

Objective

To work with the Raritan River Real-Time Hydrological Observatory's data server to estimate how much sediment is leaving the river in order to assess flooding of the river.

Background – ERDDAP Servers

What it is: “subsets of gridded and tabular scientific datasets in common file formats and make graphs and maps”

Server 1: Turbidity, pH, Depth, Salinity etc.

Server 2: different velocities along and across the channel

We chose turbidity, depth, and an integrated velocity along the channel.

References

<https://coastwatch.pfeg.noaa.gov/erddap/index.html>

Methods

time UTC	ox mg/l	depth m	chlorophyll ug/l	turbidity FNU	oxsat percent	salinity PSU	temperature Celsius	pH
2019-02-02T00:08:26Z	15.94	3.2348967	0.7537931	6.4289556	109.034485	0.19	-0.046	8.16
2019-02-02T00:18:26Z	15.96	3.2154484	0.79413795	6.470545	109.155174	0.19	-0.047931034	8.16
2019-02-02T00:28:26Z	15.99	3.1958275	0.8313793	6.4196553	109.35379	0.19	-0.051	8.16
2019-02-02T00:38:26Z	16.01931	3.170596	0.8558621	6.319655	109.53069	0.19	-0.053724136	8.161724
2019-02-02T00:48:26Z	16.029655	3.1382413	0.8010345	6.378276	109.606895	0.19	-0.055103447	8.163103
2019-02-02T00:58:26Z	16.047932	3.101793	0.8072414	6.408276	109.72103	0.19	-0.05737931	8.17
2019-02-02T01:08:26Z	16.06	3.063862	0.80413795	6.4227586	109.798965	0.19	-0.059	8.18
2019-02-02T01:18:26Z	16.06	3.0235863	0.86172414	6.423448	109.79379	0.19	-0.059724137	8.18
2019-02-02T01:28:26Z	16.053793	2.977931	0.8241379	6.368621	109.7569	0.19	-0.06	8.18
2019-02-02T01:38:26Z	16.02	2.929138	0.8337931	6.374138	109.536896	0.19	-0.061	8.18
2019-02-02T01:48:26Z	16.0	2.8748965	0.80310345	6.448276	109.38483	0.19	-0.061206896	8.17
2019-02-02T01:58:26Z	15.966207	2.8246207	0.78931034	6.4431033	109.1338	0.19	-0.062	8.17
2019-02-02T02:08:26Z	15.93	2.7753794	0.71931034	6.4572415	108.873795	0.19	-0.062172413	8.169655
2019-02-02T02:18:26Z	15.885173	2.7293794	0.7624138	6.424138	108.58931	0.19	-0.0625862	8.16
2019-02-02T02:28:26Z	15.847241	2.6827586	0.76896554	6.325517	108.32655	0.19	-0.063	8.155518
2019-02-02T02:38:26Z	15.81	2.6366897	0.7162069	6.356516	108.054825	0.19	-0.06303448	8.15
2019-02-02T02:48:26Z	15.76	2.5849285	0.7917857	6.3757143	107.733925	0.19	-0.06364286	8.14
2019-02-02T02:58:26Z	15.72	2.5328965	0.8351724	6.276207	107.44448	0.19	-0.063965514	8.13
2019-02-02T03:08:26Z	15.68	2.4801428	0.7606897	6.300345	107.17483	0.19	-0.064	8.129655
2019-02-02T03:18:26Z	15.64	2.4317932	0.71034485	6.1731033	106.90724	0.19	-0.064	8.12
2019-02-02T03:28:26Z	15.615172	2.3875518	0.7613793	6.2965517	106.74069	0.19	-0.064	8.12

```
Try different dates that work with the server such as 2019-02-02---2019-02-03
enter your starting date
Your year?(yyyy) 2019
month (m) 02
day02
2019-02-02
enter your end date
Your year?(yyyy) 2019
month (m) 02
day03
2019-02-03
```

	Depth	Turbidity	Velocity
count	238.000000	238.000000	238.000000
mean	2.729672	5.671330	2049.318112
std	0.532326	0.726099	3356.629060
min	1.894310	3.853103	-9422.247000
25%	2.210319	5.200431	-191.199875
50%	2.794310	5.652414	2203.324600
75%	3.188888	6.123879	4309.203750
max	3.583000	8.560000	10135.958000

Total sediment for the duration period is: 63375925327.50261 mg

Figure 3: Sample of code and output using ERDDAP data



Figure 4: Satellite imagery of the Rutgers Boathouse, which is where the sensor is located.

