

FINAL ARKANSAS PROGRAMMATIC WORK PLAN

Arkansas Water Plan

Prepared for:

Arkansas Department of Agriculture
Natural Resources Division
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In Partnership:



**US Army Corps
of Engineers®**
Little Rock District

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List of Acronyms

Acronyms	Definition
AFP	Arkansas Flood Plan
AWP	Arkansas Water Plan
GIS	Geographic Information Systems
IDC	Indefinite Delivery Architect-Engineer Contract
PAS	Planning Assistance of States
PWP	Programmatic Work Plan
RPEC	Regional Planning and Environmental Center (RPEC)
SWD	Southwestern Division, U.S. Army Corps of Engineers
USACE	United States Army Corps of Engineers

EXECUTIVE SUMMARY

Governor Sarah Sanders issued Executive Order 23-27 in August 2023 to conduct a comprehensive analysis and report of Arkansas's water needs and update the 2014 Arkansas Water Plan (AWP). The Department of Agriculture's Natural Resources Division (Natural Resources Division) has initiated the development of a Programmatic Work Plan (PWP) as Phase 1 of the AWP update. The United States Army Corps of Engineers (USACE) is supporting the development of the AWP using the Planning Assistance to the States (PAS) Southwestern Division (SWD) Regional Planning and Environmental Center (RPEC) under Indefinite Delivery Architect-Engineer Contract (IDC) No. W912BV23D0010, Task No. W912BV24F0015.

Governor Sanders stated, "A comprehensive strategy, to include an updated AWP, is necessary to address water demand projections, aging infrastructure, supply depletion, and flood mitigation capabilities by incorporating the most recent science and data." The AWP update is a response to the evolving water management needs of the state, considering all the above factors. The last update to the AWP was in 2014, and since then, substantial changes in the state's demographics, economy, infrastructure conditions, and environment have made an updated plan necessary. In addition, recent flooding events have underscored the urgent need for investment in a first-ever flood plan aimed at reducing the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment in Arkansas.

The six (6) overarching goals for the AWP update are:

- Goal 1.** Provide drinking water that supports public health and well-being.
- Goal 2.** Provide water that supports environmental and economic benefits to the state and supports interstate agreements.
- Goal 3.** Use the best available science, data, tools, practices, and technologies to support water resource planning and management for current and future needs.
- Goal 4.** Maintain and improve water supply, wastewater, stormwater, and flood control infrastructure and plan for future infrastructure needs.
- Goal 5.** Maintain, protect, and improve water quality to support designated uses of waterbodies.
- Goal 6.** Reduce the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment.

Michael Baker International (MBI) was contracted by the U.S. Army Corps of Engineers (USACE) Tulsa District in support of the Little Rock District to complete Phase 1 of the project. FTN Associates, now Olsson FTN, has been engaged as a subconsultant to MBI for Phase 1.

This PWP is the primary output of Phase 1. Planning is an important first step in updating the AWP to meet the water and flood related needs of communities and individuals across the state. This PWP provides a clear and structured outline of the proposed tasks, objectives, timeline, and resources needed to complete the AWP update and AFP development in Phase 2

of the project. The recommendations and content herein reflect a culmination of research and stakeholder engagement efforts performed in Phase 1.

The primary components of Phase 2 of the AWP update are provided below and organized by task in Figure ES-1.

- Model and assess water availability, estimate projected water demand, evaluate water infrastructure and water quality trends, and identify basins with projected challenges or opportunities where significant changes are known or expected from the 2014 AWP.
- Evaluate, develop, and recommend water management strategies for all water use sectors, and develop innovative new funding mechanisms to support their implementation.
- Prepare and integrate a flood plan component.
- Conduct statewide engagement throughout the process to identify the most pressing current issues and develop best practicable solutions in collaboration with representatives from all water use sectors, interested water planning groups, state and federal agencies, legislators, and local entities.
- Present and display components of the AWP through online interactive dashboards and story boards.

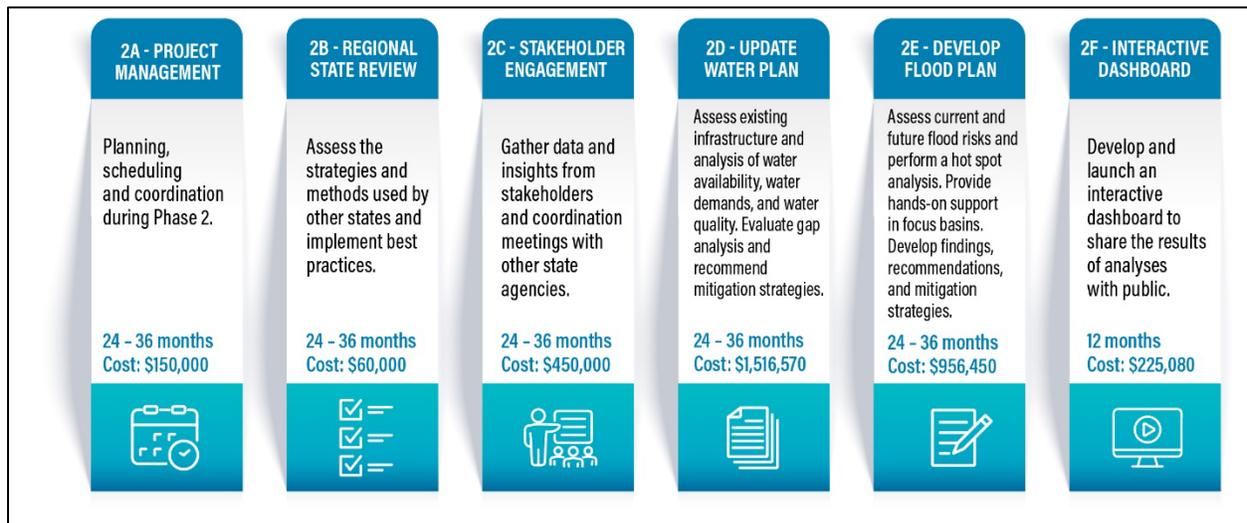


Figure ES-1: Detailed list of Phase 2 Tasks

The proposed Phase 2 includes the tasks needed for the update to the 2014 AWP as shown in Figure ES-1. The update will focus on building upon the findings from Phase 1. It aims to refine specific areas with gaps rather than overhauling the entire plan. This phase will encompass a series of tasks such as:

- Phase 2A Project Management includes various tasks, such as planning, scheduling, and coordination during Phase 2.
- Phase 2B Regional State Review assess the strategies and methods used in water and flood plans by other states to identify and implement best practices.

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- Phase 2C Stakeholder engagement includes gathering data and insights from stakeholders and coordination meetings with other state agencies.
- Phase 2D Update the AWP, which includes data collection, analysis of water availability from various sources, and consideration of extreme weather impacts. It includes sector-specific demand analysis (e.g., municipal, agriculture, industrial), validation of methodologies, updated water demand forecasts, and water quality assessment. Furthermore, this phase will include an evaluation of gap analysis, the formulation of mitigation strategies, and the creation of a comprehensive water plan document.
- Phase 2E includes the development of the new AFP. Through data collection, assessments, and analyses, it is envisioned that development of the AFP will yield a comprehensive understanding of current conditions and challenges related to flooding and flood management in Arkansas. The plan is intended to chart a path for the state in reducing the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment in Arkansas, as well as avoiding increasing flood risks in the future.
- Phase 2F Interactive Dashboard includes developing and launching an interactive dashboard to showcase and share the data collected and the results of analyses performed with stakeholders and the public.

MBI is recommending that Phases 2A through 2F be completed simultaneously over a 36-month schedule based on the availability of funds. In total, MBI estimates that approximately \$3.30 million will be required to complete Phase 2 over a 24-month schedule and \$3.36 million to complete the same tasks over a 36-month schedule, as it is designed in this PWP. Table ES-1 shows a summary of the costs and proposed schedule for two options.

Table ES-1: Summary of the costs and proposed schedule for two options

Phase / Task Description	Option 1 (2 Years) Probable Cost (\$)		Option 2 (3 Years) Probable Cost (\$)		
	Year 1	Year 2	Year 1	Year 2	Year 3
2A. Project Management	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
2B. Regional State Review	\$ 30,000	\$ 30,000	\$ 20,000	\$ 20,000	\$ 20,000
2C. Stakeholder engagement (Water Plan and Flood Plan)	\$ 225,000	\$ 225,000	\$ 150,000	\$150,000	\$ 150,000
2D. Update Water Plan	\$ 1,021,020	\$ 495,550	\$ 463,760	\$703,120	\$ 349,690
2E. Develop Flood Plan	\$ 282,150	\$ 674,300	\$ -	\$282,150	\$ 674,300
2E. Interactive Dashboard	\$ -	\$ 225,080	\$ -	\$ -	\$ 225,080
Total Cost	\$ 3,308,100	\$ 3,308,100	\$ 3,358,100	\$ 3,358,100	\$ 3,358,100

Implementation of the PWP and execution of AWP and AFP plans in Phase 2 of the project will need further direction and financial support from the State of Arkansas and the US Army Corps of Engineers.

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The PWP is divided into the following sections.

- Background information and introduction (Section 1)
- Goals and objectives of the AWP update (Section 2)
- Description of the major phases of work with their respective tasks (Section 3)
- Proposed schedule and cost (Section 4)

1 Introduction

Governor Sarah Sanders authorized a comprehensive update to the 2014 Arkansas Water Plan (AWP) through Executive Order 23-27. The Arkansas Department of Agriculture's Natural Resources Division (Natural Resources Division) was commissioned for the proposed update. The Natural Resources Division has organized the AWP update effort into two phases:

1. Review the most recent water plan and develop a programmatic work plan (PWP)
2. Update the AWP and develop an Arkansas Flood Plan (AFP).

United States Army Corps of Engineers (USACE) Tulsa District in support of the Little Rock District contracted Michael Baker International (MBI) for the first phase of the AWP update. As part of this task MBI developed this Programmatic Work Plan (PWP) with the overall strategy to update the AWP for the State of Arkansas under the Planning Assistance to the States (PAS) Southwestern Division (SWD) Regional Planning and Environmental Center (RPEC) Indefinite Delivery Architect-Engineer Contract (IDC) No. W912BV23D0010, Task No. W912BV24F0015. The PWP will provide a strategy to update the AWP, using current data and stakeholder input.

This AWP update builds upon the goals and objectives within the 2014 AWP. Major components of Phase 2 of the AWP update include:

- Model and assess water availability, water demand projections, evaluate water infrastructure and water quality trends, and identify basins with projected challenges or opportunities where significant changes are known or expected from the 2014 AWP.
- Evaluate, develop, and recommend water management strategies for all water use sectors, and develop innovative new funding mechanisms to support their implementation.
- Prepare and integrate a flood plan component.
- Conduct statewide engagement throughout the process to identify the most pressing current issues and develop best practicable solutions in collaboration with representatives from all water use sectors, interested water planning groups, state and federal agencies, legislators, and local entities.

2 Workplan Goals and Objectives

The most recent AWP was completed a decade ago and there is an urgent need to update the AWP to meet the changing needs of communities across the state. The goal of a PWP is to provide a clear and structured outline of the tasks, objectives, and resources necessary to complete the AWP update. Since the last update in 2014, substantive changes have occurred in Arkansas that should be evaluated for future water planning. Key drivers for updating the current AWP include:

- Updating water demand and infrastructure needs based on shift in population distribution over the past 10 years and protecting water resources equity for the state.
- Increase resiliency to address weather trend changes and extreme events such as high temperatures, low temperatures, flooding, and drought.
- Incorporating legal obligations from new or updated federal and state regulations, such as the Clean Water Act Section 401, 402, and 404; Dam Safety, MS4 permits, Nonpoint Source Pollution Management Plan, the Arkansas Nutrient Reduction Strategy, Lead and Cooper Rule, and the Clean Watershed Needs Survey.
- Identify new and changes to existing funding sources, strategically navigate eligibility requirements, and expand resources for programs and projects that will achieve AWP goals and objectives.

As part of the process, PWP identified the goals, objectives, means and methods for the development and update of the AWP. The six (6) overarching goals for the AWP update are:

- Goal 1. Provide drinking water that supports public health and well-being.
- Goal 2. Provide water that supports environmental and economic benefits to the state and support interstate agreements.
- Goal 3. Use the best available science, data, tools, practices, and technologies to support water resource planning and management for current and future needs.
- Goal 4. Maintain and improve water supply, wastewater, stormwater, and flood control infrastructure and plan for future infrastructure needs.
- Goal 5. Maintain, protect, and improve water quality to support designated uses of waterbodies.
- Goal 6. Reduce the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment.

Governor Sanders also called on the Natural Resources Division, through the EO 23-27, to focus on flood preparedness, which is the creation of the AFP. Arkansas has a long history of devastating floods. In recent years, the state has seen an increase in the intensity and frequency of flooding. Events like the 2019 Arkansas River flood, which caused billions in damages and losses of life, underscore the urgency of the state investing in planning and solutions to protect Arkansas from future flood events.

This PWP provides a recommended framework for developing the AFP as part of the AWP update. The recommendations and content herein reflect a culmination of research and stakeholder engagement efforts in Phase 1 of the AWP update. The proposed phases and tasks in this PWP reflect a path forward to make progress towards the known issues, plan goals, and objectives developed in Phase 1.

The overarching goal for the AFP portion of the AWP is captured in Goal 6, which is to “Reduce the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment.” Accomplishing this goal will require a two-fold effort to both reduce today’s risk and avoid further increasing risks into the future. Firstly, the plan will investigate how the state can reduce the impact of the flood risks that Arkansans face today through activities such as mitigation projects, education and outreach, and proposed studies. Secondly, the plan will investigate how flood risk is projected to grow in the future, both because of projected increases in floodplain extents and new development in these areas. Opportunities to avoid increasing future flood risks through responsible floodplain management, regulations, and policies will be explored. The plan will reflect issues and needs throughout the state. To use limited planning resources most effectively, this PWP includes a recommendation as a part of the development of the AFP, to provide additional hands-on support for identification of potential solutions and recommendations in the areas of greatest flooding risks and vulnerabilities.

The PWP roadmap was developed by considering the following:

- Goals and Objectives - a list of goals and objectives for the water plan update and target audiences and intended use of the updated AWP, and a list of goals and objectives for the new flood plan. These can be found in Appendices B and C.
- Key Issues - a list of issues to be addressed in the water plan, including 50-year supply and demand projections by basin, infrastructure needs assessment with potential solutions, conservation saving strategies for agriculture, industrial uses, municipal uses, and funding mechanisms. These can also be found in Appendices B and C.
- Components of the water plan - a list of the desired components of the water plan, including supply availability projections, demand projections, infrastructure mapping, infrastructure reliability, impacts of weather, development impacts on water supply and water quality, and water supply management alternatives. See Section 3.
- Stakeholder engagement – input from the stakeholders. The Stakeholder Engagement Plan for Phase 1 is included as Appendix E.

3 Programmatic Work Plan

This section provides a roadmap to complete the AWP key activities for the plan update by describing necessary tasks and work products. Figure 3-1 provides an overview of the major phases of work and tasks in the PWP. Appendix A has a detailed table with each of the tasks and subtasks for each phase of the project.

Phase 1: Development of Programmatic Work Plan

Phase 1 activities establish the vision for the AWP, its interim and end products, and the PWP "roadmap" of activities to achieve those goals. Top-level tasks in Phase 1 include:

- **1A: Overarching Goals and Objectives** - AWP goals, objectives, and components to be updated. Appendix B contains more details about the overarching goals and objectives.
- **1B: Develop a Programmatic Work Plan** - Develop a PWP framework to facilitate participant input regarding AWP key issues, and end products. Develop PWP to reflect Natural Resources Division vision and stakeholders needs and interests and assign priority to key tasks.
- **1C: Workplan for the Statewide Flood Plan** – Develop a final workplan for the statewide Flood Plan.
- **1D: Stakeholder Engagement Plan** - Develop a list of stakeholders interested in water planning utilizing existing regional partnerships and established planning groups.

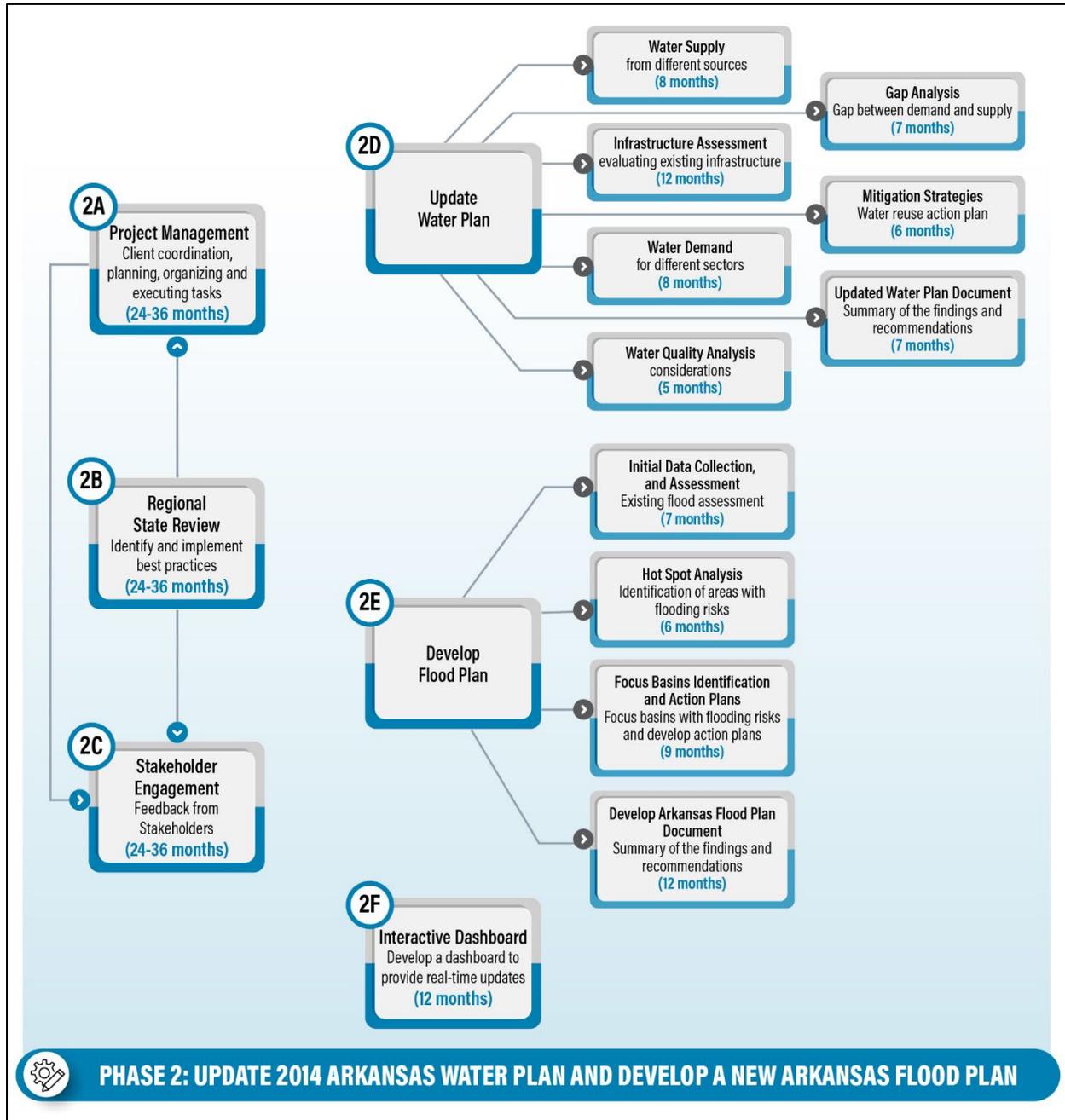


Figure 3-1: Detailed list of tasks of AWP Phases

Phase 2: Update 2014 Arkansas Water Plan and Develop the Arkansas Flood Plan

Phase 2 activities include Project Management (2A), Regional State Review (2B), Stakeholder Engagement (2C), AWP update (2D), development of the AFP (2E) and interactive dashboard roll out (2F). Top-level tasks in Phase 2 include:

2A: Project Management – includes the kick-off meeting, a detailed project management plan for all tasks described in statement of work, work plan schedule, monthly status reports and bi-weekly status meetings.

2B: Regional State Review – Assess the strategies and methods used in water and flood plans by other states to identify and implement best practices.

2C: Stakeholder Engagement – Collect data, information, and insights directly from stakeholders to inform the tasks for the Water Plan and Flood Plan. Stakeholder engagement is a key task for all the phases of the AWP, ensuring that the plan is reflective of and responsive to the needs and insights of those it impacts. Develop a draft and final Outreach and Stakeholder Engagement Plan to support efforts in other tasks. This should include but is not limited to:

- Gather data, information, and insights directly from stakeholders to inform tasks above. Conduct outreach to educate stakeholders and the public on the planning process. Methods include: In-person, hybrid, or online stakeholder meetings in various locations across the state, webinar(s), coordination meetings with other state agencies, presentations at existing events and conferences, online survey(s), marketing materials development (flyer, social media post, etc.).
- For each task, share results and status updates with stakeholders and request feedback, as applicable.
- Create a stakeholder group for each focus basin identified in Task 2C. Hold multiple meetings with each focus basin groups.
- Release the draft plan for public comment. Conduct outreach and stakeholder engagement to educate and encourage feedback on the plan.

2D: Update the 2014 Arkansas Water Plan

- **2D 100: Water Supply** – Data collection, availability analysis (traditional and nontraditional sources), weather extreme supply scenarios, permit supply availability analysis and water supply availability report.
- **2D 200 Water Demand** - Confirm water sectors (municipal, agriculture, industrial etc.) for demand analysis, methodology validation, weather extreme scenarios, demand allocation, update water demand by sectors and water demand forecast report.
- **2D 300 Water Quality Analysis** – Data collection, water quality regulatory considerations, water quality characterization and water quality summary report.
- **2D 400 Infrastructure Assessment** – Evaluate existing infrastructure and update the infrastructure needs assessment by incorporating parameters related to system reliability, resiliency, and sustainability.
- **2D 500 Gap Analysis** – Evaluate available excess surface water, model supply/demand scenarios to forecast shortages, resilience and uncertainty assessment, critical groundwater areas, and gap analysis report.
- **2D 600 Mitigation Strategies** – Identify focus basins to apply mitigation strategies, water reuse action plan, groundwater treatment methods, and groundwater recharge.

- **2D 700 Updated Water Plan Document** – Develop a comprehensive water plan report that encompasses updated components and provides a detailed summary.

2E: Develop a new Arkansas Flood Plan:

- **2E 100: Initial Data Collection and Assessments** – Collect data from available online sources and from stakeholder engagements described in 2C. Perform high-level desktop assessments and analyses of the data and information collected to develop a comprehensive understanding of current conditions and challenges related to flooding in Arkansas.
 - Topic areas for data collection and stakeholder engagement efforts include: types of flooding (stormwater/local flooding, riverine or lake, dam or levee failure, etc.); roles and responsibilities for entities involved in flooding and stormwater management; flood control infrastructure (dams, levees, stormwater drainage systems, etc.); flood history (past events and disasters, damages); current conditions flood risk and vulnerability (flood hazard mapping, exposed assets, vulnerabilities); future conditions flood risk and vulnerability; floodplain management, land use, regulations, laws, policies, and programs; ongoing and proposed flood mitigation projects, studies, planning efforts, and activities; initiatives or opportunities to capture excess flood flows for water supply purposes or otherwise contribute to water development in the state; funding availability and needs; and flood-related public awareness and outreach initiatives.
- **2E 200: Hot Spot Analysis** – Develop a methodology for and then perform a GIS-based hot spot analysis to identify areas with the greatest flooding risks and vulnerabilities, using the data and information collected in 2E 100.
- **2E 300: Focus Basin Identification and Action Plan** – Select approximately 5-8 watershed-based focus basins with the greatest flooding risks and vulnerabilities based on the results of the hot spot analysis. The intent of this task is to provide additional hands-on support for identifying potential solutions and recommendations in the areas with the highest levels of risk and vulnerability. Working with each basin's stakeholder groups (described in 2C), discuss and identify key concerns for each area. Collect any additional data required and perform additional analyses to better understand the issues and concerns in each basin. Work with stakeholders to develop basin-specific action plans for key flood-related issues based on the insights, data, and analyses performed in this task.
 - It is envisioned that the stakeholders in each focus basin will be able to tailor the content of their action plan depending on their unique needs. For example: in areas of high growth with floodplain development and management concerns, stakeholders may require coordination and suggestions for improvements to local building regulations. In a rural area lacking data on their infrastructure, a GIS map or other analysis of existing infrastructure and proposed improvements

may be requested. In a data-rich area, the action requested could entail using existing modeling to assess feasibility of mitigation project alternatives and funding needs.

- **2E 400: Develop Arkansas Flood Plan Document** – Develop the AFP document. The plan will include a state-wide summary of the planning efforts, key findings for each of the topics listed in Task 2E 100. This includes legislative and policy recommendations and proposed flood mitigation solutions and strategies. The plan will also include a summary of the efforts and action plans for each focus basin. Consider feedback from stakeholder engagement efforts in 2C and revise and finalize the plan document.

2F: Interactive Dashboard – Develop and publish AWP Executive Report to provide a comprehensive overview of water management strategies and funding assessments. A dashboard includes the data collected, and results of analyses performed with stakeholders and the public. Conduct stakeholder engagement and outreach to share tools and request feedback.

4 Funding and Schedule

Figures 4-1 and 4-2 below outline the estimated AWP cost and timeline for Phase 2 of the project, with the understanding that these may fluctuate based on funding levels and project needs. Two options were considered, one option to complete Phase 2 in 24 months and another option to complete Phase 2 in 36 months. The total estimated cost of Phase 2 option 1 is \$3.3 million and will require approximately two years to complete.

