



Curtain Wall as Part of a Comprehensive Flood Protection and Restoration Strategy in South Dade

**South Florida Water Management District
Task Force Meeting
May 7, 2020**

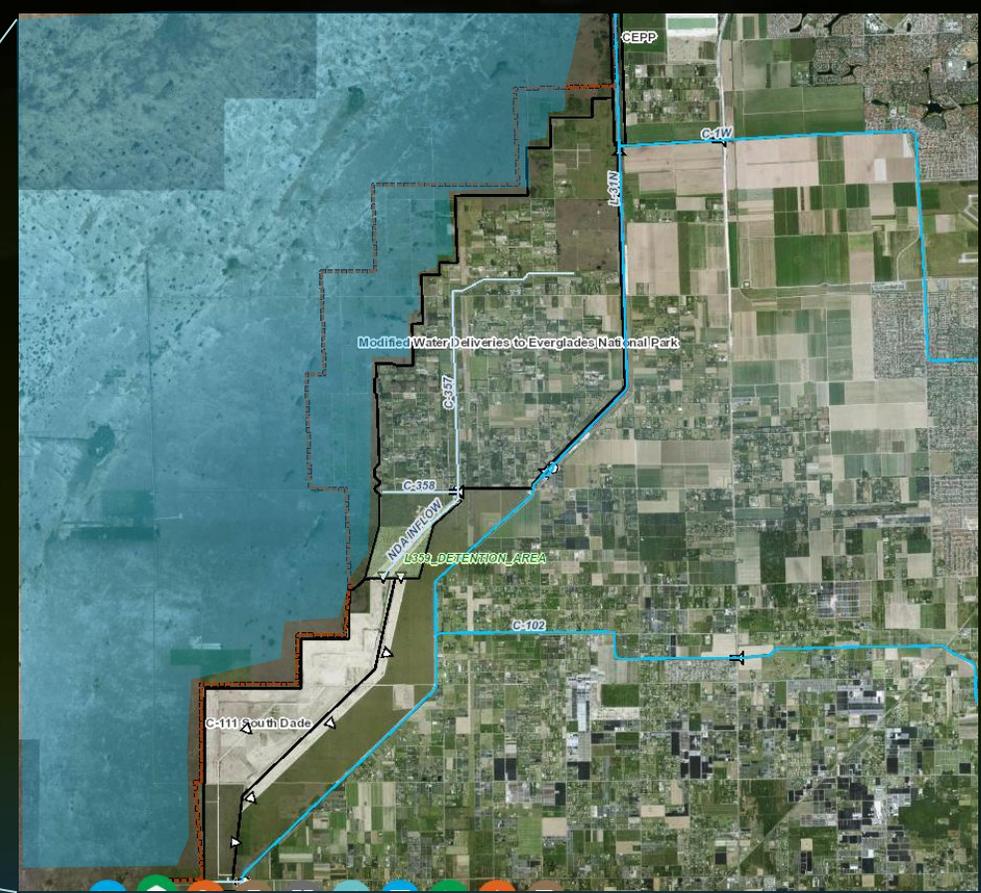
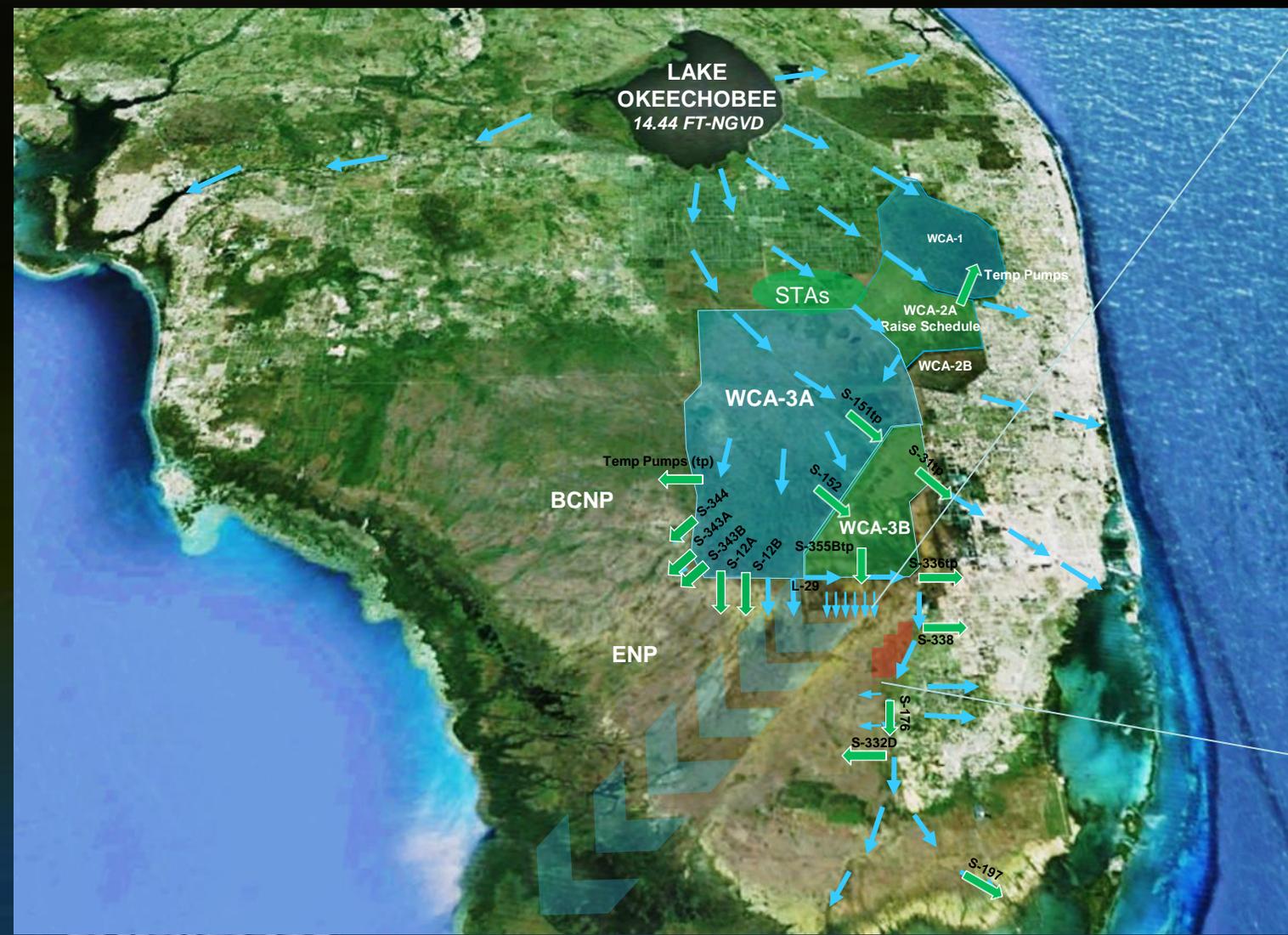
Akintunde Owosina, P.E.
Bureau Chief
Hydrology and Hydraulics

