



STATE OF THE WATER

Addressing Water Quantity and Quality Challenges in Morrow County

October 2023

Introduction

This briefing paper provides an overview of some projects¹ in the region intended to help address water quantity and water quality issues, and highlights opportunities for the County to support these efforts through policies, planning, and coordination. The projects were developed mainly by private individuals or groups in response to current or anticipated impacts to their operations from a lack of reliable water.

The Umatilla Basin in Oregon is facing significant long-term water quantity and quality issues that are impacting the environment, the health of Morrow County's residents, and the ability for the area to support existing and future agricultural and industrial operations as well as growing drinking water demands. State and local agencies, local water providers, landowners, and other stakeholders have been working under a regulatory framework and through voluntary activities, to address these issues. Morrow County is committed to supporting actions where appropriate to address these wide-ranging water issues. As context for this effort, the County has prepared a set of State of the Water briefing papers to help communicate with policymakers, local stakeholders, and the public as the County works to identify policies and actions on these water issues.

The region has a decades-long history of trying to tackle its water quantity and water quality issues. The state designated four Critical Groundwater Management Areas (CGWAs) in response to declining groundwater levels and the Lower Umatilla Basin Groundwater Management Area (LUBGWMA) due to elevated nitrates in groundwater. These issues are described further in "State of the Water: Overview of Water Quantity Challenges in Morrow County" and "State of the Water: Overview of Water Quality Challenges in Morrow County," dated October 2023. Another briefing paper, "State of the Water: Overview of Nitrate Challenges for Domestic Well Users in Morrow County," describes the specific issues facing domestic well users.

1. For purposes of this paper, the term "projects" is used to refer to any formal effort or action to address water quantity and/or water quality issues that has had direct involvement by a state agency. A project can range from a physical infrastructure associated with a specific site or an educational program for best management practices.

Key Takeaways

- ✓ Many projects have been developed by private individuals or groups in response to current or anticipated impacts to their operations from a lack of reliable water.
- ✓ Proponents of aquifer restoration projects have been well organized and willing to work together and advocate for their interests.
- ✓ Projects to address the nitrate and other groundwater quality and quantity issues have focused primarily on voluntary best management practices.
- ✓ To be successful, creative solutions and actions in the region must be well organized and funded and have regulatory flexibility.
- ✓ Morrow County has an opportunity to support the private projects underway in the Umatilla Basin, including aquifer recharge, aquifer storage and recovery, and mitigation efforts.

Historical and Active Projects to Address Water Quantity and Quality Issues

Morrow County's Water Advisory Committee helped identify historical, active, and planned projects inventoried in this paper. The list of projects is not comprehensive but is representative of the projects that local agencies and irrigation districts, individual farmers, and cities have developed in response to the water quantity and/or quality issues in the region. The projects are grouped into the three categories, described below.

Water Supply Reliability and Aquifer Restoration. Investments in creative water supply solutions have found fertile ground in the Umatilla Basin, especially artificial groundwater recharge (AR) and aquifer storage and recovery (ASR) projects. Both types of projects can help restore declining groundwater levels by infiltrating or injecting surface water into the aquifer when water is available. AR can use wells or surface application of water for recharge, while ASR uses wells only. There are important regulatory permitting differences regarding source water permitting and the water quality requirements relative to the aquifer receiving the water. The earliest aquifer recharge project was started in the late 1970s and new projects continue today. One reason for their prevalence is that the state's Umatilla Basin Program² specifically promotes aquifer recharge as a tool for supplementing groundwater supplies and offsetting declining groundwater levels. There is also an economic incentive, especially for the agriculture community, to improve the reliability of water supply to meet current and future irrigation needs. Finally, proponents of aquifer restoration projects have been well organized and willing to work together and advocate for their interests. The lead agency permitting these projects is Oregon Water Resources Department (OWRD).

