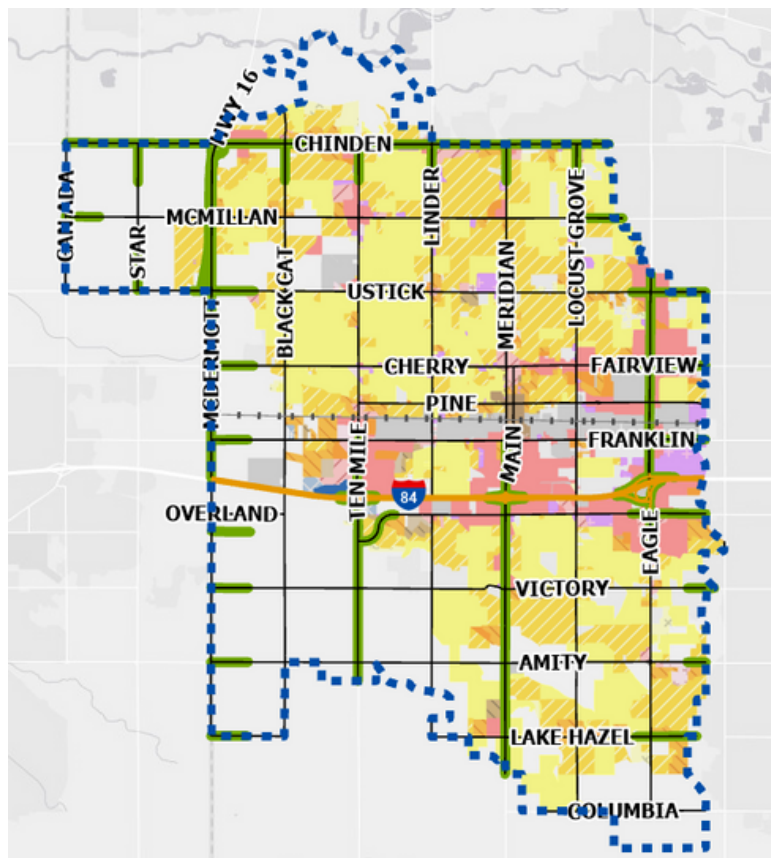
Meridian was established in 1893 and incorporated as a village in 1903 with a population of approximately 200.

The elevation of Meridian is about 2,600 feet above sea level. The average daily temperature varies from 81 degrees Fahrenheit in July to 25 degrees Fahrenheit in January. Average annual precipitation is 12 inches. The development of flood irrigation and Meridian's climate made it well-suited to a variety of agricultural activities. Dairy farms, dairy product production, fruit growing, and fruit packing were the primary industries in Meridian through the first half of the 20th century.

Agricultural activity continues today but had been largely replaced by urban development and corresponding economic diversification. Land converted from agriculture to other uses is still served by irrigation systems that provide abundant water at a low cost.

Since 1994, Meridian has been the fastest-growing city in Idaho. It has become a center of retail and commercial development in southwest Idaho. Meridian continues to be one of the fastest-growing cities in the Pacific Northwest with a current estimated population of 133,470 (based on COMPASS reporting as of April 27, 2022).

Figure 3-1 City of Meridian Utility Boundary

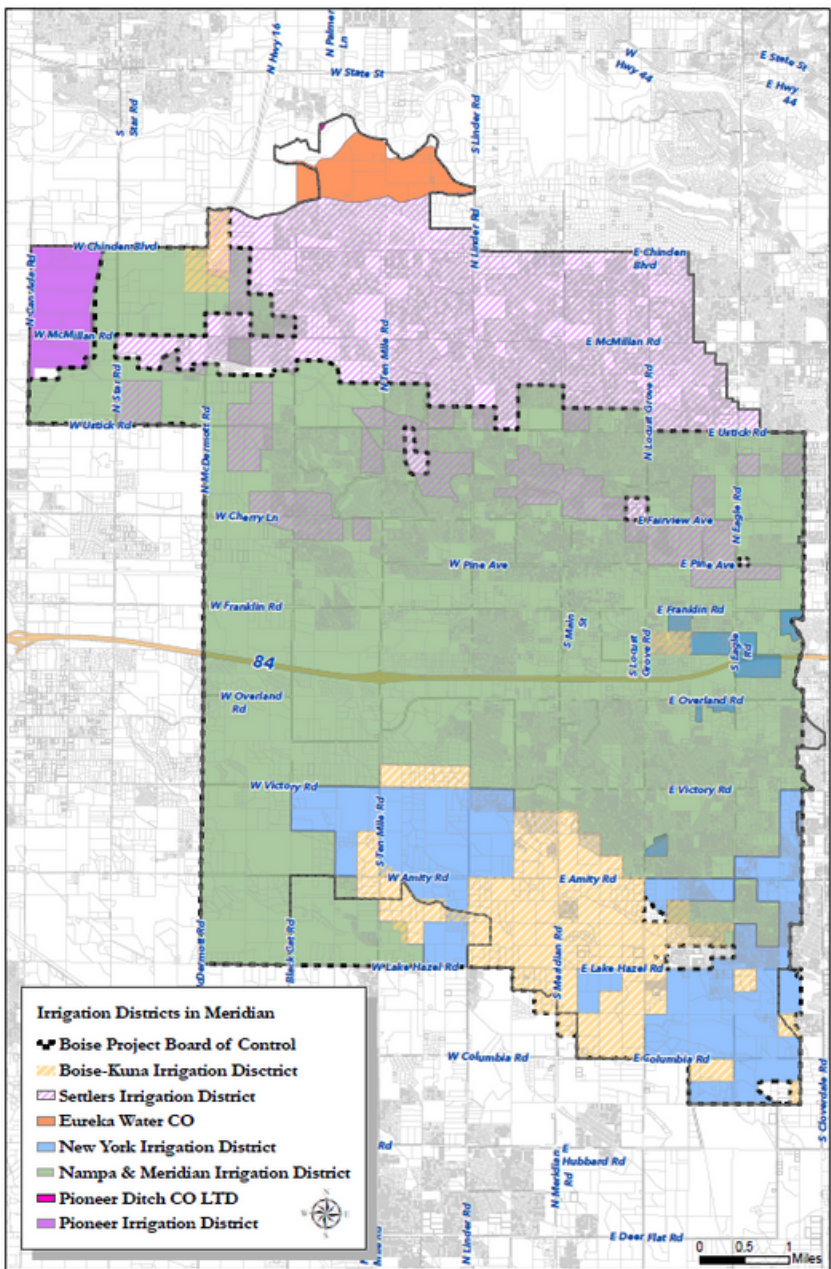


Groundwater vs. Surface Water

The City realizes that the yearly supply of surface water is a variable and finite resource that has a great impact on the local economy and quality of life for Meridian residents. However, surface water is provided in most part by irrigation districts. The City currently has no authority or control over the delivery or allocation of surface water to residents. Since residents pay a fixed fee for surface water regardless of the quantity used, there is generally little incentive for users to conserve. In years with a shortage of surface water supply, additional needs may be met through groundwater pumping, thereby increasing demand on this resource, which is the sole supply for the City’s potable water. Conservation of surface water and changes in delivery practices during surplus years could lead to a reserve supply in storage to help in shortage years, without having to rely as much on groundwater.

