



COLLABORATIVE SCIENCE ON THE UPPER SAN PEDRO RIVER: BUILDING THE BLOCKS

February 4, 2020

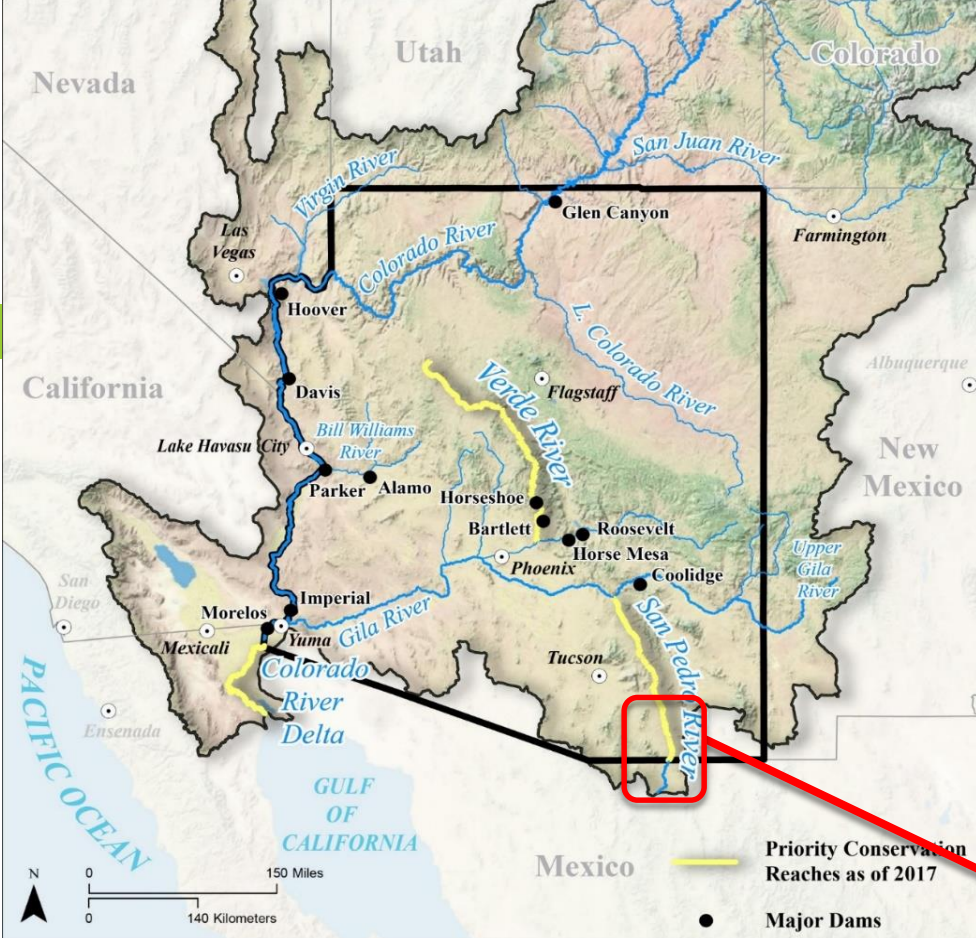
Brooke Bushman
AZ Water Projects Coordinator

The Nature
Conservancy 

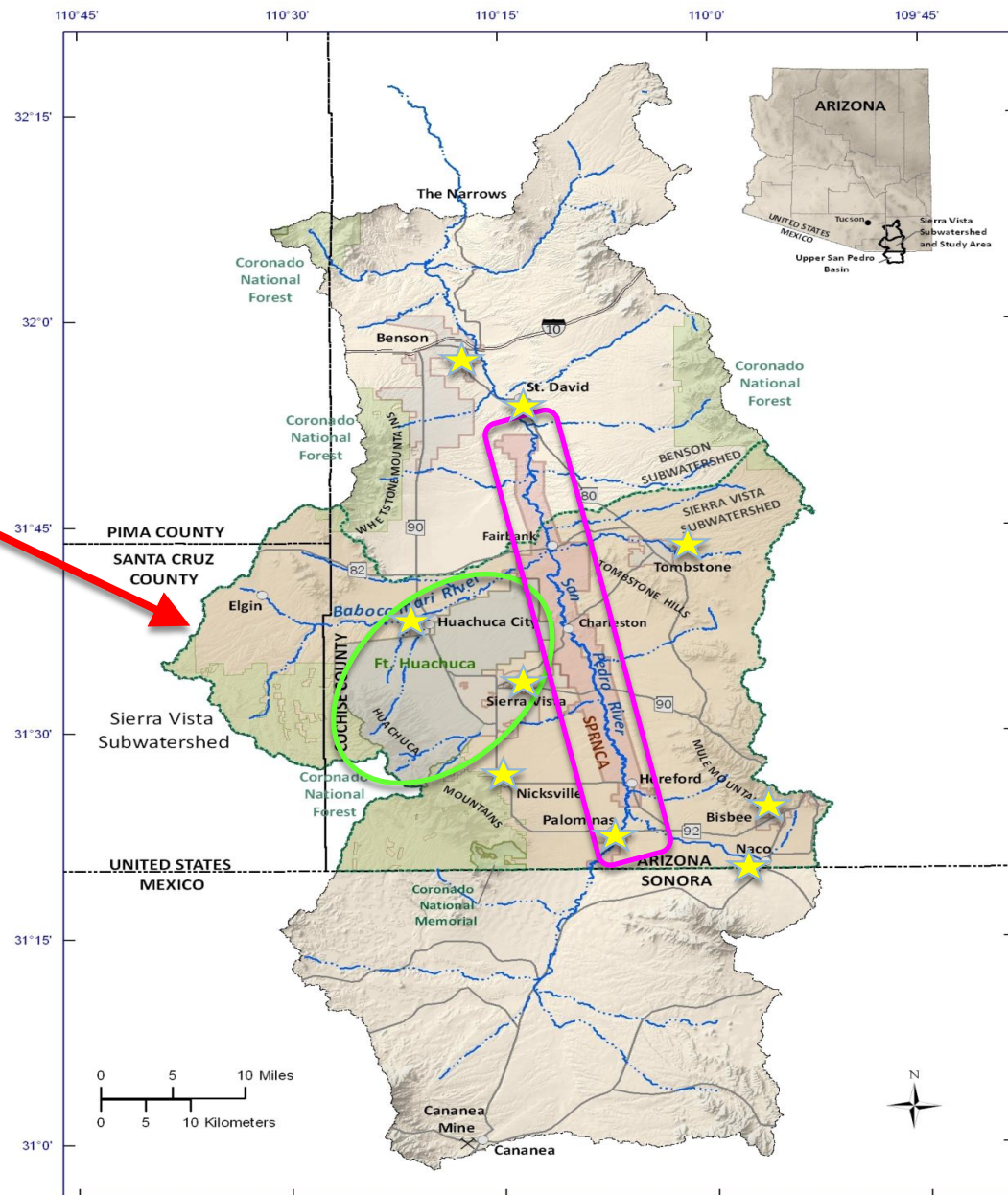
Our Story

CCRN Cochise Conservation
& Recharge Network





Upper San Pedro Basin within Colorado River Basin



Building Blocks: Consensus on the Science



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Riparian
Vegetation ★
Water Needs

