



IoT Sensor Deployment for Water Level Measurement

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Smart Communities



Smart Sea Level Tools for Emergency Planning and Response

- Chatham County Emergency Management
- City of Savannah
- Georgia Tech

Georgia Tech Team

- Kim Cobb, Russell Clark, Lalith Polepeddi, Emanuele Di Lorenzo, David Frost

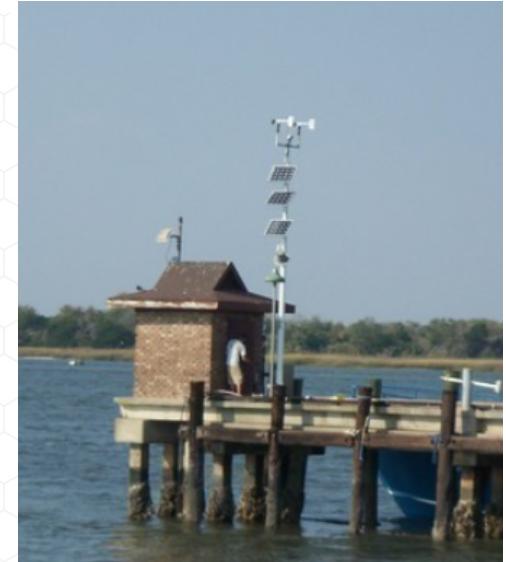
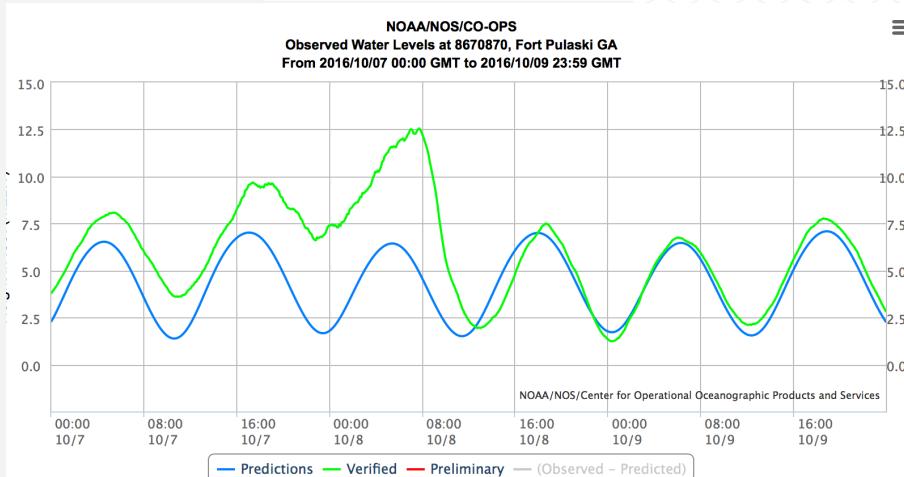


The pilot network will help to improve flood warnings, emergency response action plans, and flood predictions for future flood events, as well as serve as the basis for additional sea management tool development, environmental monitoring platform development, and data sharing.

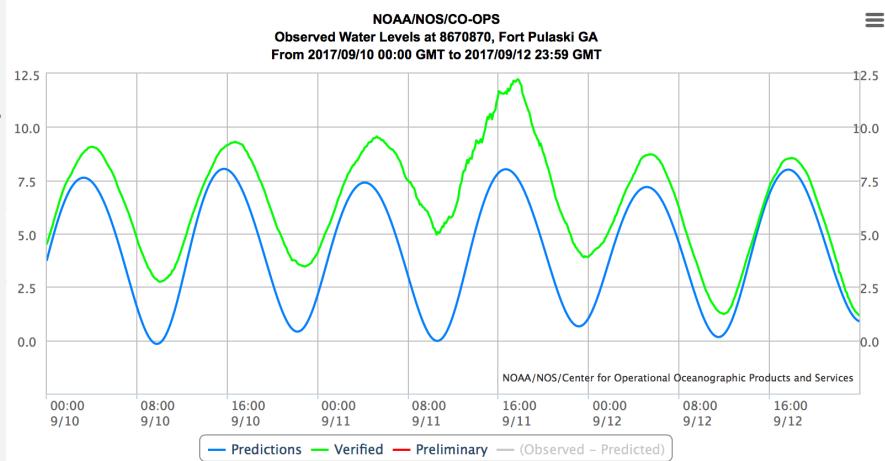
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Background - Single Vantage Point

