Sustainable Groundwater Management Act

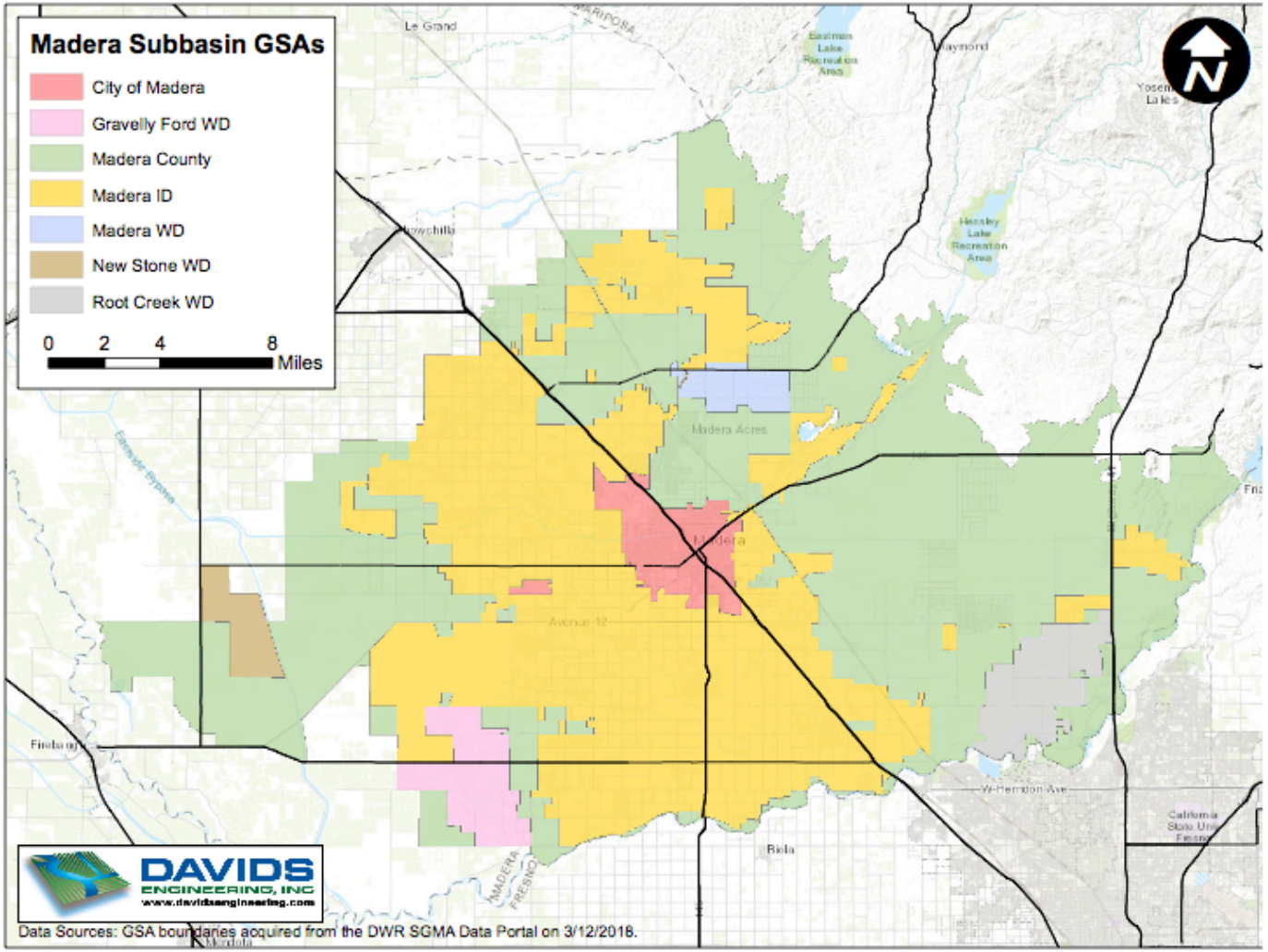
Madera Subbasin
Third Technical Workshop

2:30 p.m. to 4:30 p.m., October 18, 2018
Frank Bergon Senior Center

Madera, CA

Meeting Objectives

- Review SGMA requirements
- Review subbasin overdraft estimate
- Present GSA-specific conditions and solutions
- Discuss impacts to individual landowners



Madera Subbasin: 7 GSAs

SGMA Requirements

- Adopt and submit a Groundwater Sustainability Plan (GSP) by January 31, 2020
  - 5 GSAs are completing one GSP
    - Gravelly Ford WD may split and prepare its own
  - Root Creek and New Stone are each preparing their own GSP
  - All GSA's must agree with each other's supply and demand assumptions and must execute a binding "Coordination Agreement" per Water Code §10727(b)(3)
  - Each GSP and the Coordination Agreement must be approved by DWR and SWRCB

SGMA Requirements (cont.)

- "Sustainable groundwater management" must be occurring by 2040 for the entire subbasin
  - Today through 2039 – focus on implementation, with "undesirable results" likely to continue
  - 2040 and beyond must be sustainable, with no "undesirable results"

SGMA Requirements (cont.)

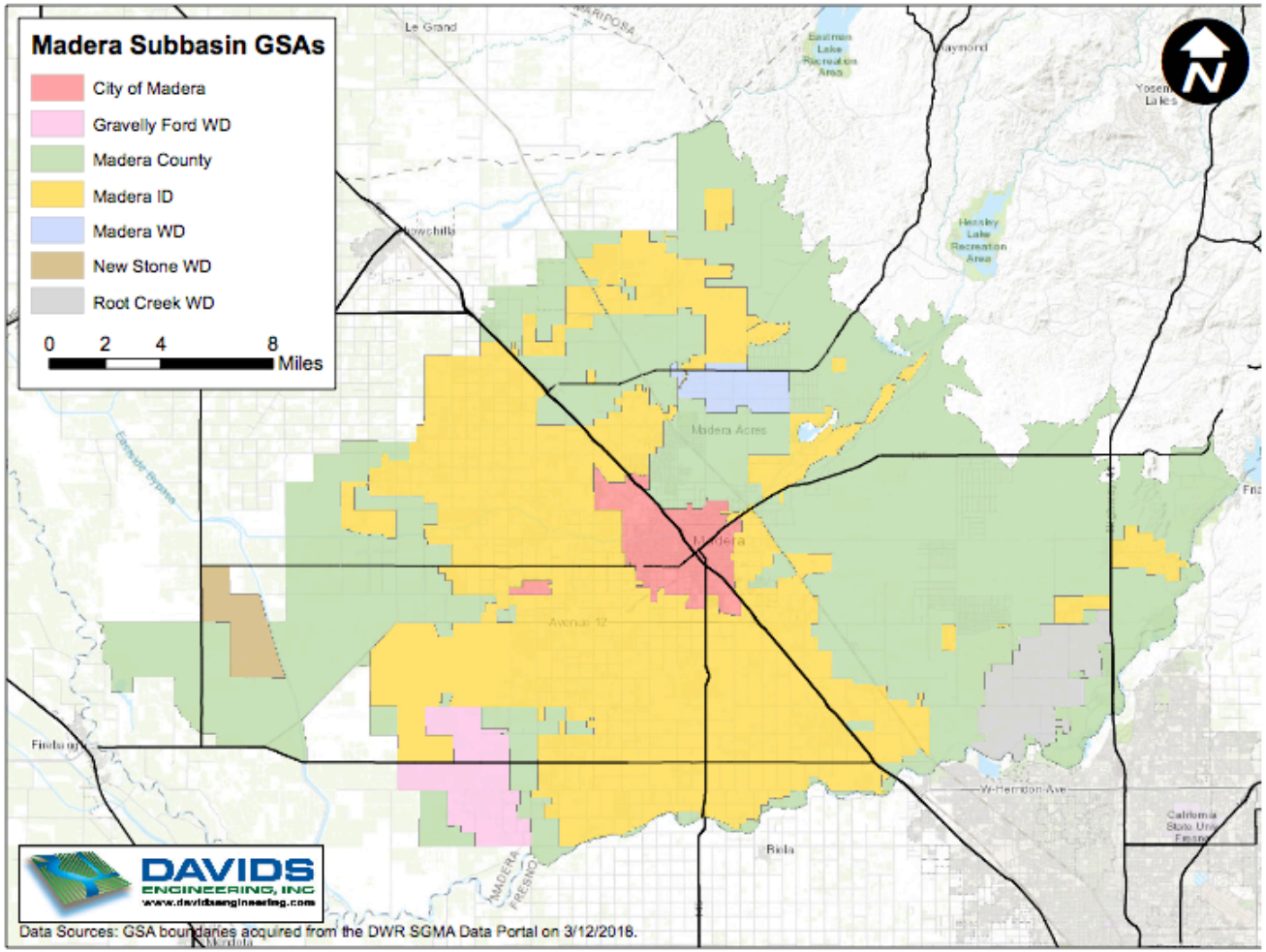
- "*Sustainable groundwater management*" means the management and use of groundwater in a manner that can be maintained…without causing undesirable results. [*CWC §10721(v)*]

SGMA Requirements (cont.)

