

In June, 1997, my article, *Before the Well Runs Dry*, warned of coming water wars. "At present, 80 countries face water shortages. But in developing countries, survival is at stake."



"Florida receives <mark>55 trillion gallons of rain a year and only uses 1 trillion gallons</mark>. But yet it appears to be running out of water."

(Tom Singleton, water consultant.)



Water use has grown at more than 2 X the rate of population increase in the last century.





By 2025, two-thirds of the world's population will live in waterstressed regions



Richey, A.S., B.F. Thomas, M. Lo, J.T. Reager, J.S. Famiglietti, K. Voss, S. Swenson, M. Rodell (2015), Quantifying Renewable Groundwater Stress with GRACE, Water Resour. Res., doi: 10.1002/2015WR017349

- Nubian Aquifer System (NAS) 1
- 2 Northwestern Sahara Aquifer System (NWSAS)
- 3 Murzuk-Djado Basin
- Taoudeni-Tanezrouft Basin 4
- Senegalo-Mauritanian Basin 5
- 6 Iullemeden-Irhazer Aquifer System
- Lake Chad Basin 7
- 8
- Sudd Basin (Umm Ruwaba Aquifer) 9 Ogaden-Juba Basin
- 10 Congo Basin

- 11 Upper Kalahari-Cuvelai-Upper Zambezi Basin
- 12 Lower Kalahari-Stampriet Basin
- 13 Karoo Basin
- 14 Northern Great Plains Aquifer
- 15 Cambro-Ordovician Aquifer System
- 16 Californian Central Valley Aquifer System
- 17 Ogallala Aquifer (High Plains)
- 18 Atlantic and Gulf Coastal Plains Aquifer
- 19 Amazon Basin

- 20 Maranhao Basin
- 21 Guarani Aquifer System
- 22 Arabian Aquifer System
- Indus Basin 23
- 24 Ganges-Brahmaputra Basin
- 25 West Siberian Basin
- **Tunguss Basin** 26
- 27 Angara-Lena Basin
- 28 Yakut Basin

- 29 North China Aquifer System
- 30 Song-Liao Basin
- 31 Tarim Basin
- 32 Paris Basin
- 33 Russian Platform Basins
- 34 North Caucasus Basin
- 35 Pechora Basin
- 36 Great Artesian Basin
- 37 Canning Basin

Drinking Water Supply Levels

Sufficient

Enough drinking water for projected 2030 population

Running Low

Not enough drinking water for projected 2030 population



Empty

Not enough drinking water for current population due to over-pumping, salt water intrusion and over-development

produced by PriceofSprawl.com



• 2017 Water Report

Florida's population could increase **75%** by 2070.

That means another 15 million new residents and a... 53.7% increase in demand for water.

In addition, more than 126 million tourists arrive every year.

Trouble in Florida:

*A 2013 study for the U.S. General Accounting Office: Florida water managers expect to see regional water shortages by 2023.

* The Central Fla. Water Initiative: "Traditional groundwater resources alone cannot meet future water demands...."some areas have already exceeded sustainable limits."

*In 2010, according to an independent analysis by the Atlantic magazine, the Orlando area is ranked tenth among American cities running out of water.

The Problem of Growth

Florida's net growth is 865–1000 people a day.

That equals a city slightly larger than Orlando every year.





Since the 1930s, average spring flows have declined by 32% for 393 of Florida's springs. Including...

Silver Springs - 30 to 40 %.

Water Warning Signs:



WHITE SPRINGS ON THE SUWANNEE RIVER. BATHERS AT THE BATHHOUSE AT WHITE SPRINGS, 1914.



White Springs as it appeared in 2005.





Declining Quality of Water

- Sewage with dangerous bacteria
- "Nutrients", such as nitrogen and phosphorous,
- Excessive amounts of industrial chemicals--arsenic, cyanide, mercury, nickel, lead, cadmium, chromium, chloroform-and SALT in Florida Bay.
- Florida has over 1700 impaired water bodies.
- Nearly 700 of Florida's estimated 5,300 public water systems violate safe drinking water rules.

Too much fresh water is wasted.

Every day Floridians use more than 50% of the public supply of fresh water to hydrate the state's number one crop—grassy lawns.





It's not just over pumping.

Our fresh water infrastructure is also old, leaky and wasteful. Stormwater's toxic impact Only 25% of Florida's stormwater utilities say their facilities are adequate to meet the most urgent needs.





Septic tanks are the fastest growing nitrogen source in Florida. (Dr. Brian Lapointe)



Wastewater: any water used by humans from farming to factory to domestic flushing.

- Florida has 2,000 domestic wastewater treatment plants and 2,100 for industry.
- Miami-Dade, Broward, and Palm Beach Counties still dump partially treated sewage into the sea 2.6 miles offshore (until 2025).
- Treated sewage is also pumped deep into the earth.



Since 2009, there have been 23,000 sewage spills in Florida with enough untreated sewage to fill 2,400 Olympic size swimming pools.

Recently Six sewage spills from decaying pipes in Ft. Lauderdale spilled more than 126 million gallons of raw sewage: 191 Olympic-sized swimming pools.





In the name of progress...

*67% of earth's forests and wetlands are gone.

*Forests = 48 football fields are lost every minute.

*50% of land surface has been altered by humans.

*50% of Florida's wetlands are gone.

*By 2060, 1/3 of Florida could be paved over.



The Soft Path/Low Impact Approach

Provide the water we Need not Want to sustain ecological and sociological health; not demanddriven

Minimize, conserve, restore and mimic natural hydrologic systems

Use natural systems to contain and purify storm water Use Green Infrastructure such as green roofs, rain gardens and vegetated swales

ALL WATER IS ONE WATER



Here's a simple idea we can copy: Japanese toilets use water from handwashing to flush toilets.



Green Storm Water Infrastructure in Tampa





Use Florida native plants!



Mimicking nature, Orlando Artificial Wetland Park



Winter Haven builds a "natural infrastructure"



Restore: Breaching the Tamiami Trail





To produce 1 cup of coffee requires 37 gallons of water.



To produce two pounds of sugar cane, 475 gallons of water are needed.



A smartphone ...may be as high as 3,190 gallons.

https://www.watercalculator.org/water-use/the-hidden-water-in-everyday-products/



The "water footprint" of 1 disposable diaper is 144 gallons. The "water footprint" of 1 cloth diaper is 4 gallons because it's reusable at least 50 times.





"Parents who opt for disposable diapers will go through about 8,000 diapers, with a water footprint of close to 1.2 million gallons of water."

Virtual Water is being used in export and import decision making.

Value of Water Research Report Series No.50, UNESCO-IHE, Delft, Netherlands



Florida Gulf Coast University's Water School