05/07/2020

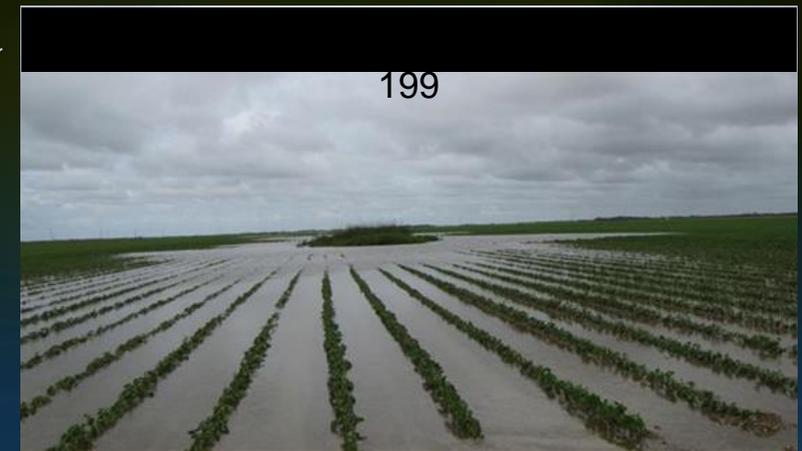
Background and History

- Restoring the Everglades and Florida Bay hinges on increasing water levels in the Everglades National Park while simultaneously managing the resulting seepage
- The Central Everglades Panning Project included installation of a curtain wall as part of the seepage management strategy
- Several studies have identified curtain walls as part of a comprehensive flood protection strategy in South Dade
- A recently completed project funded by the Miami-Dade Limestone Products Association demonstrated the concept
- SFWMD is advancing an initiative to implement a curtain wall project in South Dade

