

Using C2VSim to Estimate Water Budgets for Groundwater Sustainability Plans

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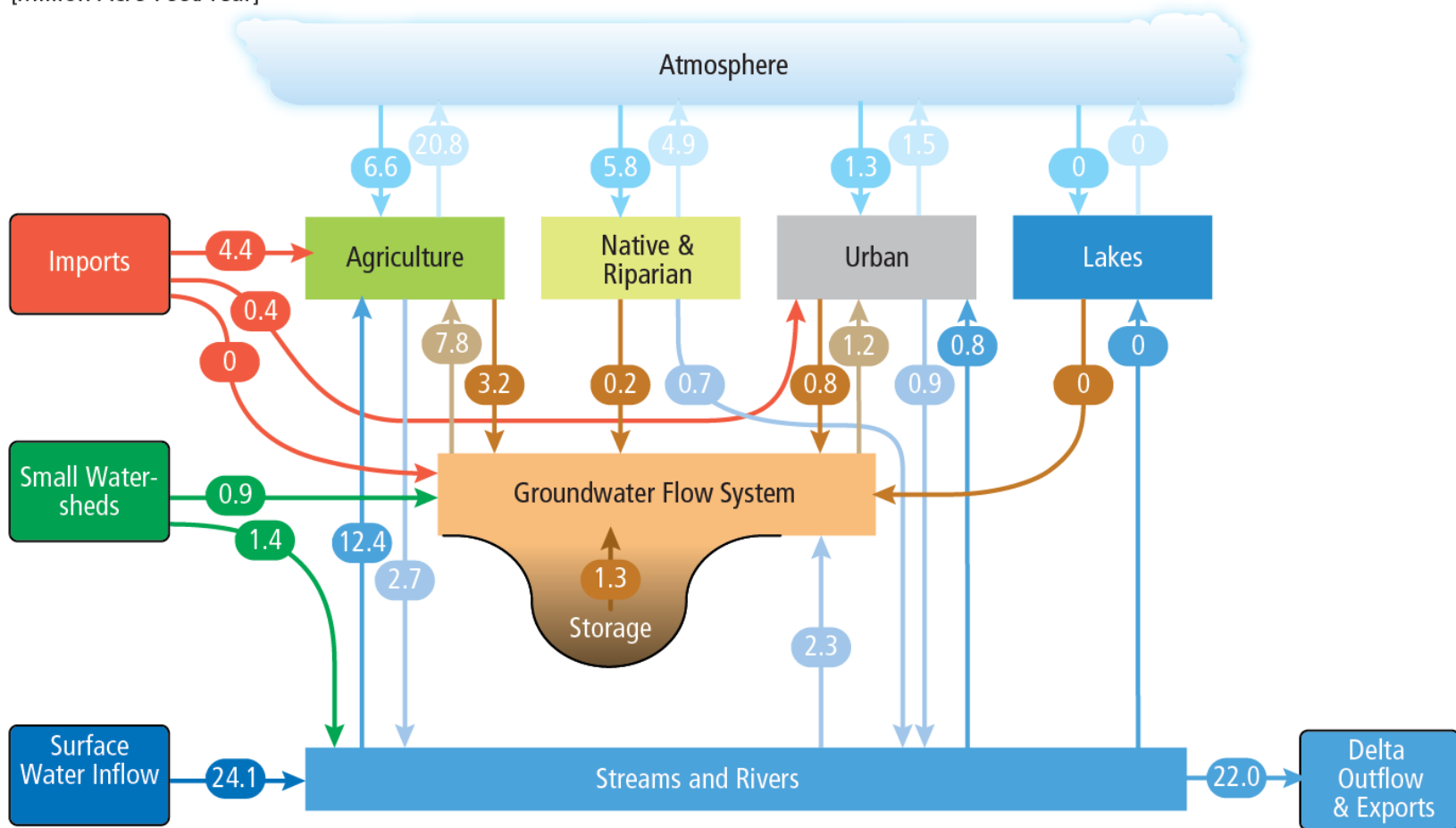


IWFM Water Balance Diagram

Simulated Annual Water Budget

Average Flows for water years 2000-2009

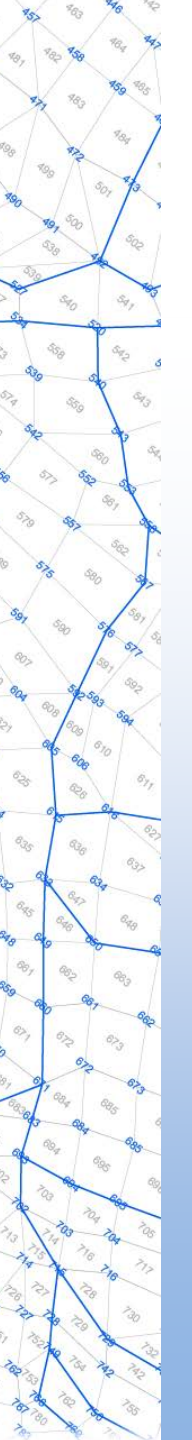
[Million Acre-Feet/Year]





GSA/GSP Data Needs

- Historical Data: Land Use, Inflows, Diversions
- Groundwater Levels & Changes
- Water Budgets
- Groundwater Flux Across Boundaries
- Stream-Groundwater Interactions
- Change in Groundwater Storage
- Land-Surface Subsidence



GSA/GSP Data Coordination

Interbasin GSP Data Coordination:

- Groundwater Flux Across Boundaries
- Stream-Groundwater Interactions at Boundaries
- Show No Negative Impacts On Adjacent Basins

Intrabasin GSP Data Coordination:

