



Butte Basin

Data and Tools for Stream-Aquifer Interaction

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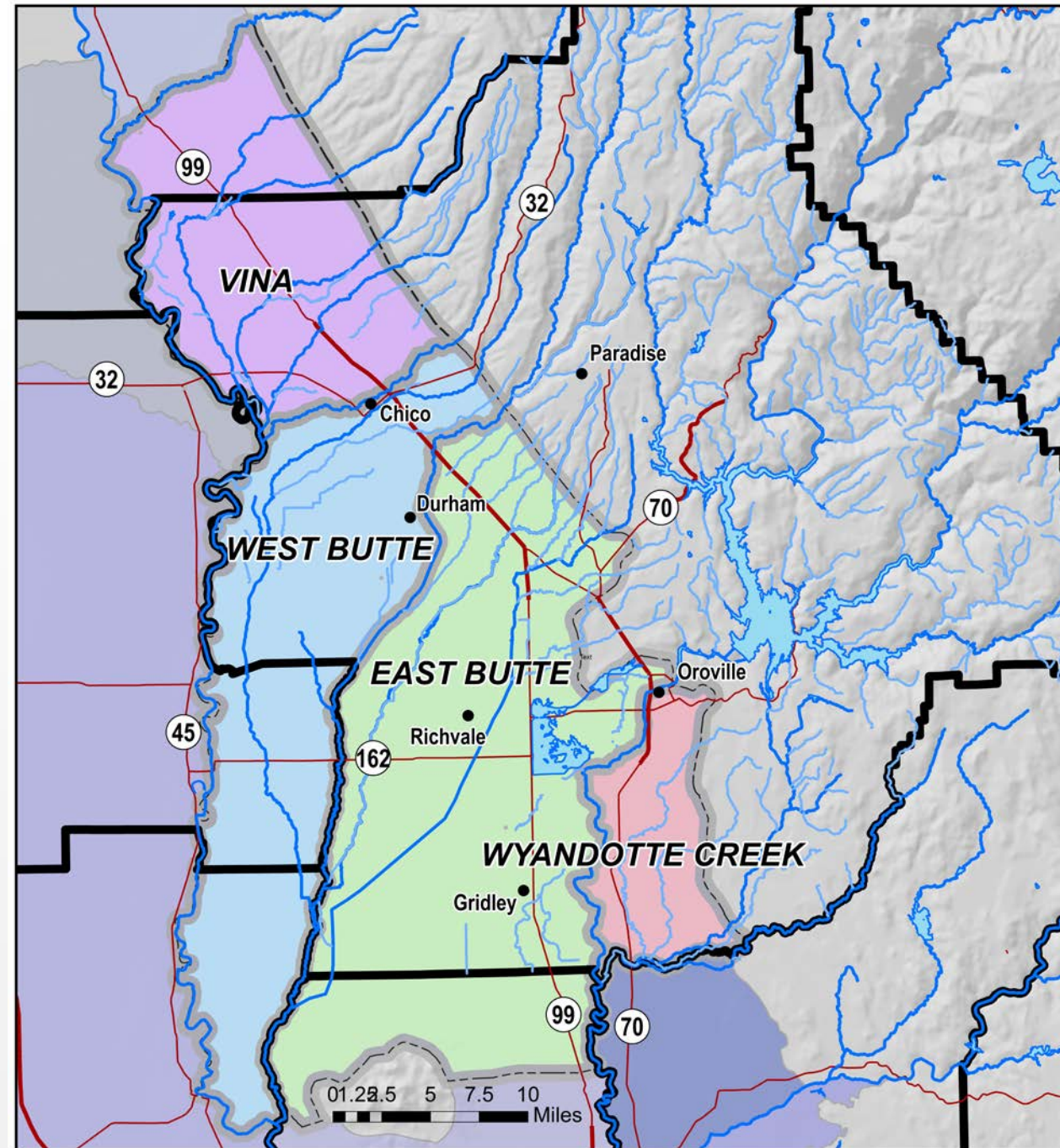
GRA Stream Depletion Workshop