Flow to Shark River Slough

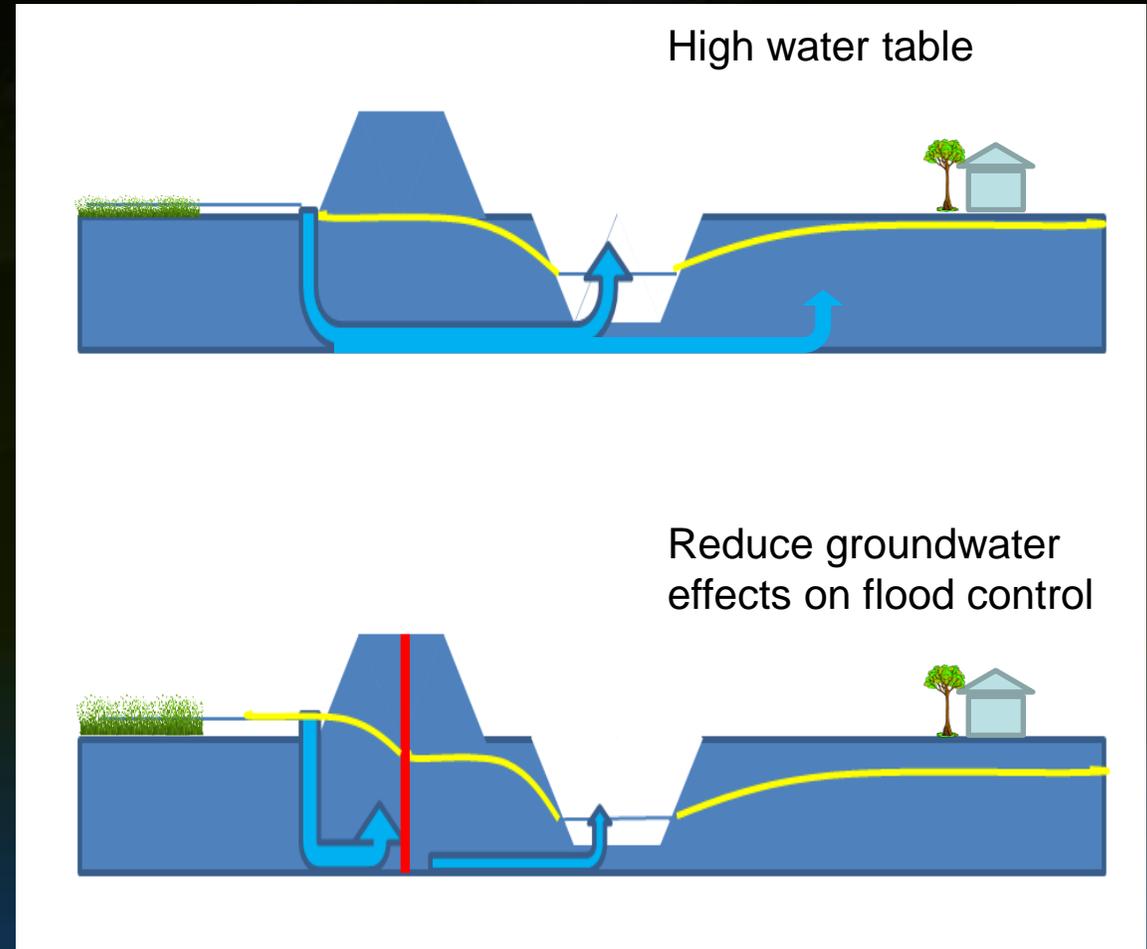


Flooding Is An Issue Further South



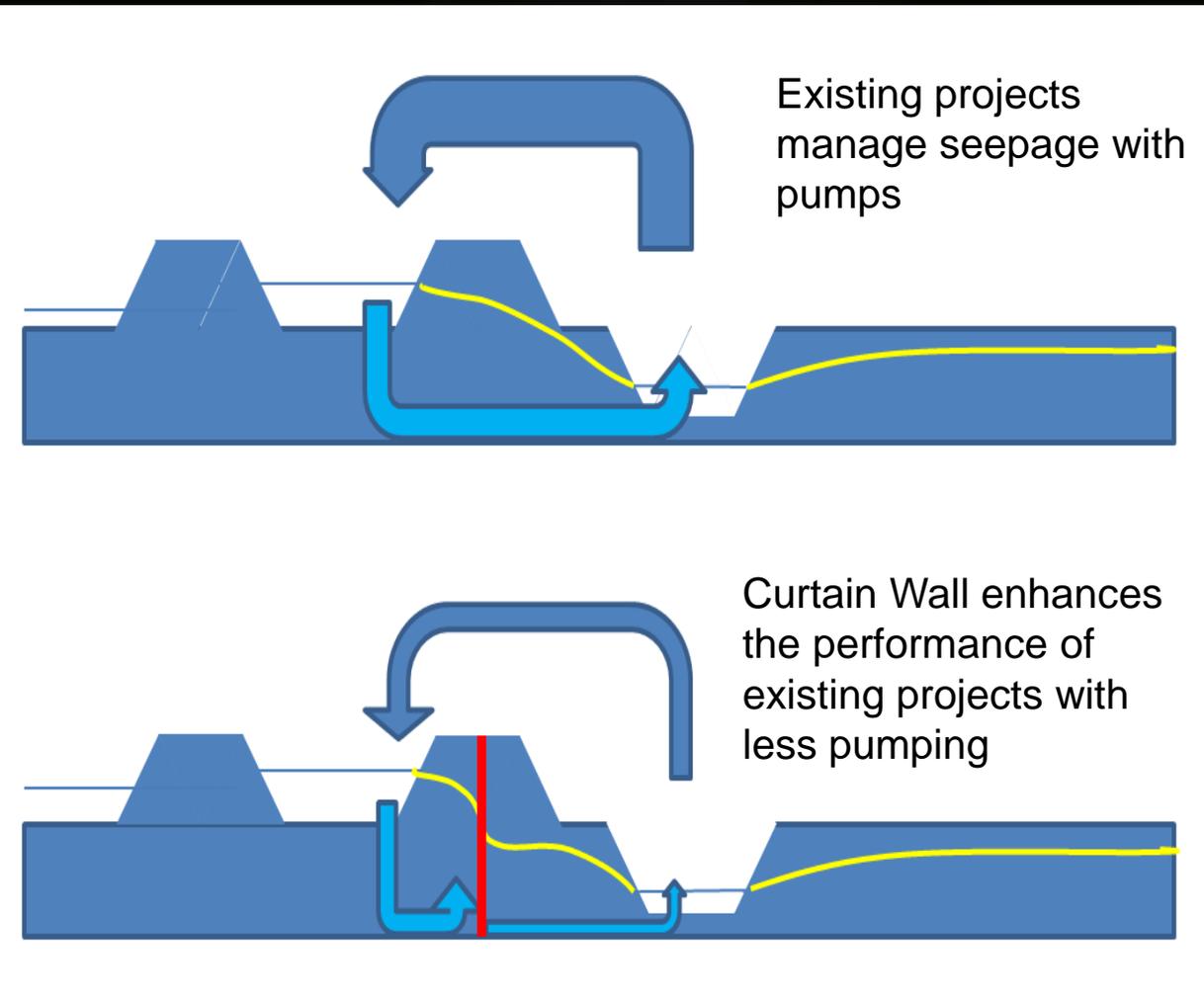
Characteristics of Curtain Walls

- In South Dade, the goal is to improve flood control in areas impacted by elevated water tables
- The use of a less permeable material placed in the flow path will help manage groundwater
- Goal is to allow a little higher water level in the natural areas (keeping the water where it is needed) while achieving a little lower water table in the developed areas



Characteristics of Curtain walls

- Passive groundwater management solution that is typically not operated (switched on and off)
- Non-selective in function as it blocks flows in both directions
- Effective solution to provide flood protection in conjunction with other measures including pumping
- Little to no maintenance and operational costs post construction



Curtain Wall Concept

- Dates back to the 1990s
- Evaluated as one of the SFWMD South Dade Studies completed in 2011

MIAMI DAILY NEWS, Tuesday, November 15, 1955

No Dade Flood Plan Counts Until Army Finishes Study

MIAMI DAILY NEWS Special Report

By JANE WOOD Miami Daily News Staff Writer

AN UNDERGROUND DAM down through 40 feet of porous rock may make it possible some day to hold back the way west to the low county behind Hialeah. This was one of the possibilities sketched in the future by Oscar Rawls, chief of the technical liaison office of the U. S. Army Engineers.

Just as interesting as his sketches of future flood defenses were these: (1) No plan for South Dade county that has ever been announced means there will be no plan for South Dade county that has ever been announced before May, 1957. (2) No plan for South Dade county that has ever been announced means there will be no plan for South Dade county that has ever been announced before May, 1957.

Rawls flew down this week from Jacksonville to a group of that no half-baked schemes for their area will be incorporated into the flood control plan being built by the Army Engineers. His talk clarified air that has been filled this fall with plans and revisions of plans and suggested revisions of plans for flood control.