Phase / Task Description	Opinion of Probable Cost	2024	2025												2026											
		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Contract Award																										
Phase 2: Update 2014 Arkansas Water Plan and Develop a new Arkansas Flood Plan	\$ 3,308,100																									
YEAR -1 (Total Cost)	\$ 1,608,170																									
2A. Project Management	\$ 50,000																									
2B. Regional State Review	\$ 30,000																									
2C. Stakeholder engagement (Water Plan and Flood Plan)	\$ 225,000																									
2D. Update Water Plan																										
2D.100 Water Supply	\$ 261,800																									
2D.200 Water Demand	\$ 443,190																									
2D.300 Water Quality Analysis	\$ 114,070																									
2D.400 Infrastructure Assessment	\$ 201,960																									
2E. Develop Flood Plan																										
2E.100 Initial Data Collection and Assessment	\$ 214,500																									
2E.200 Hot Spot Analysis	\$ 67,650																									
YEAR - 2 (Total Cost)	\$ 1,699,930																									
2A. Project Management	\$ 50,000																									
2B. Regional State Review	\$ 30,000																									
2C. Stakeholder engagement (Water Plan and Flood Plan)	\$ 225,000																									
2D. Update Water Plan																										
2D.500 Gap Analysis	\$ 145,860																									
2D.600 Mitigation Strategies	\$ 312,290																									
2D.700 Updated Water Plan Document	\$ 37,400																									
2E. Develop Flood Plan																										
2E.300 Focus Basins Identification and Action Plans	\$ 435,050																									
2E.400 Develop Arkansas Flood Plan Document	\$ 239,250																									
2F. Interactive Dashboard	\$ 225,080																									

Figure 4-1: Proposed schedule and costs for Option 1

The total estimated cost of Phase 2 option 2 is \$3.36 million and will require approximately three years to complete. The work conducted under the PWP, including engagement activities, will be prioritized based on funding availability. Foundational elements critical to subsequent tasks will be prioritized in terms of both schedule and funding. The PWP may be updated periodically through the course of developing the AWP to reflect actual funding, feedback from engagement groups, and implementation priorities.

5 Conclusion

Governor Sanders' Executive Order 23-27 was a call to action for the Arkansas Department of Agriculture and the Arkansas Natural Resources Commission to update the AWP. Governor Sanders stated, "A comprehensive strategy, to include an updated Arkansas Water Plan, is necessary to address water demand projections, aging infrastructure, supply depletion, and flood mitigation capabilities by incorporating the most recent science and data." An update to the AWP is needed due to significant changes in the state since the last AWP update in 2014.

The purpose of this document is to provide a clear and structured outline of the tasks, objectives, timeline, and resources necessary to complete the AWP update and AFP creation in Phase 2 of the project. The recommendations and content herein reflect a culmination of research and stakeholder engagement efforts performed in Phase 1.

Additional background information on this effort, including goals and objectives, is included in Section 2 of this document. Section 3 provides the overview of the major phases of work and tasks to be performed. Funding required and a proposed schedule for these phases and tasks are included in Section 4. Together, these sections make up the proposed roadmap for updating the AWP and creating the AFP. This is an important first step in answering the Governor's call for creating plans to meet the water and flood related needs of communities and individuals across the state. Looking to the future, additional direction and funding from the State of Arkansas and the U.S. Army Corps of Engineers will be needed for the Arkansas Department of Agriculture to implement the PWP and begin Phase 2 efforts.

APPENDIX A
PWP Outline

Appendix A- PWP Outline

Programmatic Work Plan Phases			Task	Brief Description
Phase 2A	Project Management (For all years)			For both Water Plan update and development of Flood Plan
Phase 2B	Regional State Review			Assess the strategies and methods used in water and flood plans by other states to identify and implement best practices.
Phase 2C	Stakeholder engagement			Gather data, information, and insights directly from stakeholders to inform the tasks above. Examples of methods include: In-person stakeholder meetings in various locations across the state, webinar(s), coordination meetings with other state agencies, presentations at existing events and conferences, online survey(s), marketing materials development.
Phase 2D	Update Water Plan			
2D 100	Water Supply			
	2D 110	Surface Water		
		111	Data Collection and Analysis	Compile 2020 stream flow data and current allocations (permits, diversions, compacts), and existing storage by 2014 AWP major river basins. Calculate average flow and drought flow.
		112	Availability Analysis – Traditional Sources	Update storage availability from reallocation of USACE reservoirs and farm pond/irrigation reservoirs. Evaluation will include use of existing basin studies, hydrologic data, and surface water models with sufficient period of record if available, to include drought effects. Changes in rainfall and land use patterns has to be accounted
		113	Availability Analysis -Nontraditional Sources	Identify and evaluate potential direct and indirect reuse of municipal, produced (O&G) and industrial water. Develop assumptions and quantitative estimates of available reuse supply at county level then aggregate to watershed basin.
	2D 120	Ground water		
		121	Data Collection and Analysis	Compile and aggregate the available information based on legal and physical availability of groundwater supply. Confirm sustainable yields to be used from MERAS model for coastal plain aquifers and investigate model or data availability for interior highland aquifers.
		122	Brackish Groundwater	Compile and analyze data on existing and potentially feasible brackish groundwater supply. USGS published country wide data can be used as basis. This will include targeted engagement with ongoing working group and NRD staff.
		123	Availability Analysis – Traditional Sources	Evaluation will include use of existing aquifer studies, bore data, and groundwater models with sufficient period of record if available to include drought effects.
		124	Availability Analysis -Nontraditional Sources	Identify and evaluate potential for direct and indirect use of Brackish groundwater tailored to focus on specific sector use . Develop assumptions and quantitative estimates of available supply at county/aquifer level.

Appendix A- PWP Outline

Programmatic Work Plan Phases			Task	Brief Description
	2D 130		Weather Extreme Supply Scenarios	High-level evaluation of extreme weather impacts on both surface and groundwater availability. Effects on precipitation, evaporation, Infiltration, and percolation should be accounted.
	2D 140		Water Supply Availability Report	Develop Technical Report documenting data and analyses performed under this task.
2D 200	Water demand			
	2D 210		Data Collection	Compile most recent available county-level projections used for 2014 AWP to estimate future water demand, e.g. population, livestock, employment, irrigated acres. Collect relevant local forecasts and studies related to water demand obtained through local engagement
	2D 220		Demand Model and Forecast for All Water Use Sectors	Reevaluate established methodology in the 2014 AWP. Assess for any required updates, incorporating recommendations from NRD for forecast models till 2050 at five-year intervals.
	2D 230		Methodology Validation and Cross Reference	Evaluate local forecasts data collected in 2A 210 and 2014 AWP forecast for potential calibration and cross reference.
	2D 240		Weather Extremes Scenarios	Consider and incorporate the potential effects of extreme weather conditions when projecting water usage by category. This could include effects of drought, long periods of unusually warm or cold temperatures.
	2D 250		Water Use data	Collect and aggregate updated 2020 USGS water use data for applicable demand sectors. Account for any changes in reporting criteria by end users .
	2D 260	Water use sector update		
		261	Municipal Demand	Use USGS 2020 municipal demand 2020 US Census data to estimate per capita water use by county. Where needed (see task 2A 220) update water demand forecast using updated county population projections. Report local demand forecasts provided by utilities. Calculate demand projections for average conditions and extreme weather conditions.
		262	Crop Irrigation	Update base period water application rate for crop type and GIS analysis to forecast agricultural land use pattern. Conduct required calibration to account for discrepancy in projected irrigated area from 2014 study. As needed (per task 2A 220), update county irrigation demand projections using USGS 2020 water use as baseline, and any revised calculation factors developed in task 2A 210. Calculate projections for average conditions and extreme weather conditions.
		263	Industrial	Collect and assess latest employment projections published by The Arkansas Division of Workforce Services (DWS) for Workforce Investment Areas (WIA). Update base period industrial demand for each WIA based on latest WUDBS reporting. If appropriate, estimate projections for extreme weather conditions in addition to average conditions.
		264	Thermoelectric power (Coal, nuclear, and natural gas)	Update base period water demand by fuel type and cooling method. Collect updated power demand forecast published by US Energy Information Administration (EIA) and Project till 2050 at 5-year intervals. Account for any green power generation action plan and its effects on water use. If appropriate, estimate projections for extreme weather conditions in addition to average conditions.

Appendix A- PWP Outline

Programmatic Work Plan Phases			Task	Brief Description
		265	Duck hunting and Habitat Maintenance	Updated WUDBS reported by duck hunting clubs, recreational activities, and commercial habitat maintenance institutions. Account for non reported use based on workgroup input and NRD recommendations.
		266	Aquaculture	Collect and evaluate latest National Agricultural Statistics Service (NASS) data for trend changes and target aquaculture species. Update base period water application rate by species type.
		267	Livestock	Collect and evaluate latest County Agricultural Production Survey (CAPS) and Census of Agriculture (COA) for trend changes and target animal group. Update Base period water application rate by animal type.
		268	Mining	Collect and evaluate latest employment projections published for WIA based on Mining applicable North American Industrial Classification System (NACIS). Revise base period water use for latest WUDBS reporting. Additionally, consider the water demand associated with lithium mining in the Magnolia region.
		269	Minimum Flow Validation (Recreation, Navigation, Habitat Maintenance)	Evaluate and incorporate work from state appointed workgroup based on the 2014 AWP recommendation if available. Use revised value or approach to define this demand for ecological and navigational needs.
	2D 270	Demand Allocation		Evaluate current demand attainment sources
		271	Allocate Demands to Basins by Scenarios	Reaggregate projected water demands by five year interval and water use to water supply basin.
		272	Allocate Demands to Aquifer by Scenarios	Reaggregate projected water demands by five year interval and water use category to aquifer extents.
		273	Demand Trend Analysis	Conduct a quantitative assessment of characteristics and trends based on water use categories and water source used.
	2D 280		Demand Forecast Report	Develop technical forecast report documenting data analyses and methodologies performed under this Task
2D 300	Water Quality Analysis			
	2D 310		Data Collection	Assess latest available pertinent water quality data and information for both surface and Groundwater. Clarify focus Water Quality (WQ) parameters with NRD staff. Data sources from Arkansas Department of Health, ADEQ, and University of Arkansas, AGFC continuous temperature data
	2D 320		WQ Regulatory Considerations	Create a comprehensive list of existing water quality regulations and identify the significant factors impacting the economy, recreation, and water supply permitting and planning. EPA is the federal regulatory body, inputs from APCEC for surface water regulations, ADEQ on implementation, and NRD for groundwater standards will be vital.
	2D 330		Summary of Surface Water and Groundwater Data/Thresholds	Aggregate and analyze data for selected water quality parameters, with a potential focus on variation in water temperatures at the basin level.
	2D 340		Water Quality Characterization – Nontraditional Sources	Develop water quality characterization and focus WQ parameters for non-traditional sources of surface and groundwater. Consideration should be given to meet local demands.
	2D 350		Water Quality Summary Documentation	Develop Technical Report documenting data, analyses, and evaluations performed under task.

Appendix A- PWP Outline

Programmatic Work Plan Phases		Task	Brief Description
2D 400	Infrastructure Assessment		
	2D 410	Data Collection	Compile the most recent infrastructure-related data available at county, regional, and state level. Data includes municipal water treatment plants, municipal wastewater treatment facilities, distribution, and collection systems. Survey of water system owners/operators are part of this task
	2D 420	Regulation and Policy review	Aggregate the most recent and future considerations to amendments of state and federal regulations concerning water quality and infrastructure requirements. Additionally, evaluate implementation approaches considering feedback from NRD Staff.
	2D 430	Assessment	Update the infrastructure needs assessment by incorporating parameters related to system reliability, resiliency, and sustainability. Also, Identify major system updates due to regulatory mandates from task 2D 430. If feasible, include infrastructure mapping as part of the task.
	2D 440	Funding Vehicles	Ascertain and consolidate the latest updates in funding approaches and accessible resources to comply with the mandates set by regulatory bodies. Also, to implement resiliency and sustainability measures indentified in task 2D 430.
2D 500	Gap Analysis		
	2D 510	Evaluate Available Excess Surface Water	Reevaluate available excess surface water, based on latest surface water supply data and considerations established in Task 2A 100. Determine or clarify appropriate safety factor to be used for the gap analysis.
	2D 520	Supply/Demand Scenarios to Forecast Shortages	Apply the fundamental water equation of supply and demand at basin level. To determine surpluses and shortages for various water use categories over the planning period. Efforts should be made to identify local water supply gaps
	2D 530	Resilience and Uncertainty Assessment	Identify statewide types/categories of threats to water supply systems. Run best and worst case scenarios to validate weather extreme stressors by basin. This analysis could be limited by data availability
	2D 540	Focus Scenarios and Supplemental Runs	Identify and conduct gap analysis for focus areas to consider targeted allocation. Adjustments to the scenario runs and database will be performed at the appropriate level, to reflect workgroup/staff feedback.
	2D 550	Gap Analyses Report	Develop Technical Report documenting data, analyses, and scenarios performed under this task.

Appendix A- PWP Outline

Programmatic Work Plan Phases		Task	Brief Description
2D 600	Mitigation Strategies		
	2D 610	Surface Water Mitigation	
		611	Identify Focus Watershed Area
			Identify focus watershed to apply mitigation strategies, alleviating the burden on groundwater supply. such as inter-basin transfers and conservative irrigation methods. Additional water supply sources to support economic expansion should also be identified as part of this exercise.
		612	Water Reuse Action Plan
			Collaborate with stakeholders to explore and evaluate water reuse possibilities for potential integration into water management policies. If suitable, create a Water Reuse Action Plan.
		613	Increase Surface water Utilization
			Compile and update recommendations to promote increase in surface water utilization to offset groundwater use. Streamline regulations related to dam and impoundment construction to enhance surface water availability. Also, implementing increase in storage on-farm and off-channel using tax credit programs.
	2D 620	Ground Water Mitigation	
		621	Identify Focus Groundwater Area
			Identify focus groundwater areas based on significant groundwater level declines or water quality degradation. Information from task 2A 270 will serve as basis.
		622	Groundwater Treatment Needs
			Evaluate the treatment requirements for brackish groundwater to promote its use in both agricultural and non-agricultural sectors.
		623	Groundwater Recharge
			Develop strategies to encourage and implement groundwater recharge methods, with a focus on previously identified critical areas.
	2D 630		Public awareness and education
			Develop public education protocols and create informative materials, recognizing that public acceptance is crucial for implementing mitigation strategy.
	2D 640		Drought Action Plan
			Develop drought contingency action plan with focus on priorities for water use sector allocations.
	2D 650		Measurement and Assessment
			Evaluate feasibility of more comprehensive monitoring of both surface and groundwater networks. Establish criteria to assess the value of water (qualitative and quantitative), informing sector-specific allocation decisions.
	2D 660		Water Conservation Methods
			Assess current water conservation strategies and recent advancements aimed at lowering water usage for identified sectors. Develop proactive plans to encourage widespread adoption of conservation practices for both surface and groundwater use.
	2D 670		Water Quality Mitigation Measures
			Evaluate the feasibility of implementing water quality mitigation measures, including adopting riparian buffer zones and backflow prevention methods.
	2D 680		Policy or legislative recommendations (Optional)
			Recommend appropriate regulatory or policy modifications to address water quality and quantity mitigation initiatives. Contingent on mitigation outcomes.
	2D 690		Mitigation Strategy Report
			Develop Technical Report documenting data, assessments and methods under this task.
2D 700	Water Plan Document		Create an all-encompassing water plan report that includes updated components, along with a detailed summary

Appendix A- PWP Outline

Programmatic Work Plan Phases		Task	Brief Description
Phase 2E	Develop Flood Plan		
2E 100	Initial Data Collection and Assessment		
	2E 110	Data collection	<p>Collect data from available online sources and from stakeholders engagement efforts in 2B 500.</p> <p>Topic areas for data collection and assessment efforts include: types of flooding (stormwater/local flooding, riverine or lake, dam or levee failure, etc.); roles and responsibilities for entities involved in flooding and stormwater management; flood control infrastructure (dams, levees, stormwater drainage systems, etc.); flood history (past events and disasters, damages); current conditions flood risk and vulnerability (flood hazard mapping, locations of assets at risk, vulnerability data, etc.); future conditions flood risk and vulnerability; floodplain management, land use, regulations, laws and policies; ongoing and proposed flood mitigation projects, studies, planning efforts, and activities; initiatives or opportunities to capture excess flood flows for water supply purposes or otherwise contribute to water development in the state; funding availability and needs; and flood-related public awareness and outreach initiatives.</p>
	2E 120	Perform assessments	<p>Perform high-level assessments and analyses of the data and information collected to develop a comprehensive understanding of current conditions and challenges related to flooding in Arkansas. This includes but is not limited to:</p> <ul style="list-style-type: none"> - For the current condition risk assessment, perform ArcGIS-based analyses to overlay areas of hazard risk, exposure, and vulnerability. - Qualitatively analyze the potential for changes to flood risk in the future due to changing land use, development, and precipitation patterns. This does not include any new modeling or mapping. - To assess floodplain management practices, gather, review, and analyze a representative sample of local floodplain management regulation ordinances.
2E 200	Hot Spot Analysis		
	2E 210	Develop methodology	Develop a methodology for factors to consider in the hot spot analysis and associated weighting/scoring.
	2E 220	Perform analysis	Perform the hot spot analysis using the methodology developed. Consider feedback from stakeholder engagement efforts in 2B 500 and revisit analysis, as necessary.

Appendix A- PWP Outline

Programmatic Work Plan Phases		Task	Brief Description
2E 300	Focus Basin Identification and Action Plans		
	2E 310	Select focus basins	Select 5-8 focus basins based on the hot spot analysis results. Consider feedback from stakeholder engagement efforts in 2B 500 and revisit selections, as necessary.
	2E 320	Perform analyses and develop action plans	The intent of this task is to provide additional hands-on support for identifying potential solutions and recommendations in the areas with the highest levels of risk and vulnerability. Working with each basin's stakeholder groups (described in 2B 500), discuss and identify key concerns for each area. Collect any additional data required and perform additional analyses to better understand the issues and concerns in each basin. Work with stakeholders to develop basin-specific action plans for key flood-related issues based on the insights, data, and analyses performed in this task.
2E 400	Develop Arkansas Flood Plan Document		
	2E 410	Draft Plan	Draft the Arkansas Flood Plan document. This should include a summary of efforts from Phase 2B and documentation of findings from these efforts, including where there are gaps in information. Based on the findings, develop and present overall recommendations for improvements to flood management in Arkansas, including policy recommendations. Include a summary of basin-specific action plans and recommendations. Where possible, the plan should include estimated funding needs for carrying out suggested recommendations and action plans.
	2E 420	Final Plan	Consider feedback from stakeholder engagement efforts in 2B 500 and revise and finalize the plan document.

Appendix A- PWP Outline

Programmatic Work Plan Phases		Task	Brief Description
Phase 2F	Interactive Dashboard		
2F 100	Website Landing Page	Water and Flood plans	Develop and publish AWP Executive Report to provide a comprehensive overview of water management strategies and funding assessments. It includes policy recommendations, statewide water assessments, and regional solutions. Develop requirements and wireframes for website. Develop initial website layout for review. Develop graphics and color scheme
	2F 110		Website Direct Costs
	2F 120		Hosting on provider, domain registration, SSL certificate (yearly)
	2F 130		Compile and Publish reports on NRD website
	2F 130		Review and feedback on website landing pages for reports
			Iterative process for gathering feedback and changes on website landing pages and incorporating changes into site design
2F 200	Dashboard Rollout		
	2F 210		Determine desired capabilities of the dashboard, user interface design and graphic standards. It includes Identifying and planning interaction elements, data storage requirements , and target audience portal design.
	2F 220		Interactive dashboard requirements gathering
	2F 220		Platform deployment
		221	Deploy ArcGIS Online tenant for hosting data and analytical products
			ArcGIS AEC Project Delivery Subscription
			GIS Platform subscription Cost per year
	2F 230		Database Structure Development
			Assess and create a robust database to handle data processing and model outputs. Develop queries based on required functionalities for both internal state use and a publicly accessible portal.
		231	Water plan
			Develop ArcGIS Hosted feature services to store data products for dashboard development and functions. Load data to feature services from study results
		232	Flood Plan
			Develop ArcGIS Hosted feature services to store data products for dashboard development and functions. Load data to feature services from study results
	2F 240		Interactive User Interface
			Develop base ArcGIS Dashboard for both water plan and flood plan similar to Oklahoma Water Resources Plan dashboard
		241	Water plan portal
		242	Flood Plan portal
	2F 250		Identify, Refine, and Add Functionality
			Iterations to review base dashboard functionality and refine features based on feedback. Assuming 3 iterations
		251	Water Plan Dashboard Iterations
		252	Flood Plan Dashboard Iterations
	2F 260		Develop Online User Guide
			Develop user guide for each dashboard application to be delivered as either web page or linked document
		261	Water Plan User Guide
		262	Flood Plan User Guide
	2F 270		User Awareness and Orientation Workshops and Web Content
			Promotional engagement material development
	2F 280		System maintenance, monitoring and data updates
			Yearly system management (~4 hours per month)

APPENDIX B

Final Overarching Goals and Objectives for the Water Plan

FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS WATER PLAN

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Appendix A-1 – Goals from 2014 Water Plan

List of Acronyms

Acronyms	Definition
AGFC	Arkansas Game and Fish Commission
AWP	Arkansas Water Plan
BMP	Best Management Practices
DEQ	Division of Environmental Quality
EPA	Environmental Protection Agency
Forestry Division	Arkansas Department of Agriculture's Forestry Division
LOA	Letter of Agreement
NPS	Non-Point Source
NRCS	Natural Resources Conservation Service
PAS	Planning Assistance of States
PWP	Programmatic Work Plan
USACE	United States Army Corps of Engineers
WUDB	Water Use Database

1 Introduction

The Arkansas Department of Agriculture’s Natural Resources Division (Natural Resources Division) has initiated the development of a Programmatic Work Plan (PWP) as part of the Arkansas Water Plan (AWP) update. The PWP identifies the goals, objectives, means and methods for the update of the AWP. This AWP update also includes the addition of Arkansas’ first statewide flood plan. The U.S. Army Corps of Engineers (USACE) is supporting the development of the AWP through the Planning Assistance to States (PAS) program as documented in a September 2023 Letter of Agreement (LOA) between USACE and Natural Resources Division.

The purpose of the AWP is to conserve and protect the state’s water resources, with a long-term goal of sustainable use to maximize the environmental and economic benefit to the State of Arkansas, and the health and well-being of its citizens (ANRC Title XXIV).

As shown in the figure below, the AWP is guided by an overall **mission** for sound management of water resources in Arkansas. The AWP **overarching goals** are broad statements of outcomes that will result in achieving the mission. AWP **objectives** are shorter term, measurable actions that work toward achieving the overarching AWP goals. Issues and recommendations (not shown in the pyramid) are used to identify strategies or actions that will be undertaken to work toward achieving the AWP objectives.



Figure 1-1: Overview of AWP

2 Background Information

2.1 2014 Mission

The Mission of the AWP is to balance the conservation, development, and protection of the state's water resources, and to sustain uses that benefit the health, well-being, environmental, and economic interests of the citizens of Arkansas.

The Mission of the AWP update will remain the same as the 2014 AWP Mission.

2.2 Target Audiences and Intended Uses

The AWP is intended to be used as a water planning and decision-making resource for all water use sectors in Arkansas. The target audiences for the AWP are broadly divided into administrative, agency, and public partners. A few examples of partners in each of these categories are listed below.

- **Administrative partners:** policy makers, water administrators, water utilities, municipalities, etc.
- **Agency partners:** various state and federal agency stakeholders such as Natural Resources Division, Arkansas Department of Energy and Environment Division of Environmental Quality (DEQ), Arkansas Game and Fish Commission (AGFC), Arkansas Department of Agriculture's Forestry Division (Forestry Division), Arkansas Department of Health, Arkansas Department of Emergency Management, U.S. Army Corp of Engineers (USACE), U.S. Environmental Protection Agency (EPA), U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), etc.
- **Public partners:** water users, the general public, and interest groups including non-profits, non-governmental organizations that focus on infrastructure or engineering, watershed groups, etc.

2.3 Drivers

Governor Sarah Sanders signed Executive Order 23-27 in August 2023 to update the AWP and conduct a comprehensive analysis of and report on Arkansas's water needs. There have been substantial changes in the state since the last update in 2014 that need to be documented and evaluated through the update of the AWP. Key drivers for updating the 2014 AWP include:

- Updating water supply availability from both traditional and non-traditional sources. The quantity of excess surface water deemed as available water must be reassessed.
- Updating water demand and infrastructure needs based on recent and forecasted population changes (i.e., increase in Northwest Arkansas and decreases in East and South Arkansas) over the past 10 years.
- Increase resiliency to address the effects of changing weather patterns, including the frequency of extreme weather events such as high temperatures, flooding, and drought.

FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS WATER PLAN

- Incorporating information from new and updated federal and state plans, studies and regulations, such as the EPA Lead and Cooper Rule, Clean Water Act Sections 401, 402, and 404; Dam Safety, MS4 permits, Arkansas Retail Water Provider Rule, Nonpoint Source Pollution Management Plan, the Arkansas Nutrient Reduction Strategy, the Clean Watershed Needs Survey and others.
- Identify new programs and resources, changes to existing programs and funding sources that will achieve AWP goals and objectives.
- Identify barriers that impeded implementation of AWP goals and objectives.
- Research national and regional state government approaches to water management, infrastructure financing, and policies that may be applicable to Arkansas.
- Prepare an AWP with specific and targeted actions to improve water management in Arkansas.

3 Proposed 2024 Overarching Goals

Overarching goals are the broad statements of outcomes that will result in achieving the mission that the AWP is designed to support. These overarching goals are intended to encompass the high-level, overall aims of the AWP. The 2014 AWP goals are referenced in parentheses to show that this update encompasses the past efforts of stakeholders as well as expands upon these efforts with objectives to achieve these goals. Objectives, or action items, that help achieve the overarching goals are listed in the next section. The overarching goals listed below are based on 2014 AWP and stakeholder review and input.

Goal 1. Provide drinking water that supports public health and well-being. (2014 Goals 1, 16, 19, 23)

Goal 2. Provide water that supports environmental and economic benefits to the state and supports interstate agreements. (2014 Goals 2, 3, 4, 5, 6, 15, 16, 18, 20, 23, 24)

Goal 3. Use the best available science, data, tools, practices, and technologies to support water resource planning and management for current and future needs. (2014 Goals 2, 7, 8, 9, 10, 16, 17, 19, 20, 21, 22)

Goal 4. Maintain and improve water supply, wastewater, stormwater, and flood control infrastructure and plan for future infrastructure needs. (2014 Goals 11, 12, 13 14)

Goal 5. Maintain, protect, and improve water quality to support designated uses of waterbodies. (2014 Goals 17, 19, 23)

Goal 6. Reduce the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment.