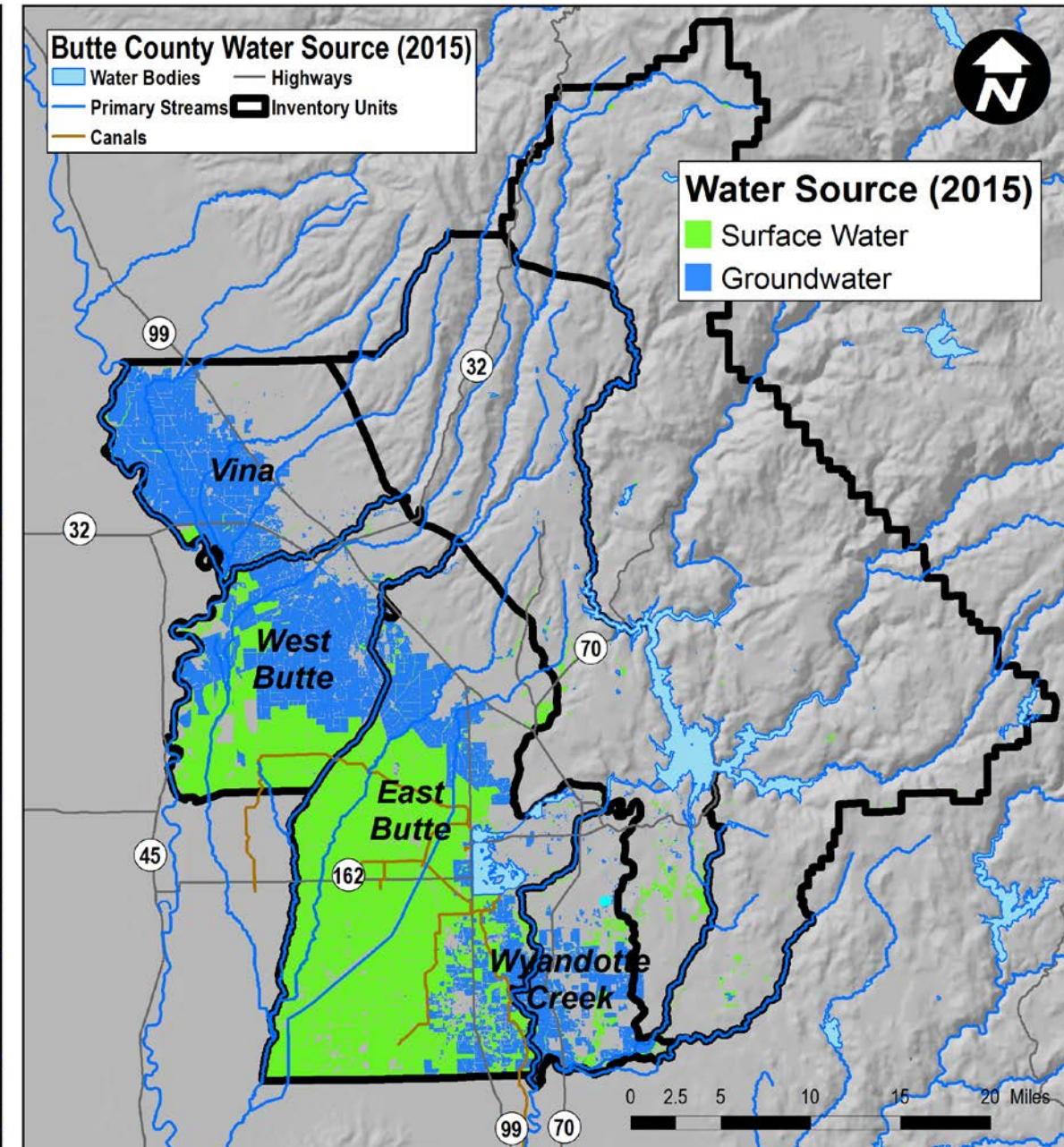