- Where "*Undesirable Results*" means one or more of the following effects caused by groundwater conditions occurring throughout the basin [*CWC §10721(x)*]:
  - (1) Chronic lowering of groundwater levels
  - (2) Significant and unreasonable reduction of groundwater storage
  - (3) Significant and unreasonable seawater intrusion
  - (4) Significant and unreasonable degraded water quality
  - (5) Significant and unreasonable land subsidence
  - (6) Depletions of interconnected surface water

Madera Subbasin

Review Initial Overdraft Estimates



- **Total = ~ 348,000 ac**
- **Irrigated Lands (2015) = ~ 216,000 ac**

http://madera-id.maps.arcgis.com/apps/PublicInformation/index.html?appid=19ea7dd002704c908fca1e0a5f77aebe

Madera Subbasin "consumptive use" [a.k.a. Evapotranspiration of Applied Water (ETAW)]

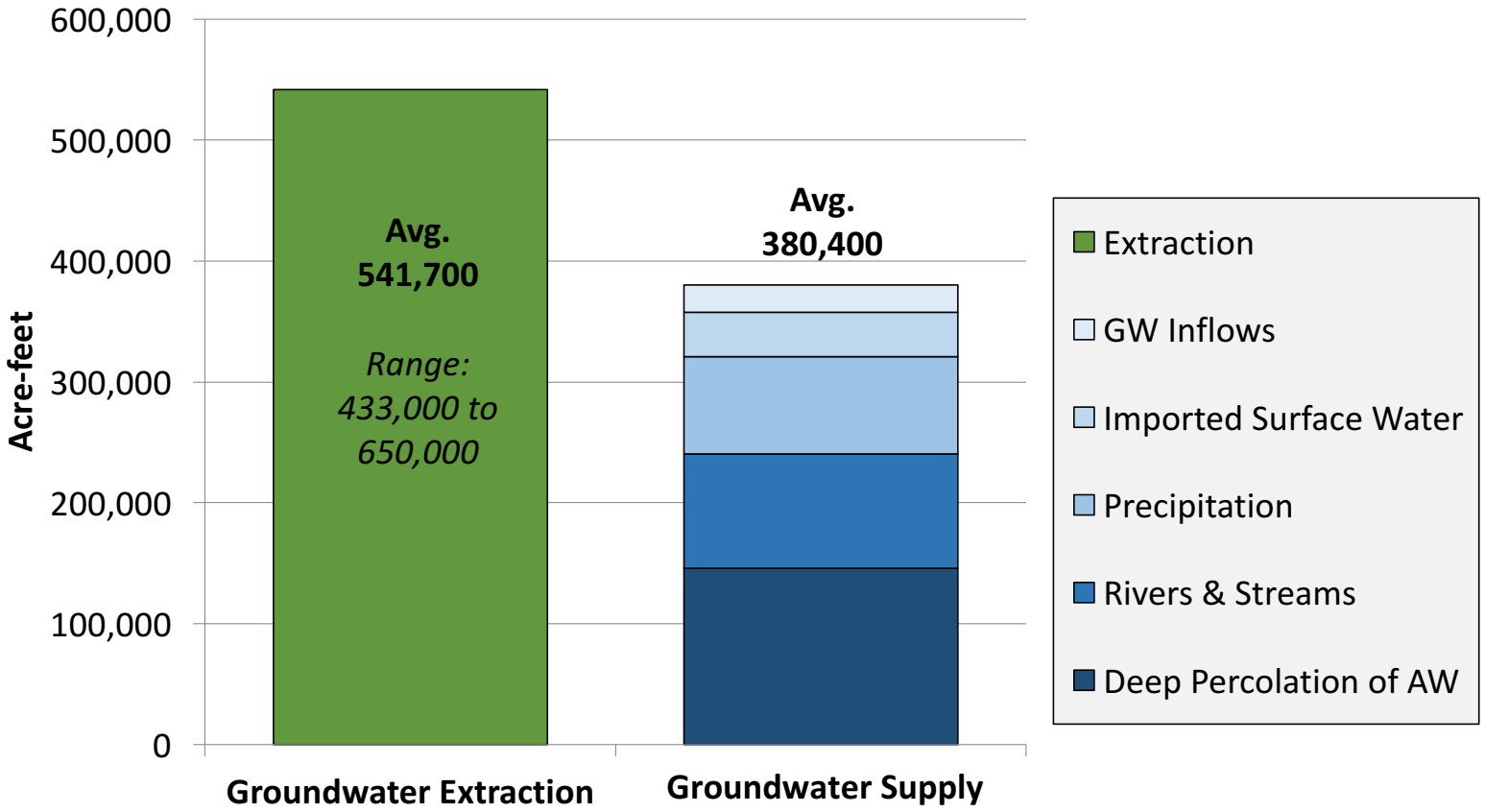
- Irrigated ag dominates
- Significant shift in crop types
- Average ETAW has increased
  - 1989 = 1.75 af/ac
  - 2015 = 2.13 af/ac
- Urban use is minor
  - City of Madera ~ 4,500 af/yr
  - Rural residential ~ 18,200 af/yr

Land Use	Crop Area (acres)	
	1989	2015
Citrus and Subtropical	6,071	4,512
Corn	5,266	6,963
Grain and Hay Crops	5,548	9,118
Grapes	69,562	67,489
Idle	32,783	4,198
Miscellaneous Field, Truck, Decid.	27,480	12,943
Almonds	21,797	75,006
Pistachios	14,169	27,189
Walnuts	1,180	1,157
Pasture and Alfalfa	30,069	7,581
Total	**213,924**	**216,158**

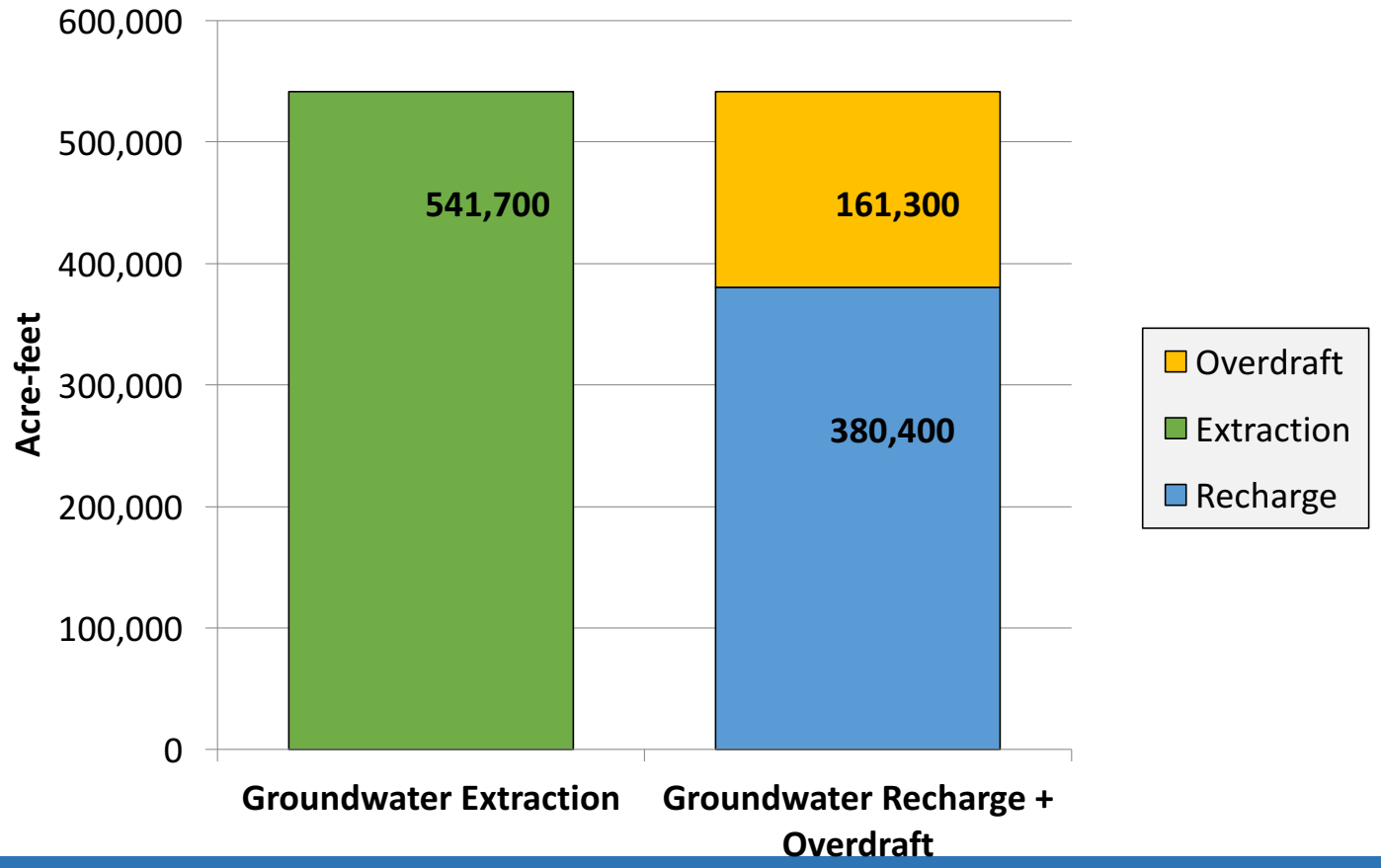
Madera Subbasin water sources to meet ETAW

- Surface water brought into subbasin
  - Significant MID and Gravelly Ford contracts and rights
  - Other GSA water rights/contracts (e.g. Madera WD and Root Creek)
  - Periodic diversion of flood flows
  - Portion routinely seeps/percolates to groundwater
- Groundwater in subbasin
  - Native groundwater from percolating rainfall and storm water seepage
  - Previously seeped and percolated surface water

Simplified Groundwater Condition (2015 Land Use)



Overdraft Estimate (2015 Land Use): ~ 160,000 af/yr



We must solve this ourselves…
[or face potential SWRCB intervention]

- We define "undesirable results" that will not be exceeded
  - Use groundwater elevations as a proxy for all six "undesirable results"
  - Set objectives and minimums that can vary across the basin
- We define opportunities to augment supplies
  - Bring in more surface water
  - Enhanced use of existing surface water sources
- We define how/where to reduce consumption
  - Use groundwater allocations – transitioned over time
  - Incentive to reduce overall consumptive use