4 Proposed 2024 Objectives

Objectives are shorter term, measurable actions that work toward achieving the overarching AWP goals. These objectives guide efforts toward achieving the overarching goals. The objectives listed below are based on stakeholder input.

Objectives for the first five AWP Goals are described below. Objectives corresponding to Goal 6 are discussed in *Appendix C: Overarching Goals and Objectives for the Arkansas Flood Plan*.

Goal 1: Provide drinking water that supports public health and well-being.

Objectives:

- Reliably meet the water quantity and quality needs for drinking water. (2014 Goal 1)
- Protect surface and groundwater drinking water sources. (2014 Goal 19)
- Identify and address current and future water stressors, such as population shift, weather extremes, inefficient irrigation, and loss associated with current water policy, laws, and regulations (2014 Goal 9, 13).
- Identify and address ways to provide resiliency for extreme weather events. (2014 Goal 16; Natural Resources Division comments)
- Identify opportunities for cooperation among water suppliers to establish a reliable contingency water supply. (Natural Resources Division comments)
- Provide public education and outreach about water conservation and usage. (2014 Goal 23)
- Encourage and expand water reclamation and reuse in high demand areas (2014 Goal 20).
- Improve water and wastewater utility dependability and resiliency by addressing inadequate and poorly maintained infrastructure. (2014 Goal 14; Natural Resources Division comments)

Goal 2: Provide water that supports environmental and economic benefits to the state and supports interstate agreements.

Objectives:

- Reliably meet the water quantity and quality needs for each water use sector. (2014 Goals 3, 4, 5, 6, 18)
- Identify ways to provide resiliency during times of drought. (2014 Goal 16; Natural Resources Division comments)
- Identify and address current and future water stressors, such as population shift, weather extremes, ineffective water policy, laws, and regulations (2014 Goals 9, 13).

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- Identify implementable water resources alternatives that are socially, fiscally, technically, and environmentally feasible to protect, enhance, and conjunctively use surface and groundwater. (2014 Goal 20)
- Work cooperatively with other regions and states, and among agencies and entities to provide and protect water use. (2014 Goals 15, 24)
- Provide public education and outreach about water conservation and usage. (2014 Goal 23).
- Expand incentivization to encourage adoption of water conservation measures that reduce groundwater withdrawals (irrigation BMPs, water audits, well metering, water reuse, etc.) and move the State toward sustainable groundwater use. (2014 Goals 2, 15, 20)
- Review and recommend water policy, laws, maps, and regulations to address water recharge (wetlands, karst topography, etc.), flooding (floodplain maps), stormwater management (MS4 requirements) and water quality (stream buffer protections, pollutant discharge permits, etc.).
- Identify opportunities for federal, state, and local funding. (Natural Resources Division comments)

Goal 3: Use the best available science, data, tools, practices, and technologies to support water resource planning and management for current and future needs.

Objectives:

- Identify emerging water resource management needs and address them. (2014 Goal 9)
- Integrate alternatives in water resource decisions. (2014 Goal 21)
- Connect water users to technical and financial resources for effective water use planning and management. (Natural Resources Division comments)
- Identify and address use and demand/need data gaps. (2014 Goal 10)
- Refine criteria for declaring drought, water shortages, and excess water, and advance policies and procedures for allocating water during times of shortage or drought. (2014 Goal 16)
- Identify and recommend procedures and criteria to improve upon existing instream flow methodology. (2014 Goal 17)
- Address differences in regional economies and resources in water resources planning and management. (2014 Goal 2)
- Improve water use data collection, management, and reporting (Natural Resources Division comments).
- Expand water use monitoring (to improve characterization of surface water and groundwater challenges). (stakeholder input)
- Update and improve water resources mapping (infrastructure, water quality, flood, etc.). (stakeholder input)

FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS WATER PLAN

- Expand reclamation of water from various sources so that it can be treated and utilized again for beneficial purposes (e.g., industrial process water, irrigation, potable water supply, groundwater recharge, etc.). (2014 Goal 20)
- Manage water use demand to alleviate gaps or depletions by implementing conservation and/or drought management measures. (2014 Goal 16)

Goal 4: Maintain and improve water supply, wastewater, stormwater, and flood control infrastructure and plan for future infrastructure needs.

Objectives:

- Plan for shifting population demographics and their implications on infrastructure operation and maintenance. (2014 Goal 13)
- Address aging infrastructure. (2014 Goal 14)
- Provide operation and coordination recommendations and resources to levee boards, improvement and/or drainage districts. (Natural Resources Division comments)
- Identify opportunities to cooperatively address regional water and wastewater needs. (2014 Goals 11, 12)
- Identify and develop new and improved opportunities for infrastructure funding. (Natural Resources Division comments)
- Update flood maps and flood ordinances to improve resiliency in a changing environment.
- Address stormwater management for water quality, stream protection, and flood protection in urban growth areas.
- Identify opportunities for water reclamation and reuse in urban areas.
- Identify and implement urban BMPs for water quality protection and alternative stormwater management designs.
- Identify and implement agricultural BMPs for water quality and irrigation management in rural areas.
- Evaluate and update existing water supply, wastewater, stormwater, and flood control planning and oversight (codes, ordinances, permits, maps, regulations, etc.) to account for future infrastructure demands.

Goal 5: Maintain, protect, and improve water quality to meet its designated uses.

Objectives:

- Attain, maintain and protect the designated uses of streams and lakes that enhance socioeconomic, agricultural, and natural benefits.
- Sustain groundwater uses by protecting groundwater quality.
- Provide effective education to water users about practices to protect surface water and groundwater quality. (2014 Goal 23)

FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS WATER PLAN

- Improve the quality of water, while providing land management, wetland, and riparian protection for fish and wildlife. (2014 Goals 17, 19)
- Expand water quality monitoring.
- Develop and implement watershed plans.
- Explore novel techniques and approaches of time-limited conservation easements, water quality trading, and other approaches for improving water quality.
- Identify funding mechanisms for nonpoint source (NPS) pollution management projects to improve water quality.

5 Issues to be Addressed

Issues identify specific actions needed to make real progress toward achieving the Mission, Overarching Goals, and Objectives of the AWP. The 2014 AWP identified 10 issues and provided recommendations for addressing them. During Phase 1 outreach meetings, stakeholders identified potential issues to be addressed in the AWP update. State and federal stakeholders have identified sustainability as a concern that should be addressed in the AWP update. The AWP update will include documentation of the work that has occurred related to the 2014 AWP issues, and the associated recommendations, since the 2014 AWP.

The issues from the 2014 AWP and Phase 1 stakeholder meetings input are:

1. Conjunctive Water Management and Groundwater Decline – Declining water levels in aquifers and the need to move toward sustainable use of groundwater.
2. Tax Incentives and Credits for Integrated Irrigation Water Conservation – Tax incentives and credits are needed to encourage the implementation and management of integrated irrigation water conservation practices. How does changing tax laws such as the reduction or elimination of the state income tax impact current tax credit incentives.
3. Funding Water Resources Development Projects – State-issued general obligation bonds are vital to finance and refinance the development of water; waste disposal; pollution control, abatement, and prevention; drainage, irrigation, flood control, wetlands, and aquatic resources projects to serve the citizens of the State of Arkansas. In the absence of State-issued general obligation bonds, new state funding programs must be considered.
4. Public Water and Wastewater Infrastructure - Public water and wastewater infrastructure is failing and in need of repair and replacement throughout Arkansas.
5. Need for Identifying and Training New Water Operators – According to utility managers during stakeholder meetings, a shortage of qualified water operators is anticipated.
6. Excess Water for Non-riparian Withdrawal and Use – The statutory definition of excess surface water should be based on sound science.
7. Drought Contingency Response – Planning for [water] allocation during drought is needed before droughts occur.
8. Reallocation of Water Storage in Federal Reservoirs - Reallocation of water storage in U.S. Army Corps of Engineers reservoirs is needed to increase available water for existing and new uses.
9. Improving Water Quality Through Nonpoint Source Management – Water quality is affected by nonpoint sources of pollutants and nonpoint source management projects need state financing in addition to federal financing.
10. Public Awareness and Education - Public awareness and education are critical for water planning and management in Arkansas.

FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS WATER PLAN

11. Water Use Reporting - The accuracy of water use reported for agricultural irrigation has been questioned because much of the water use is not accurately measured or metered.
12. Weather extremes – The change in precipitation patterns has been questioned and increased severity of weather events associated with it.
13. Land Use – The effects of land use changes in some regions of Arkansas since the 2014 AWP on water resources needs to be assessed.
14. Backflow prevention is mentioned multiple times as this measure would ensure the protection of water sources from contamination.
15. Fish and Wildlife – Change current fish and wildlife flow goals to manage water resources in a manner that protects the ecological needs of fish and wildlife.
16. Navigation – Significant drought and below normal water conditions has limited navigation and the shipment of goods via major rivers leading to disruptions in local and state economics.

6 Components to be Updated

This section reviews the components of the 2014 AWP and associated information to determine if there is a need to update. A summary of the results of the Phase 1 data review is provided in Table 6-1.

Table 6-1: Summary of 2014 AWP components to be updated for 2024 AWP

Component	Do not update	Update	Evaluate	Remove
Water Use		X		
50-year demand projection		Population and economic projections; Drinking Water, Industrial; Mining; Thermoelectric; Agriculture; Fish and wildlife support; Drought Contingency Plan	Self-supplied Commercial; Navigation	Shale gas demand
50-year supply projection	Groundwater quality	Surface water quantity; Surface water quality; Groundwater quantity		
Water Supply Gaps		X		
Infrastructure Needs Assessment		X		
Issues		X		
Recommendations		X		
Statewide Institutional Setting Report		X		

6.1 Water Use

An updated estimate of state water use is needed. USGS is preparing 2020 county level estimates of water use for most of the AWP water use sectors. There are concerns about the quality and/or usefulness of the data in the Arkansas Water Use Database system (WUDB) and/or its accessibility.

6.2 50-year Demand Projection

Projections for most sectors need to be updated to incorporate effects of changing weather patterns, economic changes, and population shifts.

6.2.1 Drinking Water

This addresses the 2014 AWP water demand sectors Municipal (Public Supply) and Self-supplied Domestic. Water demand projections for these sectors are based on population projections. In a comparison of county population projections for 2020 from the 2014 AWP to Census 2020 county populations, the 2020 Census population was less than the 2014 projections for 51 counties, and greater than the 2014 projections for 4 counties, with 2020 Census population for 20 counties within the range of 2014 projections. Thus, Municipal and Self-supplied Domestic demand projections must be updated for the majority of counties.

6.2.2 Industrial

This section addresses the 2014 AWP water demand sectors Industrial, Self-supplied Commercial, Mining, and Shale Gas. The shale gas water demand is no longer needed; shale gas development in Arkansas essentially stopped around 2016. Expansion of industry since 2014, and projected changes, such as initiation of lithium mining in the state, suggest that demands for other industrial water demand sectors should be updated (Table 6-2). The degree of change in baseline and projected water demands will vary from county to county.

Table 6-2: Update recommendations for demand projections for industry-related 2014 AWP water demand sectors

2014 AWP water demand sector	Update recommendation
Industrial	Update recommended
Self-supplied commercial	This is a small portion of projected demand. Update not recommended, pending evaluation of changes in data.
Mining	Update may be appropriate for some counties.
Shale Gas	Remove

6.2.3 Thermoelectric power

Changing weather patterns are expected to affect power demand (van Ruijven, De Cian and Sue Wing, 2019; US EPA, 2023). Water withdrawals reported for fossil fuel-based power generation in the Arkansas WUDB have not changed much between 2015 (1,378 MGD) and 2020 (1,256 MGD). However, Entergy has agreed to shut down Arkansas power plants that use coal and natural gas (Sweeney, 2021; Eley, 2021). Thus, planned changes in the power generation profile

of Arkansas are likely to reduce future cooling water demand, while 2014 projections were for increasing cooling water demand. Thermoelectric energy had the second-highest estimated water demand in the 2014 AWP. Therefore, projections for this use will need to be updated.

6.2.4 Crop Irrigation

Information from Census of Agriculture Table 10 indicates that irrigated area decreased 1.1% between 2012 (4,795,969 ac) and 2022 (4,739,011 ac). Information in the Arkansas WUDB also indicates a decrease in irrigated area between 2010 (4,716,413 ac) and 2022 (3,109,082 ac) (note that these data are from the annual crop statistics and include water applied to pasture, timber, sod, and horticultural plants). Projections for the 2014 AWP were for increases in irrigated area over time, with irrigated area in 2020 projected to be 5,513,415 acres. Changing weather patterns are expected to affect crop production (methods and outcomes) and demand for irrigation water. Given that crop irrigation accounts for the largest portion of water demand in the 2014 AWP, demand projections for crop irrigation should be updated.

6.2.5 Livestock

Information from the Arkansas WUDB indicates that water withdrawals for poultry operations have increased significantly between 2015 (3,000) and 2022 (952,822). However, the sum of broilers and layers reported for Arkansas counties in the 2022 Census of Agriculture is less than projected chicken numbers in 58 of the 75 counties. Livestock demand is a relatively small portion of the 2014 AWP projected water demand at the state level. We recommend that livestock water demand projections be evaluated at the county level to determine whether an update is warranted.

6.2.6 Aquaculture

Expected higher temperatures, increased flooding, and increased drought events in Arkansas due to changing weather patterns will all likely affect aquaculture systems. The Census of Agriculture reports that acres of aquaculture increased from 2013 (25,464) to 2018 (29,936), by about 18% (US Department of Agriculture National Agricultural Statistics Service, 2024). In the Arkansas WUDB, reported acres of aquaculture have declined between 2010 (73,330) and 2018 (35,077), and between 2018 and 2022 (27,335). Water use for aquaculture reported in the Arkansas WUDB has also declined between 2010 (299,698 ac-ft) and 2022 (97,368 ac-ft) (from annual crop statistics). We have greater confidence in the Census of Agriculture data. Given the likely increase in aquaculture since the 2014 AWP, and considering that aquaculture is a moderate water demand, updating aquaculture demand projections is recommended.

6.2.7 Duck Hunting and Habitat Maintenance

Acreage flooded for waterfowl reported in the Arkansas WUDB has declined from 2010 (111,769) to 2022 (54,791) (from annual crop statistics). Duck habitat is the third highest projected demand in the 2014 AWP, so an updated estimate of this demand is recommended.

6.2.8 Navigation

Update not recommended, pending evaluation of information about current and future water needs for navigation.

6.2.9 Fish and Wildlife Flows

A recommendation of the 2014 AWP was to evaluate alternative methods for estimating Fish and Wildlife Flows (ecological flows). In the 2014 AWP fish and wildlife flows were calculated as part of the excess surface water estimation. Since the 2014 AWP, minimum flows to support fisheries have been established at USACE reservoirs, and ecological flow projects for several rivers have been initiated. We recommend the work related to ecological flows since the 2014 AWP be reviewed and documented in the update. In the 2014 AWP Fish and Wildlife Flows are assumed to also meet water needs for water-based recreation.

6.3 Drought contingency plan

Drought is mentioned as a hazard in the 2018 All-Hazards Mitigation Plan. However, there is no mention of priorities for water use sector allocations. We recommend documenting progress toward this goal in the AWP update.

6.4 50-year supply projection

6.4.1 Surface water quantity and excess surface water

Surface water quantity and excess surface water will need to be updated to account for:

1. Precipitation and surface water flow trends, e.g. increased stream flows in Northwest Arkansas (Hart, Howe and Blankenship 2023).
2. Changes in demand projections.
3. Changes in USACE reservoir allocations.
4. Changes in surface water withdrawals/use, e.g., Bayou Meto and Grand Prairie irrigation projects. Information reported in the Arkansas WUDB indicates that surface water withdrawals may have more than doubled between 2015 (1,420,471 MGD) and 2020 (3,774,028 MGD).
5. Construction of agricultural ponds and irrigation tailwater and storage reservoirs since 2014.

6.4.2 Surface water quality

We recommend updating the miles and acres of surface water not meeting water quality standards for designated uses, focusing on the designated uses impacted. We recommend to characterize potential water quality impacts of nonpoint source projects and characterize potential water quality impacts of increased incidence of drought and flood events predicted by weather models for our region/state.

6.4.3 Groundwater quantity

Eastern aquifers have continued to experience decline. Updating groundwater quantity is recommended.

6.4.4 Groundwater quality

We are not aware of a need to update this information.

6.5 Water supply gaps

Given update recommendations for water demand and supply projections, the water supply gap analysis will need to be updated.

An infrastructure needs assessment was conducted for the 2014 AWP as part of the water supply gap analysis. An update of the infrastructure needs assessment has been requested. This update has been requested to include infrastructure mapping and assessment of system reliability, resiliency, and sustainability (i.e., funding). It is recommended that this update address municipal water supply and wastewater infrastructure.

6.6 Issues

New issues have been identified (see Section 5), thus this component of the AWP will need to be updated. New issues may include local water supply gaps and new water quality standards imposed through state and federal regulations.

6.7 Recommendations

Since issues have changed, recommendations for mitigation will also need to be updated. Updated recommendations will include strategies for addressing issues in local focus areas.

6.8 Statewide Institutional Setting Report

There have been changes in both State and Federal laws and assistance (including funding) programs that it would be useful to document. Recommend updating this report.

6.9 List of Stakeholder Involvement Activities Completed

Document the stakeholder involvement activities of the AWP update.

6.10 References

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Appendix A-1

Goals from 2014 Water Plan

2014 AWP OVERARCHING GOALS

2014 ORDER	
DEMANDS	
1.	First and foremost, meet the drinking water needs of the state.
3.	Reliably meet agricultural water needs.
4.	Reliably meet industrial water needs.
6.	Reliably meet the water quantity and quality needs to help support navigation, recreation, and tourism.
SCIENCE AND TECHNOLOGY	
7.	Use the best available science, data, tools, and technologies to support water resource decisions.
8.	Employ the latest supply management and water efficiency technologies among the different sectors of use including residential, commercial, industry, natural resources, and agriculture.
10.	Use best available science and data to update and implement the AWP, and identify and address data gaps and needs.
INFRASTRUCTURE	
11.	Optimize existing water, wastewater, and flood control infrastructure, including identifying opportunities to cooperatively address regional water and wastewater needs.
12.	Maximize the current infrastructure reliability including dams, levees, and treatment and conveyance facilities.
13.	Plan for changing demographics and related infrastructure maintenance and operation implications.
14.	Improve and update existing infrastructure and address aging infrastructure.
ECOLOGICAL PROTECTION	
5.	Manage water resources in a manner that protects the ecological needs of fish and wildlife.
17.	Identify and recommend procedures and criteria to improve upon existing instream flow methodologies taking into consideration water quality, fish and wildlife needs, aquifer recharge, and navigation needs at the statewide and basin-specific level.
19.	Identify opportunities to manage water, wastewater, and stormwater to improve the quantity and quality of water, while providing for wise land management, wetland, and riparian protection for fish and wildlife sustainability.
WATER MANAGEMENT	
2.	Optimize the use of surface and groundwater for the differing economies of the unique regions of the state.
9.	Identify and address emerging water resource management needs as identified through the water planning process.
15.	Use surface and groundwater sources for the multiple intrastate uses complying with interstate compacts.
20.	Identify implementable water resources alternatives that are socially, fiscally, technically, and environmentally feasible to protect, enhance, and wisely use surface and groundwater.

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21. Identify and implement alternatives.
22. Allow for adaptability with changing technology, water uses, and socioeconomic conditions.
24. Work cooperatively with other regions and states, and among agencies and entities responsible for stewardship of the state's natural resources.

WATER ADMINISTRATION

16. Refine criteria for declaring drought, water shortages and excess water, and advance policies and procedures for allocating water during times of shortage or drought.
18. Include recreation and tourism as non-consumptive water uses.

EDUCATION

23. Provide education and open communication about the AWP and its implementation.

APPENDIX C

Final Overarching Goals and Objectives for the Flood Plan

APPENDIX C: FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS FLOOD PLAN

Prepared for:

Arkansas Department of Agriculture
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July 2024

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List of Acronyms

Acronyms	Definition
ADEM	Arkansas Division of Emergency Management
AFP	Arkansas Flood Plan
AGFC	Arkansas Game and Fish Commission
ARDOT	Arkansas Department of Transportation
AWP	Arkansas Water Plan
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PAS	Planning Assistance of States
PWP	Programmatic Work Plan
RPEC	Regional Planning and Environmental Center
USACE	United States Army Corps of Engineers
USGS	U.S. Geological Survey

APPENDIX C: FINAL OVERARCHING GOALS AND OBJECTIVES FOR THE ARKANSAS FLOOD PLAN

1 Introduction

The Arkansas Department of Agriculture’s Natural Resources Division has initiated a major update to the Arkansas Water Plan (AWP) which will include the addition of the first Arkansas Flood Plan (AFP). The U.S. Army Corps of Engineers (USACE) is supporting the development of the plans using the Planning Assistance to the States (PAS) Southwestern Division (SWD) Regional Planning and Environmental Center (RPEC) under Indefinite Delivery Architect-Engineer Contract (IDC) No. W912BV23D0010, Task No. W912BV24F0015.

This document serves as Appendix C to the Programmatic Work Plan (PWP) for the Arkansas Water Plan (AWP) and Arkansas Flood Plan (AFP). The PWP document is intended to serve as the primary output of Phase 1 of this project. The PWP is an important first step in answering the Governor’s call for creating plans to meet the water- and flood-related needs of communities and individuals across the state. The purpose of the PWP is to provide a clear and structured outline of the proposed tasks, objectives, timeline, and resources needed to complete the AWP update and AFP development in Phase 2 of the project.

The purpose of this document is to present the goals and objectives for the AFP developed in collaboration with the Natural Resources Division.

This document contains the following sections:

- Section 2 Known Issues: The current, known issues in Arkansas flood management gathered through desktop research and stakeholder engagement efforts in Phase 1 of the project.
- Section 3 Goals and Objectives: The proposed goals and objectives for the AFP, based on the known issues identified.
- Section 4 Data Needs and Availability: Identified categories and availability of information and data that will be needed to develop the AFP.

Throughout this document and the PWP document, the word “flood” is used generally to include all types of flooding. It is important to recognize that there are various types and sources of flooding, from smaller-scale stormwater (nuisance or localized) flooding to larger-scale flooding from rivers, lakes, or levee failure. There are unique challenges with each flood type, and each require a different approach for measurement, management, and mitigation. It is expected that the AFP will primarily focus on data collection, assessments, policies, projects, and funding related to larger-scale flooding issues. However, smaller stormwater-type flooding will still be important to analyze and discuss in the AFP to provide a complete picture of how Arkansas manages excess flood waters.

In the early stages of Phase 2 of the project, the tasks, goals, and objectives can be revisited and refined to reflect, if necessary, differing approaches or level of effort for each task or objective based on flooding type. The Natural Resources Division may make decisions in Phase 2 of the

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project to determine the appropriate scale and types of projects, studies, and activities that are to be included in this effort.

2 Known Issues

Through the insights provided by stakeholders (see Appendix E Stakeholder Engagement Plan) and through supplemental desktop research, Michael Baker has identified the following known issues related to flood management in Arkansas:

- **Connection to the AWP:**
 - Flooding issues connect to the broader issues of water quality, quantity, and infrastructure in the AWP. Examples include:
 - Flood events impact water quality through increased runoff, streambank erosion/failure, and the presence of pollutants, debris, sediment, and excess nutrients in waterways.
 - Flood events can damage infrastructure, including roads, water, wastewater, and navigation infrastructure.
 - Flood events are seen as an opportunity to enhance water supply and quantity. Stakeholders expressed interest in capturing excess flood water for beneficial use, such as for agricultural irrigation or aquifer recharge. There may be technical or logistical barriers to implementing these types of solutions that would require further study and investigation.
- **Flood Control Infrastructure:**
 - Infrastructure across the state is aging. Lack of capacity and maintenance on flood control infrastructure is a concern. Examples of flood control infrastructure include flood control dams, levees, agricultural water conveyances (ditches), and local stormwater drainage systems. In some cases, roles and responsibilities for infrastructure management, maintenance, and improvements are unclear.
 - Note: The Natural Resources Division is currently initiating an inventory and assessment of levees via a separate effort.
- **Flood Risk Types and History:**
 - Arkansas experiences various types of flooding. This includes flooding from rivers, lakes, reservoirs, levee failure, localized drainage issues, and flash flooding. To date, there has not been a comprehensive assessment of the location and severity of these types of risks statewide.
 - Flood events in recent years have caused widespread impacts to Arkansans. This includes flooded homes, businesses, and agricultural assets. More flood events are being seen outside of the typical time of year expected, which has particularly affected the agricultural sector. Also, flooded roadways have created unsafe conditions for drivers and impeded delivery of effective emergency services. Economic activity has been negatively impacted through direct damage to businesses and infrastructure, as well as indirectly through loss of income for workers unable to access their workplaces. Streambank erosion has also occurred, resulting in loss of land and property.

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- Historic flooding in the Arkansas River Basin in May and June of 2019 is estimated to have caused \$3.7 billion in damages to homes, cars, agriculture, roads, bridges and levees throughout Oklahoma and Arkansas.
- **Future Conditions:**
 - Changing precipitation patterns (rainfall intensity and duration) and alterations to the physical landscape are contributing to worsening flooding issues. Flood events are expected to continue to be more severe in the future due to these factors.
- **Data Availability and Quality:**
 - Flood-related data availability, age, and level of detail varies across the state. New or updated data is sought by stakeholders. Stakeholders are also often unaware of the data resources available.
- **Floodplain Management, Regulation, and Policy:**
 - Floodplain management involves regulation of development within flood-prone areas. It is currently administered at the local (city or county) jurisdictional level. Because of this, there is a lack of consistency in floodplain management regulations and enforcement. In some parts of the state, a lack of floodplain mapping or outdated floodplain mapping impacts the existence or effectiveness of floodplain regulations.
 - There is a need to balance floodplain management regulations with economic development considerations. Some jurisdictions do not implement stricter floodplain development standards out of concern that it will deter business investment in the area.
- **Outreach, Education, and Collaboration**
 - There is a lack of public awareness and a need for greater educational initiatives around stormwater and flood risk, preparedness, and mitigation.
 - Currently, there is no state law that requires a property owner to disclose when selling a property whether it is in a floodplain. This means purchasers can buy a home unaware of the flooding risk and flood insurance requirements.
 - In the past, jurisdictions have typically initiated smaller flood and stormwater mitigation projects that address risks within their boundaries. Increased collaboration between jurisdictions could result in larger, regional-scale mitigation projects that solve flooding issues more holistically.
- **Flood Mitigation Projects and Activities**
 - Lack of funding, lack of data or technical expertise, multi-layered regulatory requirements, and complex federal funding programs are some of the biggest challenges local jurisdictions face to implementing flood mitigation projects.