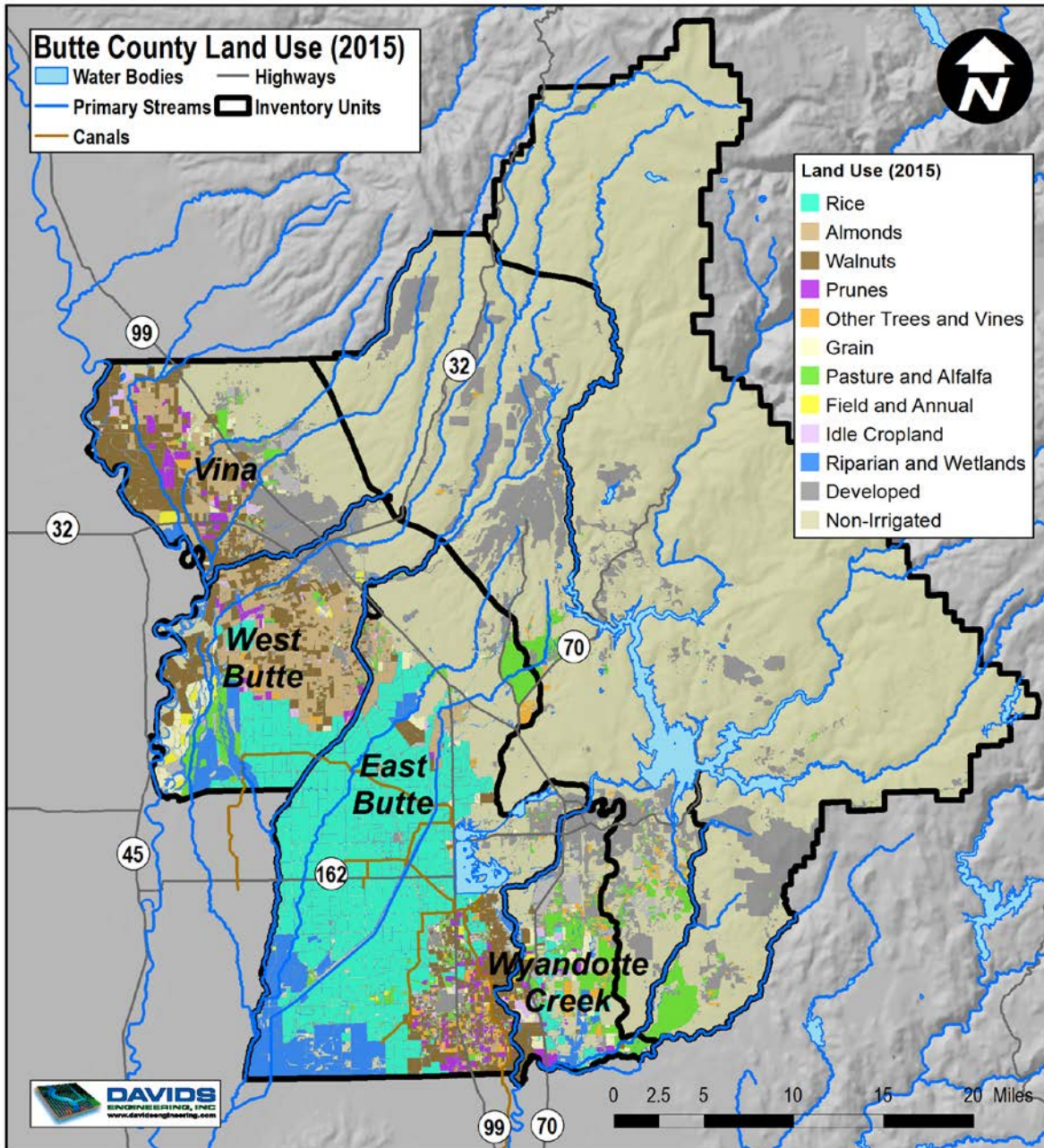
August 29, 2017