Matthew
2016



Irma 2017

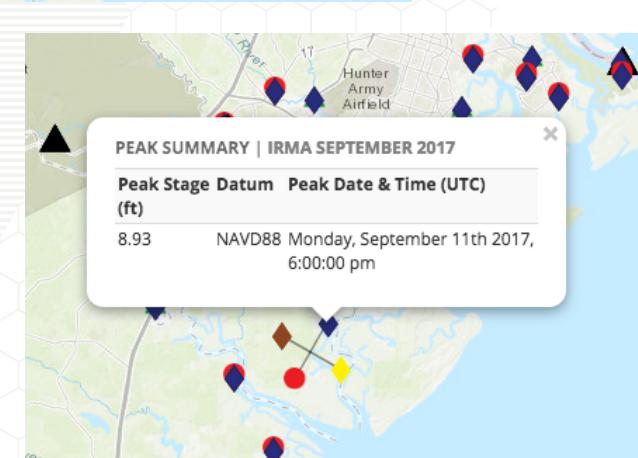
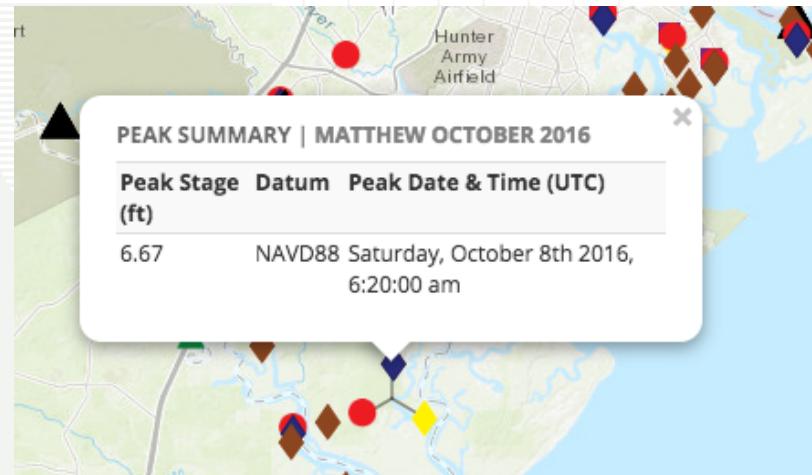
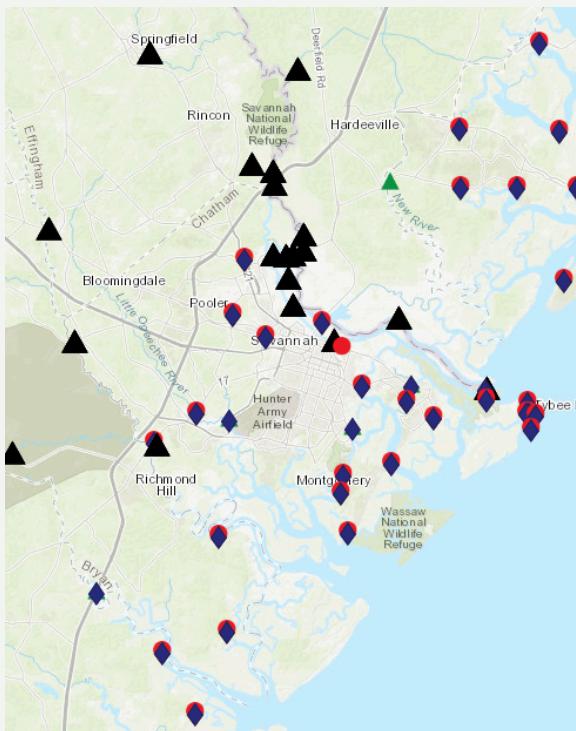


