Agencia de Sostenibilidad de Agua Subterránea (GSA) Kern River

TALLER PARA EVALUAR EL PLAN DE SOSTENIBILIDAD DEL AGUA SUBTERRÁNEA (GSP)

Para cumplir con la Ley de Manejo Sostenible de Agua Subterránea (SGMA), Kern River GSA desarrolló un Plan de Sostenibilidad de Agua Subterránea (SGP) que servirá como una hoja de ruta sobre cómo las aguas subterráneas se manejarán de manera sostenible en los próximos años.

El GSP preliminar ya está disponible, y un período de revisión de 90 días finalizará el 27 de noviembre de 2019. Kern River GSA organizará dos talleres para revisar el plan y permitir que miembros de las comunidad local hagan comentarios. **Estos talleres discutirán temas importantes que pueden afectar el agua que usa en su hogar. Sus comentarios sobre este plan son vitales para ayudar a abordar la calidad del agua y los desafíos del suministro de agua en su comunidad.**

TEMAS DE DISCUSIÓN:

- ¿Qué es la Ley del Manejo Sostenible del Agua Subterránea (SGMA)?
- Su Agencia de Sostenibilidad del Agua Subterránea (GSA) local
- ¿Cómo puede afectar SGMA a mi y a mi comunidad?
- **Revise el Plan de Sostenibilidad del Agua Subterránea**

Taller #1:
Fecha: Martes, 15 de octubre 2019
Tiempo: 5:30 – 7:30 p.m.
Ubicación: Stan Keasling Community Room
601 Douglas St.
Bakersfield, CA 93308

Taller #2:
Fecha: Miercoles, 6 de noviembre 2019
Tiempo: 5:30 – 7:30 p.m.
Ubicación: David Head Center
10300 San Diego St.
Lamont, CA 93241

Se alienta a los residentes de la comunidad, propietarios de pozos privados, residentes de los sistemas de agua de la comunidad y miembros de la junta de agua y escuela a asistir.

Servicio de traducción al español está disponible.

Para confirmar su asistencia en cualquiera de los talleres (no requerido), visite http://bit.ly/KRGSAReview o comuníquese con Eva Domínguez al (559) 802-1634 o EvaD@SelfHelpEnterpises.org.

KERN RIVER GROUNDWATER SUSTAINABILITY AGENCY

Kern River GSA – Groundwater Sustainability Plan (GSP)
Review Workshop

Detailed Agenda

October 15, 2019 and November 6, 2019

5:30 – 5:35 p.m.	Welcome and Introduction (GSA Representative)
5:35 – 5:45 p.m.	SGMA Overview (SHE) • What is the Sustainable Groundwater Management Act (SGMA)? • SGMA Video*: SGMA and Groundwater Users Working Together* • Your local Groundwater Sustainability Agency (GSA)
5:45 – 6:30 p.m.	Draft GSP Review (Horizon and SHE) • GSP Part A: Review and discuss groundwater conditions and sustainability goal(s) • GSP Part B: Review and discuss sustainable management criteria for groundwater levels and groundwater quality • GSP Part C: Review and discuss proposed KRGSA projects and management actions
6:30 – 6:45 p.m.	GSP Part D: Notice and Communication (SHE) Discussion: Are there additional approaches the KRGSA should include in the GSP to support providing community information and engagement
6:45 – 7:00 p.m.	Closing (SHE) • How to provide comments and recommendations (Horizon) • Technical Assistance for disadvantaged communities • Evaluation

Kern River Groundwater Sustainability Agency

Groundwater Sustainability Plan (GSP) Review

October 15, 2019

KRGSA

WORKSHOP OVERVIEW

- SGMA Overview
- Draft Groundwater Sustainability Plan Review
  - Part A: Groundwater Conditions & Sustainability Goal(s)
  - Part B: Sustainable Management Criteria for Groundwater Levels and Quality
  - Part C: Projects and Management Actions
  - Part D: Notice and Communication
- How to Provide Comments and Recommendations / Available Technical Assistance

GROUNDWATER MATTERS IN CALIFORNIA, PARTICULARLY IN THE CENTRAL VALLEY

WATER IS LIFE

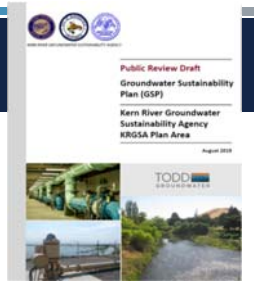
Overdraft:

The Kern County Subbasin has been pumping more groundwater than what is being replenished back into the ground.

- Lowering of groundwater levels
- Dry wells and well failures
- Degradation of water quality
- Sinking land (subsidence)

Sustainable Groundwater Management Act (SGMA) Requirements

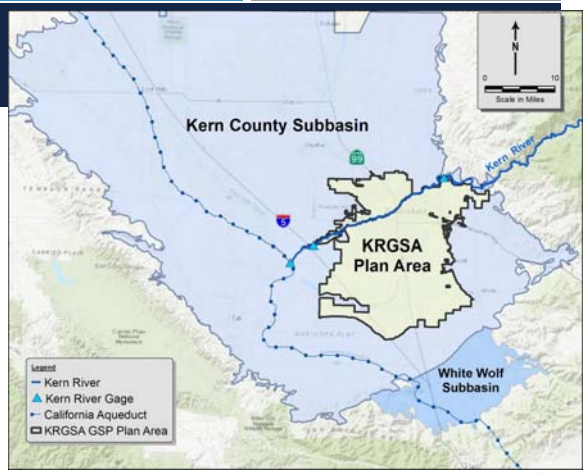
KRGSA Groundwater Sustainability Plan (GSP) Organization



1 Administrative Information
2 Plan Area
3 HCM/Groundwater Conditions
4 Water Budgets
5 Sustainable Management Criteria
6 Monitoring Networks
7 Projects and Management Actions
8 Implementation Plan
9 References and Technical Studies

KRGSA GSP Plan Area

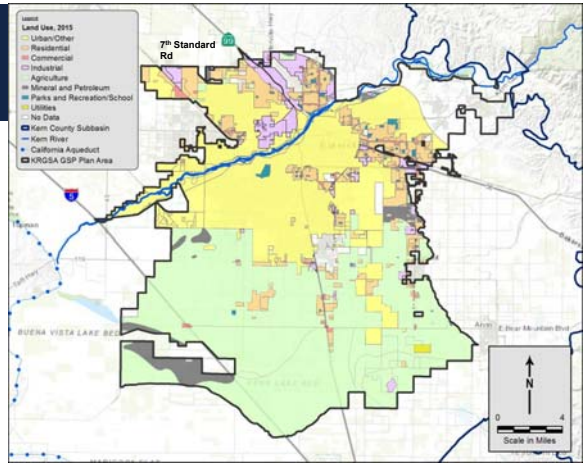
- 361 square miles
- 13% of the Kern County Subbasin
- Composed of:
  - City of Bakersfield
  - Kern County Water Agency Improvement District No. 4 (ID4)
  - Kern Delta Water District (KDWD)
  - Additional smaller agencies



TODD GROUNDWATER

Land Use in the KRGSA Plan Area

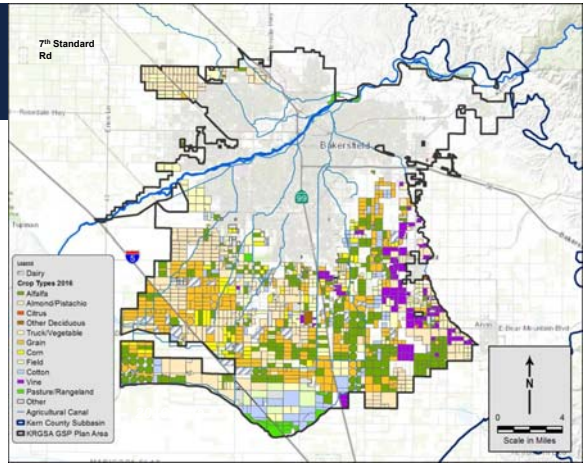
- North – Urban
- South – Agricultural
- 2015 Land Use
  - 41% - Agricultural
  - 33% - Urban
  - 26% - Undeveloped



TODD GROUNDWATER

Agricultural Lands in the KRGSA

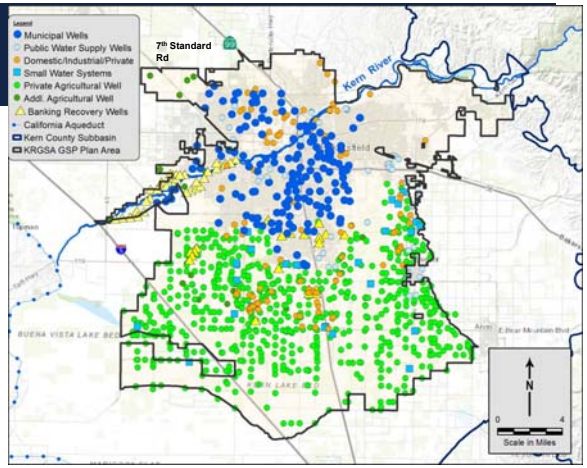
- 90,000 acres irrigated agriculture in southern Plan Area
- 16,000 acres irrigated lands in northern Plan Area
- 20 Dairies in southern Plan Area



TODD GROUNDWATER

Active Wells in the KRGSA

- 162 Municipal wells
- 67 Public Supply and Small Water System wells
- 151 Industrial, Domestic, and other Private wells
- 642 Agricultural wells
- 54 Banking recovery wells



TODD GROUNDWATER

KRGSA Sustainability Goal

Manage groundwater resources sustainably in the KRGSA Plan Area to:

- support current and future beneficial uses of groundwater including municipal, agricultural, industrial, domestic, public supply, and environmental uses
- optimize conjunctive use of surface water and groundwater
- avoid or eliminate undesirable results over the implementation and planning horizon.

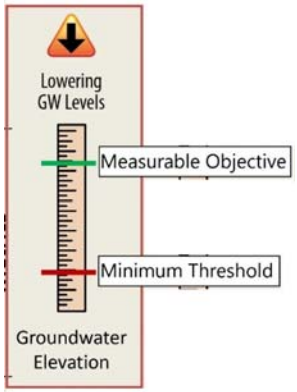
DISCUSSION: SUSTAINABILITY GOAL

- How would you like to see groundwater improve over the next twenty years?
- What would you like to avoid?
- Does the proposed goal reflect your priorities and objectives?
- What comments and/or recommendations would you like to offer?

Significant and Unreasonable Harm

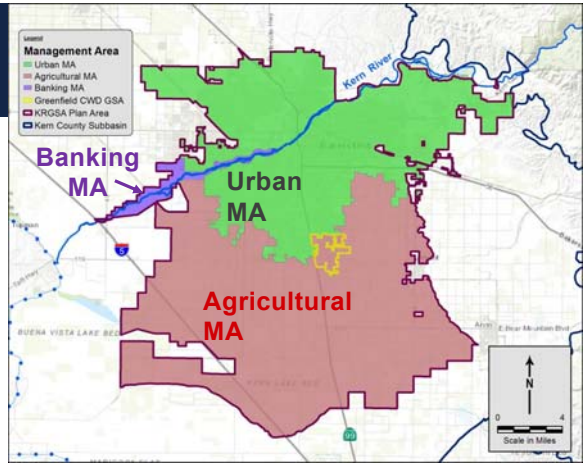
Two key terms: Measurable Objectives and Minimum Thresholds

- Measurable Objectives are <u>aspirational</u> goals.
- Minimum Thresholds are like <u>failure points</u> and should be avoided.



Preliminary Management Areas

- Based on land use and well use
  - Urban MA – 41%
  - Agricultural MA – 57%
  - Banking – 2%



TODD GROUNDWATER

Sustainability Indicators

- Chronic lowering of water levels
- Reduction of groundwater storage
- Degradation of water quality caused by management actions
- Land subsidence affecting land use
- Depletion of interconnected surface water affecting beneficial use

If a sustainability indicator is determined to be significant and unreasonable, then it is an Undesirable Result.

TODD GROUNDWATER

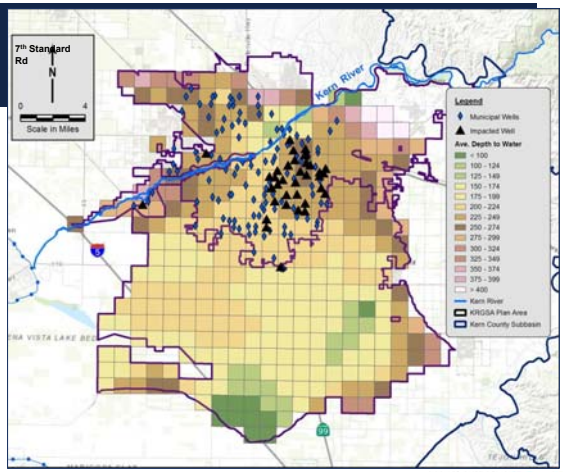
Chronic Lowering of Water Levels

- Undesirable result: when a significant lowering of water level occurs that limits the beneficial use and access to groundwater by overlying users.
- Impacts focus on groundwater wells
- Balancing needs:
  - Municipal wells maintain higher water levels
  - Irrigation and banking wells – lower water levels to provide critical supplies during multi-year droughts.

TODD GROUNDWATER

Historic Low WL Impacts to Wells

- Comparing depth to water and top of municipal well screens
- 2015 - water levels were below the top of screens in more than 40 municipal wells
- Costly to lower pumps, take wells offline, secure other water supplies



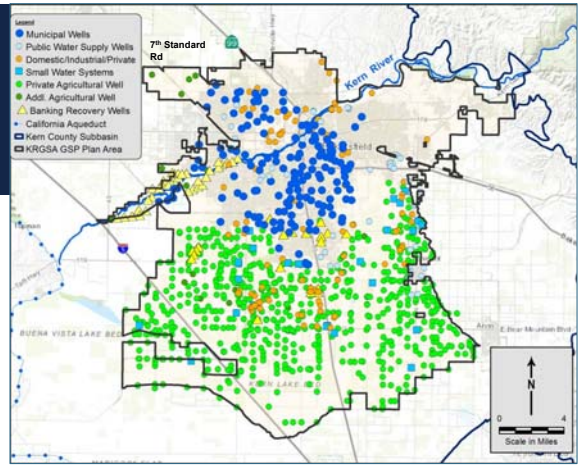
TODD GROUNDWATER

Concentrated Pumping in Ag and Banking Wells

~ 150 municipal wells

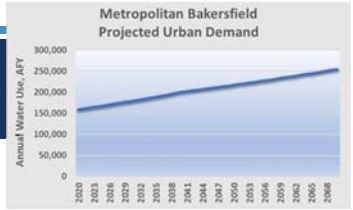
~ 50 banking recovery wells

~ 642 Agricultural wells



TODD GROUNDWATER

Projected - Future Deficits



- Increase urban demand
- Decrease SWP supply
- Increase agricultural demand

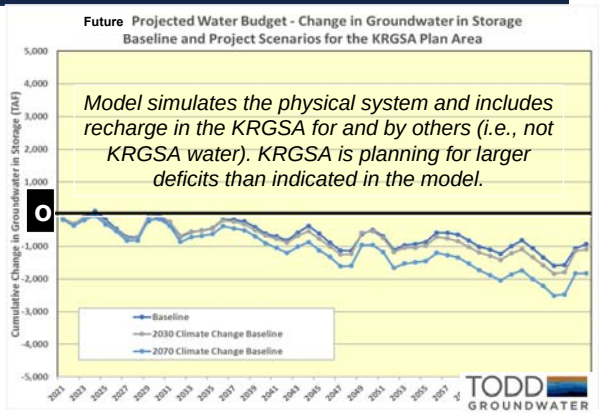
Water Budget Component	Historical Average Annual Amounts (AFY)	Baseline Conditions (AFY)	2030 Climate Change Conditions (AFY)	2070 Climate Change Conditions (AFY)
SWP[1] – ID4	74,035	52,758	51,182	48,759
SWP - KDWD	18,655	15,765	15,294	14,537
TOTAL SWP	92,690	68,523	66,476	63,296
Net decrease in SWP from historical:		**24,167**	**26,214**	**29,394**
Agriculture Demand	261,019	261,019	271,460	281,460
Urban Demand[2]	167,970	182,290	178,115	254,117
TOTAL DEMAND	428,989	443,309	449,575	535,577
Net increase in demand from historical:		**14,320**	**20,586**	**106,588**
Potential Future Water Budget Deficits:		**-38,487**	**-46,800**	**-135,982**

Note - Historical Adjusted deficit of -29,000 AFY

TODD GROUNDWATER

Projected Water Budgets – Using Models to Estimate Future Conditions

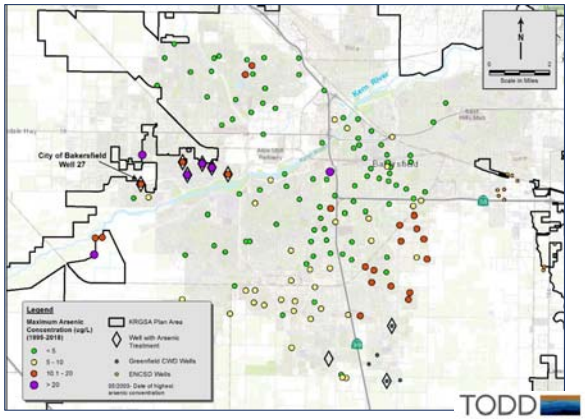
- Baseline - current land use and projected water supply and demand
- 2030 Climate Change Scenario with increased agricultural demand and decreased supply
- 2070 Climate Change Scenario with further increase in demand and decrease in supply



TODD GROUNDWATER

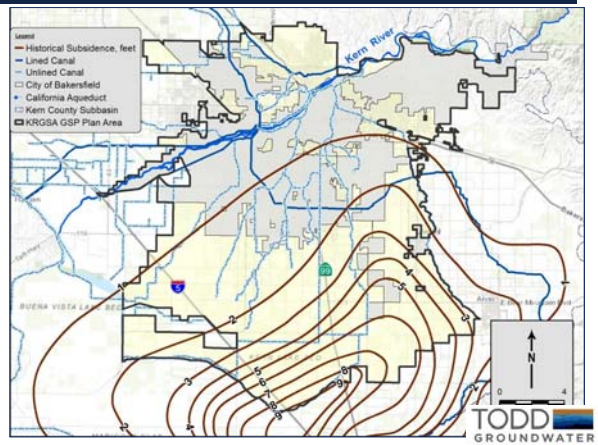
Constituent of Concern - Arsenic

- Focus on constituents affected by management actions
- Arsenic concentrations increase with declining water levels
- More than 25 wells with detections above the MCL
- Widespread issue in the Plan Area



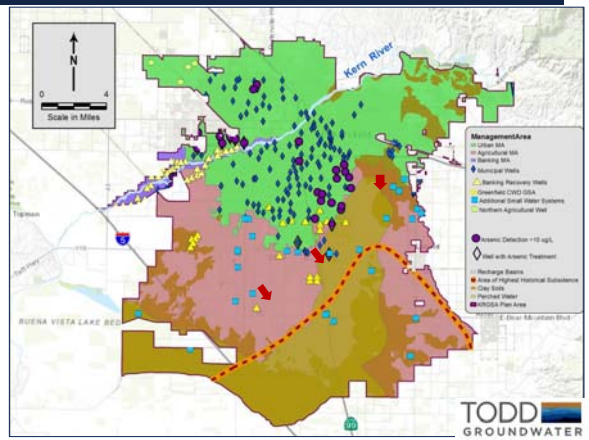
Land Subsidence and Infrastructure

- Critical infrastructure includes pipelines, canals, utilities, structures, wells, transportation
- No damage to critical infrastructure in the Plan Area identified to date
- Set minimum thresholds to mitigate future subsidence



Sustainability Considerations

- WL below screens in municipal wells
- Deficits for projected water budgets
- Arsenic in municipal wells
- Ability of banking wells to recover water
- Historical subsidence



Approach to Minimum Thresholds

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Sustainability Indicator and Minimum Threshold (MT)			
			Chronic Lowering of Water Levels	Reduction of Groundwater in Storage	Degraded Water Quality	Land Subsidence
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Historic Low WL	Historic Low WL	Historic Low WL	Historic Low WL
	Northwest corner	Transition to agricultural lands	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	50' below Historic Low WL
	North-Central	Greenfield CWD wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	10' below Historic Low WL
	Northwest	Agricultural and recovery wells	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	South and East	Subsidence potential	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	20' below Historic Low WL
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	20' below Historic Low WL	Not applicable	20' below Historic Low WL	50' below Historic Low WL
	Berrenda Mesa	KCWA operational area	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL
	COB 2800 Facility	City of Bakersfield municipal wells	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.
Measurable Objective (MO) for each sustainability indicator is the average of the MT and the historical high groundwater elevation during the historical Study Period.
Highlighted green cell indicates the controlling sustainability indicator(s) for that area in each MA.

- Undesirable results relate to historic low water levels; keep urban wells near historic lows.
- Allow operational flexibility for banking wells to recover critical supplies during drought.

Approach to Minimum Thresholds

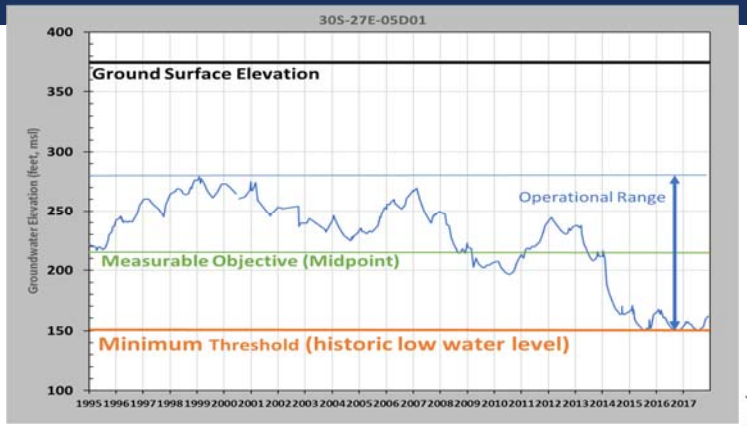
KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Undesirable Results for Controlling Sustainability Indicators			
			Controlling Indicator	Minimum Threshold (MT)	Percent of Wells <MT	Duration of MT Exceedance
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	Northwest corner	Transition to agricultural lands	Water Levels	20' below Historic Low WL	Any well	>3 Consecutive Months
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Water Levels/Quality	Historic Low WL	40% in Urban MA	>2 Consecutive Years
	North-Central	Greenfield CWD wells	Water Levels/Quality	Historic Low WL	Greenfield CWD MW	>2 Consecutive Years
	Northwest	Agricultural and recovery wells	Water Levels	50' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
	South and East	Subsidence potential	Subsidence	20' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	Water Levels/Quality	20' below Historic Low WL	Any well	>3 Consecutive Months
	Berrenda Mesa	KCWA operational area	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	COB 2800 Facility	City of Bakersfield municipal wells	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.

- Measurable Objectives are selected as the midpoint for an operational range.
- Keep MTs and MOs SIMPLE to facilitate management.
- Add number of wells and duration to refine definition of undesirable results.

TODD GROUNDWATER

Assignment of MT, MO, and Operational Range



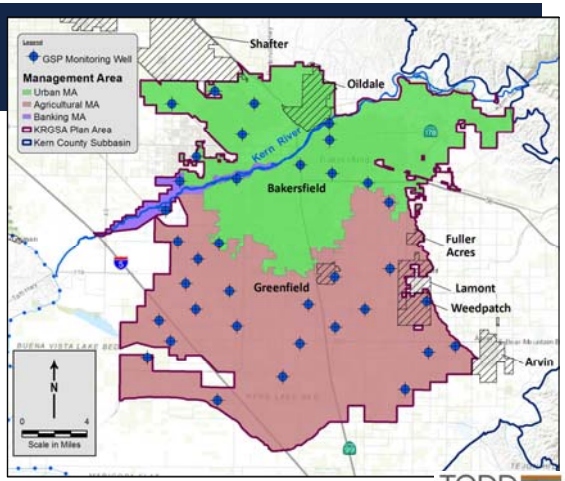
TODD GROUNDWATER

DISCUSSION: MINIMUM THRESHOLDS

- What do you think about the proposed minimum thresholds?
- Do the proposed minimum thresholds avoid your definition of significant and unreasonable harm?
- What comments and/or recommendations would you like to offer?

Initial GSP Monitoring Wells

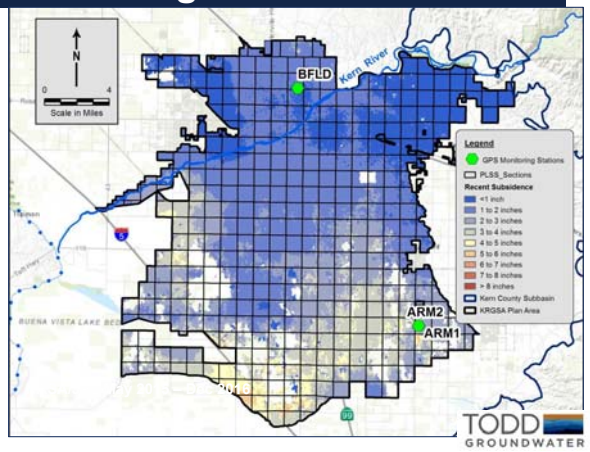
- 36 wells identified
- Currently monitored in other programs:
  - Kern Fan Monitoring Comm.
  - KCWA/ID4 WL Program
  - City Monitoring Wells
  - KDWD Monitoring Programs
- Possible to add more wells



TODD GROUNDWATER

KRGSA Subsidence Monitoring

- Water level monitoring
- Three GPS stations for screening
- Radar subsidence data from DWR (1-mile grids)
- Will coordinate with other GSAs for regional monitoring



Key Management Projects

KDWD Kern River Water Allocation Plan

- Optimizes Kern River recharge across the southern Plan Area
- Reduces groundwater pumping
- Allows local maintenance of water levels
- EIR completed 2018 – implementation initiated

Key Management Projects

City of Bakersfield Optimized Conjunctive Use

- Prioritizes use of City's available Kern River water to flow in river, recharge aquifer, and support municipal needs
- Supports increased water availability
- Allows municipal pumping to be reduced to avoid undesirable results
- Meets future projected water budget deficits for urban demand

Key Management Projects

East Niles Community Services District North Weedpatch Highway Consolidation

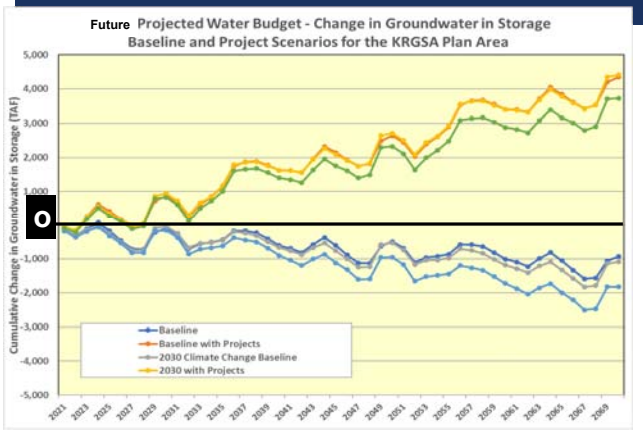
- Consolidation of up to six small water systems with ENCSD to address water quality concerns: nitrate, TCP, and arsenic
- Grant funding through the DWRSF program
- Improves drinking water quality for disadvantaged communities in the KRGSA

1,2,3-TCP Wellhead Treatment

Management Actions

- 5-Step Action Plan if Minimum Thresholds are exceeded
- Implement well metering throughout the KRGSA
- Program for reporting groundwater extractions in the KRGSA
- Conserve recycled water in the KRGSA Plan Area
- Support Delta Conveyance to preserve imported supplies
- Incorporate Climate Change Adaptation Strategies
- Improve monitoring program
- Coordinate water quality analysis with existing programs

Projected Water Budgets with Projects



Collectively, these projects and management actions address current and projected groundwater deficits to achieve sustainable management.

TODD GROUNDWATER

DISCUSSION: PROJECTS AND MANAGEMENT ACTIONS

- What do you think of the proposed projects and management actions?
- Are there any other projects and/or management actions that you would like the GSA to consider?

What Comes Next?

- Monitoring and annual reporting to DWR
- Review Plan every 5 years and report to DWR
- Pursue and implement recharge projects
- Collaborate with other regulatory agencies
- Explore, decide, and define:
  - Methods to allocate groundwater among users
  - Assistance program for drinking water wells
  - Funding for GSP implementation

DISCUSSION: NOTICE AND COMMUNICATION

- How would you like to be informed and engaged?
- When would you like to be informed and engaged?

90-Day Review Period and Outreach

- Communication and outreach with Stakeholders for GSP input
- Outreach accomplished at many levels:
  - Agency Board Meetings and Workshops
  - Targeted community meetings
  - Coordinate with other GSAs on Open House
- GSP is a draft document and can be revised based on input:
  - Working to improve monitoring program
  - Incorporate details on how GSP implementation can be achieved
- KRGSA supports collaborative efforts and internal coordination to achieve sustainable management for the Subbasin's shared groundwater resources

How to Provide Comments and Recommendations

- The Draft GSP is available on the KRGSA website at:

  www.kernrivergsa.org

- Public Hearing to receive comments on the Draft GSP is scheduled for **December 5, 2019**

TECHNICAL ASSISTANCE FOR DISADVANTAGED COMMUNITIES

Self-Help Enterprises
- Outreach and Education
- Direct Community Assistance
- GSP Development Assistance

www.selfhelpenterprises.org

Eva Dominguez
(559) 802-1634 | EvaD@selfhelpenterprises.org

Agencia de Sostenibilidad del Agua Subterránea de Kern River

Taller de Revisión del Plan de Sostenibilidad del Agua Subterránea

15 de octubre 2019

KRGSA

TALLER A LA VISTA

- Revision de SGMA
- Revisión del Plan de Sostenibilidad del Agua Subterránea Preliminar
  - Parte A: Condiciones del Agua Subterránea y Meta(s) de Sostenibilidad
  - Parte B: Criterios de Manejo Sostenible para los Niveles y la Calidad del Agua Subterránea
  - Parte C: Proyectos y Acciones de Manejo
  - Parte D: Aviso y Comunicación
- Cómo Proporcionar Comentarios y Recomendaciones / Asistencia Técnica Disponible

EL AGUA SUBTERRÁNEA CUENTA EN CALIFORNIA, PARTICULARMENTE EN EL VALLE CENTRAL

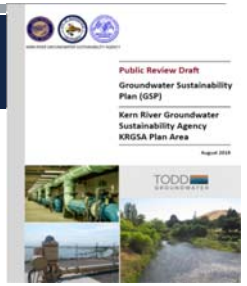
Sobre-Bombeo:

La subcuenca del condado de Kern ha estado bombeando más agua subterránea de la que se está reponiendo en el suelo.

- Disminución de los niveles de agua subterránea.
- Pozos secos y fallas de pozos
- Degradación de la calidad del agua.
- Tierra que se hunde (hundimiento)

Requisitos de la Ley de Manejo Sostenible del Agua Subterránea (SGMA)

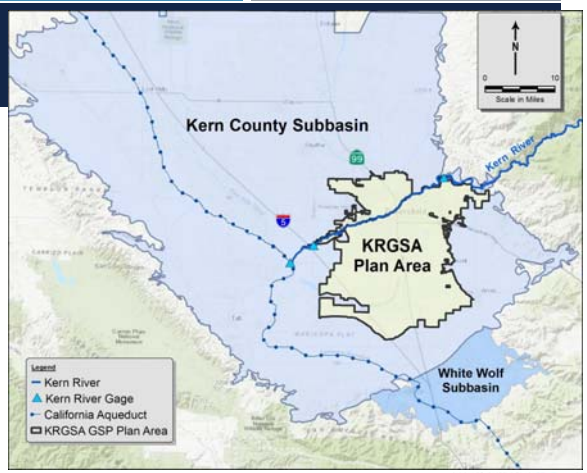
Organización del Plan de Sostenibilidad de Agua Subterránea (GSP) de KRGSA



1 Información administrativa
2 Área del plan
3 condiciones de HCM / agua subterránea
4 presupuestos de agua
5 Criterios de gestión sostenible
6 redes de monitoreo
7 proyectos y acciones de gestión
8 Plan de implementación
9 Referencias y estudios técnicos

KRGSA GSP Área de Plan

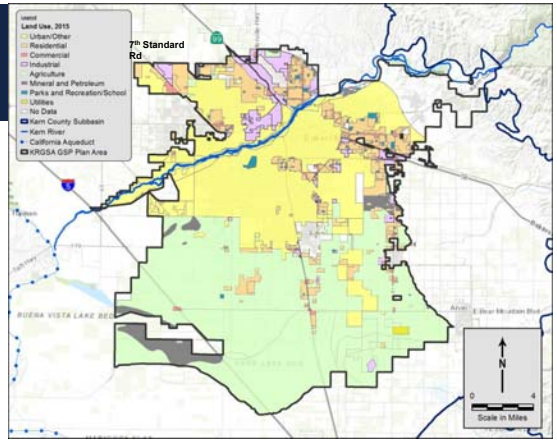
- 361 millas cuadradas
- 13% de la subcuenca del condado de Kern
- Compuesto de:
  - Ciudad de Bakersfield
  - Distrito de Mejoramiento de la Agencia de Agua del Condado de Kern No. 4 (ID4)
  - Distrito del Agua del Delta de Kern (KDWD)
  - Agencias más pequeñas adicionales



TODD GROUNDWATER

Uso de la Tierra en el Área del Plan KRGSA

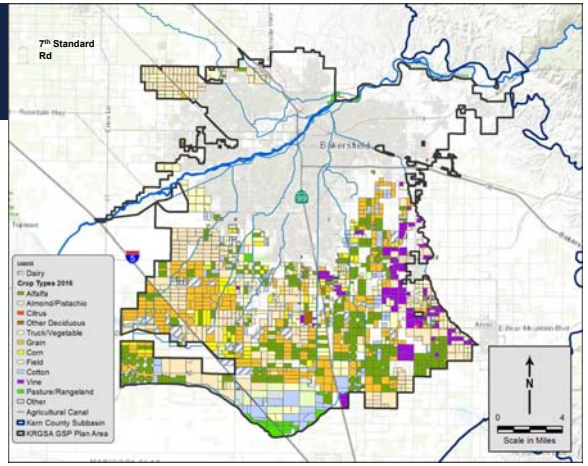
- Norte - Urbano
- Sur - Agrícola
- Uso de la Tierra 2015
  - 41% - Agrícola
  - 33% - Urbano
  - 26% - Sin desarrollar



TODD GROUNDWATER

Tierras agrícolas en el KRGSA

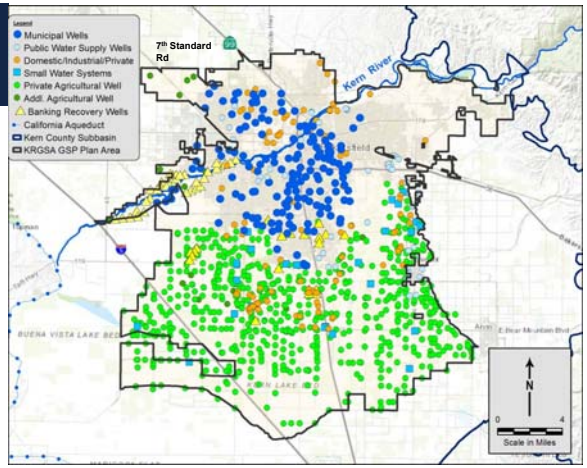
- 90,000 acres de agricultura irrigada en el Área del Plan sur
- 16,000 acres de tierras irrigadas en el área norte del Plan
- 20 lecherías en el área sur del plan



TODD GROUNDWATER

Pozos activos en el KRGSA

- 162 pozos municipales
- 67 pozos de suministro público y pequeños sistemas de agua
- 151 Pozos industriales, domésticos y otros pozos privados
- 642 pozos agrícolas
- 54 pozos de recuperación bancaria



TODD GROUNDWATER

Meta de Sostenibilidad de KRGSA

Manejar los recursos de aguas subterráneas de manera sostenible en el Área del Plan KRGSA para:

- Apoyar los usos beneficiosos actuales y futuros del agua subterránea, incluidos los usos municipales, agrícolas, industriales, domésticos, públicos y ambientales.
- Optimizar el uso conjunto de las aguas superficiales y subterráneas
- Evitar o eliminar resultados no deseados en el horizonte de implementación y planificación.

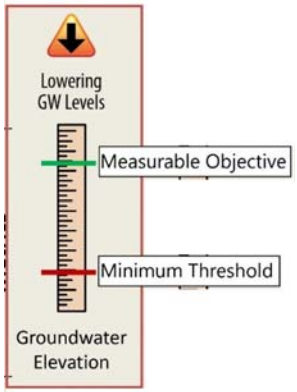
DISCUSIÓN: META DE SOSTENIBILIDAD

- ¿Cómo le gustaría ver mejorar las aguas subterráneas en los próximos veinte años?
- ¿Qué te gustaría evitar?
- ¿La meta propuesta refleja sus prioridades y objetivos?
- ¿Qué comentarios y / o recomendaciones le gustaría ofrecer?

Daño Significativo e Irracional

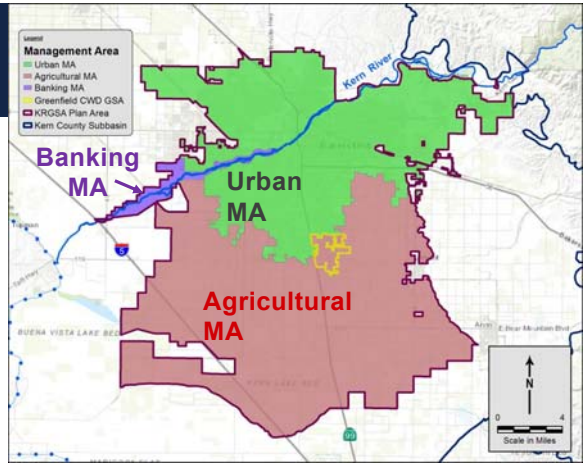
Dos términos clave: Objetivos Medibles y Umbrales Mínimos

- Los **Objetivos Medibles** son metas aspiracionales.
- Los **Umbrales Mínimos** son como puntos de falla y deben evitarse.



Áreas Preliminares de Manejo

- Basado en el uso de la tierra y uso de los pozos
  - MA urbana - 41%
  - MA agrícola - 57%
  - Banca - 2%



TODD GROUNDWATER

Indicadores de Sostenibilidad

- Reducción crónica de los niveles de agua
- Reducción del almacenamiento de agua subterránea
- Degradación de la calidad del agua causada por acciones de manejo
- Subsidencia de la tierra que afecta el uso de la tierra
- El agotamiento del agua superficial interconectada afecta el uso beneficioso

Si se determina que un indicador de sostenibilidad es significativo e irracional, entonces es un resultado indeseable.

TODD GROUNDWATER

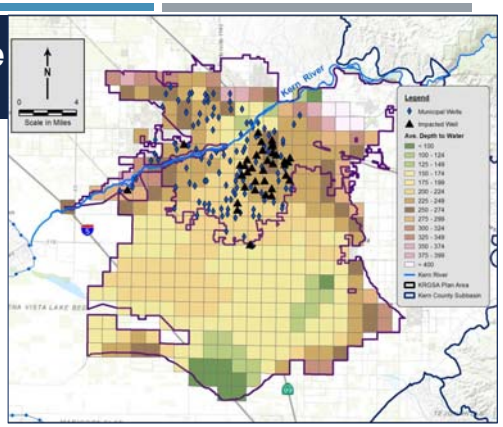
Reducción crónica de los niveles de agua

- Resultado no deseado: cuando ocurre una disminución significativa del nivel del agua que limita el uso beneficioso y el acceso al agua subterránea por parte de los usuarios suprayacentes.
- Los impactos se centran en los pozos de agua subterránea
- Necesidades de equilibrio:
  - Los pozos municipales mantienen niveles de agua más altos
  - Pozos de riego y bancos: reducen los niveles de agua para proporcionar suministros críticos durante las sequías de varios años.

TODD GROUNDWATER

Impactos históricos de bajo WL a los pozos

- Comparación de la profundidad con el agua y la parte superior de las pantallas de los pozos municipales
- 2015 - los niveles de agua estuvieron por debajo de la parte superior de las pantallas en más de 40 pozos municipales
- Es costoso bajar las bombas, desconectar los pozos, asegurar otros suministros de agua.



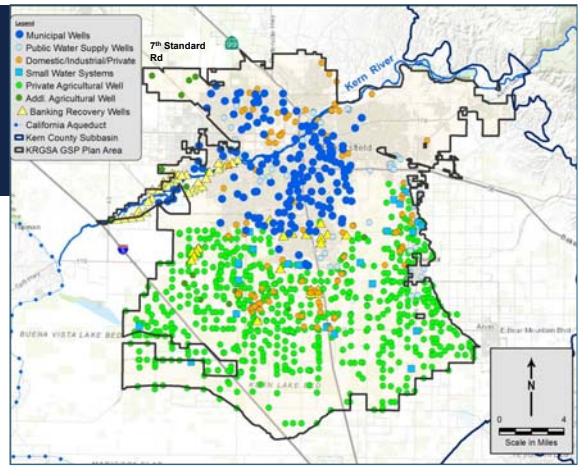
TODD GROUNDWATER

Bombeo concentrado en pozos agrícolas y bancarios

~ 150 pozos municipales

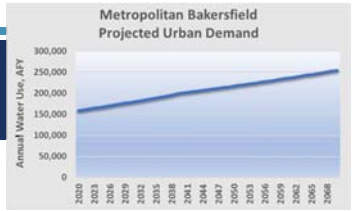
~ 50 pozos de recuperación bancaria

~ 642 pozos agrícolas



TODD GROUNDWATER

Proyectado - Déficits Futuros



- Aumentar la demanda urbana.
- Disminuir el suministro de SWP
- Aumentar la demanda agrícola.

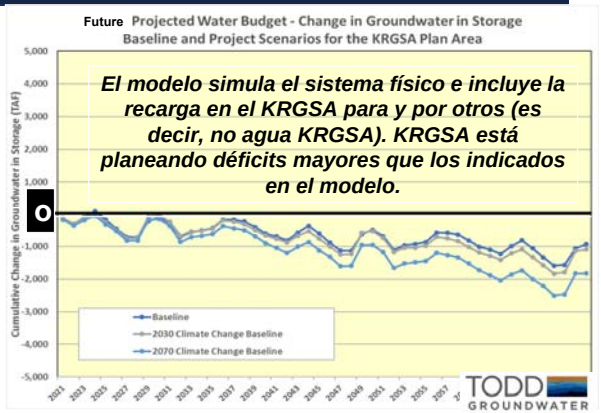
Water Budget Component	Historical Average Annual Amounts (AFY)	Baseline Conditions (AFY)	2030 Climate Change Conditions (AFY)	2070 Climate Change Conditions (AFY)
SWP[1] – ID4	74,035	52,758	51,182	48,759
SWP - KDWD	18,655	15,765	15,294	14,537
TOTAL SWP	92,690	68,523	66,476	63,296
Net decrease in SWP from historical:		**24,167**	**26,214**	**29,394**
Agriculture Demand	261,019	261,019	271,460	281,460
Urban Demand[2]	167,970	182,290	178,115	254,117
TOTAL DEMAND	428,989	443,309	449,575	535,577
Net increase in demand from historical:		**14,320**	**20,586**	**106,588**
Potential Future Water Budget Deficits:		**-38,487**	**-46,800**	**-135,982**

Nota - Déficit ajustado histórico de -29,000 AFY

TODD GROUNDWATER

Presupuestos de Agua Proyectados: Uso de Modelos para Estimar Condiciones Futuras

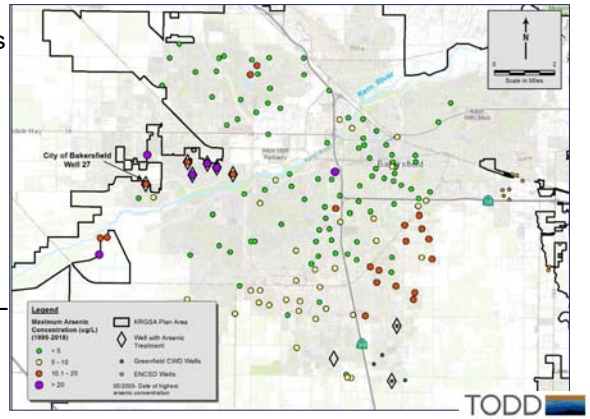
- Línea de base: uso actual de la tierra y suministro y demanda de agua proyectada
- Escenario de cambio climático 2030 con mayor demanda agrícola y menor oferta
- Escenario de cambio climático 2070 con mayor aumento de la demanda y disminución de la oferta



TODD GROUNDWATER

Constituyente de Preocupación - Arsénico

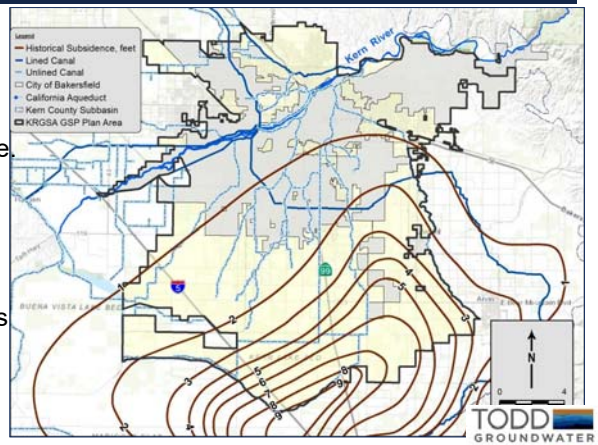
- Centrarse en los componentes afectados por las acciones de manejo.
- Las concentraciones de arsénico aumentan con la disminución de los niveles de agua.
- Más de 25 pozos con detecciones superiores al MCL
- Problema generalizado en el área del plan



TODD GROUNDWATER

Subsidencia del Suelo e Infraestructura

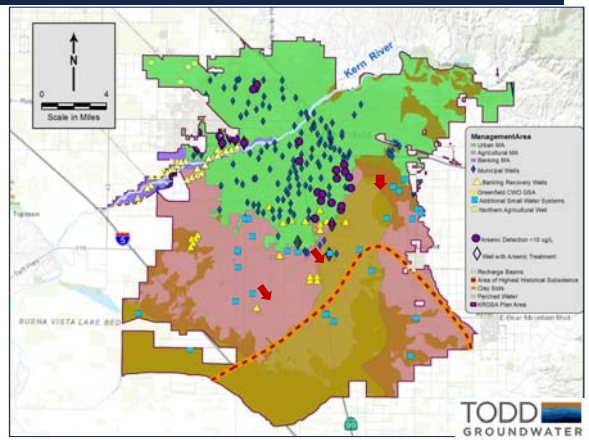
- La infraestructura crítica incluye tuberías, canales, servicios públicos, estructuras, pozos, transporte.
- Ningún daño a la infraestructura crítica en el área del plan identificado hasta la fecha
- Establecer umbrales mínimos para mitigar el hundimiento futuro



TODD GROUNDWATER

Consideraciones de Sostenibilidad

- WL debajo de pantallas en pozos municipales
- Déficits para los presupuestos de agua proyectados
- Arsénico en pozos municipales
- Capacidad de los bancos de pozos para recuperar agua
- Hundimiento histórico



TODD GROUNDWATER

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Sustainability Indicator and Minimum Threshold (MT)			
			Chronic Lowering of Water Levels	Reduction of Groundwater in Storage	Degraded Water Quality	Land Subsidence
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Historic Low WL	Historic Low WL	Historic Low WL	Historic Low WL
	Northwest corner	Transition to agricultural lands	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	50' below Historic Low WL
	North-Central	Greenfield CWD wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	10' below Historic Low WL
	Northwest	Agricultural and recovery wells	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	South and East	Subsidence potential	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	20' below Historic Low WL
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	20' below Historic Low WL	Not applicable	20' below Historic Low WL	50' below Historic Low WL
	Berrenda Mesa	KCWA operational area	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL
	COB 2800 Facility	City of Bakersfield municipal wells	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.
Measurable Objective (MO) for each sustainability indicator is the average of the MT and the historical high groundwater elevation during the historical Study Period.
Highlighted green cell indicates the controlling sustainability indicator(s) for that area in each MA.

- Los resultados indeseables se relacionan con bajos niveles históricos de agua; mantenga los pozos urbanos cerca de mínimos históricos.
- Permita flexibilidad operativa para que los pozos bancarios recuperen suministros críticos durante la sequía.

TODD GROUNDWATER

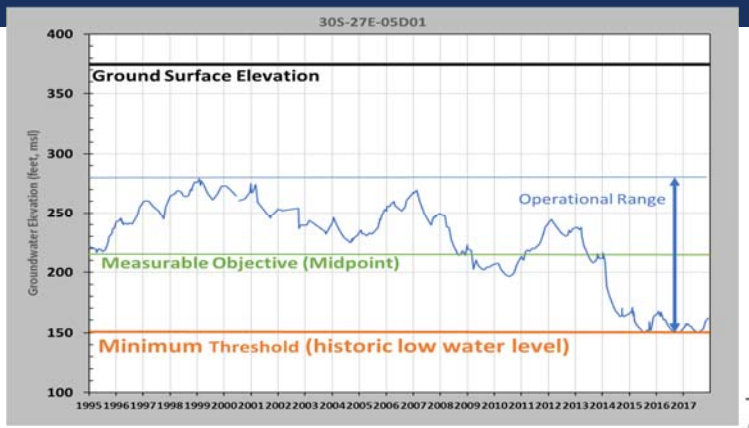
KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Undesirable Results for Controlling Sustainability Indicators			
			Controlling Indicator	Minimum Threshold (MT)	Percent of Wells <MT	Duration of MT Exceedance
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	Northwest corner	Transition to agricultural lands	Water Levels	20' below Historic Low WL	Any well	>3 Consecutive Months
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Water Levels/Quality	Historic Low WL	40% in Urban MA	>2 Consecutive Years
	North-Central	Greenfield CWD wells	Water Levels/Quality	Historic Low WL	Greenfield CWD MW	>2 Consecutive Years
	Northwest	Agricultural and recovery wells	Water Levels	50' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
	South and East	Subsidence potential	Subsidence	20' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	Water Levels/Quality	20' below Historic Low WL	Any well	>3 Consecutive Months
	Berrenda Mesa	KCWA operational area	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	COB 2800 Facility	City of Bakersfield municipal wells	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.

- Los objetivos medibles se seleccionan como punto medio para un rango operativo.
- Mantenga MTs y MOs SIMPLE para facilitar la gestión.
- Agregue el número de pozos y la duración para refinar la definición de resultados indeseables.

TODD GROUNDWATER

Asignación de MT, MO y Rango Operativo



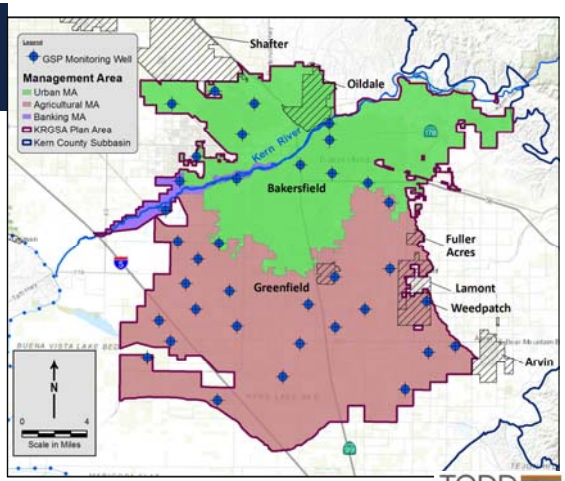
TODD GROUNDWATER

DISCUSIÓN: UMBRALES MÍNIMOS

- ¿Qué opinas sobre los umbrales mínimos propuestos?
- ¿Los umbrales mínimos propuestos evitan su definición de daño significativo e irrazonable?
- ¿Qué comentarios y / o recomendaciones le gustaría ofrecer?

Pozos Iniciales de Monitoreo del GSP

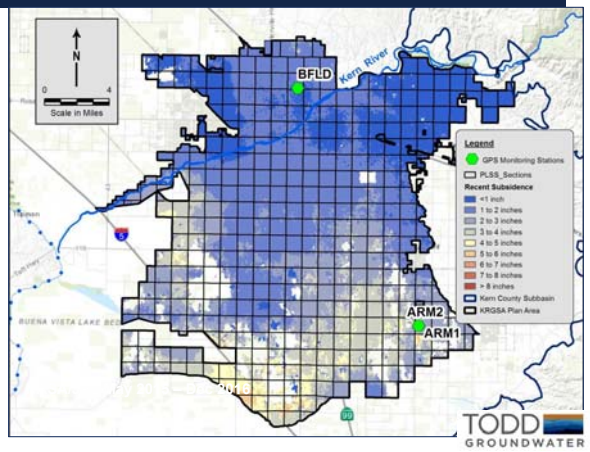
- 36 pozos identificados
- Actualmente monitoreado en otros programas:
  - Kern Fan Monitoring Comm.
  - Programa KCWA / ID4 WL
  - Pozos de monitoreo de la ciudad
  - Programas de monitoreo de KDWD
- Posible agregar más pozos



TODD GROUNDWATER

Monitoreo de Subsidencia de KRGSA

- Monitoreo del nivel del agua
- Tres estaciones de GPS para detección
- Datos de subsidencia de radar de DWR (cuadrículas de 1 milla)
- Se coordinará con otros GSA para el monitoreo regional



Proyectos Clave de Manejo

KDWD Plan de Asignación de Agua del Río Kern

- Optimiza la recarga del río Kern en el área sur del plan
- Reduce el bombeo de agua subterránea
- Permite el mantenimiento local de los niveles de agua
- EIR completado 2018 – iniciada la implementación

Uso conjunto optimizado de la ciudad de Bakersfield

- Prioriza el uso del agua del río Kern disponible de la ciudad para fluir en el río, recargar el acuífero y satisfacer las necesidades municipales
- Apoya una mayor disponibilidad de agua
- Permite reducir el bombeo municipal para evitar resultados no deseados
- Satisface los futuros déficits presupuestarios de agua proyectados para la demanda urbana

Distrito de servicios comunitarios de East Niles Consolidación de North Weedpatch Highway

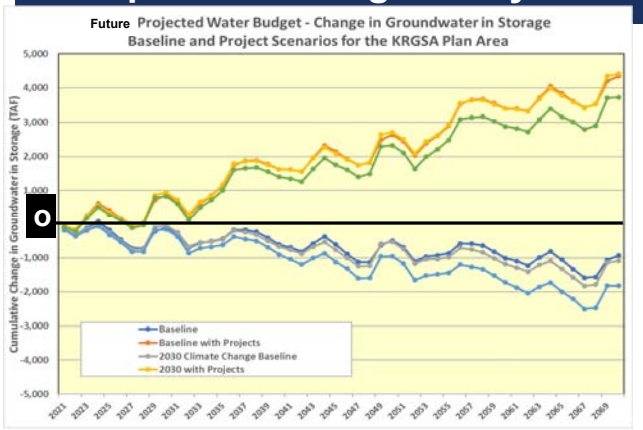
1,2,3-TCP Wellhead Treatment

- Consolidación de hasta seis pequeños sistemas de agua con ENCSD para abordar problemas de calidad del agua: nitrato, TCP y arsénico
- Conceder fondos a través del programa DWRSF
- Mejora la calidad del agua potable para comunidades desfavorecidas en KRGSA

Acciones de Manejo

- Plan de acción de 5 pasos si se exceden los umbrales mínimos
- Implemente una medición adecuada en todo el KRGSA
- Programa para reportar extracciones de agua subterránea en el KRGSA
- Conservar agua reciclada en el área del plan KRGSA
- Apoye Delta Conveyance para preservar suministros importados
- Incorporar estrategias de adaptación al cambio climático
- Mejorar programa de monitoreo
- Coordinar el análisis de la calidad del agua con los programas existentes.

Presupuestos de Agua Proyectados con Proyectos



Colectivamente, estos proyectos y acciones de gestión abordan los déficits de agua subterránea actuales y proyectados para lograr una gestión sostenible.

TODD GROUNDWATER

DISCUSIÓN: PROYECTOS Y ACCIONES DE MANEJO

- ¿Qué opina de los proyectos propuestos y las acciones de gestión?
- ¿Hay otros proyectos y / o acciones de gestión que le gustaría que GSA considere?

¿Que Viene Despues?

- Monitoreo e informes anuales a DWR
- Revise el plan cada 5 años e informe a DWR
- Seguir e implementar proyectos de recarga
- Colaborar con otras agencias reguladoras.
- Explore, decida y defina:
  - Métodos para asignar agua subterránea entre los usuarios.
  - Programa de asistencia para pozos de agua potable.
  - Financiamiento para la implementación del GSP

DISCUSIÓN: AVISO Y COMUNICACIÓN

- ¿Cómo le gustaría estar informado y comprometido?
- ¿Cuándo le gustaría estar informado y comprometido?

Período de Revisión de 90 Días y Divulgación

- Comunicación y divulgación con las partes interesadas para el aporte del GSP
- Alcance logrado en muchos niveles:
  - Reuniones y talleres de la junta de agencias
  - Reuniones comunitarias dirigidas
  - Coordinar con otros GSA en Open House
- GSP es un documento borrador y puede revisarse en función de los aportes:
  - Trabajando para mejorar el programa de monitoreo
  - Incorporar detalles sobre cómo se puede lograr la implementación del GSP
- KRGSA apoya los esfuerzos de colaboración y la coordinación interna para lograr una gestión sostenible de los recursos de agua subterránea compartidos de la Subcuenca.

Cómo Proporcionar Comentarios y Recomendaciones

- El GSP Preliminar está disponible en el sitio web de KRGSA en:

  www.kernrivergsa.org

- La audiencia pública para recibir comentarios sobre el GSP Preliminar está programada para el **5 de diciembre de 2019**

ASISTENCIA TÉCNICA PARA COMUNIDADES DE BAJOS RECURSOS

Self-Help Enterprises
- Alcance y educación
- Asistencia comunitaria directa
- Asistencia para el desarrollo del GSP

www.selfhelpenterprises.org

Eva Dominguez
(559) 802-1634 | EvaD@selfhelpenterprises.org

Item 7d

Kern River Community Groundwater Sustainability Plan Review Workshop – Bakersfield
October 15, 2019

SUMMARY

Event Details

Self-Help Enterprises (SHE) collaborated with the Kern River Groundwater Sustainability Agency (KRGSA) and Horizon Water and Environment (HWE) to present a workshop to review the KRGSA's Groundwater Sustainability Plan (GSP) with disadvantaged community leaders and representatives. Facilitators for the workshop were Eva Dominguez, representing SHE, and Ken Schwarz, representing HWE and KRGSA. The workshop took place at the Stan Keasling Community Room at the North Park Apartments in Bakersfield at 5:30 p.m. During sign-in and registration, each person was given a copy of the PowerPoint presentation and KRGSA factsheet.

Purpose of Workshop

The purpose of the workshop was to review the draft Groundwater Sustainability Plan (GSP) for the KRGSA region and discuss comments on the draft GSP provided by community residents. During the workshop, the topics discussed were Sustainability Goals, Management Areas, Minimum Thresholds, Measurable Objectives, Water Quality and Quantity, Projects and Management Actions, and Stakeholder Outreach and Communication. HWE presented the data provided by the engineering consultants for each of the topics, and SHE led the discussions for each topic.

Attendance

There were ten attendees in total at the meeting, including five KRGSA representatives. The remaining attendees included three representatives from the City of Bakersfield and two growers.

Summary

The presentation started with a brief overview of SGMA and a video from SHE titled "Rural Communities and the Sustainable Groundwater Management Act (SGMA)". HWE presented the basin setting data and information that led to the development of the Sustainability Goal. SHE presented the Sustainability Goal and led a discussion with participants about the goal. During this discussion, one participant requested that the GSA not restrict water usage and the acquisition of more surface water for the area. After this discussion, the Minimum Thresholds were presented, which prompted questions about how water levels would be measured and reported. There was a small discussion about the monitoring network. Projects and Management Actions were presented next, and many were concerned about potential effects of projects on farming activities, with some concerned about land fallowing and water use restrictions. The GSA representatives informed them that water use restrictions would only be implemented if the proposed projects and management actions were not effective in the near future. The workshop concluded with a short discussion on future communication between the KRGSA and

stakeholders. Participants recommended that the KRGSA take full use of their website to make it easier for stakeholders to comment and provide questions instead of holding meetings.

Attachments

Attachment A	Meeting Notes
Attachment B	Sign-In Sheet

Attachment A
MEETING NOTES

Sustainability Goals (SG)

- Farmer asked that they don't restrict watering or interfere with his wells and does not want wells to be taken away or be regulated
    - Does not see meters as bad, just shutting off water is bad
    - Wants to see more surface water from Sacramento and Northern California, where there is more and it can be used down in this area
- Resident wants that their comments get back to the State and legislators/politicians
    - Said he received a note that we need to put more pressure on the politicians to fix this issue

Significant and Unreasonable Harm

- Farmer requests that "predictable surface water" be added to the criteria

Minimum Thresholds

- How do the water levels get recorded through wells?
    - Answer: A monitoring network has been set up within the Kern River GSA boundaries, which will be presented in a few slides. The GSP needs to report an annual metering of active water wells that meet the minimum thresholds.
- By 2020, do we need to report what we are pumping?
    - Answer: The monitoring wells will be used to keep track of water levels. At the moment, individual pumping is not being recorded.
- Meters for wells, is there a specific kind to be implemented by agency or by farmer?
    - Answer: No specific kind of meter is specified at the moment

Projects and Management Actions

- Farmer has heard from Nicol's office that she wants to take a few acres of land to meet PM 2.8 standards
- Louis' article talked about the current accounts that are not at par for this planning
- Recharge projects: will they be done by district or by the grower?
    - Follow-up comment and question: What has been done was working with growers to do their own banking projects. Could that still be possible?

Communication

- It would be easier for folks to provide comments and questions online versus during a meeting
    - Meetings are mandated in the plan/by the act
    - A public hearing will be held on December 5, 2019 to discuss comments on the GSP

Attachment B

SIGN-IN SHEET

SIGN-IN SHEET
Event Name: Kern River GSA Groundwater Sustainability Plan Review Workshop
Date: Tuesday, October 15, 2019
Presenter(s): Eva Dominguez and Ken Schwarz (consultant)

	Name / Nombre	Organization or Community / Organización o Comunidad	Email Address / Correo Electrónico	Phone / Teléfono	Would you like to be notified of future meetings? / ¿Desea que le avisemos sobre futuras juntas?
1	Steve Teglia	Kern Delta WD	steven@kerndelta.org		
2	Kris Bydalek	City of Bakersfield	KBydalek@bakersfieldcity.us	661-326-3002	
3	Kristin Pittnick	City of Bakersfield	kpittnick@bakersfieldcity.us	(661)-326-3644	
4	KEVIN F COYLE	City of Bakersfield	KCoyle@bakersfieldcity.us	661-326-3681	Yes, please
5	Jana Marquez	Kern Delta WD	jana@kerndelta.org	661 834 4656	
6	JOHN ALLEN	JOHN ALLEN FARMS INC	allenalmonds@gmail.com	6661.332.2838	
7	Jane Lundquist	Kern County WA/ID-4	gslundquist@icloud.com	661.343.7192	
8	Chris Bellue	KDWD	Chris@Kerndelta.org	834-4656	
9	Lindsay Cederquist	Maricopa Orchards	lindsay.cederquist@maricopaorchards.com	661-704-7341	Yes
10	Jeevan Muhar	Arvin-Edison WSD	jmuhar@aewsd.org	661-854-5573	Yes
11					
12					
13					
14					
15					

Item 8a

Kern River Groundwater Sustainability Agency (GSA)

GROUNDWATER SUSTAINABILITY PLAN (GSP) REVIEW WORKSHOP

To comply with the Sustainable Groundwater Management Act (SGMA), the Kern River GSA developed a Groundwater Sustainability Plan (GSP) that will serve as a roadmap for how groundwater will be sustainably managed for years to come.