He fixed the responsibility for designing the flood control works that will determine this county's future. He gave a accurate time-table of design. He described in detail the yard-sticks used to decide whether any part of the flood control scheme will be worth building. And he outlined, very briefly, some of the water control problems in this area may finally

will seek authorization for this scheme in the next Congress. In answer to this, Rawls said that nobody but the U. S. Army engineers is going to have the final say on this vast project. The army suggestions will be welcomed by local engineers but will not be bound by them, he made clear.

The old plan for flood control in Dade county was hastily thrown together by the army engineers on the basis of suggestions from local residents. It has never been re-studied since then. Next year study will begin on what Dade really needs. Rawls said that the original army plan of 1947 was simply a skeleton, a paper plan drawn up so that engineers could vote money for control in central and south Florida following the disastrous floods of that year. Army engineers' always intended to re-study in every detail each section of the plan, and have been doing so ever since.

Even before the re-study, they were convinced that the north-south levees to protect the east coast cities would be necessary, and went ahead and built that.

THIS RE-STUDY is so exhaustive, that the engineers are still in headed south, in their valley, on revising the flood control work system. When they finish work, they will begin to control Kissimmee valley design, he says, they will begin to work near the plans for Lake Okeechobee and its drainage.

By time-schedule for re-study their bring them to north Dade county, where they will be practical to try up the land around Pensacola, northwest of Hialeah for urban expansion. The cost of 1956 to study flood control plan is economically sound, worth spending tax-

feasible, Rawls says, they use ed out by a mathematical formula. The ratio of benefits to cost must be one, or greater, before the army engineers will e.o.k. any project. That means that benefits must be equal to or greater than the cost.

While this formula sounds accurate and practical, a closer inspection of the way the engineers get a figures to put into it shows that a certain amount of guess-work can be pretty solid. They include the total capital expenditure for the period of 50 years. They do not deteriorate for ages, but the allowed for any such period is 50 years.

THAT MEANS, says Rawls, that two per cent of the capital cost of the works is the annual amortization cost. To this is added the interest on the money borrowed, plus the amortization cost of operating of

benefit. Rawls says, they use the increase in value of produce for agricultural land. But for land that is urban, on which home will probably be built, it is harder to accurately estimate benefits of flood control. The basic figures on which the benefit are the value of such land now compared to now when dry 50 years from now.

Can you guess accurately what so acres in the saw-grass levee of Dade's backyard will be worth if it is half cut out enough for residential building?

If you can, the army engineers need your figures. They are economists who are specialists in urban land values. They take figures from economic forecasters like Robert Light, and Dr. Reinhold Wolf of the University of Miami. They study graphs showing what Los Angeles county, Calif., has done in the past.

Boiling all these figures together, Rawls says, they make a real try at deciding whether any part of a flood control plan is economically sound, worth spending tax-

ars money because of benefits it will bring.

Within the cost limits and the purpose of the flood control plan, Rawls says, the army engineers have the power to change and revise any part that will make it work better. But if the scope or cost of the plan is to be greatly increased, the engineers will need further authorization from Congress.

TO DRY Dade county out clear to the levee for urban building would greatly increase the scope of the original plan. Studies for north Dade and south Dade, in separate sections, will begin next year to see if that job can be done, and whether doing it will pay benefits above costs.

Rawls says today that he will guess that land owners benefit, and that it will pay a greater percentage of the costs under the present flood control plan. One of the first obstacles to drying out Dade within the levee is built on fact that the soil that considerable seepage water flows through the rock

beneath it. However, Rawls says the levee does hold back some water. In 1953, for example, it held back a three-foot head of water in the Everglades that would have raised water levels in Dade county by one to two feet had it all come through the dike.

The ground beneath the levee can be made more nearly watertight, Rawls says. This can be done by using a fantastic new ditch-digging machine that can dig a trench one foot wide and 40 feet deep, down to an impermeable strata of rock. An impermeable dam could be built by filling this trench with something like marl. An underground trench like that, made by drilling six feet apart and forcing a liquid mortar or rock down the holes, to solidify the spongy rock.

