Parker's River: Habitat Survey and Geomorphic Assessment

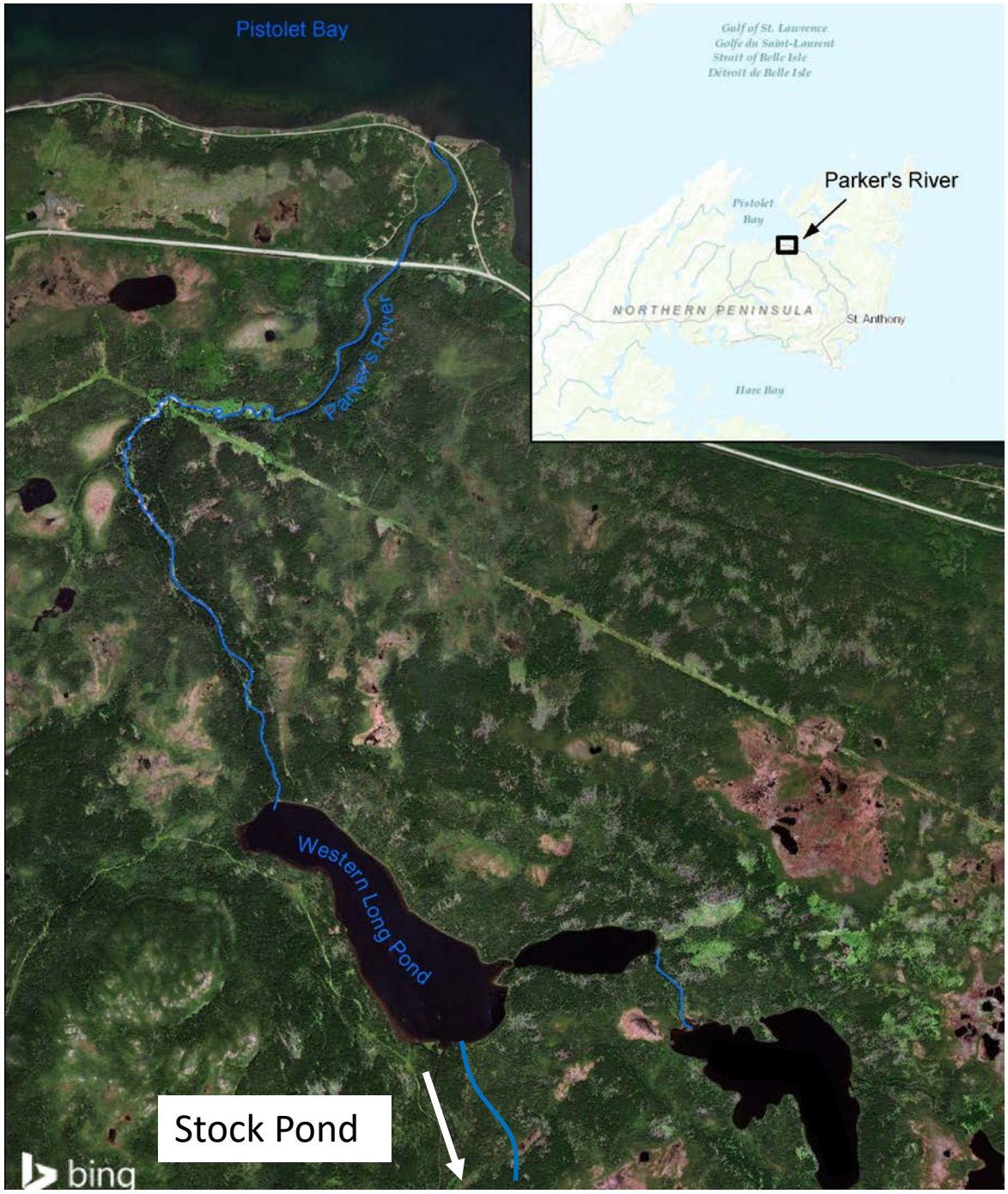
October 27, 2020

Nick Nelson
Mike McAllister
Mackenzie Butler

inter·fluve

Inter-fluve.com

Table of contents:

