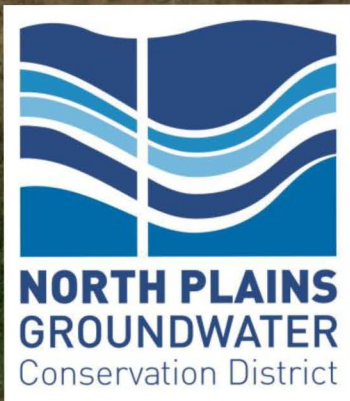
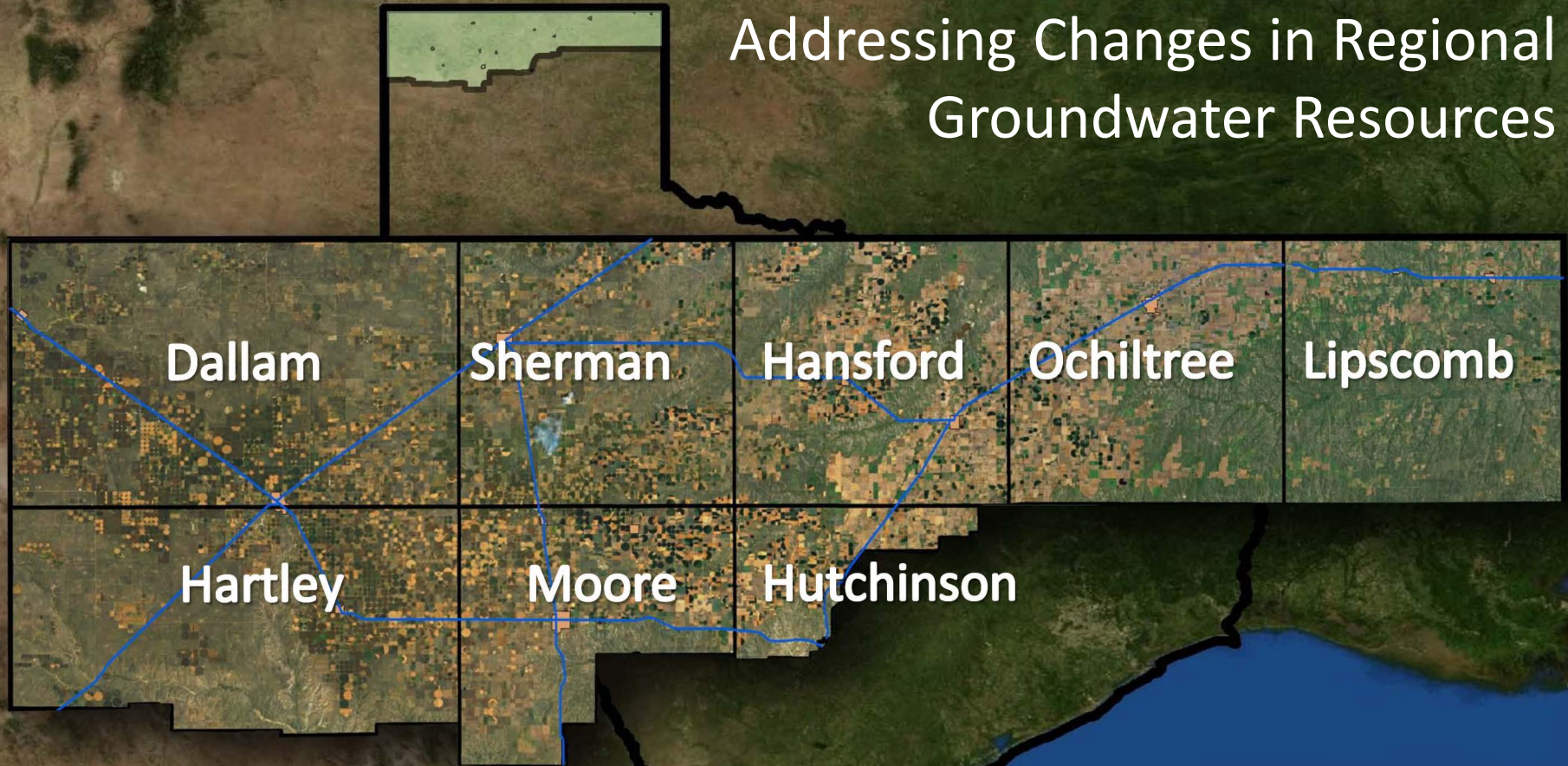