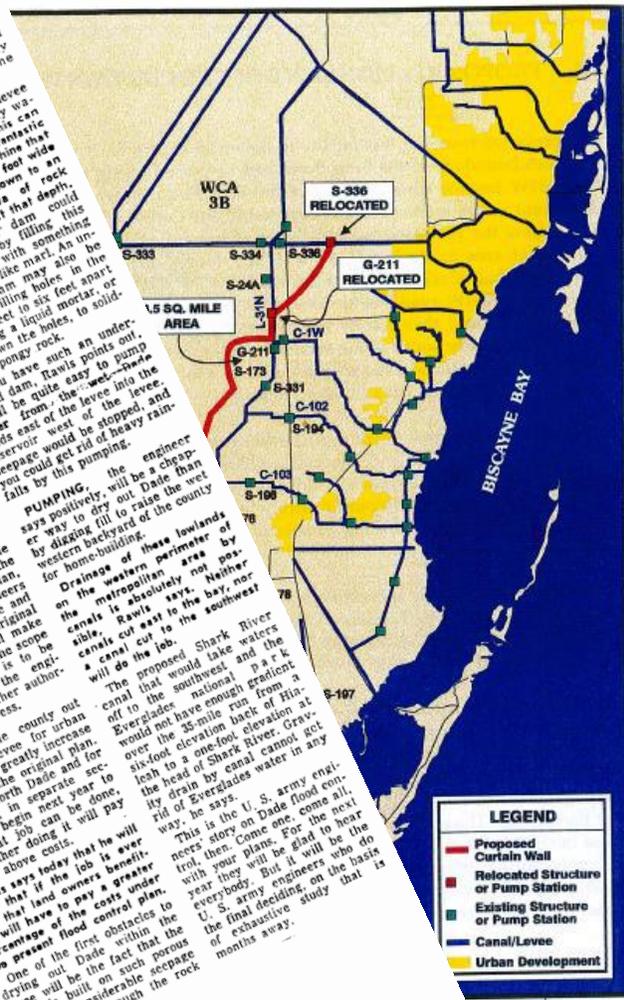
If you have such an underground dam, Rawls points out, it will be quite easy to pump water from the westward lands east of the levee. Seepage would be stopped, and you could get rid of heavy rain-falls by this pumping.

say positively, out Dade than by digging fill to raise the wet western backyard of the county for home-backing.

Drainage of these lowlands is absolutely not possible, Rawls says. Neither a canal cut east to the southwest will do the job.

The proposed Shark River canal that would take waters off to the southwest park would not have enough gradient over the 35-mile run from a six-foot elevation back at Hialeah to a one-foot elevation at the head of Shark River. Gravity drain by canal cannot get rid of Everglades water in any way, he says.

This is the U. S. Army engineers' story on Dade flood control, with your plans. For the next year they will be glad to hear everybody. But it will be the U. S. Army engineers who do the final deciding on the basis of an exhaustive study that is months away.



Opportunity to Study and Construct a Flood Protection Solution

- Multiple requests from stakeholders, legislators and other interested parties to implement a comprehensive flood protection strategy for South Dade
- Request to consider a flood control focused study
- Protect property, mitigate flooding concerns of South Dade farmers with a view to sustain broad support for restoration initiatives in the region

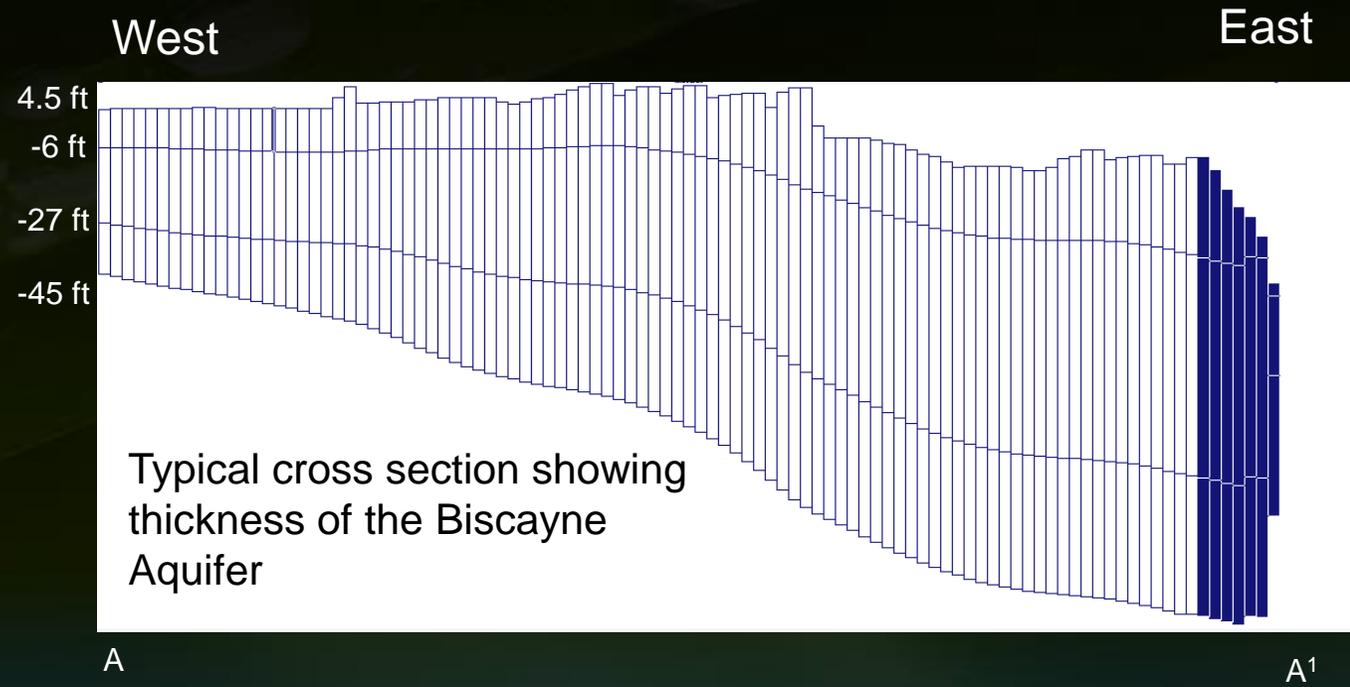
Overview of 2018 Assessment of Curtain Wall as Part of a Comprehensive Flood Protection Strategy

