The Sustainable Rivers Program: Cape Fear River, North Carolina

Combined efforts by TNC North Carolina chapter and the Corps Wilmington District

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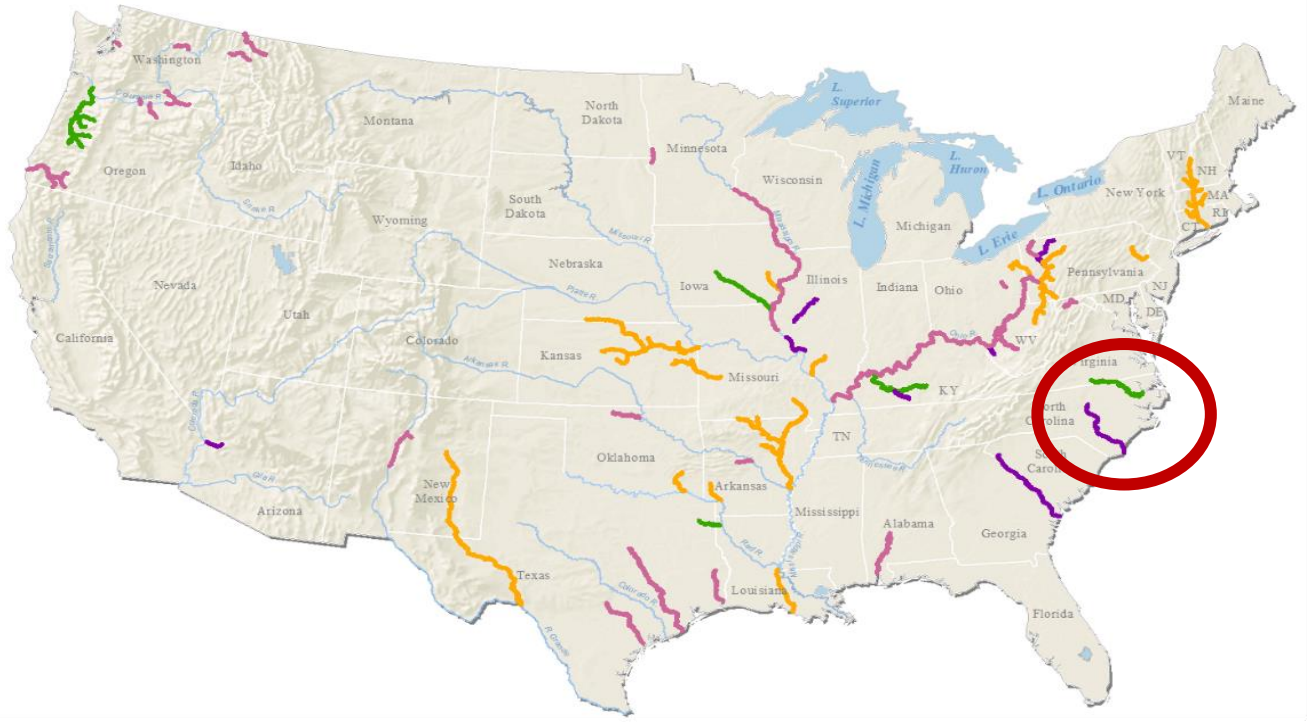
SRP North Carolina Rivers



- Advance (creating e-flow prescriptions) (6,170 river miles)
- Implement (testing e-flows) (940 river miles)
- Incorporate (formalizing Corps' operations) (1,255 river miles)

- Newly proposed (+3,807 river miles; +24 sites)

- The goal of the Sustainable Rivers Program (SRP) is to identify, refine, and implement environmental strategies at Corps water infrastructure.

