ASR in Florida

History, Current Technologies and Benefits

Presented to

Venice City Council

Presented by

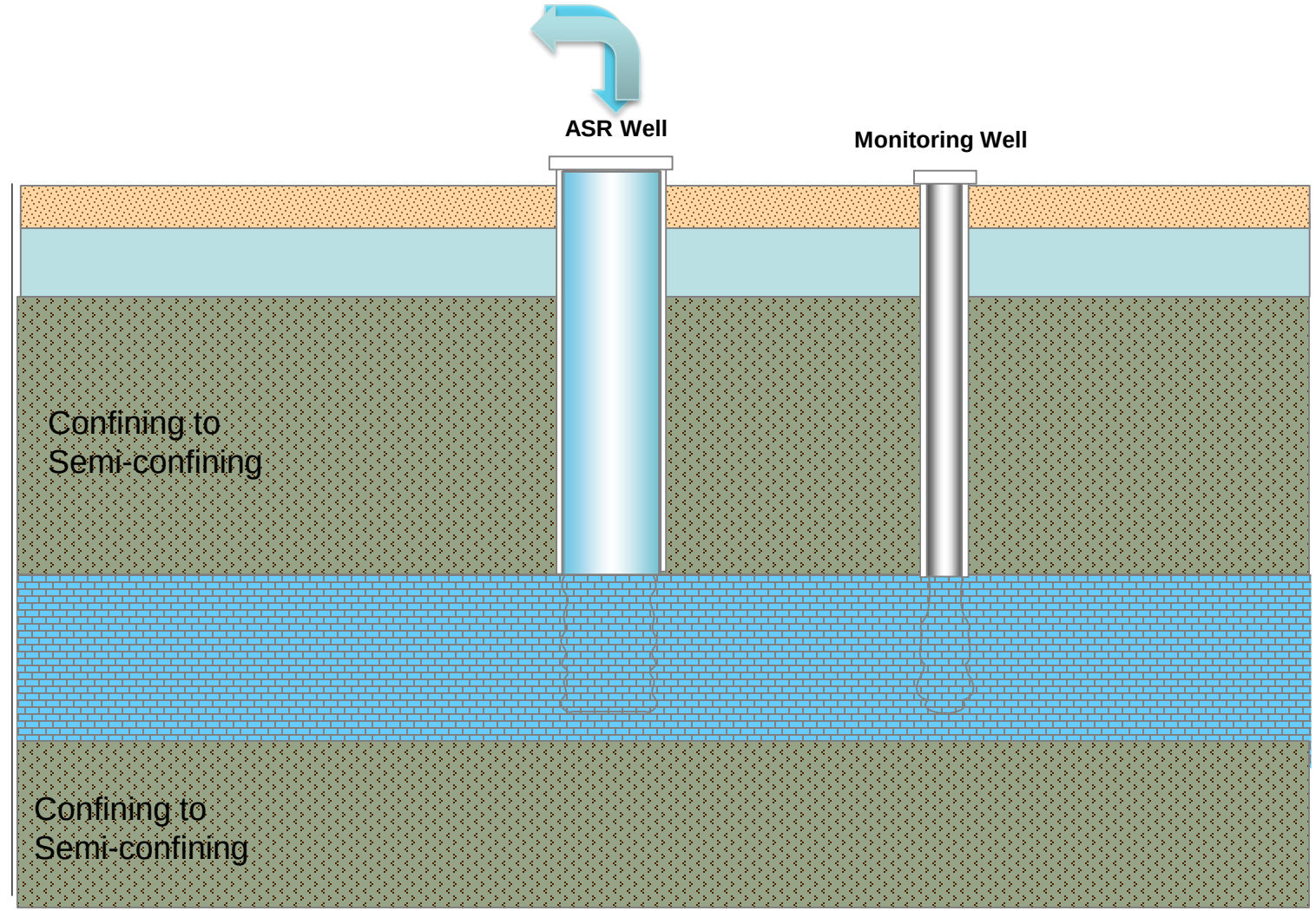
Don Ellison, P.G., Senior Hydrogeologist
Resource Evaluation Section