While we are in this together, the seven GSAs differ on historic shortfall conditions, and on options to resolve groundwater shortage

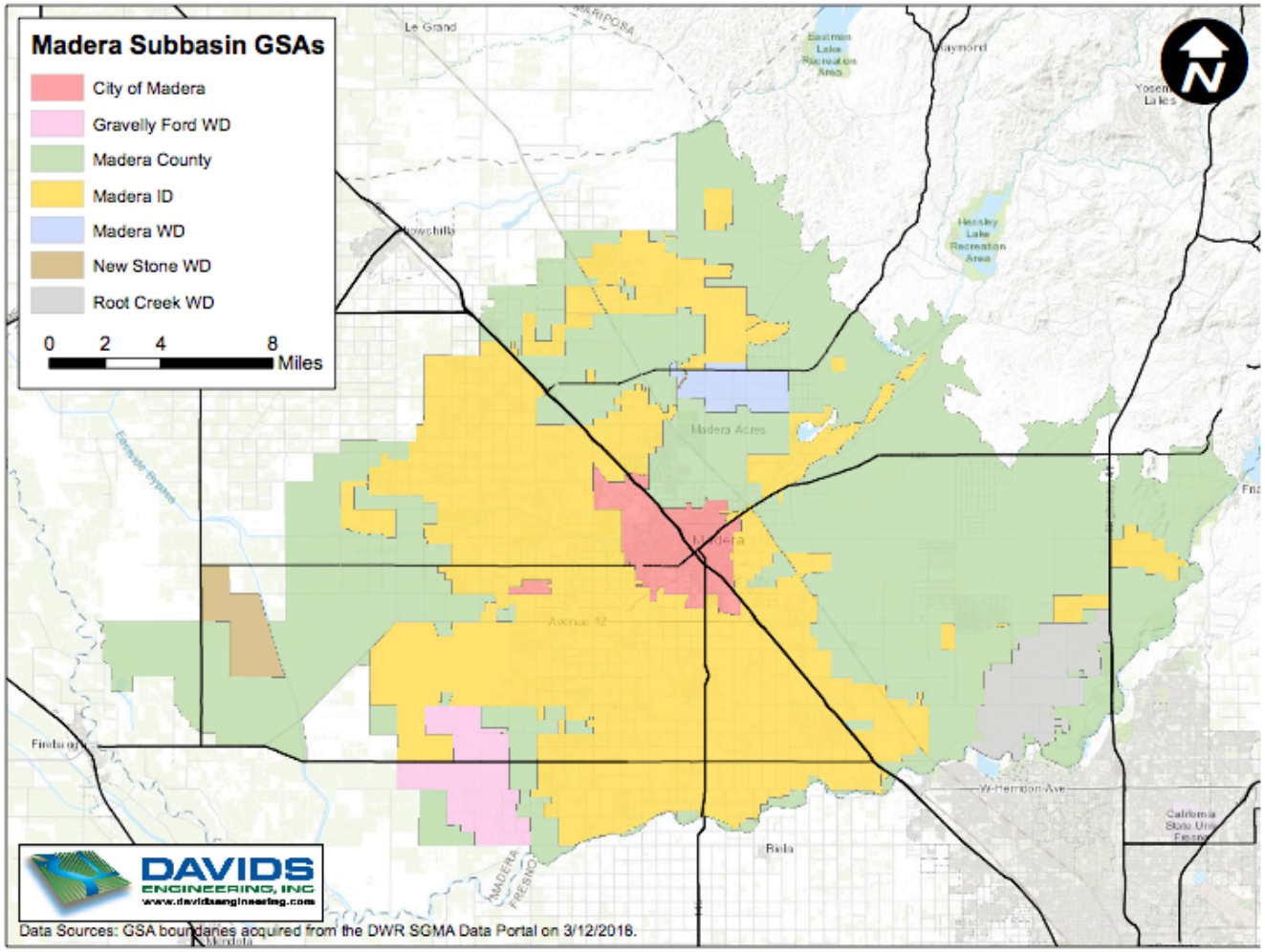
- GSAs and even individual parcels may have different options available to them
  - The distribution of costs and benefits from projects and management actions is not uniform across the subbasin
- A combination of projects and management actions can be evaluated by considering costs, feasibility (technical and economic), and fairness.

Use “native groundwater” as a starting point for ”Sustainable Yield”

- “Native groundwater” is estimated as the combination of:
  - Infiltration of rainfall = ~0.23 af/ac/year
  - Seepage from rivers and streams = ~0.25 af/ac/yr
- For purposes of exploring solutions, each acre in each GSA boundary is provided **0.5 af/ac/yr of “Native Groundwater”**
- All 7 GSAs share equally in the availability of native groundwater
- Each GSA may have other water supplies that contribute to “Sustainable Yield”

Madera County GSA

Conditions and Initial Solutions



Madera County GSA

Total = ~178,000 ac

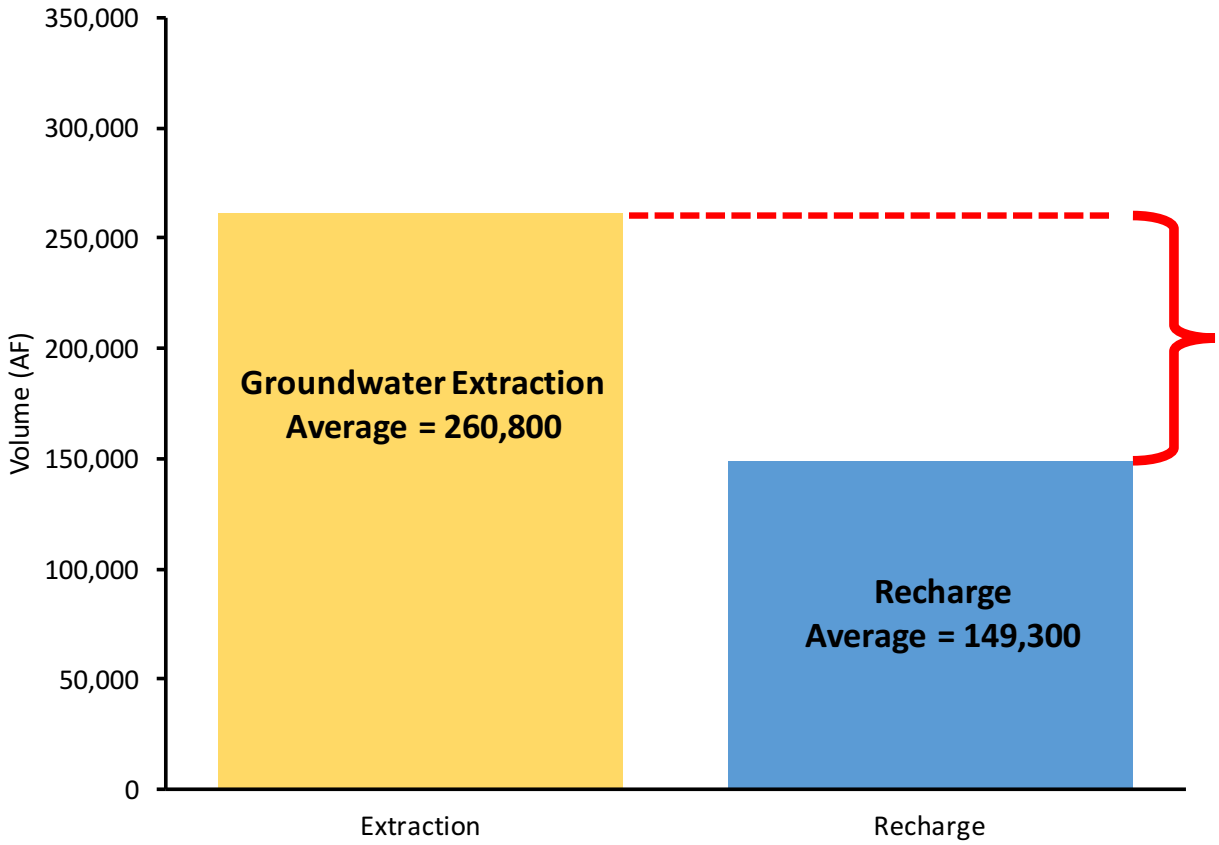
Irrigated = ~85,000 ac

95% of Madera County's 2015 ETAW is from irrigated agriculture

- Irrigated Agriculture = 190,160 acre-feet
- Rural residential = 12,190 acre-feet
- Total = 202,350 acre-feet

Current average consumptive use (ETAW) (ETAW) = 2.24 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 111,500 af/year

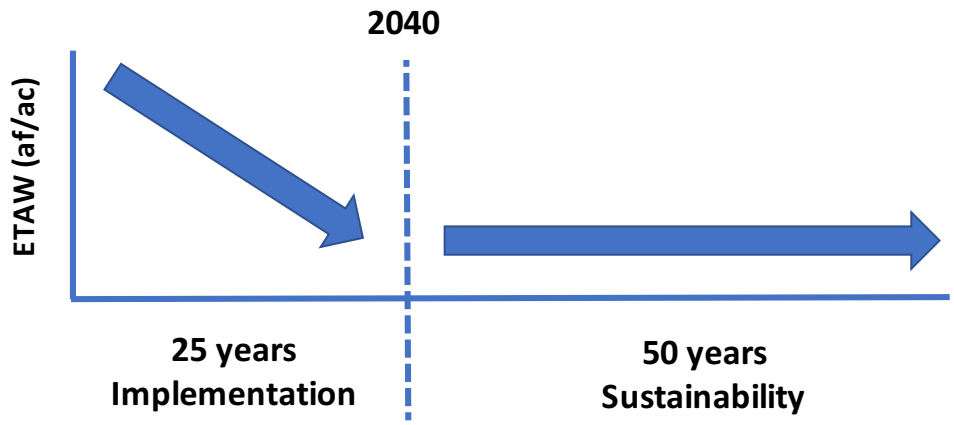
DRAFT PRELIMINARY ANALYSIS AND RESULTS TO BE REFINED AS GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT PROCEEDS

What is being planned by the County GSA to close this deficit by 2040?