Understanding that the culture of water conservation is developed over time, this plan recognizes that starting the effort before there is a dire need and revisiting it with the master plan will help to ensure future success. For these reasons, this plan encourages the conservation of both groundwater and surface water.

Figure 3-2 Meridian Irrigation Districts Map



Water Systems

Municipal System

Meridian's municipal water system is a public system under the direction of the City government. The system has over 675 miles of potable water pipe and approximately 6,604 active fire hydrants. It includes 25 wells that have a combined capacity of about 39,000 gpm (56 MGD) and 4 million gallons of storage.

As noted, not all residential properties in the City have surface water irrigation systems. Currently, an estimated 8-10% of customers use municipal water for irrigation. New developments in the City are required by City code to provide pressurized irrigation systems from surface water if the developing land was previously served by surface water. This City code is in alignment with state law that strongly encourages the use of surface water as the primary source for irrigation (including lawns). Because of this, the population percentage using municipal water for irrigation will continue to shrink with time.

Additional information on the municipal system can be found in the City Customer Profile (Appendix B) and the City's most recent [Water Master Plan](#).

Surface Water Systems

Most residents in the City of Meridian are also served by irrigation systems supplied by surface water that was originally diverted for agricultural use. Delivery of surface water is managed by irrigation districts. Flood irrigation is employed in much of the agricultural areas surrounding the City; however, as urban development occurs on farmland, surface water delivered to that land is provided to City residents through pressurized irrigation systems. These systems are owned and operated either by the irrigation districts or homeowner's associations.

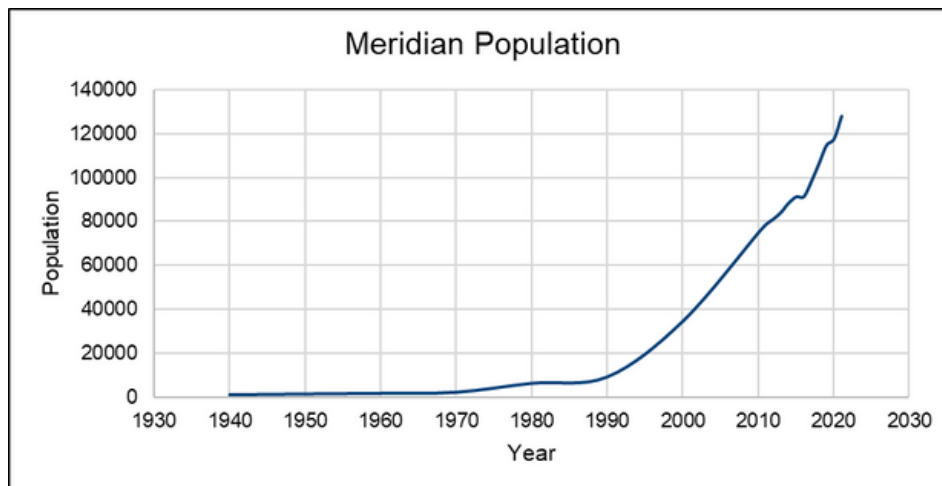
SECTION 4 - ANALYSIS OF HISTORICAL & PROJECTED WATER DEMAND

Demographics Trends and Forecast

Population

The population of the City and the surrounding area saw relatively slow growth until 1990. From 1990 through present, the population estimates reflect rapid growth. This trend is expected to continue at least in the short term. Figure 4-1 shows the historical population trend from COMPASS and US Census data.

Figure 4-1 Historical Population Trend (from COMPASS data)



As part of the Water Master Plan Update, COMPASS population forecasts by Traffic Analysis Zones (TAZ) were applied to growth areas estimated by City Planning staff to approximate future populations for the City impact area. The service area population includes only residents served by the City’s water system.

Table 4-1 Service Area Population Projections (from 2018 Water Master Plan)

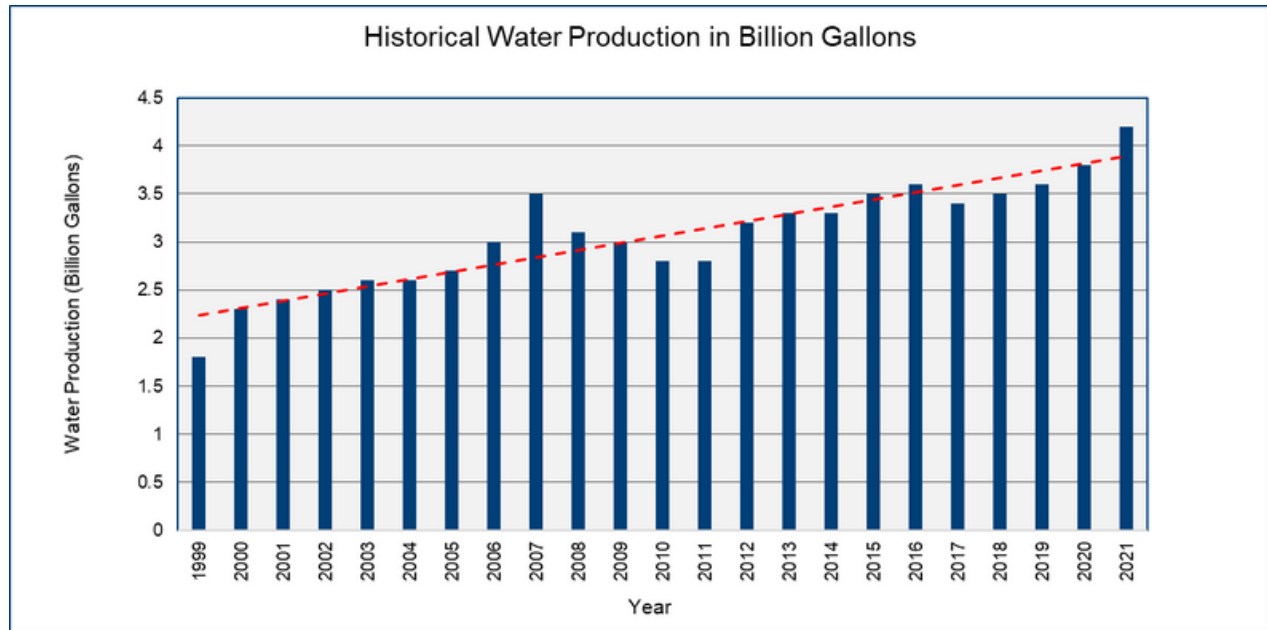
Year	Service Area Population Estimate
2017	98,300
2023	133,470
2037	166,945
Build Out*	345,000

*Build-out population not based on TAZ zones, but COMPASS estimate for the City.