Water Quality Best Management Practices. Despite the designation of the LUBGWMA more than 30 years ago, no nitrate cleanup or remediation projects have been implemented in the region. Projects to address the nitrate and other groundwater quality issues have focused primarily on voluntary best management practices and education and outreach related to the LUBGWMA action plans (refer to the briefing paper "State of the Water: Overview of Water Quality Challenges in Morrow County"). While the LUBGWMA is managed through Oregon Department of Environmental Quality (DEQ), the regulatory framework for Groundwater Management Areas centers on Oregon Department of Agriculture's (ODA's) Agricultural Water Quality Management Program, which also focuses on voluntary water quality best management practices. Implementation of these projects and recommendations have been limited by lack of funding and staff.

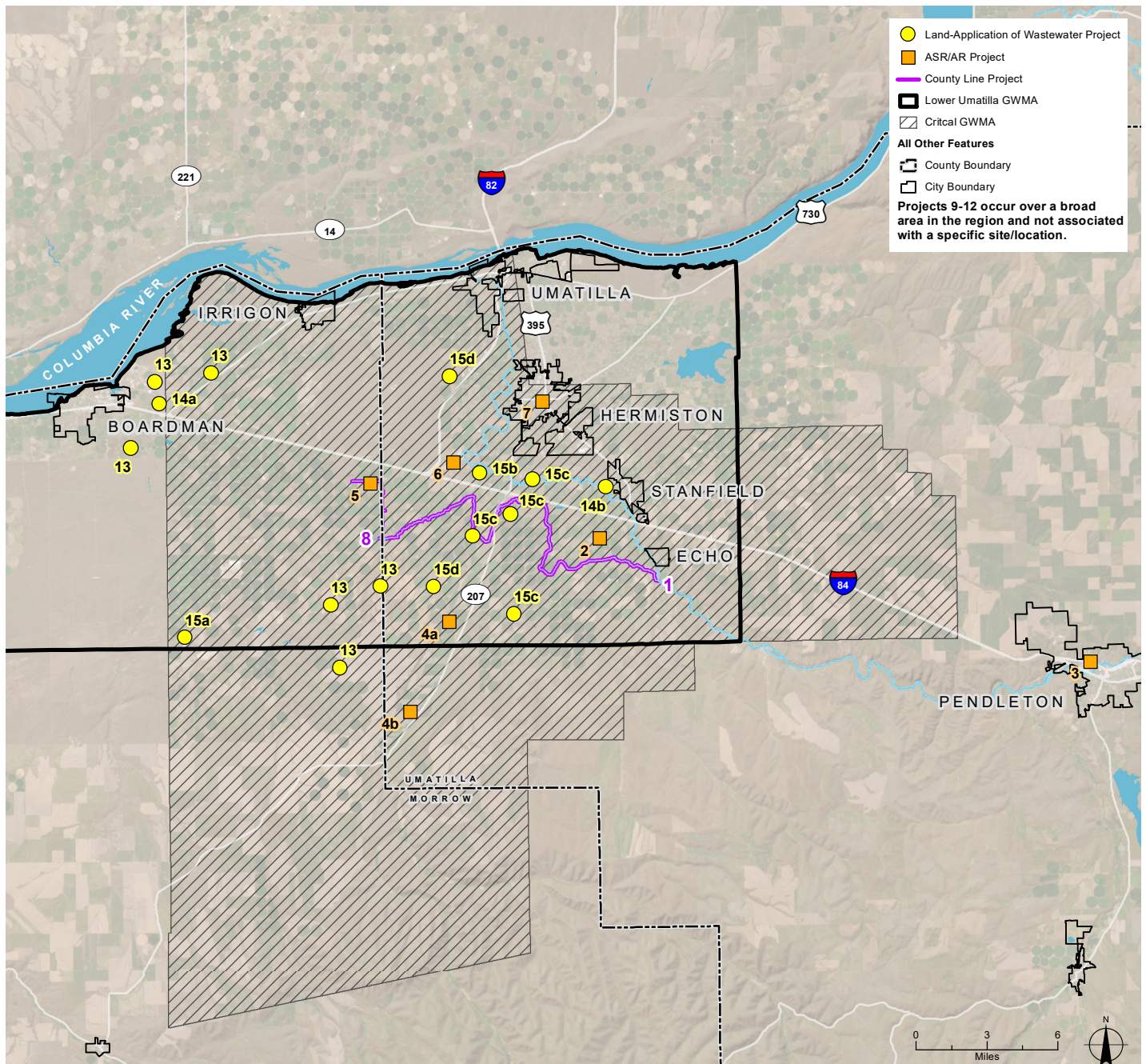
2. Basin programs are administrative rules which establish water management policies and objectives, and which govern the appropriation and use of the surface and groundwater within each of the Administrative Basins defined by the State of Oregon.



