

Preserving Public Water for Public Use

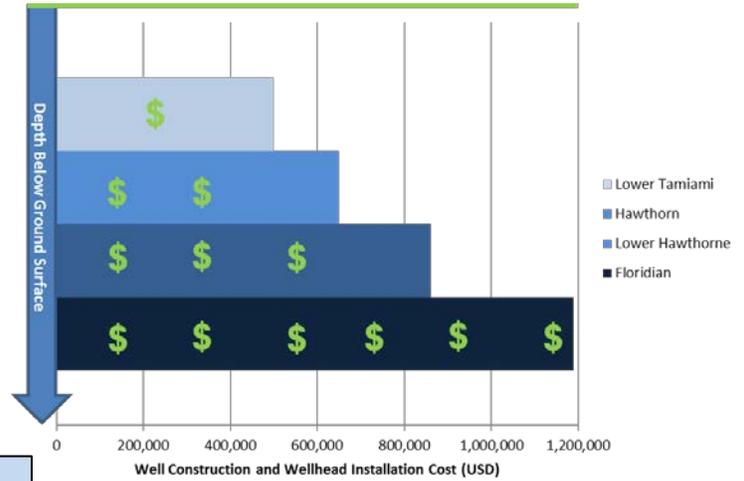


Inappropriate use of freshwater

In Collier County, oil and gas wells have been permitted to use millions of gallons of water each year from the lower Tamiami aquifer. This aquifer provides easily accessible potable water through shallow wells.¹ This water is cheaper to access and treat than water located in the brackish or salty aquifers found deeper underground (Figure 1).²

When this fresh water is used in well stimulation projects such as hydraulic fracturing, it is injected below ground and only a small percentage is returned. This water cannot be recycled back into drinking water (Figure 2, 6).

Figure 1: Cost of water well construction increases with depth



*Well stimulation at the Collier Hogan well in Collier County used over **662,000 gallons of water over just three days** (more than enough to fill an Olympic swimming pool). Only 30% of this fluid was recovered. The remainder was trapped underground. That which was recovered was not recycled but instead was disposed of.*

Assuming plant capacity of 5 million gallons per day, treating fresh groundwater through nanofiltration costs an estimated \$3.42/1000 gallons while treating brackish water through reverse osmosis costs \$4.41/1000 gallons.

Local water supply impacts

Collier County obtains only 41% of its potable water from fresh groundwater aquifers while 59% is from saltier or brackish aquifers.³ County demand for potable water is predicted to increase over time (Figure 3).⁴

Figure 2: Water cycle vs. linear water use in well stimulation

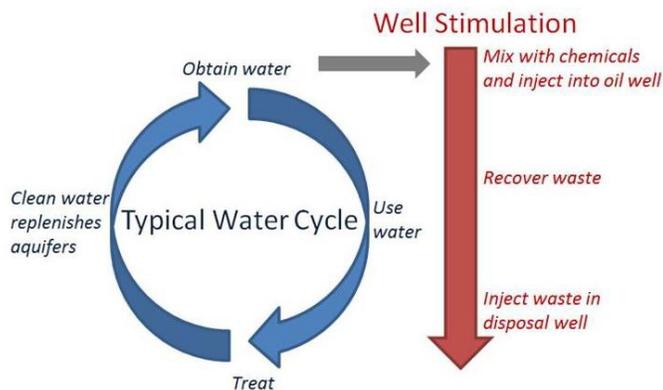
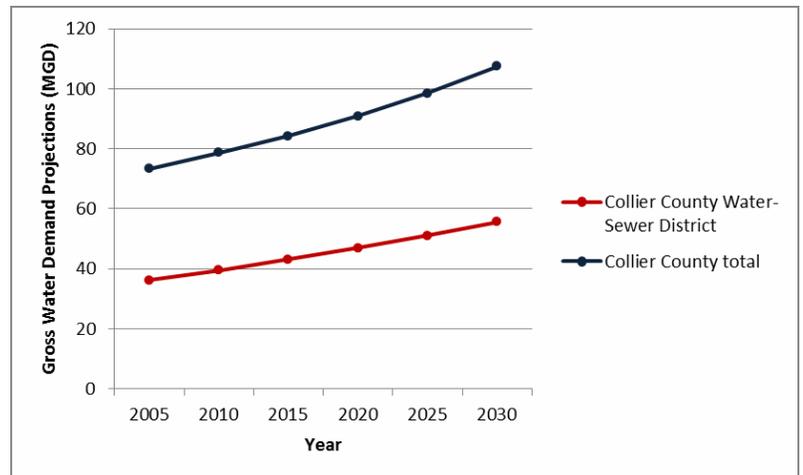


Figure 3: Collier County Water Demand Projections



Collier County total includes Ave Maria Utility, Collier County Water-Sewer District, Everglades City, Florida Government Utility Authority, Immokalee, Marco Island, City of Naples, Orange Tree, Port of the Islands public water supply and domestic self supply. **Collier County Utility** includes only public water supply for that particular utility.

¹ South Florida Water Management District (2012) Lower West Coast Water Supply Plan Update.

² South Florida Water Management District (2007) Water Supply Cost Estimation Study. (Figure 1 based upon data from this study)

³ South Florida Water Management District (2012) Lower West Coast Water Supply Plan Update.