- Water Supply Projects/Programs
  - Augment supplies
    - Use 200 af CVP contract
    - Flood flows (limited)
    - Purchase from others
  - Build recharge projects
    - On-farm and dedicated
    - Deep-dry and injection wells
  - Participate with others:
    - Expand Capacity behind Buchanan Dam
    - Expand Capacity of Madera Canal
  - Expand community water systems
- Demand Management
  - Create conservation easements
  - Establish groundwater allocations
  - Create market for allocations
  - Charge extraction fees
  - Temporary continued use of existing stored groundwater
  - Establish funds to potentially mitigate dry domestic wells

What might this look like in detail?

- Recharge projects
  - Planning for avg of 10,000 to 15,000 af/yr
  - Competitive and expensive
- Incremental reduction from current consumptive use
  - Transition from current per-acre use
  - Coordinated with other projects
- Continued use of stored groundwater (lowering levels)
  - Initially ~ 90,000 af/yr
  - Lowering as consumptive use reduction is implemented



As a landowner in the County GSA, how much can I pump?

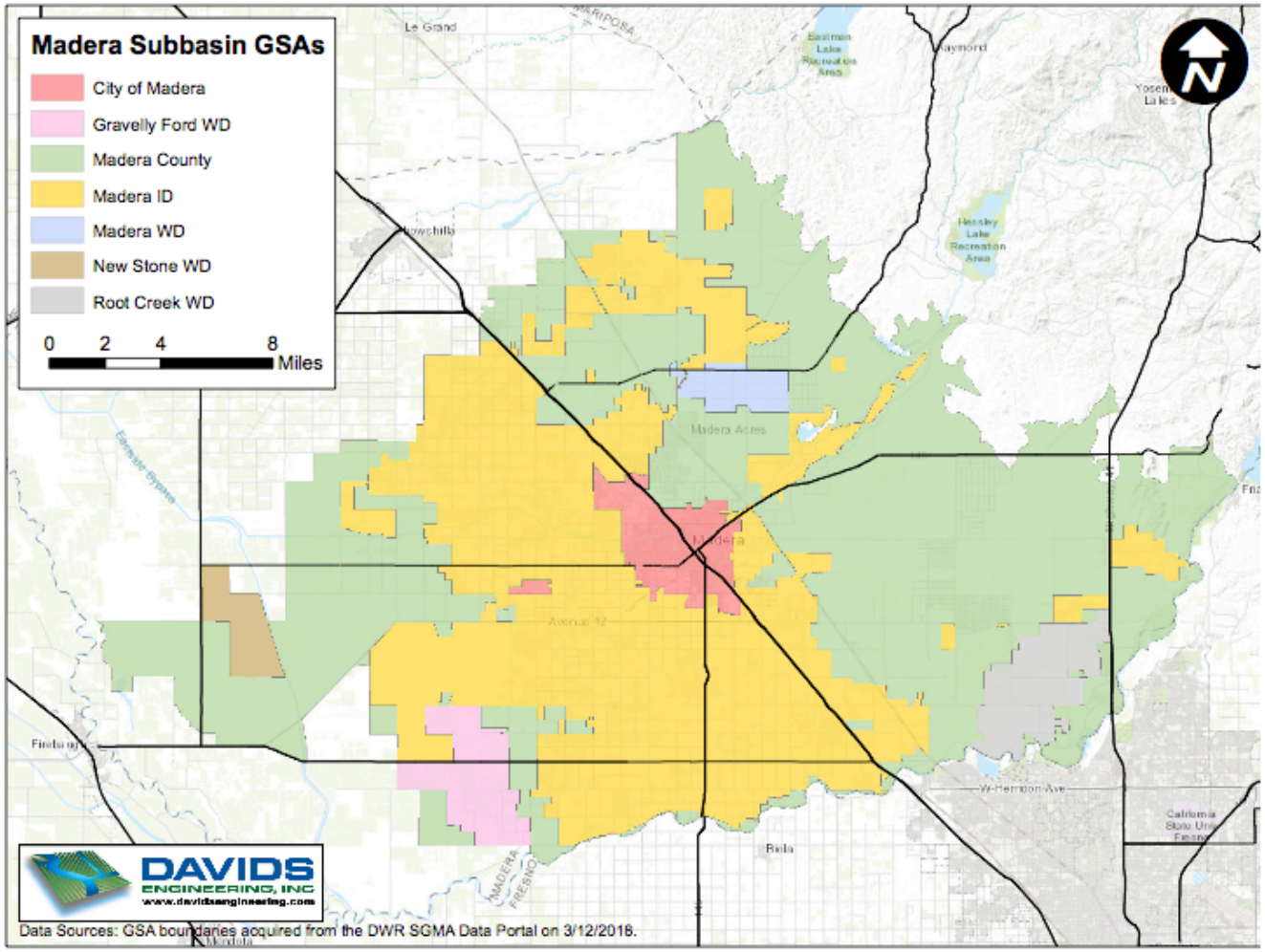
- By 2040 and beyond, may be limited to consuming no more than 0.5 af/ac
  - Pumping quantities will depend on efficiency and deep percolation of pumped groundwater
- County is working on ways to transition from current pumping to sustainable levels
  - Trading and credit systems can allow more water per acre
  - Continued use of existing stored groundwater can help, but will lower groundwater levels in many areas

What does this mean to me as a Landowner in the County GSA?

- Developing recharge projects to help augment natural groundwater where economically feasible
- Transitioning to much lower total consumptive use, possibly through allocations, incentives, or charges
- Continued lowering of groundwater levels
- Increasing groundwater regulations and reporting
- Participating in groundwater market

Madera ID GSA

Conditions and Initial Solutions



MID GSA

Total = ~134,100 ac

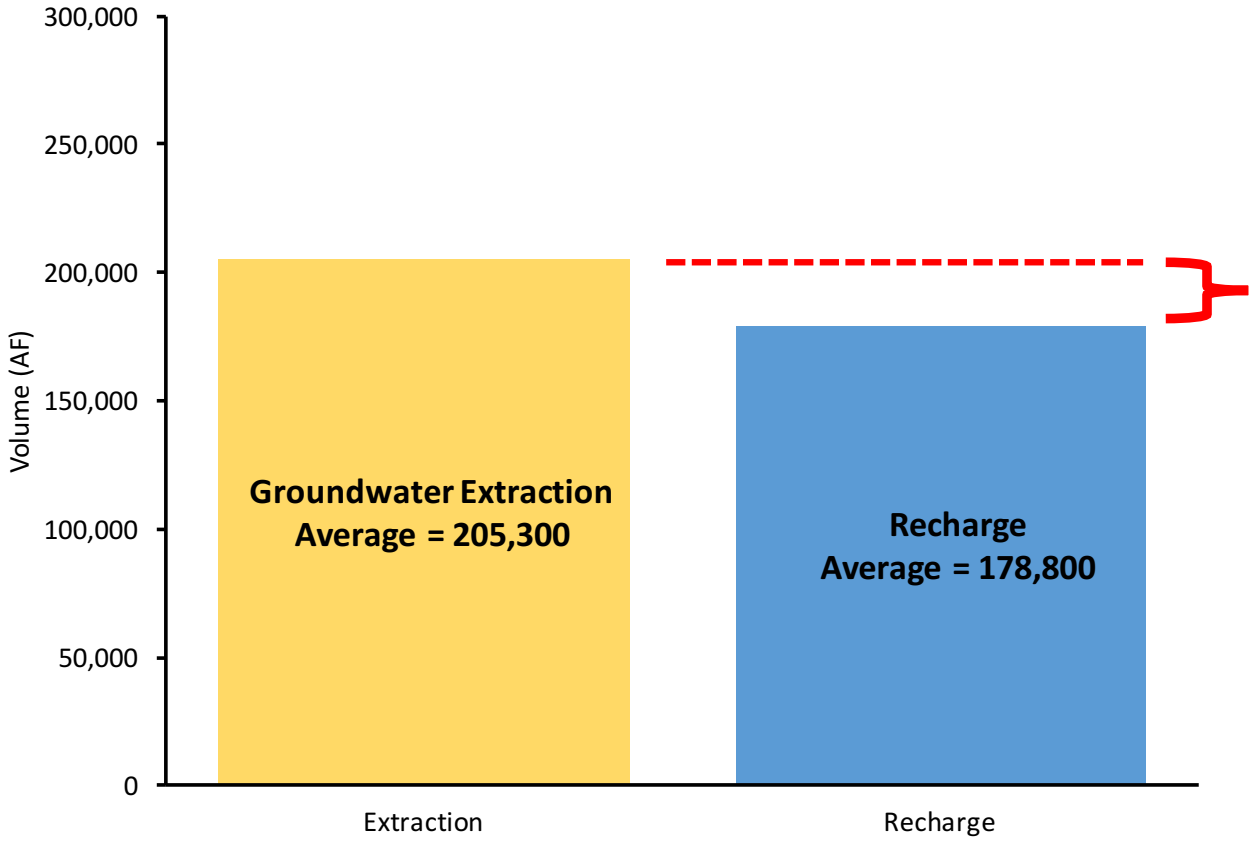
Irrigated = ~106,600 ac

99% of MID's 2015 ETAW is from irrigated agriculture

- Irrigated Agriculture = 233,400 acre-feet
- Rural residential = 5,600 acre-feet
- Total = 239,000 acre-feet

Current average consumptive use (ETAW) (ETAW) = 2.19 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 26,500 af/year

1989-2014 avg:
~ 1,800 af/yr

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DRAFT PRELIMINARY ANALYSIS AND RESULTS TO BE REFINED AS GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT PROCEEDS

What is being planned by the MID GSA to close this deficit by 2040?