NOAA Tide Gauge
Fort Pulaski

USGS Flood Survey Data



Flood Event Viewer



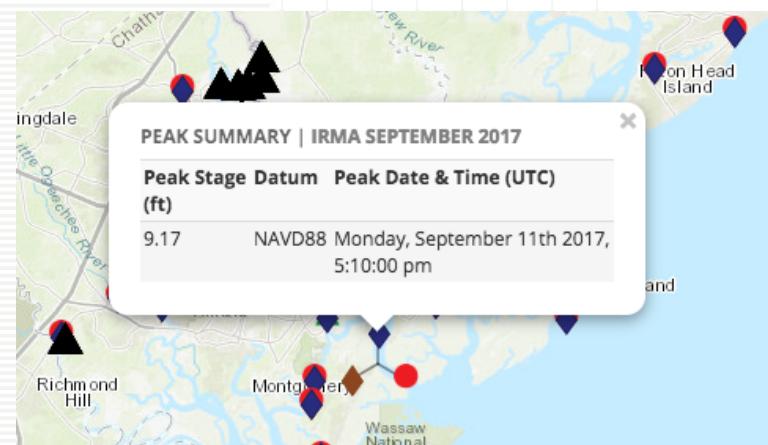
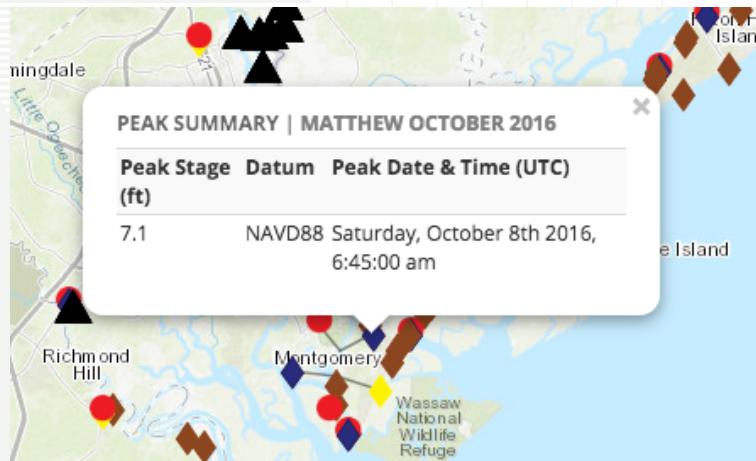
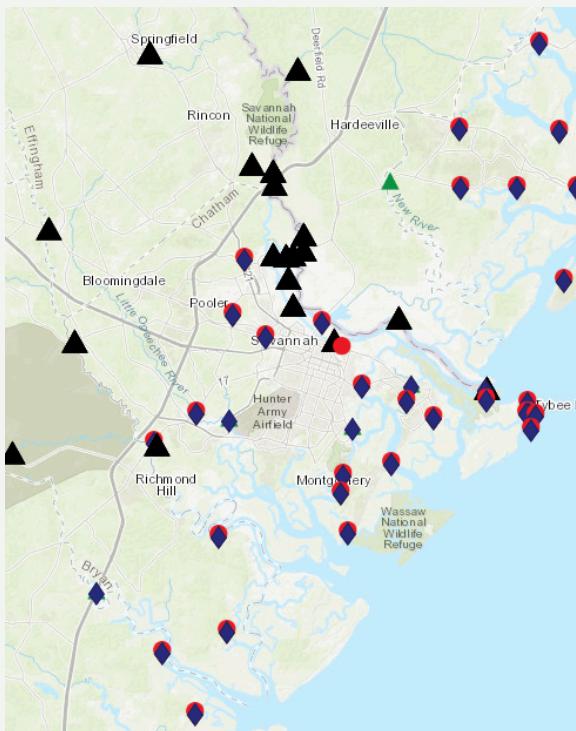
- Deployed temporary sensors for both storm events

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USGS Flood Survey Data



Flood Event Viewer



- Similar at Skidaway

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Not Just Hurricanes



Super Moon!



