Data availability and filling gaps

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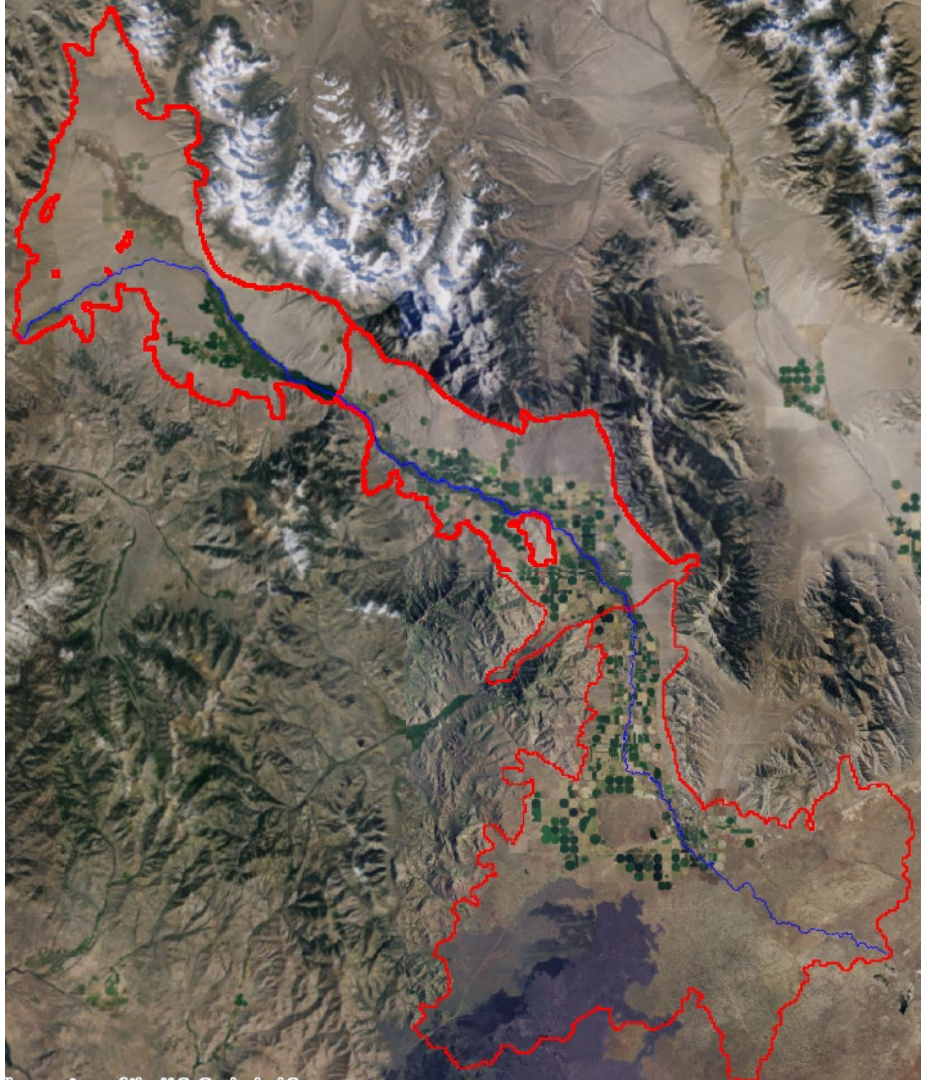
Model area

- Upper Basin
  - Howell Ranch to Mackay Dam
- Middle Basin
  - Mackay Dam to Moore Diversion
- Lower Basin
  - Moore Diversion to beyond Arco gage