- Water supply/conservation projects and programs
  - MID GSA 2015 to 2018 (i.e. already completed)
    - Rehabilitated & began utilizing 8 recharge basins
    - Over 12,000' of pipeline projects installed
    - System Automation (SCADA & Automated Gates)-54 sites
    - Annexation of Madera Ranch (~10,500 ac of grazing land)
    - On-Farm Recharge Program-established and utilized
    - Acquired and imported additional surface water supplies

10,000 AF ANNUAL AVERAGE

What is being planned by the MID GSA to close this deficit by 2040?

- Water supply/conservation projects and programs
  - MID GSA 2018 TO 2040
    - Additional recharge basin acquisition
      - Acquisition of 22 acre recharge facility (in progress)
    - Additional water supply development through partnerships
    - Enhance On-Farm Recharge Programs
    - Explore new fee structures and incentive based programs for the MID GSA
- Demand Management
  - MID GSA, *at this time*, is not anticipating the need for demand management **IF** water supplies can continue to be enhanced

What might this look like in detail?

- WATER SUPPLY/CONSERVATION PROJECTS & PROGRAMS
  - MID GSA 2018 TO 2040
    - Additional recharge basin acquisition (4,000 AF)
    - Additional water supply development through partnerships (3,500 AF)
    - Enhance On-Farm Recharge Programs (4,000 AF)
    - Explore new fee structures and incentive based programs for the MID GSA (5,000 AF)

10,000 AF (2015-2018 projects) + 4,000 AF + 3,500 AF + 4,000 AF + 5,000 AF = 26,500 AF

As a landowner in the MID GSA, how much can I pump?

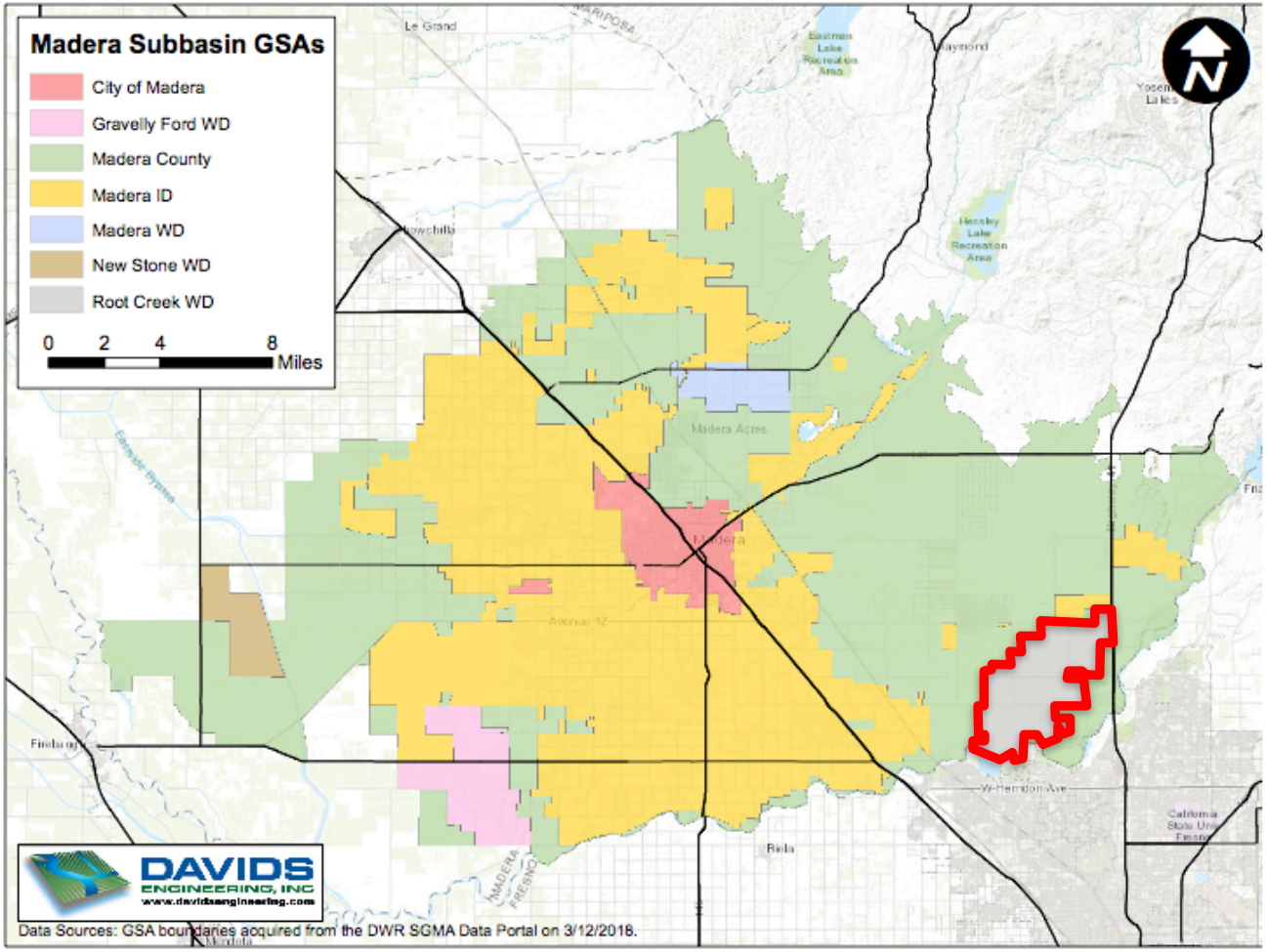
- The MID GSA has decided to take a District-wide sustainability approach, which means:
  - MID GSA will be managed as a District, not by individual parcels
  - Again, the MID GSA, *at this time*, is not anticipating the need for demand management (pumping restrictions) **IF** water supplies can continue to be enhanced

What does this mean to me as a Landowner in the MID GSA?

- MID GSA will:
  - Need to continue to invest in water supply projects and programs
  - Need stakeholder participation in programs such as On-Farm Recharge Programs
  - Analyze current assessment and water pricing structures
- What else does this mean to me as a stakeholder?
  - Water meters will not be required by MID GSA, *at this time*
  - Water levels in wells will likely continue to decline until the remainder of the Madera Subbasin becomes balanced

Root Creek WD GSA

Conditions and Initial Solutions



RCWD GSA

Total = ~9,300 ac

Irrigated = ~8,200 ac

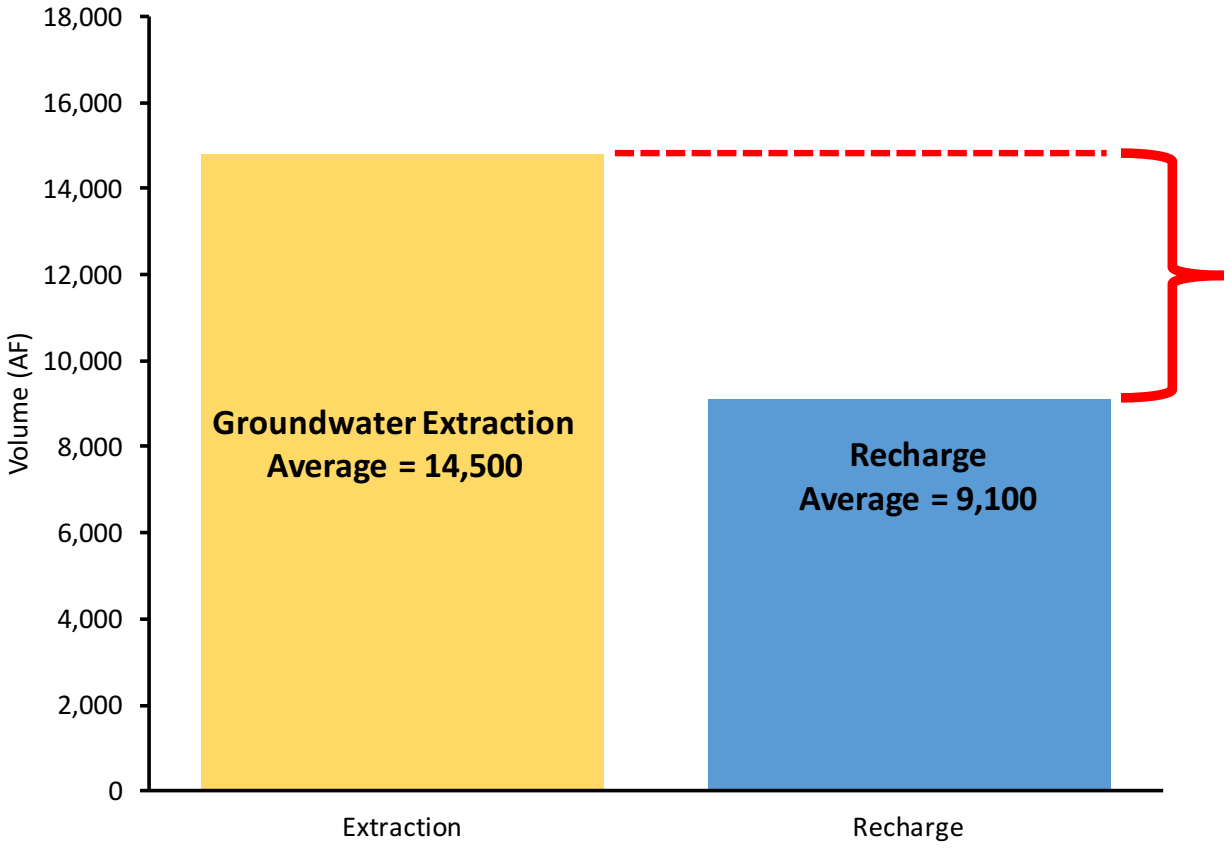
Note:
~ 2,300 ac have "Holding Contracts" while remainder of land does not.

