

An aerial photograph showing a dense forest of evergreen trees. A winding river or stream flows through the forest in the lower half of the image. In the upper right, a large body of water, likely a lake or bay, is visible with some small boats. The sky is clear and blue. The text is overlaid in the center of the image.

**Joyful Work:  
Beach Profiling and Cove Sedimentation Edition**

# Beach Profiling

- allows you to take a snapshot (cross section) of a beach at a point in time
- taking the same snapshot in different months and/or years show changes over time
- changes may be due to wave action, currents or the placement or removal of man-made structures

**Concerns by property owners prompted Stillwaters to conduct beach profiling to document changes in sedimentation patterns in the cove after culvert removal**

# Appletree Cove 2019

Legend



Google Earth

© 2020 Google



1000 ft

# Appletree Cove 2019

Legend



Triangle on breakwater

Google Earth

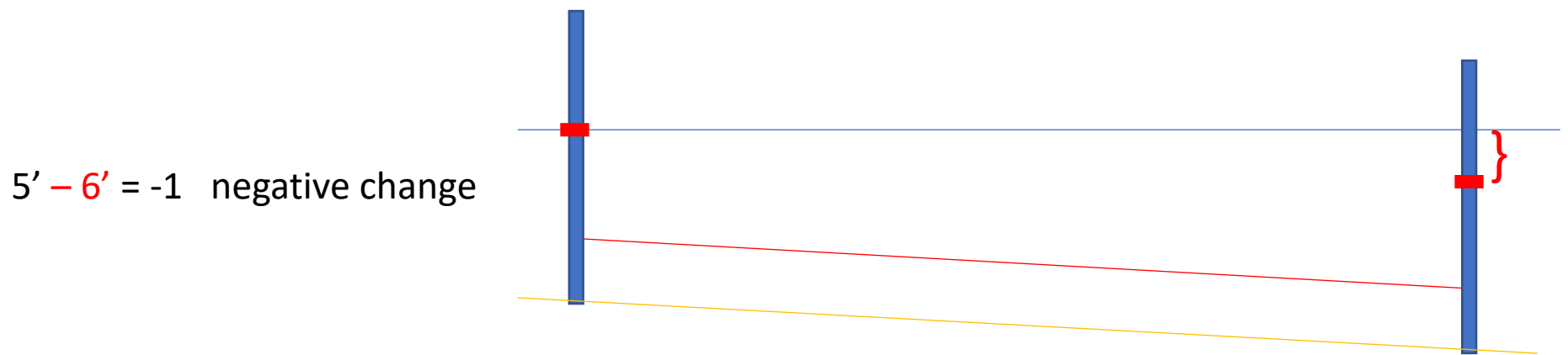
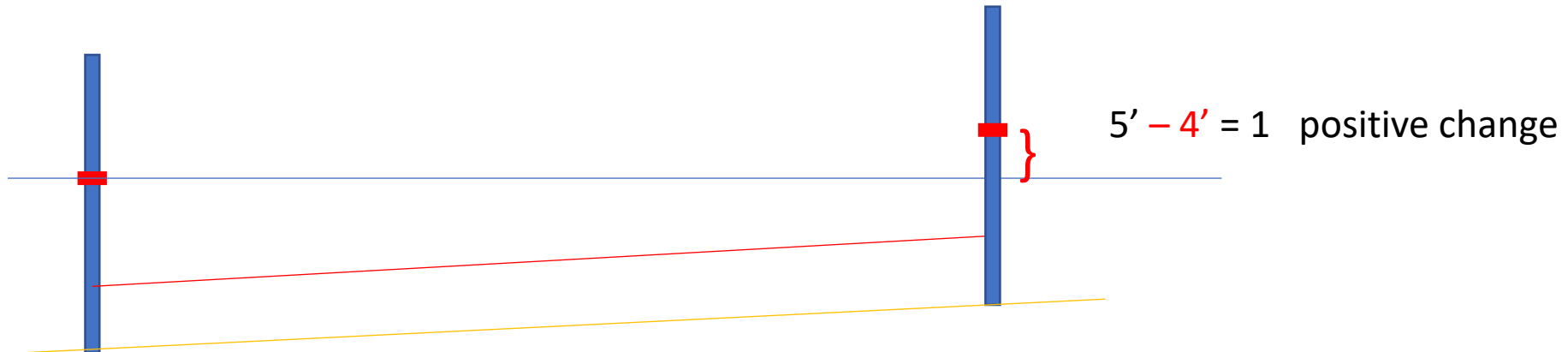
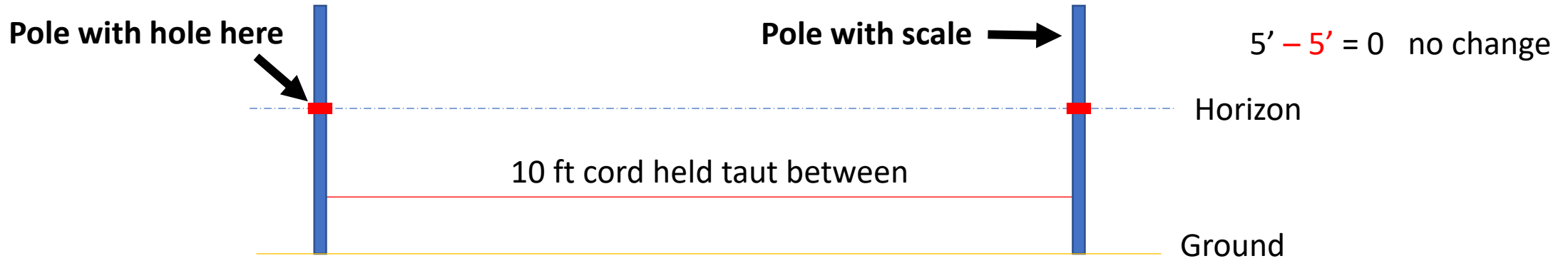
© 2020 Google