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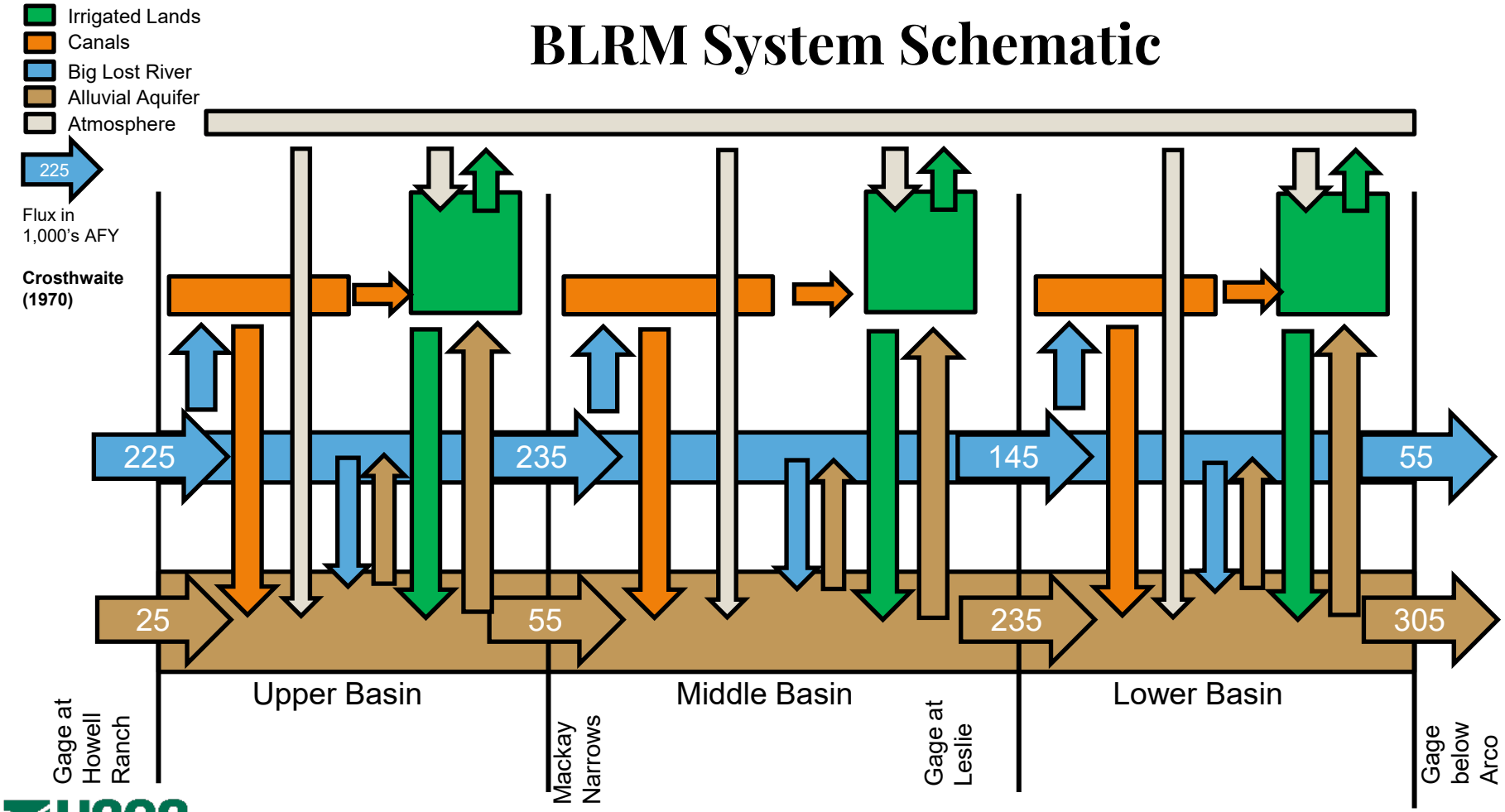
BLRM System Schematic



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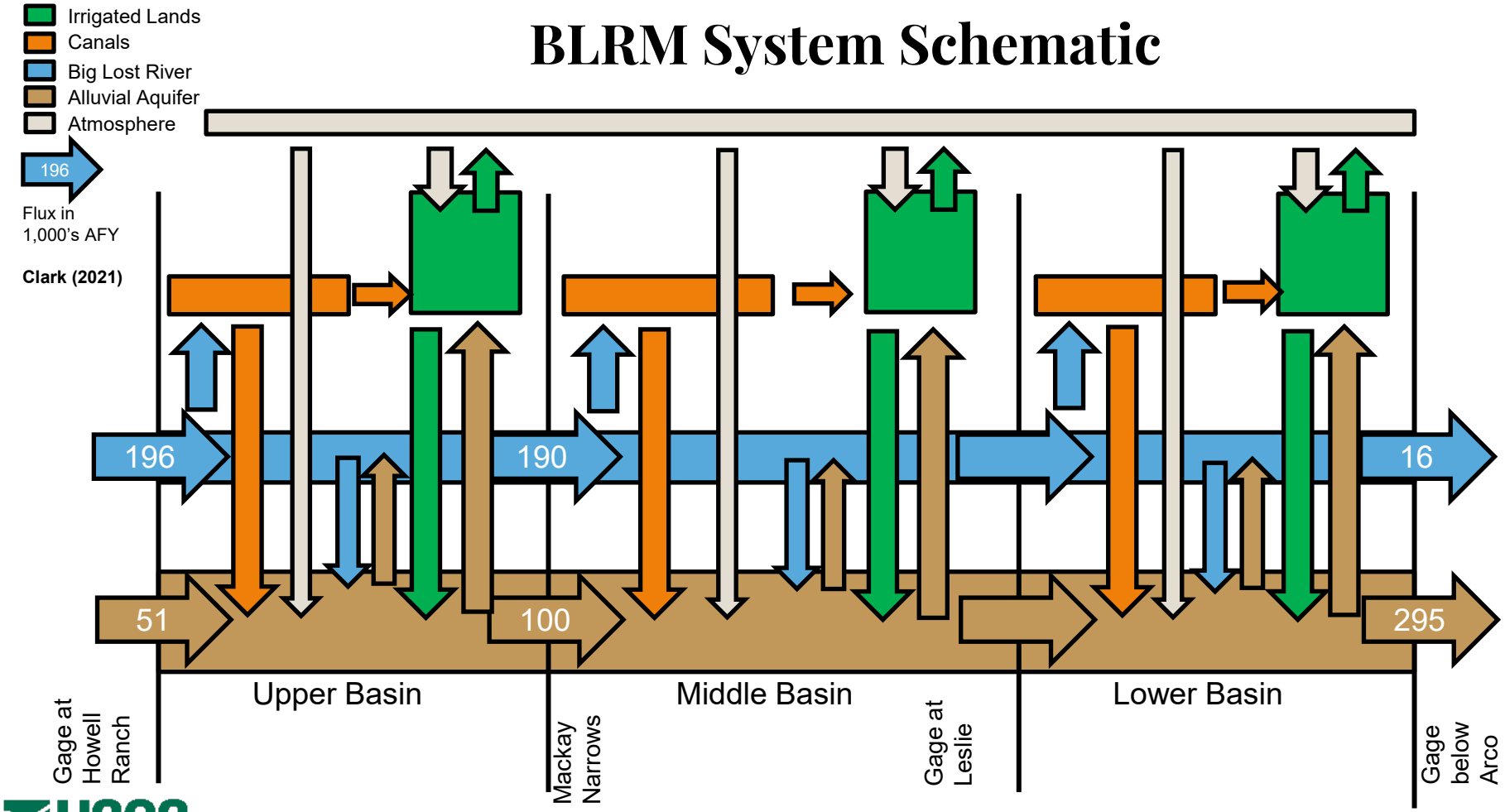
BLRM System Schematic



