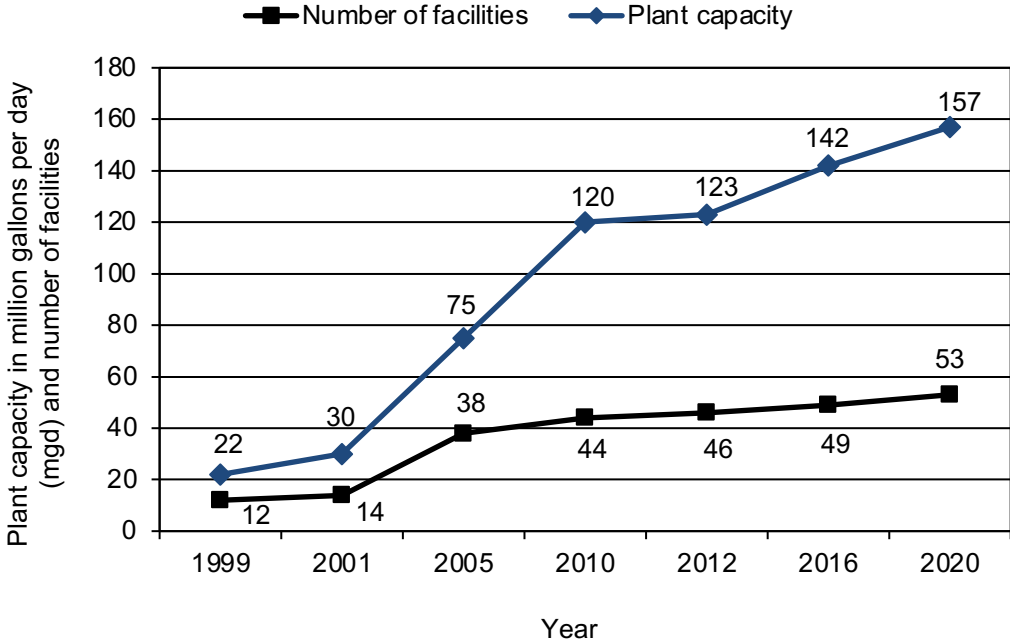


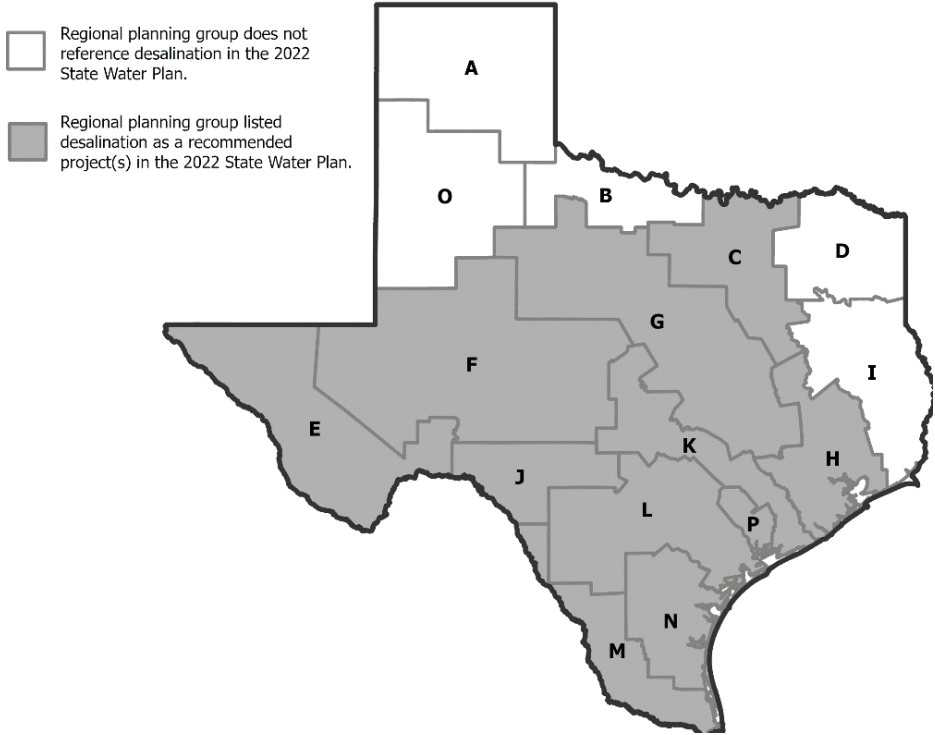
Texas Desalination Plant Concentrate Management Methods

William Delgado, Ph.D.
Desalination & Reuse Engineering Specialist
Innovative Water Technologies
Texas Water Development Board (TWDB)