The draft GSP is now available for a 90-day public review period that will end on November 27, 2019. The Kern River GSA will host two workshops to review the plan and allow members of the local community to provide comments. **These workshops will discuss important issues that can affect the water you use in your home. Your comments on this plan are vital to helping address water quality and water supply challenges in your community.**

DISCUSSION TOPICS:

- What is the Sustainable Groundwater Management Act (SGMA)?
- Your local Groundwater Sustainability Agency (GSA)
- How can SGMA affect me and my community?
- **Review the Groundwater Sustainability Plan**

Workshop #1:
Date: Tuesday, October 15, 2019
Time: 5:30 – 7:30 p.m.
Location: Stan Keasling Community Room
601 Douglas St.
Bakersfield, CA 93308

Workshop #2:
Date: Wednesday, November 6, 2019
Time: 5:30 – 7:30 p.m.
Location: David Head Center
10300 San Diego St.
Lamont, CA 93241

Community residents, private well owners, residents on community water systems, and water and school board members are encouraged to attend.

Spanish translation service is available.

To RSVP for either workshop (not required), please visit http://bit.ly/KRGSAReview or contact Eva Dominguez at (559) 802-1634 or EvaD@SelfHelpEnterpises.org.

KERN RIVER GROUNDWATER SUSTAINABILITY AGENCY

Agencia de Sostenibilidad de Agua Subterránea (GSA) Kern River

TALLER PARA EVALUAR EL PLAN DE SOSTENIBILIDAD DEL AGUA SUBTERRÁNEA (GSP)

Para cumplir con la Ley de Manejo Sostenible de Agua Subterránea (SGMA), Kern River GSA desarrolló un Plan de Sostenibilidad de Agua Subterránea (SGP) que servirá como una hoja de ruta sobre cómo las aguas subterráneas se manejarán de manera sostenible en los próximos años.

El GSP preliminar ya está disponible, y un período de revisión de 90 días finalizará el 27 de noviembre de 2019. Kern River GSA organizará dos talleres para revisar el plan y permitir que miembros de las comunidad local hagan comentarios. **Estos talleres discutirán temas importantes que pueden afectar el agua que usa en su hogar. Sus comentarios sobre este plan son vitales para ayudar a abordar la calidad del agua y los desafíos del suministro de agua en su comunidad.**

TEMAS DE DISCUSIÓN:

- ¿Qué es la Ley del Manejo Sostenible del Agua Subterránea (SGMA)?
- Su Agencia de Sostenibilidad del Agua Subterránea (GSA) local
- ¿Cómo puede afectar SGMA a mi y a mi comunidad?
- **Revise el Plan de Sostenibilidad del Agua Subterránea**

Taller #1:
Fecha: Martes, 15 de octubre 2019
Tiempo: 5:30 – 7:30 p.m.
Ubicación: Stan Keasling Community Room
601 Douglas St.
Bakersfield, CA 93308

Taller #2:
Fecha: Miercoles, 6 de noviembre 2019
Tiempo: 5:30 – 7:30 p.m.
Ubicación: David Head Center
10300 San Diego St.
Lamont, CA 93241

Se alienta a los residentes de la comunidad, propietarios de pozos privados, residentes de los sistemas de agua de la comunidad y miembros de la junta de agua y escuela a asistir.

Servicio de traducción al español está disponible.

Para confirmar su asistencia en cualquiera de los talleres (no requerido), visite http://bit.ly/KRGSAReview o comuníquese con Eva Domínguez al (559) 802-1634 o EvaD@SelfHelpEnterpises.org.

KERN RIVER GROUNDWATER SUSTAINABILITY AGENCY

Kern River GSA – Groundwater Sustainability Plan (GSP)
Review Workshop

Detailed Agenda

October 15, 2019 and November 6, 2019

5:30 – 5:35 p.m.	Welcome and Introduction (GSA Representative)
5:35 – 5:45 p.m.	SGMA Overview (SHE) • What is the Sustainable Groundwater Management Act (SGMA)? • SGMA Video*: SGMA and Groundwater Users Working Together* • Your local Groundwater Sustainability Agency (GSA)
5:45 – 6:30 p.m.	Draft GSP Review (Horizon and SHE) • GSP Part A: Review and discuss groundwater conditions and sustainability goal(s) • GSP Part B: Review and discuss sustainable management criteria for groundwater levels and groundwater quality • GSP Part C: Review and discuss proposed KRGSA projects and management actions
6:30 – 6:45 p.m.	GSP Part D: Notice and Communication (SHE) Discussion: Are there additional approaches the KRGSA should include in the GSP to support providing community information and engagement
6:45 – 7:00 p.m.	Closing (SHE) • How to provide comments and recommendations (Horizon) • Technical Assistance for disadvantaged communities • Evaluation

Kern River Groundwater Sustainability Agency

Groundwater Sustainability Plan (GSP) Review Workshop

November 6, 2019

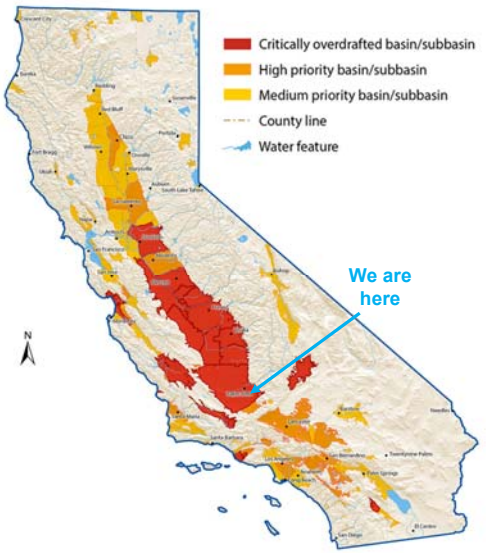
KRGSA

WORKSHOP OVERVIEW

- SGMA Overview
- Draft Groundwater Sustainability Plan Review
  - Part A: Groundwater Conditions & Sustainability Goal(s)
  - Part B: Sustainable Management Criteria for Groundwater Levels and Quality
  - Part C: Projects and Management Actions
  - Part D: Notice and Communication
- How to Provide Comments and Recommendations / Available Technical Assistance

GROUNDWATER MATTERS IN CALIFORNIA, PARTICULARLY IN THE CENTRAL VALLEY

WATER IS LIFE



Overdraft:

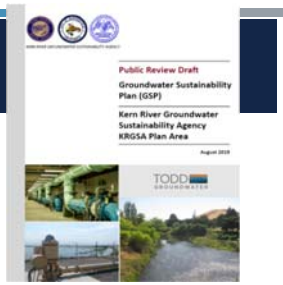
The Kern County Subbasin has been pumping more groundwater than what is being replenished back into the ground.

- Lowering of groundwater levels
- Dry wells and well failures
- Degradation of water quality
- Sinking land (subsidence)

Sustainable Groundwater Management Act (SGMA) Requirements

SGMA Video

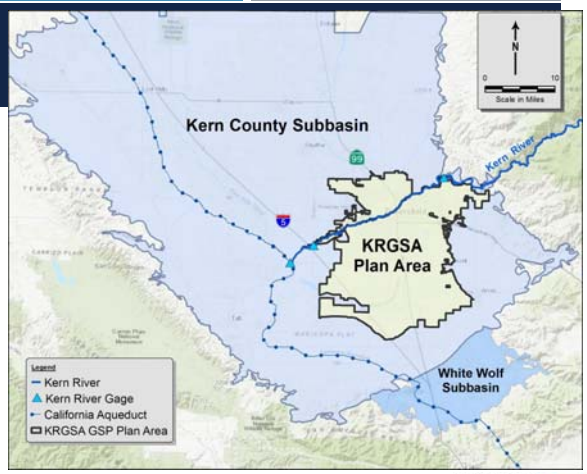
KRGSA Groundwater Sustainability Plan (GSP) Organization



1 Administrative Information
2 Plan Area
3 HCM/Groundwater Conditions
4 Water Budgets
5 Sustainable Management Criteria
6 Monitoring Networks
7 Projects and Management Actions
8 Implementation Plan
9 References and Technical Studies

KRGSA GSP Plan Area

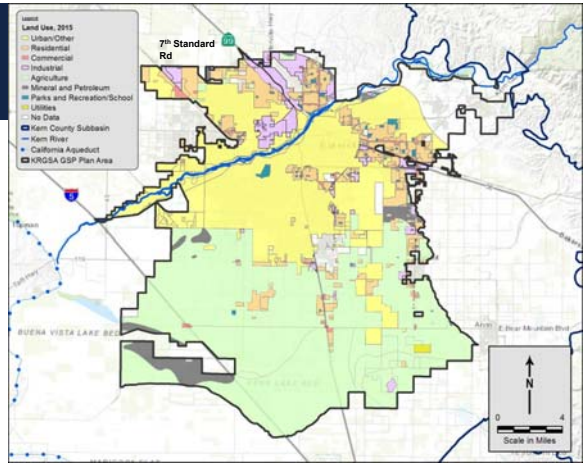
- 361 square miles
- 13% of the Kern County Subbasin
- Composed of:
  - City of Bakersfield
  - Kern County Water Agency Improvement District No. 4 (ID4)
  - Kern Delta Water District (KDWD)
  - Additional smaller agencies



TODD GROUNDWATER

Land Use in the KRGSA Plan Area

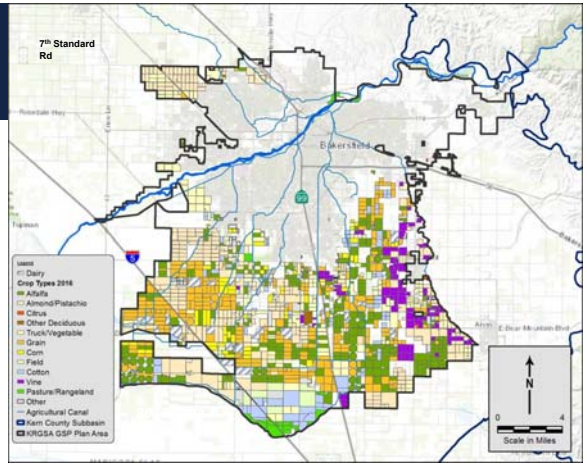
- North – Urban
- South – Agricultural
- 2015 Land Use
  - 41% - Agricultural
  - 33% - Urban
  - 26% - Undeveloped



TODD GROUNDWATER

Agricultural Lands in the KRGSA

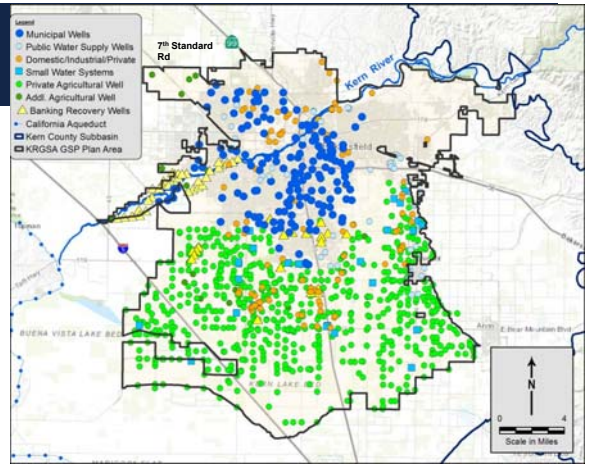
- 90,000 acres irrigated agriculture in southern Plan Area
- 16,000 acres irrigated lands in northern Plan Area
- 20 Dairies in southern Plan Area



TODD GROUNDWATER

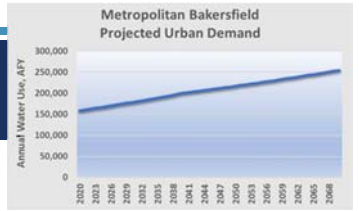
Active Wells in the KRGSA

- 162 Municipal wells
- 67 Public Supply and Small Water System wells
- 151 Industrial, Domestic, and other Private wells
- 642 Agricultural wells
- 54 Banking recovery wells



TODD GROUNDWATER

Projected - Future Deficits



- Increase urban demand
- Decrease SWP supply
- Increase agricultural demand

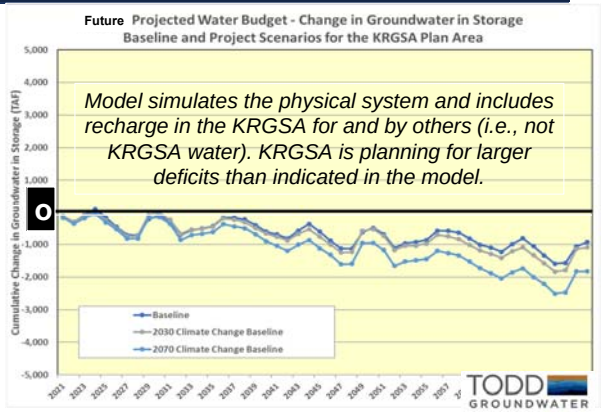
Note - Historical Adjusted deficit of -29,000 AFY

Water Budget Component	Historical Average Annual Amounts (AFY)	Baseline Conditions (AFY)	2030 Climate Change Conditions (AFY)	2070 Climate Change Conditions (AFY)
SWP[1] – ID4	74,035	52,758	51,182	48,759
SWP - KDWD	18,655	15,765	15,294	14,537
TOTAL SWP	92,690	68,523	66,476	63,296
Net decrease in SWP from historical:		**24,167**	**26,214**	**29,394**
Agriculture Demand	261,019	261,019	271,460	281,460
Urban Demand[2]	167,970	182,290	178,115	254,117
TOTAL DEMAND	428,989	443,309	449,575	535,577
Net increase in demand from historical:		**14,320**	**20,586**	**106,588**
Potential Future Water Budget Deficits:		**-38,487**	**-46,800**	**-135,982**

TODD GROUNDWATER

Projected Water Budgets – Using Models to Estimate Future Conditions

- Baseline - current land use and projected water supply and demand
- 2030 Climate Change Scenario with increased agricultural demand and decreased supply
- 2070 Climate Change Scenario with further increase in demand and decrease in supply



KRGSA Sustainability Goal

Manage groundwater resources sustainably in the KRGSA Plan Area to:

- support **current and future beneficial uses of groundwater** including municipal, agricultural, industrial, domestic, public supply, and environmental uses
- **optimize conjunctive use** of surface water and groundwater
- **avoid or eliminate undesirable results** over the implementation and planning horizon.

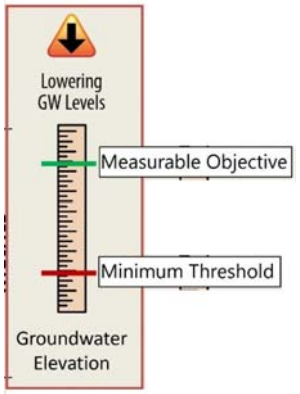
DISCUSSION: SUSTAINABILITY GOAL

- How would you like to see groundwater improve over the next twenty years?
- What would you like to avoid?
- Does the proposed goal reflect your priorities and objectives?
- What comments and/or recommendations would you like to offer?

Significant and Unreasonable Harm

Two key terms: Measurable Objectives and Minimum Thresholds

- **Measurable Objectives** are aspirational goals.
- **Minimum Thresholds** are like failure points and should be avoided.



Sustainability Indicators

- Chronic lowering of water levels
- Reduction of groundwater storage
- Degradation of water quality caused by management actions
- Land subsidence affecting land use
- Depletion of interconnected surface water affecting beneficial use

If a sustainability indicator is determined to be significant and unreasonable, then it is an Undesirable Result.

TODD GROUNDWATER

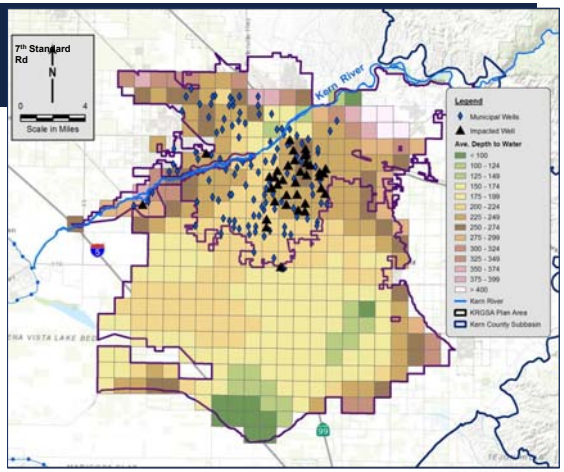
Chronic Lowering of Water Levels

- Undesirable result: when a significant lowering of water level occurs that limits the beneficial use and access to groundwater by overlying users.
- Impacts focus on groundwater wells
- Balancing needs:
  - Municipal wells maintain higher water levels
  - Irrigation and banking wells – lower water levels to provide critical supplies during multi-year droughts.

TODD GROUNDWATER

Historic Low WL Impacts to Wells

- Comparing depth to water and top of municipal well screens
- 2015 - water levels were below the top of screens in more than 40 municipal wells
- Costly to lower pumps, take wells offline, secure other water supplies



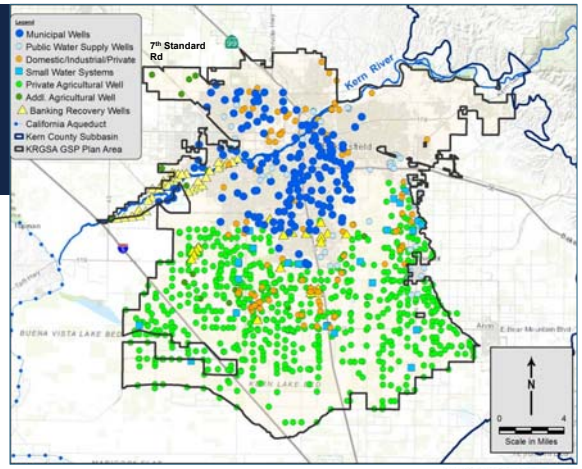
TODD GROUNDWATER

Concentrated Pumping in Ag and Banking Wells

~ 150 municipal wells

~ 50 banking recovery wells

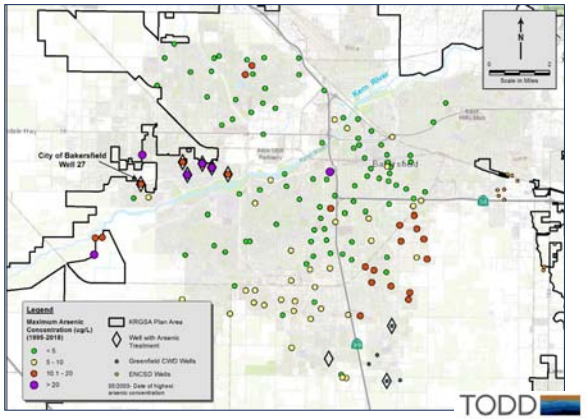
~ 642 Agricultural wells



TODD GROUNDWATER

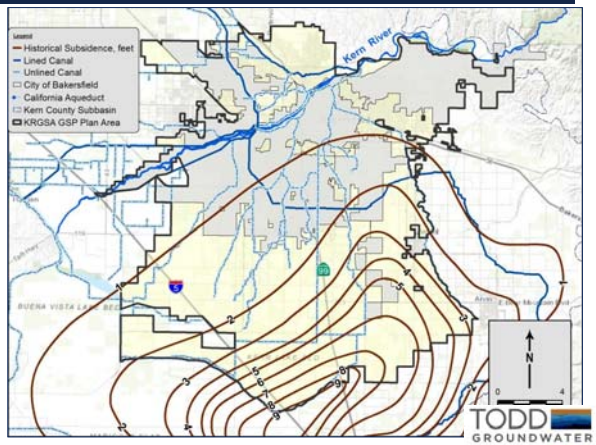
Constituent of Concern - Arsenic

- Focus on constituents affected by management actions
- Arsenic concentrations increase with declining water levels
- More than 25 wells with detections above the MCL
- Widespread issue in the Plan Area



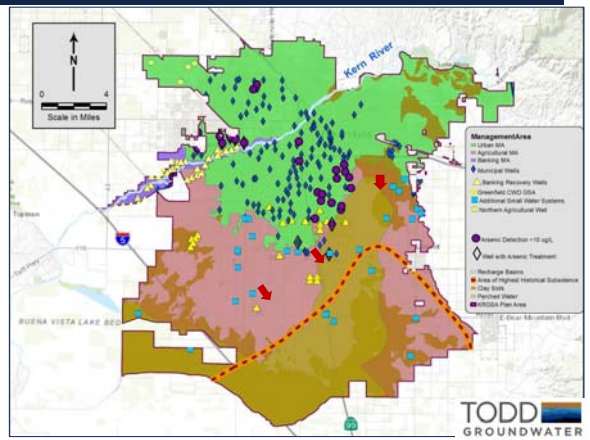
Land Subsidence and Infrastructure

- Critical infrastructure includes pipelines, canals, utilities, structures, wells, transportation
- No damage to critical infrastructure in the Plan Area identified to date
- Set minimum thresholds to mitigate future subsidence



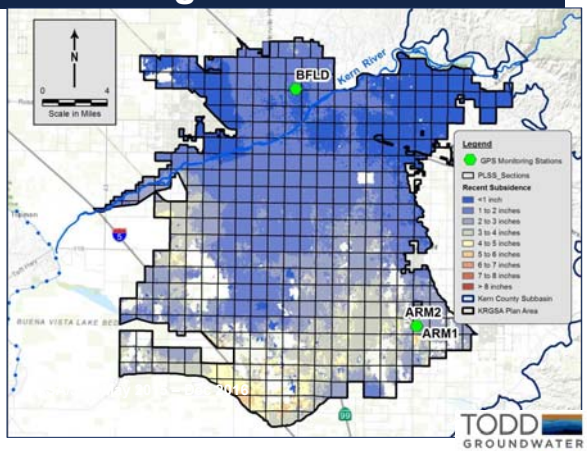
Sustainability Considerations

- WL below screens in municipal wells
- Deficits for projected water budgets
- Arsenic in municipal wells
- Ability of banking wells to recover water
- Historical subsidence



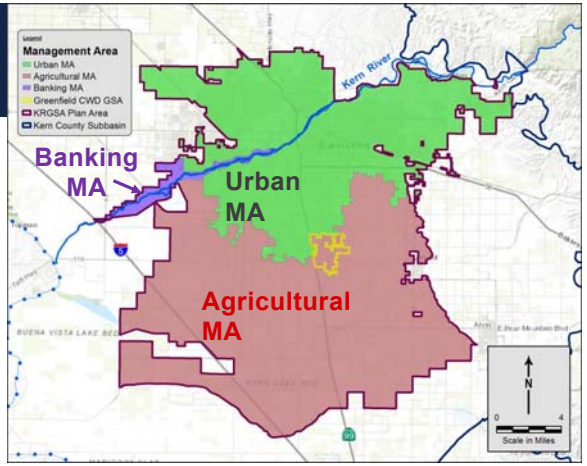
KRGSA Subsidence Monitoring

- Water level monitoring
- Three GPS stations for screening
- Radar subsidence data from DWR (1-mile grids)
- Will coordinate with other GSAs for regional monitoring



Preliminary Management Areas

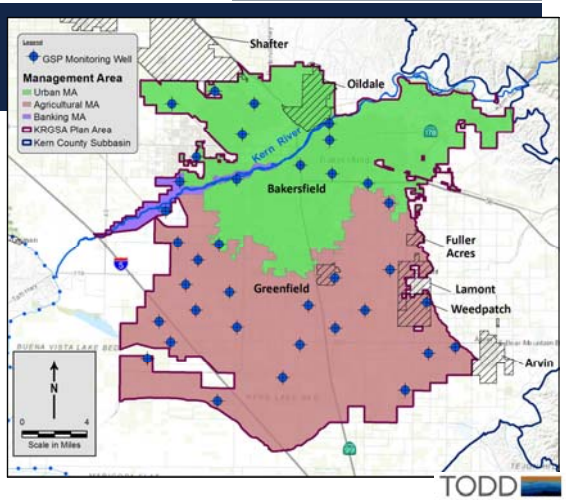
- Based on land use and well use
  - Urban MA – 41%
  - Agricultural MA – 57%
  - Banking – 2%



TODD GROUNDWATER

Initial GSP Monitoring Wells

- 36 wells identified
- Currently monitored in other programs:
  - Kern Fan Monitoring Comm.
  - KCWA/ID4 WL Program
  - City Monitoring Wells
  - KDWD Monitoring Programs
- Possible to add more wells



TODD GROUNDWATER

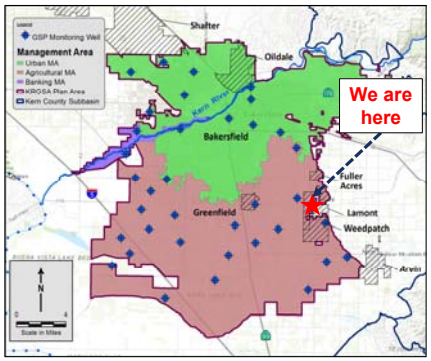
Approach to Minimum Thresholds

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Sustainability Indicator and Minimum Threshold (MT)			
			Chronic Lowering of Water Levels	Reduction of Groundwater in Storage	Degraded Water Quality	Land Subsidence
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Historic Low WL	Historic Low WL	Historic Low WL	Historic Low WL
	Northwest corner	Transition to agricultural lands	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	50' below Historic Low WL
	North-Central	Greenfield CWD wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	10' below Historic Low WL
	Northwest	Agricultural and recovery wells	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	South and East	Subsidence potential	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	20' below Historic Low WL
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	20' below Historic Low WL	Not applicable	20' below Historic Low WL	50' below Historic Low WL
	Berrenda Mesa	KCWA operational area	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL
	COB 2800 Facility	City of Bakersfield municipal wells	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.
Measurable Objective (MO) for each sustainability indicator is the average of the MT and the historical high groundwater elevation during the historical Study Period.
Highlighted green cell indicates the controlling sustainability indicator(s) for that area in each MA.

- Undesirable results relate to historic low water levels; keep urban wells near historic lows.
- Allow operational flexibility for banking wells to recover critical supplies during drought.

TODD GROUNDWATER



Chronic Lowering of Water Levels	Reduction of Groundwater in Storage
Historic Low Water Level	50' below Historic Low Water Level
Degraded Water Quality	Land Subsidence
Historic Low Water Level	50' below Historic Low Water Level

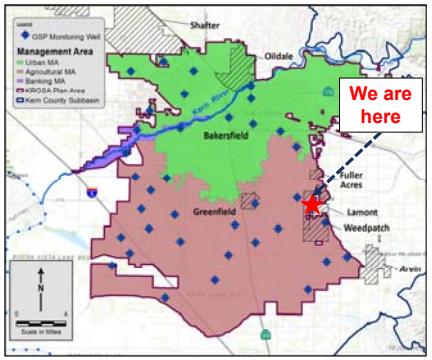
Approach to Minimum Thresholds

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Undesirable Results for Controlling Sustainability Indicators			
			Controlling Indicator	Minimum Threshold (MT)	Percent of Wells <MT	Duration of MT Exceedance
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	Northwest corner	Transition to agricultural lands	Water Levels	20' below Historic Low WL	Any well	>3 Consecutive Months
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Water Levels/Quality	Historic Low WL	40% in Urban MA	>2 Consecutive Years
	North-Central	Greenfield CWD wells	Water Levels/Quality	Historic Low WL	Greenfield CWD MW	>2 Consecutive Years
	Northwest	Agricultural and recovery wells	Water Levels	50' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
	South and East	Subsidence potential	Subsidence	20' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	Water Levels/Quality	20' below Historic Low WL	Any well	>3 Consecutive Months
	Berrenda Mesa	KCWA operational area	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	COB 2800 Facility	City of Bakersfield municipal wells	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.

- Measurable Objectives are selected as the midpoint for an operational range.
- Keep MTs and MOs SIMPLE to facilitate management.
- Add number of wells and duration to refine definition of undesirable results.

TODD GROUNDWATER



- E qpvtqmkpi"Kpflecvqt<"
- O kpko wo "Vjtgujqrf<"
- Rgtegpv"qh"Y gmu">O V<"
- F wtcvkqp"qh"O V"Gzeggfcpeg<"

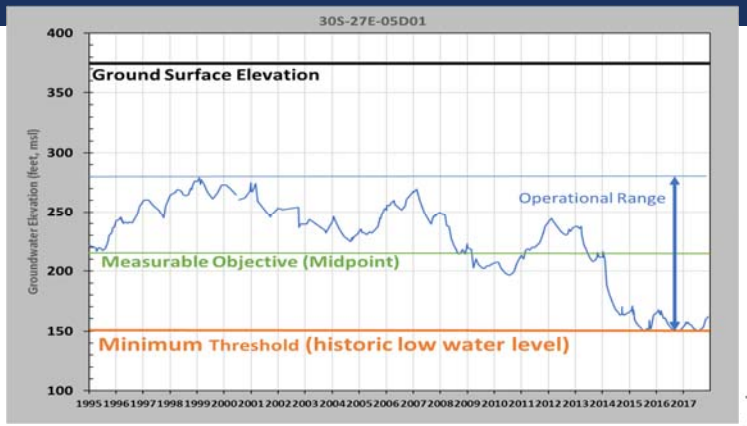
ED1

Local Definition of Undesirable Result:
40% of wells in the Urban MA exceed the Minimum Threshold for more than 2 years

Slide 30

ED1 Could you please verify that this is correct? Since it's in the Agricultural MA, I don't understand why the undesirable result would be defined by wells in the Urban MA.
Eva Dominguez, 10/30/2019

Assignment of MT, MO, and Operational Range



TODD GROUNDWATER

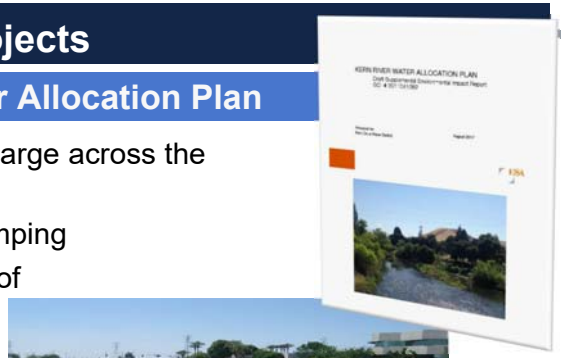
DISCUSSION: MINIMUM THRESHOLDS

- What do you think about the proposed minimum thresholds?
- Do the proposed minimum thresholds avoid your definition of significant and unreasonable harm?
- What comments and/or recommendations would you like to offer?

Key Management Projects

KDWD Kern River Water Allocation Plan

- Optimizes Kern River recharge across the southern Plan Area
- Reduces groundwater pumping
- Allows local maintenance of water levels
- EIR completed 2018 – implementation initiated



Key Management Projects

City of Bakersfield Optimized Conjunctive Use

- Prioritizes use of City's available Kern River water to flow in river, recharge aquifer, and support municipal needs
- Supports increased water availability
- Allows municipal pumping to be reduced to avoid undesirable results
- Meets future projected water budget deficits for urban demand

Key Management Projects

East Niles Community Services District North Weedpatch Highway Consolidation

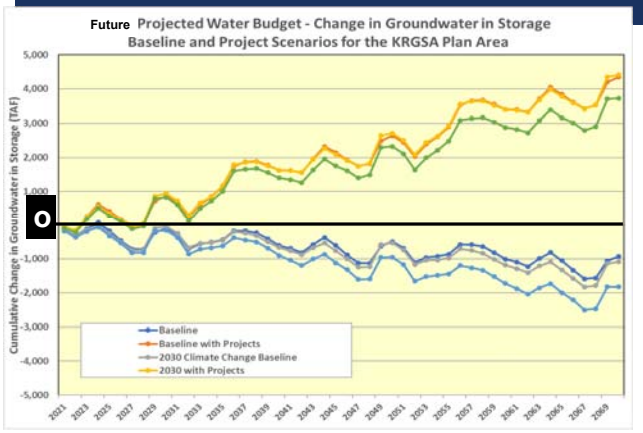
- Consolidation of up to six small water systems with ENCSD to address water quality concerns: nitrate, TCP, and arsenic
- Grant funding through the DWRSF program
- Improves drinking water quality for disadvantaged communities in the KRGSA

1,2,3-TCP Wellhead Treatment

Management Actions

- 5-Step Action Plan if Minimum Thresholds are exceeded
- Implement well metering throughout the KRGSA
- Program for reporting groundwater extractions in the KRGSA
- Conserve recycled water in the KRGSA Plan Area
- Support Delta Conveyance to preserve imported supplies
- Incorporate Climate Change Adaptation Strategies
- Improve monitoring program
- Coordinate water quality analysis with existing programs

Projected Water Budgets with Projects



Collectively, these projects and management actions address current and projected groundwater deficits to achieve sustainable management.

TODD GROUNDWATER

DISCUSSION: PROJECTS AND MANAGEMENT ACTIONS

- What do you think of the proposed projects and management actions?
- Are there any other projects and/or management actions that you would like the GSA to consider?

What Comes Next?

- Monitoring and annual reporting to DWR
- Review Plan every 5 years and report to DWR
- Pursue and implement recharge projects
- Collaborate with other regulatory agencies
- Explore, decide, and define:
  - Methods to allocate groundwater among users
  - Assistance program for drinking water wells
  - Funding for GSP implementation

DISCUSSION: NOTICE AND COMMUNICATION

- How would you like to be informed and engaged?
- When would you like to be informed and engaged?

90-Day Review Period and Outreach

- Communication and outreach with Stakeholders for GSP input
- Outreach accomplished at many levels:
  - Agency Board Meetings and Workshops
  - Targeted community meetings
  - Coordinate with other GSAs on Open House
- GSP is a draft document and can be revised based on input:
  - Working to improve monitoring program
  - Incorporate details on how GSP implementation can be achieved
- KRGSA supports collaborative efforts and internal coordination to achieve sustainable management for the Subbasin's shared groundwater resources

How to Provide Comments and Recommendations

- The Draft GSP is available on the KRGSA website at:

  www.kernrivergsa.org

- Public Hearing to receive comments on the Draft GSP is scheduled for **December 5, 2019**

TECHNICAL ASSISTANCE FOR DISADVANTAGED COMMUNITIES

Self-Help Enterprises
- Outreach and Education
- Direct Community Assistance
- GSP Development Assistance

www.selfhelpenterprises.org

Eva Dominguez
(559) 802-1634 | EvaD@selfhelpenterprises.org

Agencia de Sostenibilidad del Agua Subterránea de Kern River

Taller de Revisión del Plan de Sostenibilidad del Agua Subterránea

6 de noviembre 2019

KRGSA

TALLER A LA VISTA

- Revision de SGMA
- Revisión del Plan de Sostenibilidad del Agua Subterránea Preliminar
  - Parte A: Condiciones del Agua Subterránea y Meta(s) de Sostenibilidad
  - Parte B: Criterios de Manejo Sostenible para los Niveles y la Calidad del Agua Subterránea
  - Parte C: Proyectos y Acciones de Manejo
  - Parte D: Aviso y Comunicación
- Cómo Proporcionar Comentarios y Recomendaciones / Asistencia Técnica Disponible

EL AGUA SUBTERRÁNEA CUENTA EN CALIFORNIA, PARTICULARMENTE EN EL VALLE CENTRAL

Sobre-Bombeo:

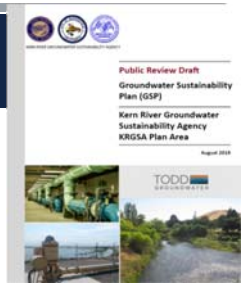
La subcuenca del condado de Kern ha estado bombeando más agua subterránea de la que se está reponiendo en el suelo.

- Disminución de los niveles de agua subterránea.
- Pozos secos y fallas de pozos
- Degradación de la calidad del agua.
- Tierra que se hunde (hundimiento)

Requisitos de la Ley de Manejo Sostenible del Agua Subterránea (SGMA)

UIOC'Xkfgq"

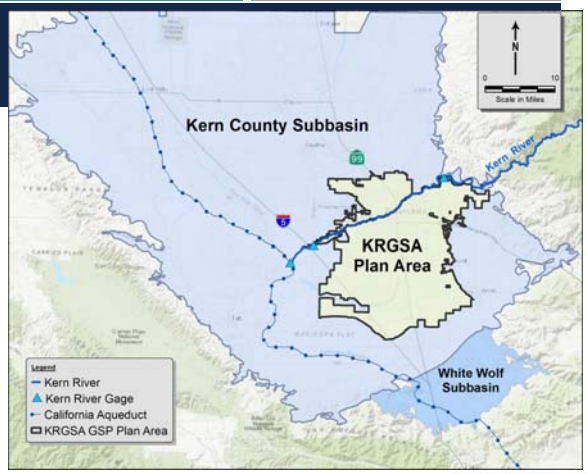
Organización del Plan de Sostenibilidad de Agua Subterránea (GSP) de KRGSA



1 Información administrativa
2 Área del plan
3 condiciones de HCM / agua subterránea
4 presupuestos de agua
5 Criterios de gestión sostenible
6 redes de monitoreo
7 proyectos y acciones de gestión
8 Plan de implementación
9 Referencias y estudios técnicos

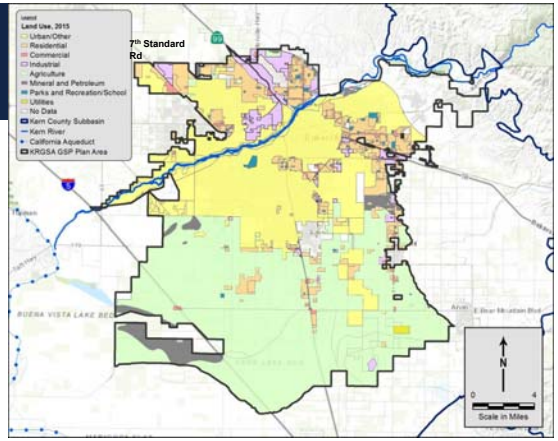
KRGSA GSP Área de Plan

- 361 millas cuadradas
- 13% de la subcuenca del condado de Kern
- Compuesto de:
  - Ciudad de Bakersfield
  - Distrito de Mejoramiento de la Agencia de Agua del Condado de Kern No. 4 (ID4)
  - Distrito del Agua del Delta de Kern (KDWD)
  - Agencias más pequeñas adicionales



Uso de la Tierra en el Área del Plan KRGSA

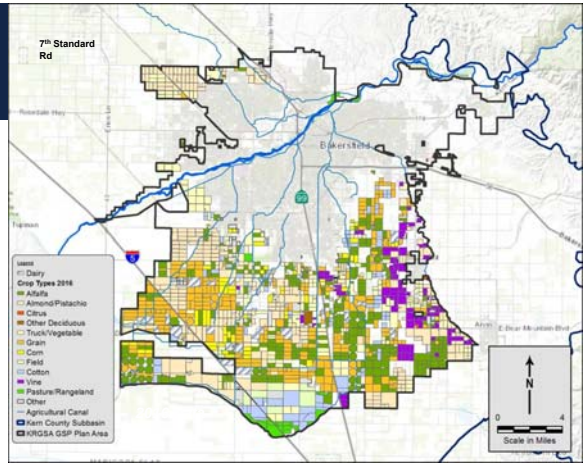
- Norte - Urbano
- Sur - Agrícola
- Uso de la Tierra 2015
  - 41% - Agrícola
  - 33% - Urbano
  - 26% - Sin desarrollar



TODD GROUNDWATER

Tierras agrícolas en el KRGSA

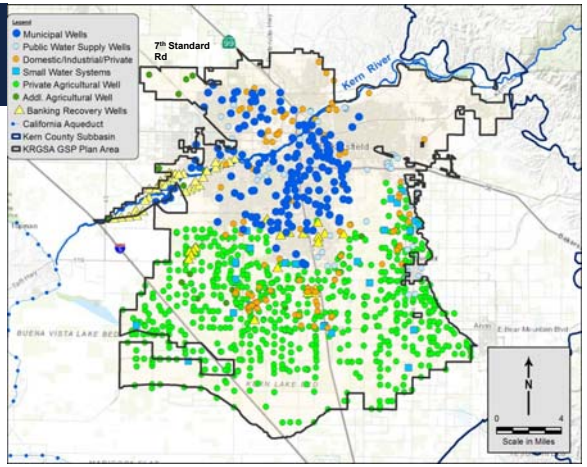
- 90,000 acres de agricultura irrigada en el Área del Plan sur
- 16,000 acres de tierras irrigadas en el área norte del Plan
- 20 lecherías en el área sur del plan



TODD GROUNDWATER

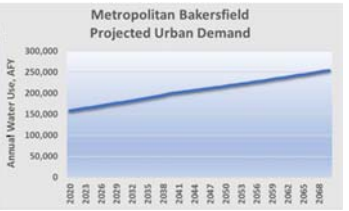
Pozos activos en el KRGSA

- 162 pozos municipales
- 67 pozos de suministro público y pequeños sistemas de agua
- 151 Pozos industriales, domésticos y otros pozos privados
- 642 pozos agrícolas
- 54 pozos de recuperación bancaria



TODD GROUNDWATER

Proyectado - Déficits Futuros



- Aumentar la demanda urbana.
- Disminuir el suministro de SWP
- Aumentar la demanda agrícola.

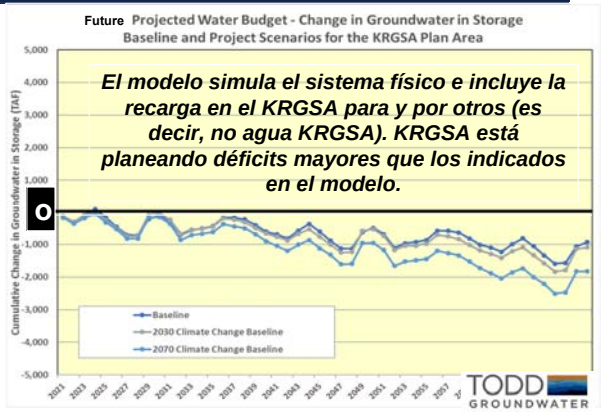
Water Budget Component	Historical Average Annual Amounts (AFY)	Baseline Conditions (AFY)	2030 Climate Change Conditions (AFY)	2070 Climate Change Conditions (AFY)
SWP[1] – ID4	74,035	52,758	51,182	48,759
SWP - KDWD	18,655	15,765	15,294	14,537
TOTAL SWP	92,690	68,523	66,476	63,296
Net decrease in SWP from historical:		**24,167**	**26,214**	**29,394**
Agriculture Demand	261,019	261,019	271,460	281,460
Urban Demand[2]	167,970	182,290	178,115	254,117
TOTAL DEMAND	428,989	443,309	449,575	535,577
Net increase in demand from historical:		**14,320**	**20,586**	**106,588**
Potential Future Water Budget Deficits:		**-38,487**	**-46,800**	**-135,982**

Nota - Déficit ajustado histórico de -29,000 AFY

TODD GROUNDWATER

Presupuestos de Agua Proyectados: Uso de Modelos para Estimar Condiciones Futuras

- Línea de base: uso actual de la tierra y suministro y demanda de agua proyectada
- Escenario de cambio climático 2030 con mayor demanda agrícola y menor oferta
- Escenario de cambio climático 2070 con mayor aumento de la demanda y disminución de la oferta



Meta de Sostenibilidad de KRGSA

Manejar los recursos de aguas subterráneas de manera sostenible en el Área del Plan KRGSA para:

- Apoyar los usos beneficiosos actuales y futuros del agua subterránea, incluidos los usos municipales, agrícolas, industriales, domésticos, públicos y ambientales.
- Optimizar el uso conjunto de las aguas superficiales y subterráneas
- Evitar o eliminar resultados no deseados en el horizonte de implementación y planificación.

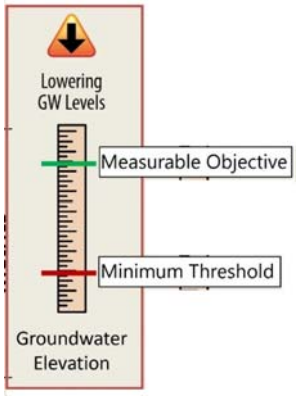
DISCUSIÓN: META DE SOSTENIBILIDAD

- ¿Cómo le gustaría ver mejorar las aguas subterráneas en los próximos veinte años?
- ¿Qué te gustaría evitar?
- ¿La meta propuesta refleja sus prioridades y objetivos?
- ¿Qué comentarios y / o recomendaciones le gustaría ofrecer?

Daño Significativo e Irracional

Dos términos clave: Objetivos Medibles y Umbrales Mínimos

- Los **Objetivos Medibles** son metas aspiracionales.
- Los **Umbrales Mínimos** son como puntos de falla y deben evitarse.



Indicadores de Sostenibilidad

- Reducción crónica de los niveles de agua
- Reducción del almacenamiento de agua subterránea
- Degradación de la calidad del agua causada por acciones de manejo
- Subsidencia de la tierra que afecta el uso de la tierra
- El agotamiento del agua superficial interconectada afecta el uso beneficioso

Si se determina que un indicador de sostenibilidad es significativo e irracional, entonces es un resultado indeseable.

TODD GROUNDWATER

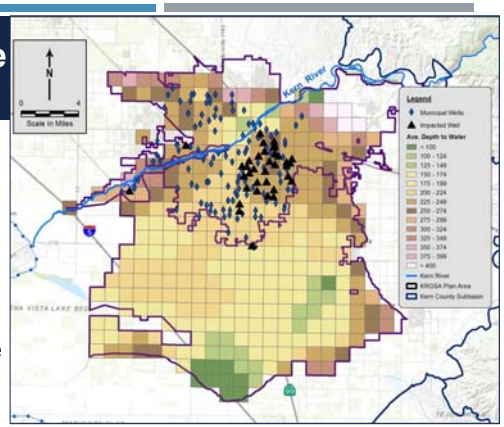
Reducción crónica de los niveles de agua

- Resultado no deseado: cuando ocurre una disminución significativa del nivel del agua que limita el uso beneficioso y el acceso al agua subterránea por parte de los usuarios suprayacentes.
- Los impactos se centran en los pozos de agua subterránea
- Necesidades de equilibrio:
  - Los pozos municipales mantienen niveles de agua más altos
  - Pozos de riego y bancos: reducen los niveles de agua para proporcionar suministros críticos durante las sequías de varios años.

TODD GROUNDWATER

Impactos históricos de bajo WL a los pozos

- Comparación de la profundidad con el agua y la parte superior de las pantallas de los pozos municipales
- 2015 - los niveles de agua estuvieron por debajo de la parte superior de las pantallas en más de 40 pozos municipales
- Es costoso bajar las bombas, desconectar los pozos, asegurar otros suministros de agua.



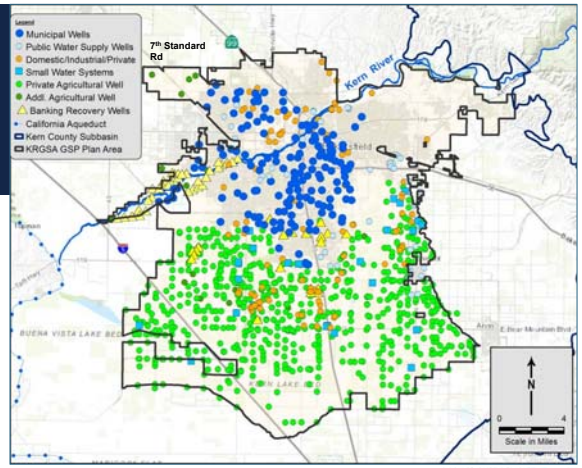
TODD GROUNDWATER

Bombeo concentrado en pozos agrícolas y bancarios

~ 150 pozos municipales

~ 50 pozos de recuperación bancaria

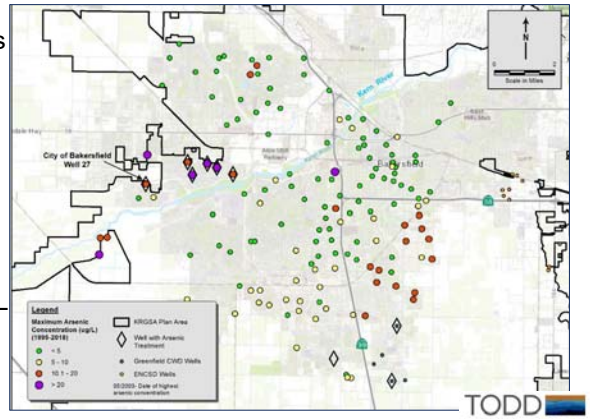
~ 642 pozos agrícolas



TODD GROUNDWATER

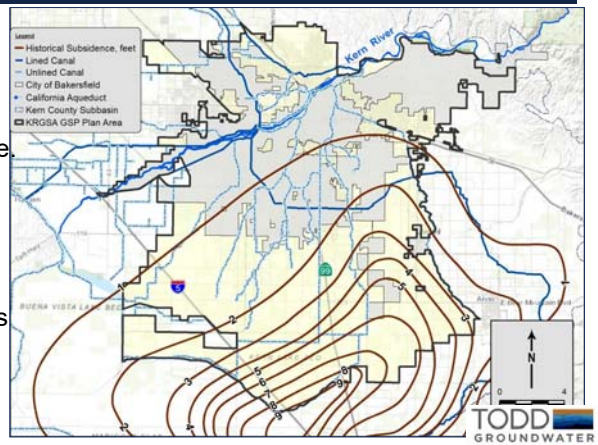
Constituyente de Preocupación - Arsénico

- Centrarse en los componentes afectados por las acciones de manejo.
- Las concentraciones de arsénico aumentan con la disminución de los niveles de agua.
- Más de 25 pozos con detecciones superiores al MCL
- Problema generalizado en el área del plan



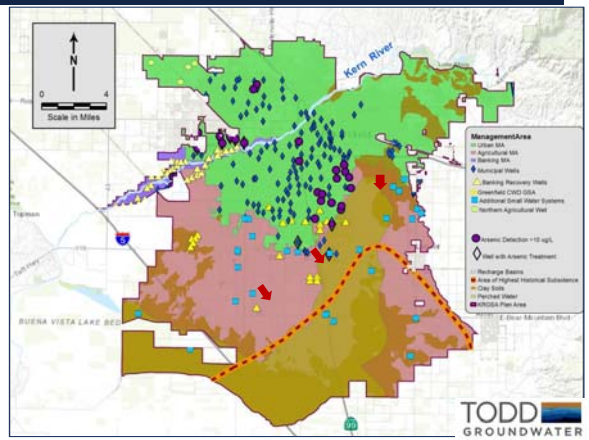
Subsidencia del Suelo e Infraestructura

- La infraestructura crítica incluye tuberías, canales, servicios públicos, estructuras, pozos, transporte.
- Ningún daño a la infraestructura crítica en el área del plan identificado hasta la fecha
- Establecer umbrales mínimos para mitigar el hundimiento futuro



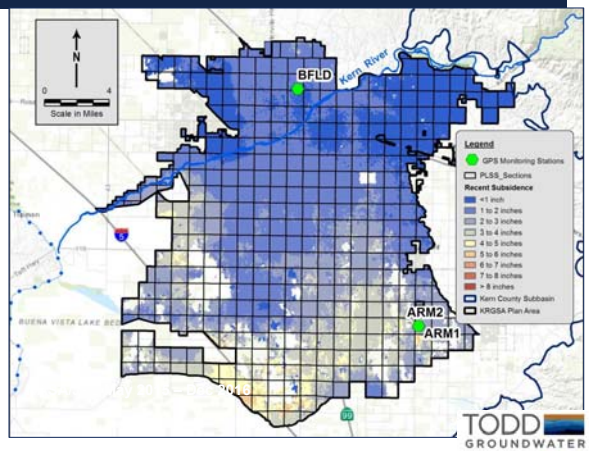
Consideraciones de Sostenibilidad

- WL debajo de pantallas en pozos municipales
- Déficits para los presupuestos de agua proyectados
- Arsénico en pozos municipales
- Capacidad de los bancos de pozos para recuperar agua
- Hundimiento histórico



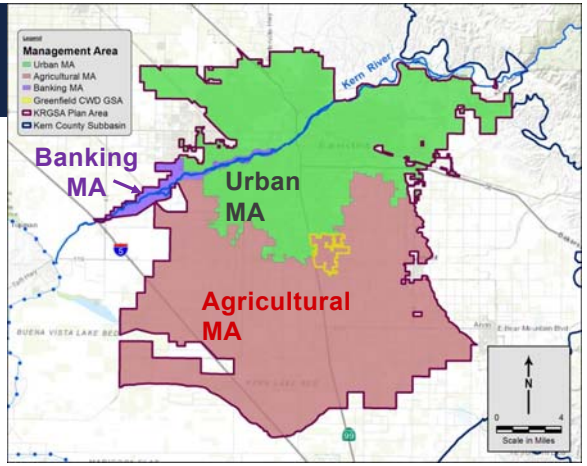
Monitoreo de Subsidencia de KRGSA

- Monitoreo del nivel del agua
- Tres estaciones de GPS para detección
- Datos de subsidencia de radar de DWR (cuadrículas de 1 milla)
- Se coordinará con otros GSA para el monitoreo regional



Áreas Preliminares de Manejo

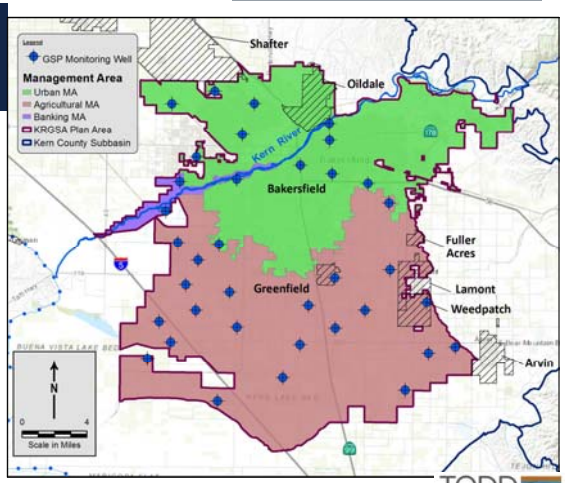
- Basado en el uso de la tierra y uso de los pozos
  - MA urbana - 41%
  - MA agrícola - 57%
  - Banca - 2%



TODD GROUNDWATER

Pozos Iniciales de Monitoreo del GSP

- 36 pozos identificados
- Actualmente monitoreado en otros programas:
  - Kern Fan Monitoring Comm.
  - Programa KCWA / ID4 WL
  - Pozos de monitoreo de la ciudad
  - Programas de monitoreo de KDWD
- Posible agregar más pozos



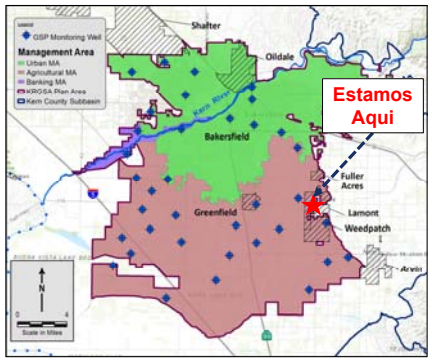
TODD GROUNDWATER

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Sustainability Indicator and Minimum Threshold (MT)			
			Chronic Lowering of Water Levels	Reduction of Groundwater in Storage	Degraded Water Quality	Land Subsidence
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Historic Low WL	Historic Low WL	Historic Low WL	Historic Low WL
	Northwest corner	Transition to agricultural lands	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	50' below Historic Low WL
	North-Central	Greenfield CWD wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	10' below Historic Low WL
	Northwest	Agricultural and recovery wells	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	South and East	Subsidence potential	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	20' below Historic Low WL
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	20' below Historic Low WL	Not applicable	20' below Historic Low WL	50' below Historic Low WL
	Berrenda Mesa	KCWA operational area	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL
	COB 2800 Facility	City of Bakersfield municipal wells	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.
Measurable Objective (MO) for each sustainability indicator is the average of the MT and the historical high groundwater elevation during the historical Study Period.
Highlighted green cell indicates the controlling sustainability indicator(s) for that area in each MA.

- Los resultados indeseables se relacionan con bajos niveles históricos de agua; mantenga los pozos urbanos cerca de mínimos históricos.
- Permita flexibilidad operativa para que los pozos bancarios recuperen suministros críticos durante la sequía.

TODD GROUNDWATER



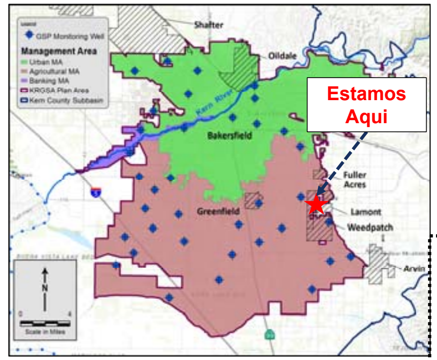
Descenso Crónico de los Niveles de Agua **Nivel bajo histórico del agua**	Reducción de Agua Subterránea en Almacenamiento **50' debajo del nivel bajo histórico del agua**
Calidad del Agua Degradada **Nivel bajo histórico del agua**	Hundimiento de la Tierra **50' debajo del nivel bajo histórico del agua**

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Undesirable Results for Controlling Sustainability Indicators			
			Controlling Indicator	Minimum Threshold (MT)	Percent of Wells <MT	Duration of MT Exceedance
KRGSA Urban MA	Central/South/Northeast	Municipal wellfields	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	Northwest corner	Transition to agricultural lands	Water Levels	20' below Historic Low WL	Any well	>3 Consecutive Months
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Water Levels/Quality	Historic Low WL	40% in Urban MA	>2 Consecutive Years
	North-Central	Greenfield CWD wells	Water Levels/Quality	Historic Low WL	Greenfield CWD MW	>2 Consecutive Years
	Northwest	Agricultural and recovery wells	Water Levels	50' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
	South and East	Subsidence potential	Subsidence	20' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	Water Levels/Quality	20' below Historic Low WL	Any well	>3 Consecutive Months
	Berrenda Mesa	KCWA operational area	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	COB 2800 Facility	City of Bakersfield municipal wells	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.

- Los objetivos medibles se seleccionan como punto medio para un rango operativo.
- Mantenga MTs y MOs SIMPLE para facilitar la gestión.
- Agregue el número de pozos y la duración para refinar la definición de resultados indeseables.

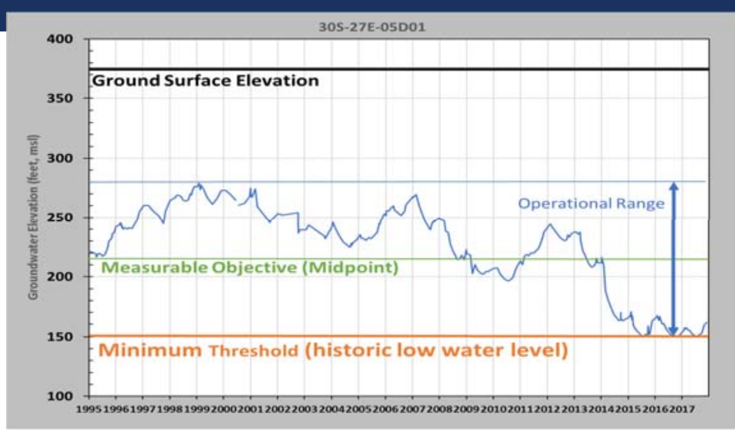
TODD GROUNDWATER



- Kpfkecfqt fg'Eqpvtqn<"
- Wodtcn'OÀpkoq<"
- Rqtegpvclg fg'Rq|qu >OV<"
- Fwtcekïp"fg"nc"Uwrgtcekïp'OV<"

Definición Local de Resultado Indeseable:
El 40% de los pozos en el MA urbano supera el umbral mínimo durante más de 2 años

Asignación de MT, MO y Rango Operativo



TODD GROUNDWATER

DISCUSIÓN: UMBRALES MÍNIMOS

- ¿Qué opinas sobre los umbrales mínimos propuestos?
- ¿Los umbrales mínimos propuestos evitan su definición de daño significativo e irrazonable?
- ¿Qué comentarios y / o recomendaciones le gustaría ofrecer?

Proyectos Clave de Manejo

KDWD Plan de Asignación de Agua del Río Kern

- Optimiza la recarga del río Kern en el área sur del plan
- Reduce el bombeo de agua subterránea
- Permite el mantenimiento local de los niveles de agua
- EIR completado 2018 – iniciada la implementación

Uso conjunto optimizado de la ciudad de Bakersfield

- Prioriza el uso del agua del río Kern disponible de la ciudad para fluir en el río, recargar el acuífero y satisfacer las necesidades municipales
- Apoya una mayor disponibilidad de agua
- Permite reducir el bombeo municipal para evitar resultados no deseados
- Satisface los futuros déficits presupuestarios de agua proyectados para la demanda urbana

Distrito de servicios comunitarios de East Niles Consolidación de North Weedpatch Highway

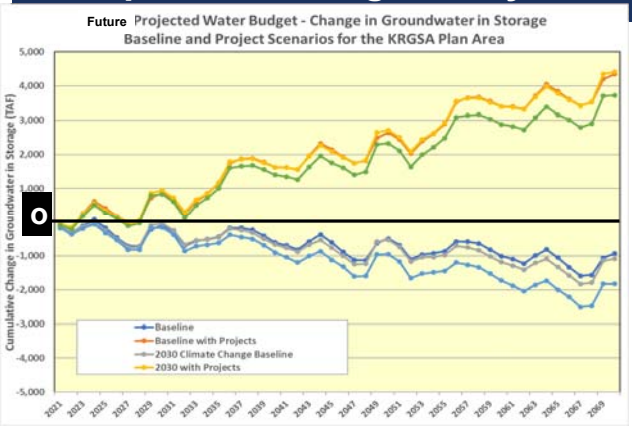
- Consolidación de hasta seis pequeños sistemas de agua con ENCSD para abordar problemas de calidad del agua: nitrato, TCP y arsénico
- Conceder fondos a través del programa DWRSF
- Mejora la calidad del agua potable para comunidades desfavorecidas en KRGSA

1,2,3-TCP Wellhead Treatment

Acciones de Manejo

- Plan de acción de 5 pasos si se exceden los umbrales mínimos
- Implemente una medición adecuada en todo el KRGSA
- Programa para reportar extracciones de agua subterránea en el KRGSA
- Conservar agua reciclada en el área del plan KRGSA
- Apoye Delta Conveyance para preservar suministros importados
- Incorporar estrategias de adaptación al cambio climático
- Mejorar programa de monitoreo
- Coordinar el análisis de la calidad del agua con los programas existentes.

Presupuestos de Agua Proyectados con Proyectos



Colectivamente, estos proyectos y acciones de gestión abordan los déficits de agua subterránea actuales y proyectados para lograr una gestión sostenible.

TODD GROUNDWATER

DISCUSIÓN: PROYECTOS Y ACCIONES DE MANEJO

- ¿Qué opina de los proyectos propuestos y las acciones de gestión?
- ¿Hay otros proyectos y / o acciones de gestión que le gustaría que GSA considere?

¿Que Viene Despues?

- Monitoreo e informes anuales a DWR
- Revise el plan cada 5 años e informe a DWR
- Seguir e implementar proyectos de recarga
- Colaborar con otras agencias reguladoras.
- Explore, decida y defina:
  - Métodos para asignar agua subterránea entre los usuarios.
  - Programa de asistencia para pozos de agua potable.
  - Financiamiento para la implementación del GSP

DISCUSIÓN: AVISO Y COMUNICACIÓN

- ¿Cómo le gustaría estar informado y comprometido?
- ¿Cuándo le gustaría estar informado y comprometido?

