



# **WATER QUALITY MONITORING CHALLENGES AND DATA MANAGEMENT SOLUTIONS**

**CT NEMO Water Quality Workshop June 20, 2019**

Joseph Canas, PE and Sarah Bounty, PE

# LOGISTICS

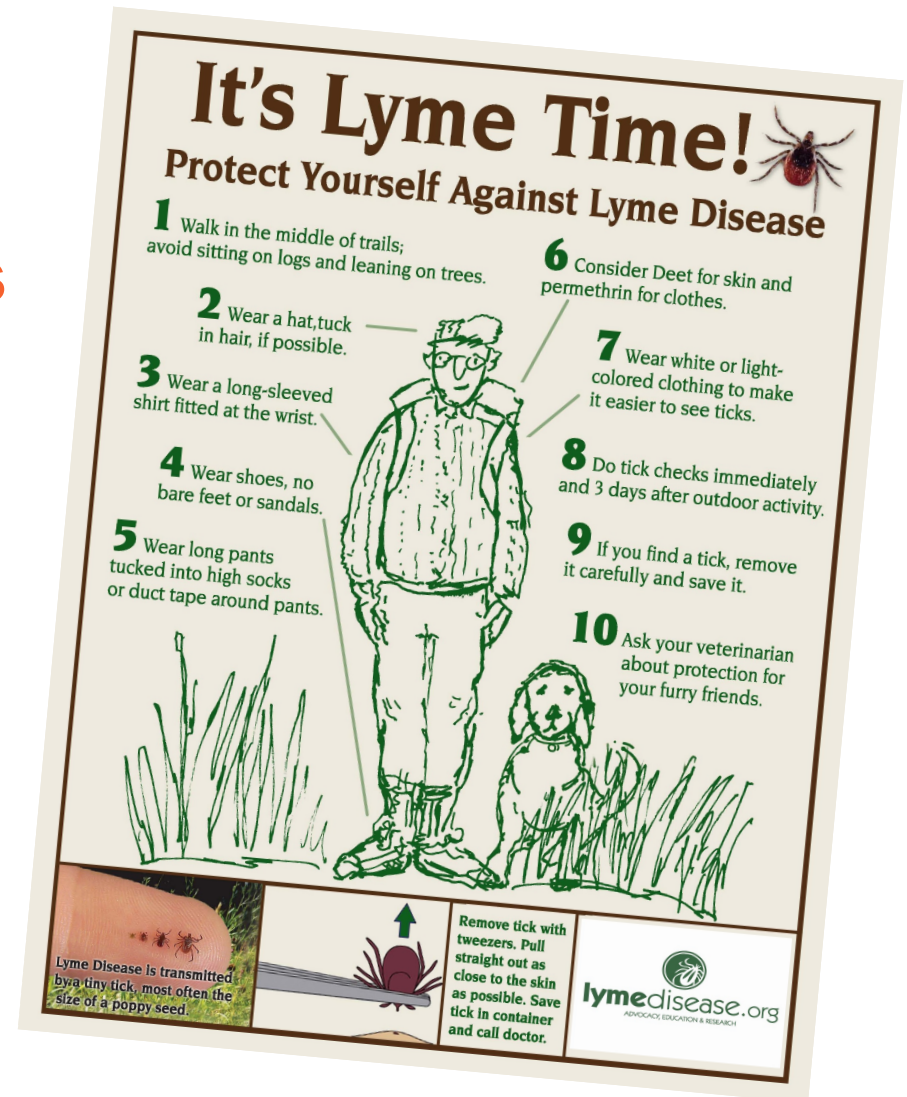
- **Safety**
- **When to Sample**
- **Working with the Testing Lab**
- **Dealing with the Public**