Overview of Desalination in Texas

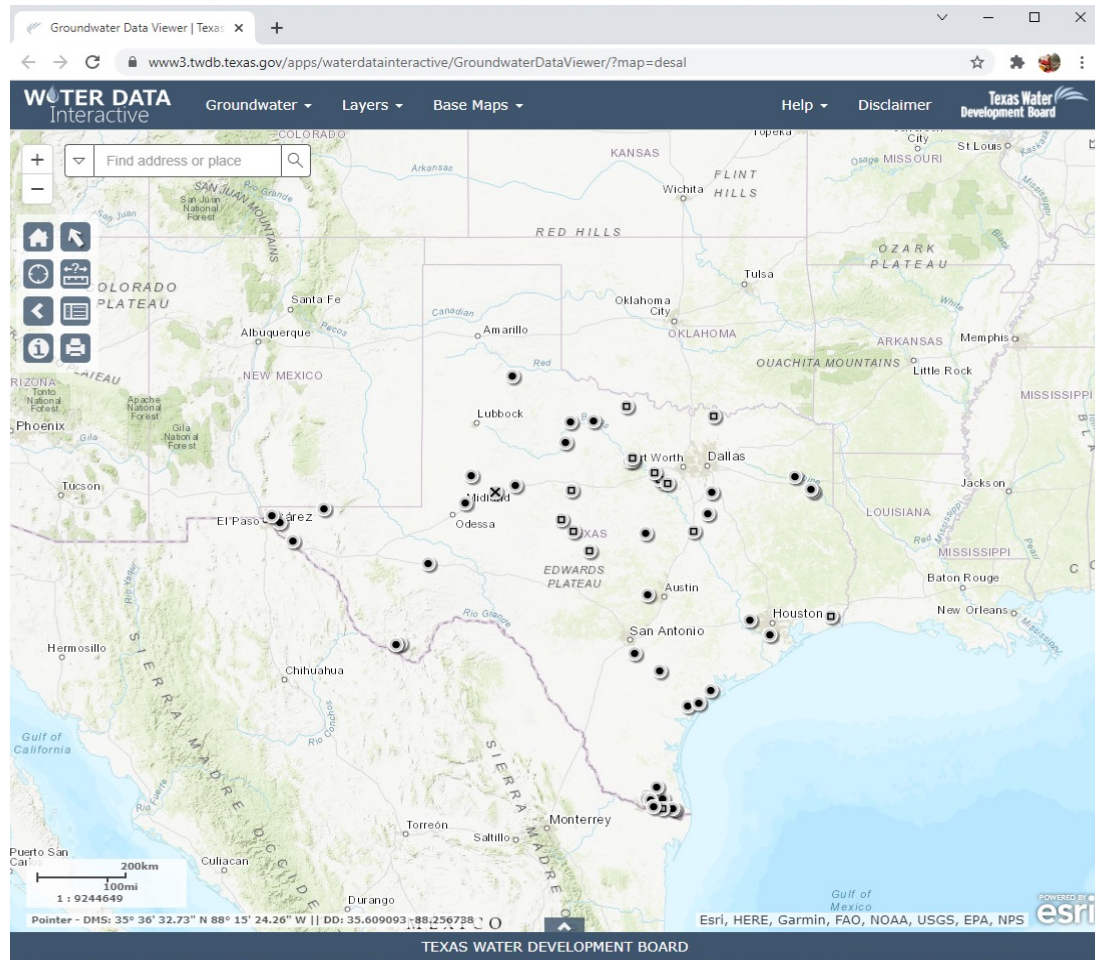


Growth of desalination in Texas from 1999 through 2020



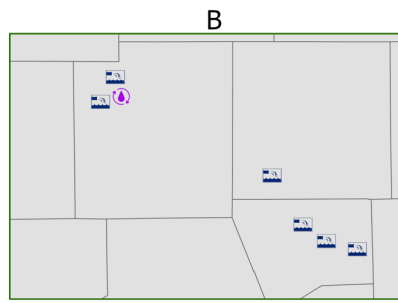