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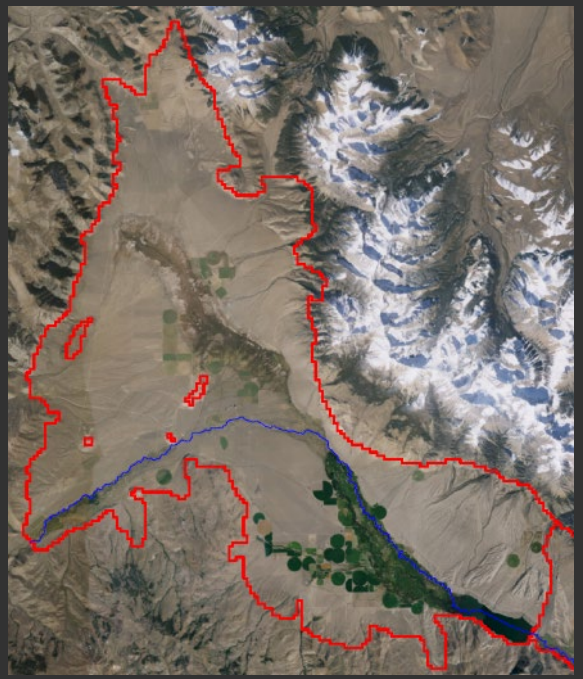
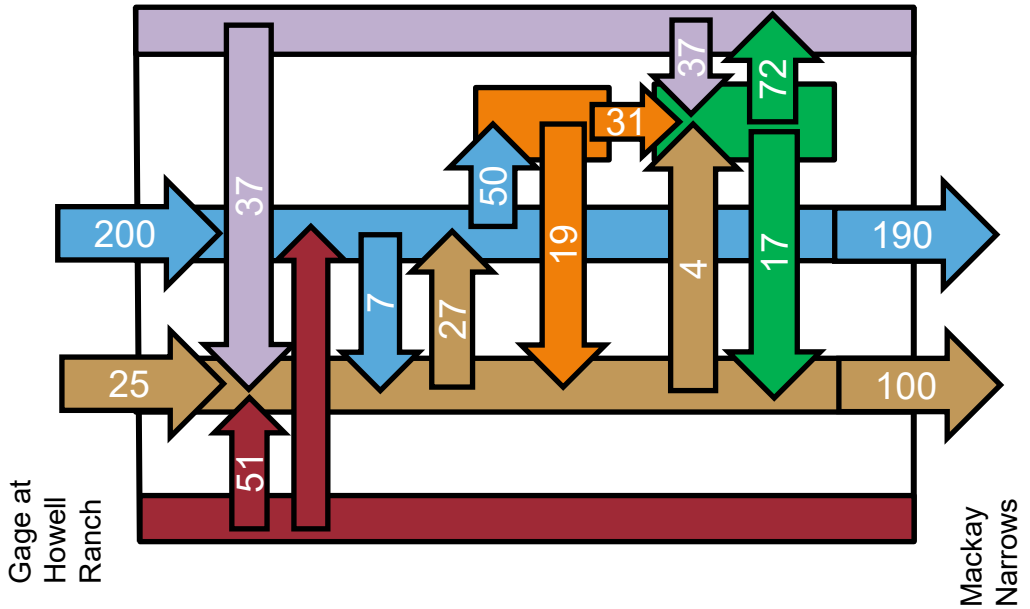
Upper Basin (above Mackay)

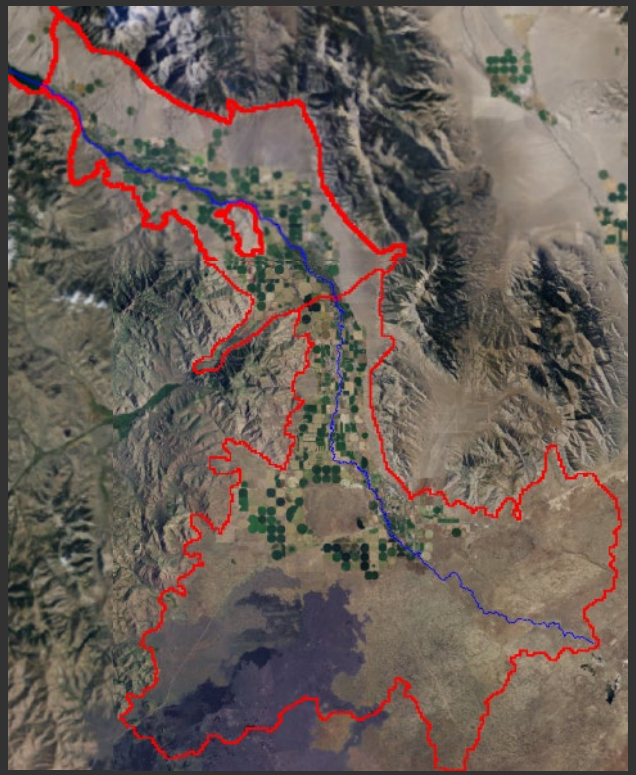


Irrigated Lands
Canals
Big Lost River
Alluvial Aquifer
Atmosphere
Tributary Basins