- The Cape Fear was added in 2016

The Cape Fear used an established SRP process

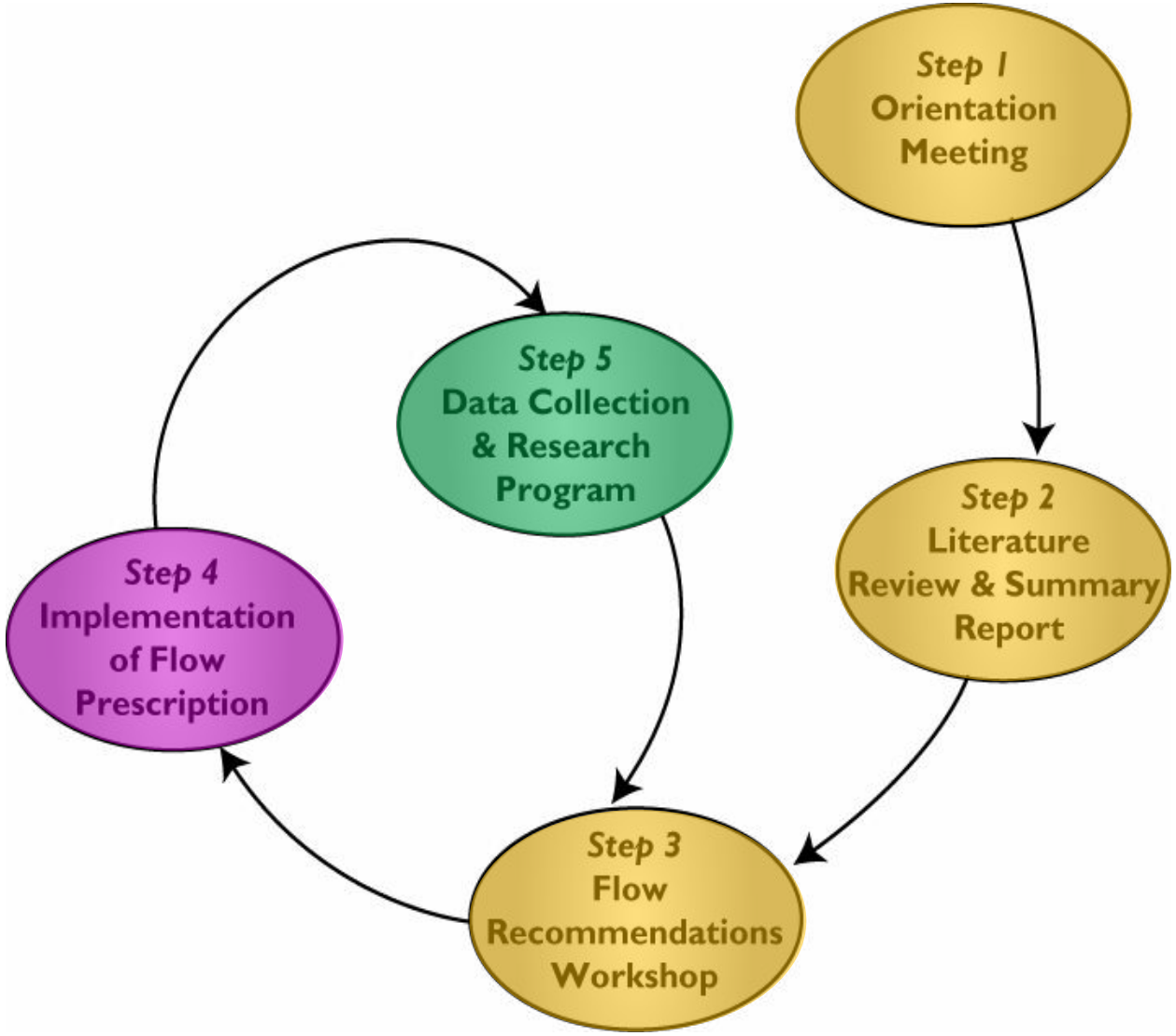
Launch meeting in 2017 to identify threats and opportunities in the basin.

Lit review complete in 2019 to investigate hydrology and ecology, especially for floodplains, water quality and rare fish.