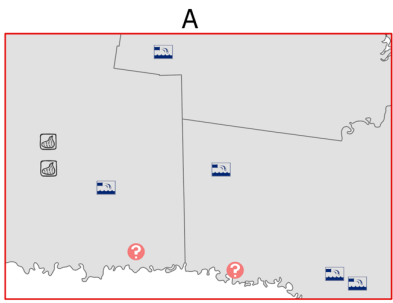
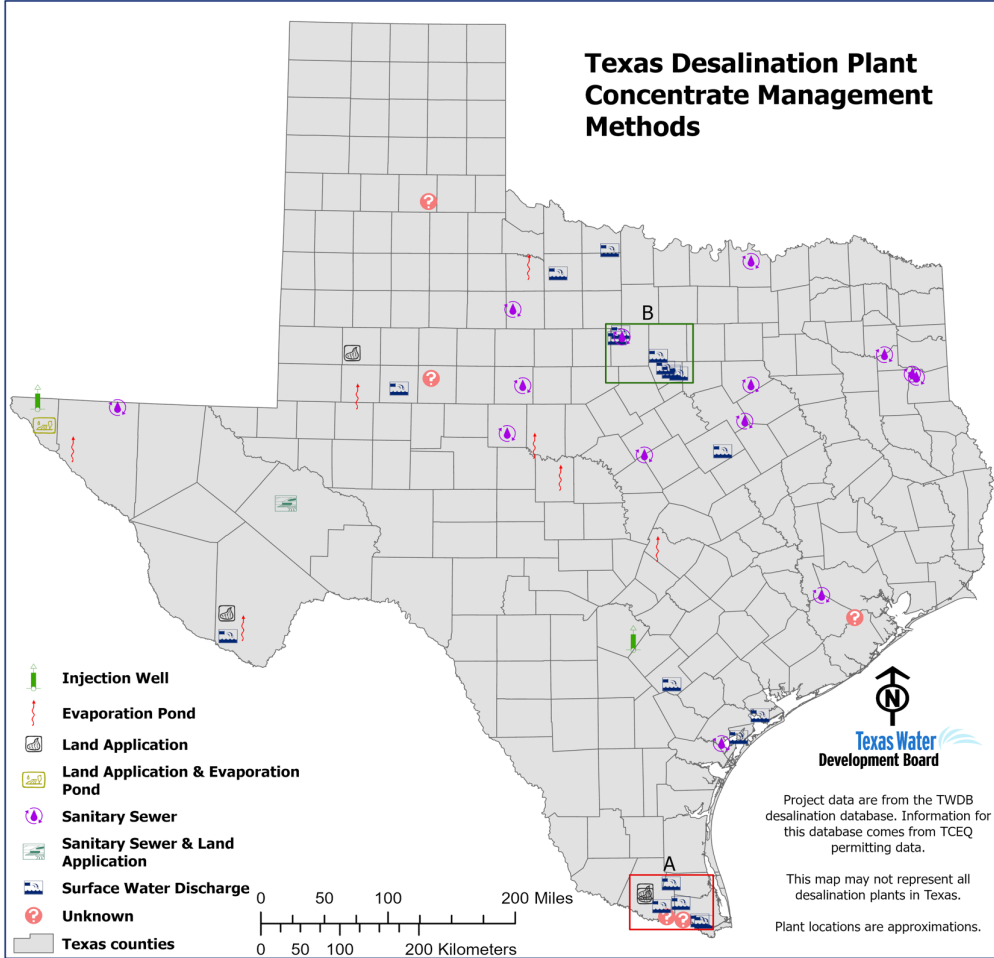
Regional Water Planning Groups that recommend desalination as a water management strategy in the 2022 State Water Plan