December 11, 2018

Presentation Overview

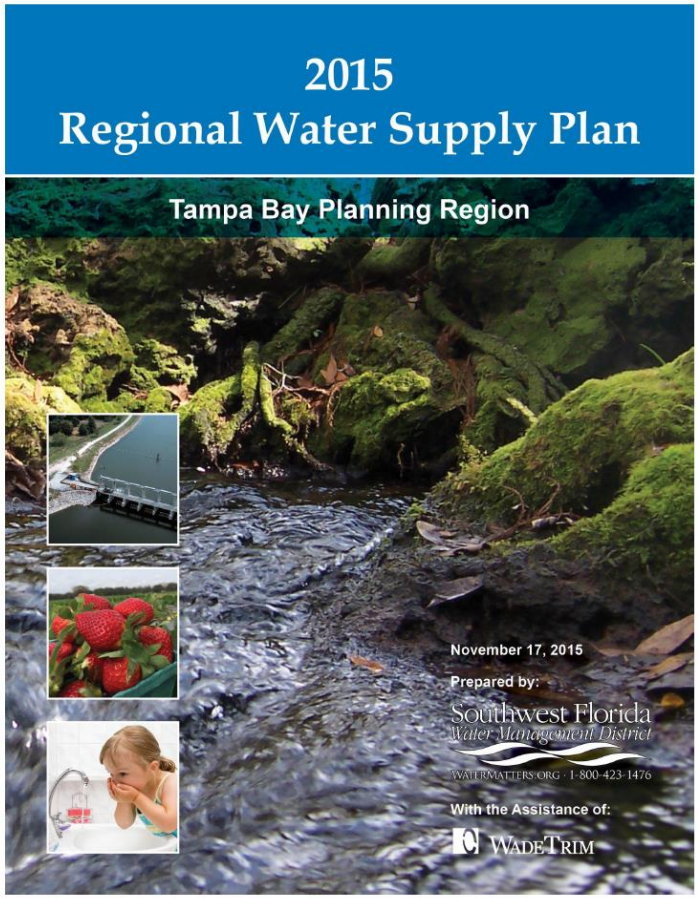
1. What is ASR and its benefits?
2. History of ASR in Florida
3. What are the current ASR technologies.
4. State of ASR in Florida

Typical ASR Well System



Benefits

- Primary Benefit is to enhance or increase water supply for drought mitigation
- Cost effective
- Small Land surface foot print
- Greater ability to strategically locate storage
- Eliminate evaporative losses
- Mitigate impacts of drought
- Potential improvement in water quality

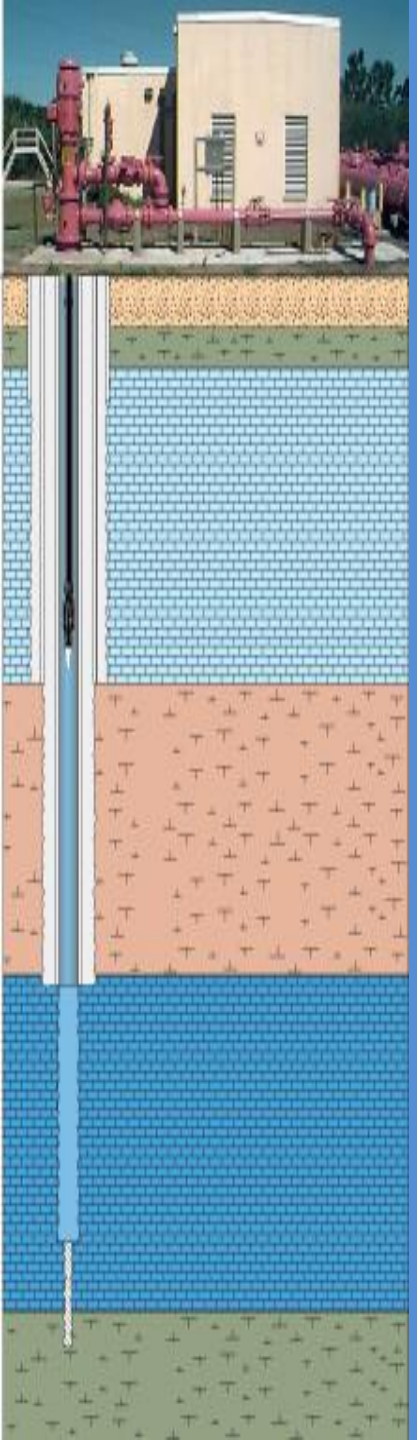


The word "ASR" is used more than100 times.

The word "Recharge" is also used more than100 times.

"However, the region's continued growth will require the development of additional alternative sources such as reclaimed water, brackish groundwater, seawater and surface water with off-stream reservoirs and ASR systems for storage or AR to provide recovery and offset impacts from withdrawals. To facilitate the development of these projects, the District encourages partnerships between neighboring municipalities and counties for purposes of developing regionally-coordinated water supplies."