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- Stakeholders expressed a need to ensure that projects to solve a flooding issue in one area does not end up adversely impacting another area.
- **Funding:**
 - There is a need for greater levels of funding for flood mitigation projects and activities. Stakeholders prefer financial assistance in the form of zero- or low-interest loans or grants.
 - There is a need to understand the difference between how much funding is needed to reduce flooding caused by sporadic large-scale events versus funding needed to address stormwater issues caused by frequent and smaller-scale events.

In addition to these known issues, stakeholders also shared the following insights and viewpoints:

- Flooding is a natural occurrence. It is not possible to prevent all flooding from happening; however, we can focus on reducing the impact and damage from flood events.
- Some stakeholders advocated for increased utilization of nature-based solutions for flood mitigation.

3 Proposed Goals and Objectives

This section contains the proposed overarching goal and objectives for the AFP, based on the stakeholder insights gathered around known flood management issues in Arkansas, as well as supplemental research on state-level flood planning initiatives in other states.

The AFP is envisioned as following the same organizational framework as the AWP. The five overarching goals developed for the updated AWP are listed below.

Goal 1. Provide drinking water that supports public health and well-being.

Goal 2. Provide water that supports environmental and economic benefits to the state and support interstate agreements.

Goal 3. Use the best available science, data, tools, practices, and technologies to support water resource planning and management for current and future needs.

Goal 4. Maintain and improve water supply, wastewater, stormwater, and flood control infrastructure and plan for future infrastructure needs.

Goal 5. Maintain, protect, and improve water quality to support designated uses of waterbodies.

To capture the intended outcomes related to the development of the AFP, the following additional goal is included:

Goal 6. Reduce the impacts of future flooding events on people, property, infrastructure, industry, agriculture, and the environment.

Proposed objectives for the AFP under Goal 6 are provided below by topic.

Flood Control Infrastructure

- Identify the type, location, condition and/or capacity of major flood control infrastructure, including dams, levees, pumps, and stormwater drainage systems.
- Assess the current roles and responsibilities for entities involved in the management and maintenance of major flood control infrastructure, including drainage districts.
- Assess if improvements are required for the management, maintenance, condition and/or capacity of existing flood control infrastructure.

Risk Assessment

- Gather best available data to identify the location and severity of current flood risks.

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- Identify areas with high concentrations of assets and infrastructure (homes, businesses, critical facilities, agricultural land, roadways, etc.) currently at risk of flooding.

Data Availability and Quality

- Determine and address gaps in flood risk and vulnerability data, including flood modeling and mapping.

Future Conditions

- Provide projections for potential future changes to existing flood risk and vulnerability, based on changing precipitation patterns, future development, and land use.

Floodplain Management

- Evaluate and provide recommendations for improvements to current regulations and incentives related to floodplain management, land use, stormwater drainage and building standards.
- Evaluate current levels of participation in the National Flood Insurance Program and assess the need for new initiatives to encourage and support communities in joining the program.

Emergency Preparedness and Response

- Coordinate with the Arkansas Division of Emergency Management (ADEM) to assess entities involved in and current capabilities for flood emergency preparedness and response activities.

Outreach, Education, and Collaboration

- Engage stakeholders across the state to gather input, data, and information.
- Increase collaboration between the Natural Resources Division and other state and federal agencies such as ADEM, the Department of Transportation (ARDOT), USACE, and NRCS.
- Investigate whether new flood-related public awareness and education initiatives are needed.
- Identify opportunities for improved coordination and collaboration amongst local, regional, and state entities and jurisdictions.
- Use story maps, dashboards, and other means of displaying and presenting the AFP so that it is accessible and understandable.

Flood Mitigation Projects and Activities

- Identify flood mitigation activities and projects currently being implemented.
- Identify and recommend priority proposed flood mitigation projects, studies and activities across the state.
- Develop action plans for addressing key needs in the areas of highest flood risk and vulnerability (focus basins), based on stakeholder input.

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- Characterize barriers to implementation of flood mitigation activities and projects. Propose ways to overcome these barriers.
- Identify barriers to maintaining and repairing infrastructure constructed for flood prevention and mitigation and make recommendations.

Programs, Policy, and Funding Needs

- Provide an overview of existing local, state, federal, non-profit, and private funding sources for flood-related projects and activities.
- Assess programs, policies, and funding assistance related to flood planning, floodplain management, and mitigation in other states and regions. Make recommendations for implementing new programs, policies, or funding sources based on this review and based on the findings through AFP tasks.
- Understand the amount of funding needed for priority proposed flood mitigation projects, studies, and activities. Assess gaps between the amount of funding needed versus the amount available. Assess how the type and amount of funding needed varies for different flooding types (smaller versus larger scale). Recommend new or changes to existing funding sources to meet these needs.

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4 Data Needs and Availability

Table 4-1, below, contains an initial list of potential data needed and its availability via potential sources.

Table 4-1: Data Needs and Availability

Data Type	Potential Source
Past flooding events and disasters	<ul style="list-style-type: none"> • FEMA disaster declarations • NOAA storm events database • USGS streamflow gage data
Existing flood hazard area / floodplain extents	<ul style="list-style-type: none"> • FEMA Flood Insurance Rate Maps Map Service Center • FEMA Base Level Engineering • Local studies from past stormwater or drainage master plans or watershed assessments • Industry sources (for example: First Street Foundation)
Future condition flood hazard area / floodplain extents	The Natural Resources Division’s Probable Maximum Precipitation Study and Tool
Locations of buildings (homes, businesses, critical facilities, etc.)	<ul style="list-style-type: none"> • Structure Data Arkansas GIS Office • County Appraisal Districts’ webpages
Repetitive / multiple loss properties	<ul style="list-style-type: none"> • FEMA NFIP Multiple Loss Properties
Locations of existing infrastructure (dams, levees, storm sewer systems)	<ul style="list-style-type: none"> • Dam (point) Arkansas GIS Office • Future Natural Resources Division levee inventory study • Arkansas GIS Office Levee Mapping • Local jurisdictions webpages (for example - GIS Maps Fayetteville, AR) • USACE • The Natural Resources Division’s dam safety office • Arkansas Division of Emergency Management • County Government Offices
Roadway locations	<ul style="list-style-type: none"> • ArcGIS Data - ARDOT • Arkansas Road Inventory Arkansas GIS Office
Agricultural asset locations	<ul style="list-style-type: none"> • USDA - National Agricultural Statistics Service - CropScape and Cropland Data Layer • USDA/NASS 2023 State Agriculture Overview for Arkansas • University of Arkansas Division of Agriculture estimate of crop losses for 2021 storms: June 2021 Arkansas Flood Damage Estimates (state.ar.us)

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NFIP participation	<ul style="list-style-type: none"> • Community Status Book FEMA.gov
NFIP policies and claims	<ul style="list-style-type: none"> • OpenFEMA Data Sets FEMA.gov • TBD – due to the protected nature of this data, more detailed data may not be available to contractors but may be available to the Natural Resources Division or other state agency partners.
Local floodplain management ordinances	<ul style="list-style-type: none"> • Local webpages • TBD - NFIP State Coordinator’s Office at the Natural Resources Division
Jurisdiction boundaries	<ul style="list-style-type: none"> • Boundaries Arkansas GIS Office
Ongoing or proposed flood mitigation projects	<ul style="list-style-type: none"> • Hazard Mitigation Assistance Projects FEMA.gov • Local hazard mitigation or drainage master plans
Local hazard mitigation and emergency response plans	<ul style="list-style-type: none"> • Local webpages • TBD – State Hazard Mitigation Office at ADEM

APPENDIX D

Final Technical Platform Memo of Water Plan

Project Name: Master Planning Support Services for Arkansas Department of Agriculture Natural Resources Division, Arkansas Water Plan (AWP)

To: Arkansas Department of Agriculture Natural Resources Division; USACE, Little Rock District

From: Michael Baker International; Olsson FTN

Date: 15 July 2024

Re: Appendix D – Final Technical Platform Memo for Water Plan

This memorandum describes the methodologies and approach proposed for updating water supply, water demand, gap analysis, and the water and wastewater infrastructure assessment during Phase 2 of the Arkansas Water Plan (AWP) update. The purpose of the AWP is to conserve and protect the state's water resources, with a long-term sustainable use goal maximizing environmental and economic benefit to the State of Arkansas, with focus on health and well-being of its citizens (Arkansas Natural Resources Commission Title XXIV). To accomplish this goal, accurate analysis of Arkansas' water resources is vital.

The following sections describe the methods proposed to quantify state water supply and infrastructure, and to meet current and future water demands, along with available sources of the data needed for these analyses. The proposed methodologies provide a means of maintaining consistency in the forecasting effort while still allowing for regional variation to be captured.

Proposed Methodologies for Water Plan Analysis

In general, we recommend applying the same methodologies for updating the AWP as those used for the 2014 AWP, unless specified otherwise. This will ensure the AWP remains effective, and the state is informed and prepared to manage its water resources efficiently.

The base year for analysis for the Phase 2 AWP update will be 2020. Most of the data to be used in demand and supply estimation is available for that year. When data is limited for 2020, the latest available information will be used. The concern has been raised that reported water usage for 2020 may be impacted by economic effects of the COVID 19 epidemic. Therefore, we recommend that reported water usage for 2020 be compared to available reported water usage for 2022 or 2023. If the concern is justified, a recommendation will be made to the Governor and Natural Resources Division for revising the base year for the AWP update.

Water Demands

We recommend using the 2014 AWP methods for projecting water demands for the Phase 2 AWP update, and reporting both baseline and projected demands by county. We recommend water demands be reported for the same water use sectors as in the 2014 AWP:

- Crop irrigation – water withdrawn by producers for the purpose of crop irrigation;
- Thermoelectric – water used at power generation facilities using steam-driven turbines;
- Municipal – water withdrawn by public water utilities to primarily supply “drinking” water to communities, i.e., withdrawals minus industrial use;
- Self-supplied domestic – water (primarily groundwater) withdrawn by individuals for household use;
- Self-supplied commercial – water withdrawn by entities such as campgrounds, resorts, and stores for use at their facilities;
- Industrial – includes both self-supplied and use/demand from public water utilities;
- Mining – water withdrawn by mining companies for use in their operations;
- Waterfowl management – water used to flood fields in winter to provide habitat for migrating waterfowl;
- Livestock – water withdrawn to supply drinking water to livestock and poultry;
- Aquaculture – water used to fill and operate aquaculture ponds;
- Fish and wildlife support – water allocated to maintain aquatic habitat;
- Navigation – stream flow/water level required to ensure river navigation channels are passable, and
- Interstate Compacts – stream flow guaranteed to downstream states.

Not all water use sectors are present in all Arkansas counties. Available data that can be used to estimate baseline and projected water demand for each water use sector, by county, is listed in Table 1. See Attachment 1 for a comparison of water use sector names used in the AWP to those used in the Arkansas Water Use Database, and USGS National Water Use reports.

Table 1. Data for estimating baseline and projected water demands.

Water Use Sector	Data Type	Data Sources
Crop Irrigation	Irrigated area	<ul style="list-style-type: none"> • US Department of Agriculture National Agricultural Statistics Service (NASS) • Arkansas Water Use Database (WUDB)
	Crop water application rates	<ul style="list-style-type: none"> • WUDB

Water Use Sector	Data Type	Data Sources
	Projected water demand for irrigation projects	<ul style="list-style-type: none"> • White River Irrigation District • Bayou Meto Water Management District
Thermoelectric	Power generation projections	<ul style="list-style-type: none"> • Energy Information Agency (EIA) • Entergy Arkansas
Municipal, Self-supplied domestic, Self-supplied commercial	Population projections	<ul style="list-style-type: none"> • Woods & Poole • University of Arkansas Institute of Economic Advancement (UAIEA) • Natural Resources Division • US Census • Local and regional projections
Industrial, Mining	Employment projections	<ul style="list-style-type: none"> • Arkansas Department of Workforce Services • Woods & Poole • Local and regional projections
Waterfowl Management	Area flooded for waterfowl	<ul style="list-style-type: none"> • US Department of Agriculture Natural Resources Commission • WUDB • Arkansas Game and Fish Commission • Duck clubs
Livestock	Animal inventories	<ul style="list-style-type: none"> • US Department of Agriculture National Agricultural Statistics Service (NASS) • County Agricultural Production Survey (CAPS) • US Department of Agriculture National Livestock Projections
All	Water use (current and past) and source	<ul style="list-style-type: none"> • WUDB • US Geological Survey (USGS) National Water Use reports
Fish and Wildlife support	Water demand	<ul style="list-style-type: none"> • Arkansas Game and Fish Commission

Water Use Sector	Data Type	Data Sources
		<ul style="list-style-type: none"> • US Army Corps of Engineers (USACE) (reservoir minimum releases, Sustainable Rivers Program) • Natural Resources Division
Navigation	Water demand	<ul style="list-style-type: none"> • USACE • Arkansas Waterways Commission
Interstate Compacts	Water demand	<ul style="list-style-type: none"> • Arkansas River Compact Commission • Red River Compact Commission

As part of 2024 Water demand update, we recommend three levels of data validation informing us the need for calibration.

1. Compare 2020 reported county water use with 2014 forecasted 2020 demand for each sector.
2. For the data used to estimate water demand projections (Table 1) compare reported 2020 county values to 2020 forecasted values used in the 2014 AWP.
3. If updated/ revised 2050 projections are available for the data used to calculate water demand projections (Table 1), compare them to 2050 projections used in the 2014 AWP.

We propose that available local or regional population, economic, and water demand projections be used to evaluate calculated baseline county water use and updated county level water demand projections. We recommend updating water demands to account for the impacts of increased frequency in weather extremes events such as drought, high temperatures, and low temperatures. We also suggest that seasonality of demands be characterized if appropriate. All related information should be documented and summarized in a water demands forecast report.

Water Supply

As with demand, we recommend using the same approach from 2014 AWP to update water supply data for. Updated water supply estimates should be documented and summarized in a water supply availability report. Water quality information and any analyses should be documented in a technical report included as part of the water supply report.

Surface Water Quantity

The 2014 AWP uses major river basins as the base scale for calculating surface water quantity and availability. The recommended general approach is to estimate available water volume using base year flow monitoring data adjusted to account for instream fish and wildlife flow requirements, 7Q10 flow requirements for dilution of point source discharges, and navigation requirements. Baseline values will be the average annual amount of surface water in acre-foot per year (AFY) for each basin. The seasonality of baseline supply is characterized by reporting average monthly surface water amounts. Sources of data used to estimate surface water availability are listed in Table 2.

Table 2. Data for estimating surface water availability.

Data Type	Sources
Continuous flow data	USGS National Water Dashboard
Number and/or area of farm ponds and irrigation reservoirs	<ul style="list-style-type: none">• USGS National Hydrology Dataset• USDA Natural Resources Conservation Service (NRCS) aerial imagery to identify ponds and reservoirs• NRCS records of funded pond and reservoir construction
Water allocations in federal reservoirs	<ul style="list-style-type: none">• USACE Little Rock District• USACE Vicksburg District
Allocations for interstate water compacts	<ul style="list-style-type: none">• Arkansas River Compact Commission• Red River Compact Commission
Land cover and land use changes, past and projected	<ul style="list-style-type: none">• USGS National Land Cover Dataset• USGS Land Change Monitoring Assessment and Projection program• Research studies – local and statewide
Changes in precipitation patterns, past and projected	Research studies – local, statewide, national

We recommend using latest data from the 51 USGS flow gages identified in 2014 for Phase 2 water supply update considering any deviation from 2014 baseline volume. Seasonality of supply will be addressed by calculating monthly supply amounts, additionally we would recommend estimating average water supply under drought conditions. The water supply update should also document any changes in USACE reservoir storage and operations. We recommend the update also document the increase in the number of irrigation farm ponds and tailwater reservoirs since 2010 (the baseline year for the 2014 AWP). We suggest that effects of recent and projected changes in land use and precipitation patterns on surface water supply be characterized.

Surface Water Quality

The most recent EPA-accepted 303(d) list of impaired surface water bodies is available from the Arkansas Department of Energy and the Environment Division of Environmental Quality. We propose a statewide summary of the extent of impaired waterbodies, and pollutants causing impairments, for the baseline period for the 2014 AWP be compared to the statewide summary of the most recent list of impairments. We recommend water quality impairments also be summarized at water supply evaluation gages, for supply river basins, and by county. Pollutants with water quality standards are associated with appropriate water use sectors in Table 3. We suggest the AWP update list specific water quality criteria protective of the water use sectors.

Recreation is included in this table even though it is not a water use sector for which a demand is calculated. Fish and wildlife demands are assumed to include water-based recreation needs.

Table 3. Arkansas water quality standards protect water uses.

Water Use Sector	Water Quality Concerns	Arkansas Designated Use	Pollutants with Arkansas Water Quality Standards (numeric and/or narrative)
Municipal/Domestic	Chemicals and pathogens that affect water taste and odor or human health, including algal toxins, and disinfection by-products	Domestic Water Supply	Bacteria, nitrate, toxics, taste and odor, radioactivity, oil and grease
Crop Irrigation	High levels of some metals or chloride can harm plants	Agricultural Water Supply	Minerals, radioactivity, oil and grease
Industrial	Chemicals in water can affect industry processes, machinery, or cooling systems	Industrial Water Supply	Depends on potential interactions in process.
Thermoelectric	Chemicals in water can affect systems through clogging or corrosion, or by encouraging growth of algae or zebra mussels that clog the system	Industrial Water Supply	Minerals
Duck Hunting	Pathogens, nutrients, and other chemicals can affect waterfowl health	Agricultural Water Supply	Bacteria, toxics, radioactivity, oil and grease
Aquaculture	Chemicals and pathogens in water can affect fish health either directly or by altering pH or dissolved oxygen levels	Aquatic Life	Ammonia, toxics, minerals, pH, dissolved oxygen, radioactivity, oil and grease
Livestock	Chemicals and pathogens in water can affect livestock health	Agricultural Water Supply	Pathogens, toxics, oil and grease, possibly other chemicals, depending on the animal species

Water Use Sector	Water Quality Concerns	Arkansas Designated Use	Pollutants with Arkansas Water Quality Standards (numeric and/or narrative)
Mining	Chemicals in water can affect mining processes	Industrial Water Supply	Depends on potential interactions in process.
Fish and Wildlife	Chemicals and pathogens in water can affect the health or aquatic organisms and other wildlife either directly or by altering pH or dissolved oxygen levels	Aquatic Life, Ecologically Sensitive Waterbody	Ammonia, toxics, minerals, temperature, pH, dissolved oxygen, radioactivity, oil and grease
Recreation	Pathogens and chemicals in water can make swimmers ill. At high enough levels, they may harm boaters and fishermen. Pollutants accumulated in fish at high enough levels can make eating the fish harmful to human health. In addition, water quality can affect the aesthetics of waterbodies and their desirability for recreation (e.g., brown water, presence of scum, or algae mats)	Primary Contact Recreation Secondary Contact Recreation Extraordinary Resource Water Natural and Scenic Waterway	Bacteria, pH, radioactivity, oil and grease
Navigation	Sediment in rivers can fill navigation channels.	Other Uses	none
Interstate Compacts	Water leaving the state must be of adequate quality to support designated uses in the downstream state	All	All

We also propose any recent (post 2015) local and regional studies of water quality trends be summarized, as well as information about emerging water quality concerns and anticipated changes to ambient water quality standards. In addition, water quality impacts of nonpoint source

projects can also be considered. Evaluation of water temperature data to identify changes since 2010 could be conducted as a preliminary assessment of impacts of changing weather patterns.

Groundwater Quantity

We propose updating groundwater levels in the Mississippi River Valley Alluvial aquifer and Sparta aquifer from the most recent Natural Resources Division Annual Groundwater Report (2023 or 2024) and validating with 2014 AWP baseline quantity. Water level data is available on the USGS National Water Information System website (both USGS and Natural Resources Division measurements). Average or median current water levels and aquifer volumes for the Sparta and Mississippi River Valley Alluvial aquifers can be calculated for associated counties and water supply river basins. We suggest current water levels be compared to one-half the aquifer thickness. One-half the aquifer thickness is the target for sustainable groundwater pumping in the Mississippi Embayment Regional Aquifer Study groundwater modeling for the 2014 AWP. Aquifer thickness information for the Mississippi Embayment is available from a 2018 USGS airborne electromagnetic (AEM), magnetic, and radiometric data collection project ([AEM inverted resistivity models - ScienceBase-Catalog](#)).

The Sparta and Mississippi River Valley Alluvial aquifers are the most monitored. USGS maintains five monitoring wells in other state aquifers. Data from these wells can be used to evaluate changes in other aquifers. As in the 2014 AWP we recommend withdrawals from aquifers other than the Sparta and Mississippi River Valley Alluvial aquifers are assumed to be less than sustainable yield.

Groundwater Quality

Significant ground water quality changes from the 2014 AWP are not expected. Stakeholders at the preliminary public meetings did not identify local groundwater quality issues. However, if stakeholders identify local groundwater quality issues as a concern during the update, a groundwater quality analysis may be conducted. Depending on data availability and inputs, this could involve trend analysis.

Gap Analysis

We recommend Phase 2 of the AWP update to include preparing an updated gap analysis. We propose the gap analysis update be performed using the same approach as the 2014 AWP, utilizing the AWP Phase 2 updated water demand and supply data. We recommend monthly water gaps be calculated to account for seasonal variation and water gaps be calculated for surface and groundwater combined by month. We suggest gaps be estimated using average condition supplies and drought, or dry condition supplies, and 2050 projected demands. Infrastructure needs will also be incorporated in this section. We propose to report gap analysis by major river

basins. For the Mississippi Alluvial and Sparta aquifers, county level water gaps may be calculated. For these aquifers, pumping reduction targets to achieve sustainable pumping levels (identified from 2014 AWP groundwater modeling) will be calculated. The gap analysis should be documented and summarized in a gap analysis report.

Level of Aggregation of Demands and Supplies

Base scales are the proposed areal scale at which primary update calculations are conducted. For water demand estimates we propose the county level as base scale. The suggested base scale for surface water supply is by major river basins from the 2014 AWP. The suggested groundwater supply base scale are aquifers. For the Mississippi River Valley Alluvial and Sparta aquifers, ground water supply can also be estimated at the county and river basin scale. County estimates can be aggregated to approximate river basins. County, river basin, and aquifer results can be aggregated to state level.

Approach for the Engineering Evaluation of Public Water Systems

Public water systems (PWS) in this section are defined as systems that provide water for human consumption and the treatment of wastewater. Public supply systems are responsible for providing safe, reliable drinking water to Arkansas communities. Concern about aging and insufficient infrastructure amid weather fluctuations and demographic changes is considered a high priority by stakeholders in Arkansas. Therefore, we recommend an evaluation of PWS be conducted in Phase 2 to provide information about the condition, needs, efficiency, and reliability of water supply and wastewater treatment systems. Arkansas reported nearly \$5.5B in water and wastewater infrastructure needs in 2022 (EPA CWNS, 2022).

Information for the evaluation may include existing data from the Arkansas Department of Health and the Water and Wastewater Needs Survey. Additionally, new data can be requested from representative water and wastewater service providers through a survey. The survey will collect information on planning efforts by each provider, including projects identified in master plans, asset management plans (AMP) and strategies, critical asset identification, emergency preparedness, and current and planned funding sources for capital improvement projects (CIP) and operations and maintenance (O&M) costs. The survey may also inquire about current and anticipated regulatory impacts and any other issues facing providers. The survey will be sent electronically to all PWS. Paper surveys may be mailed to any provider that requests a paper survey. The Phase 2 update team will coordinate with the Natural Resources Division to follow up with providers to gather as much information as possible in each major river basin and aquifer for small, medium, and large PWS.

We propose a database of PWS facilities, water sources, asset lifecycles, infrastructure needs, and funding sources and strategies for CIP and O&M be created. We propose that the information be reported by surface water basin or aquifer and aggregated to county level using GIS tools. Then, this information can inform the gap analysis update. We also propose to identify water supply shortfalls and provide recommendations for critical projects to address gaps in municipal water supply or wastewater treatment due to infrastructure needs and/or revenue

issues at the provider level. A report of the findings from the survey, critical infrastructure assessment, gap analysis, and recommendations should be provided. This report is to inform statewide planning and is not intended to replace local or regional plans in place.

Attachment 1

Water use sector naming and availability among data sources

2014 AWP	USGS 2015 and 2020 National Water Use Reports	Arkansas Water Use Database
Crop Irrigation	Self-supplied Irrigation	Agriculture/Irrigation (self-supplied), or by crop type
Thermoelectric (cooling)	Self-supplied Thermoelectric	Fossil-fuel Power Nuclear Energy Power (both self-supplied)
Municipal	Public Supply	Water Supplier
Self-supplied Domestic	Self-supplied Domestic	--
Self-supplied Commercial	--	Commercial (self-supplied)
Industrial	Self-supplied Industrial	Industrial (self-supplied)
Mining	Self-supplied Mining	Mining (self-supplied)
Waterfowl management	--	Ducks-all waterfowl, Hunting
Livestock	Self-supplied Livestock	By livestock type
Aquaculture	Self-supplied Aquaculture	Aquatic (by species) and Aquaculture not classified
Fish and Wildlife Support	--	--
Navigation	--	--
Interstate Compacts	--	--

APPENDIX E
Stakeholder Engagement Plan

ARKANSAS PROGRAMMATIC WORK PLAN

STAKEHOLDER ENGAGEMENT PLAN

State of Arkansas

Prepared for:

Arkansas Department of Agriculture Natural Resources Division
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In Partnership:



**US Army Corps
of Engineers®**
Little Rock District

U.S. Army Corps of Engineers (USACE)

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July, 2024

ARKANSAS PROGRAMMATIC WORK PLAN – STAKEHOLDER ENGAGEMENT PLAN

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1 Introduction and Project Overview

The Arkansas Department of Agriculture Natural Resources Division (Natural Resources Division) has initiated the development of a Programmatic Work Plan (PWP) as part of the Arkansas Comprehensive Water Plan (ACWP) update. This ACWP update also includes the addition of Arkansas’ first statewide flood plan. The U.S. Army Corps of Engineers (USACE) is supporting the development of the ACWP through the Planning Assistance to States (PAS) program as documented in a September 2023 Letter of Agreement (LOA) between USACE and Natural Resources Division.