Desalination Database

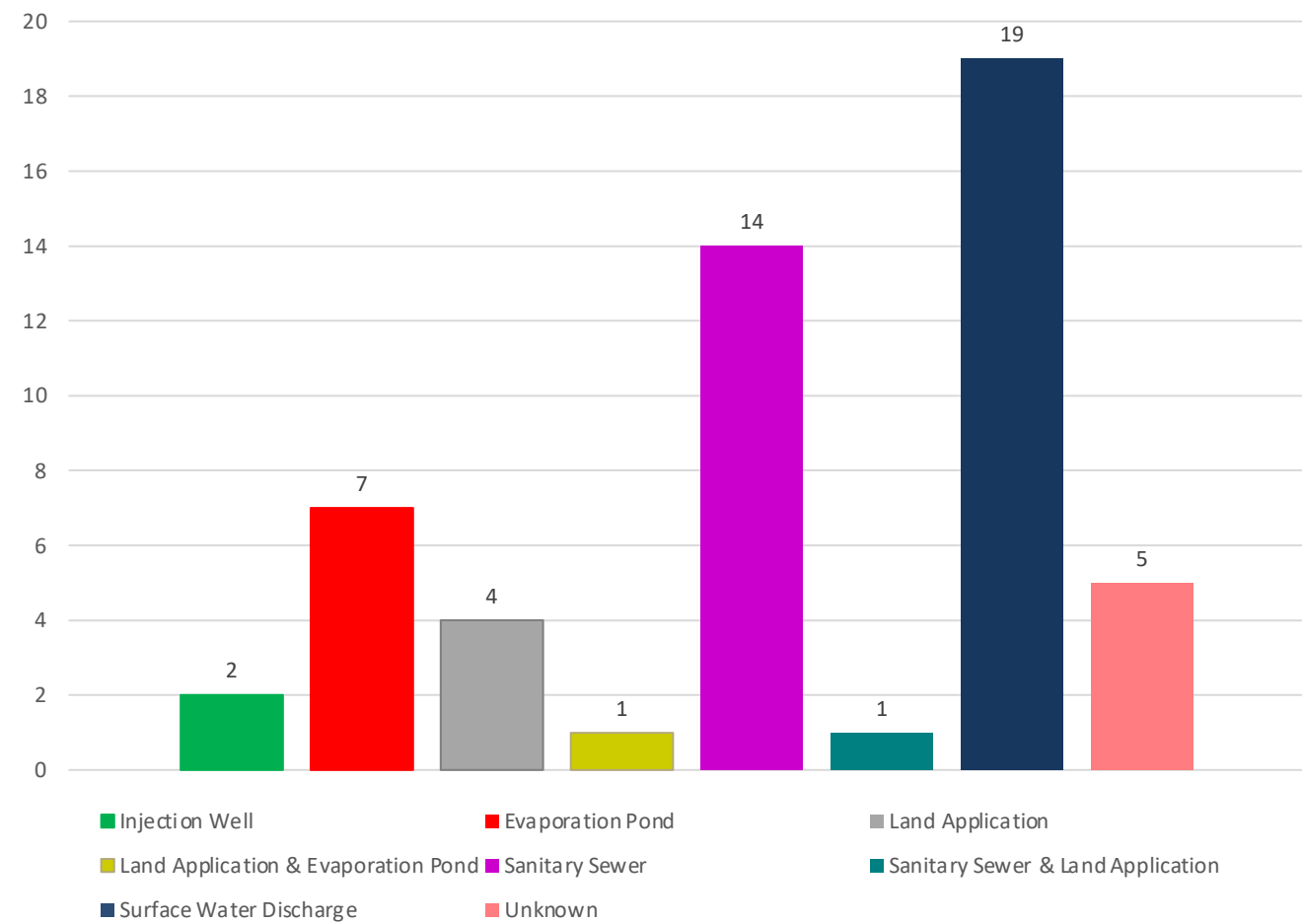


TWDB [Desalination Database](https://www3.twdb.texas.gov/apps/waterdatainteractive/GroundwaterDataViewer/?map=desal)

- Provides key production and feedwater information for each facility
 - Only includes municipal facilities with production capacity >0.025 MGD
- Updated ~5 years – 2020 was last update
- Created in 2005 by Bureau of Economic Geology with TWDB funds
- Information obtained from surveys and follow-up interviews