Período de Revisión de 90 Días y Divulgación

- Comunicación y divulgación con las partes interesadas para el aporte del GSP
- Alcance logrado en muchos niveles:
  - Reuniones y talleres de la junta de agencias
  - Reuniones comunitarias dirigidas
  - Coordinar con otros GSA en Open House
- GSP es un documento borrador y puede revisarse en función de los aportes:
  - Trabajando para mejorar el programa de monitoreo
  - Incorporar detalles sobre cómo se puede lograr la implementación del GSP
- KRGSA apoya los esfuerzos de colaboración y la coordinación interna para lograr una gestión sostenible de los recursos de agua subterránea compartidos de la Subcuenca.

Cómo Proporcionar Comentarios y Recomendaciones

- El GSP Preliminar está disponible en el sitio web de KRGSA en:

  www.kernrivergsa.org

- La audiencia pública para recibir comentarios sobre el GSP Preliminar está programada para el **5 de diciembre de 2019**

ASISTENCIA TÉCNICA PARA COMUNIDADES DE BAJOS RECURSOS

Self-Help Enterprises
- Alcance y educación
- Asistencia comunitaria directa
- Asistencia para el desarrollo del GSP

www.selfhelpenterprises.org

Eva Dominguez
(559) 802-1634 | EvaD@selfhelpenterprises.org

Item 8d

KERN RIVER GROUNDWATER SUSTAINABILITY PLAN REVIEW WORKSHOP
LAMONT
NOVEMBER 6, 2019

MEETING SUMMARY

Event Details

Self-Help Enterprises (SHE) collaborated with Kern River Groundwater Sustainability Agency (KRGSA) and Horizon Water and Environment (HWE) to present a workshop to review the KRGSA's Groundwater Sustainability Plan (GSP) with disadvantaged community leaders and representatives. Facilitators for the workshop were Eva Dominguez, representing SHE, and Ken Schwarz representing HWE and KRGSA. The workshop took place at the Bear Mountain Recreation Building in Lamont at 5:30 p.m. During sign-in and registration, each person was given a copy of the PowerPoint presentation and KRGSA factsheet.

Purpose of Workshop

The purpose of the workshop was to review the draft Groundwater Sustainability Plan for the KRGSA region and discuss comments on the draft GSP provided by community residents. During the workshop, the topics discussed were Sustainability Goals, Management Areas, Minimum Thresholds, Measurable Objectives, Water Quality and Quantity, Projects and Management Actions, and Stakeholder Outreach and Communication. HWE presented the data provided by the engineering consultants for each of the topics, and SHE led the discussions for each topic.

Attendance

There were twelve attendees in total at the meeting, including six KRGSA representatives. The remaining attendees included two representatives from Leadership Counsel for Justice and Accountability, one resident of Weedpatch, one representative from Lamont, one representative from the Central California Environmental Justice Network, and one grower. Also in attendance was one representative from Fuller Acres Mutual Water Company who was not included in the sign in sheet.

Summary

The presentation started with a brief overview of SGMA and a video from SHE. HWE presented the basin setting data and information that led to the development of the Sustainability Goal. At this time, participants were given an opportunity to discuss their comments on the goal. Some said they could not comment on the Sustainability Goal until they got more information; others stated the goal was too vague. After this short discussion, information on Management Areas (MAs), Minimum Thresholds (MTs), and Measurable Objectives (MOs) was presented. Participants asked questions throughout the presentation, so a formal discussion was not held at the end of the section. For MAs, there was a concern about disadvantaged communities being considered under the Agriculture MA, which could disregard the needs of the communities. It was recommended that the MAs be adjusted for the communities to be included in the Urban MA. Similarly, concerns for the MTs and MOs in these areas were discussed, and it was recommended that the MTs and MOs be restructured for communities in the

Agricultural MA. There was also a short discussion about water quality and the constituents that would be included. Participants proposed that the KRGSA include nitrate and 1,2,3-TCP in their GSP to be inclusive of contaminants present in the boundaries. After this discussion, projects and management actions were presented. There were a few questions about whether water markets, fallowing of land, or water use restrictions were being considered, all of which are not currently being considered unless the presented projects and management actions are ineffective. The last recommendation for the workshop was that a well mitigation plan be included in the GSP to address potential effects to private wells and small community water systems.

Attachments

Attachment A	Meeting Notes
Attachment B	Sign-In Sheet

Attachment A
MEETING NOTES

Management Areas (MA), Minimum Thresholds (MTs) and Measurable Objectives (MOs)

- Which MA does Lamont fall in? Urban MA or Agricultural MA?
    - Answer: Lamont falls within the Agricultural MA
- Why is an urban area such as Lamont in the Agricultural MA?
- How will urban communities such as Lamont be considered if they are within the Agricultural MA? Will the sustainable management criteria for groundwater levels and water quality be set based on the Urban MA or Agricultural MA?
    - Answer was confusing: Maps would be updated based on a new agreement with Lamont. However, I believe there was a misunderstanding as it was still unclear if the MTs/MOs for the representative monitoring wells near the communities will be based on Urban MA or Agricultural MA. The GSA said they would take a look at the matter.
    - Participants recommendation:
        - Create exceptions within the Agricultural MA for small communities such as Lamont and Fuller Acres.
        - Ensure that all representative monitoring wells near DACs are subject to the MTs and MOs for groundwater levels and water quality that are for the Urban MA and thus more protective of drinking water sources.

Sustainability Goal (SG)

- The SG is too vague. As a result, the public is not able to fully evaluate nor provide comments and recommendations on the draft SG.
- Recommend clarifying how the SG will be achieved and summarizing the main projects and management actions that will be developed and implemented to address the problems.
- Recommend adding a sentence about the GSA intention to seek new sources of water.

Water Quality

- Why is the GSP only focusing on Arsenic if we have problems with other constituents as well?
- Why will the GSP not monitor Nitrate and 1,2,3-TCP?
- Why will the GSP not focus and set sustainable management criteria for nitrates and 1,2,3-TCP?
    - Answer: Because only Arsenic has correlation with groundwater levels.
    - Recommendation:
        - All constituents should be monitored and included in the GSP
        - The GSP should be more clear that all these constituents will be monitored

Representative Monitoring Network (RMN)

- Is the RMN representative of drinking water wells (small public systems and clusters of domestic well owners)? In specific Fuller Acres and Lamont?
    - Answer: the GSAs followed a rigorous process to select the RMN.

Climate Change

- With climate change, how much can we continue to rely on Kern River?
    - Answer: I can't tell you if Kern River is a reliable water source for the years to come. However, climate change assumptions are included in the GSP and were based on DWR projections of less snow and more rain.

Projects and Management Actions

- Is this GSA considering water markets?
    - Answer: No
- Is this GSA considering fallowing lands?
    - Answer: land following will only be considered if the projects and management actions proposed in the GSP are not capable to address the overdraft or ensure that the subbasin reaches sustainability.
- Is this GSA considering limiting water usage and/or pumping restrictions?
    - Answer: same answer as above. The GSA hopes to solve the problems through the projects and MAs proposed in the GSP. But if that is not enough to address overdraft, the GSA might consider implementing an allocation framework and pumping restrictions. In the next 5 years we will be able to know more.
- Does the GSP includes drought contingency actions?
    - Answer: was not able to grasp the GSA answer to this…
- Could water rates of families experience increase due to GSP implementation?
    - Answer: From Lamont representative: Lamont residents should not see an increase in their rates since the water company will absorb all costs associated with SGMA involvement. If needed, a rate study and Proposition 218 election will be needed.
- The GSP must include a mitigation plan for domestic well owners.

Attachment B

SIGN-IN SHEET

SIGN-IN SHEET
Event Name: Kern River GSA Groundwater Sustainability Plan Review Workshop
Date: Wednesday, November 6, 2019
Presenter(s): Eva Dominguez and Ken Schwarz (consultant)

	Name / Nombre	Organization or Community / Organización o Comunidad	Email Address / Correo Electrónico	Phone / Teléfono	Would you like to be notified of future meetings? / ¿Desea que le avisemos sobre futuras juntas?
1	Rogelio Macias			661-858-8930	
2	Nataly Escobedo Garcia	LCJA	ngarcia@leadershipcounsel.org		
3	Jasmine del Aguila	LCJA	jdelaguila@leadershipcounsel.org	661.843.7677	yes
4	Scott TAYLOR	LPUD	STAYLOR@LPUD.ORG	845-1213	
5	Mark Mulkay	KDWD			
6	ART Chianello	City of Bakersfield	ACHIANEL@bakersfieldcity.us	(661) 326 3715	
7	David Beard	KCWA ID4	dbeard@kcwa.com	661 634 1400	yes.
8	Geni Lundquist	KCWA ID4	galundquist@icloud.com	661 343 7192	yes
9	Elizabeth Perez	CCEJN	elizabeth.perez@ccejn.org	(661)616-3848	yes
10	Jana Marquez	Kern Delta WD	jana@kerndelta.org	661 834 4656	yes
11	Kristin Pittack	City of Bakersfield	kpittack@bakersfieldcity.us	(661)-326-3616	
12	Tahu Merchant	Grower	cherries@tayyebafarms.com	630-880-8142	yes
13					
14					
15					

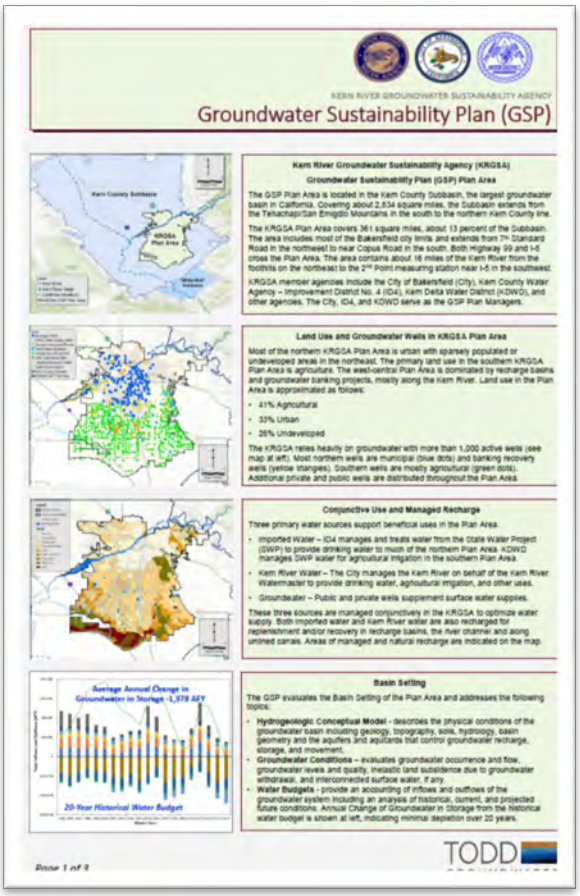
Item 9

KERN DELTA WATER DISTRICT

KRGSA

KERN RIVER GROUNDWATER SUSTAINABILITY AGENCY

Kern River Groundwater Sustainability Agency
Kern Delta Grower Outreach Meeting



TOPIC

SGMA Update
Draft Groundwater Sustainability Plan
Presentation

DATE/TIME

Tuesday, November 19th
5:00PM – 6:30PM

or

Wednesday, November 20th
8:00AM – 9:30AM

LOCATION

Kern Delta District Office
501 Taft Highway

For more information visit: www.kernrivergsa.org

Kern River Groundwater Sustainability Agency (KRGSA)

KRGSA Groundwater Sustainability Plan (GSP)

KDWD Grower Outreach Meeting
November 19 and 20, 2019

TODD GROUNDWATER

KRGSA Sustainability Goal

Manage groundwater resources sustainably in the KRGSA Plan Area to:

- support current and future beneficial uses of groundwater including municipal, agricultural, industrial, domestic, public supply, and environmental uses
- optimize conjunctive use of surface water and groundwater
- avoid or eliminate undesirable results over the implementation and planning horizon.

DRAFT

TODD GROUNDWATER

KRGSA GSP Organization

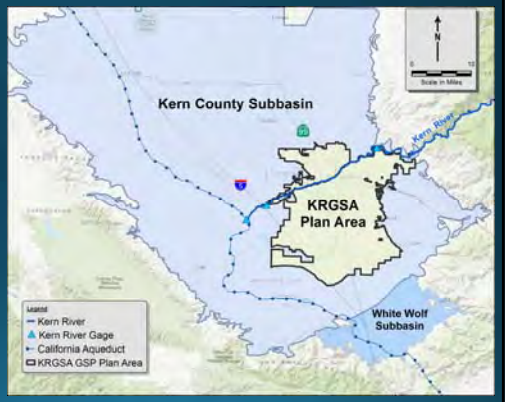
1 Administrative Information
2 Plan Area
3 HCM/Groundwater Conditions
4 Water Budgets
5 Sustainable Management Criteria
6 Monitoring Networks
7 Projects and Management Actions
8 Implementation Plan
9 References and Technical Studies

DRAFT

TODD GROUNDWATER

KRGSA GSP Plan Area

- 361 square miles
- 13% of the Kern County Subbasin
- Composed of:
  - City of Bakersfield
  - Improvement District No. 4 (KCWA)
  - Kern Delta Water District (KDWD)
  - Additional smaller agencies

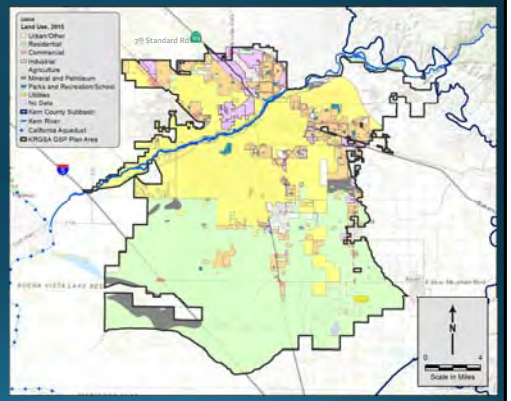


DRAFT

TODD GROUNDWATER

Land Use in the KRGSA Plan Area

- North – Urban
- South – Agricultural
- 2015 Land Use
  - 41% - Agricultural
  - 33% - Urban
  - 26% - Undeveloped

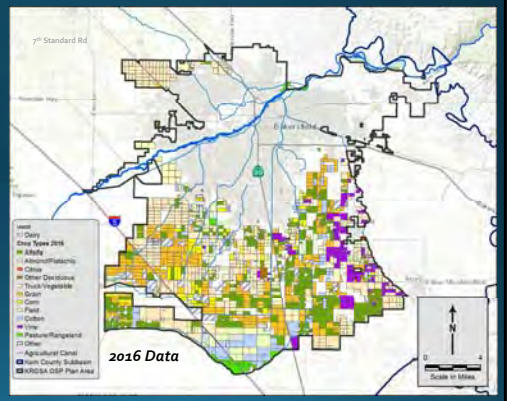


DRAFT

TODD GROUNDWATER

Agricultural Lands in the KRGSA

- 90,000 acres irrigated agriculture in southern Plan Area
- 16,000 acres irrigated lands in northern Plan Area
- 20 Dairies in southern Plan Area

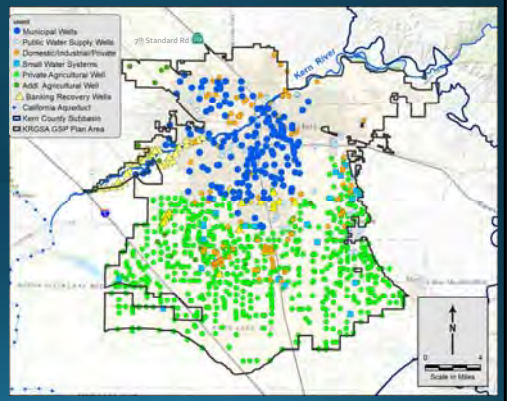


DRAFT

TODD GROUNDWATER

Active Wells in the KRGSA

- 162 Municipal wells
- 67 Public Supply and Small Water System wells
- 151 Industrial, Domestic, and other Private wells
- 642 Agricultural wells
- 54 Banking recovery wells

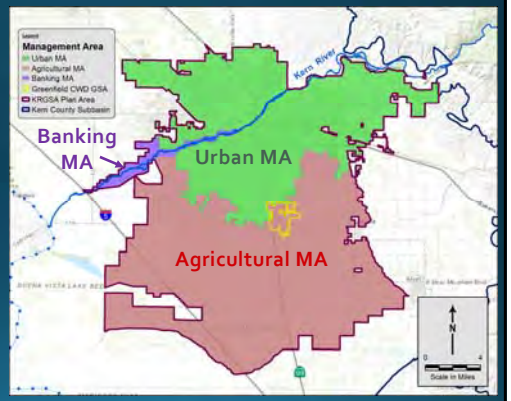


DRAFT

TODD GROUNDWATER

Preliminary Management Areas (MA)

- Based on land use and well use
  - Urban MA – 41%
  - Agricultural MA – 57%
  - Banking – 2%



DRAFT

TODD GROUNDWATER

Sustainability Indicators

- Chronic Lowering of Water Levels
- Reduction of Groundwater Storage
- Degradation of Water Quality caused by management actions
- Land subsidence affecting land use
- Depletion of Interconnected Surface Water affecting beneficial use

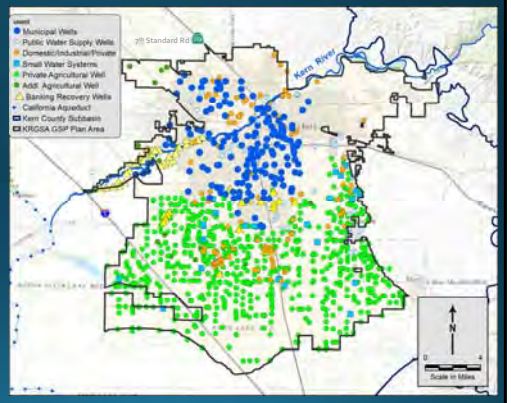
If a sustainability indicator is determined to be significant and unreasonable , then it is an Undesirable Result

DRAFT

TODD GROUNDWATER

Balance High and Low WLs

- Municipal wells went dry or experienced problems during drought – keep water levels above historic lows
- Agricultural and banking wells require lower water levels
- Balance needs of KRGSA wells



DRAFT

TODD GROUNDWATER

Reduction of Groundwater in Storage

- 3 Independent Methods
- Relatively good agreement
- Minimal deficits; sustainable budget
- Deficit for banking adjustments

Historical Water Budget Method	Change in Groundwater in Storage (AFY)[1]	Comments
Checkbook	-1,978 AFY	Tabulates recharge and pumping for the physical groundwater system beneath the KRGSA
C2VSimFG-Kern Model	4,055 AFY	Simulated inflows and outflows including subsurface flows
Groundwater Elevation Contour Maps	-2,912 AFY	Subtraction of spring groundwater elevation contour maps
Adjusted Checkbook	-29,153 AFY	Removes recharge and pumping attributable non-KRGSA parties. Adds banking outside of KRGSA attributable to KRGSA agencies

TODD GROUNDWATER

Projected Water Budgets Future Deficits

- Increase urban demand
- Decrease SWP supply
- Increase agricultural demand (climate changes factors)
- Potential Future Water Budget Deficits
- Plus Historical Adjusted deficit of -29,000 AFY

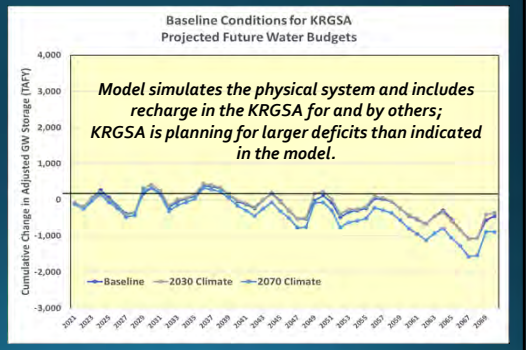
Water Budget Component	Historical Average Annual Amounts (AFY)	Baseline Conditions (AFY)	2030 Climate Change Conditions (AFY)	2070 Climate Change Conditions (AFY)
SWP[1] – ID4	74,035	52,758	51,182	48,759
SWP - KDWD	18,655	15,765	15,294	14,537
TOTAL SWP	92,690	68,523	66,476	63,296
Net decrease in SWP from historical:		**24,167**	**26,214**	**29,394**
Agriculture Demand	261,019	261,019	271,460	281,460
Urban Demand[2]	167,970	182,290	178,115	254,117
TOTAL DEMAND	428,989	443,309	449,575	535,577
Net increase in demand from historical:		**14,320**	**20,586**	**106,588**
Potential Future Water Budget Deficits:		**-38,487**	**-46,800**	**-135,982**

DRAFT

TODD GROUNDWATER

Projected Water Budgets C2VSimFG-Kern Model

- Baseline - current land use and projected water supply and demand
- 2030 Climate Change Scenario with increases in agricultural demand and decreased supply
- 2070 Climate Change Scenario with further increase in demand and decrease in supply

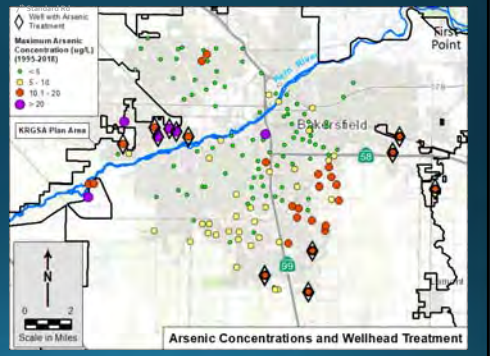


DRAFT

TODD GROUNDWATER

Constituent of Concern Arsenic

- Focus on constituents affected by management actions
- Arsenic concentrations increase with declining water levels
- More than 25 wells with detections above the MCL
- Widespread issue in the Plan Area

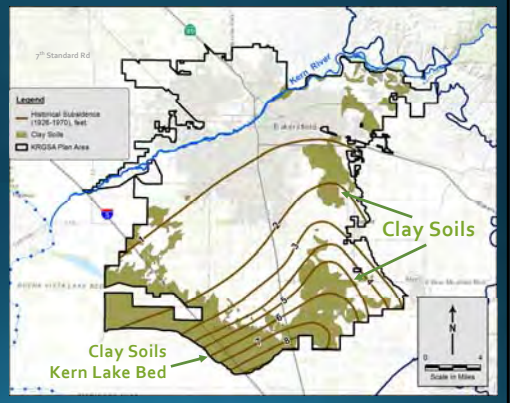


DRAFT

TODD GROUNDWATER

Inelastic Land Subsidence

- Historical Subsidence from 1926 – 1970 mapped by USGS
- Up to 9 feet in southern Plan Area
- Correlates to areas of clay soils and subsurface clay sediments in southeast Plan Area

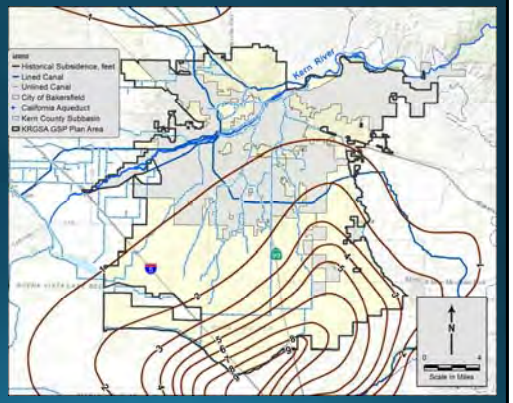


DRAFT

TODD GROUNDWATER

Subsidence and Critical Infrastructure

- Critical infrastructure includes pipelines, canals, utilities, structures, wells, transportation
- No damage to critical infrastructure in the Plan Area identified to date
- Set minimum thresholds to mitigate future subsidence



DRAFT

TODD GROUNDWATER

Analysis of Interconnected Surface Water

- Evaluated groundwater conditions using local NCCAG* maps along Kern River
- Kern River is actively managed through regulated releases, diversions, and managed aquifer recharge

More than 80% of the flow is diverted above the Calloway Weir
River was dry below the Calloway Weir more than 25 % of the time
Groundwater is deeper than 50' below the river throughout the entire KRGSA

DRAFT

TODD GROUNDWATER

Analysis of Interconnected Surface Water

- Evaluated groundwater conditions at local NCCAG areas in southern Plan Area
- Analysis indicates that local vegetation and wetlands are not supported by groundwater in the Principal Aquifer

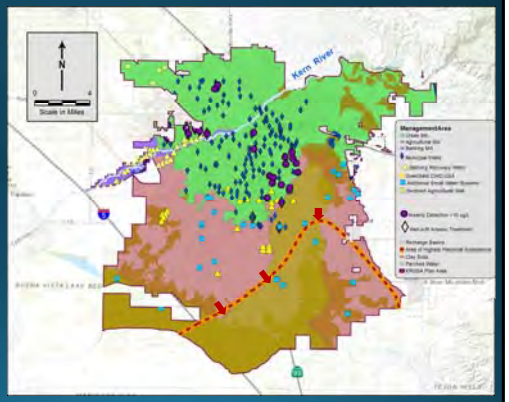
Mapped areas include recharge basins, spills along the rim canal, artificially-constructed ski lakes. Local irrigation and perched water conditions throughout the area.

DRAFT

TODD GROUNDWATER

Sustainability Considerations

- WL below screens in Municipal Wells
- Deficits for Projected Water Budgets
- Arsenic in Municipal Wells
- Ability of banking recovery wells to recover water
- Historical subsidence



DRAFT

TODD GROUNDWATER

Approach to Minimum Thresholds

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Sustainability Indicator and Minimum Threshold (MT)			
			Chronic Lowering of Water Levels	Reduction of Groundwater in Storage	Degraded Water Quality	Land Subsidence
KRGSA Urban MA	Central/South	Municipal wellfields	Historic Low WL	Historic Low WL	Historic Low WL	Historic Low WL
	Northeast	ENCSD wellfield	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	Northwest corner	Transition to agricultural lands	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL	20' below Historic Low WL
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	50' below Historic Low WL
	North-Central	Greenfield CWD wells	Historic Low WL	50' below Historic Low WL	Historic Low WL	10' below Historic Low WL
	Northwest	Agricultural and recovery wells	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL
	South and East	Subsidence potential	50' below Historic Low WL	50' below Historic Low WL	50' below Historic Low WL	20' below Historic Low WL
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	20' below Historic Low WL	Not applicable	20' below Historic Low WL	50' below Historic Low WL
	Berrenda Mesa	KCWA operational area	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL
	COB 2800 Facility	City of Bakersfield municipal wells	Historic Low WL	Not applicable	Historic Low WL	50' below Historic Low WL

Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.
Measurable Objective (MO) for each sustainability indicator is the average of the MT and the historical high groundwater elevation during the historical Study Period.
Highlighted green cell indicates the controlling sustainability indicator(s) for that area in each MA.

DRAFT

- Undesirable results relate historic low water levels; keep urban wells near historic lows.
- Allow operational flexibility for banking wells to recover critical supplies during drought.
- Measurable Objectives are selected as the midpoint for an operational range.
- Keep MTs and MOs SIMPLE to facilitate management.

TODD GROUNDWATER

Approach to Undesirable Results

KRGSA Management Area (MA)	MA Subarea and Considerations for Management		Undesirable Results for Controlling Sustainability Indicators			
			Controlling Indicator	Minimum Threshold (MT)	Percent of Wells <MT	Duration of MT Exceedance
KRGSA Urban MA	Central/South	Municipal wellfields	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	Northeast	ENCSD wellfield	Water Levels	50' below Historic Low WL	Any well	>3 Consecutive Months
	Northwest corner	Transition to agricultural lands	Water Levels	20' below Historic Low WL	Any well	>3 Consecutive Months
KRGSA Agricultural MA	Along southern Urban MA	Transition with municipal wells	Water Levels/Quality	Historic Low WL	40% in Urban MA	>2 Consecutive Years
	North-Central	Greenfield CWD wells	Water Levels/Quality	Historic Low WL	Greenfield CWD MW	>2 Consecutive Years
	Northwest	Agricultural and recovery wells	Water Levels	50' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
	South and East	Subsidence potential	Subsidence	20' below Historic Low WL	40% in Agricultural MA	>2 Consecutive Years
KRGSA Banking MA	Kern River Channel	ID4/KCWA recovery activities	Water Levels/Quality	20' below Historic Low WL	Any well	>3 Consecutive Months
	Berrenda Mesa	KCWA operational area	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months
	COB 2800 Facility	City of Bakersfield municipal wells	Water Levels/Quality	Historic Low WL	Any well	>3 Consecutive Months

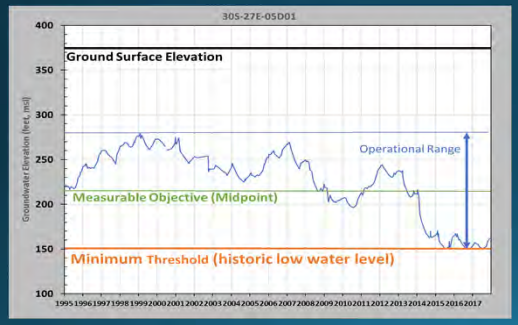
Historic low water level (WL) is the lowest level observed in an area during the recent drought of 2013-2016.

- Add number of wells and duration to refine definition of undesirable results.

DRAFT

TODD GROUNDWATER

Assignment of Minimum Thresholds (MTs) and Measurable Objectives (MOs)



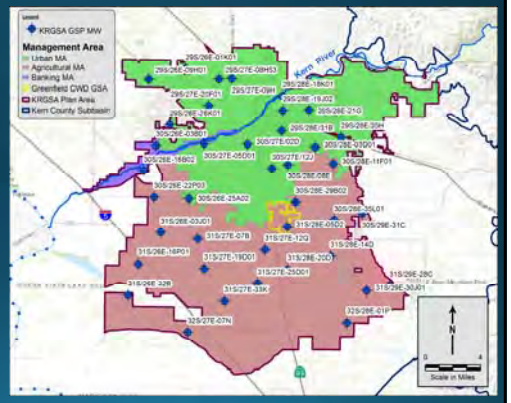
- Example hydrograph from monitoring well
- In Urban MA, MT is set at the historic low water level
- The MO is the average between the high level and the MT

DRAFT

TODD GROUNDWATER

Preliminary GSP Monitoring Wells

- 39 wells identified
- Many monitored in other programs:
  - Kern Fan Monitoring Comm
  - KCWA/ID4 WL Program
  - City Monitoring Wells
  - KDWD Monitoring Programs
- Water level monitoring only
- Use Water Quality data from other programs

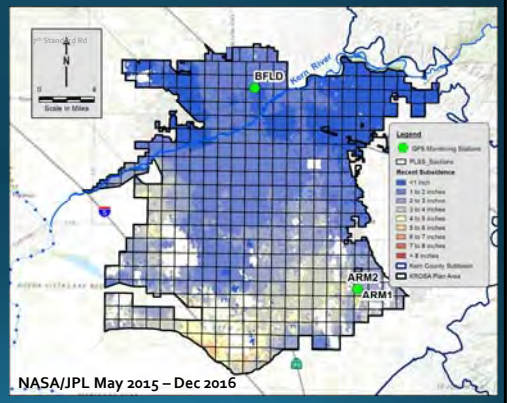


DRAFT

TODD GROUNDWATER

KRGSA Subsidence Monitoring

- Water level monitoring
- Three GPS stations for screening
- InSAR Subsidence available from DWR (on 1-mile grids)
- Coordinate with KGA and other GSAs for regional Subbasin-wide subsidence monitoring



NASA/JPL May 2015 – Dec 2016

DRAFT

TODD GROUNDWATER

Project	Description	KRGSA Project Water
Water Allocation Plan	KDWD plans to use its full Kern River entitlement as prioritized in its Water Allocation Plan (WAP) for the Agricultural MA. The WAP total average supply has been corrected for planned sales to NKWSD.	20,797 AFY
Kern River Optimized Conjunctive Use	The City plans to use its full Kern River entitlement, less current obligations, to mitigate undesirable results for water levels and water quality in the Urban MA.	89,619 AFY
Expand Recycled Water Use in the KRGSA	The City will increase recycled water use inside of the KRGSA from its WWTP No. 3 in 2026 when a contract for use outside of the KRGSA expires (about 72% is currently used outside of the KRGSA).	11,556 to 13,407 AFY
Conversion of Agricultural Lands to Urban Use	Approximately 10,000 acres of current KRGSA agricultural lands is expected to be urbanized; this future urban demand is already included in the projected water budget, so 100% of this agricultural water use represents a demand reduction.	27,000 AFY
ENCSD North Weedpatch Highway Water System Consolidation	Up to six small water systems in the northeast KRGSA will be consolidated into the ENCSD system for benefits to drinking water quality, including to disadvantaged communities (DACs).	No new supply; improved water quality to DACs
Possible Water Exchange	KRGSA member agencies can perform exchanges of surface water and groundwater for benefits to water quality, including to DACs	No new supply; improved water quality to DACs

GSP Projects to Address Future Water Budget Deficits

Up to about 150,000 AFY of additional KRGSA supply

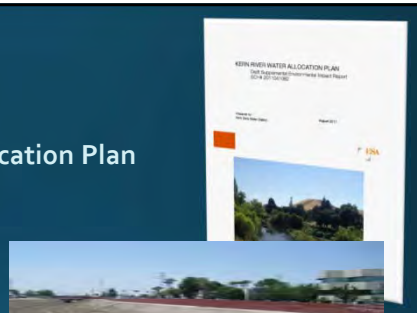
DRAFT

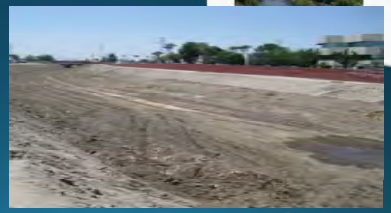
TODD GROUNDWATER

Key GSP Projects

KDWD Kern River Water Allocation Plan

- Optimizes Kern River recharge across the southern Plan Area
- Reduces groundwater pumping
- Allows local maintenance of water levels
- SEIR completed 2018 – implementation initiated





DRAFT

TODD GROUNDWATER

Key GSP Projects

City of Bakersfield Optimized Conjunctive Use

- Prioritizes use of City's available Kern River water
- Increasing water availability over the implementation and planning horizon
- Allows municipal pumping to be reduced to avoid undesirable results
- Meets future projected water budget deficits for urban demand

DRAFT

TODD GROUNDWATER

Key GSP Projects

East Niles Community Services District North Weedpatch Highway Consolidation

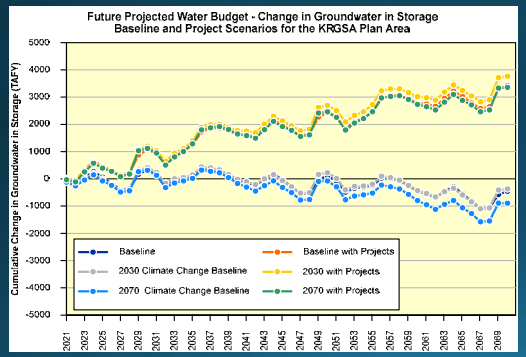
- Consolidation of up to six small water systems with ENCSD to address water quality concerns: nitrate, TCP, and arsenic
- Grant funding through the DWRSF program
- Improves drinking water quality for disadvantaged communities in the KRGSA

1,2,3-TCP Wellhead Treatment

DRAFT

TODD GROUNDWATER

Projected Water Budgets with GSP Projects



GSP projects and address current and projected water budget deficits to achieve sustainable management.

DRAFT

TODD GROUNDWATER

Management Actions – KRGSA Policies

- 5-Step Action Plan if Minimum Thresholds are exceeded
- Optimize Conjunctive Use in the KRGSA
- Implement a Well Metering Program
- Implement a groundwater extractions Program
- Support CA Delta Conveyance to Preserve Imported Supplies
- Incorporate Climate Change Adaptation Strategies
- Support Sustainable Groundwater Supplies for KRGSA DACs
- Improve Groundwater Monitoring Program
- Incorporate a Policy of Adaptive Management in the GSP Process

DRAFT

TODD GROUNDWATER

Kern Delta WD Specific Impact

The GSP identifies a path to sustainability for the KRGSA based on:

- Current water demand patterns / land use / irrigated acreage; including future projections for each
- Benefits of GSP Projects and Management Actions

First 5 years - focus to refine data used to develop GSP

- GSP calls for GSA to require metering of all wells in the GSA
- Kern Delta WD considering a well meter subsidy/incentive program to assist District well owners with compliance

DRAFT

TODD GROUNDWATER

Kern Delta WD Specific Impact

GSP does not include pumping allocations or restrictions

- Significant changes to crop patterns or number of irrigated acreage may impact this status in future years

GSP must be updated every 5 years

- Data collection/refinement will assist with justifying current plan and/or identifying potential future programs
- GSA/District will provide as much lead-time/notice regarding development of potential future pumping regulations as possible (likely one to several years)

DRAFT

TODD GROUNDWATER

Next Steps

- Near end of 90-day review process
- Revised Draft GSP, as needed
- Board Adoption of Final GSP 12-05-2019
- Final document and data preparation
- Submit to DWR by January 31, 2020

DRAFT

TODD GROUNDWATER

TODD GROUNDWATER

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 19, 2019

5:00PM – 6:30PM

Name:	Phone #	Email	Affiliation:
Rodney Pace	661-979-0301		KDW
	661-201-5968		KDW
Cynthia Gomez	6161-472-4337		KDWD
FRED Garone	" 331-4831		Mckittrick Ranch
Dennis Frick	661-342-4379		Tejon Tree & Vine
Darren + Doug Kindig	661-809-0677		Kindig Bros.
DALE EDWARDS	397-7611		OLD RIVER SUD
Darlin Wilson	397-7611		OLD River SUD
Pete Kaiser			KDWD
Chad Garone	831-1734		
Rick Tillem			KDWD

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 19, 2019

5:00PM – 6:30PM

John Kaiser	661-331-2877		Adobe Station Ranch
Dan Fugitt	332-3504		
Clay Etchison	331-1064		
[illegible]	661-201-7521		
Greg Subury	661-747-8702		Subury Farm
MIKE GOYENETCHE	661-764-6176		G3 DAIRY
Amandeep Chehal	805-708-7020		Sethi Vineyards, A.S. Chehal Farms
Roberts	661-363-3966		Jeff Roberts Farms
Kevin Antongiovanni			
Tony Garone	243-7430		
[illegible]	201-5047		
[illegible]	2013042		

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 19, 2019

5:00PM – 6:30PM

John Summers	661-201-6005		
Aldo Angone	661-201-6062		
Jan Sickert	661-706-0786		
Durwood Sickert	661 331-4546		
David Nielsen	661-316-3343		
Diana Turnage	661.364.3500		
Steve Anderson	760 902 5839		
[illegible]	661-335-1234		

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 20, 2019

8:00AM – 9:30AM

John Goyenetche	661-978-9703		GD Dairy
Josh Casilla	661-340-2108		Acwise
Blake Palla	661-834-7817		Palla Rose
Jason Giannelli	~~[illegible]~~		Tenstar / Giannelli Farms
[illegible] Bugni	3037773		Bugni
John Allen	661.332.2838		John Allen Farms, Inc
Bill Dewey	559-904-6989		OLAM
Frank [illegible]	661 742-5775		Olam
Andy Schoorl	661 330-2650		Bolthouse Farms
Brian Palla	661-979-0298		Family Tree Farms
Kristin Pittack	661-805-2076		City of Bakersfield
Dominique Mirakomgadi	661 654 6355		Farmer

Pampolis Dosomph 661-333-2005 Dosomph Bros

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 20, 2019

8:00AM – 9:30AM

Larry Womack	661-333-7129		J.G. Boswell Co
Charlie Riddle	661-330-3054		
Madonna Lang	(661) 6999637		Laborde Land Co
Daniel Dalton			
MARK MCDOWELL	661 398 7150		HEATHERWOOD DRIVE NORTH, INC
Joyce Rodrigues	661 201 9444		Belridge Ranch / George Barlow
Ariadne Cimental	661 325-1567		Ag-Wise
Natalie Sarhouet	661-283-8392		Bidart Dairy
Jonathan Romero	661-440-6309		Laborde Land Co
Arturo Romero	661 808-5807		Laborde Land Co
Pete Kaiser			KDWD
Jack Thomson	(661-301-2719		Thomson International Inc.

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 20, 2019

8:00AM – 9:30AM

Name:	Phone #	Email	Affiliation:
Jimmie Bartlett	661-330-1309		Freedom Farms
John Russell	661-477-4905		Warren Ag.
Chris Vandborg	393-0708		
Doug Frick	978-8306		Hilldale Farms LLC
Danny Andrews	661-331-0723	dan@danandrewsfarms.com	Dan Andrews Cooling LLC
Joey Mendonca			
Joe Marchetti	661-6196013	lime4u@yahoo.com	
Scott Dewar	661-979-8146	farmerscotty@msn.com	
Vernon Stenderup	661 319-1731		Stenderup Ag
Michael Brancato	661-703-9004	Brancatofarms@aol	Self
Andy Stenderup	747-2593		Stenderup Ag

Kern River Groundwater Sustainability Agency / Kern Delta Water District
Groundwater Sustainability Plan Outreach Meeting

November 20, 2019

8:00AM – 9:30AM

Megan Gibbs	707-478-5330		
John Clines	661-246-9662		1K H50
Donald Collins			KDWD

ATTACHMENT F.6
COMMENTS ON THE DRAFT KRGSA GSP AND RESPONSES

Comments Received During Public Review of the Draft KRGSA GSP

Written comments were received on the Draft KRGSA GSP from five separate parties during an approximate 90-day public review period (August 21 through December 5, 2019). Those commenters, their affiliation, and the dates their comments were received are listed in the table below. For completeness, the table also includes a comment letter received prior to the publication of the Draft KRGSA GSP from the Leadership Counsel for Justice and Accountability on July 10, 2019; KRGSA responded to those comments in a letter to the Leadership Counsel on August 13, 2019.

Parties that Submitted Comments on the Draft KRGSA GSP

Name	Contact Information	Date Comments Received
Jasmene del Aguilar and Amanda Monaco Leadership Counsel for Justice and Accountability	amonaco@leadership counsel.org	7/10/19
Janie Moehnke, San Joaquin Valley Land Division Chevron North America Exploration and Production Company	9525 Camino Media (P.O. Box 6) Bakersfield, CA 93311 (93302) JMoehnke@chevron.com	10/24/19
Enrique C. Zaldivar, P.E., and Tim Dafeta, Hyperion Water Reclamation Plant Manager LA Sanitation and Environment City of Los Angeles	1149 South Broadway, 9th Floor Los Angeles, CA 90015 timeyin.dafeta@lacity.org	11/20/19
Julie A. Vance, Regional Manager California Department of Fish & Wildlife, Central Region	1234 East Shaw Avenue Fresno, CA 93710	11/25/19
Jasmene del Aguilar, Amanda Monaco, and Nataly Escobedo Garcia Leadership Counsel for Justice & Accountability	amonaco@leadership counsel.org	11/26/19
Dana Munn, General Manager Shafter-Wasco Irrigation District (via Braun Gosling, A Law Corporation)	P.O. Box 1168 Wasco, CA 93280	11/26/19 (fwd 12/3/19)

Because most of the letters were received late in the review period, initial responses were incorporated into a presentation on the Final Draft KRGSA GSP given at the KRGSA Public Hearing held on December 5, 2019, prior to GSP adoption. That presentation is included as Item 15 in **Attachment F.4**, *Public Workshop Materials*. In addition to the material provided at the December hearing, some clarifying revisions were made to the Draft GSP to provide an improved understanding of several issues mentioned in the comment letters.

Each comment letter is provided at the end of this attachment in its entirety. A brief summary of the responses to the written comments is provided below.

The KRGSA appreciates the time and effort taken by these entities to review and comment on the Draft KRGSA GSP. The KRGSA looks forward to a continuing dialogue with these and other stakeholders as the GSP implementation moves forward.

Response to Comments from Leadership Counsel for Justice and Accountability (7/10/19)

A comment letter from the Leadership Counsel to the KRGSA was received on July 10, 2019; the KRGSA provided a detailed written response to those comments in a letter dated August 13, 2019. Both letters are included at the end of this attachment.

Response to Comments from Chevron North America Exploration and Production Company (10/24/19)

Comments from Chevron NA, provided via email, involved clarification of a few technical issues primarily relating to the depth of oilfield operations, bottom of the groundwater basin, and the identification of critical infrastructure relating to the analysis of land subsidence. All comments were addressed to the satisfaction of Chevron NA through direct edits to the Draft KRGSA GSP.

Response to Comments from City of Los Angeles (11/20/19)

As owner and operator of irrigated agricultural lands (Green Acres Farm) located both inside and outside of the KRGSA, the City of Los Angeles requests to be considered a stakeholder for potential future limitations on groundwater pumping. The KRGSA acknowledges this relationship and will include Green Acres Farm as a stakeholder for GSP implementation.

In addition, the City of Los Angeles takes exception to the average amount of recycled water provided by the KRGSA (specifically, the City of Bakersfield) as reported in Table 2-1 of the Draft KRGSA GSP (August 2019). The comment letter cites different averages based on Green Acres Farm records. Part of the discrepancy between the amounts in the Draft GSP and the comment letter appears to be related to the use of various sources and time periods. In response to this comment, the average amount in Table 2-1 of the Final KRGSA GSP has been revised to 11,321 AFY using data from the historical Study Period (WY 1995 – WY 2014). This average better aligns with other data in the table and is very close to the average of 11,540 AFY suggested by the City of Los Angeles. Finally, the City of Los Angeles noted an

incorrect statement in the Draft KRGSA GSP regarding deliveries of recycled water to Green Acres Farm; that sentence has been revised in the Final KRGSA GSP.

Response to Comments from California Department of Fish and Wildlife, Central Region (11/25/19)

Responses to this comment letter are organized in a series of numbered comments as provided in the letter (see letter at the end of this attachment).

Comment #1 notes that CDFW land covering the Bakersfield Cactus Ecological Reserve Hart Unit as discussed in **Section 2.2.1** and shown in **Figure 2-2** of the KRGSA GSP does not contain wells; comment noted.

Comment #2 states that although the KRGSA GSP Sustainability Goal includes current and future environmental users of groundwater, "there is little explanation on how these beneficial users rely on groundwater and how they were considered in the Sustainable Management Criteria (SMC)." As described in **Section 3.3.6** and clarified in **Section 5.9**, current environmental users of groundwater as defined by SGMA were not identified in the KRGSA. Nonetheless, as described in **Section 5.9**, the SMC will maintain water levels near or above historic low levels to protect any un-identified GDEs and ongoing monitoring will document surface water conditions to ensure that the Sustainability Goal can be met. The comment recommends the inclusion of habitat and species that may rely on groundwater. As documented in **Section 3.3.6.6**, key species identified as "commonly associated with groundwater" were specifically listed in the KRGSA GSP for most of the NCCAG-mapped areas in the KRGSA.

Comment #2 also suggests that there was no identification or description of beneficial uses and users of groundwater in the Notice and Communication section (**Section 2.7** of the GSP). To the contrary, environmental users of groundwater, along with CDFW and other state and federal agencies, are identified as Interested Parties and Stakeholders in the KRGSA Communication and Engagement Plan, provided in **Appendix F**, which is introduced, referenced, and summarized in **Section 2.7**. A clarifying sentence has been added to the Final GSP regarding this comment.

Comment #3 suggests that the absence of interconnected surface water and GDEs in the KRGSA was not adequately analyzed with "empirical evidence" and relies on conclusions by the KGA and KWB. To the contrary, historical water levels, perched conditions, and Kern River management activities were all incorporated into the analysis and represent decades of empirical data with which to analyze groundwater use by the environment. Nonetheless, the GSP commits to continued monitoring of water levels, including those resulting from GSP project implementation to provide additional data and information to inform the potential for future environmental groundwater use.

Comment #4 reiterates concerns that the Sustainable Management Criteria do not consider environmental users of groundwater, criticizes the selection of MTs up to 50 feet below the historic low water level in a critically-overdrafted basin, and states that the use of water

levels as a proxy for undesirable results is not substantiated for the water quality sustainability indicator. First, as stated above, no current environmental users of groundwater were identified. Second, the MTs are set at the historic low water level for most of the KRGSA, document the ability to sustain lower levels without undesirable results, and will be monitored and re-evaluated on an ongoing basis. The link between KRGSA MTs and the designation of an overdrafted basin is unclear. For those areas of the Subbasin outside of the KRGSA, water levels may continue to decline while GSP projects are implemented, a condition allowed by SGMA. Finally, the use of water levels as a proxy for the water quality indicator are clearly substantiated in **Section 3.3.4.6** and **Figure 3-33**, as referenced and discussed in **Section 5.7.4.1**.

Remaining "**Other Comments**" outline CDFW's responsibilities and interests regarding the CEQA process and other details related to implementation of GSP projects. Those comments are noted.

Response to Comments from Leadership Counsel for Justice and Accountability (11/26/19)

A second comment letter was received from the Leadership Counsel, which was accompanied by a technical evaluation and comments on the water budget, water quality, and the potential for dry wells as provided in the Draft KRGSA GSP. The comment letter from the Leadership Counsel was organized around a series of declaratory statements asserting deficiencies in the Draft KRGSA GSP regarding completeness, inadequate outreach in the DACs, and hydrogeologic analyses, using the accompanying technical comments as evidence for some of these alleged deficiencies.

With regards to the adequacy of outreach, please refer to all of the documentation contained in the Communications and Engagement Plan in this **Appendix F** to the GSP, along with **Attachments F.1** through **F.5** and including this **Attachment F.6**. Responses to the Leadership Counsel technical comments were provided in the December 5 Public Hearing and are summarized below.

Water Budget Comments: The Leadership Counsel notes that the "checkbook method" simplifies the water budget and does not consider subsurface flows. We agree. However, as explained in **Section 4.1.1** and subsequent subsections of **Section 4**, the checkbook method was used to provide a more detailed accounting of inflows and outflows that are attributed to the agency managing those flows. The checkbook method supplemented the more detailed water budget analysis conducted with the C2VSimFG-Kern model, which does account for subsurface flows was and is supported by the analysis of groundwater elevation contour maps.

The Leadership Counsel technical comments also noted that the Future Water Budgets were developed using data from three sequences of historical years and may not reflect the hydrologic variability associated with 50 years of actual hydrology. To the contrary, these sequences included a series of wet years and drought cycles including WY 1998 – one of the wettest years on record and the 2013-2016 drought of record, which resulted in historic low

water levels over the KRGSA and much of the Subbasin. Documentation of the C2VSimFG-Kern integrated surface water-groundwater model used to analyze the future water budgets, including the rationale for the water budget study periods, is provided in **Attachment 1** to the KRGSA GSP (see **Sections 3.2** and **6.1** in **Attachment 1**).

Water Quality Comments: The Leadership Counsel technical comments recommend inclusion of a formal determination regarding active management impacts on groundwater quality in the GSP Annual Reports. Required data and GSP implementation activities will be included in the Annual Report; an evaluation of groundwater conditions will be included in the Five-year GSP Update as required by the regulations. The Leadership Counsel technical comments also recommend better coordination between the KRGSA and other entities collecting water quality data in the KRGSA; this will be done. As described in **Section 6** of the GSP, the KRGSA intends to coordinate with numerous other monitoring programs including water quality sampling as the GSP is implemented. The Leadership Counsel comments question the source of certain chemicals detected in KRGSA groundwater; the KRGSA GSP has a management action to better understand areas of localized groundwater impacts. The Leadership Counsel technical comments ask for additional information on how TCP data collected by others with be compiled. The approach to water quality data compilation is discussed in **Section 6.2.5.3** and will be modified based on data availability as the GSP is implemented.

Dry Well Analysis: In an effort to evaluate the impacts of MTs and MOs on KRGSA domestic wells, the Leadership Counsel's accompanying technical comments provided a "dry well analysis" using the DWR well completion database. The Leadership Counsel analysis concluded that out of 3,633 wells in the database, 6 domestic wells would go dry if the MOs are met and one additional domestic well would go dry if the MTs are met.

There are several issues associated with this analysis. First, the results of the analysis show that these vulnerable wells are located in the Urban MA where MTs are set at the recent historic low and the MOs are set at the midpoint of historic water levels (for average hydrologic conditions). Accordingly, water levels have already fallen below the MOs historically and have also declined to the MT level in that area. Therefore, if those impacted domestic wells exist, 6 of the 7 wells would have already gone dry during previous droughts (e.g., 1990s) and would also have been dry prior to the SGMA baseline. In addition, these wells are located in the water service areas of various water purveyors in the KRGSA, which provides local drinking water supplies. Given these conditions, there is a high likelihood that the wells are either no longer in service or not used for drinking water. The results of the Leadership Counsel analysis demonstrate the issues associated with the DWR dataset, which does not typically identify the status of the well. Rather, the KRGSA GSP has identified locations of active wells as reported to ID4 or mapped for GSP purposes by KDWD. Impacts to local wells will continue to be monitored as the GSP is being implemented.

Incorporation of Comments into the KRGSA GSP: Notwithstanding the fact that the dry well analysis did not identify significant issues of impacts to local wells, the KRGSA decided to take additional measures to protect wells in the DACs as suggested by the Leadership Counsel. Demonstrating the KRGSA's resolve to listen and respond to stakeholder comments,

the KRGSA changed the Draft GSP sustainable management criteria in the eastern Agricultural MA to address concerns from small water suppliers in the DACs. In particular, DAC representatives in the eastern KRGSA expressed concerns at recent community outreach meetings that pumping from agricultural wells could meet the then-current MTs while creating excessive drawdown in their small water system wells. Although a review of those wells indicated that small water system wells were sufficiently deep to avoid significant and unreasonable impacts, the KRGSA chose to address those small water system concerns directly. Accordingly, MTs and MOs were raised 50 feet in two GSP monitoring wells close to the DACs to require the management of water levels at higher elevations in this area (**Section 5.4.4.2**).

Representatives from the Leadership Counsel attended the December 5, 2019 Public Hearing where responses to their comment letter were summarized, including the process by which comments had been addressed in the KRGSA GSP. Representatives were invited to provide additional comments during the Public Hearing; only one clarifying question was asked, and it was addressed through by the MT revision summarized above and discussed in **Section 5.4.4.2**.

Response to Comments from Shafter-Wasco Irrigation District (11/26/19)

This comment letter was provided to the KRGSA for information only and relates to discussions between SWID and KGA on Management Area water budgets. No response from KRGSA is needed.

LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY

[Sent via email]

Kern River GSA
krgsa@kernrivergsa.org

July 10th, 2019

Re: Concerns and Recommendations to Ensure that Kern River GSA GSP Protects Vulnerable Drinking Water Users

Dear members of the Kern River Groundwater Sustainability Agency,

Our organization works alongside low income communities of color in the San Joaquin Valley and the Eastern Coachella Valley to advocate for local, regional and state government entities to address their communities' needs for the basic elements that make up a safe and healthy community, including clean, safe, reliable and affordable drinking water, affordable housing, effective and safe transportation, efficient and affordable energy, green spaces, clean air, and more. We have been engaged in the Sustainable Groundwater Management Act (SGMA) implementation process because many of the communities with whom we work are dependent on groundwater for their drinking water supplies, and often have already experienced groundwater quality and supply issues.

Historically, communities we work with have not been included in decision-making about their previous water resources, and their needs have not been at the forefront of such decisions. In 2012, California recognized the Human Right to Drinking Water as a statewide goal. Now, because of SGMA's requirements for a transparent and inclusive process, groundwater management under the new law has the opportunity to include disadvantaged communities in decision-making and create groundwater management plans that understand their unique vulnerabilities and are sensitive to their drinking water needs.

We are concerned that drinking water impacts and disadvantaged community input have not been adequately analyzed and incorporated into the draft GSP, and recommend the following actions to ensure that drinking water is protected, especially for the communities whose drinking water is severely at risk from groundwater management activities, and who are the least able to pay for solutions for clean and reliable drinking water.

Development of Sustainable Management Criteria

In order to "consider the interests of" disadvantaged communities in developing sustainable management criteria, GSAs must address the impacts of the six sustainability indicators by reaching out

to all disadvantaged communities within the Kern Subbasin to understand their groundwater needs and incorporate their input prior to developing and adopting sustainable management criteria and analyzing the impact of preliminary minimum thresholds on drinking water users before proposing or approving alternatives. Under SGMA, ***all sustainable management criteria must be based on the GSA's determination of what will cause a "significant and unreasonable" impact on each of the six sustainability indicators.***[1] The determination of what is "significant and unreasonable" must be based on the needs of all beneficial users.[2] Therefore, without meaningfully consulting beneficial users within disadvantaged communities to understand what groundwater impacts those individuals want to avoid, the GSA cannot make a valid determination of what is "significant and unreasonable", and thus cannot set valid sustainable management criteria. As a result of the unique tiered structure that the Kern Subasin has decided to follow to address the creation of a GSP under SGMA, Kern River GSA, among other GSAs within the Kern Basin, have created and approved very broad undesirable results that will encompass the diverse terrain that exists within the Kern Basin. These undesirable results, however are intentionally difficult to trigger in order to avoid state intervention. We have suggested and continue to recommend that Kern River GSA consult with all types of beneficial users on what they consider to be "significant and unreasonable" impacts from each of the sustainability indicators before making decisions about sustainable management criteria. .

In order to effectively "consider the interests of" all beneficial users, GSA committees must analyze how preliminary sustainable management criteria will affect drinking water users before reaching proposed final sustainable management criteria.[3] Before deciding on proposed minimum thresholds, board members must be equipped with information about how potential minimum thresholds will impact access to drinking water for domestic well owners and communities on small community water systems. To the best of our knowledge, there has been no analysis of drinking water impacts incorporated into the process for determining minimum thresholds at the GSA or water district level. Kern River GSA must ensure that minimum thresholds are protecting drinking water, either by doing a drinking water impacts analysis of the minimum thresholds proposed by water districts, or by requiring water districts to conduct a drinking water impact analysis before finalizing their draft minimum thresholds.

The GSP development process ***must be representative of the interests of all beneficial users named in the Act***. To this end, it is imperative for the GSAs and water districts to reach out to disadvantaged community members for input before making key decisions such as recommending or proposing draft sustainable management criteria. We understand that under the Kern Basin's approach to SGMA, the responsibility for community engagement lies with the local water districts where more

[1] CCR sec. 352.28(a), 354.30(b), 354.26(a)

[2] CCR sec. 352.28(b)(4)

[3] California Department of Water Resources, Sustainable Management Criteria Best Management Practices, p. 9. The GSP must discuss how groundwater conditions at a selected minimum threshold could affect beneficial uses and users. This information should be supported by a description of the beneficial uses [of] groundwater and identification of beneficial uses, which should be developed through communication, outreach, and/or engagement with parties representing those beneficial uses and users, along with any additional information the GSA used when developing the minimum threshold.

detailed decisions will be made. To ensure that water districts are doing robust outreach and receiving substantial input from water users, we recommend that the GSA require water districts to conduct outreach to all types of beneficial users and incorporate feedback from all types of beneficial users into their decisions about sustainable management criteria. The GSA should also require water districts to report back on a regular basis in public GSA meetingsWe also recommend the GSA and the water districts engage with community based organizations that can help enhance outreach efforts and outcome.

Another obstacle to ensuring that all beneficial users' needs are incorporated into decisions about sustainable management criteria is the format in which the GSA will be making decisions that impact small communities, when those small communities have no representation on the GSA board. We know this situation is mainly due to the County of Kern's decision to waive its participation in SGMA, and that Kern River GSA reached this format after exploring several options to cover white areas. However, small water agencies like Lamont Public Utilities District will now be regulated by the Kern River GSA, but will have no voting power. The GSA board has never represented the needs of the individuals in Lamont, and is not familiar with their needs. Therefore the need for effective community engagement is imperative in cases like Lamont, as well as Greenfield and other communities that are not directly represented on the GSA board.

Groundwater Quality Minimum Threshold Recommendation

In determining how they will set their sustainable management criteria for groundwater quality, GSAs must consider many factors, including the state Maximum Contaminant Levels (MCLs), collaborating with other agencies currently monitoring and regulating groundwater contaminants in the region, analysis of areas where MCLs are already exceeded, and ways that groundwater management (i.e. pumping and recharge projects) could impact the concentration and movement of groundwater contaminants. We understand the complexity of setting groundwater quality Sustainable Management Criteria (SMC) that are accurate, attainable and measurable, and are eager to work with Central Kings GSA to ensure that groundwater management does not increase groundwater contamination, especially where groundwater is being used as a drinking water source.

Recommendation for Water Quality Minimum Thresholds

Given the need for a concrete minimum threshold that strongly protects the human right to drinking water and to ensure groundwater management actions do not impact drinking water, we recommend that Kern River GSA implement the following minimum thresholds:

- Minimum thresholds for water quality should be set at the best water quality since 2015 for each constituent, or at the Maximum Contaminant Level (MCL), whichever of the two reflects the better quality of water (lower contamination level).

- Where the minimum threshold exceeds the public health goal for any constituent, the GSP should, at a minimum, include a policy to strive for improvements to water quality to the point of meeting the relevant public health goal(s).
- The scope of minimum thresholds for water quality should include all potential water contaminants in order to prioritize ensuring access to safe drinking water.

The reasoning behind these minimum thresholds is that the GSAs are tasked with avoiding any undesirable results, and contamination of groundwater and other drinking water sources is a "significant and unreasonable" impact to the resource that we all need to drink, cook, bathe, grow food, and more. Accordingly, minimum thresholds must ensure protection from and prevention of contamination of groundwater and other drinking water sources. DWR instructs GSAs to look to existing groundwater regulatory programs and water quality standards.[4] Many GSAs have proposed incorporating the existing MCLs into their minimum thresholds, however reliance on an MCL is not sufficiently protective of drinking water sources, and does not prevent contamination of our critical resources.

An appropriate standard in the context of groundwater protections is the state's anti-degradation policy, which is used by the SWRCB and regional water boards, and does not allow for further contamination of groundwater based on the best quality of the water since 1968[5] the year the anti-degradation policy became effective. Given that SGMA became law in 2015, the GSA should, at a minimum ensure the better of highest quality of water achieved since 2015, or the MCL, whichever reflects a lower level of water contamination. Additionally, GSAs must ensure that the project and management actions they are proposing do not cause or exacerbate groundwater contamination, and in fact improve drinking water quality for the near and long term. For example, it is our understanding that GSAs within the Madera Subbasin Joint GSP plan to rely on on-farm recharge. Our organization has expressed concern that recharge on current or retired farmland where toxic pesticides and fertilizers have been applied threaten to significantly contaminate groundwater.

Another rule commonly used in environmental law is the precautionary principle, which prohibits activities that could cause harm when the amount of potential harm is unknown. We urge the GSAs to use these two rules, combined with seeking to remediate groundwater to the public health goal, as laid out above, to ensure that groundwater management does not cause degradation of groundwater quality.

Contaminants to Include in Minimum Threshold

[4]California Department of Water Resources, Sustainable Management Criteria Best Management Practices, p. 15.
[5] *Asociacion de Gente Unida por el Agua v. Central Valley Regional Water Quality Control Bd.* (2012) 210 Cal.App.4th 1255, 1268.