⁴ South Florida Water Management District (2012) Lower West Coast Water Supply Plan Appendices. (Figure 3 based on data from this study)

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Increasing oil activities may impact cost and availability of water

Collier County is already relying on water from difficult to access, brackish aquifers to meet demand. Despite this, the Collier Hogan well was permitted to use 280.31 million gallons of fresh water from the Lower Tamiami aquifer per year for five years.⁵ In other words, this well was permitted to use enough fresh water per year to fill 425 Olympic sized swimming pools or to supply approximately 4,860 people (over the population of the city of LaBelle, FL) for one year.⁶

By 2030, most if not all of southwest Florida's water needs will be met with alternative water supplies including brackish water.⁷ Taxpayers will need to pay the additional cost to drill deeper for their water and treat that water.

Newer well stimulation techniques are found to require more water than older techniques. On average, approximately 1.2 million gallons of water is used to fracture a horizontal oil well.⁸ The majority of the injected fluid remains trapped underground in the well.⁹ A new report showing water use state-wide for the horizon year of 2070, shows that future development may be unsustainable for our water resources. This did not account for industrial uses of water like well stimulation, which would be additional pressure to our water supply (Figure 4).

Therefore we must consider the potential for the increased use of new water-intensive well stimulation techniques when evaluating the impact of future oil and gas activities on Southwest Florida's water supply (Figure 5).

Figure 5: Oil Plays in Southwest Florida

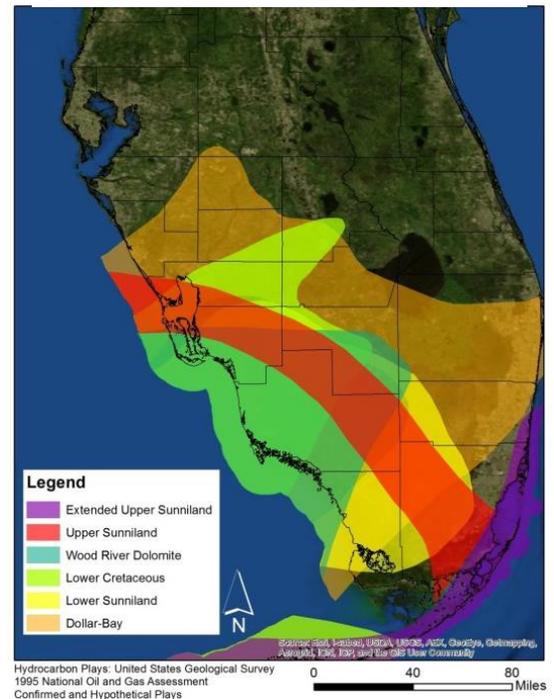


Figure 4: "Water 2070" GeoPlan Center Study Predictions

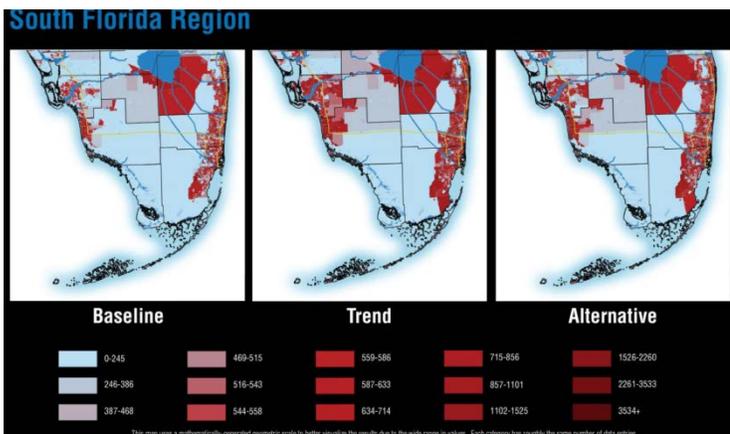
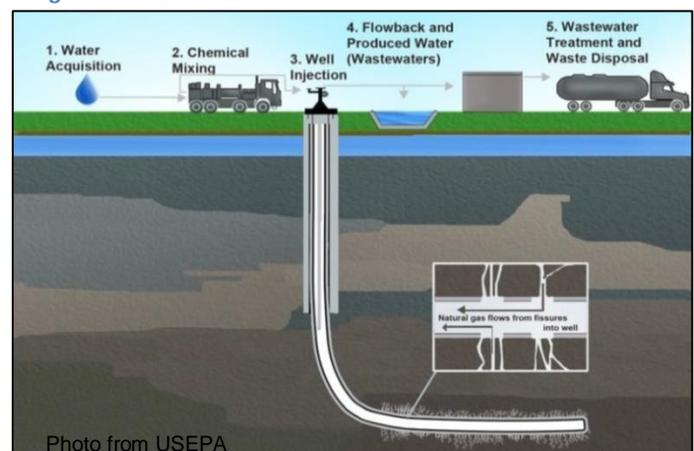


Figure 6: Well Stimulation Process



⁵ Dan A. Hughes Company Water Use Permit No. 11-03415-W Issued December 2012 for 280.32 million gallons per year.

⁶ Based on per capita use of 158 gallons/day (from USGS <http://pubs.usgs.gov/sir/2009/5125/pdf/sir2009-5125.pdf>). 158 gallons*365=57,670 gallons per person per year. 280.31 million gallons/ 57,670 gallons= 4,860 people per year. Population of LaBelle is 4,588 (from <http://www.florida-demographics.com/labelle-demographics>).

⁷ South Florida Water Management District (2012) Lower West Coast Water Supply Plan Update.

⁸ United States Geological Survey. (2014). Trends in hydraulic fracturing distributions and treatment fluids, additives, proppants, and water volumes applied to wells drilled in the United States from 1947 through 2010—data analysis and comparison to the literature.

⁹ Hansen, E., Mulvaney, D., Betcher, M. (2013). Water resource reporting and water footprint from Marcellus Shale development in West Virginia and Pennsylvania.