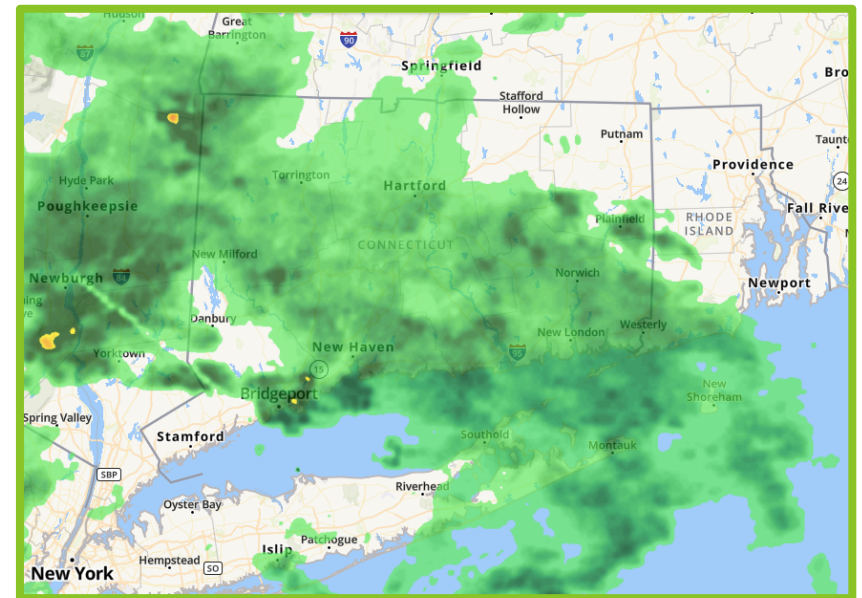
# SAFETY: BEFORE YOU GO

- Tick protection
- Vests, goggles, gloves
- Poison ivy
- Charged cellphone



# WHEN TO SCREEN: LIMITATIONS

- **Wet weather screening shall be done only during the spring**
- **Dry weather screening shall be done only if less than 0.1 inches of rain has fallen in the last 24 hours**





# WHEN TO SCREEN: DRY WEATHER



## Late Spring to Early Fall

## Late Fall to Early Spring

### Advantages

- Drier, less outfalls flowing, less samples
- Generally better weather
- Outfalls will be easier to reach
- No leaves on trees makes GPS connection easier

### Disadvantages

- Outfalls may be harder to reach because of growth
- GPS connection may be more difficult due to leaf cover
- Mosquitos, poison ivy
- Snow cover
- Wetter, more outfalls flowing, more samples
- Instruments may be slower to respond in cold

# COORDINATION WITH THE LAB

- **Take stock of supplies**
  - Always have extra bottles on hand
- **Be aware of hold times**
  - Surfactants (48 hours)
  - E. coli (24 hours)
- **Understand how your testing lab operates**
  - Coordination of pick-up
  - Some analyses may be subcontracted
  - Capacity of lab
  - Friday sampling may be problematic