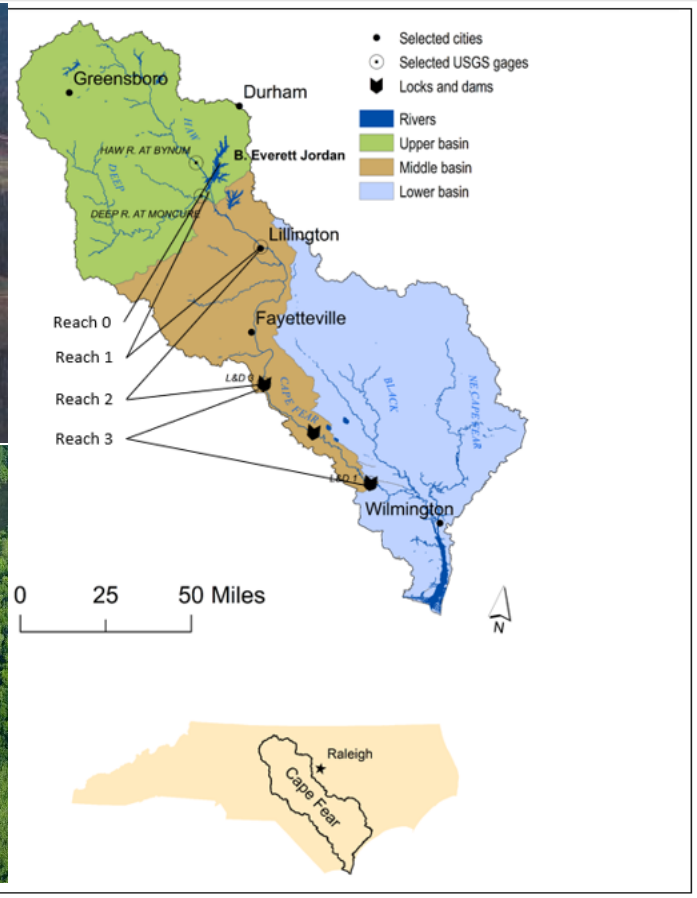
Technical e-flows workshop in 2019 with 45 experts to create flow prescriptions. Meeting summary complete.

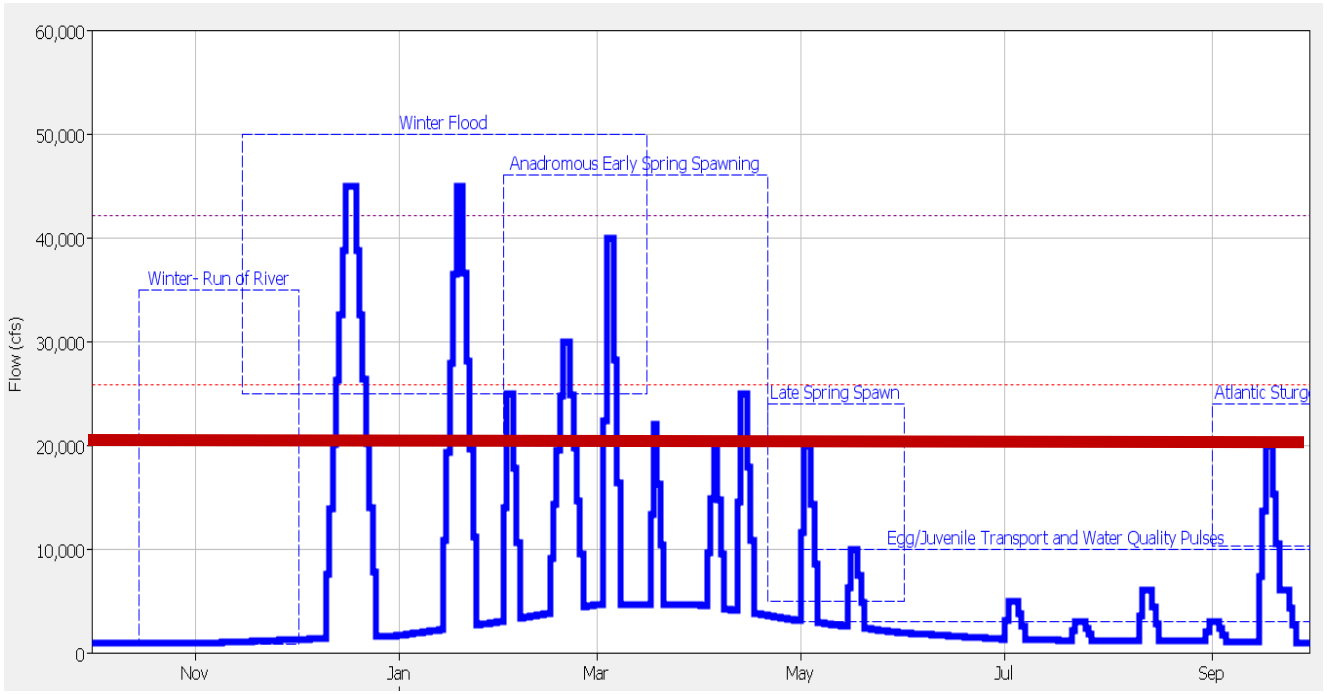
Began implementing and studying test pulses in 2020.

