

Floridan Aquifer System Exploratory Coring and Monitoring Well Construction Program

Jennifer Reynolds
Director, Ecosystem Restoration & Capital Projects
South Florida Water Management District
Governing Board Meeting
August 13, 2020

Floridan Aquifer Exploratory Coring and Monitoring Wells

- Provide site-specific geologic and hydrogeologic data to evaluate properties of the Floridan Aquifer System (FAS) at locations under consideration for water resource evaluation for future water supply wells and potential future construction of aquifer storage and recovery (ASR) wells
 - Comprehensive Everglades Restoration Plan (CERP)
 - Lake Okeechobee Watershed Restoration Project (LOWRP)
 - Central Florida Water Initiative (CFWI)
 - Northern Everglades and Estuaries Protection Program (NEEPP)
- Exploratory drilling of continuous core boreholes will provide critical information on lithology and water bearing properties of the FAS
 - Used to determine suitability for ASR and water supply wells and aids in well design

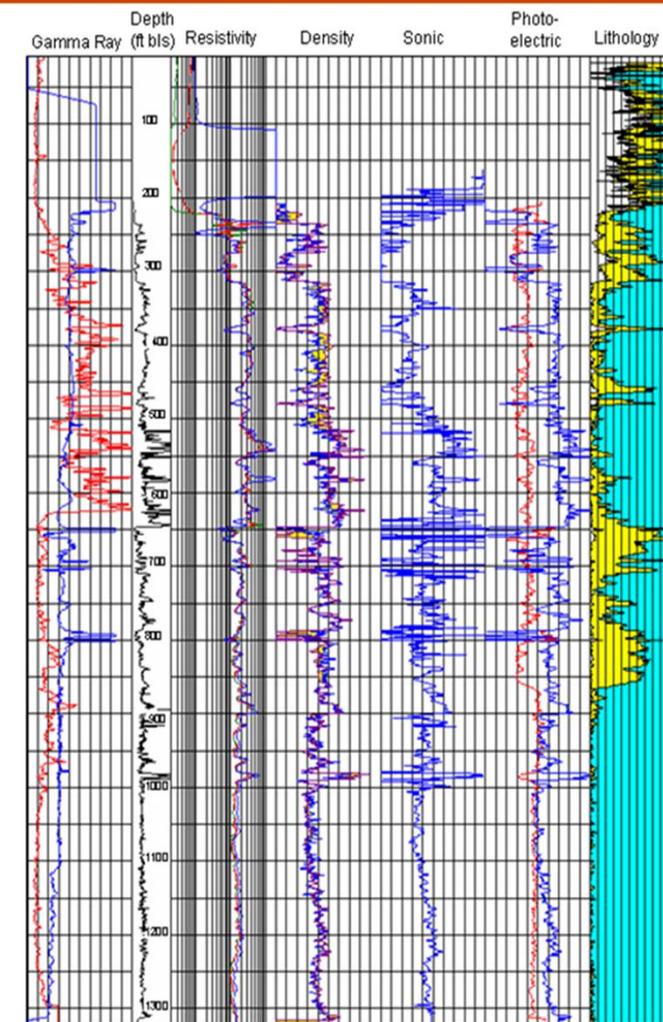


Example Cores

Cores will allow for Detailed Geologic Assessment

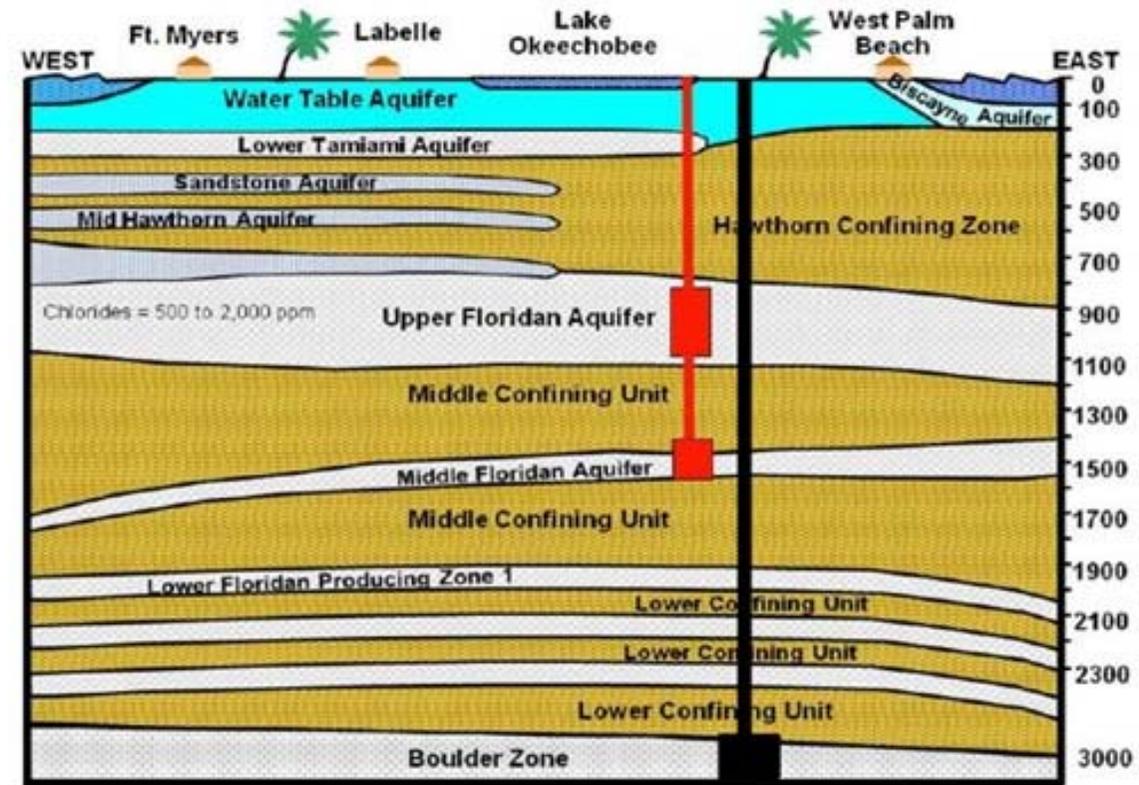