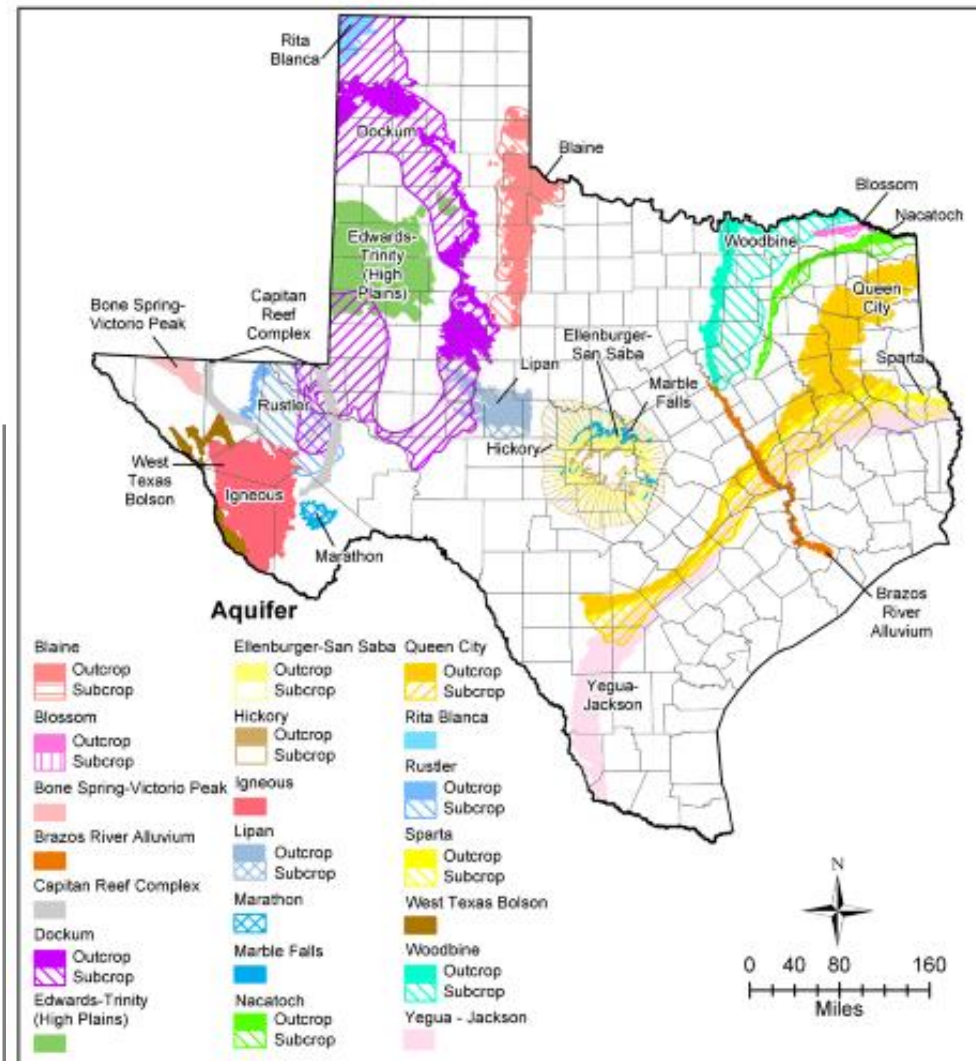
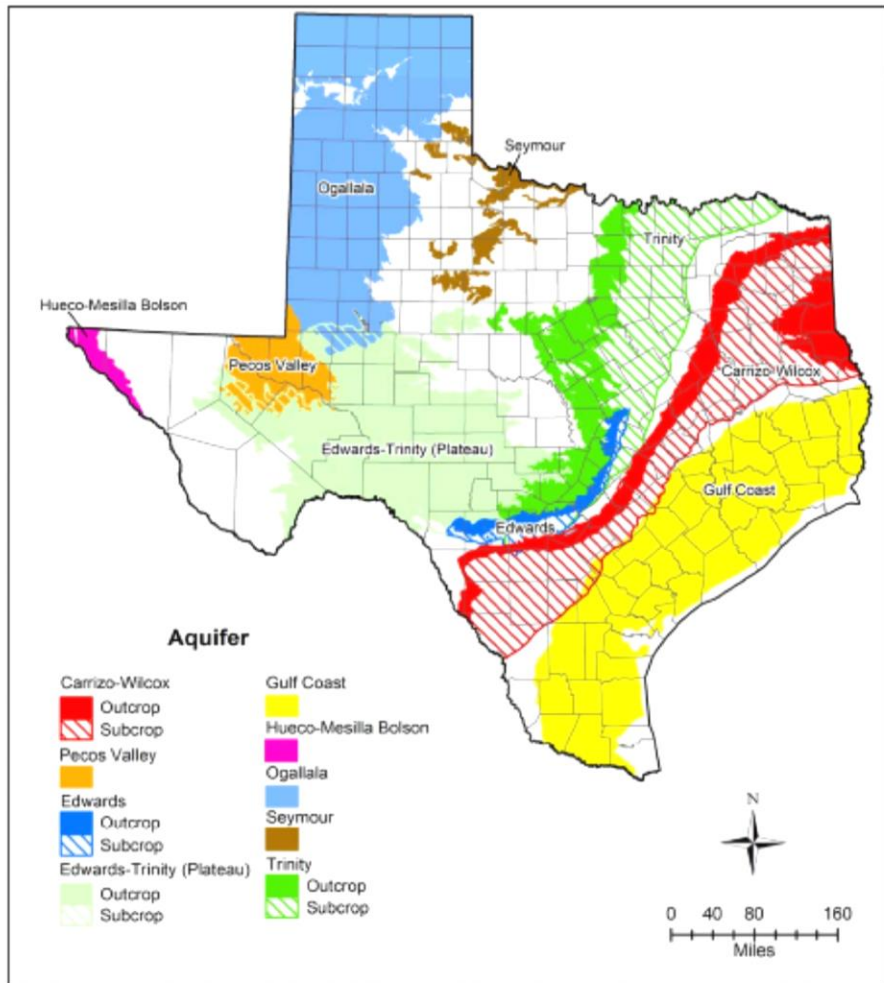
2016 AGI Critical Issues Forum: Addressing Changes in Regional Groundwater Resources



High Plains Aquifer: A
Perspective from Texas
Steve Walthour, PG
October 27, 2016