This Stakeholder Engagement Plan provides a blueprint for informing and engaging the public throughout the entire project lifecycle.

Plan Organization: The main section of this plan answers the fundamental “what” and “why” questions of the program—detailing what strategies, activities, tools, methods, etc., will be used, and why. The appendices—which include scoping/hearing plans, a media plan, and a roles/responsibilities matrix—answer the more specific questions of “who,” “when,” “where” and “how,” providing the necessary details for implementation, scheduling, logistics, and team responsibilities.

2 Purpose of Stakeholder Engagement

The purpose of stakeholder engagement is to engage the public throughout the entire project lifecycle, starting during the planning or decision-making stage. This plan describes how the stakeholder engagement process will be conducted to support the Water Plan update and statewide flood plan development.

Specifically, it describes how the project team will:

- Inform and involve the public, project stakeholders, elected officials, media, and government agencies,
- Solicit public, stakeholder, and agency input, and
- Comply with the requirements of applicable Arkansas and USACE policies and regulations

This plan has been developed—and will be continually updated—to help ensure a comprehensive and effective stakeholder engagement process that aids the study team’s analytical and decision-making processes.

3 Stakeholder Engagement Process

The implementation of a comprehensive and effective stakeholder engagement program facilitates the identification of project impacts early in the plan to adequately address potential issues and public concerns. A variety of parties and entities may be affected and interested in the project. A proactive stakeholder engagement program that informs and educates the public reduces the probability of misperceptions and future project delays by resolving and addressing concerns early in the process. In addition, input from the public can enhance the decision-making process through the contribution of information and ideas for project alternatives.

The stakeholder engagement program fulfills the federal and state requirements to obtain meaningful public participation, leading to a widely supported and sustainable outcome. The purpose of this plan is to provide clear and comprehensive guidance to the project team in the implementation of stakeholder engagement components and activities that supports the state’s and the USACE’s goals in updating the water plan and developing the statewide flood plan. The program is intended to inform stakeholders about the project, its progress, and opportunities to provide formal input.

Stakeholder engagement program efforts will include early issue identification, public notification, preparation, and publication of handout and display materials, advertisements, maps, posters, and meeting coordination and logistics. Michael Baker will coordinate with Natural Resources Division and the USACE to ensure that the stakeholder engagement plan meets state, local, and federal agency requirements.

4 Stakeholder Engagement Plan Elements

Plan elements include:

1. Stakeholder Meetings
2. Development of Key Data and Questions
3. Online Survey
4. Printed Materials
5. Appendix of Comments Received

Portions of this section have been revised to incorporate the results of plan implementation activities and completed stakeholder engagement tasks.

4.1 Stakeholder Meetings

As part of its activities to implement the Programmatic Work Plan (PWP) for the project, Michael Baker facilitated 7 in-person stakeholder meetings for water professionals to collect feedback on current water issues that pertain to the development of the PWP. The meetings were held across all quadrants of Arkansas, except for the two initial kick-off meetings in Central and Northwestern Arkansas. The second set of 5 stakeholder meetings were held the first week of May 2024. A summary of these meetings is included in Section 4.6 of this document, Stakeholder Engagement Results and Progress Summary (June 2024).

In adherence to federal requirements, information about the meetings was published on the Natural Resources Division website. Notices announcing the public meetings were published on the Natural Resources Division website for at least three weeks before the meeting, as well as in local agencies' websites in designated cities, based on meeting focus and geographic area. Letter invitations were also distributed to federal, state, and local agencies at least three weeks prior to the meeting.

The Natural Resources Division will provide the final formal PWP document at the final stakeholder meetings for public comment. All other outreach efforts will be completed by Michael Baker in coordination with Natural Resources Division and the USACE. More details on Stakeholder engagement Tools are provided in Section 7.0. Section 4.6 provides an update of stakeholder engagement activities to date.

4.2 Development of Key Data and Questions

As part of the planning for the stakeholder meetings described in Section 4.1, Michael Baker developed a list of key data and questions to seek input from stakeholders. Development of the list was coordinated with the Natural Resources Division and the USACE and was used to inform the meeting agenda and online survey development.

4.3 Online Survey

An initial online survey was sent to stakeholders before the stakeholder engagement meetings in March to obtain initial input on the water plan. The survey was developed using the list of questions described in Section 4.2.

Additional information about the online survey, including results to date, is included in Section 4.6 Stakeholder Engagement Results and Progress Summary (June 2024).

4.4 Printed Materials

Printed materials were developed to provide information to stakeholders participating in the meetings. These included program background and updates, as well as copies of the survey.

4.5 Appendix of Comments Received

After the meetings, an appendix of all comments received will be compiled and added to the PWP. This appendix will also include a summary of the responses developed by Michael Baker and Natural Resources Division.

4.6 Stakeholder Engagement Results and Progress Summary (June 2024)

This section was added to the Stakeholder Engagement Plan following completion of the Phase 1 meetings to share a summary of Phase 1 stakeholder engagement progress as of June 2024, including meetings held and themes identified during the stakeholder engagement sessions conducted throughout the state during Phase 1. Stakeholders participating in these meetings included representatives from local, state, and federal entities; elected officials and representatives from state and federal legislative bodies; private industry representatives including consulting firms and Arkansas-based corporations; and non-governmental organizations (NGOs). Supporting outreach and engagement materials included a project overview handout distributed to stakeholders, as well as meeting agendas, presentations, and an online survey. In addition, a facilitation guide was prepared to include relevant meeting information to support meeting facilitators and help them to prepare for and conduct the meetings. Examples of these materials are included in Appendix E-1: Stakeholder Engagement and Meeting Materials.

The following meetings were held throughout the state between March 26 and May 10, 2024.

Series 1 Meetings – Plan Kickoff

Series 1 meetings were intended to kick-off the Water Plan Update and provide an overview of the Arkansas Water Plan Update and Flood Plan. These meetings were held on the following dates and locations:

1. March 26, 2024 – Little Rock
2. March 27, 2024 – Fayetteville

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As part of the discussion, presenters from the USACE and NRD, with support from the Michael Baker team, talked with stakeholders about the importance of the Water Plan and the Flood Plan. The discussion also included a review of the 2014 Water Plan. Participants also had an opportunity to ask questions and share their thoughts about needs and concerns related to the Water Plan update and Flood Plan development.

The discussion also included an overview of the Arkansas 2024 Water Plan Update Process and presentation of the Arkansas Water Plan Roadmap and an overview of the Statewide Flood Plan. Participants were also shown how to follow the Water Plan update and Flood Plan update, and were provided with a QR code linking to the online survey developed to engage stakeholders and capture their input and concerns related to the Water Plan and Flood Plan. This information was captured by the project team to inform the Water Plan update and Flood Plan development.

Additional details about these discussions are included as Appendix E-3 to this document, Series 1 Meeting Minutes (March Kickoff).

Series 2 Meetings

All-day meetings, split into morning and afternoon sessions, were held on the following dates and locations:

1. May 6, 2024 – Fowler Center, 201 Olympic Dr., Jonesboro, AR 7240 Jonesboro
 - a. Afternoon session topic: Water Infrastructure
2. May 7, 2024 – Fort Smith Convention Center, 55 S 7th St., Fort Smith, AR 72901
 - a. Afternoon session topic: Drinking Water Supply
3. May 8, 2024 – Donald W. Reynolds Campus & Community Center, 100 E. University St., Magnolia, AR 71753
 - a. Afternoon session topic: Industrial Water Supply and Mineral Extraction
4. May 9, 2024 – Rice Research and Extension Center, 2900 AR-130, Stuttgart, AR 72160
 - a. Afternoon session topic: Agricultural Water Supply
5. May 10, 2024 – Arkansas Cooperative Extension State Office, 2301 S. University, Little Rock, AR 72204
 - a. Afternoon session topic: Environmental Quality and Recreation.
 - i. A virtual option was provided on the agency website at agriculture.arkansas.gov.

MEETING LOCATIONS	TOTAL IN-PERSON ATTENDEES*
Jonesboro, AR	17
Fort Smith, AR	12
Magnolia, AR	10
Stuttgart, AR	38
Little Rock AR	24 (Not including Zoom attendees)
All locations	101 (in-person)

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Table 1. Summary of Meeting Participants per Location (Excluding Project Team).

*Total does not include ANRD, USACE, MBI and FTN staff.

Morning sessions included an overview of the Arkansas Water Plan and Flood Plan, including a discussion about the importance of both plans. The discussion also included a review of the 2014 Arkansas Water Plan and the 2024 Water Plan update process, as well as a state flood plan overview, and a discussion about the Water Plan survey followed by group discussion.

A copy of the survey is available at [ARKANSAS WATER PLAN - STAKEHOLDER ENGAGEMENT FORM \(office.com\)](https://arkansaswaterplan-stakeholderengagementform.office.com). Topics covered in the survey include the following:

1. Flood Plan
 - a. Stakeholder Priorities
 - b. Types of Flooding Experienced (in their communities)
2. Infrastructure Assessment
 - a. Focus
 - b. Policy-level Approaches
3. Future Infrastructure Demands
 - a. Most Critical
4. Drinking Water Quantity Approaches
5. Drinking Water Quality Concerns
6. Priorities of Local Industry
7. Industrial Impacts
8. Agriculture Water Demands
9. Agricultural Development and Strategies
10. Environmental – Water Quality
11. Environmental – Strategies

Afternoon sessions included topic-focused discussions, as noted above, followed by breakout sessions to discuss goals, issues, and concerns. Following the breakout sessions and briefings by each breakout team to the larger group, participants had the opportunity to engage in additional discussion, identify next steps, and provide feedback. This information was captured by the project team update team to further inform the Water Plan update and Flood Plan development. The QR code linking to the online survey was also shared during the May meetings to encourage stakeholders to provide input and feedback related to the Water Plan update and Flood Plan development. To date, the project team has received 55 completed stakeholder surveys.

Survey Results and Insights to Date (June 2024)

This section provides a snapshot of survey responses to date. Screenshots of responses to questions 2-7 are included in this section. Screenshots of questions 1 and 8 ask for respondent location and email addresses and are not included here.

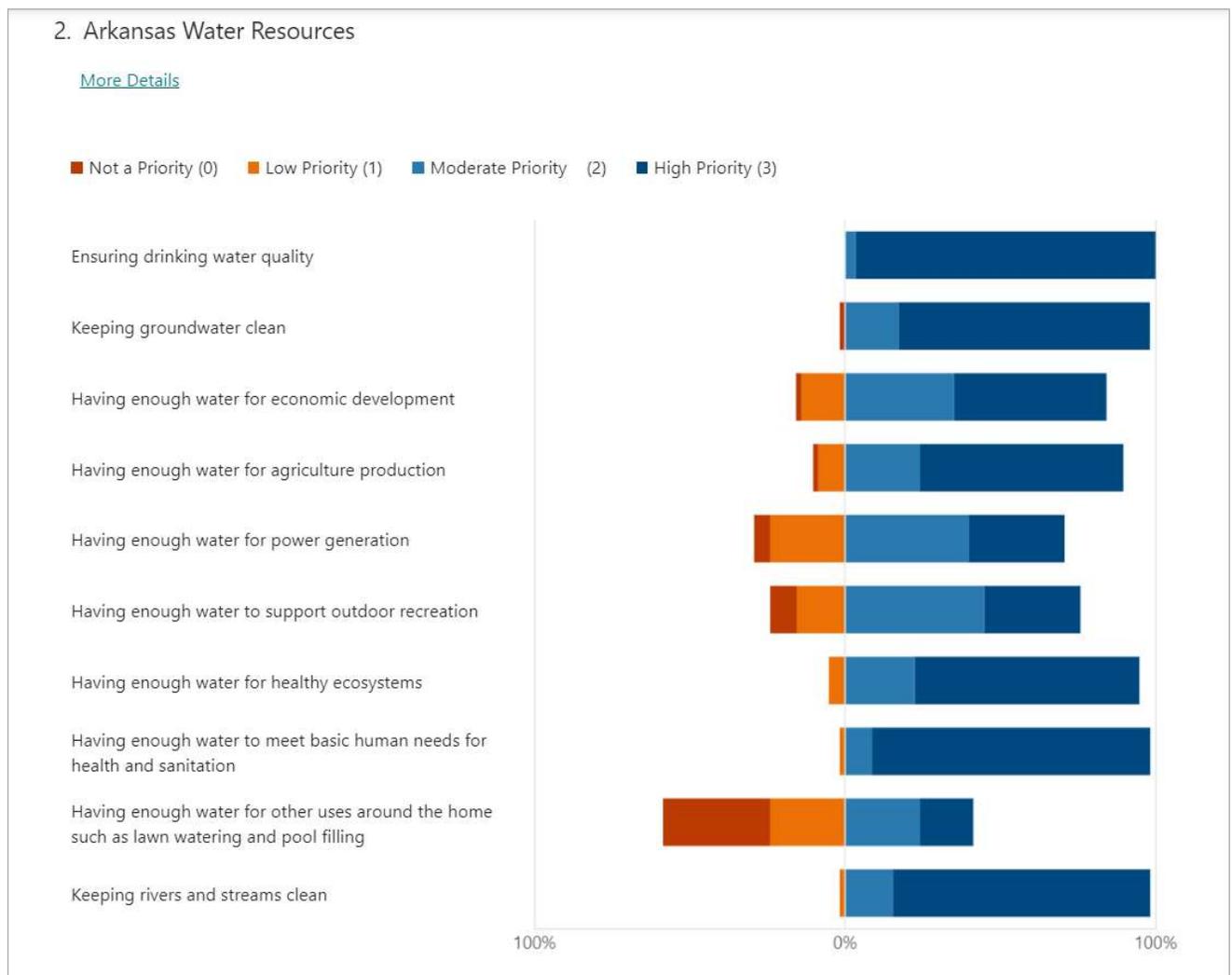
Insights

Based on the only surveys received to date, respondents:

- Assigned a high priority to drinking water quality, followed by keeping groundwater clean, having enough water for basic human needs, having enough water for agriculture, and keeping streams and rivers clean.

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- Are concerned about issues with the river quality, flooding, and problems related to quality of drinking water over the next 20 years.
- Ranked improving drinking water reliability highest when answering a question about planning for the future, followed by improving water quality and improving infrastructure.
- Strongly prefer improvements to state water and wastewater infrastructure, as well as water conservation and improved efficiency, including improved water use efficiency across the state. Respondents also expressed a strong preference for stormwater capture and use, advanced water purification and reuse, and maximizing water supplies in existing lakes and reservoirs.
- Believe the Water Plan can provide the most value as a tool to identify water-related infrastructure needs, water-related funding needs, and water-related funding sources. Addressing water-related problems and challenges proactively, educating the public on water-related issues, educating about water conservation in agriculture, and providing regional and local information on current future water supply availability were ranked only slightly below the first three items.
- High-level summaries/fact sheets was chosen as the most valuable type of data when accessing Water Plan information, followed closely by geospatial/mapping data and interactive online dashboards.



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Figure 1. Online survey responses to question #2 – Water Resources Priorities.

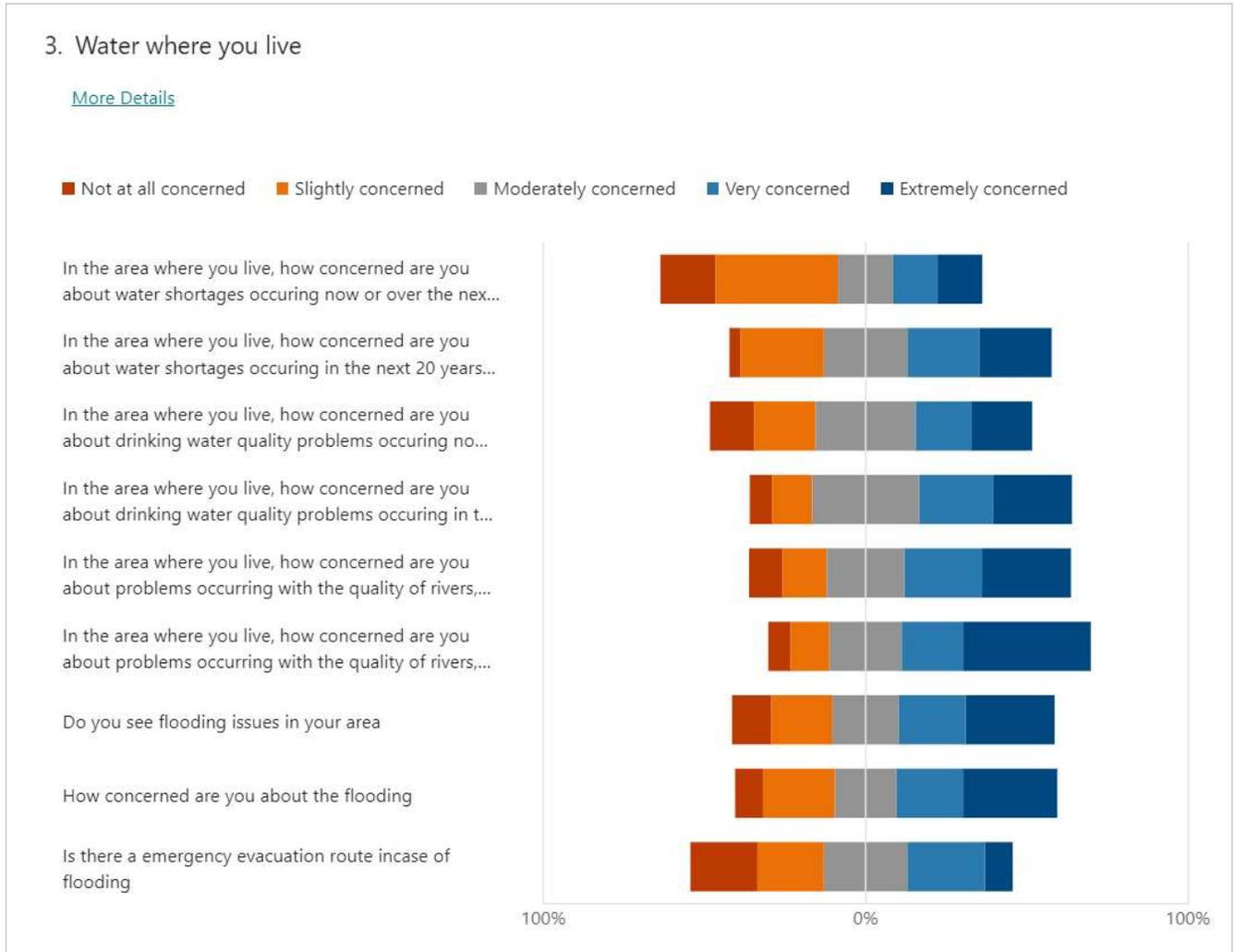


Figure 2. Water Plan Survey question #3 — Water where you live.

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4. In planning for the future of Arkansas water, please rank each of the following activities from most to least important. You may use the arrows or drag and drop to complete the ranking.

[More Details](#)

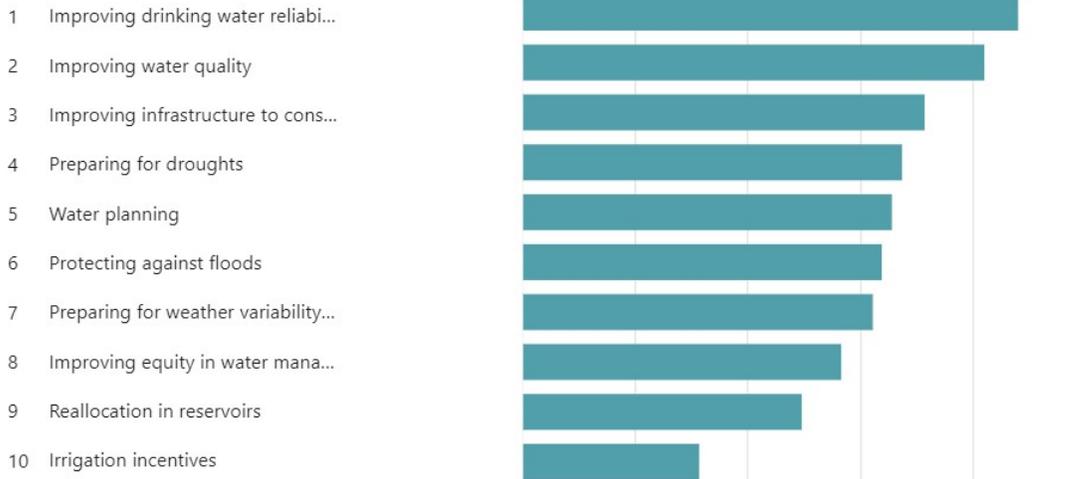


Figure 3. Water Plan Survey Question #4 — Planning for the Future of Arkansas Water

5. Water Supply Strategies

[More Details](#)

■ Strongly preferred (3)
 ■ Moderately preferred (2)
 ■ Somewhat preferred (1)
 ■ Not preferred (0)

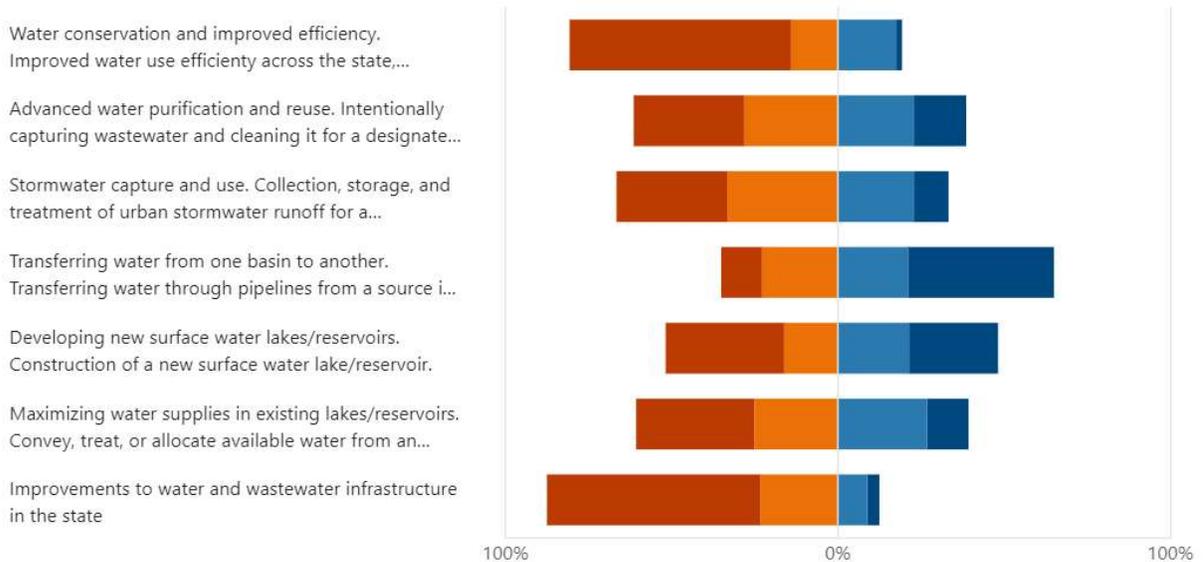


Figure 4. Water Plan Survey Question #5 — Water Supply Strategies.

ARKANSAS WATER PLAN – PUBLIC ENGAGEMENT PLAN

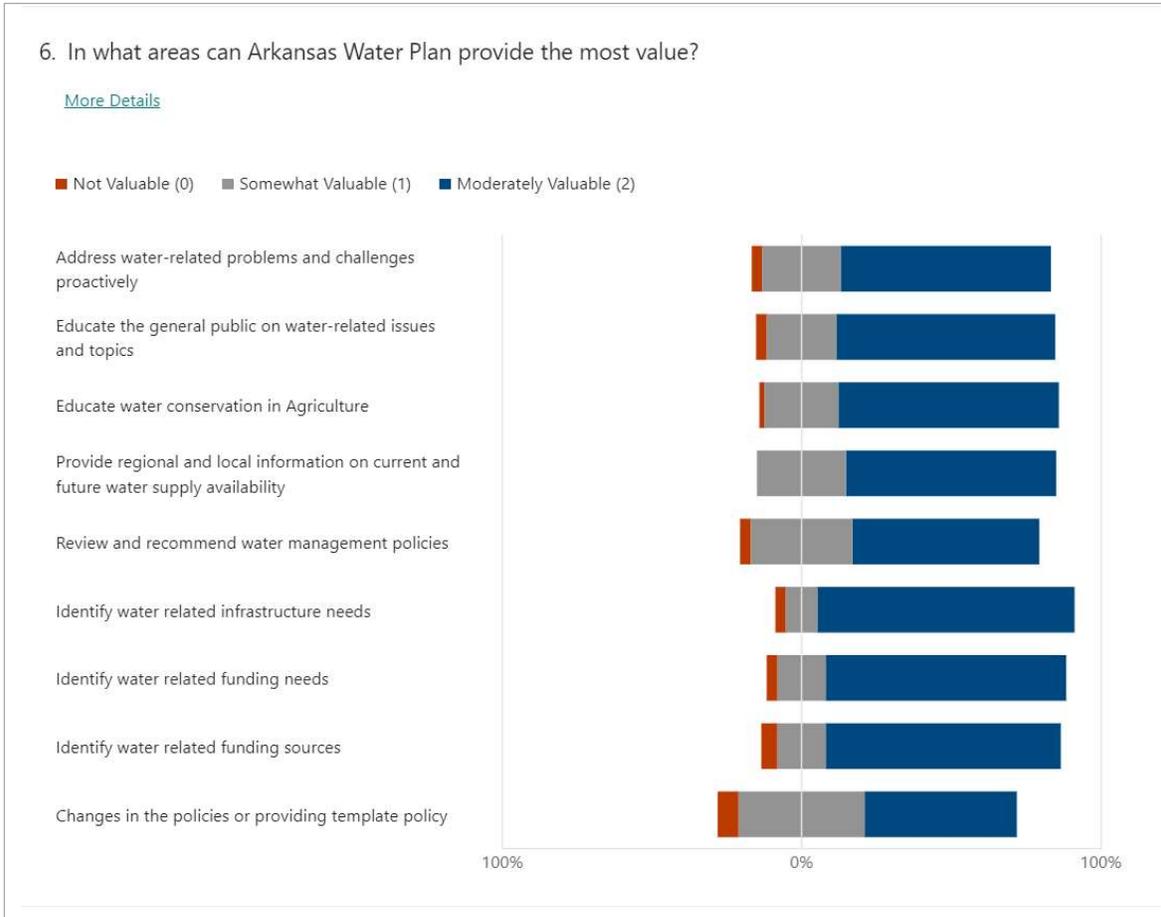


Figure 5. Water Plan Survey Question #6 — In what areas can the Arkansas Water Plan provide the most value?