DRAFT

- Precise information on areas considered for ASR well clusters
 - Early assessment of the vertical relationships of aquifer zones and subsurface water quality
 - Allows for advanced wellfield design and monitoring
- Allows for geochemical assessment of water-rock interactions
 - Analysis of rock mineralogy and geophysical properties
 - Column studies can reveal processes of nutrient reduction, microbial activity, and potential for leaching of constituents of concern



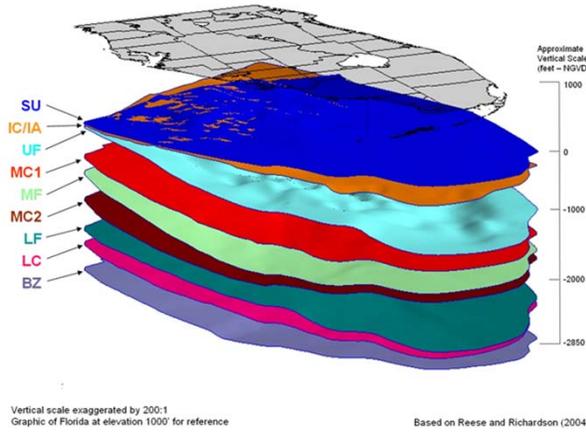
Implementing a Phased Approach to ASR

- Following the recommendations of the National Research Council
- Formation of an Independent Panel of Experts
 - Representing the Florida Geological Survey, Florida Fish and Wildlife Conservation Commission, Florida International University, Florida Gulf Coast University and University of South Florida
- ASR Peer Review Panel workshop held on July 22 and 23
 - Summarized the results of previous ASR projects and studies
 - Solicited suggestions on integration of scientific investigations
 - Panel will remain engaged as new information becomes available
 - Will provide guidance for the ASR program



