Salinas Valley Basin GSA

Extraction Barrier Concept

September 27, 2021

Prepared by

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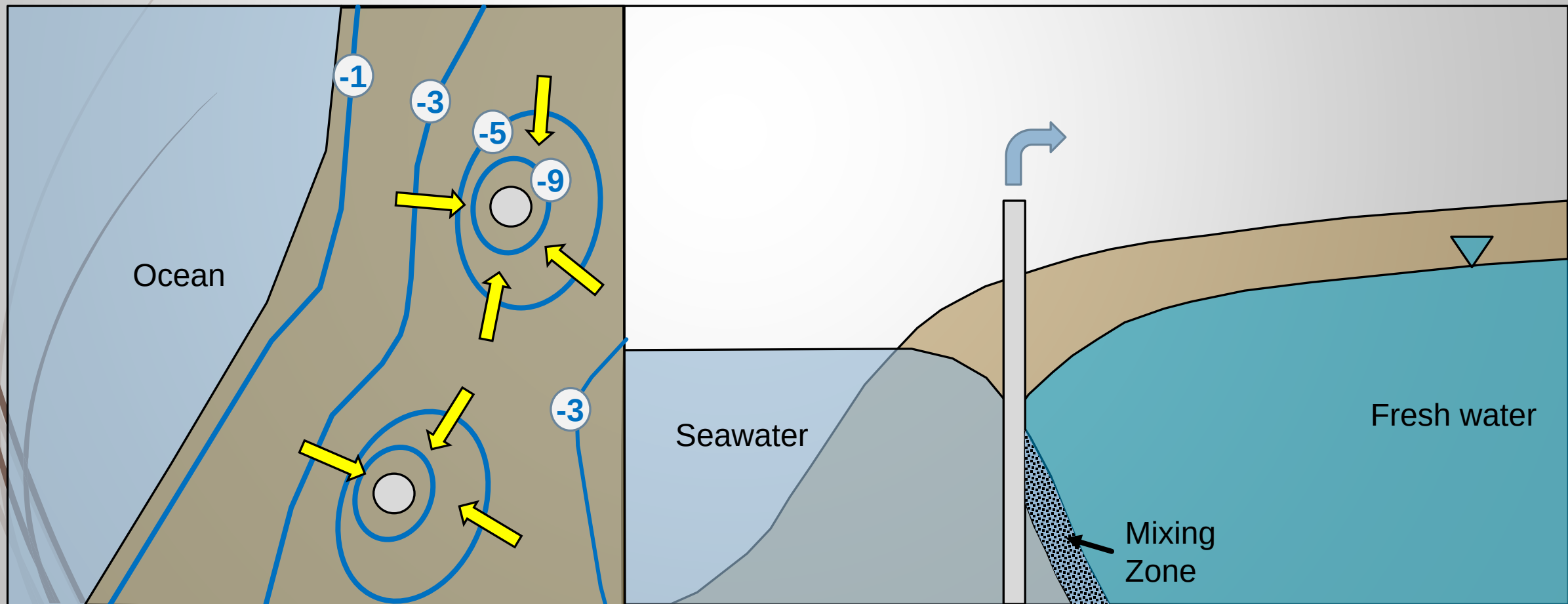
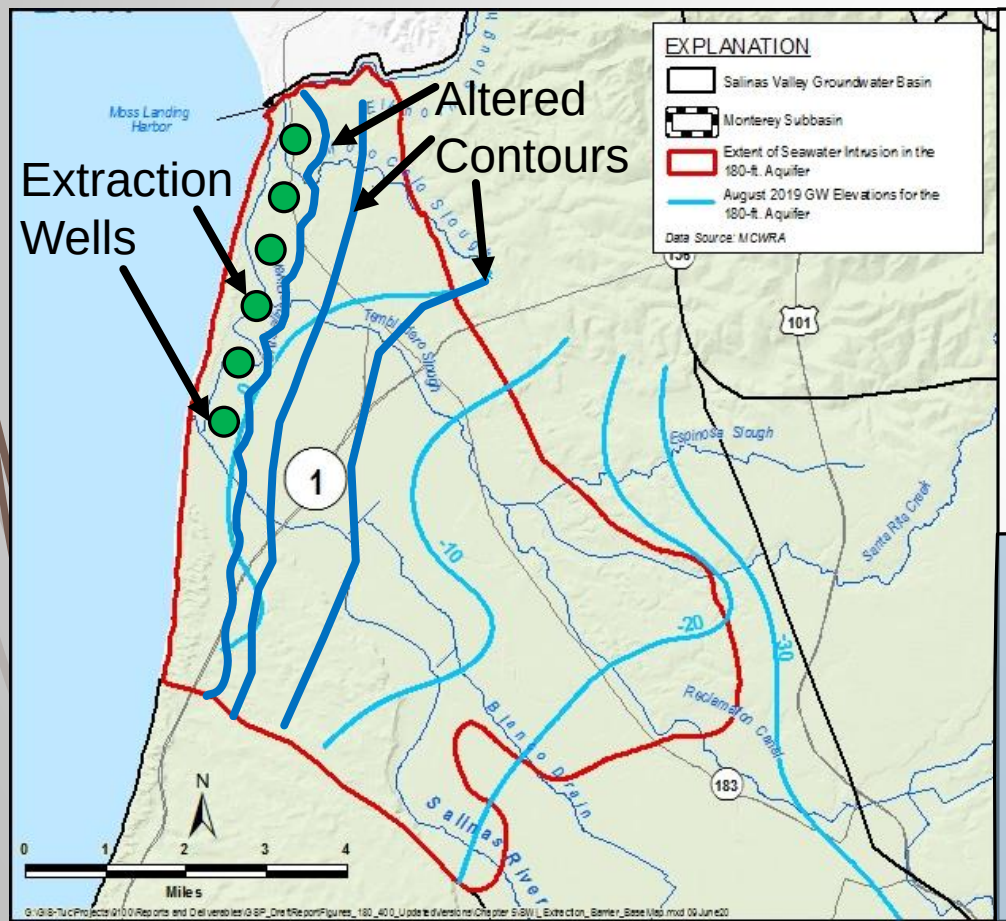
What is an extraction barrier, generally?

