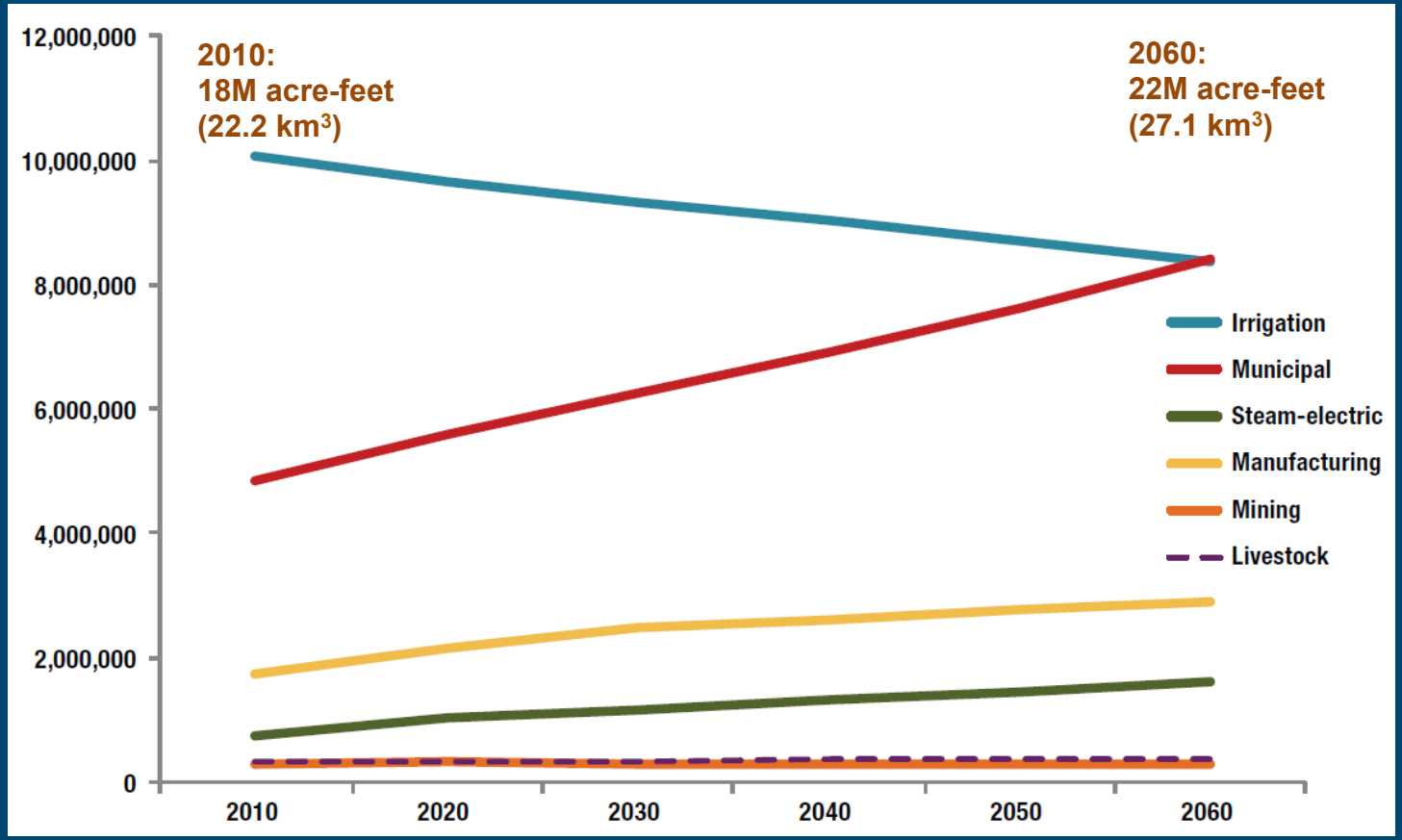
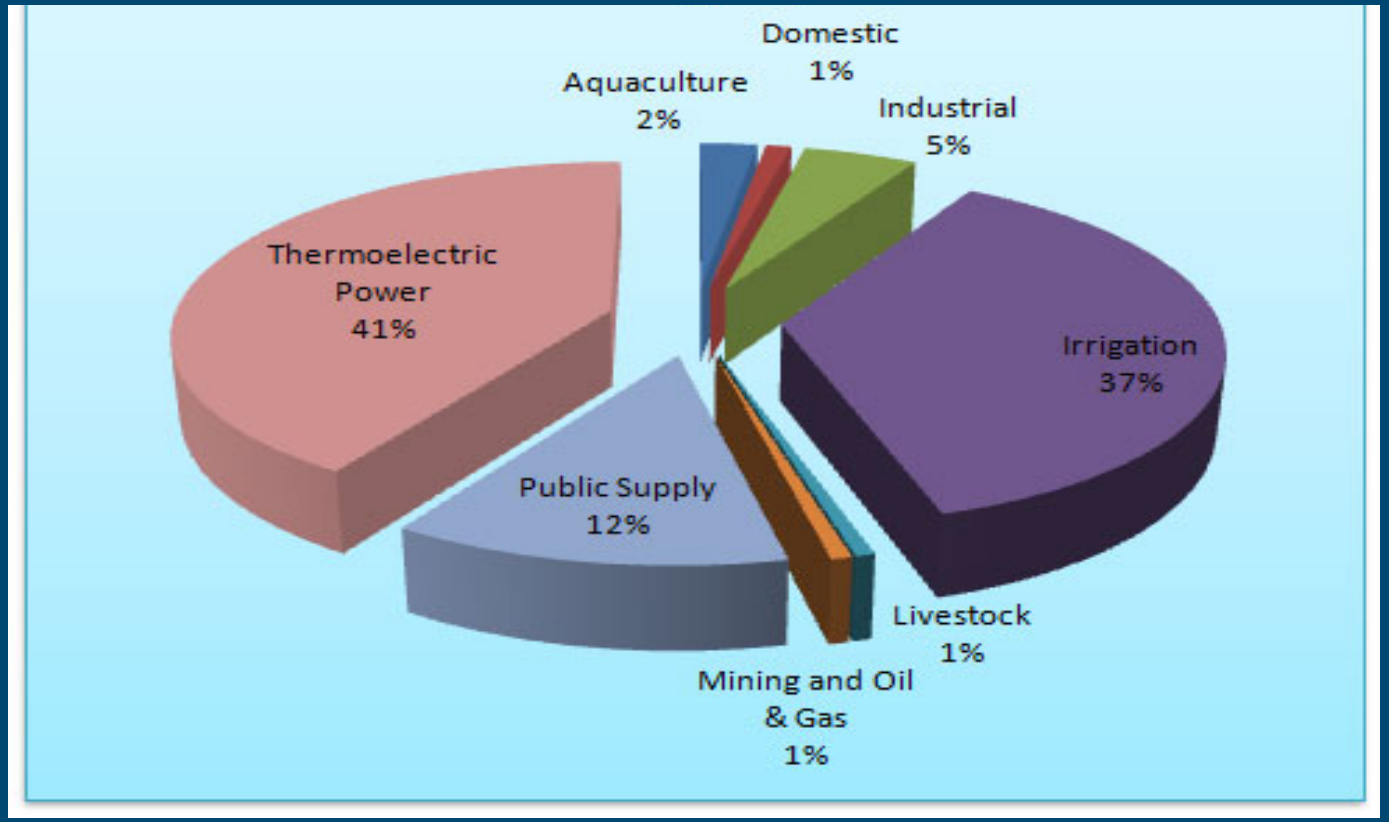
Some Texas-Specific Observations on Water Use