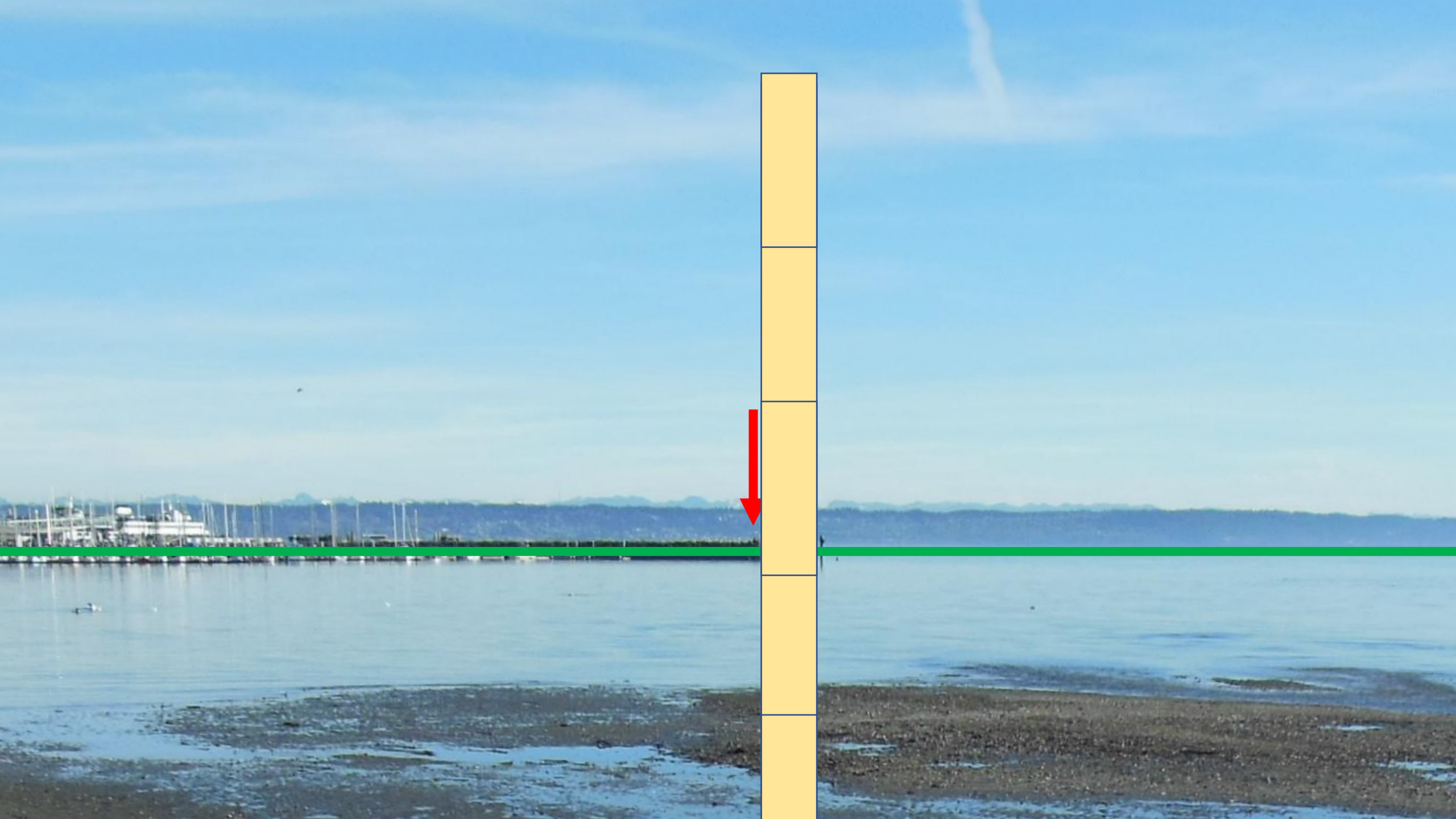
1000 ft





10.14.2020 09:07







10.14.2020 09:07

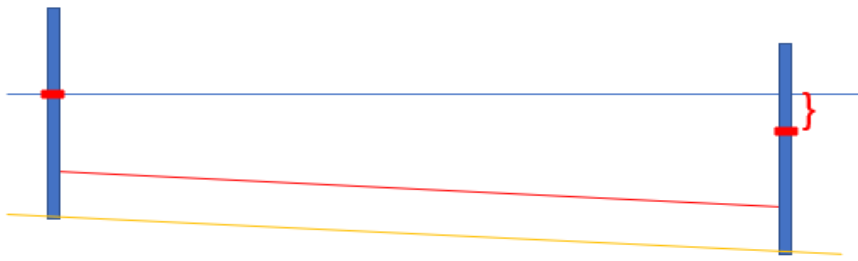




10.14.2020 09:14



5' - 6' = -1 negative change



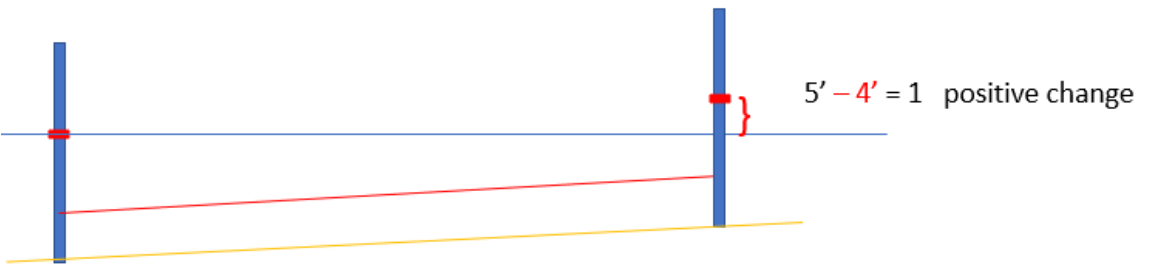
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10.14.2020 09:19