Historical Water Use - Potable Water

In general, the total potable water production, as shown in Figure 4-2, has steadily increased over the last decade as the City population has grown.

Figure 4-2 Historical Total Potable Water Production



While total production has increased, an analysis of total production divided by the estimated population each year shows a clear trend of decreasing per capita consumption.

Table 4-2 Historical Per Capita Demand - Potable Water

Year	Service Area Population ^a	ADD (gpcpd) ^b
2005	50,449	147
2006	59,851	137
2007	64,617	147
2008	64,969 ^c	132
2009	65,321 ^c	128
2017	92,800	112

^a Population figures are based on COMPASS city populations and service area ratios

^b Gallons per capita per day

^c Population is linearly interpolated using COMPASS 2010 benchmark population

This decrease could be explained by several factors:

- City requirement for new development to use surface water for irrigation where available thereby reducing the percentage of customers using potable water for irrigation.

- Conservation due to rate increases.
- Conservation due to recent economic hardships, even without rate increases.
- Conservation due to building codes and practices that require or encourage more efficient fixtures and appliances.
- Greater public awareness regarding the importance of water conservation.

Because most of the area that will develop and provide new customers for the City’s potable water is currently served by surface water for agriculture, it is expected that the trend of decreasing per capita demand for potable water will continue as the City grows. Since all new customers will be served by surface water for irrigation, the overall per capita demand should continue to drop without any additional conservation measures.

A conservative per capita average day demand (ADD) of 112 GPCPD was used as a base for future demand projections that do not include any additional conservation measures.

Historical Water Use - Surface Water

It is important to note that, although the demand for potable water for lawn irrigation is reduced by the use of surface water, the overall use of water is not reduced. Surface water is supplied to property owners during the irrigation season at delivery rates sufficient to meet peak irrigation demands. Property owners are assessed a fixed fee and are not charged based on the amount of water used. Consequently, property owners have no incentive to conserve surface water.

Even though surface water delivery is accounted for by providers through weir measurements, the use of that water by customers is not reported, so the per capita demand is unknown.

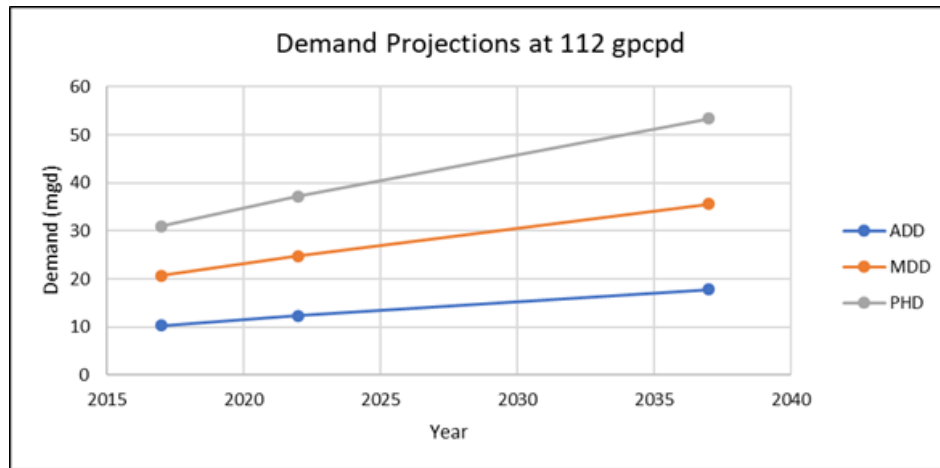
Summary of Projected Demand - Potable Water

As discussed earlier, a per capita ADD of 112 GPCPD was applied to the population forecasts. The following Table 4-3 and Figure 4-3 summarize the resulting demand forecast.

Table 4-3 Projected Demand without Conservation

Year	Service Area Population Estimate	ADD (mgd)	MDD (mgd)	PHD (mgd)
2017	92,800	10.3	20.7	31.0
2023	111,100	12.4	24.8	37.2
2037	159,300	17.8	35.6	53.4

Figure 4-3 Demand Projections to 2037



The 2018 Water Master Plan Update discusses the impact of water conservation on future demand. The data gathered showed that customers using surface water for irrigation had an average per capita potable (City) water consumption of 94 GPCPD. This number can be used as a target for overall per capita consumption with conservation. This is a 16 percent difference in per capita consumption (from the proposed planning metric of 112 GPCPD).

The impact of such reduction over time to a water provider would be significant. In 2037, MDD could be reduced by 5.7 MGD. ADD could be reduced by 2.9 MGD, which equates to over 1 billion gallons per year. For the utility, this means less infrastructure expense, less operational expense, and less impact on the water source.

Conservation of Surface Water

The extensive use of surface water by Meridian residents for irrigation is a benefit because it reduces overall use and peaking factors for potable water, which reduces the need for additional pumping and storage facilities, and therefore overall cost. However, this conservation plan recognizes that using surface water instead of potable water for purposes such as irrigation does not imply overall water conservation. As previously mentioned, the pricing of surface water (one flat fee for a year regardless of how much is used) does not provide an economic incentive to conserve.

Surface water is not supplied by the City, and the City has no control over how it is priced and delivered. Additionally, the actual use of surface water delivered to Meridian residents is not reported by any provider, so conservation efforts related to this resource cannot be quantified at this time.

This plan recognizes that, even though yearly surface water supply is normally more than sufficient for irrigation purposes and remains inexpensive now, it is likely that conservation of this resource will eventually be critical to the growth and prosperity of the City and the region. Therefore, the plan includes consideration of actions to conserve water, whether it is surface water provided by irrigation districts and canal companies or potable water provided by the City.

This plan focuses on education and building a culture of water conservation that is appropriate for the arid climate in which Meridian is situated and invites anyone to participate. It includes forming partnerships with the Idaho Department of Water Resources (IDWR) and other water suppliers. It is envisioned that future revisions of the plan can build on this initial effort and progress can be made towards conservation of the overall water resource.

SECTION 5 - WATER SUPPLY

Sources of Water - Current Capacity and Source of Supply

Meridian currently relies on groundwater as the single source for all its potable water supply. Although it is the sole source of potable supply, it is a complex and robust resource. Municipal wells tap the groundwater supply from 120 to 800 feet below ground level. Water from these various depths and locations differs in chemical composition and overall quality.

Meridian's municipal water supply system has the capacity to pump approximately 48,000 GPM for several hours and up to 39,000 GPM for an indefinite time period.

The 2018 Water Master Plan Update includes detailed information about Meridian's water supply and distribution infrastructure.

Sustainable Yield

Changes in static water levels have been observed at wells across Meridian, but they have not been significant and have not necessarily been attributed to municipal pumping. There is very little information on the rate of recharge of the aquifer system and the sustainable pumping volume/yield.

Meridian monitors water levels at several observation wells at various locations throughout the city. Data has been collected for a number of years with some wells dating back to the early 1990s. An effort by the Idaho Department of Water Resources to develop a regional groundwater model is underway to better understand the characteristics of the aquifer system, including the recharge mechanisms and sustainable yield. The City has been participating in this effort including providing groundwater level records.