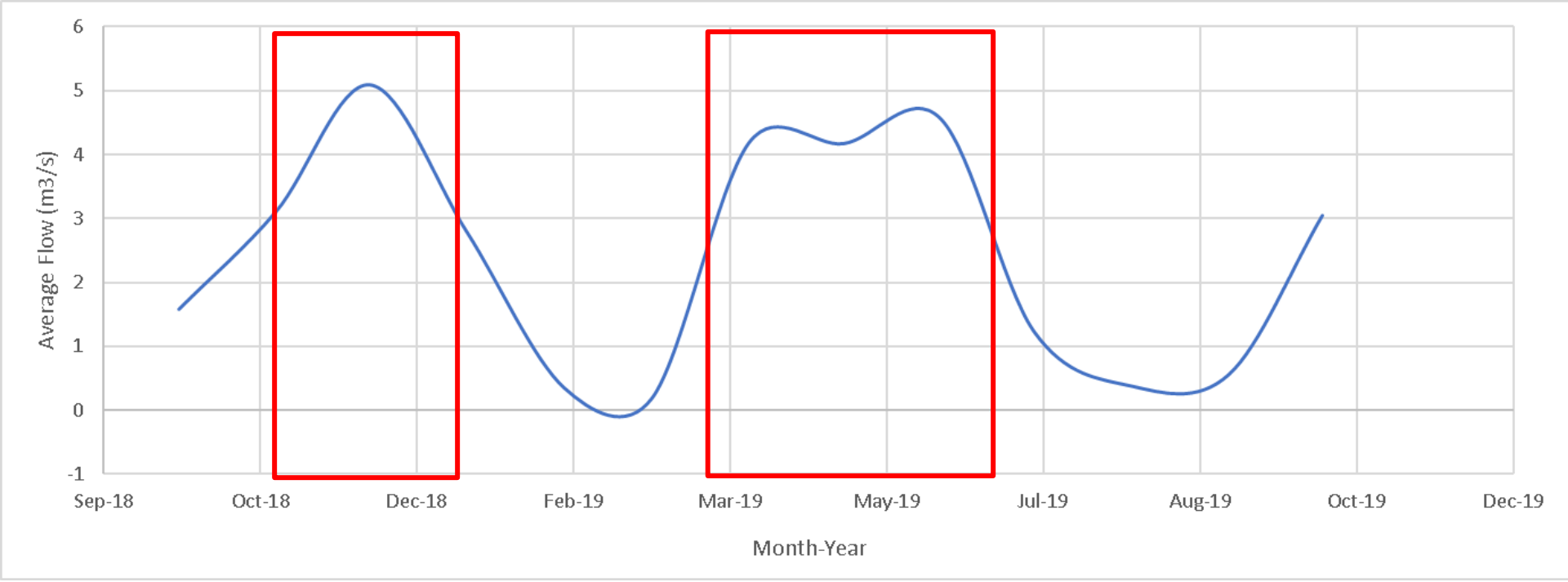


Area of Study

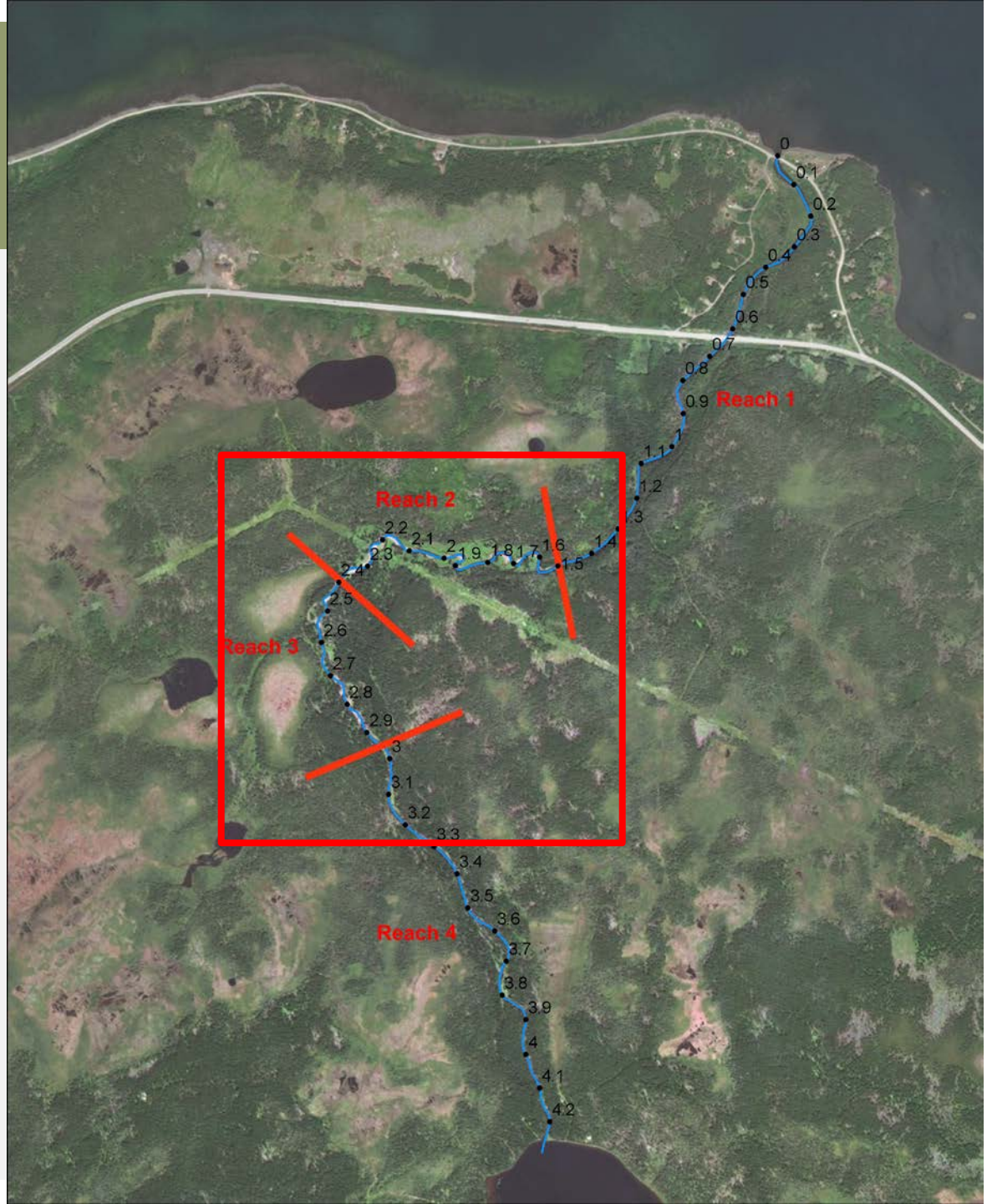
- 'West' or 'Western Brook'
- Headwaters in Eastern Long Pond
- >4 kilometers from Western Long Pond to Pistolet Bay
- Important for Arctic char and Atlantic salmon
- Sedimentation at mouth of river contributing to fish mortality

Hydrology

- Little available data for nearby streams - data below from Bartlett's River near St. Anthony
- High flows during spring melt/runoff as well as fall rainy season



Stream Reaches




Reach 2
Reach 1
Reach 3
Reach 4
© 2020 Google
Image © 2020 Maxar Technologies
Image © 2020 CNES / Airbus