Popup Thunderstorms!

- highly localized
- need to send response assets to the right place



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Low Powered Wireless



LoRaWAN - Long Range Wide Area Network

- Longer range than WiFi
- Low power - 3-5 years battery life
- Low data rate



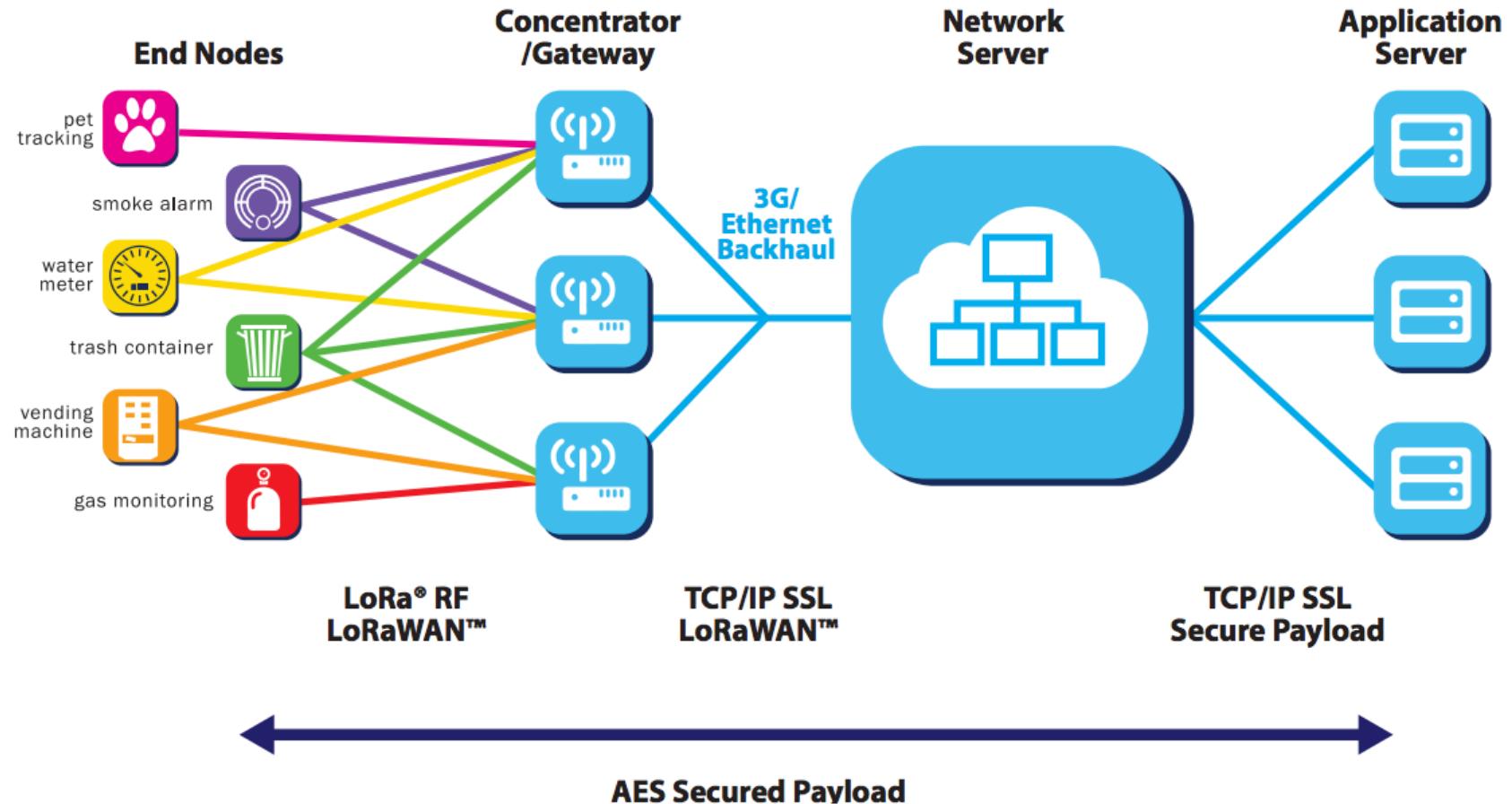
Low Cost