Comprehensive study outside the scope of any one ongoing study or project

- Provide flood protection to homeowners and agriculture east of ENP
- Integrates and functions seamlessly with existing efforts
- Preserves existing water supply and salt water intrusion protection
- Ensures the continuation of significant investment in managing ecosystem restoration benefits



Scope and Project Conceptualization



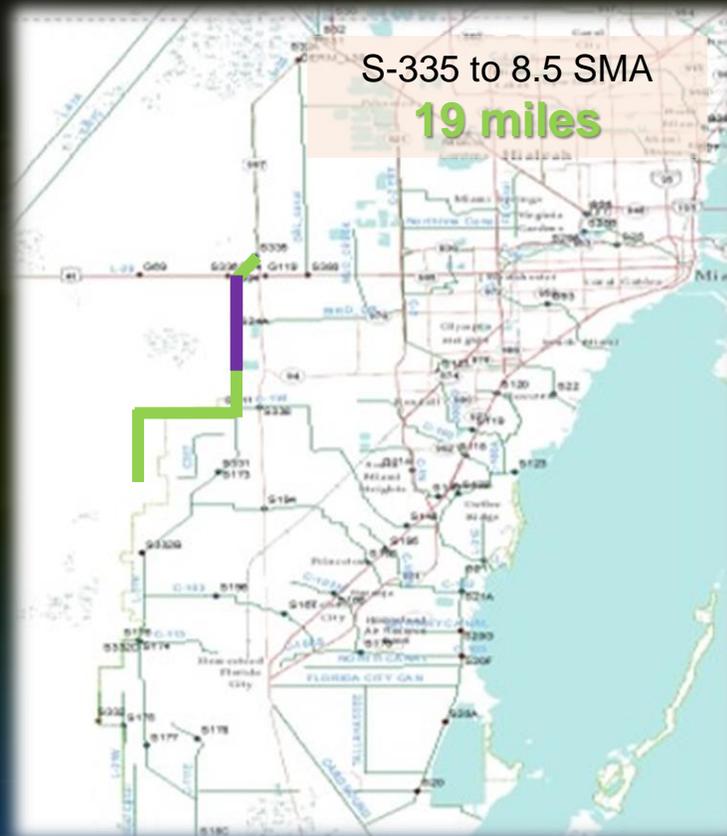
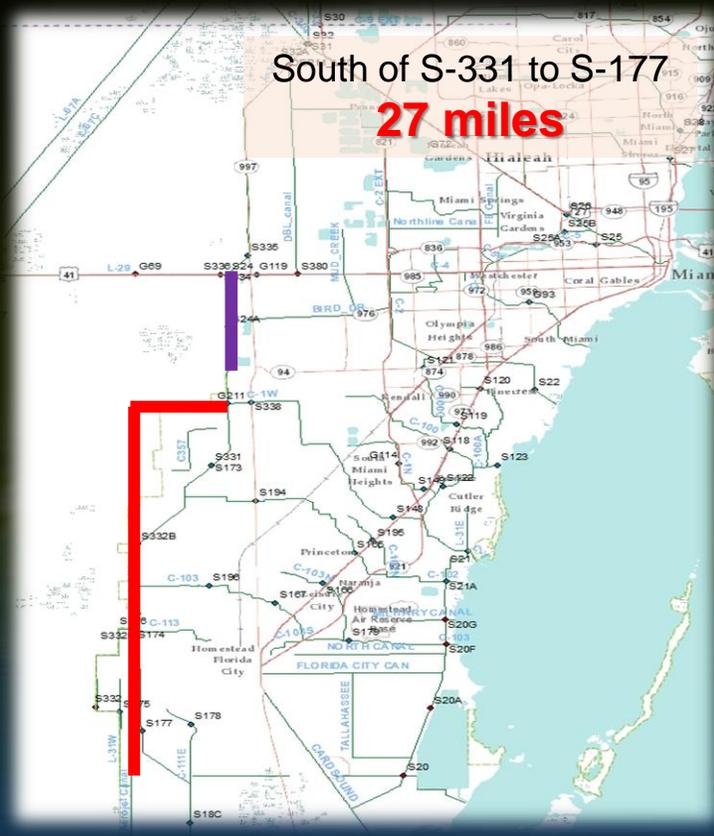
(Not to scale)