Methods – Topographic Survey

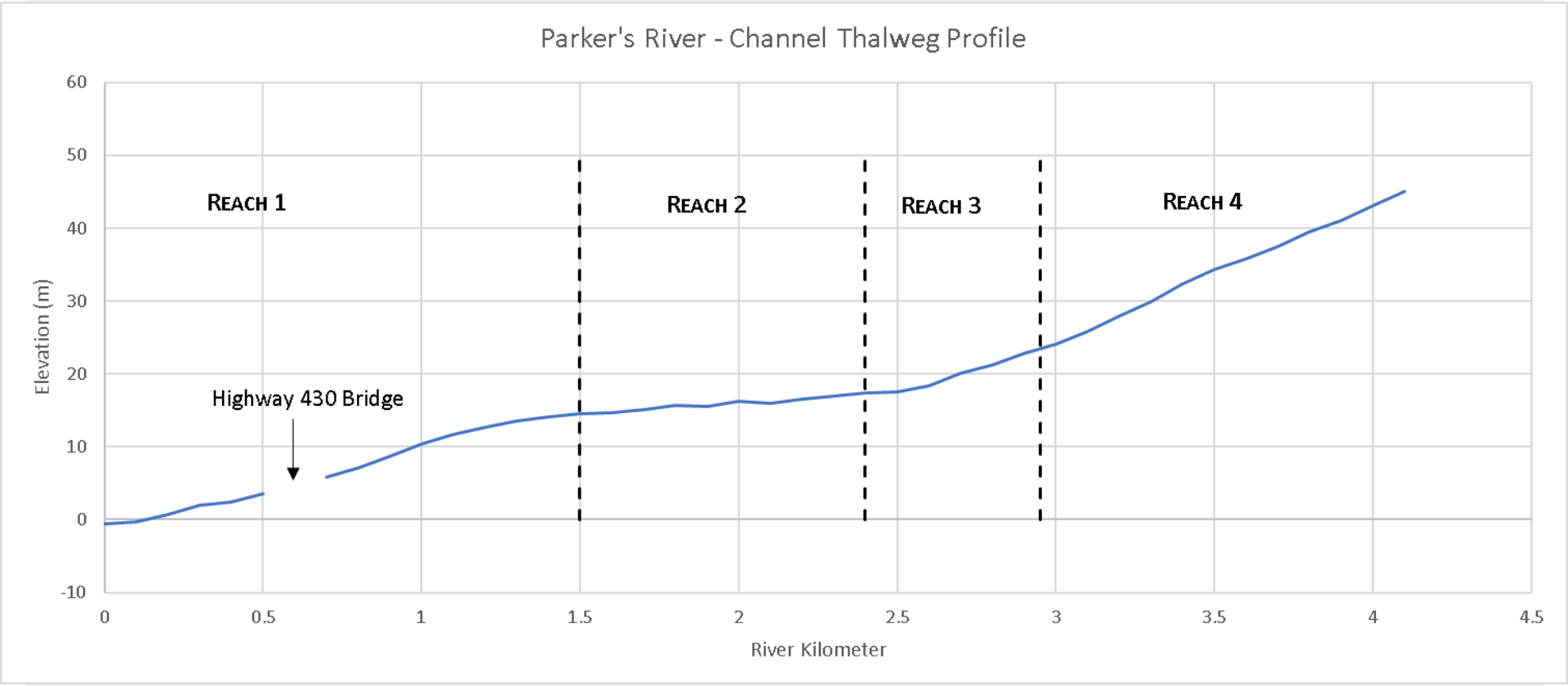
Methods – Grain Size Analysis

Methods – Water Surface Elevation and Temperature

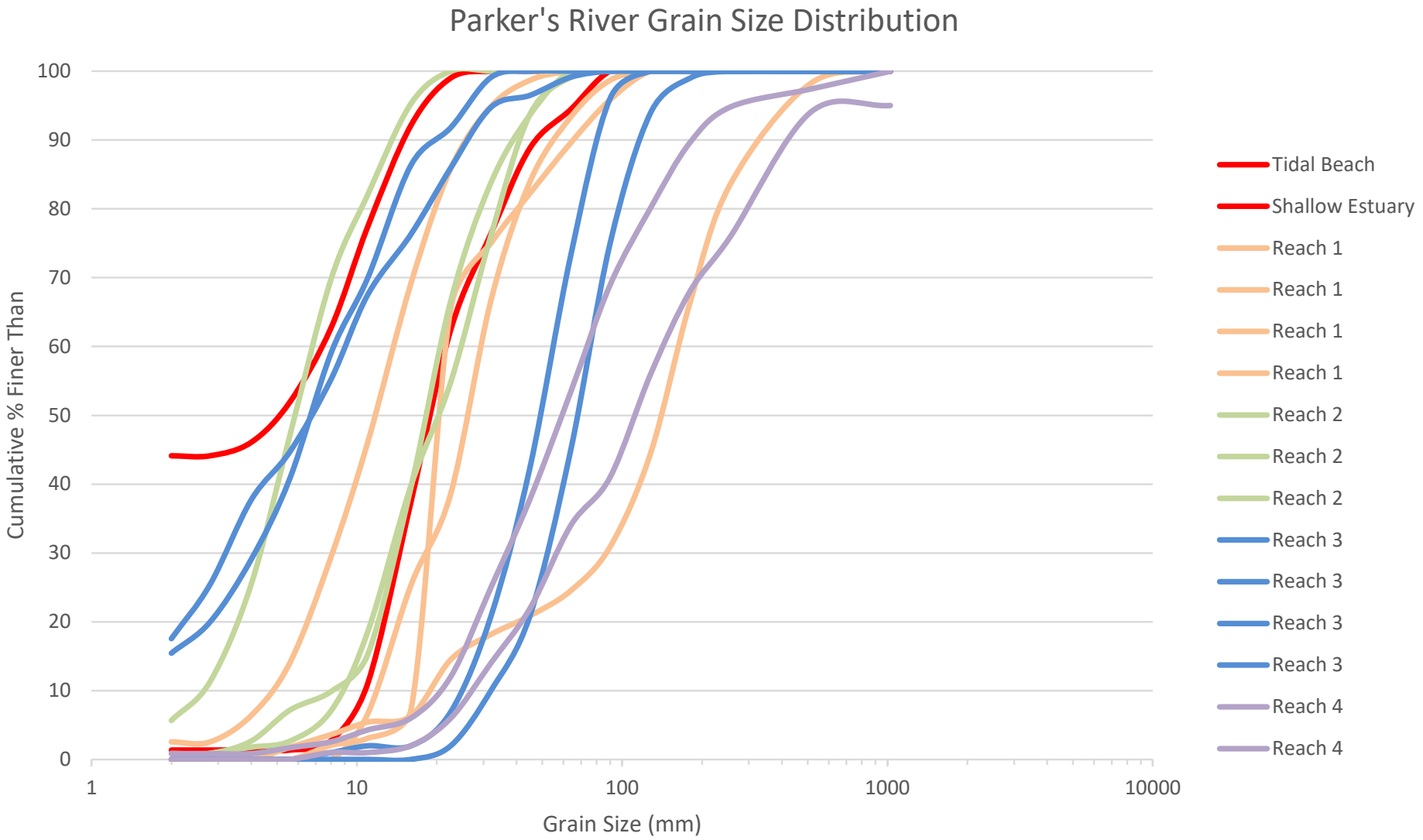
- 4 loggers placed at different heights above channel bed under road bridge
- 1 logger placed in riffle at upstream end of tidal influence
- 1 logger placed in estuary
- Continual measurements over 2 days