GSAs should monitor all primary drinking water contaminants, as well as chrome-6[6], which is known has significant health effects but is undergoing a new process to set the MCL because of procedural flaws. It is widely known that the San Joaquin Valley experiences widespread water quality issues from nitrates[7], DBCP[8][9], 123-TCP[10] and other contaminants, and the GSA's groundwater management activities could impact the concentration and location of those contaminants. Where relevant, GSAs should also consider monitoring for PFOA and PFOS as the EPA has established a Lifetime Health Advisory for them due to their potential impacts on drinking water systems.[11] Furthermore, GSAs should also monitor contaminants that are proven to increase from groundwater management, such as arsenic and uranium,[12] and closely examine the movement of contaminant plumes from recharge[13] and other groundwater management activities.

Other Considerations for Groundwater Quality Minimum Threshold

GSAs should monitor for contaminant concentrations quarterly, and increase monitoring to every month if a water quality test detects higher contamination concentration than the previous water quality test.

To establish causality between groundwater management activities and groundwater contamination, GSAs should look to (1) whether there has been a correlation in groundwater management pumping and an increase in contamination that could result from groundwater management activities, (2) relevant scientific studies that show proven mechanisms by which causation can be established between groundwater management activities and groundwater contamination, and (3) data and samples collected showing a causal nexus in the case at hand.

---

[6] Hausladen, Debra M., et al. "Hexavalent chromium sources and distribution in California groundwater." *Environmental science & technology* 52.15 (2018): 8242-8251.

[7] *Addressing Nitrate in California's Drinking Water: With a Focus on Tulare Lake Basin and Salinas Valley Groundwater: Report for the State Water Resources Control Board Report to the Legislature*. Center for Watershed Sciences, University of California, Davis, 2012.

[8] Peoples, S. A., et al. "A study of samples of well water collected from selected areas in California to determine the presence of DBCP and certain other pesticide residues." *Bulletin of environmental contamination and toxicology* 24.1 (1980): 611-618.

[9] Loague, Keith, et al. "A case study simulation of DBCP groundwater contamination in Fresno County, California 2. Transport in the saturated subsurface." *Journal of Contaminant Hydrology* 29.2 (1998): 137-163.

[10] Burow, Karen R., Walter D. Floyd, and Matthew K. Landon. "Factors affecting 1, 2, 3-trichloropropane contamination in groundwater in California." *Science of The Total Environment* 672 (2019): 324-334.

[11] "Drinking Water Health Advisories for PFOA and PFOS." *EPA*, Environmental Protection Agency, www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos.

[12] Jurgens, Bryant C., et al. "Effects of groundwater development on uranium: Central Valley, California, USA." Groundwater48.6 (2010): 913-928.; *also see* "Groundwater Quality in the Sustainable Groundwater Management Act (SGMA): Scientific Factsheet on Arsenic, Uranium, and Chromium," found at https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328800/Groundwater_Quality_in_SGMA_Scientific_factsheet_on_arsenic__uranium__and_chromium.pdf?1559328800

[13] Ground Water Recharge Using Waters of Impaired Quality (1994) https://www.nap.edu/read/4780/chapter/3

Finally, in order to effectively protect drinking water resources, GSAs should establish Management Areas in areas that are more vulnerable to groundwater contamination, such as communities with many shallow wells and communities that cannot afford to install drinking water filters or treatment facilities. Kern River GSA has decided to take a different approach to management areas, and has instead defined management areas based on the boundaries of local water districts. This approach does not highlight the importance of monitoring to ensure and protect safe groundwater for folks who depend on small water systems or private water wells. Kern River GSA should form management areas that protect groundwater users who are more vulnerable to contamination, such as homes on private wells and communities with shallow wells.

Groundwater Levels Recommendations

The California legislature has stated that the use of water for domestic purposes is the highest use of water,"[14] and passed the Human Right to Drinking Water in 2012.[15] After the passage of SGMA, GSAs now have the responsibility to protect drinking water through groundwater management. If they choose to allow individuals to keep pumping at the expense of severe drinking water impacts, that is a groundwater management decision that violates their obligation to protect drinking water resources. GSAs must therefore have strong minimum thresholds that protect all drinking water wells from dewatering.

Minimum thresholds are the most pivotal measure for how a GSA will prevent impacts on the sustainability indicators required to be monitored by SGMA. Minimum thresholds are also the point that a GSA must avoid, and could necessitate state intervention. There is some flexibility, however; for groundwater levels, DWR shows in its Sustainable Management Criteria Best Management Practices guide that it will allow a GSA to dip below its minimum threshold for groundwater levels in some cases, as long as its GSP will ensure that it comes back up and towards its measurable objective. Therefore, GSAs should strive to set minimum thresholds at levels that they seek to avoid.

Recommendation for Groundwater Levels Minimum Thresholds

We request that all GSAs set all groundwater levels minimum thresholds at a level to provide a buffer above the depth of the top of the screen of the shallowest well. The buffer must be adequate to ensure that the shallowest well does not go dry due to a short or medium-term exceedance of the minimum threshold. The GSAs should only disregard wells that they can prove are not in use. If GSAs choose not to do so, they must take on the responsibility for the wells that do go dry from this policy choice. impact analysis to evaluate how many drinking water wells will go dry, set management areas for shallower minimum thresholds where there are more concentrated shallow domestic wells, and ensure that drinking water is protected by implementing preventive actions such as digging deeper wells and

[14] Water Code sec. 106.
[15] Water Code sec. 106.3

assisting with consolidation projects. It is important to note that prevention, not mitigation, is the only way to effectively protect drinking water resources.

We have not seen Kern River GSA take any steps in protecting wells that serve individuals and communities. Under SGMA, Kern River GSA has the responsibility to ensure that groundwater management serves the interests of all of the beneficial groundwater users in its service area, including homes on private wells as well as small community water systems. It is important for minimum thresholds to be placed at a level that ensures access to water to the most vulnerable populations who most often rely on private wells or small water districts that tend to have more shallow wells than those used for agriculture purposes.

Other Considerations for Groundwater Levels Minimum Thresholds

In setting groundwater levels minimum thresholds, GSAs should also set minimum thresholds high enough as to avoid groundwater contamination from over pumping. They should also set minimum thresholds that ensure that rural communities have equitable access to groundwater resources, and have enough for current needs and future growth. GSAs must also factor in the increased costs of pumping and installing new wells if groundwater levels decrease, and avoid additional costs in groundwater access for low income communities dependent on groundwater for drinking water resources. GSAs should also set minimum thresholds for groundwater levels that will prevent subsidence from occurring and disrupting infrastructure that is critical to the health and safety of vulnerable communities, such as private wells, roads, and homes.

Monitoring Network

Broadly, GSAs must develop actionable steps to fill data gaps and monitor groundwater levels and groundwater quality. In order to protect drinking water resources, monitoring networks should be closely monitoring impacts on drinking water. In particular to water quality, GSAs should monitor for contaminant concentrations quarterly, and increase monitoring to every month if a water quality test detects higher contamination concentration than the previous water quality test. Testing should also robustly monitor plume migration especially given the high number of groundwater users in the Kings subbasin. The GSA should place monitoring wells near DACs and clusters of domestic wells.

We look forward to providing further recommendations on the monitoring network in the future.

Transparency and Inclusivity

As public agencies, GSAs are subject to the requirements of the Brown Act, which requires transparency of public agencies through notice of meetings and prior posting of agendas, posting of meeting minutes after meetings, and public access to meeting materials upon request by a member of the public. In addition to Brown Act requirements, GSAs must also adhere to the specific public participation

and inclusivity requirements for GSP development laid out in SGMA. SGMA expands the public participation requirements of GSAs to also "*encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin prior to and during the development and implementation of the groundwater sustainability plan.*" (Water Code sec. 10727.8) To assist in GSAs complying with this requirement, DWR has published guidance on public notice and engagement, highlighting good practices for effective engagement. Both the letter and spirit of SGMA communicate that GSAs must conduct GSP development in an open and inclusive way.

In order to comply with the requirements for transparency and inclusivity under the Brown Act and SGMA, ***GSA agendas should contain specific information about the topics to be reviewed, and any action to be taken at the upcoming meeting.*** Additionally, ***meeting minutes should be sufficiently detailed to accurately show what transpired at meetings.*** We acknowledge that Kern River provides interested parties an agenda for the upcoming meeting via email and online via there Kern River GSA website, however these agendas are overly broad, making it difficult for the public to prepare to effectively participate in the meeting. This approach transfers over to the way that the minutes are recorded: minutes are also overly broad; for example, one entry in the meeting minutes from June 20th, 2019 states "Policy Coordination Meeting Update (M. Mulkay) Mark Mulkay, General Manager of Kern Delta Water District, provided update."[16] The minimal way in which meeting minutes are recorded hinders the opportunity for individuals who missed a meeting to understand what was discussed at the meeting. In order to comply with the requirements for transparency and inclusivity under the Brown Act and SGMA, we recommend that Kern River GSA develop more specific agendas and minutes. This will allow the public to effectively participate in the GSP development process and encourage the members of the public to continue to be engaged even if they cannot attend every meeting. to improve.

A best practice to ensure authentic, meaningful input as required by SGMA is to post meeting materials before the meeting, so that these materials are available to the public for feedback and engagement. The Brown Act requires these materials to be made available after the meeting upon written request of the public. Paired with SGMA's requirements for robust community engagement, the most effective way to ensure that the public is aware of what will be discussed and acted upon at meetings, and to access critical GSP development information despite not being able to attend one meeting, is to post all meeting materials online before the meeting. However, GSAs would facilitate more effective public engagement at the meetings if they were to post meeting presentations ahead of time, so that attendees could view the discussion items and data before the meeting. We are aware that Kern River GSA has a dedicated website in which they upload agendas, minutes, and presentations for public access. We request that Kern River GSA make all meeting materials available before each meeting by posting them on their website and sending them out via the interested parties email listserv.

[16] The agenda and minutes from this conversation can be found here: https://www.kerncog.org/wp-content/uploads/2019/06/COG_agenda_20190620.pdf

GSAs should also ***dedicate sufficient funding to ensure meaningful, effective, and accessible engagement of the public***. We, along with Self-Help Enterprises and Community Water Center, have worked with many GSAs' consultants to improve outreach to disadvantaged communities. With other GSAs, we have helped give input on workshops, and have helped conduct outreach for those workshops. We have also kept community residents informed about GSP developments at community meetings. We recommend that Kern River GSA host inclusive community workshops at times and locations that are accessible for a variety of stakeholders, work with organizations like ours and Self-Help Enteprises to host workshops and conduct outreach to disadvantaged communities, and provide food and translation services at workshops. Given the type of outreach that is necessary in order to engage disadvantaged communities, GSAs should also hire bilingual staff or consultants who can help conduct door-to-door outreach, attend community meetings, translate materials, and interpret at all GSA meetings. In creating annual operating budgets, GSAs should prioritize funding for these necessary outreach activities.

Lastly, GSAs ***must make GSP development decisions at public meetings***, and must not make decisions behind closed doors. Making substantive GSP development decisions outside of public meetings goes against the requirements of the Brown Act, as well as SGMA's requirements for "*consideration of all interests*" and "*encourage[ment] of active involvement*" of the public "*during the development...of the groundwater sustainability plan.*" (Water Code sec. 10723.2 and 10727.8) We are aware that Kern River GSA conducts 'manager meetings' as well as 'stakeholder meetings.' However, it has come to our attention that by the time items come to the stakeholder meeting, decisions have already been discussed extensively within manager meetings and are only presented in the stakeholder meetings as informational items, which then go to the board for approval. We encourage and recommend Kern River GSA to be more transparent about what is talked about at Manager meetings, and allow stakeholders at the stakeholder meetings to weigh in on decisions.

Water districts must also adhere to the requirements of the Brown Act in their SGMA-related activities that have been delegated to them by Kern River GSA. The requirement under the Brown Act for legislative agencies like Kern River GSA to only "take action" at public meetings also applies to the water districts to whom the GSA has delegated decision-making power over sustainable management criteria.[17] Water districts are making those decisions at meetings that are not open to the public and are not noticed and agendized in compliance with the Brown Act or the requirements under SGMA for transparency and inclusivity. We recommend that the GSA require all water districts to notice and agendize their meetings, and only make SGMA decisions in public fora where members of the public can attend and participate.

Projects and Management Actions

[17] Gov. Code sec. 54952(c)(1)(A): As used in this chapter, "legislative body" means: A board, commission, committee, or other multimember body that governs a private corporation, limited liability company, or other entity that either: Is created by the elected legislative body in order to exercise authority that may lawfully be delegated by the elected governing body to a private corporation, limited liability company, or other entity.

Projects and Management Actions are a crucial part of the GSP, since they demonstrate how the GSA plans on attaining the sustainability goals that they have set out. Therefore, GSAs should also set specific timelines and triggers for specific projects. In addition, GSAs should include projects to prevent domestic drinking water impacts from lack of protection of domestic and community wells, particularly in disadvantaged communities that are unable to afford the high cost of replacing drinking water infrastructure.

We look forward to presenting more comments on the GSA's projects and management actions in the future.

Groundwater Markets

We have engaged in many discussions around the state about groundwater markets, and continue to warn against them. Commoditizing precious drinking water resources is dangerous and inequitable, since it lets those with more purchasing power have access to more water, and more likely than not will lead to concentrations of over-pumping by large agribusinesses, leaving nearby communities without drinking water. Furthermore, given all GSAs' severe lack of data on domestic wells and water use in their service areas, and our region's lack of understanding of how a market could impact groundwater use and subsurface groundwater flows, implementing groundwater markets now would be precipitous and foolish.

We strongly discourage and oppose the idea of putting groundwater markets into place where communities have already been exhausted of their resources and already carry financial burden to attain basic necessities. Water markets will increase the monetary value of water, hence perpetuating the idea that the wealthy will continue to have access to water leaving the most vulnerable, disadvantaged communities with an uncertainty to their access to water, which is a human right in the state of California. The power of what water markets are able to become, goes against California's declaration of water as a human right in of itself.

We look forward to giving more feedback in the future on the impact of groundwater market on drinking water resources in the GSA area.

~~~~~~~

We look forward to speaking more in depth with consultants, staff, stakeholder committee members and the Board of Directors about our recommendations. We hope that Kern River GSA will consider and incorporate the above recommendations, and hope to collaborate with the GSA to ensure that the GSP protects the subbasin's most vulnerable drinking water users. We are also in communication with the Department of Water Resources about current GSP development activities in the San Joaquin Valley, and hope to successfully work with Kern River GSA and DWR to ensure that groundwater management is equitable and sufficiently protective of vital drinking water resources.
~~~~~~~

Sincerely,

Jasmene Del Aguila and Amanda Monaco
Leadership Counsel for Justice and Accountability

NEW YORK
LONDON
SINGAPORE
PHILADELPHIA
CHICAGO
WASHINGTON, DC
SAN FRANCISCO
SILICON VALLEY
SAN DIEGO
LOS ANGELES
TAIWAN
BOSTON
HOUSTON
AUSTIN
HANOI
HO CHI MINH CITY

DuaneMorris®

FIRM and AFFILIATE OFFICES

COLIN L. PEARCE
DIRECT DIAL: +1 415 957 3015
PERSONAL FAX: +1 415 704 3098
E-MAIL: CLPearce@duanemorris.com

www.duanemorris.com

SHANGHAI
ATLANTA
BALTIMORE
WILMINGTON
MIAMI
BOCA RATON
PITTSBURGH
NEWARK
LAS VEGAS
CHERRY HILL
LAKE TAHOE
MYANMAR
OMAN
A GCC REPRESENTATIVE OFFICE OF DUANE MORRIS

ALLIANCES IN MEXICO
AND SRI LANKA

August 13, 2019

VIA EMAIL AND U.S. MAIL

Jasmene del Aguila
Amanda Monaco
Leadership Counsel for Justice and Accountability
1527 19th Street, Suite 212
Bakersfield CA 93301

Re: July 10, 2019 Letter to Kern Delta Water District and KRGSA

Dear Ms. del Aguila and Ms. Monaco:

This letter responds to the July 10, 2019, letter from the Leadership Counsel for Justice and Accountability ("Counsel") which you delivered to the Kern River Groundwater Sustainability Agency ("KRGSA") at its July 11, 2019 regular meeting, in Bakersfield, California. I understand you also emailed the letter to the Kern Delta Water District ("Kern Delta") prior to the KRGSA meeting.

I am special water counsel for the City of Bakersfield ("City"). The KRGSA consists of the City, Kern Delta and Improvement District No. 4 ("ID 4") of the Kern County Water Agency. The City authorized me to respond to your letter on behalf of the KRGSA and its member agencies.

Your letter states that the Counsel is involved in the Sustainable Groundwater Management Act ("SGMA") implementation process. The letter states that the Counsel is "concerned that drinking water impacts and disadvantaged community input have not been adequately analyzed and incorporated into the draft GSP." The letter also refers to an "umbrella approach that Kern basin GSAs are using to create GSPs in collaboration with local water districts," and further refers to "local GSP chapters" that are being created by water districts for "their particular service areas."

We are not sure what "draft GSP" your letter references. The KRGSA has not yet disseminated a draft Groundwater Sustainability Plan ("GSP") for public review. The KRGSA further does not intend to have its members utilize an "umbrella approach" to GSP preparation, or have its members prepare separate or distinct "GSP chapters" for their service areas. The KRGSA instead intends to prepare and distribute for public review a single GSP for the entire KRGSA service area. The KRGSA's GSP will thereafter be coordinated with GSPs prepared by other GSAs within the Kern Subbasin, to produce "a single plan covering the entire basin developed and implemented by multiple groundwater sustainability agencies." (Water Code §10727.)

Your letter also recommends that the KRGSA take a number of "actions" to "ensure that drinking water is protected, especially for the communities whose drinking water is severely at risk from groundwater management activities." (P. 1.) Your letter contends that these actions are required by SGMA as part of the process of developing sustainable management criteria.

Although we appreciate your suggestions and recommendations with regard to the contents of a GSP, we do not believe your letter accurately states or represents the requirements of SGMA, or the obligations of GSAs in connection with water quality issues.

In particular, we do not agree that "GSAs now have the responsibility to protect drinking water through groundwater management." (P. 5.) Enhancement or protection of water quality is not listed as one of the purposes or goals of SGMA. SGMA instead was intended to (1) provide for the sustainable management of groundwater basins, (2) enhance local management of groundwater consistent while preserving the security of water rights in the state, (3) establish minimum standards for sustainable groundwater management, (4) provide local agencies with the authority and technical and financial assistance necessary to sustainably manage groundwater, (5) avoid or minimize subsidence, (6) improve data collection and understanding about groundwater, (7) increase groundwater storage and remove impediments to recharge, (8) manage groundwater basins locally while minimizing state intervention, and (9) provide a more efficient and cost-effective groundwater adjudication process. (Water Code §10720.1.)

Federal, State and local agencies still have primary responsibility for protecting drinking water, and water quality. SGMA did not authorize or direct GSAs to assume authority or responsibility for the regulation of water quality. SGMA was not intended to limit or alter the authority of the State Water Resources Control Board, the Department of Water Resources, the State Department of Public Health, or any other regulatory agency. (Water Code §10726.8(c).) SGMA does not supersede "the land use authority of cities and counties." (Water Code §10726.8(f).) SGMA additionally was not intended to and does not determine or alter surface water rights or groundwater rights. (Water Code §10720.5(b).)

We do recognize that GSPs should "discuss how groundwater conditions at a selected minimum threshold could affect beneficial uses and users." (P. 2, n. 4.) We understand that GSPs should, "as applicable to the basin," address the "monitoring and management of

groundwater quality, groundwater quality degradation, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin." (Water Code §10727.2(d)(2).) We also acknowledge that GSPs should avoid "undesirable results," which are defined to include "significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies." (Water Code §10721(x)(4).)

We do not agree, however, that GSAs must establish Maximum Contaminant Levels (MCLs) for groundwater contaminants, or set "minimum thresholds for water quality." We further do not agree that GSPs should direct or authorize its members to assume responsibility for "monitoring groundwater quality under the Kern River/ Kern Groundwater Authority GSA's Groundwater Sustainability Plans," or to "monitor all primary drinking water contaminants, as well as chrome-6." (P. 4.)

SGMA does not require member agencies to monitor or test for drinking water contaminants, as part of the GSP process or in connection with the implementation of a GSP. SGMA does not expand or increase existing monitoring and testing requirements for water quality conditions. SGMA does not require GSAs to address or include water quality conditions in their regular reports to the State following adoption of a GSP. (Water Code §10728.)

GSPs instead are only required to address, in connection with water quality issues, "migration of contaminated groundwater," and "measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects." (Water Code §10727.4.) Those matters, moreover, need only be addressed in a GSP "where appropriate and in collaboration with the appropriate local agencies." (*Id.*)

SGMA further does not require GSAs or members of GSAs, as part of the GSP process, to "establish" or consider any alleged causality between management and contamination, as you claim at page 5 of your letter. GSAs are additionally not required to "place management areas around areas where there are a high number of vulnerable private well owners and community water systems." (P. 5.)

We still welcome comments and input from members of the public and interested organizations, including the Counsel, in the SGMA process. The KRGSA will take the comments in your letter, which are relevant and applicable to SGMA and the preparation of GSPs into consideration in the course of preparing and implementing the GSP for the KRGSA.

We also acknowledge and appreciate your suggestions and comments regarding engagement of the public in the SGMA and GSP planning process. The KRGSA has undertaken many of the steps proposed in your letter in order to engage and inform the public during the SGMA and GSP process. The KRGSA conducted or participated in a number of community meetings and forums, and has made direct outreach to members of the community, including to

disadvantaged communities. The KRGSA has also complied with the requirements of the Brown Act, and otherwise made decisions and had discussions regarding the GSP and SGMA at properly noticed public meetings.

The KRGSA has considered, and intends to continue to consider, "the interests of all beneficial uses and users of groundwater," including, but not limited to, domestic well owners, public water systems, and "[d]isadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems." (Water Code §10723.2.) Through its education and outreach efforts, the KRGSA, and its members, have "actively engag[ed] with all types of beneficial users and encouraging the participation of local grassroots organizations as GSP chapters are being developed," as you recommend in your letter.

We thank you for your comments and suggestions. We look forward to working with you and other members of the public through the process of preparing, adopting and implementing the GSP for the KRGSA, and coordinating GSPs for the entire subbasin.

Sincerely,

Colin L. Pearce

CLP:bah

cc: City of Bakersfield,
Kern Delta Water District
Improvement District No. 4 of the Kern County Water Agency

From: Phyllis Stanin <PStanin@toddgroundwater.com>
Sent: Saturday, October 26, 2019 3:04 PM
To: Moehnke, Janie <JMoehnke@chevron.com>
Cc: Mark Mulkay <Mark@kerndelta.org>
Subject: [**EXTERNAL**] RE: KERN RIVER GSA DRAFT GSP

Hi Janie – your comments are in and much appreciated (see response in red font on your email below).
Your Word file for section 3 was missing page 3-50; so sorry about that - I have no idea how that could have even happened, but I have attached it to this email for your use.
Thank you again for your review,
Phyllis

Phyllis S. Stanin
Vice President and Principal Geologist

TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
510.747.6920 x116
pstanin@toddgroundwater.com
www.toddgroundwater.com

From: Moehnke, Janie <JMoehnke@chevron.com>
Sent: Thursday, October 24, 2019 11:44 AM
To: Mark Mulkay <Mark@kerndelta.org>; Phyllis Stanin <PStanin@toddgroundwater.com>
Subject: FW: KERN RIVER GSA DRAFT GSP

Good morning. I apologize for my previous email that was a bit premature.

Chevron has reviewed Kern River GSA's Draft GSP and has a few comments and proposed changes.

We have attached copies of GSPs with redline comments as detailed below:

In Section 3 on Page 3 -49, Chevron would like to add the word "water". **DONE** We also believe Page 3-50 is missing based on the last sentence is not finished on the next page which is 3-52. **See missing page 3-50 attached.**

In Section 5, Page 5-29 we would like to add the word "water" and remove a sentence related to critical infrastructure. **DONE**

Figure 3-14 – please see comment on the third attachment. Your comment on the attached cross section (**Figure 3-14**) requested moving the oil producing zone to 400 feet (shallowest production in the Kern River Field), but we had already qualified in the text that the production had been adjusted to show the depth at the location of the cross section, as noted in Section 3.2.5.1 (page 3-15, 1st paragraph, last sentence), which reads **"Although the shallowest production in the Kern River oil field is at about 400 feet deep, the depth to the production zone at the location of the cross section is the depth depicted on Figure 3-14 (more than 1,000 feet deep)."** This was done to avoid confusion about the use of the shallow Kern River Formation for water supply throughout the remainder of the KRGSA Plan Area. To address your comment, we have added the following note to the legend on Figure 3-14: "Production from the Kern River Oilfield is shallower (400 feet) immediately north of the KRGSA than shown on the cross section." In addition, we have placed the bottom of the groundwater basin above the top of all of the production from the Kern River Oilfield.

Please let me know if you have any questions or would like to discuss further.

Janie Moehnke
Agriculture, Surface Land & Water Representative
San Joaquin Valley Land Division

Chevron North America
Exploration and Production Company
9525 Camino Media (P.O. Box 6)
Bakersfield, CA 93311 (93302)
Tel 661 654-7071 Fax 661 654-7392

E-mail: JMoehnke@chevron.com

From: Moehnke, Janie <JMoehnke@chevron.com>
Sent: Thursday, October 24, 2019 11:44 AM
To: Mark Mulkay <Mark@kerndelta.org>; Phyllis Stanin <PStanin@toddgroundwater.com>
Subject: FW: KERN RIVER GSA DRAFT GSP

Good morning. I apologize for my previous email that was a bit premature.

Chevron has reviewed Kern River GSA's Draft GSP and has a few comments and proposed changes.

We have attached copies of GSPs with redline comments as detailed below:

In Section 3 on Page 3 -49, Chevron would like to add the word "water". We also believe Page 3-50 is missing based on the last sentence is not finished on the next page which is 3-52.

In Section 5, Page 5-29 we would like to add the word "water" and remove a sentence related to critical infrastructure.

Figure 3-14 – please see comment on the third attachment.

Please let me know if you have any questions or would like to discuss further.

Janie Moehnke
Agriculture, Surface Land & Water Representative
San Joaquin Valley Land Division

Chevron North America
Exploration and Production Company
9525 Camino Media (P.O. Box 6)
Bakersfield, CA 93311 (93302)
Tel 661 654-7071 Fax 661 654-7392

E-mail: JMoehnke@chevron.com

1149 SOUTH BROADWAY, 9TH FLOOR
LOS ANGELES, CA 90015
TEL: (213) 485-2210
FAX: (213) 485-2979
WWW.LACITYSAN.ORG

November 20, 2019

Kern River GSA Board and Staff
Kern River Groundwater Sustainability Agency
1600 Truxtun Avenue
Bakersfield, CA 93301

Dear Kern River Groundwater Sustainability Agency Board and Staff:

COMMENT LETTER – KERN RIVER GROUNDWATER SUSTAINABILITY AGENCY DRAFT GROUNDWATER SUSTAINABILITY PLAN (GSP)

City of Los Angeles, LA Sanitation and Environment (LASAN) appreciates the opportunity to comment on the Kern River Groundwater Sustainability Agency (KRGSA) Draft Groundwater Sustainability Plan (GSP). LASAN owns and operates Green Acres Farm (GAF) located in Kern County 16 miles southwest of Bakersfield and one mile northeast of Lake Buena Vista. The Farm grows wheat, corn, alfalfa, oats, milo, and sudan grass that are sold to several local dairies as feedstock. The Farm land applies Class A–EQ biosolids produced at LASAN's Hyperion Water Reclamation Plant in Playa Del Rey, CA (90293). The biosolids are transported and applied by Responsible Biosolids Management, Inc. (RBM). GAF currently uses effluent from Bakersfield WWTP No. 3 as well as water from Kern Delta Water District (KDWD). Approximately one third of GAF (1,300 acres) is part of KDWD and therefore a part of the KRGSA. However, the remaining 3,388 acres are classified as undistricted "whitelands." In a letter to the KRGSA dated August 2019, LASAN requested this land to be "managed" by the KRGSA, to keep all lands of one property in one plan, and to ensure coverage as required by Sustainable Groundwater Management Act (SGMA).

As the development of the safe basin yield and annual pumping requirements are developed over the next few years, LASAN requests to be included as a stakeholder in the creation of any future limitations for groundwater pumping from wells. As GAF farming operations require water from the groundwater supply, LASAN requests the opportunity to comment on any proposed restrictions as well as any future groundwater management projects that may in any way change allowable water limits from any source.

LASAN's specific comments on the KRGSA's GSP are as follows:

1) On page 36, table 2-1, it is reported that "about 18,000 AF of recycled water is exported for irrigation at Green Acres Farm". **This number is not correct**. Based on our records, we only received approximately 6.45 Million Gallons per Day (MGD) (7,227 Acre Feet (AF) per year) in Fiscal Year (FY) 18/19. If we go further back of the records, from 2014 to present, we have been receiving an average of 10.3 MGD (11,540 AF per year). These numbers are much less than the 18,000 AF reported in the GSP.
2) 2) On page 196, it states that "All effluent discharged between February and September was provided to Green Acres Farm for irrigation". **This statement is not correct**. Based on our records, we only received an average range of 9 MGD to 16 MGD for that period. For example, we received only an average of 8.74 MGD between February and September in 2001, and we received an average of 16.5 MGD between Feb and Sep in 2014.

LASAN looks forward to continued effective dialogue on the KRGSA's GSP and any groundwater restrictions that may be imposed in the future. As our comments are reviewed by KRGSA staff, we would welcome one or more meetings to discuss some of our outstanding issues and work together on solutions that will help us reach the healthy basin yield goals by 2040.

If you have any questions, please contact Tim Dafeta, Hyperion Water Reclamation Plant Manager, at (310) 648–5555 or by email at timeyin.dafeta@lacity.org.

Sincerely,

ENRIQUE C. ZALDIVAR, P.E.
Director and General Manager
LA Sanitation and Environment

ECZ/CJ:km

c: Tim Dafeta, LASAN
Mas Dojiri, LASAN
Traci Minamide, LASAN
Hassan Rad, LASAN

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

November 25, 2019

Via Mail and Electronic Mail

Art Chianello, Water Resources Manager
Kern River Groundwater Sustainability Agency
City of Bakersfield
1600 Truxtun Avenue
Bakersfield, California 93301

Emails: krgsa@kernrivergsa.org
achianel@bakersfieldcity.us

Subject: Comments on the Kern River Groundwater Sustainability Plan

Dear Mr. Chianello:

The California Department of Fish and Wildlife (Department) Central Region is providing comments on the Kern River Draft Groundwater Sustainability Plan (GSP) prepared by the Kern River Groundwater Sustainability Agency (KRGSA) for its portion of the Kern County Subbasin (subbasin), pursuant to the Sustainable Groundwater Management Act (SGMA). As trustee agency for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & G. Code §§ 711.7 and 1802).

Development and implementation of Groundwater Sustainability Plans under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems and species depend on groundwater and interconnected surface waters, including ecosystems on Department-owned and -managed lands within SGMA-regulated basins. SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to Groundwater Sustainability Plans:

- Groundwater Sustainability Plans must identify and consider impacts to groundwater dependent ecosystems (GDE) pursuant to 23 California Code of Regulations (CCR) § 354.16(g) and Water Code § 10727.4(l); and

- Groundwater Sustainability Agencies must consider all beneficial uses and users of groundwater, including environmental users of groundwater pursuant to Water Code §10723.2 (e); and Groundwater Sustainability Plans should identify and consider potential effects on all beneficial uses and users of groundwater

pursuant to 23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3); and

- Groundwater Sustainability Plans must establish sustainable management criteria that avoid undesirable results within 20 years of the applicable statutory deadline, including depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water pursuant to 23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b) and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters pursuant to 23 CCR § 354.34(c)(6)(D); and

- Groundwater Sustainability Plans must account for groundwater extraction for all Water Use Sectors including managed wetlands, managed recharge, and native vegetation pursuant to 23 CCR §§ 351(al) and 354.18(b)(3).

Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to navigable surface waters and surface waters tributary to navigable surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844). Accordingly, groundwater plans should consider potential impacts to and appropriate protections for navigable interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statues and regulations, and Public Trust Doctrine considerations, the Department values SGMA groundwater planning that carefully considers and protects groundwater-dependent ecosystems, fish and wildlife beneficial uses, and users of groundwater and interconnected surface waters.

COMMENT OVERVIEW

The Department supports ecosystem preservation in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science. The Department recommends that the GSP provide additional information and analysis that considers all environmental beneficial uses and users of groundwater in its sustainability management criteria, and better characterize and consider surface water-groundwater connectivity. The Department is providing additional comments and recommendations below.

GSP COMMENTS AND RECOMMENDATIONS

1. **Comment #1. Plan Area.** Chapter 2 Plan Area. Section 202 Agencies and Jurisdictional Boundaries, Subsection 2.2.1 Jurisdictional Boundaries of Federal and State Lands in KRGSA (pages 2-2 to 2-3) and Figure 2-2.

   As stated on page 2-2, the Department owns the Bakersfield Cactus Ecological Reserve Hart Unit with scattered parcels along and near the northeastern boundary of the GSP area. These properties do not have any wells present.

2. **Comment #2. Environmental Beneficial Users of Groundwater.** Chapter 5 Sustainable Management Criteria (page 5-2).

   The GSP includes an 'environmental' category of beneficial user but does not specify how impacts to environmental beneficial uses and users of groundwater were considered throughout the GSP.

   a. *Issue:* The GSP identifies a sustainability goal to manage groundwater sustainably to support "current and future beneficial uses of groundwater including municipal, agricultural, industrial, public supply, domestic, and environmental" (page 5-2). Environmental beneficial users of groundwater are mentioned in the sustainability goal, but there is little explanation on how these beneficial users rely on groundwater and how they were considered in the development of Sustainable Management Criteria (SMC) and the design of a monitoring system. There is also no identification and description of beneficial uses and users of groundwater earlier in the GSP in the Notice and Communication section, as is required by 23 CCR § 354.10(a).

   b. *Recommendation:* The Department recommends that the GSP identify specific habitats and species that may depend on groundwater in the subbasin and define for these beneficial users their relationship to groundwater and potential undesirable results and related causes within SMC. A good reference is the Critical Species Lookbook (https://groundwaterresourcehub.org/sgma-tools/the-critical-species-lookbook/) (TNC 2019) for threatened and endangered species in your basin, as well as for narrative on species and habitat groundwater dependence that can be a model for describing environmental beneficial uses and users of groundwater in the GSP. The Department then recommends identifying appropriate monitoring approaches that track environmental beneficial users over time and that can capture early signs of adverse impacts such as stressed phreatophyte vegetation.

3. **Comment #3. Interconnected Surface Waters and Groundwater-Dependent Ecosystems**. Chapter 3 Hydrogeological Conceptual Model and Groundwater Conditions. Section 3.3 Groundwater Conditions. Subsection 3.3.6

Interconnected Surface Water and Groundwater Dependent Ecosystems (pages 3-49 to 3-59 and Figures 3-40 to 3-48).

The GSP identifies the potential for interconnected surface waters (ISW) and GDE but concludes their absence without further study.

a. *Issue:* The GSP generally describes an absence of shallow groundwater other than under perched conditions (pages 3-13, 3-27 to 3-28, 3-49, 3-56) and identifies surface waters as disconnected from groundwater (page 3-49, 3-51, 3-59).

   Under these conditions, the GSP concludes there are no ISW or GDE in the GSP area. This conclusion merits further investigation. The GSP relies on other analyses from the Kern Groundwater Authority and Kern Water Bank to conclude there are no ISW. These analyses do not provide detailed empirical evidence of disconnection along the length of the Kern River, nor do they evaluate connectivity based on a robust hydrologic baseline that considers a range of water years. Additionally, the Kern Water Bank identifies losing stream conditions downstream of the GSP area (Page 3-50 to 3-51), but the GSP conclusion that 'losing' conditions equate to disconnection from groundwater is fallible, because rivers can still be hydraulically connected to groundwater – and therefore impacted by pumping – while losing water to the subsurface aquifer (Barlow and Leake 2012). Finally, though the conclusion that all potential GDE are likely surface water dependent or reliant on perched aquifers is thoroughly discussed (page 3-55 to 3-59), it still includes data gaps and uncertainty (page 3-58 to 3-59).

b. *Recommendation:* Until such time as ISW and GDE can be verified with empirical evidence, the Department recommends that the GSP include all potential GDE as beneficial users of groundwater and identify continued efforts to confirm the presence or absence of GDE and surface water-groundwater interconnection. Further data collection to reduce uncertainty around ISW and GDE may include the following:

   i. Installation of shallow groundwater monitoring wells near potential GDE and interconnected surface water, potentially pairing multiple-completion wells with streamflow gauges, for improved understanding of potential surface water-groundwater interconnectivity, particularly in the eastern-most reaches of the jurisdictional Kern River and the northeastern GSP area. The northeastern area is identified as a data gap in Table 3-6 (page 3-61). The Kern County Water Authority (KCWA) shallow monitoring well network may help illustrate shallow groundwater elevations/depth to groundwater water. The Semitropic Water Storage District Management Area Plan (2019) on page 81 summarizes that "KCWA has published high quality contour maps of the shallow aquifer zone which is typically

considered groundwater above the A-clay or equivalent. These maps were published from 1979 to 2011. KCWA collects data during the summer months (usually July or August) from as many of the 300+ wells. The perforations typically range from 5 to 10 feet in length and are typically completed in shallow wells less than 100 feet deep, many of which are 20 feet deep."

ii. Inclusion of additional references for a more robust GDE evaluation pursuant to 23 CCR § 354.16 (g). The Department recognizes that the Natural Communities Commonly Associated with Groundwater (Klausmeyer et al. 2018) provided by California Department of Water Resources (CDWR) is a good starting reference for GDE. There are additional resources available for evaluating GDE locations and habitat types, as well as information for State and Federal listed species. These recommended references include, but are not limited to the following tools and other resources: the California Department of Fish and Wildlife (CDFW) Vegetation Classification and Mapping Program (VegCAMP) (CDFW 2019A); the CDFW California Natural Diversity Database (CNDDB) (2019B); the California Native Plant Society (CNPS) Manual of California Vegetation (CNPS 2019A); the CNPS California Protected Areas Database (CNPS 2019B); the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (2018); the USFWS online mapping tool for listed species critical habitat (2019); the United States Forest Service CALVEG ecological grouping classification and assessment system (2019); and other publications by Klausmeyer et al. (2019), Rohde et al. (2018), The Nature Conservancy (TNC) (2014, 2019), and Witham et al. (2014).

4. **Comment #4. Sustainable Management Criteria.** Chapter 5 Sustainable Management Criteria (starting page 5-1).

   The SMC demonstrate limited consideration of undesirable results for environmental beneficial uses and users of groundwater and do not reflect a 'Critically Overdrafted' basin status.

   a. *Issues:*
      i. The GSA defines undesirable results for water levels only as "the point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth/elevation of water, affect the reasonable and beneficial use of, and access to, groundwater by overlying users" (page 5-11). Despite inclusion of environmental beneficial users in the sustainability goal (page 5-2), the analysis of undesirable result causes and effects for water levels (and all SMC) focuses on impacts to wells and extractors without consideration of environmental users (starting page 5-10).

ii. The subbasin is characterized by CDWR as 'Critically Overdrafted,' meaning "continuation of present water management practices [in the basin] would probably result in significant adverse overdraft-related environmental, social, or economic impacts" (CDWR "Critically Overdrafted"). The GSP identifies minimum groundwater elevation thresholds for representative monitoring wells (page 6-3), each of which serves as a threshold beyond which adverse effects are expected. These minimum thresholds are considered triggering of significant and unreasonable effects, or undesirable results, only when "minimum threshold for groundwater levels are exceeded in at least three (3) adjacent management areas which represent at least 15% of the sub-basin or greater than 30% of the Sub-Basin (as measured by each Management Area)" (page 5-11). Many of these minimum thresholds accommodate 20-foot to 50-foot groundwater elevation decreases beyond historic lows, which in and of themselves, are already reflective of 40+ feet of drought-induced groundwater decline (page 3-27). The combination of minimum threshold exceedances required to constitute an undesirable result translates to a significant duration and geographic extent of very low groundwater levels, especially because there are only three management areas in the GSP area. The GSP SMC therefore may allow continued groundwater table decline, mirroring the historical trends that led to the subbasin's Critically Overdrafted status. Conceptually, there is a disconnect between the subbasin's 'Critically Overdrafted' designation and SMC that allow for continued groundwater level decline.

iii. The GSP relies on groundwater elevations as a proxy for all four SMC (page 5-7), citing applicability under the GSP regulations. The GSP states, "water levels are directly linked to how the indicator is being applied in this GSP. The actual water level for each MT may require future adjustment, however, once the aquifer response to management actions is more accurately measured" (page 5-35). The regulations state, "groundwater elevations may be used as a proxy for monitoring other sustainability indicators if [...] significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy" [23 CCR § 354.36 (b)(1)]. The GSP does not justify use of a proxy for the water quality sustainability indicator with specific evidence of a significant correlation between constituents of concern and groundwater elevation (starting page 5-23).

b. *Recommendations:*

i. Revise the SMC and accompanying narrative accounting for undesirable results for environmental beneficial users of groundwater. Clarify how species and habitat groundwater needs were considered in the identification of SMC (see Comment #2). Reconsider development of SMC

for interconnected surface water depletions after further investigation of surface water-groundwater interconnectivity (see Comment #3).

ii. Revise the SMC to reflect a 'Critically Overdrafted' subbasin designation by seeking to improve current groundwater conditions rather than allowing for continued aquifer depletions over the next two decades. Establish groundwater elevation minimum thresholds no lower than historical low groundwater elevations to avoid significant and unreasonable impacts to beneficial uses and users of groundwater.

iii. Clarify how groundwater elevation is an apt proxy for water quality constituents of concern with evidence of significant correlation.

OTHER COMMENTS: Implementation of Project Actions Related to SGMA

The Department is also commenting on its subsequent role as Trustee and Responsible Agency when individual project actions related to SGMA are implemented.

SGMA exempts the preparation and adoption of GSPs from the California Environmental Quality Act (CEQA) (WC §10728.6); however, SGMA specifically states that implementation of project actions taken pursuant to SGMA are not exempt from CEQA (WC §10728.6). The Department is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). The Department, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id.*, § 1802). Similarly, for purposes of CEQA, the Department is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

The Department is also a Responsible Agency under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381), and the Department expects that it may need to exercise regulatory authority as provided by the Fish and Game Code for implementation of projects related to the GSP that are also subject to CEQA. These projects may be subject to the Department's lake and streambed alteration regulatory authority (i.e., Fish & G. Code, § 1600 et seq.). Notification pursuant to Fish and Game Code § 1602 is warranted if a project will (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of any river, stream, or lake (including the removal of riparian vegetation); and/or (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. Likewise, to the extent that implementation of any project may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization

as provided by the Fish and Game Code will be required. The Department is required to comply with CEQA in its issuance of a Lake or Streambed Alteration Agreement or an Incidental Take Permit.

The implementation of SGMA does not alter or determine surface or groundwater rights (WC §10720.5). It is the intent of SGMA to respect overlying and other proprietary rights to groundwater, consistent with section 1200 of the Water Code (Section 1(b)(4) of AB 1739). The capture of unallocated stream flows to artificially recharge groundwater aquifers are subject to appropriation and approval by the State Water Resources Control Board (SWRCB) pursuant to Water Code § 1200 et seq. The Department, as Trustee Agency, is consulted by SWRCB during the water rights process to provide terms and conditions designed to protect fish and wildlife prior to appropriation of the State's water resources. Certain fish and wildlife are reliant upon aquatic and riparian ecosystems, which in turn are reliant upon adequate flows of water. The Department therefore has a material interest in assuring that adequate water flows within streams for the protection, maintenance and proper stewardship of those resources. The Department provides, as available, biological expertise to review and comment on environmental documents and impacts arising from project activities.

CONCLUSION

In conclusion, the GSP needs to address all SGMA statutes and regulations, and the Department recommends that the GSP seriously consider fish and wildlife beneficial uses and interconnected surface waters. The Department recommends that the KRGSA consider the above comments before the GSP is submitted to CDWR. The Department appreciates the opportunity to provide comments on the GSP. If you have any further questions, please contact Dr. Andrew Gordus, Staff Toxicologist, at Andy.Gordus@wildlife.ca.gov or (559) 243-4014, extension 239.

Sincerely,

for Julie Vance

Julie A. Vance
Regional Manager, Central Region

Attachment (Literature Cited)

ec: See Page Nine

ec: **California Department of Fish and Wildlife**

Joshua Grover, Branch Chief
Water Branch
Joshua.Grover@wildlife.ca.gov

Robert Holmes, Environmental Program Manager
Statewide Water Planning Program
Robert.Holmes@wildlife.ca.gov

Briana Seapy, Statewide SGMA Coordinator
Groundwater Program
Briana.Seapy@wildlife.ca.gov

Annee Ferranti, Environmental Program Manager
Central Region
Annee.Ferranti@wildlife.ca.gov

Andy Gordus, Staff Toxicologist
Central Region
Andy.Gordus@wildlife.ca.gov

Annette Tenneboe, Senior Environmental Scientist Specialist
Central Region
Annette.Tenneboe@wildlife.ca.gov

John Battistoni, Senior Environmental Scientist Supervisor
Central Region
John.Battisoni@wildlife.ca.gov

California Department of Water Resources

Craig Altare, Supervising Engineering Geologist
Sustainable Groundwater Management Program
Craig.Altare@water.ca.gov

Matt Owens, SGMA Point of Contact
South Central Region Office
Matthew.Owens@water.ca.gov

State Water Resources Control Board

Natalie Stork, Chief
Groundwater Management Program
Natalie.Stork@waterboards.ca.gov

Literature Cited

Barlow, P.M. and S.A. Leake. 2012. Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376.

California Department of Fish and Wildlife (CDFW). 2019A. Vegetation Classification and Mapping Program. Available from https://www.wildlife.ca.gov/Data/VegCAMP

CDFW. 2019B. CNDDB (California Natural Diversity Database). Rarefind Version 5. Internet Application. CDFW, Sacramento, California. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data

California Department of Water Resources (CDWR) 2019. Critically Overdrafted Basins. https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118/Critically-Overdrafted-Basins

California Native Plant Society (CNPS). 2019A. A Manual of California Vegetation, online edition. http://www.cnps.org/cnps/vegetation/

CNPS. 2019B. California Protected Areas Database. (CPAD). Sacramento, California. https://www.calands.org/cpad/

Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, and A. Lyons. 2018. Mapping indicators of groundwater dependent ecosystems in California. https://data.ca.gov/dataset/natural-communities-commonly-associated-groundwater

Klausmeyer, K. R., T. Biswas, M. M. Rohde, F. Schuetzenmeister, N. Rindlaub, and J. K. Howard. 2019. GDE pulse: taking the pulse of groundwater dependent ecosystems with satellite data. San Francisco, California. Available at https://gde.codefornature.org. (Same as:TNC. 2019. GDE pulse. Interactive map. Website. https://gde.codefornature.org/#/home

Rohde, M. M., S. Matsumoto, J. Howard, S. Liu, L. Riege, and E. J. Remson. 2018. Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans. The Nature Conservancy, San Francisco, California.

Semitropic Water Storage District. 2019. Semitropic Water Storage District GSA Management Area Plan. http://www.kerngwa.com/assets/semitropic-water-storage-district-gsa-management-area-plan_draft.pdf

The Nature Conservancy (TNC). 2014. Groundwater and stream interaction in California's Central Valley: insights for sustainable groundwater management. Prepared by RMC Water and Environment.

TNC. 2019. The Critical Species LookBook. Groundwater Resource Hub. https://groundwaterresourcehub.org/sgma-tools/the-critical-species-lookbook/

U.S. Forest Service. 2019. Landsat-based classification and assessment of visible ecological groupings, USDA Forest Service (March 2007). https://www.fs.fed.us/r5/rsl/projects/classification/system.shtml

U.S. Fish and Wildlife Service (USFWS). 2018. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

USFWS. 2019. Threatened & Endangered Species Active Critical Habitat Report: online mapping tool. https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77

Witham, C. W., R. F. Holland, and J. E. Vollmar. 2014. Changes in the Distribution of Great Valley Vernal Pool Habitats from 2005 to 2012. Prepared for CVPIA Habitat Restoration Program, U.S. Fish and Wildlife Service, Sacramento, CA. USFWS Grant Agreement No. F11AP00169 with Vollmar Natural Lands Consulting. October 14.

Sent via Email

Kern River GSA
krgsa@kernrivergsa.org

November 26th, 2019

Re: Comments on Kern River GSA Draft Groundwater Sustainability Plan

Dear Kern River GSA Board of Directors,

Leadership Counsel for Justice and Accountability works alongside low income communities of color in the San Joaquin Valley and the Eastern Coachella Valley. As is most relevant here, we work in partnership with community leaders that represent communities of Fuller Acres, Lamont, and Weedpatch to advocate for local, regional and state government entities to address their community's needs for the basic elements that make up a safe and healthy community, including safe and affordable drinking water, affordable housing, effective and safe transportation, efficient and affordable energy, green spaces, and clean air.

We have been engaged in the Sustainable Groundwater Management Act (SGMA) implementation process because most of the communities with which we work are wholly dependent on groundwater for their drinking water supplies, and many have already experienced groundwater quality and supply issues. Communities we work have not been included in decision-making about their precious water resources, and their needs are not at the forefront of such decisions. In 2012, California recognized the Human Right to Water for domestic purposes, and required that state agencies consider this human right in their activities. State law also requires that GSAs avoid disparate impacts on protected classes. SGMA's requirements for a transparent and inclusive process present an opportunity in the context of groundwater management to meaningfully include disadvantaged communities in decision-making, and to create groundwater management plans that understand their unique vulnerabilities, are sensitive to their drinking water needs, and avoid causing disparate negative impacts on low-income communities of color.

We submit these comments to elevate our concerns that the Kern River Groundwater Sustainability Agency's (KRGSA) Draft Groundwater Sustainability Plan (Draft GSP) is incomplete, does not adequately consider the needs of disadvantaged communities and drinking water users protected under state and federal civil rights law, has structured its sustainable management criteria and management areas in a way that puts drinking water resources at risk, does not adequately address groundwater quality, and does not include projects and management actions to protect drinking water users from severe and widespread drinking water impacts. Our

review shows that the Draft GSP neither adequately analyzes nor incorporates input from disadvantaged communities and domestic well users, and will create a disparate impact on protected classes unless modified to protect drinking water resources for disadvantaged communities unless significant changes are made. We include herein our comments with respect to deficiencies in the Draft GSP as well as recommendations for improvements.

~ ~ ~ ~ ~ ~

Table of Contents

~ ~ ~ ~ ~ ~

The Draft GSP is Incomplete, and Must Include Additional Information For the Public to Evaluate the GSP

The Kern River GSP lacks critical information on the assumptions and information used in the water budget, lacks any demonstration of how the GSA considered the impact on drinking water needs from the proposed sustainability criteria and the structure of the management areas, lacks adequate action on recognized groundwater contaminants, and lacks projects and management actions to address drinking water issues caused by groundwater management activities. The Draft GSP also fails to demonstrate how its proposed policies and activities will achieve its sustainability goal, which SGMA requires.[1]

The Draft GSP cannot be adopted until all of the above information is made available to the public for public review during a new review period.

The Kern River GSA is Responsible for the Disproportionate and Disparate Impacts That Its Policies and Activities Will Have on Disadvantaged Communities Belonging to Protected Groups

Under SGMA, the GSAs are tasked with managing groundwater in a way that does not cause "significant and unreasonable impacts" to the beneficial uses and users of groundwater in the subbasin. The GSAs' activities cannot avoid impacts only on certain types of beneficial users; under SGMA they must "consider the interests of" an enumerated list of all types of beneficial users, including disadvantaged communities on domestic wells and community water systems.[2] Furthermore, state law provides that no person shall, on the basis of race, national origin, ethnic group identification, and other protected classes, be unlawfully denied full and equal access to

[1] Water Code sec. 10727.2(b)(2)
[2] Water Code § 10723.2.

the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state.[3] In addition, the state's Fair Employment and Housing Act guarantees all Californians the right to hold and enjoy housing without discrimination based on race, color, or national origin.[4] Lastly, the Department of Water Resources is required to consider the Human Right to Water in its evaluation of the GSAs' proposed Groundwater Sustainability Plan, so the drinking water impacts of the GSP are of utmost importance in its approval.[5]

Disadvantaged communities in the Kern River GSA area have the most to gain and the most to lose from SGMA implementation in the region. Communities like Lamont, Fuller Acres and Weedpatch are majority Latino and depend on small community water systems and domestic wells for their drinking water supply. Because residents in disadvantaged communities do not have the financial means to dig deeper wells and install drinking water treatment infrastructure, they are more likely to be severely impacted by lowering groundwater levels and groundwater contamination. As a particularly vulnerable group, their critical drinking water needs must be considered and meaningfully protected by the GSP. The Kern River GSA has not adequately done so in this Draft GSP; as described below, the proposed undesirable results, sustainable management criteria, and management area structure put drinking water for these communities at risk for contamination and dry wells, and the GSA has no assistance program to help families address those impacts from its actions and policies. As a result, the plan does not consider the interests of this beneficial user group, and may cause a disparate impact on Latino families in the GSA area.

Our recommendations below show how the GSA could improve its GSP to avoid disparate impacts on protected groups and ensure that it is treating all beneficial users equitably.

Inadequate Transparency, Public Process, Consideration of Public Input and Representation Undermine the Value and Efficacy of the Draft GSP

SGMA requires that a GSA "shall consider the interests of all beneficial uses and users of groundwater," which expressly includes "[h]olders of overlying rights" and "[d]isadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems."[6] The emergency regulations similarly require that a Draft GSP summarize and identify "opportunities for public engagement and a discussion of how public

[3] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

[4] Gov. Code § 12900 et seq.

[5] Water Code § 106.3.

[6] Water Code § 10723.2.

input and response will be used."[7] The GSA thus must engage "diverse social, cultural, and economic elements of the population within the basin."[8]

The Kern River GSA made critical decisions about GSP development at its bi-monthly Plan Managers meetings and its KRGSA Board Meetings. However, the Plan Managers meetings were not open to the public, and this prevented the public from being included in key policy decisions. For example, the GSA determined the GSP's Measurable Objectives and Minimum Thresholds in this space without public input until it reached the KRGSA board meeting for final review and approval. This means that the public had no opportunity for its input to be meaningfully considered in the crafting of sustainable management criteria. In addition, the KRGSA board meetings were held during work hours, making them inaccessible for individuals working during the day. Therefore there was not a was for the public to meaningfully participate in decision-making in this process.

The GSA did host an open house and at least one workshop in Lamont; however, these venues did not solicit feedback from all beneficial user groups, and did not lead to a plan that "considers the interests of" all of these groups, as shown below. Instead, active community participation should have taken place during the entire GSP creation process in communication with local community-based organizations, community groups, and small water agencies like Fuller Acres Water Company and Lamont Public Utilities District. Additionally, public input from all beneficial user groups should have shaped the GSA's critical policy decisions about sustainable management criteria, projects, management actions, and more. Given the impacts to drinking water users noted below, drinking water users' input was not meaningfully obtained or adequately incorporated into the GSP.

To address concerns over public engagement, transparency, and inclusivity, Kern River GSA must do the following:

- Modify the KRGSA Communication and Engagement Plan to include the following:
    - Before the GSP is submitted to DWR, include a robust plan for engaging all beneficial users in all upcoming decisions about groundwater management, including modifications to GSP policies and implementation of projects and management actions.
    - Ensure that all beneficial user groups are adequately notified of upcoming decisions and are able to attend meetings and workshops to provide feedback, and ensure that feedback from all beneficial user groups shapes subsequent decisions.
    - To reach disadvantaged groups, Kern River GSA staff and consultants should present relevant information and solicit feedback at meetings in disadvantaged communities regularly. Public workshops must provide interpretation in all threshold languages, and should follow robust and effective community outreach to ensure that the most vulnerable drinking water users are informed and included.
    - Report annually on community engagement and how drinking water users' feedback was implemented in decision making

[7] 23 CCR 354.10(d).
[8] Guidance Document for Groundwater Sustainability Plan; Stakeholder Communication and Engagement, p.1.

- Change Kern River GSA board meeting and workshop times to take place in the evening at a time that is accessible for individuals who work 9am-5pm jobs. We recommend that board meetings and workshops be held at 6pm.

The Water Budget is Incomplete

GSPs must rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow.[9] SGMA also requires the water budget to contain an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored.[10] Based on our Technical Analysis, the Draft GSP does not conform to SGMA regulations, and therefore contains an incorrect estimate of the available water in the GSA area.

The water budget is missing information in regards to water budget calculations. For example, the GSP restricts the number of years included in the forecast and therefore does not incorporate sufficient variability into its analysis. The 50-year forecasting period for future water budgets is built using three sequences of hydrologic data from 1995 to 2014.[11] This approach is described as replicating the "average hydrologic conditions" in the basin over the full historic record. But the fact that long-term annual precipitation is average over the 50-year forecasting period does not provide any information about the spread of those years.[12] The GSA must provide more information on how it chose this forecasting period, and change it if it does not contain sufficient variability.

Additionally, as the GSP acknowledges, the "checkbook" method for calculating groundwater inflows and outflows simplifies the hydrogeologic system.[13] Water flows from high to low head, and ignoring the subsurface flows into and out of the basin runs the risk of over-or possibly under-estimating the amount of water available to be reclaimed. Based on the C2VSimFG-Kern Model results, it appears that over long-term planning horizons that bridge wet and dry hydrologic cycles, subsurface flows into the Plan Area are more or less in balance - that is, it is not continuously losing water to adjacent jurisdictions (or continuously gaining it).[14] If a neighboring GSA manages their aquifers in such a way that the net flow of groundwater is consistently leaving the Plan Area, the "checkbook" approach will need to be updated to include losses to neighboring aquifers. If agencies do not account for these subsurface outflows, and reclaim the total amount they recharged, they will be transferring the negative impact of those subsurface outflows to other groundwater users.

[9] 23 CCR § 354.18.(e)
[10] 23 CCR § 354.18.
[11] Kern River Groundwater Sustainability Plan Draft, Table 4-13 p.4-37, dated August 2019
[12] Kern River Groundwater Sustainability Plan Draft, p.4-37 to 4-38, dated August 2019
[13] Kern River Groundwater Sustainability Plan Draft, p.4-20, dated August 2019
[14]Kern River Groundwater Sustainability Plan Draft, p.4-37, dated August 2019

The water budget is central to establishing effective policies for sustainable groundwater management in the GSA area. In order to have a valid water budget, Kern River GSA must correct the following elements of the water budget:

- The Projected Water Budgets sections must include statements describing any analyses done to compare the hydrology of the projected period with the historical hydrology. The GSA must ensure that the period contains sufficient variability.

- The water budget must include a statement describing the conditions under which local agencies would need to account for net subsurface outflows impacting banked water recovery.

The Draft GSP's Sustainable Management Criteria for Groundwater Levels are not Adequate

SGMA and the GSP regulations contain many requirements for shaping sustainable management criteria for groundwater levels. Regarding minimum thresholds, the groundwater levels minimum thresholds set by the GSAs must be the point that, "if exceeded, may cause undesirable results."[15] Therefore they must have the purpose of avoiding "significant and unreasonable" impacts on beneficial users caused by declining groundwater levels.[16] Under the SGMA regulations, the GSA must provide a description of "the information and criteria relied upon to establish minimum thresholds," an explanation of how the proposed minimum thresholds will "avoid undesirable results," and "how minimum thresholds may affect the interests of beneficial uses and users of groundwater."[17] In reference to measurable objectives, the SGMA regulations require the GSA to set measurable objectives that "achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon."[18] Measurable objectives must be more ambitious than the minimum thresholds, and must achieve the sustainable yield for the GSA area. Regarding undesirable results, GSAs must set undesirable results at the point at which "significant and unreasonable" impacts on beneficial users are caused by declining groundwater levels. The SGMA regulations require GSAs to justify their undesirable results by including the "[p]otential effects on the beneficial uses and users of groundwater."[19] GSAs must also describe the "processes and criteria relied upon to define undesirable results."[20] Finally, all of the sustainable management criteria for groundwater levels must be made after considering the interests of all beneficial user groups, including disadvantaged communities on domestic wells and small community water systems.[21] These policy decisions must also avoid disparate impacts on protected groups pursuant to state and federal law.[22] The GSA must also consider that drinking water use has been recognized as the "highest use of water" by the California

[15] 23 CCR § 354.28.
[16] 23 CCR § 354.26.
[17] 23 CCR § 354.28.
[18] 23 CCR §354.24
[19] 23 CCR § 354.26.
[20] 23 CCR § 354.26.
[21] Water Code § 10723.2.
[22] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

legislature, and should consult with stakeholders to ensure that the minimum threshold is set is such a way as to guarantee the human right to drinking water to all individuals in the subbasin.[23]

The GSA has not shown how it has considered the interests of beneficial users including domestic well owners and disadvantaged communities, and has not prioritized access to drinking water. Kern River GSA has proposed three different management areas: Urban, Agricultural, and Banking,[24] and the way in which SMC have been developed for each management area (1) puts communities in the supply Agricultural area at risk of lack of drinking water supply, and (2) puts drinking water users in the Urban management area at risk of depletion of drinking water because of the way that the nearby Agricultural minimum thresholds are set. The resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups pursuant to state and federal law.

SMC put communities in the Agricultural Management Area at risk of losing access to adequate drinking water supply

The Kern River GSA's approach to setting minimum thresholds, undesirable results, and measurable objectives in the Agricultural Management Area did not consider the interests of disadvantaged communities. The GSA has set its minimum thresholds at 50 feet and 20 feet below the historical low water levels of representative GSP monitoring wells, and this minimum threshold will only be triggered after minimum threshold have been violated for two consecutive years.[25] The Undesirable Results in the Agricultural Management Area also did not consider impacts on disadvantaged communities, and are likely to cause a significant and unreasonable impacts to beneficial users to occur without triggering an undesirable result. In this management area, undesirable results will be triggered only after 40% of the minimum thresholds have been exceeded at representative monitoring sites for two consecutive years.[26] Furthermore, the GSA defines the measurable objective for groundwater levels at each as the average of the selected minimum threshold and the highest groundwater level observed during the historical Study Period,[27] and has not evaluated how this groundwater elevation will affect disadvantaged communities on domestic wells and small community water systems, whose critical drinking water resources will be most impacted by a decline in groundwater levels. Therefore it cannot have considered the interests of this vulnerable beneficial user group. The small urban communities of Lamont and Fuller Acres are in the Agricultural Management Area, and are likely to be most impacted by these policy decisions.

After speaking with GSA staff at the workshop in Lamont on November 6, 2019, we understand that the GSA will apply Urban Management Area minimum thresholds and measurable objectives to the communities of Lamont and Fuller Acres. This is currently not reflected in writing in the GSP, so if this is the GSA's intention it must be written into the GSA. However, even if different minimum thresholds are applied in Lamont and Fuller Acres, their groundwater levels will be dramatically impacted by the surrounding groundwater levels. Therefore, this is

[23] Water Code § 106.
[24] Kern River Groundwater Sustainability Plan Draft, pg 5-3, dated August 2019
[25] Kern River Groundwater Sustainability Plan Draft, p.5-14 dated August 2019
[26] Kern River Groundwater Sustainability Plan Draft, pg 5-17, dated August 2019
[27] Kern River Groundwater Sustainability Plan Draft, p.5-14, dated August 2019

not likely to be an effective solution for protecting Lamont and Fuller Acres' drinking water supply, and may cause impacts to Lamont and Fuller Acres' drinking water supply.