10.14.2020 09:26



10.14.2020 09:32



10.14.2020 09:40



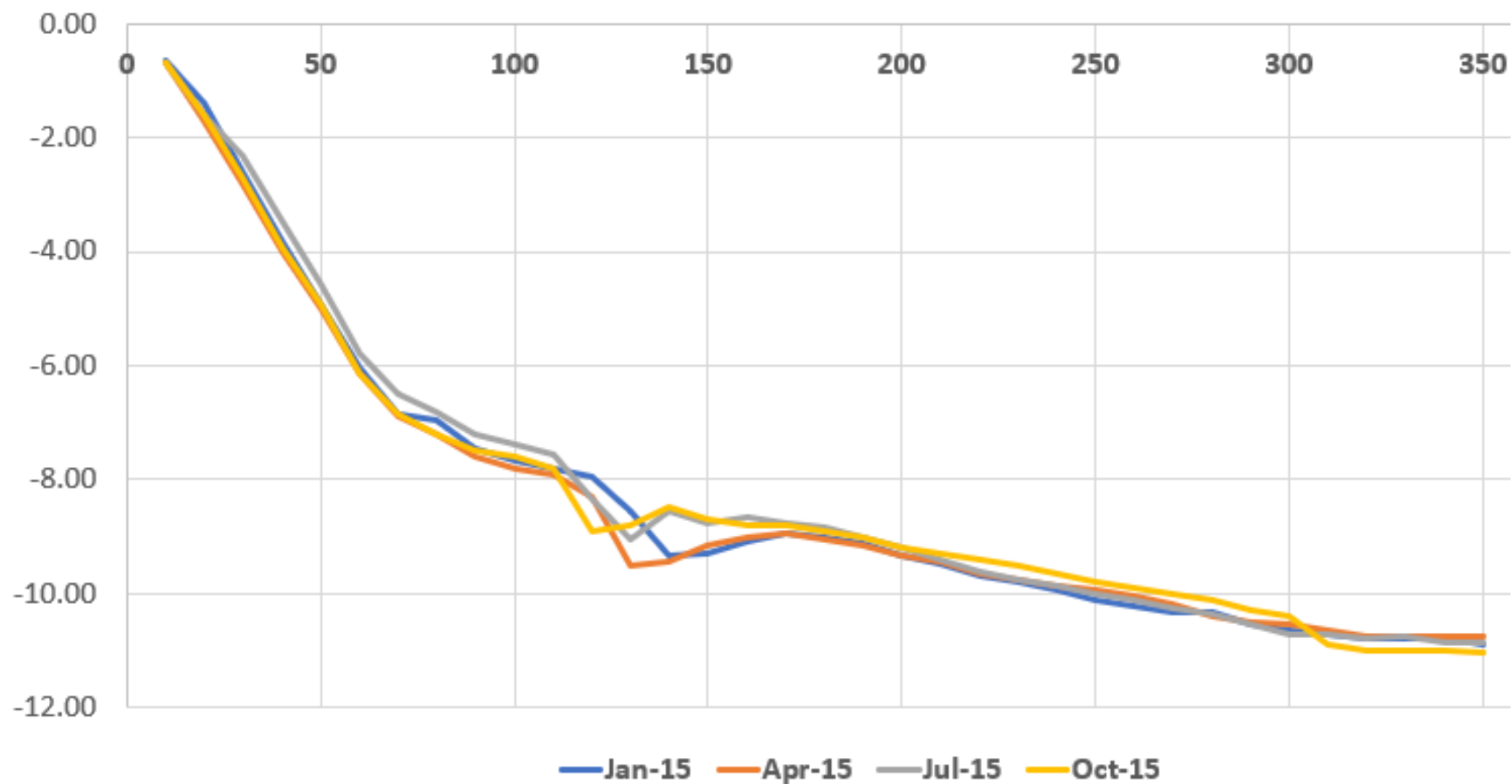
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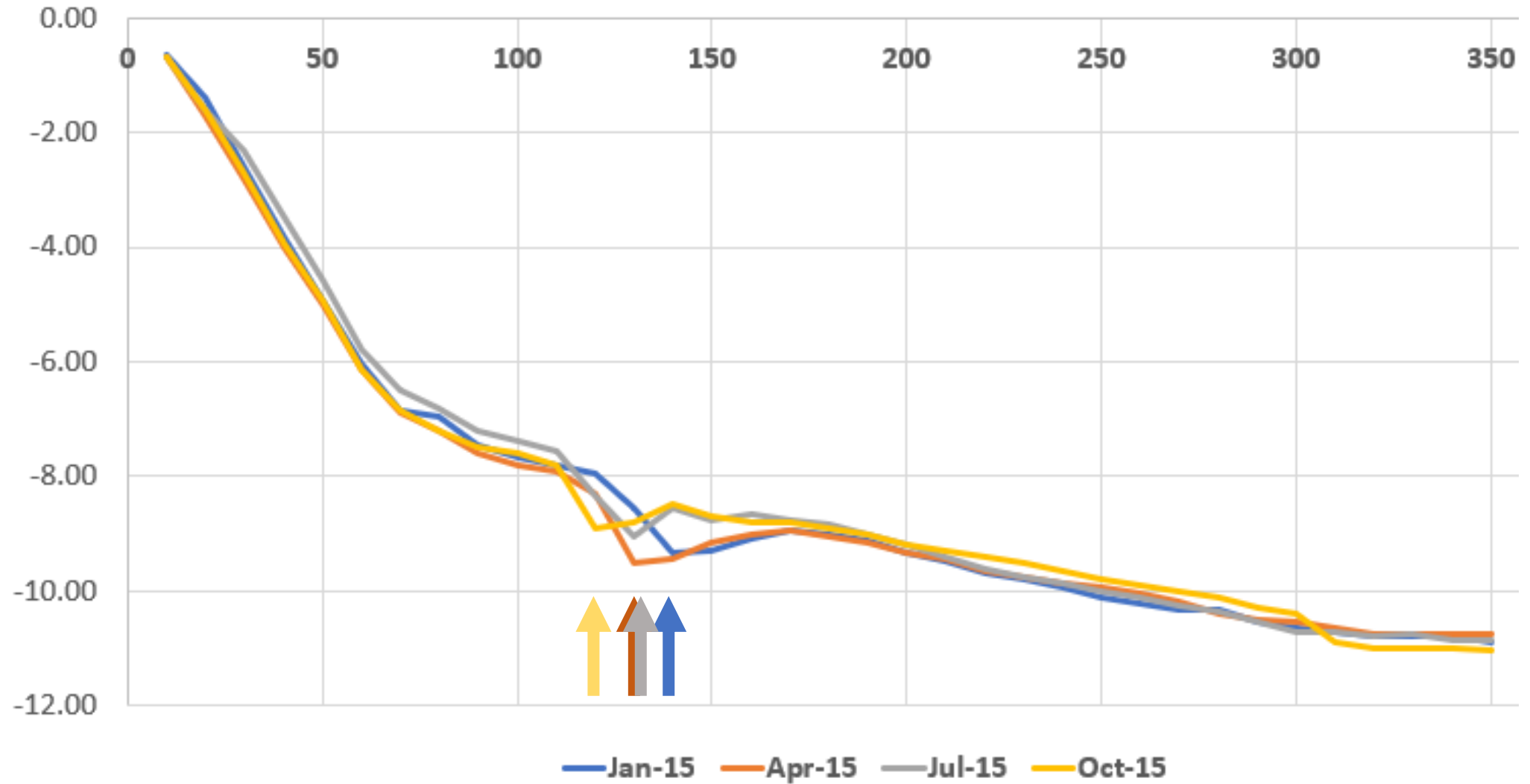
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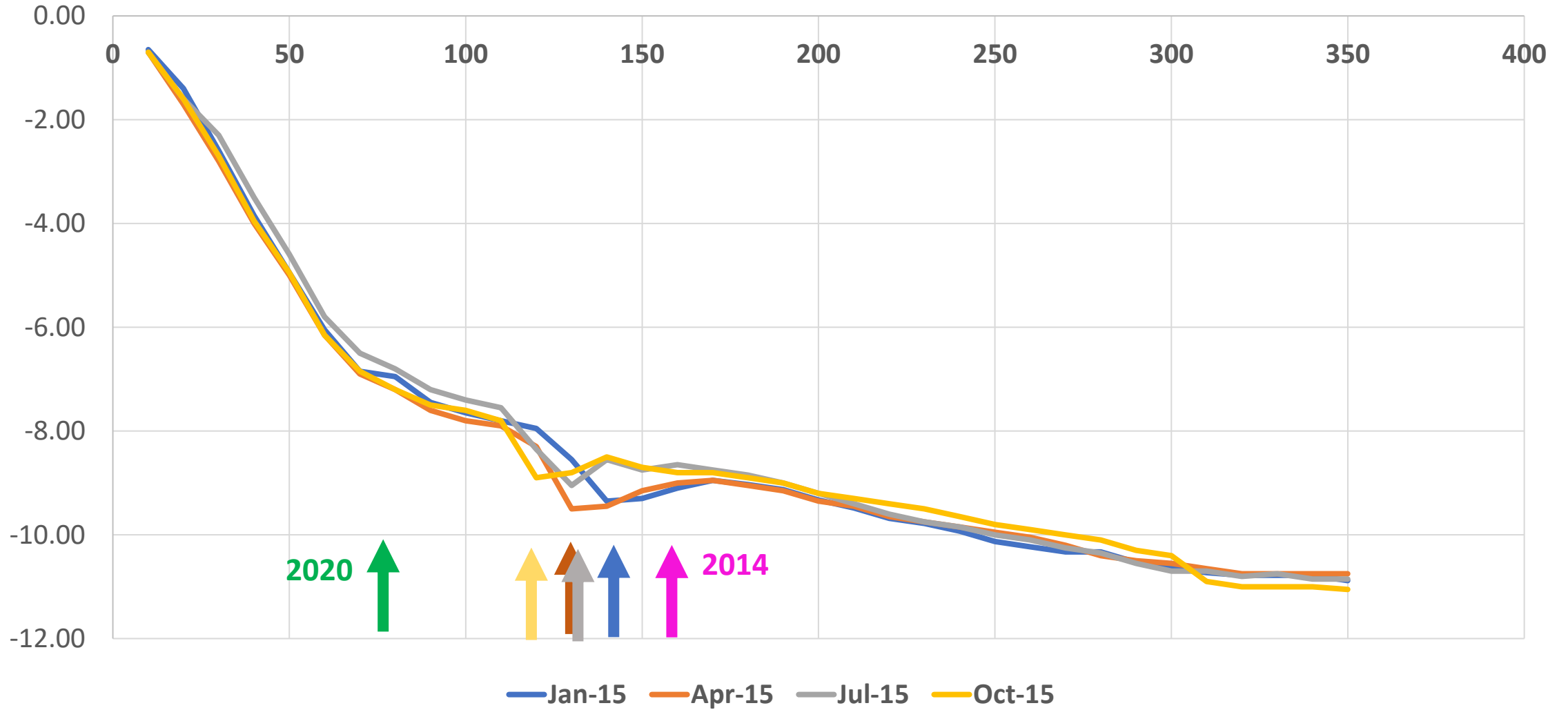
## Transect 1 Beach Profile