Projected total water use in TX



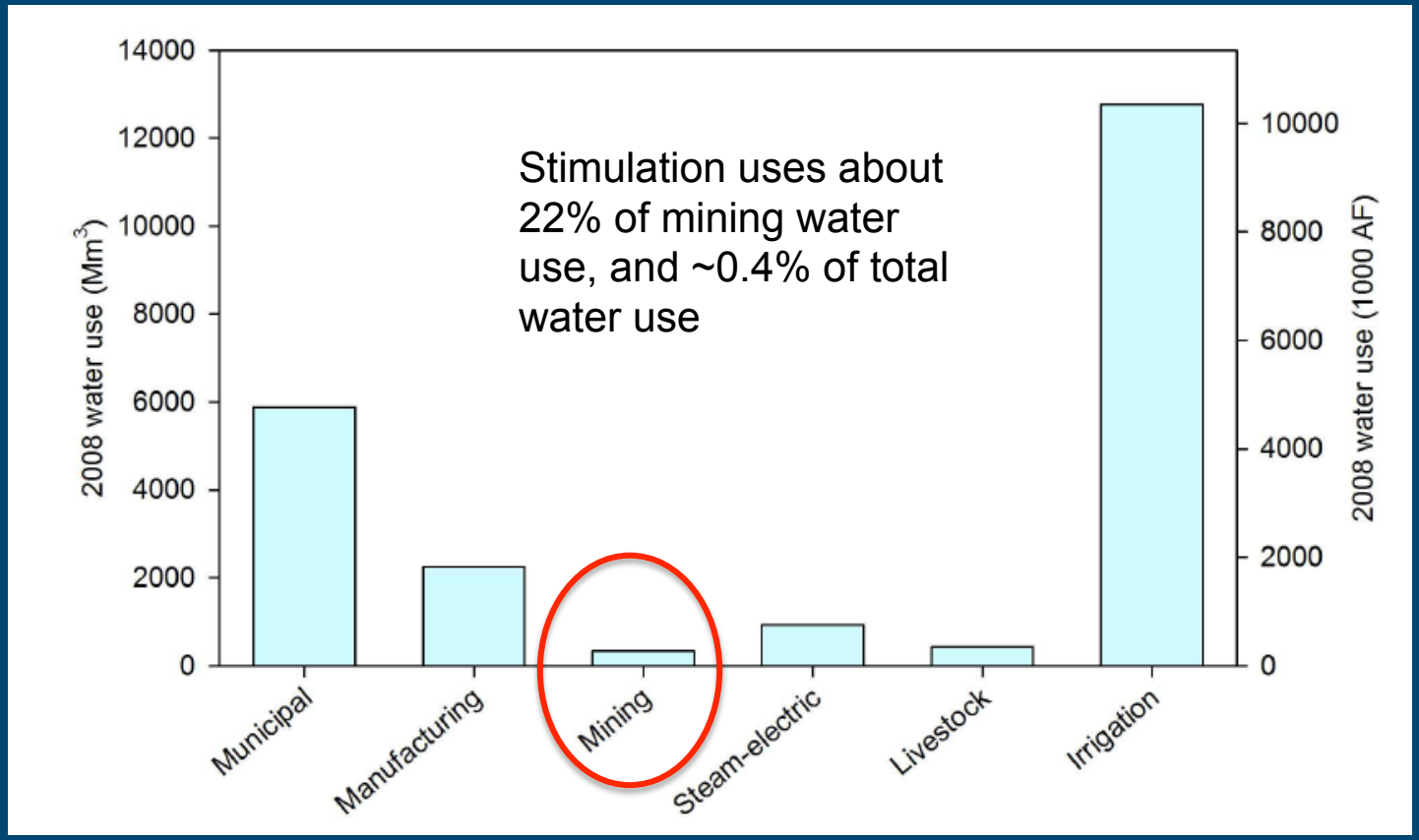
Source: TWDB State Water Plan, 2012

How water is used in the US



Source: Estimated Use of Water in the United States 2005, USGS 2005