Supply and Demand Balance

The 2018 Water Master Plan projected demands through ultimate build-out for the City using a conservative per-capital demand of 112 gallons per day. The average demand per day at build-out is projected to be about 38.6 million gallons. Over a year, that equates to 14 billion gallons of potable water supply needed for Meridian customers. Other potable water suppliers surrounding Meridian will increase demands on the shared aquifer system to serve their current and future customers as well.

Experience and available data have shown that the aquifer system that Meridian relies upon for potable water supply is extremely productive; however, as discussed, the ultimate sustainable yield is unknown. Additionally, it may not know when the sustainable yield has been exceeded until after it happens.

The Treasure Valley Comprehensive Aquifer Management Plan (CAMP) effort produced a Treasure Valley Future Water Demand study by WRIME Consultants. The study indicated that the net water demand (regardless of source) per acre for agricultural land was greater than for urban land. Therefore, the conversion of agricultural use to urban use as population in Meridian and the Treasure Valley grows produces a net decrease in overall water demand.

Although this concept has not been met with agreement from all parties involved in the CAMP, it underlines a recurring theme of this plan - that water conservation should include surface water and groundwater.

To encourage the conservation of both resources, which are naturally connected, legislators and regulatory agencies must work toward the most beneficial use of water.

It would appear based on all available data that the overall water resource will support demands for at least 50 years.



SECTION 6 - RECLAIMED WATER PLAN

The conversion of wastewater to reclaimed (often called recycled or reuse) water, and its use, could be a component in water conservation in the future. Reclaimed water has a variety of applications that can either replace or reduce the need for other sources of water. It can also be used to replenish groundwater supplies.

City’s Current and Planned Reclaimed Water Program

Overview of Reclaimed Water Program

The City of Meridian (City) produces and distributes reclaimed water for a variety of uses. Reclaimed water is a highly treated water resource generated at the City’s municipal wastewater treatment plant that meets standards for reuse established by the Idaho Department of Environmental Quality (DEQ).

Program History

The City of Meridian constructed its reclaimed water facility in 2008-2009. The City was issued its first reclaimed water permit in 2008 which allowed irrigation at Heroes Park. This permit was updated in 2010 to include City-wide use. This permit was effective for a 5-year operating period. This was the first-Class A, city-wide reuse permit issued in the State of Idaho. The City was granted an extension on this permit to continue operating until 2017. The City was issued an updated reclaimed water permit in 2017, which is effective for 10 years. The City will need to re-apply for an updated reclaimed water permit in 2027.

The reclaimed water permit allows for the use of reclaimed water in irrigation, dust suppression, toilet flushing, lined surface water features, sanitary sewer flushing, and fire suppression throughout the City.

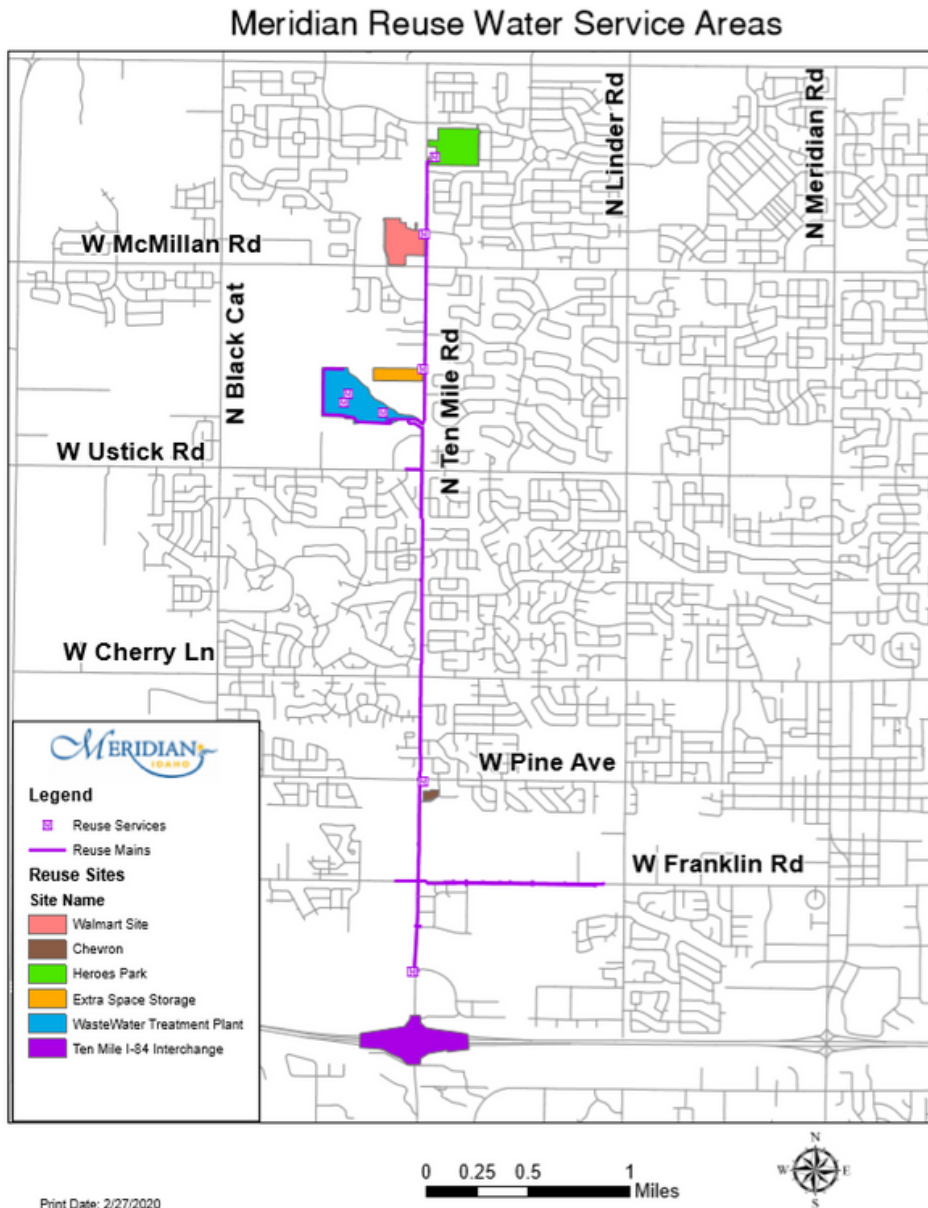
Current Reclaimed Water Use

Today (2023) reclaimed water is used or planned to be used at eight sites throughout the City along the City’s reclaimed water distribution pipeline.