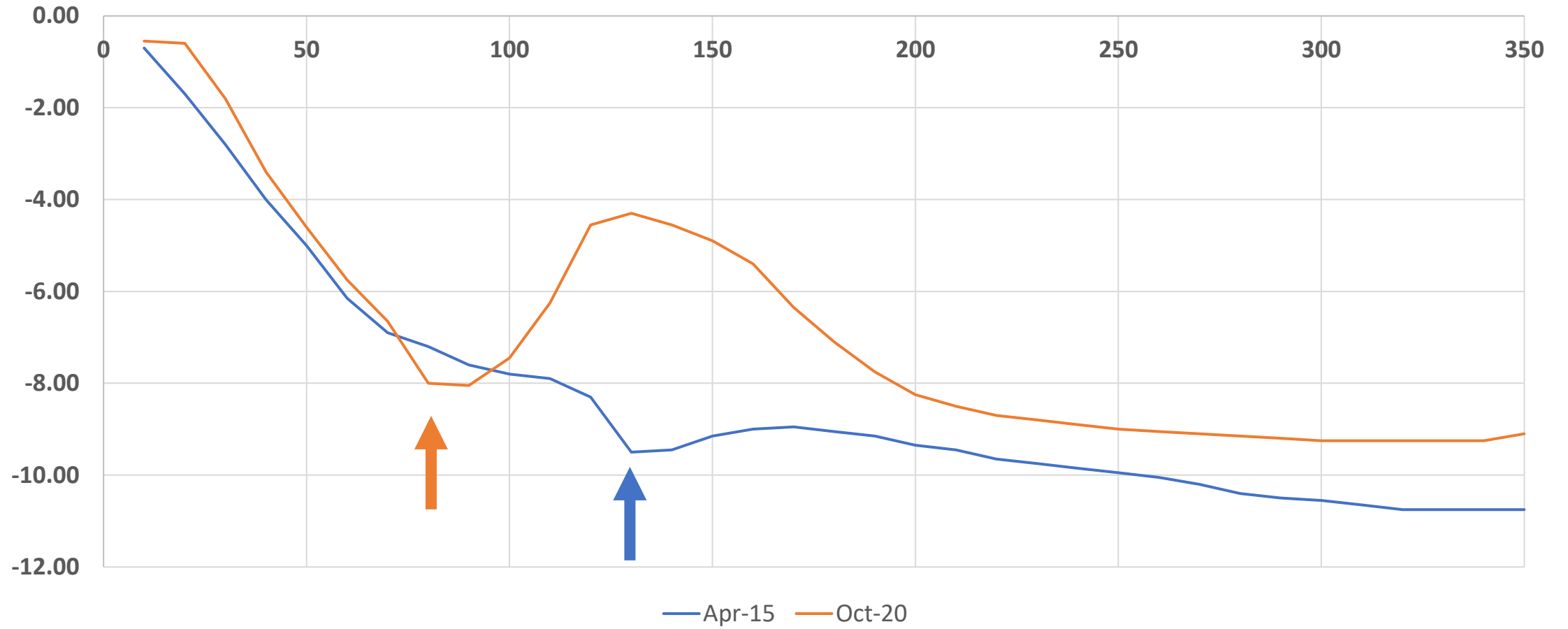
# Transect 1 Beach Profile



# Transect 1 Beach Profile



# Transect 1





# Transect 1

**April 2015  
100 ft**

**Oct. 2020  
100 ft**

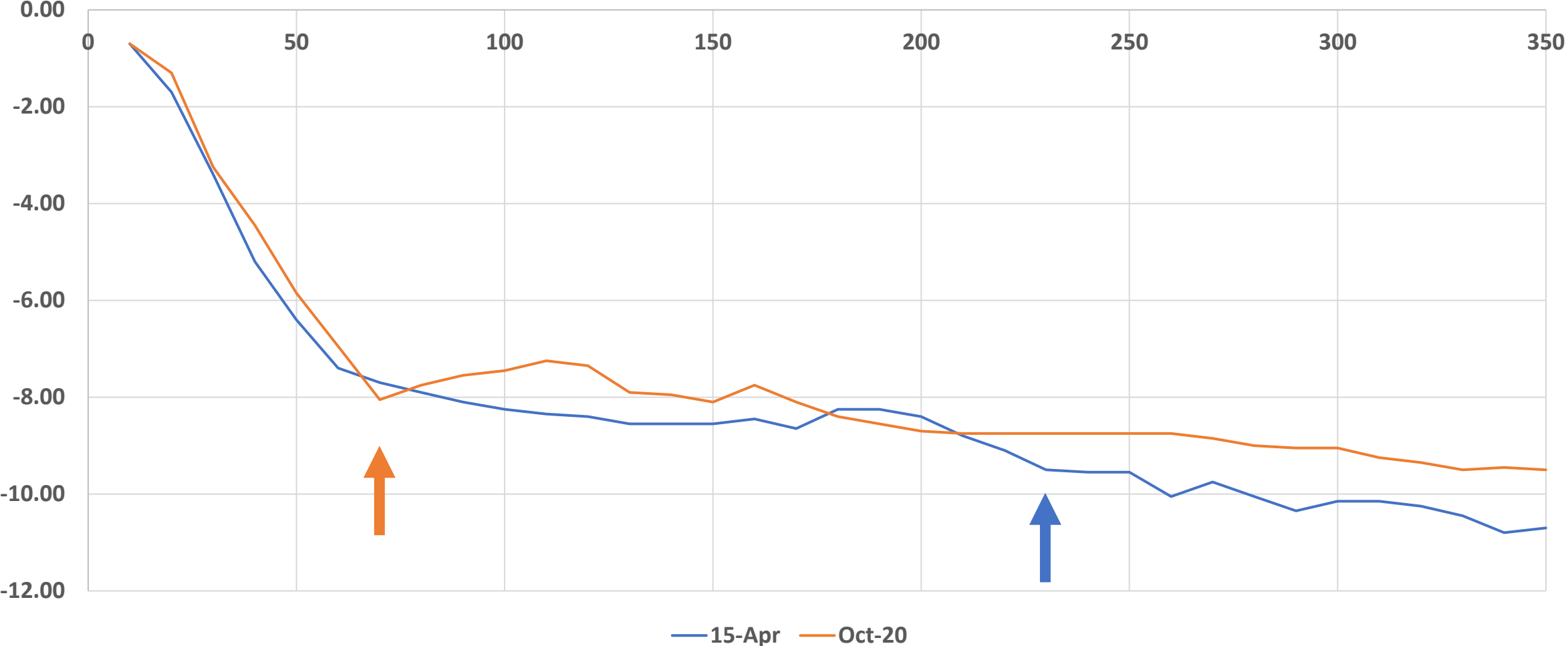


**April 2015  
150 ft (Stream  
@ 130-140 ft)**

**Oct 2020  
150 ft**



# Transect 2





## Transect 2

**April 2015**  
**100 ft**

**Oct 2020**  
**90 ft**

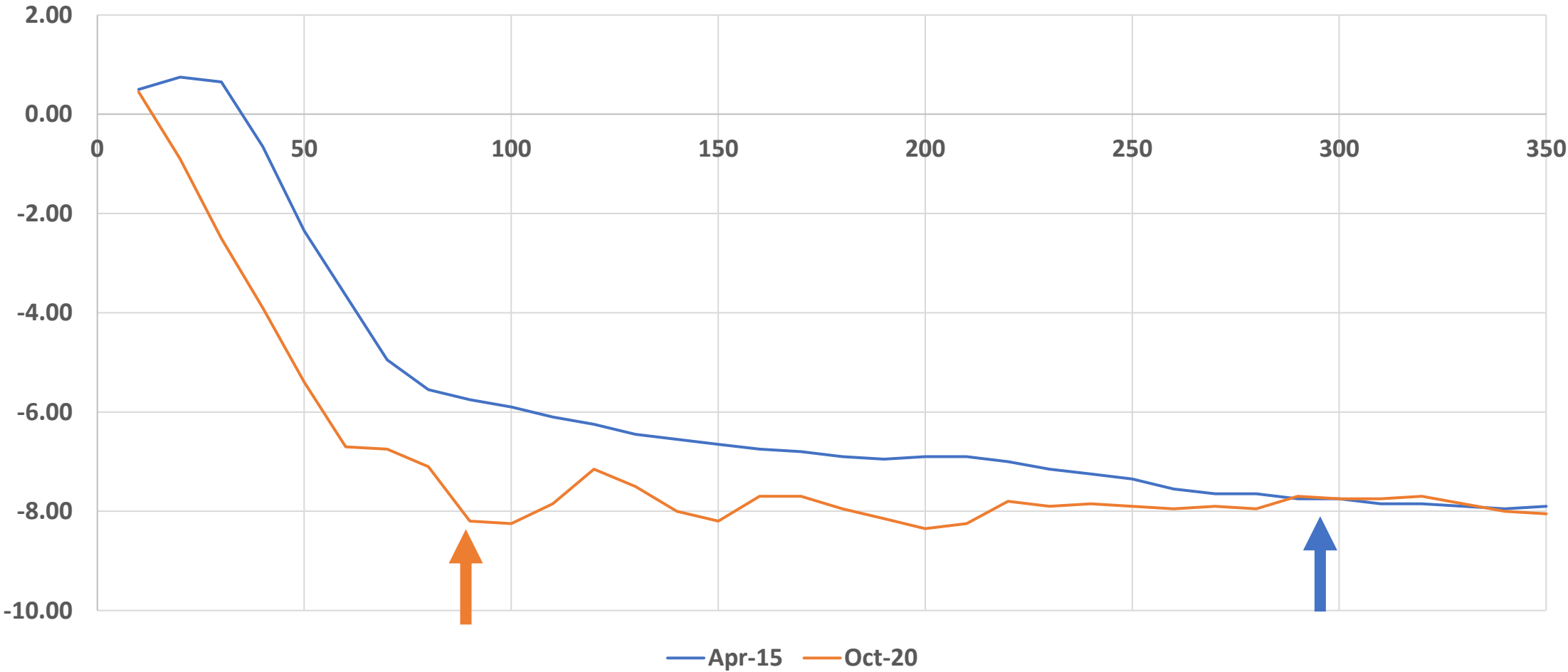


**April 2015**  
**250 ft (Stream @**  
**~230 – 300 ft)**

**Oct 2020**  
**250 ft**



# Transect 3







## Transect 3

**April 2015  
100 ft**

**Oct 2020  
90 ft**



**April 2015  
300 ft (Stream  
@ 290-300)**

**Oct 2020  
300 ft.**





10.14.2020 09:23



2011



2012



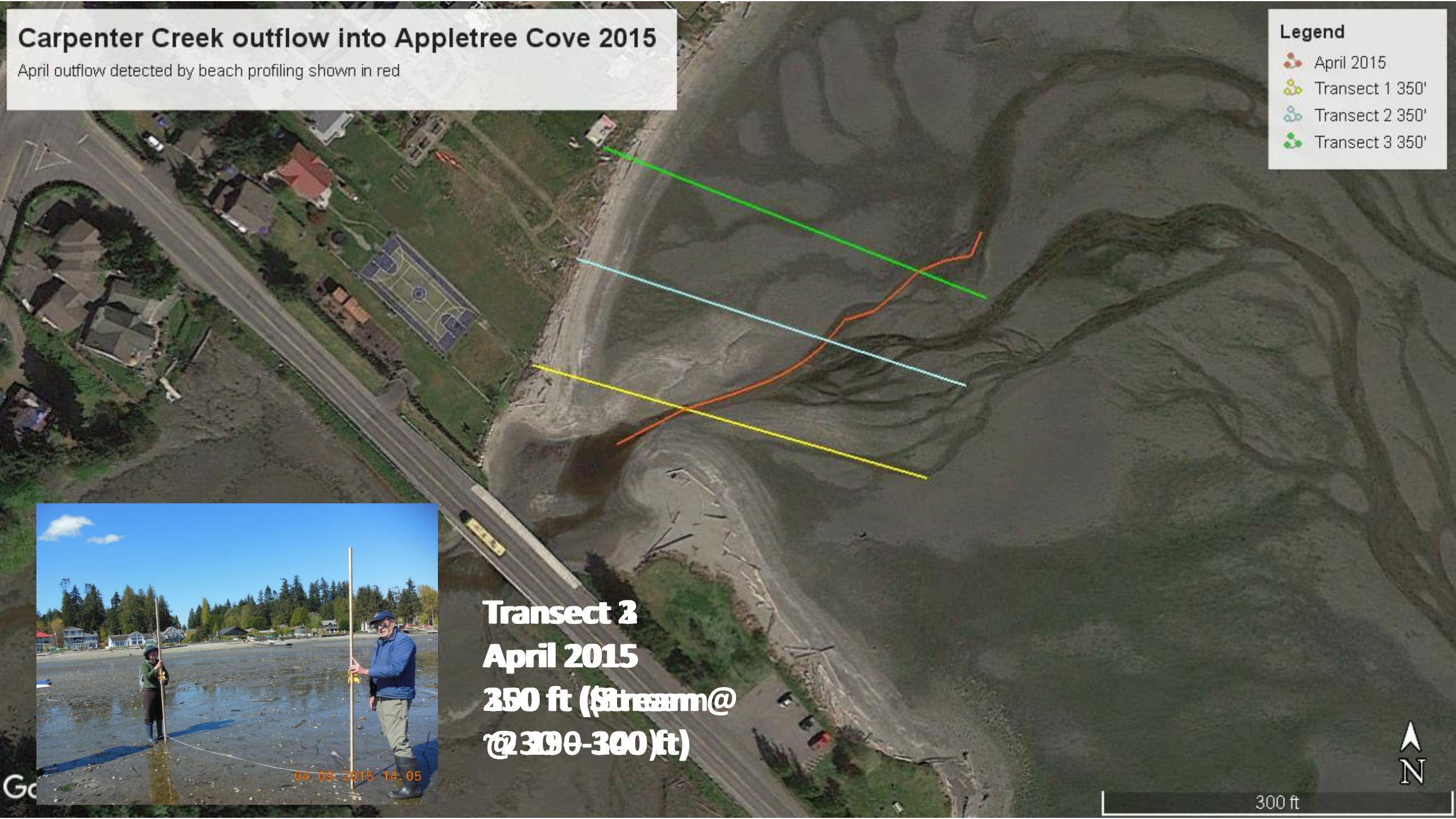


# Carpenter Creek outflow into Appletree Cove 2015

April outflow detected by beach profiling shown in red

**Legend**

- April 2015
- Transect 1 350'
- Transect 2 350'
- Transect 3 350'