- < \$2000 per gateway
 - 10-12 units to cover Chatham
- < \$250 per sensor location

<http://www.semtech.com/wireless-rf/lora-geolocation>

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LoRaWAN Architecture



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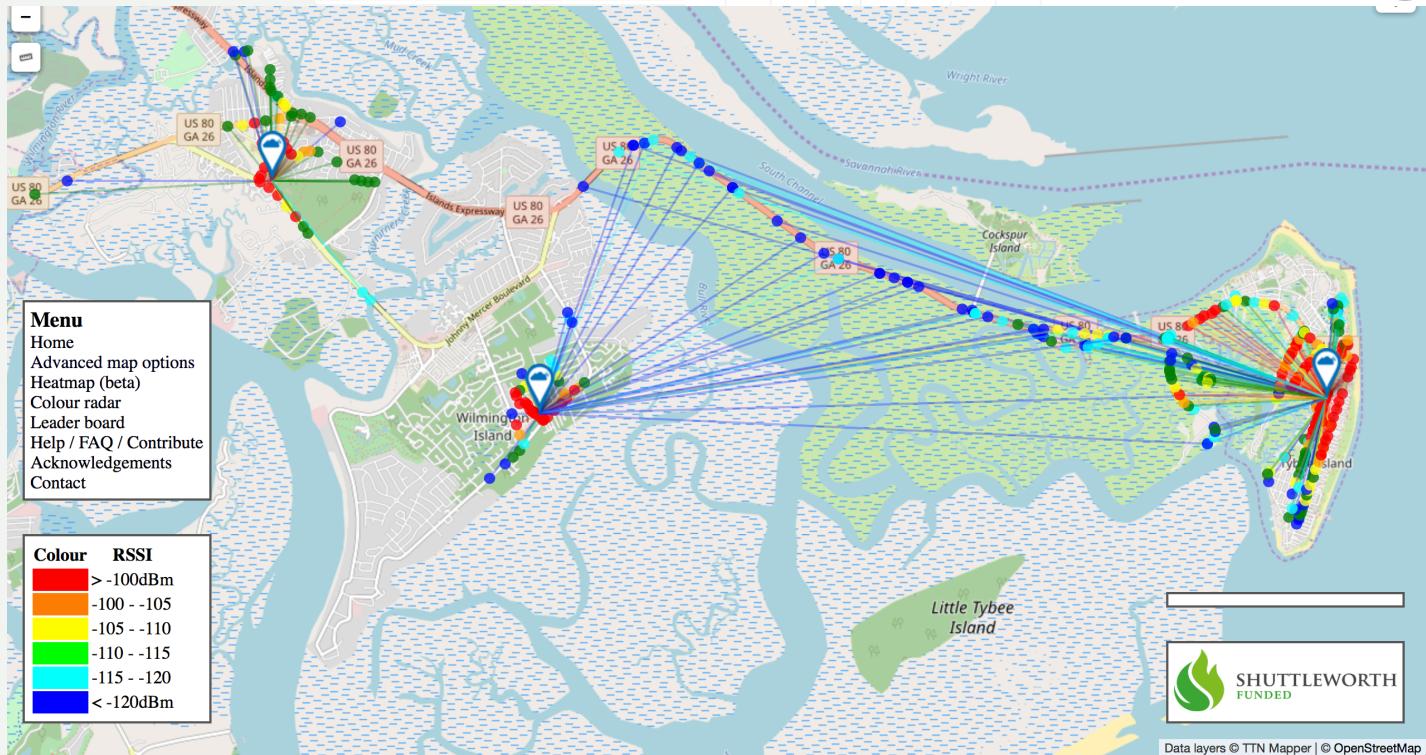
Gateway Coverage Testing