Hydrogeology

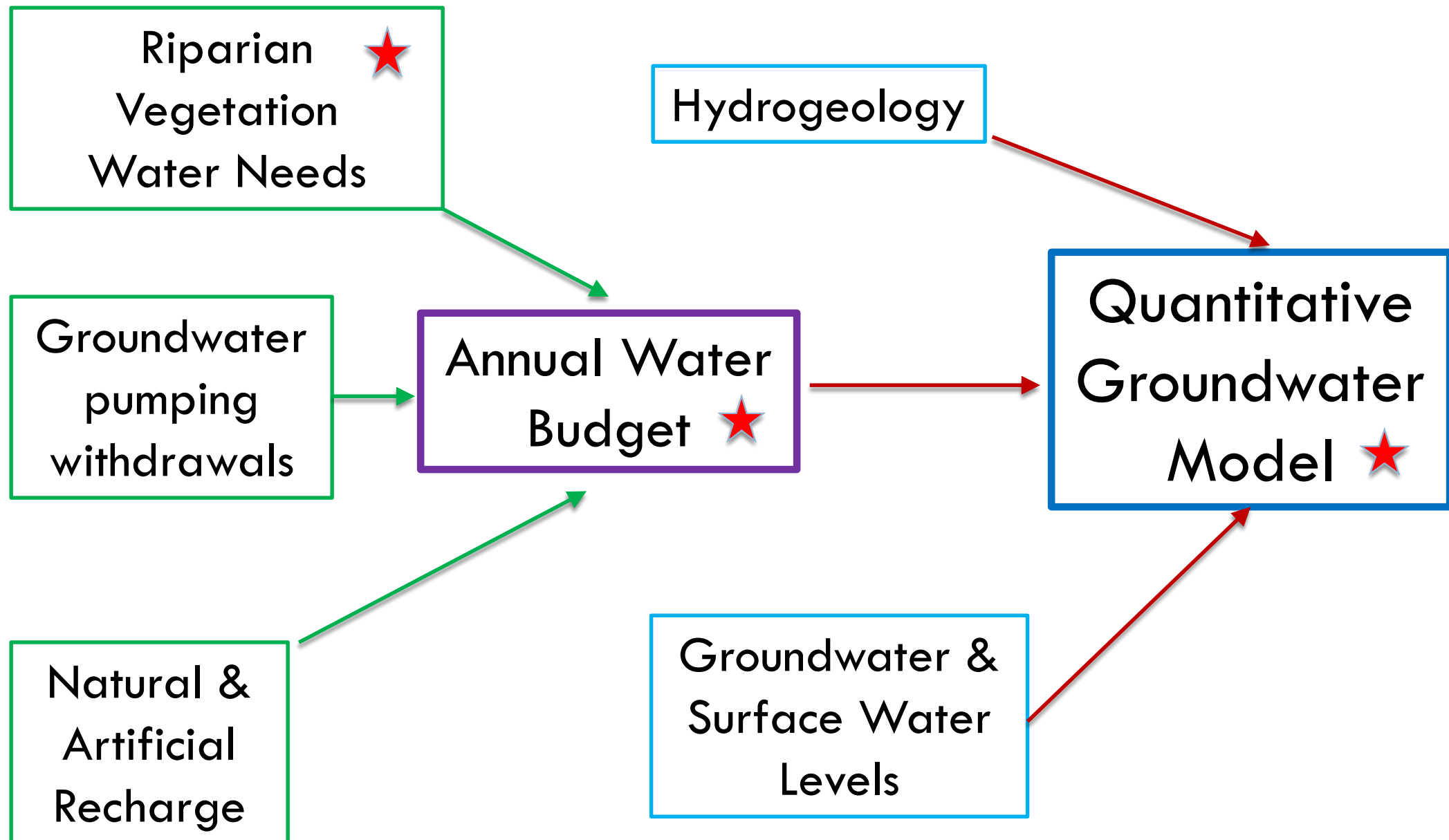
Groundwater
pumping
withdrawals

Annual Water
Budget ★

Quantitative
Groundwater
Model ★

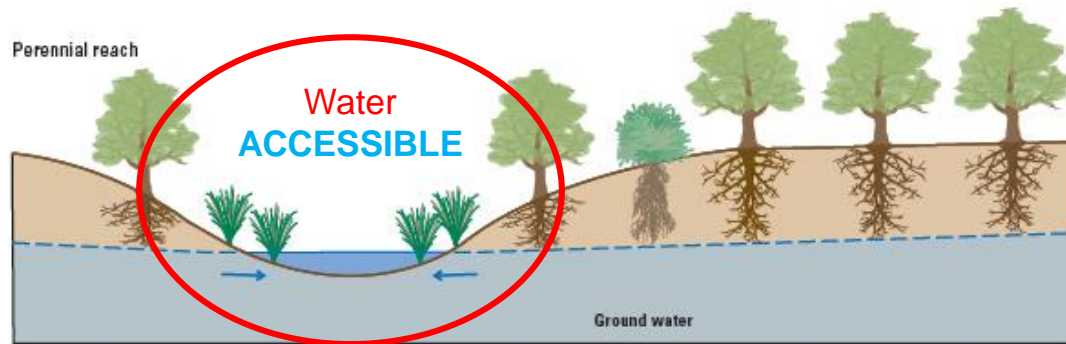
Natural &
Artificial
Recharge

Groundwater &
Surface Water
Levels

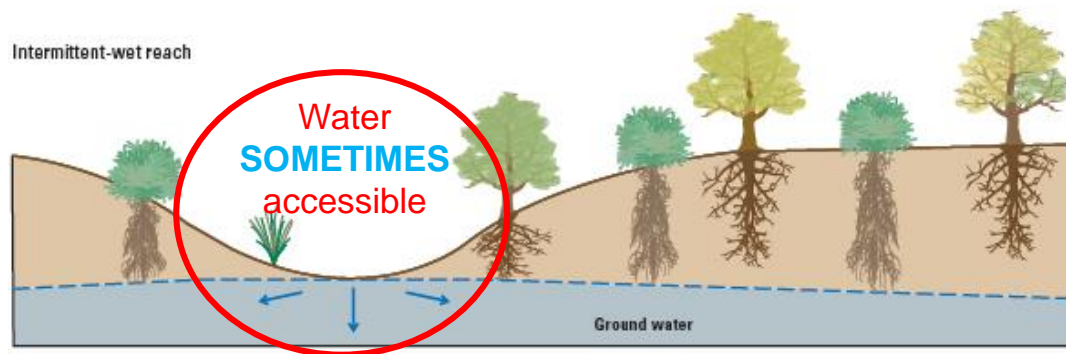


Riparian Vegetation Water Needs Report

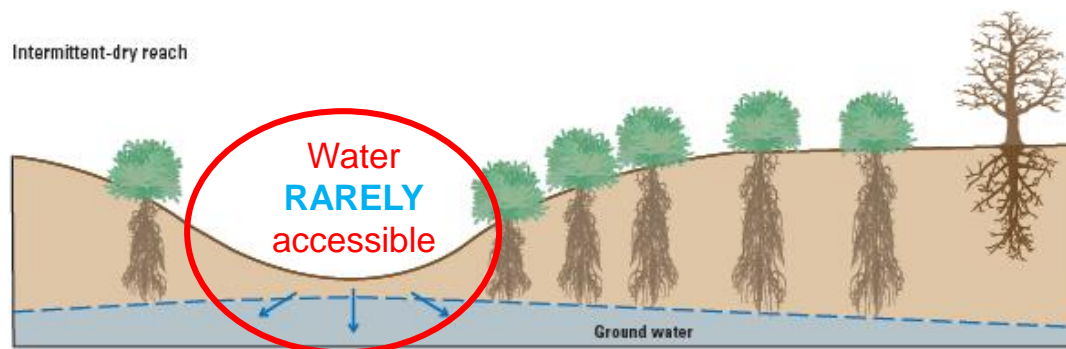
Hydrologic Reqs. & Consumptive G.W. Use
(USGS SIR 2005-5163)