Volumes derived from Clark (2021)



Lower Basin (below Mackay)



- Irrigated Lands
- Canals
- Big Lost River
- Alluvial Aquifer
- Atmosphere
- Tributary Basins

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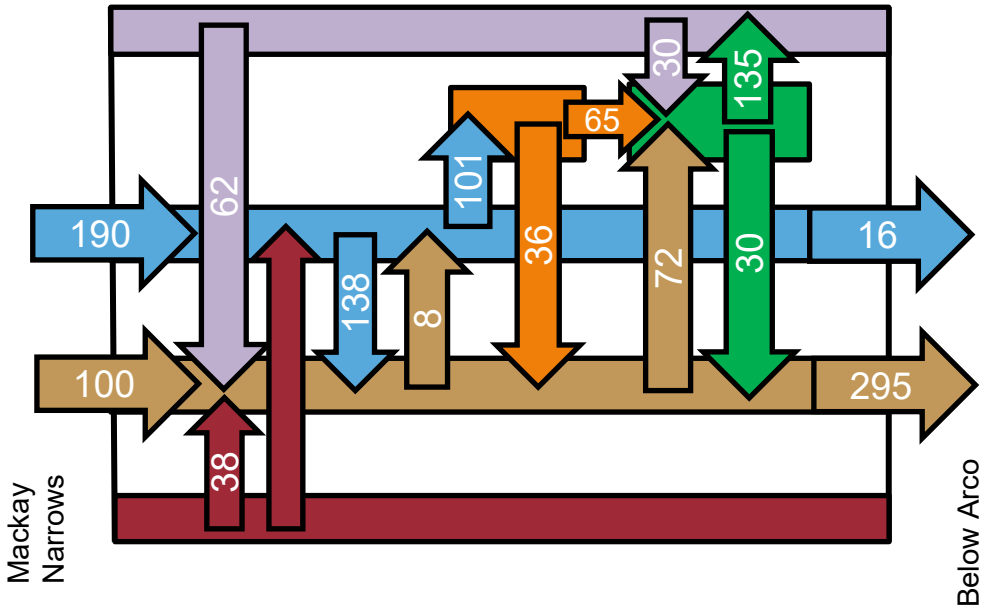

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Data Availability

	Temporal Resolution	Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Diversion Records	daily	IDWR																							
Pumping Records	annual	IDWR																							
Irrigated Lands Shapefile	yearly	IDWR																							
Metric EVT	monthly	IDWR																							
Water Budget Report	yearly	IGS																							
Prism Precipitation Arrays	monthly	PRISM																							
						Proposed historical simulation period																			

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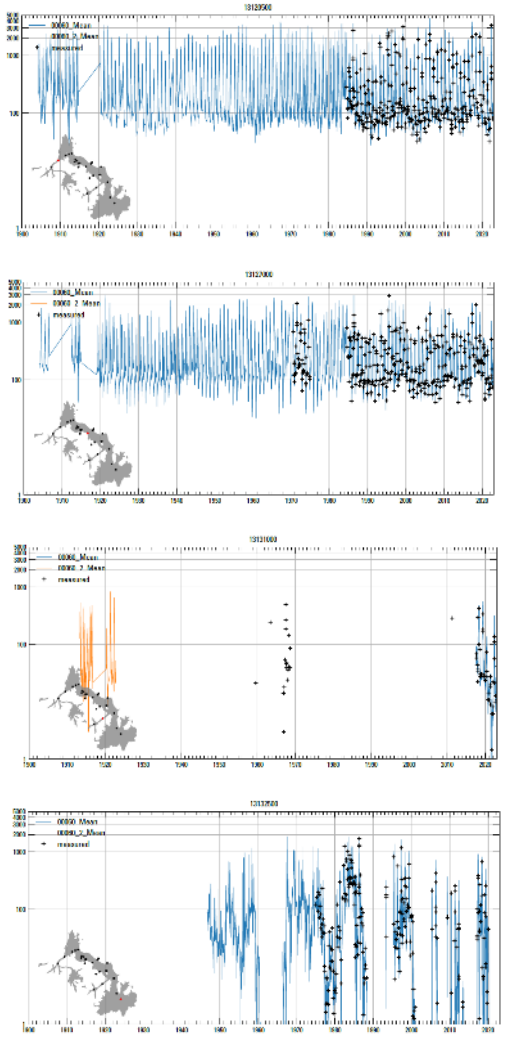
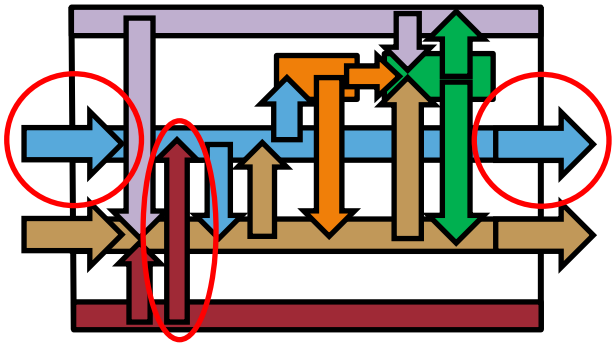
Streamflow In/Out