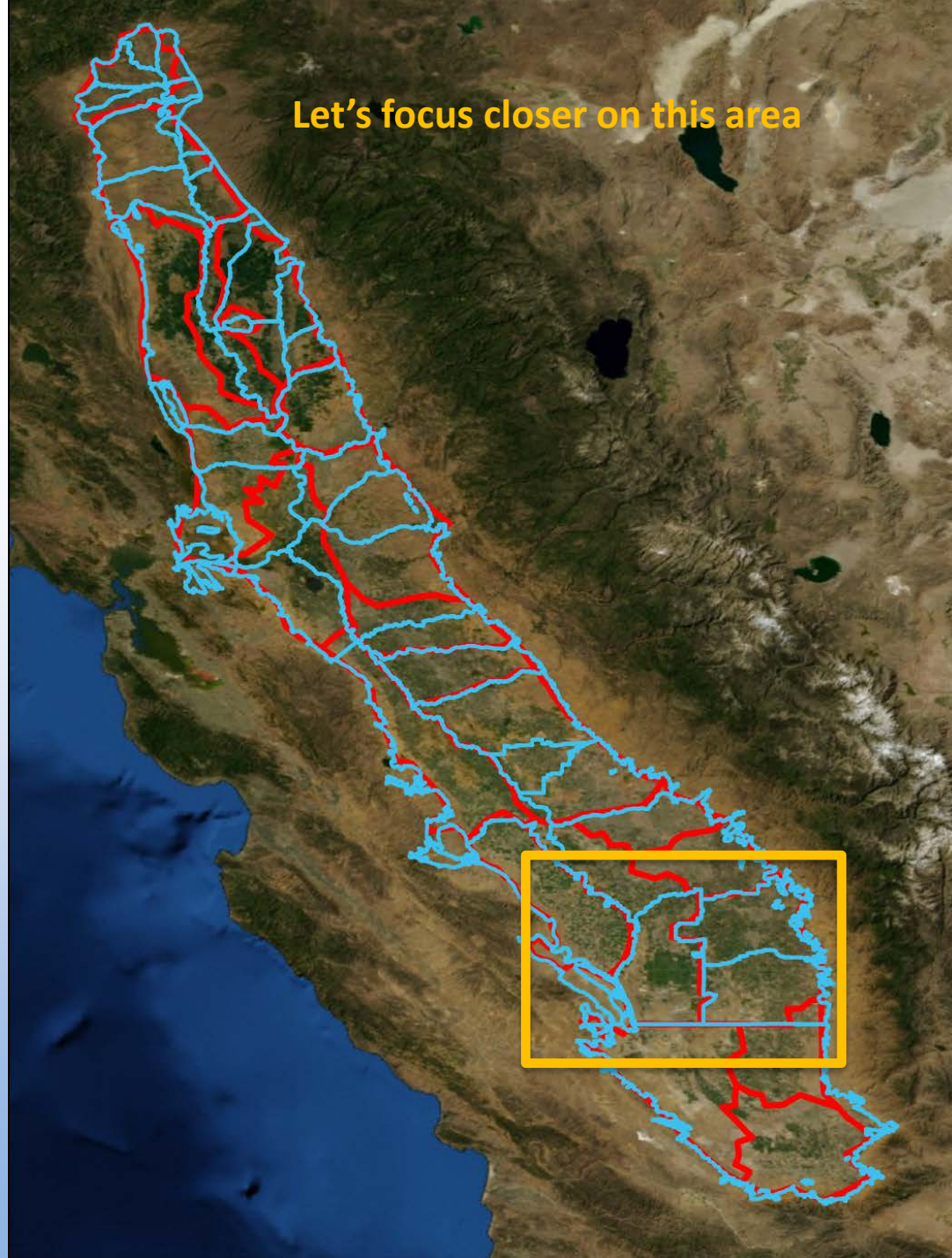
- Water Budget
- Water Demand
- Surface Water Supply
- Groundwater Extraction
- Storage Change
- Sustainable Yield