Water Reuse/Land Application of Wastewater. Land application of wastewater is a method of disposing of and treating wastewater by spreading it to tracts of land. These projects are permitted as Water Pollution Control Facilities (WPCFs) by DEQ. In the region, WPCFs are operated by the Cities of Boardman and Stanfield, the Port of Morrow, and several agricultural and food processing facilities. Land application is a relatively cost-effective way to manage wastewater, especially in areas where large parcels of land are available. A major advantage of the land application approach for the region is that the water can be recovered and later used as a source of nutrient-rich irrigation water. It also provides aquifer recharge benefits. A major disadvantage is the risk of additional loading of nutrients and other constituents to groundwater if permitted requirements of the WPCF are not met. In fact, the 2020 LUBGWMA Local Action Plan estimated that land application operations contribute nearly 5 percent of the nitrogen leached to groundwater.

The map below and the table on the following page provide an overview of each project. A companion table to this paper includes additional descriptions for each project.

Location of Groundwater Management Areas and Representative Water in the Region



Inventory of Projects Addressing Water Issues in the Umatilla River Basin Region

No.	Lead Entity	Start Year and Status	Type and Objective
Water Supply Reliability and Aquifer Restoration			
1	County Line Water Improvement District	1977 Operational	Artificial groundwater recharge (AR) of alluvial aquifer using Umatilla River water in canal.
2	Echo Meadows	2001 Not operational	Artificial recharge of alluvial aquifer with increased flow of cool groundwater back to the river.
3	City of Pendleton	2003 Operational	ASR wells to help meet summer water demands and reduce declining groundwater levels.
4	(a) McCarty Ranch (b) Madison Ranches	2006 Operational	AR and ASR is used to recharge the basalt aquifer and use stored water for irrigation
5	Umatilla Basin Water Coalition/Umatilla Basin Water Commission	2008 Completed	Feasibility assessment of using AR for the shallow alluvial aquifer and ASR to inject into deeper basalts to benefit both instream and irrigation uses.
6	Umatilla County and Westland Irrigation District	2017 Initial testing completed	Program to improve water delivery and supply reliability to district users, improve conservation, and support groundwater recharge using Columbia River water.
7	City of Hermiston	2021 Feasibility	Feasibility assessment of using ASR to meet summer water demands and reduce declining groundwater levels.
8	West Extension Irrigation District	Ongoing	Piping of open canals and ditches and conversion of flood irrigation to sprinkler irrigation to improve efficiency.
9	Morrow Soil & Water Conservation District (SWCD)	2023 In development	Grant application to use ASR to serve approximately 30 growers during the summer.
Water Quality Improvement Projects			
10	Morrow SWCD	2023 In development	Inventory of sprinkler system and rotation of irrigated crops to develop best management practices.
11	Oregon Health Authority (OHA)	2023 Operational	Vouchers for domestic well testing for nitrate concentrations and home treatment systems or water deliveries. This was built on the testing, treatment, and water delivery efforts initiated by Morrow and Umatilla Counties, Oregon Rural Action, and OHA in 2022.
12	Morrow SWCD	2024 In development	Technical assistance, education and outreach, and project implementation covering the LUBGWMA.
Water Reuse/Land Application of Wastewater (Water Pollution Control Facilities)			
13	Port of Morrow	Operational (1986)	Water reuse and land application program under a DEQ WPCF permit supplementing irrigation at participating farms.
14	Municipal WPCF permits	2020 Operational	WPCF land application of treated wastewater for (a) the City of Boardman and (b) the City of Stanfield.
15	Non-municipal WPCF permits	2015 Operational	WPCF land application of process wastewater for: (a) Olam West Inc., (b) Shearer's Foods, (c) JR Simplot Farm, and (d) Lamb Weston Farm.