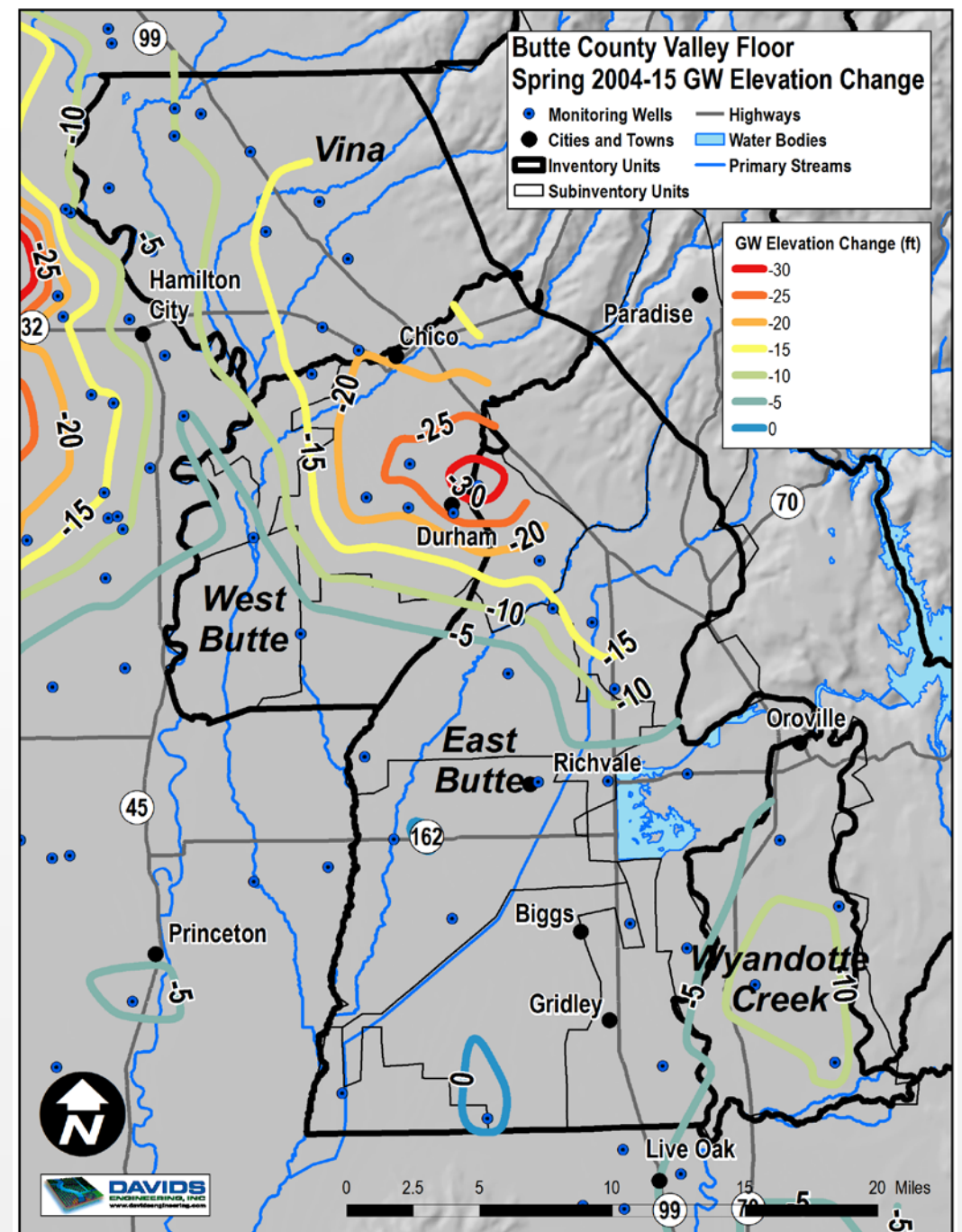
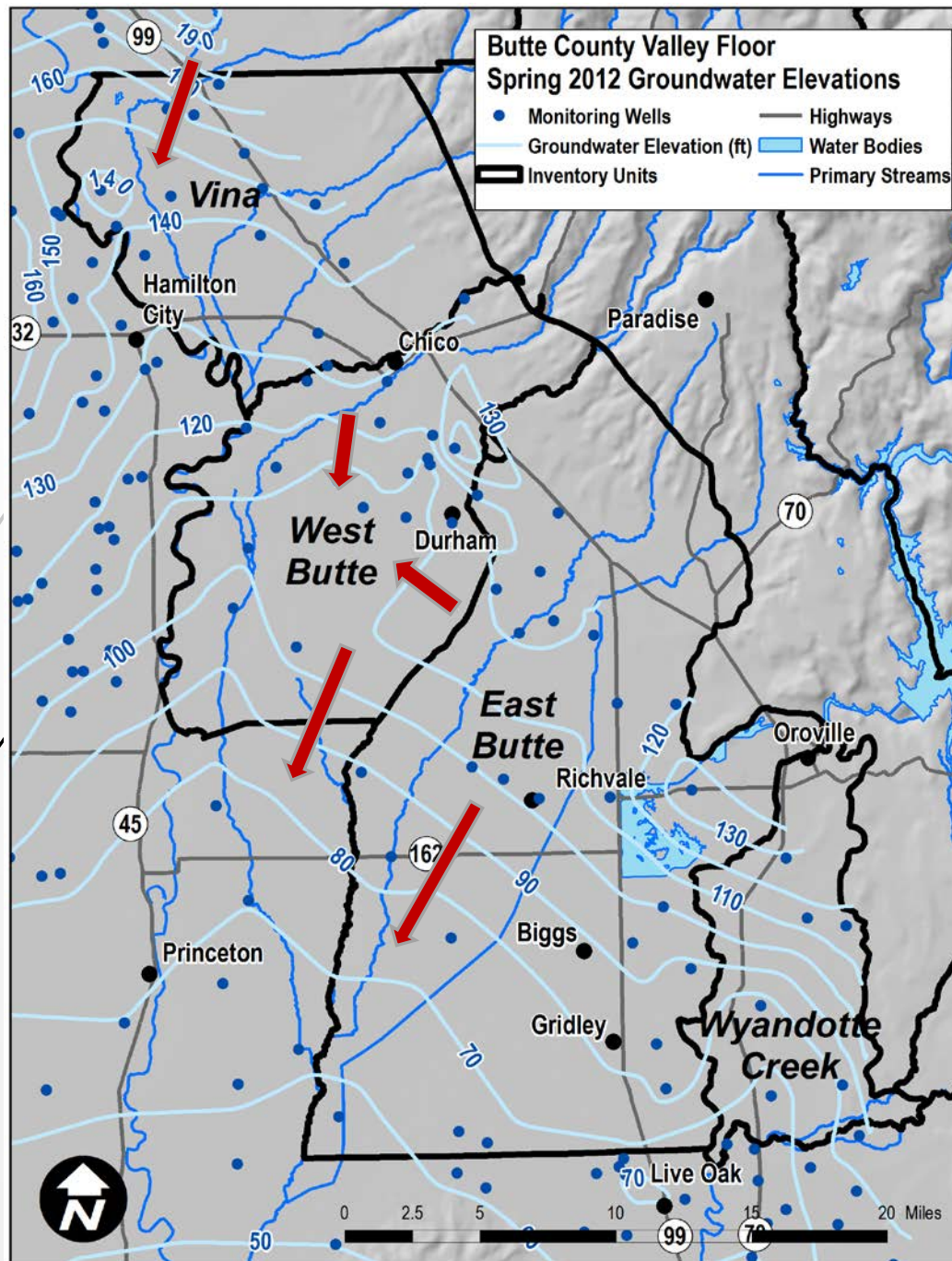
Setting the Stage