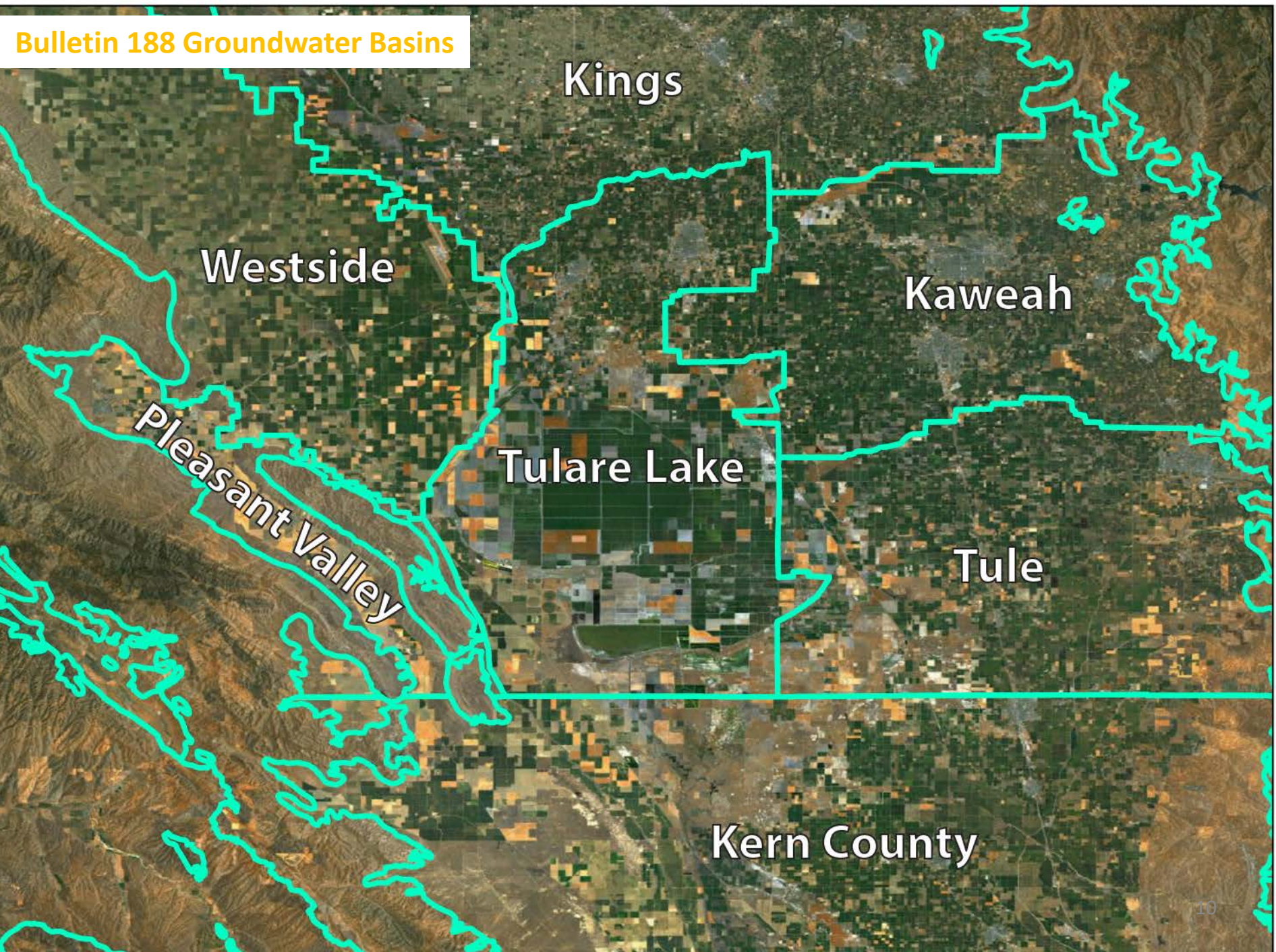




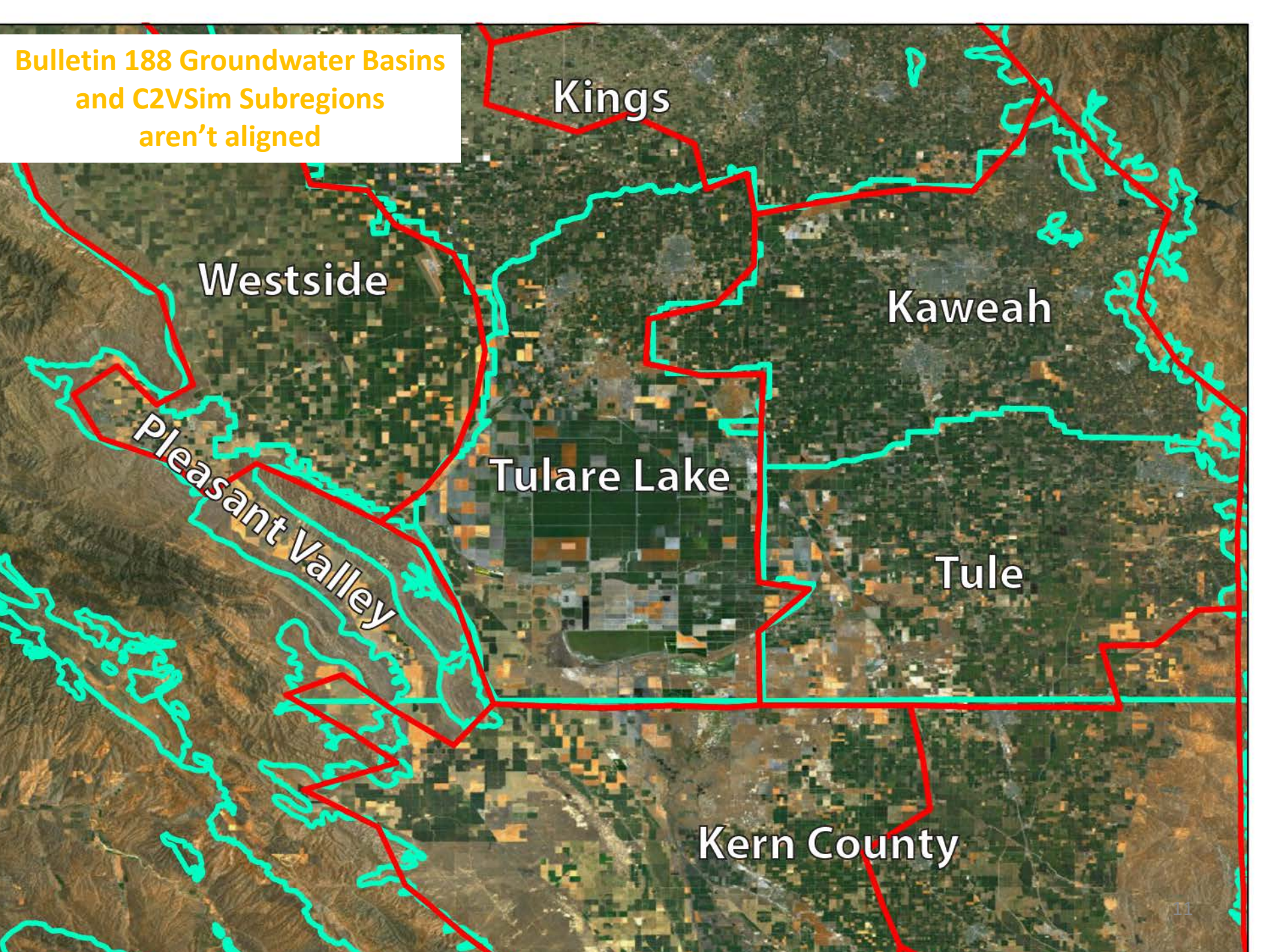




Bulletin 188 Groundwater Basins



Bulletin 188 Groundwater Basins