**Transect 2**  
**April 2015**  
**350 ft (stream @**  
**2300-300)ft)**

300 ft

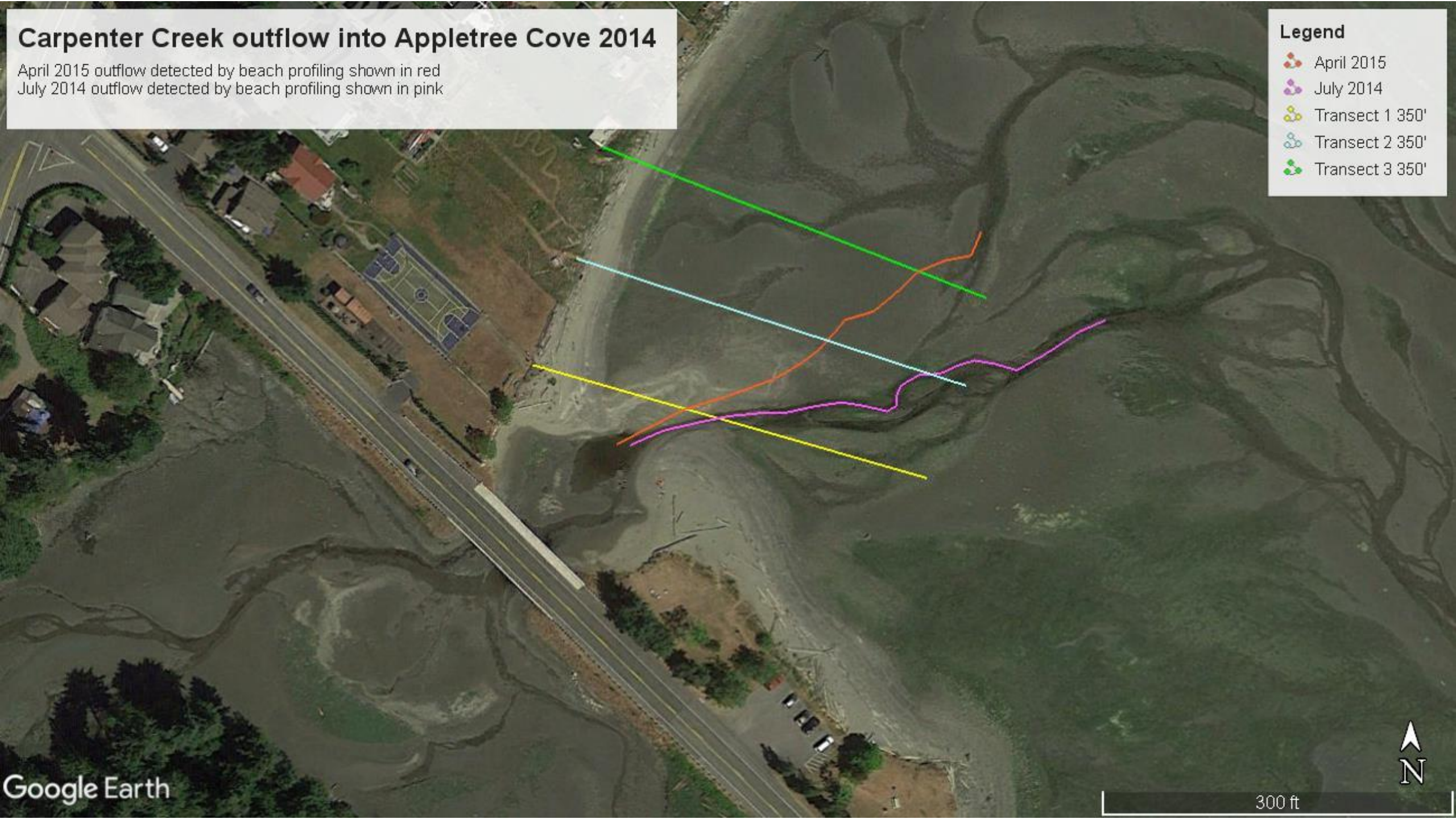


# Carpenter Creek outflow into Appletree Cove 2014

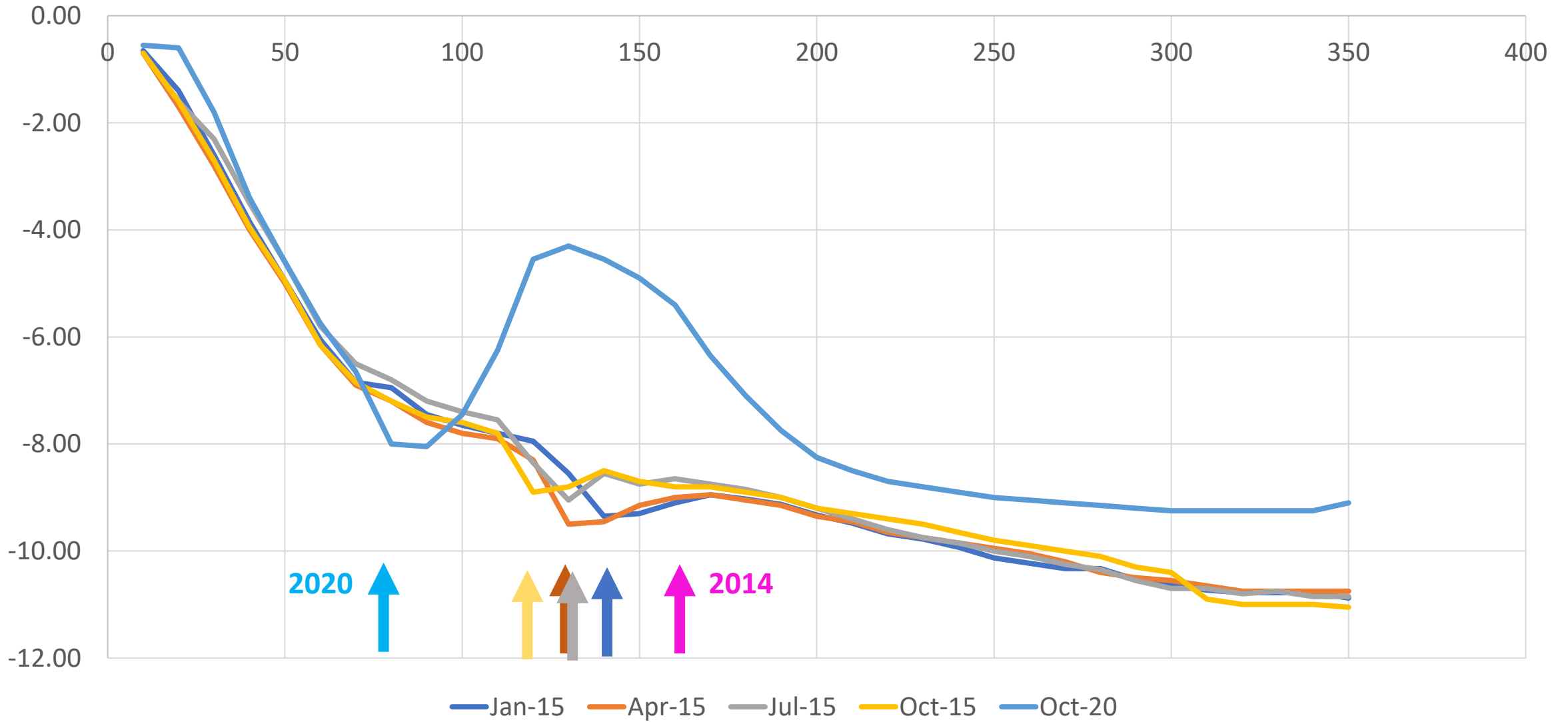
April 2015 outflow detected by beach profiling shown in red  
July 2014 outflow detected by beach profiling shown in pink

**Legend**

- April 2015
- July 2014
- Transect 1 350'
- Transect 2 350'
- Transect 3 350'