NOTE: Surface water features serve as subbasin boundaries



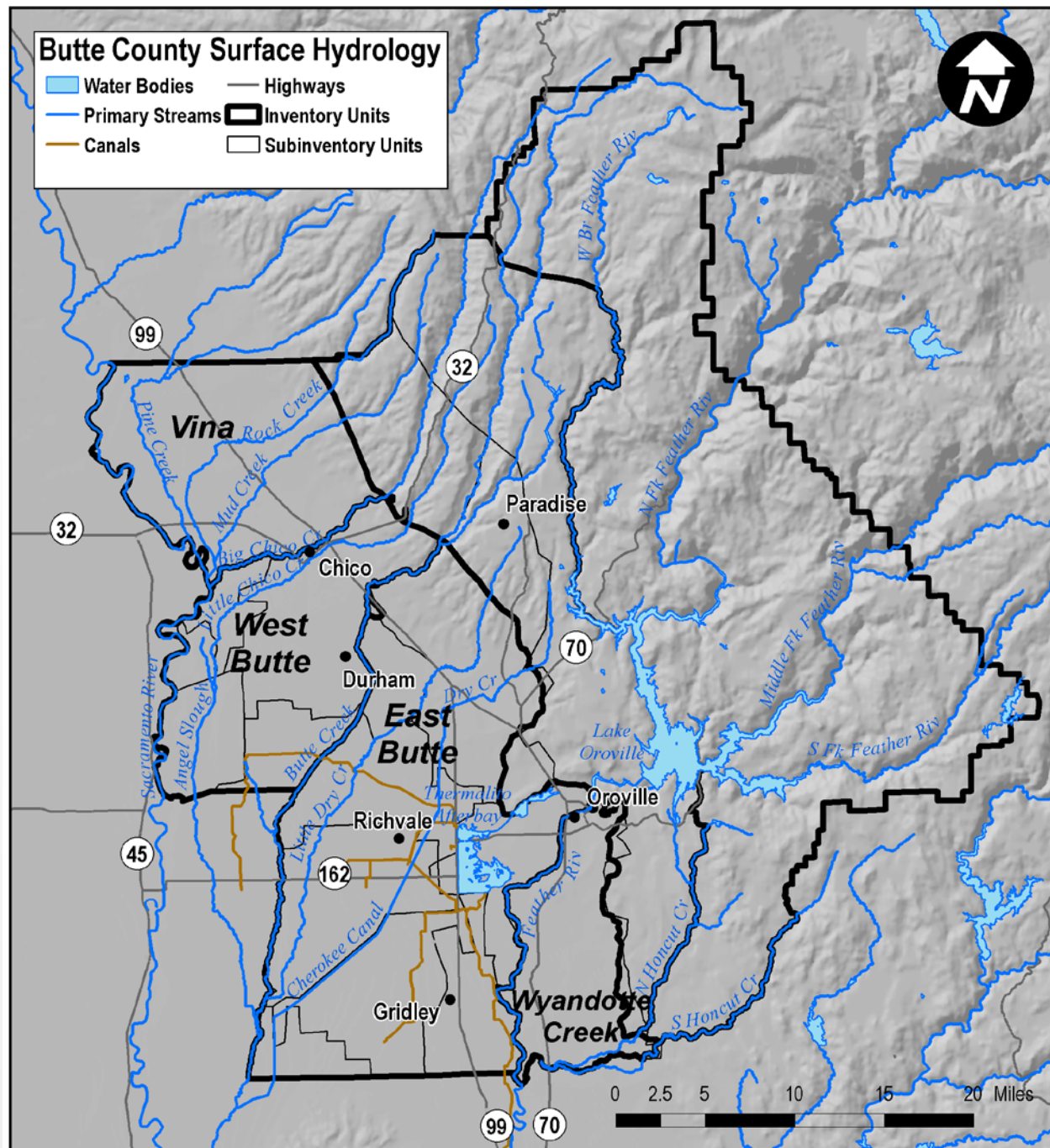


Groundwater



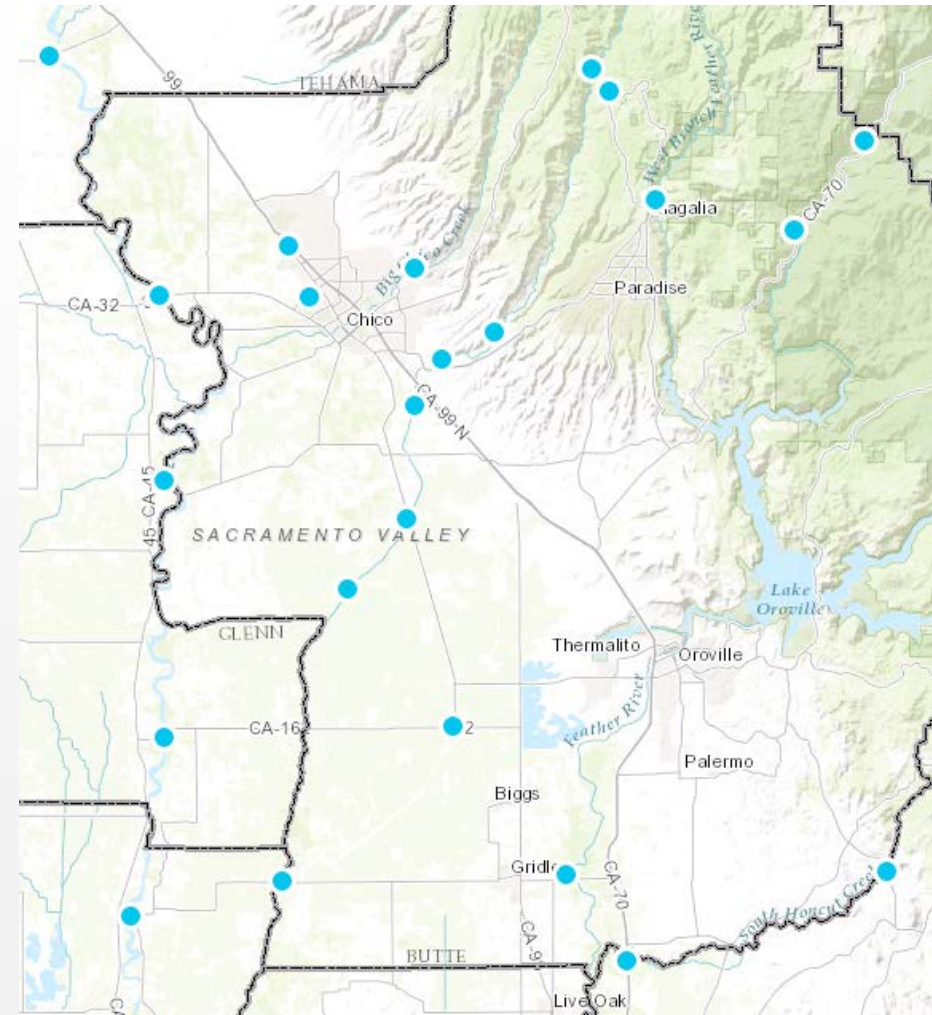
Surface Water

- Reservoir Regulated
 - Sacramento and Feather Rivers
- Creeks Important for Fish and Water Supply
 - e.g. Butte Creek
- Ephemeral Creeks and Streams
 - Important for Recharge?