and C2VSim Subregions
aren't aligned



Kings

Westside

Kaweah

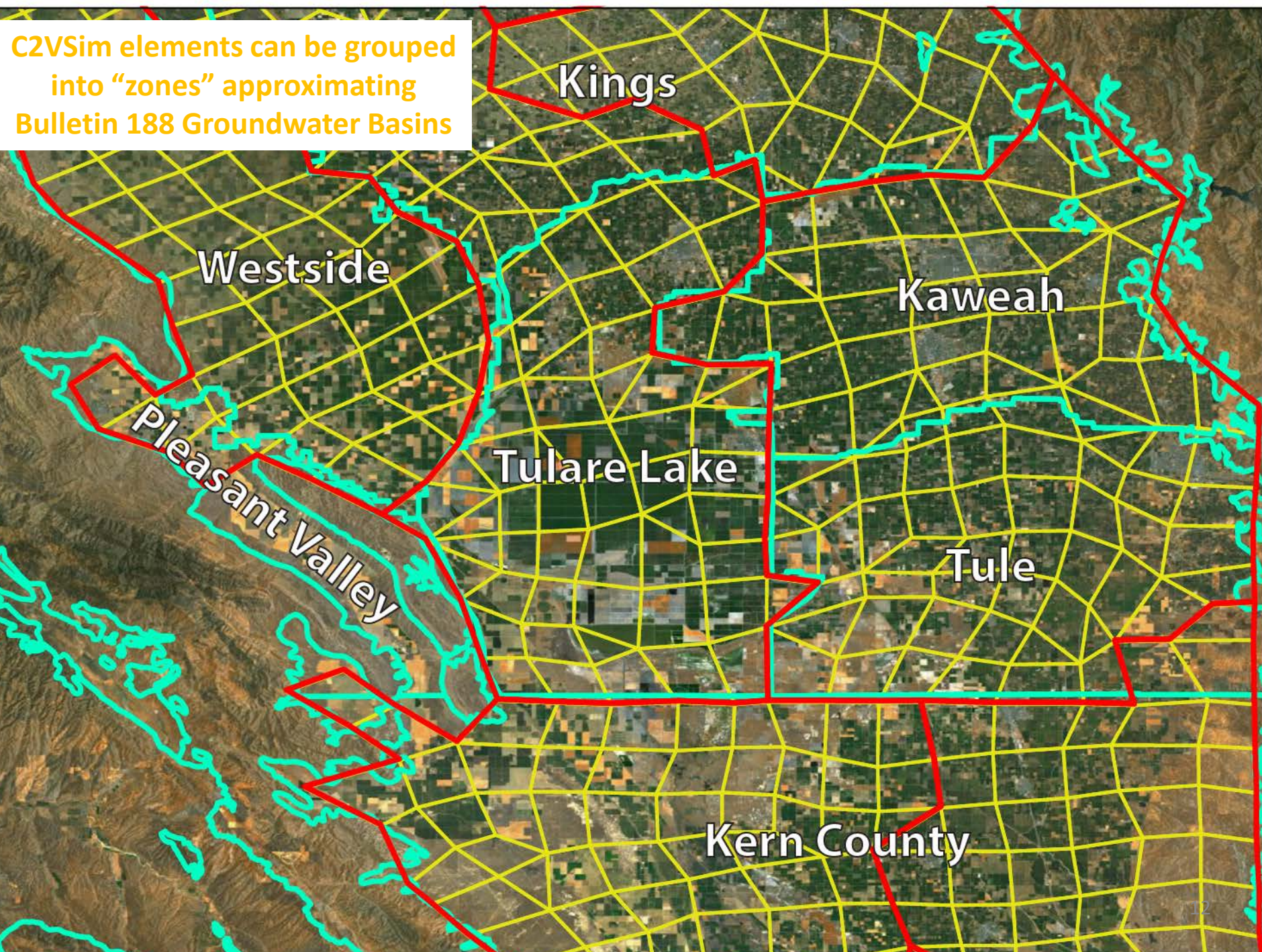
Tulare Lake

Tule

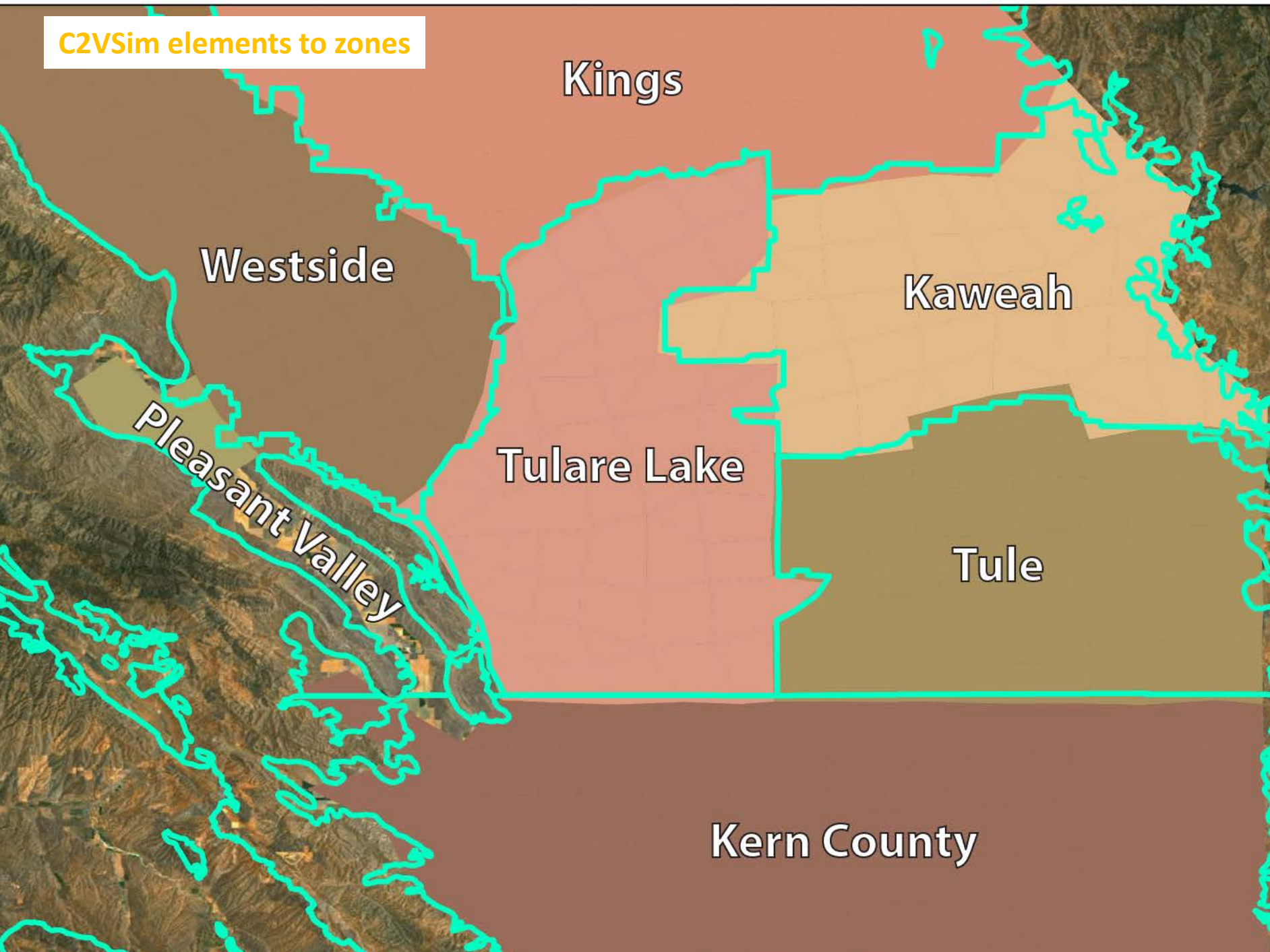