Long term goal: Formalize effective e-flows into the Corps' normal operating procedures



Cape Fear E-flow Prescription





From the prescription, the Corps determined they can conduct pulses out of the reservoir to assist diadromous fish and to reduce the potential for algal blooms.

Fish

Goal: Send pulses to submerge the locks and dams when the fish are trying to get upstream to spawn (March-early June)

- 2020 pulse had no monitoring (covid)
- 2021 one pulse- monitoring included acoustic telemetry, traditional electrofishing, and eDNA sampling
- 2022- monitoring expanded and several pulses attempted, despite dry conditions
- Study species include shad, striped bass, sturgeon, and flathead catfish (as of 2023)

Collaborators: Corps, TNC, NC WRC, NC DMF, UNC-W, Clemson

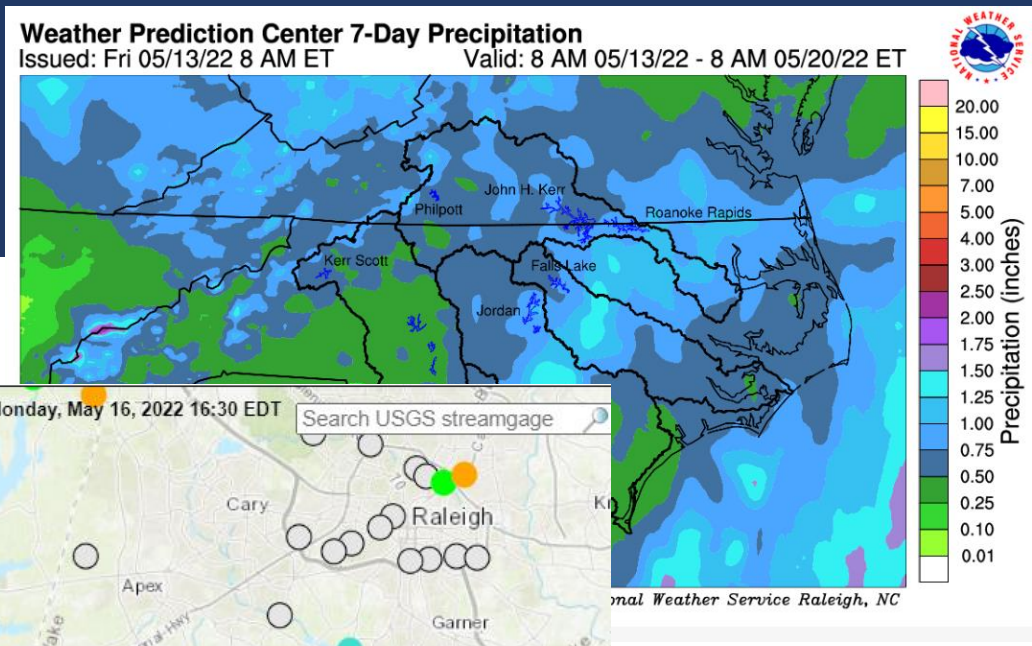
Fish: Pulse Enabling Conditions

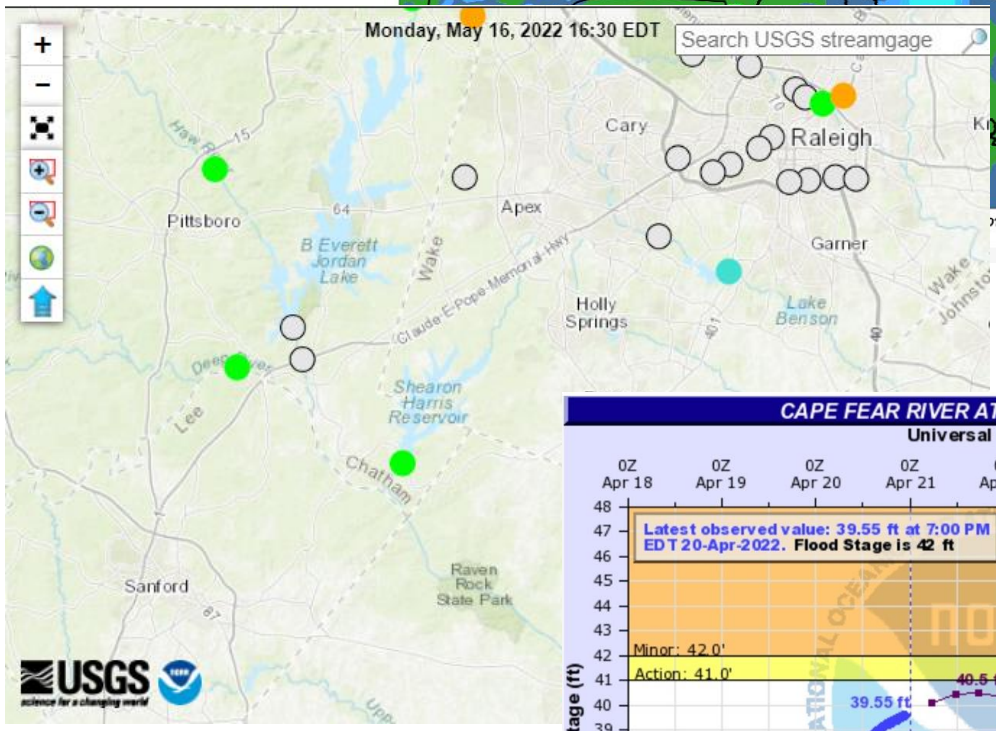
Wet weather in the upper basin allows us to “surf the Deep” to send pulses downstream.

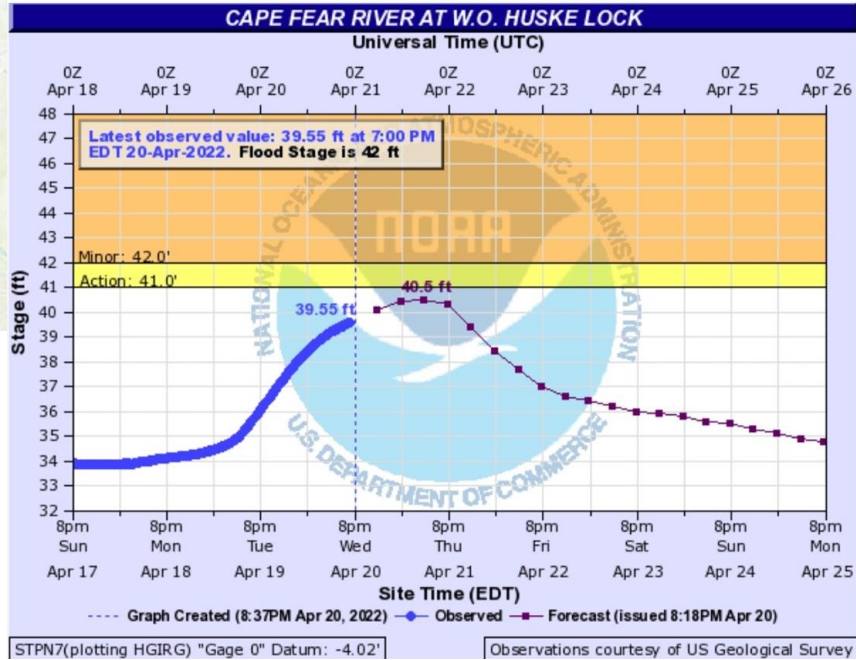
To submerge LD3:

- The Deep River is projected to have high flows (~7,000 cfs +)
- The lake level in Jordan is above guide curve and inflows into Jordan support a large release
- The timing allows us to combine Jordan and the Deep to send large pulses downstream

