**Test Plan: Operations in Ashumet Pond and the Charles River with JetYaks and SandSharks, September 2019**

***Objectives:*** Collect data in Ashumet Pond for determining a speed vs propeller turns table for the current SandShark configuration. Collect current data in the Charles River to assist in the evolution of a new Extended Kalman Filter.

***Dates:*** May 13-18, weather permitting. Timeline may need to be compressed/shifted based on weather issues. Site order may need to be revisited based on winds.

**(Phone call Sunday night to discuss weather)**

***Travel:***

Day 1- WHOI team to drive to Ashumet Pond to conduct shakedown and speed vs propeller turns testing.

Day 2- WHOI team drive to MIT Sailing Pavilion to conduct current testing

30 minute drive to Ashumet Pond.

Approximately 2 hour drive to MIT Sailing Pavilion

*Boat ramp: Ashumet Pond - ample parking.*

*Parking at Sailing Pavilion?*

***WHOI Personnel attending:***

Chris Dolan

Caileigh Fitzgerald

Erin Fischell

**You can also contact: Erin Fischell, lead PI, 732-299-6650**

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***Equipment:***

SandShark AUV(x2) with iUSBL

* Length: ~6’
* Weight: ~200lbs

JetYak ASV with RDI WHN300 DVL

* Length: ~11’
* Width:~3’
* Weight:~200lbs

iUSBL/LBL Transducers

***General Operation Plan***

***Day 1:***

Transport the JetYak and SandSharks to Ashumet Pond. Conduct shakedown testing to determine if all systems are functioning properly. If shakedown successful, continue on to acoustic Doppler and speed vs propeller turn testing

***Day 2:***

Transport the JetYak and SandSharks to the MIT Sailing Pavilion. Collect current data with the JetYak with the SandSharks following recording iUSBL positions and acoustic Doppler shift data.

***Site Information:***

**Site 1: Ashumet Pond**

*Information: Public boat launch*

*Water Depth:* 5-65ft.

*Current and Tides:*

*Desired Surveys: Jetyak shakedown and equipment tests. SandShark shakedown and equipment tests followed by lawnmower surveys.*

*Obstructions/keep-out:* GPS coordinates

**Site 2: Charles River/MIT Sailing Pavilion**

*Information: Time on the water limited by crew shells in the early morning and sailing classes after lunch*

*Water depth:* 9-18ft

*Current and tides:*

*Desired Surveys: Lawnmower patterns led by the JetYak with the SandSharks following.*

*Obstructions/keep-out:*

***Science objectives:***

Acoustics:

* Baseline comparison between sonars for lines with kelp on them.
* Evaluate EK80 ability to detect kelp on lines, assess variability across field, and provide frequency-dependent information for kelp and fish scattering from below and above.
* Assess EK80/Ping on ASV and EK80 on AUV based on range to kelp: vary sensor depth (AUV multi-depth mission, ASV lower pole).
* Assess acoustic variability in EK80 and Ping from ASV, EK80 on AUV (Repeat passes over same line).

Structural engineering:

* Line locations/behavior v. time?

Environmental data:

* Variability of Nitrate, salinity, D O2, temperature etc. over entire farm site mapping, correlation with growth?
* Variability v. depth?
* Upstream v. downstream?

Data we will collect:

* Sandsharks:
  + Ashumet Pond: Lawnmower survey recording iUSBL position and propeller RPM at varying propeller RPM to determine speed vs propeller RPM curve
  + Charles River: Lawnmower survey patterns following the Jetyak while recording iUSBL position and propeller RPM.
* JetYak:
  + Lawnmower survey pattern to collect current profiles