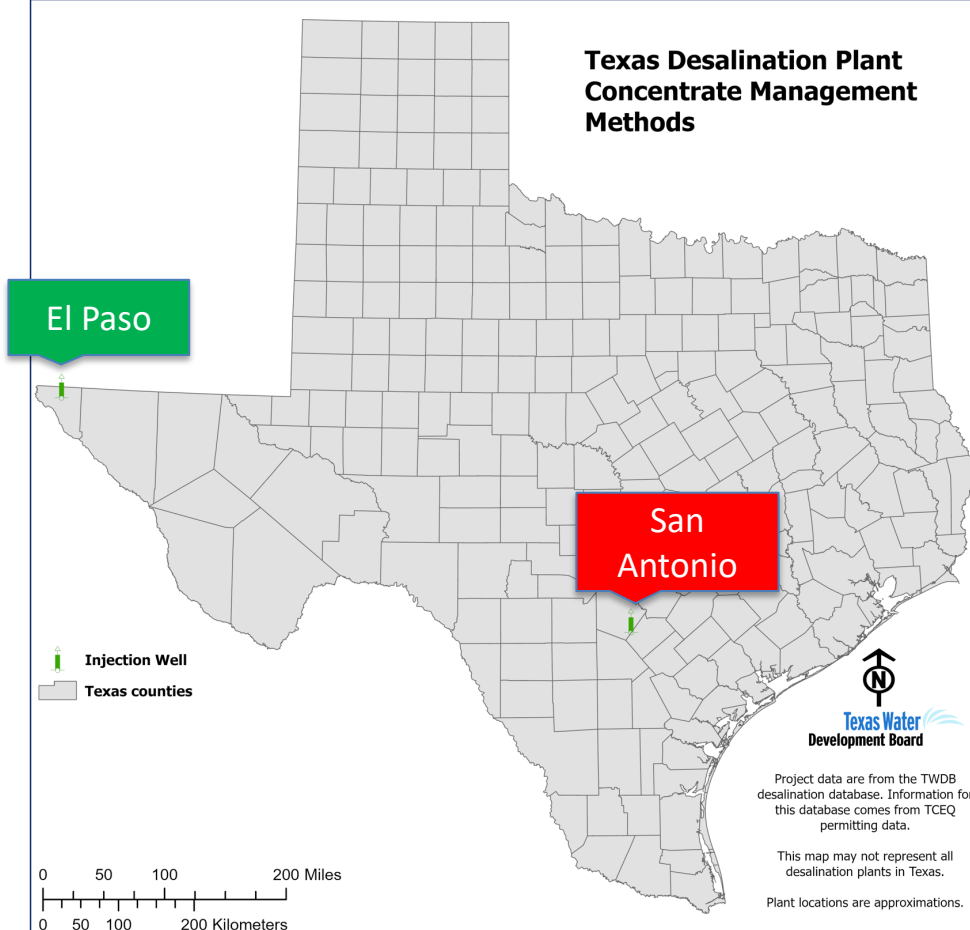


Texas Desalination Plant Concentrate Management Methods



- Information sourced from 2020 desalination database survey & TCEQ permitting data

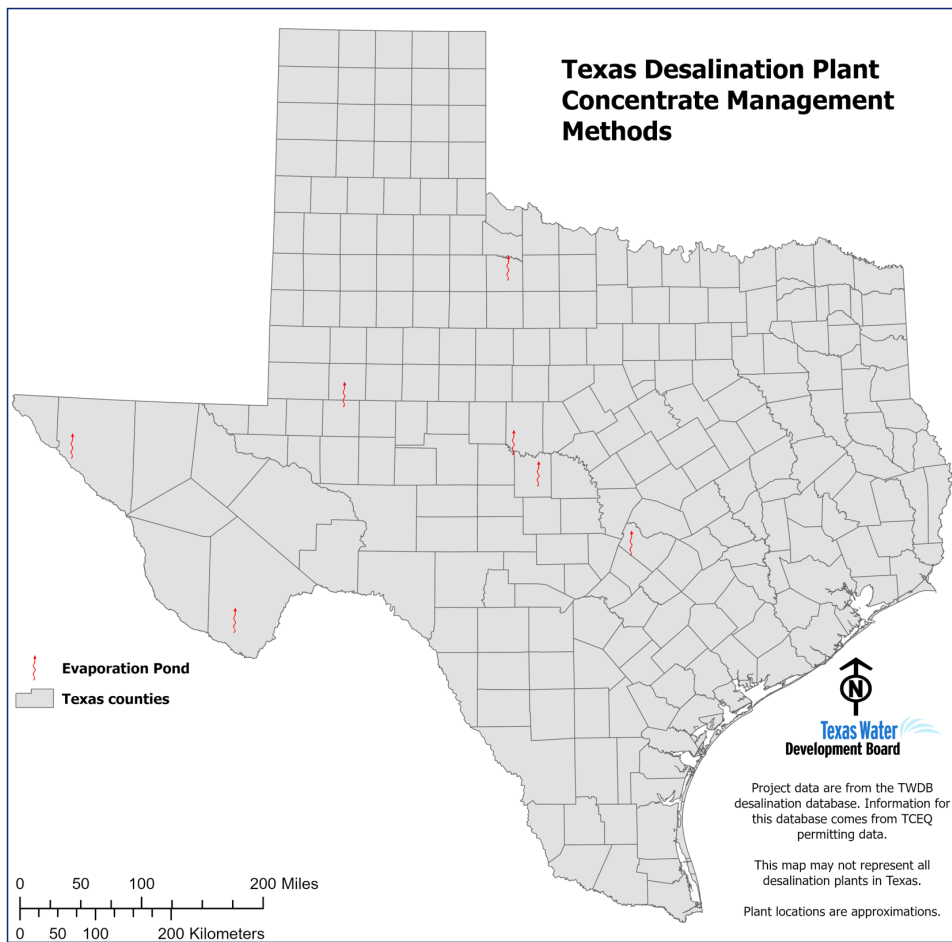
Texas Desalination Plant Concentrate Management Methods



