

# Monitoring Water Quality Around Key West

Dr. Patrick Rice

Chief Science and Research Officer  
The College of the Florida Keys

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THE  
COLLEGE  
OF THE  
FLORIDA KEYS

**FIU**  
FLORIDA  
INTERNATIONAL  
UNIVERSITY





# Background Information

- COVID-19 Anthropause
- Need for baseline data
- Marine science classes at CFK
- FKNMS Advisory Committee
- WQPP and the EPA
- KWWQ project



- **Fall 2020**

- **Basic water quality testing in KW Harbor and ship channel (red lines)**
- Temperature
- Salinity
- Dissolved oxygen (DO)
- Turbidity
- Ammonia
- pH
- Hydrogen sulfide

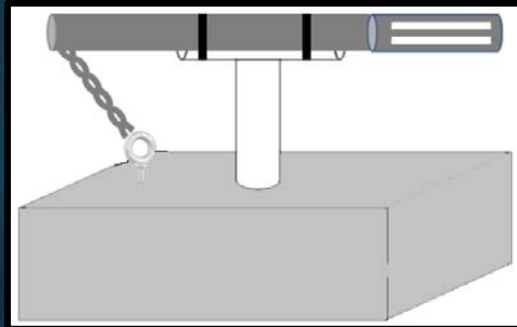
- **Spring 2021**



Google Earth

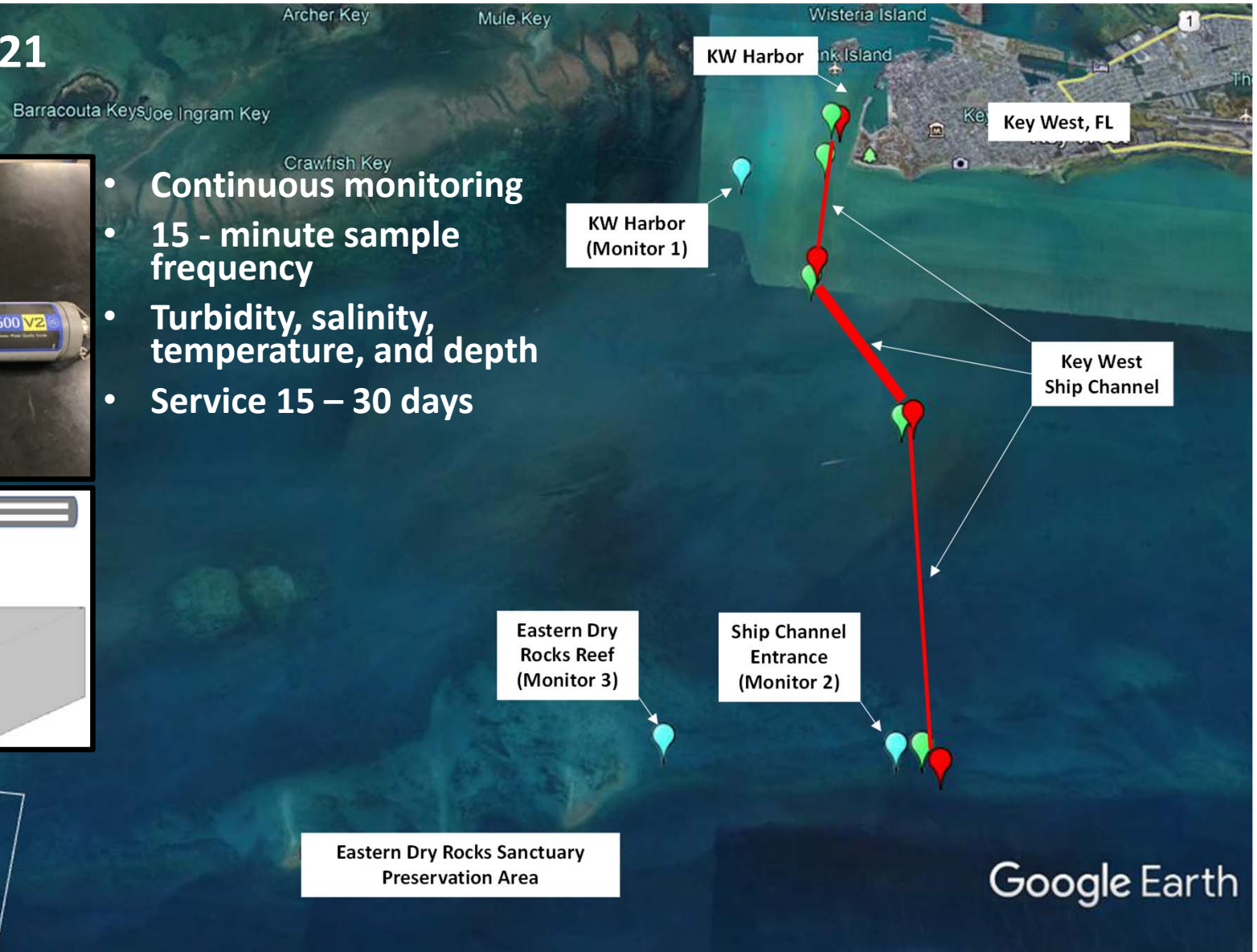


- Summer 2021
- Fall 2021



Western Dry  
Rocks Reef  
(Control)

- Continuous monitoring
- 15 - minute sample frequency
- Turbidity, salinity, temperature, and depth
- Service 15 – 30 days



## Spring 2022

- Awarded KWWQ Project from EPA
- Partner w/ FIU Institute of Environment - CACHe Nutrient Analysis Core Facility
- National Environmental Laboratory Accreditation Program (NELAC) -accredited nutrient analysis laboratory to directly support research

