

Big Bend Groundwater Management District #5

WELCOME!

**Rattlesnake Creek Watershed Plan-Environmental
Impact Statement Open House**



Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE



WHY ARE YOU HERE?



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1



The Big Bend Groundwater Management District #5 (GMD #5) has received funding from the Natural Resources Conservation Service (NRCS) to develop a long-term plan to improve natural resource management in the watershed.

2



The project team has collected public and agency information through a series of scoping and agency meetings. This information was used to develop the draft Watershed Plan-EIS.

3



NRCS is requesting public and agency comments on the draft Watershed Plan-EIS including the selection of a preferred alternative that meets the project purpose and need.

ABOUT NRCS



The Natural Resources Conservation Service (NRCS) is an agency of the United States Department of Agriculture that helps America's farmers, ranchers, and forest landowners conserve the nation's soil, water, air, and other natural resources. NRCS provides technical assistance, financial assistance, tools, and resources related to conservation.

NRCS manages the Watershed Protection and Flood Prevention Operations (WFPO) Program to help units of federal, state, local, and tribal government (project sponsors) protect and restore watersheds.

NRCS is providing funds to the local project sponsor GMD #5 to complete the Watershed Plan-EIS.

USDA is an equal opportunity provider, employer, and lender.

PROJECT BACKGROUND: PL83-566 WATERSHED PROTECTION AND FLOOD PREVENTION OPERATIONS (WFPO)



The USDA Natural Resources Conservation Service (NRCS) WFPO program provides a funding mechanism for public sponsors to construct projects with the following purposes:

- Flood Damage Reduction
- Watershed Protection
- Public Recreation
- Public Fish and Wildlife
- Agricultural Water Management
- Municipal and Industrial Water Supply
- Water Quality Management

PL83-566 refers to the Watershed Protection and Flood Prevention Act which authorizes the USDA NRCS to help local project sponsors, like the GMD #5, plan and implement watershed projects. PL83-566 watershed projects are locally led to address agricultural-related natural resource concerns in watersheds.

Projects must:

- Have public sponsorship
- Provide benefits that are directly related to agriculture, including rural communities, that must account for at least 20 percent of the total project benefits.

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WHAT IS A WATERSHED PLAN-EIS?



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The Watershed Plan-EIS will identify potential projects that would fulfill one or more of the program's authorized purposes and evaluate those projects for:

- Technical feasibility
- Economic feasibility
- Environmental feasibility

The Watershed Plan-EIS must also comply with National Environmental Policy Act (NEPA) requirements:

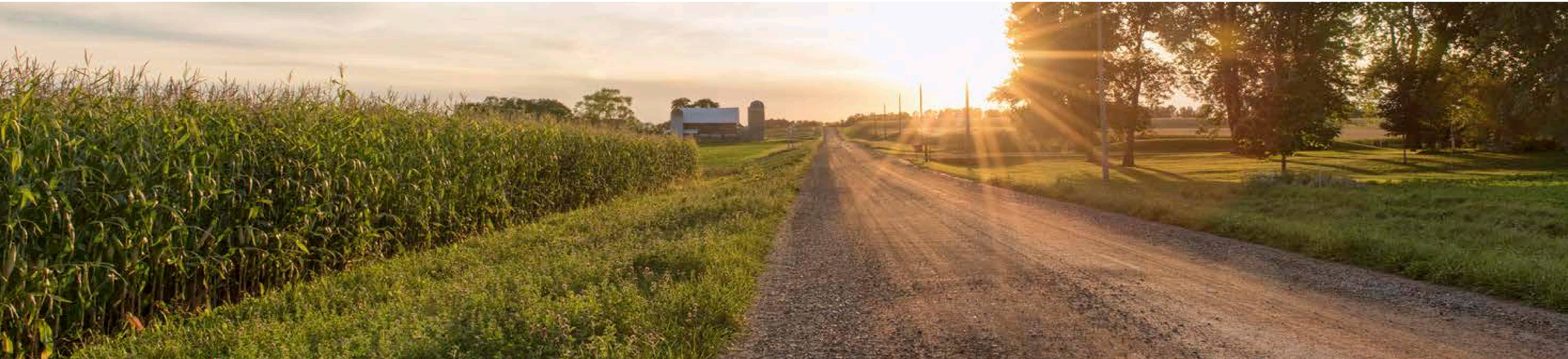
- Resource problems to be addressed (purpose and need of the project)
- Practices to be installed (project alternatives to address the purpose and need of the project)
- Description of the project environment and potential environmental effects

Public comment and input are solicited throughout the Watershed Plan-EIS process.

WHAT TYPES OF RESOURCES ARE EVALUATED IN THE WATERSHED PLAN-EIS?



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Soil Related Concerns

- Geology and Soils
- Prime and Unique Farmland, and Farmland of Statewide or Local Importance

Water Related Concerns

- Aquifers
- Surface water quality and resources
- Water rights
- Regional water management plans
- Wetlands and other waters of the United States

Plant and Animal Related Concerns

- Threatened and endangered species
- Invasive species
- Riparian areas
- Fish and wildlife resources
- Ecologically critical areas
- Natural areas
- Migratory birds and eagles

Human Use Related Concerns

- Cultural resources and historic properties
- Tribal coordination
- Civil rights
- Socioeconomics
- Significant scientific resources
- Parklands
- Climate

SECTION 106 – NATIONAL HISTORIC PRESERVATION ACT



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Section 106 of the National Historic Preservation Act requires the federal government to identify historic properties that may be affected by its undertakings; assess the impacts of the undertaking on those properties; and seek ways to avoid, minimize, or mitigate any negative effects the project may have on those properties.

NEPA also requires that an agency evaluate the effects of a project such as cultural resources and historic properties.

Archeological surveys will be conducted in the affected area during the design phase of the project after the Plan-EIS has been authorized.

Archeological sites can include:

- Artifact scatters (objects on ground surface such as arrowheads, “flint chips,” pottery fragments, tin cans, glass bottles, brick fragments, etc.)
- Building foundations or collapsed buildings
- Burials

Standing structures more than 50 years old can include:

- Houses
- Barns
- Bridges

Other cultural resources can include:

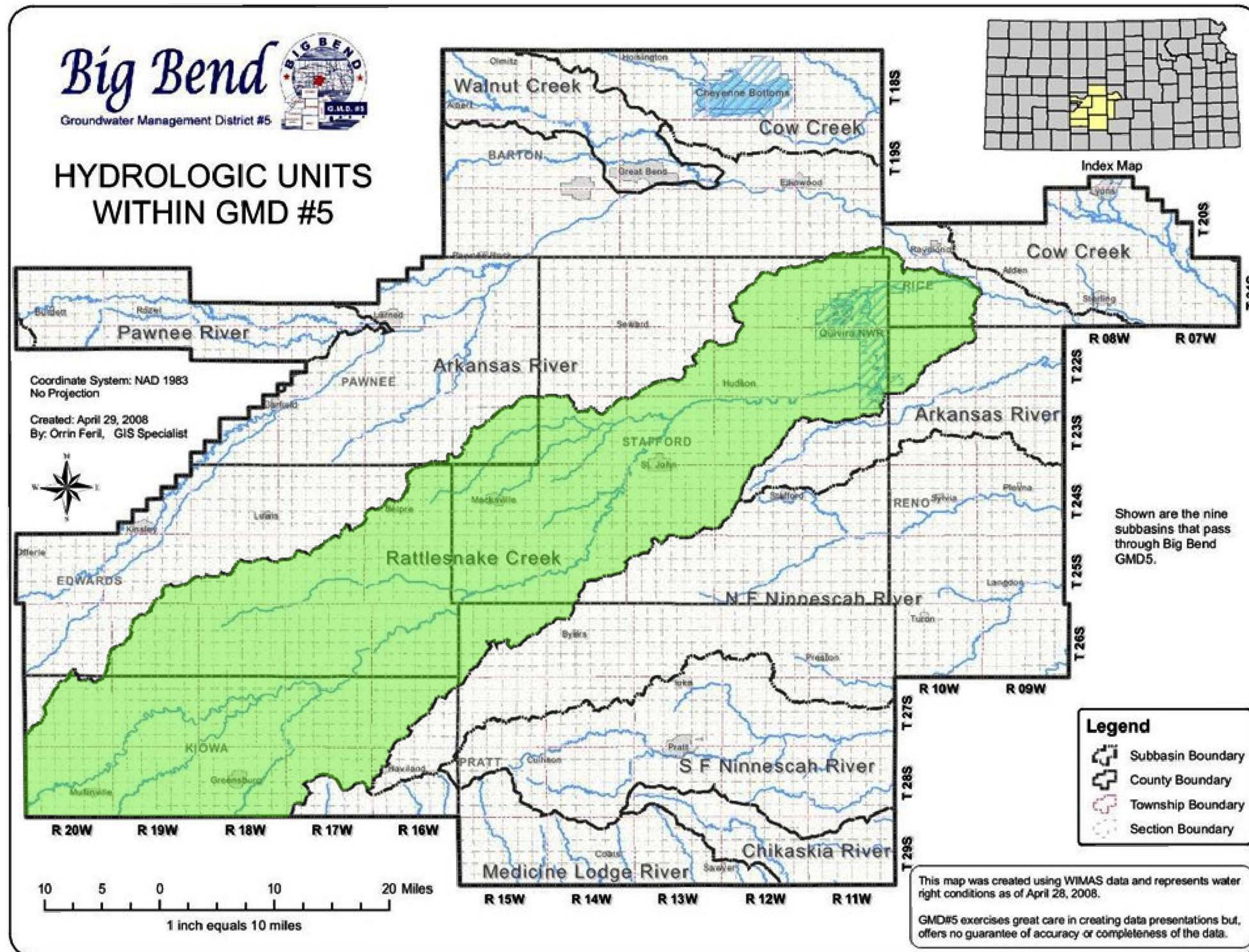
- Culturally significant plants
- Culturally significant landscapes