99% of Root Creek's 2015 ETAW is from irrigated agriculture

- Irrigated Agriculture = 19,650 acre-feet
- Rural residential = 150 acre-feet
- Total = 19,850 acre-feet

Current average consumptive use (ETAW) (ETAW) = 2.39 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 5,500 af/year

DRAFT PRELIMINARY ANALYSIS AND RESULTS TO BE REFINED AS GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT PROCEEDS

What has the RCWD GSA already accomplished?

- 2014 through 2018 (i.e. already completed!)
  - Construction of 5.4 miles of irrigation and conveyance pipelines
  - Import surface supplies: 2014 (502 af), 2017 (6,800 af) and 2018 (1,365 af)
  - Conversion of ~640 acres from agriculture to residential development, reducing consumptive use
  - Intentional capture and recharge of storm water
  - Adopted fees to pay for construction of infrastructure and to purchase surface water supplies

What is being Planned by the RCWD GSA to close this deficit by 2040?

- Water Supply Projects and Programs
  - Increased use of surface water
    - Expand the irrigation distribution system
    - Develop additional intentional recharge projects (imported and stormwater)
    - Maximize the delivery of contract surface supplies
  - Develop and utilize recycled water from the residential developments
  - District assessments for agricultural landowners will pay for new irrigation systems and purchasing surface water (initiated in 2018)

What might this look like in detail?

- Increased use of surface water supplies (3,000 – 5,000 af/yr)
- Transition to urban will reduce overall consumptive use, reducing demand
  - Municipal consumptive use < 1 af/ac
- Storm water capture along Root Creek to allow for increased recharge to the underground
- A separate recycled water system that uses treated water to be used on the agricultural lands in the district

As a landowner in the RCWD GSA, how much can I pump?

- Municipal and agricultural landowners may pump groundwater to meet beneficial use on their property

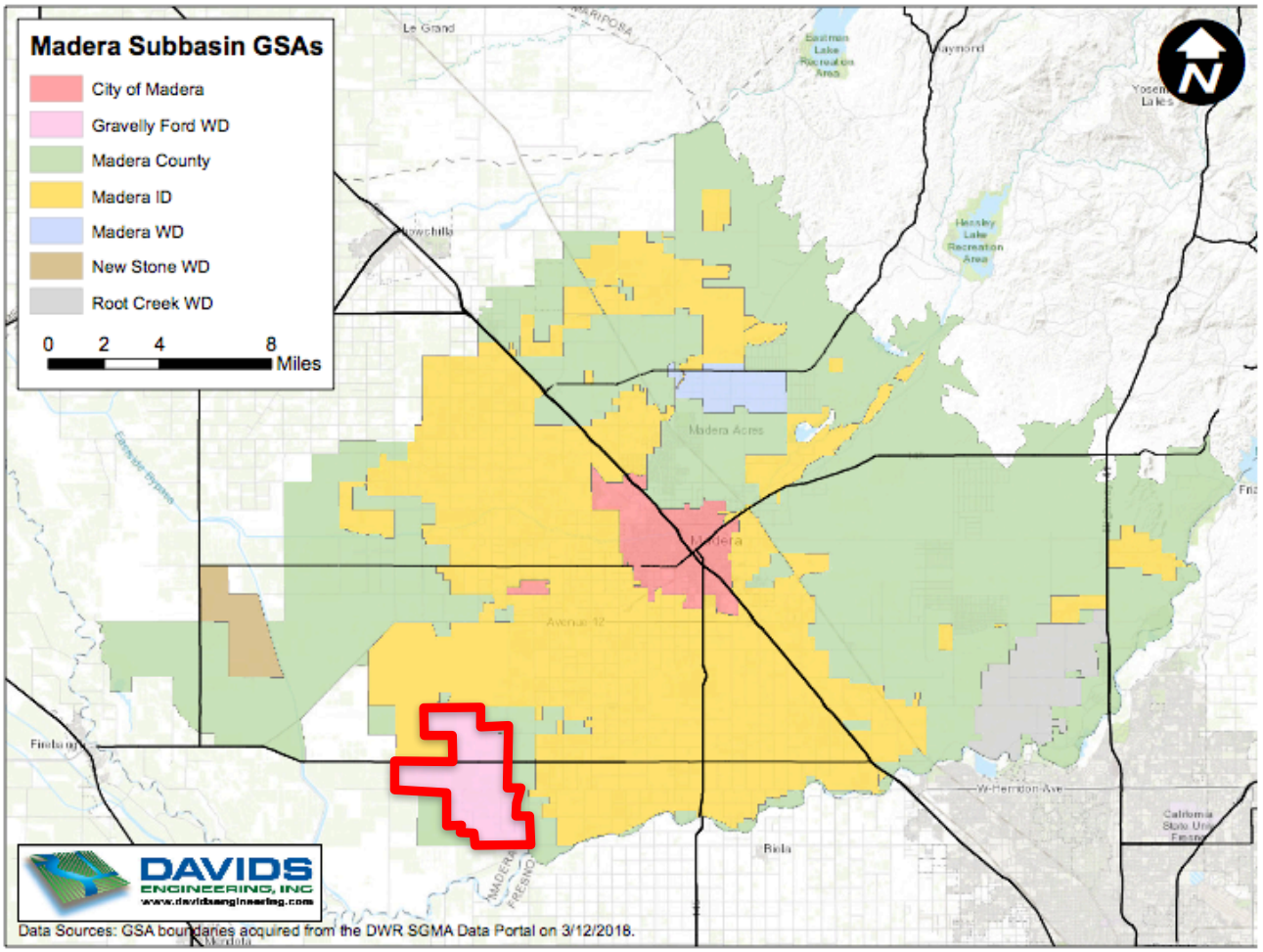
- RCWD GSA, *at this time*, is not anticipating the need for demand reduction **IF** surface water can continue and expand

What does this mean to me as a Landowner In the RCWD GSA?

- You will continue to be able to farm as historically
- You have a secure water supply
- Transition to urban will reduce overall consumptive use, reducing demand
- It will cost more to farm
- Groundwater levels in the District have begun to stabilize, but will continue to decline until the rest of the Subbasin comes into balance

Gravelly Ford WD GSA

Conditions and Initial Solutions



GFWD GSA

Total = ~8,400 ac

Irrigated = ~7,500 ac

District established in 1961

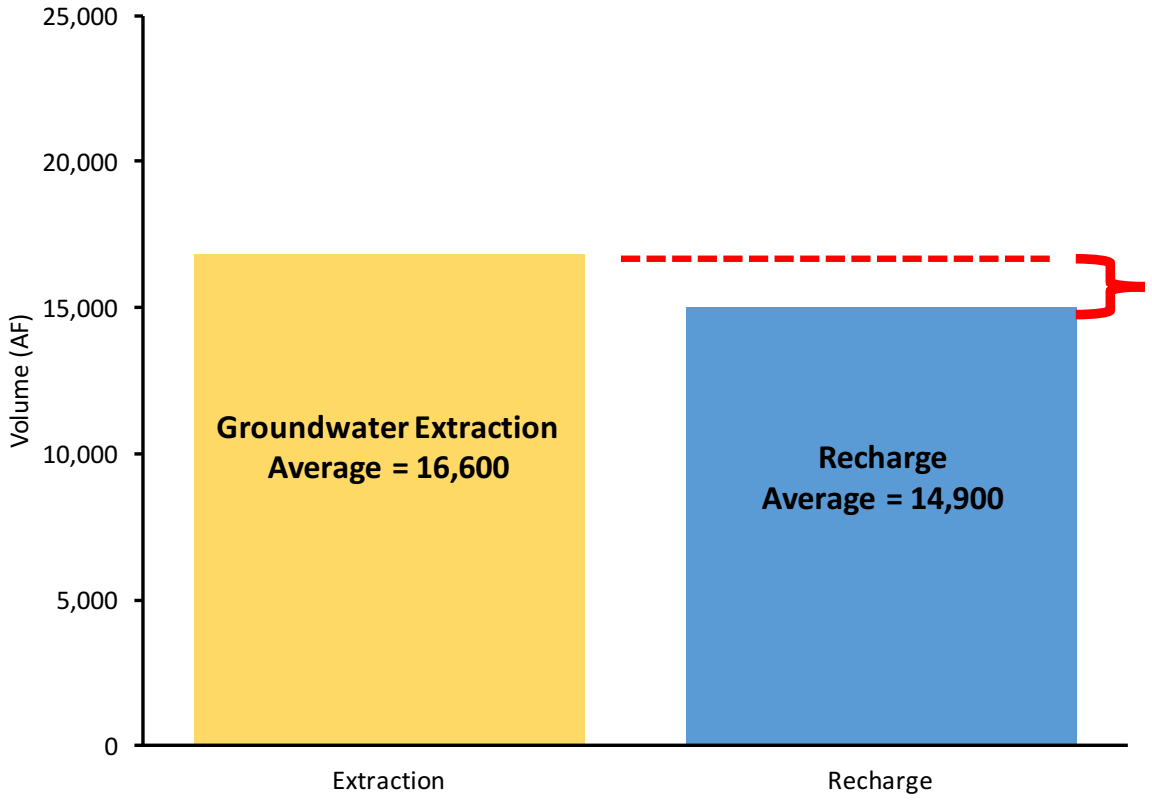
Water Supply = USBR CVP Class 2 Contract 14,000 AF/yr

99% of Gravelly Ford's 2015 ETAW is from irrigated agriculture

- Irrigated Agriculture = 16,200 acre-feet
- Rural residential = 100 acre-feet
- Total = 16,300 acre-feet

Current average consumptive use (ETAW) (ETAW) = 2.16 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 1,700 af/year

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What is being Planned by the GFWD GSA to close this deficit by 2040?