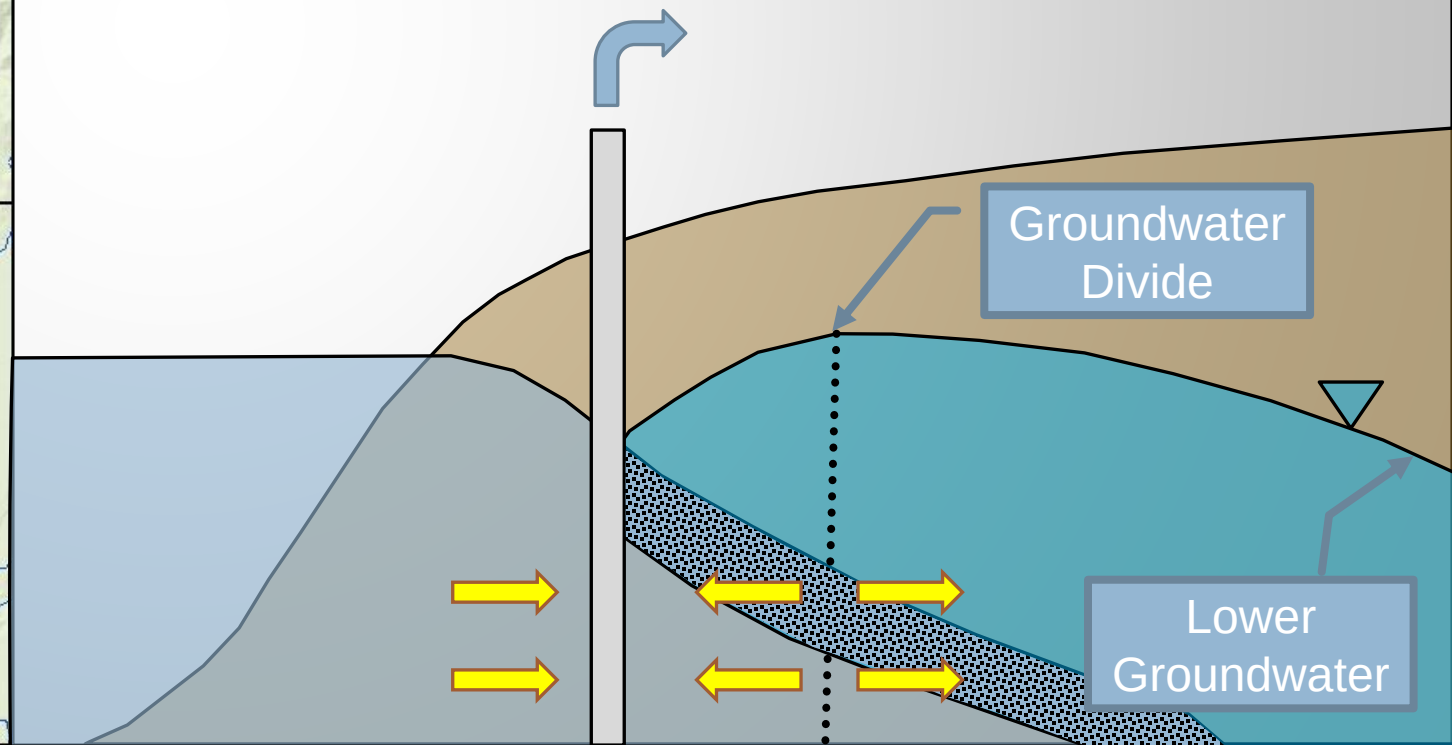
- Pull in seawater rather than push out seawater



What is an extraction barrier, Salinas Basin?