Injection Wells

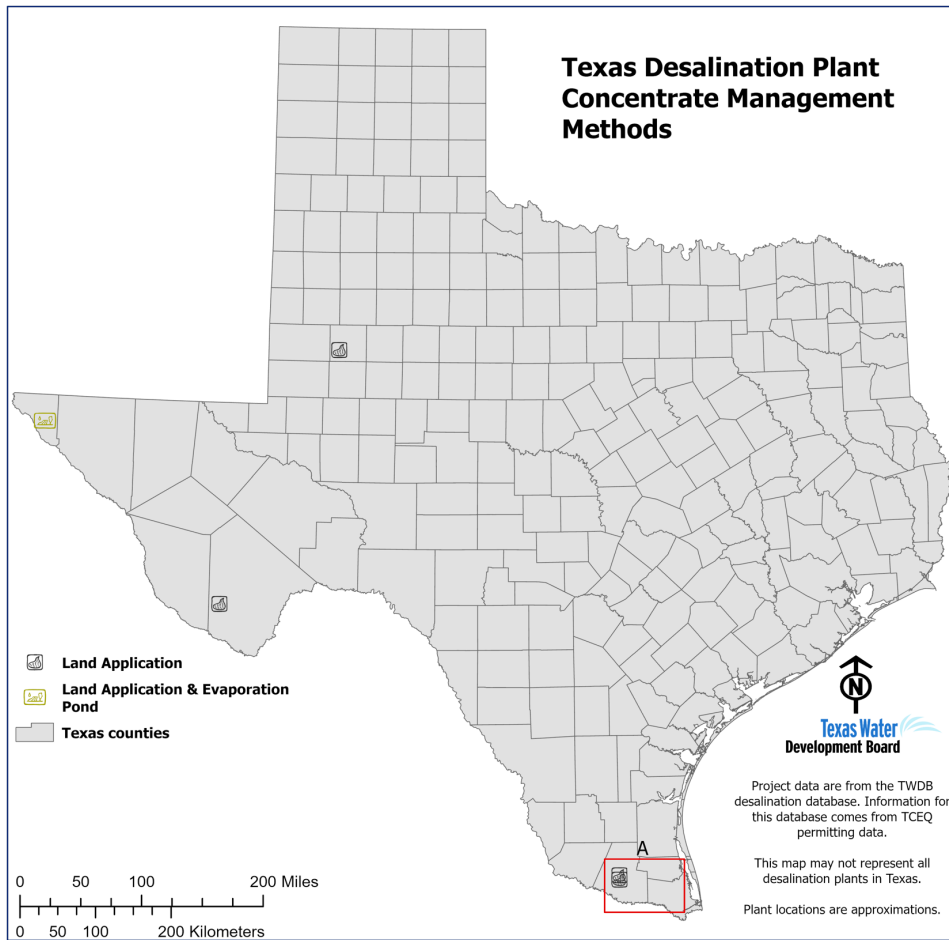
- Requires Class I underground injection control permit from Texas Commission on Environmental Quality & appropriate geology
- Aquifer must have one or more confining layers
- Typically used for plants with high concentrate volumes and/or dangerous contaminants (e.g. arsenic)

<i>Facilities that use injection wells</i>	Number of injection wells	Concentrate TDS (mg/L)	Well Depth (feet)	Formation TDS (mg/L)
Kay Bailey Hutchison - El Paso	3	11,650	Up to 4,000	9,000
H2Oaks Center - San Antonio	2 - there are 5 wastewater well permits associated with the facility	15,000	5,000	10,000



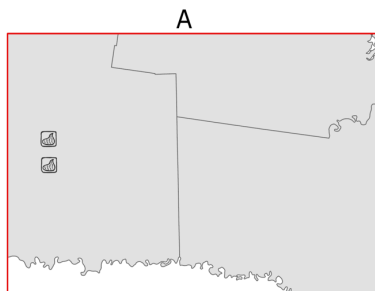
Evaporation Ponds

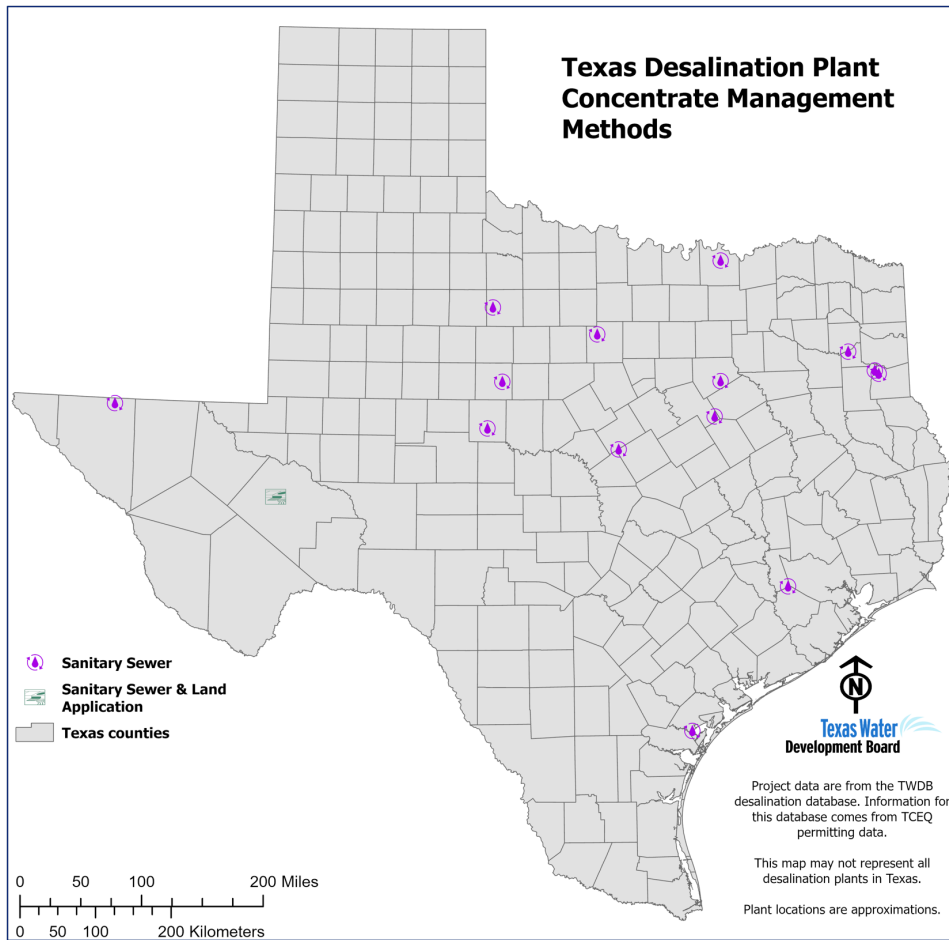
- Concentrate separated from water via evaporation
 - Solid concentrate goes to waste disposal facility
 - Waste disposal fees can be costly
- Requires dry climate with lots of space
- Typically require impervious lining for environmental protection