- Water supply projects and programs
  - Increased use of surface water rights
  - Continued reliance on Bureau Class 2 contracted supplies
  - Construct recharge projects
- GFWD GSA, *at this time*, is not anticipating the need for demand reduction **IF** surface water can continue and expand.

What might this look like in detail?

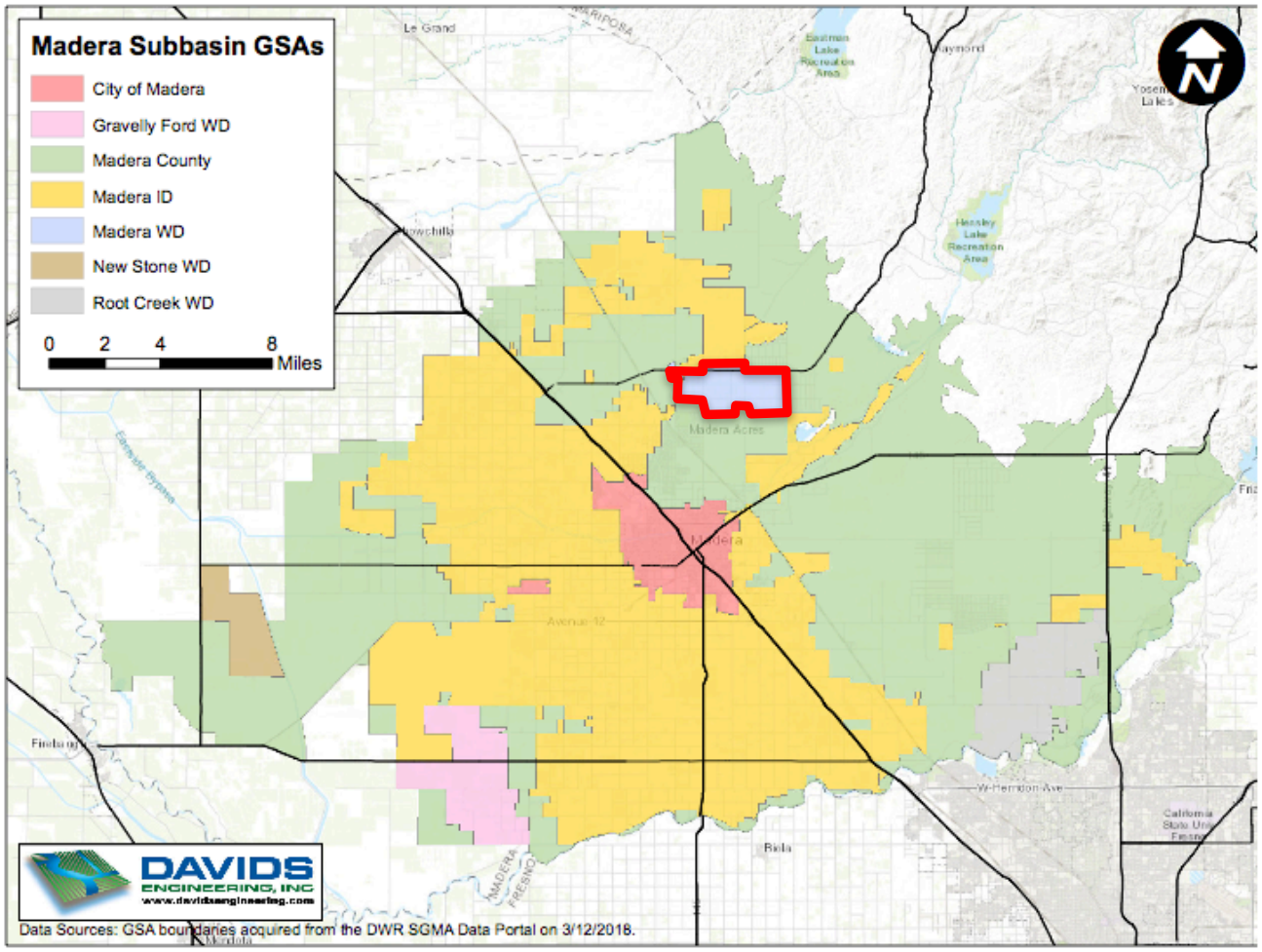
- Construction of groundwater recharge facilities
- Development of groundwater monitoring program
- Short term use of existing stored groundwater
- Elimination of overdraft within 10 years

What does this mean to me as a Landowner in the GFWD GSA?

- Growers will be able to continue current levels of farming
- Water supply balance achieved within 10 years
- Increase in water supply costs

Madera WD GSA

Conditions and Initial Solutions



MWD GSA

Total = ~3,750 ac

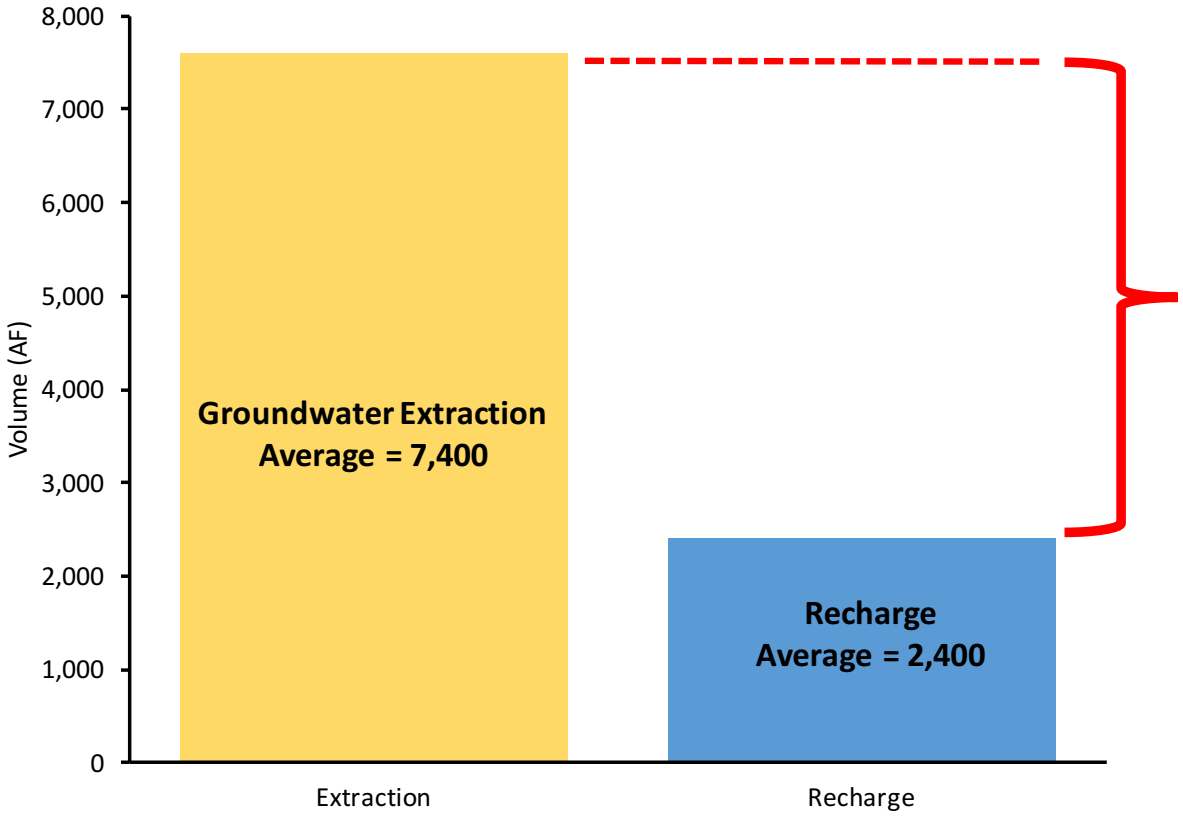
Irrigated = ~3,400 ac

100% of Madera Water District's 2015 ETAW is from irrigated agriculture

- Irrigated Agriculture = 8,250 acre-feet
- Rural residential = 0 acre-feet
- Total = 8,250 acre-feet

Current average consumptive use (ETAW) (ETAW) = 2.43 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 5,000 af/year

DRAFT PRELIMINARY ANALYSIS AND RESULTS TO BE REFINED AS GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT PROCEEDS

What is being Planned by the MWD GSA to close this deficit by 2040?

- Water Supply Projects and Programs
  - Obtain more surface water (avg ~4,000 to 5,000 af/yr)
    - Dry Creek Pumps
    - Madera Lake Project
    - Banking and water transfers
  - Consistent use of MID contracted supplies
- MWD GSA, at this time, is not anticipating the need for demand reduction IF surface water can continue and expand

What might this look like in detail?

- Increase surface water sources incrementally
  - Cover 10% of shortfall by 2025 (~500 af)
  - Add about 30% incrementally (~1,500 af increase every 5 years)
- Continued use of existing stored groundwater while adding new surface water
- Reduce demand (temporarily/permanently) if unable to secure incremental surface supplies

As a landowner in the MWD GSA, how much can I pump?