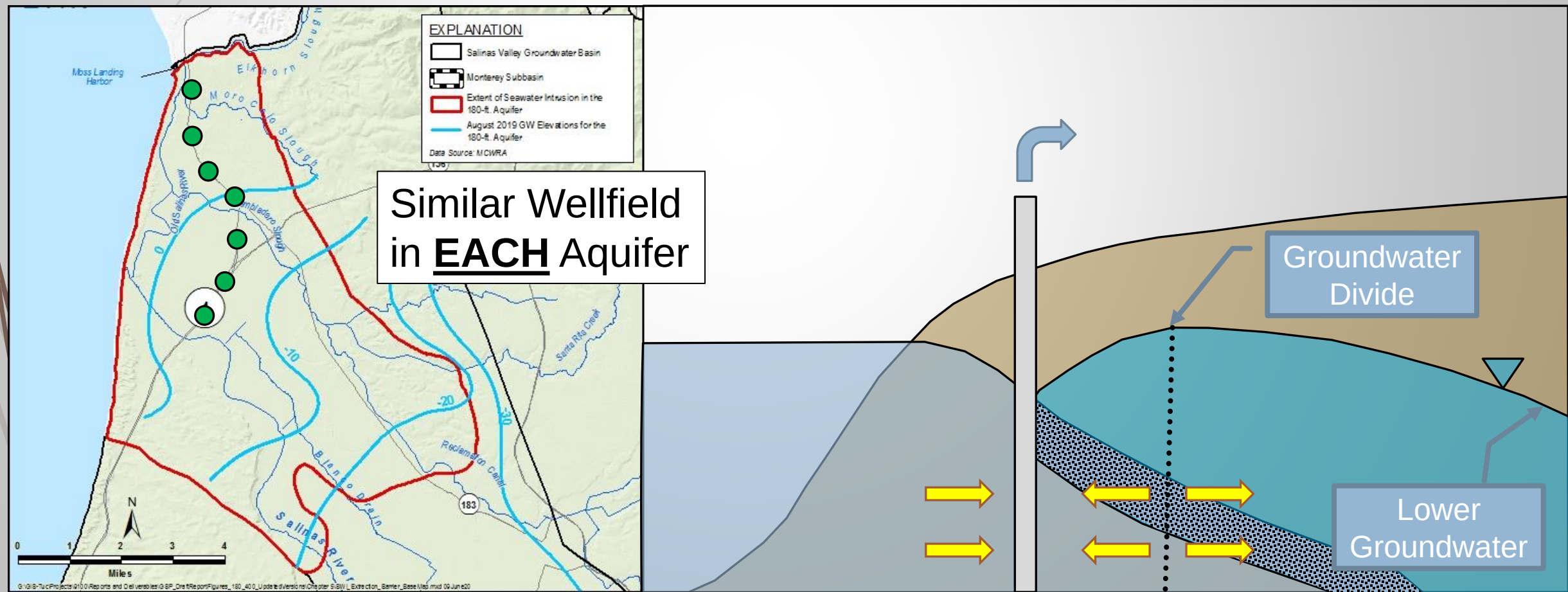
- Pull in seawater rather than push out seawater
- Creates an inland groundwater divide





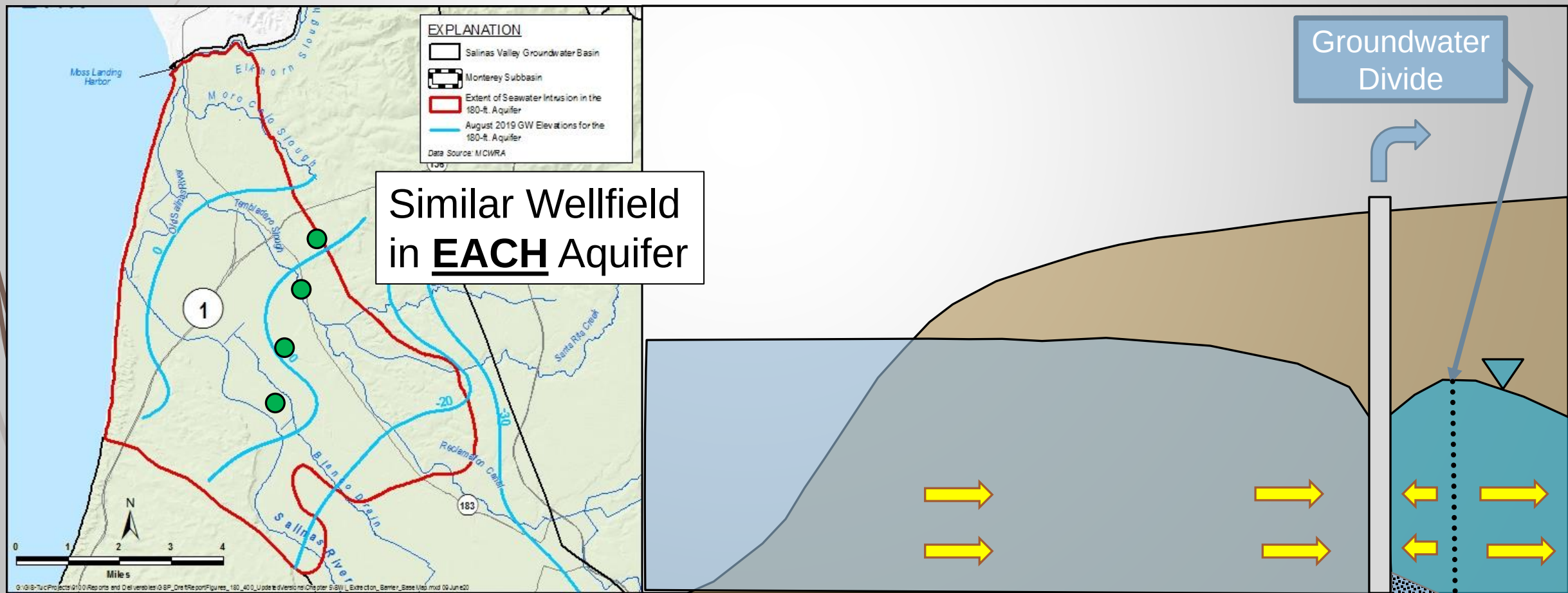
What would an extraction barrier look like in the Salinas Valley?