Project Spotlights

Additional details for two of the longest operating projects in the region are presented below. Both projects are intended to bring a combination of water quantity and water quality benefits but have faced implementation challenges. The summaries below highlight opportunities and lessons for implementing other projects in the region.

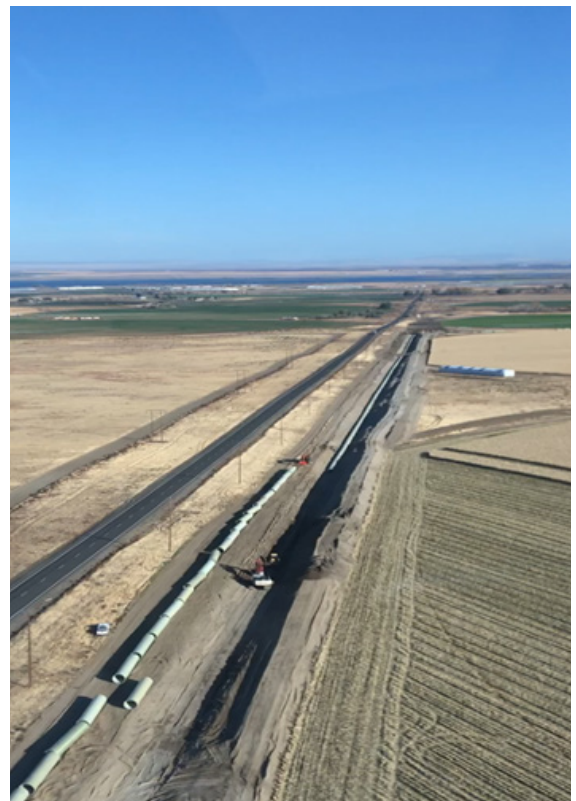
Umatilla Basin Aquifer Restoration

Project Objective: The County Line Water Improvement District project (Project 1 in the inventory) was developed in 1977, one year after the Ordinance Gravel CGWA was designated. In the mid-2000s, a broad stakeholder group wanted to build on the success of this project. The original County Line project used the Umatilla River as a source for aquifer recharge, while the subsequent expansion of the approach looked to the Columbia River. ***The objectives of the subsequent projects (Projects 2, 5, and 6) center on long-term water sustainability and aquifer restoration to address curtailment of groundwater while doing no harm to the Columbia River and optimizing use of recovering aquifers for the region's priorities.***

Project Description: In 2009, the initial feasibility study of the Umatilla Basin Aquifer Restoration (Project 5 in the inventory) was completed by the Umatilla Basin Water Coalition. The study evaluated the feasibility of using AR for the shallow alluvial aquifer and ASR to inject water into deeper basalts to benefit both instream and irrigation uses. After the feasibility study was completed, members of the Coalition formed the Umatilla Basin Water Commission to lead project development. This Stage 1 work envisioned a large-scale effort of annual recharge, but testing and preliminary engineering revealed that the capacity for recharge was much lower than expected (25,000 vs. 100,000 acre-feet per year). Furthermore, anticipated environmental benefits from raising aquifer levels and increasing discharge of groundwater to surface water bodies were less than predicted. Finally, the regulatory and legal review found that the Umatilla Basin Water Commission lacked authority to operate a banking and marketing program (namely, authorizing allocations of the stored water to individual water users).