In order to show that it has considered impacts on domestic well users and disadvantaged communities, and ensure that it is not causing a disparate impact on groups protected from such impact by state civil rights law, the GSA must conduct a complete analysis of how many wells will be impacted by this measurable objective, in particular domestic wells and small community system wells in disadvantaged communities. It should measure whether the impacts to wells are "significant and unreasonable" by consulting with the impacted beneficial user groups: domestic well owners and disadvantaged communities. If its current measurable objective will cause a disparate impact or cause significant and unreasonable impacts to these beneficial user groups, it must modify its measurable objective to comply with its legal obligations.

In order to comply with its obligations to consider the interests of disadvantaged communities like those in the Agricultural Management Area, prioritize the human right to drinking water, and ensure that it will cause a disproportionate impact on Latino families in the Agricultural Management Area, the GSA must do the following:

- Complete an analysis of the impact of reaching the undesirable result on all beneficial users, including disadvantaged communities on domestic wells and community water systems, who are most vulnerable to groundwater supply issues and least financially able to address issues. To protect drinking water resources for disadvantaged communities, the undesirable result for the management area must be triggered when any drinking water well is at risk of being dewatered.

- Evaluate the number of wells that will be impacted should water levels reach the proposed minimum thresholds and measurable objectives, taking into account the well screen depth of all drinking water wells in the GSP area. Determine which domestic wells and community water system wells are at risk of going fully or partially dry, and calculate the increased pumping costs associated with the increased lift for each well at the projected water levels. Take this drinking water impact analysis out to beneficial users most impacted by the proposed minimum threshold and measurable objectives and ask beneficial users what they consider to be a "significant and unreasonable" impact on their drinking water resources. The GSA should then change the minimum thresholds and measurable objectives based on this feedback. In order to show how it has considered the needs of all beneficial users in setting its minimum thresholds and measurable objectives, the GSA must publish the above analysis in the GSP and show how it consulted with domestic well users and disadvantaged communities to set a minimum threshold that avoids significant and unreasonable impacts to their beneficial user groups.

- To protect all drinking water users, the GSAs should place the minimum threshold at a level above where the shallowest domestic well is *screened* in the GSA area.

- The GSA must clarify how its measurable objectives will achieve the sustainable yield.

- Implement a Drinking Water Observation Plan to detect potential impacts to drinking water resources and trigger GSA action before drinking water supply problems occur.

Please see our comments on the Projects and Management Actions for more description of what this program could look like.

- Implement a Drinking Water Protection Program that would be implemented when the Drinking Water Observation Plan is triggered, to prevent and mitigate drinking water impacts from the GSA's policy decisions and groundwater management activities. Please see our comments on the Projects and Management Actions for more description of what this program could look like.

SMC put drinking water users in the Urban Management Area at risk of depletion of drinking water

First, the sustainable management criteria for the Urban Management Area do not comply with SGMA's directive to "consider the interests of" drinking water users, drinking water systems and disadvantaged communities. The GSA has set its minimum thresholds in this Management Area at the historical low water level as measured in representative GSP monitoring wells, as shown on Tables 5-2a and 5-2b. This minimum threshold is triggered when a representative monitoring well exceeds this threshold for three consecutive months.[28] Based on our Technical Analysis, a minimum of seven wells will go dry under the proposed minimum threshold. The Draft GSP states that an undesirable result for groundwater levels in the Urban Management Area is triggered after any well exceeds the minimum threshold for three consecutive months. The Kern River GSA defines the groundwater levels measurable objective for this Management Area as the average of the high water level of the historical Study Period (typically 1998) and the minimum threshold in each GSP monitoring well.[29] Based on our Technical Analysis attached, we estimate that at a minimum, six domestic wells will go dry under the proposed measurable objective. The GSA has not conducted an analysis of what the impact would be on beneficial users from reaching its minimum thresholds, measurable objectives or undesirable results. Therefore it cannot have considered the interests of all beneficial user groups, in particular disadvantaged communities on domestic wells.

In order to show that it has considered impacts on domestic well users and disadvantaged communities, and ensure that it is not causing a disparate impact on groups protected from such impact by state civil rights law, the GSA must conduct a complete analysis of how many wells will be impacted by this measurable objective, in particular domestic wells and small community system wells in disadvantaged communities. It should also quantify the increased pumping costs associated with the increased lift at the projected water levels, and include impacts to ratepayers. For example, lower groundwater levels could cause increases in the cost of municipal water by from additional cost burden of water systems having to drill new or deeper wells or import surface water. Then, it must measure whether the impacts to wells and household finances are "significant and unreasonable" by consulting with domestic well owners and disadvantaged communities. If its current choice of minimum threshold, measurable objectives or undesirable results will cause a disparate impact or cause significant and unreasonable impacts to these

[28] Kern River Groundwater Sustainability Plan Draft, p.5-13 dated August 2019
[29] Kern River Groundwater Sustainability Plan Draft, p.5-14, dated August 2019

beneficial user groups, it must modify its sustainable management criteria to comply with its legal obligations.

Finally, the Urban Management Area's sustainable management criteria will not be achievable due to the much less protective sustainable management criteria in the surrounding Management Areas. The Agricultural and Banking management areas, which have less protective minimum thresholds and measurable objectives, are right next to the Urban management area and will affect the Urban management area's ability to comply with its own groundwater levels minimum thresholds and measurable objectives. For example, as noted above, the Urban area's undesirable results are triggered when one minimum threshold is violated for more than three months; meanwhile, for the neighboring Agricultural Management Area, undesirable results for groundwater levels will be triggered only after 40% of the minimum thresholds have been exceeded at representative monitoring sites for two consecutive years.[30] Additionally, the flexibility of the Agricultural Management Area's minimum thresholds are likely to cause the Urban Management Area to violate its minimum thresholds. While the Urban area's minimum thresholds are at historical low water levels, the Agricultural area's minimum thresholds are at 50 feet and 20 feet below the historical low water levels, which are already much lower than the historical low water levels in the Urban area. Additionally, the Agricultural area's minimum threshold will only be triggered after minimum threshold have been violated for two consecutive years,[31] whereas the Urban minimum threshold will be triggered after only three months. If the GSA allows groundwater levels to dop towards the minimum thresholds in the Agricultural area, is hard to see how the Urban minimum thresholds will not be continuously violated by water flowing towards the Agricultural area of the GSA area, leaving the Urban area without a reliable source of drinking water.

In order to consider the interests of all beneficial user groups in the Urban management area and avoid a violation of state civil rights law, the following must be done:

- The GSP must clearly explain how the Urban management area can comply with its minimum thresholds and measurable objectives without being impacted by groundwater flow out to the Agricultural management area, where minimum thresholds and measurable objectives are much less protective.[32]

- Protect groundwater levels under all small community water systems and clusters of domestic wells by (a) expanding the Urban management area to capture all small communities and clusters of domestic wells, including Lamont, Fuller Acres and Weedpatch, or (b) apply the Urban Management Area's minimum thresholds, measurable objectives and undesirable results throughout the GSA area.

- Evaluate the number of wells that will be impacted should water levels reach the proposed minimum thresholds, taking into account the well screen depth of all drinking water wells in the GSP area. Determine which domestic wells and community water system wells are at risk of going fully or partially dry, and calculate the increased

[30] Kern River Groundwater Sustainability Plan Draft, pg 5-17, dated August 2019
[31] Kern River Groundwater Sustainability Plan Draft, p.5-14 dated August 2019
[32] 23 CCR § 354.20

pumping costs associated with the increased lift for each well at the projected water levels. Take this drinking water impact analysis out to beneficial users most impacted by the proposed minimum threshold policy, disadvantaged communities and domestic well users, and ask beneficial users what they consider to be a "significant and unreasonable" impact on their drinking water resources. The GSA should then change the minimum threshold policy based on this feedback. In order to show how it has considered the needs of all beneficial users in setting its minimum thresholds, the GSA must publish this analysis in the GSP and show how it consulted with domestic well users and disadvantaged communities to set a minimum threshold that avoids significant and unreasonable impacts to their beneficial user groups.

- To protect all drinking water users, the GSAs should place the minimum threshold at a level above where the shallowest domestic well is *screened* in the GSA area.
- The GSA must clarify how its measurable objectives will achieve the sustainable yield.
- To protect drinking water resources for disadvantaged communities, the undesirable result must be triggered when any drinking water well is at risk of being dewatered.
- Implement a Drinking Water Observation Plan to detect potential impacts to drinking water resources and trigger GSA action before drinking water supply problems occur. Please see our comments on the Projects and Management Actions for more description of what this program could look like.
- Implement a Drinking Water Protection Program that would be implemented when the Drinking Water Observation Plan is triggered, to prevent and mitigate drinking water impacts from the GSA's policy decisions and groundwater management activities. Please see our comments on the Projects and Management Actions for more description of what this program could look like.

The Draft GSP Fails to Adequately Address Groundwater Quality

SGMA requires GSAs to prevent further groundwater quality impacts from groundwater management policies and practices.[33] GSAs must place groundwater quality minimum thresholds for each monitoring site at the level "that may lead to undesirable results."[34] Under the SGMA regulations, the GSA should provide a description of "the information and criteria relied upon to establish minimum thresholds," an explanation of how the proposed minimum thresholds will "avoid undesirable results," and "how minimum thresholds may affect the interests of beneficial uses and users of groundwater."[35] The GSA must also consider that drinking water use has been recognized as the "highest use of water" by the California legislature,[36] and should consult with stakeholders to ensure that the minimum threshold is set is such a way as to guarantee the human right to drinking water to all individuals in the subbasin.

[33] Water Code §§ 10727.2(d)(2); 10721(x)(4)
[34] 23 CCR § 354.28.
[35] 23 CCR § 354.28.
[36] Water Code § 106.

Kern River GSA has not shown how it has considered the interests of beneficial users including domestic well owners and disadvantaged communities in shaping groundwater quality sustainable management criteria.[37] This Draft GSP fails to incorporate performance measures and management criteria with respect to contaminants that impact human health, including those contaminants with established primary drinking water standards. Since many beneficial users in the subbasin could be harmed by increased groundwater contamination due to this policy, the GSA therefore fails to conform with its obligation to ensure that its groundwater management policies and practices do not cause an increase in groundwater contamination that has a "significant and unreasonable" impact on beneficial users in the subbasin.

From the perspective of drinking water use, this is concerning because GSA activities and policies could cause increased drinking water contamination in many ways, and sustainable management criteria are supposed to be designed to prevent such contamination. For example, continued pumping could increase arsenic contamination, and pumping patterns could cause migration of contaminant plumes. Projects such as on-farm recharge projects and could also have severe impacts on groundwater quality by facilitating water percolation on land contaminated with years of pesticide, herbicide, fungicide, and fertilizer application. Additionally, groundwater markets can cause geographic concentrations of pumping that increase the likelihood of contaminant plume migration, putting drinking water resources at risk. The GSA must craft protective sustainable management criteria in order to avoid such impacts to critical drinking water resources in the GSA area.

The GSA must incorporate sustainable management criteria for all drinking water contaminants in the GSA area

Instead of incorporating protection of all drinking water quality standards into the Draft GSP, the Kern River GSA limits its constituents of concern to Arsenic, despite acknowledging in the Basin Setting chapter that the subbasin contains plumes of other contaminants such as total dissolved solids, nitrate, 1,2,3-TCP, and pesticides.[38] The GSA therefore will not be able to detect increases or expansion of harmful drinking water contaminants from its groundwater management activities. The resulting impact from the proposed sustainable management criteria will likely lead to disparate impacts on protected groups, in conflict with state and federal law, because the area will likely experience groundwater contamination impacts, and those least able to fund treatment solutions are Latino communities on domestic wells and small community water systems in the GSA area.[39]

---

[37] Water Code § 10723.2.

[38] Kern River Groundwater Sustainability Plan Draft, p.3-34 to 3-41, dated August 2019

[39] Gov. Code § 11135 ["No person in the State of California shall, on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."]; Gov. Code § 65008 [Any discriminatory action taken "pursuant to this title by any city, county, city and county, or other local governmental agency in this state is null and void if it denies to any individual or group of individuals the enjoyment of residence, land ownership, tenancy, or any other land use in this state…"]; Government

The sustainable management criteria for groundwater quality do not adequately consider the impact on drinking water users and disadvantaged communities

The GSA has not considered the interests of disadvantaged communities or protect critical drinking water resources in crafting its sustainable management criteria for groundwater quality. First, the GSA has set its groundwater quality sustainable management criteria based on groundwater levels, justifying this decision only by saying that arsenic levels increased during the drought, when groundwater levels were lower. This correlation is not scientifically accurate, is not based on actual contamination levels, and therefore does not allow the GSA to prevent the contaminant of concern from reaching levels that are harmful to human health. Therefore this decision cannot have been based on a consideration of the interests of drinking water users, as required under SGMA.

Additionally, the GSA did not consider what the impact of its proposed sustainable management criteria would be on drinking water users. The minimum thresholds for groundwater quality in the Urban Management Area are at the historical low groundwater levels, and the measurable objective is the average of the minimum threshold and the high water level in the representative monitoring well during the historical Study Period under average hydrologic conditions. In the Agricultural Management Area, the minimum threshold for most of the Management Area is 50 feet below the historic low water level, and the measurable objective is the average of the high groundwater level during the historical Study Period and the MT. All of these groundwater quality sustainable management criteria were based on the connection with groundwater levels. The GSA included no analysis of how it considered the impact of these policies on drinking water users. Furthermore, the undesirable results for the Urban and Agricultural management areas will allow significant drinking water contamination. In the Urban Management Area, the undesirable result for arsenic will only be triggered when a well exceeds the minimum threshold after three consecutive months[40] and in the Agricultural Management Area that borders the Urban Management Area, the undesirable result for arsenic will only be triggered after 40% of wells in the Urban Management Area exceed the minimum threshold for 4 consecutive years.[41] By the time an undesirable result is triggered and addressed, it is more than likely that a high percentage of vulnerable drinking water users will be experiencing severe, long-term drinking water contamination problems before the undesirable result is triggered.Therefore these sustainable management criteria for groundwater quality did not consider the interests of beneficial users.

Also of note, the draft GSP does not identify the potential management actions to be implemented if undesirable results occur. Therefore the GSP does not show how it will address contamination caused by its policies and management actions.

In order to set sustainable management criteria that are protective of groundwater quality for all beneficial users in the basin, the GSA must make the following changes to the Draft GSP:

Code §§ 12955, subd. (l) [unlawful to discriminate through public or private land use practices, decisions or authorizations].

[40] Kern River Groundwater Sustainability Plan Handout, p.3

[41] Kern River Groundwater Sustainability Plan Handout, p.3

- Set minimum thresholds, measurable objectives, and undesirable results for all constituents of concern based on avoiding significant and unreasonable impacts to all beneficial users, particularly drinking water users and disadvantaged communities. Evaluate how the groundwater quality undesirable results, minimum thresholds, and measurable objectives will impact groundwater quality for disadvantaged communities and other drinking water users in the subbasin, and take this analysis to drinking water users for their feedback on what is significant and unreasonable. Establish sustainable management criteria for groundwater quality that takes this feedback into account, and prioritizes protection of drinking water resources for all. Provide a detailed explanation of this study and this policymaking process in the GSP.

- Ensure that minimum thresholds will be triggered after a single test shows a violation of the MCL.

- In order to set measurable objectives that adequately protect drinking water, an appropriate standard is the state's anti-degradation policy, which is used by the SWRCB and regional water boards, and does not allow for further contamination of groundwater based on the best quality of the water since 1968[42] the year the anti-degradation policy became effective. Another rule commonly used in environmental law is the *precautionary principle*, which prohibits activities that could cause harm when the amount of potential harm is unknown. Given that SGMA became law in 2015, the GSA should, at a minimum ensure the better of highest quality of water achieved since 2015, or the MCL, whichever reflects a lower level of water contamination. Additionally, the GSA should state in the GSP that it will strive to achieve the public health goals for all drinking water contaminants, wherever possible.

- Implement a Drinking Water Observation Plan to trigger GSA action when contamination spikes occur. Please see more information about the types of projects that could be implemented when a Drinking Water Observation Plan is triggered in our comments about Projects and Management Actions.

The Monitoring Network Is Inadequate With Respect to Groundwater Levels and Groundwater Quality

GSAs must monitor impacts to groundwater for drinking water beneficial users, including domestic well users and disadvantaged communities,[43] and must avoid disparate impacts on protected groups pursuant to state law.[44] The SGMA regulations state that monitoring networks must include a sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.[45] The GSA must also make decisions about the monitoring network in a way that considers the interests of all beneficial users.

---

[42] *Asociacion de Gente Unida por el Agua v. Central Valley Regional Water Quality Control Bd.* (2012) 210 Cal.App.4th 1255, 1268.
[43] Water Code § 10723.2; 23 CCR § 354.34.
[44] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).
[45] 23 CCR § 354.34(c)(1)(A)

The GSA's monitoring network is insufficient with respect to groundwater quality and groundwater levels. The network fails to capture drinking water impacts from groundwater pumping and management, and has therefore not considered the interests of drinking water users and is likely to cause a disparate impact on the protected groups dependent on domestic wells and community water systems in the GSA area.

Groundwater Levels Monitoring Network is Inadequate

The GSP states that current existing monitoring networks will be utilized to monitor groundwater levels, and include an illustration of the monitoring wells in Figure 6-1.[46] We observe that there are wells next to both Fuller Acres and Lamont, but it is unclear whether these will detect groundwater levels at the level at which the two communities' wells procure water. It is also unclear whether the monitoring network has representative monitoring wells in all clusters of domestic wells and all small community water systems in the GSA. In order to adequately protect drinking water for these users, the GSA must do include such wells in its representative monitoring network, and ensure that the wells are constructed to detect groundwater levels in the aquifers upon which drinking water users are dependent.

In order to protect groundwater levels from lowering to a critical depth and ensuring access to groundwater for all beneficial users in the basin, the GSA must make the following changes to the Draft GSP:

- Ensure that representative monitoring wells are adequately capturing the effects of groundwater levels trends on all types of beneficial users, especially the most vulnerable drinking water users on domestic wells and small community water systems, including Lamont, Fuller Acres and Weedpatch. To do this, ensure that the monitoring network includes representative monitoring wells in all clusters or domestic wells and small community water systems. If the monitoring network does not include such wells, include a concrete plan for funding and constructing new representative monitoring wells in these areas.

Groundwater Quality Monitoring Network is Inadequate

The draft GSP states that total dissolved solids and nitrates are under active management through other programs, and describes those programs.[47] However, there is no description of how Kern River GSA will make the determination of how its management has caused impacts to groundwater quality. The GSA does not mention how it will monitor other contaminants that are known to be present in the GSA area, such as pesticides.[48] In regards to 1,2,3-TCP, the GSP states that "[Public TCP concentration] data will be compiled periodically and reviewed by the KRGSA to ensure that management actions do not exacerbate the extent of TCP in groundwater," yet the GSA neglects to clarify how often this data will be compiled and how the

[46] Kern River Groundwater Sustainability Plan Draft, p.6-1 to 6-2, dated August 2019
[47] Kern River Groundwater Sustainability Plan Draft, p.6-10 to 6-11, dated August 2019
[48] Kern River Groundwater Sustainability Plan Draft, p.3-37, dated August 2019

GSA will determine that its actions and policies caused impacts to 1,2,3-TCP concentrations in groundwater.[49]

To ensure that the representative wells within the monitoring network accurately monitor impacts
to groundwater management for all beneficial users, and does not create a disparate impact on protected groups, the GSP monitoring section must be changed in the following ways:

- Ensure that representative monitoring wells are adequately capturing the effects of groundwater quality trends on all types of beneficial users, especially the most vulnerable drinking water users on domestic wells and small community water systems. Ensure that the monitoring network includes representative monitoring wells in or near all clusters or domestic wells and small community water systems. If the monitoring network does not include such wells, include a concrete plan for funding and constructing new representative monitoring wells in these areas.

- Ensure that the GSA is monitoring for compliance with all of the following constituents of concern: all established primary drinking water standards, hexavalent chromium, and PFOSs/PFOAs, as well as contaminants that are known to increase with groundwater management activities, such as uranium.[50]

- Ensure that all representative monitoring wells are measuring for concentrations of the contaminants of concern, including all drinking water contaminants, every month.

- Clarify how the GSA will determine that its activities and policies caused impacts to groundwater quality.

Projects and Management Actions

The GSA must consider the interests of all beneficial users including domestic well owners and disadvantaged communities[51] and avoid disparate impacts on protected groups.[52] The GSP must also concretely outline how each objective and the overall sustainability goal will be achieved.[53] The GSP does not show how its projects and management actions will achieve the sustainability goal or reach the sustainable yield. The GSA does not contain projects and management actions to protect against or mitigate the impacts of the policies above on disadvantaged communities and protected groups.

---

[49] Kern River Groundwater Sustainability Plan Draft, p.3-39, dated August 2019

[50] Smith et al., "Overpumping Leads to California Arsenic Threat," Nature Communications (June 2018) [arsenic discharge from clay correlated with overpumping]; Jurgens et al., "Effects of Groundwater Development on Uranium" (November 2010) [strong correlation between high bicarbonate irrigation and recharge water and leaching of uranium from shallow sediments to groundwater].

[51] Water Code § 10723.2.

[52] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

[53] Water Code § 10727.2(b)(2).

In light of the impacts on disadvantaged communities from the policy decisions discussed above, the GSP must therefore include Projects and Management Actions that protect disadvantaged communities from the drinking water impacts that will occur from the GSA's policy decisions. In order to prevent disparate impacts on protected groups, and show that it has considered the interests of all beneficial users including domestic well users and disadvantaged communities, the GSA should consider the following projects and management actions:

The GSA Must Clearly Commit to a Drinking Water Protection Program for the Kern River GSA Area

The GSP must contain a concrete commitment to funding and implementing a Drinking Water Protection Program (DWPP). We recommend some parameters for a potential program below, and are glad to work with the GSA on shaping an effective program for preventing drinking water impacts from declining groundwater levels, and increased groundwater contamination:

- Eligible activities: Assistance in connecting to larger water systems; drilling of new wells or deepening wells if homes' wells go dry due to declining groundwater levels; lowering of well pumps; short term and long term treatment of drinking water; provision of all permitting, planning and labor needs and all other costs associated with the mitigation; increased energy costs from pumping from deeper depths;[54] and emergency bottled water or alternate water sources while mitigation measures are being implemented. Wherever possible, and whenever it is the community's preference, the GSA should strive to assist residents on domestic wells and small community water systems with connecting to larger drinking water systems. If consolidation is not possible, the GSAs should support the deepening of wells, installation of treatment facilities or POE/POU treatment in homes and offset the increased energy costs for pumping water from a lower level. In the interim, the GSA should collaborate with local and state agencies to provide emergency bottled water for consumption and sanitary purposes.

- Leadership by program beneficiaries: Any project funded by the program must be guided by the residents or communities that are recipients of program benefits. Community input into a project will ensure project success, by learning from resident experience and knowledge to shape a project that will best suit their drinking water needs.

- Access to the program: The GSA must ensure that the program is accessible for all residents who may need its assistance. The program should work with local agencies and organizations to spread information about the program, should not require residents to opt in to the program, and the GSA must provide translated materials regarding the program.

[54] Recent research has concluded that "in the Tulare Lake area, with an average well depth of 120 feet, pumping would require 175 kWh per acre-foot of water. In the San Joaquin River and Central Coast areas, with average well depths of 200 feet, pumping would require 292 kWh per acre-foot of water." Wilkinson and Kost, *An Analysis of the Energy Intensity of Water in California: Providing a Basis for Quantification of Energy Savings from Water System Improvements*, 2006, ACEEE Summer Study on Energy Efficiency in Buildings, p. 12-123.

[55]

- Such a program must be proactive, rather than reactive: We recommend that the GSA implement a ***Drinking Water Observation Plan (DWOP)*** that will serve as a warning system so that the GSA is aware of when wells are going dry, or when wells are going to become contaminated from groundwater management activities, so it can take action to prevent drinking water impacts before they occur. This DWOP should trigger proactive measures wherein the GSA should act before wells lose production capacity or before wells become contaminated, to ensure that community members are not left without access to safe and reliable drinking water.

Recharge In or Near Disadvantaged Communities and Domestic Well Clusters

The KGA GSA should implement or incentivize recharge basins or other recharge activities throughout the subbasin wherever DACs and clusters of domestic wells exist. The GSA should encourage these kinds of recharge projects with health co-benefits over on-farm recharge, which is likely lead to accelerate groundwater contamination.

Establish Pumping Buffer Zones That Protect Disadvantaged Communities and Clusters of Domestic Wells

For areas vulnerable to declining water levels and loss of production capacity, the KGA GSA should adopt management actions that establish geographical protection areas (buffer zones) by establishing bans, pumping limitations or community-specific management areas around disadvantaged communities and domestic well clusters. This buffer must be protective enough to ensure that disadvantaged communities and residents reliant on domestic wells do not experience localized impacts from nearby pumping activities. This action should not be used to allow more pumping elsewhere in the subbasin, and needs to be coupled with a strong demand reduction policy across the basin.

Warning Against a Groundwater Market

We also strongly recommend against a groundwater market in the KGA GSA area. Groundwater markets raise concerns from the perspective of domestic well users and disadvantaged communities. Such a scheme will likely negatively impact critical drinking water resources, as more financially powerful groundwater users are able to purchase more groundwater resources and diminish the drinking water supplies of nearby community water systems and domestic well users.

Multi-benefit projects

The GSAs should implement and incentivize multi-benefit projects such as wetlands restoration or stormwater drainage ponds that would eliminate flooding and increase groundwater recharge in disadvantaged communities.

[55] Gov. Code, §§ 7293, 7295

Funding of Projects and Management Actions

Although there are multiple short-term funding sources to leverage for SGMA-related projects, the GSA's and member agencies' operating budgets must be a reliable source of funding over the long-term of GSP implementation, and the GSA and member agencies cannot rely on grant funding for long-term projects and programs that benefit disadvantaged communities. The GSA and member agencies must be responsible for addressing the drinking water issues caused by their policy decisions and activities. Furthermore, any proposed assessments that will pay for projects may not place a disproportionate financial burden on disadvantaged communities. Small disadvantaged communities like Arvin should not be required to pay fees for GSP implementation.

Plan Implementation Section is Incomplete

GSPs must include a planning and implementation horizon, and show how it will achieve the sustainability goal and sustainable yield.[56] Under the GSP implementation section 8, Table 8-1is referenced to show the two phased approach that the GSA has decided to pursue. This table indicates that any efforts towards reducing groundwater pumping is scheduled to start until 2031 on an "as needed" basis as stated in this section. Allowing for groundwater pumping reduction management actions to be set in the second phase of projects and management actions does not align with the intention behind SGMA. The GSA should incorporate groundwater pumping reduction initiatives earlier on in GSP Implementation timeline to counteract the many years of over pumping groundwater and provide a better opportunity to reach sustainability within the basin.

Although the GSP includes a KRGSA Communication and Engagement Plan,[57] this plan only includes communications and engagement efforts done before the adoption of the GSP, and fails to include what efforts will be made to ensure ongoing active engagement throughout the implementation of the GSP. As a public agency, the GSA must establish processes by which it will seek and incorporate feedback from the public on an ongoing basis. It must do so through direct outreach to disadvantaged communities, collaboration with local community-based nonprofits, and public meetings or workshops that are held in locations and at times that are accessible to all beneficial user groups, with presentations and materials translated into all threshold languages.[58] Additionally, proposed changes to the plan must be publicly noticed and circulated for public review and comment prior to final adoption. None of these processes for public participation are outlined in the GSP.

To ensure that the GSP is implemented properly, the GSA must do the following:

---

[56] Water Code § 10727.2.(c).

[57] Kern River Groundwater Sustainability Plan Draft, Appendix F, dated August 2019

[58] Bilingual Services Act, Gov. Code, §§ 7293, 7295: a public agency must provide interpretation and translate materials into all languages for which there is a "substantial" number of people that it serves who speak that language.

- The GSA must include a plan for public outreach during the GSP implementation process. This plan should include translation services in order to meaningfully consult with and consider the interest of all beneficial users. Workshops and meetings must be at an accessible time and locations for all stakeholders.

- The GSA must include public outreach as part of all GSP implementation activities, including decision-making about GSA activities and policies, annual reporting, and five-year updates.

- The GSA must budget for public outreach. The budget should include translation services in order to meaningfully consult with and consider the interest of all beneficial users.

- Clarify in the GSP that the plan may be modified as data becomes available, and that the GSA will seek and accept feedback from the public on an ongoing basis throughout plan Implementation.

- Clarify that any modification to the GSP must be in writing, noticed and provide sufficient time for public review and feedback.

- Provide a clear implementation timeline for the GSP, including timelines for achieving sustainable management criteria, projects and management actions.

- The GSP must show how it will achieve its sustainability goal and the sustainable yield. To do so, it must implement demand reduction actions immediately.

Other Legal Considerations

The Draft GSP Threatens to Infringe on Water Rights

In enacting SGMA, the legislature found and declared that "[f]ailure to manage groundwater to prevent long-term overdraft infringes on groundwater rights."[59] The test of SGMA further notes that "[n]othing in this part, or in any groundwater management plan adopted pursuant to this part, determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights."[60] As discussed in detail above, the Draft GSP allows continued overdraft above the safe yield of the basin, such that drinking water wells (especially domestic wells) will continue to go dry, infringing on the rights of overlying users of groundwater. The GSP must be revised to protect the rights of residents of disadvantaged communities and/or low-income households who hold water rights to groundwater.

[59] AB 1739 (2014).
[60] Water Code § 10720.5(b).

The Draft GSP Conflicts with the Reasonable And Beneficial Use Doctrine

The "reasonable and beneficial use" doctrine, to which SGMA expressly must comply,[61] is codified in the California Constitution. It requires that "the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare." (Cal Const, Art. X § 2; *see also United States v. State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 105 ["…superimposed on those basic principles defining water rights is the overriding constitutional limitation that the water be used as reasonably required for the beneficial use to be served."].)

The reasonable and beneficial use doctrine applies here given the negative impacts of the Draft GSP on groundwater supply and quality, which are likely to unreasonably interfere with the use of groundwater for drinking water and other domestic uses. As the Draft GSP authorizes waste and unreasonable use, it conflicts with the reasonable and beneficial use doctrine and the California Constitution.

The Draft GSP Conflicts with the Public Trust Doctrine

The "public trust" doctrine applies to the waters of the State, and establishes that "the state, as trustee, has a duty to preserve this trust property from harmful diversions by water rights holders" and that thus "no one has a vested right to use water in a manner harmful to the state's waters."[62]

The "public trust" doctrine has recently been applied to groundwater where there is a hydrological connection between the groundwater and a navigable surface water body.[63] In *Environmental Law Foundation*, the court held that the public trust doctrine applies to "the extraction of groundwater that adversely impacts a navigable waterway" and that the government has an affirmative duty to take the public trust into account in the planning and allocation of water resources.[64] The court also specifically held that SGMA does not supplant the requirements of the common law public trust doctrine.[65] In contrast to these requirements, the Draft GSP does not consider impacts on public trust resources, or attempt to avoid insofar as feasible harm to the public's interest in those resources.

~ ~ ~ ~ ~ ~ ~ ~ ~

The Kern River GSP must protect the most vulnerable drinking water users in the GSA area. We welcome the opportunity to discuss our recommendations with the Kern River GSA board, staff

[61] Water Code § 10720.1(a).
[62] *United States v. State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 106; *see also Nat'l Audubon Soc'y v. Superior Court* (1983) 33 Cal.3d 419, 426 ["before state courts and agencies approve water diversions they should consider the effect of such diversions upon interests protected by the public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests."].
[63] *Environmental Law Foundation v. State Water Resources Control Bd.* (2018) 26 Cal.App.5th 844, 844.
[64] *Id.* at 856-62.
[65] *Id.* at 862-870.

and consultants to ensure compliance with state law. We are also in communication with the Department of Water Resources about current GSP development activities in the Central Valley, and hope to successfully work with GSAs, communities and DWR to ensure that groundwater management is equitable and sufficiently protective of vital drinking water resources.

Sincerely,

/s/

Jasmene del Aguila, Amanda Monaco and Nataly Escobedo Garcia
Leadership Counsel for Justice and Accountability

CC:
Amanda Peisch-Derby
Senior Engineer
Department of Water Resources

Attached:
Kern River GSP Technical Review (KRGSP_Comments.pdf)

Kern River GSP Comments

10/21/2019

Water Budget

1. Checkbook method
As the GSP acknowledges, the “checkbook” method for calculating groundwater inflows and outflows simplifies the hydrogeologic system. Water flows from high head to low head, and ignoring the subsurface flows into and out of the basin runs the risk of over- (or possibly under-) estimating the amount of water available to be reclaimed.

Based on the C2VSimFG-Kern Model results, it appears that over long-term planning horizons that bridge wet and dry hydrologic cycles, subsurface flows into the Plan Area are more or less in balance - that is, it is not continuously losing water to adjacent jurisdictions (or continuously gaining it). Additionally, the checkbook approach is convenient for local agencies. So, for now, the checkbook method has substantial utility in the Plan Area.

However, in the future, if a neighboring GSA manages their aquifers in such a way that the net flow of groundwater is consistently leaving the Plan Area, the “checkbook” approach will need to be updated to include losses to neighboring aquifers. If agencies do not account for these subsurface outflows, and reclaim the total amount they recharged, they will be transferring the negative impact of those subsurface outflows to other groundwater users.

Comment: **the water budget should include a statement describing the conditions under which local agencies would need to account for net subsurface outflows impacting banked water recovery**.

2. Future water budget
The 50-year forecasting period for future water budgets is built using three sequences of hydrologic data from 1995 to 2014 (see Table 4-13). By restricting the number of years included in the forecast, the water budget may not be incorporating sufficient variability into its analysis.

This approach is described as replicating the “average hydrologic conditions” in the basin over the full historic record. But the fact that long-term annual precipitation is average over the 50-year forecasting period doesn’t provide any information about the spread of those years: was there a high proportion of average years, or were there many wet and dry years that averaged out? Did the GSP do any analysis of average drought period or severity in the historic record? Did the GSP analyze the occurrence of “extreme” wet and dry years?

If the projected budget uses a hydrologic period with lower variability than the historic record, it may be simulating a “smoother ride” than the historic record suggests.

Comment: **the Projected Water Budgets sections should include statements describing any analyses done to compare the hydrology of the projected period** (described in Table 4-13) **with the historical hydrology**. Example comparison statistics could include: mean and standard deviation of precipitation on an annual or aggregate-monthly basis, frequency of “extreme” wet or dry years (defined using precipitation alone or precipitation plus Kern/SWP water availability), and average drought period.

Water Quality

General summary:

The approach to managing water quality is described in the quotation below:

> “the primary concern of this GSP is to ensure that management actions proposed by the KRGSA Plan Area agencies do not cause an undesirable result for water quality. Such actions could potentially involve:
> • operation of groundwater levels that increase concentrations of contaminants in wells such that the beneficial use of groundwater is impacted,
> • recharge of surface water supplies that could impact water quality, or
> • pumping wells that are likely to spread or exacerbate contaminant plumes.”

The plan concludes that the second two bullet points are unlikely because the water from the Kern River and the State Water Project used for recharge is of high quality, and “no distinct plumes have been identified in the KRGSA Plan Area”.

To manage the first bullet point, the Sustainable Management Criteria for Water Quality is based on arsenic. The GSP uses a water level proxy to manage arsenic concentrations.

Specifically, in some KRGSA wells a relationship has been observed between depth to water and arsenic especially during the historic drought years of 2014-2015 (Figure 3-33), suggesting that arsenic is associated with deeper aquifer zones. Wellhead treatment is in place for some impacted wells, and blending was used to avoid taking some wells out of operation during the drought. Water level management is considered the best tactic to manage arsenic concentrations. The MT is defined as historic low during the recent drought. The MO is defined as the “average hydrologic conditions” over the period of the hydrologic model, but the GSP recognizes that MT and MO may be subject to change based on future data.

1. TDS, nitrates and arsenic
TDS, nitrates and arsenic are under active management. Programs to manage these COCs are described adequately in the GSP.

Comment: when the Annual Report is developed, it should include **sampling schedules and maps describing monitoring for these COCs** (or references to local agency reports, if the monitoring is described in local agency documents). We suggest that the Annual Report should also include a **formal determination regarding whether active management is exacerbating groundwater quality** related to these COCs.

2. Pesticides:
Detections of pesticides in groundwater are indicated on Figure 3-31. Fortunately, no pesticides have been detected above MCLs. Most of these detections are of two soil fumigants, with one area of xylene detections.

Comment: **The GSP should clarify the extent of coordination between the GSA and local agencies conducting water quality management**. If the information requested below is included in some of the technical reports cited in this chapter (the P&P 2015 or the KFMC 2011 reports), please state this where local management is mentioned.

Specifically, although pesticide applications and oil refining are not regulated by the GSA, more detail should be included regarding monitoring or managing of groundwater quality in areas where groundwater quality concerns exist. This is especially true in areas with domestic wells, as domestic well owners may not have frequent access to analytical water quality testing.

On page 3-37, some additional details should be included regarding the local management of two fumigants, DBCP and EDB: what are the monitoring protocols in these areas? Are there any domestic wells in the vicinity of these detections? If so, in the event that pesticides are detected above MCLs, what management actions are available to prevent ingestion of these concentrations (e.g., emergency bottled water provision, wellhead treatment, or blending)?

Similarly, in the following paragraph on Page 3-37, what activity is the presumed source of the xylene detections (e.g. spilled produced water or leaking well casings)? Are there any domestic wells in the vicinity of this cluster of detections at the east-central boundary of the Plan Area? Are the oil refining entities associated with these detections continuing to monitor water quality? If so, what monitoring protocols are in use, and what management actions are available if xylenes are detected at concentrations greater than the MCL?

3. 1,2,3-TCP
Based on the land use history of the areas with TCP detections, TCP contamination in areas with domestic or municipal wells is considered a legacy issue associated with “non-point”

sources, so are this contaminant is not considered to be part of a distinct plume. Though higher TCP concentrations are expected in shallower groundwater, no relationship between depth and TCP concentrations has been observed in the current dataset. Current TCP management actions involve wellhead treatment (>55 wells).

Comment: On page 3-39, **additional information should be provided regarding the statement**, “[Public TCP concentration] data will be compiled periodically and reviewed by the KRGSA to ensure that management actions do not exacerbate the extent of TCP in groundwater.” Specifically, at what timescale will public TCP data be compiled? (Annually? During the GSP 5-year updates?) What will serve as evidence for management actions exacerbating TCP in groundwater (e.g., migration to new areas or deeper wells)?

Dry Well Analysis

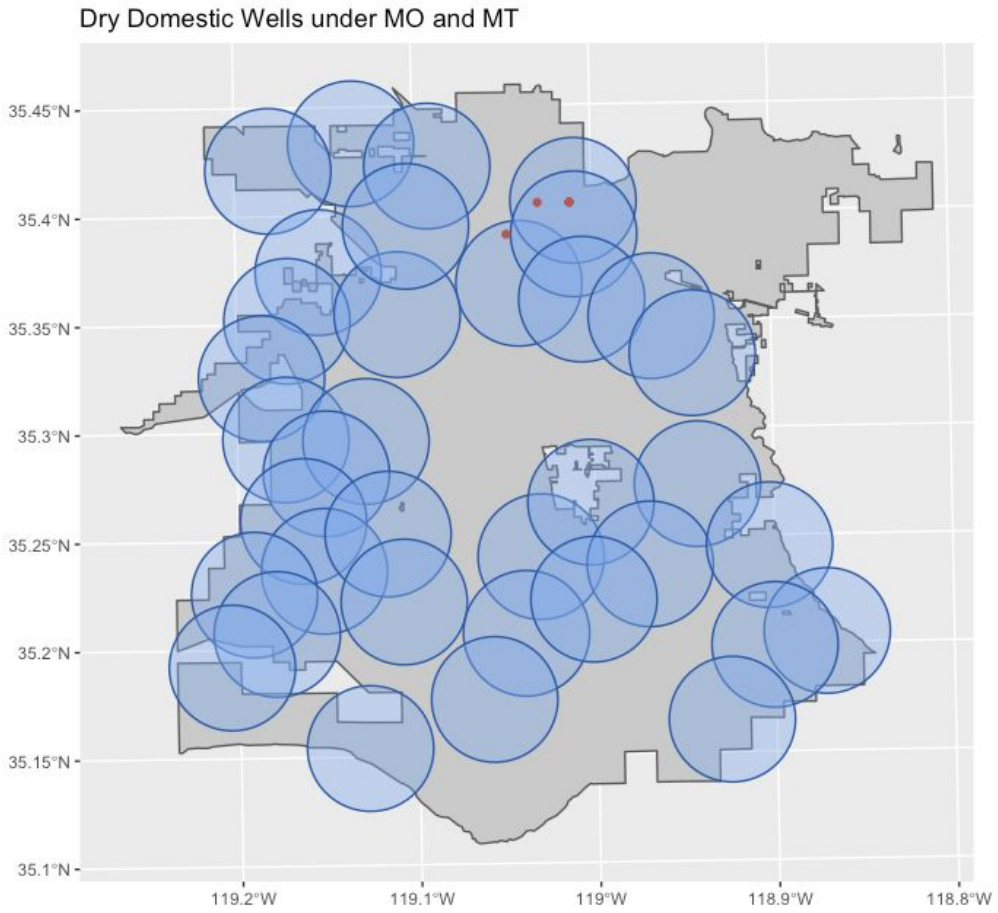
To analyze the potential for well outages under the designated measurable objectives and minimum thresholds, we used publicly available data from the Online State Well Completion Report (OSWCR) database, which contains well location and depth information for all wells that filed Well Completion Reports in the state. We mapped all 3,633 wells within the KRGSA boundary. A 2-mile radius was assumed around each of the GSP’s designated monitoring wells (since we did not find it otherwise specified in the Plan), and we compared the MOs and MTs set for each monitoring well to the depths of the wells within the 2-mile buffer. We focused primarily on domestic wells. All wells where the total depth is less than the MO or MT for the closest monitoring well are assumed to go dry if those MOs and MTs are met. Our analysis estimated that, at a minimum, 6 domestic wells will go dry under the proposed MOs, and 7 domestic wells would go dry under the proposed MTs. These represent 1.6% and 1.9% of all operational domestic wells in the GSA, respectively.

The map in figure 1 shows the spatial analysis of domestic wells that will go dry under the MOs and MTs for each monitoring well. The two maps look the same because the locations of the wells are abstracted. There is more than one well within each point (points have the same coordinates and are mapped on top of one another). Figures 2 and 3 show all dry wells under MOs and MTs and their respective types.

We interpret these numbers as an **underestimate** of the potential well outages given the following limitations of the data available for the following reasons: 1) The analysis relies on total completed depth information of the well, but wells will go dry before hitting their absolute depth; 2) The OSCWR database is incomplete and may be missing older wells or wells where the well completion reports were not filed; 3) The analysis could not be completed for over 700 wells that were either missing information about total completed depth information (about 431 wells in the GSA boundary) or fell outside of the 2-mile radius around a monitoring well (295 wells in the GSA boundary).

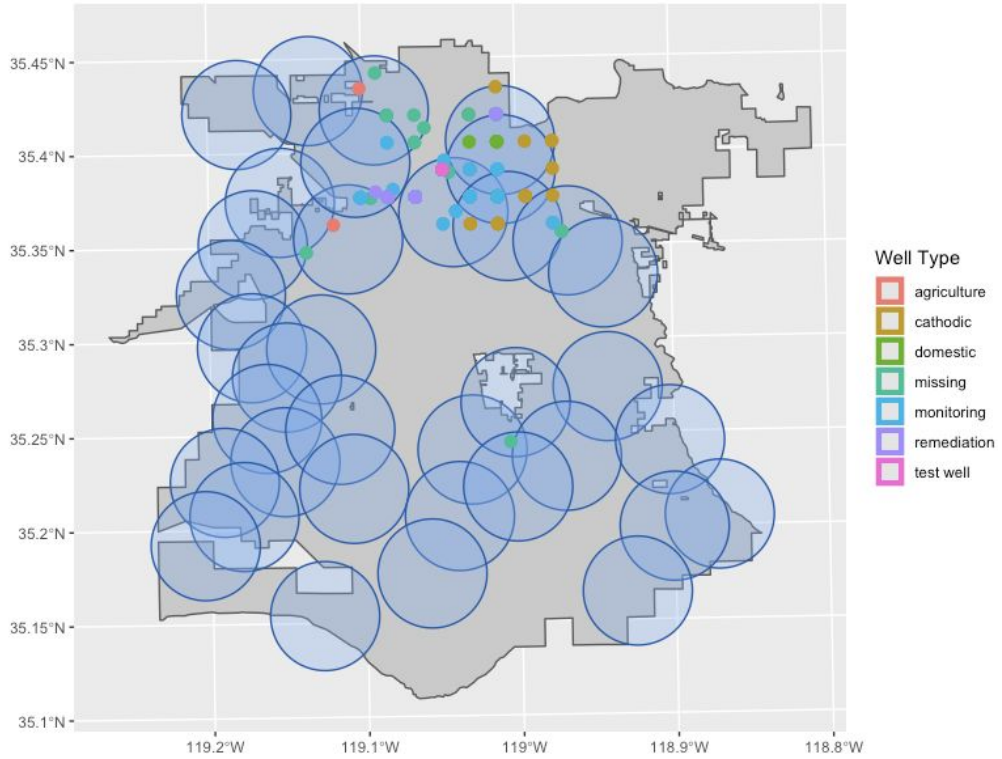
If **Measurable Objective** is met..	If **Minimum Threshold** is met..
159 wells go dry	250 wells go dry
6 domestic wells go dry	7 domestic wells go dry

** NOTE: One point on the map represents more than one well. **



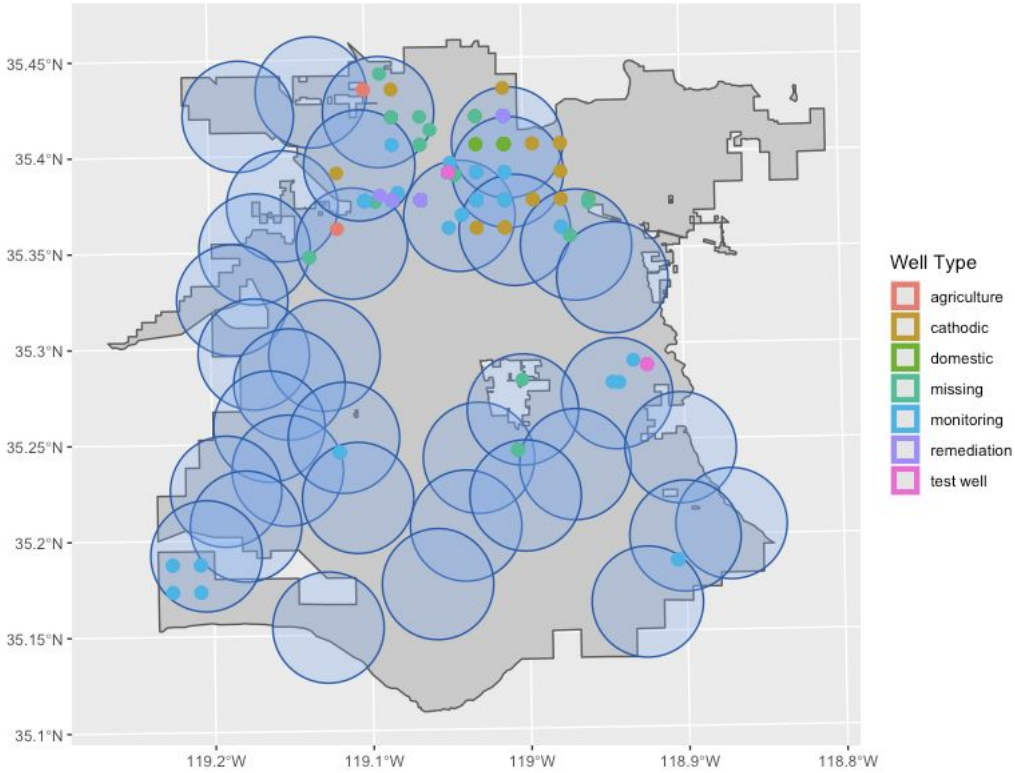
All dry wells under MO

n = 159



All dry wells under MT

n = 250



BRAUN GOSLING
A Law Corporation

1620 Mill Rock Way
Suite 400
Bakersfield, CA 93311

Phone: (661) 663-8300
Fax: (661) 663-8388
www.braungosling.com

Craig D. Braun
Douglas A. Gosling

cbraun@braungosling.com
dgosling@braungosling.com

December 3, 2019

VIA U.S. MAIL AND E-MAIL
Kern River Groundwater Sustainability Agency
Art Chianello
Water Resources Manager
1600 Truxtun Avenue
Bakersfield, CA 93301
achianel@bakersfieldcity.us

Re: Copy of Comments submitted to Kern Groundwater Authority

Mr. Chianello:

Please allow this correspondence to simply provide your GSA, for its file, with a copy of comments that were submitted by Shafter~Wasco Irrigation District to the Kern Groundwater Authority GSA. We are providing information for your file since your GSA is also located within the Kern County Subbasin, we do not expect any official response.

Yours very truly,

DOUG GOSLING, ESQ.

Enclosure

cc: file/client

Shafter~Wasco Irrigation District

Board of Directors

CRAIG D. FULWYLER, ***President***
GEORDY W. WISE, ***Vice President***
D. MARK FRANZ
JEFF W. MEHLBERG
BENJAMIN P. WILSON

P.O. Box 1168
Wasco, California 93280
❖
Business Office: (661) 758-5153
Fax: (661) 758-6167
Water Department: (661) 758-5369

General Manager
DANA S. MUNN

Office Manager/Treasurer
SARAH K. PITTS

Legal Counsel
SCOTT K. KUNEY
ALAN F. DOUD

November 26, 2019

Patricia Poire
Planning Manager
Kern Groundwater Authority
(c/o Provost & Pritchard Consulting Group)
1800 30th Street, Suite 280
Bakersfield, CA 93301

Re: Water budget guidance inside individual Groundwater Sustainability Plans

Please allow this letter to address a standing item of concern that the Shafter Wasco Irrigation District continues to review and evaluate from a management level position and in anticipation of taking management actions in the future for SGMA compliance within its current management areas as detailed within its draft plan. As stated at recent Kern Groundwater Authority board meetings on September 25, 2019 and October 23, 2019, the Shafter Wasco Irrigation District has disagreement over the recent guidance for preparation of water budget for individual Groundwater Sustainability Plans. In addition, key members of the KGA board along with KGA staff also stated in those board meetings that these current assumptions being used will change as dictated by SGMA and the anticipated future actions to be taken for GSP compliance, and thus we assume that in the next five years, additional data will be generated that may alleviate said disagreement. Given this, although not agreeing with the recent guidance for preparation of water budget for individual Groundwater Sustainability Plans or

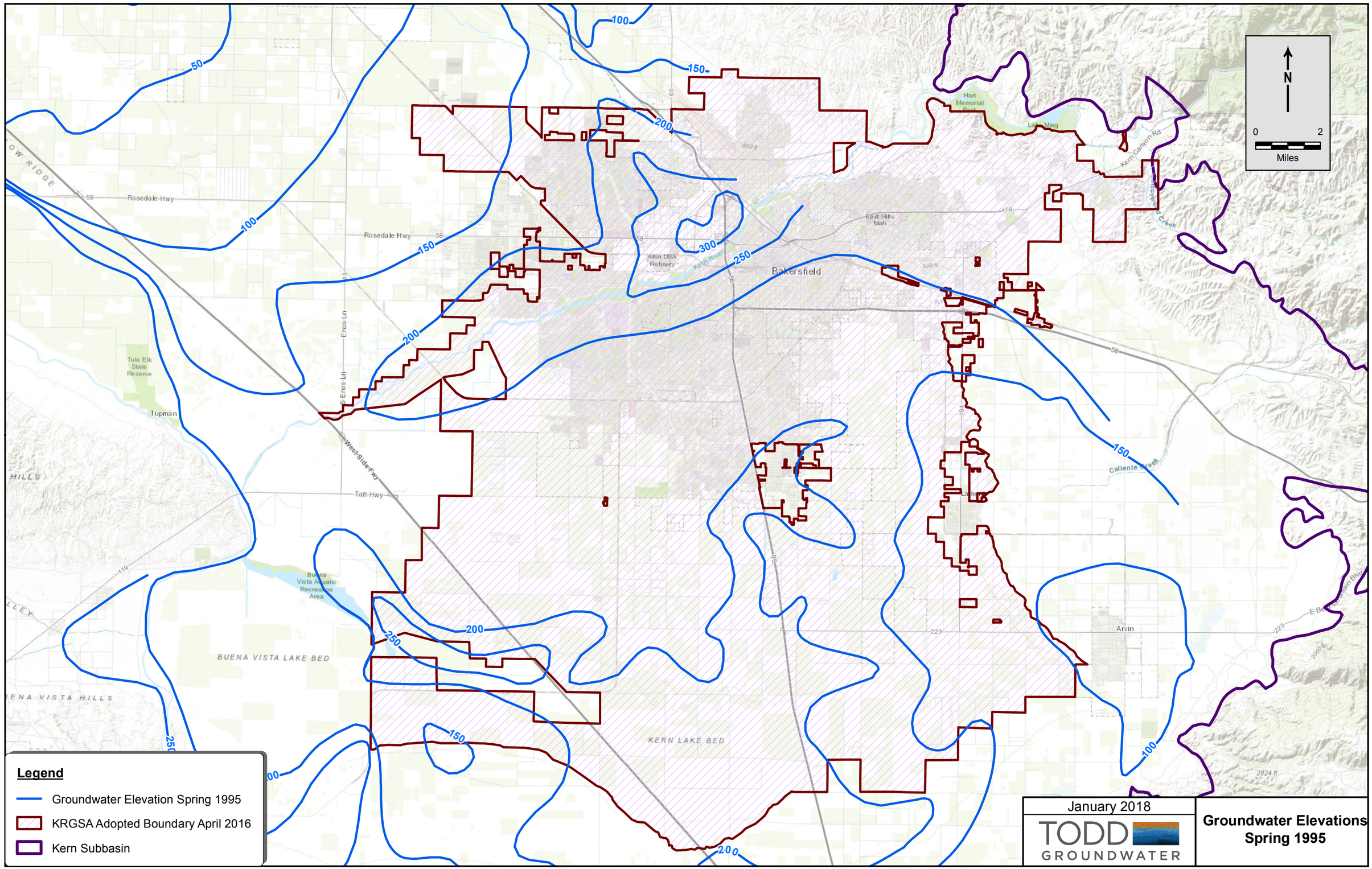
management areas, the Shafter Wasco Irrigation District will accommodate KGA's request and direction at this time. However, this accommodation should not be viewed as a waiver or admission of any of Shafter Wasco Irrigation District's rights or claims that exist or may exist as related to its Projects or its past, present, or future operations or management actions, and thus does not affect, limit, change, or alter any of Shafter Wasco Irrigation District's rights. We continue to look optimistically forward as an active member of the KGA and hope to provide the necessary data and engage in the vital discussions to find positive results within this basin. We appreciate your understanding on this item.