- **Source:** USGS NWIS streamgaging network

- **Temporal coverage:** Good
- **Spatial coverage:** Good
- **Reliability:** Excellent
- **Important Gaps:** Antelope Creek before 2018; 4 gages upstream of Mackay Reservoir after 1920-1960;





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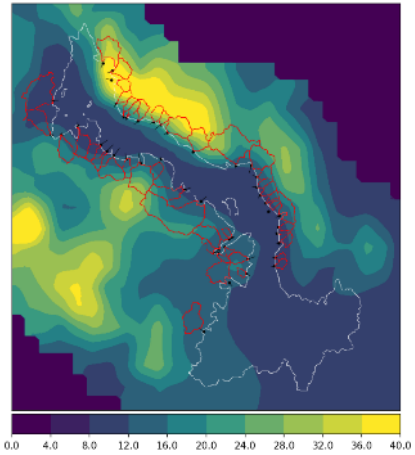
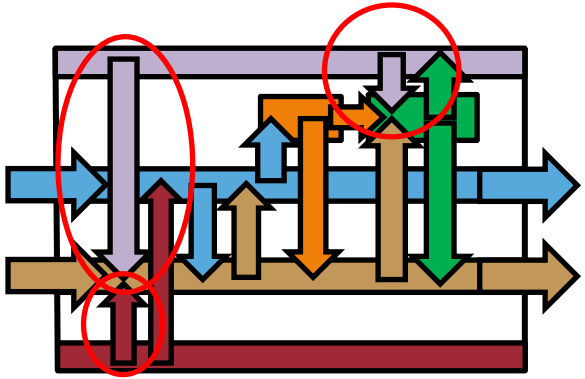
Areal recharge & Trib. underflow

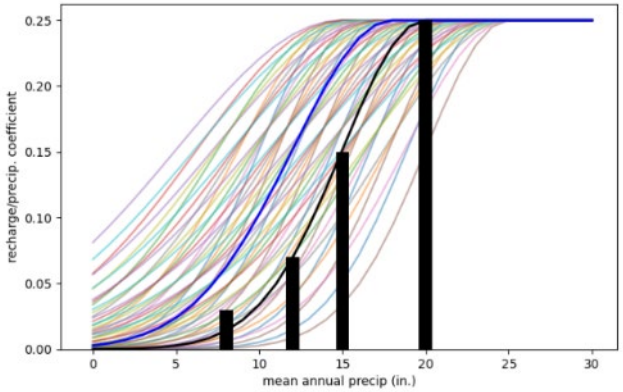
- **Source:** Effective recharge estimates derived from PRISM precipitation data
- **Temporal coverage:** monthly 1981-2022
- **Spatial coverage:** Full model domain, 4km resolution
- **Reliability:** derived estimates highly uncertain
- **Important Gaps:** Modified Maxey-Eakin relation between ppt/rch is empirical, not physically based.

Mean annual precip.