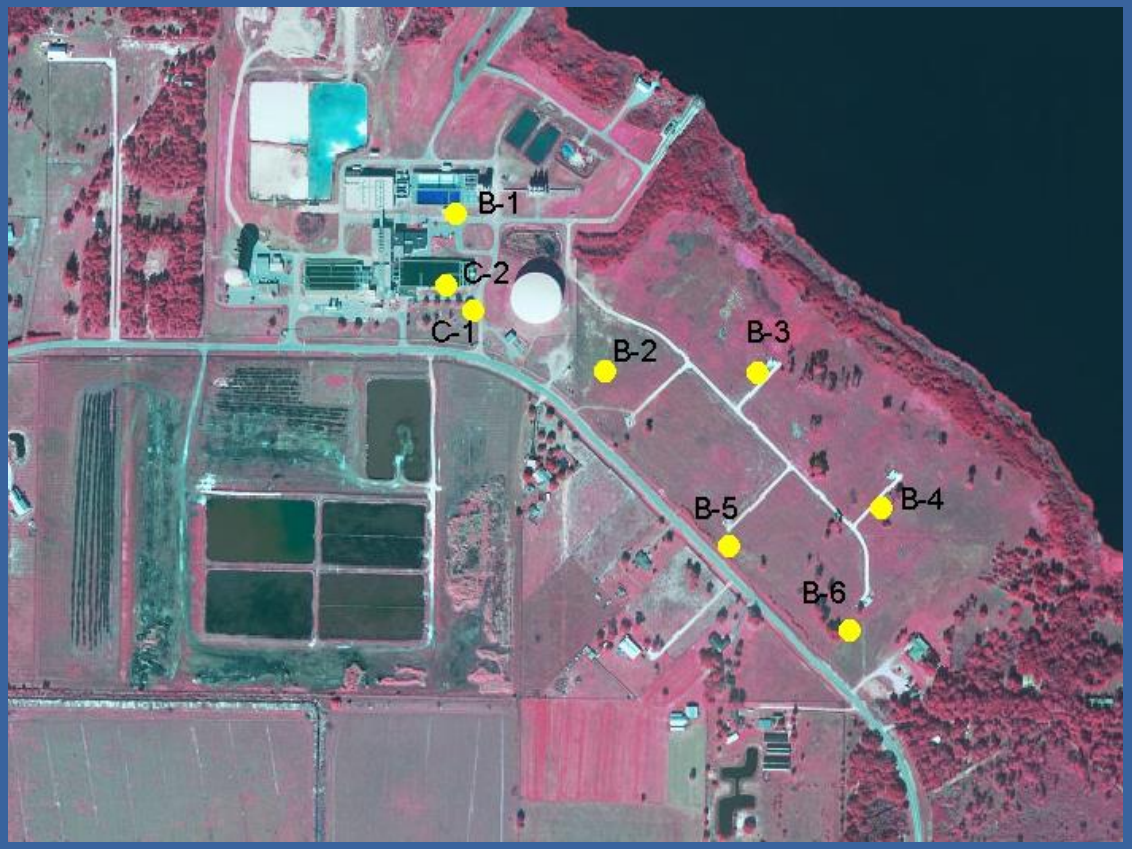
"A utility cannot expand its reuse system beyond peak flow demand, which occurs during dry periods when demand is highest, without experiencing shortages."



Early Years ASR

- Wildwood N.J (1975)
- Manatee County (1983)
- Peace River (1985)
- Tampa (1993)
- St. Pete RW ASR (1993)

Manatee County ASR



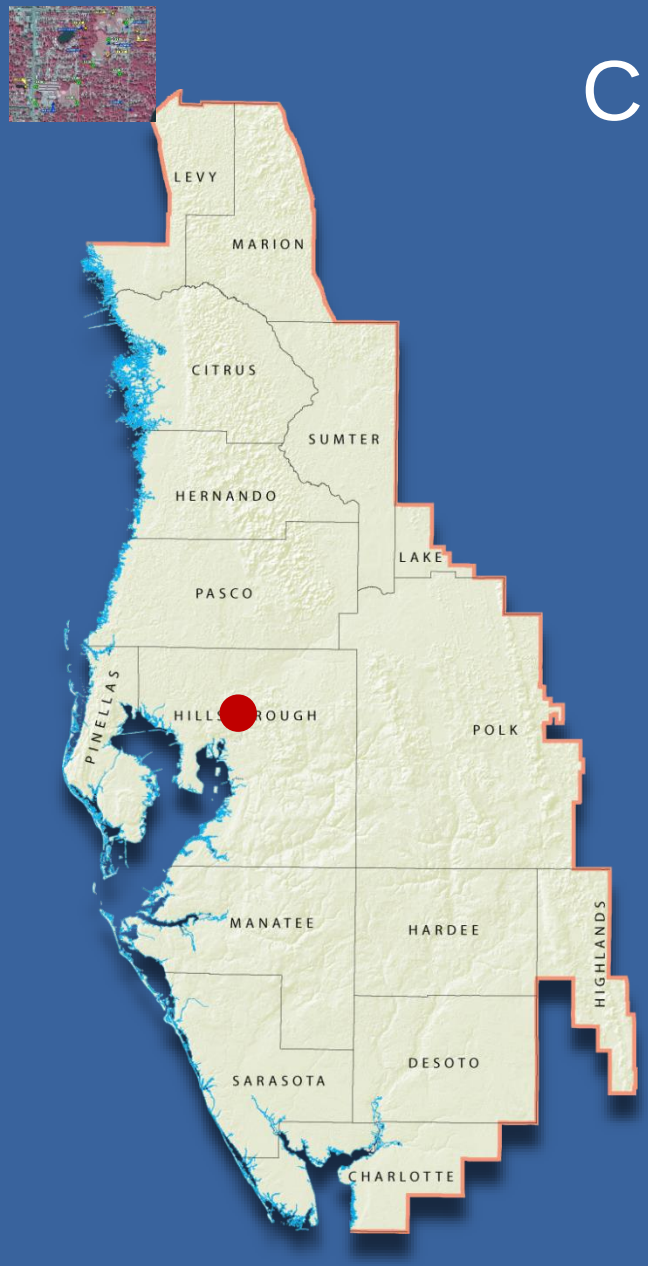
Southwest Florida Water Management District