Methods – Drone Survey

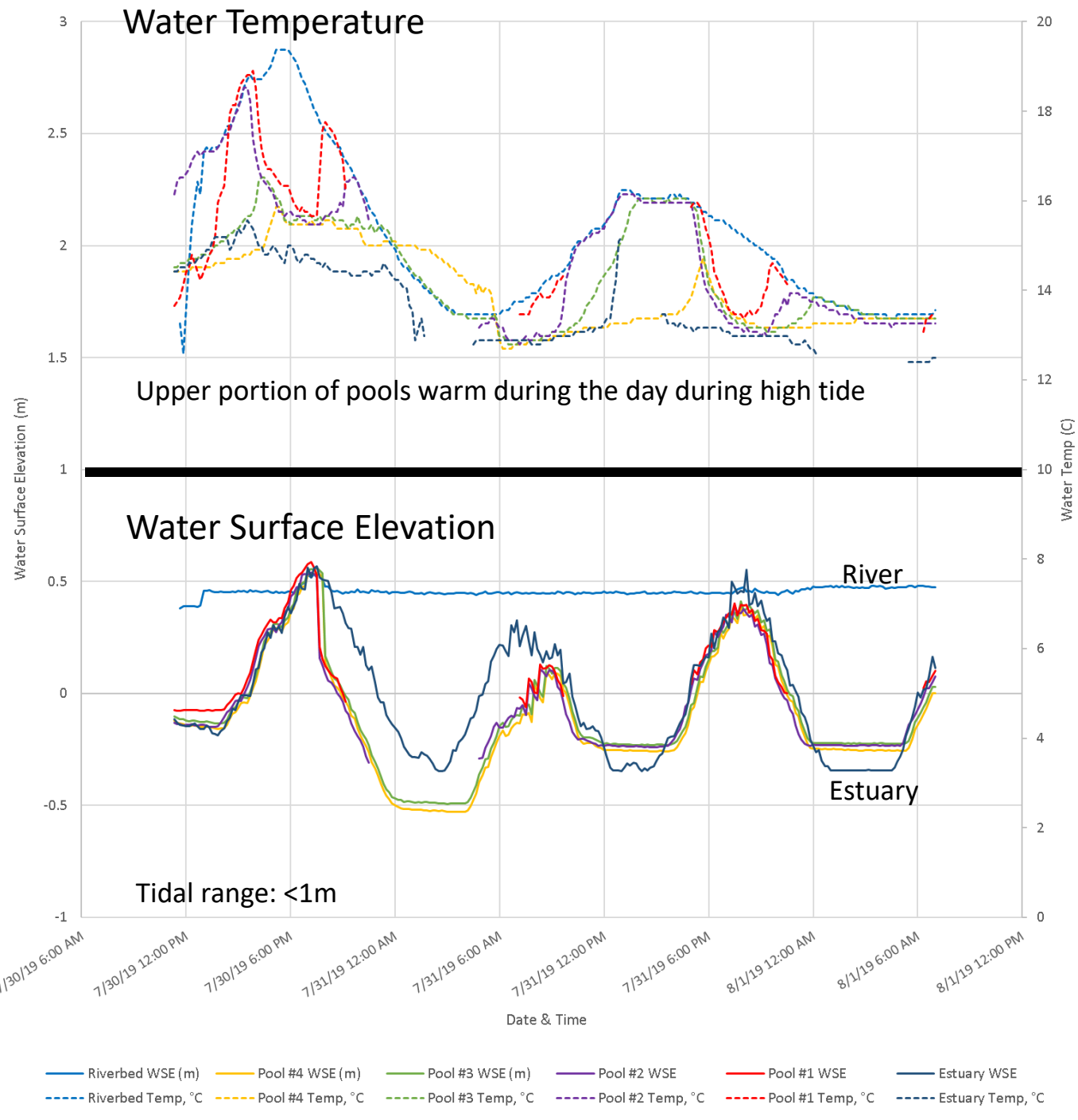
Results - Longitudinal Profile



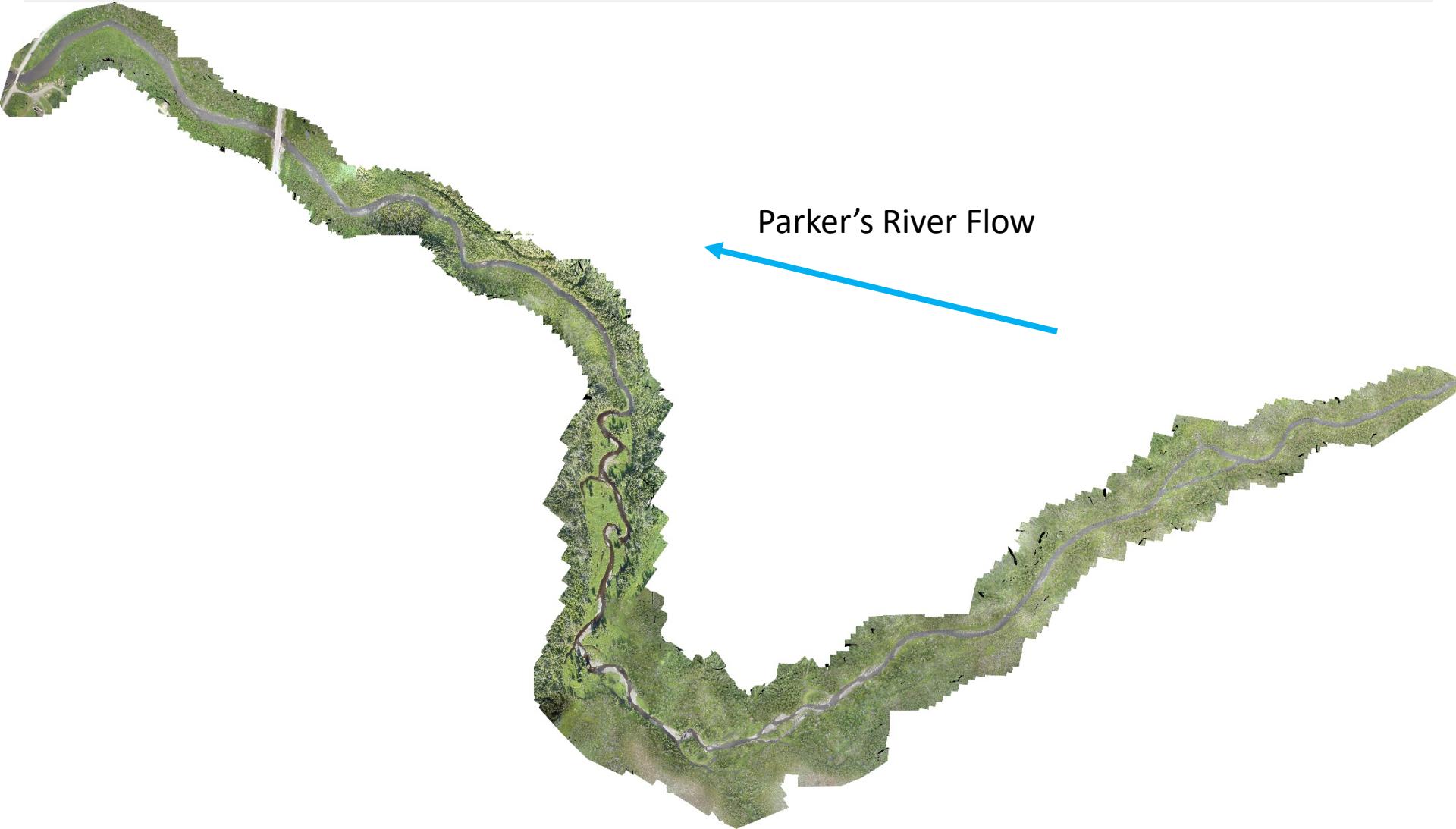
Results - Grain Size Distribution



Results - Water Level Loggers



Results - Drone Survey




Reach 2
Reach 1
Reach 2
Reach 3
Reach 4
Reach 3
Reach 4
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3
3.4
3.5
3.6
3.7
3.8
3.9
4
4.1

Summary

- Good habitat throughout the watershed
- Though the channel is mobile, no major sources of sediment
- Precipitation records and conversations with local landowners suggest an event over 10 years ago may have caused the sedimentation issues at the mouth of the river:
  - Early rain on snow/ice resulted in large floods and movement of ice from the upper reaches
  - We observed evidence of possible channel re-working in Reach 2 that could be explained by such an event
  - Ice may have gotten stuck at the bridge at the outlet resulting in a backwater that may have extended longer than a high tide – sediment fell out of suspension and deposited in the area around the bridge
    - Partially fill deeper pools
    - Obscure outlet
    - May take years to mobilize

Summary, continued

- Fish mortality has occurred when the stream water levels are low and water temperatures high
- Low stream flow combined with low tide could trap fish in the pool
- Hot air temperatures could increase temperatures in the water
- Real or perceived danger from people and dogs may result in increased stress of the fish, further harming them in an already stressed situation
- Fish may use up much of the oxygen in the pool while water levels are still too low to escape

- Die-offs don’t happen every year