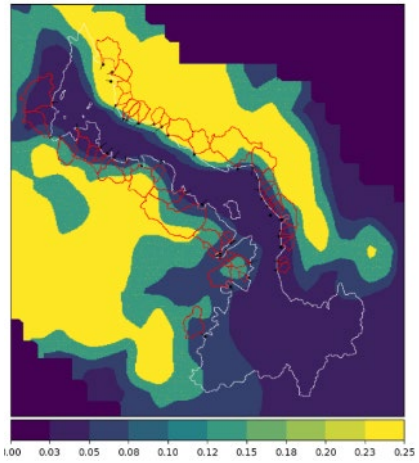




Calculate rch/ppt relation,
$coef_{i,i} = f(\text{mean } ppt_{i,i})$



Assign relation to map,
$rch_{i,j,t} = ppt_{i,j,t} * coef_{i,j}$



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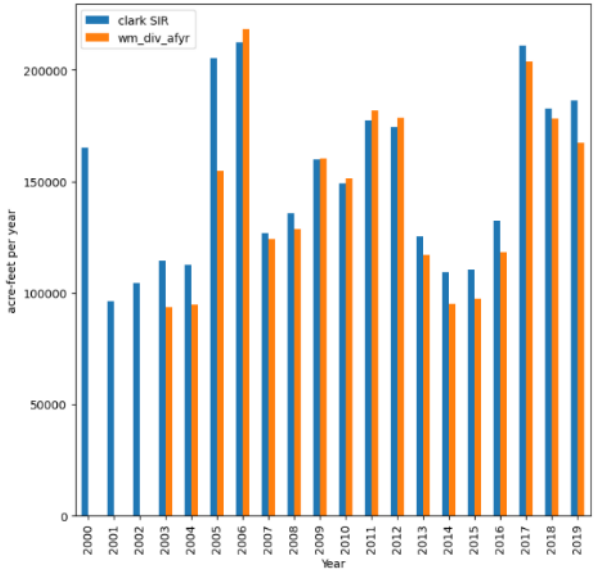
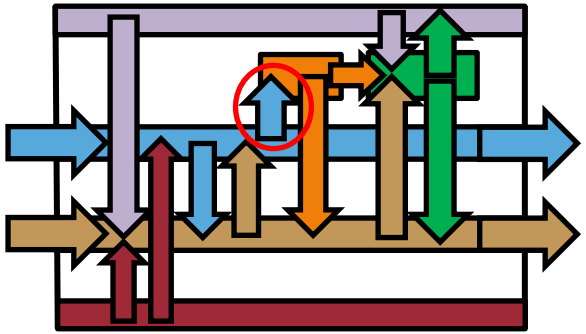
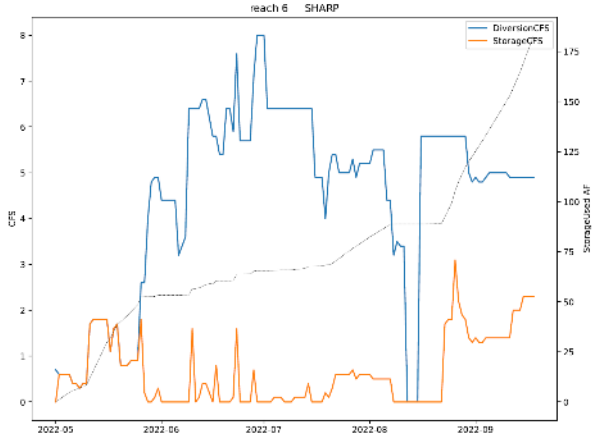
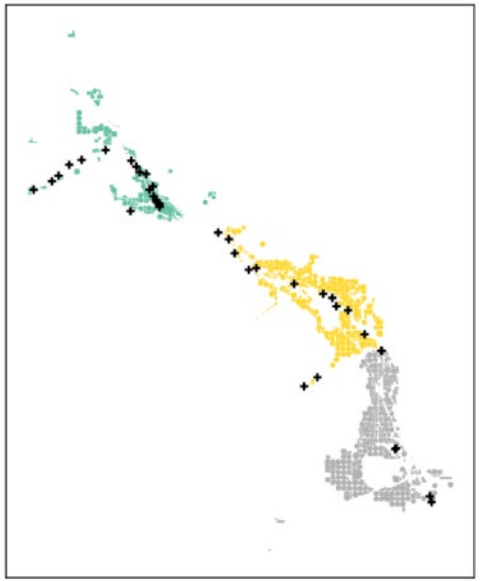
Surface water diversions

- **Source:** IDWR Water District surface-water diversion database
- **Temporal coverage:** daily since 2003
- **Spatial coverage:** All diversions from main stem
- **Reliability:** Very good
- **Important Gaps:** how to route/apply water after diverting from main stem



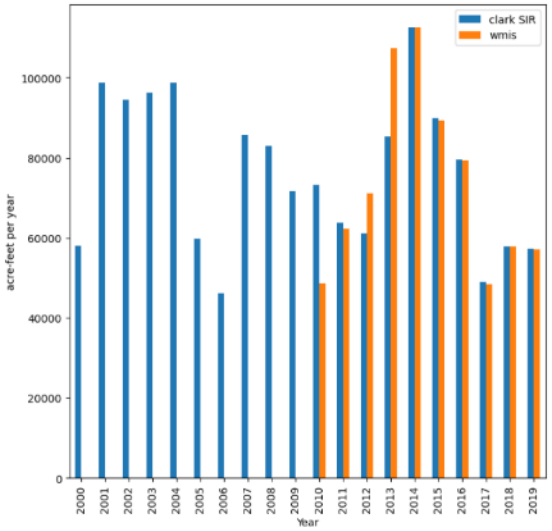


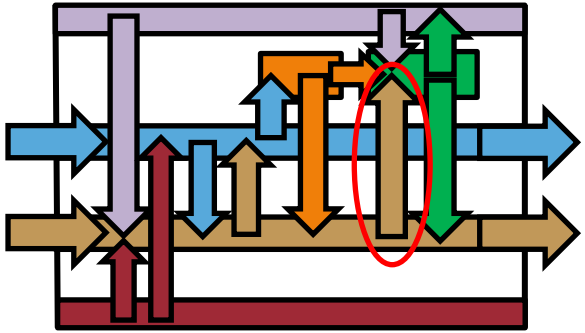


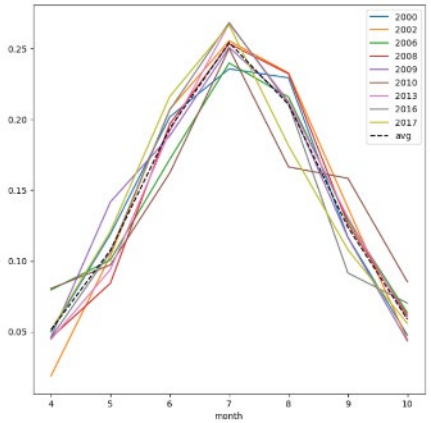


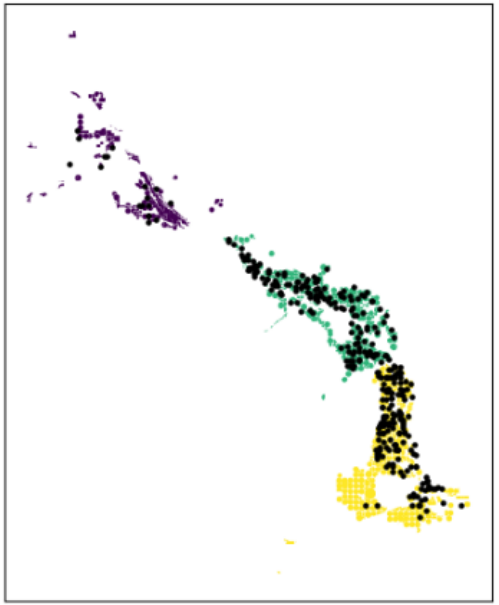
Groundwater pumping

- **Source:** IDWR Water Management Information System database
- **Temporal coverage:** annual since 2010
- **Spatial coverage:**
- **Reliability:** Very good
- **Important Gaps:** Must upscale annual to monthly via; must backfill pre-2010. Important function of service area supply/demand calculator