- Option 1- Highway 1. Protects more of aquifer, likely more wells needed and more pumping needed. Possibly more saline water – meaning higher treatment costs



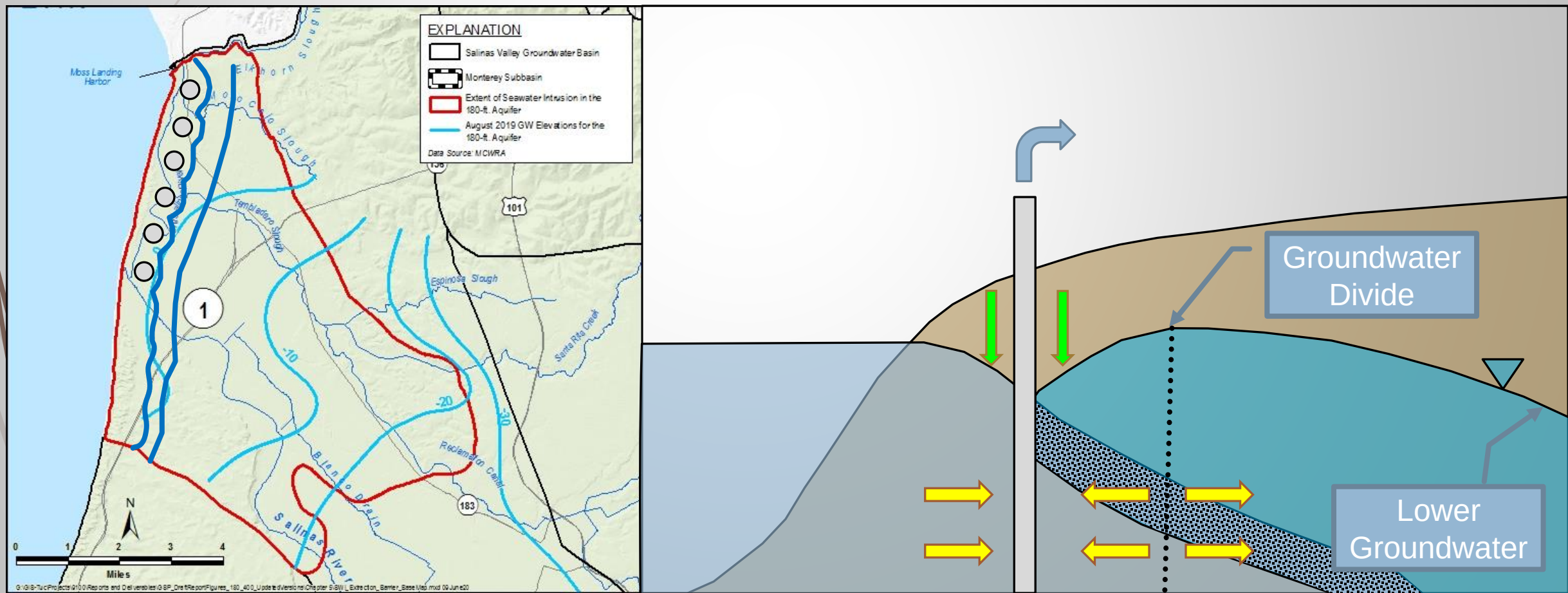
What would an extraction barrier look like in the Salinas Valley?

- Option 2- One and a Half Miles (?) inland. Allows more of the aquifer to be intruded, likely fewer wells and less pumping needed. Possibly more brackish water – meaning lower treatment (desalting) costs.



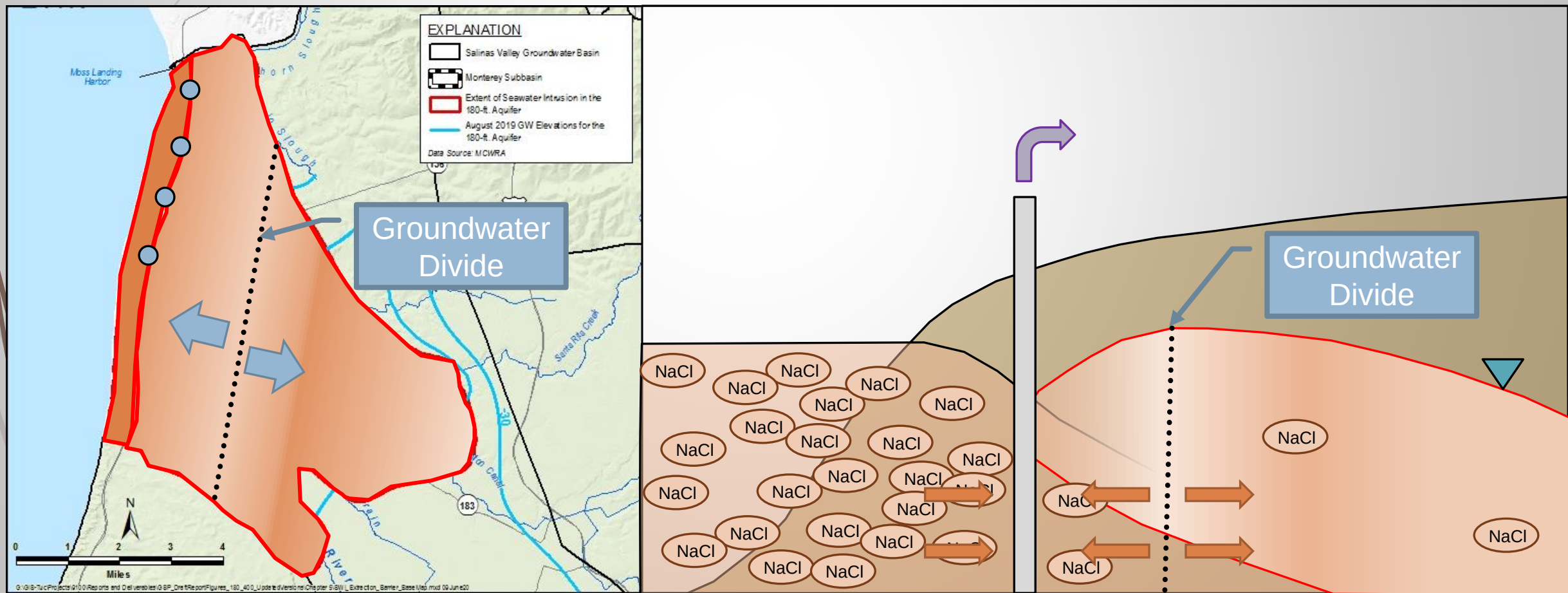
What are the anticipated impacts to groundwater levels?