Initial Curtain Wall Configurations

South: including portion of 8.5 SMA

North: Stops after 8.5 SMA

Full: Full extent



Key Findings of the 2018 Assessment

- South Wall configuration shows the potential of a well-designed curtain wall to improve flood protection to the residential and agricultural lands in South Dade without adversely impacting conditions in Everglades National Park
- Assessment of flows to Biscayne Bay highlights the importance of ongoing efforts to send more flows to the Bay now and as restoration projects continue
- Flood control with passive curtain walls must be paired with operations to ensure desirable flows continue to Biscayne Bay and for Water Supply
- Design of curtain wall and operations that allow some flows through S-331 South will improve flows through Taylor Slough to eastern Florida Bay.

Planned Activities Current Fiscal Year

Goal for 2020:

- Identify key concepts that will support design
- Determine conceptual project for subsequent design and refinement

Data acquisition and site-specific details:

- Collect field data of aquifer characteristics
- Assess canal system connection and conveyance

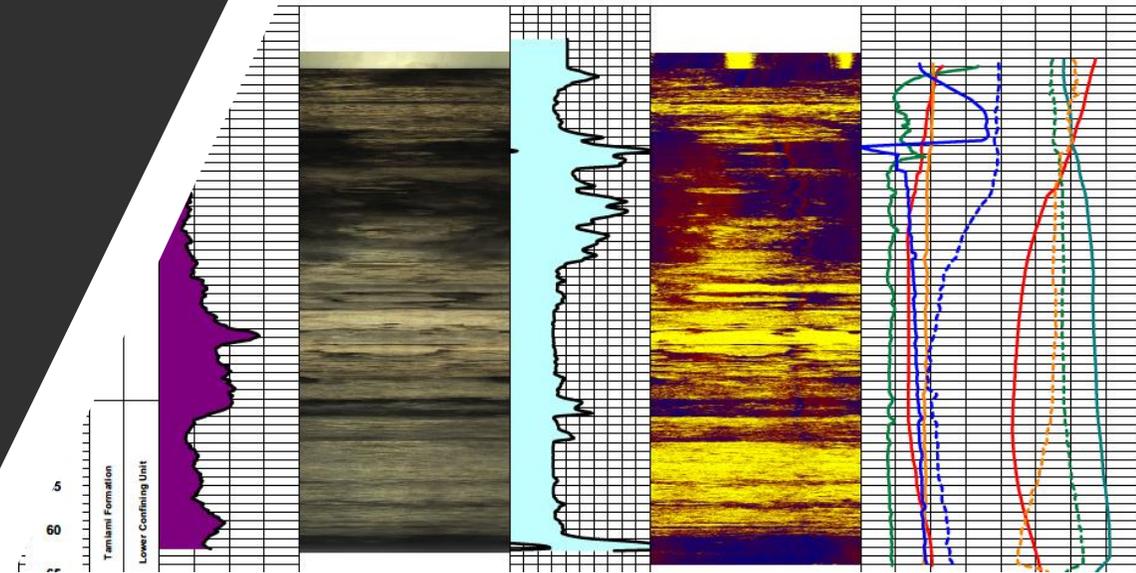
Planning process:

- Public engagement

2020 Timelines for South Dade Curtain Wall

Schedule:

- Collect aquifer field data:
November 2019 – November 2020
- Assess existing canal system:
January 2020 – September 2020
- Public engagement: May –
November 2020
- Complete planning process:
February 2021



Questions



Images from MDPLA Curtain Wall Project
Site