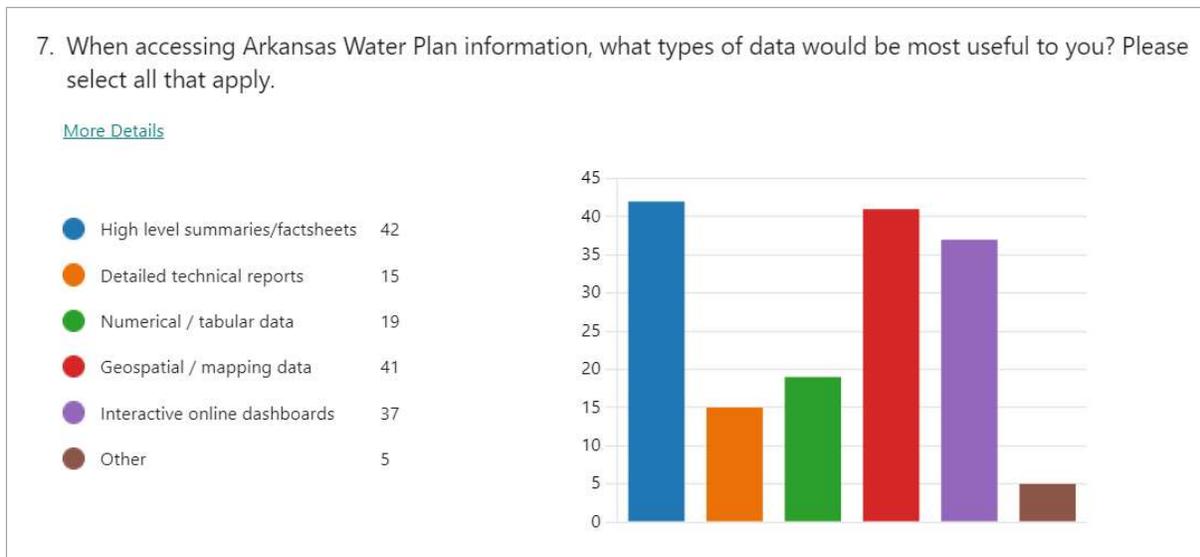


Figure 6. Water Plan Survey Question #6 — What types of data would be most useful to you?

5 Public Involvement Methods and Goals

The goals of the project public outreach include the following:

1. Establish approach informing public and other stakeholders of the Plan.
2. Collect data, inform, and respond to questions from stakeholders.
3. Develop public trust that the Plan is representative of water and flooding issues in Arkansas.
4. Proactively gather, address, and respond to questions, concerns, and input from stakeholders.
5. Educate stakeholders and involve them in the process by providing tools to inform them of the existing system and recommended improvements.

Public Meetings: Public meetings provide a forum to share information about the project with the public, obtain information about local water and flooding issues to be considered in the study, and elicit public input and feedback.

Other Methods:

- Social Media Accounts –Social media sites will be used to communicate project objectives and updates.
- Email – Emails that inform the public of State news and upcoming events. These emails will be used to inform the public of project progress.

6 Outreach Strategies and Schedule

Appendix E-1 summarizes the outreach strategies to be used to engage stakeholders and disseminate project information.

7 Stakeholder engagement Techniques

7.1 Meeting and Collateral Materials

Meeting and collateral materials included board displays and informational materials/handouts such as fact sheets, project area maps, and printed copies of the community survey. These materials served as useful visual and written reference materials for meeting participants to facilitate discussion and understanding during and after meetings. They also served as leave-behinds to share project information with community members who were unable to attend meetings in person, particularly those with limited digital access or who are visual learners.

7.2 Comment Management

Through the use of the community surveys, the project team is collecting and tracking comments from stakeholders and community members who are providing input. The team is also using comment management to track comment responses and develop the summary of comments received and responses developed.

7.3 Media Responsibility

Media inquiries will be routed to Natural Resources Division and USACE officials for response throughout the project lifecycle. Michael Baker assisted Natural Resources Division with event notices. The Natural Resources Division will coordinate any ads/event notices advertising public meetings or availability of reports to media when applicable.

8 Stakeholder Identification

The Natural Resources Division and USACE provided a list of stakeholders, and the Michael Baker team identified additional project stakeholders and developed and maintained a contact list used to coordinate meetings and communicate project information to interested parties in the community. The intent of this list was to reach and engage the community and support inclusive, comprehensive project-related communication and public involvement.

Appendix E-2 includes the list of stakeholders provided by Natural Resources Division.

Appendix E-1: Outreach Strategies and Schedule

ARKANSAS PROGRAMMATIC WORK PLAN – STAKEHOLDER ENGAGEMENT PLAN

Stakeholder Engagement Plan Summary

ACTIVITY	DATE SCHEDULED/SENT	STAKEHOLDERS/PUBLICATIONS	STATUS/COMMENTS
Meeting Coordination (See Meeting Dates section for specific meetings and dates.)			
Coordination phone calls to stakeholders.	- Ongoing		
Coordination call/meeting (for planning purposes)	- One month before meeting (schedule permitting)	<ul style="list-style-type: none"> - Natural Resources Division - USACE - Natural Resources Division project providers/consultants (PM, engineering consultant, others as required) 	<ul style="list-style-type: none"> - Develop meeting agenda. - Confirm stakeholders/identify additional stakeholders who should be included. - Identify/confirm meeting venue/location(s). - Identify/confirm exhibits, handouts, and presentations needed. - Discuss and confirm timeline for review, revision, and approval cycle for meeting materials.
Develop meeting agenda	- Finalize draft after coordination call/meeting		
Confirm meeting date	- Confirm potential and/or actual dates during coordination call, subject to venue availability.		
Identify and confirm	- As early as possible, 2-4		

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

ACTIVITY	DATE SCHEDULED/SENT	STAKEHOLDERS/PUBLICATIONS	STATUS/COMMENTS
meeting venue	weeks prior to meeting.		
Identify and confirm stakeholders.	<ul style="list-style-type: none"> - Finalize list after coordination call/meeting. - Contact stakeholders as noted in “Direct Contact” section. 		
Develop materials	<ul style="list-style-type: none"> - Approvals for displays and other outreach materials complete NLT 1 week before meeting. - Draft meeting invite letters to be provided to Natural Resources Division at least 45 days in advance to allow sufficient time for review and approval. 		
Print, publish materials	<ul style="list-style-type: none"> - Printing – 1 week before meeting 		

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

ACTIVITY	DATE SCHEDULED/SENT	STAKEHOLDERS/PUBLICATIONS	STATUS/COMMENTS
	<ul style="list-style-type: none"> - Publishing – to be coordinated w/Natural Resources Division for web content. 		
Direct Contact			
Elected Officials	<ul style="list-style-type: none"> - Initial contact: four weeks prior to meeting - Confirm/follow-up: two weeks prior to meeting 		
Government Agencies/ Stakeholder Groups	<ul style="list-style-type: none"> - Initial contact: 4-6 weeks prior to meeting - Confirm/follow-up: two weeks prior to meeting, reconfirm one week prior 		<ul style="list-style-type: none"> - Stakeholders will be contacted via phone, direct mail, or e-mail. Project ambassadors/existing volunteer stakeholder points of contact (POCs) may provide additional assistance in reaching stakeholders.
Individual Stakeholders	<ul style="list-style-type: none"> - Initial contact: 4-6 weeks prior to meeting - Confirm/follow-up: two weeks prior to meeting, 		<ul style="list-style-type: none"> - Stakeholders will be contacted via phone, direct mail, or e-mail. Project ambassadors/existing volunteer stakeholder points of contact (POCs) may provide additional assistance in reaching stakeholders.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

ACTIVITY	DATE SCHEDULED/SENT	STAKEHOLDERS/PUBLICATIONS	STATUS/COMMENTS
	reconfirm one week prior		
	-		
Free Advertisements			
Published on NRD’s website	-		○
	-	-	-
Social Media/Website			
Project-specific content for Natural Resources Division website	<ul style="list-style-type: none"> - Date proposed to coincide with publication of first ad. At minimum, publish update prior to meeting. - Other material to be added as available throughout project or in advance of public involvement or stakeholder engagement meetings. 		
Meetings Dates			
*Meeting to be planned/held if needed.			
Stakeholder Engagement	- March 26 th and 27 th , 2024		-

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

ACTIVITY	DATE SCHEDULED/SENT	STAKEHOLDERS/PUBLICATIONS	STATUS/COMMENTS
Meeting Series 1			
Stakeholder Engagement Meeting Series 2	- May 6 th – May 10 th , 2024		
	-		

Appendix E-2: List of Stakeholders

COMPANY NAME	CONTACT FIRST NAME	CONTACT LAST NAME	CONTACT TITLE	CONTACT EMAIL ADDRESS	CONTACT BUSINESS PHONE	CONTACT CELL PHONE	CONTACT MAILING ADDRESS	CONTACT CITY	CONTACT STATE	CONTACT ZIP CODE	CONTACT UPDATED BY
Arkansas Wildlife	Terri	Lane	Director	tlane@arwild.org							ANRD
Arkansas Game	Jen	Sheehan	Environmental	jennifer.sheehan							ANRD
US Fish and	Chris	Davidson	Deputy Field	chris_davidson@f							ANRD
The Nature	Roger	Mangham	Director	rmangham@tnc.or							ANRD
United States	Drew	Westerman	Assistant Director -	dawester@usgs.go	501-228-3643						ANRD
Arkansas	Lance	Jones	Director	lance.jones@arka	501-661-2623						ANRD
Office of the State	Scott	Ausbrooks	Director	osg@arkansas.gov							ANRD
Arkansas			DEQ- Director and	caleb.osborne@ad							
Department of	Caleb	Osborne	Chief	eq.state.ar.us	501-682-0959						ANRD
Illinois River	Leif	Kindberg	Executive Director	director@irwp.org	479-422-5676						ANRD
USDA Natural			State	michael.sullivan2							
Resource	Mike	Sullivan	Conservationist	@usda.gov	501-301-3100						ANRD
USDA Natural			State Water	rodney.wright@us							
Resource	Rodney	Wright	Manager Engineer	da.gov	870-973-4603						ANRD
The Ozark Society	Brian	Thompson	President	thompsonaddc@g	479-879-0688						ANRD
Winthrop	Janet	Harris	Executive Director	jharris@rockefelle							ANRD
Arkansas Natural	Bill	Holimon	Director	bill.holimon@arka	501-324-9761						ANRD
Arkansas				Shae.lewis@arkan							
Department of	Shea	Lewis	Secretary	sas.gov							ANRD
Union County				Cindywoolsey@su			441 West Cedar				
Water	Cindy	Woolsey		ddenlink.net		870-814-2871	Street	El Dorado	AR	71730	ANRD
			Director -								
			Agricultural	smanley@ducks.or			193 Business Park				
Ducks Unlimited	Scott	Manley	Support	g	601-956-1936		Drive - Suite E	Ridgeland	MS	39157	ANRD
USDA Agricultural			Research	michele.reba@usd							
Research Service	Michele	Reba	Hydrologist	a.gov	870-819-2708						ANRD
Univeristy of			Professer and								
Arkansas System			Water								
Division of			Management	cghenry@uada.ed							
Agriculture	Chris	Henry	Engineer	u			2900 Hwy 130 E.	Stuttgart	AR	72160	ANRD
USDA Agricultural			Research	joseph.massey@u							
Research Service	Joe	Massey	Agronomist	sda.gov	870-680-8317						ANRD
Univeristy of											
Arkansas at Little											
Rock	Ranjitsinh	Mane	Researcher	rmane@ualr.edu							ANRD
				whiterivertu698@							
Trout Unlimited	Bill	Thorne	president	gmail.com	870-736-4799		P.O. ox 52	Gassville	AR	72635	USACE
H2Ozarks	Erin	Scott	Senior Policy and	erin@h2ozarks.org	479-841-2627		1200 West Walnut				
			Program Director				Street - Suite 3405	Rogers	AR	72758	USACE
Beaver Watershed				becky@beaverwat							
Alliance	Becky	Roark	Executive Director	ershedalliance.org	479-750-8007		P.O. Box 762	Elkins	AR	72727	FTN

COMPANY NAME	CONTACT FIRST NAME	CONTACT LAST NAME	CONTACT TITLE	CONTACT EMAIL ADDRESS	CONTACT BUSINESS PHONE
Arkansas Division of Emergency Management	AJ	Garry	Director	AJ.gary@adem.arkansas.gov	
Arkansas Division of Emergency Management	Lacye	Blake	State Hazard Mitigation Officer	Lacye.Blake@adem.arkansas.gov	(501) 683-6724
Arkansas Floodplain Management Association	Lee	Beshoner	Executive Director	executive.director@arkansasfloods.org	(479) 571-3334
Arkansas Emergency Management Association	LeeAnn	Smith	President	leeann.smith@adem.arkansas.gov	(870) 534-1534
National Weather Service	Chris	Buonanno	Science and Operations Officer	christopher.buonanno@noaa.gov	(501) 834-0308
Arkansas Commissioner of State Lands	Kelly	Boyd	Chief Deputy	kboyd@cosl.org	
St. Francis Levee District	Rob	Rash	CEO/Chief Engineer		870-735-1062

CONTACT CELL PHONE	CONTACT MAILING ADDRESS	CONTACT CITY	CONTACT STATE	CONTACT ZIP CODE	CONTACT UPDATED BY
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	Building 9501. Camp Joseph T. Robinson	North Little Rock	Arkansas	72199	ANRD
	124 W Sunbridge Drive #3	Fayetteville	Arkansas	72703	ANRD
	Building 9501. Camp Joseph T. Robinson	North Little Rock	Arkansas	72199	ANRD
	8400 Remount Road	North Little Rock	Arkansas	72118	ANRD
					ANRD
					ANRD

COMPANY NAME	CONTACT FIRST NAME	CONTACT LAST NAME	CONTACT TITLE	CONTACT EMAIL ADDRESS	CONTACT BUSINESS PHONE	CONTACT CELL PHONE	CONTACT MAILING ADDRESS	CONTACT CITY	CONTACT STATE	CONTACT ZIP CODE	CONTACT UPDATED BY
Natural State Consulting and Strategies	Steve	Goode			501-514-2013						ANRD
Arkansas Rice	Kelly	Robbins	Executive Director	jkellyrobbins@gmail.com	501-680-1316						ANRD
Arkansas Agricultural Council	Andrew	Grobmeyer	Executive Vice President	andrew.grobmyer@agcouncil.net	501-376-0455	501-454-9643					ANRD
Arkansas Department of Agriculture - Livestock and Poultry Division	Patrick	Fisk	Director	patrick.fisk@agriculture.arkansas.gov	501-249-3369						ANRD
Arkansas Department of Agriculture - Plant Industries Division	Scott	Bray	Director	Scott.bray@agriculture.arkansas.gov	501-626-2187						ANRD
Arkansas Department of Agriculture - Forestry Division	Kyle	Cunningham	State Forester	kyle.cunningham@agriculture.arkansas.gov	501-580-5479						ANRD
Arkansas Department of Agriculture	Wes	Ward	Secretary	wes.ward@agriculture.arkansas.gov	501-219-6368						ANRD
Tyson Foods	Jeffery	Wood	Director - Government Relations	jeff.wood@tyson.com	479-290-3486						ANRD
Arkansas Department of Commerce	Tucker	Brackins	Director - Legislative Affarirs and Policy	tucker.brackins@arkansas.gov	501-682-7374						ANRD
Arkansas Farm Bureau Federation	Evan	Teague	Vice President Environmental Issues	evan.teague@arfb.com	501-228-1335						ANRD
Arkansas Waterways Commission	Cassandra	Caldwell	Director	cassandra.caldwell@arkansas.gov	501-682-2114						ANRD
Arkansas Forestry Association	Max	Braswell	Executive Vice President	mbraswell@arkforests.org	501-374-2441						ANRD
Office of Outdoor Recreation	Katherine	Andrews	Director	katherine.andrews@arkansas.gov	501-682-6829						ANRD
The Poultry Federation	Marvin	Childers	President	marvin@thepoultryfederation.com	501-375-8131	501-766-1545	321 South Victory Street	Little Rock	Arkansas	72201	ANRD
Arkansas Cattleman's Association	Michelle	Horton	Executive Vice President		501-224-2114		310 Executive Ct	Little Rock	Arkansas	72205	ANRD
Entergy Arkansas	John	Bethel	Director of Public Affairs	jbethel@entergy.com		501-776-7689					ANRD
Southwest Power Administration											ANRD
Arkansas Electric Cooperatives	Lance	Beckman	Engineer III - Land and Development	lance.beckman@aecc.com	501-691-5215						USACE

COMPANY NAME	CONTACT FIRST NAME	CONTACT LAST NAME	CONTACT EMAIL ADDRESS	CONTACT UPDATED BY
Governor's Office				FTN
Senator John Boozman	Elijah	Snow	elijah_snow@boozman.senate.gov	FTN
Senator Tom Cotton	Vanessa	Moody	vanessa_moody@cotton.senate.gov	FTN
US Rep. 1st Dist. - Rick Crawford	Courtney	Handey	Courtney.Handey@mail.house.gov	FTN
US Rep. 2nd Dist. - French Hill	Maha	Witherington	maha.witherington@mail.house.gov	FTN
US Rep. 3rd Dist. - Steve Womack				FTN
US Rep. 4th Dist. - Bruce Westerman				FTN
AR House Speaker - Matthew Shepherd				FTN
AR Senate President Pro Tempore - Bart Hester				FTN

COMPANY NAME	CONTACT FIRST NAME	CONTACT LAST NAME	CONTACT TITLE	CONTACT EMAIL ADDRESS	CONTACT BUSINESS PHONE	CONTACT CELL PHONE	CONTACT MAILING ADDRESS	CONTACT CITY	CONTACT STATE	CONTACT ZIP CODE	CONTACT UPDATED BY
USACE	Katy	Breaux	Senior Project Manager Chief, Project Management Branch	katy.breaux@usace.army.mil	601-631-5741	601-618-4669		Vicksburg District			USACE
USACE	Danny D.	Ward	Branch	daniel.d.ward@usace.army.mil	901-544-0709	901-652-2875	167 N. Main, Rm. B-202	Memphis	TN	38103-1894	USACE

Appendix E-3: Series 1 and 2 Meeting Minutes

ARKANSAS PROGRAMMATIC WORK PLAN – STAKEHOLDER ENGAGEMENT PLAN

Dates: 03/26-27/2024

See Appendix E-3b: Sign-in Sheets for In-Person Attendee Lists

Overview

1. Speakers included representatives from the Arkansas Department of Agriculture Natural Resources Division (NRD), the US Army Corps of Engineers (USACE) Little Rock District, as well as the consultants working on the project.
2. Speakers talked about the partnership between USACE and NRD in updating the Water Plan and the mission of the Water Plan. During the discussion, speakers highlighted events that underscored the need for the update, including growth in the state, and the 2019 Arkansas River flood. Together we can build a plan for wise use of resources and comprehensive flood management.
3. The Water Plan update is an iterative process, and the result will only be as good as the information provided. Attendees were encouraged people to send as much data and information as possible.
4. The Water Plan update is being completed through a partnership between USACE and NRD through the Federal Planning Assistance to States Program and being funded 50% with federal money and 50% with state money. The contractors working on the update are Michael Baker International (MBI), with FTN Associates, Ltd. (FTN).
5. A QR code was shared with meeting participants. The QR code links to the NRD Water Plan webpage where materials related to the update will be housed, including copies of the presentation used at this meeting. On the NRD Water Plan webpage, people can also sign up for notifications about Water Plan update events and progress.
6. The Water Plan update will be a two-phase process. We are currently in the first phase, which is defining the scope of the update. The team doesn't believe there is a need to start from scratch again, but that there have been changes since the 2014 Water Plan that should be addressed or may affect recommendations in the 2014 Water Plan.
 - a. The input needed from stakeholders in this phase is what they think needs to be in the updated plan and/or what changes need to be considered and/or what topics were not addressed in the 2014 Water Plan that should be in the plan.
 - b. One new element that has already been identified is a State Flood Plan. A project to inventory levees on all rivers of the state is already under way, also funded through the Federal Planning Assistance to States Program.
 - c. The discussion included a review of the history of water planning in Arkansas, along with basic information about the 2014 Water Plan. As part of the discussion, the 24 goals of the 2014 Water Plan were reviewed with participants, who were asked if they think these goals are still relevant or could be combined into a smaller number of goals.
7. The preliminary goals for the State Flood Plan were presented and participants were invited people to provide feedback/input about goals for the Flood Plan and what the Flood Plan should address and/or include.
8. A QR code that links to a survey about what to include in the 2024 Water Plan update was provided.
9. State officials spoke about the path forward for the 2024 Water Plan update.
 - a. A second kickoff meeting in Northwest Arkansas (Fayetteville) will be held tomorrow, followed by a series of five public meetings around the state the first week of May.
 - b. Phase two of the update will be actual preparation of the 2024 update of the Water Plan, along with the State Flood Plan, which will also involve stakeholder engagement.
 - c. Phase three is rollout of the Water Plan update.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

- d. Meeting attendees were invited to ask questions or provide comments about the Water Plan or Flood Plan.

Discussion

1. *Question:* Will the Flood Plan address areas that have already experienced flood damage and will it utilize existing regional studies?
Answer: It can if you want it to. We want to hear what you want in the Flood Plan. We want your input, data, studies. We don't want to repeat work that someone has already done.
2. *Question:* Please tell me more about the levee inventory project. How will the Water Plan address them?
Answer: The first phase is identifying all levees in the state, which includes defining what is and isn't a levee. As a result of the 2019 Arkansas River flood, we already know a lot about the Arkansas River levees. Now we want to gather information about levees on other rivers in the state. The second phase of the project will assess the condition and risks associated with the levees.
3. *Comment:* A list of levees is not very useful. The issue is management of the levees, governance, certification, inspections, and generating revenue. We know a lot of our levees are substandard and not being properly maintained.
Answer: Management of the levees and their condition is important. But first we need to have a complete list of levees. That is critical.
4. *Question:* Will private levees and dams be included?
Answer: The current project is inventorying just levees. NRD manages the state Dam Safety Program. If you have a concern about a dam, private or public, you can call NRD.
5. *Comment:* We have tried to get the owners to deal with the dam, but it's a mess. These dams need to be inspected.
6. *Comment:* Many landowners or neighborhood associations don't realize they own the dam and are responsible for maintaining it.
7. *Question:* Will the update remove things in the 2014 Water Plan?
Answer: If goals or recommendations in the 2014 Water Plan are no longer valid, they will not be included in the update.
8. *Question:* The Grand Prairie aquifer has failed; it's gone. Why are we still trying to save it?
Answer: It is a complex issue. The entire Alluvial aquifer is not gone. There are some areas where water levels are rebounding where projects have been implemented.
9. *Question:* The Grand Prairie aquifer never had the capacity to provide enough water. USACE says the aquifer is gone. What about using water from the Little Red or Black Rivers?
Answer: The entire aquifer is not gone. The Water Plan update will likely include groundwater recommendations. We need to take another look at the science, but we will not re-do the science if the projections are still accurate. We don't think we have seen much change over the last 10 years. We will examine whether or not the 2014 recommendations are still valid.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

10. *Question:* When you use the term riparian, is that from the law or science?
Answer: Not sure (it depends on the context). The Water Plan is intended to protect all uses. Riparian water rights are different.
11. *Question:* Will Water Plan information be shared with interstate entities?
Answer: Yes. Data will be shared with the Red River Compact Commission and similar entities.
12. *Question:* Will you use information from other studies that have been recently completed or started?
Answer: Yes. Send us anything you have.
13. *Question:* Where does drought get addressed?
Answer: There are recommendations in the 2014 Water Plan related to drought, and we have had some meetings and made some progress with drought planning. The update will definitely address both flooding and drought.
14. *Question:* What about infrastructure failure?
Answer: Infrastructure has been addressed in all of the Water Plans. We know that population in some areas of the state is growing and in other areas of the state it is shrinking, which results in different infrastructure issues.
15. *Question:* Will the Flood Plan address only flooding of major rivers? What about localized flooding?
Answer: The Flood Plan could certainly look at both. If people tell us they want the Flood Plan to address localized flooding, it will be part of the Flood Plan.
16. *Question:* Legislative sessions have tried to help the levee districts by reorganizing, etc. Will you include a status update on recently passed levee laws?
Answer: We can. There has been a lot of work on the Arkansas River levees since 2019. Now we want to look at levees on other rivers in the state in the same way, which includes looking at the functionality of the boards and the status or condition of the levees. State law does not allow Arkansas to regulate levees. So, the state will have to address levee issues primarily through identification of where there are issues and educating the local owners and managers about what is needed.
17. *Question:* When you say “water uses” what do you mean? Is that “uses” as defined in the Clean Water Act?
Answer: The Water Plan is a guidance document that state and federal agencies, local government, and state legislature can use when setting policies about water and its uses. The plan itself is not regulatory.
18. *Question:* Will the Water Plan define regionalization for water utilities? The current state definition is narrow. Definitions at the federal level are not helpful.
Answer: That is not a definition NRD can set. Regionalization will probably come up in the update, but the plan is not regulatory. The Water Plan may use a different term for this concept/situation.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

19. *Question:* The 2019 [Arkansas River] flood exposed flaws in how the levee districts and boards function. Will the Water Plan address that?

Answer: The Water Plan can provide recommendations to the levee districts and boards, as well as to legislators, related to their functionality.

20. *Comment:* Planning development districts should take charge of the levees.

Answer: Good recommendation.

21. *Question:* The 2014 Water Plan states that Arkansas has an annual water excess of 8.7 million acre-feet. The issue of excess water has been the subject of several lawsuits. Will the plan address this situation?

Answer: We need this type of comment. The 2014 Water Plan calculated excess water, but the real question is, is this water accessible? Meaning is the excess water located where there is existing infrastructure? Also, is there excess water when it is needed? These are questions that we can try to answer in the Water Plan update, if people say they want us to.