Pleasant Valley

Kern County

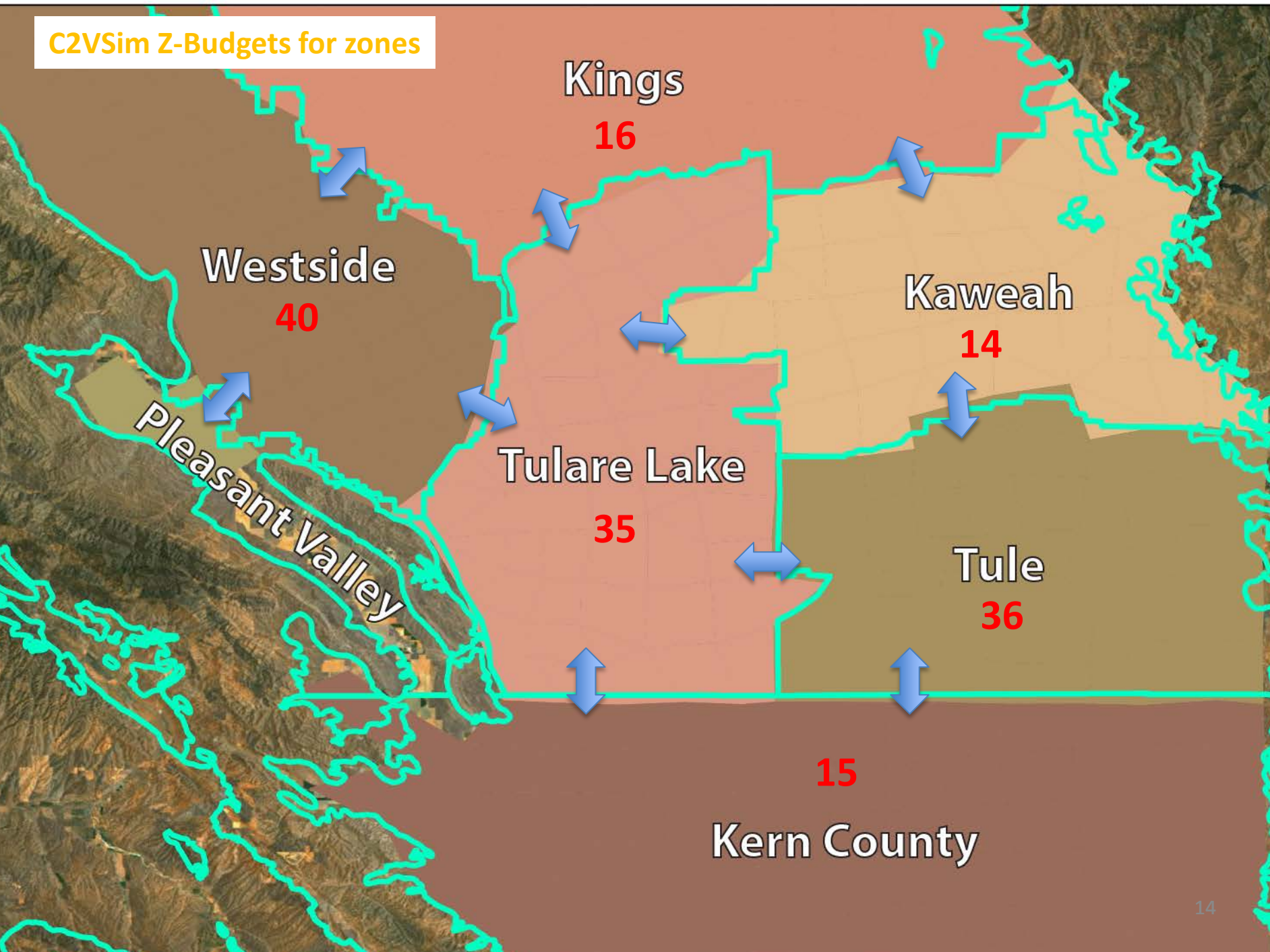
C2VSim elements can be grouped
into “zones” approximating
Bulletin 188 Groundwater Basins