Texas Aquifers

Major Aquifers



Minor Aquifers

High Plains Aquifer System (HPAS) Model

Ogallala Aquifer

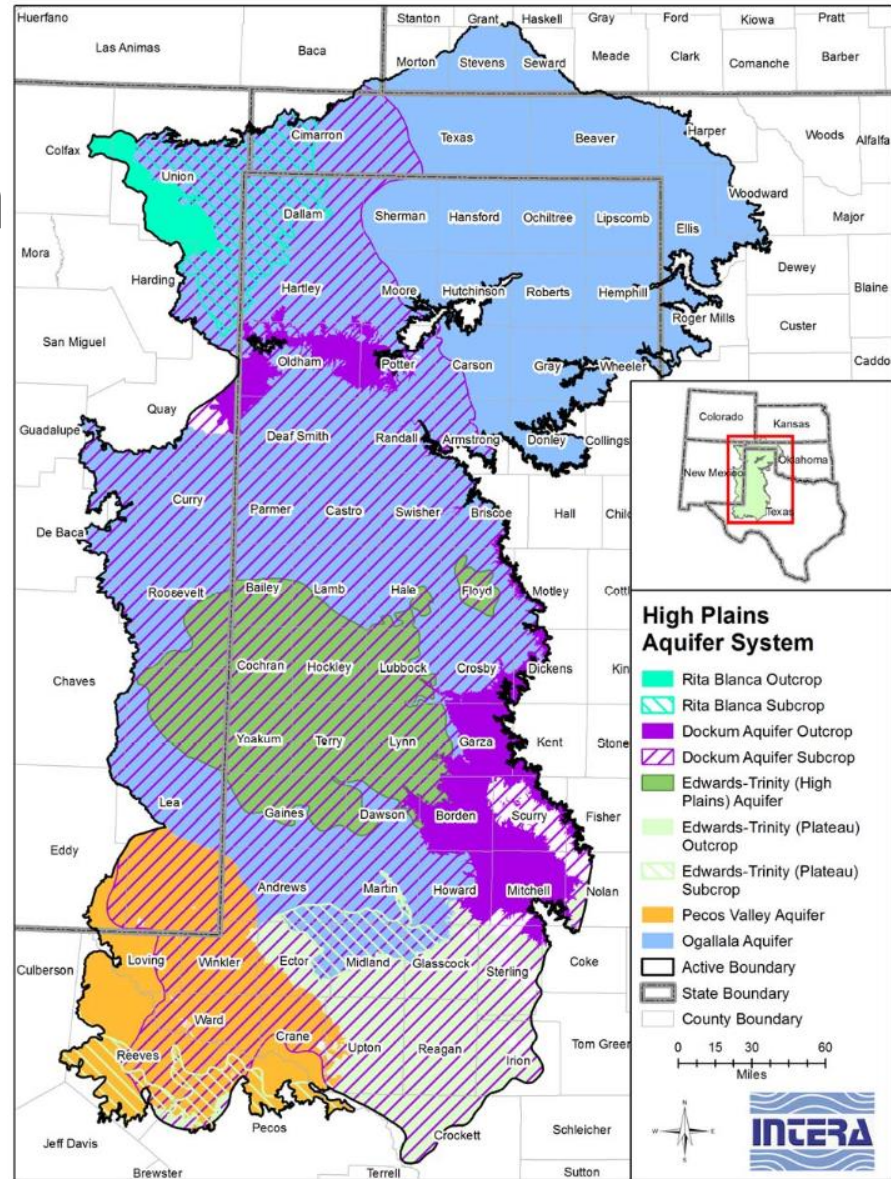
Rita Blanca Aquifer

Dockum Aquifer

Edwards – Trinity
Aquifer

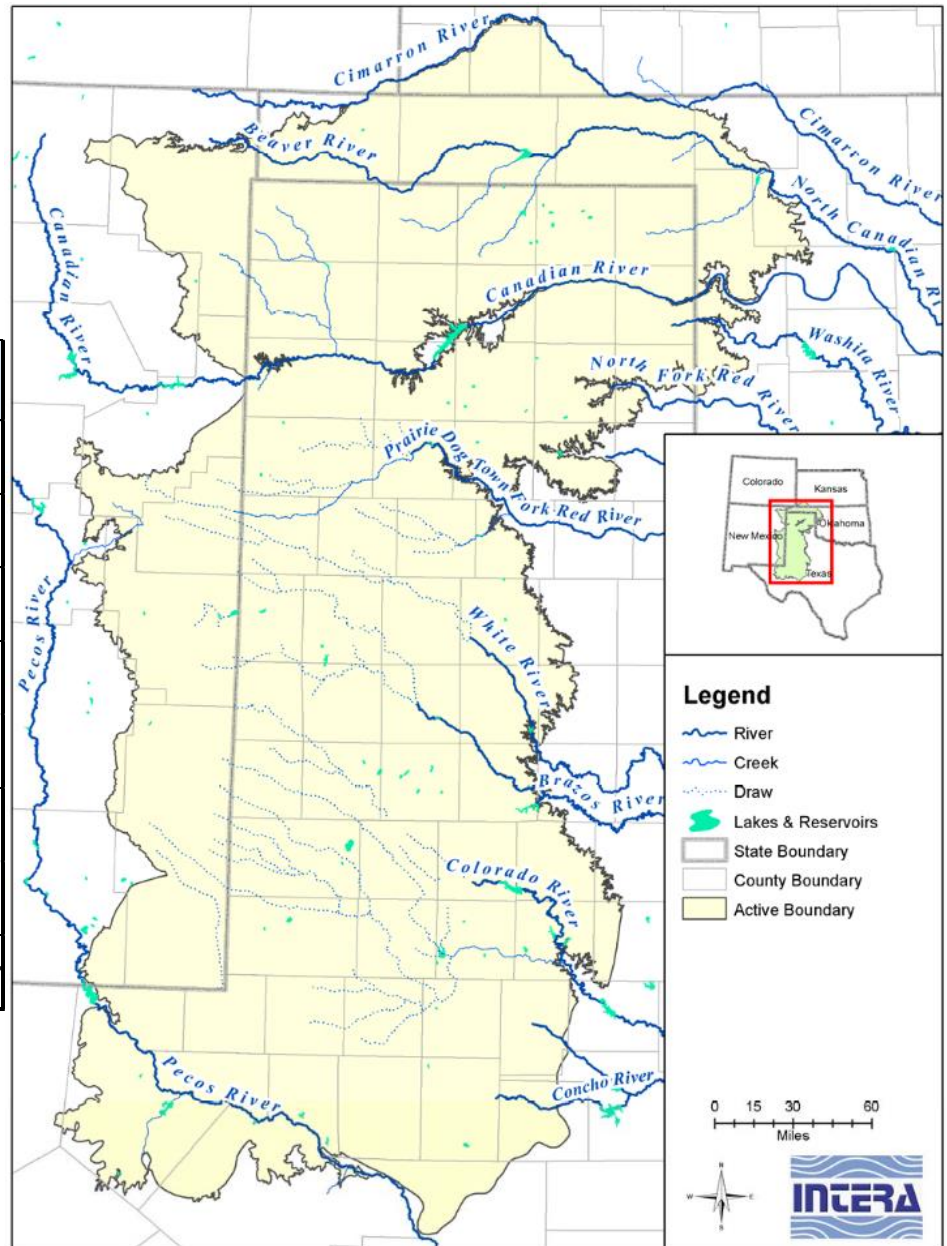
Pecos Valley Aquifer

From: TWDB HPAS Report
(INTERA 2015)



HPAS River Basins

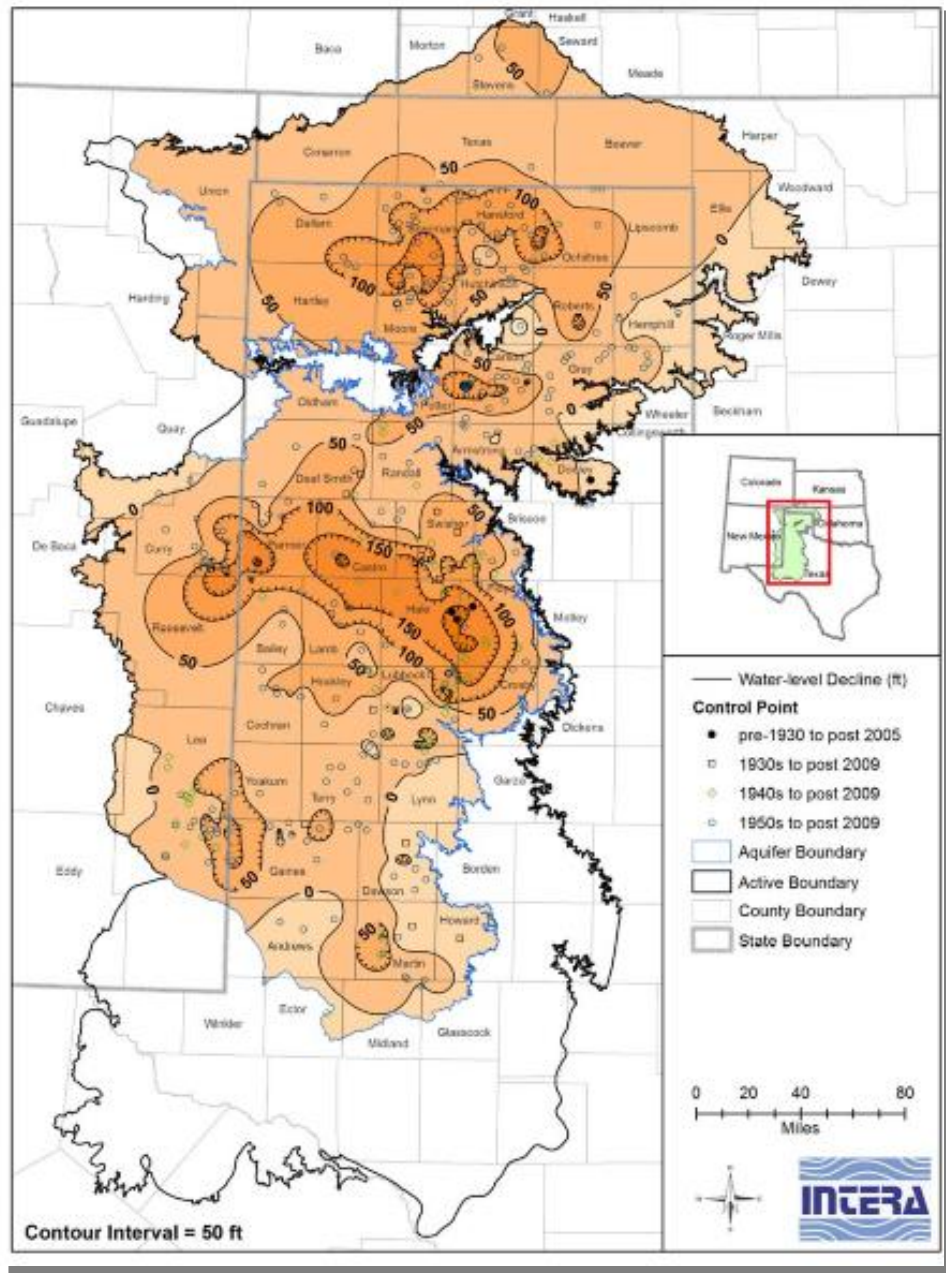
Basins	River
Rio Grande	Pecos River
Colorado	Colorado River
Brazos	Brazos River
Red	Red River
	Washita River
Canadian	Canadian River
	Beaver River
Arkansas	Cimarron River