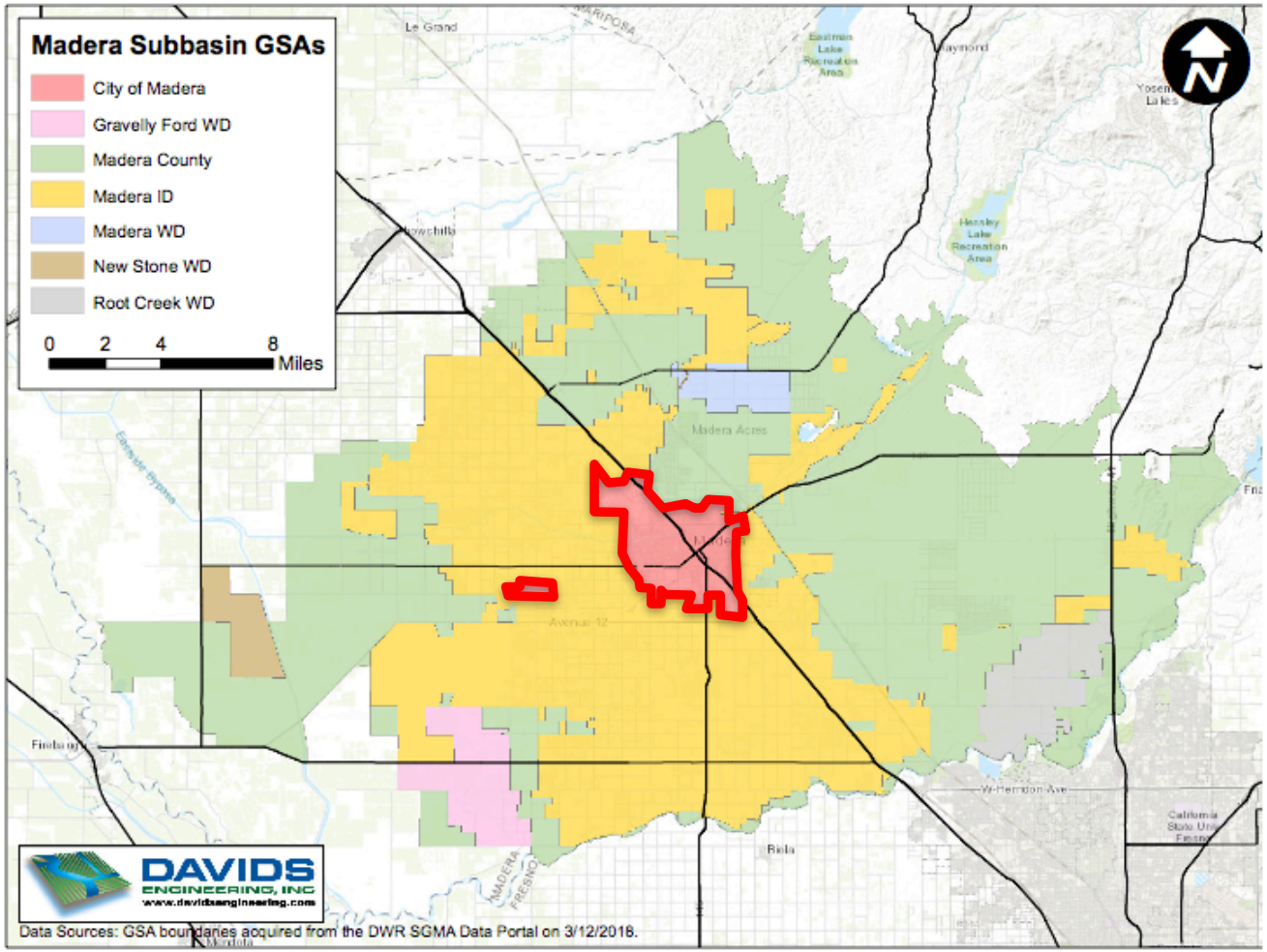
- All groundwater pumping is a service of MWD
- Native groundwater estimated at 0.5 af/ac/yr
- Percolated/seeped surface water adds to this amount
- This is a 2040 objective, not a 2020 mandate
- Without continued and expanded surface water into the MWD GSA, may be limited to 0.5 af/ac/yr at 2040

What does this mean to me as a Landowner in the MWD GSA?

- Continued lowering of groundwater as we transition to stable water levels
- Increased reporting requirements
- Increased cost of water
  - Surface water costs more than groundwater

City of Madera GSA

Conditions and Initial Solutions



City of Madera GSA

Total = ~10,100 ac

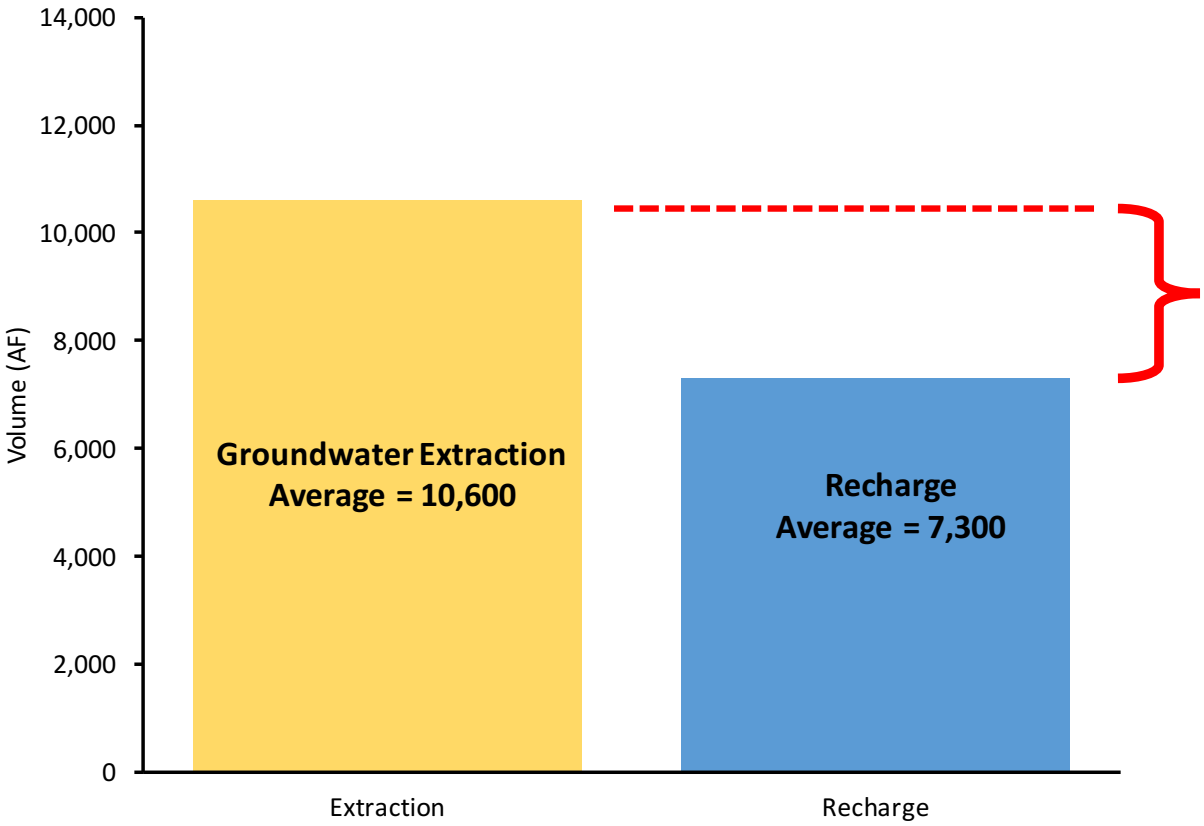
Irrigated = ~1,600 ac

65% of the City's 2015 ETAW is from urban landscapes

- Irrigated Agriculture = 2,500 acre-feet
- Urban = 4,600 acre-feet
- Total = 7,100 acre-feet

Current average consumptive use (ETAW) (ETAW) = 1.58 acre-feet/ac

Average Groundwater Balance (2015 Land Use)



Current shortfall:
~ 3,300 af/year

DRAFT PRELIMINARY ANALYSIS AND RESULTS TO BE REFINED AS GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT PROCEEDS

What is being Planned by the City GSA to close this deficit by 2040?

- DEMAND MANAGEMENT
  - Urban (M&I) Conservation: ~800 af
  - Irrigated Ag Reduction: ~1900 AF
- WATER SUPPLY PROJECTS & PROGRAMS
  - Expanding Recharge Efforts/MID Partnership: ~600 AF
  - Recycled Water ?

What might this look like in detail?

- 20+% Reduction in Overall Extraction Since 2014
- Continued Emphasis on Reducing Irrigation Usage
  - Tiered Water Rates
  - Rebates
- Converting Ag Inside City Limits to Urban Land Use
- Reducing consumption on City-owned ag land
- Partnering with MID, enhance recharge
- Add basins and connect to MID canals

Summary and Engagement

Madera Subbasin Summary

- Madera subbasin PRELIMINARY overdraft estimates
  - Historic: -118,300 AF/yr (-94,600 to -142,000 AF/yr)
  - Current: -161,100 AF/yr (-128,900 to -193,300 AF/yr)
- Overdraft volumes vary by GSA
- Solutions vary by GSA

Engaging with GSAs

- Currently Scheduled GSA meetings
  - City of Madera – November 7, 2018
  - Root Creek Water District – November 12, 2018
  - Madera Water District – November 14, 2018
  - Gravelly Ford Water District – November 19, 2018
  - Madera Irrigation District – November 20, 2018
  - County GSA - December 4, 2018
- For more information and input
  - www.MaderaCountyWater.com

Discussion