Perennial Reaches



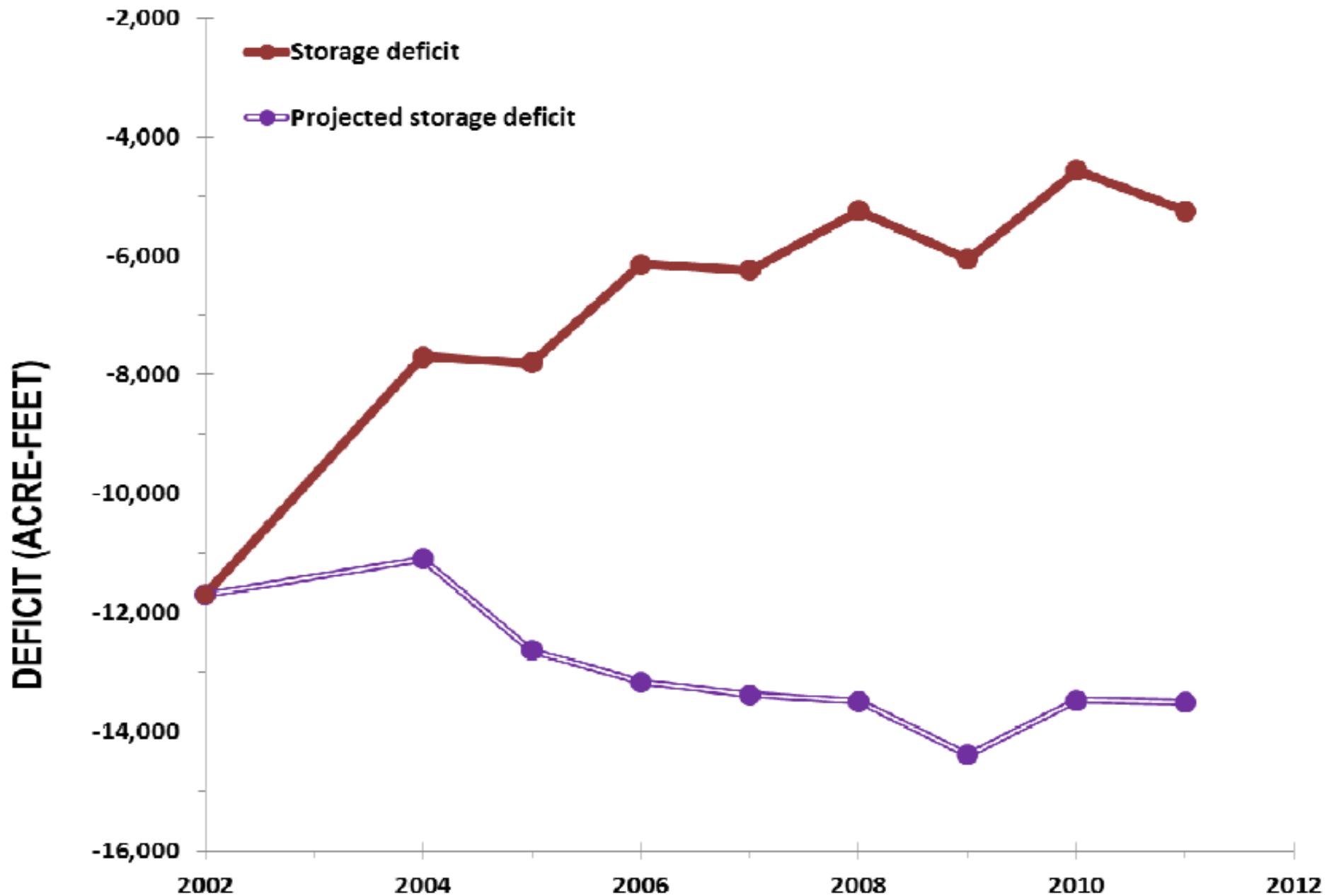
Intermittent- Wet Reaches



Intermittent- Dry Reaches

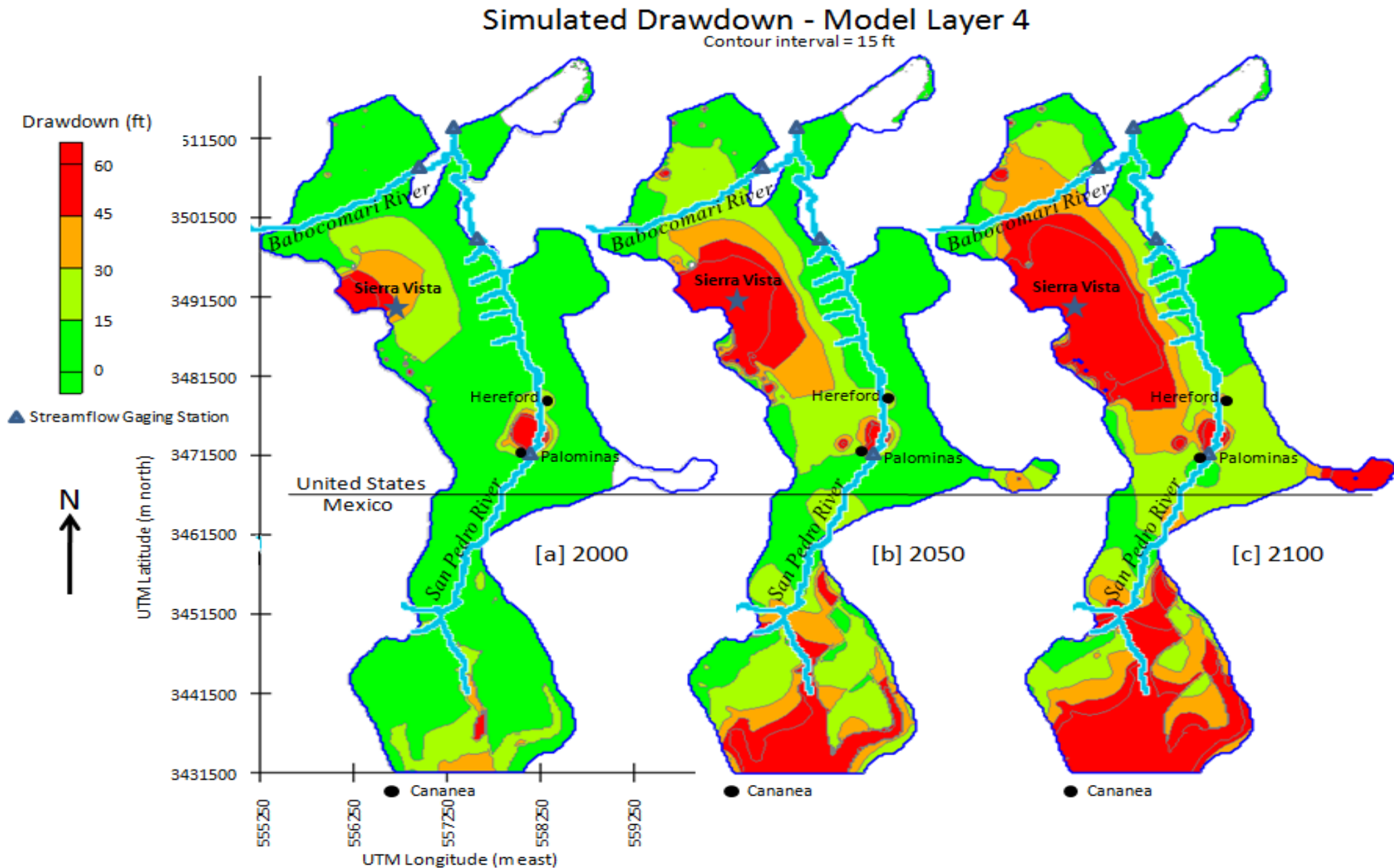