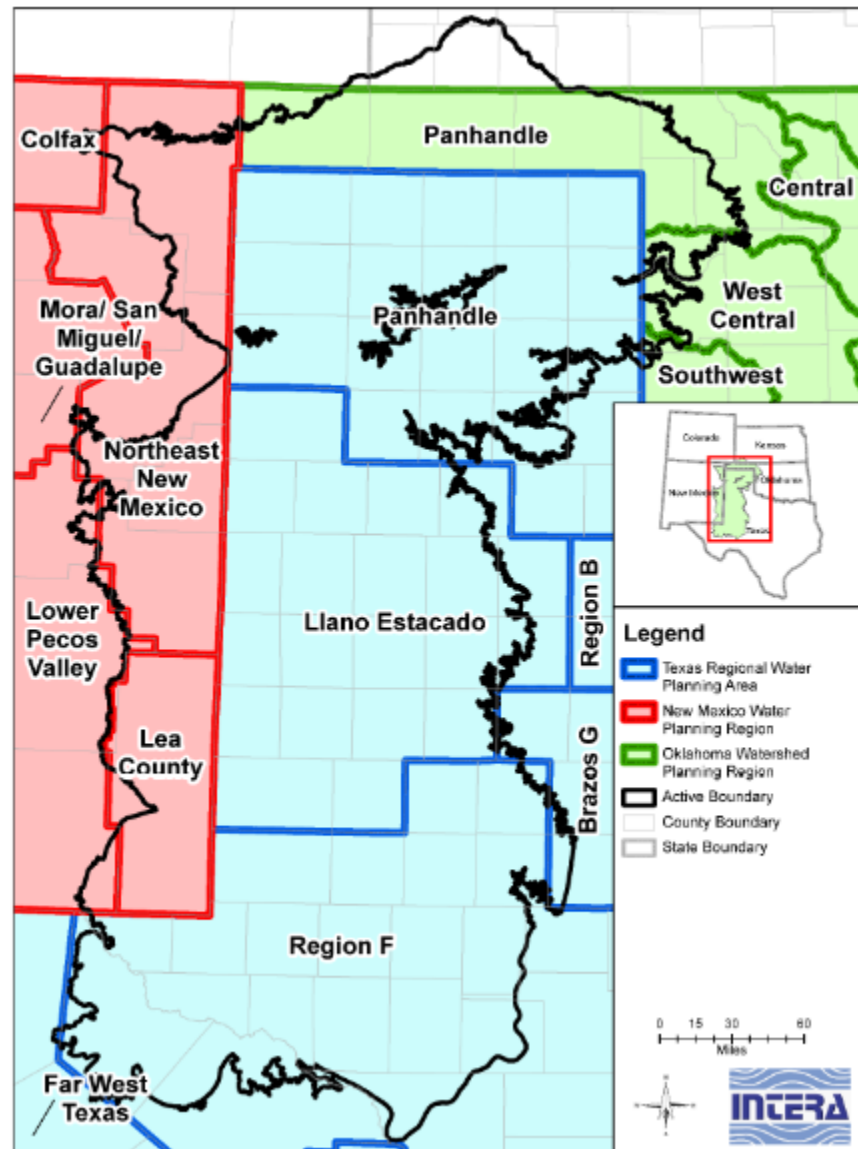
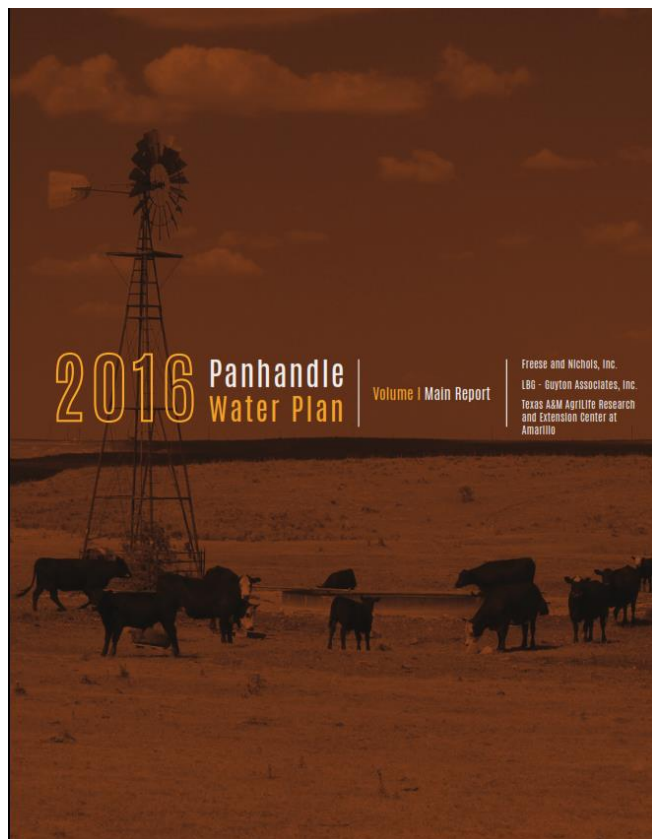
From: TWDB HPAS Report
(INTERA 2015)