DRAFT

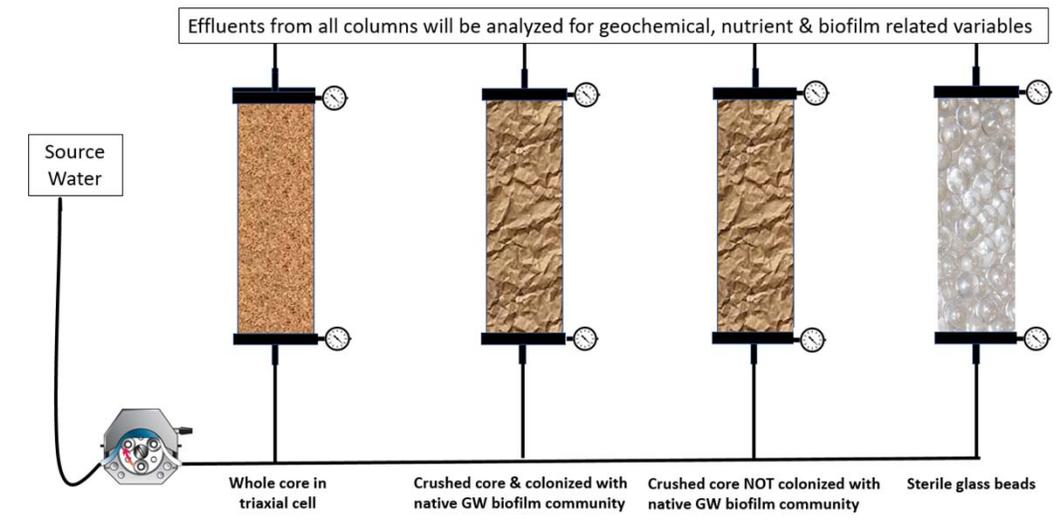
Scientific Advancement



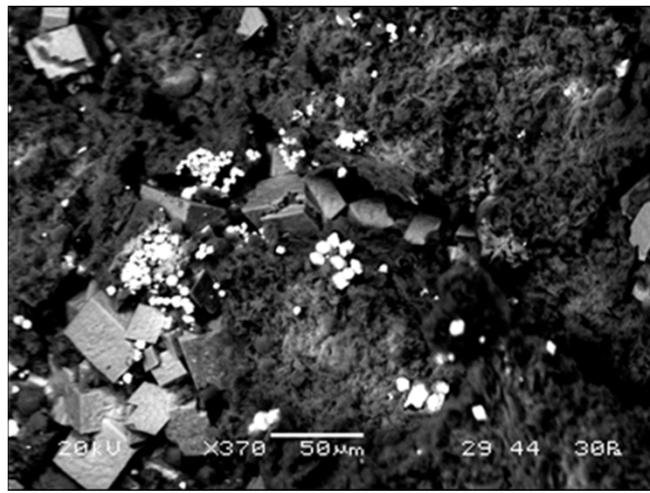
Groundwater Modeling



Water-Rock Interaction



Column Experiments



Aquifer Mineralogy

LOWRP ASR Well Program

- State Appropriations for LOWRP
 - Received \$50M in FY19-20
 - Additional \$50M in FY20-21
- “Design, engineering, and construction of specific project components designed to achieve greatest reductions in harmful discharges to the Caloosahatchee and St. Lucie Estuaries” (Specific Appropriation 1642A)
- Incremental, phased approach being implemented in the program and the specific watershed ASR projects prioritized for these State Appropriations



Example LOWRP Cluster Design & Construction Phasing

DRAFT

Current (Near Term) Activities

- Phase 1 Site Evaluation/
Hydrogeologic Assessment
- **Exploratory 2000' Coring and
Monitoring Well Construction**
- Phase 1 Design Adjustment
- Geotechnical Drilling of Upper
Floridan Aquifer (UFA) and Avon
Park Permeable Zone (APPZ)
Exploratory Wells
- Treatment Technology Evaluation
 - For recharge and recovery

Future Activities

- Phase 2 Design
- Construction of ASR System including
Treatment, Filters, Pumps (modular)
- Cycle Testing