ABOUT GMD #5



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Big Bend Groundwater Management District No. 5 (GMD #5) was formed in March of 1976 under the authority of Kansas Statutes Annotated 82a-1020 et seq.

The purposes of the district are:

1. Establish a data gathering bank including the measurement of water withdraw, measurement of aquifer recharge, and other pertinent information.
2. Establish a water quality monitoring program.
3. Discourage waste of water.
4. Develop an educational program on optimum water use.
5. Develop well spacing criteria.
6. Encourage accurate production measurements.
7. Promote tail-water pits.
8. Exert action to prevent water pollution.
9. Review replacement wells.
10. Review and authorize annual appropriation of water usage.
11. Investigate alternate points of diversion.
12. Explore and develop artificial recharge.
13. Provide advice and assistance in the management of drainage problems and surface water.

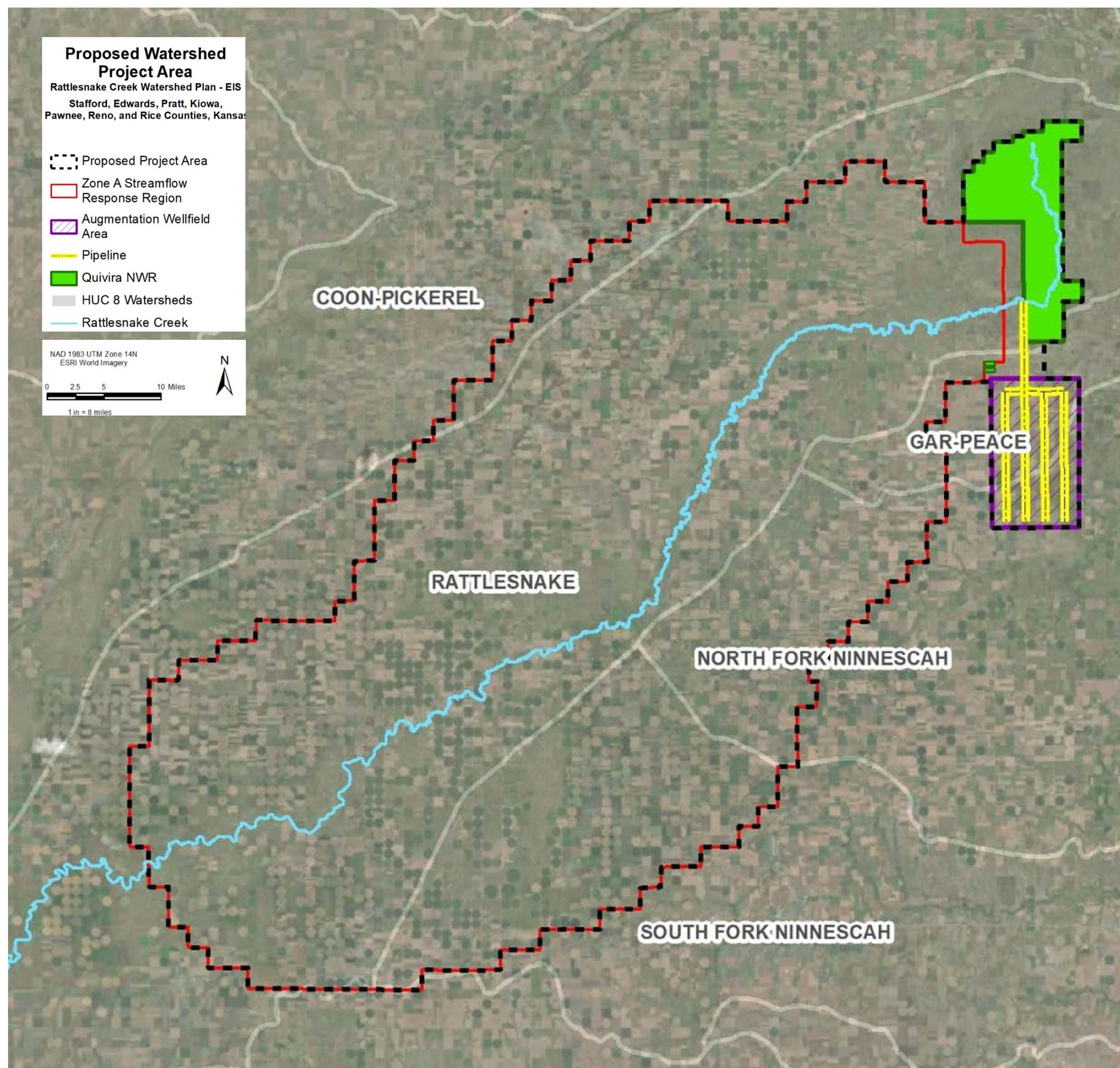
GMD #5 covers approximately 2.5 million acres, including 569,725 authorized irrigated acres. There are 4,523 water rights, with 5,459 points of diversion. The total authorized quantity these water rights can produce is 768,784 acre-feet, or 250.5 billion gallons of water, per year.

GMD #5 is the local sponsor of the Watershed Plan-EIS.

WATERSHED PLAN-EIS PROJECT AREA



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The purpose of the Rattlesnake Creek Watershed Plan – EIS is to provide for long-term, sustainable agricultural water management within the Rattlesnake Creek subbasin of GMD #5, including project components to meaningfully address the impairment at Quivira NWR.

The Plan – EIS is necessary for two reasons: (1) Quivira NWR’s ongoing senior water right impairment, and (2) the importance of groundwater to the agricultural economy.