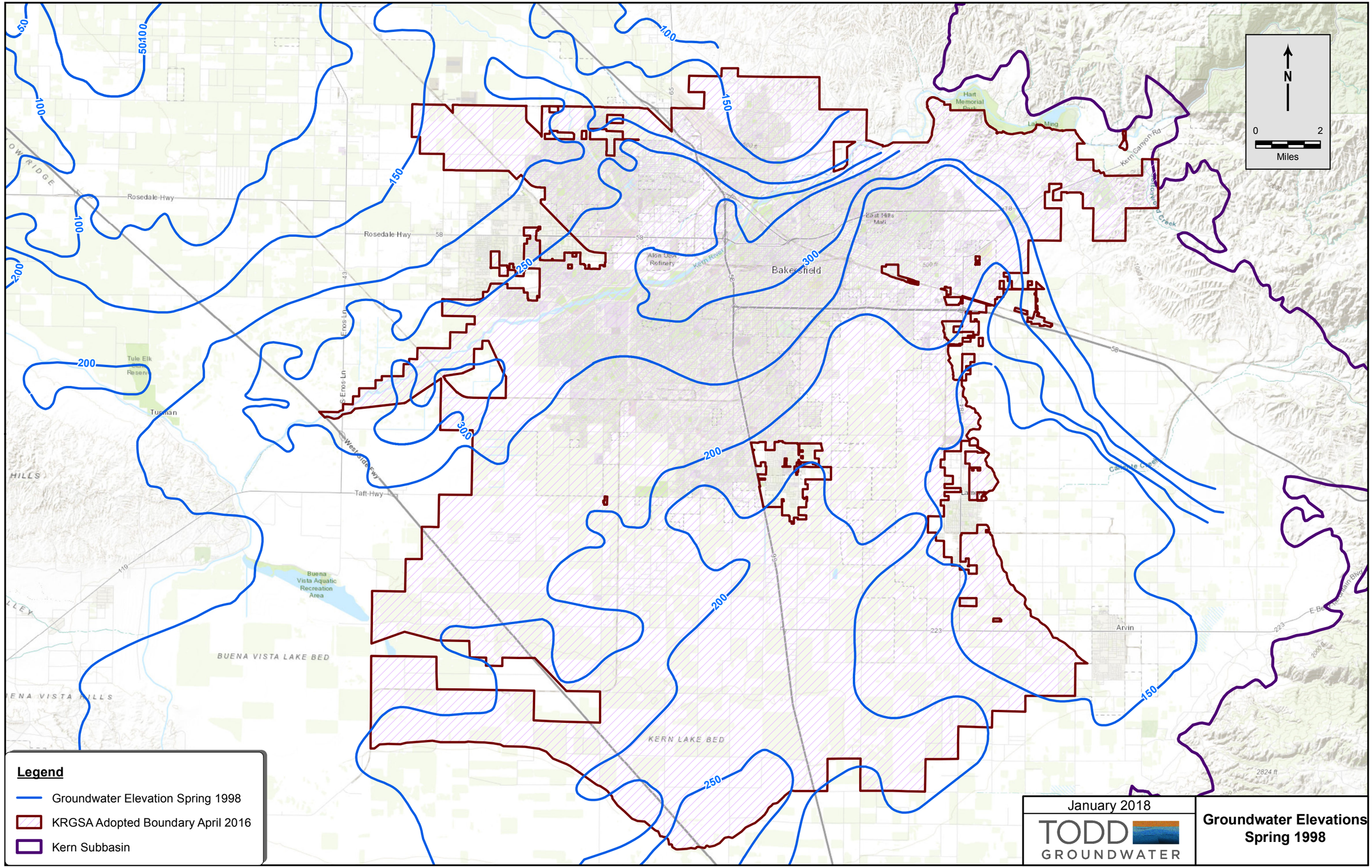
Sincerely,

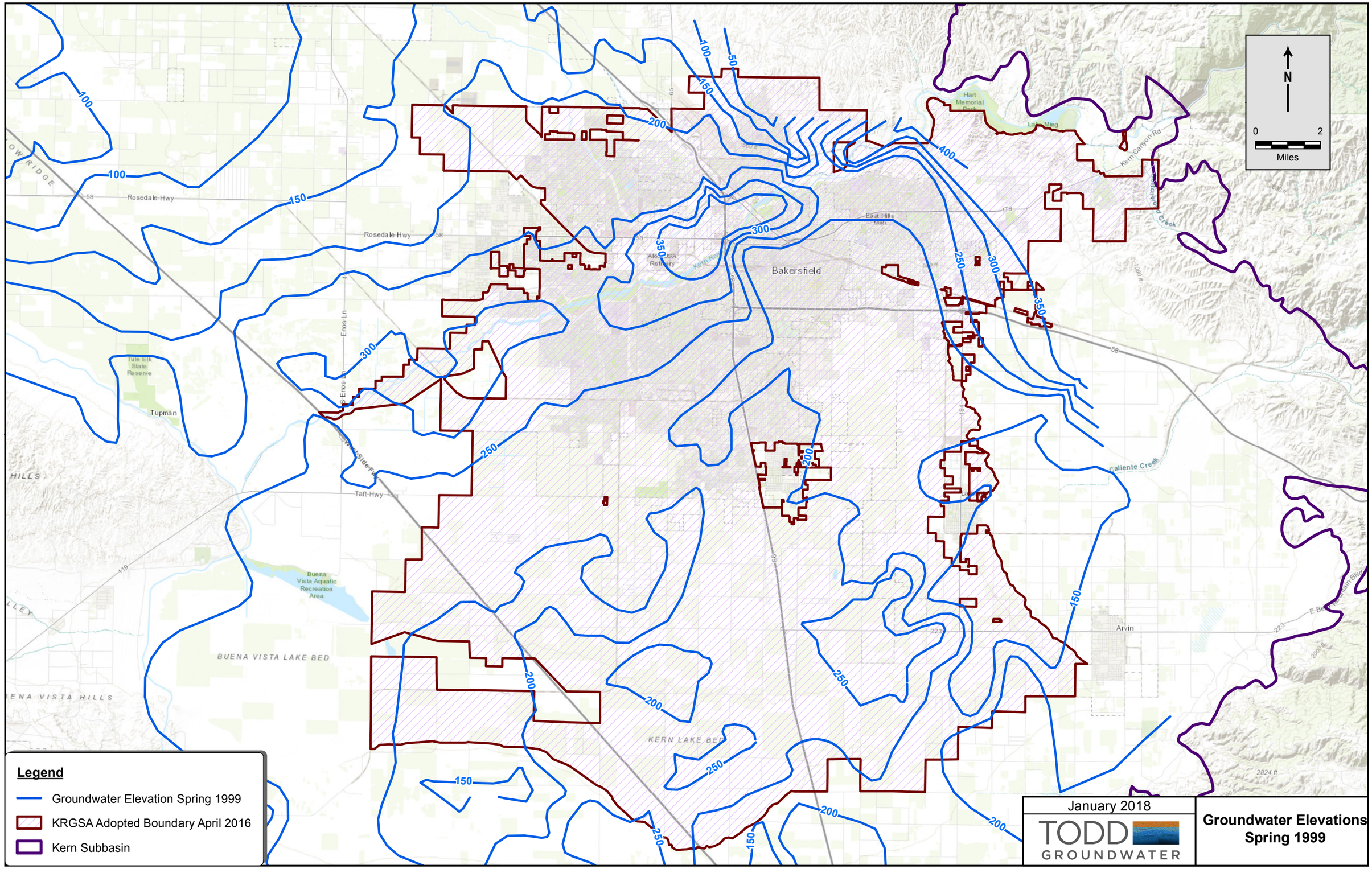
Dana Munn
General Manager

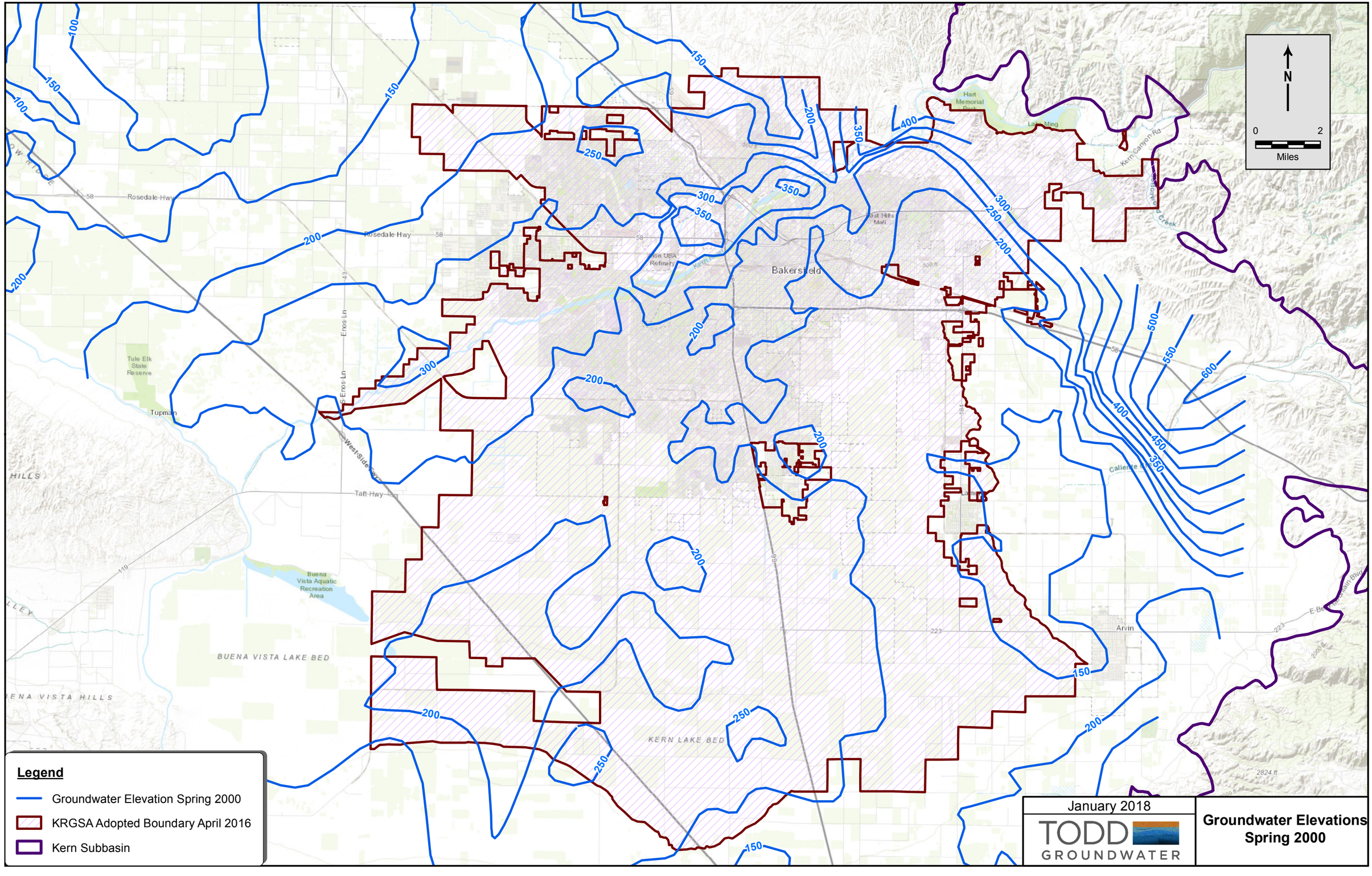
APPENDIX G

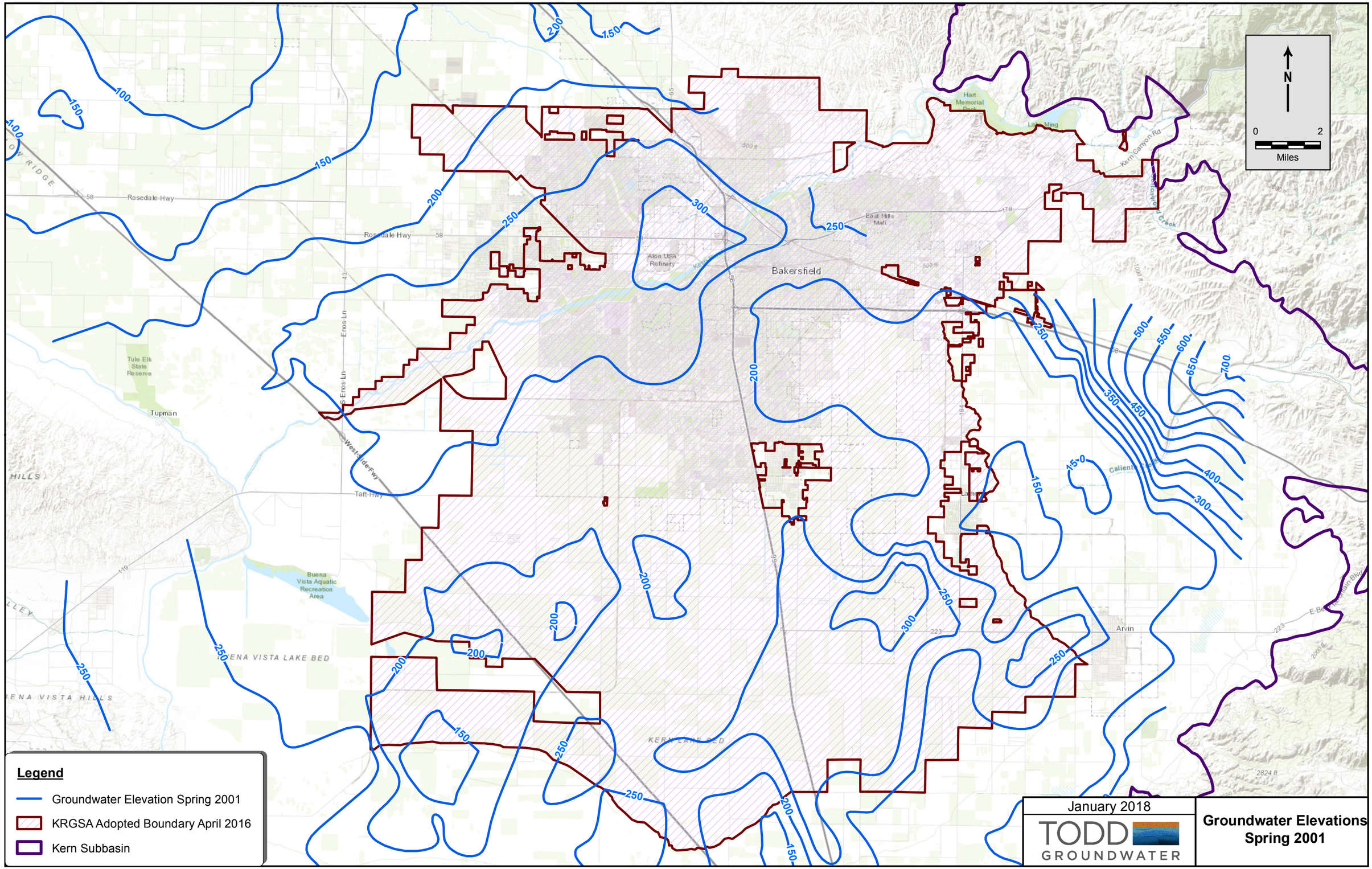
Annual Spring Groundwater Elevation Contour Maps, KCWA


N
0
2
Miles
Legend
Groundwater Elevation Spring 1995
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 1995
Bakersfield
Arvin
Tupman
Rosedale Hwy
Taft Hwy
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Kern River
Caliente Creek
Kern Canyon Rd
Hart Memorial Park
Lake Ming
Alon USA Refinery
East Hills Mall
50
100
150
200
250
300


50
100
150
200
250
300
Rosedale Hwy
Bakersfield
Tupman
Taft Hwy
Arvin
Lamont
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Kern River
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Alon USA Refinery
N
0
2
Miles
Legend
Groundwater Elevation Spring 1998
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 1998


N
0
2
Miles
Bakersfield
Rosedale Hwy
Tupman
Tule Elk State Reserve
Taft Hwy
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Arvin
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Caliente Creek
East Hills Mall
Kern River
100
150
200
250
300
350
400
50
Legend
Groundwater Elevation Spring 1999
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 1999

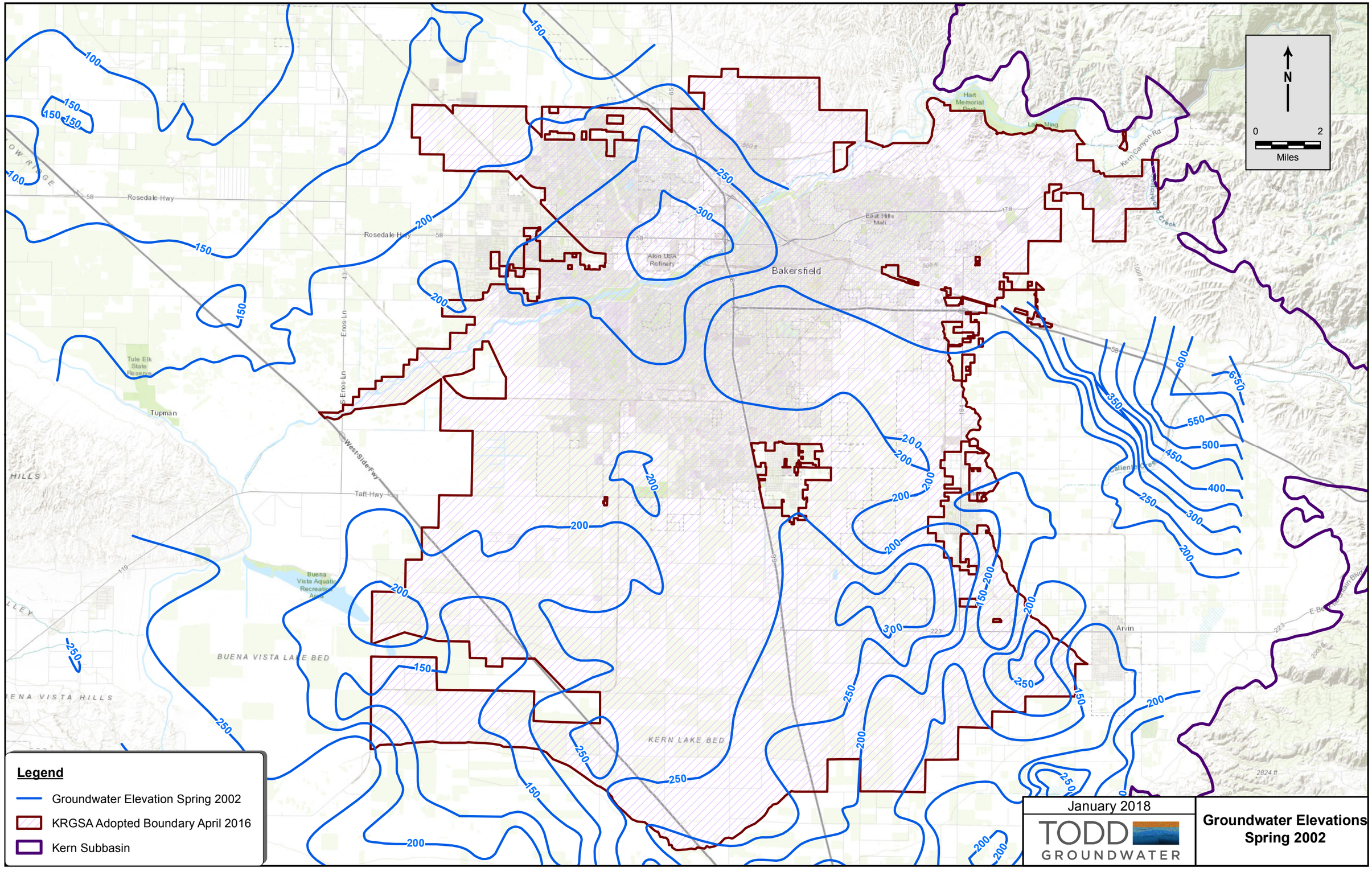

N
0
2
Miles
Bakersfield
Rosedale Hwy
Taft Hwy
Tupman
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Arvin
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Caliente Creek
Legend
Groundwater Elevation Spring 2000
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2000

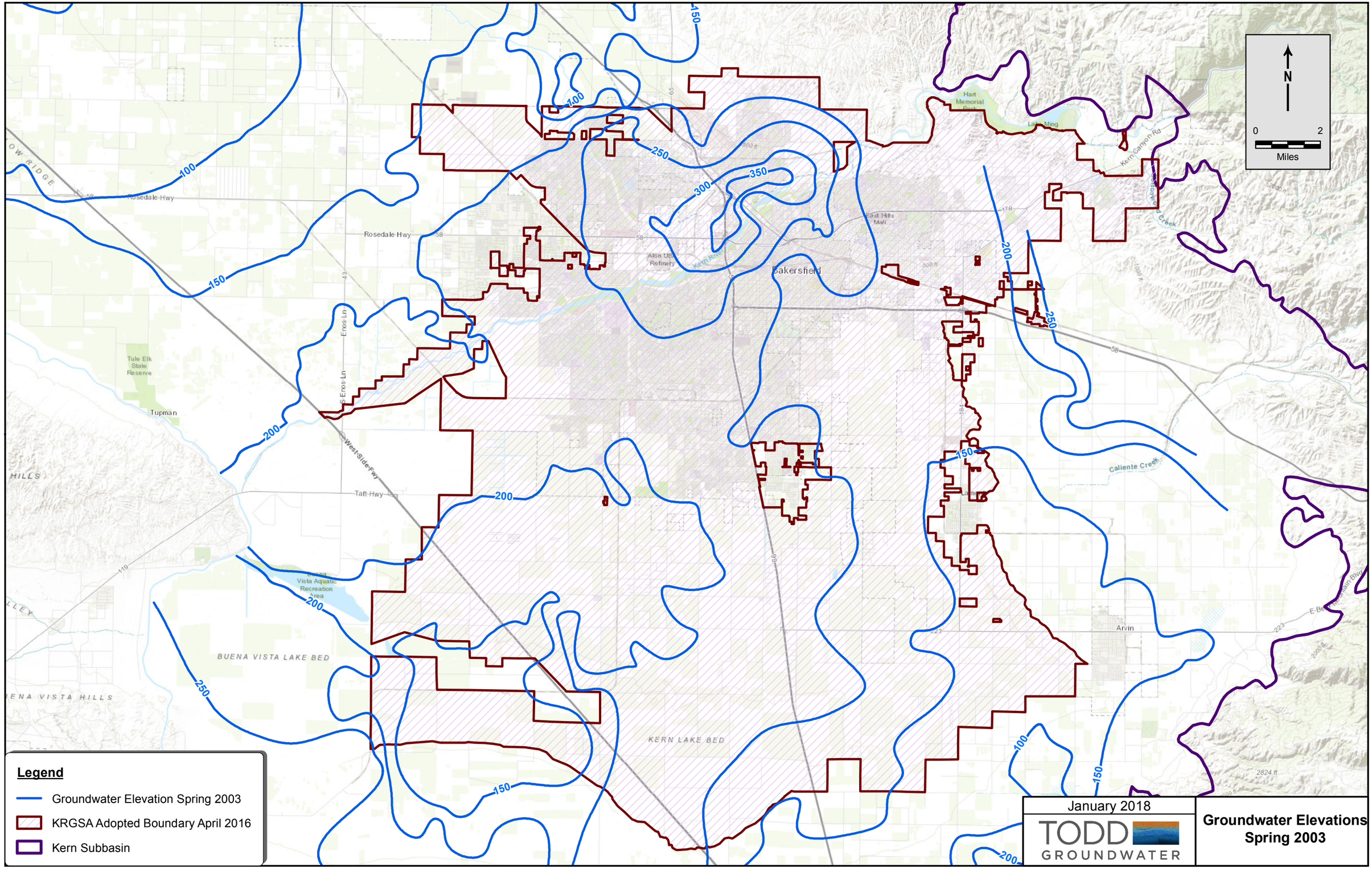


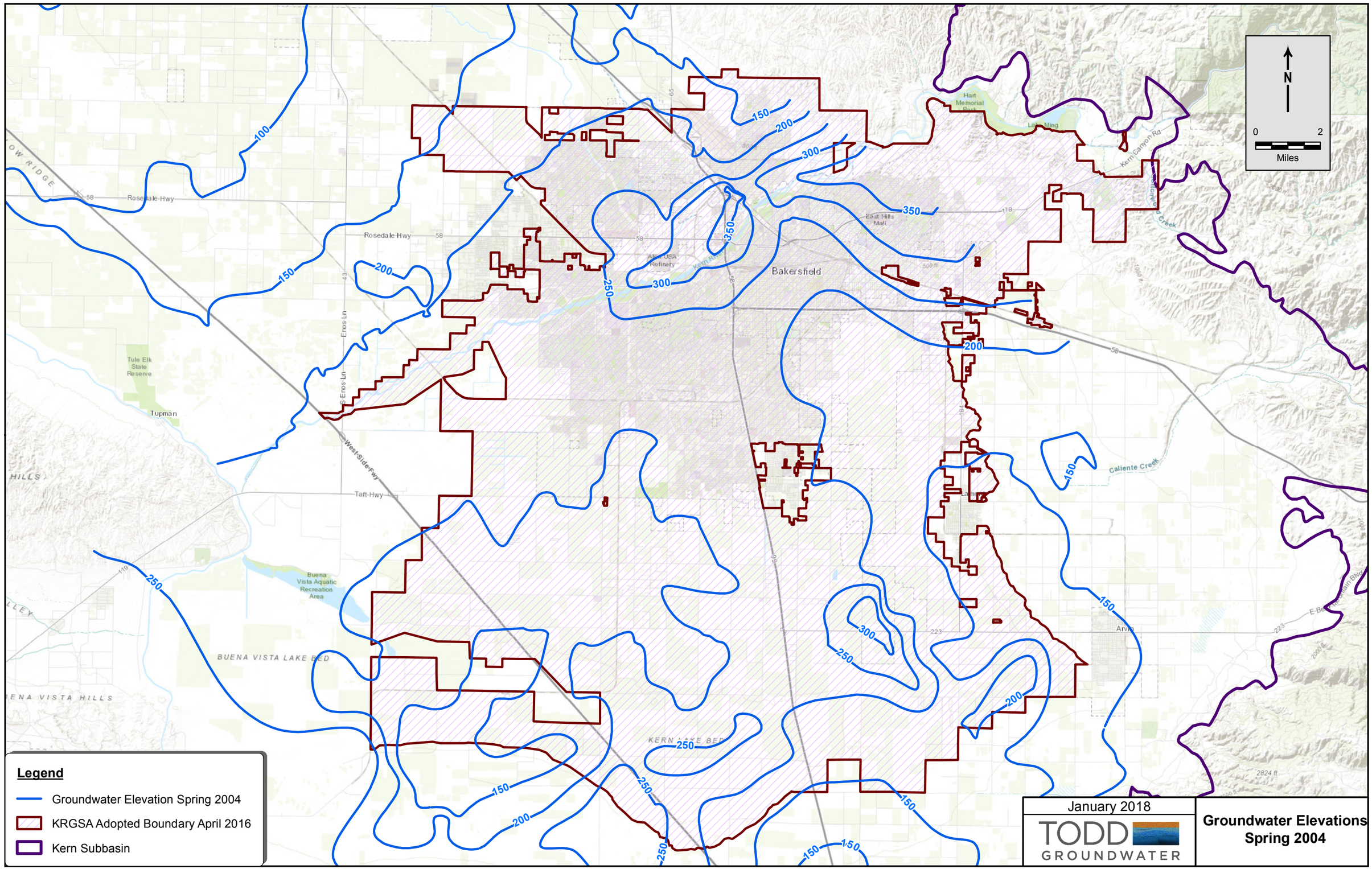
January 2018

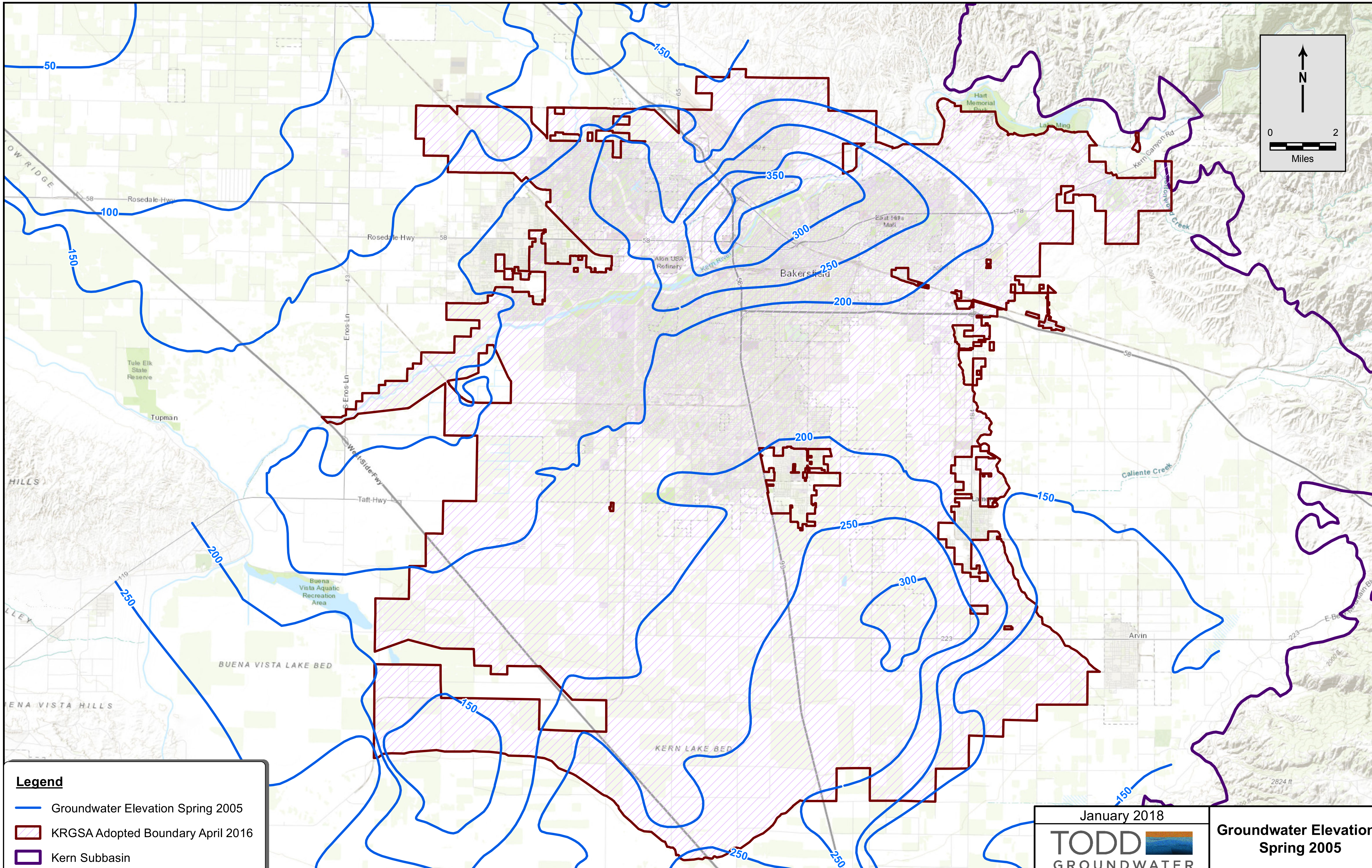
TODD GROUNDWATER

Groundwater Elevations Spring 2001


N
0
2
Miles
Legend
Groundwater Elevation Spring 2002
KRGSA Adopted Boundary April 2016
Kern Subbasin
Bakersfield
Arvin
Tupman
Rosedale Hwy
Taft Hwy
West Side Fwy
Enos Ln
S Enos Ln
Kern Canyon Rd
Hart Memorial Park
Lake Ming
East Hills Mall
Alon USA Refinery
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
BUENA VISTA HILLS
100
150
200
250
300
350
400
450
500
550
600
650
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2002


N
0
2
Miles
Legend
Groundwater Elevation Spring 2003
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2003
Bakersfield
Rosedale Hwy
Tupman
Taft Hwy
Arvin
Lamont
Oildale
Hart Memorial Park
Alon USA Refinery
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Caliente Creek
Kern Canyon Rd
Kern River
100
150
200
250
300
350
400


N
0
2
Miles
Bakersfield
Rosedale Hwy
Tupman
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Caliente Creek
Kern Canyon Rd
Hart Memorial Park
Lake Ming
East Hills Mall
Arvin
Taft Hwy
West Side Fwy
100
150
200
250
300
350
Legend
Groundwater Elevation Spring 2004
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2004

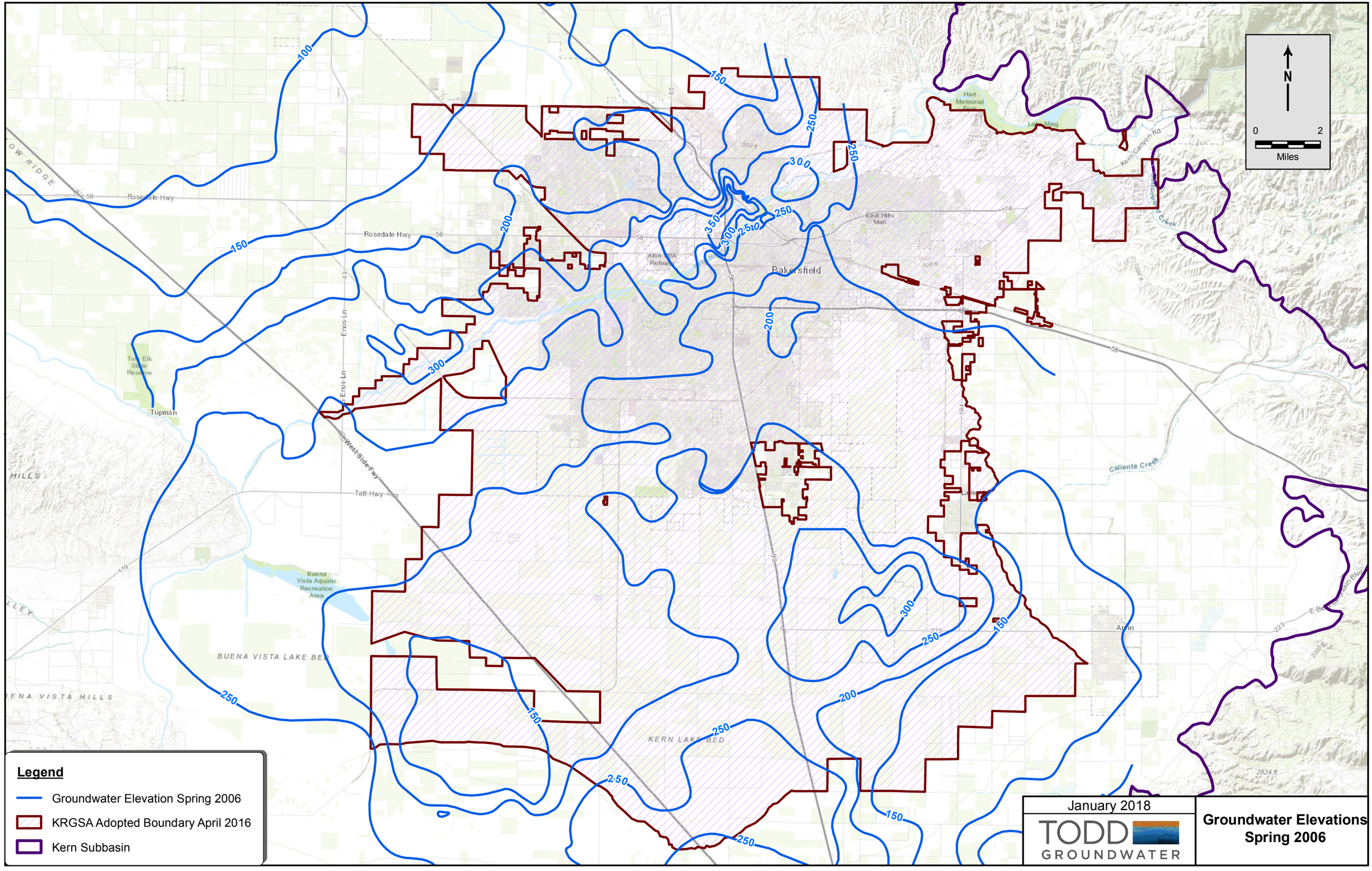


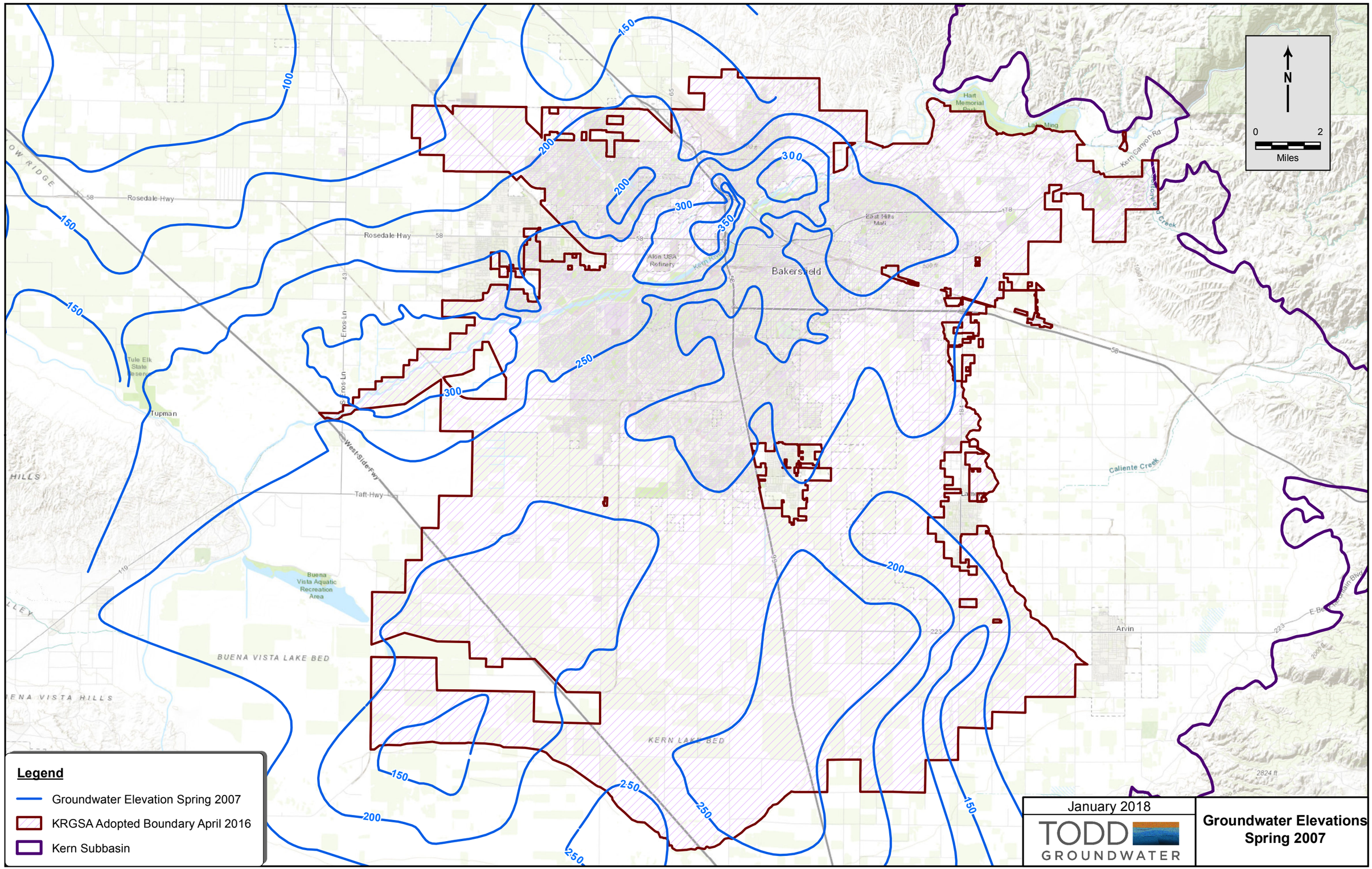
Legend
Groundwater Elevation Spring 2005
KRGSA Adopted Boundary April 2016
Kern Subbasin
N
0
2
Miles
50
100
150
200
250
300
350
Bakersfield
Rosedale Hwy
Taft Hwy
Tupman
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
BUENA VISTA HILLS
Alon USA Refinery
East Hills Mall
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Caliente Creek
Arvin
Eros Ln
West Side Fwy

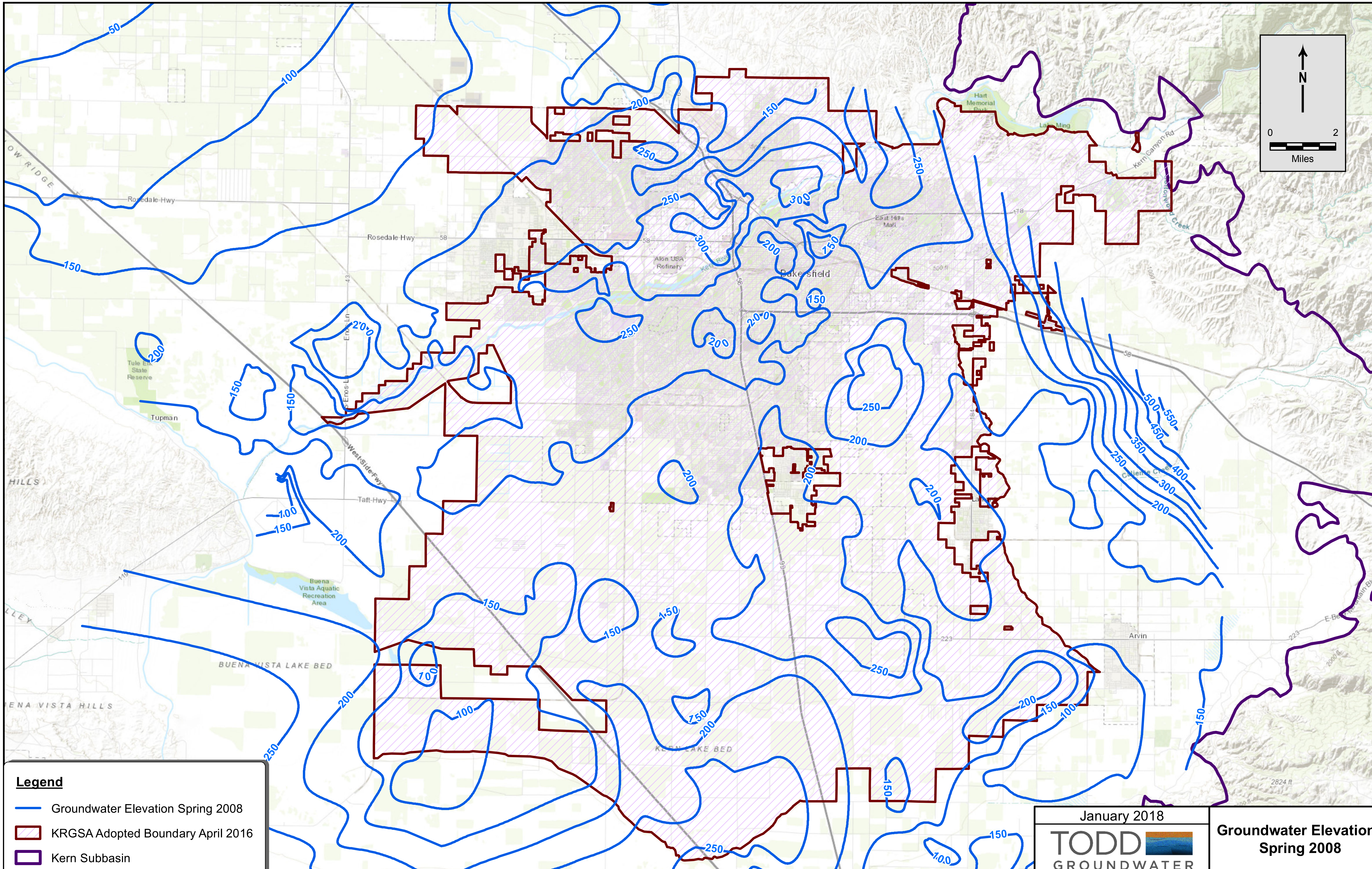
January 2018

TODD GROUNDWATER

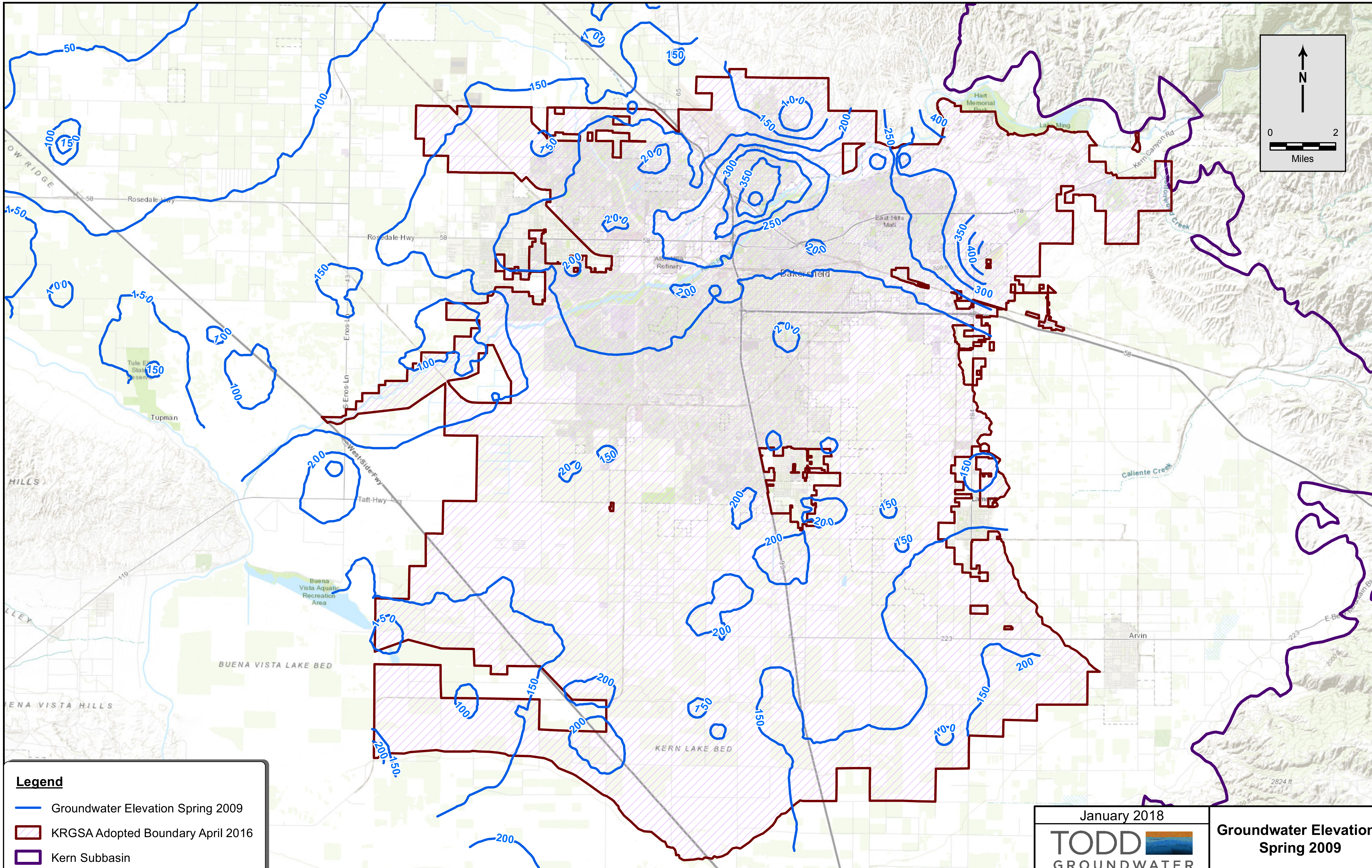
Groundwater Elevations Spring 2005

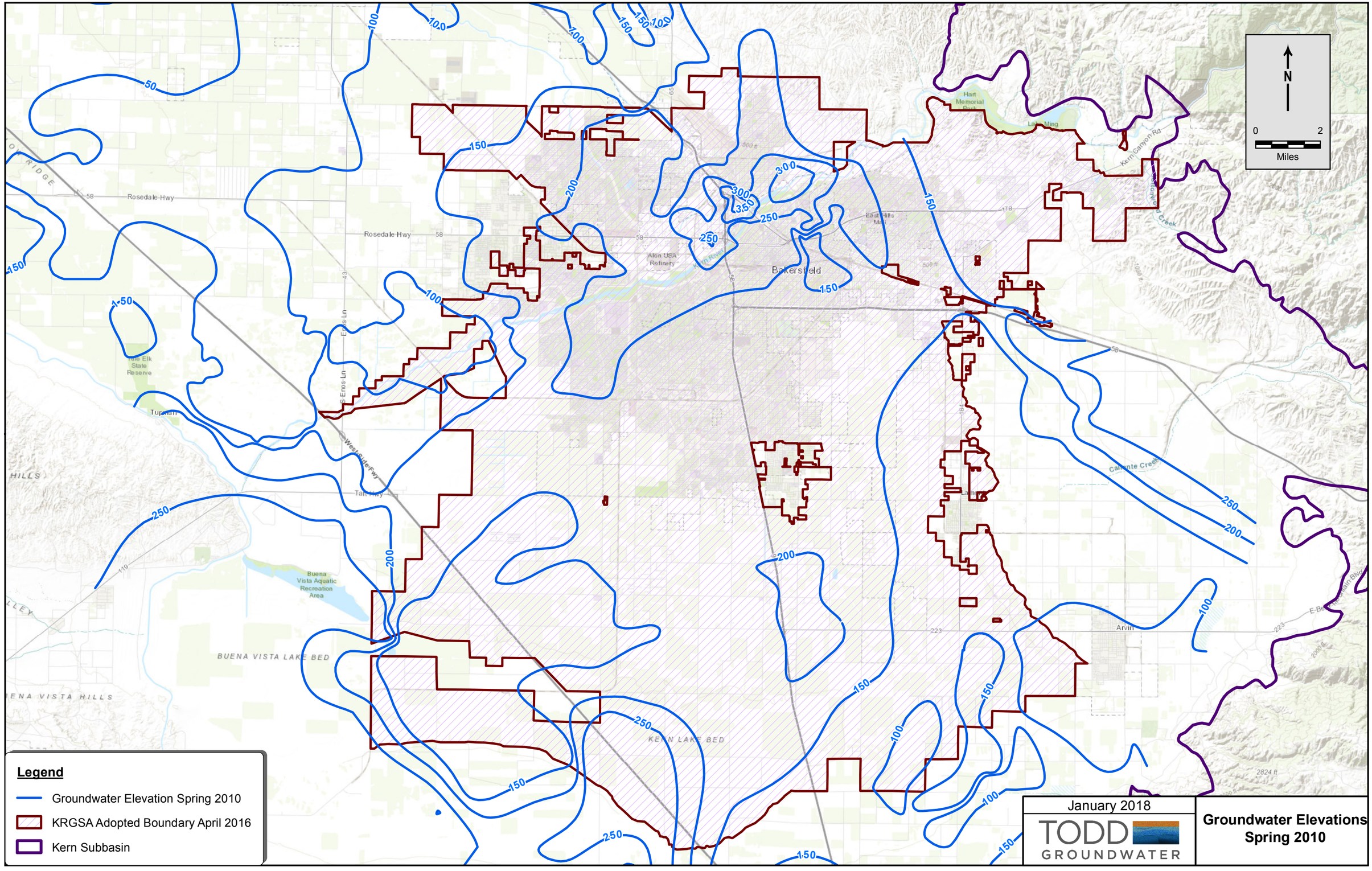

N
0
2
Miles
100
150
200
250
300
350
Rosedale Hwy
Bakersfield
Tupman
Eros Ln
West Side Fwy
Taft Hwy
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Caliente Creek
Kern Canyon Rd
Hart Memorial Park
Lake Ming
Alon USA Refinery
Legend
Groundwater Elevation Spring 2006
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2006

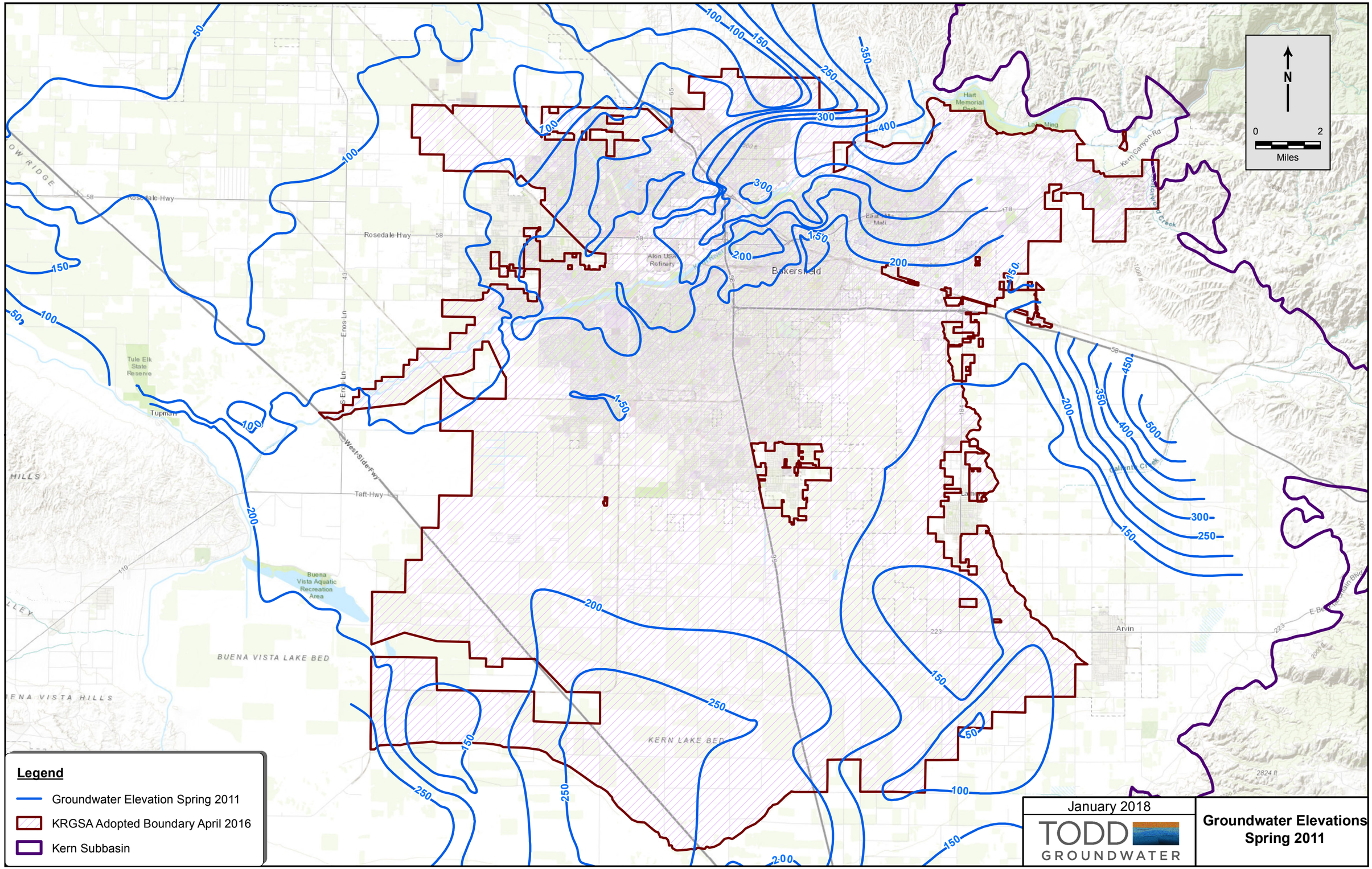

N
0
2
Miles
100
150
200
250
300
350
Rosedale Hwy
Bakersfield
Tupman
Taft Hwy
Arvin
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
Alon USA Refinery
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Caliente Creek
Oildale
East Hills Mall
Eros Ln
West Side Fwy
BUENA VISTA LAKE BED
KERN LAKE BED
Legend
Groundwater Elevation Spring 2007
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2007

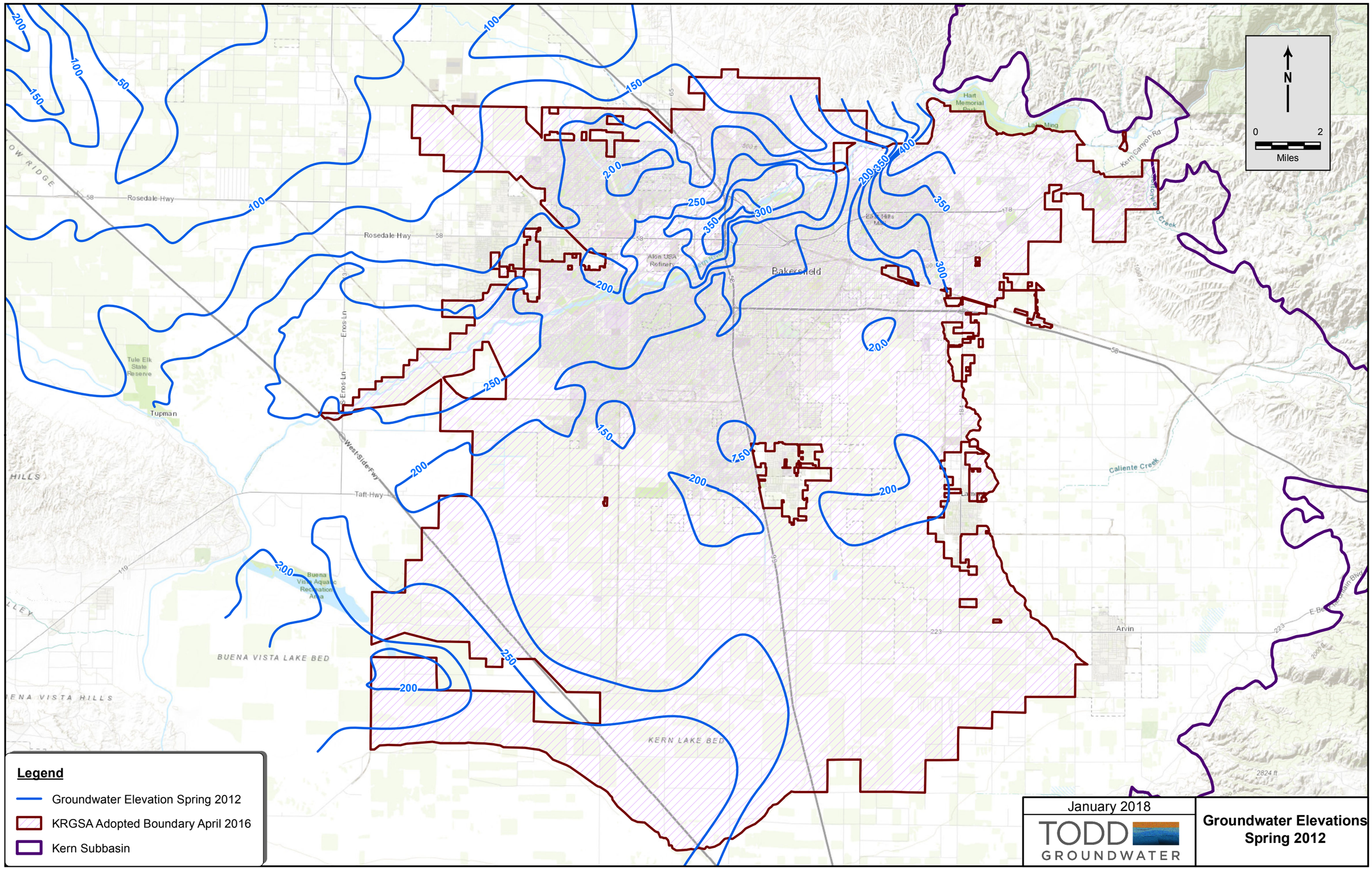


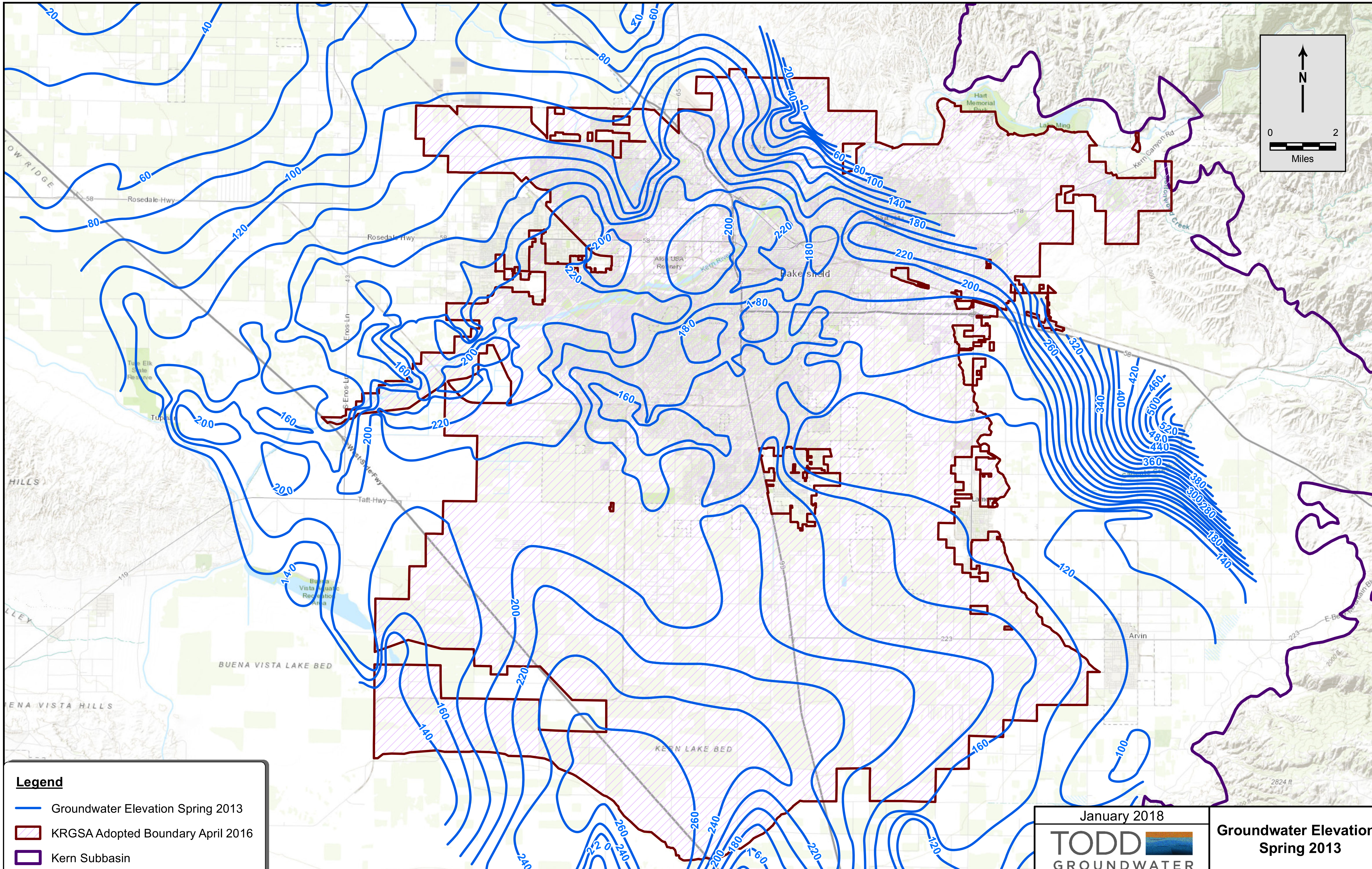
Legend
Groundwater Elevation Spring 2008
KRGSA Adopted Boundary April 2016
Kern Subbasin
N
0
2
Miles
Bakersfield
Rosedale Hwy
Tupman
Arvin
Taft Hwy
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
East Hills Mall
Hart Memorial Park
Lake Ming
Kern Canyon Rd
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2008


Legend
Groundwater Elevation Spring 2009
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD
GROUNDWATER
Groundwater Elevations
Spring 2009
N
0
2
Miles
Bakersfield
Rosedale Hwy
Taft Hwy
West Side Fwy
Tupman
Arvin
Caliente Creek
Kern Canyon Rd
East Hills Mall
Hart Memorial Park
Lake Ming
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Eros Ln

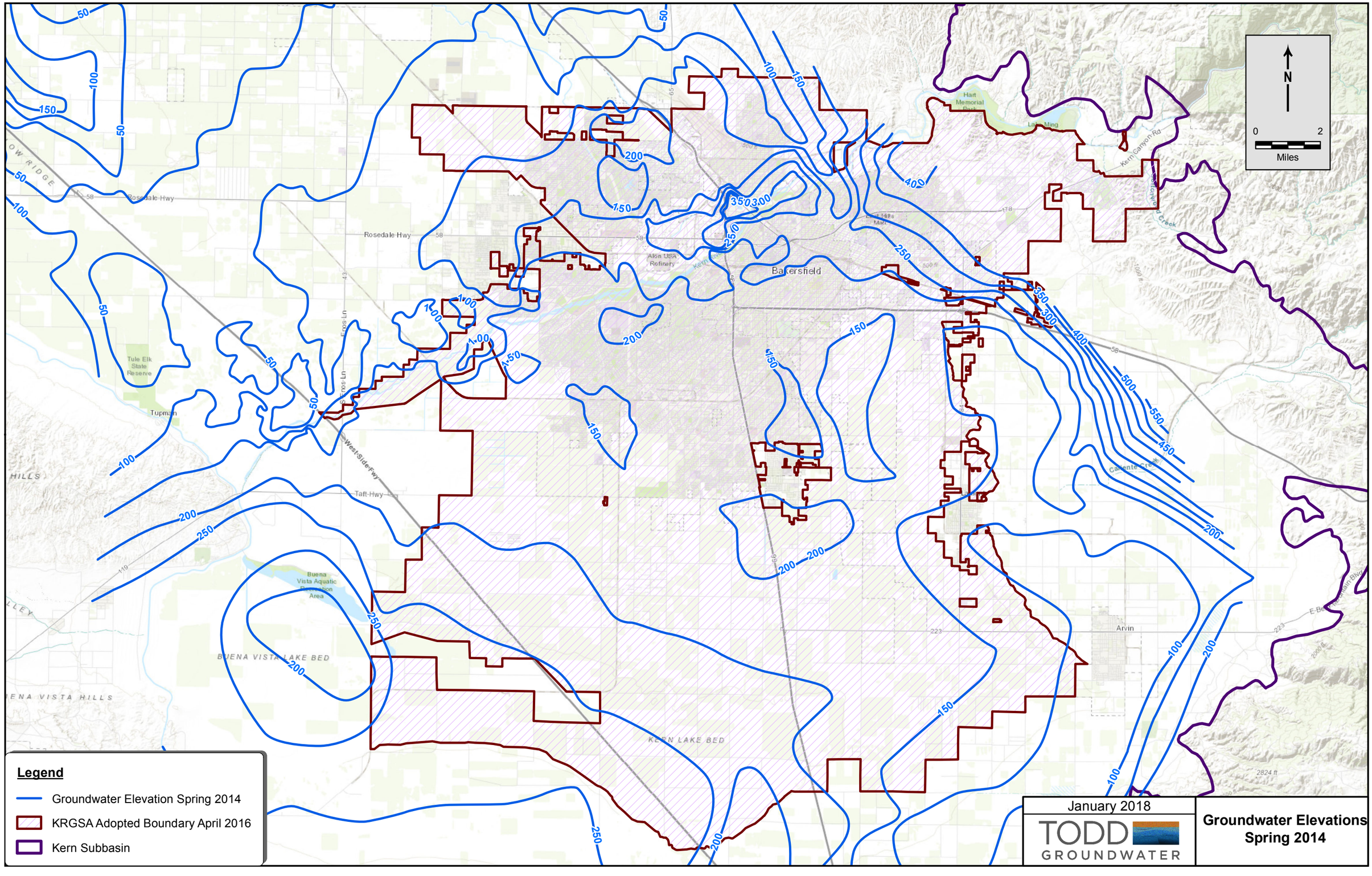

N
0
2
Miles
Legend
Groundwater Elevation Spring 2010
KRGSA Adopted Boundary April 2016
Kern Subbasin
Bakersfield
Arvin
Rosedale Hwy
Alon USA Refinery
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Caliente Creek
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2010

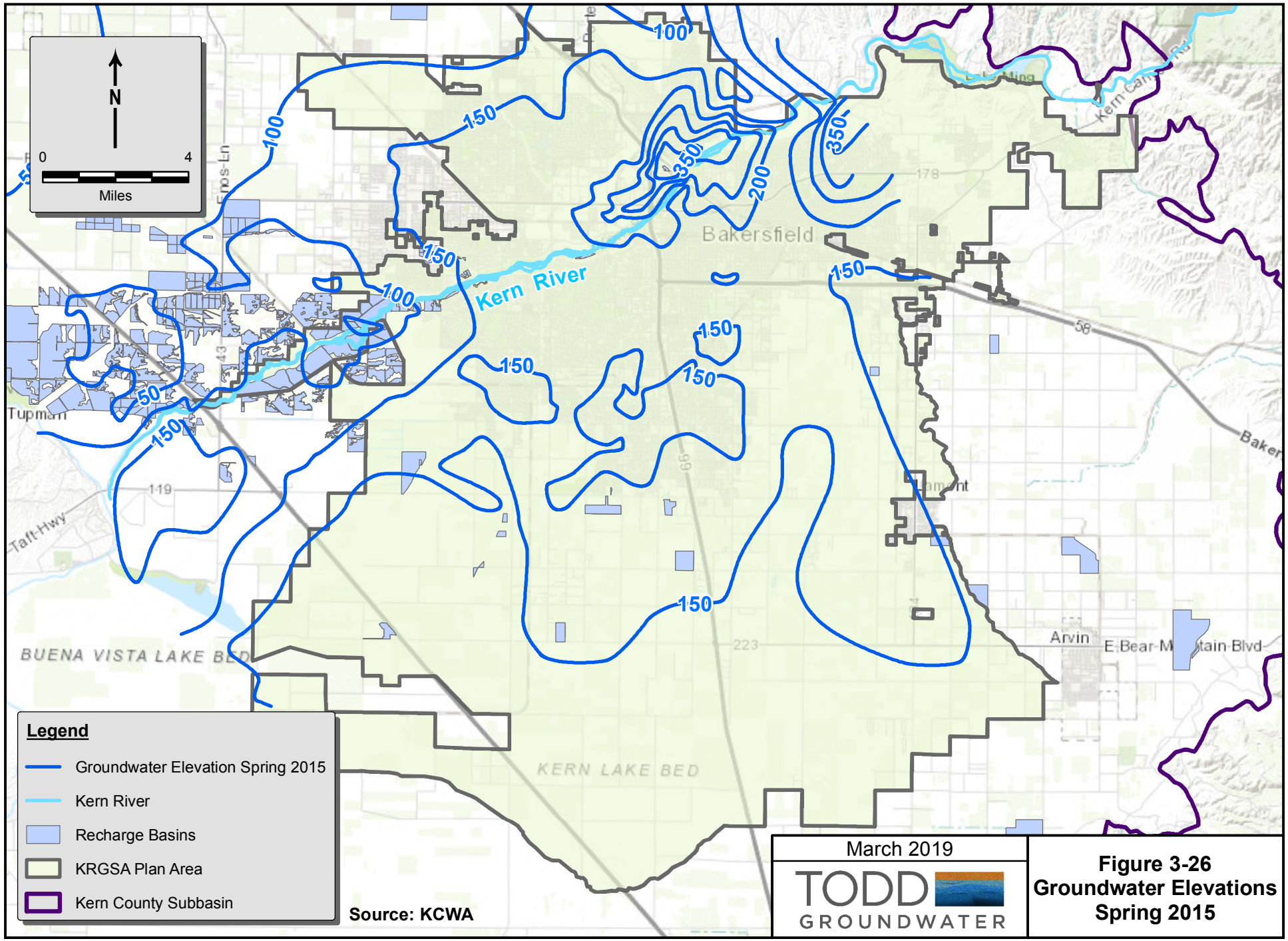

N
0
2
Miles
Legend
Groundwater Elevation Spring 2011
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2011
Bakersfield
Arvin
Rosedale Hwy
Taft Hwy
Tupman
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
Alon USA Refinery
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Enos Ln
West Side Fwy
BUENA VISTA LAKE BED
KERN LAKE BED
BUENA VISTA HILLS
50
100
150
200
250
300
350
400
450
500