Table 6-1 Reclaimed Water Distribution

Current Reclaimed Water User	Current Use
City’s Wastewater Resource Recovery Facility (WRRF)	Landscaping, Toilet Flushing, Blower Cooling Water
City’s Heroes Park	Landscaping, Toilet Flushing
City’s Ten Mile/I-84 Interchange	Landscaping
Jacksons/Chevron (750 N Ten Mile Road)	Landscaping, Car Wash
Public Storage (3959 N Ten Mile Rd)	Landscaping
Walmart Complex (5001 N Ten Mile Road)	Landscaping
Republic Services (2130 W Franklin Rd)	Landscaping, Trash Bin Washing (planned future use)
FedEx/Amazon site (2340 W Franklin Rd)	Landscaping

Figure 6-1 Reclaimed Water Service Areas



In 2021, Meridian produced approximately 38 million gallons of reclaimed water. This is equal to about 1.3% of all of the wastewater flow treated at the Wastewater Facility.

Future Reclaimed Water Use

Does making reclaimed water benefit the City today? Yes, using the right water for the right use is always beneficial. Using reclaimed water helps the City use less potable drinking water for uses like landscape irrigation. However, producing reclaimed water does not have the same regulatory benefit for the City that it did when the City had a flow cap constraint at the treatment plant. Additionally, producing reclaimed water is expensive, costing approximately 100% more than potable drinking water to produce. Moreover, to further expand the production of reclaimed water, millions of dollars would need to be invested into the system to increase capacity. The reclaimed water program may be expanded in the future if it provides regulatory benefits for the wastewater treatment facility or if the cost of irrigation and/or potable water increases significantly.

SECTION 7 - CURRENT WATER CONSERVATION PLAN

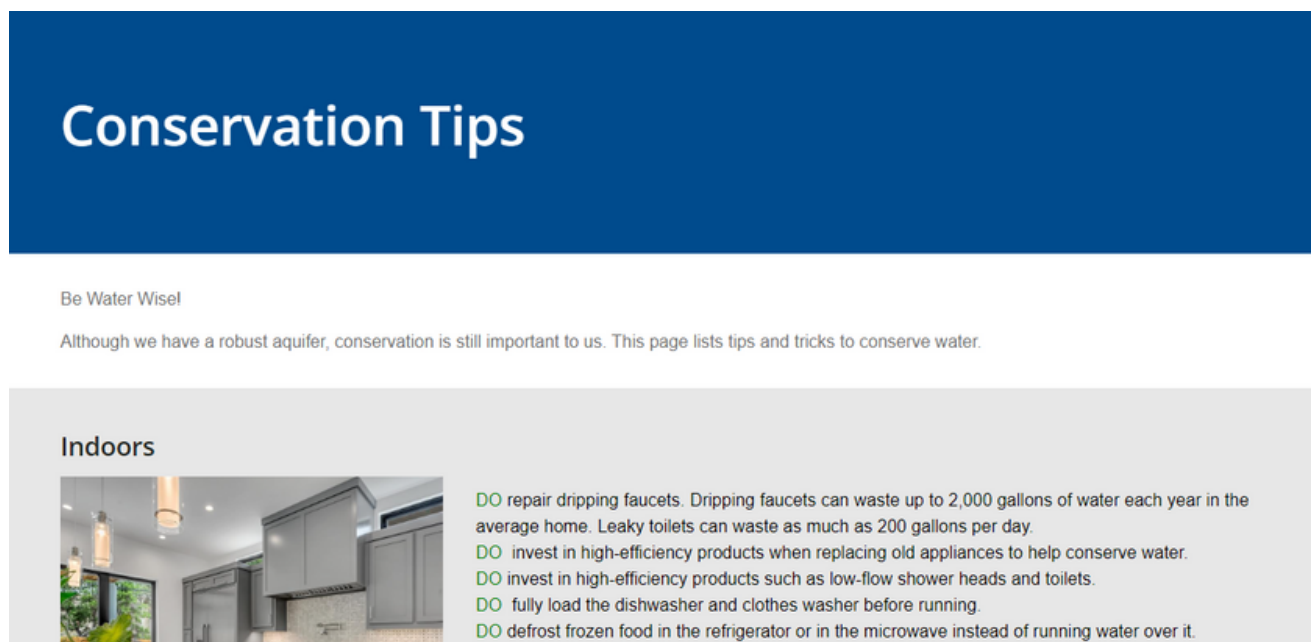
Measures Implemented

Conservation efforts in Meridian have historically been the result of supply and distribution system limitations, rather than a concern for the long-term availability of supply. In 1993, the City distributed a flyer to customers and asked them to conserve in a number of different ways so water would be available to everyone for the summer, but, after new wells were constructed, the system crisis was over and formal conservation plans were not adopted.

Meridian currently practices several important water conservation practices:

- Metering water to customers and including a usage component on the bill
- Tracking non-revenue water used for water main flushing and hydrant flows
- Managing pressure zones to avoid high service pressures
- Enforcing building codes for low flow toilets and shower heads
- Using automatic irrigation controls for Parks Facilities
- Providing water conservation tips on the City's website (meridiancity.org/water/conservation)

Figure 7-1 City of Meridian's Conservation Tips Webpage



Management of Non-Revenue Water

System non-revenue water (unaccountable/unsold water losses) between 2012 and 2021 averaged 2.2%, which is better than the recommended industry standard of 10%. This low percentage can be attributed to several factors:

- Much of the City's infrastructure is very new due to recent rapid growth
- The City has an active meter replacement and testing program
- The City tracks water used for flushing sediment from water mains
- The City tracks water used for fire training
- The City tracks water used for new development/construction flushing and filling
- The City tracks water lost to main and service line failures

SECTION 8 - POTENTIAL FUTURE WATER CONSERVATION ACTIONS

The City's water supply and distribution infrastructure is more than capable of providing peak demands and emergency flows to customers now and into the future. In addition, the City is extremely fortunate to be withdrawing from an aquifer system that has shown little to no decline after many years of sustained pumping.

The City understands, however, that annual water supply is a limited resource and is taking measures to better monitor and manage its use.

As part of the Water Master Plan Update, COMPASS population forecasts by Traffic Analysis Zones (TAZ) were applied to growth areas estimated by City Planning staff to approximate future populations for the City impact area. The service area population includes only residents served by the City's water system.

The 2011 Conservation Plan Working Group submitted their ideas for water conservation measures which were consolidated and added to measures found in the American Water Works Association (AWWA) Manual: Water Conservation for Small and Medium-Sized Utilities. These potential actions were organized and discussed by the Working Group in light of the Goals and Objectives they had previously developed. The outcome was a list of recommended actions for the plan.

The Conservation Actions were categorized as follows:

- Utility / City Practices
- Ordinances and Rules
- Outreach
- Incentives
- Reclaimed Water

It was a consistent opinion among members that the best conservation actions were those that employed education, outreach, and setting an example through City leadership rather than developing ordinances or rules to try to force customers to conserve.

Appendix A contains the matrix of Conservation Actions considered including recommendations/notes from the Working Group. Some actions discussed may require additional research to determine potential costs and benefits. In several cases, the group recommended that actions be considered based on future research and analysis.