QUIVIRA NWR WATER RESOURCE CONCERNS

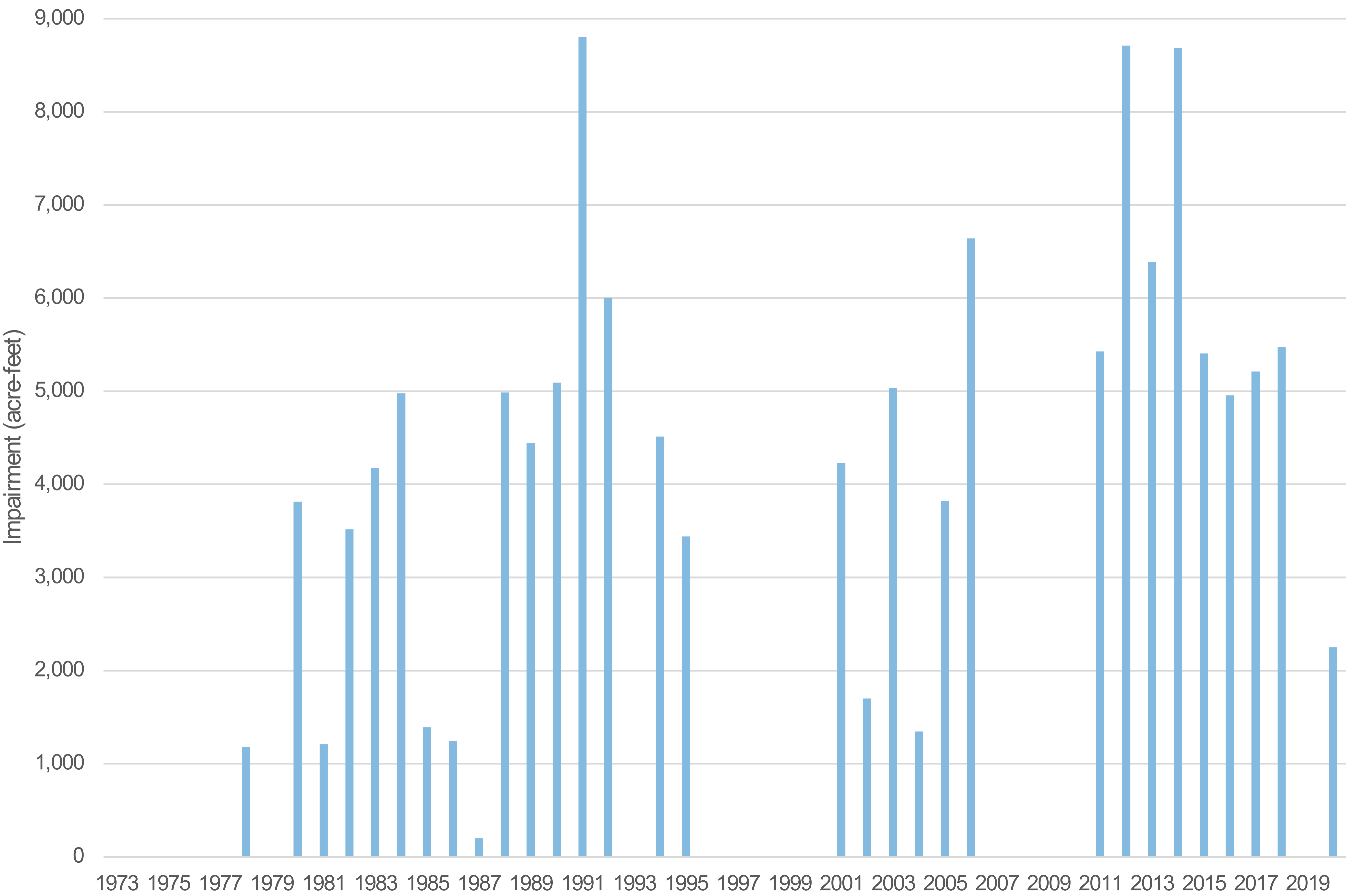
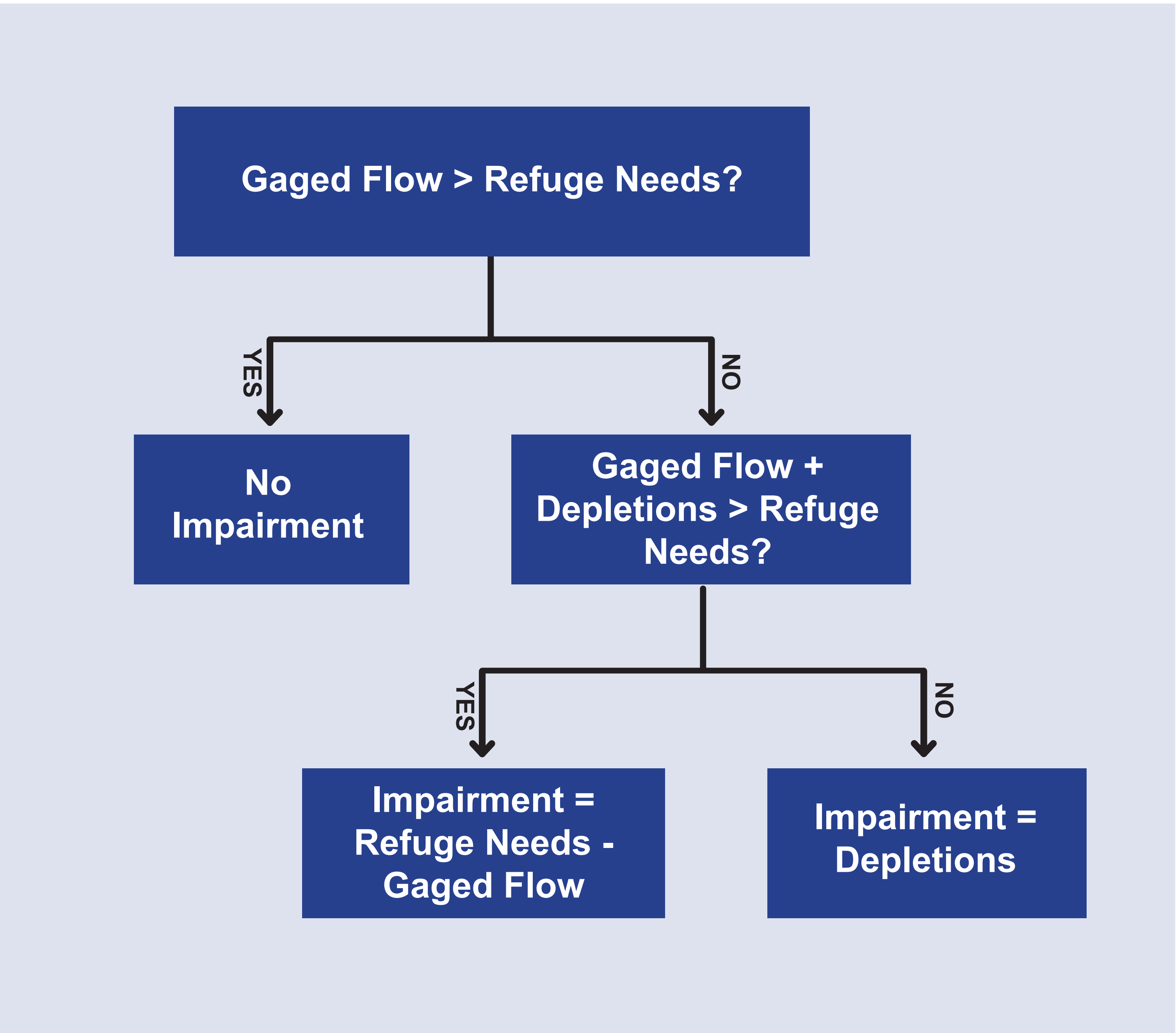


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Water supplies for the Quivira National Wildlife Refuge (NWR) fluctuate. Flows at the Zenith stream gage upstream of Quivira NWR show the variability in available water through time. The EIS seeks a project that increases streamflow available to the Quivira NWR while providing long-term sustainable agricultural water management..

When needs at Quivira NWR are greater than supplies at the Zenith gage, impairment can occur. The U.S. Fish & Wildlife Service (who manages Quivira NWR) holds a water right that is senior to many groundwater users in the watershed. Using the GMD #5 groundwater model, depletions to Rattlesnake Creek due to groundwater pumping were determined and are factored into the historical gaged streamflows. To determine historical simulated impairment at Quivira NWR, Kansas Department of Agriculture - Division of Water Resources used this flow chart below:



Source: Kansas Department of Agriculture - Division of Water Resources. 2023. Supplement to Technical Report on a Claim of Water Right Impairment, dated, July 2016