Knowledge Base

- Monitoring Data:
 - Groundwater level monitoring
 - Stream gages
- Special Studies
 - Water Inventory and Analysis, 2016
 - Stable Isotope Recharge Study
 - Lower Tuscan Aquifer Investigation
 - Butte Basin Groundwater Model
- Anecdotal Knowledge



Stations with Flow or Stage on CDEC

Lower Tuscan Aquifer Investigation, 2013

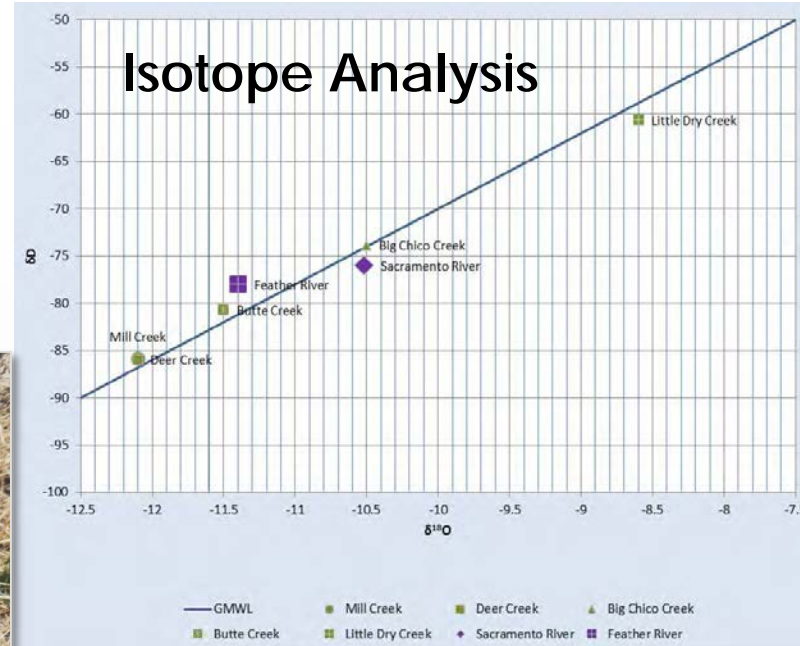
New Monitoring Wells



Infiltration



Isotope Analysis

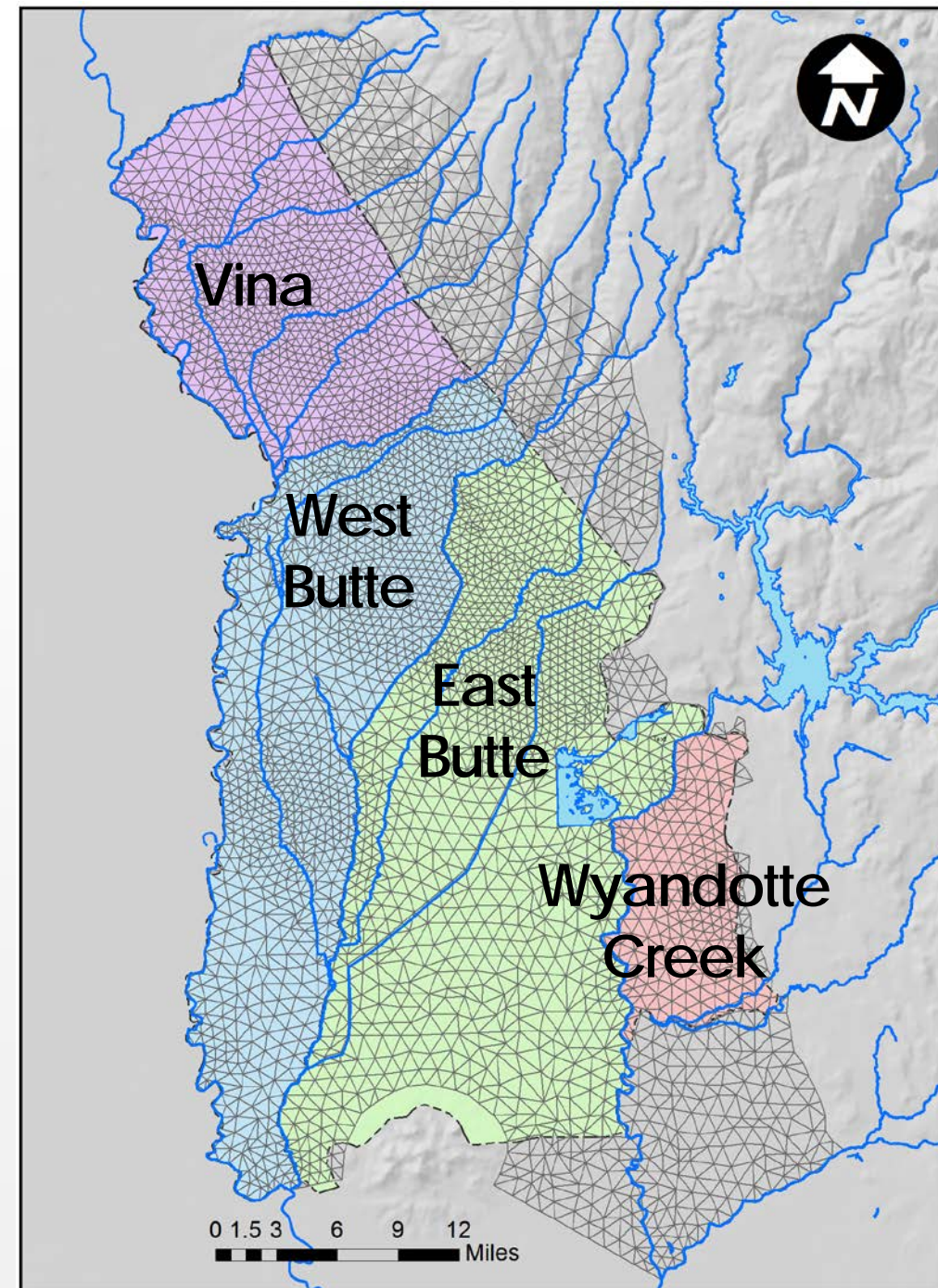


Measuring Stream Flow



Butte Basin Groundwater Model






- IWFM-2015 (v. 4.0 IDC)
- 1970-2014, daily