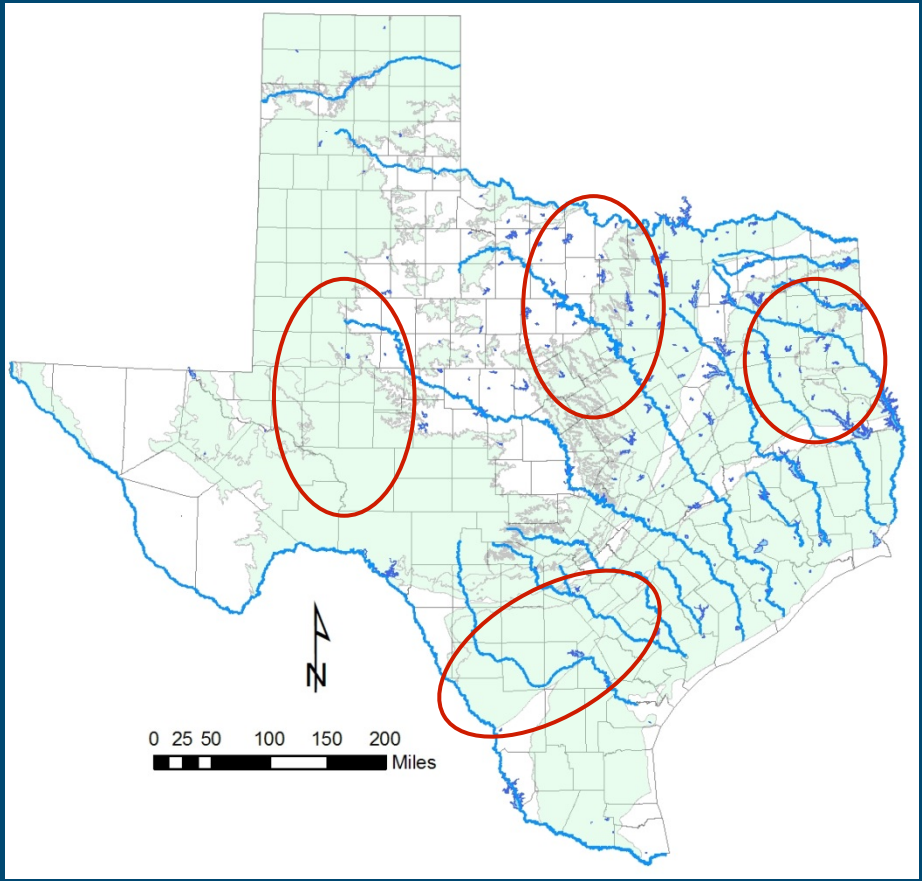
Relative amount of water use



Source: Modified from Nicot and Scanlon, 2012

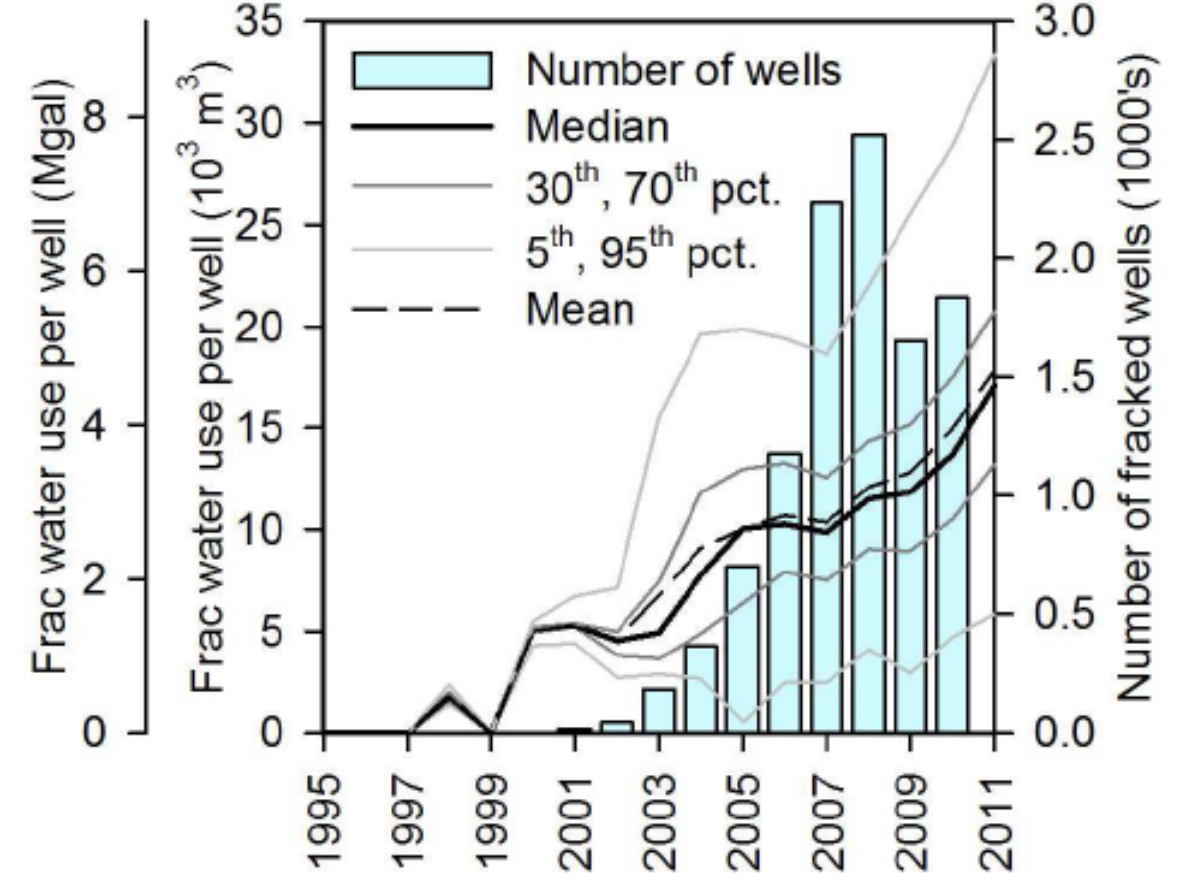
How water sources are split

- Barnett (2010):
  ~40% groundwater
- Haynesville (2010):
  ~70% groundwater
- Eagle Ford (2010):
  ~100% groundwater
- Permian Basin (2010):
  ~100% groundwater