The Peace River Facility

- Treated surface water (alum)

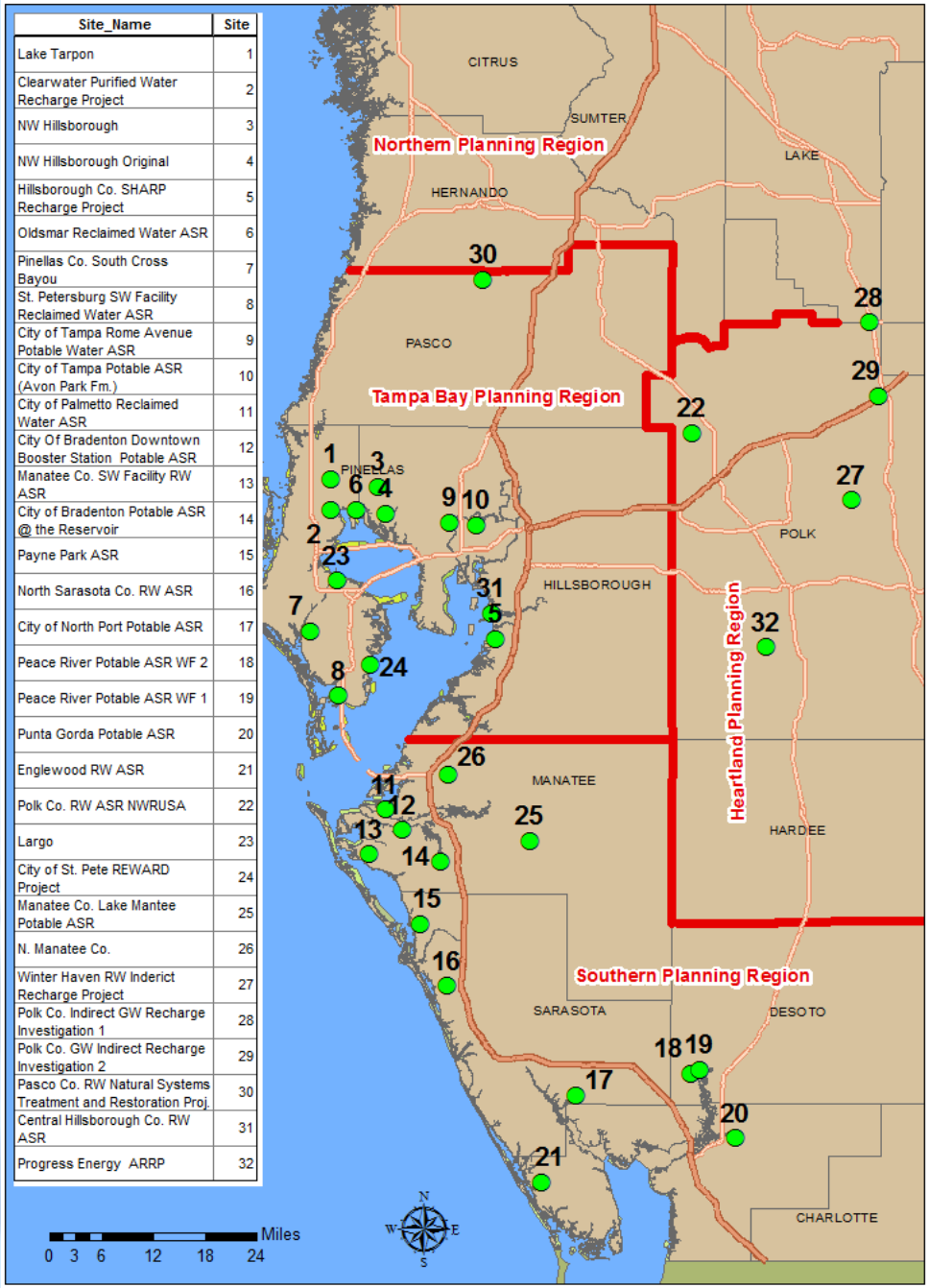
- 12 ASR wells installed near reservoir in last expansion (21 total wells)