- 1,265 square miles
- 7,200+ Individual elements
15-670 acres (Avg. 112 acres)
- Boundaries:
 - Deer Creek,
 - Sacramento River,
 - North side of Sutter Buttes/Yuba River
 - Eastern foothills

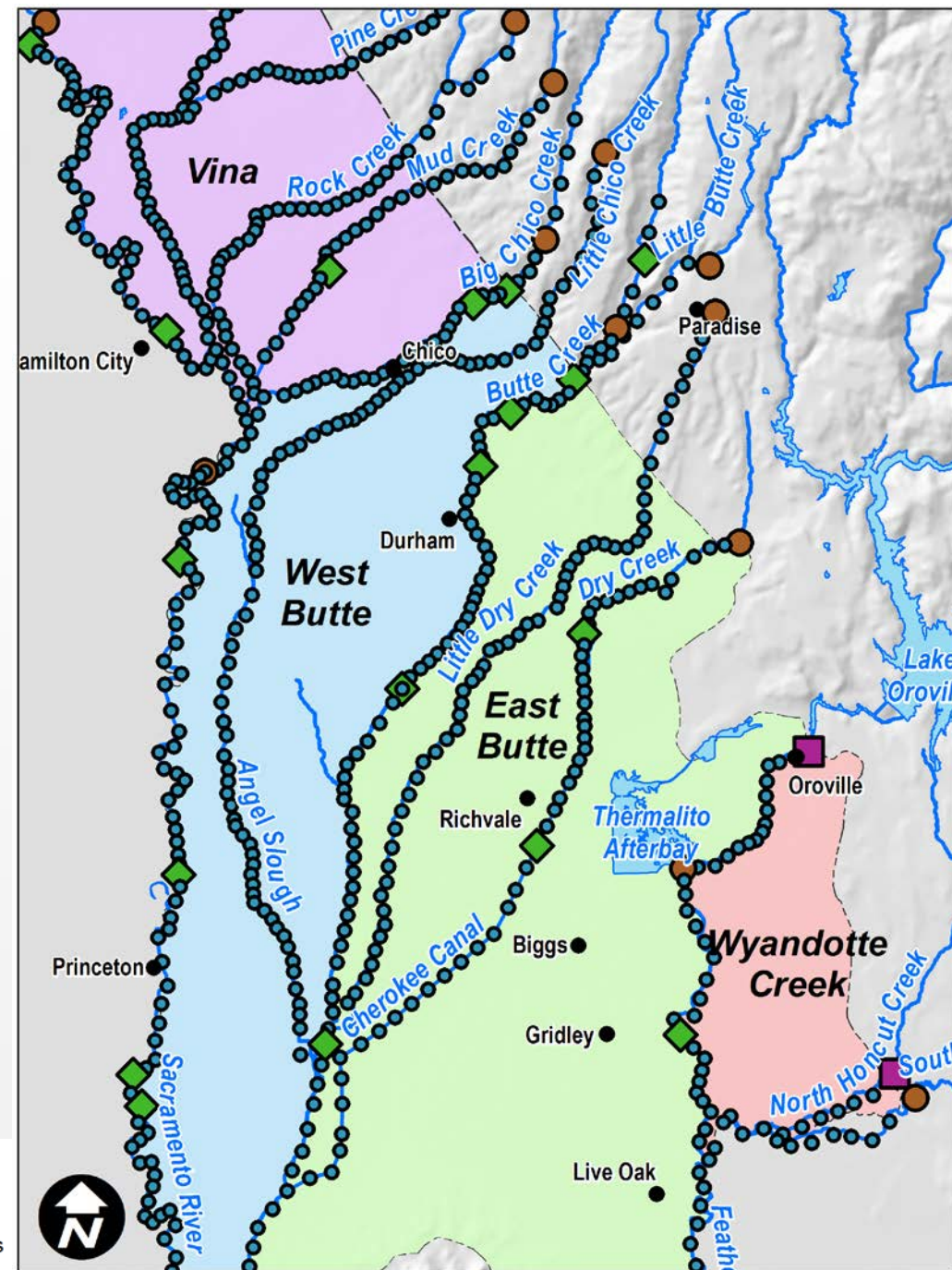


Butte Basin Groundwater Model- Stream Network

- Rim inflows (17)- measured and calculated
- Stream Characterization (25 reaches)
 - All streams/reaches: uniform hydraulic conductivity of stream bed (1 ft./day) & streambed thickness (1 meter)
 - Stream Reach Specific: rating curves, wetted perimeter
- Calibration- 18 locations for comparison