Drive Around Testing

- Where can we get a signal
- Which antennas work best

Gateway Coverage Testing



Pretty good results

- Excellent across open water
- Tree canopy is a challenge
- Height of the gateway is most important factor

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Sensor Deployment

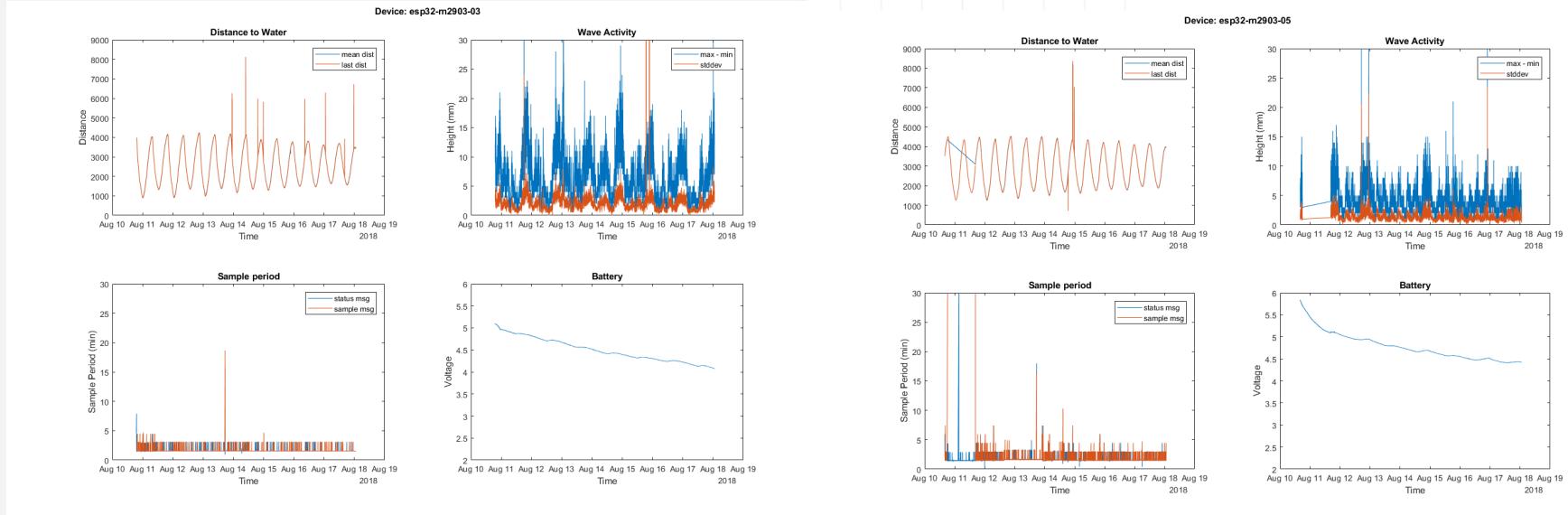