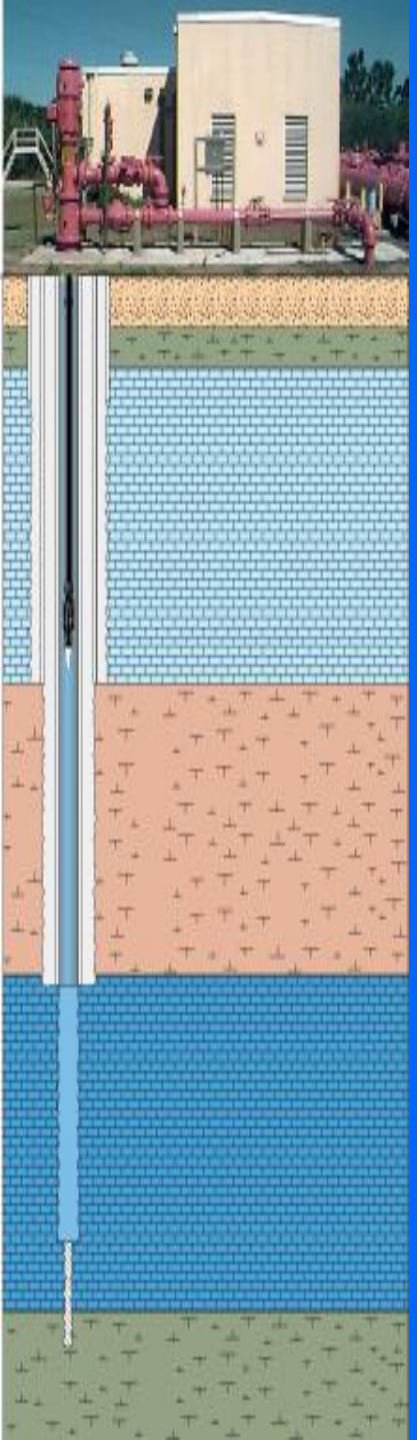
City of Tampa ASR 1993



Southwest Florida Water Management District

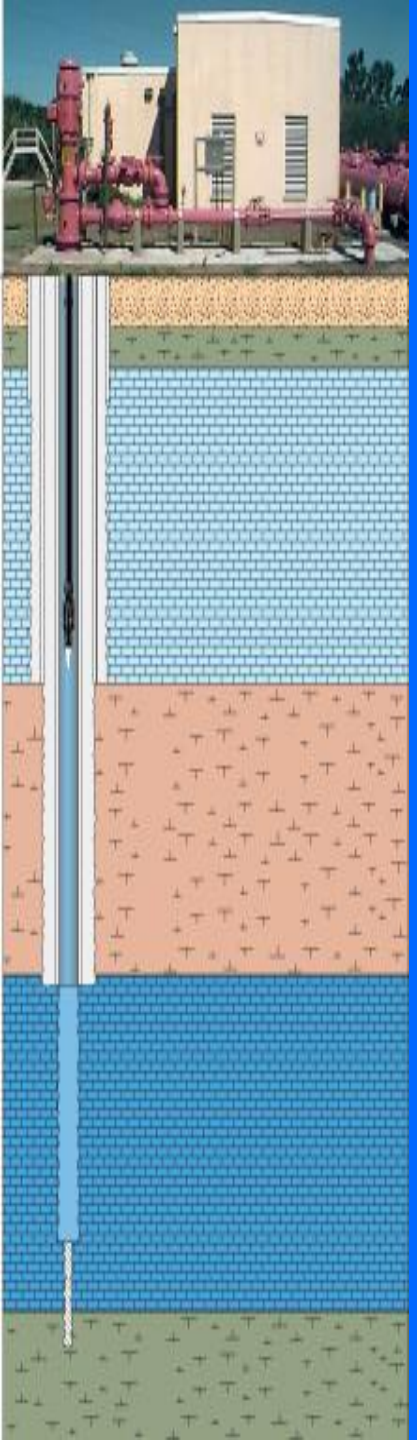
Site_Name	Site
Lake Tarpon	1
Clearwater Purified Water Recharge Project	2
NW Hillsborough	3
NW Hillsborough Original	4
Hillsborough Co. SHARP Recharge Project	5
Oldsmar Reclaimed Water ASR	6
Pinellas Co. South Cross Bayou	7
St. Petersburg SW Facility Reclaimed Water ASR	8
City of Tampa Rome Avenue Potable Water ASR	9
City of Tampa Potable ASR (Avon Park Fm.)	10
City of Palmetto Reclaimed Water ASR	11
City Of Bradenton Downtown Booster Station Potable ASR	12
Manatee Co. SW Facility RW ASR	13
City of Bradenton Potable ASR @ the Reservoir	14
Payne Park ASR	15
North Sarasota Co. RW ASR	16
City of North Port Potable ASR	17
Peace River Potable ASR WF 2	18
Peace River Potable ASR WF 1	19
Punta Gorda Potable ASR	20
Englewood RW ASR	21
Polk Co. RW ASR NWRUSA	22
Largo	23
City of St. Pete REWARD Project	24
Manatee Co. Lake Mantee Potable ASR	25
N. Manatee Co.	26
Winter Haven RW Inderict Recharge Project	27
Polk Co. Indirect GW Recharge Investigation 1	28
Polk Co. GW Indirect Recharge Investigation 2	29
Pasco Co. RW Natural Systems Treatment and Restoration Proj.	30
Central Hillsborough Co. RW ASR	31
Progress Energy ARRP	32