Annual Water Budget:

Groundwater Deficit Tracking

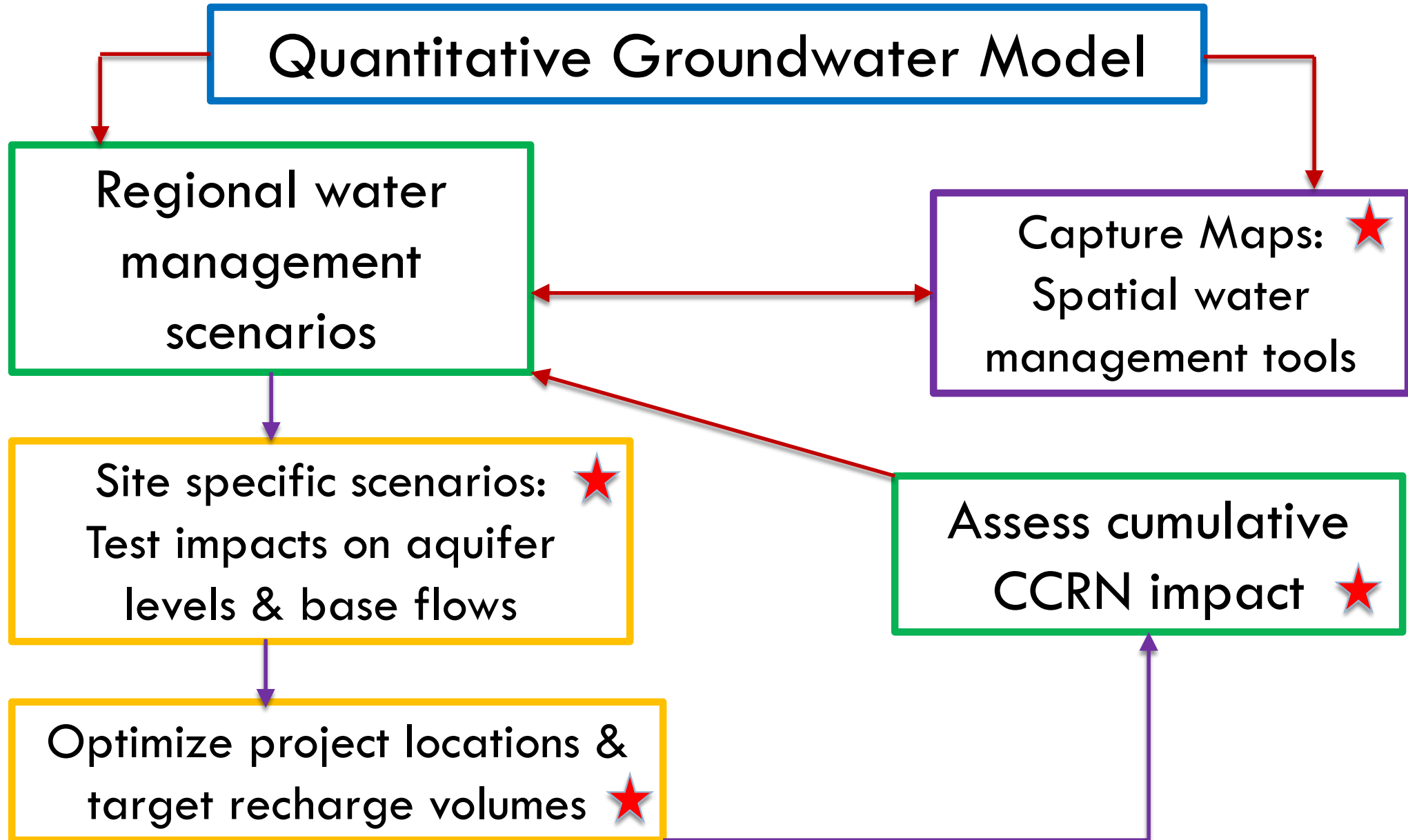


Quantitative Groundwater Model

(USGS SIR 2006-5228)