Land Application

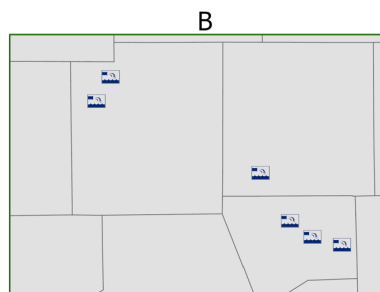
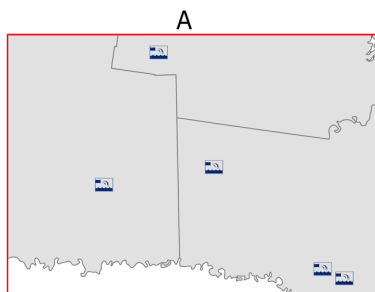
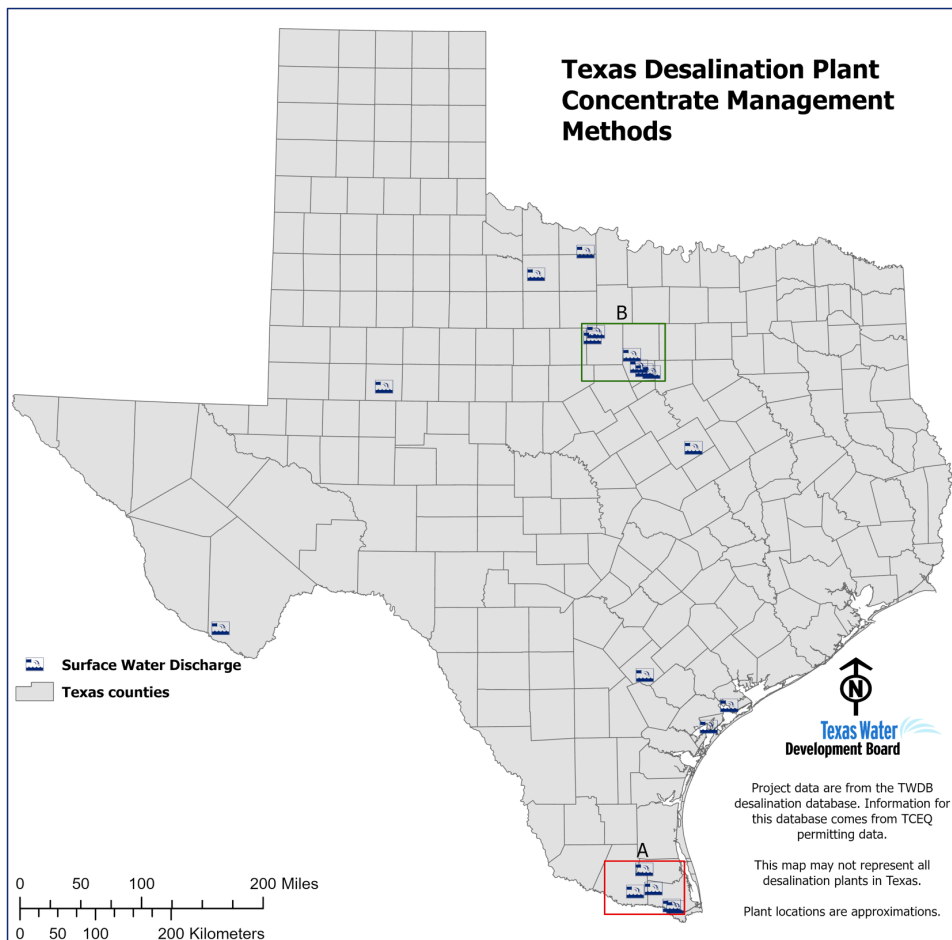
- Appropriate for small facilities with low concentrate volumes
- Can be applied to plants with high salt tolerance
- Soil health and local regulations are important considerations