Groundwater Level Declines 1930 - 2010

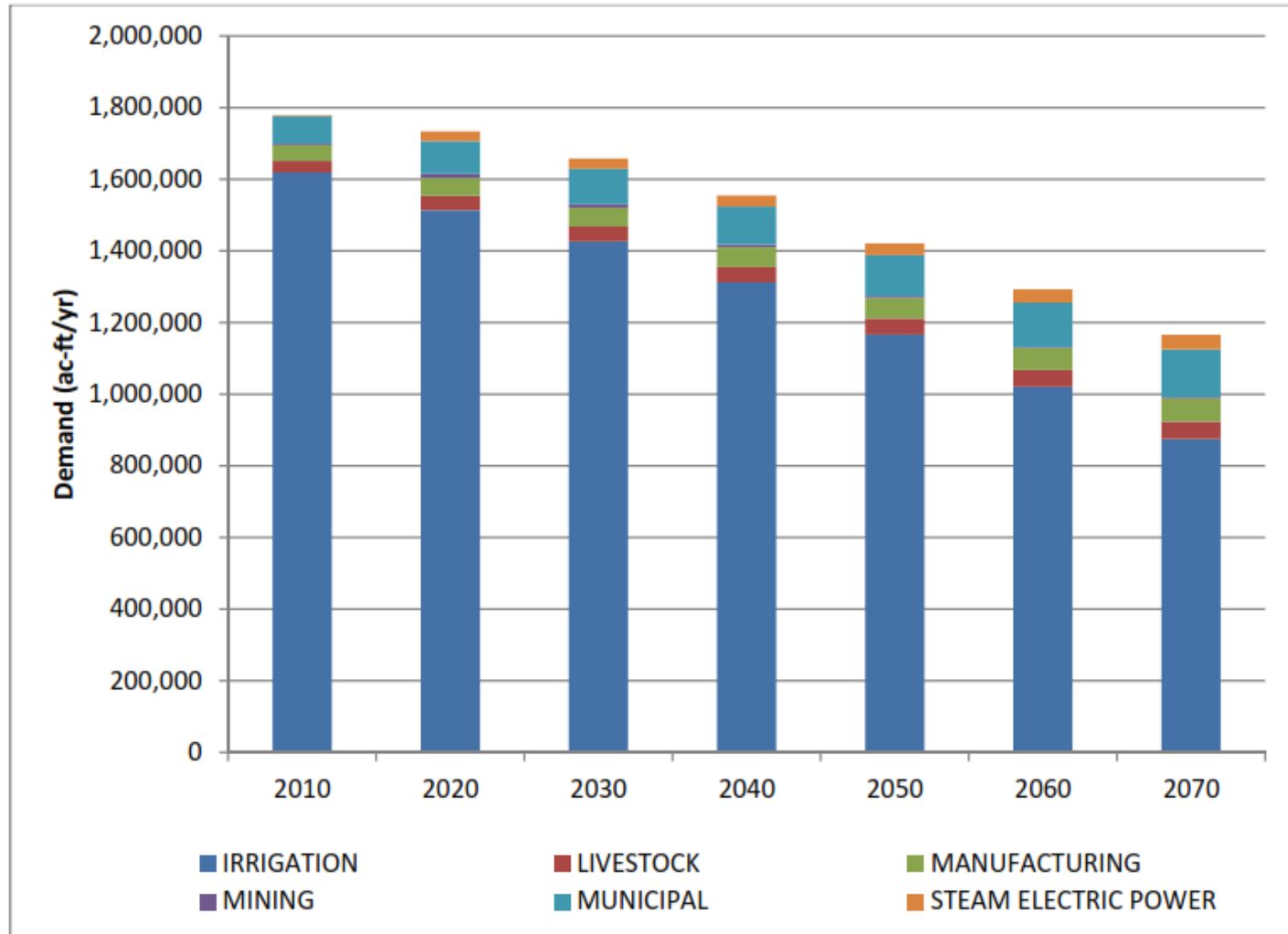
From: TWDB HPAS Report
(INTERA 2015)



State and Regional Water Planning



2016 Panhandle Regional Water Plan (PRWP) Demand Projections

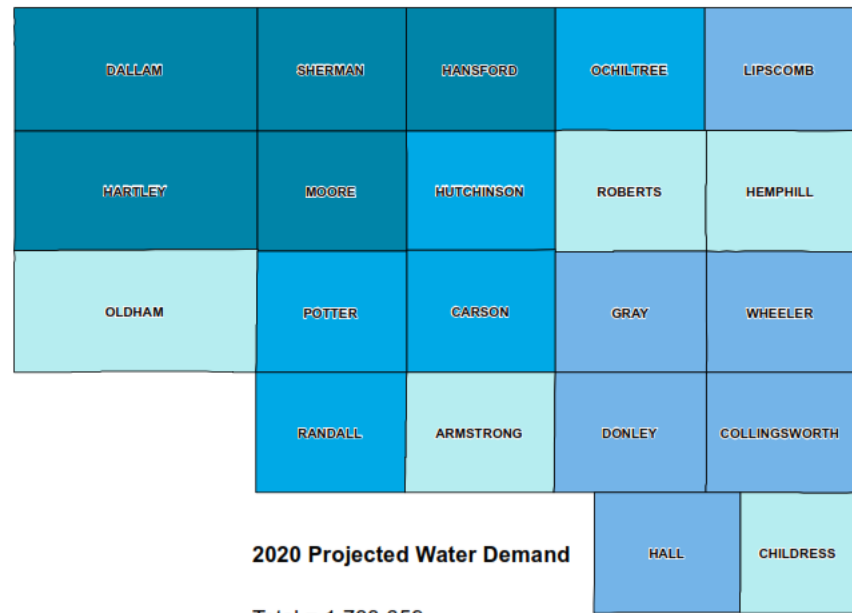


2016 PRWP Projected Need

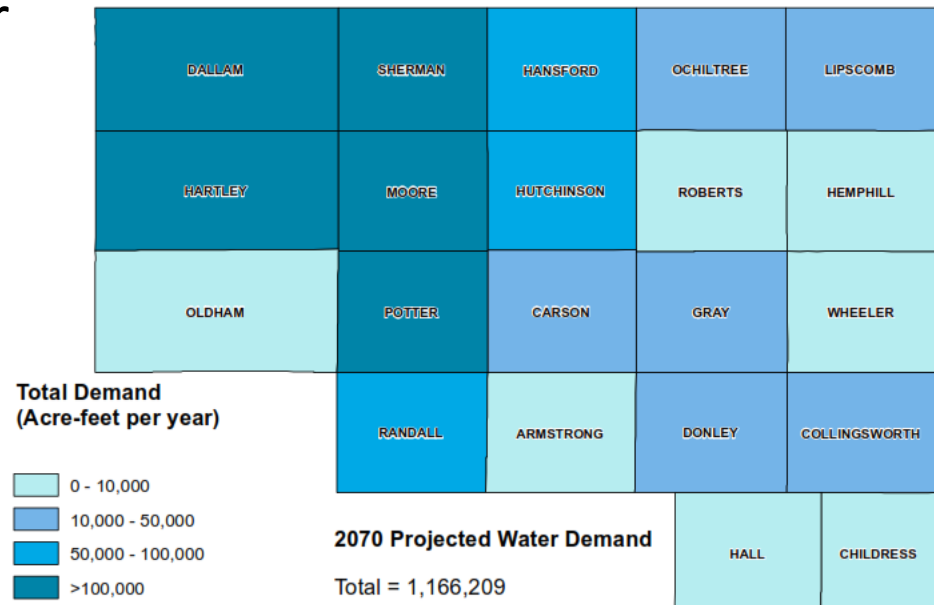
Water User Group	Water Need (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
Irrigation	156,704	185,043	192,876	180,151	165,133	148,519
Livestock	0	0	0	0	0	0
Manufacturing	4,017	6,986	10,048	14,243	18,369	22,538
Mining	0	0	0	0	0	0
Municipal	10,074	24,142	38,521	52,624	66,847	81,559
Steam Electric Power	0	0	0	0	0	0
Total	170,795	216,171	241,445	247,018	250,349	252,616