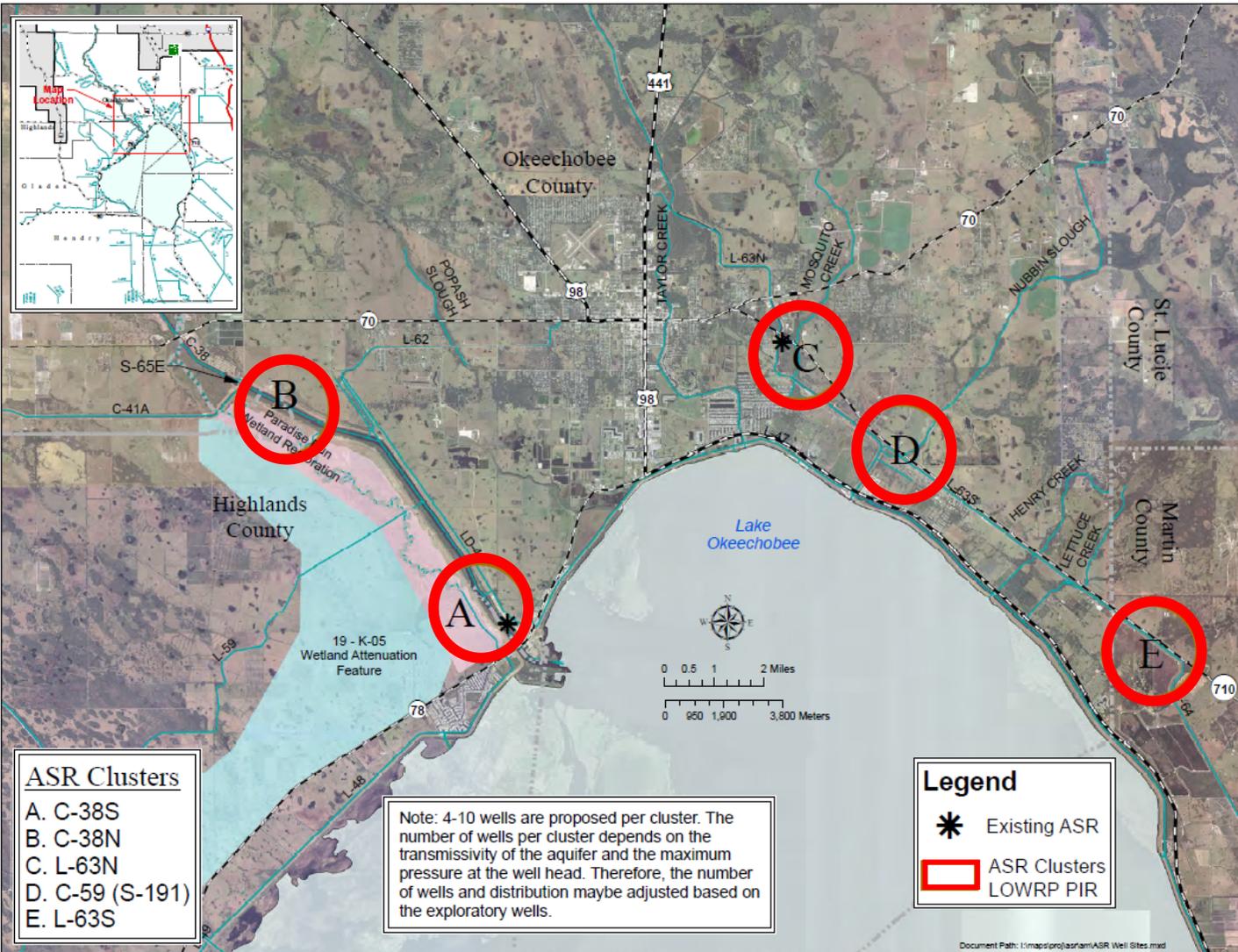
- Adjust Phase 2 Design for spacing
- Construction of ASR Well Couple(s)
- Cycle Testing