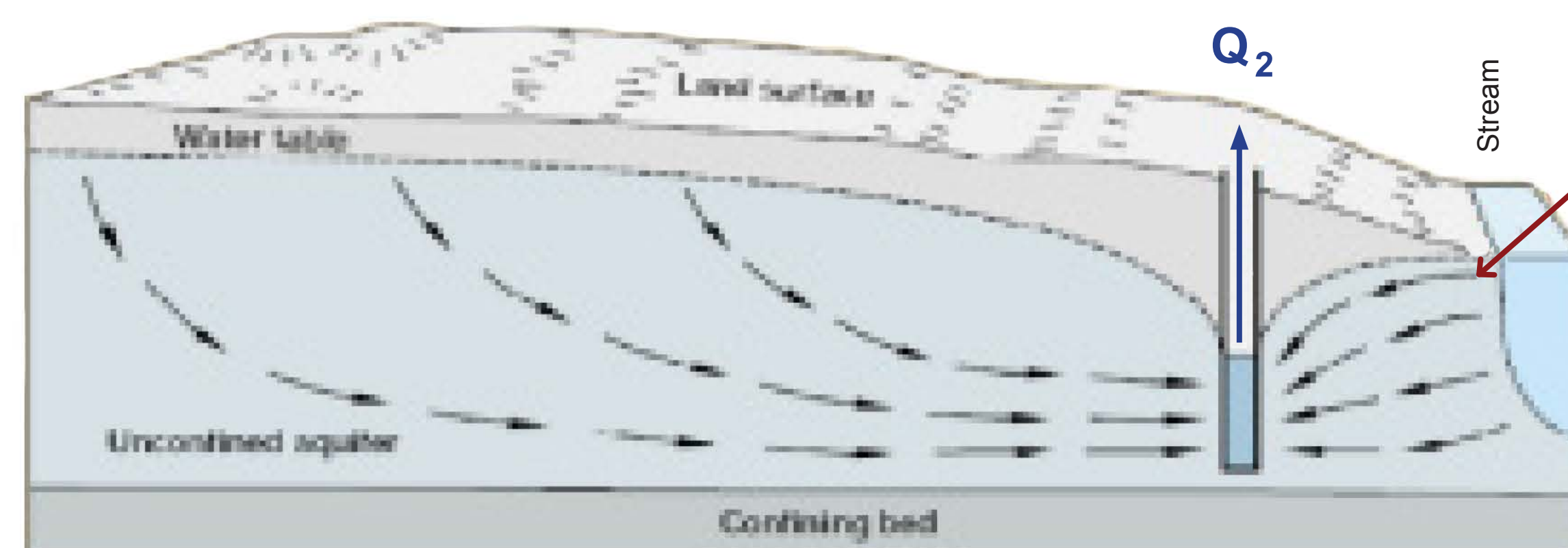
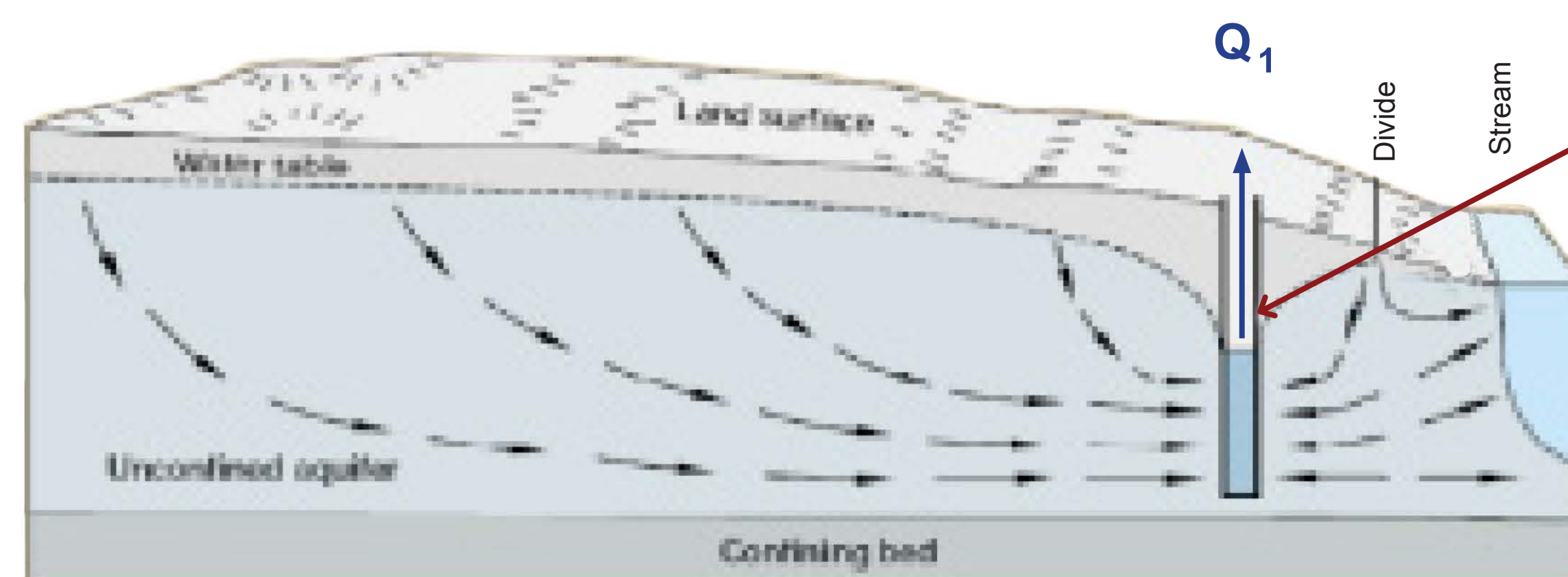
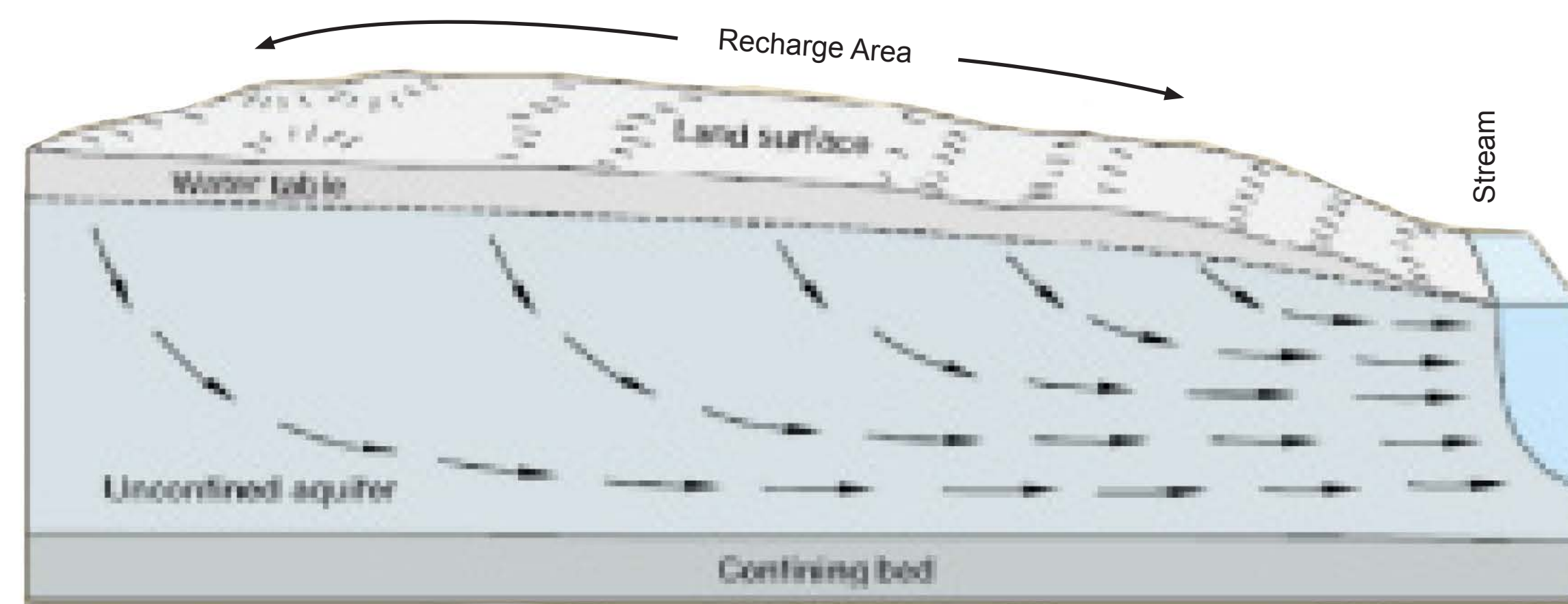
THE EFFECT OF GROUNDWATER PUMPING ON STREAMFLOW