- Groundwater levels only need to be lowered locally to capture seawater.



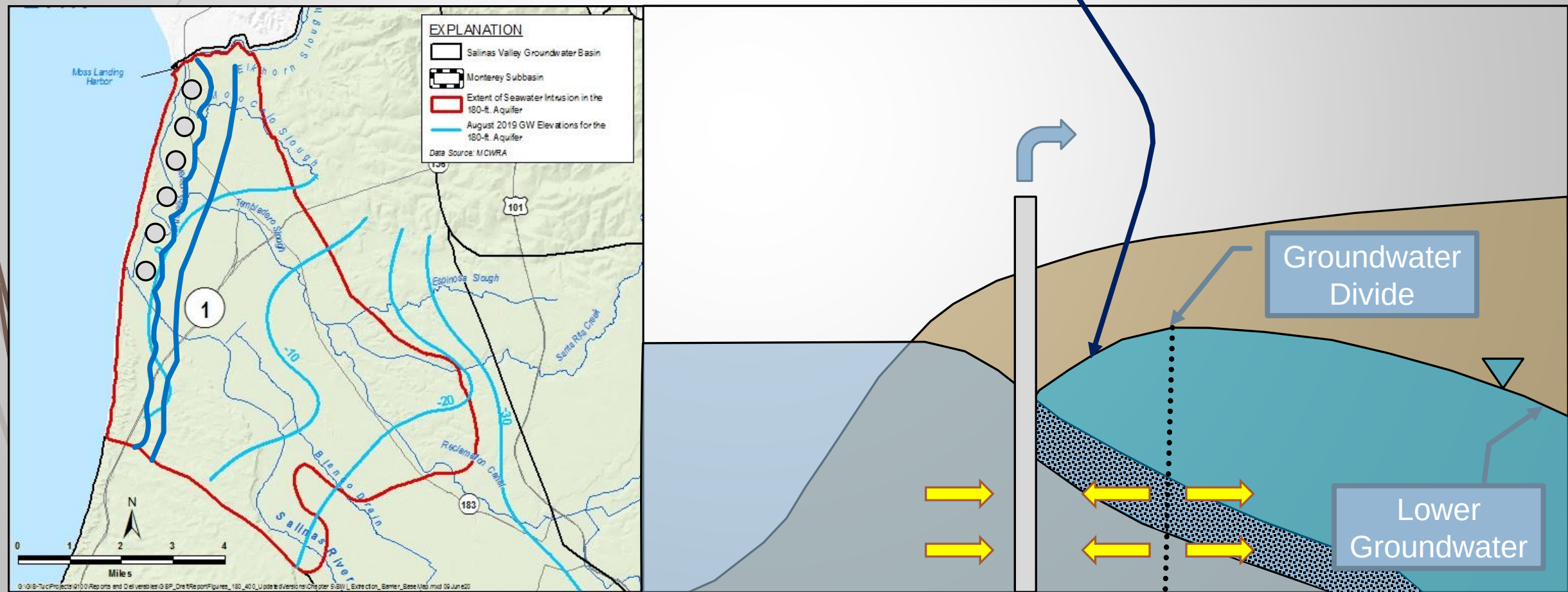
What are the impacts to existing seawater intrusion?

- Low concentration seawater inland of the barrier continues to migrate inland. This may influence barrier placement