DRAFT

LOWRP ASR Cluster Evaluation: Phased Approach

- Phase 1 - Site Evaluation / Hydrogeologic Assessment Complete
 - C-38S (A) & C-38N (B)
 - Geotechnical Drilling of UFA and APPZ Exploratory Wells (Advanced Planning Field Work)
 - L-63N (C), C-59 (D), L-63S (E)
 - **FAS exploratory coring and monitoring well construction** (Advanced Planning Field Work)
- Assessment and repairs to existing ASR wells
 - L-63N (*C)
 - Kissimmee River Pilot (*A)
- Treatment technology evaluation

Presenter: Jennifer Reynolds 9



LOWRP ASR Program Schedule

DRAFT

		FY 2021				FY 2022				FY 2023					
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
S-191 Basin Locations at L-63N, C-59, and L-63S															
Conceptual/Hydrogeologic Evalaution		█	█												
Exploratory Coring and Monitoring Well Program			█	█	█	█	█	█							
L-63N ASR (Existing)															
Assessment of Existing Well		█													
Permitting and Refurbishment of Existing Well			█	█	█	█	█	█							
Testing and Operation	Oct-21							█	█	█	█	█	█	█	█
Design and Construction of New Pretreatment	Dec-23								█	█	█	█	█	█	█
Kissimmee River ASR at C-38S (Existing)															
Permitting and Refurbishment of Existing Well		█	█	█	█										
Testing and Operation	Dec-20				█	█	█	█	█	█	█	█	█	█	█
Design and Construction of Well Field Expansion	TBD														
C-38N Cluster															
Design and Permitting of ASR Wells		█	█	█											
Geotechnical Drilling of ASR Wells (Advance Planning Field Work)					█	█	█								
Design and Permitting of Pretreatment and ASR						█	█	█	█	█					
Construction of Pretreatment and Pumps for ASR										█	█	█			
Testing and Operation of First ASR Well Pair	Oct-22											█	█	█	█
Design, Permitting, and Construction of Second ASR	TBD														
C-38S Cluster															
Design and Permitting of ASR Wells		█	█	█											
Geotechnical of ASR Wells (Advance Planning Field Work)					█	█	█								
Design and Permitting of Pretreatment and ASR						█	█	█	█	█					
Construction of Pretreatment and Pumps for ASR										█	█	█			
Testing and Operation of First ASR Well Pair	Oct-22											█	█	█	█
Design, Permitting, and Construction of Second ASR	TBD														
TBD - Will be scheduled when additional funding becomes available															