Building Blocks: Project Implementation



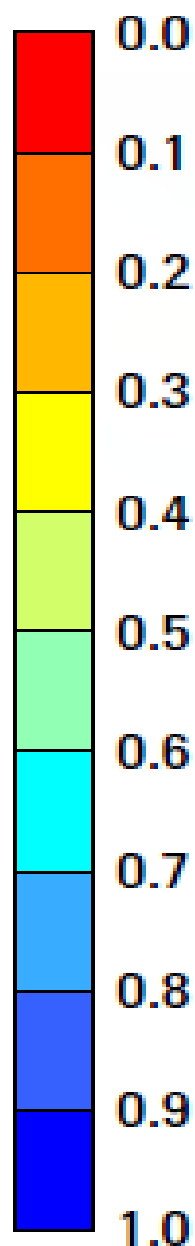
WHO: Sierra Vista, Bisbee, Cochise County, Hereford
Natural Resource Conservation District,
The Nature Conservancy

WHAT: Implement a regional network of water
management projects that meet the long-term water
needs of the Fort, San Pedro and local communities

WHERE: 8 project sites along 25 miles of the river

USGS Groundwater Capture Map

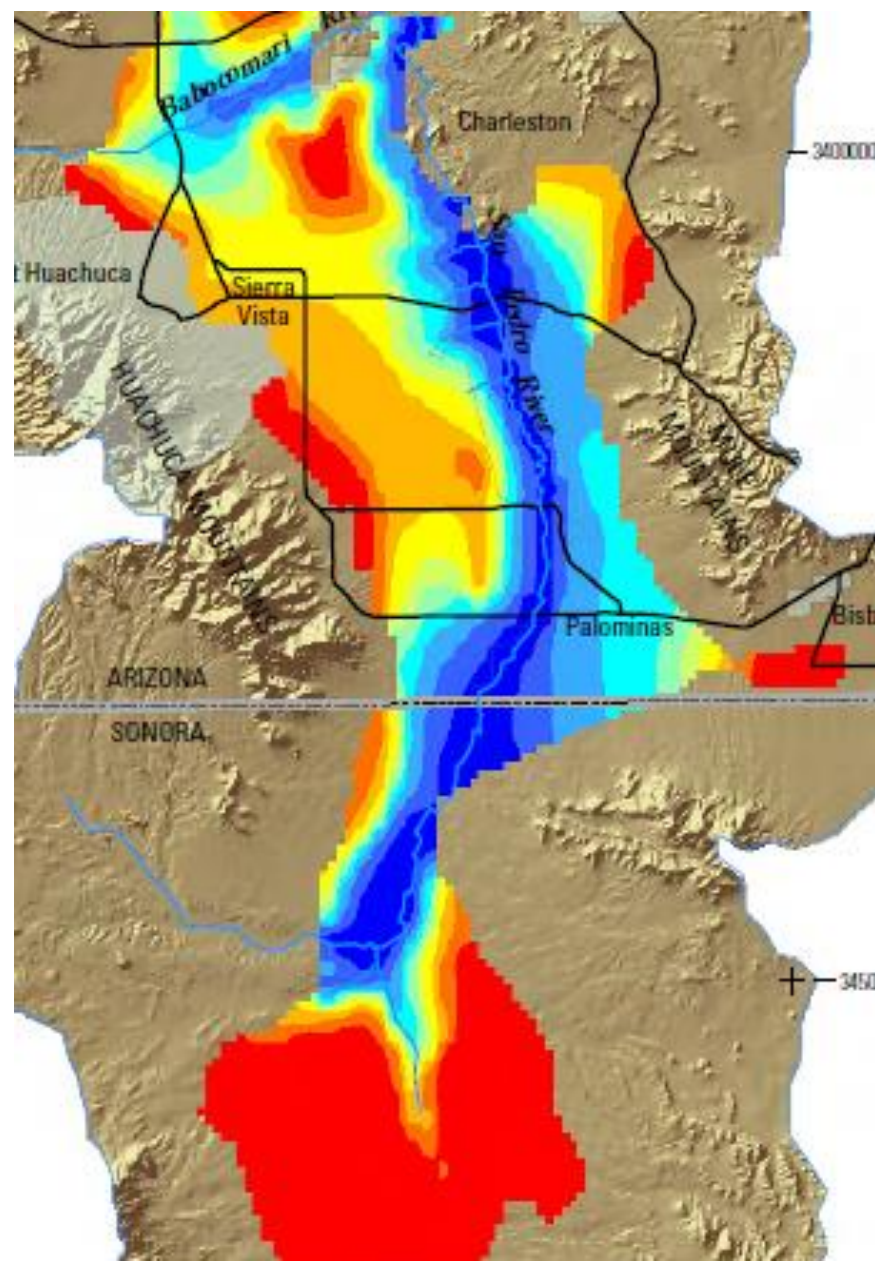
(USGS SIR 2008-5207)