C2VSim elements to zones



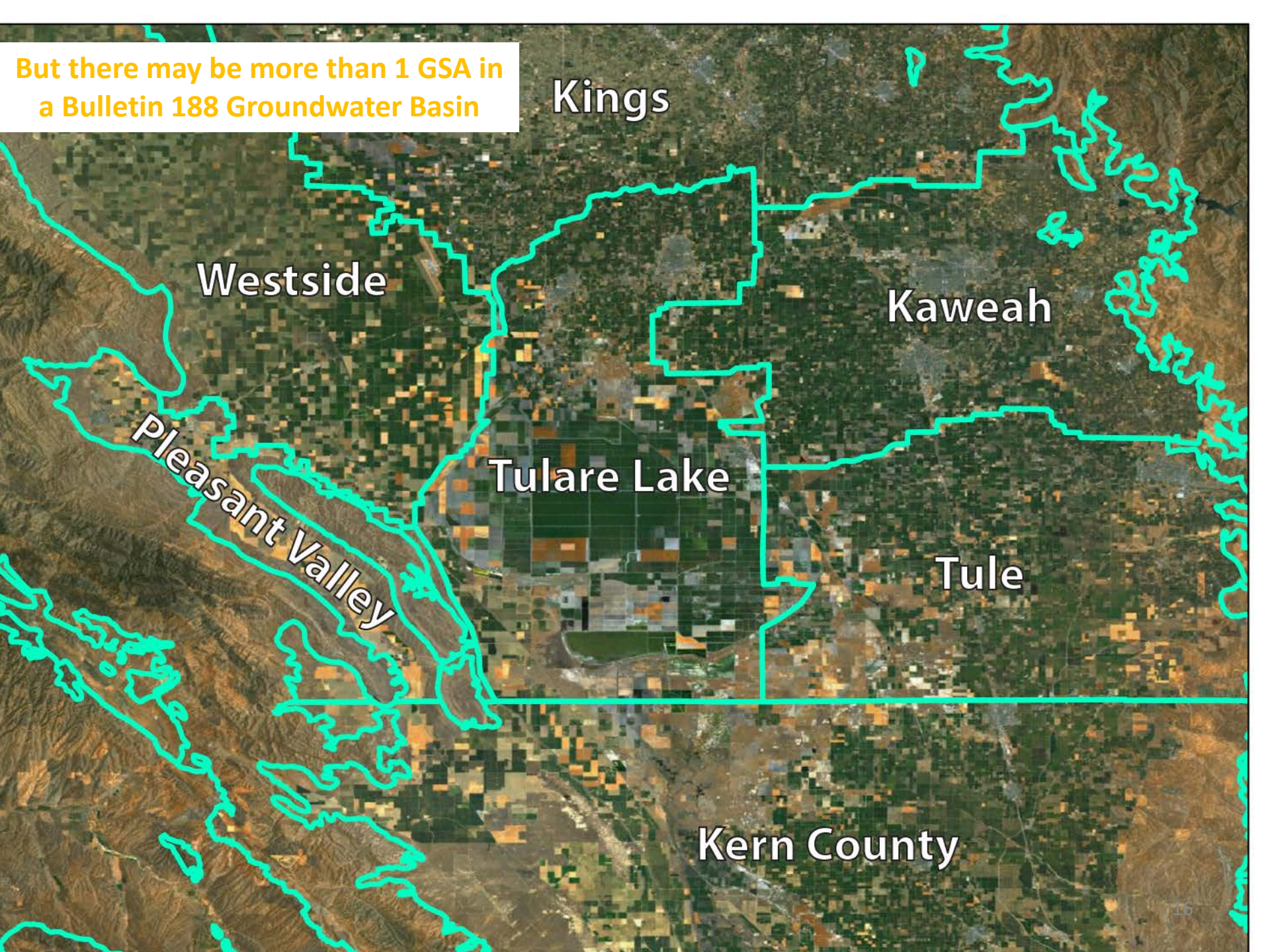
C2VSim Z-Budgets for zones



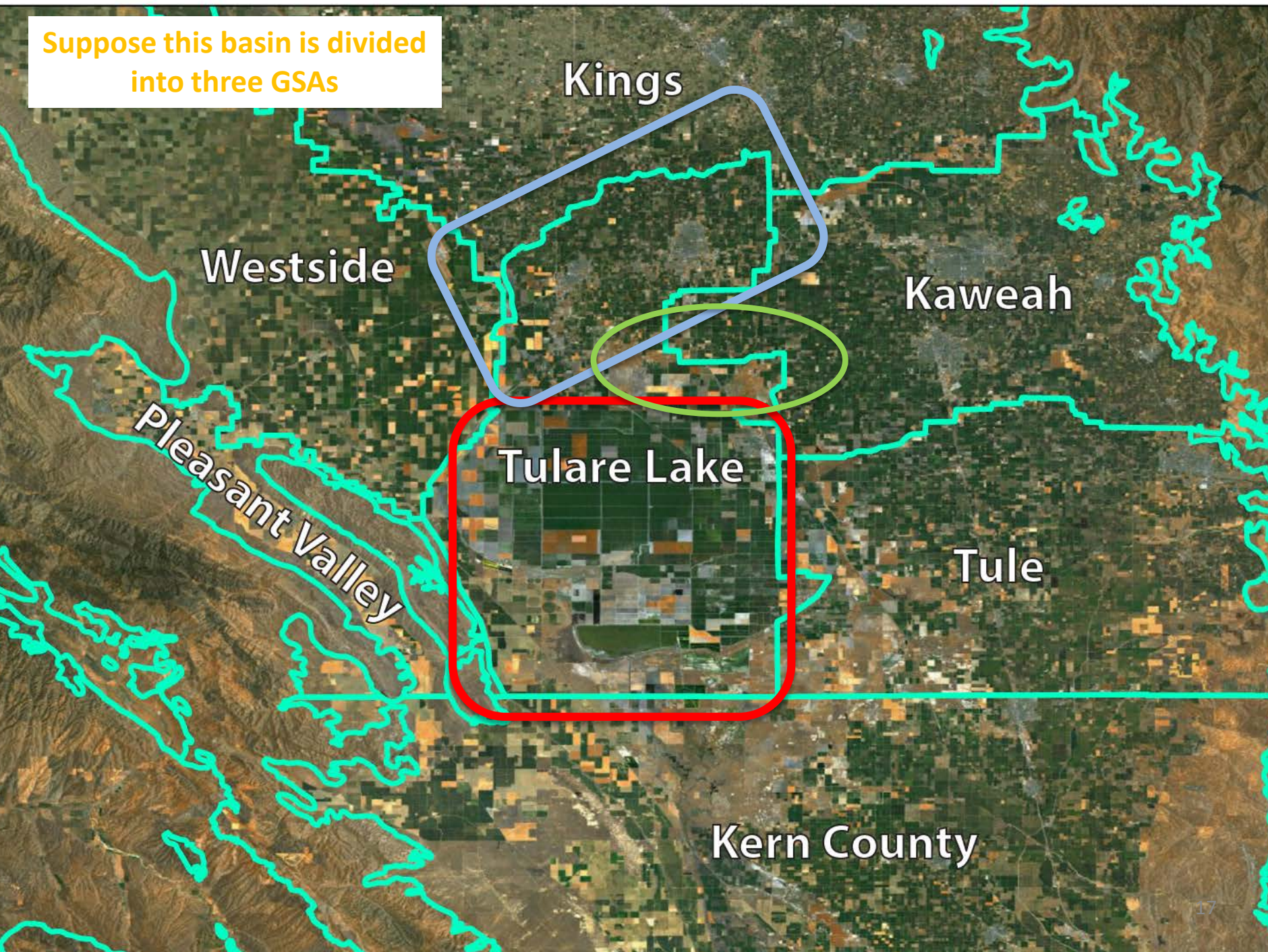
Tulare Lake Subbasin Z-Budget

Flow Component	[AF/mo]	Flow	IN	OUT	Process
GW Storage		+/-	11,936	30,429	
Streams		+/-	850	9,927	SW
Tile Drains		OUT	-	0	SW
Subsidence		+/-	34	1,268	
Net Deep Percolation		IN	9,865	-	LS
Small Watershed Baseflow		IN	0	-	SWS
Small Watershed Percolation		IN	0	-	SWS
Diversion Recoverable Loss		IN	557	-	SW
Bypass Recoverable Loss		IN	0	-	SW
Lakes		+/-	16,236	0	SW
Agricultural Pumping		OUT	-	0	LS
M&I Pumping		OUT	-	1,666	LS
Zones 35 and 14 (Kaweah)		+/-	5,949	795	
Zones 35 and 15 (Kern)		+/-	568	891	
Zones 35 and 16 (Kings)		+/-	5,582	0	
Zones 35 and 36 (Tule)		+/-	729	2,190	
Zones 35 and 40 (Westside)		+/-	492	3,357	
Overall Zone Error			0.00	January 2009	