# Transect 1 Beach Profile

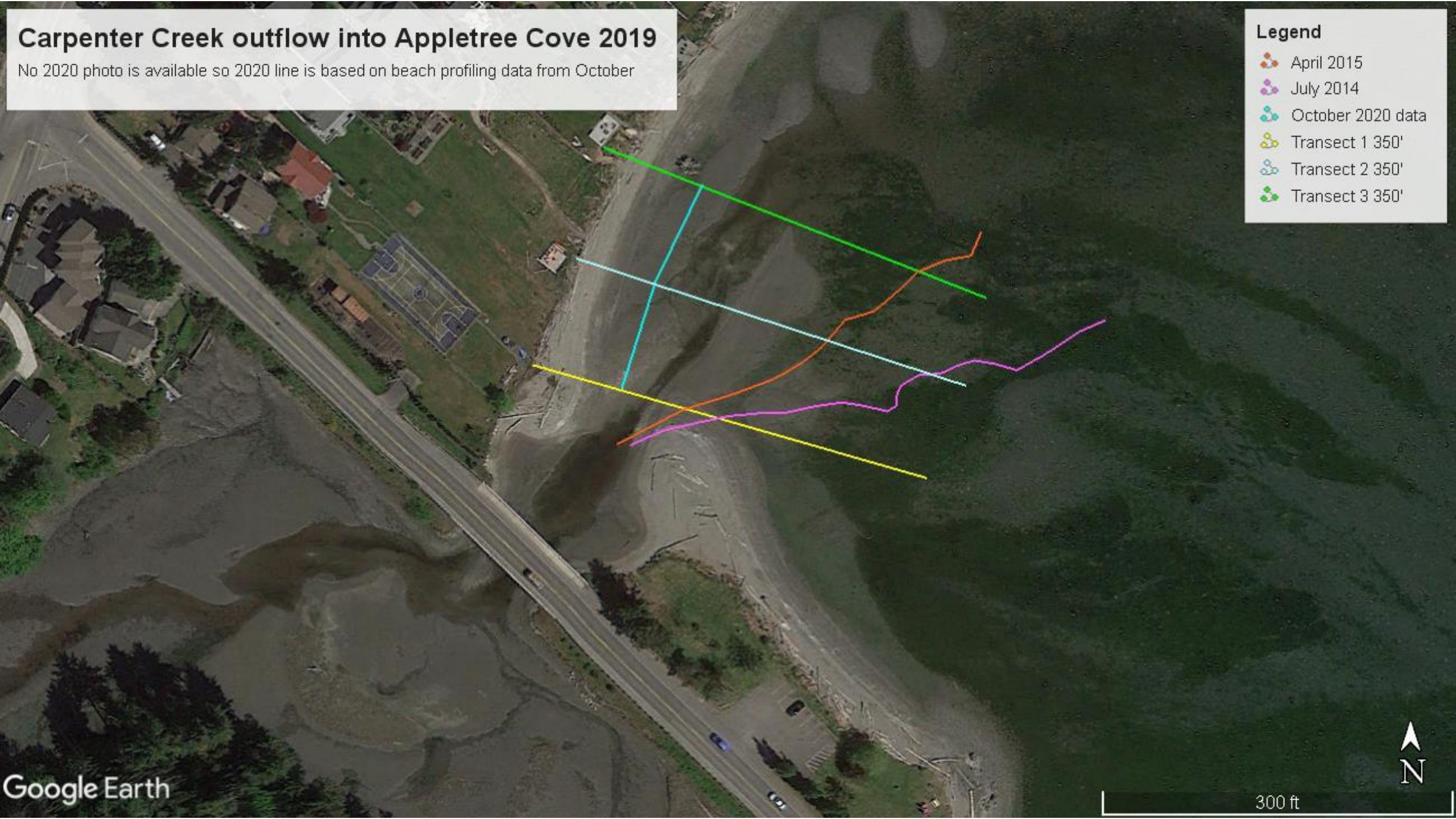


# Carpenter Creek outflow into Appletree Cove 2019

No 2020 photo is available so 2020 line is based on beach profiling data from October

**Legend**

- April 2015
- July 2014
- October 2020 data
- Transect 1 350'
- Transect 2 350'
- Transect 3 350'





# Carpenter Creek Outflows 2014-2020

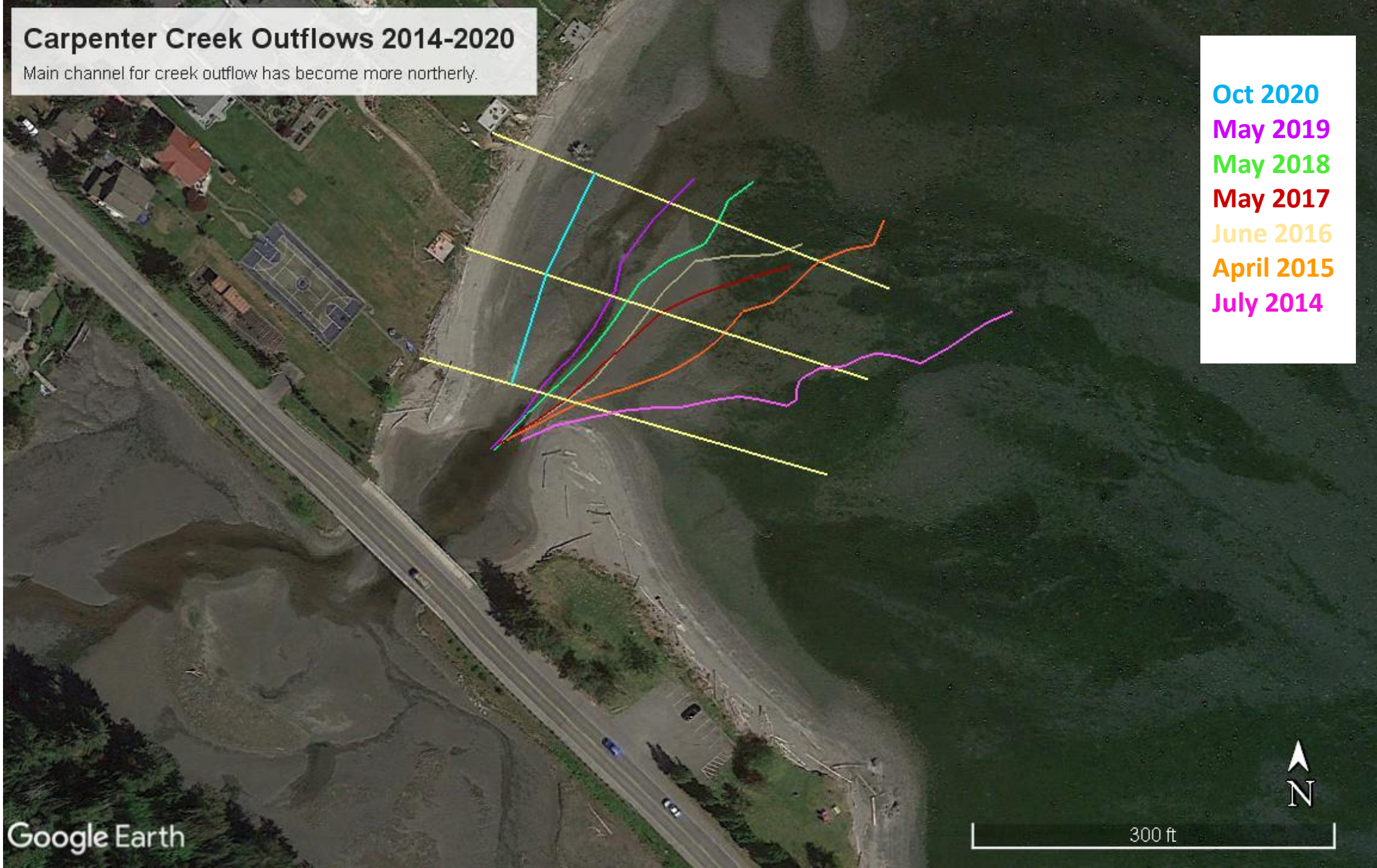
Main channel for creek outflow has become more northerly.

- Oct 2020
- May 2019
- May 2018
- May 2017
- June 2016
- April 2015
- July 2014

Google Earth

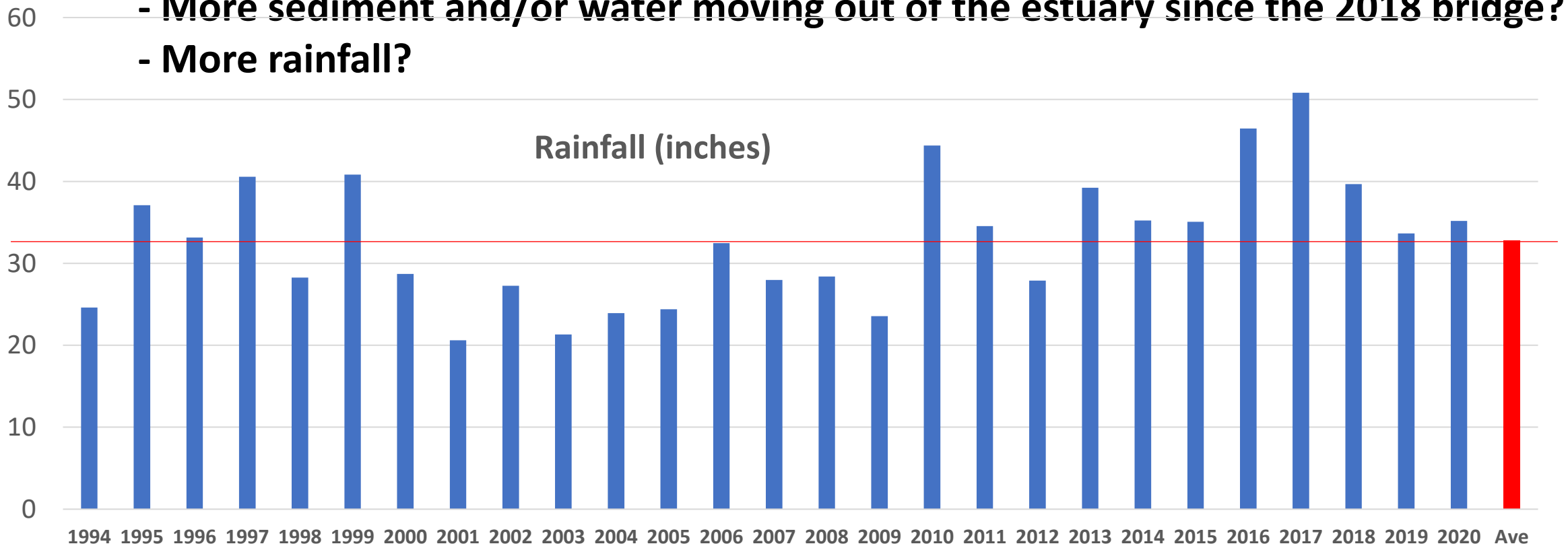


300 ft



## Since 2014, the main outflow of Carpenter Creek through Appletree Cove at low tide has been moving north – why?

- Build up of sediment on right bank. But why?
- Natural flow rates as opposed to flow rates increased by the restricted culvert?
- More sediment being moved out of the estuary since 2012 Fish Passage?
- More sediment and/or water moving out of the estuary since the 2018 bridge?
- More rainfall?



# Appletree Cove 2002

Showing beach contours

## Legend



2002



Transect

Google Earth

Image U.S. Geological Survey

500 ft



# Appletree Cove 1990

Showing 2002 beach contours



Google Earth

Image U.S. Geological Survey

500 ft

# Appletree Cove 2006

Showing 2002 beach contours and 1990 creek outflow



Google Earth

Image © 2020 Maxar Technologies

500 ft

## Legend

- 1990 Outflow
- 2002
- Transect

# Appletree Cove 2011

Showing little change in outflow 2006-2010 and beach countours.