*LD2 is passable at lower flows, which is a study goal of this season







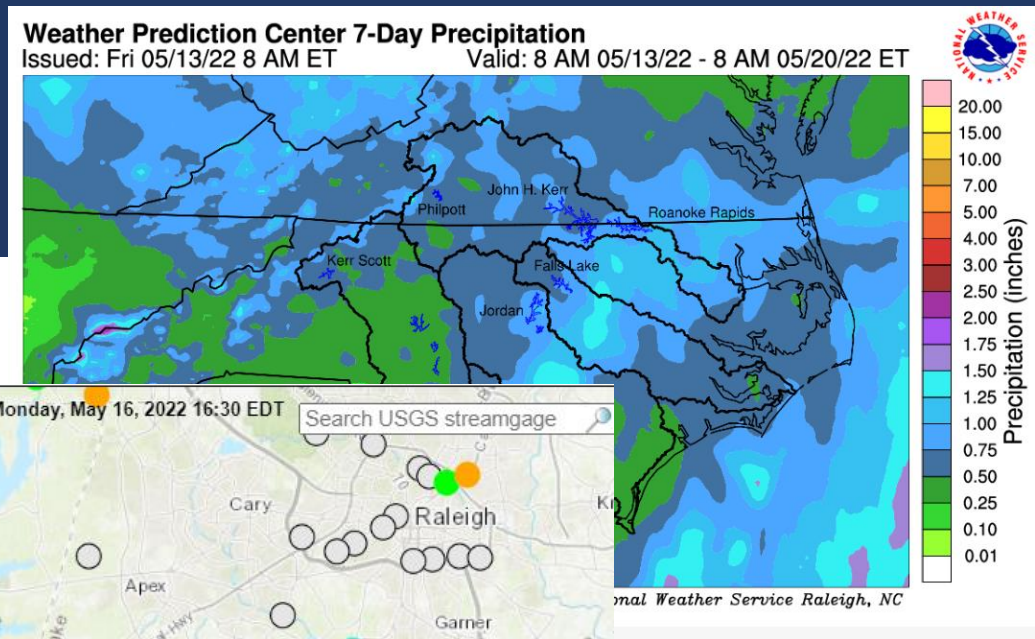
How does a pulse happen?

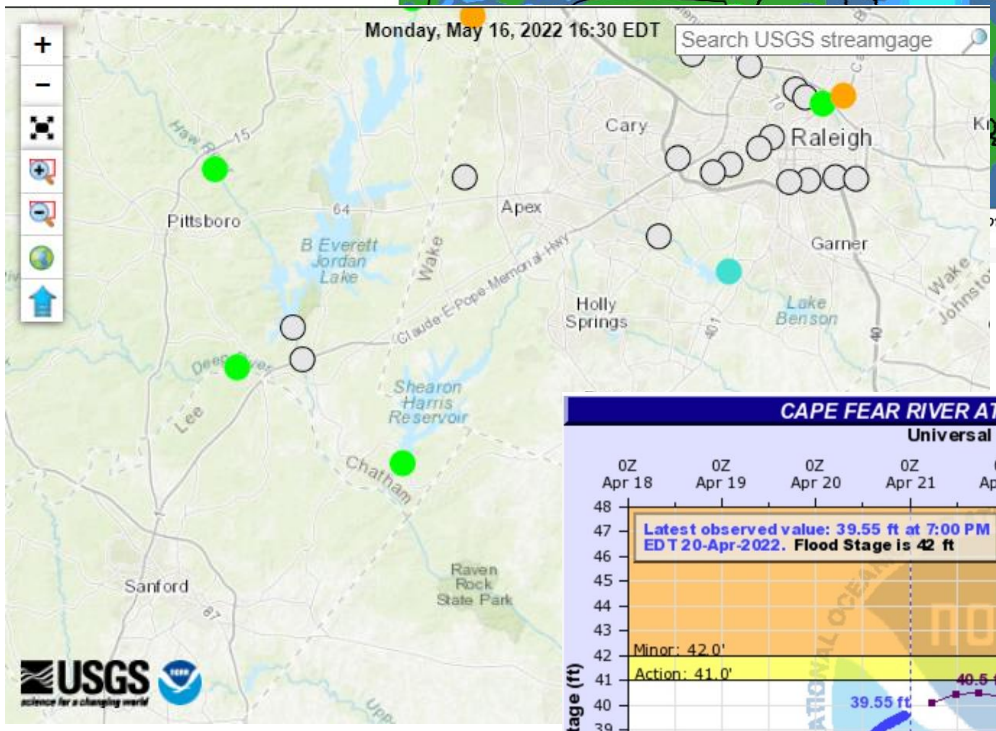
- A week out, watch the upcoming weather forecast for rain