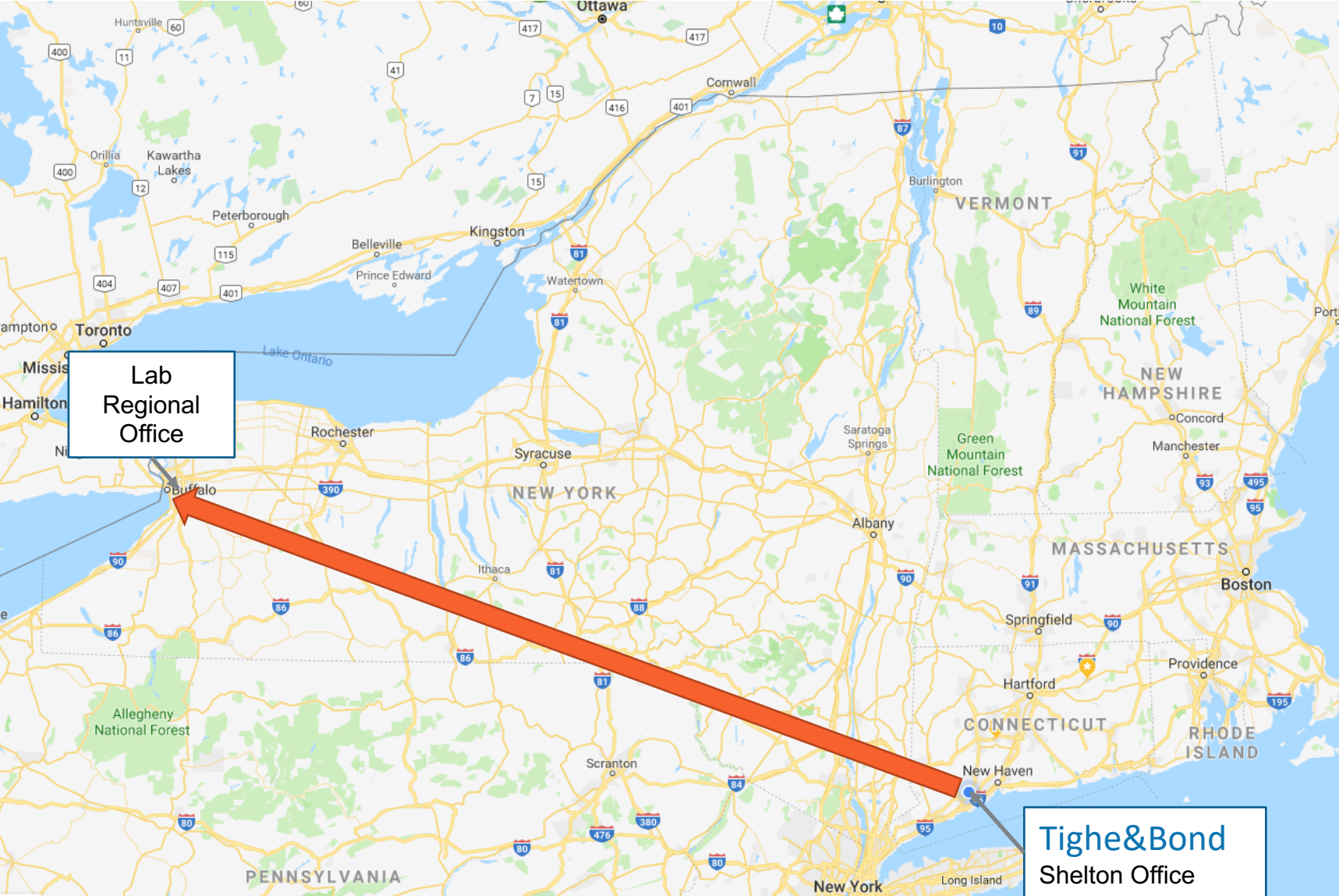




# COORDINATION WITH THE LAB



# COORDINATION WITH THE LAB





# DEALING WITH THE PUBLIC

- **Coordinate with local police department at start of each day**
- **Have field staff carry a letter describing the purpose of the program**
  - Multiple copies so they can be passed out
  - BONUS: Public education credit!



# INACCESSIBLE OUTFALLS

- Buried
- Fenced in
- Angry dog
- Angry human
- Otherwise unsafe





# INACCESSIBLE OUTFALLS

- **Maximum Extent Practicable Provision**
- **Screen next accessible upstream location on drainage network**
- **If possible, try to get access**
- **Document, or it never happened**



# OTHER THINGS YOU MAY ENCOUNTER

- Eyes staring back at you
- Homemade throttle and/or fort
- Blatant, active illicit discharge
- Report promptly to DPW Director