# Appletree Cove 2012

Showing little change in outflow 2006-2012 and beach countours.



## Legend

- 1990 Outflow
- 2002
- 2006 Outflow
- 2007 Outflow
- 2009 Outflow
- 2010 Outflow
- 2012 Outflow
- Transect

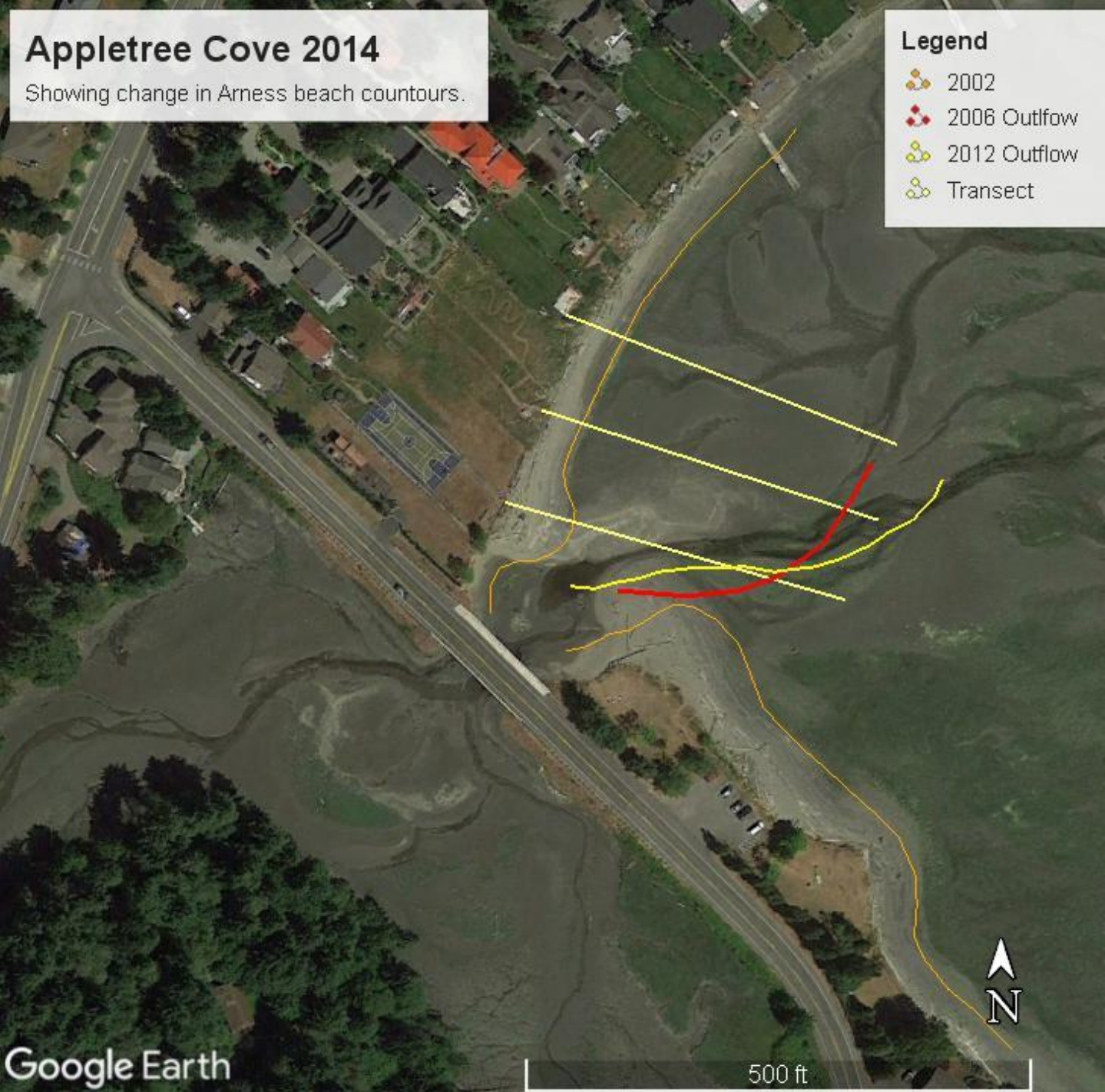
## Appletree Cove 2013

Showing change in Arness beach countours.






## Appletree Cove 2014

Showing change in Arness beach countours.



### Legend

-  2002
-  2006 Outflow
-  2012 Outflow
-  Transect

# Appletree Cove 2015

Showing change in Arness beach countours.

## Legend

- 2002
- 2006 Outflow
- 2012 Outflow
- Transect



# Appletree Cove 2016

Showing change in Arness beach countours.



# Appletree Cove 2018

Showing change in Arness beach countours.