2016 PRWP Demand Projections by County

- Agriculture demand highest in Dallam, Hartley, Sherman, Moore, Hansford Counties
- Municipal/Manufacturing demand highest in Potter and Randall Counties
- Recommended Water Management Strategies:
 - Conservation
 - Further developing groundwater



Total = 1,733,659

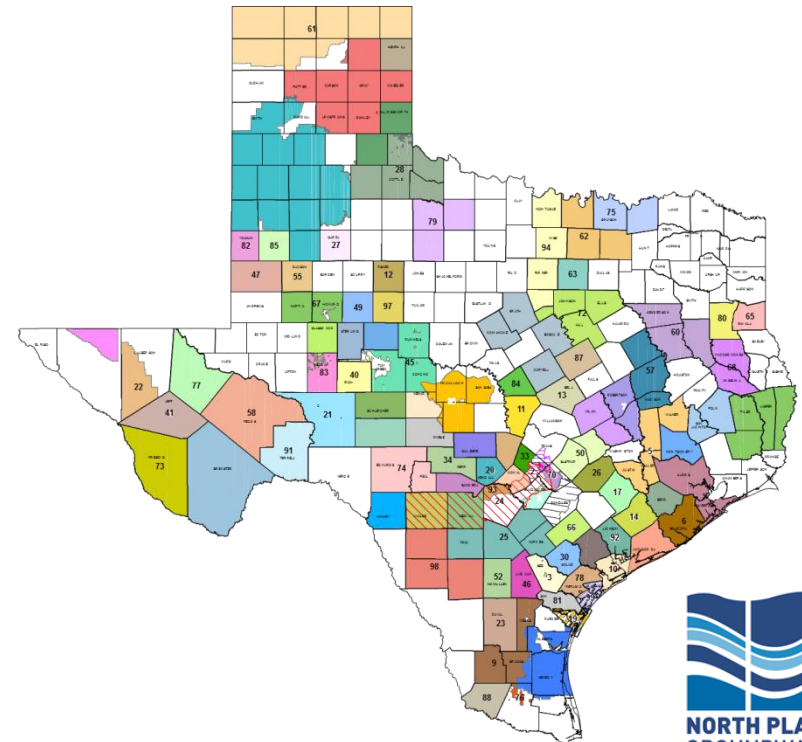
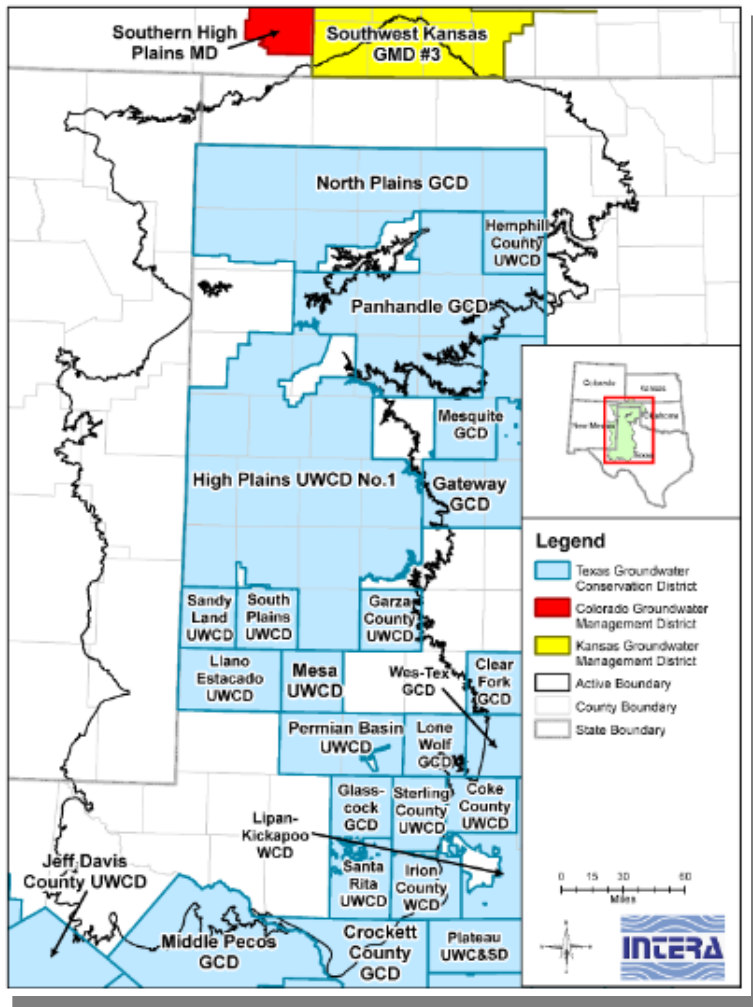


2070 Projected Water Demand

Total = 1,166,209

Groundwater Conservation Districts

- Management Plans
- Conservation Rules
- Conservation Programs
- Groundwater Monitoring/Science



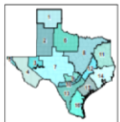
Groundwater = Private Property

Private property interests and rights can be benefited or enhanced by:

- Current groundwater use.
- Near future groundwater use.
- Long-term groundwater use.
- Leaving groundwater in place.

Groundwater Management Areas

Dellon	Sherman	Hansford	Ochiltree	Lipscomb
Harley	Moore	Hutchinson	Roberts	Hempill
Oldham	Potter	Carson	Gray	Wheeler
	Randall	Armstrong	Dowley	



