

Geometric Correlations Between Mid-Channel Islands in the Oswegatchie River

Abstract

We were interested in the formation, location, and geometry of islands in the Oswegatchie River and the correlation between distance from the mouth, channel width, and island size. We wanted to see how the island shape changed based on where the islands were located in the channel. The Oswegatchie River was our focus because of its connection to the St. Lawrence River and its connection to the Adirondack Park. This river starts in Partlow Lake and flows to the Ogdensburg where it flows into the Saint Lawrence River.

We used Google Earth to remotely measure the geometry and location of the islands in the channel. Using Google Earth, we were able to determine the island's geometry based on channel width, island width, surface area, position of the island relative to the left and right bank, and the distance from the mouth of the river. Given the data we are able to see that as you move upstream the island width and length becomes smaller. The range of the island width is 2.42 meters to 77.8 meters. The range of the island length is 3.1 meters to 467 meters. We were also able to measure the surface area of the islands in comparison to how far upstream they were the surface areas of the islands decreased the farther upstream they were. An island that was 8,278.21 meters upstream had a surface area of 502 meters squared compared to an island 224,691.12 meters with a surface area of 15.6 meters squared. We expected to see a decrease in surface area size consistent with the channel distance moving upstream, however, there is no consistent pattern leaving us with a shotgun pattern.

Metholodology

Island geometry was measured using Google Earth Pro as demonstrated in the figure below.



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Reference Map



Charts

Surface Area Vs the Distance from Mouth of the Oswegatchie River



- -Expecting a linear pattern where surface area decerased as we moved upstream.
- -Shotgun pattern
- -Not the expected pattern
- -As the channel width increases so does surface area
- -This leads to a observable logarithmic pattern

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Surface Area Vs Island Width

-As island width increase surface area increases

-This leads to a logarithmic pattern

Surface Area Vs Island Length



-As island length increase surface area increases

-This leads to a logarithmic pattern

Channel Width Vs Island Width



-Channel width and island width are proportional

-This is a linear pattern

Min, Median, Max

	Min	Median	Max
Island Length (m)	3.1	77.08	445
Island Width(m)	2.32	34.94	244
Surface Area(m ²)	6.2	4244.51	48,588
Channel Width(m)	10.6	107.74	390

This chart shows the varition in measurements in the island length, width, surface area and channel width.

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Outliers

The average surface area is 4,244.51m². These are formed because there are currently two channels. These islands were not formed by channel geometry.

Island 29 has a surface area of 145,987m²

Island 57 has a surface area of 48,030m²

Conclusions

- -We are able to observe that there is no determinable pattern in surface area as you move upstream from the mouth.
- -We are able to determine that the smaller the channel width the smaller the surface area
- -The largest surface area does not have the largest channel width.
- -There are very few islands that have high channel width and high surface area.

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