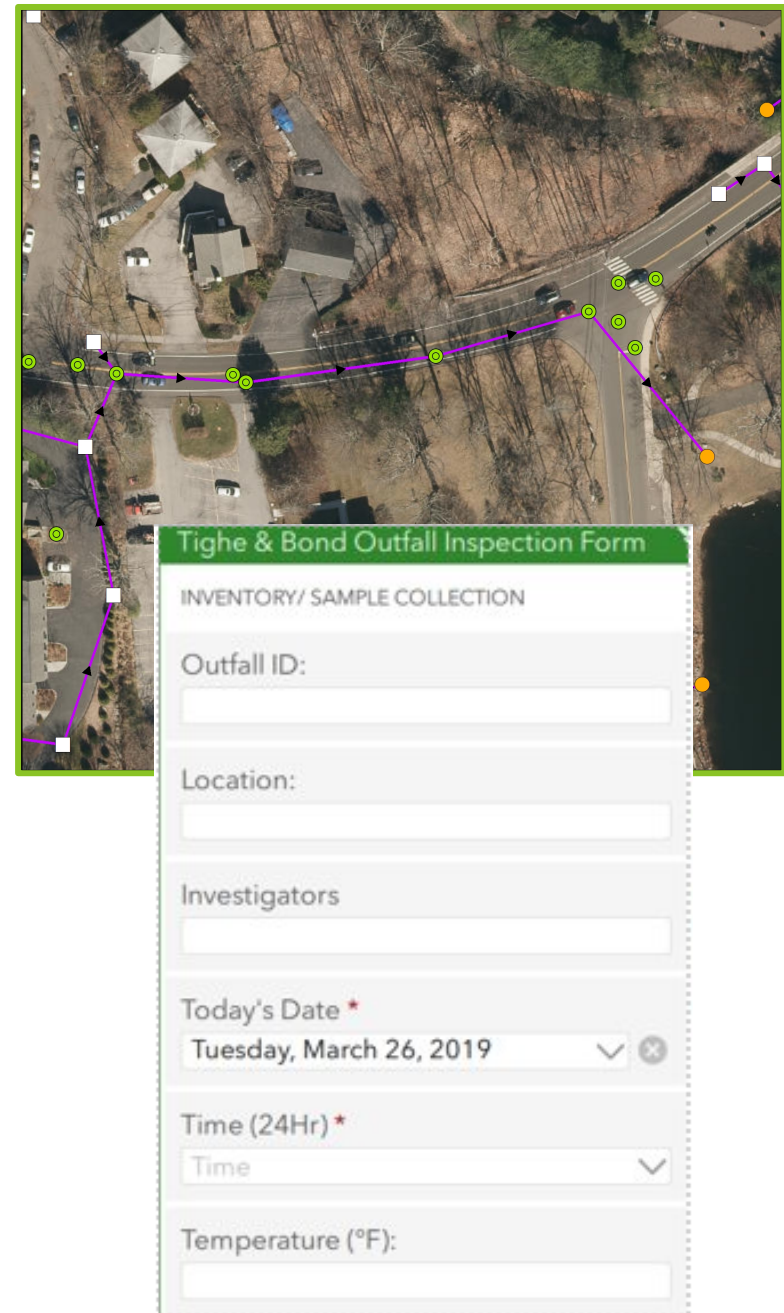
# DATA MANAGEMENT SOLUTIONS

Sarah Bounty, PE



# DATA MANAGEMENT

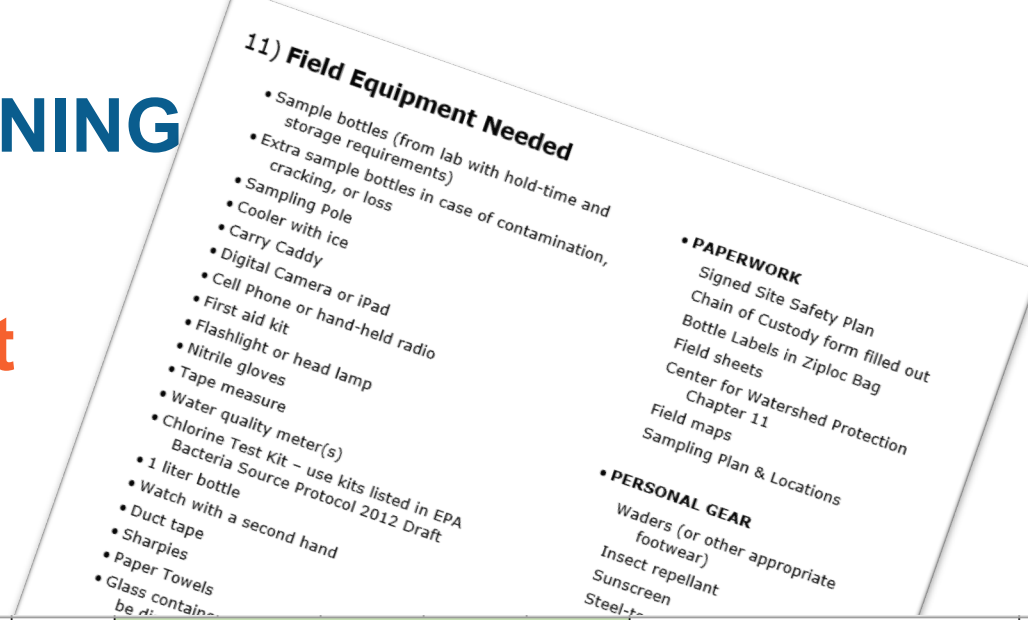
- GIS for infrastructure data and water quality monitoring data
- Tablet for data collection
- Critical coordination between office and field work



# PRE-SAMPLING PLANNING

- Make a sampling plan *before* going out in the field

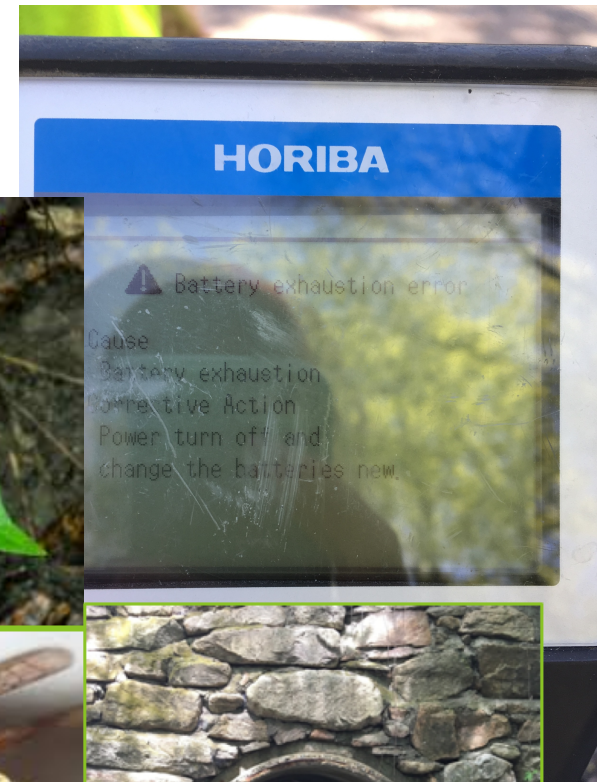
- Review maps and



Outfall ID			Lab Monitoring Parameters						Field Monitoring Parameters					Noteworthy Items
Town ID	Receiving Water	Major Basin	Surfactants	E. Coli	Total Copper	Total Lead	Total Phosphorus	Fecal Coliform	Conductivity	Salinity	Temperature	Ammonia	Chlorine	
1-1	Willimantic River	Thames	X	X					X	X	X	X	X	Outfall submerged -sample at MH294
1-2	Willimantic River	Thames	X	X					X	X	X	X	X	
1-3	Willimantic River	Thames	X	X					X	X	X	X	X	
1-4	Willimantic River	Thames	X	X					X	X	X	X	X	
1-5	Willimantic River	Thames	X	X					X	X	X	X	X	
1-6	Willimantic River	Thames	X	X					X	X	X	X	X	
1-7	Willimantic River	Thames	X	X					X	X	X	X	X	
1-8	Willimantic River	Thames	X	X					X	X	X	X	X	
2-1	Willimantic River	Thames	X	X					X	X	X	X	X	
2-2	Willimantic River	Thames	X	X					X	X	X	X	X	
2-3	Willimantic River	Thames	X	X					X	X	X	X	X	
2-4	Willimantic River	Thames	X	X					X	X	X	X	X	