SECTION 9 - RECOMMENDED WATER CONSERVATION PLAN

The following table includes the actions that were recommended by the original Working Group with 2023 updates. As a formal conservation effort was new to the City, many of the recommendations were simply to research or evaluate different actions to analyze their feasibility and efficacy.

The following actions that were recommended in the 2011 Water Conservation Plan were completed as of 2023:

- Evaluate costs and benefits of reducing the water from flushing by improving supply water quality through filters
- Develop source meter calibration program
- Create automatic alerts when customer use increases abnormally
- Use utility bills to communicate usage trends or comparisons to normal usage
- Perform audits on top users in customer categories and use information for outreach
- Support Parks Department conservation efforts
- Cooperate with other government or water supplier conservation efforts
- Adopt updated plumbing code
- Distribute educational materials at various locations / events
- Develop webpage dedicated to water conservation, including tips, electronic brochures, innovative technologies, and links to other sites, kid's pages, and games
- Recognize people or businesses that practice conservation via award program or news posts

The following actions that were recommended in the 2011 Water Conservation Plan are currently in progress as of 2023, but are not entirely completed:

- Install Automatic Meter Reading infrastructure
- Explore feasibility of tiered rate structure

The following actions that were recommended in the 2011 Water Conservation Plan have been identified as not feasible based on changing needs and conditions as of 2023 and will not be recommended for further action:

- Purchase leak detection equipment to reduce wasted water from system leaks
- Explore feasibility of reclaimed water fire hydrants and water truck filling stations
- Encourage conversion of potable water irrigators to reclaimed water
- Encourage large potable water users to convert appropriate uses to reclaimed water

The following table identifies recommended future conservation actions that could be investigated and/or implemented in the future. The suggestions are sorted based on cost and benefits. It is recommended that the City pursue low cost options that yield high benefits first.

Table 9-1 2023 Recommended Future Conservation Actions

Action	Estimated Cost*	Estimated Benefit
City / Utility Practices		
Develop audit pilot program for landscape irrigation	Low	High
Meet with IDWR regularly to discuss ground and surface water conservation issues	Low	Med
Explore formation of regional water conservation group (or use existing regional group)	Low	Low
Benchmark Meridian’s conservation efforts with other similar cities	Low	Low
Seek conservation program funding from state, county, or federal resources	Low	Low
Coordinate with Building Services to ensure high efficiency fixtures are included in new construction	Low	Low
Perform fixture audit and corrective actions for City buildings	Low	Low
Ordinances and Rules		
Develop Planning ordinances that encourage and incentivize conservation	Med	High
Create design standards for landscaping	Med	High
Benchmark other cities regarding individual unit metering to multi-unit buildings	Low	Low
Outreach		
Continue efforts with schools	Low	High
Provide information on self-audits to customers	Low	High
Collaborate with professional organizations and HOAs	Low	Med
Include education about peak hour usage to reduce peaking factors	Low	Med
Conduct outreach to commercial and industrial customers regarding fixtures, cooling towers, appliances, etc.	Low	Med

*Cost Estimates (Estimated Cost to City): Low = \$0-5,000, Med = \$5,000-\$20,000, High = Over \$20,000

SECTION 10 - WATER SHORTAGE PLAN

While the likelihood of a potable water shortage in the City is very low, the following section has been developed as a pre-planning exercise to identify condition triggers and potential solutions.

Water shortages are situations when the City is unable to meet the potable water demands of its customers at the minimum required distribution pressure. Such conditions can be short (intermittent – less than a day) or long-term (extended or seasonal timeframes) depending on the causes and can be due to problems with pumping and distribution infrastructure, the water supply, or unusually high demands.

Water Infrastructure Problems:

- Water main breaks
- Well failures
- Booster failures
- Power failures

Water Supply Problems:

- Contaminants in supply
- Extreme drought
- Conjunctive management / curtailment
- Water table decline

Unusually High Demands:

- Multiple simultaneous fires
- Extremely hot weather combined with loss of surface water for irrigation

The City of Meridian has a robust supply and distribution system. However, if several of the problems identified above occurred in combination, there may be a need for cooperative community conservation to ensure that water is available for critical uses such as firefighting and medical needs.

Meridian's water distribution system includes five different pressure zones to ensure water is delivered to customers in a narrow range of pressures - generally between 60 and 80 psi. Pressure zones are separated by Pressure Reducing Valves (PRVs) that maintain pressure differential, but still allow flow between zones when needed. The highest-pressure zone can transfer water down to any zone below it.

Because of the operational nature of these pressure zones, calculations for supply and demand will include a pressure zone and all zones above it to determine if a water shortage situation is pending or exists.

Water Shortage Plan Elements

Ideally, the City would respond to the threat of a shortage and manage demand to avoid the shortage. The following are three different conditions and the appropriate responses in order to manage demand and maintain system pressure for critical uses. Each condition level includes the following elements:

1. Triggering Conditions
2. Initiation Procedures
3. Demand Management Response
4. Termination Procedures

Because Meridian's system does not currently include storage facilities in every pressure zone, it relies to some extent on instantaneous pumping capacity from wells to serve peak demands. Therefore, the triggering conditions for determining whether a shortage is pending or exists are based on the Peak Hour Demand in relation to the pumping capacity of the system.

It is important to note that the City has taken initial steps in securing and constructing an emergency interconnect supply connection with a neighboring water purveyor and will take additional actions to correct or mitigate whatever problems have led to a water shortage (like repairing pumps or drilling new wells). The responses considered in this plan are only directed at managing demand/encouraging conservation.

Another important note is that the termination of a Supply Condition can mean the condition has improved or become worse, so the demand management response selected should be appropriate to the change in condition.

Water Supply Condition 1: Possible Water Shortage Predicted

Triggering Conditions:

Six-month forecast for Peak Hour Demand plus fire flow for any pressure zone and the pressure zones above exceeds supply capacity.

Initiation Procedures:

Water Division works with Engineering Division to assess current pumping capacity and forecast demands based on current demand patterns, historic trends, and other available data. Water Superintendent makes determination that condition exists and notifies the Public Works Director, who declares the condition to the Mayor's Office. The Mayor officially declares the condition to the public and initiates an appropriate demand management response.

Demand Management Response:

Work with the Public Works Director and the Public Works Communication Specialist to organize outreach effort to request voluntary water conservation or management of peak demands (timing of water use). Consider the following options:

- Use billing inserts to inform customers of the situation
- Provide press release for website and the City's Twitter account
- Distribute press release to HOAs, businesses, and customers by email
- Social media posts and City e-Newsletter

Termination Procedures:

Water Division works with Engineering Division to assess pumping capacity and refine demand forecasts. Water Superintendent makes determination that condition no longer exists and notifies the Public Works Director, who informs the Mayor and Council. The Mayor officially declares the change in condition to the public and initiates the appropriate demand management response if any.

Water Supply Condition 2: Probable Water Shortage Predicted

Triggering Conditions:

Six-month forecast for Peak Hour Demand (without fire flow) for any pressure zone and the pressure zones above exceeds supply capacity.