**Table 2. FIU Water Sample Lab Analysis**

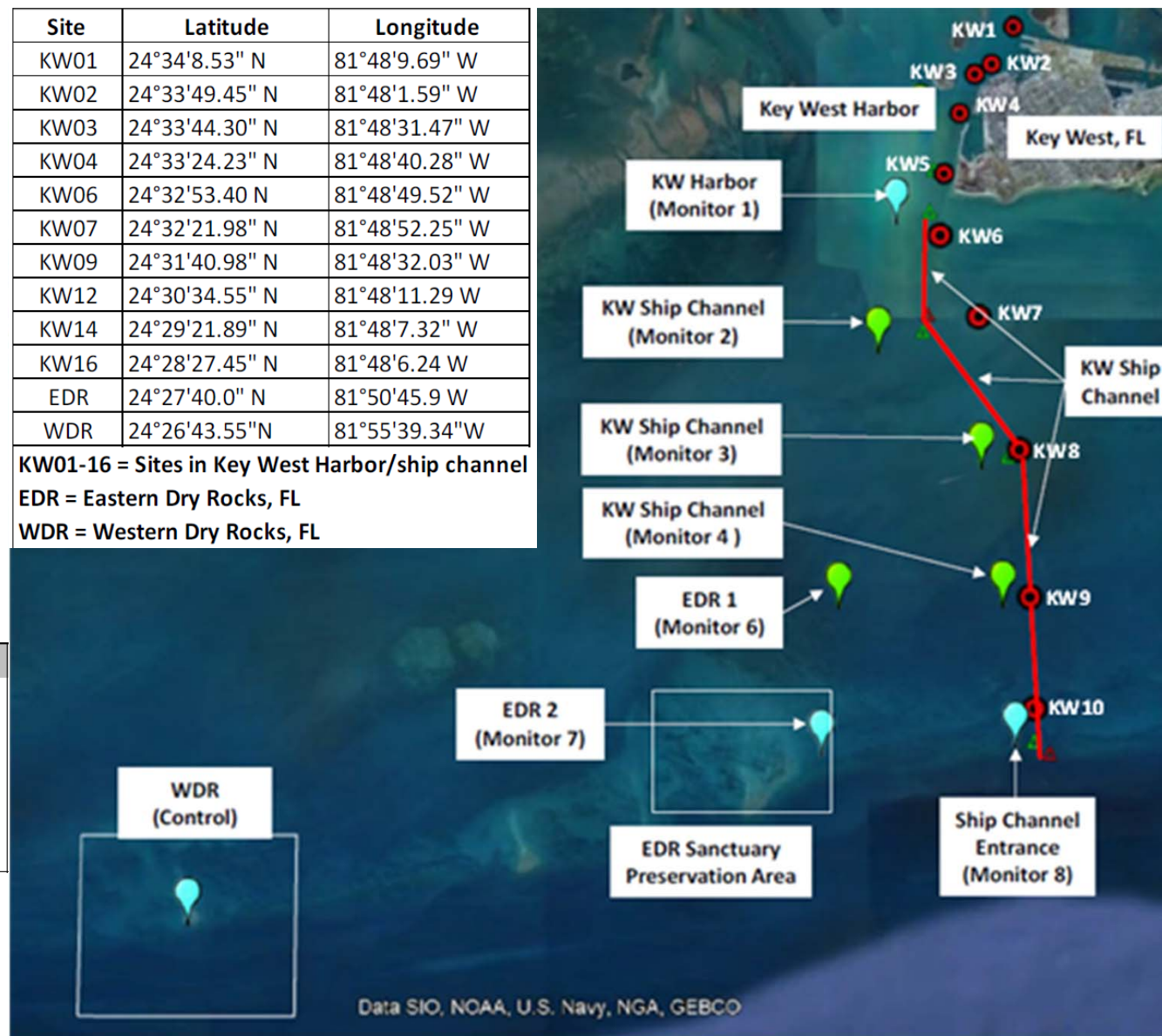
Dissolved Inorganic Nutrients (NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , NH <sub>4</sub> <sup>+</sup> , PO <sub>4</sub> <sup>-3</sup> )
Total Phosphorus (TP)
Total Nitrogen - ANTEK (TN)
Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC)
Dissolved Silicate (SI)
Chlorophyll a (GF/F filtered, spectrofluorometric)

Site	Latitude	Longitude
KW01	24°34'8.53" N	81°48'9.69" W
KW02	24°33'49.45" N	81°48'1.59" W
KW03	24°33'44.30" N	81°48'31.47" W
KW04	24°33'24.23" N	81°48'40.28" W
KW06	24°32'53.40" N	81°48'49.52" W