% of recharge to
reach river over
50 years

Warm Colors =
Decades to Centuries

Cooler Colors =
Days to Years

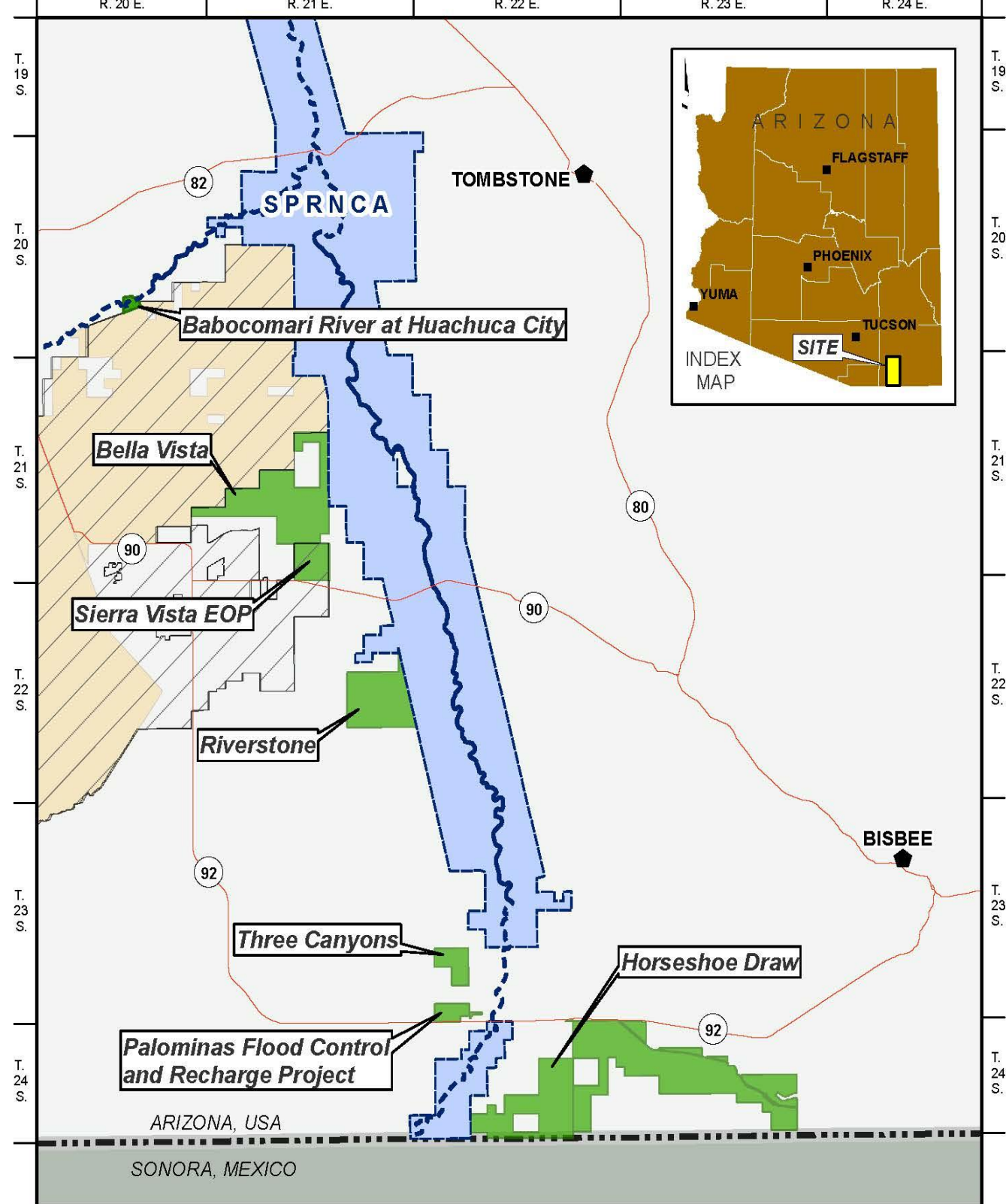


CCRN Site

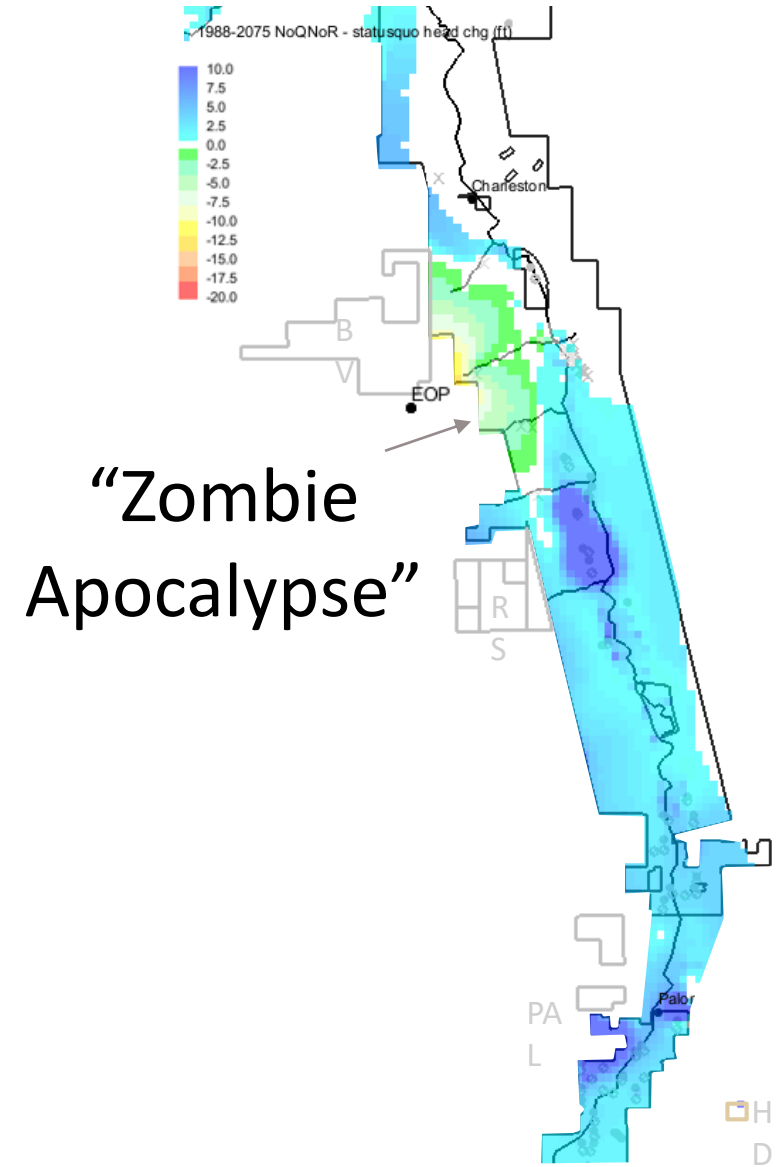
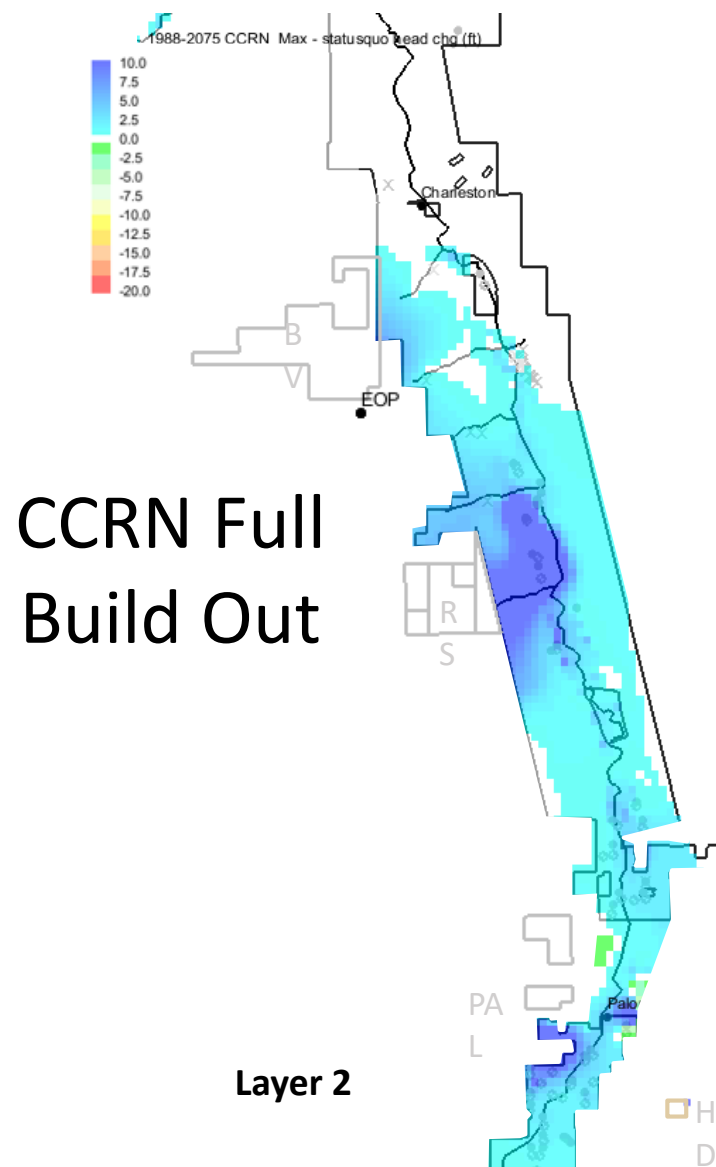
Specific Scenarios