N
0
2
Miles
Legend
Groundwater Elevation Spring 2012
KRGSA Adopted Boundary April 2016
Kern Subbasin
January 2018
TODD GROUNDWATER
Groundwater Elevations
Spring 2012
Bakersfield
Arvin
Tupman
Taft-Hwy
Rosedale Hwy
West Side Fwy
Eros Ln
Caliente Creek
Kern Canyon Rd
Hart Memorial Park
Lake Ming
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
BUENA VISTA HILLS
Alon USA Refinery
100
150
200
250
300
350
400
50



Legend
Groundwater Elevation Spring 2013
KRGSA Adopted Boundary April 2016
Kern Subbasin
N
0
2
Miles
Rosedale Hwy
Bakersfield
Taft Hwy
BUENA VISTA LAKE BED
KERN LAKE BED
BUENA VISTA HILLS
Arvin
Hart Memorial Park
Kern Canyon Rd
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2013


N
0
2
Miles
Legend
Groundwater Elevation Spring 2014
KRGSA Adopted Boundary April 2016
Kern Subbasin
Bakersfield
Rosedale Hwy
Tupman
Tule Elk State Reserve
Buena Vista Aquatic Recreation Area
BUENA VISTA LAKE BED
KERN LAKE BED
Arvin
Taft Hwy
West Side Fwy
Hart Memorial Park
Lake Ming
Kern Canyon Rd
Alon USA Refinery
Caliente Creek
January 2018
TODD GROUNDWATER
Groundwater Elevations Spring 2014


N
0
4
Miles
100
150
200
350
Kern River
Bakersfield
Tupman
Taft Hwy
119
58
Arvin
E Bear Mountain Blvd
BUENA VISTA LAKE BED
KERN LAKE BED
Legend
Groundwater Elevation Spring 2015
Kern River
Recharge Basins
KRGSA Plan Area
Kern County Subbasin
Source: KCWA
March 2019
TODD GROUNDWATER
Figure 3-26
Groundwater Elevations
Spring 2015

APPENDIX H

C2VSimFG-Kern Model Results:

KRGSA Projected Water Budget with Projects and Superposition Hydrographs

KRGSA Plan Area

Table H-1: Baseline Scenario with GSP Projects
Projected Future Groundwater Budget for KRGSA - WY2021 to WY2070
Kern County Subbasin C2VSimFG-Kern Update

Water Year	Deep Percolation	Managed Recharge and Canal Seepage	Net GW/SW Interactions	GW Pumping	Subsurface Flow with Adjacent Areas	Change in Groundwater Storage
Units	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**
SUMMARY: WY2021 to WY2070 Simulatation Period						
Total	7,588,625	9,381,325	2,233,647	-13,383,092	-2,938,757	**2,881,750**
Annual Average	151,772	187,626	44,673	-267,662	-58,775	**57,635**
SUMMARY: WY2021 to WY2040 Implementation Period						
Total	3,000,767	3,753,116	1,005,378	-5,115,264	-1,184,368	**1,459,629**
Annual Average	150,038	187,656	50,269	-255,763	-59,218	**72,981**
SUMMARY: WY2041 to WY2070 Sustainability Period						
Total	4,587,858	5,628,208	1,228,270	-8,267,828	-1,754,389	**1,422,120**
Annual Average	152,929	187,607	40,942	-275,594	-58,480	**47,404**
Annual Simulation Results for WY2021 to WY2070 Simulation Period						
2021	88,816	134,618	72,317	-239,244	-47,615	8,893
2022	118,984	124,826	49,158	-304,693	-50,664	-62,390
2023	197,686	299,971	114,350	-186,235	-61,333	364,439
2024	215,542	281,245	57,333	-195,069	-54,119	304,933
2025	106,847	104,397	26,351	-331,029	-68,337	-161,771
2026	77,626	118,283	30,367	-340,384	-83,907	-198,015
2027	86,029	135,949	34,040	-326,601	-81,315	-151,898
2028	117,848	211,992	73,318	-247,285	-75,595	80,279
2029	364,691	421,577	54,979	-154,766	-37,575	648,906
2030	210,744	200,754	30,843	-188,954	-62,857	190,529
2031	162,573	80,037	71,959	-390,821	-73,146	-149,398
2032	60,164	68,273	38,924	-477,265	-72,116	-382,020
2033	126,957	295,014	87,390	-163,418	-59,880	286,064
2034	137,850	214,098	89,208	-204,953	-70,783	165,421
2035	185,777	242,141	52,252	-189,330	-65,582	225,258
2036	283,143	330,679	4,214	-139,883	-44,872	433,281
2037	162,811	162,273	3,496	-207,885	-29,486	91,209
2038	104,878	144,921	40,936	-231,365	-47,784	11,587
2039	113,370	97,152	33,937	-294,633	-52,347	-102,521
2040	78,431	84,917	40,004	-301,453	-45,055	-143,156
2041	90,065	122,770	71,022	-228,792	-58,792	-3,727
2042	126,213	114,395	49,128	-294,105	-61,112	-65,482
2043	181,731	289,911	81,263	-188,892	-66,793	297,220
2044	211,771	270,420	-5,996	-195,847	-33,677	246,671
2045	104,879	96,472	8,237	-334,638	-56,678	-181,728
2046	74,359	108,855	30,541	-343,207	-86,922	-216,373
2047	82,383	127,371	34,275	-333,344	-88,451	-177,766
2048	109,814	202,951	73,330	-257,558	-83,782	44,755
2049	360,968	408,057	50,330	-167,616	-41,764	609,975
2050	208,271	201,937	24,218	-217,891	-65,514	151,021
2051	158,624	81,216	71,348	-409,562	-81,228	-179,601
2052	52,630	69,440	38,998	-485,767	-79,271	-403,969
2053	119,837	296,162	85,744	-192,106	-65,327	244,310
2054	135,916	215,237	77,001	-229,270	-69,632	129,252
2055	184,434	243,268	39,305	-215,683	-60,449	190,876
2056	310,056	331,772	-5,063	-163,106	-39,791	433,869
2057	180,973	163,376	-5,136	-238,268	-21,901	79,044
2058	107,139	146,013	35,373	-261,970	-41,113	-14,558
2059	111,736	98,231	33,652	-324,859	-48,145	-129,385
2060	78,111	85,979	40,105	-321,733	-41,211	-158,750
2061	91,172	123,844	71,178	-259,203	-54,829	-27,837
2062	127,621	115,470	49,249	-324,248	-57,015	-88,923
2063	185,467	290,999	76,741	-220,405	-59,874	272,927
2064	207,440	271,517	-13,952	-227,524	-23,837	213,644
2065	99,047	97,580	6,053	-365,264	-47,231	-209,814
2066	71,594	109,973	30,617	-374,135	-79,356	-241,307
2067	81,813	128,495	34,351	-365,002	-80,786	-201,130
2068	130,308	204,084	75,818	-275,097	-74,357	60,757
2069	390,839	409,200	48,529	-201,143	-31,539	615,885
2070	212,646	203,213	22,010	-251,592	-54,013	132,264

NOTES:

Deep Percolation	Precipitation and applied water that reaches groundwater after simulated transport across the unsaturated zone
Managed Recharge and Canal Seepage	Combined groundwater recharge from managed aquifer recharge operations, groundwater banking, and seepage from canals/conveyance
Net GW/SW Interactions	Net volumetric exchange of surface water and groundwater from streams: positive represents net groundwater recharge; negative represents net groundwater discharge
GW Pumping	Total groundwater pumping by wells. Groundwater banking recovery pumping is specified input whereas agricultural and municipal pumping is calculated by C2VSim based on demand
Subsurface Flow with Adjacent Areas	Net subsurface groundwater flow into an adjacent area within the Kern County Subbasin: negative is a net flow out of the KRGSA; positive is a net flow into the KRGSA
Change in Groundwater Storage	Sum of the inflow components (positive numbers) plus the outflow components (negative numbers): positive is an increase in storage typified by a rise in GW levels whereas a negative is a decrease in storage typified by a decline in GW levels

Table H-2: 2030 Climate Change Scenario with GSP Projects
Projected Future Groundwater Budget for KRGSA - WY2021 to WY2070
Kern County Subbasin C2VSimFG-Kern Update

Water Year	Deep Percolation	Managed Recharge and Canal Seepage	Net GW/SW Interactions	GW Pumping	Subsurface Flow with Adjacent GSAs	Change in Groundwater Storage
Units	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**
SUMMARY: WY2021 to WY2070 Simulatation Period						
Total	7,618,652	10,300,193	1,671,521	-14,084,948	-2,668,899	**2,836,523**
Annual Average	152,373	206,004	33,430	-281,699	-53,378	**56,730**
SUMMARY: WY2021 to WY2040 Implementation Period						
Total	3,029,610	4,122,581	764,132	-5,402,792	-1,032,498	**1,481,035**
Annual Average	151,481	206,129	38,207	-270,140	-51,625	**74,052**
SUMMARY: WY2041 to WY2070 Sustainability Period						
Total	4,589,042	6,177,612	907,389	-8,682,157	-1,636,400	**1,355,488**
Annual Average	152,968	205,920	30,246	-289,405	-54,547	**45,183**
Annual Simulation Results for WY2021 to WY2070 Simulation Period						
2021	95,656	138,742	73,370	-252,118	-48,812	6,837
2022	134,065	132,456	54,470	-323,480	-50,259	-52,748
2023	204,586	319,168	90,836	-200,224	-58,566	355,800
2024	202,604	296,166	27,884	-215,779	-37,977	272,897
2025	96,811	107,680	28,386	-338,336	-59,608	-165,066
2026	82,268	135,974	60,929	-353,395	-82,816	-157,041
2027	83,697	135,623	59,565	-352,536	-81,282	-154,933
2028	127,174	232,498	80,172	-264,882	-78,654	96,307
2029	458,421	516,424	23,688	-175,214	-20,795	802,524
2030	144,311	198,787	10,875	-199,242	-50,207	104,525
2031	152,695	99,485	42,728	-385,453	-71,722	-162,267
2032	58,447	76,990	26,318	-482,284	-68,408	-388,937
2033	134,357	325,687	73,590	-180,394	-63,047	290,192
2034	139,669	239,861	37,888	-221,626	-53,604	142,187
2035	208,532	277,181	10,772	-211,368	-38,553	246,564
2036	279,684	368,931	-32,789	-155,141	-20,743	439,942
2037	135,744	160,540	-13,649	-222,164	-14,864	45,607
2038	107,921	157,681	14,560	-244,711	-35,922	-471
2039	107,289	102,961	40,296	-314,379	-48,074	-111,908
2040	75,679	99,746	54,246	-310,064	-48,583	-128,976
2041	89,757	126,900	74,086	-240,529	-64,930	-14,716
2042	135,398	122,025	54,739	-311,912	-62,648	-62,398
2043	190,164	309,106	55,290	-200,308	-60,849	293,403
2044	204,292	285,342	-38,243	-215,125	-14,873	221,394
2045	94,117	99,754	6,517	-341,643	-48,956	-190,210
2046	78,224	126,556	61,080	-355,437	-89,916	-179,493
2047	79,239	127,047	59,653	-356,917	-93,534	-184,512
2048	115,158	223,458	81,030	-272,509	-91,872	55,266
2049	449,050	502,903	7,613	-185,732	-25,567	748,267
2050	132,796	199,972	222	-226,989	-55,307	50,693
2051	148,430	100,660	42,629	-404,988	-83,429	-196,698
2052	52,081	78,158	26,349	-490,871	-79,789	-414,072
2053	126,014	326,840	71,244	-208,329	-72,161	243,608
2054	136,666	240,999	22,923	-245,679	-53,855	101,054
2055	205,721	278,308	-600	-236,985	-37,394	209,050
2056	297,190	370,047	-41,357	-176,697	-19,219	429,964
2057	149,711	161,643	-21,430	-252,495	-11,168	26,261
2058	111,414	158,774	9,018	-275,272	-32,260	-28,326
2059	105,862	104,037	37,577	-344,467	-45,621	-142,612
2060	75,771	100,807	54,210	-330,561	-47,396	-147,169
2061	90,935	127,967	74,077	-270,815	-63,529	-41,364
2062	137,357	123,105	54,731	-341,945	-61,073	-87,825
2063	192,821	310,192	50,233	-231,574	-55,755	265,917
2064	200,329	286,439	-44,579	-247,075	-7,660	187,455
2065	88,843	100,860	4,578	-372,134	-41,807	-219,660
2066	75,845	127,670	61,111	-386,234	-84,223	-205,832
2067	78,423	128,169	59,690	-388,306	-87,608	-209,631
2068	139,172	224,586	83,067	-291,254	-83,871	71,700
2069	478,305	504,041	4,345	-218,853	-15,587	752,250
2070	129,956	201,247	-2,413	-260,524	-44,542	23,725

NOTES:

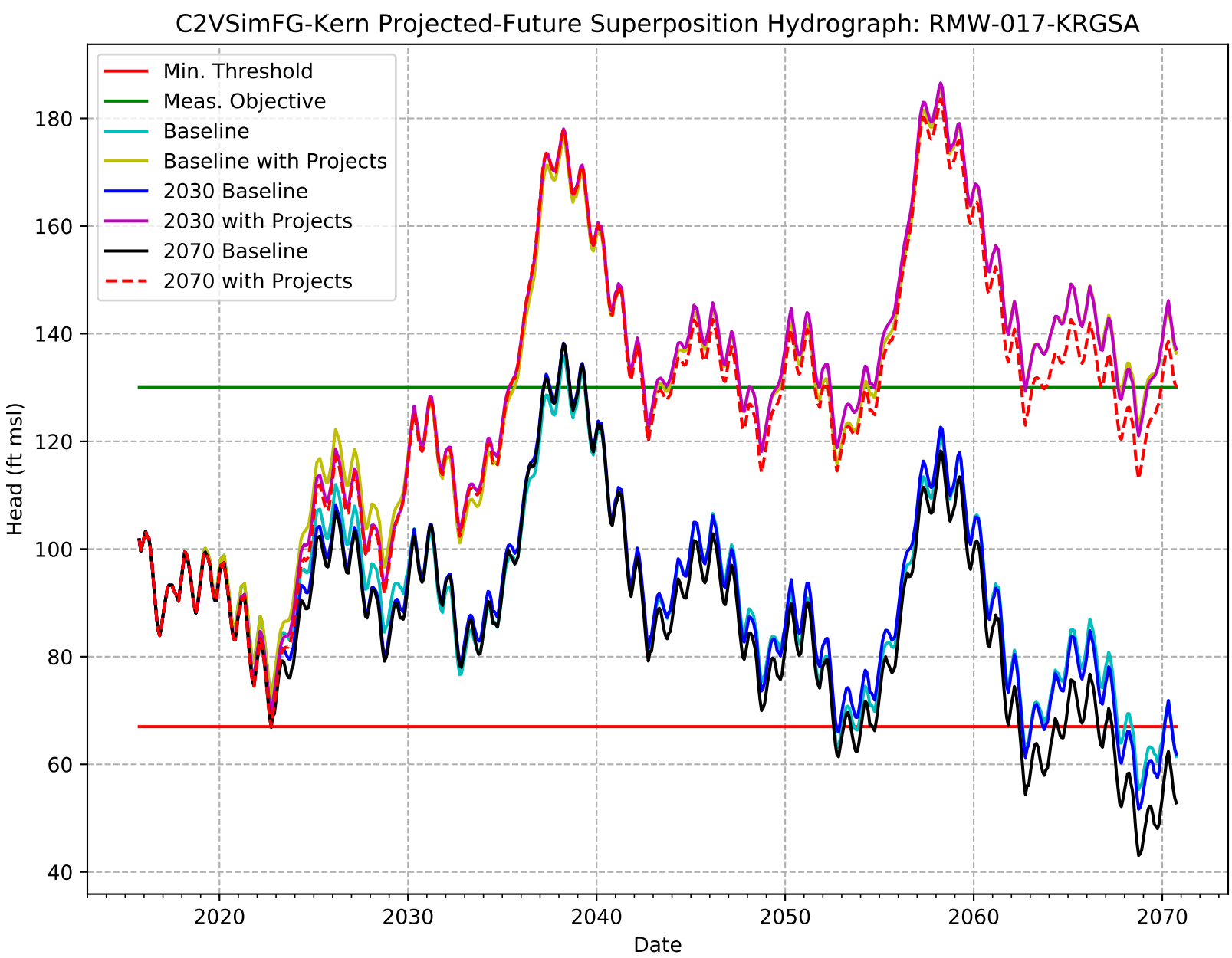
Deep Percolation	Precipitation and applied water that reaches groundwater after simulated transport across the unsaturated zone
Managed Recharge and Canal Seepage	Combined groundwater recharge from managed aquifer recharge operations, groundwater banking, and seepage from canals/conveyance
Net GW/SW Interactions	Net volumetric exchange of surface water and groundwater from streams: positive represents net groundwater recharge; negative represents net groundwater discharge
GW Pumping	Total groundwater pumping by wells. Groundwater banking recovery pumping is specified input whereas agricultural and municipal pumping is calculated by C2VSim based on demand
Subsurface Flow with Adjacent Areas	Net subsurface groundwater flow into an adjacent area within the Kern County Subbasin: negative is a net flow out of the KRGSA; positive is a net flow into the KRGSA
Change in Groundwater Storage	Sum of the inflow components (positive numbers) plus the outflow components (negative numbers): positive is an increase in storage typified by a rise in GW levels whereas a negative is a decrease in storage typified by a decline in GW levels

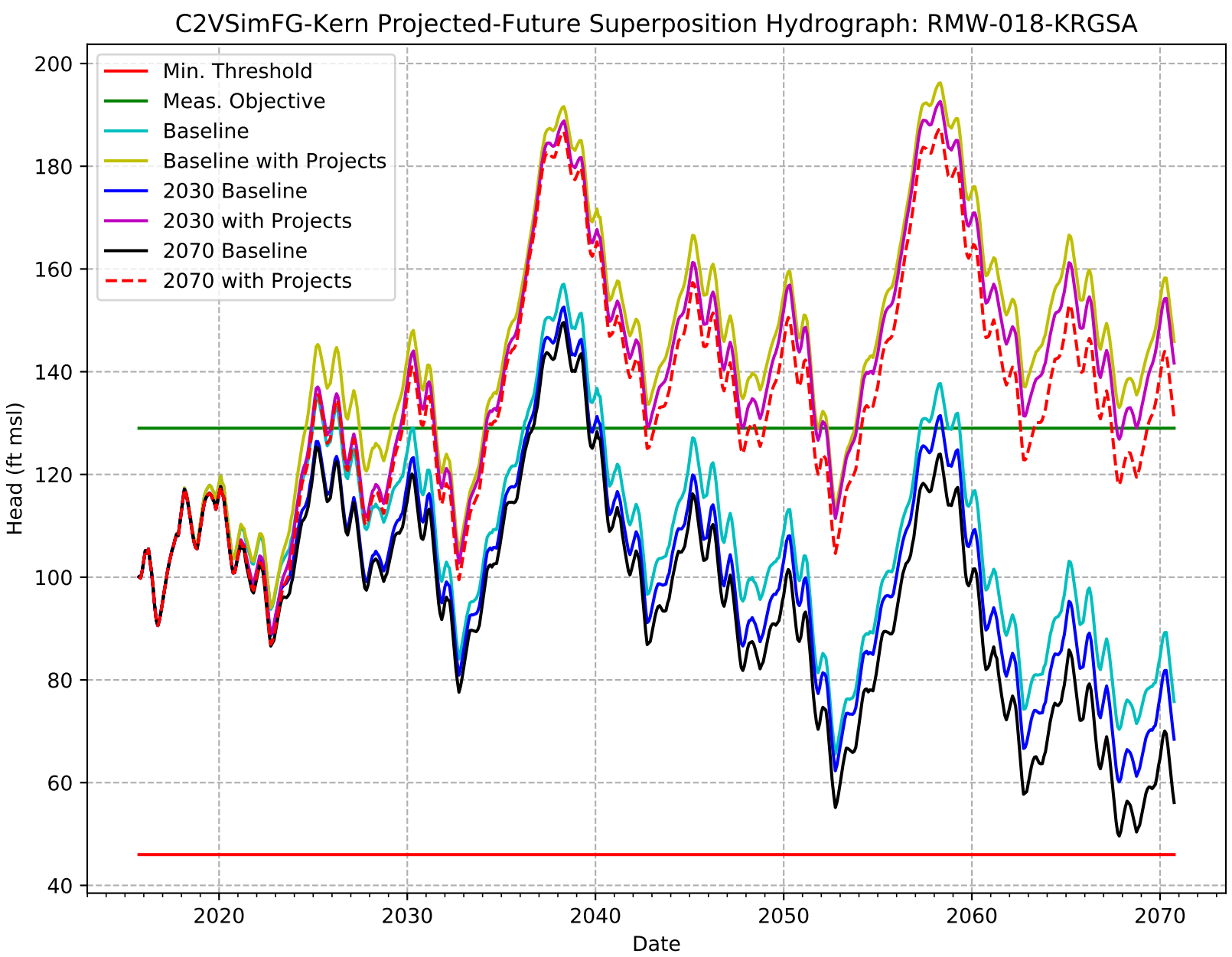
Table H-3: 2070 Climate Change Scenario with GSP Projects
Projected Future Groundwater Budget for KRGSA - WY2021 to WY2070
Kern County Subbasin C2VSimFG-Kern Update

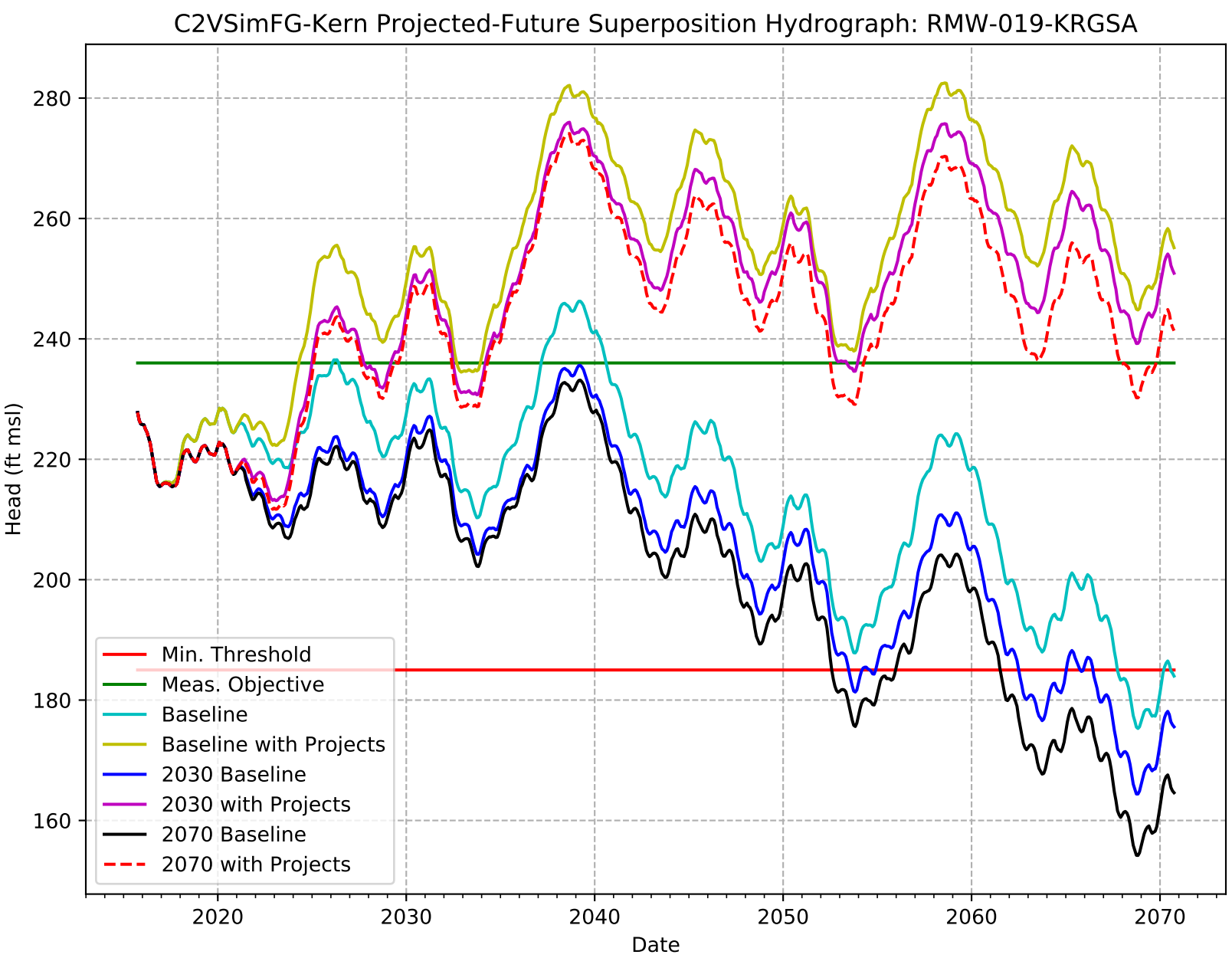
Water Year	Deep Percolation	Managed Recharge and Canal Seepage	Net GW/SW Interactions	GW Pumping	Subsurface Flow with Adjacent GSAs	Change in Groundwater Storage
Units	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**	**Acre-ft**
SUMMARY: WY2021 to WY2070 Simulatation Period						
Total	7,394,519	10,987,989	1,274,639	-14,991,768	-2,564,720	**2,100,663**
Annual Average	147,890	219,760	25,493	-299,835	-51,294	**42,013**
SUMMARY: WY2021 to WY2040 Implementation Period						
Total	2,977,231	4,406,767	595,755	-5,780,432	-971,988	**1,227,334**
Annual Average	148,862	220,338	29,788	-289,022	-48,599	**61,367**
SUMMARY: WY2041 to WY2070 Sustainability Period						
Total	4,417,288	6,581,221	678,884	-9,211,335	-1,592,732	**873,329**
Annual Average	147,243	219,374	22,629	-307,045	-53,091	**29,111**
Annual Simulation Results for WY2021 to WY2070 Simulation Period						
2021	85,093	134,802	70,839	-274,191	-48,758	-32,215
2022	128,174	135,084	53,028	-344,082	-49,567	-77,363
2023	208,931	341,843	89,887	-225,149	-58,954	356,558
2024	213,540	323,192	9,315	-233,395	-28,437	284,215
2025	87,711	111,577	23,712	-354,775	-55,471	-187,245
2026	100,256	167,027	64,048	-365,479	-81,977	-116,125
2027	74,315	129,583	58,298	-377,144	-81,801	-196,750
2028	126,754	250,333	81,586	-283,262	-78,723	96,688
2029	452,697	546,377	4,263	-196,156	-11,053	796,129
2030	121,076	193,155	2,432	-213,311	-44,754	58,597
2031	147,961	109,344	45,149	-400,259	-71,276	-169,080
2032	52,882	61,381	22,485	-510,443	-68,414	-442,109
2033	137,827	359,527	71,884	-202,255	-70,104	296,880
2034	154,594	274,818	14,945	-232,963	-46,838	164,557
2035	196,964	298,652	-13,959	-238,917	-28,157	214,583
2036	272,576	406,929	-61,759	-181,847	-11,197	424,701
2037	125,085	172,443	-26,761	-237,040	-9,988	23,739
2038	118,381	179,196	2,026	-259,505	-30,731	9,367
2039	105,294	116,524	35,208	-324,648	-45,750	-113,372
2040	67,118	94,981	49,130	-325,613	-50,038	-164,421
2041	73,730	122,958	71,686	-260,890	-66,745	-59,260
2042	122,674	124,652	53,297	-331,515	-63,642	-94,533
2043	185,764	331,777	44,402	-222,436	-58,213	281,294
2044	205,726	312,370	-56,418	-230,871	-5,155	225,652
2045	83,764	103,656	877	-357,299	-45,747	-214,750
2046	96,458	157,599	64,228	-366,874	-90,603	-139,191
2047	70,151	121,011	58,398	-379,976	-95,081	-225,497
2048	115,823	241,289	82,513	-289,448	-93,381	56,796
2049	431,901	532,851	-13,344	-204,739	-16,962	729,707
2050	112,223	194,340	-8,720	-238,645	-51,262	7,935
2051	144,514	110,519	44,640	-419,297	-84,181	-203,805
2052	49,304	62,549	22,508	-518,022	-81,214	-464,874
2053	130,016	360,680	68,652	-229,588	-80,447	249,312
2054	149,056	275,958	821	-256,716	-48,700	120,418
2055	191,992	299,778	-23,046	-263,966	-29,058	175,700
2056	284,686	408,044	-68,123	-201,194	-12,586	410,827
2057	131,580	173,546	-32,935	-266,913	-8,911	-3,633
2058	127,917	180,286	-2,648	-290,006	-29,274	-13,725
2059	106,529	117,601	32,504	-354,724	-45,045	-143,134
2060	69,182	96,042	49,123	-345,905	-50,333	-181,891
2061	76,136	124,028	71,680	-290,997	-66,573	-85,726
2062	125,060	125,730	53,198	-361,461	-62,935	-120,407
2063	188,880	332,865	41,487	-253,392	-54,373	255,466
2064	201,703	313,465	-59,741	-262,551	-205	192,671
2065	79,821	104,756	-67	-387,682	-40,535	-243,707
2066	94,428	158,713	64,273	-397,639	-85,940	-166,164
2067	70,061	122,136	58,443	-411,232	-89,688	-250,281
2068	133,029	242,420	84,931	-307,879	-85,958	66,543
2069	451,547	533,990	-13,778	-237,484	-7,974	726,302
2070	113,631	195,612	-9,956	-271,993	-42,010	-14,715

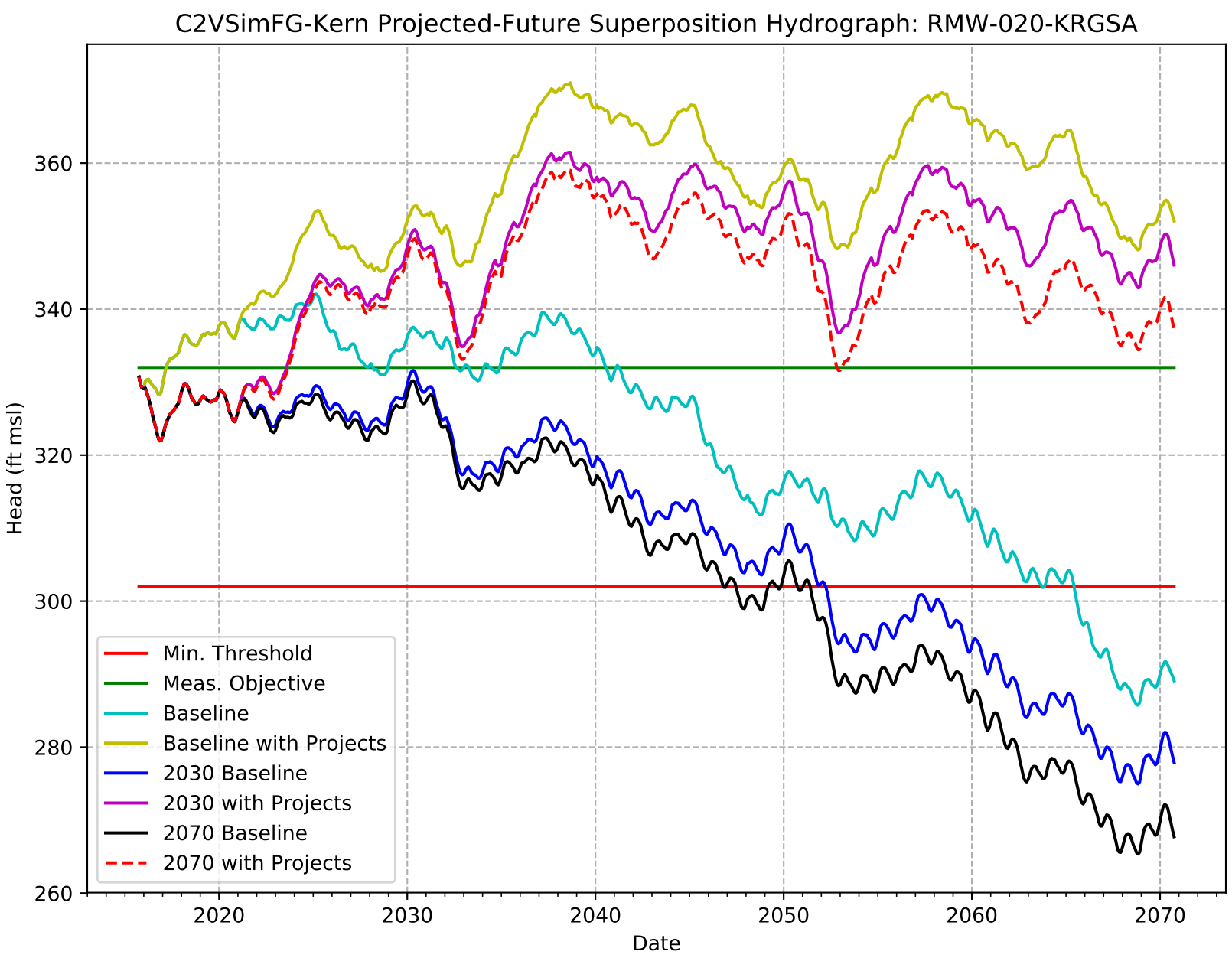
NOTES:

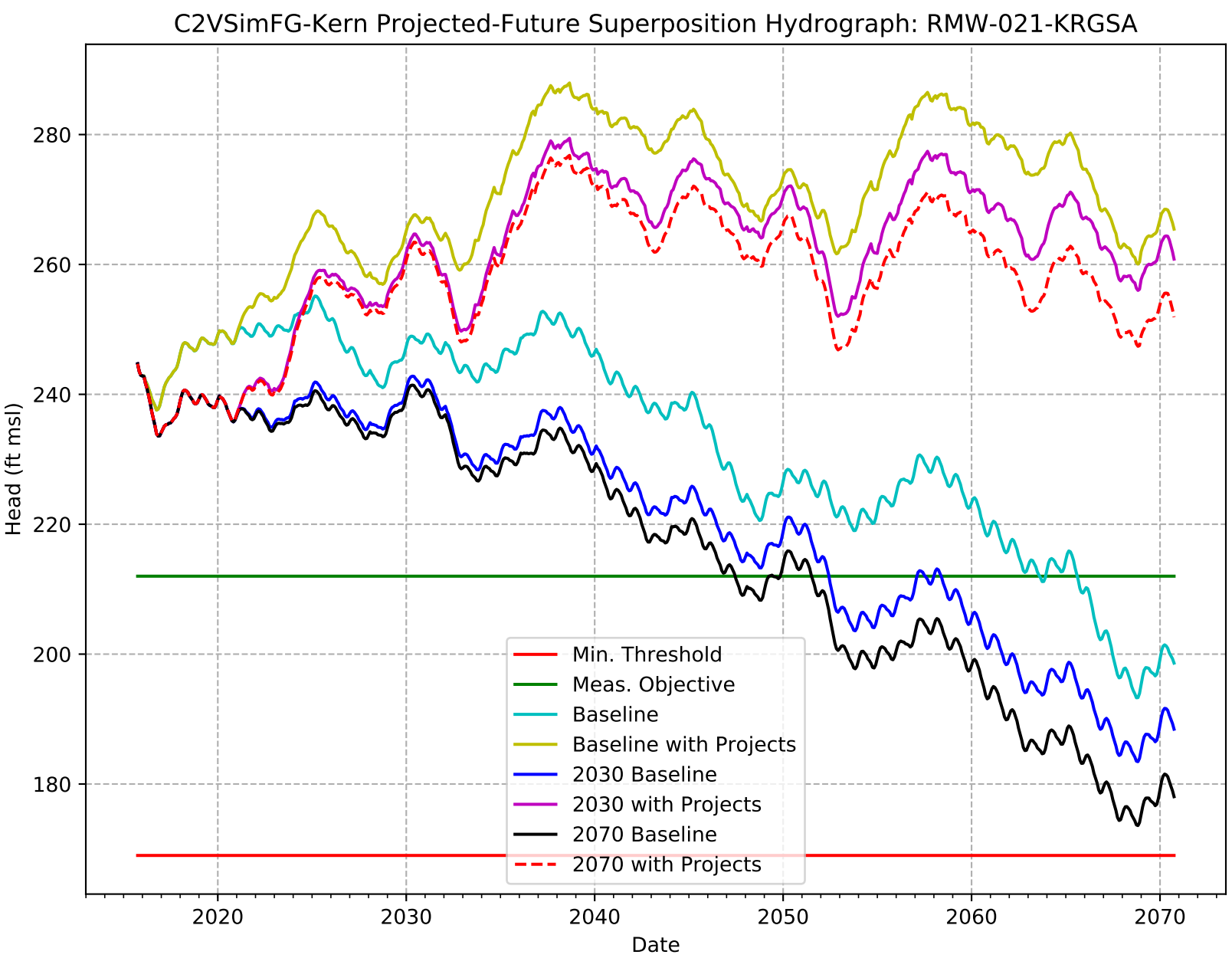
Deep Percolation	Precipitation and applied water that reaches groundwater after simulated transport across the unsaturated zone
Managed Recharge and Canal Seepage	Combined groundwater recharge from managed aquifer recharge operations, groundwater banking, and seepage from canals/conveyance
Net GW/SW Interactions	Net volumetric exchange of surface water and groundwater from streams: positive represents net groundwater recharge; negative represents net groundwater discharge
GW Pumping	Total groundwater pumping by wells. Groundwater banking recovery pumping is specified input whereas agricultural and municipal pumping is calculated by C2VSim based on demand
Subsurface Flow with Adjacent Areas	Net subsurface groundwater flow into an adjacent area within the Kern County Subbasin: negative is a net flow out of the KRGSA; positive is a net flow into the KRGSA
Change in Groundwater Storage	Sum of the inflow components (positive numbers) plus the outflow components (negative numbers): positive is an increase in storage typified by a rise in GW levels whereas a negative is a decrease in storage typified by a decline in GW levels

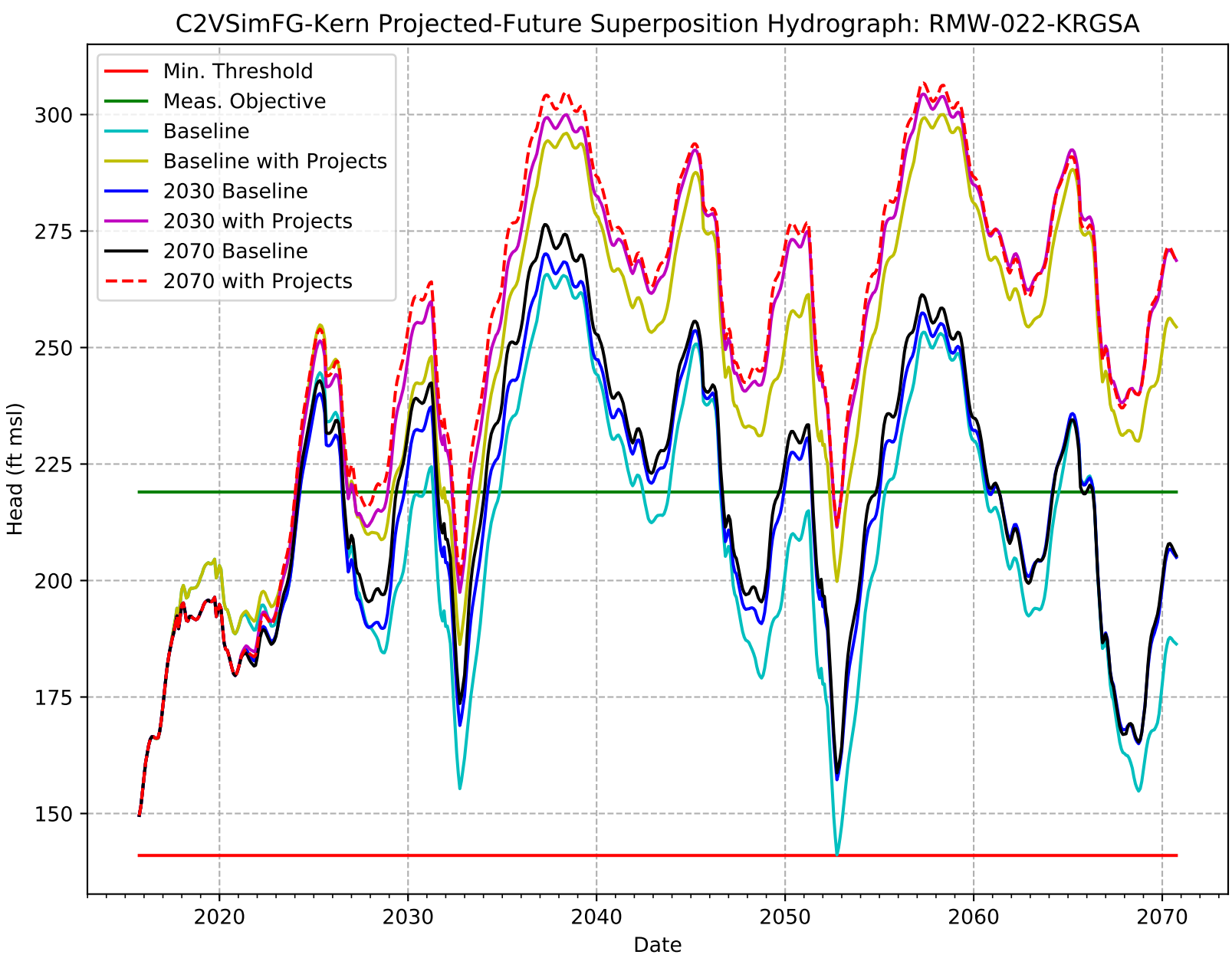

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-017-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
180
160
140
120
100
80
60
40
2020
2030
2040
2050
2060
2070
Date

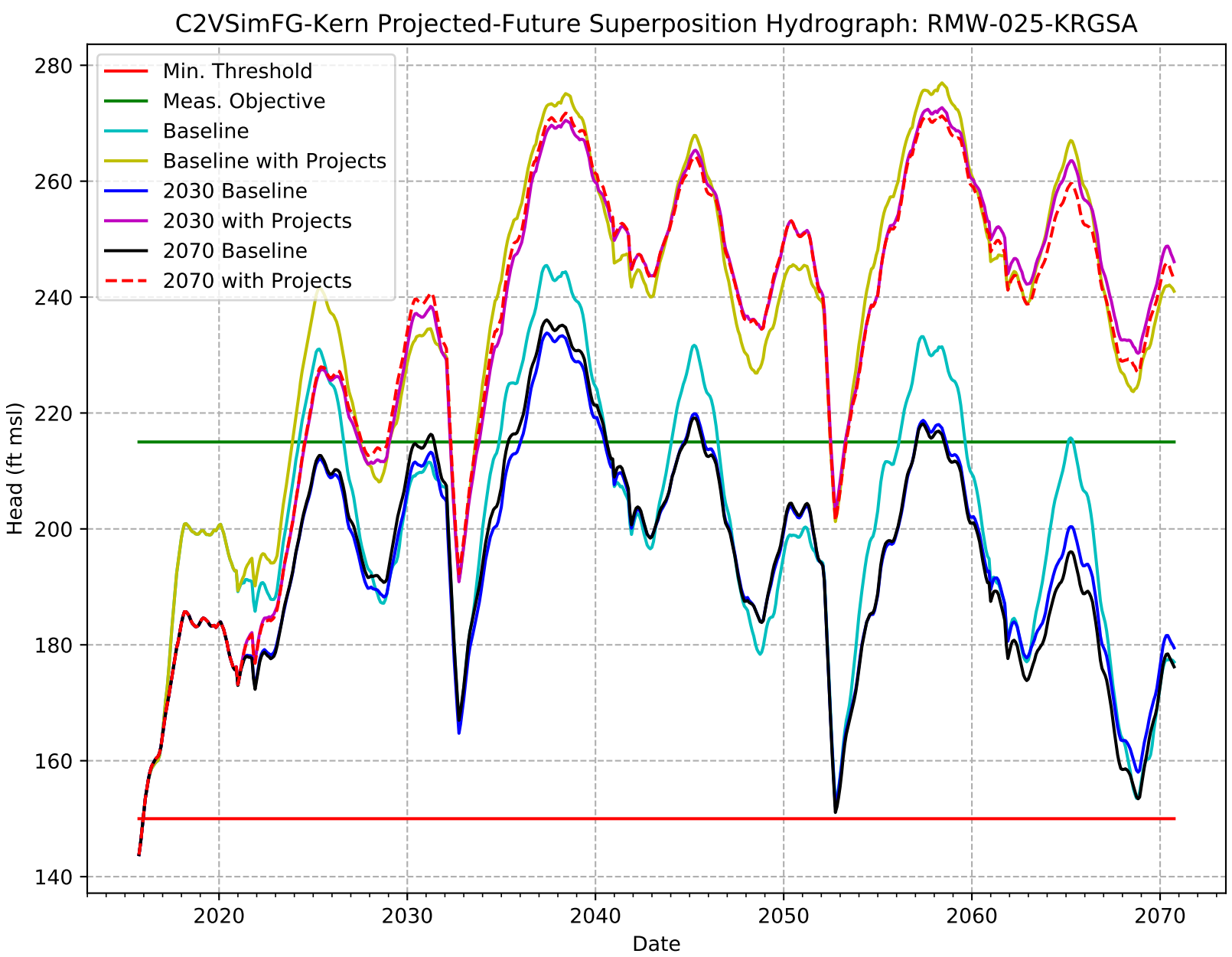

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-018-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
Date
200
180
160
140
120
100
80
60
40
2020
2030
2040
2050
2060
2070

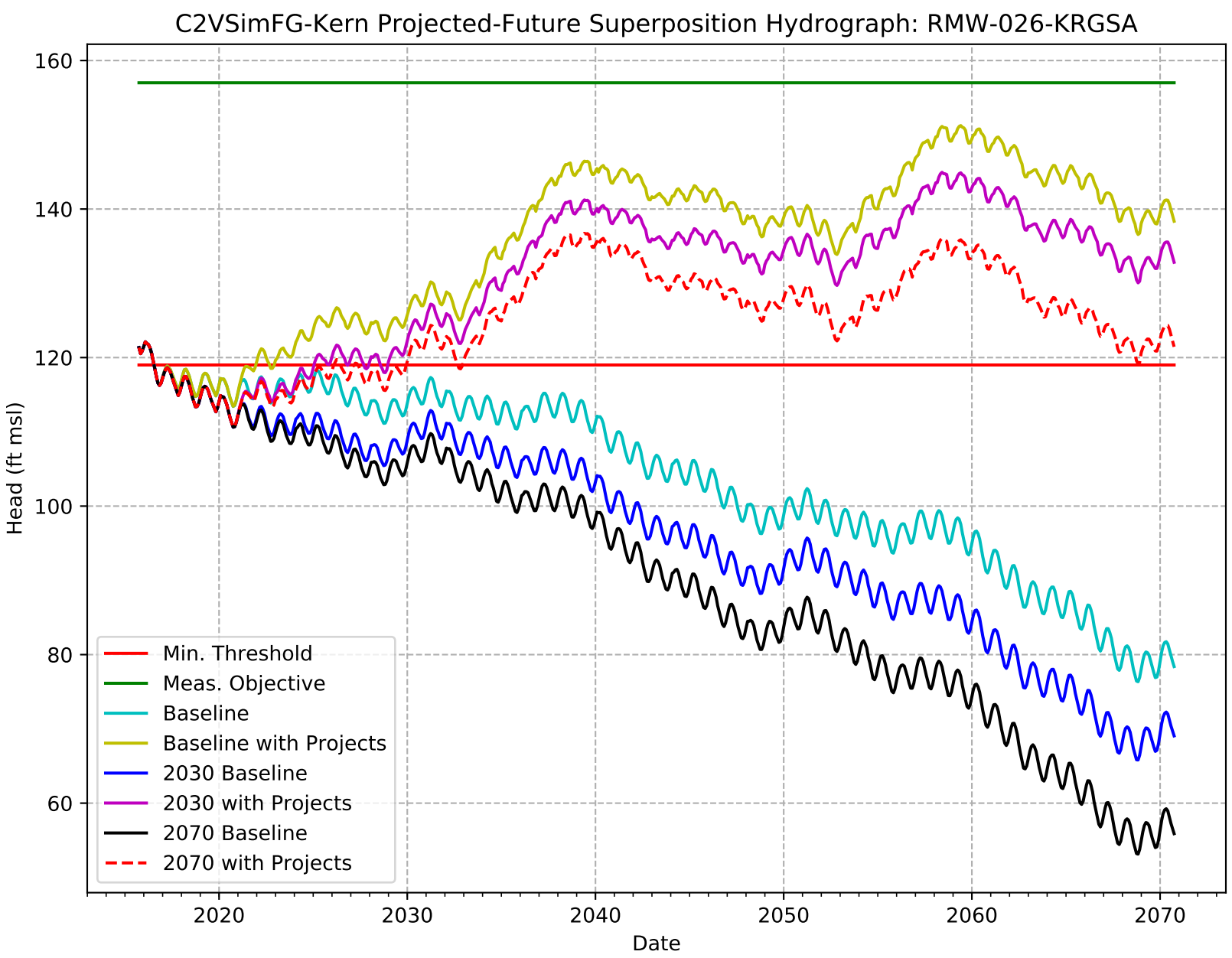

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-019-KRGSA
Head (ft msl)
280
260
240
220
200
180
160
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

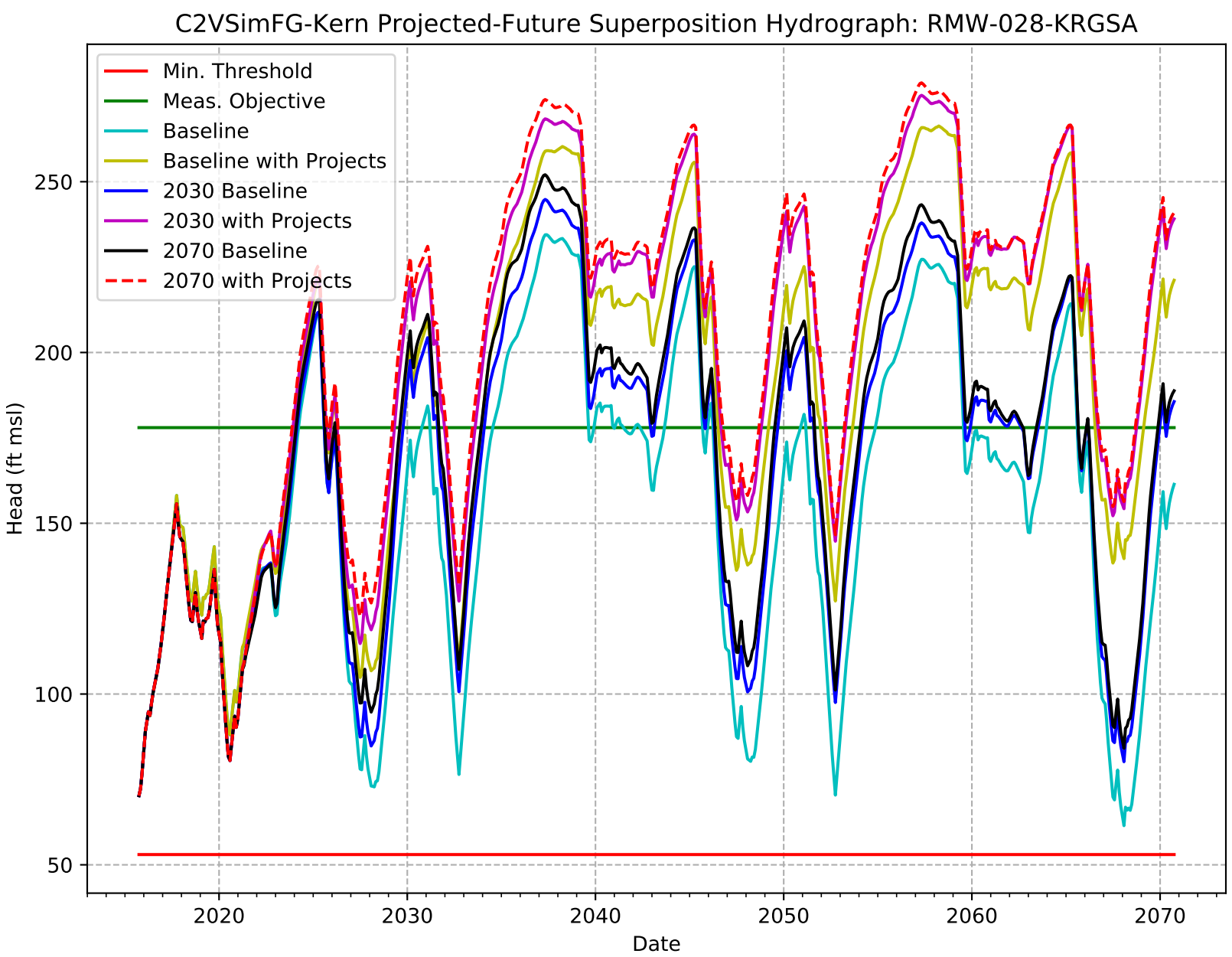

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-020-KRGSA
Head (ft msl)
360
340
320
300
280
260
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

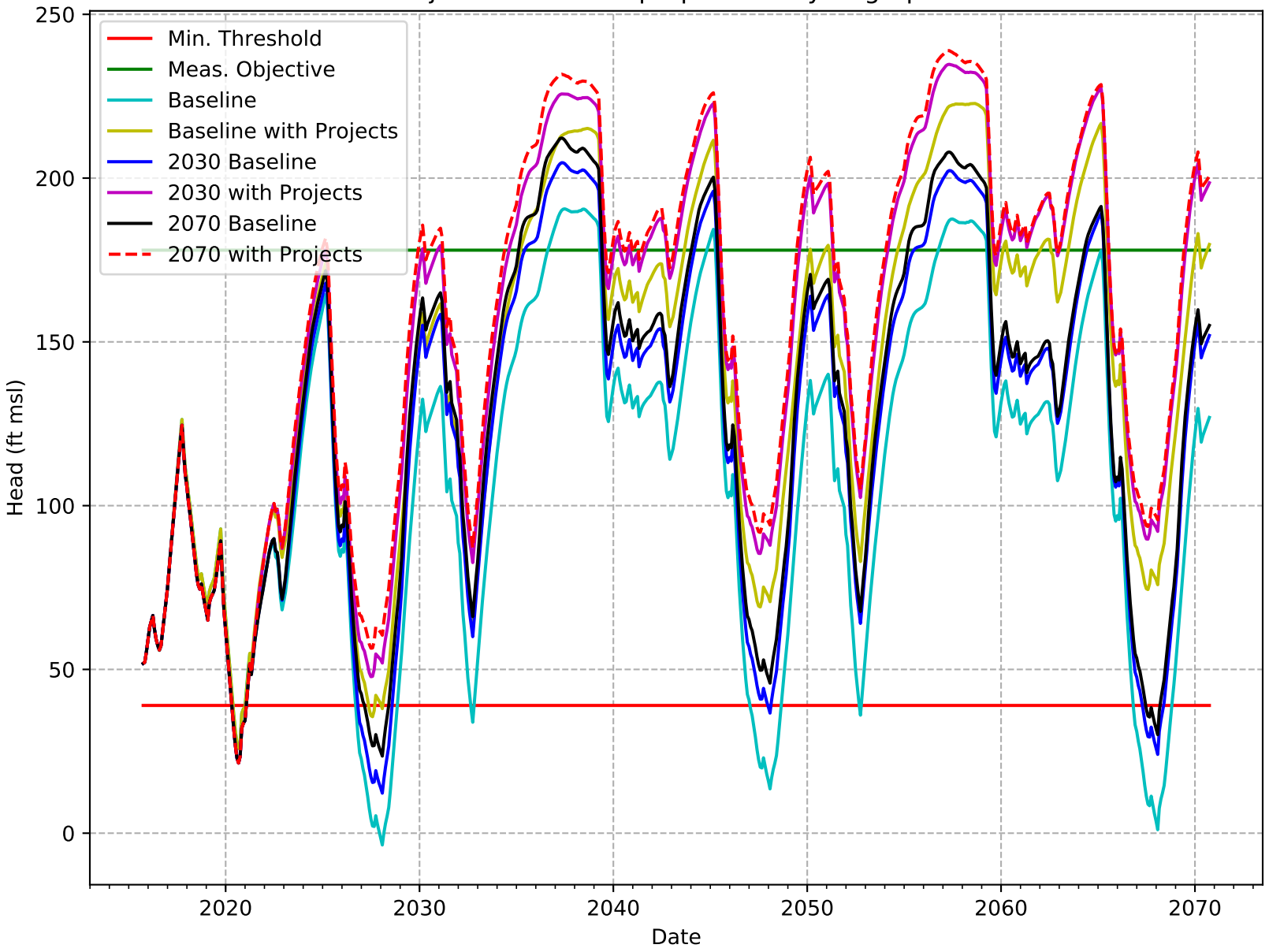

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-021-KRGSA
Head (ft msl)
280
260
240
220
200
180
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

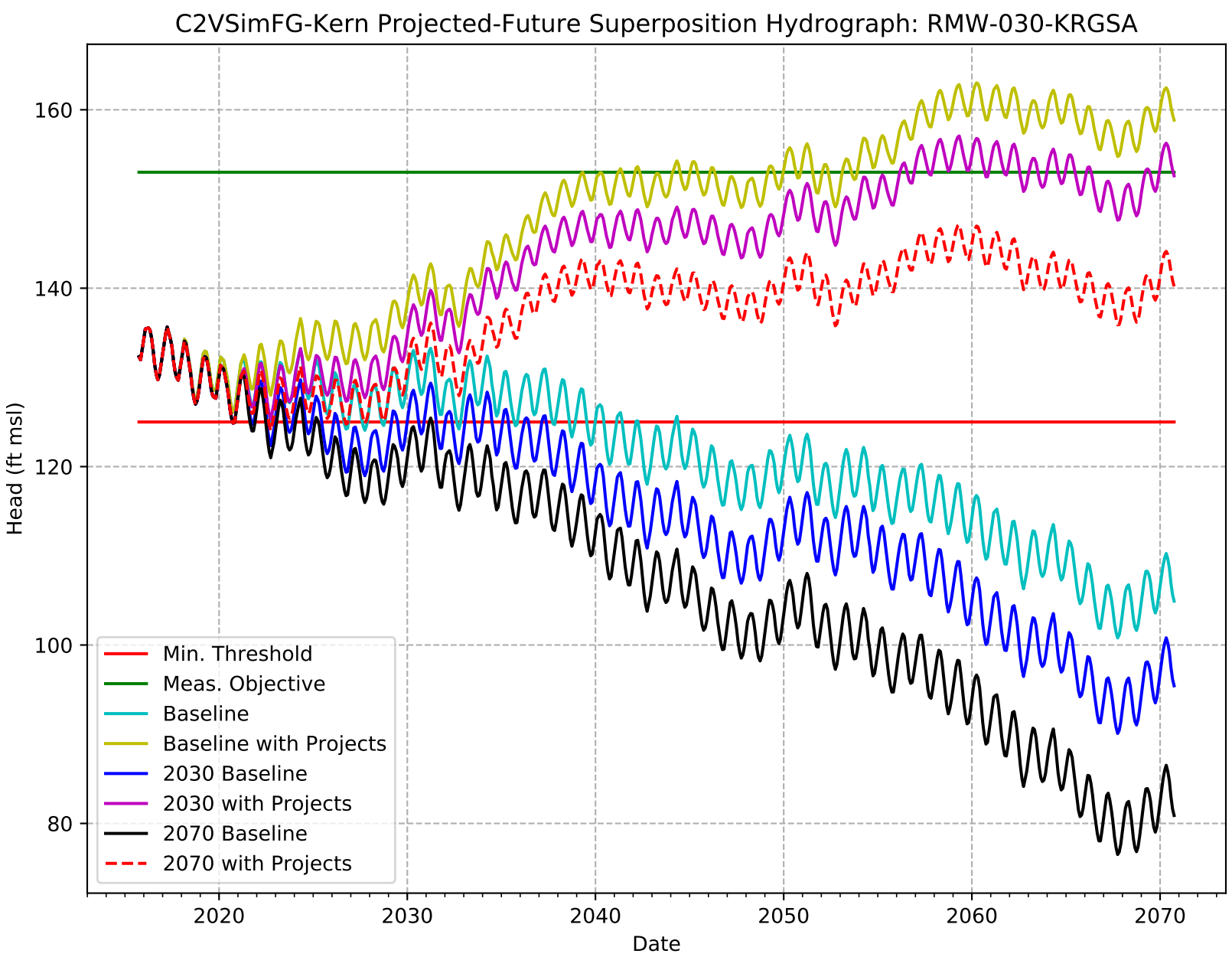

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-022-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
300
275
250
225
200
175
150
2020
2030
2040
2050
2060
2070
Date

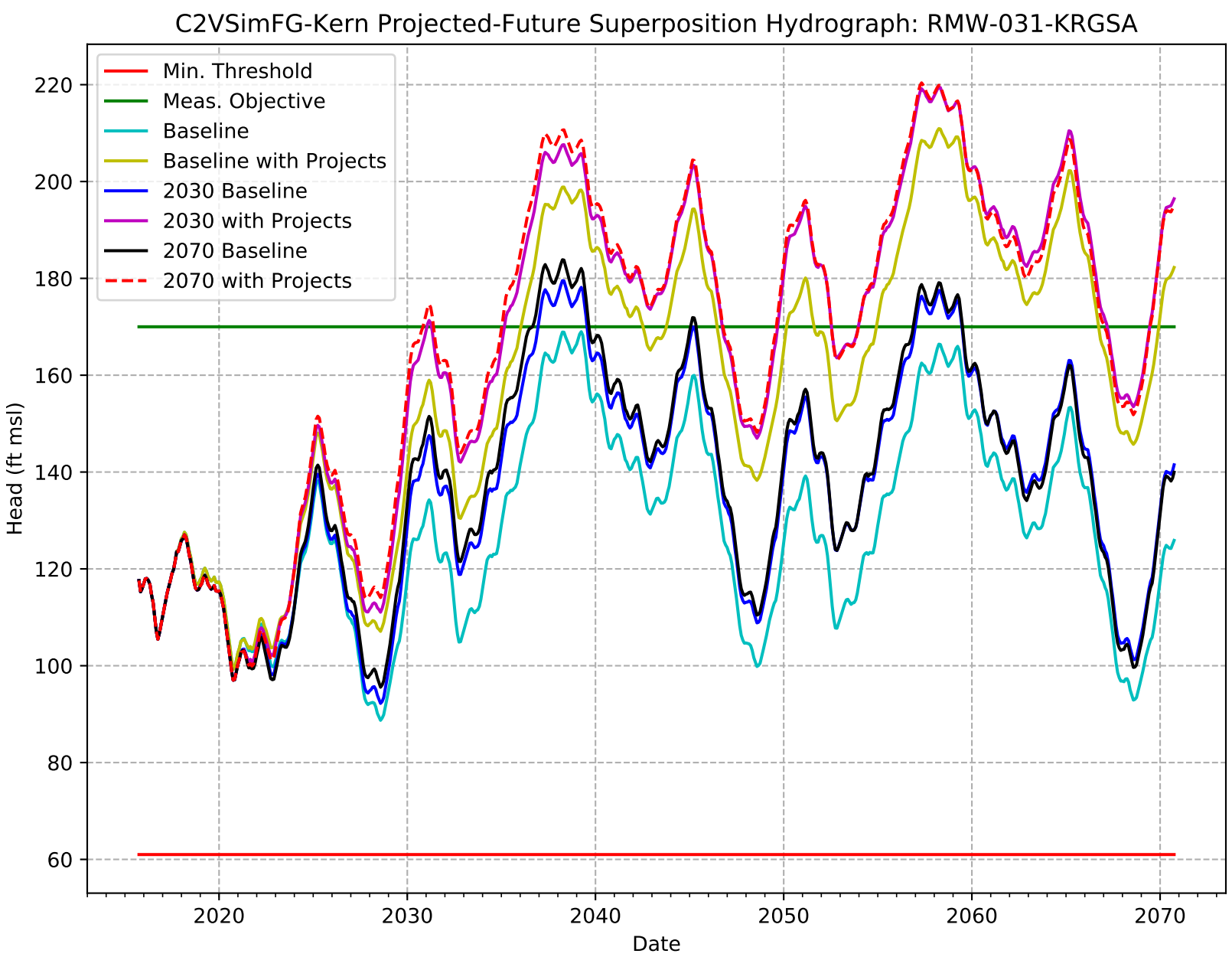

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-025-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
280
260
240
220
200
180
160
140
2020
2030
2040
2050
2060
2070
Date