KW07	24°32'21.98" N	81°48'52.25" W
KW09	24°31'40.98" N	81°48'32.03" W
KW12	24°30'34.55" N	81°48'11.29" W
KW14	24°29'21.89" N	81°48'7.32" W
KW16	24°28'27.45" N	81°48'6.24" W
EDR	24°27'40.0" N	81°50'45.9" W
WDR	24°26'43.55" N	81°55'39.34" W

KW01-16 = Sites in Key West Harbor/ship channel

EDR = Eastern Dry Rocks, FL

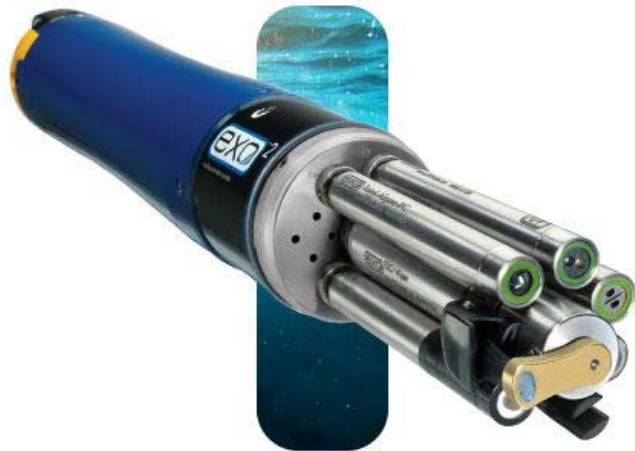
WDR = Western Dry Rocks, FL





## Spring 2022

- Awarded KWWQ Project from EPA
- Double YSI sensor coverage
- Creates an array to track water quality changes from disturbances in the Key West harbor and shipping channel