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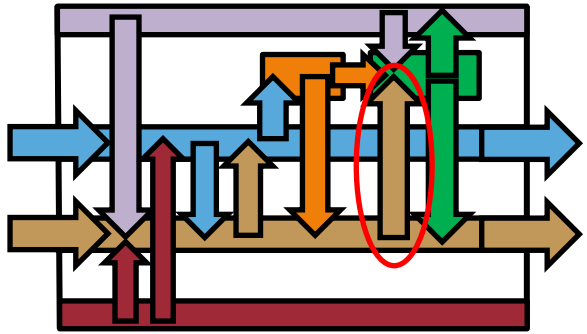
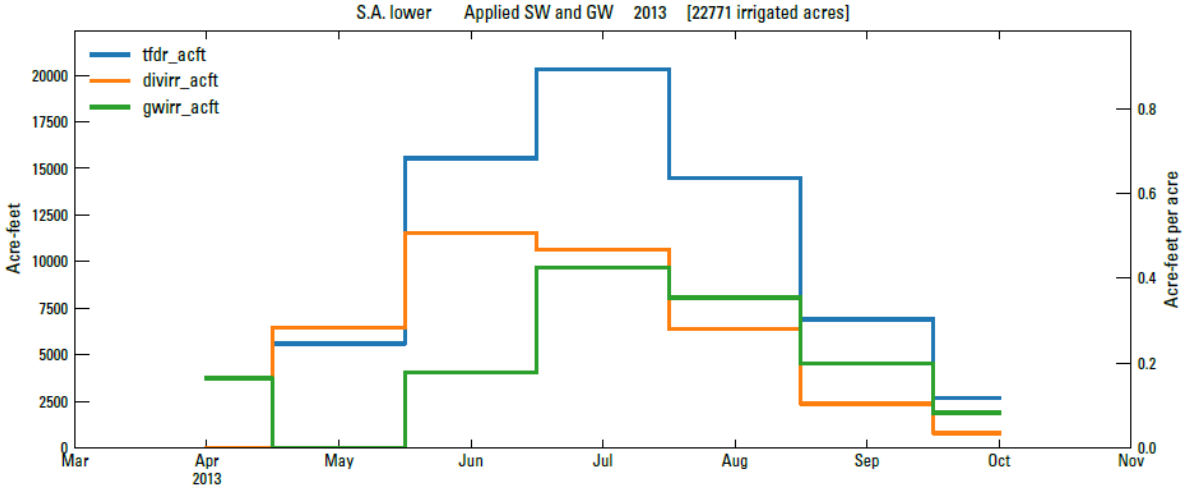
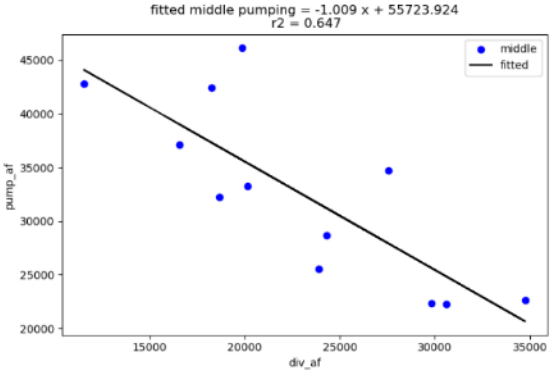
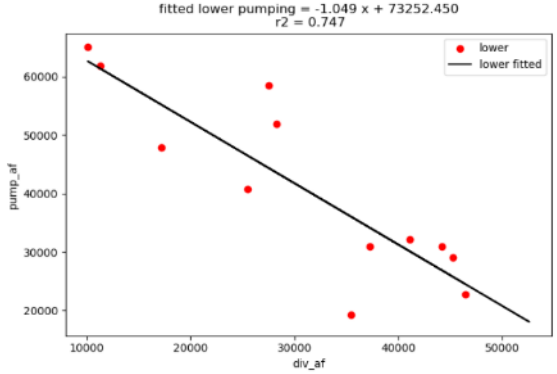