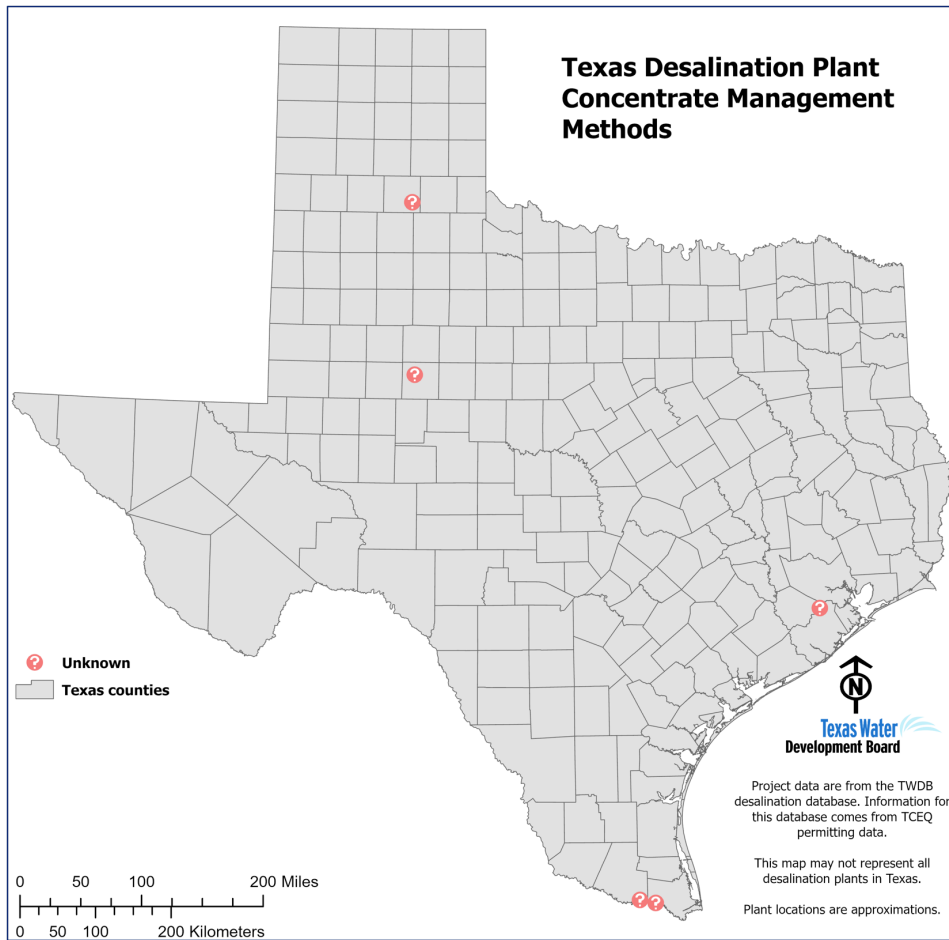
Sanitary Sewer Discharge

- Concentrate goes to wastewater treatment plant
- Concentrate diluted with wastewater influent
- Wastewater treatment plants must report to Texas Commission on Environmental Quality (TCEQ) when accepting concentrate



Surface Water Discharge

- Requires TCEQ permit
- Permit based on concentrate volume and contaminant concentration regulates:
 - Flow
 - Contaminant concentration
Total Dissolved Solids
- Permits issued on case-by-case basis
 - Valid for 5 years – terms can change on renewal
 - Involves environmental assessment on receiving body of water
 - Concentrate samples required
- Public can provide feedback before permit issuance



Unknown

- Some respondents did not disclose concentrate disposal method
- Others did not answer every survey question
- We are working on filling data gaps

Innovative Concentrate Management



Critical Minerals Corporation Facility in El Paso

Photo Credit: [Critical Minerals Corporation](#)

Critical Minerals Corporation – El Paso

- Further processes brine from Kay Bailey Hutchison Plant
 - Removes all water from brine stream
 - Uses proprietary membrane process
- Extracts valuable resources from brine stream
 - Lithium carbonate
 - Lithium hydroxide monohydrate
 - Gypsum for agriculture
 - HCl for oil & gas industry
 - NaOH for paper manufacturing

Contact Information

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For more information