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KW01	24°34'8.53" N	81°48'9.69" W
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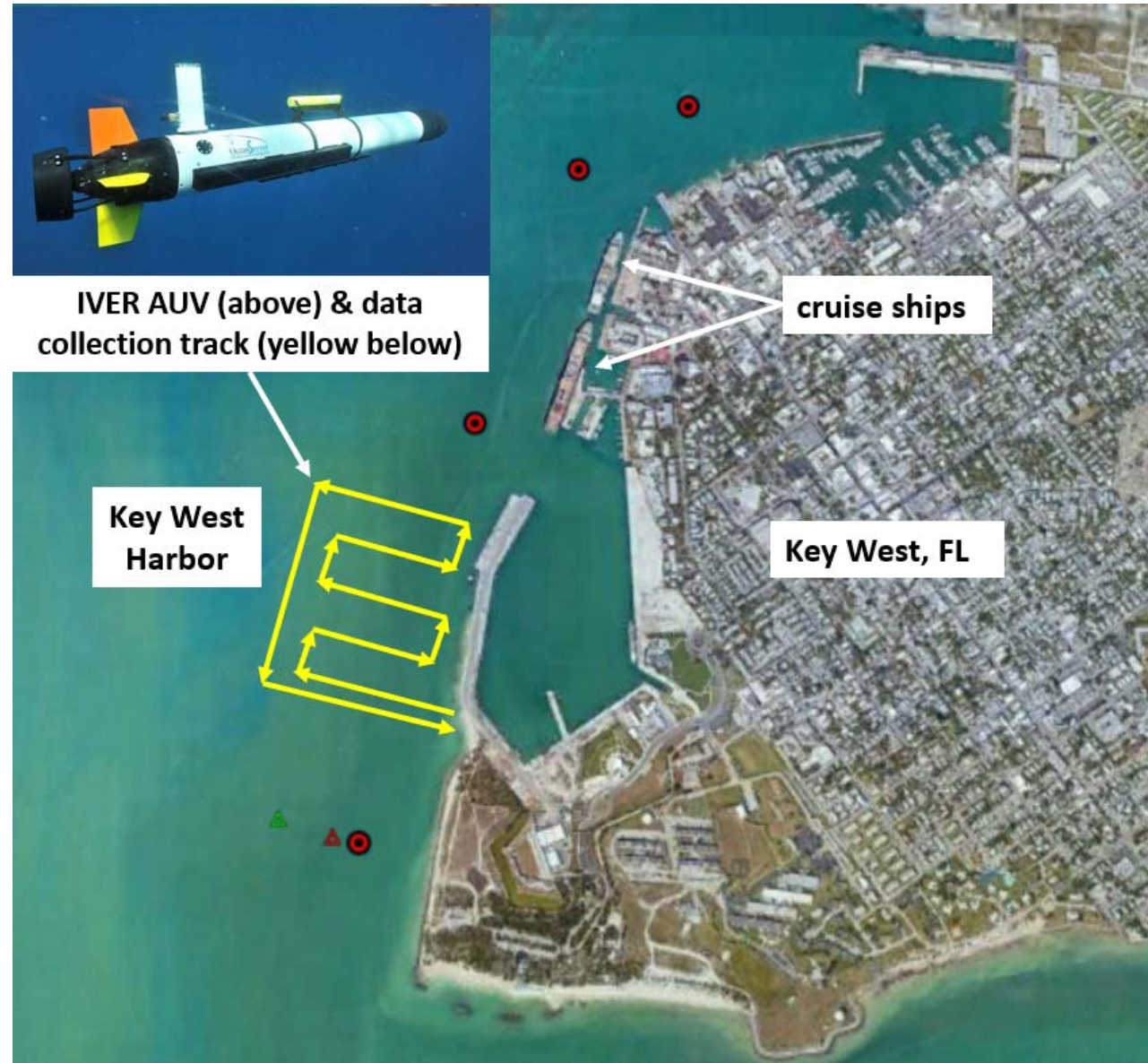
EDR = Eastern Dry Rocks, FL