Initiation Procedures:

Water Division works with Engineering Division to assess current pumping capacity and forecast demands based on current demand patterns, historic trends, and other available data. Water Superintendent makes determination that condition exists and notifies the Public Works Director, who declares the condition to the Mayor's Office. The Mayor officially declares the condition to the public and initiates an appropriate demand management response.

Demand Management Response:

Work with the Public Works Director and Public Works Communication Specialist to organize outreach effort to request voluntary water conservation. Consider the following options:

- Use billing inserts to inform customers of the situation
- Provide press release for Website and the City's Twitter account
- Distribute press release to HOAs, businesses, and customers by email
- Social media posts and City e-Newsletter

Consider implementing mandatory conservation measures:

- Prohibit outdoor use of City water
- Develop conservation rate schedule with approval of City Council

Termination Procedures:

Water Division works with Engineering Division to assess pumping capacity and refine demand forecasts. Water Superintendent makes determination that condition no longer exists and notifies the Public Works Director, who informs the Mayor and Council. The Mayor officially declares the change in condition to the public and initiates the appropriate demand management response if any.

Water Supply Condition 3: Water Shortage Emergency

Triggering Conditions:

Current Peak Hour Demand (without fire flow) for any pressure zone and the pressure zones above exceeds supply capacity.

Initiation Procedures:

Water Division works with Engineering Division to assess current pumping capacity and forecast demands based on current demand patterns, historic trends, and other available data. Water Superintendent makes determination that condition exists and notifies the Public Works Director, who declares the condition to the Mayor's Office. The Mayor officially declares the condition to the public and initiates an appropriate demand management response.

Demand Management Response:

Work with the Public Works Director and Public Works Communication Specialist to organize outreach effort to request voluntary water conservation. Consider the following options:

- Use billing inserts to inform customers of the situation
- Provide press release for Website and the City's Twitter account
- Distribute press release to HOAs, businesses, and customers by email or phone alert
- Social media posts and City e-Newsletter
- Initiate potable water shortage rate schedule
- Consider implementing mandatory conservation measures:
 - Prohibit outdoor use of City water
 - Continue or initiate conservation rate schedule

Termination Procedures:

Water Division works with Engineering Division to assess pumping capacity and refine demand forecasts. Water Superintendent makes determination that condition no longer exists and notifies the Public Works Director, who informs the Mayor and Council. The Mayor officially declares the change in condition to the public and initiates the appropriate demand management response if any.

APPENDIX A - CONSERVATION ACTIONS CONSIDERED

Below is a matrix of the conservation actions considered by the Working Group in 2011. The purpose of retaining this matrix is simply to document what ideas the original Working Group discussed.

Water Conservation Action	Current Practice	Proposed Action
Utility / City Practices		
Reduce water used for flushing City water mains	Water Division tracks water used for flushing water mains and for fire hydrant tests. Additional planning and modeling for reducing water needed for flushing will carry some cost.	Water supply filters (such as green sand filters) may reduce need for flushing. What do other cities do? Reuse the flushed water? Portable filters?
Reduce water used for fire training	Fire Department tracks water used	Reclaimed water fire hydrants? / truck filling?
Reduce lost water - ensure system leaks are detected and stopped quickly	No leak detection program	Purchase leak detection equipment and institute a proactive program. Use SCADA to monitor supply vs. WRRF inflow.
Reduce water consumption and lost water - system pressure management	Currently manage pressure zones between 60 and 80 psi	Encourage customers to install pressure reducing valves at houses near higher pressure areas. Could outreach to customers with a map.
Develop reclaimed water system / expand the use of reclaimed water	Reclaimed water master plan currently being developed	Reclaimed water hydrants? Install reclaimed water as opportunities arrive.
Convert potable water irrigators to reclaimed water irrigation	Reclaimed water master plan effort	Convert potable water irrigators to reclaimed water irrigation according to master planning guidance.
Convert large potable water users (other than irrigation) to reclaimed water	Reclaimed water master plan effort	Convert large potable water users (other than irrigation) to reclaimed water according to master plan guidance.
Calibrate source meters	Currently not done regularly	Startup program
Perform indoor water audits for customers	Water leak detection on case-by-case basis for customers or when abnormally high usage is noted. This system is automated.	Alert automatically when customers' use goes up a given percent (TBD). Encourage water audits by customer (self) or by private business through outreach. Attach note to bills regarding usage compared to history or average customers. Look at top users and audit some of them, then use that info for outreach. Partner with home improvement stores - water conservation kiosk.
Perform landscape irrigation audits (City water)	No audits	Develop audit pilot program
Benchmark and leverage other suppliers' efforts	Currently not done	Work with other government offices to cooperate with their conservation efforts.
Perform landscape irrigation audits on City parks and other facilities	Install weather based smart controllers in City Parks	Support Parks efforts

Water Conservation Action	Current Practice	Proposed Action
Utility / City Practices Continued		
Perform fixture audit and replacement if needed in current City buildings	Currently not done	Perform fixture audit and replacement if needed in current City buildings. Also make sure efficient fixtures are working as intended (signage, valve direction, etc.) Perform cost effective corrective actions as needed.
Use high efficiency fixtures in all new City building construction	Last building (City Hall) was LEED Silver	Coordinate with Building Services to ensure fixtures in new construction are high efficiency.
Seek conservation program funding from state, county, or federal sources	Currently not done	Seek conservation program funding from state, county, or federal sources.
Identify a Water Conservation Coordinator	No Water Conservation Coordinator	Water Conservation Coordinator recommended to be added to .5-time position duties in Environmental Division.
Approve a conservation budget	No budget for conservation	Request a budget of (TBD) for water conservation from City Council.
Benchmark Meridian's conservation efforts with other similar cities - include in annual report to Council	Currently not done	Benchmark Meridian's conservation efforts with other similar cities - include in annual report to Council.
Form regional water conservation group	Not currently exploring formation of Conservation group	Explore formation of regional water conservation group.
Meet with IDWR regularly to discuss ground and surface water conservation issues.	Currently not done	Meet with IDWR regularly to discuss ground and surface water conservation issues. This action compliments the formation of a regional water conservation group.
Low water user awards		Recognize people or businesses that practice conservation (e.g., yard signs).
Ordinances and Rules		
Meter water to customers	Meter water to all customers	Continue to meter water to all customers.
Meter water to individual units in multi-family buildings	Currently not done	Benchmark other cities to see if any are requiring new multi-family buildings to have individual meters to each unit. Encourage property managers to teach conservation for their own or their tenants' benefit.
Structure rates to emphasize consumption over base	Water rate = \$5.60 + \$1.94 / 1000 gal	Use a portion of collected rates to fund conservation efforts.
Charge City accounts like other customers	Currently meter usage, but do not charge the City as other customers	Don't charge, but review usage and make sure City Departments are on board and demonstrating conservation methods.
Use a tiered rate structure	Not currently using a tiered structure	Explore feasibility of tiered rate structure.
Collect a Conservation Fee	Not currently collecting a Conservation Fee	Put conservation funding in water rates.