ASR Project Development Status

- **Projects capable of operation yield** — 52 mgd
- **Projects in construction phase yield** — 7 mgd



ASR Challenges

- Compatibility of injected water with the aquifer
- By-products resulting from disinfection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

RECEIVED
OCT 03 2013
DIRECTOR-WATER
RESOURCE MANAGEMENT

SEP 27 2013

OFFICE OF WATER

Mr. Mark Thomasson
Director, Division of Water Resource Management
Florida Department of Environmental Protection
2600 Blair Stone Road, Mail Station 3500
Tallahassee, Florida 32399-2400

Dear Mr. Thomasson:

Thank you for your interest in clarifying EPA's regulations as they apply to the injection and storage of water in underground formations for later withdrawal and use. This practice, known as aquifer storage and recovery, or ASR, can be used to provide water for a number of purposes. This letter addresses the need for public water systems experiencing water shortages to store treated drinking water underground for later use as a source of drinking water.

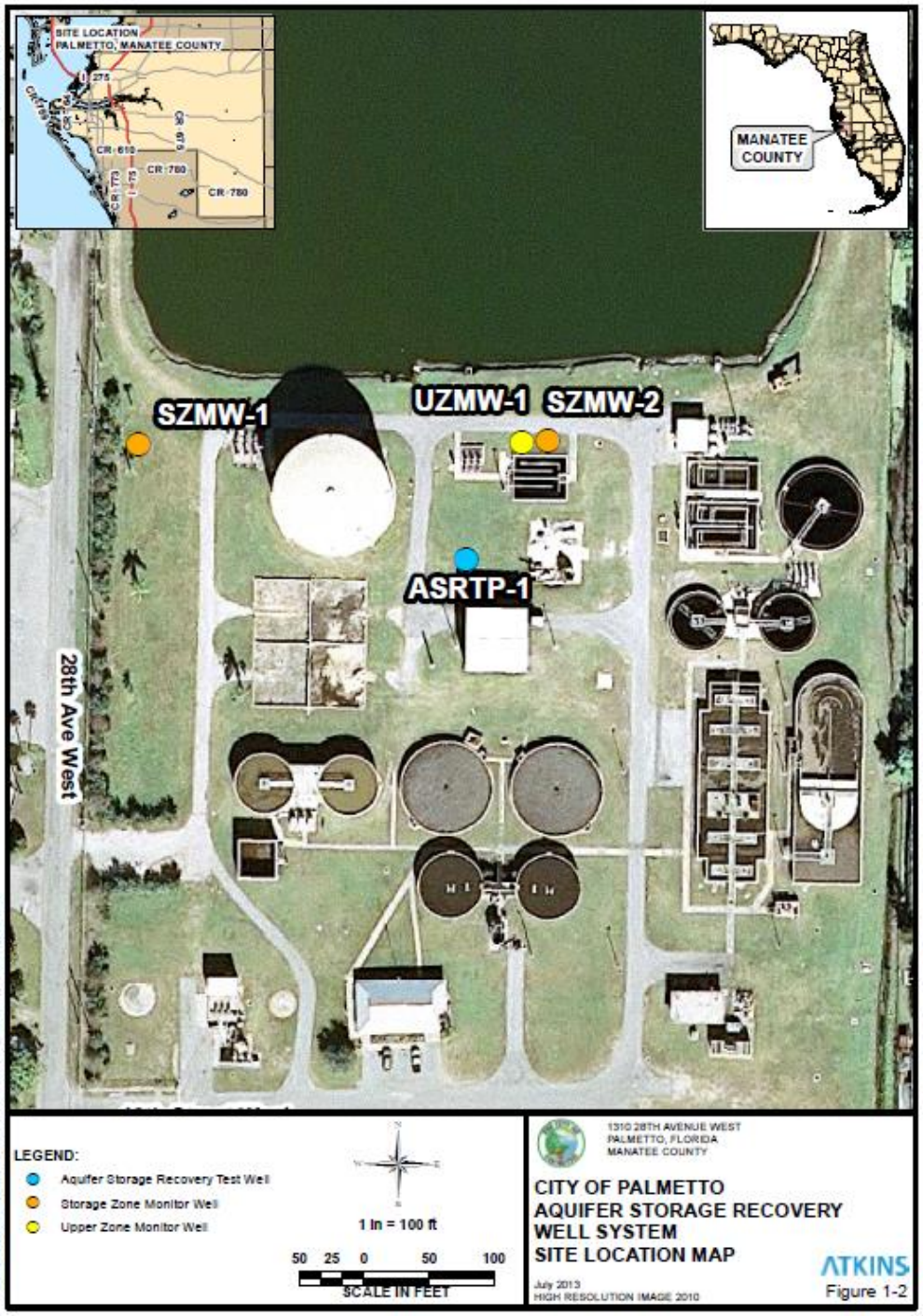
The EPA applauds Florida's efforts to account for existing and alternative water supplies in its regional water supply planning. As population growth, land use changes and changes in local climatic weather patterns impact water supplies in many areas of the country, innovative water management tools will be increasingly important to sustain water availability. We recognize that using ASR to conserve water that would otherwise be lost can be an important component of a long-term water management strategy.