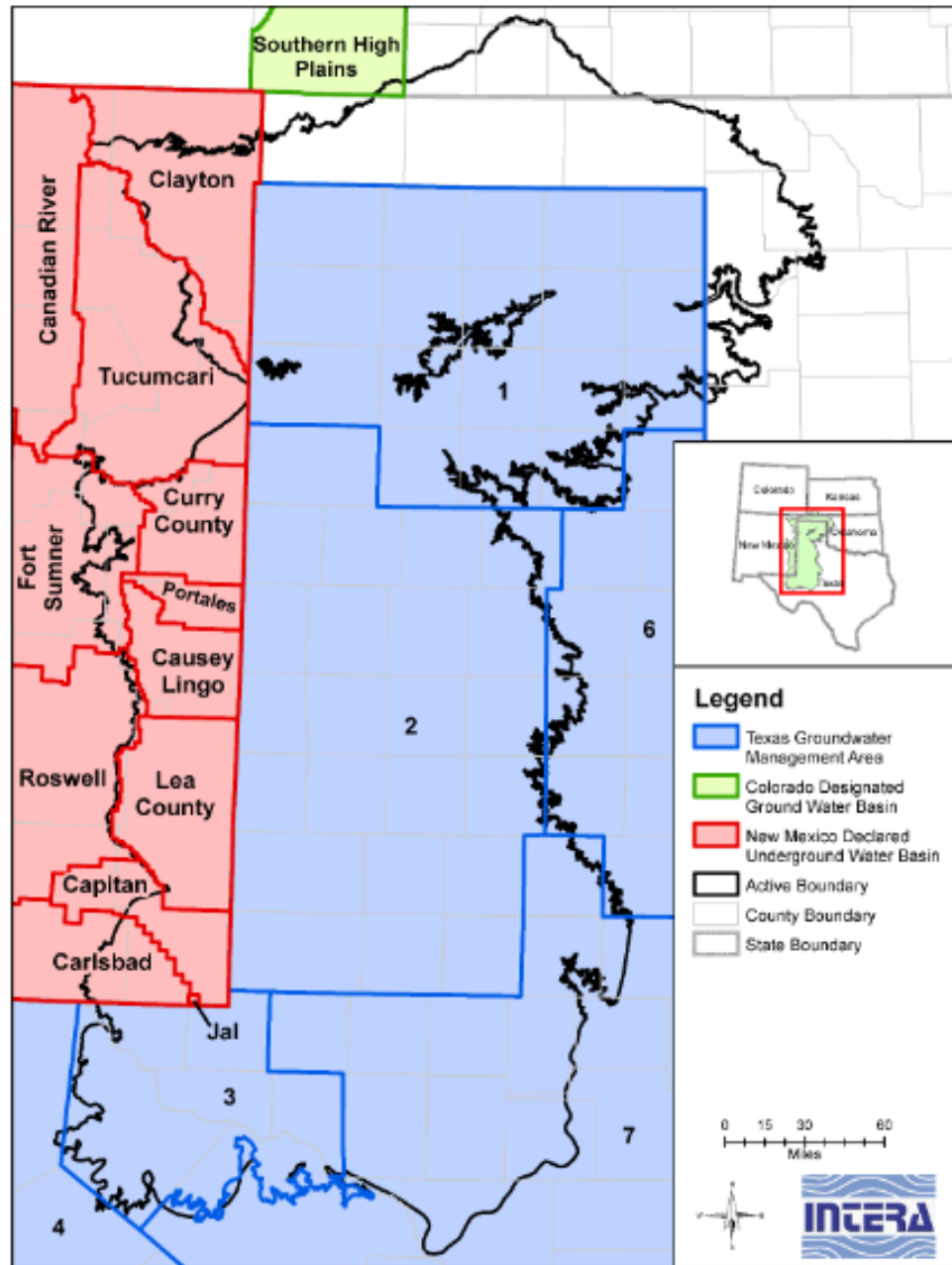
Groundwater Management Area #1

DESIRED FUTURE CONDITIONS
EXPLANATORY REPORT

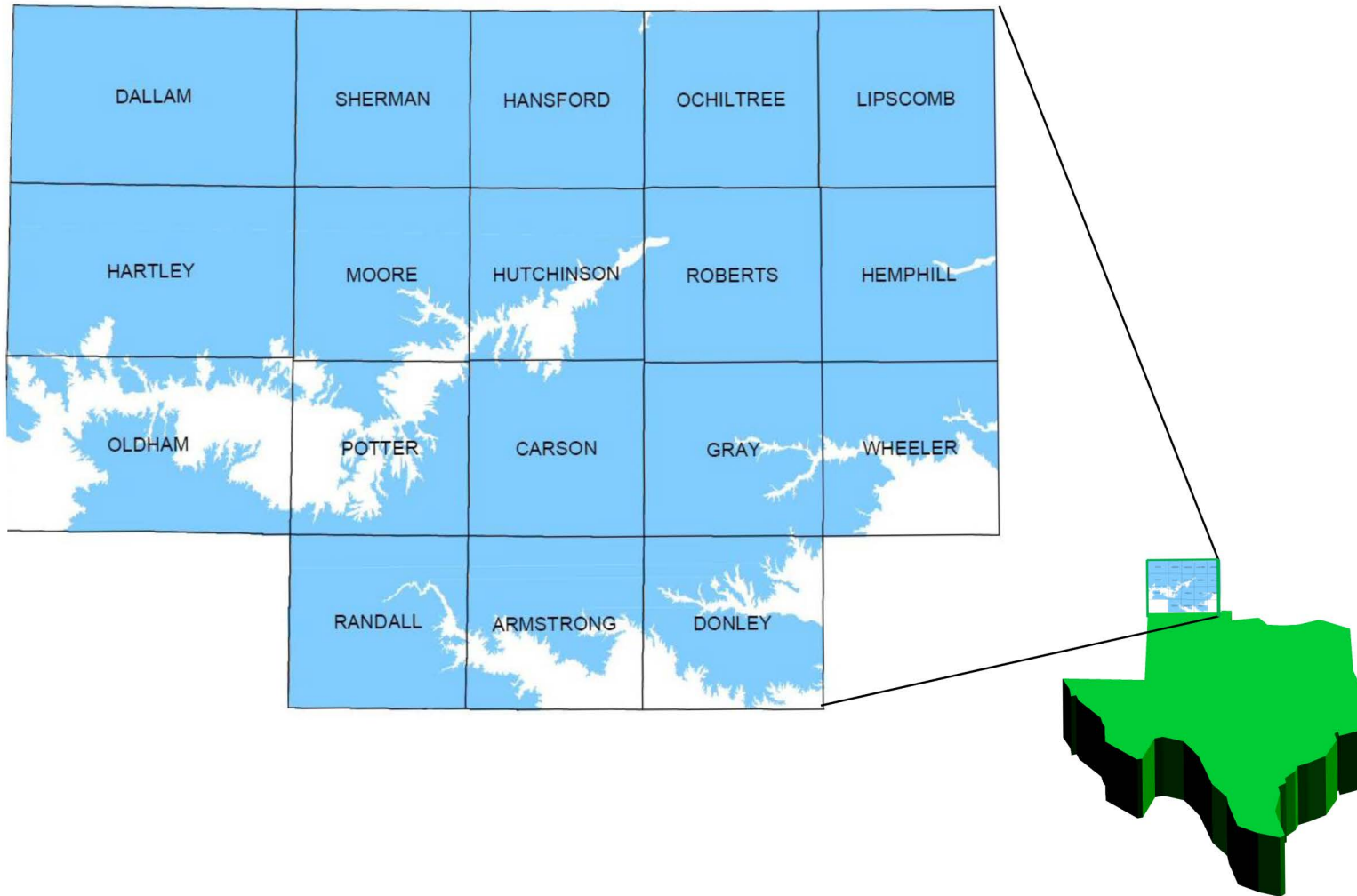
NOVEMBER 2, 2016

PREPARED BY GROUNDWATER MANAGEMENT AREA 1

WITH ASSISTANCE FROM:
INTERA INC.
PANHANDLE REGIONAL PLANNING COMMISSION
STEVEN D. WALTHOUR, PG



Groundwater Management Area 1

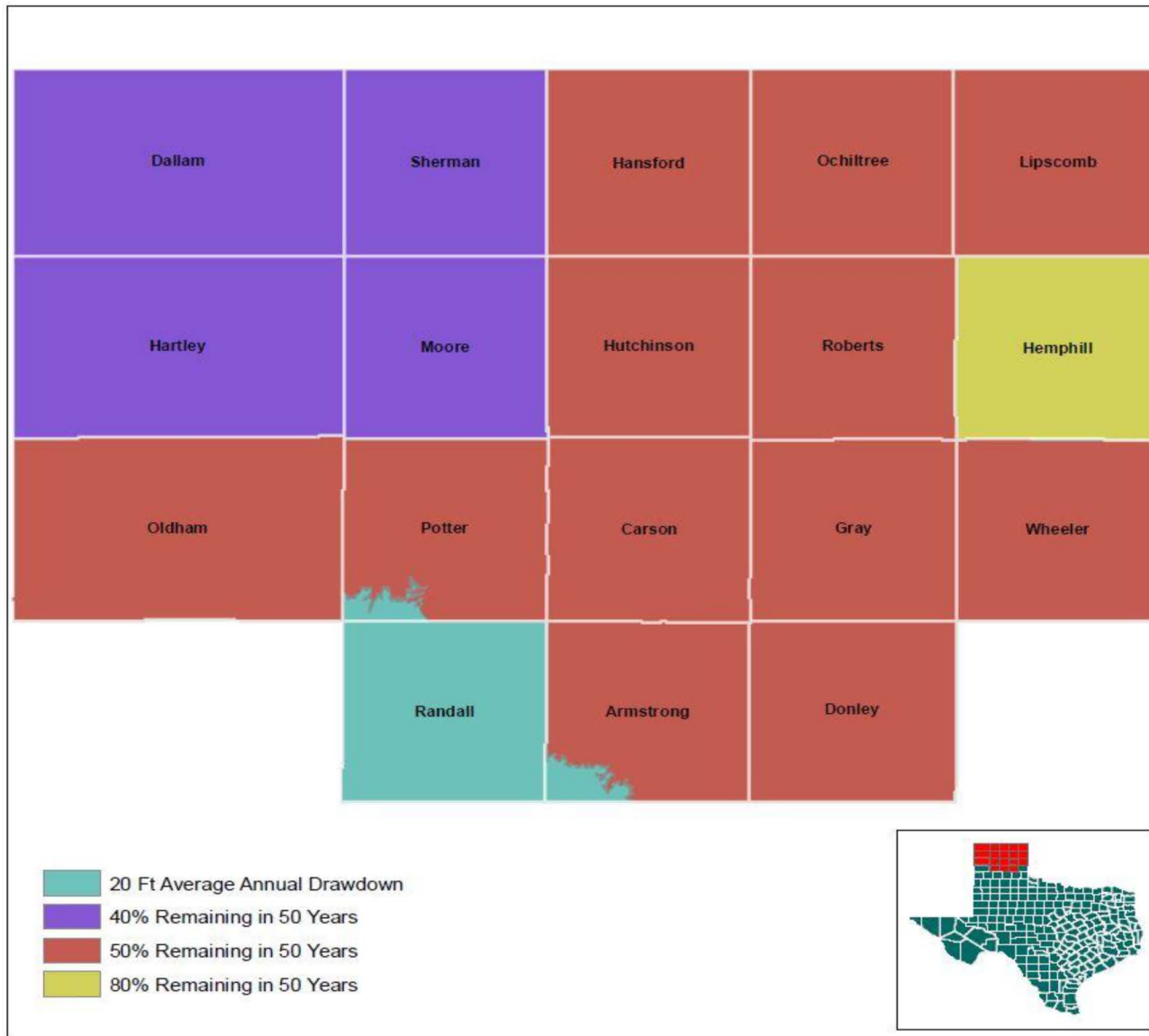


Desired Future Conditions

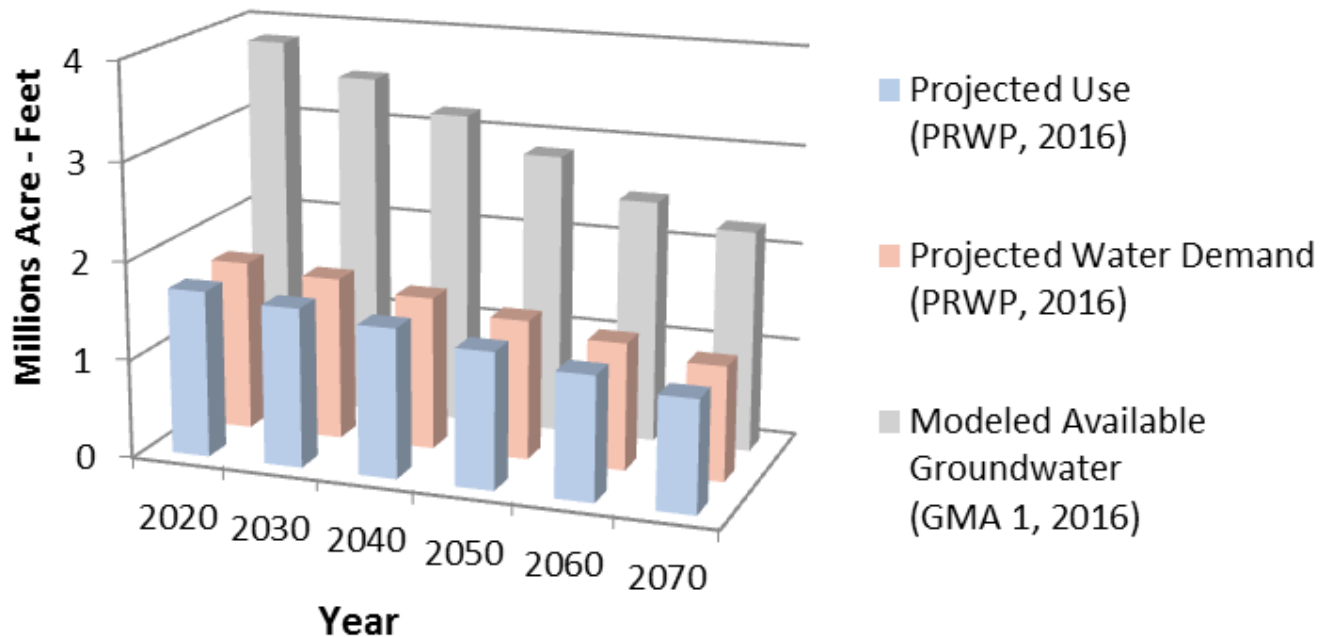
- Provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste.....
- Aquifer uses or conditions
- Water supply needs and water management strategies
- Hydrological conditions, including TERS, recharge, inflows, and discharge
- Environmental impacts (spring flow/ groundwater - surface water)
- Subsidence
- Socioeconomic impacts
- Impact on private property interests and rights
- the feasibility

Desired Future Conditions

Ogallala Aquifer - GMA# 1 - 2016



Groundwater Available Compared to Projected Demand and Use



Texas Groundwater Policy Questions

- What oil and gas law principles/rules, if any, would improve groundwater management?
- Should Texas allow GCDs to adopt so-called user-based rules for groundwater permitting?
- How can Texas stop or prevent GCDs reverse-engineering DFCs?
- How can Texas better protect judicially and statutorily recognized private property rights in groundwater?
- Are GCDs impeding the development of groundwater within Texas?

Motivations for Conservation

- Regulatory
- Financial
- Environmental
- Other





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