3 Sensors Deployed in Chatham

- Oatland Island Road
- Catalina Drive
- Walthour Road
- Betz Creek



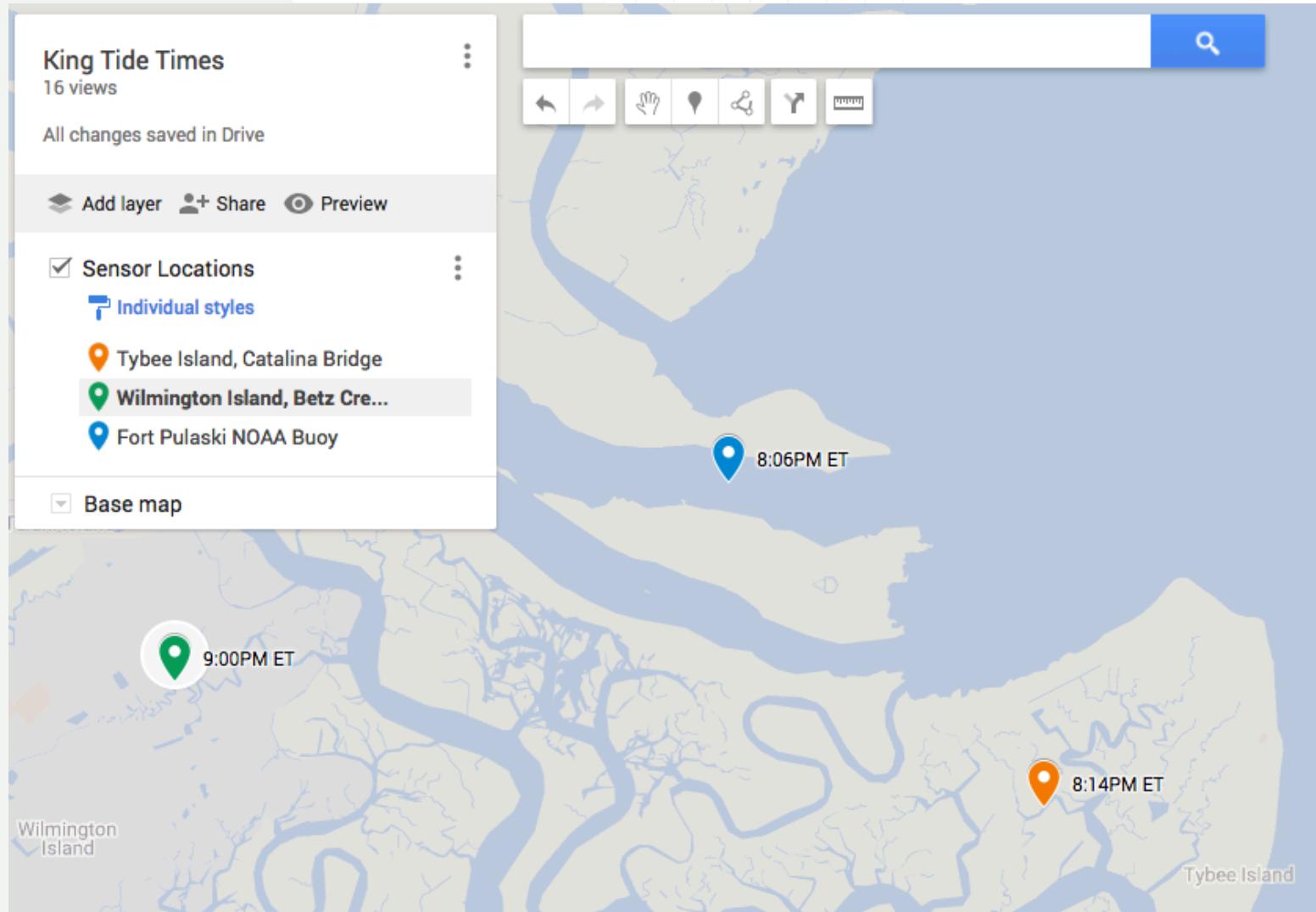
Sensor Results



Very good data from initial week of testing

- Confirmed behavior of ultrasonic over water
- Initial wave height calibration
- Good data on power consumption