Design █

Advanced Planning Field Work █

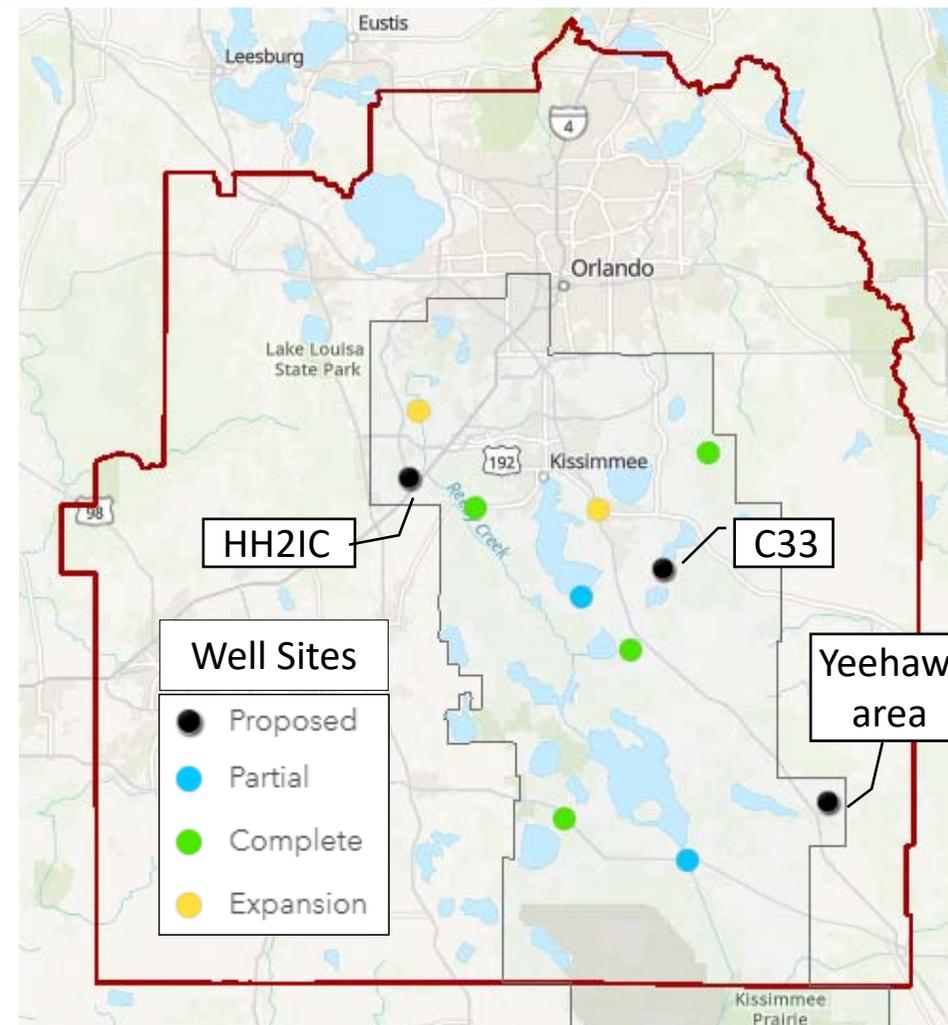
Construction █

Operations █

Potential CFWI Exploratory Coring Locations