22. *Comment:* Northwest Arkansas has different water quantity and quality issues than the rest of Arkansas.

Answer: The quantity of water that is calculated to be available is different from the quantity of water that can be accessed by existing infrastructure. The quality of available water also needs to be considered. What do you want us to look at? Is there strong interest in localized issues? Let us know by filling out the survey, coming to meetings, emailing me (Ryan Benefield).

23. *Question:* What is the financial allocation for the entire plan update? How much is the state paying?

Answer: For Phase One of the update the state and USACE are paying \$200K each. We don't know yet what the cost will be for Phase Two. That will depend on what people decide they want in the update. It is likely that requests will need to be prioritized, because there won't be enough money to do what everyone wants. We expect Phase Two to be a multi-million-dollar project.

24. *Question:* How were the consulting firms selected?

Answer: Through the USACE contracting program. Jordan Niedzwiecki can provide details.

25. *Comment:* I represent a drainage district in Monroe County. We need to promote improvements such as capturing tailwater and other water management projects.

Answer: Agreed; good point.

26. *Question:* Previous water plans affected riparian water rights. Will the update regulate riparian rights away, or go back to the way things used to be?

Answer: The Water Plan can't make changes to state water rights. The Water Plan may include recommendations to the legislature regarding water rights. The Water Plan identifies water needs. Water rights are controlled by the legislature.

27. *Question:* Would you allow folks from Missouri to come talk to us about how they irrigate efficiently?

Answer: Yes. We want all the information we can get.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

28. *Comment:* In Phase One we need you to tell us what you want us to look at in Phase Two. Please give input early and often. Take the survey. Give us your data and studies.
29. *Question:* How can people provide input?
Answer: Send information to me (Ryan Benefield) or fill out the online survey.
30. *Comment:* You need to take a close look at the state water use database before you use the data to estimate use or demand. You need to decide if the data provides a good estimate of use.
Answer: We know there are issues with the database. We have lots of data, but not necessarily lots of good data, in the database. Correcting the problems may require legislative changes. Water usage is most often reported based on the crop, rather than the actual water usage.
31. *Question:* In the flood risk assessment, do we need to look at changing hydrologic conditions?
Answer: USACE has been looking at changes in hydrologic conditions in Northwest Arkansas streams. We are definitely seeing changes since 2014.

Date: 03/27/2024

1. *Question:* How long are you taking stakeholder comments?
Answer: We would like to have your input before the next round of meetings, so May 6th.
2. *Question:* Will the input provided be publicized?
Answer: Input will not be published, but it will be subject to freedom of information law, so any information specifically requested will have to be made available, but will not necessarily be attributed to a specific source.
3. *Question:* What progress has been made on drought contingency plan?
Answer: Meetings about a drought contingency plan were conducted, but a formal Plan was not completed. The draft drought contingency plan could use a little more work.
4. *Question:* Does the Plan address interstate compacts?
Answer: NRD works closely with other states on compacts. You must have a permit for an out-of-state water transfer. We would like your input on policy or law changes needed.
5. *Question:* Does the Plan address surface-to-groundwater issues in the Delta region?
Answer: This was a big part of the 2014 Plan. There is much effort to convert agricultural withdrawals to surface water to reduce groundwater drawdown. Some of the recommendations in the 2014 Plan may still be valid.
6. *Question:* What about intrastate diversions of water? Basin-to-basin transfers.
Answer: No, but we could look at that if needed. Currently, regions have adequate supply on macro-scale. However, basin-to-basin transfers do exist in AR. The Plan needs to address water supply and demand at a finer spatial resolution than large regions or basins. Data aggregated over an entire region or basin may not indicate any problems, but there may be smaller areas within that region or basin that do have problems with water supply and/or infrastructure.
7. *Question:* Are any experts going to be involved in this process?

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

Answer: Phase 1 is open to all stakeholders. Phase 2 may involve more input from subject matter experts for assistance in completing the Plan update.

8. *Question:* Does this have the potential to result in rulemaking?

Answer: A rule was created to memorialize the recommendations from the 2014 Plan. However, these recommendations do not have any regulatory authority. The Plan itself is not regulatory but can recommend, inform, and support law and policy changes.

9. *Question:* Is flood control infrastructure on the table?

Answer: Nothing is off the table. We have already begun looking at flood control infrastructure with the statewide levee inventory. Please let us know what else you want evaluated. However, financial constraints in Phase 2 may limit the level of detail.

10. *Question:* How do you want us to turn in our comments?

Answer: There are multiple ways you can provide information; take the survey, email Ryan Benefield, you can even hand deliver to the NRD office. Before the first week of May.

11. *Question:* In Lincoln, the rural water utility is losing as much water as customers are using (due to leakage). For example, we are over selling due to rapid expansion. Will the Plan address these issues?

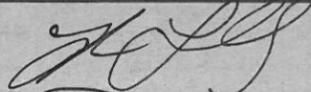
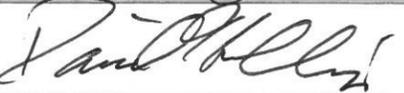
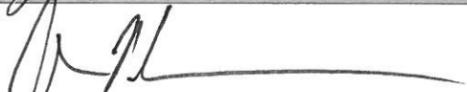
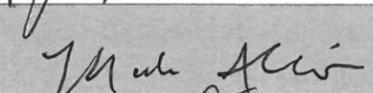
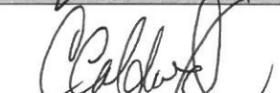
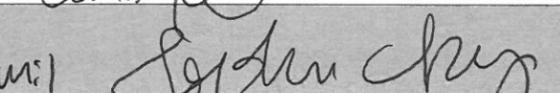
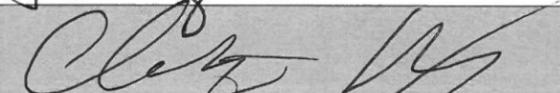
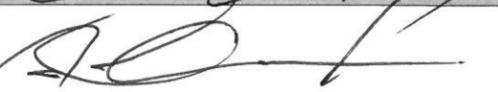
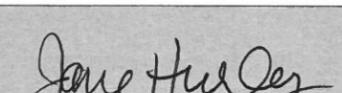
Answer: We can look at that.

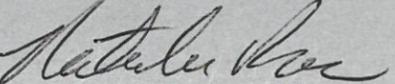
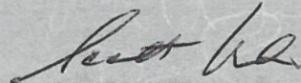
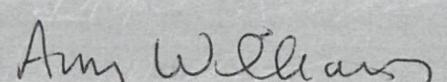
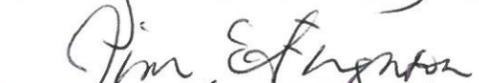
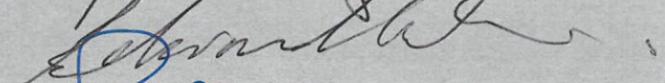
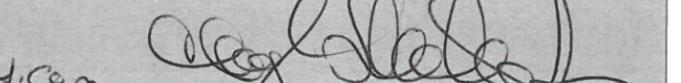
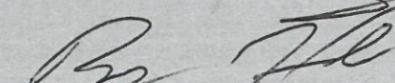
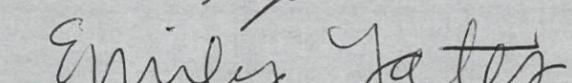
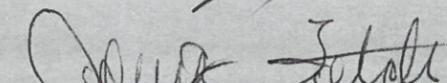
12. *Question:* What kind of forecasting will this update provide?

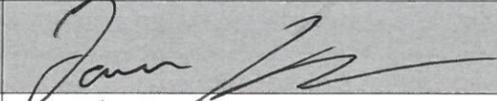
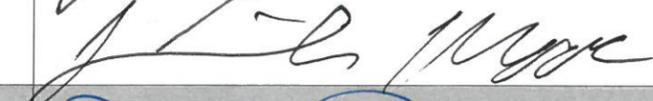
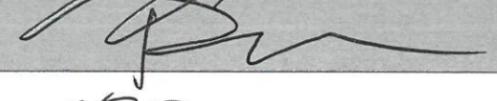
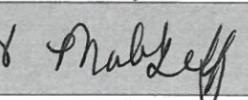
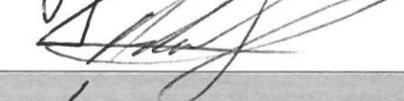
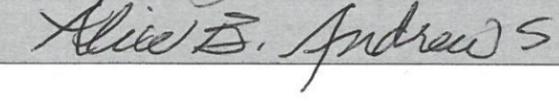
Answer: A 50-year forecast was provided in the 2014 Plan. This may need to be updated if we are not currently following that forecast.

13. *Question:* Are you going to include climate change impacts in the Plan this time?

Answer: This is a comment we have heard repeatedly, so climate change impacts will be considered. We are already looking at changes in rainfall intensity through work with USACE. Please provide us with your comments.

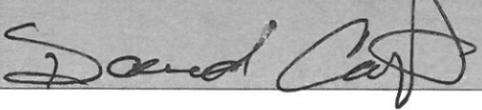
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15	Chris Law	ARWA	Scoter@windstream.net	
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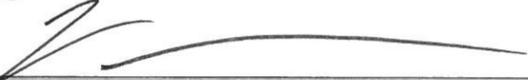
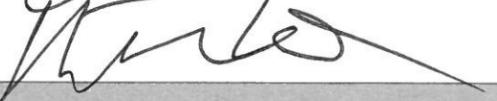
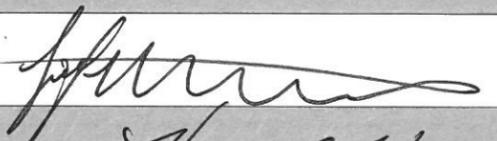
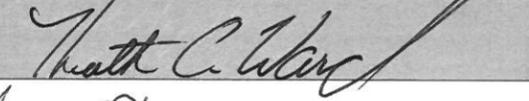
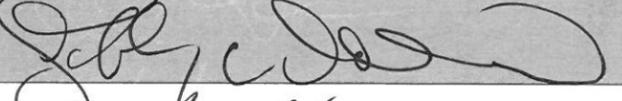
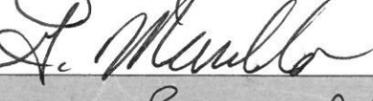
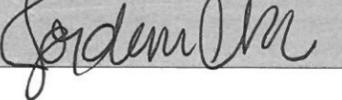
Arkansas Comprehensive Water Plan Update 2024 | Public Meeting #1
 March 26, 2024 | University of Arkansas System Division of Agriculture Cooperative Extension Office, Little Rock | 2:00 P.M.

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1	David Carruth	self	tdcarruthatty@gmail.com	
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3	David Peterson	Izard Co. OEM	oemdirector@izardcounty,ark.org	
4	David Peterson	Ozark Society	drpdnp@winkstream.net	David Peterson
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14 Sim Barrow	AR Wildlife Federation	sbarrow@arwild.org	Sim Barrow
15 Ryan Mills	Homer & Shifrin	rmills@homer-shifrin.com	Ryan Mills
16 Alana Strauss	U of A Water Quality	strauss@uada.edu	Alana Strauss
17 Katie Teague	UA Coop. Extension	Kteague@uada.edu	Katie Teague

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16	Craig Pierce	USACE	craig.pierce@usace.army.mil	Craig Pierce
17	Beky Rank	Beaver Watershed Alliance	beky@beaverwatershedalliance.org	Beky Rank

Arkansas Comprehensive Water Plan Update 2024 | Public Meeting #1
 March 27, 2024 | Don Tyson Center for Agricultural Sciences, Fayetteville | 2:00 P.M.

	Name	Organization/Public Interest	Email	Signature
	Name	Organization/Public Interest	Email	Signature
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3	James McCarty	Beaver Water District	jmcarty@bwdh2o.org	
4	Nikki Heck	ARK Comm. of State Lands	nheck@cosl.org	
5	EVAL TEAGUE	ARZFB		
6	Leif Kindberg	IRWP	leif@irwp.org	
7	Heath Ward	Springdale Water Utilities	hward@springdalewater.com	
8	Gene Pharr		genepharr@pgtc.com	
9	Jeffrey Wood	Tyson Foods	jeff.wood@tyson.com	
10	Ginny Masullo	PI	masullo.ginny@gmail	
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ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

Dates: May 6-10, 2024

Attendees: For list of in-person attendees, please see Appendix E-3: Sign-in Sheets

Overview

The Arkansas Department of Agriculture Natural Resources Division (Natural Resources Division) and the U.S. Army Corps of Engineers (USACE) hosted a series of stakeholder engagement meetings in May 2024 at various locations throughout Arkansas to discuss the 2024 Water Plan Update and development of the 2024 Flood Plan. This meeting series, referenced as “Series 2”, served as a follow up to the two kickoff meetings held in March 2024 in Little Rock and Fayetteville.

These meetings, built around topic-focused agendas for each location, provided an opportunity to reach additional stakeholders throughout the state and host interactive discussions on topics relevant to the Water Plan Update and development of the flood plan. Session participants provided feedback that will inform the Water Plan Update and flood plan development efforts.

Speakers included representatives from the Arkansas Department of Agriculture Natural Resources Division (Natural Resources Division); the U.S. Army Corps of Engineers (USACE); and the project consultant team, Michael Baker International and FTI. In-person attendees included 101 stakeholders across all 5 live sessions. The number of virtual participants was not available at the time of this writing. Table 1 shows the breakdown of participants by location.

MEETING LOCATIONS	TOTAL IN-PERSON ATTENDEES*
Jonesboro, AR	17
Fort Smith, AR	12
Magnolia, AR	10
Stuttgart, AR	38
Little Rock AR	24 (Not including Zoom attendees)
All locations	101 (in-person)

Table 2. Summary of Meeting Participants per Location (Excluding Project Team).

***Total does not include ANRD, USACE, MBI and FTN staff.**

These all-day meetings, split into morning and afternoon sessions, were held on the following dates and locations:

1. May 6, 2024 – Fowler Center, 201 Olympic Dr., Jonesboro, AR 7240 Jonesboro
2. May 7, – Fort Smith Convention Center, 55 S 7th St., Fort Smith, AR 72901
3. May 8, 2024 – Donald W. Reynolds Campus & Community Center, 100 E. University St., Magnolia, AR 71753
4. May 9, 2024 – Rice Research and Extension Center, 2900 AR-130, Stuttgart, AR 72160
5. May 10, 2024 – Arkansas Cooperative Extension State 2024 Office, 2301 S. University, Little Rock, AR 72204
6. A virtual option was provided on the agency website at agriculture.arkansas.gov.

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

Figure 1 shows the high-level focus topics for each session per city and date. Additional detail is included in the Discussion section of this document.

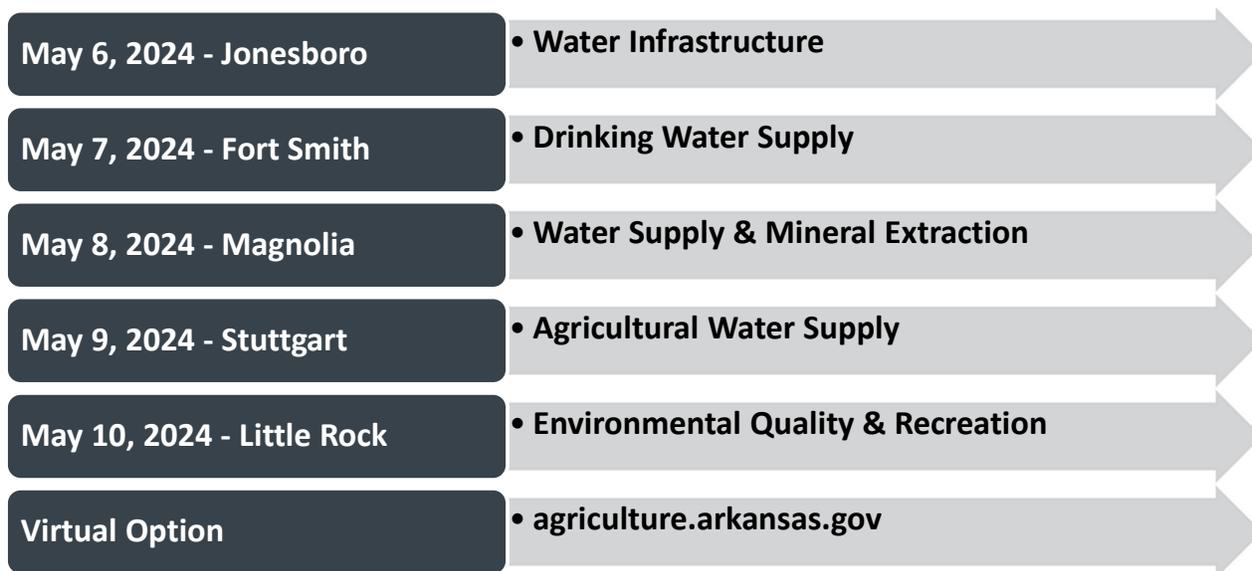


Figure 7. Series 2 stakeholder meeting locations, dates, and discussion focus per session.

Discussion

Structure and Topics

Morning sessions included an overview of the Arkansas Water Plan and Flood Plan, including a discussion about the importance of both plans. The discussion also included a review of the 2014 Arkansas Water Plan and the 2024 Water Plan update process, as well as a state flood plan overview, and a discussion about the Water Plan survey followed by group discussion.

A copy of the survey is available at [ARKANSAS WATER PLAN - STAKEHOLDER ENGAGEMENT FORM \(office.com\)](http://ARKANSAS WATER PLAN - STAKEHOLDER ENGAGEMENT FORM (office.com)). Topics covered in the survey include the following:

1. Flood Plan
 - a. Stakeholder Priorities
 - b. Types of Flooding Experienced (in their communities)
2. Infrastructure Assessment
 - a. Focus
 - b. Policy-level Approaches
3. Future Infrastructure Demands
 - a. Most Critical
4. Drinking Water Quantity Approaches
5. Drinking Water Quality Concerns
6. Priorities of Local Industry
7. Industrial Impacts
8. Agriculture Water Demands
9. Agricultural Development and Strategies
10. Environmental – Water Quality
11. Environmental – Strategies

ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

Afternoon sessions included topic-focused discussions, as noted above, followed by breakout sessions to discuss goals, issues, and concerns. Following the breakout sessions and briefings by each breakout team to the larger group, participants had the opportunity to engage in additional discussion, identify next steps, and provide feedback. This information was captured by the project team update team to further inform the Water Plan update and Flood Plan development. The QR code linking to the online survey was also shared during the May meetings to encourage stakeholders to provide input and feedback related to the Water Plan update and Flood Plan development. To date, the project team has received 55 completed stakeholder surveys.

Stakeholder Session Feedback

Jonesboro

Issues and Areas of Concern

When asked, the audience chose flooding as a bigger issue than drought. They also shared the issues and areas of concern noted below during the discussion.

- Problems with water wells and tanks
- Lack of funding opportunities
- Staffing/Workload issues – Many small towns do not have the staff to apply for grants and loans, and the mayor does it all.
- Declining/Aging Infrastructure
 - Lots of declining/aging infrastructure that need to be addressed
 - Levees
 - Many levees are old, but are critical for controlling flood waters
 - The state will be inventorying all the levees in Arkansas but will not be regulating
 - Only some levees are shown as providing flood protection.
 - USACE has been looking at vegetation on levees. The Little River Drainage District has had success with native grasses on levees. These grasses have higher water usage and crowd out woody vegetation. Wildlife have been stranded on levees during floods and died because Bermuda grass offers no nutritional value.
- Water distribution line issues – many losses; most are plastic, with ductile iron in a few places
- Water is not always available when and where it is needed
- Water usage
 - Incentives are needed for practices that encourage using less ground water. Trying to use more surface water and tailwater recovery, especially in critical groundwater areas. Farmers still depend on groundwater, but are using tailwater recovery and reservoirs to use less ground water.
 - More surface water impoundments are being built to store water for irrigation, but they are expensive and take land out of production. It is necessary to look at increasing the amount of surface water that is available and also reducing water usage.
 - It is necessary to look at all water needs and uses, including fishable/swimmable waters.
 - Assistance for natural solutions is needed.
 - Reconnecting backwater areas to main channels provides storage for reducing downstream flooding.
 - AGFC is receiving requests for water from outside the state.
- Watershed Studies

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- Ouachita Basin Section 729 study (large watershed study) conducted to characterize baseline solutions for bottomland forests. Trees are being lost due to prolonged high-water levels during the growing season.
- Drought
 - Also important for farmers. It is more manageable than flooding, though.
- Wildlife Management
 - Areas in the Delta and Coastal Plains affected by flooding in the growing season. USACE Little Rock District has looked into hydrology changes there.

Positive Aspects

- Rural water systems
- Solid waste pickup in rural areas
- Lots of grants and low interest loans available

Fort Smith

Attendees met as one group to discuss the Water Plan and the Flood Plan. The morning session focused on changes since 2014, Water Plan needs, and general questions. The afternoon session focused on the Flood Plan and drinking water quantity and quality.

Issues and Areas of Concern

Participants expressed interest in following a holistic approach to the Water Plan and the Flood Plan that can be scaled from a state to local scale. Part of this holistic approach would be identifying and defining how the 7 sectors connect and how the various sections work together. There is also an interest in harnessing science and technology to address multiple needs, and in securing funding and technical assistance to implement Plan recommendations. Participants cited water re-use as a science and technology option that also covers water supply and can be used in agriculture.

They identified the following major challenges and areas of concern:

1. Funding and Infrastructure
 - a. \$1.3B for Water/Wastewater (W/WW) needed (est.) for Fort Smith for 10-year plan.
 - b. \$300M for each W/WW needed for Bentonville.
 - c. Quality of Materials
 - i. Newer materials are not of the same quality, with 90% of leaks from materials 20-years old or less.
 - d. The cost of compliance with new water quality testing and measurement rule(s) without financial and technical assistance is very high.
2. Increased demand/pressure on water resources
 - a. CIP projects for Beaver Water have been accelerated, for example, a 20-year plan in one area has now become a 10-year plan.
 - b. Pressure from other states to share aquifers
 - c. Population and groundwater decline in the East and South have imposed a burden on rate payers.
3. Need for qualified (or any) contractors for Capital Improvement Programs (CIP) and construction projects
 - a. Major issues with quality of installation and getting contractors to bid/do jobs at all
 - i. Contractors often not bidding on projects below \$10 million, which also drives up project costs
 - b. NEPA and political challenges exist for expanding service to meet future demands.

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- i. New reservoirs take 20+ years to develop. For example, the Grand Prairie and Bayou Meto projects took decades to become fully functional.
4. Shortage of licensed operators
 - a. Need for better support and training
5. Education and understanding
 - a. There is a need for the Water Plan to provide guidance to support making and implementing multi-million-dollar decisions.
6. Regionalization Challenges/Barriers
 - a. Labor is a major challenge.
 - b. Regionalization is needed, along with 30-year planning for small and mid-size utilities.
 - i. Local politics play a role.
 - ii. The State may need to act as an intermediary to help groups of utilities resolve issues around compliance, funding (money), countywide v. localized consolidation.
 - iii. Similar challenges exist on the wastewater side.

Participants also identified the following needs and wish-list items:

1. Greater involvement from the State to get utilities/cities/boards to adopt regional planning and management approaches
2. Education
3. Funding and technical assistance to implement recommendations
 - a. Funding sources are changing and using new sources may require administrative and procedural changes, etc.
 - i. Drinking Water State Revolving Fund (DWSRF) v. bonds – in some instances, it is now easier to use bonds rather than DWSRF for projects.
 - ii. Interest v. forgiveness loans
 - iii. “Pay as we go” is not a practical model – “it’s not working”

Other topics of interest and concern discussed included:

1. Aging infrastructure and demands
 - a. Challenges for small water utilities (UA Extension, UAE) and cost increases
 - i. Pandemic price hikes have increased the cost of water utilities
 - ii. Act 605
 - b. Participants cited an incident in Mansfield as a good example of water scarcity when something unexpected happens (ruptured water line left over a thousand people without water). Fort Smith is looking at contingency options if something similar occurs.
2. Growth
3. Environmental and Permitting Issues, Water Quality and Quantity, Natural Hazards/Climate-Related
 - a. Lithium and bitcoin production
 - b. Weather Patterns
 - c. Drought
 - i. State hierarchy for priority water uses
 1. The SWP has priority stated as 1. Health and safety (i.e., municipal); 2. Agricultural; 3. Industrial/Commercial. Groundwater recharge rates are variable, but monitored and reported by the U.S. Geological Survey (USGS).
 - d. Flooding
 - i. Localized Flooding Issues and Causes

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1. Codes for development standards are not up to date
 - a. The most developed areas have the highest population without stormwater post-controls. (No checks on development.)
 2. Density has changed things, and rain intensity and impervious area have drastically increased. Localized normal intensity storms cannot reach the system and “literally get stuck on the road.”
 3. Increased traffic has impacted stormwater. The system has the capacity to take the water, but the water cannot reach the inlets.
 4. Streambank erosion from higher velocities are also having an impact.
 - a. Higher velocities for longer time are allowed because the development follows the rules but concentrate flows to impact downstream users.
 5. Secondary-relief systems are not maintained.
 6. Localized urban flooding usually leads to riverine flooding.
 7. In 2019, the City of Fort Smith incurred \$14-15M in utility damages. It lost 2 pump stations and experienced damage to 11 (salvaged). There was also property damage to homes, and a high cost to clean lines impacted by mud. The flooding also resulted in a closed port, levee issues, levee failure, and the closure of Garrison bridge.
- ii. Mitigation Measures
 1. Buying houses and trying to mitigate flooding is an option for some cities, which may be a challenging process.
 - a. Private property owners may not want to sell or relocate, and prefer instead to build houses on their land, especially if there are scenic views, even though they are not pleased when flooding occurs.
- e. Water Quality
 - i. Water quality testing and measurement is ahead of treatment technology.
 1. The cost of compliance with new rule(s) without financial and technical assistance is very high.
 2. The treatment technology needs to catch up to monitoring.