Test individual site impacts on aquifer levels & baseflows

Optimize project locations & recharge volumes



Assess cumulative CCRN impact



Groundwater depth change (ft), compared to status quo (1988-2075)

Lessons Learned...Specify Criteria

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Build the science around:

- ✓ Collaboratively-defined,
 - ✓ Place-based, &
- ✓ Specific social, economic, and environmental criteria.



Lessons Learned...

Managing Groundwater

Resist simple water budget approaches.

Use the science to find the best place for impact.

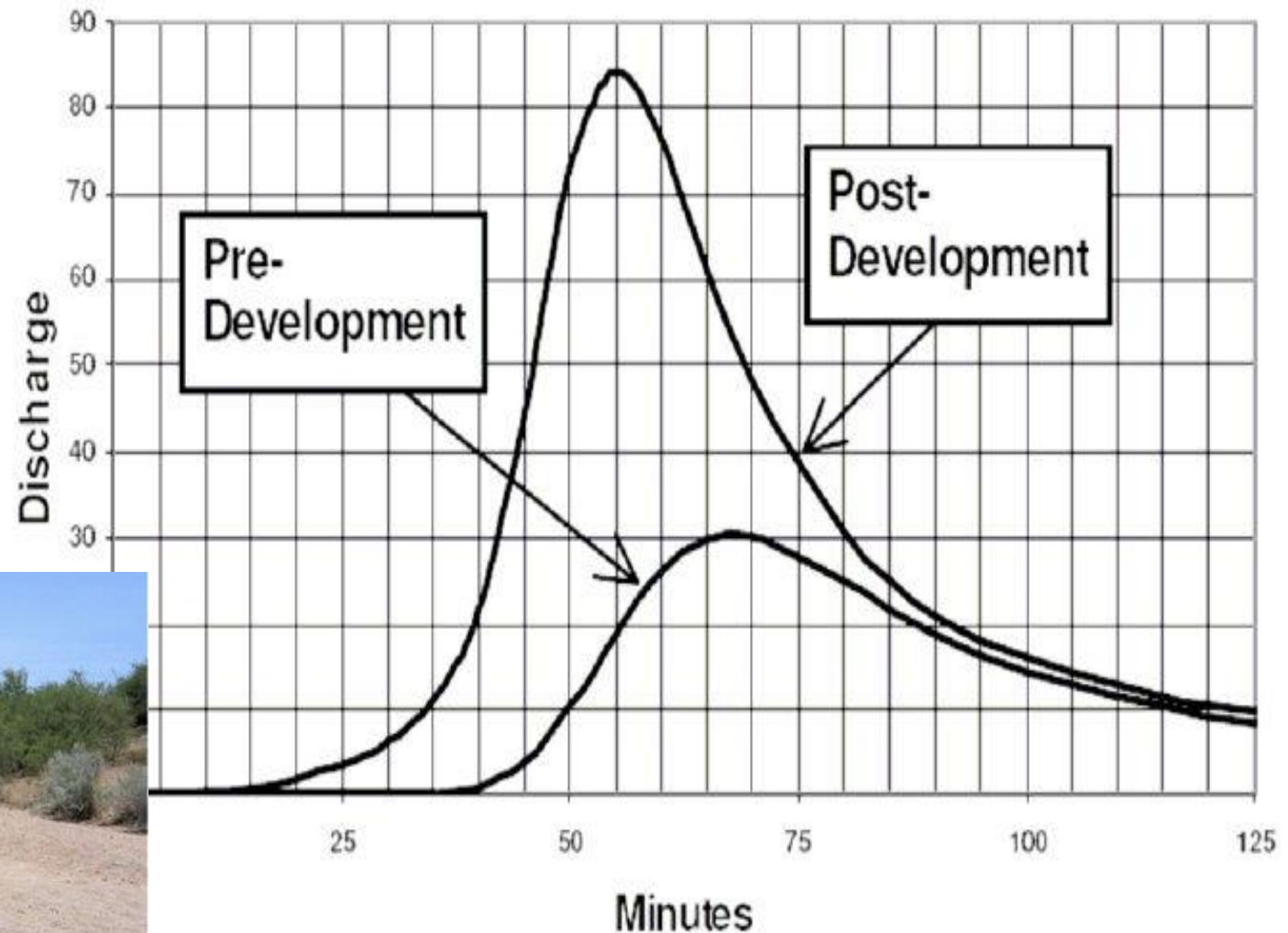


Lessons Learned...Learn Together

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Base projects on
the best science
available.

Then learn MORE
together.