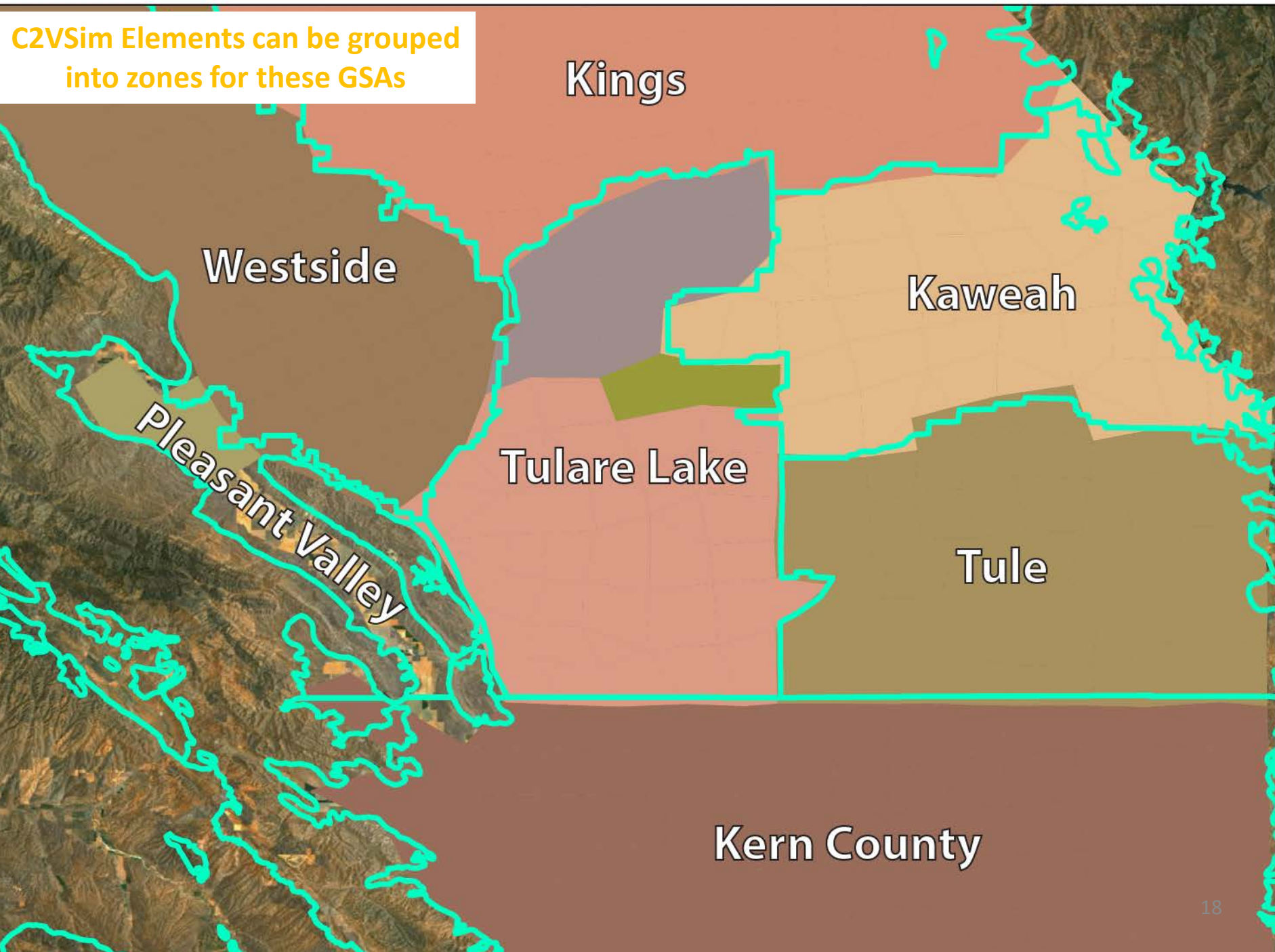
But there may be more than 1 GSA in
a Bulletin 188 Groundwater Basin



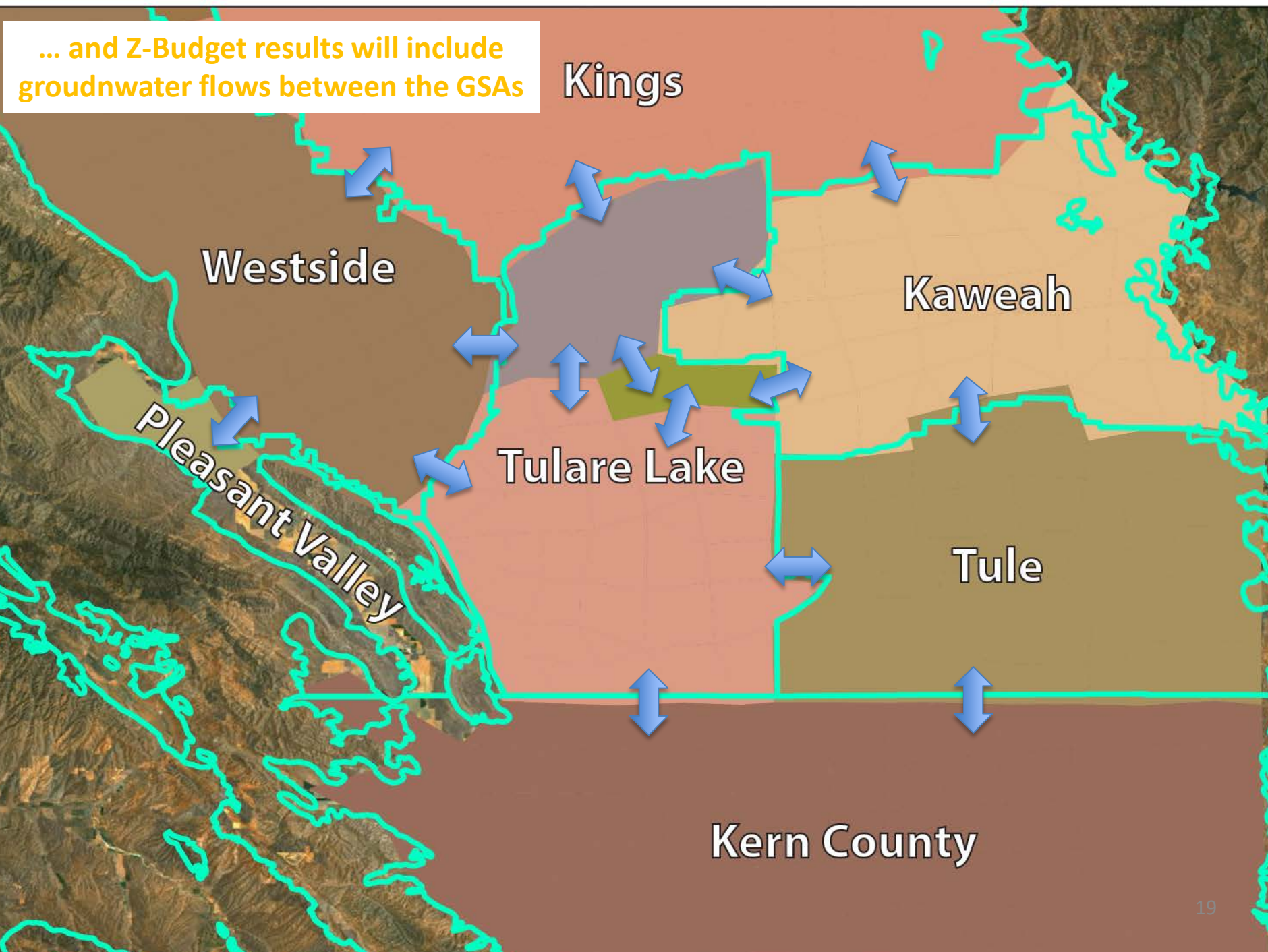
Suppose this basin is divided
into three GSAs