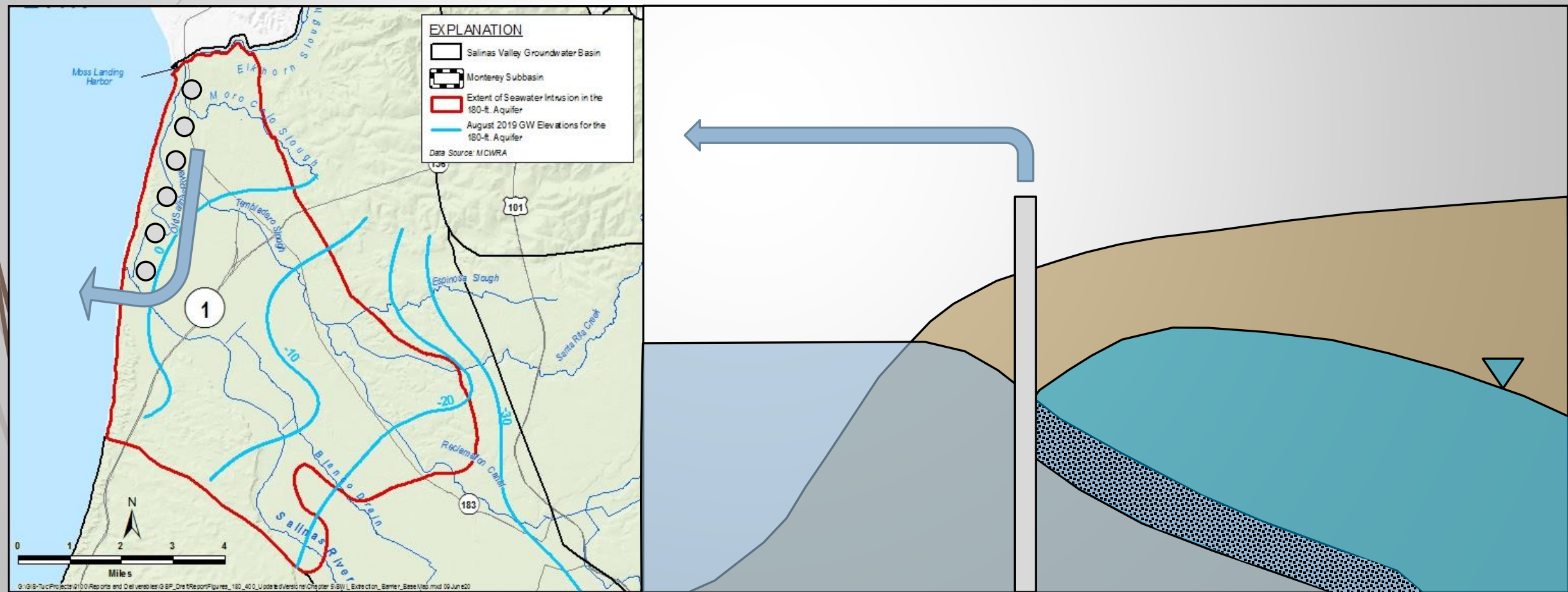
What are the anticipated impacts to groundwater storage?

- Removing fresh water from the inland side will reduce the amount of water in storage. This may influence how we dispose of extracted water



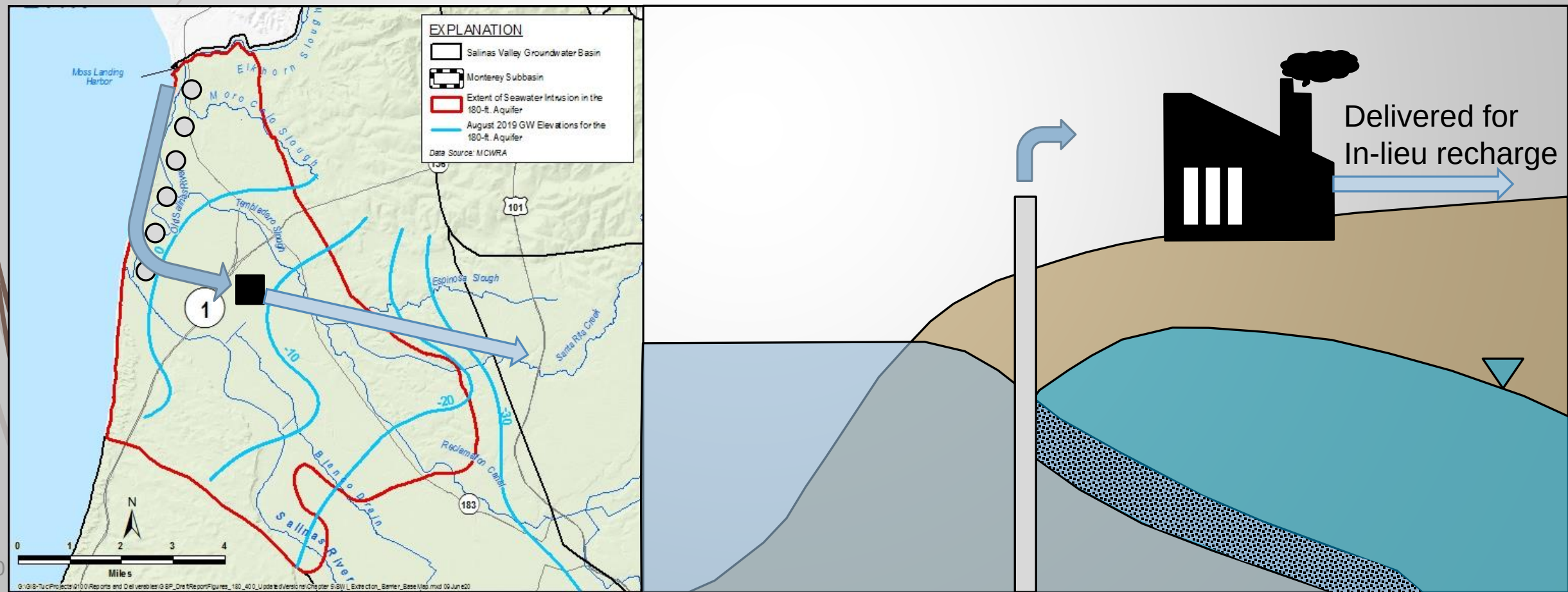
Water Disposal Option 1 – Ocean Outfall

- May need to reline M1W outfall.
- Results in a net loss of water from basin – including fresh water