# PLAN FOR CHALLENGES

- **Outfall not found**
- **Different location**
- **Submerged outfall**
- **Outfall vs. culvert**
- **Sampling challenges**
  - Poison ivy
  - Bees
  - Steep/slippery terrain
  - Thick vegetation or thorns
  - Access to outfall/ in-stream sample
  - Wet weather challenges
  - Equipment malfunction





# DATA COLLECTION

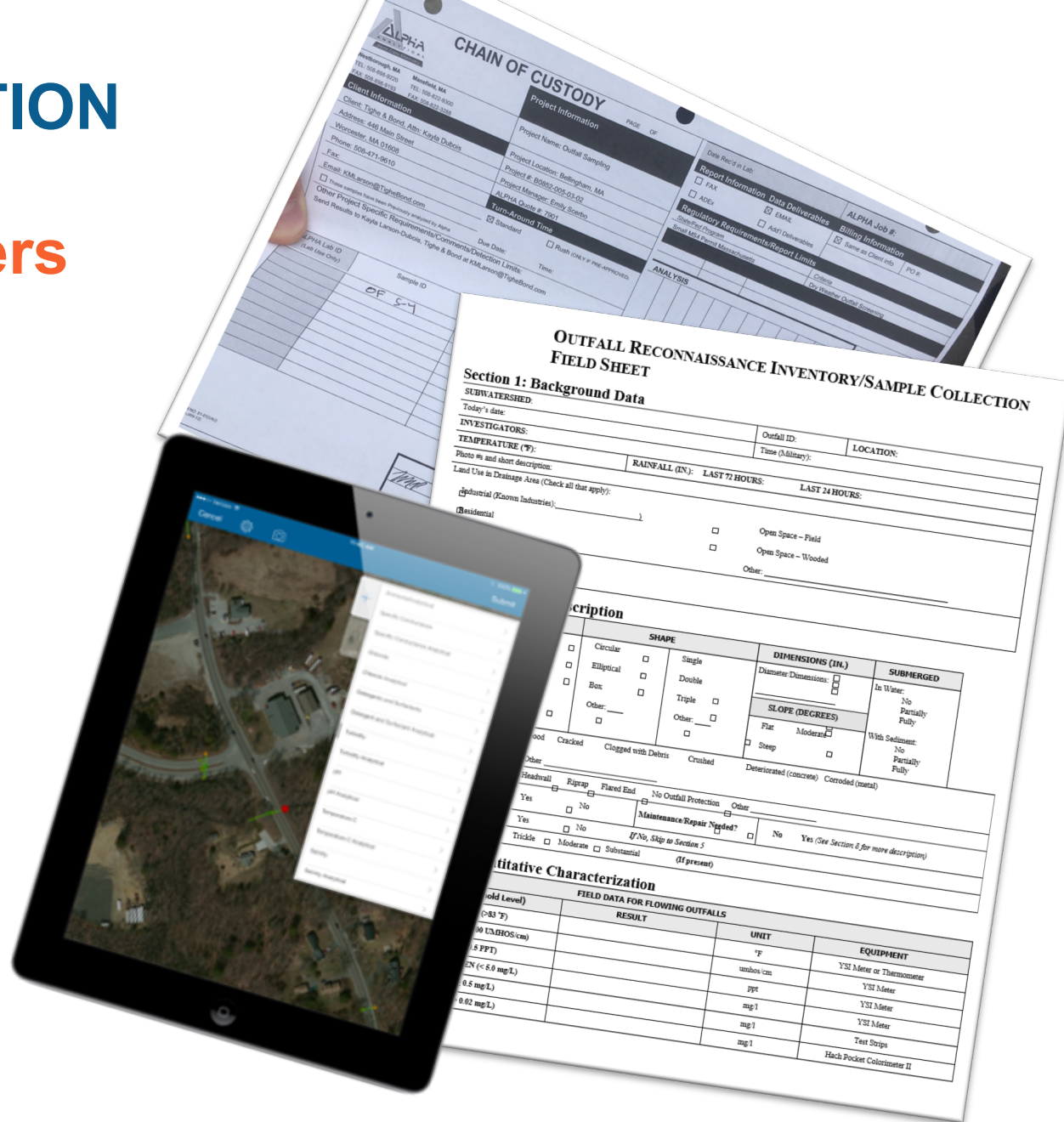
- **Field parameters**

- **Laboratory parameters**

- Chains of custody

- **Notes and photographs**

- Weather data
- Map changes



# POST SAMPLING OFFICE/FIELD COORDINATION

- Who manages data?
- Who does the field work?
- Who reviews data?



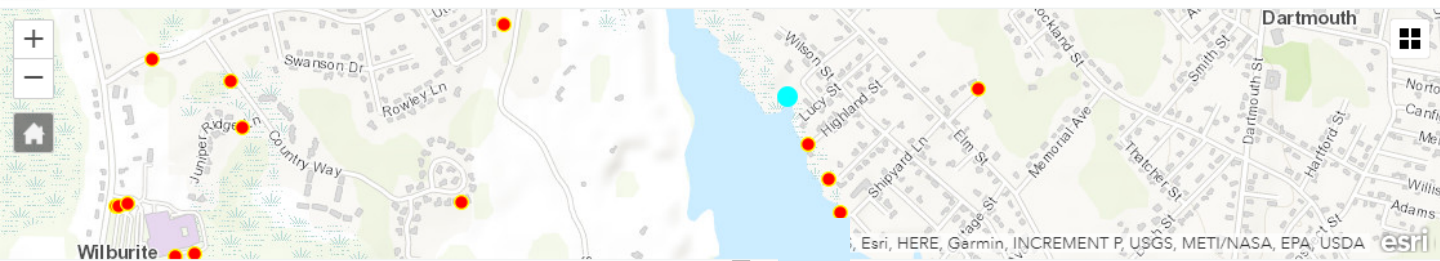
A picture is worth 1,000 words...or how many hours in the field?



# POST SAMPLING DATA REVIEW

- Outfall Results
- Laboratory Data
- Map Updates
- Useful information for future sampling

5/22/19 - 6/19/19 Filter Report (Beta) Export Open in Map Viewer Show individual response 122/122



surveyPoint (Features: 122, Selected: 1)

Outfall ID:	Location:	Investigators	Today's Date	Time (24Hr)	Temperature (°F):	Rainfall Last 72 Hours (IN):	Rainfall Hours (I)
OF194	Fort rd	ARD	Jun 4, 2019	12:07	65	0.06	0
OF48	Moss st	ARF	Jun 4, 2019	08:05	58	0.06	0
OF51	West McCabe st	ARF	Jun 4, 2019	07:47	58	0.06	0

Submitted by: TBFieldworker  
Submitted time: Jun 4, 2019, 12:49:36 PM

Outfall ID:  
**OF194**

Location:  
**Fort rd**

Investigators  
**ARD**

Today's Date



# FOLLOW UP INVESTIGATIONS

- **Data management is crucial to keep track of information for follow up**
- **Data may also be useful for IDDE program**



# SITE SAFETY PLAN

- Plan for safety in advance and make notes of any safety concerns while sampling
- First aid kit in sampling kit





# CONCLUSIONS

- **Prioritize data management early**
- **Plan for challenges**
- **Coordinate between office and field work**
- **Safety**





# QUESTIONS

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