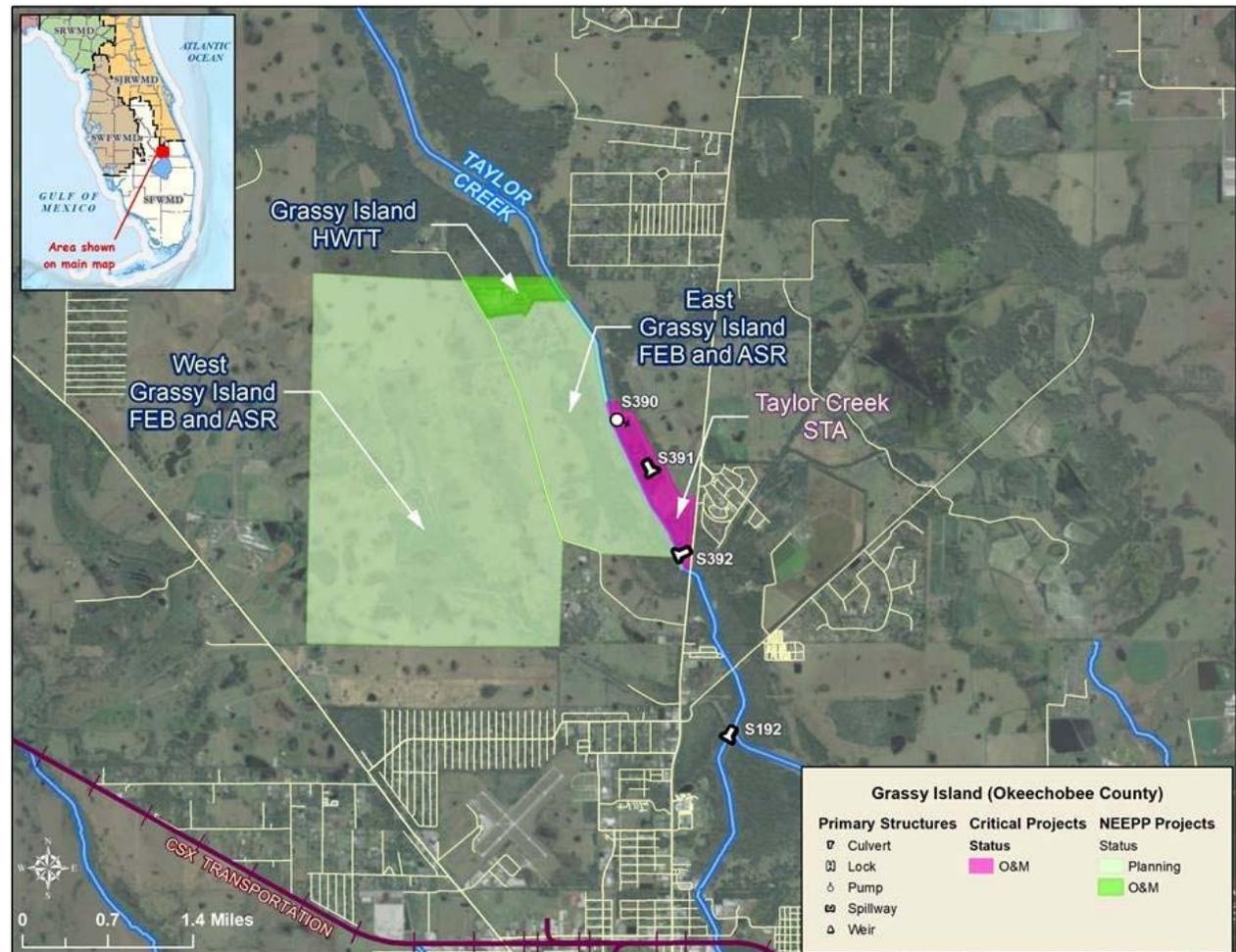
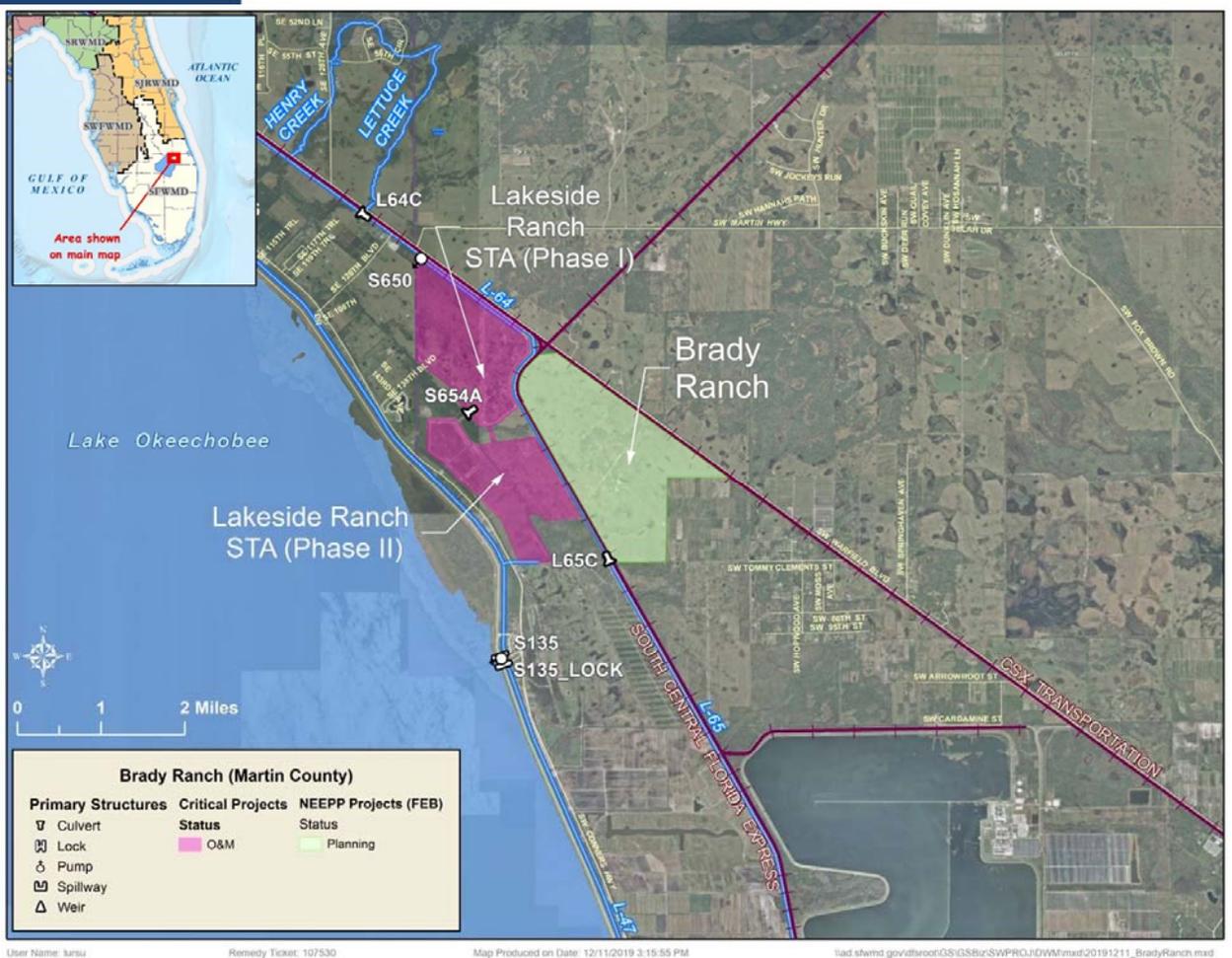
CFWI has identified three sites to:

- Obtain hydrogeologic and subsurface water quality data
- Resolve hydrogeologic questions, collect long-term groundwater level data, update groundwater model, support water supply planning
- Continue evaluation of Lower Floridan Aquifer (LFA) as an alternative water supply (AWS) source
- 2 CFWI sites are currently included in the Contractor's estimate, with the flexibility to issue additional work orders for more sites



DRAFT

Potential NEEPP Exploratory Coring Locations



Floridan Aquifer Exploratory Coring and Monitoring Wells

DRAFT

- Unit Price Contract allows for work orders to be executed to perform continuous core boreholes that may be converted to FAS monitoring wells over the next three years with two 1-year extensions, for a not-to-exceed amount of \$14,000,000
- Monitoring wells provide long-term hydrogeologic data collection
 - Water quality sampling in multiple subsurface aquifers will provide assessment of the groundwater resource
 - Wells will provide water level data which will be integrated into regional groundwater models
- First locations selected for exploratory drilling include ASR clusters in the LOWRP and water supply areas of interest in the CFWI
- Additional programs may use this services contract to evaluate the FAS for future projects, including the Northern Everglades and Estuaries Protection Program

Unit Price Contract

- Scope of work: To perform continuous wireline coring, wireline packer testing, and construction of an estimated six (6) FAS exploratory boreholes and associated monitoring wells
- Unit Price Contract based on estimated quantities
 - LOWRP (4) ASR (\$3,536,550)
 - CFWI (2) (\$898,100)
- There are unknowns in drilling at depths of up to 2,000 feet below ground surface. Due to the specific conditions, “extra” items may be required. The additional items are added via unit price.
- Additionally, projects currently in the planning phase with ASR components such as NEEPP can save time and money by utilizing this unit price contract in the future

Bid Summary

- RFB Advertised: June 12, 2020
- Bid Opening: July 13, 2020
- Number of Bids Received: 1
- Bid Amount: \$4,434,650 (negotiated)
- Engineer's Estimate: \$3,800,000 to \$4,200,000
- Total Contract Amount not-to-exceed: \$14,000,000

Resolution 2020-0811

A Resolution of the Governing Board of the South Florida Water Management District to authorize entering into a 3-year work order contract with two 1-year extensions with Huss Drilling, Inc., the lowest responsive and responsible bidder, for the Floridan Aquifer System Exploratory Coring and Monitoring Well Construction Program, in an amount not to exceed \$14,000,000, for which \$100,000 in dedicated funds (State General Revenue and Land Acquisition Trust Fund Revenue) and Ad Valorem funds are budgeted in Fiscal Year 2019-2020 and the remainder is subject to Governing Board approval of future years budgets; providing an effective date. (Contract No. 4600004288)