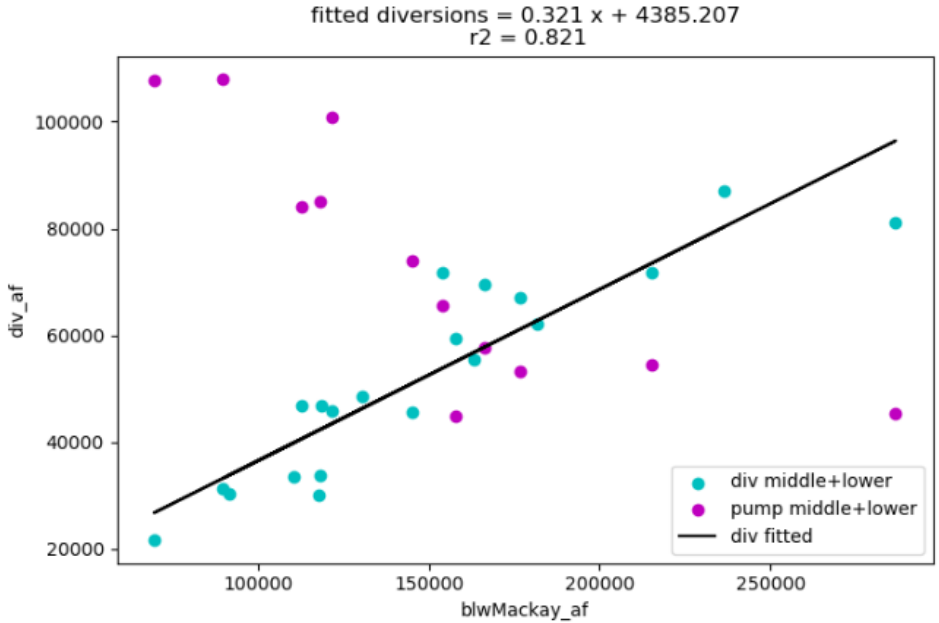


SW/GW diversion relation

- **Source:** IDWR Water Management Information System database
- **Temporal coverage:** overlap of availability of SW diversion data and GW pumping data
- **Spatial coverage:** middle and lower basin
- **Reliability:** Very good
- **Important Gaps:** Must upscale annual to monthly, backfill to simulation start

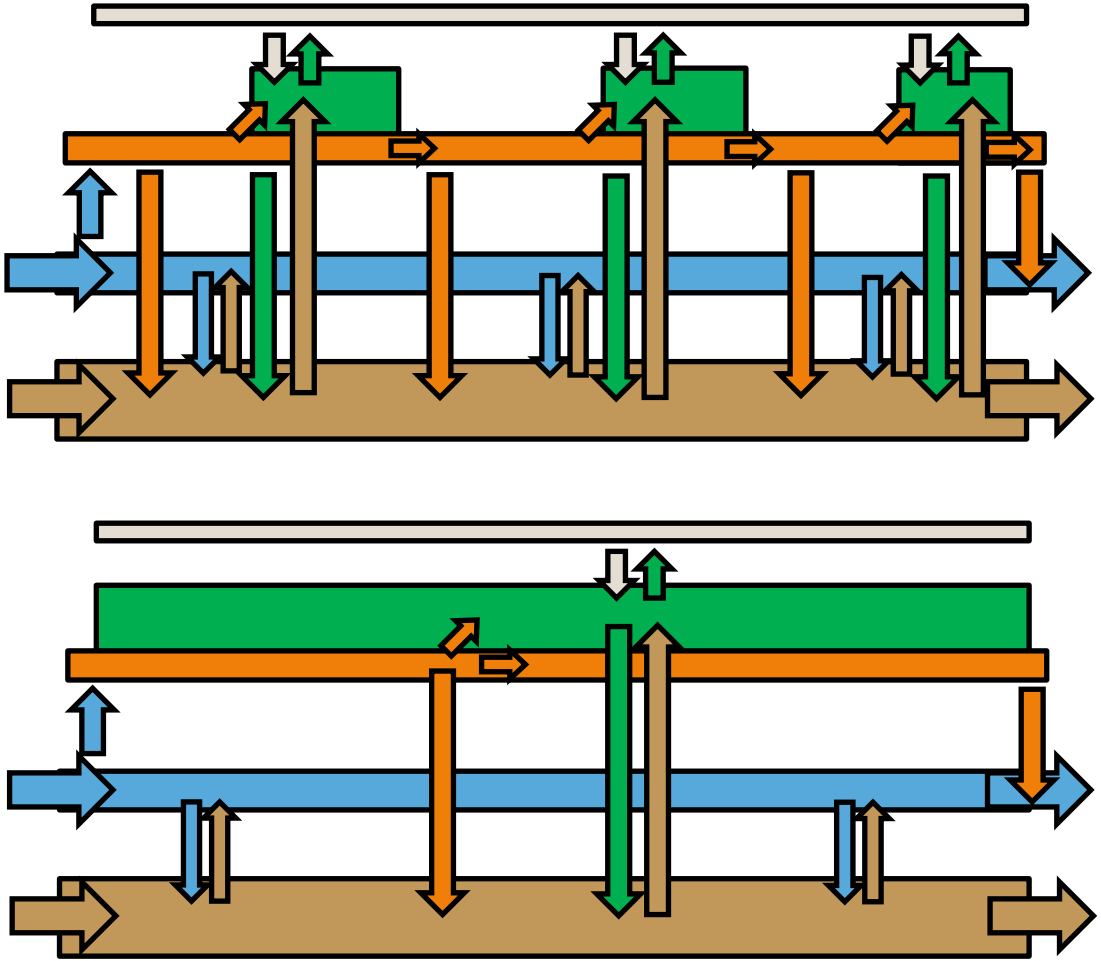






Service Areas

- **Motivation:** simplify necessary calculations of inputs and outputs to groups of irrigated lands instead of individual POU
- **Advantages:** more tractable problem, easier to back/forward-fill inputs when data unavailable
- **Disadvantages:** lose variability within grouped area, some processes become “hard wired” instead of dependent on simulated states
- **Need stakeholder input as we develop the model logic**



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Service Areas

- **Example**