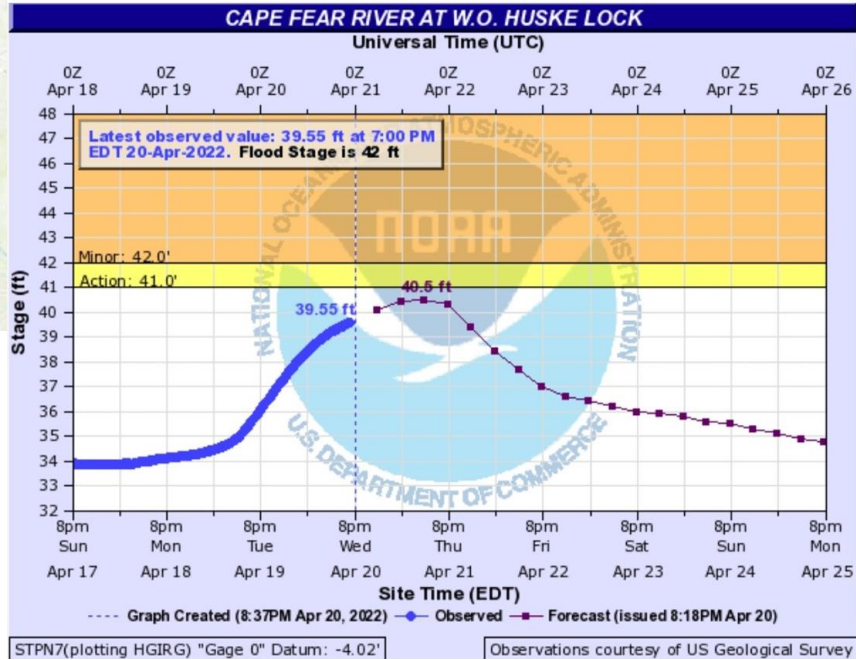
- 3 days out, analyze river flows, model options, begin to communicate with researchers and basin users.

- 1 day out, prep dam operators with the gates to open and close.

- During the pulse, get on-the ground info from researchers/ Corps lockmasters and take pictures.







2021- We passed fish!

- We had the weather to accomplish one pulse from March 29-April 6.
- LD3 and LD2 were submerged. We saw tagged fish pass LD2.
- The pulse did not last long enough for fish to get over both LD2 and LD3.
- We went into moderate drought and did not have water for another pulse.

2022- We conducted pulses in dry(ish) weather

- It was a dry year which limited the opportunities.
- We successfully submerged LD3 in March.
- Two other attempts likely submerged LD2, but fell short of submerging LD3.
- More fish were tagged ahead of pulses and we saw them pass LD2 and LD3.

Pre-pulse LD3

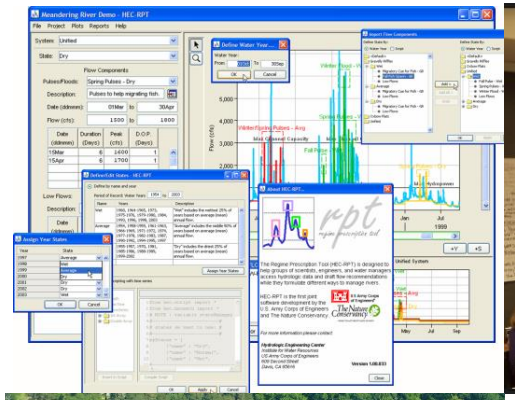
3/14/22: pulse LD3

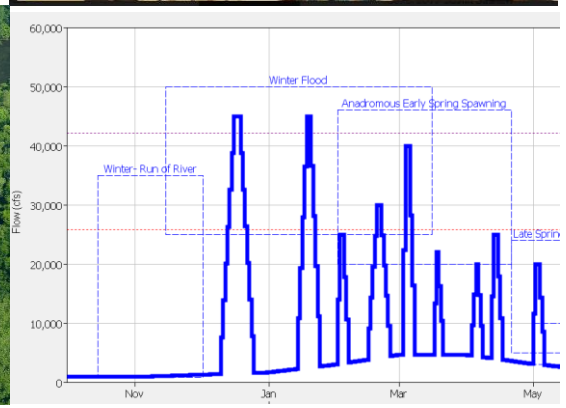
3/14/22: pulse LD2

This summer

- We received 2 years of new funding to keep telemetry and eDNA work moving with Clemson, UNCW, WRC.
- The researchers are increasing the number of fish tags deployed and added flathead catfish.
- The Corps and TNC will continue to refine pulses and protocols.

*Water quality pulses will start in June. We have an awesome crew to monitor pulses. More on this in the late spring.





Additional TNC work- Advanced Water Modeling

The base model is complete for an advanced water model for both flooding and water quality

It breaks the Cape Fear River Basin into 3,000 sub-basins, each with 5-6 different smaller scale catchments

TNC is running a wetland restoration scenario