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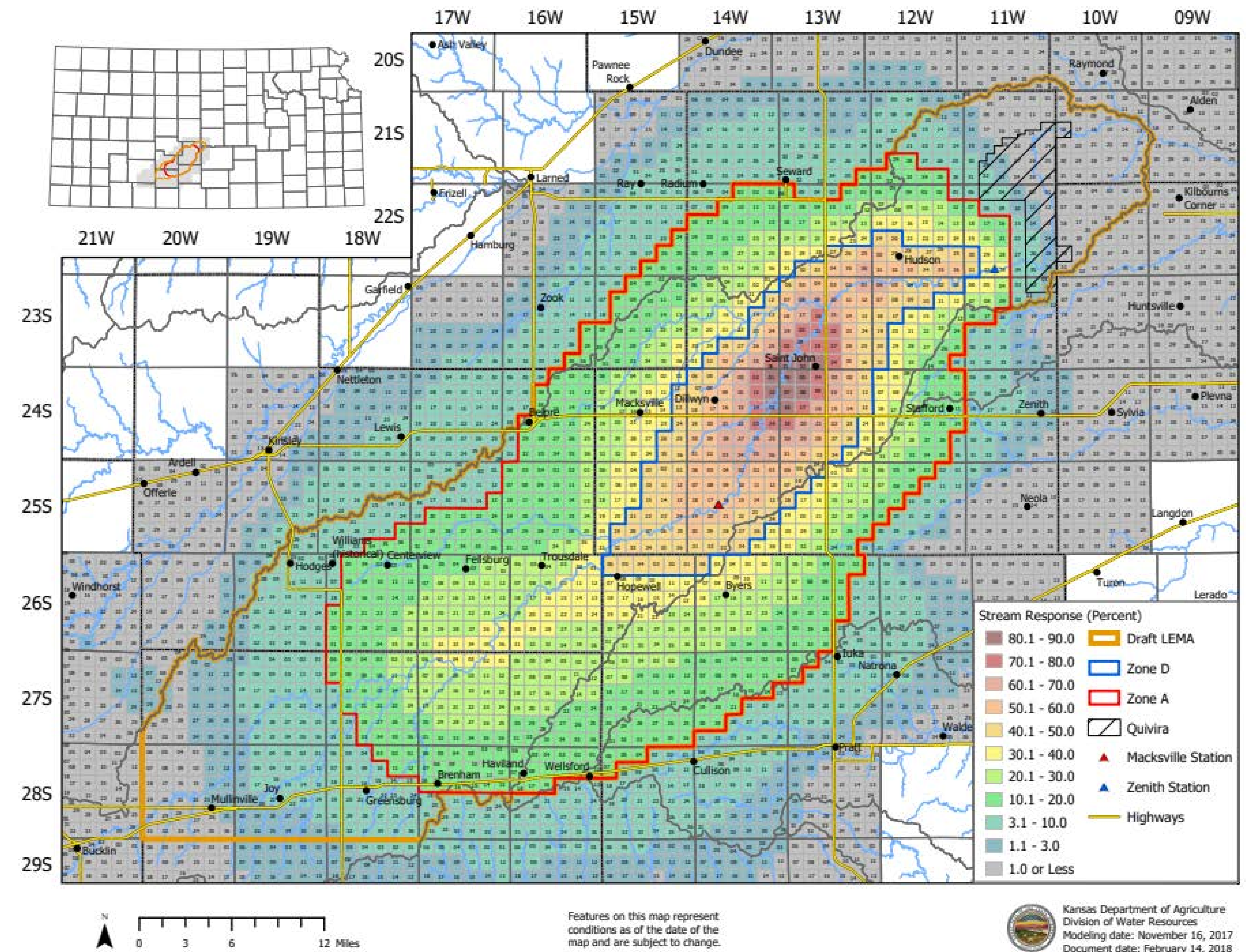
Groundwater pumping in the Rattlesnake Creek watershed has an impact on streamflow. The impact an irrigation well has on streamflow can be approximated using a groundwater model. Relative impact is determined by the well's proximity to the stream and aquifer properties.



Cone of Depression

Intersection of stream by the cone of depression, resulting in diminishing streamflow

Rattlesnake Creek Streamflow Response Regions
1998 - 2007 average streamflow response (pct) at Zenith gage as calculated using the GMD No. 5 model.



The figure above shows the average stream response at Zenith gage to groundwater pumping by section throughout the previously proposed Local Enhanced Management Area (LEMA) and vicinity. Sections shaded red indicate that pumping in these areas will have higher impacts to the stream than pumping in sections shaded green.

THE PREFERRED ALTERNATIVE: AUGMENTATION WELLFIELD AND GROUNDWATER USE REDUCTION ALTERNATIVE

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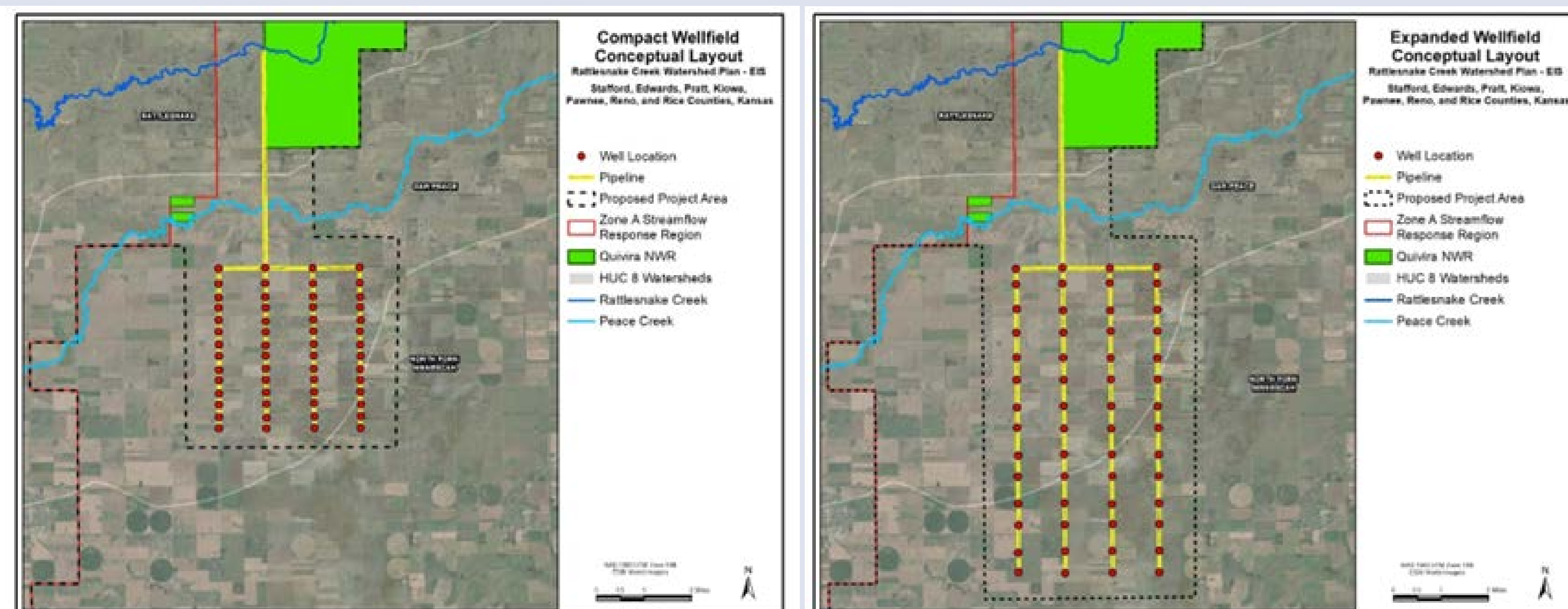
Augmentation Wellfield and Groundwater Use Reduction Alternative (The Proposed Action Alternative)

Under the Augmentation Wellfield and Groundwater Use Reduction Alternative, a groundwater augmentation project would be constructed; targeted water right retirements would be implemented in Zone D; and an adaptive management approach would be developed that allows for adjustments based on results over time.

Up to 18 cfs of groundwater from the wellfield would be transported via pipeline to a discharge point in Rattlesnake Creek downstream of the Zenith gage (northeast near 110th Avenue) and upstream of Quivira NWR.

Operation of the augmentation wellfield would increase surface flows within Rattlesnake Creek at the point of delivery and downstream within Quivira NWR. Water storage in Little Salt Marsh could help retime the augmentation and streamflow and allow for extended use.

Based on the technical assessment conducted for the proposed project, two siting configurations are under consideration: a compact wellfield and an expanded wellfield. The number of wells is the same for the two configurations and the maximum yield per well would be approximately 150 gallons per minute regardless of wellfield configuration. During the engineering design phase, to be completed following authorization of the Plan – EIS, the wellfield configuration and exact well locations would be determined.