- Erosion and sedimentation is a natural process, but the following factors may lead to increased frequency:
  - Climate change
  - Increased weather/precipitation variability
  - Constriction at the bridge

Options Analysis

Options	Habitat Impact	Feasibility Considerations	Relative Cost
A. No Action	- Depending on environmental conditions, may still experience years with die-off events (may become more frequent under climate change scenarios)	- Low initial cost, may be greater overall cost if wait too long/until after next extreme event - Channel conditions may improve naturally over time; if so and how long is uncertain	$
A. Dredge channel	- Immediate charr migration improvement; habitat open from bridge out to deeper part of Pistolet Bay during entire tidal cycle -	- Depending on environmental conditions, extreme weather events in future may cause dredged channel to fill in again due to hydraulic impacts of bridge	$$
A. Replace bridge	- In near term, may still experience die-off events depending on environmental conditions - Over long term, expect a deeper channel to reform, improving habitat conditions	- Uncertain how long it will take to improve habitat/reform deeper channel	$$$
A. Replace bridge and dredge channel	- Immediate charr migration improvement in near term; habitat open from bridge out to deeper part of Pistolet Bay during entire tidal cycle - Over long term, expect a deeper channel to remain, improving habitat conditions, due to improved hydraulics near mouth of channel	- Most expensive	$$$$

Nick Nelson

617-852-7744
nnelson@interfluve.com

220 Concord Ave., 2nd Floor,
Cambridge, MA 02138

www.interfluve.com

inter·fluve

Inter-fluve.com