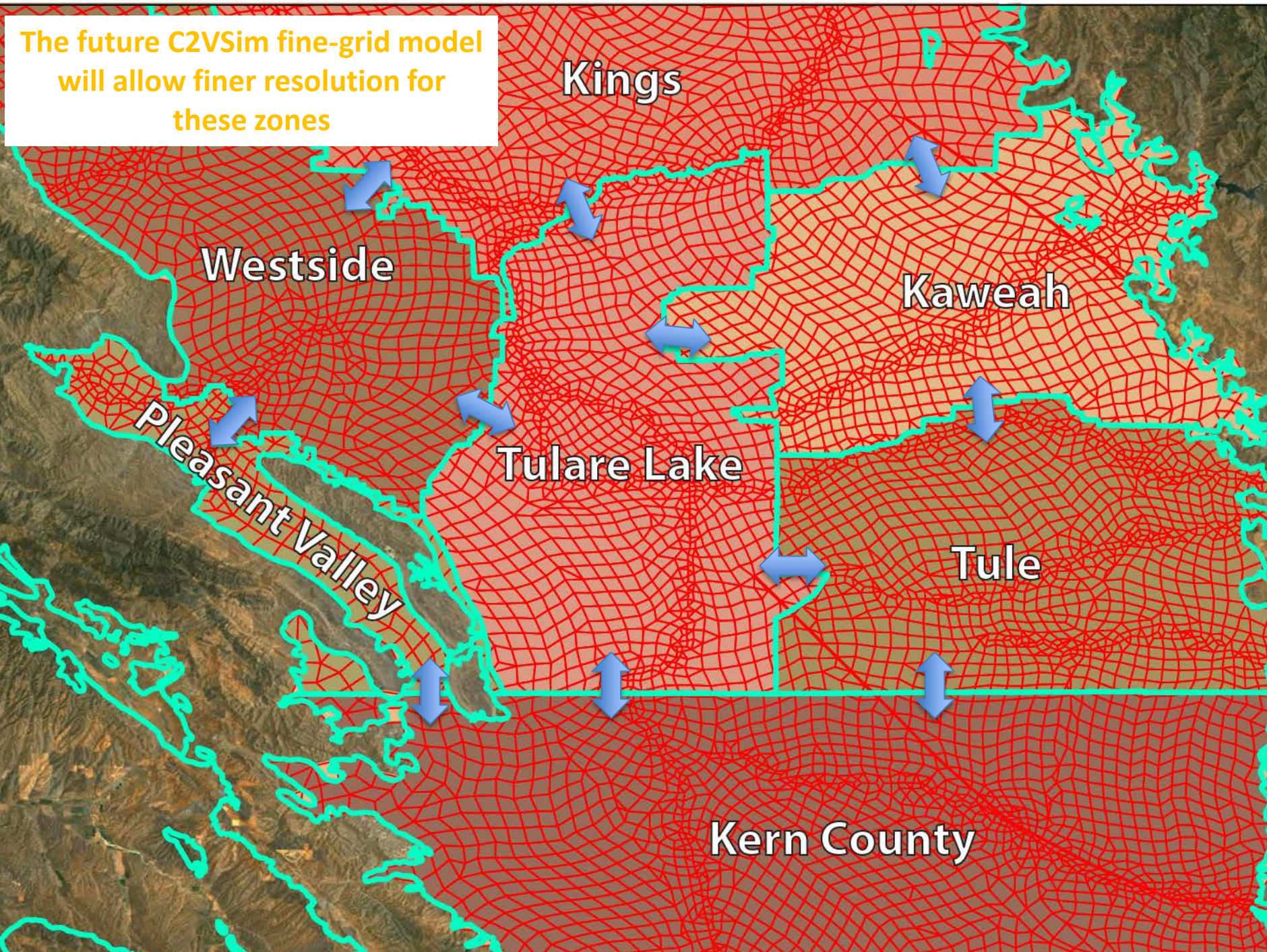
C2VSim Elements can be grouped
into zones for these GSAs

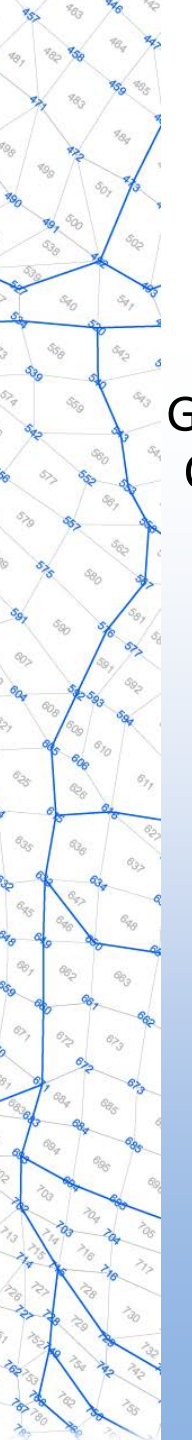


... and Z-Budget results will include
groundwater flows between the GSAs



The future C2VSim fine-grid model
will allow finer resolution for
these zones





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THE END