## Legend

- 2002
- 2006 Outflow
- 2012 Outflow
- Transect



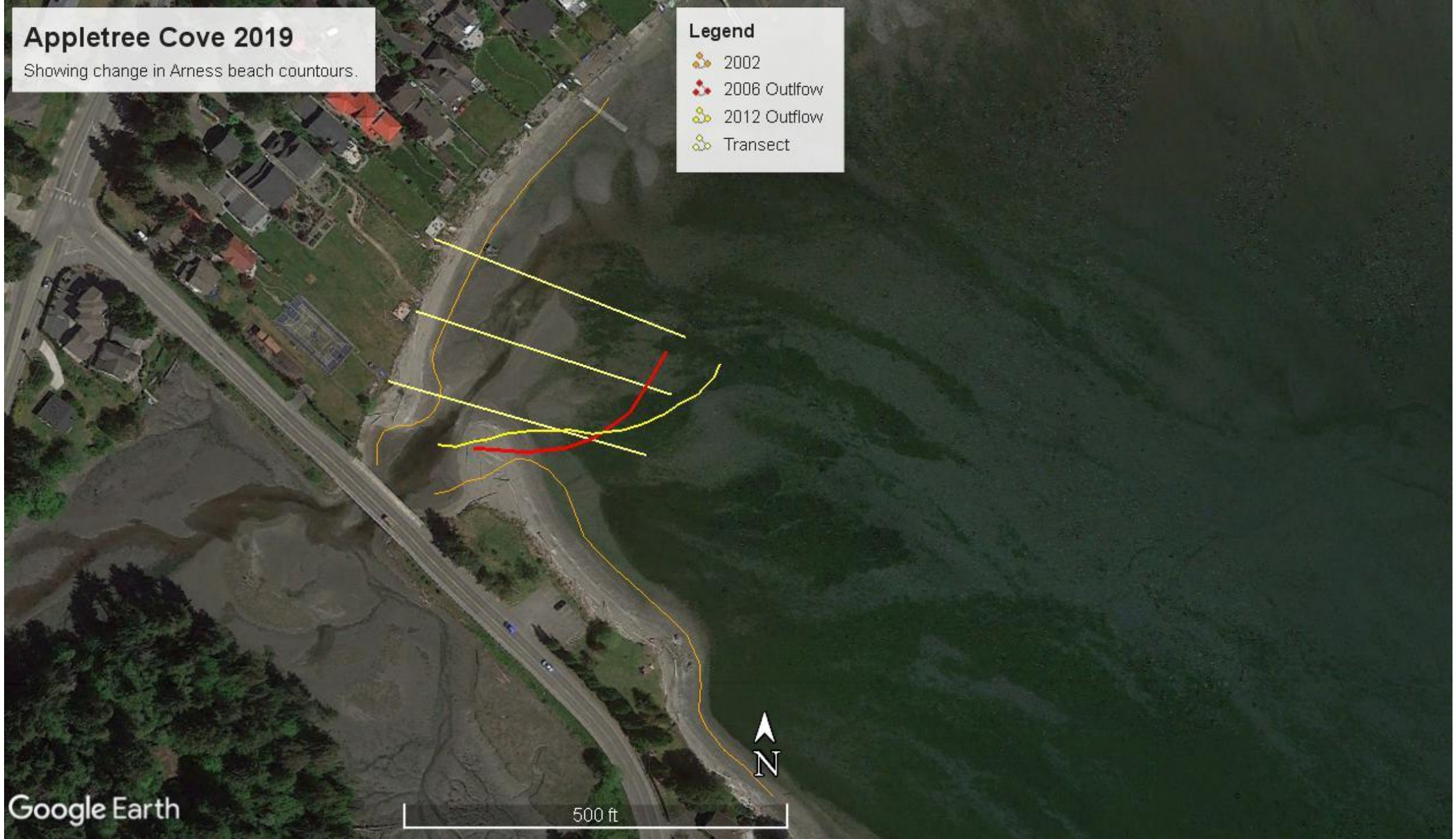


# Appletree Cove 2019

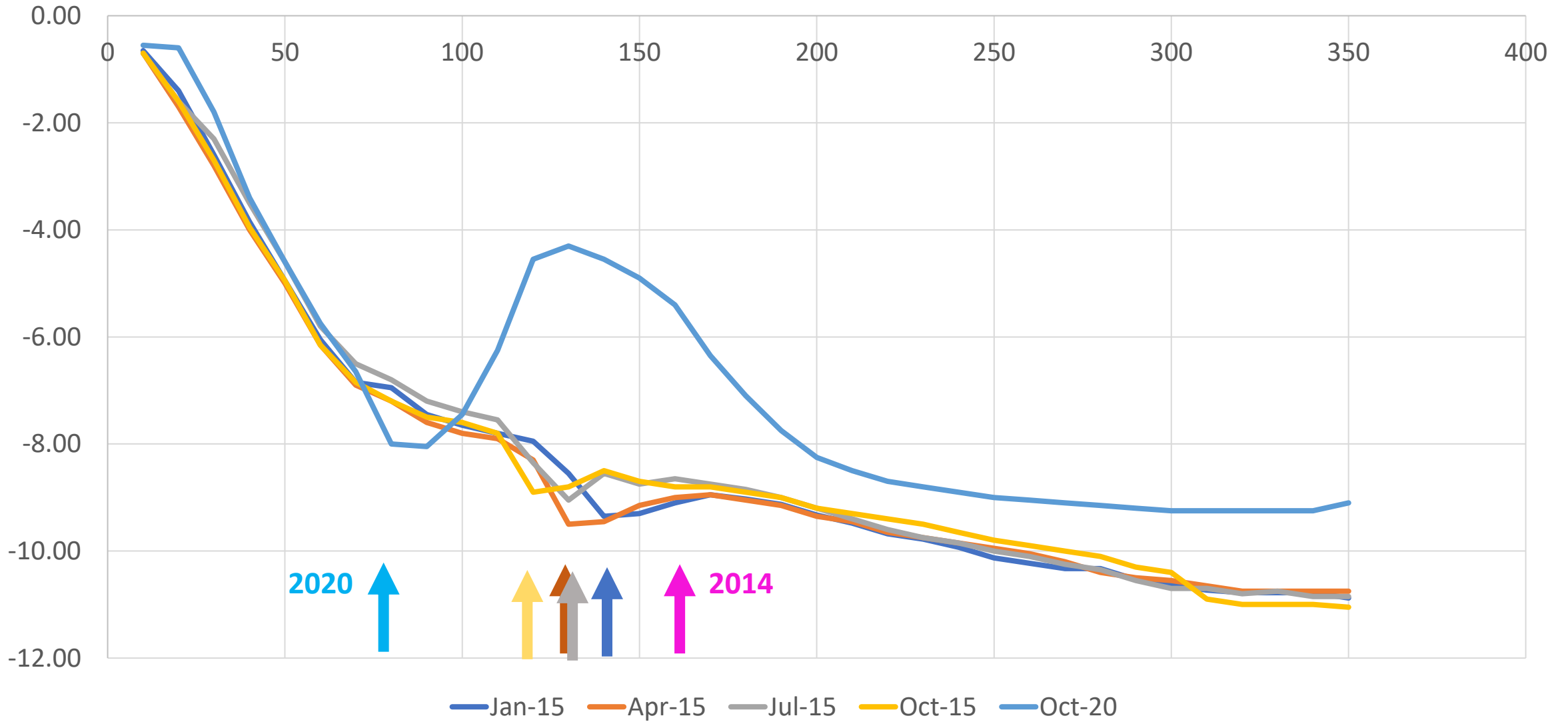
Showing change in Arness beach countours.

## Legend

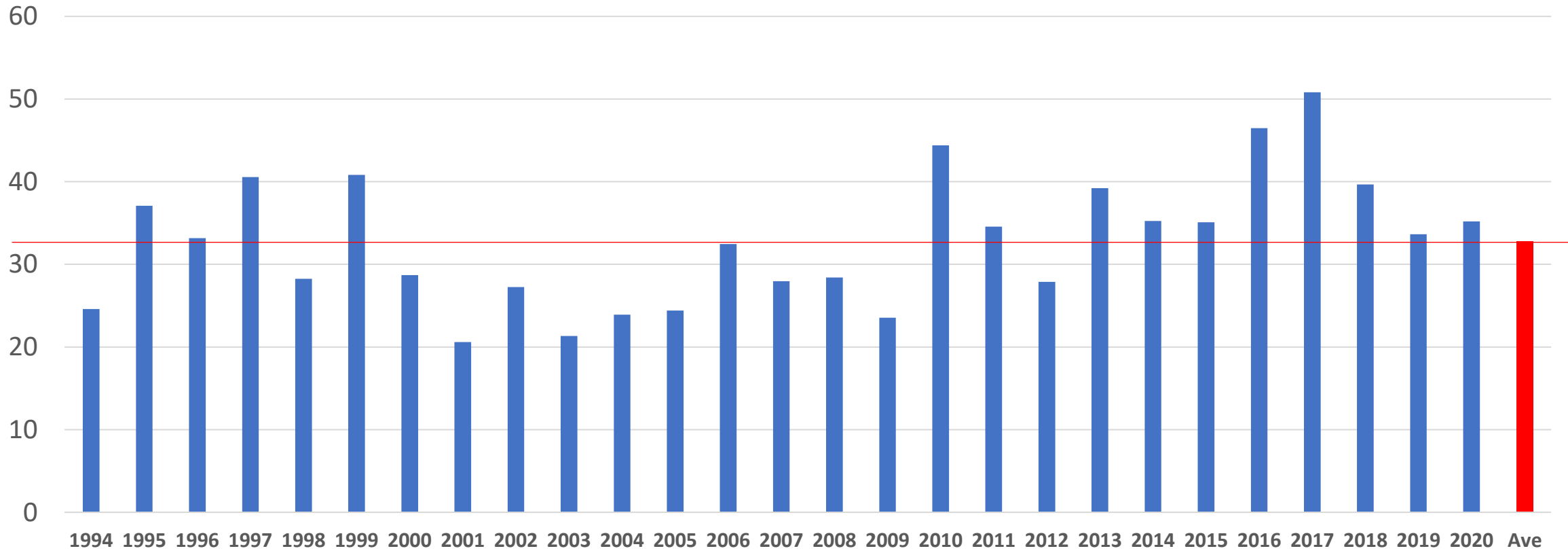
- 2002
- 2006 Outflow
- 2012 Outflow
- Transect



# Transect 1 Beach Profile

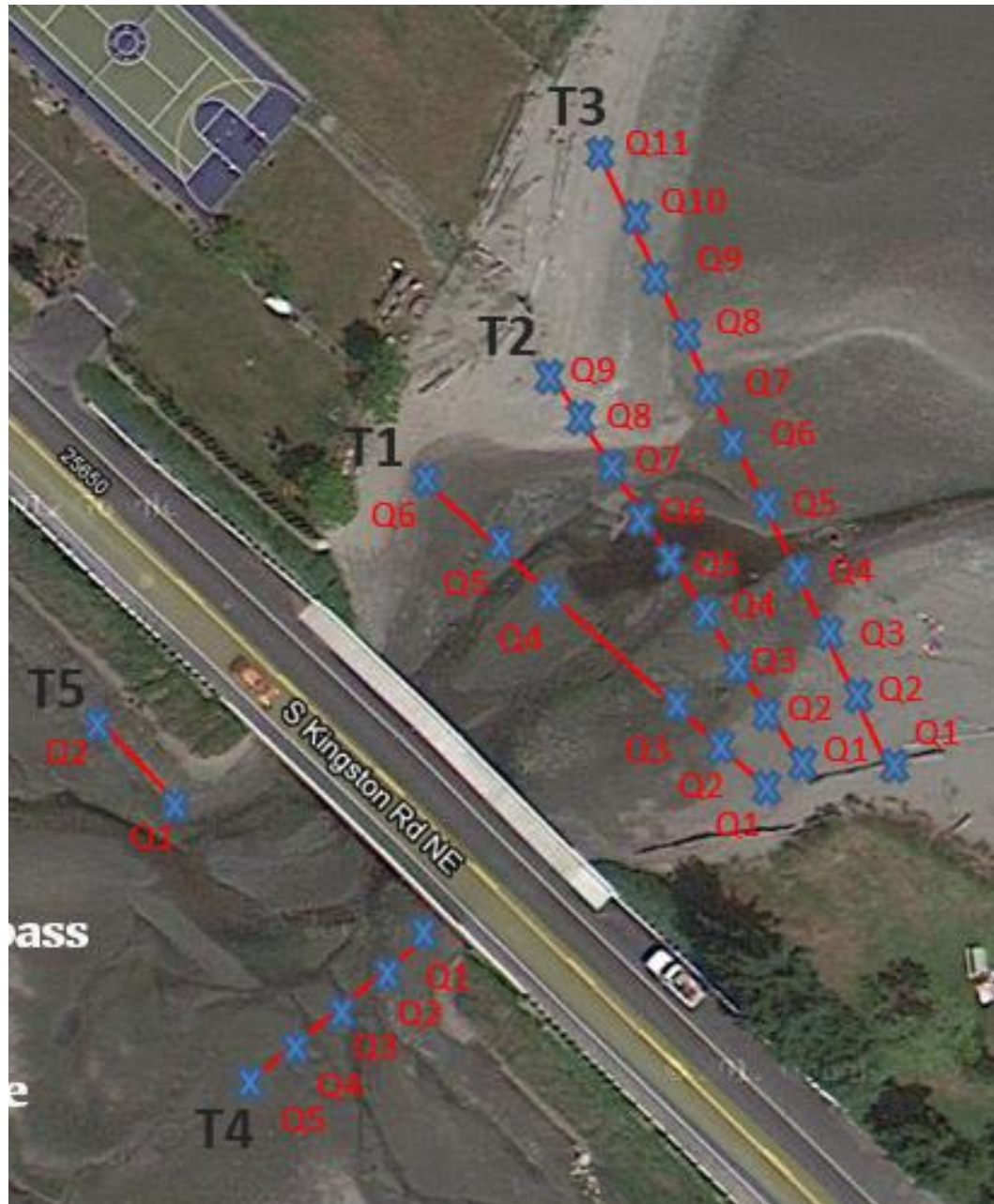


# Rainfall (inches)



What are the implications for the rest of the ecosystem?





**Thank you all  
for volunteering,  
supporting Stillwaters,  
and joining us today!**