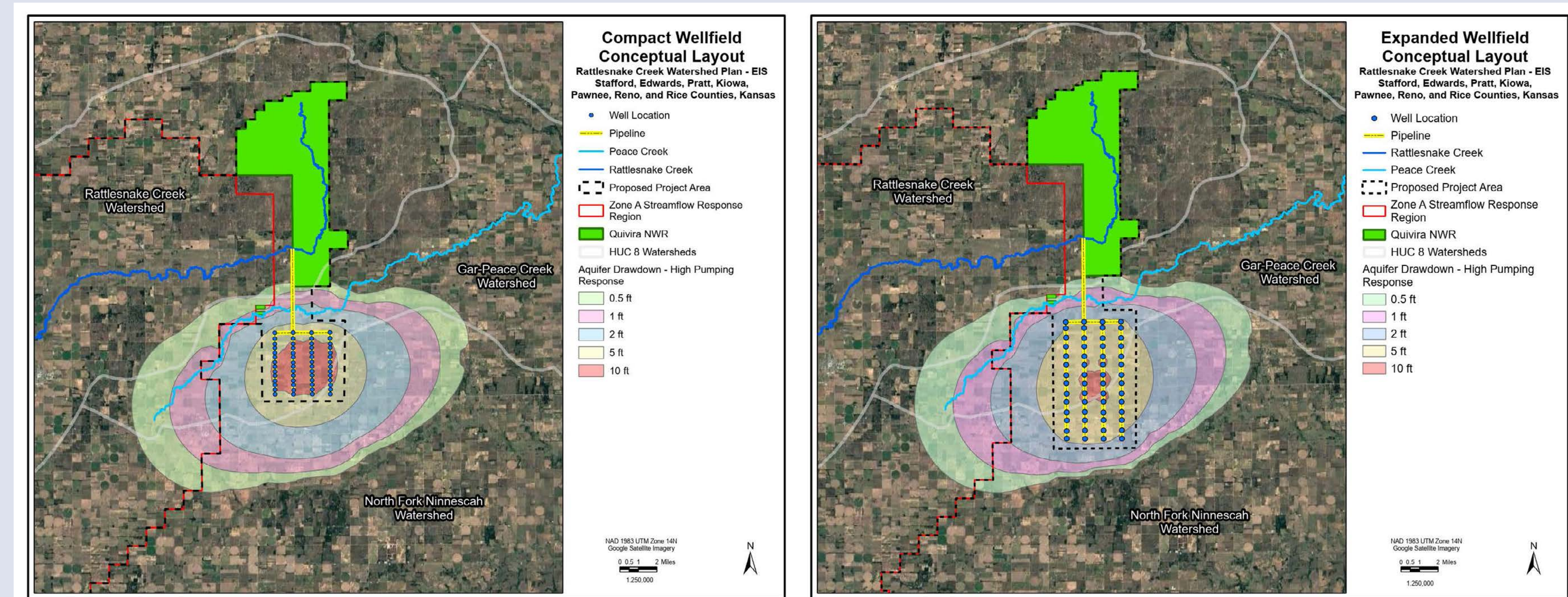


Augmentation Wellfield Cone of Depression

Under the Augmentation Wellfield and Groundwater Use Reduction Alternative, an augmentation wellfield consisting of up to 56 wells would provide up to 15 cfs throughout any year, as needed, and an additional 3 cfs during critical time periods, as needed. As a result of the augmentation pumping, aquifer storage in the vicinity of the wellfield would be affected. An analysis was conducted modeling aquifer drawdowns occurring approximately 50 years into the future, which indicate a maximum drawdown level of 5 feet in the vicinity of the wellfield during a relatively low pumping period and a maximum drawdown level of 10 feet in the vicinity of the wellfield during a relatively high pumping period.

The area of maximum drawdown is generally smaller in the expanded wellfield configuration because the wells are more spread out, thus resulting in less overlap of their respective cones of depression.

Maximum drawdowns are confined to the footprint of the wellfield and drawdowns are less with increasing distance from the wellfield. The cone of depression in the water table is generally elongated in the east-west direction; it is constrained by the location of Peace Creek to the north and the North Fork Ninesciah River to the south. In general, drawdown values of 2 feet or greater over a 50-year period are constrained to an area of approximately 80 square miles under the compact configuration or 90 square miles under the expanded configuration.