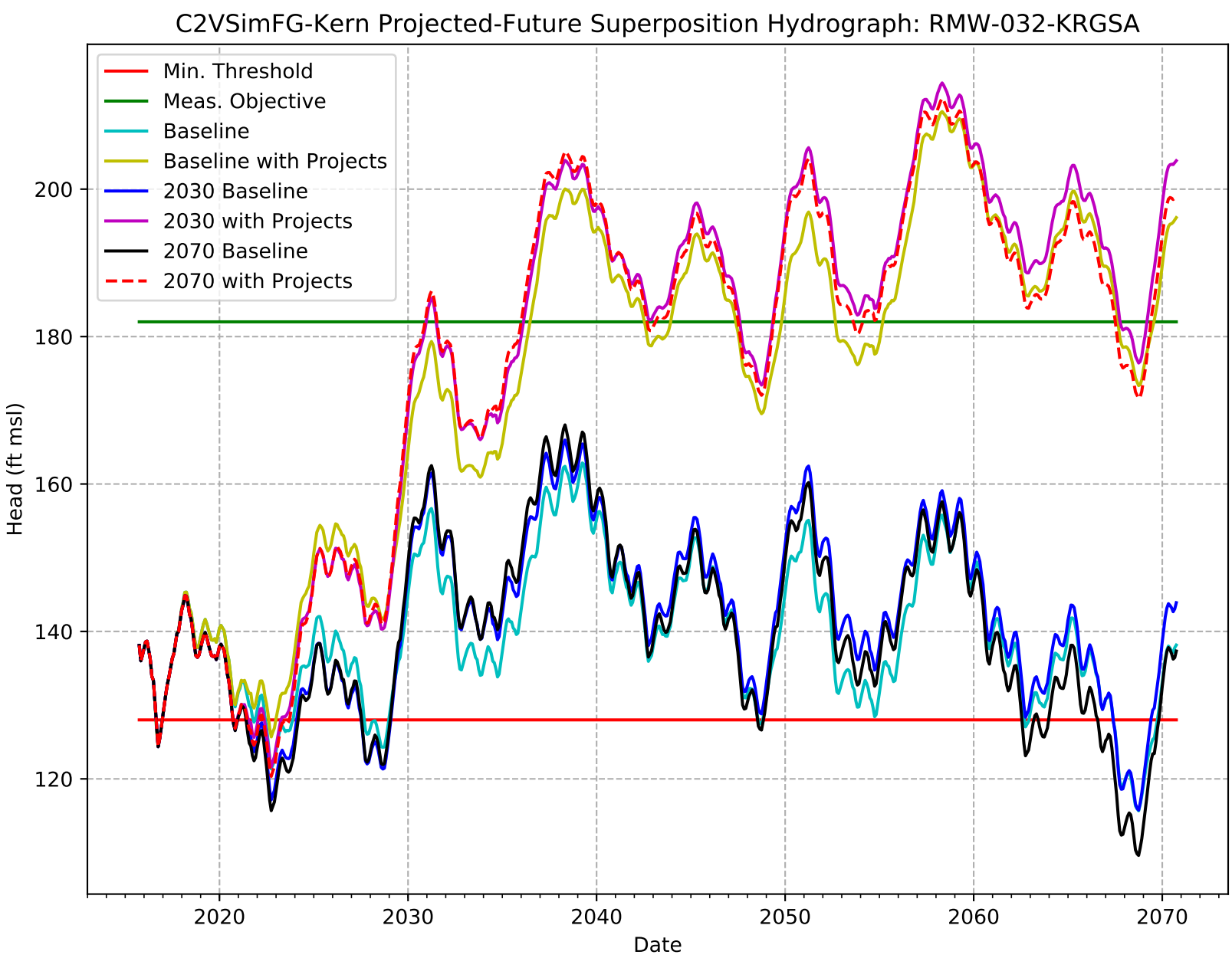

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-026-KRGSA
Head (ft msl)
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

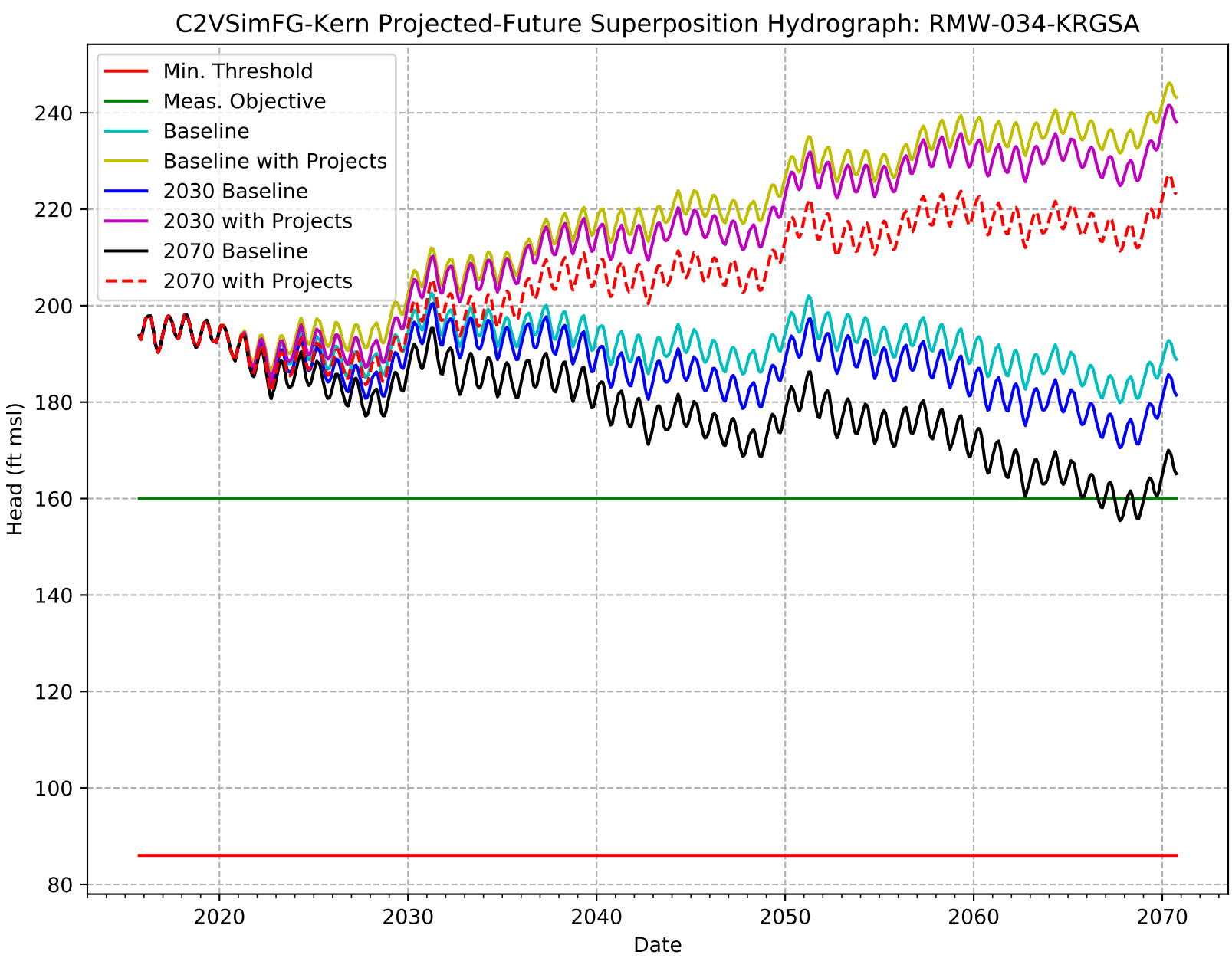

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-028-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
250
200
150
100
50
2020
2030
2040
2050
2060
2070
Date

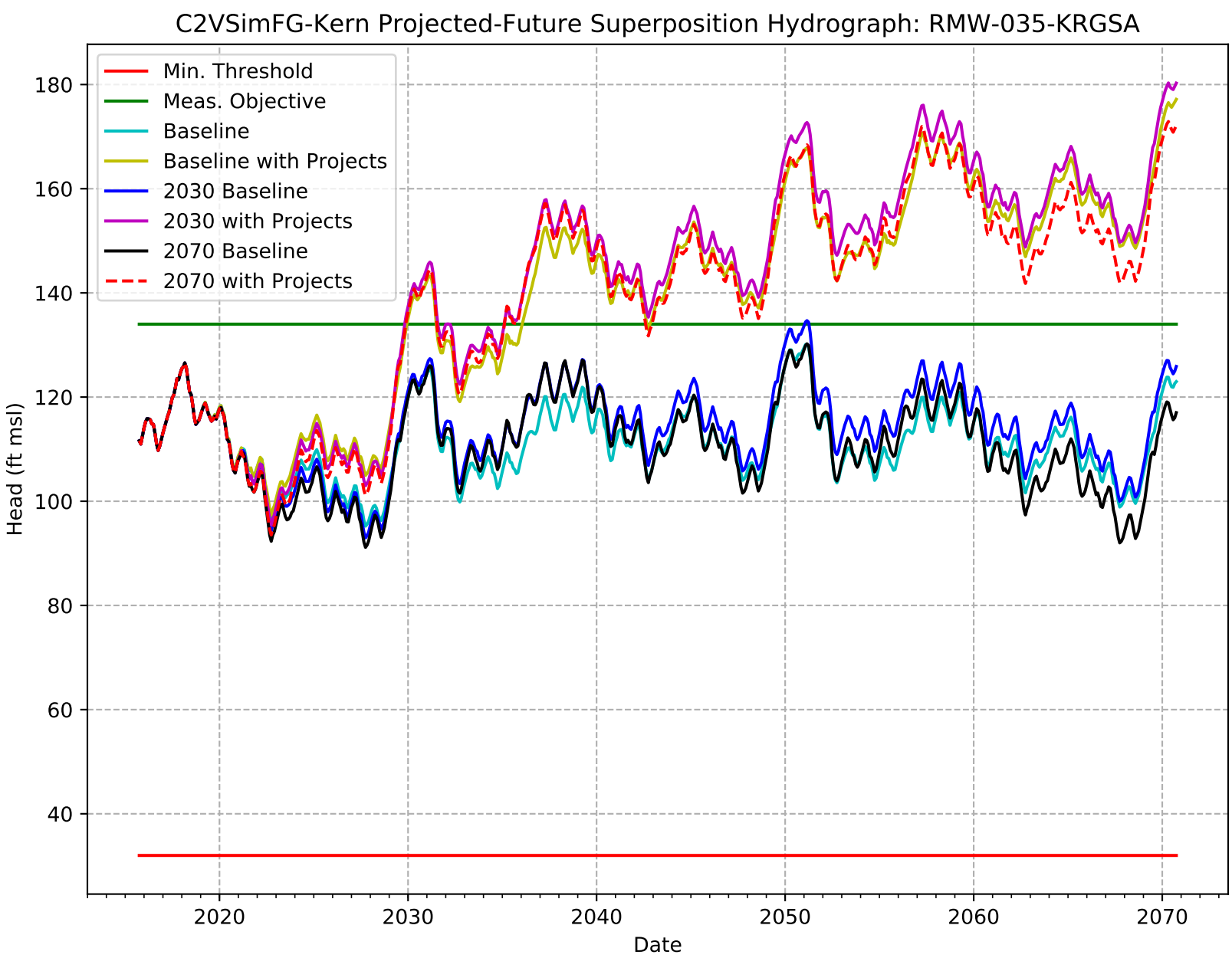

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-029-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
250
200
150
100
50
0
2020
2030
2040
2050
2060
2070
Date

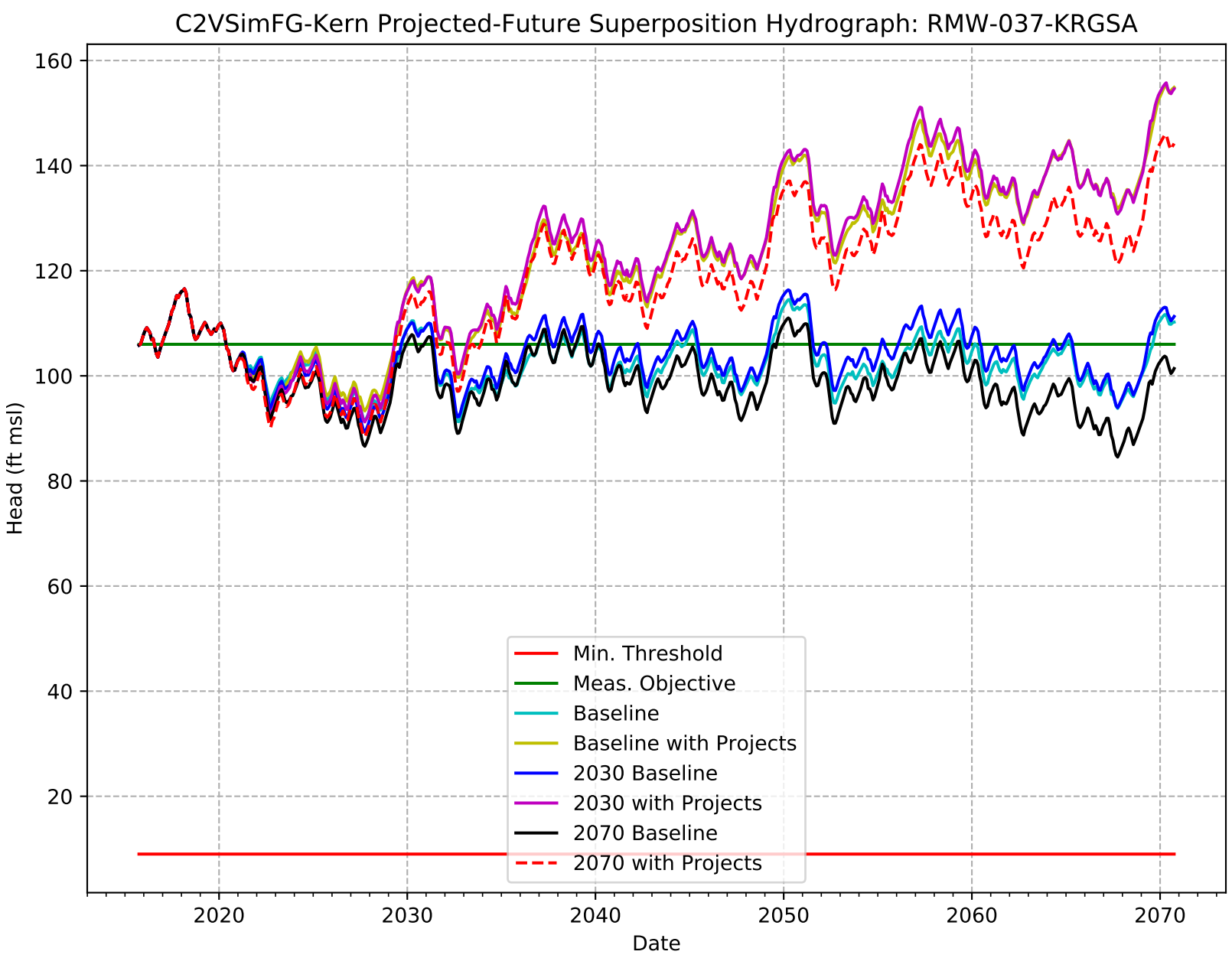

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-030-KRGSA
Head (ft msl)
160
140
120
100
80
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

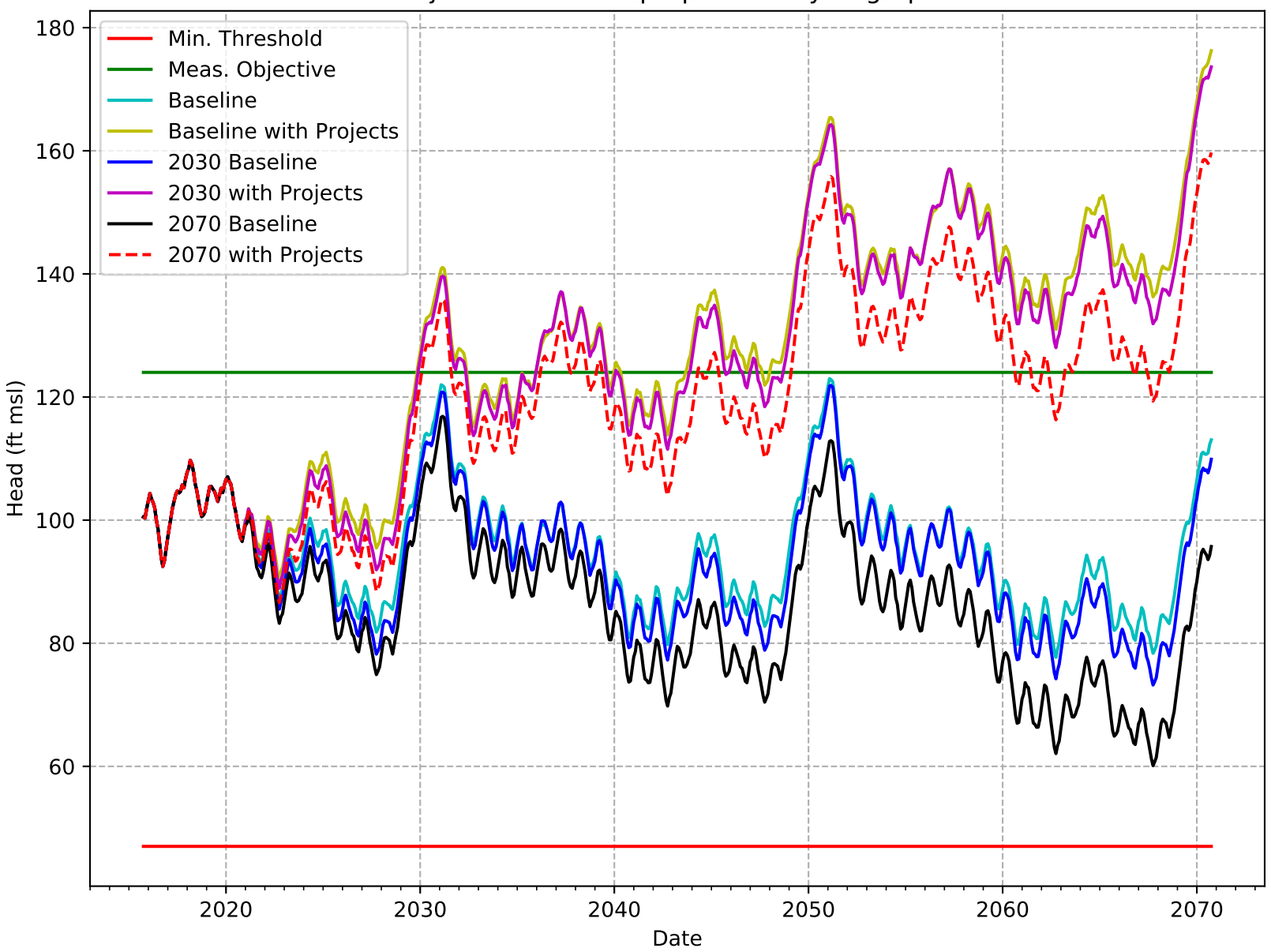

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-031-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
220
200
180
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date

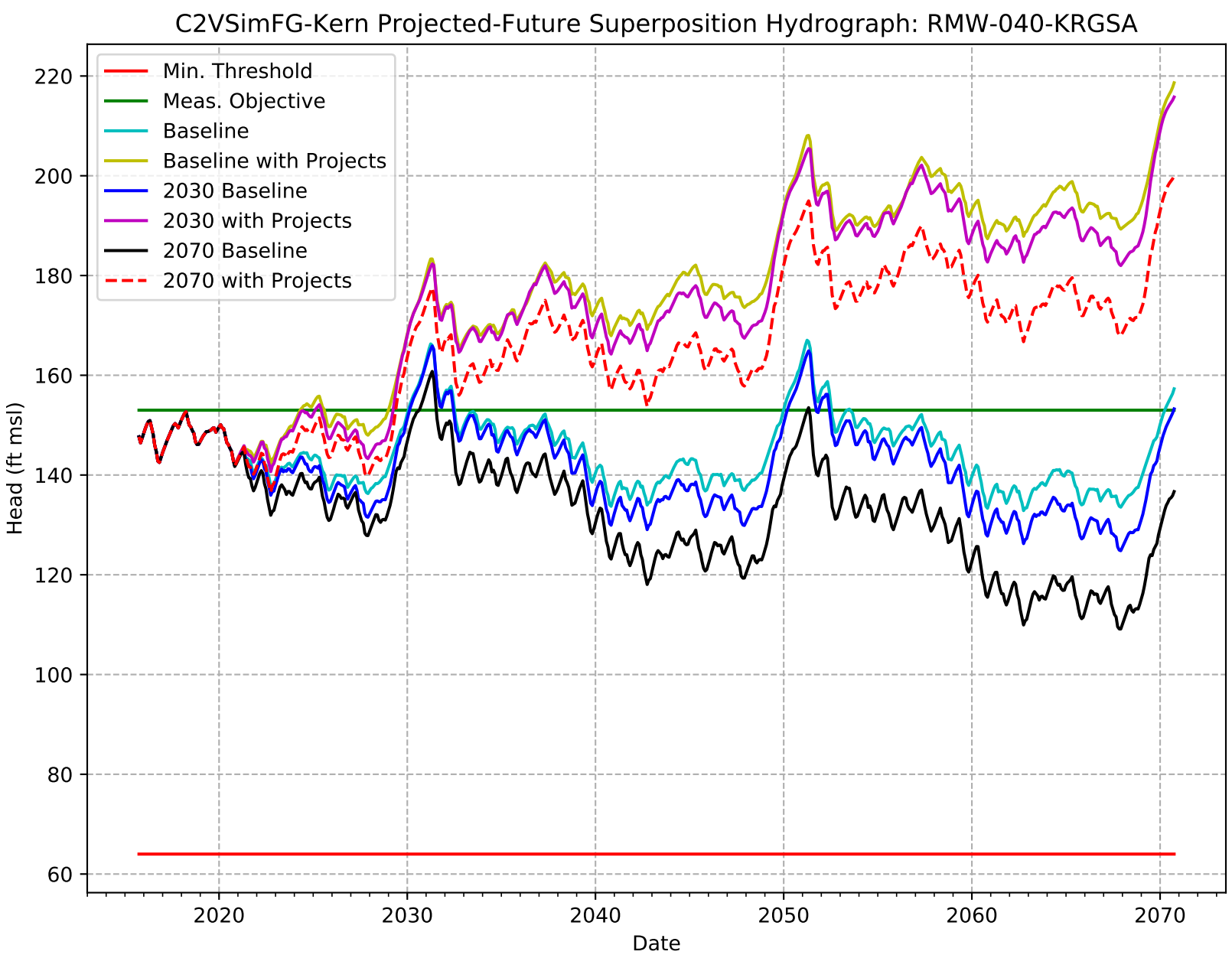

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-032-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
200
180
160
140
120
2020
2030
2040
2050
2060
2070
Date

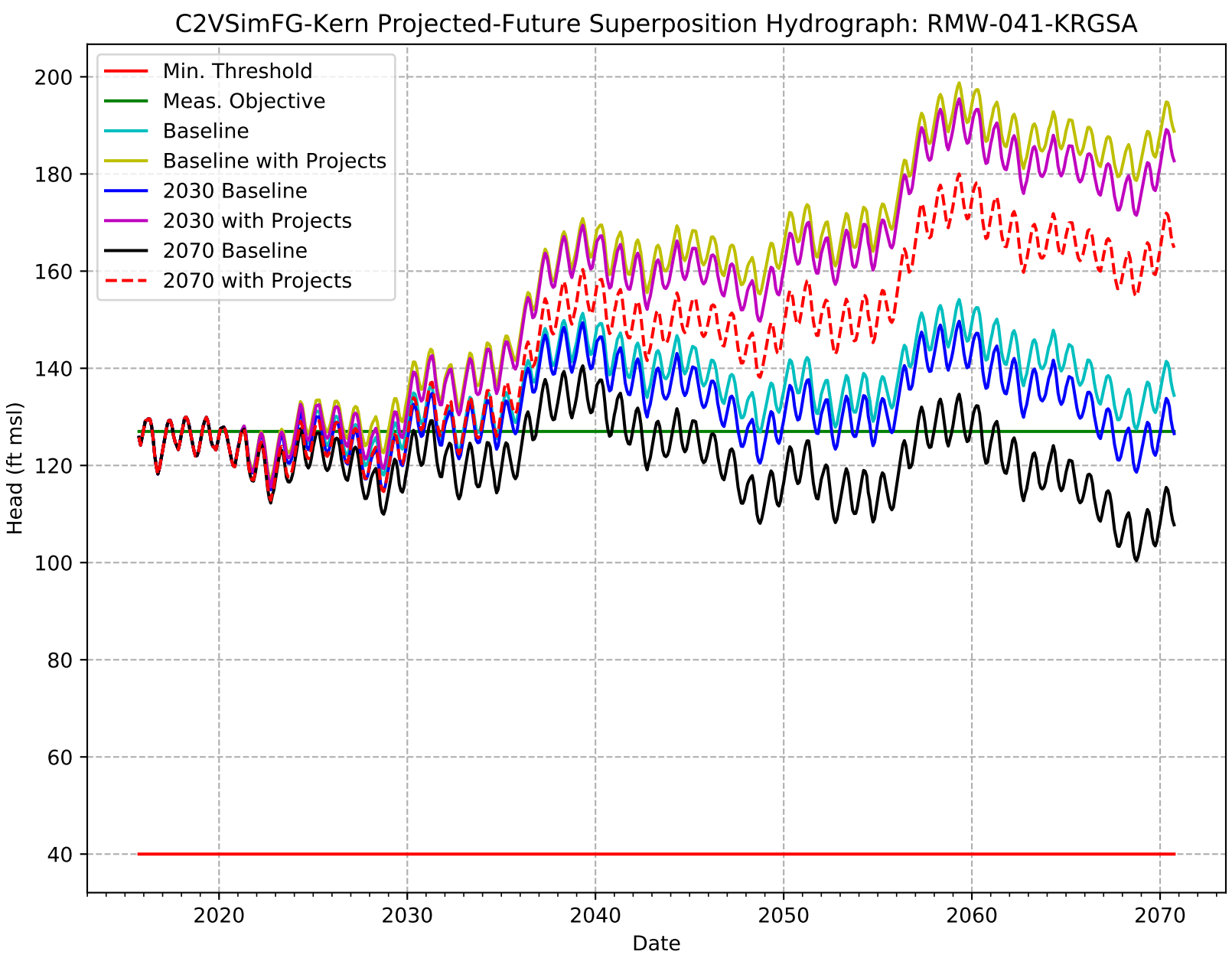

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-034-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
240
220
200
180
160
140
120
100
80
2020
2030
2040
2050
2060
2070
Date

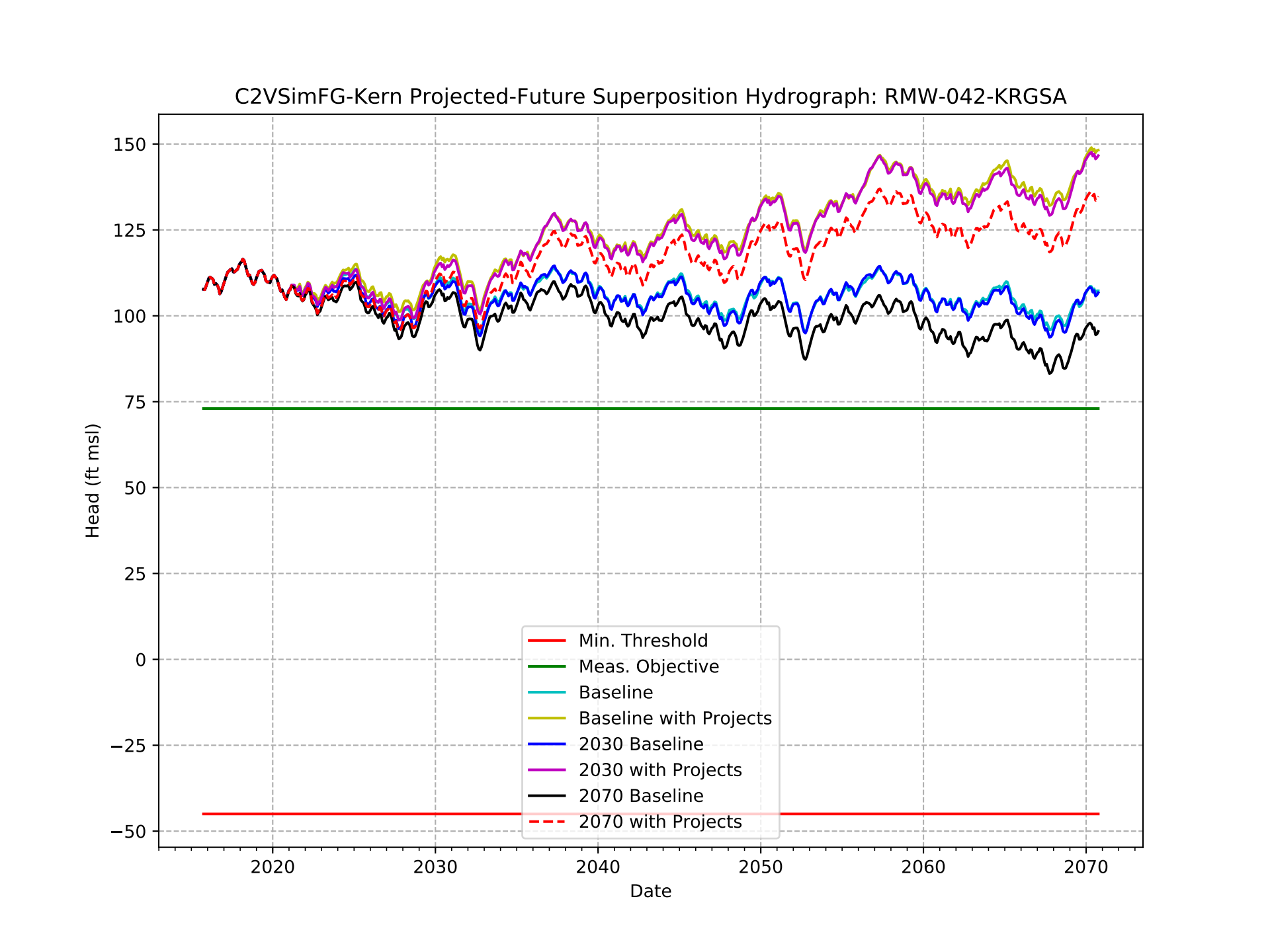

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-035-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
180
160
140
120
100
80
60
40
2020
2030
2040
2050
2060
2070
Date

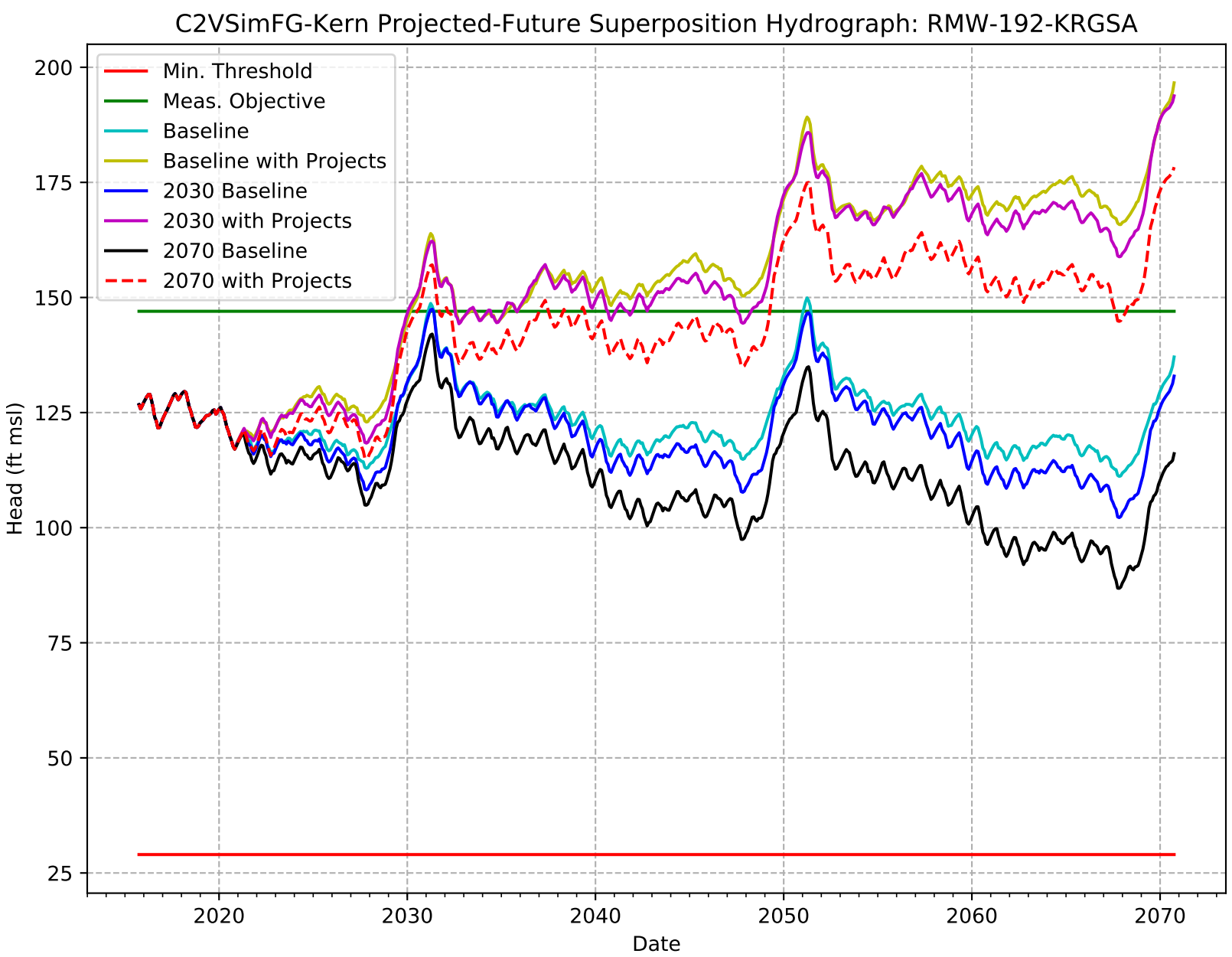

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-037-KRGSA
Head (ft msl)
160
140
120
100
80
60
40
20
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

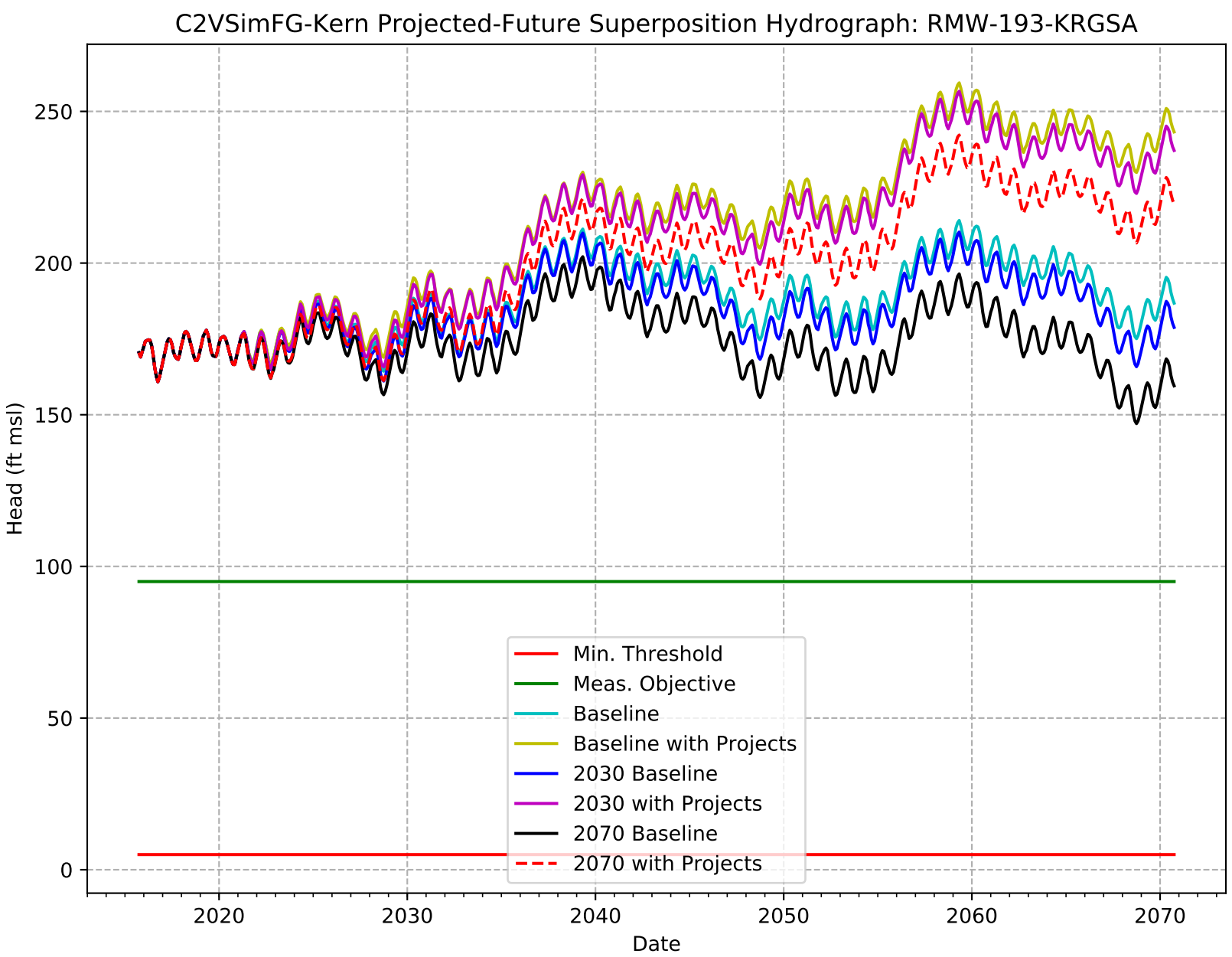

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-038-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
180
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date

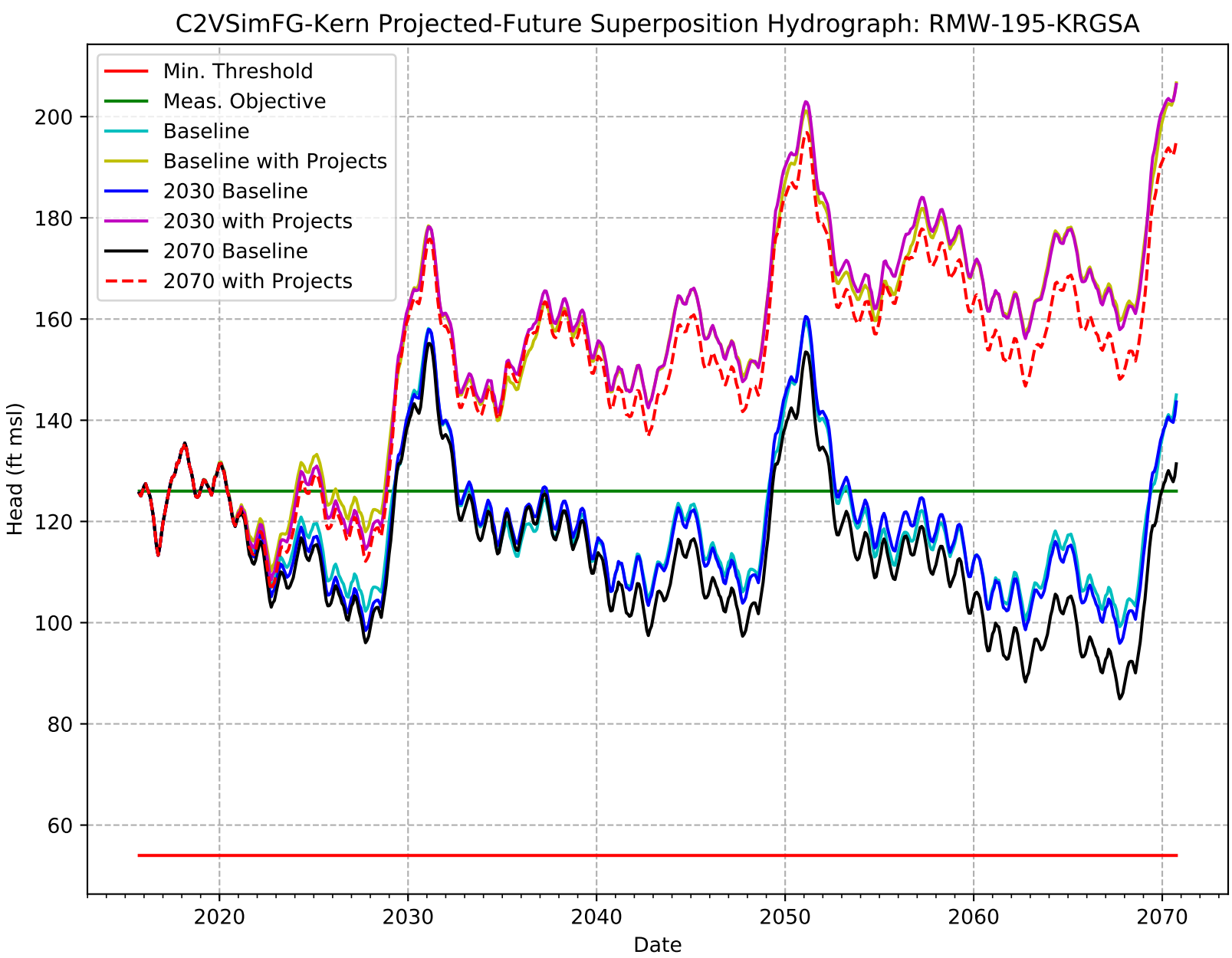

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-040-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
220
200
180
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date

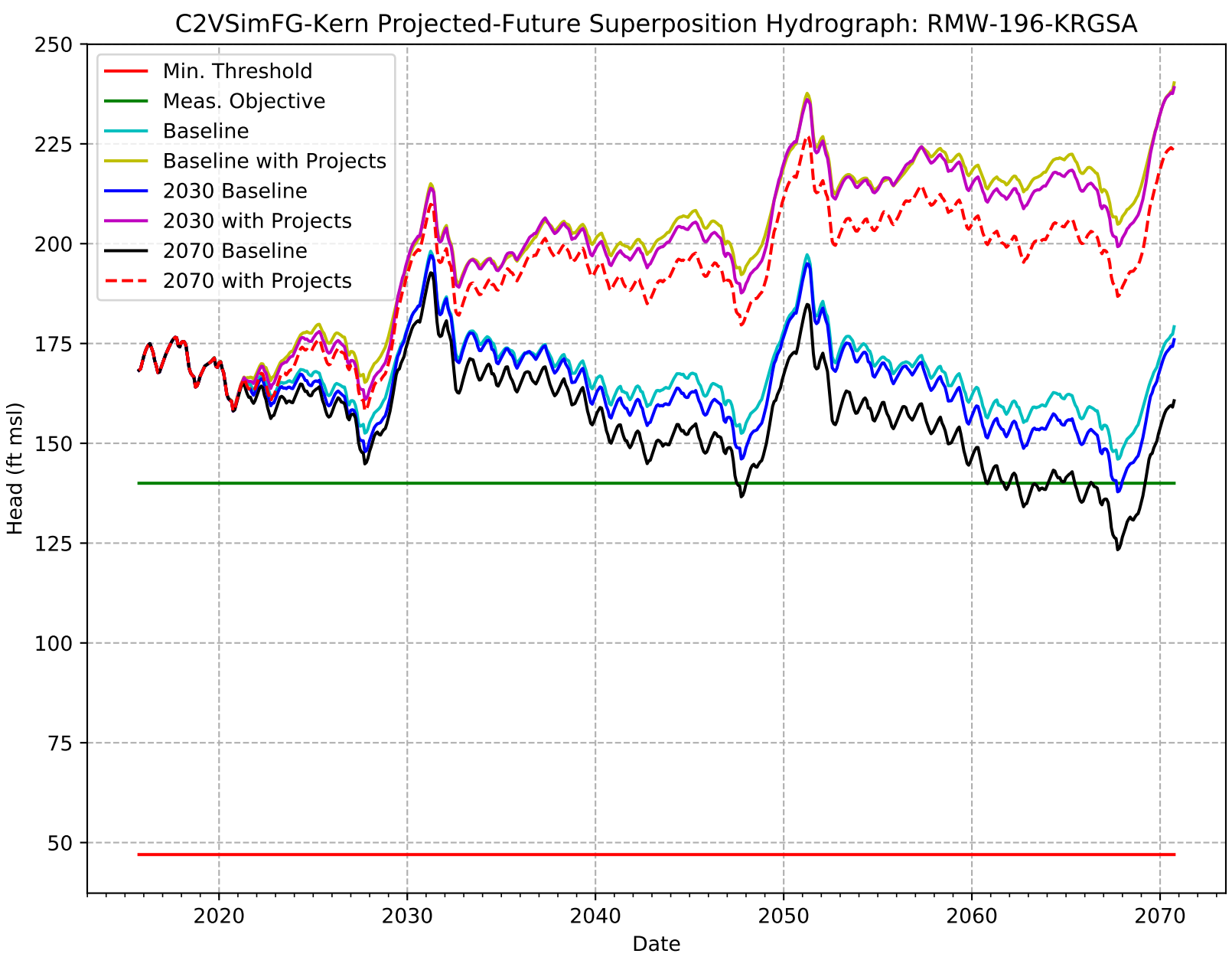

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-041-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
200
180
160
140
120
100
80
60
40
2020
2030
2040
2050
2060
2070
Date

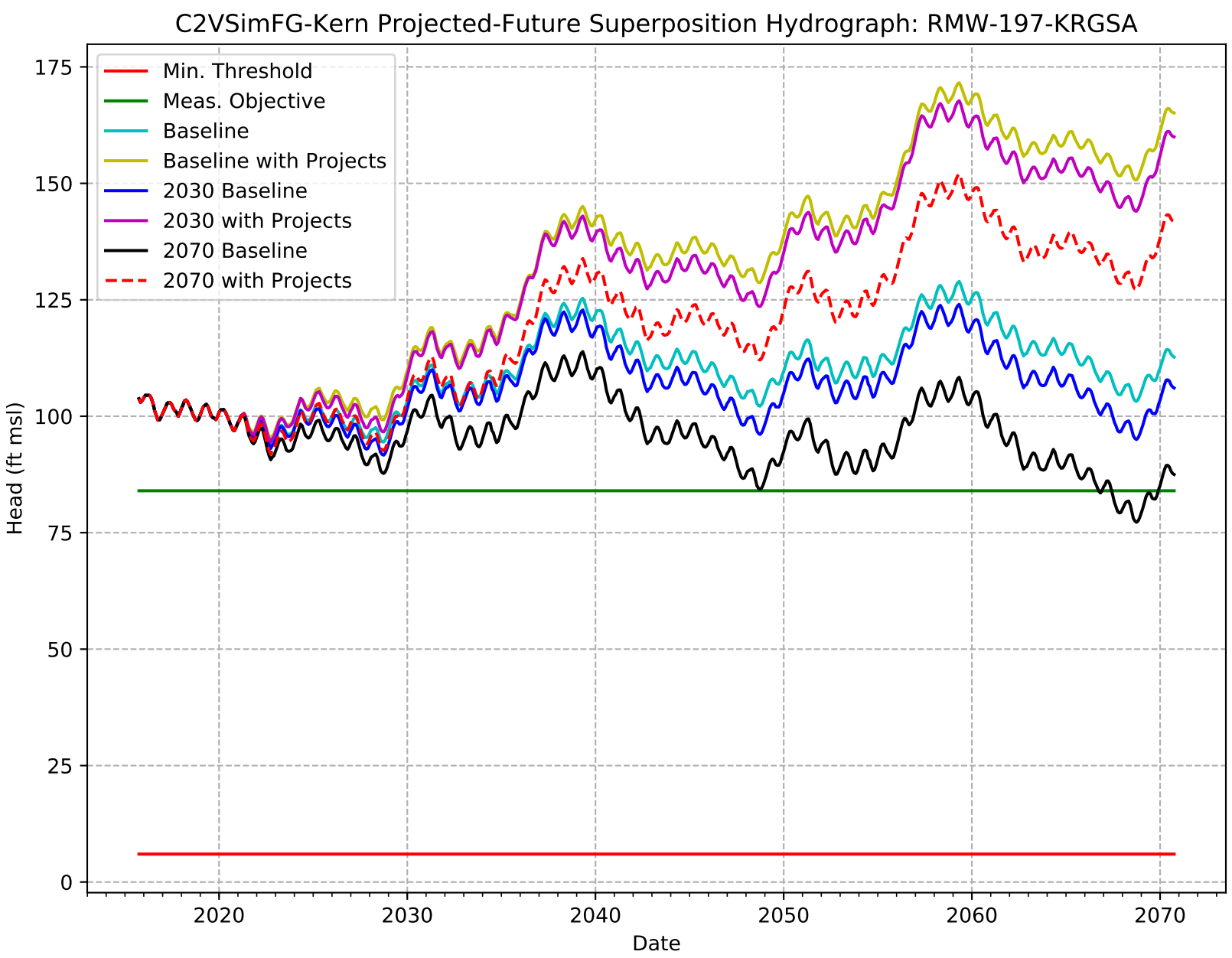

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-042-KRGSA
Head (ft msl)
150
125
100
75
50
25
0
−25
−50
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

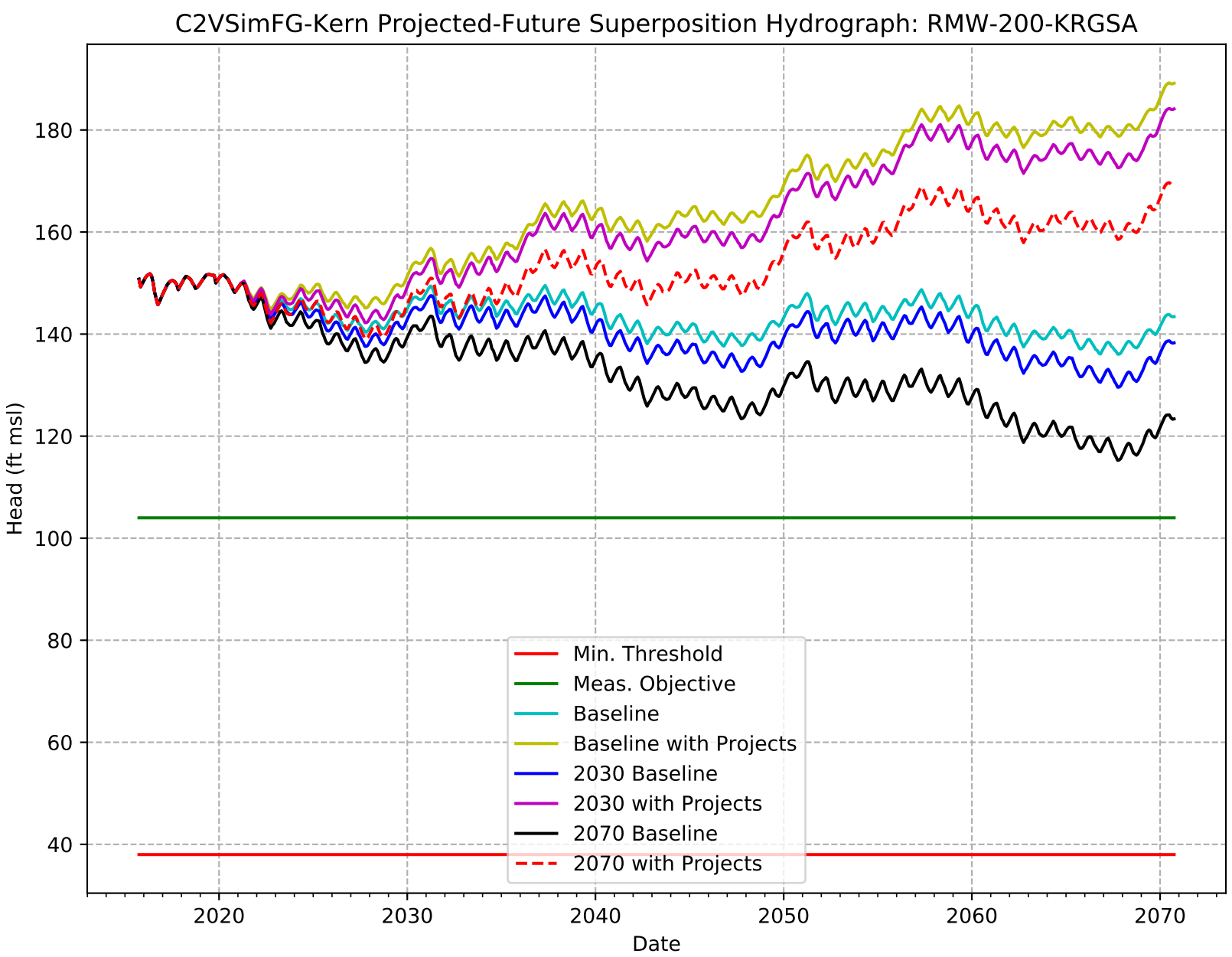

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-192-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
200
175
150
125
100
75
50
25
2020
2030
2040
2050
2060
2070
Date

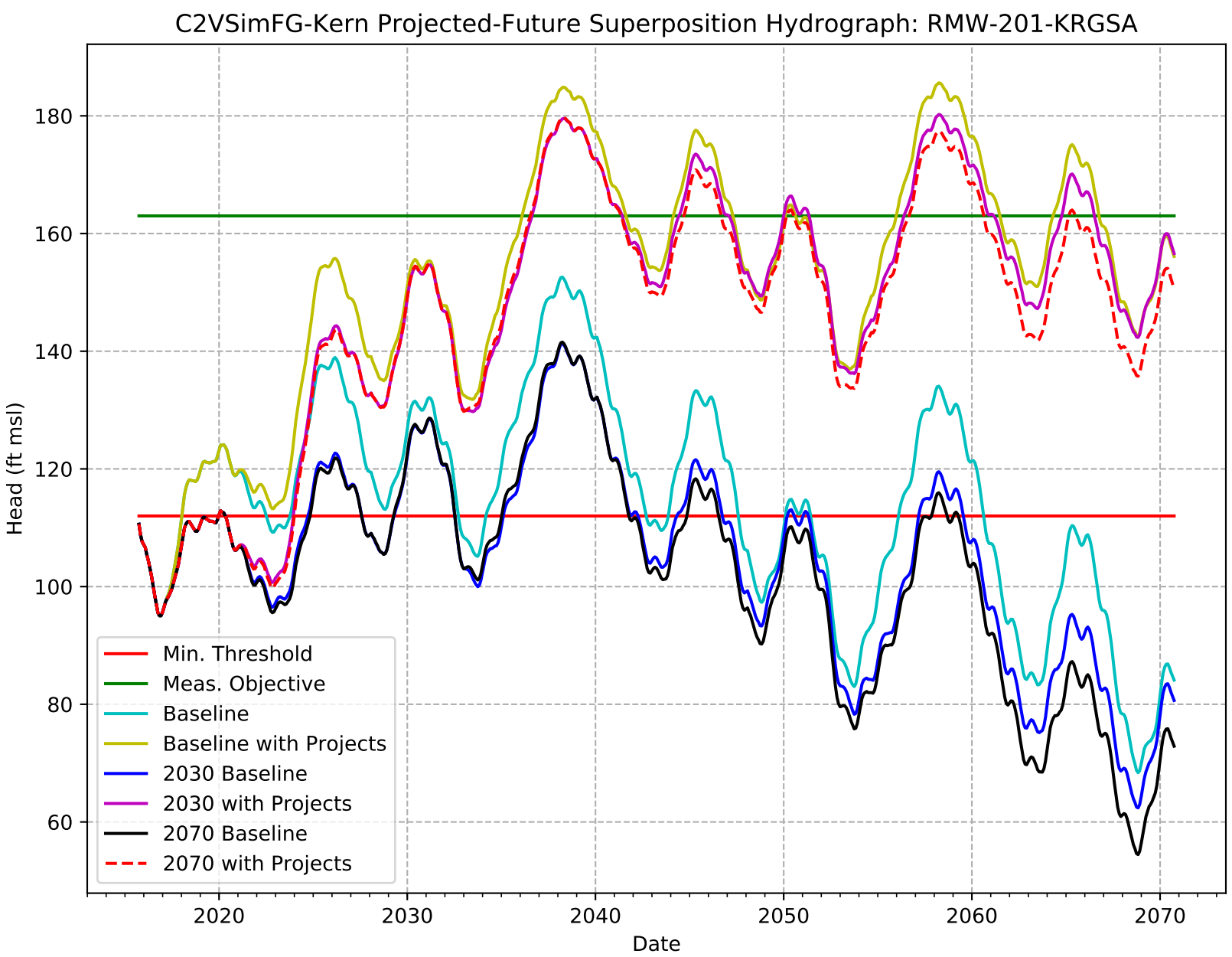

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-193-KRGSA
Head (ft msl)
250
200
150
100
50
0
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects

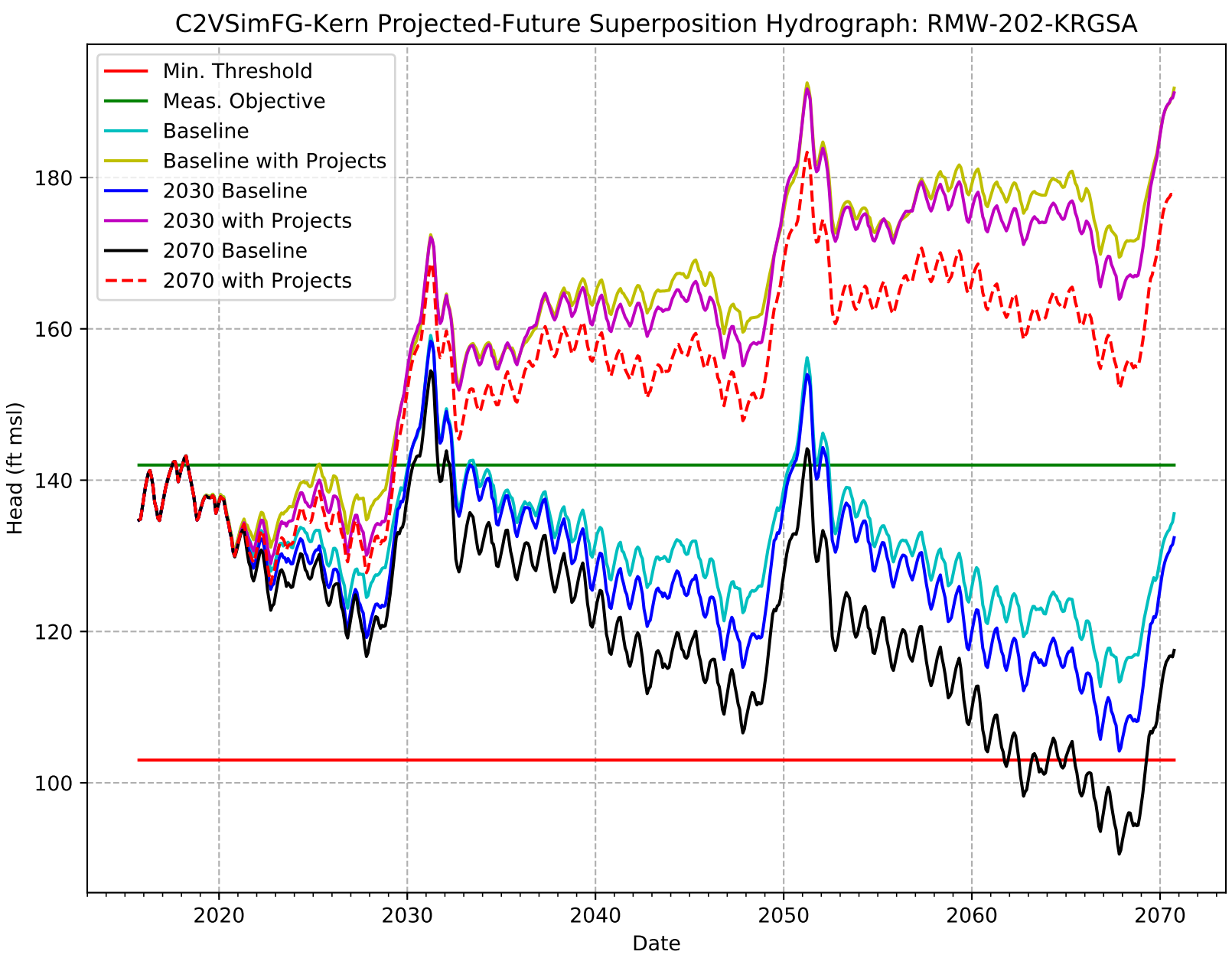

C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-195-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
200
180
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date


C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-196-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
250
225
200
175
150
125
100
75
50
2020
2030
2040
2050
2060
2070
Date


C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-197-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
175
150
125
100
75
50
25
0
2020
2030
2040
2050
2060
2070
Date


C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-200-KRGSA
Head (ft msl)
180
160
140
120
100
80
60
40
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects


C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-201-KRGSA
Head (ft msl)
180
160
140
120
100
80
60
2020
2030
2040
2050
2060
2070
Date
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects


C2VSimFG-Kern Projected-Future Superposition Hydrograph: RMW-202-KRGSA
Min. Threshold
Meas. Objective
Baseline
Baseline with Projects
2030 Baseline
2030 with Projects
2070 Baseline
2070 with Projects
Head (ft msl)
180
160
140
120
100
2020
2030
2040
2050
2060
2070
Date