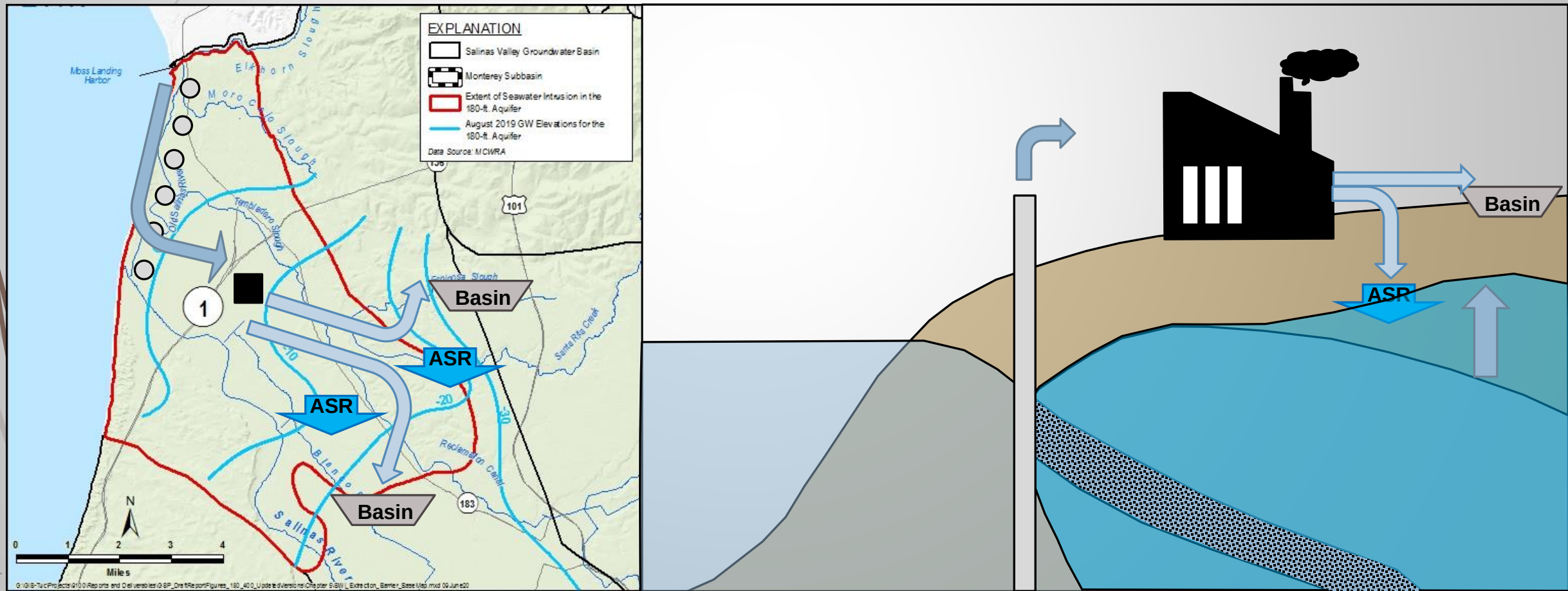
Water Disposal Option 2 – Desalting Plant

- May influence barrier location to get correct salinity for desalting
- No net loss of water from basin (or small addition of water)



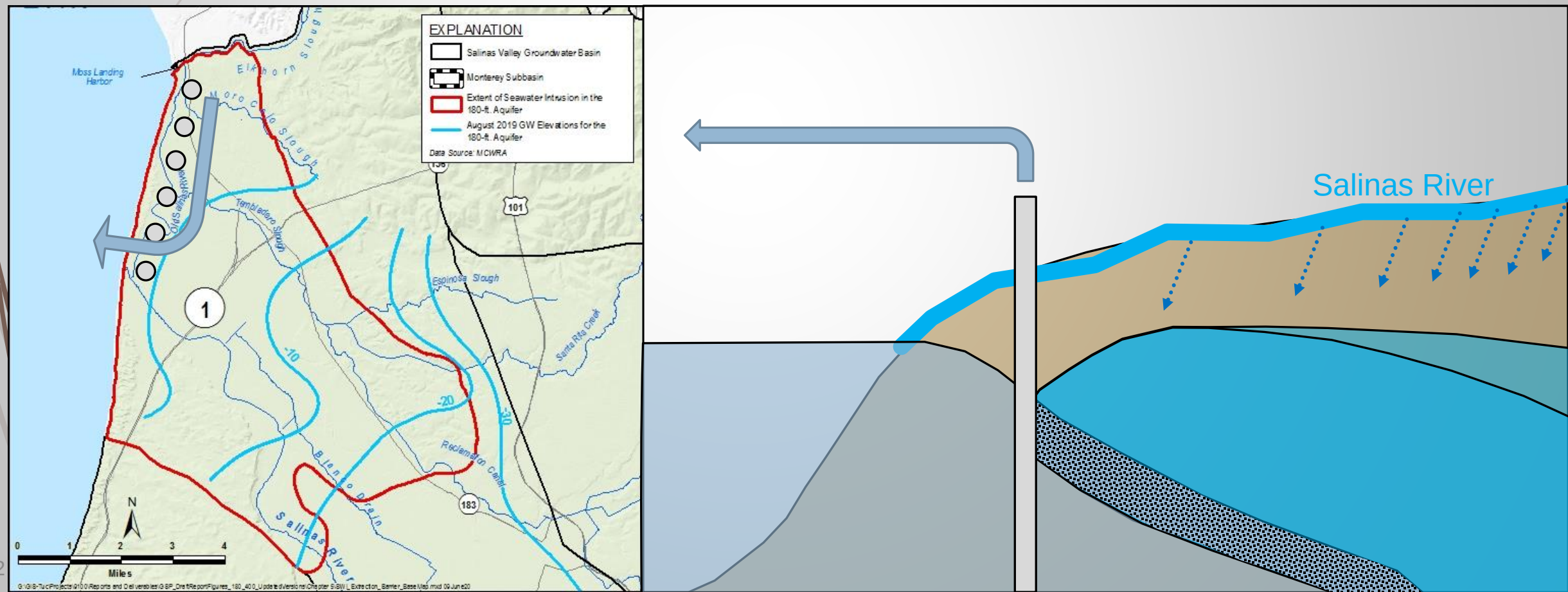
Water Disposal Option 3 – Desalting Plant and Recharge