Project Status: These project limitations led to the formation of the Columbia River Umatilla Solutions Task Force (CRUST) in 2013 to help address the issues identified from the Stage 1 work. CRUST developed revised options and consensus solutions, with an action plan based in part on consolidating previous regional water planning efforts in the basin. Later that year, the Umatilla Basin Water Commission was dissolved, and the Northeast Oregon Water Association (NOWA) was formed to represent the local water users and work toward implementing the CRUST action plan. NOWA has since been coordinating efforts to implement the plan, including developing a targeted list of pilot projects and seeking and managing funding for construction—key among them is the Ordinance Regional Water Supply and Aquifer Restoration project (Project 6 in the inventory).

Opportunities and Lessons: The Umatilla Basin Aquifer Restoration effort did not turn out as expected from its early implementation, but the significant time and money invested in the effort has yielded continued strong collaboration among the diverse stakeholders; significant data to understand and characterize the water resources of the region; and a consensus strategy and action plan that NOWA is continuing to implement. Major hurdles continue to be lack of funding and legal and regulatory mechanisms to address water banking limitations.



Pipeline segment for Ordinance Regional Supply

Port of Morrow Land Application and Water Reuse Program

Project Objective: The Port of Morrow (Port) operates a land application program that uses industrial wastewater from Boardman Industrial Park in Morrow County. *The program benefits food processors and industrial producers by helping them manage their wastewater and benefits local farmers by supplying low-cost, nutrient-rich irrigation water.*

Project Description: DEQ first issued the Port a WPCF permit in 1986, with expansions occurring several times over the years as new lands were added to the program. The Port receives industrial wastewater from food processors and other industrial flows (e.g., cooling water). This process wastewater is pumped into storage lagoons and then distributed to local farms for irrigation, beneficially reusing around 3 billion gallons of water annually. Some land application occurs on farmland adjacent to the industrial park, and some occurs at other sites approximately 15 miles southeast of Boardman. Farms participating in the program use the process wastewater to meet a portion of their crop water demands but continue to use other sources for irrigation. The compounding effects of the nitrate in the process water and already elevated nitrate concentrations in regional groundwater from irrigation wells can make managing nitrate loading as required by the WPCF permit challenging.

The Port's permit requires an Operations, Monitoring, and Management Plan that covers loading rates, fertilizer timing, and crop rotations. As part of the WPCF permit requirements, the Port also tests and documents the water quality of the wastewater it receives, and operates a water quality monitoring well network for the land application sites.

Project Status: DEQ has fined the Port previously for overapplying wastewater in certain times and areas that exceed nitrate loading rates allowed under the permit. To address excess nitrate loading, the Port acquired more land to spread out the application area, upgraded infrastructure to allow delivery of more low-nitrogen surface water for irrigation, and expanded winter storage capacity. The Port has also worked with its industrial customers to reduce wastewater flows and nitrogen loads.

DEQ issued a modified WPCF permit to the Port in November 2022. Changes included adding more land application acreage and eliminating land application during the winter, so wastewater received outside of the irrigation season must be stored until the spring. The Port has also planned more than \$500 million in new infrastructure projects to reduce nitrate loading. Planned projects include expanding the application area, separating wastewater streams, installing anaerobic digesters to treat wastewater by November 2023, installing oxidation treatment ditches by 2025, constructing additional storage capacity by 2026, and cleaning up an existing storage lagoon to add capacity by 2027.

Opportunities and Lessons: The new permit conditions, additional acreage, and significant investments in storage and treatment infrastructure are anticipated to reduce the Port's contribution to nitrate loading in the LUBGWMA while maintaining the benefits of the land application program. The Port has secured federal loans for the infrastructure improvements, but ongoing funding and aggressive schedules are key challenges for the Port. Over the long term, a key issue will be to maintain careful monitoring and collaboration with the farmers to understand loading parameters (crop types and use of other water sources) to ensure that all permit requirements are met.