POTENTIAL IMPACTS

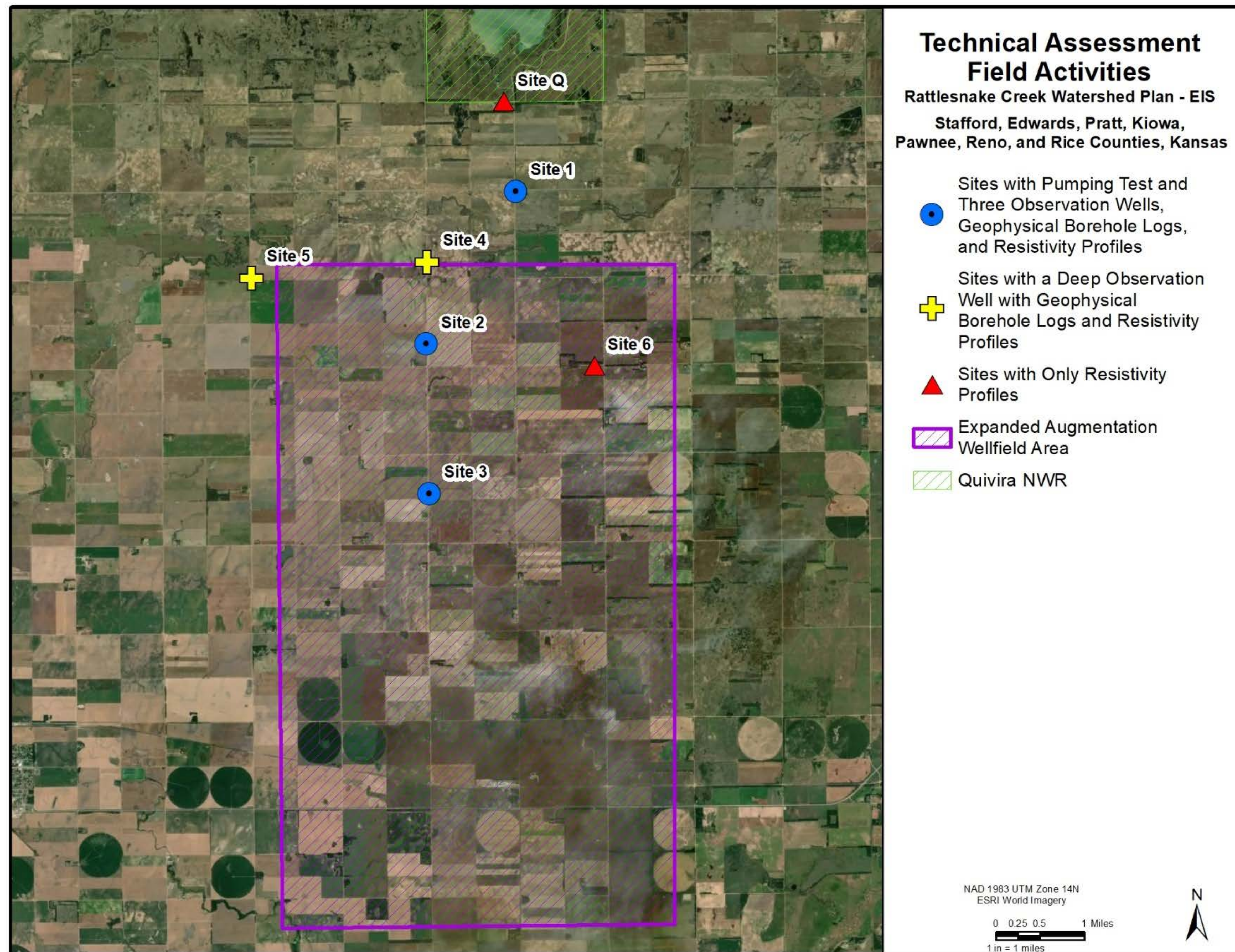


AFFECTED ENVIRONMENT CATEGORY	NO ACTION ALTERNATIVE	AUGMENTATION WELLFIELD AND GROUNDWATER USE REDUCTION ALTERNATIVE		AUGMENTATION WELLFIELD AND GROUNDWATER USE REDUCTION ALTERNATIVE		GROUNDWATER USE REDUCTION ALTERNATIVE	GROUNDWATER USE REDUCTION ALTERNATIVE
	<i>Compared to Existing Conditions</i>	<i>Compared to No Action Alternative</i>		<i>Compared to Existing Conditions</i>		<i>Compared to No Action Alternative</i>	<i>Compared to Existing Conditions</i>
Geology and Soils	No Effect	Negative Minor Effect (short-term)		Negative Minor Effect (short-term)		No Effect	No Effect
Aquifers and Sole Source Aquifers	Beneficial Minor Effect (long-term)	Negative Minor Effect (long-term)		Negative Minor Effect (long-term)		Negligible Effect	Beneficial Minor Effect (long-term)
Climate	Beneficial Minor Effect (long-term)	Negative Minor Effect (long-term)		Beneficial Minor Effect (long-term)		Negligible Effect	Beneficial Minor Effect (long-term)
Historic Properties	No Effect	To be determined pending execution of Programmatic Agreement and cultural resource surveys		To be determined pending execution of Programmatic Agreement and cultural resource surveys		No Effect	No Effect
Socioeconomics	Negative Major Effect	Beneficial Major Effect		Negative Minor Effect (long-term)		Negative Minor Effect (long-term)	Negative Major Effect
Parklands and Natural Areas	Beneficial Minor Effect (long-term)	Negligible Effect		Beneficial Minor Effect (long-term)		Negligible Effect	Beneficial Minor Effect (long-term)
Land Cover and Land Use	Negligible Effect	Negligible Effect		Negligible Effect		Negligible Effect	Negligible Effect
Prime Farmland	No Effect	Negative Minor Effect (long-term)		Negative Minor Effect (long-term)		No Effect	No Effect
Surface Water Resources and Water Quality	Beneficial Moderate Effect	Negligible Effect	Negative Minor Effect (long-term)	Negative Minor Effect (long-term)	Beneficial Moderate Effect	Negligible Effect	Beneficial Moderate Effect
Regional Water Resource Plans	No Effect	No Effect		No Effect		Negligible Effect	Negligible Effect
Riparian Areas	Beneficial Minor Effect (long-term)	Negligible Effect	Negative Minor Effect (short- and long-term)	Negative Minor Effect (short- and long-term)	Beneficial Minor Effect (long-term)	Negligible Effect	Beneficial Minor Effect (long-term)
Fish and Wildlife Resources	Beneficial Moderate Effect	Negligible Effect	Negative Minor Effect (short- and long-term)	Negative Minor Effect (short- and long-term)	Beneficial Moderate Effect	Negligible Effect	Beneficial Moderate Effect
Invasive Species	No Effect	Negligible Effect		Negligible Effect		No Effect	No Effect
Threatened and Endangered Species	Beneficial Minor Effect (long-term)	Negligible Effect	Negative Minor Effect (short- and long-term)	Negative Minor Effect (short- and long-term)	Beneficial Minor Effect (long-term)	Negligible Effect	Beneficial Minor Effect (long-term)
Migratory Birds, Bald Eagles, and Golden Eagles	Beneficial Minor Effect (long-term)	Negligible Effect	Negative Minor Effect (short- and long-term)	Negative Minor Effect (short- term)	Beneficial Minor Effect (long-term)	Negligible Effect	Beneficial Minor Effect (long-term)
Significant Scientific Features	Beneficial Moderate Effect	Negligible Effect	Negative Minor Effect (short- and long-term)	Negative Minor Effect (long-term)	Beneficial Moderate Effect	Negligible Effect	Beneficial Moderate Effect (long-term)

AUGMENTATION WELLFIELD TECHNICAL ASSESSMENT



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Purpose of Field Activities:

To gain a better understanding of the groundwater resources in the vicinity of the proposed wellfield. Specifically, a better understanding of drawdown when pumping, the lithology, and resistivity of aquifer materials.

Key Findings from Field Activities:

Drawdown due to pumping at a high rate (500 gallons per minute) over a 24-hour period was small (i.e., 0.1-1.4 feet) relative to the saturated thickness of the aquifer.

Water quality suitable for streamflow augmentation was encountered within the proposed wellfield area (Sites 2, 3, and 6). The northern sites (Sites 1 and Q) produced poorer quality water.

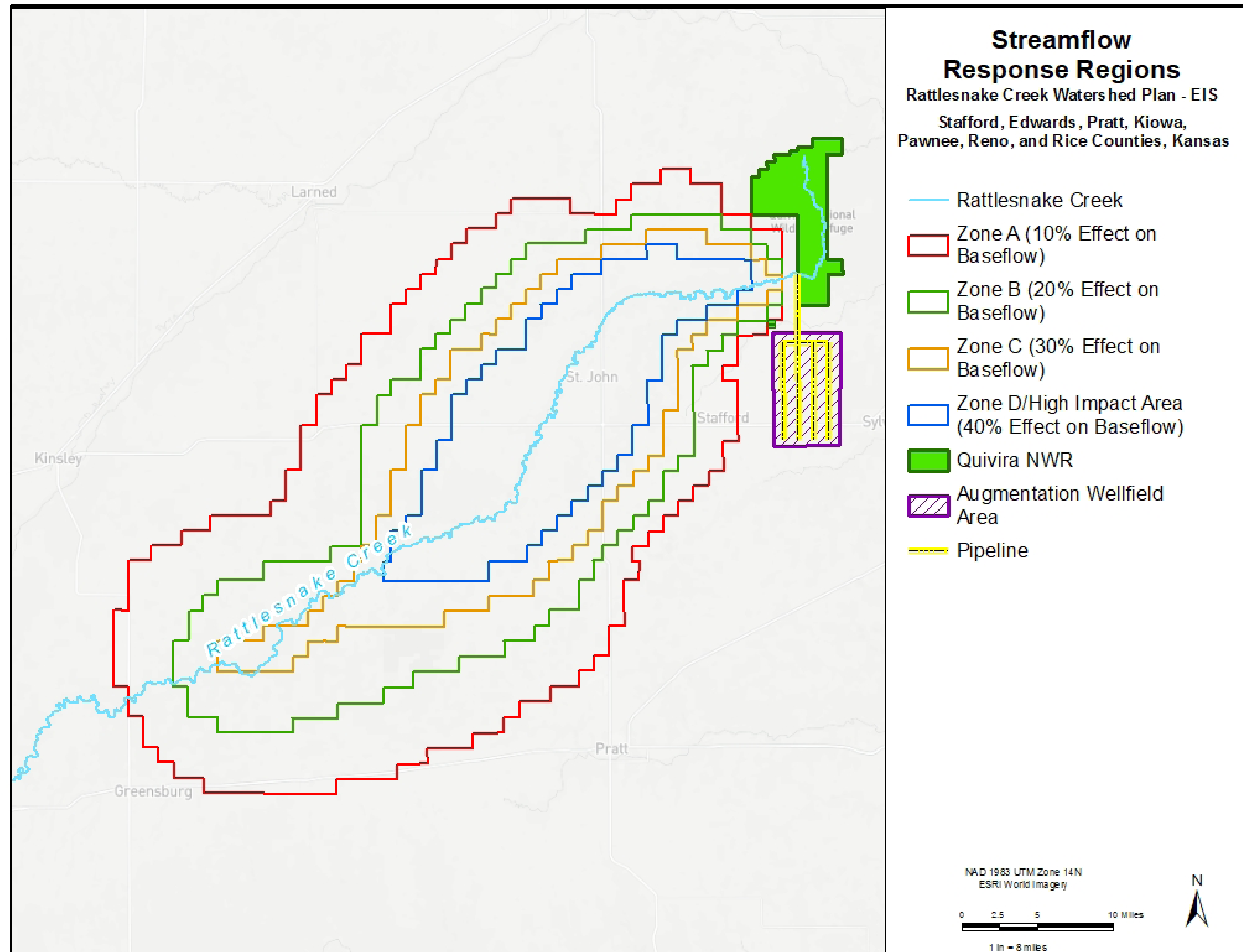
There is a relative lack of connection between the shallow, fresher groundwater and the deeper, more saline groundwater.

Overall, data indicates that some substantial level of augmentation could be developed and maintained over time in the proposed augmentation wellfield area.