Local Peak Times

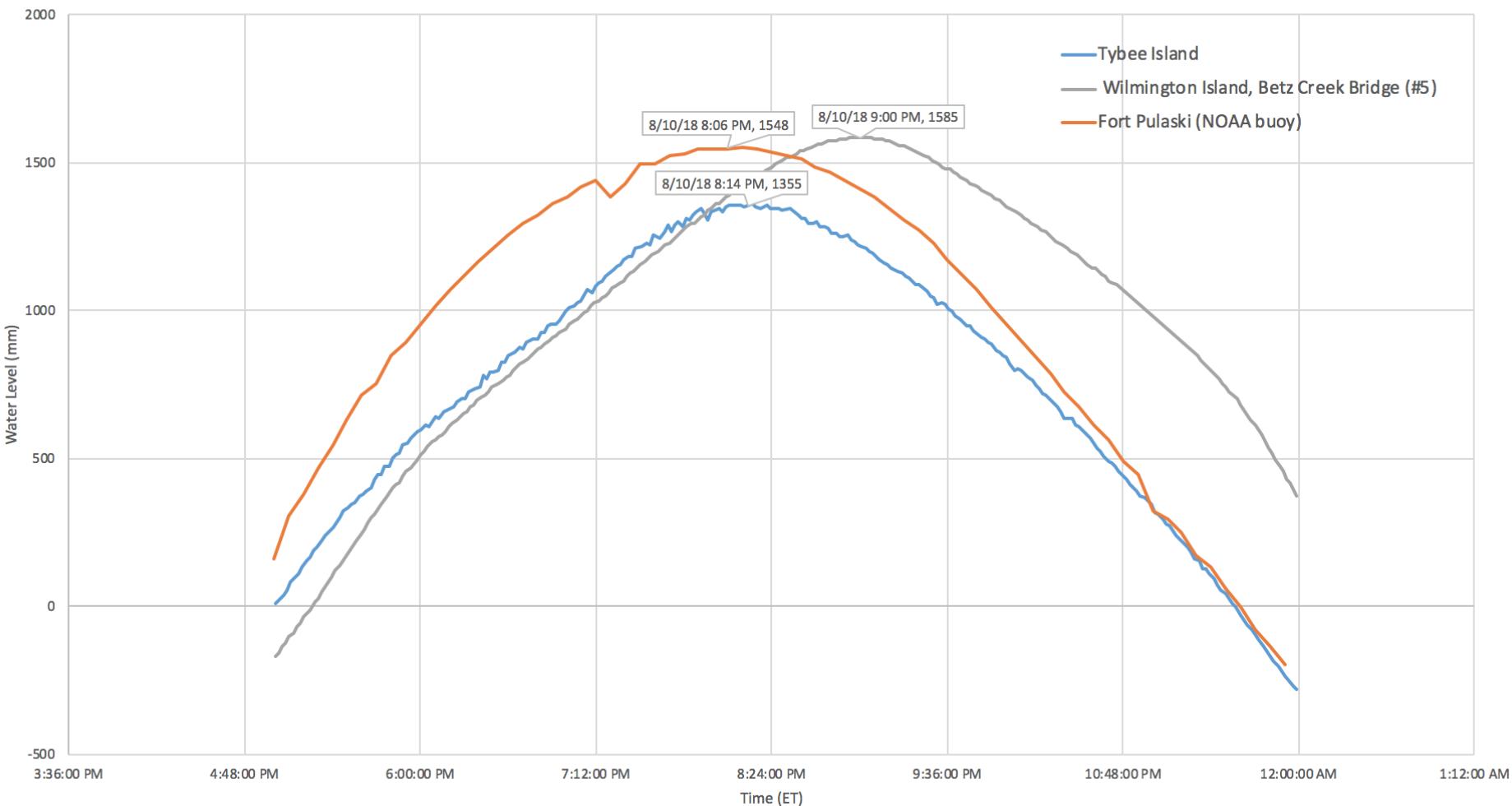


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Local Peak Times



King Tide on August 10, 2018



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Next Steps



Sensor Deployments

- Identify and prioritize 20 locations
- Complete testing and development
- Deploy over next 8-10 weeks

Gateway Deployments

- Identify and prioritize 6-8 locations

Work on applications to facilitate:

- Deployment, Monitoring, Reporting, Management, Crowd sourcing

Identify priority needs from the community!