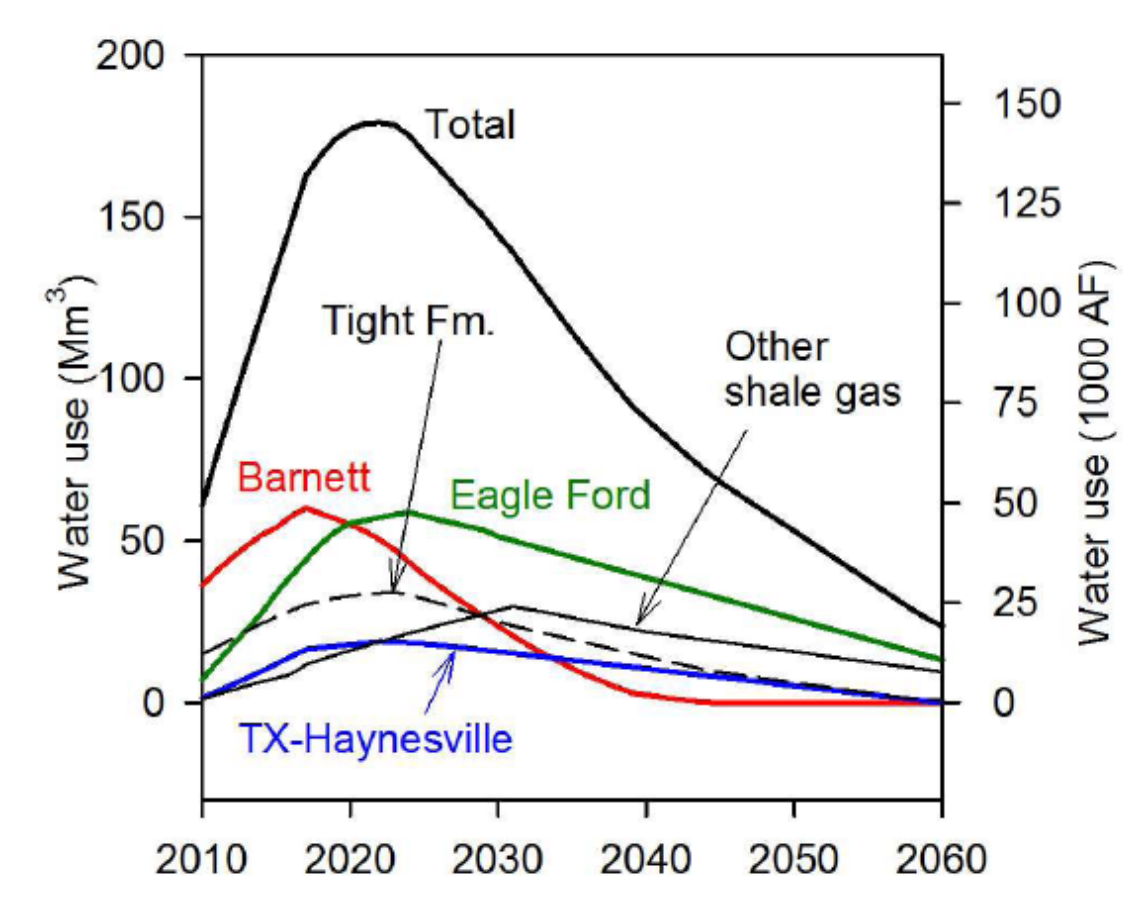
Source: TWDB website

Per well water use – Barnett Shale play



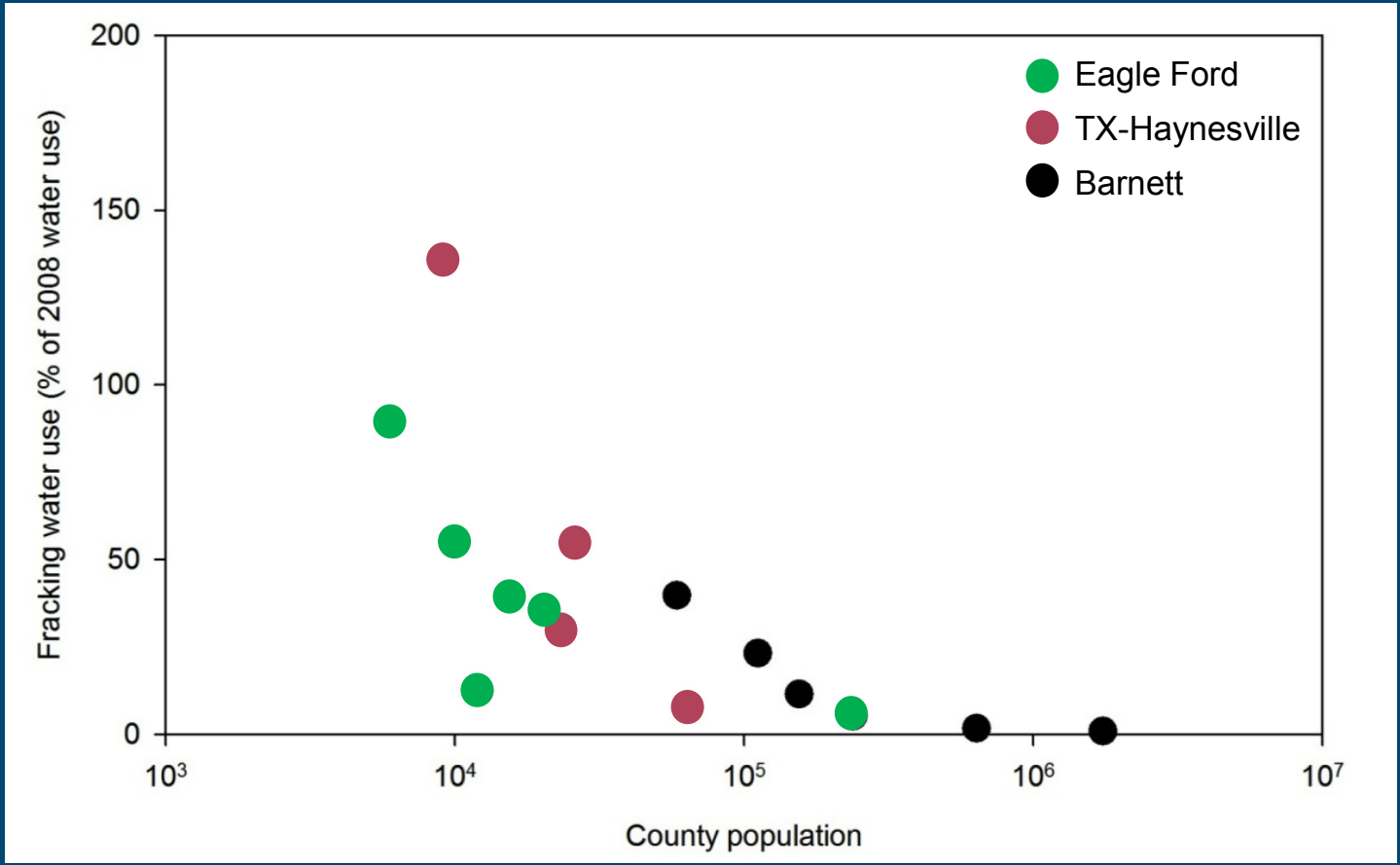
Source: Nicot and Scanlon, 2012

Water use projections for HF in Texas



Source: Nicot and Scanlon, 2012

Water use for HF vs. local population



Source: Nicot and Scanlon, 2012

Solutions

- Engage in proactive communication with local agencies
- Do Basin-wide planning
- Review water quality characteristics
- Consider timing and location of withdrawals
- Assess the baseline characteristics of groundwater and surface water
- Priority should be assigned to the use of wastewater from other industrial facilities.
- Beneficial reuse of flow back and produced fluids

Best Practices

Flowback Fluids

- Fluids returned to the surface following hydraulic fracturing
- Comprised of as little as 3% and as much as 80% or more of the total amount of water and other material used to fracture the well.
- Can also contain fluids and minerals that were in the fractured formation

Disposal of Fluids

- Operators must manage and dispose of flowback and produced waters using methods complying with state and local regulatory requirements.

- Disposal Methods
  - underground injection (primary method)
  - surface discharge,
  - municipal wastewater treatment plant
  - commercial industrial wastewater treatment plant
  - beneficial reuse (least adopted)

(Veil 2010).

Disposition of Flowback Fluid