WDR = Western Dry Rocks, FL



## Summer 2022

- Deploying autonomous underwater vehicle (AUV) with YSI EXO in the nose cone.
- Immediately before and after cruise ships enter the KW harbor
- DO, turbidity, salinity, temperature, phytoplankton concentration
- Marine science research assistants and internship students





# Gaps in Water Quality Monitoring

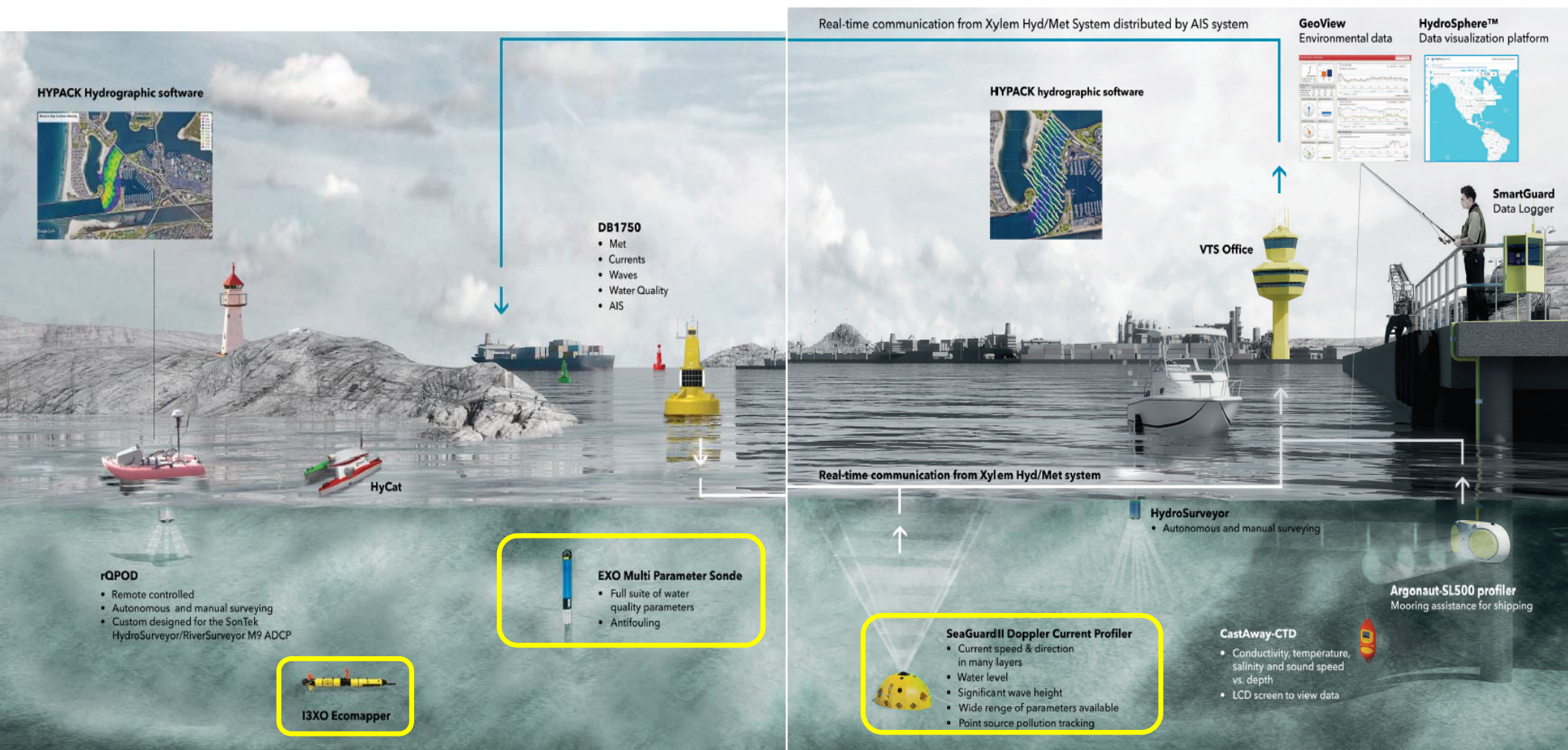
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- KWWQ only funded for one year
- KWWQ focus on KW harbor and ship channel
- Very little near shore (< 500 m) WQ monitoring
- Monitoring of storm water effluents
- Monitoring for chemicals of emerging concern (CECs)
  - Endocrine disruptors
  - Pharmaceuticals
- Monitoring of mooring fields or marinas for basic indicators of anthropogenic pollution