ALTERNATIVES CONSIDERED



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NO ACTION ALTERNATIVE:

Curtailment of junior water rights within Zone B (areas with a 20 percent or greater streamflow impact). Annual evaluation to determine effectiveness and make adjustments.

AUGMENTATION WELLFIELD AND GROUNDWATER USE

REDUCTION ALTERNATIVE:

Augmentation wellfield that provides 15-18 cubic feet per second (cfs) to Rattlesnake Creek. Retirement of 2,500 acre-feet per year (AFY) of authorized water use. Adaptive management program to evaluate success of alternative.

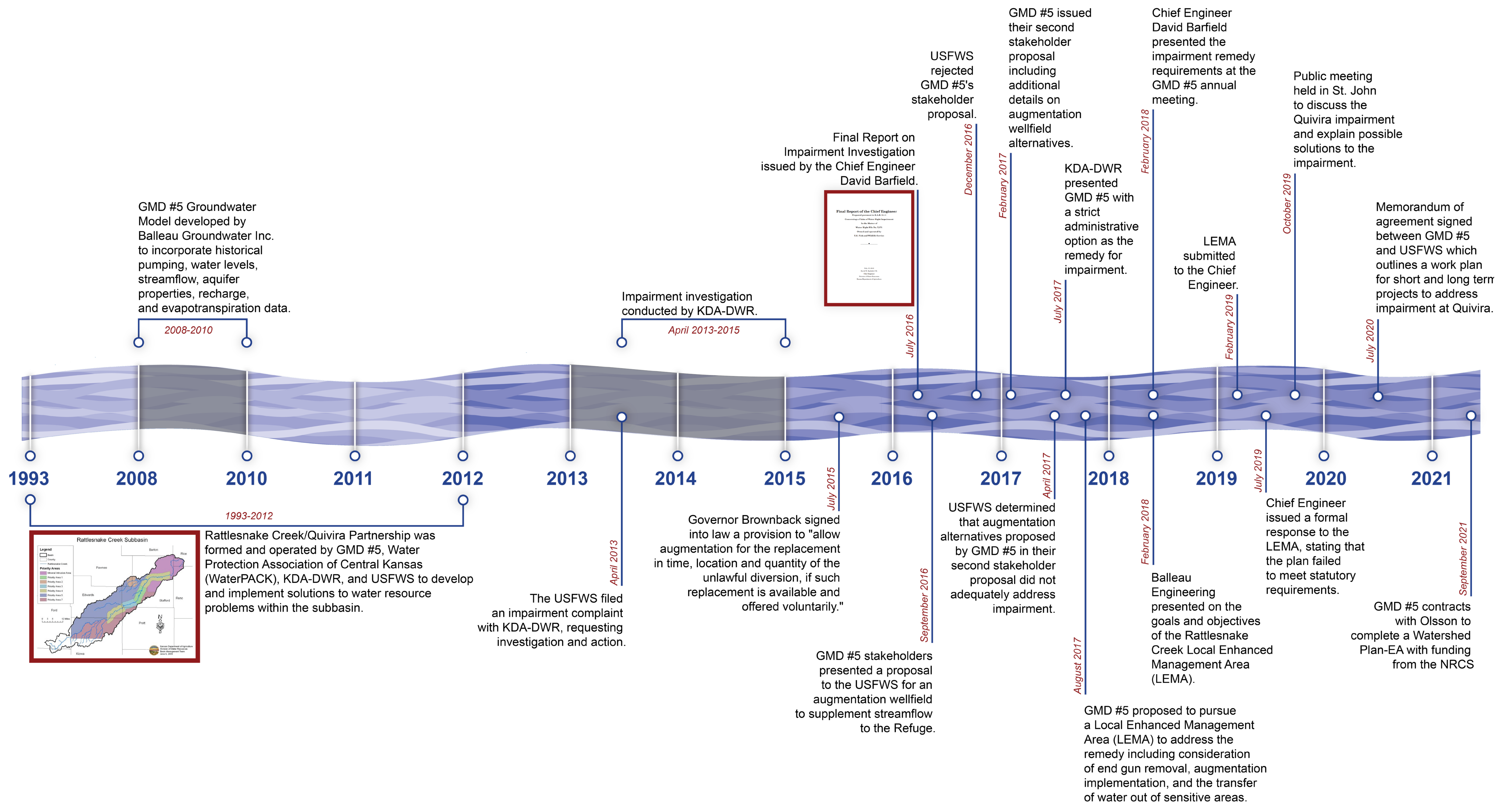
GROUNDWATER USE REDUCTION ALTERNATIVE:

Reduce groundwater use 60 percent from historical pumping in Zone A (Local Enhanced Management Area [LEMA]/ Intensive Groundwater Use Control Area [IGUCA]). Adaptive management program to evaluate success of alternative.

Key Takeaways:

- Under all three considered alternatives, Quivira National Wildlife Refuge would have an increase in water delivered to the refuge, satisfying the impairment of their senior water right.
- The No Action and Groundwater Use Reduction alternatives would both result in a reduction in irrigation pumping that would provide beneficial impacts to, and beyond, Rattlesnake Creek and Quivira NWR, including benefits to the local aquifer depths, surface water resources, and riparian areas. These effects would benefit fish and wildlife resources, wildlife habitat, and potentially threatened and endangered species both inside and outside of Quivira NWR.
- Under the Augmentation Wellfield and Groundwater Use Reduction Alternative, hydrology and aquifer changes are anticipated to cause reductions in streamflow (Peace Creek, Rattlesnake Creek, and North Fork Ninnescah River), loss of riparian habitat, and hydrologic changes to groundwater-fed wetlands. Impacts to streamflow in Rattlesnake Creek, Peace Creek, and the North Fork Ninnescah River are anticipated to be long-term and minor.
- Negative major effects to socioeconomics under the No Action Alternative and Groundwater Use Reduction Alternative would be anticipated. Under the No Action Alternative, net farm income would decrease on average by \$5 million annually, and under the Groundwater Use Reduction Alternative, net farm income would decrease by an additional \$1.4 million (relative to the No Action Alternative).
- Although there would be a slight decrease (\$160,000 annually) to the current agricultural economy due to the water right retirements under the Augmentation Wellfield and Groundwater Use Reduction Alternative, the impacts to the regional economy are viewed as an increase because compared to the losses anticipated under the No Action Alternative, the net farm income under the Augmentation Wellfield and Groundwater Use Reduction Alternative will increase by \$4.9 million (i.e. the loss of \$5 million in net farm income under the No Action Alternative would not happen).

HISTORY OF COMMUNICATION BETWEEN GMD #5, US FISH & WILDLIFE SERVICE, AND THE STATE OF KANSAS REGARDING QUIVIRA NATIONAL WILDLIFE REFUGE



WATERSHED PLAN-EIS TIMELINE



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Planning Phase

- ✓ Collect Information
- ✓ Project Scoping
- ✓ Agency Input/Coordination
- ✓ Tribal Consultation
- ✓ Develop Alternatives
- ✓ Studies and Research
 - Augmentation Wellfield Technical Assessment
 - Technical Committee Coordination
 - Augmentation Wellfield Modeling
 - Biological Assessment
- ✓ Agency Reviews and Comments
 - NRCS
 - USFWS
 - USACE
 - KDA-DWR
 - KWO
- ✓ Finalize DRAFT Plan-EIS
 - **Present DRAFT Plan-EIS** ← **WE ARE HERE**
 - Public Input
 - Agency Input
 - Updates to the Draft Plan EIS
 - Approval of the Biological Assessment and Programmatic Agreement
 - Finalization of the Plan-EIS
 - NRCS Decision

Design Phase

- Additional field studies
- Engineering design of augmentation wellfield
- Cultural surveys
- Environmental surveys
- Acquisition of easements for wellfield
- Purchase of water rights to retire in Zone D
- Permits and Compliance: Obtain all necessary permits for compliance

Construction Phase

- Construction of augmentation wellfield and delivery pipeline
- Adaptive management program begins
- Regular operation and maintenance
- Post-construction monitoring

WE WANT TO HEAR FROM YOU!



HOW TO MAKE FORMAL COMMENTS



Comment online at:

gmd5.org/watershed-plan



Scan here and comment online



Fill out a comment form and return to the address on the form.

Written comments are to be submitted by June 2, 2025.

Information regarding the watershed planning process and development of the Watershed Plan-EIS is available on the project website at **gmd5.org/watershed-plan**.