Magnolia

1. Climate Change
 - a. Greater emphasis on climate change needed beyond one paragraph in the 2014 Plan.
2. Aging Infrastructure
3. Funding
 - a. The State’s main tool is loans, but small towns are not always able to repay them. Would regionalizing or consolidating utilities help with this? (Some have already consolidated.)
 - b. Funding Sources and Available Funding v. Identified Needs
 - i. ARPA provided \$260 million, but the State received requests totaling more than \$1 billion.
 - ii. Other funding sources include the USDA Rural Development Program and the Delta Regional Authority.
 - iii. State has instructed Michael Baker International to research funding mechanisms in other states.
4. Water Quantity and Quality

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- a. Industrial users wish to maintain their existing allocation.
 - b. There have been requests for water from the Ouachita River. Louisiana would like to receive more water.
 - c. Some communities in northwest Arkansas were close to running out of water in 2011, underscoring the need for backup and redundancy. Connectivity is needed to share water.
 - d. Using both surface water and groundwater may require different systems.
 - e. Water conservation is important.
 - i. Ouachita River pipeline example - 70% reduction in groundwater usage to sustain the Sparta aquifer, which is naturally recharged in the Sandhills area. The cost of developing an alternative water supply was a big incentive to conserve water. Public education began years before the alternative was developed and resulted in about a 10% reduction in groundwater usage. The cooperation of two industries that used a more efficient cooling tower, and the use of gray water by two golf courses, as well as further reductions from industrial users contributed to reaching the 70% reduction.
5. Flooding
- a. Severe/major flooding examples in the region were discussed, as well as ongoing flooding issues. Some communities do not participate in the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA), and some cities do not have the staff for enforcement/floodplain management.
 - b. Infrastructure improvements are needed.
 - c. State GIS Office updated maps for levee-based flood risk but encountered issues with lack of information on levees.
6. Business Continuity/Resiliency
- a. Additional backup and redundancy/resiliency of systems is needed. The consolidation of utilities has reduced redundancy, and entire systems may not run if there is a power outage.
 - b. Maintenance issues. Some facilities do not have funds to make repairs after spending their monies identifying the problem.
 - c. Education and knowledge transfer are a contributing factor. Staff turnover at the local level require constant staff education; one utility needed assistance from a former employee to help find the source of a leak and repair it.
 - d. Conjunctive water management is important. Connectivity is needed to share water, as well as collaboration between entities to identify and address issues common to all.
7. Industry Demands
- a. Coal-fired power plants use more water than combined cycle gas fired power plants. (Carbon capture is water intensive.)
 - b. Bromine production in Camden (Department of Defense) is also water intensive. Eventually, they would like to extract lithium, which will generate a greater demand for water, at yet unknown levels. An alternative water process may need to be developed to address this. The quality of water needed for lithium extraction is currently unknown.
 - c. Public engagement/communication regarding water needs for lithium is needed.
 - i. Long lead time for industry development that requires a technology breakthrough beyond the laboratory scale.
 - ii. Applications to the Oil and Gas Commission have been withdrawn.

Suggestions and Recommendations

- Flooding and Floodplain Management

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- Provide a form for small cities to use to develop floodplain management regulations. (Model ordinances are available.)
- Apply model ordinances to stormwater, too.
- Plan for 100-year floods.
- Address road drainage issues; look to local residents for ideas, and include ARDOT.
- Require permeable surfaces.
- Also consider beaver dams and damage caused by beavers.
- Business Continuity/Resiliency/Redundancy
 - Ensure staff education and knowledge transfer.
 - Collaborate between entities to address issues across the region.
 - Training is critical

Stuttgart

Since 2014, the region has seen several changes. These include:

- Irrigation efficiency improvements, including the construction of new storage reservoirs.
- Changes to state laws and tax incentives built into state law, and an increase in the adoption rate of incentives. These include federal incentives (Farm Bill, NRCS RPP, BIL funding, and Climate Smart programs).
- Projects to take advantage of excess surface water.
- Implementation of several agricultural water management practices since 2014, and an increase in the adoption of practices such as soil moisture sensors, surge irrigation, and reservoirs. Adoption of these practices has positively affected groundwater levels.
- More information is available now.
- Water and wastewater challenges
 - Higher costs – some people cannot afford the existing rates for water and wastewater services. (Clarendon example.)
 - Finding and keeping qualified water and wastewater personnel is difficult.

Funding Recommendations

- Establish state incentives to match federal funding to protect water quality, and threatened or endangered species, etc.
 - Climate Smart funding is available for cover crops, but there is no state funding for incentives.

Additional Suggestions, Recommendations, and Observations

- Pursue efficiency and other improvements before problems occur.
- Stretch funding across the entire state from sources such as NRCS, TNC, and others.
- Water Quantity/Water Quality
 - Try to identify less costly water treatment methods for small towns as they try to attract industries
 - Regarding drinking water, focus on rivers that impact towns, and involve the USACE. Look at all uses of the White River and other rivers.
 - Water from the Sparta Aquifer is good, but tap water will damage dishwashers and is not drinkable.
 - Demand for water from the Sparta Aquifer needs to be monitored closely because it does not recharge as quickly as the alluvial aquifer.

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- Recycle water on farms to reduce chemicals in streams. Tailwater recovery ponds should be big enough to hold runoff.
 - The NRCS provides cost-sharing assistance for irrigation reservoirs and tailwater recovery.
- Balance infrastructure needs across the entire state.
- Adopt resiliency measures to reduce or shorten the impact from historic floods.
 - Ensure proper, proactive ditch maintenance.
 - Create a state fund to respond more quickly and provide resiliency before a major flood event (Arkansas River flood delayed response and levee repair example).
 - USACE is developing the White River Plan and working with Arkansas State University to implement it.
 - “Don’t move the flood.” Flooding should be controlled without hurting people downstream.
- There have been some successes with regionalization of utilities (West Tennessee example), but local districts prefer to spend the money locally. The West Tennessee River Basin District combined multiple individual drainage districts.
 - One suggestion was to keep local control but have entities coordinate with other districts.
- Floodplain Management and Levee-Related Flooding
 - A reporting mechanism implemented after the 2019 floods enables County clerks to send information to the Arkansas Department of Emergency Management. This was used to allocate levee repair funding.
 - There is no flood insurance coordinator for local organizations outside of FEMA, and the NFIP does not address large-scale flooding outside of communities participating in the NFIP.
 - State law prevents the Natural Resources Division from regulating local boards.
 - There is often a lack of funds and knowledge among boards with less participation and a resulting lack of maintenance.
 - Funding to address rural-drainage that affects flooding is site-specific.

Little Rock

Issues of Concern

1. Aging infrastructure
 - a. Programmatic replacement of water mains is needed.
 - b. The water plant in the Pine Bluff industrial park is currently being upgraded.
2. Industrial Growth
 - a. White Hall is growing and will need a new water plant in the future.
3. Funding and Incentives
 - a. Liberty Utilities is prevented from receiving grants because of its nonprofit status.
 - b. There are many applications for grants but not many are funded.
 - c. Hot Springs created a local stormwater utility to help cover costs.
 - d. The Natural Resources Division offers grants for green infrastructure.
4. Water Quality
 - a. Drinking Water
 - i. Drinking water in the Pine Bluff area is from aquifers and water quality is currently not an issue. If the existing water plants were stressed due to lack of supply, they would produce less water.
 - b. Pollution

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- e. Green infrastructure is being used, but not enough. (Grants are available.)
 - i. It is costly, so implementation cannot be forced.
 - ii. Consider incorporating the less tangible benefits of green infrastructure.
 - iii. Increases in green infrastructure might attract some businesses.
 - f. It is necessary to increase resiliency in riparian buffers, as well as water supply.
7. Water Transfer Issues
- a. “We should get to where we can use water before it gets to the stream or aquifer capture, and use it, then release it.”
 - b. Reservoirs consume a lot of space and money.
 - c. How can we capture water from rooftops or other small-scale situations to reduce demand on systems?
8. Excess water permitting (see *Suggestions, Recommendations, and Observations* section)
9. Environmental Quality
- a. Is vulnerable to other interests and this vulnerability should be accommodated in the Water Plan.
10. Arkansas has a low cost of living, with low-cost water and land compared to certain states, and this should be kept in mind for the future. This includes implementing protections when considering competing uses due to uncertainty.
- a. Increases in population result in increases in runoff due to more impervious area.
 - b. Some population growth also results in increased water demand.
 - c. Some burden with excess runoff is/was preventable.
11. The Water Plan should be consistent with other documents and plans.

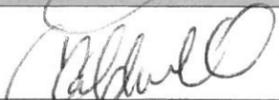
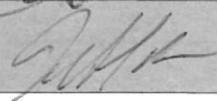
Suggestions, Recommendations, and Observations

1. A holistic approach to planning and to capturing and using water is needed. “We need to look at things creatively.”
 - a. Partnering to recharge aquifers was suggested.
 - b. A directory with all existing data should be available so that interested parties can access the information.
 - c. Acknowledging that it is difficult, a suggestion was made to look into artificial groundwater recharge for the future.
 - d. A participant commented that there are examples of utilities that own the entire watershed for their drinking water supply reservoir.
 - e. It is important to remember that aquifers are shared with other states.
 - f. Different uses of water do not have to compete against each other, and all uses are needed. For example, tourism and recreation is the #2 in the state, and it is important that all parties work together.
 - g. Include a discussion of technology to save water in the Water Plan.
2. Nature-based and ecoregion-specific solutions work and should be emphasized and promoted. Nature-based solutions are highly desirable and have good longevity.
 - a. Consider ecological flows in addition to agricultural and industrial demands on water. If a species is extirpated due to lack of water, it is lost. However, if a crop dies because of lack of water, it can be replanted.
 - b. Use native plants wherever possible.
3. Revisit the issue of water-permitting needs.
 - a. The amount of excess water has not changed much since 2014, and the review will be more spatially granular, not a deep dive into the calculations.

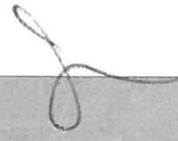
ARKANSAS WATER PLAN UPDATE – STAKEHOLDER ENGAGEMENT PLAN

- b. A participant suggested that the 2014 Plan established a 25% limitation on permitting of excess flow to accommodate projects, such as Grand Prairie Metro and Boeuf-Tensas, which may need more than 25% excess water.
 - i. State officials explained that multiple uses must be considered when evaluating the 25% limitation, including Interstate Compacts.
 - ii. Another participant suggested that the temporal aspect of flows must also be considered, not just annual averages. How do we store water and use it later?
4. Implementation of specific 2014 recommendations has not been tracked. Some recommendations were not implemented due to lack of funding or other obstacles.
5. Ensure wildlife protection
 - a. Outdoor recreation is important and depends on ecology. Elevate ecological protection to a critical initiative.
6. Integrate environmental quality into all priorities.
7. More education and technology are needed, not more regulation. This includes implementing existing technology.
8. Look at the updated Plan as a functional model. Look at win-win solutions for/across multiple topics, rather than by individual topic.
9. Consider adding a land conservation credit.
10. Arkansas should join the International Soil Erosion Control Association.

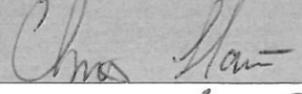
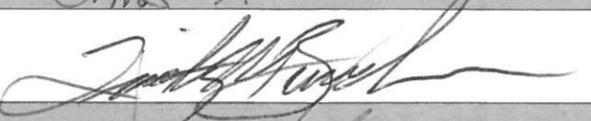
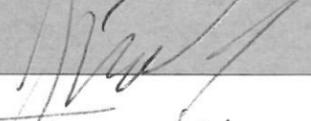
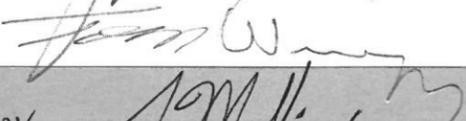
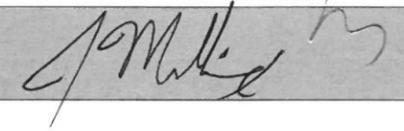
Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 6, 2024 | Fowler Center, 201 Olympic Dr., Jonesboro, AR 72401 |

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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
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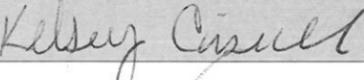
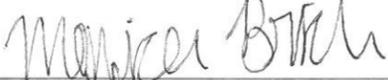
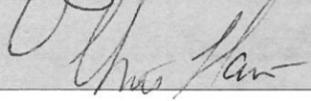
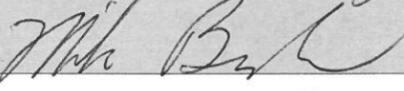
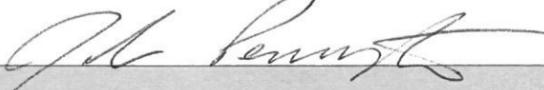
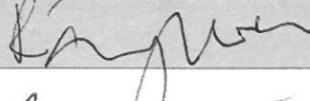
Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 6, 2024 | Fowler Center, 201 Olympic Dr., Jonesboro, AR 72401 |

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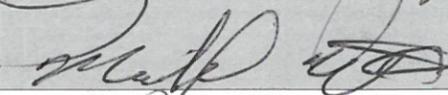
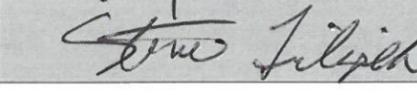
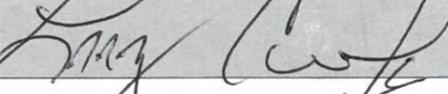
Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 6, 2024 | Fowler Center, 201 Olympic Dr., Jonesboro, AR 72401 |

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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 7, 2024 | Fort Smith Convention Center, 55 S 7th ST., Fort Smith, AR 72901 |

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7	EVAN TERAONE	Farm Bureau		
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10	Lance McAvoe	Font Smith	LMCAVOE@FONTSMITHAR.GOV	
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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 8, 2024 | Donald W. Reynolds Campus & Community Center, 100 E. University St., Magnolia AR 71753 |

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7	EVAN TROGUE	FARM BUREAU		
8	LARRY COWEN	LITTLE RIVER CWF DIST		
9	Ranjitsinh Mane	AEDI-UALR	smane@ualr.edu	Ranjitsinh Mane
10	Cassandra Caldwell	AWC	cassandra.caldwell@arkansas.gov	Caldwell
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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 9, 2024 | Rice Research and Extension Center, 2900 AR-130, Stuttgart, AR 72160 |

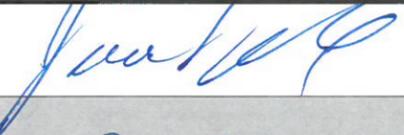
	Name	Organization/Public Interest	Email	Signature
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3	William Winford	Water Hog	waterhoginc@outlook.com	[Signature]
4	Rick Spargo	Water Hog	waterhog@web60t.com	Rick Spargo
5	Ty Davis	Sen. Boozman	ty-davis@boozman.senate.gov	[Signature]
6	ADAM SHEA	Riceland Foods, Inc.	awshea@riceland.com	[Signature]
7	Cristina L'He	ARK Dem - GAE	clawee@adgrnews.com	[Signature]
8	Chris Isbell	Isbell Farms	chris@isbellfarms.com	[Signature]
9	Tony McFarland	Land owner	TLMcSR@gmail.com	[Signature]
10	Kimberly Bolin	Winthrop Rockefeller Institute	kbolin@rockefellerinstitute.org	[Signature]
11	Jerry Lee Bogard	Water Provider	jlbogard55@icloud.com	[Signature]
12	Blake Forrest	Ark Dept of Ag	blake.forrest@agriculture.arkansas.gov	[Signature]
13	Merle Anders	Self Consultant	nicecarboe@cartierlink.net	[Signature]
14	Steven Lussery	LandFund Partners	slussery@landfundpartners.com	[Signature]
15	Ranjitsinh Thare	AEDI - UAR	manee.uar.edu	[Signature]
16	Rahul [unclear]	Gov Ofc		[Signature]
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	Name	Organization/Public Interest	Email	Signature
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2	William Anderson	ANRC		William Anderson
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5	EVAN TENAGUE	Furman Burdette		
6	Josef Hankins	USA RICE	jhankins@usarice.com	Josef Hankins
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14	Jason Phillips	USFWS	jason-phillips@fws.gov	Jason Phillips
15	Rodney Wright	USDA-NRCS	RODNEY.WRIGHT@USDA.GOV	Rodney Wright
16	Joe Massey	USDA-ARS	Joseph.Massey@usda.gov	Joe Massey
17	Cassandra Caldwell	ARC	Cassandra.Caldwell@arkansas.gov	Cassandra Caldwell

Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 9, 2024 | Rice Research and Extension Center, 2900 AR-130, Stuttgart, AR 72160 |

	Name	Organization/Public Interest	Email	Signature
1	Jay Coker	Coker Farms & Producers Rice	Coker.jay@eme.com	
2	Kelly Robbins	AR Rice	kelly@arkansasrice.org	
3	Lys Johnson	AR Dept. of Ag	n/a	
4	David Jessup	Stone Bank	djessup@stonebank.com	
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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 10, 2024 | Arkansas Cooperative Extension State Office, 2301 S. University, Little Rock, AR 72204 |

	Name	Organization/Public Interest	Email	Signature
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2	Rebecca Burkman	LPWPA	rebecca.burkman@LPWPA.com	RWBURKMAN
3	Nikki Hess	Comm. of State Lands	nhess@cosl.org	
4	Ben Wilson	City of Bryant - P.W.	bwilson@cityofbryant.com	Ben Wilson
5	Amanda Story	Hoganes Cemetery/Liberty Utilities	amanda@hogranes.cemlibty.com	
6	Tyler Fox	TNC	ityler.fox@tnc.org	
7	Robert Mooney	WRIT	rmooney@broadviewstrategies.com	
8	Kristin Higgins	PPC - UADA	khiggins@uada.edu	
9	John Pennington	UADA	jpennington@uada.edu	
10	Alice Andrews	Ozark Society	alice2090k@yahoo.com	Alice Andrews
11	Terri Lane	AR Wildlife Federation	tlane@arwild.org	
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Arkansas Comprehensive Water Plan Update 2024 | Public Meeting
 May 10, 2024 | Arkansas Cooperative Extension State Office, 2301 S. University, Little Rock, AR 72204 |

	Name	Organization/Public Interest	Email	Signature
1	KEN GORDEN	CITY OF BRYANT	KGORDEN@CITYOFBRYANT.COM	M.K. Gordon
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4	Christy Steward	NRD	Christy.d.steward@agriculture.arkansas.gov	Christy Steward
5	Sarah Banks	USACE	Sarah.m.banks@usace.army.mil	S Banks
6	Cindy Osborne	ANHC	Cindy.Osborne@Arkansas.gov	Cindy Osborne
7	Patrick Dill	Ducks Unlimited	Pdill@ducks.org	Patrick Dill
8	STEVE Fi LIPEK	ARK. WILDLIFE FED	SPT.LIPEK42@GMAIL.COM	Steve Lipik
9	EVAN TENAGUE	FARM BUREAU		
10	Rachel Keeling	City of Hot Springs	rkeeling@cityhs.net	Rachel Keeling
11	Lillie Dancy	Fw. Co. Con. Dist. Pw. Con. FSA - Pres. Pw. Co. Farm Bureau - Pres.		
12	Sim Barrow	AR Wildlife Federation	Sbarrow@arwild.org	Sim Barrow
13	Hunter Sadler	U.S. Rep. French Hill	hunter.sadler@mail.house.gov	Hunter Sadler
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APPENDIX F
Stakeholder Comments

Appendix F - Stakeholder Comments

Entity	From	Date	Document Titled	Comments	Responses
AGFC	Sheehan Jennifer	5/13/2024	05-13-2024 AGFC AWP con	<ul style="list-style-type: none"> • The updated Arkansas Water Plan should address climate change and the increased severity of weather events associated with it. • AGFC would support efforts to assess the effects of land use changes, since the 2014 Plan, on flooding. • AGFC encourages the use of “nature based solutions” in the development of the Flood Plan. For instance, planting native, herbaceous plants on levees has been found to strengthen the structural integrity of levees due to the extensive root system of prairie grasses, the increased water potential of native grasses decreases the risk of levee over saturation and sloughing, and native grasses work to exclude the encroachment of woody vegetation on to levees. • The location of boat ramps can be an important component of emergency flood response. AGFC owns and manages many boat ramps across the state and our agency would be happy to engage in conversations with, and provide information to, emergency responders on the siting, construction, and maintenance of boat ramps. • The recent “Sackett” decision by the Supreme Court of the United States removed many wetlands from federal protections. Wetlands provide the important ecosystem function of flood storage capacity. The Arkansas Water Plan should elevate the protection and restoration of wetlands for their flood water storage ability. 	<ul style="list-style-type: none"> • 2014 AWP update will evaluate the effects due to Weather extremes, and changes of land use • Encouragement for the use of nature-based solutions has been added to the Known Issues from stakeholders in Appendix C. • Discuss addition of boat ramps to the flood response plan. • Restoration of wetlands has been added to Goal 2 as an objective, implement water policy, laws, maps, and regulations to address water recharge (wetlands)
Northeast Public Water Authority	Gerry Lance	5/13/2024	Water Plan for Backflow P	Request to add a Backflow Prevention to the Water Plan. The request is for the Health Department to mandate the installation of Reduced Pressure Zone (RPZ) backflow preventers for all in-ground residential sprinkler systems, with annual testing and reporting to the appropriate Public Water System (PWS). This would align residential requirements with commercial practices and enhance the safety of the water supply, especially considering the risks posed by the widespread availability of lawn chemicals and the lack of backflow preventers in residential swimming pools.	Discuss addition of backflow prevention with Natural Resources Division
Conway Corp	Lee Tedford	5/14/2024	20240514145453500.pdf	Request to add a Backflow Prevention to the Water Plan.	Discuss addition of backflow prevention with Natural Resources Division
	Wayne Long	5/13/2024		I am in support of updating the ADH policy on RPZ testing requirements for ALL lawn irrigation systems, commercial and residential. The chemicals used in lawn irrigation systems present one of the highest dangers to our public water supply, therefore I support requiring residences to follow the same protocol as commercial.	Discuss addition of backflow prevention with Natural Resources Division
City of Bryant	Bryce J Rimmer	5/13/2024	Backflow.docx	Support the inclusion of backflow prevention to the water plan. This measure would ensure the protection of our water sources from contamination	Discuss addition of backflow prevention with Natural Resources Division
RGB Mechanical Contractors	Darlene Downs	5/14/2024	2024_05_14_10_25_12	Request to see if Backflow prevention can be added to the water plan	Discuss addition of backflow prevention with Natural Resources Division
Central Arkansas Water	Joe Uekman	5/9/2024	2516_001.pdf	Request to see if Backflow prevention can be added to the water plan	Discuss addition of backflow prevention with Natural Resources Division
	Parker Rushing		ASOS_Water_Plan.docx	Unable to open the document	
The Ozark Society	Brian Thompson	5/15/2024	Arkansas Water Plan Sugg	<ul style="list-style-type: none"> • Fully implement numeric standards for all waterbodies across the state. • Require nutrient management plans statewide for all permits involving land application of nutrients. • Review and update the Arkansas Phosphorous Index (API). • Review and update formulas for the application of Best Management Practices (BMP)s within the API, to consider groundwater 	Improving water quality through nonpoint source management, including nutrient management plans, the API, and other BMPs, was a priority issue in the 2014 AWP and continues to be a priority for the state. These concerns are addressed by proposed Goal 5 for the AWP update. Note that the state nutrient management plan is recently updated and the state nonpoint source pollution management plan is currently available for public comment.

Appendix F - Stakeholder Comments

Entity	From	Date	Document Titled	Comments	Responses
Arkansas Wildlife Federation	Terri Lane	5/15/2024	State Water Plan_Input_A	<p>1. Overall, elevate the protection of fish and wildlife throughout the plan, aligning as a top consideration within all other priorities.</p> <p>2. Consider elevating the current goal, "Manage water resources in a manner that protects the ecological needs of fish and wildlife", to a Critical Initiative.</p> <p>3. In recognition of nature-based solutions and the potential "win-win" opportunities this approach presents for both people and wildlife, elevate this approach throughout the plan and in new flood plan.</p> <p>a. Consider adding a new goal to, "Look at nature-based solutions first, as a complement to engineered solutions."</p> <p>b. List examples of nature-based solutions (restoration and protection of wetlands, floodplains, riparian buffers; reconnection of rivers and streams to their floodplains; low-impact design, etc.).</p> <p>c. NOTE: This approach also addresses a leading threat to wildlife (habitat loss and fragmentation) by allowing for the restoration and reconnection of wildlife corridors and habitats, improved fish passage, and more.</p> <p>4. Include the identification and delineation of karst-sensitive areas within the state (which are home to some of our most imperiled wildlife species) and other sensitive aquatic habitats as a priority in water management decisions.</p> <p>5. Maintain the current 25 percent restriction on excess surface water withdrawal (no increase) to ensure adequate in-stream flow for fish and wildlife.</p> <p>6. The current plan states: "Continue using the Arkansas Method in estimating the proportion of total available water needed to satisfy fish and wildlife flow needs in estimating excess water for non-riparian withdrawals and transfers. Through adaptive management, the ANRC will evaluate and assess alternative methods for estimating fish and wildlife flows, or other instream needs and uses, as more accurate, scientifically reviewed, and defensible methods become available."</p> <p>a. Consider the ELOHA Method (Ecological Limits of Hydrologic Alteration) as an alternative method.</p> <p>7. NOTE: It should be acknowledged in reviewing responses to the Arkansas Water Plan Survey Form that the survey in general, and specifically question #4 asking respondents to rank future water-related priorities, and question #6 asking respondents to identify in what subject areas the water plan could provide the most value, did not provide an option for respondents to select protecting the ecological needs of fish and wildlife as a priority.</p>	<ul style="list-style-type: none"> • 1 - 2014 AWP includes the goal, manage water resources in a manner that protects the ecological needs of fish and wildlife. The 2014 AWP update will continue to look at improving the quality of water for fish and wildlife. • 2 - Noted, discuss with Natural Resources Division regarding elevating the current fish and wildlife goal. • 3 - Encouragement for the use of nature-based solutions has been added to the Known Issues from stakeholders in Appendix C. • 4 - Noted, this objective may be added under proposed Goal 5. • 5 - No changes were proposed to the excess surface water withdrawal. The current 25 percent will remain the same until further direction from Natural Resources Division. • 6 - An update of the current status for modifying the Arkansas method will be included in the AWP update. • 7 - Feedback will be considered and the future survey will be revised to incorporate the ecological needs of fish and wildlife.
Green Thumb Water Garden Cent	Mark Gibson	5/10/2024	water plan.pdf	Request to see if Backflow prevention can be added to the water plan	Discuss addition of backflow prevention with Natural Resources Division