# Water Quality Monitoring Technology



# Recommendations

## ■ Partnership with CFK

- Local
- Build upon KWWQ project
- Environmental Service Learning
  - Research Assistantships, Internships, marine science classes
- Network (e.g. FIU Water Quality Monitoring Lab, FKNMS, FDEP, NPS, etc.)
- Some Technology (e.g. i3XO Ecomapper, YSI EXO and 6600 data sondes)

## ■ Data buoys

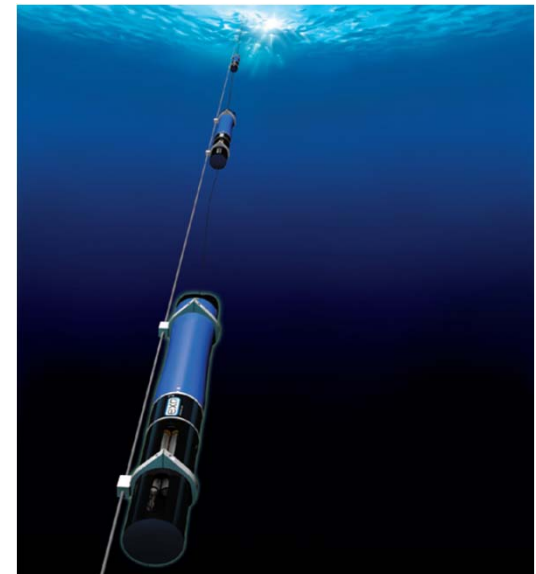
## ■ Current profilers

## ■ Suggested locations

- Near shore (< 500 m)
- Mooring fields
- Outfalls
- Popular beaches (e.g. Higgs beach, Smathers beach )
- Control site (e.g. Western Dry Rocks)
- Water proximal to landfills
- Marinas

Table 1. CFK Marine Science Courses for Participation in KWWQ

Course	Fall	Spring	Summer
OCB 2102C Marine Data Collection	1	1	0
ISC 2132 Basic Research Diving	1	1	1
ISC 3133 Advanced Research Diving	1	0	0
OCB 2262C Assessing Coral Reef Habitats	0	0	1
OCB 2263C Coral Reef Biology and Management	2	1	0
OCB 2107C Monitoring Caribbean Reef Fish	0	0	1
OCB 3035 Nearshore and Offshore Ecology & Assessment	1	0	0
OCB 4624 Estuarine and Coastal Ecology	0	1	0
OCB 4103L Forensic Marine Science Lab	1	0	0
<b>Total</b>	<b>7</b>	<b>4</b>	<b>3</b>





# Questions?



Crystal-clear water at Smathers Beach



First cruise ship after the anthropause