A particular challenge to the safe use of ASR in some parts of the country, including Florida, is that the underground formations available for drinking water storage contain minerals that can be mobilized when in contact with injected water. For example, in Florida, arsenic is present in the sulfide-bearing minerals in the carbonate formations used for storing water underground. The oxygen in injected water can cause the arsenic to move from the formation into the ground water. This letter describes how Florida can apply the Underground Injection Control program (UIC) requirements to ASR wells used by public water systems when mobilization of arsenic is a concern.

Safe Drinking Water Act and Underground Injection Control Regulations

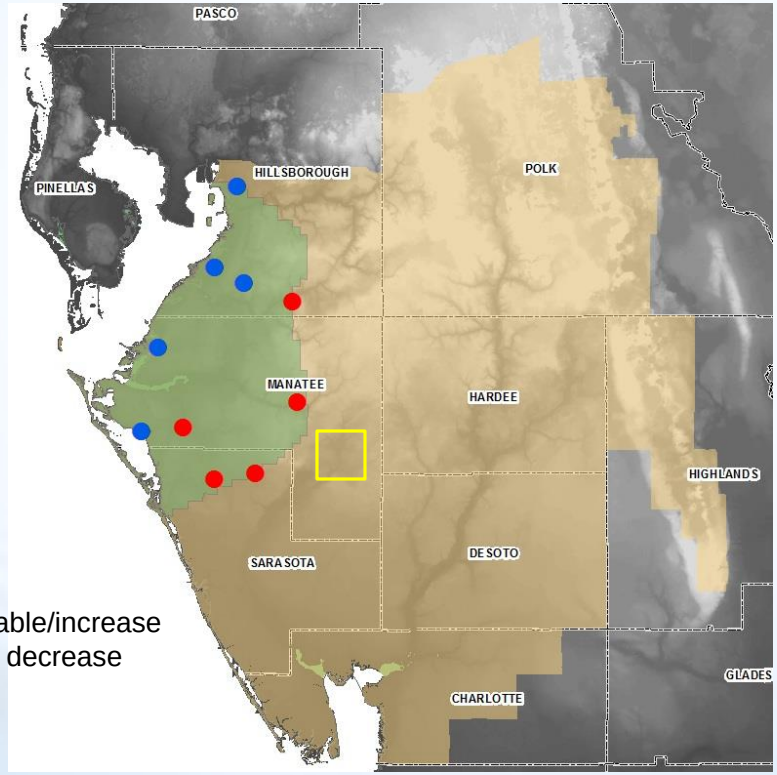
When Congress passed the Safe Drinking Water Act (SDWA), a stated goal was "to protect not only currently-used sources of drinking water, but also potential drinking water sources for the future" (H.R. Report No. 1185, 93rd Congress, 2nd Session, 1974). SDWA requires that the EPA establish a UIC program to prevent "endangerment" as described in SDWA Section 1421(d)(2):

> *Underground injection endangers drinking water sources if such injection may result in the presence in underground water…of any contaminant, and if the presence of such contaminant may result in such systems not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.*


SITE LOCATION
PALMETTO, MANATEE COUNTY
MANATEE COUNTY
SZMW-1
UZMW-1
SZMW-2
ASRTP-1
28th Ave West
LEGEND:
Aquifer Storage Recovery Test Well
Storage Zone Monitor Well
Upper Zone Monitor Well
1 In = 100 ft
50 25 0 50 100
SCALE IN FEET
1310 28TH AVENUE WEST
PALMETTO, FLORIDA
MANATEE COUNTY
CITY OF PALMETTO
AQUIFER STORAGE RECOVERY
WELL SYSTEM
SITE LOCATION MAP
July 2013
HIGH RESOLUTION IMAGE 2010
ATKINS
Figure 1-2