- The vast majority of flowback fluids are disposed of in either
- underground injection wells.
  - Class II Injection Wells (SDWA)
  - regulated by (EPA) Underground Injection Control (UIC) program or by a state granted primary UIC enforcement authority by the EPA
- Treated and Discharged
  - On site
  - Treatment facility
- Requires issuance of a National Pollutant Discharge Elimination System (NPDES) permit from a state or the federal environmental protection agency.

Reasons to Treat and Reuse Flowback and Produced Waters

- Conserves freshwater resources,
- Reduces social and environmental impacts
- Improves public confidence,
- Minimizes costs (Burnett et al. 2012; Veil 2010)

10 Hydraulic Fracturing Best Practices

1) Conduct Environmental Sampling Before and During Operations
2) Disclose the Chemicals Being Used in hydraulic fracturing Operations
3) Ensure that Wellbore Casings are Properly Designed and Constructed
4) Eliminate Venting and Work Toward Green Completions

10 Hydraulic Fracturing Best Practices

5) Prevent Flowback Spillage/Leaks
6) Dispose/Recycle Flowback Properly
7) Minimize Noise and Dust
8) Protect Workers and Drivers
9) Communicate and Engage
10) Record and Document

Conclusions

- Shale gas production has not polluted aquifers in the United States

  Does not releases more methane than other forms of gas production

  Uses less water than other industrial uses of water

  Uses only a handful of toxic chemicals

  Does not cause damaging earthquakes