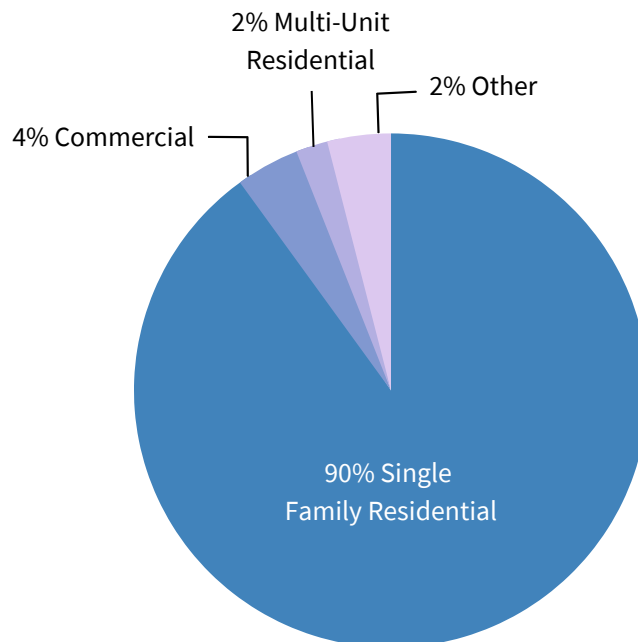
Water Conservation Action	Current Practice	Proposed Action
Ordinances and Rules Continued		
Landscaping	Current ordinance encourages use of surface water for irrigation.	Continue use of surface water for irrigation. Develop Planning ordinances that encourage and incentivize conservation in landscaping. Create design standards for landscape features to ensure that they don't waste water (e.g., berms, grass reduction, xeriscape berms, etc.).
Residential activities	Building codes control fixtures	Examine benefits of adopting 2009 plumbing code.
Industrial activities		
Construction activities	Code requires rental of meters for filling trucks and other activities.	Continue current practice. Build reclaimed water fill points and encourage use of reclaimed water for dust control.
Indoor Water Use - explore opportunities to amend Idaho Plumbing Code to allow reclaimed water for indoor uses	No budget for conservation	Research / Clarify this issue.
Require upgrades to fixtures as a condition of sale of property	Currently not done	How can the City incentivize? What is current account setup fee? Can the City have customer contact to encourage fixture upgrades for customers' long-term benefit? Use real estate community to outreach also.
Outreach		
Discuss / assist schools with conservation measures	Some activity	Continue efforts with schools. Get them to consider more efficient fixtures.
Distribute educational pamphlets on conservation (lawn watering, conversion to low water use landscaping, indoor use practices, etc.)	Pamphlets available at Water Department	Continue and expand.
Conduct presentations in collaboration with other organizations - professional, HOA, etc.	Currently not done	Conduct presentations in collaboration with other organizations - professional, HOA, etc. Have HOA contests to see which subdivisions do best.
Develop web page dedicated to water conservation, including tips, electronic brochures, links to other sites, and reports on innovative technologies	Some tips in Water Division section of current website - not very extensive	Develop web page dedicated to water conservation, including tips, electronic brochures, links to other sites, kids' pages, games, etc. and reports on innovative technologies.
Educate about peak usage control (amount and time of usage) to reduce peaks.	Currently not done	Educate about peak usage control (amount and time of usage) to reduce peaks.

Water Conservation Action	Current Practice	Proposed Action
New construction and upgrades - not City owned		
Improve plant facilities maintenance	No outreach program to encourage	Outreach to these customers.
Upgrade cooling towers		
Change to low water use landscaping		
Upgrade fixtures and appliances - hotels, schools, care facilities, HOA maintained facilities		
Upgrade fixtures and appliances - older residential buildings		
Incentives		
Give away faucet aerators	No give away / exchange program	Evaluate cost / benefit.
Give away or exchange low flow shower heads	Some giveaway items available for public events, etc.	
Provide rebates for high efficiency toilets	No rebate program	Evaluate which fixtures to provide rebate for and propose a plan. Benchmark other cities.
Provide rebates for efficiency clothes washers		
Provide rebates for irrigation system moisture sensors		

APPENDIX B - CITY CUSTOMER PROFILE - 2016 RECORDS (FROM 2018 WATER MASTER PLAN)

Category	Estimated Number of Accounts	Estimated Percent
Single Family Residential	29,700	90%
Commercial	1,320	4%
Multi-Unit Residential	660	2%
Other (Builder, Church, City, School, Sprinkler)	1,320	4%

Customer Profile Split



Year	Total Single Family	Total Multi-Family
Up to 1993	5,852	1,245
1994 - 2021 (building / plumbing code updated in 1994)	34,065	7,182

APPENDIX C - DEFINITIONS

ADD - Average Day Demand: The total volume of water delivered to the system in a year, divided by 365 days.

AWWA - American Water Works Association: An international nonprofit educational association dedicated to safe water. Founded in 1881 as a forum for water professionals to share information and learn from each other for the common good, AWWA is the authoritative resource for knowledge, information, and advocacy for improving the quality and supply of water in North America and beyond.

COMPASS - Community Planning Association of Southwest Idaho: An association of local governments working together to plan for the future of the region. The agency conducts this work as the metropolitan planning organization (MPO) for northern Ada County and Canyon County. The federal government requires the formation of an MPO when an urban area reaches 50,000 people.

DEQ / IDEQ - Idaho Department of Environmental Quality: The state agency tasked with ensuring clean air, water, and land in the state and protecting Idaho citizens from the adverse health impacts of pollution.

Groundwater - Groundwater is water that exists below the land surface.

GPCPD - gallons per capita per day: Amount of water a person uses on average per day.

GPM - Gallons Per Minute

HOA - Homeowners Association

IDWR - Idaho Department of Water Resources - State agency that serves the people of Idaho and protects their welfare by making sure water is conserved and available to sustain Idaho's economy, ecosystem, and the resulting quality of life.

MGD - Million Gallons Per Day

MMD - Maximum Month Demand: The maximum volume of water delivered to the system during any single month, divided by 30 days.

MDD - Maximum Day Demand: The maximum volume of water delivered to the system during any single day.

MPO - Metropolitan Planning Organization: A federally-mandated and federally-funded transportation policy-making organization in the United States that is made up of representatives from local government and governmental transportation authorities.

PHD - Peak Hour Demand: The maximum volume of water delivered to the system during any single hour.

Potable Water - Water that can be consumed in any desired amount without concern of adverse health effects. Water provided by community water systems including public and private utilities is considered potable water.

PSI - pounds per square inch

SCADA - Supervisory Control and Data Acquisition.

Surface Water - Non-potable water that is supplied by streams, rivers, and lakes. It is usually stored in man-made reservoirs and transported through canals.

WRRF - Wastewater Resource Recovery Facility