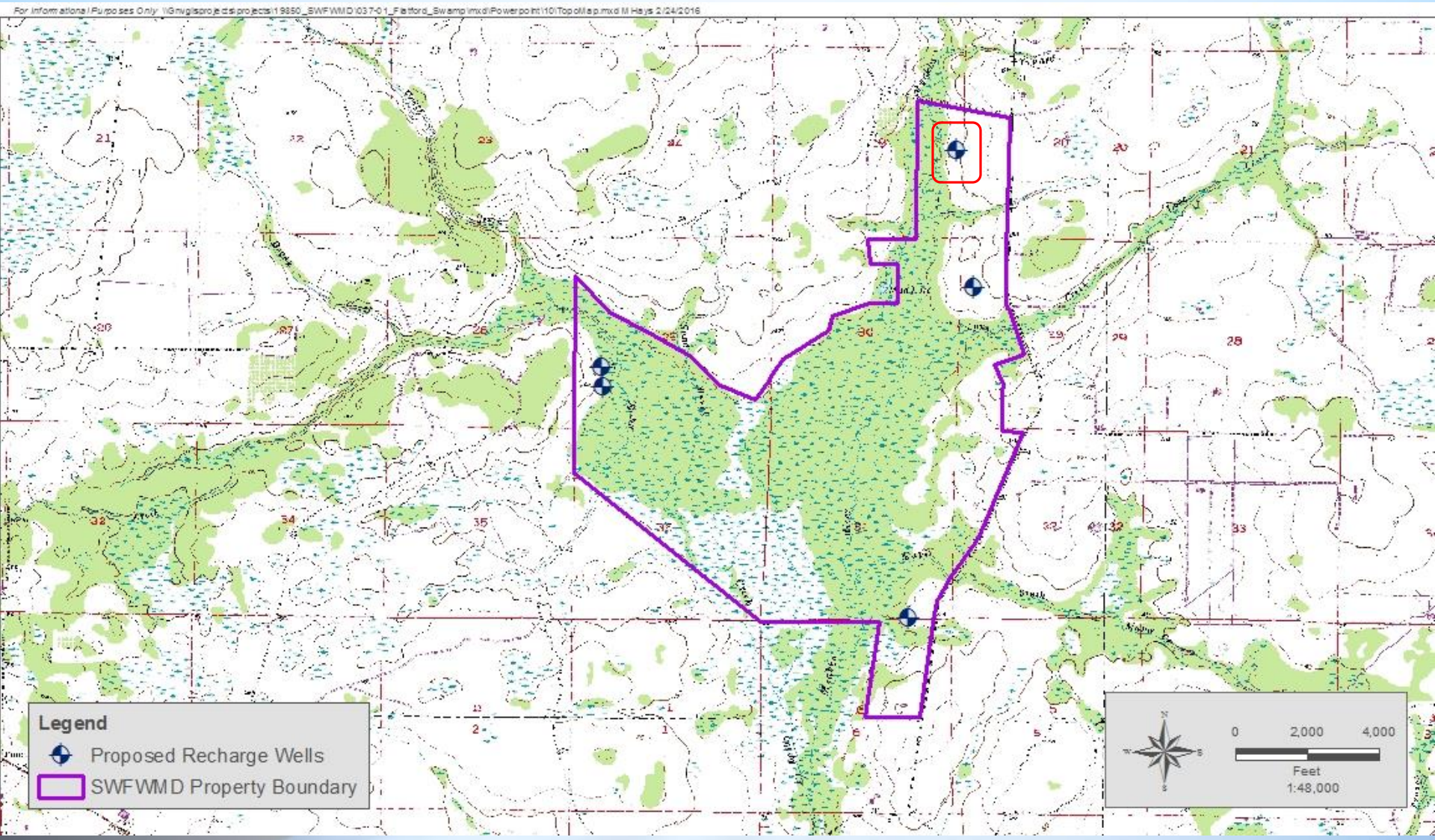
North Port Surface Water ASR

Salt Water Intrusion Minimum Aquifer Level (SWIMAL)



Blue – stable/increase
Red – decrease

Potential Well Sites



ASR and Recharge Status

Operation Permits

1. Bradenton
2. Tampa
3. Peace River
4. Englewood
5. St. Pete
6. Punta Gorda
7. Palmetto
8. Polk County
9. Sarasota Central County
10. Manatee County

Construction/Testing

1. Oldsmar
2. City of Clearwater Aquifer Replenishment
3. South Hillsborough County Recharge Project (SHARP)
4. North Port
5. Bradenton Reservoir Site
6. PRMRWSA
7. Tampa Augmentation Project (TAP)
8. Flatford Swamp

Approximate ASR Investment/Return

Approximate District Investment	$23 million
Approximate Annual Storage Volume	6 billion gallons*
Approximate District investment per thousand gallons storage	$4.00 per thousand gallons

* Volume is an estimate of all ASR project in the District, some didn't receive funding

Thank you