Storage lagoon from the Port of Morrow's land application system

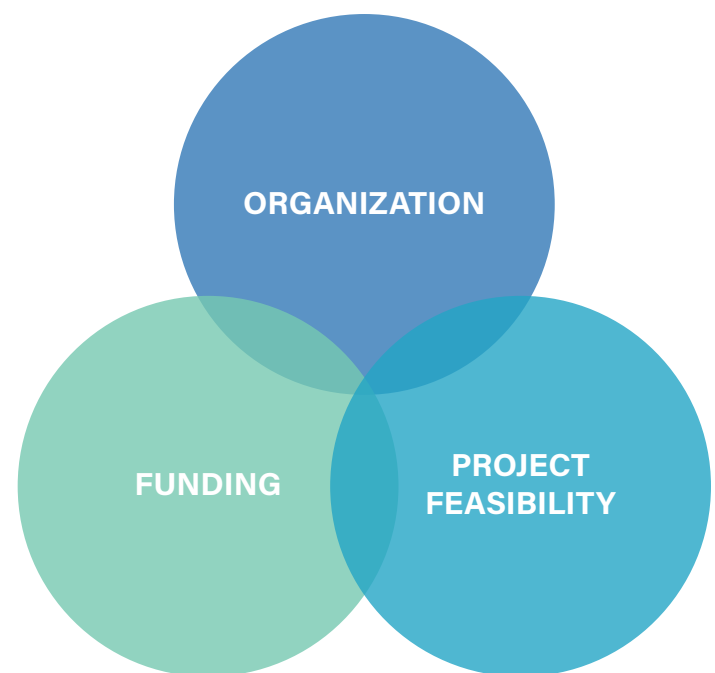
Morrow County's Opportunities to Support Projects

Morrow County's purview is to promote orderly growth while protecting and enhancing the environment, and to support healthier community through information, advocacy, and services. While Morrow County has not traditionally taken on an explicit and proactive water management role, it can facilitate progress toward addressing water quantity and quality issues in the region.

Many water users, including cities, individual farmers, and private industry in the region have engaged in trying to address water issues, as demonstrated by the projects described in this paper. The opportunities and lessons from the projects reviewed in this paper highlight some common critical needs for water projects in the region to be successful:

- **Organization:** A project needs to have a long-term vision and capacity to organize and implement a strategy/plan. Water issues take a long time to address and a stable organization is needed to facilitate collaboration among stakeholders, educate, lobby, and secure funding.
- **Funding:** Funding is needed not only for technical studies, planning/design, and construction, but also to support permitting and regulatory oversight. Regulatory agencies must compete for funding and can struggle to fulfill their regulatory responsibilities, which are critical for water security.
- **Project Feasibility:** Technical feasibility is critical to the success of a project, and a key aspect of that is to meet regulatory requirements. Proponents of regional-scale and outside-of-the box projects (e.g., water banks) will need to work within the regulatory framework. There also needs to be effective inter- and intra-agency coordination and willingness to work creatively with the project proponents to try and resolve regulatory limitations.

LONG-TERM PROJECT SUCCESS



Morrow County can play a role in supporting these project needs. The County can support management entities, establish funding mechanisms, and coordinate lobbying efforts for state funding and state agency assistance. In addition, the County can support the domestic well user community. While domestic well users can benefit broadly from any improvements in groundwater conditions, they have generally not been the targeted benefactors for water projects to date. The petition to EPA for Emergency Action in 2020 and the Morrow County emergency declaration in 2022 to address the nitrate issue have brought long-needed attention and focus to this community of water users. This, in turn, is an opportunity to leverage the attention to help move other water projects forward.

The next steps for Morrow County in the coming year (2023–2024) are to identify and develop appropriate water-related policies and actions consistent with the County's responsibilities and resources to help address the water quantity and water quality issues of the region.

This briefing paper was prepared by GSI Water Solutions, Inc., under contract with Morrow County.