Lessons Learned...Pilot & Scale Up

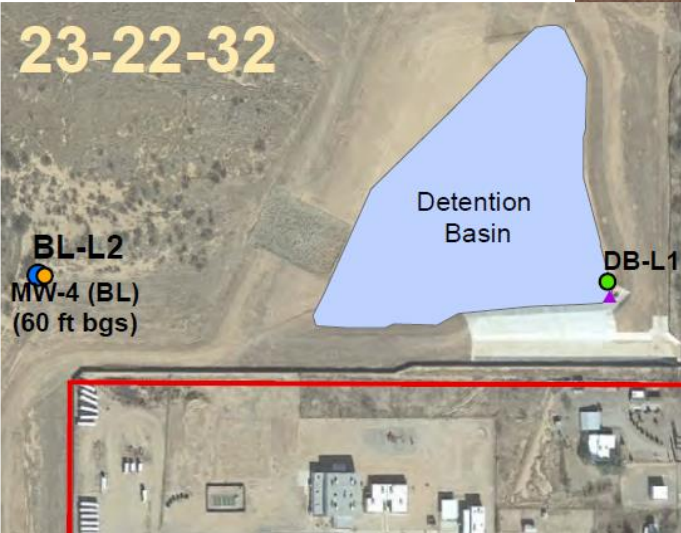
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Start small
and learn
first.

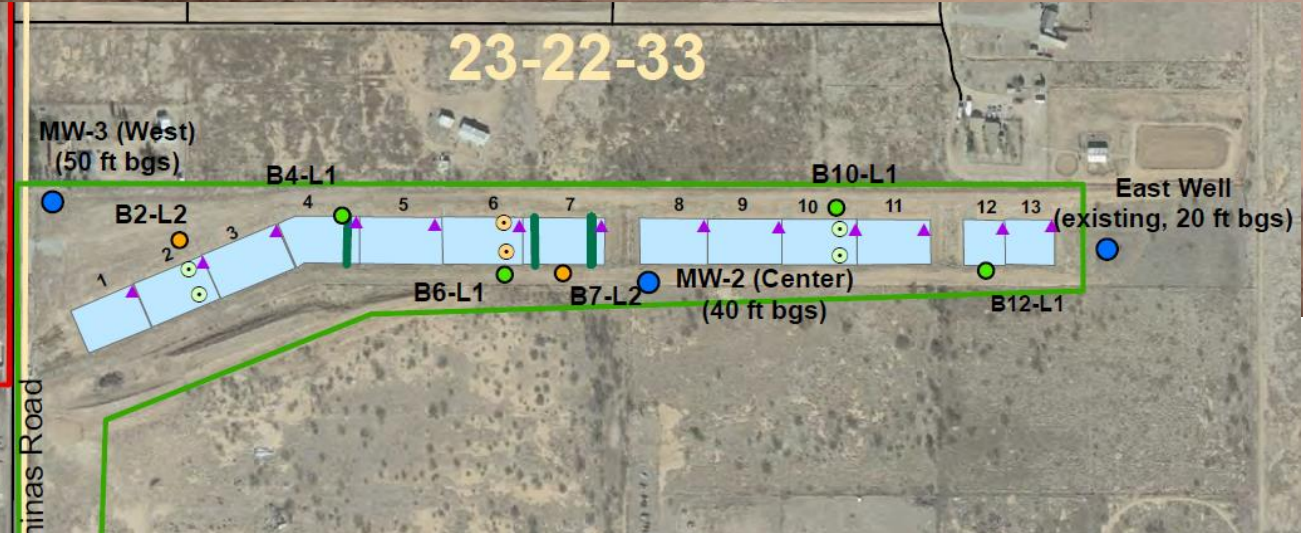
But plan
strategically.



23-22-32



23-22-33

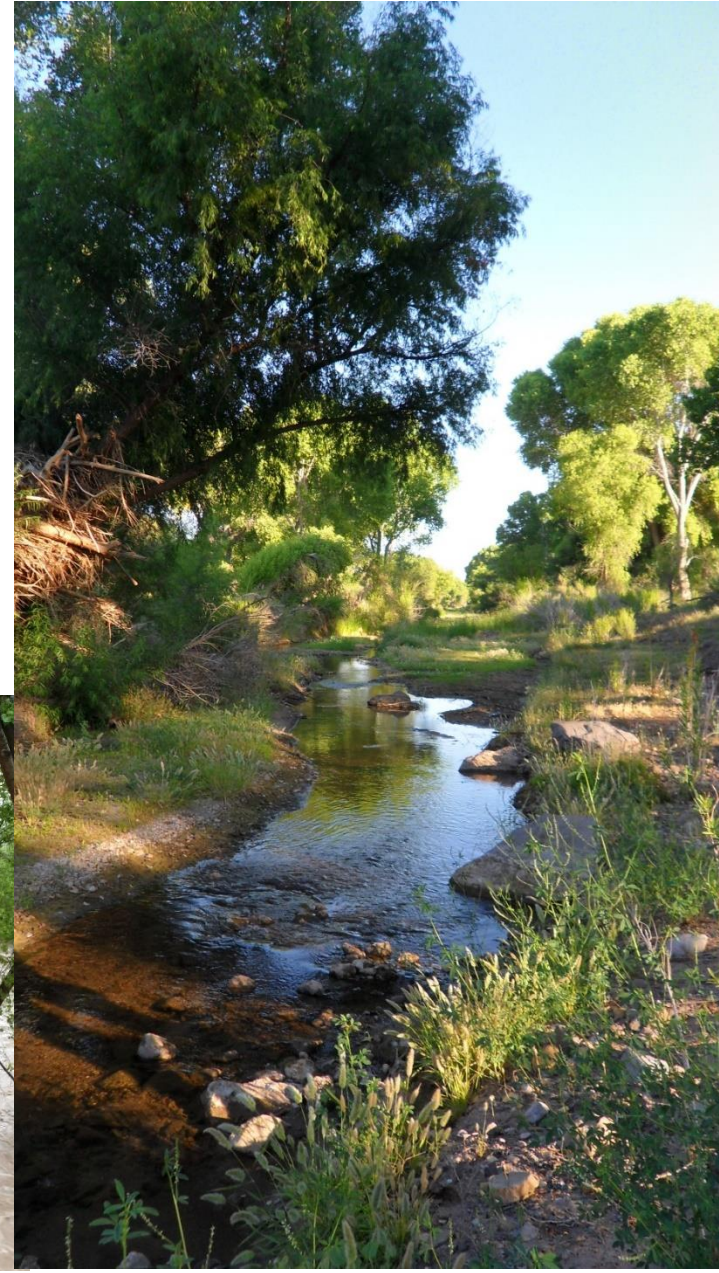


Final Thought: INTEGRATED Water Management

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Coordinate interrelated hydrologic processes to protect and restore whole system resiliency.

- ❑ Baseflows
- ❑ Flood flows
- ❑ Groundwater
- ❑ Effluent
- ❑ Urban runoff





Thank you!

Questions?

CCRNsanpedro.org

UpperSanPedroPartnership.org

[Renewing our Rivers: Guidebook to Stream Corridor Restoration](#)