BBGM Stream Nodes

 Rimflow, gaged	 Gage Site
 Rimflow	 Stream Node
	 Primary Streams



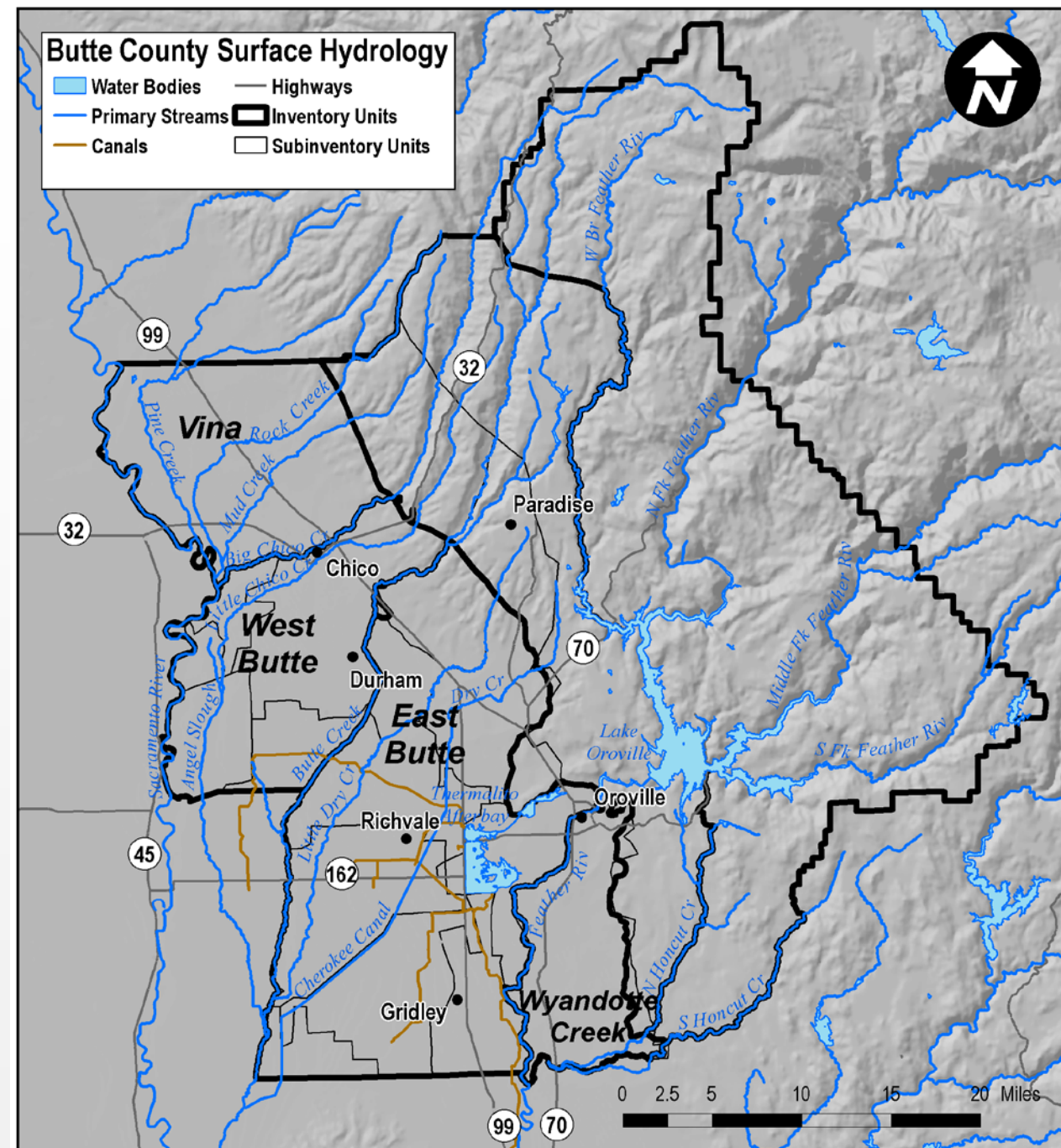
Data Gaps

- Limited data to characterize streams in BBGM
 - Stream Rating Curves (e.g. Big Chico Creek, Butte Creek, Little Dry Creek)
 - Stream Bed Thickness, wetted perimeter
- Limited data to calibrate stream flow
 - Dynamics of when/where streams go dry
- How well does the groundwater level monitoring network provide information on Water Table conditions?



SGMA Questions

- Which Creeks? Specific reaches?
- What are we trying to protect?
 - Riparian habitat? Salmon habitat? Recreational benefits? Surface water diversions?
- How to characterize existing conditions and monitor for changes?





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