- Likely only in times of limited demand for direct use due to costs
- No net loss of water from basin (or small addition)



Water Disposal Option 4 – Ocean Outfall with Enhanced Recharge

- Likely recharge of winter river water
- No net loss of water from basin



Example Numbers

- 18 wells: 9 in the 180-Foot Aquifer, 9 in the 400-Foot Aquifer
- 1,000 gpm each
- Total flow = 29,000 AF/yr.
- Desalting might provide 14,500 AF/yr. treated water
- Costs from 180/400-Foot GSP, Preferred Project 6: Seawater Intrusion Pumping Barrier
  - Capital Cost: $102,389,000
  - Annual O&M Cost: $9,800,000
  - Amortized Cost/AF: $590

Example Extraction Barriers

- Niles Cone, Alameda County
  - Initially only an extraction barrier
  - Now feeds a desalting plant
- Oxnard, Ventura County
  - Successfully halted intrusion
  - Wells eventually corroded

Extraction Barrier Advantages

- Halt seawater intrusion at the barrier location
- Works where in-lieu (pumping reduction) may not work
- Potentially provide alternative source of water if paired with a desalting plant
  - Available for direct delivery (in-lieu use), barrier injection, ASR, irrigation
  - Desalted water is available year-round

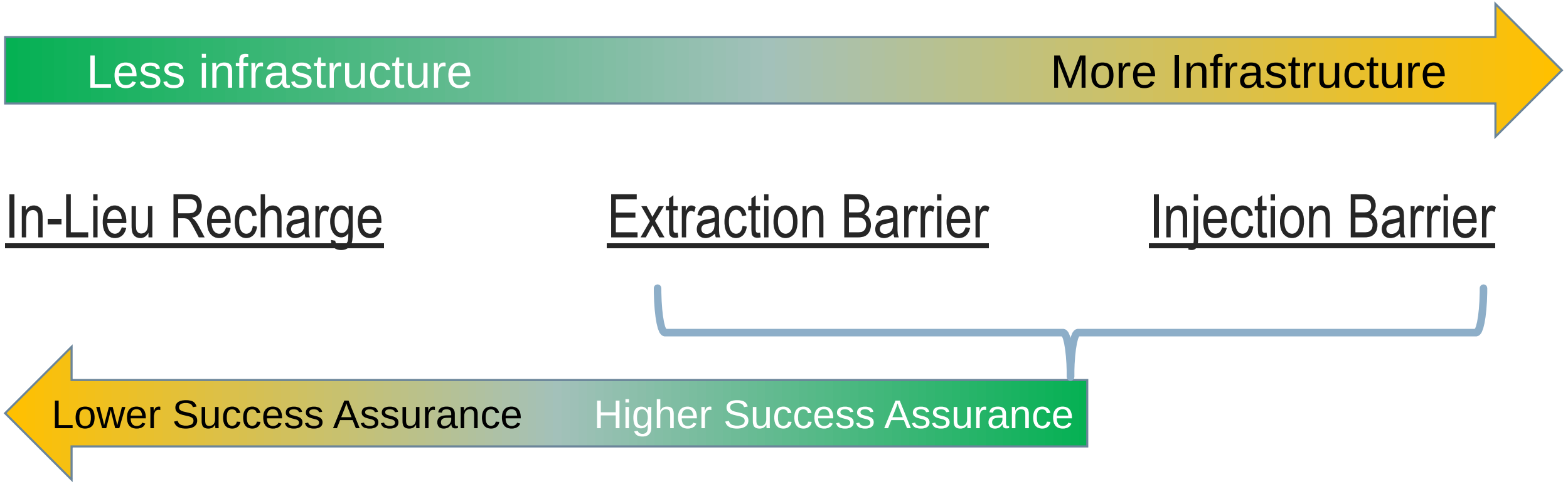
Extraction Barrier Disadvantages

- Without pairing with another project, extracted water is not put to beneficial use
- Without pairing with another project, ultimately harms subbasin water balance

Discussion – Extraction Barrier

- Regardless of pro/cons, project will be expensive in terms of:
  - Land
  - Access
  - Materials/Infrastructure
  - Installation/Construction
  - Energy
- Who benefits? Who pays?
- What does this mean for the Basin as a whole?

M&A Review of Project Types



Discussion