time UTC	pressure dbar	temperature degrees C	mu cm s-1	mv cm s-1	tu cm^2 s-1	tv cm_2 s-1
2019-02-02T00:00:00Z	3.195	-0.15	14.824943	6.8094845	3706.2356	1702.3711
2019-02-02T00:02:00Z	3.191	-0.15	15.745382	17.376413	3936.3455	4344.1035
2019-02-02T00:04:00Z	3.188	-0.15	-6.7830358	23.939157	-1695.7589	5984.789
2019-02-02T00:06:00Z	3.188	-0.15	-6.9808435	19.172935	-1745.2108	4793.234
2019-02-02T00:08:00Z	3.179	-0.15	0.849502	16.792664	212.3755	4198.166
2019-02-02T00:10:00Z	3.178	-0.15	10.140129	22.462782	2535.0322	5615.6953
2019-02-02T00:12:00Z	3.174	-0.15	13.593361	13.399781	3398.3403	3349.9453
2019-02-02T00:14:00Z	3.17	-0.15	13.746376	1.323913	3436.594	330.97824
2019-02-02T00:16:00Z	3.168	-0.15	15.451263	-5.3943725	3862.816	-1348.5931
2019-02-02T00:18:00Z	3.162	-0.15	17.491344	2.3842952	4372.836	596.0738
2019-02-02T00:20:00Z	3.16	-0.15	11.386003	9.13725	2846.5007	2284.3125
2019-02-02T00:22:00Z	3.157	-0.15	4.9746323	12.502057	1243.6581	3125.5144
2019-02-02T00:24:00Z	3.152	-0.16	-3.3708208	20.09994	-842.7052	5024.985
2019-02-02T00:26:00Z	3.147	-0.15	-8.3235655	22.051945	-2080.8914	5512.9863
2019-02-02T00:28:00Z	3.144	-0.16	-6.2953066	26.2708	-1573.8376	6567.7
2019-02-02T00:30:00Z	3.138	-0.16	18.405016	24.033405	4601.254	6008.3516
2019-02-02T00:32:00Z	3.131	-0.15	18.040773	19.867434	4510.1934	4966.8584
2019-02-02T00:34:00Z	3.127	-0.16	-3.1849084	9.061433	-796.2271	2265.3582
2019-02-02T00:36:00Z	3.121	-0.16	7.3845186	14.688297	1846.1296	3672.0745

Figures 1 and 2: Samples of ERDDAP server data

Results

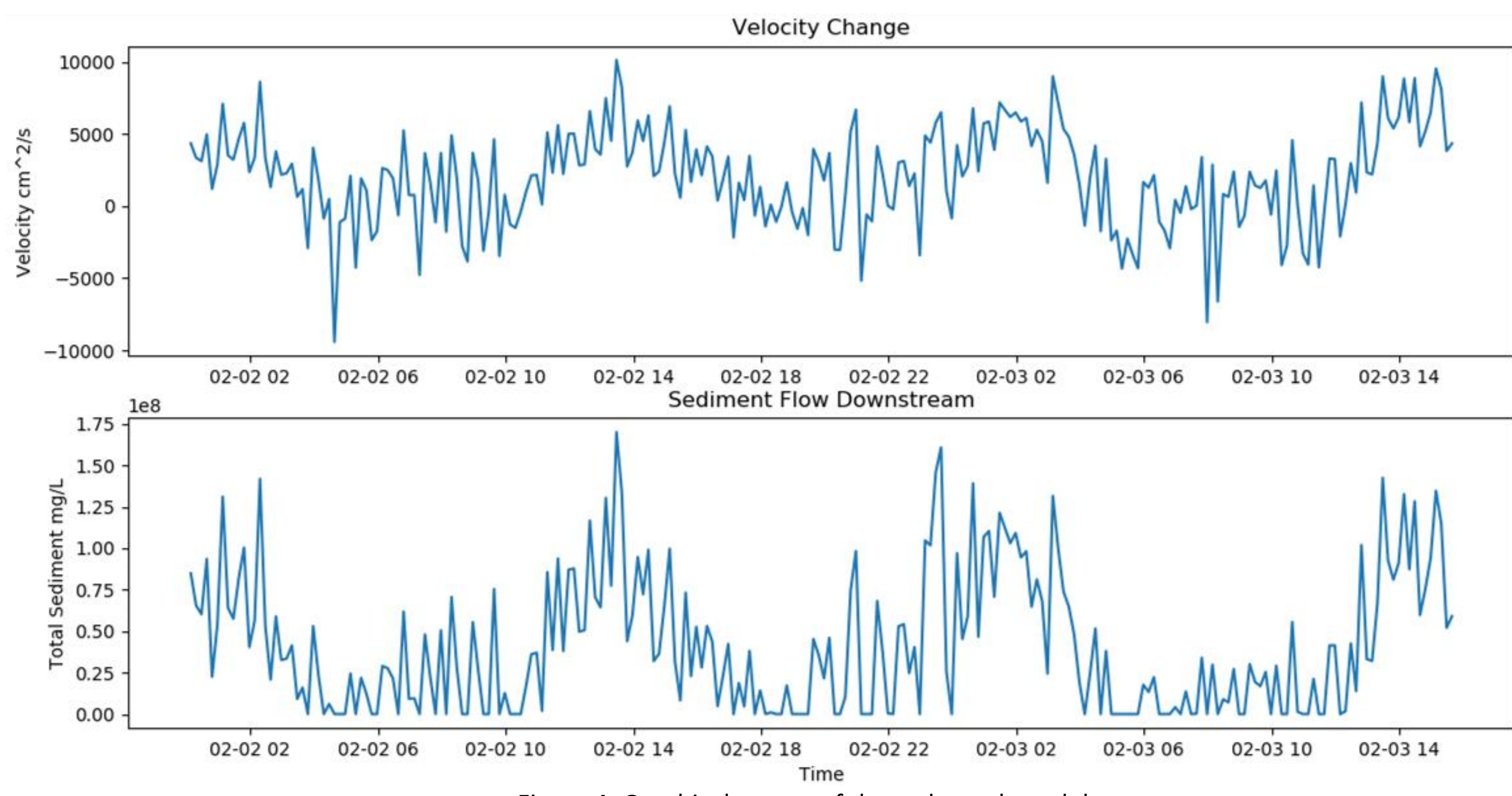


Figure 4: Graphical output of the code-analyzed data

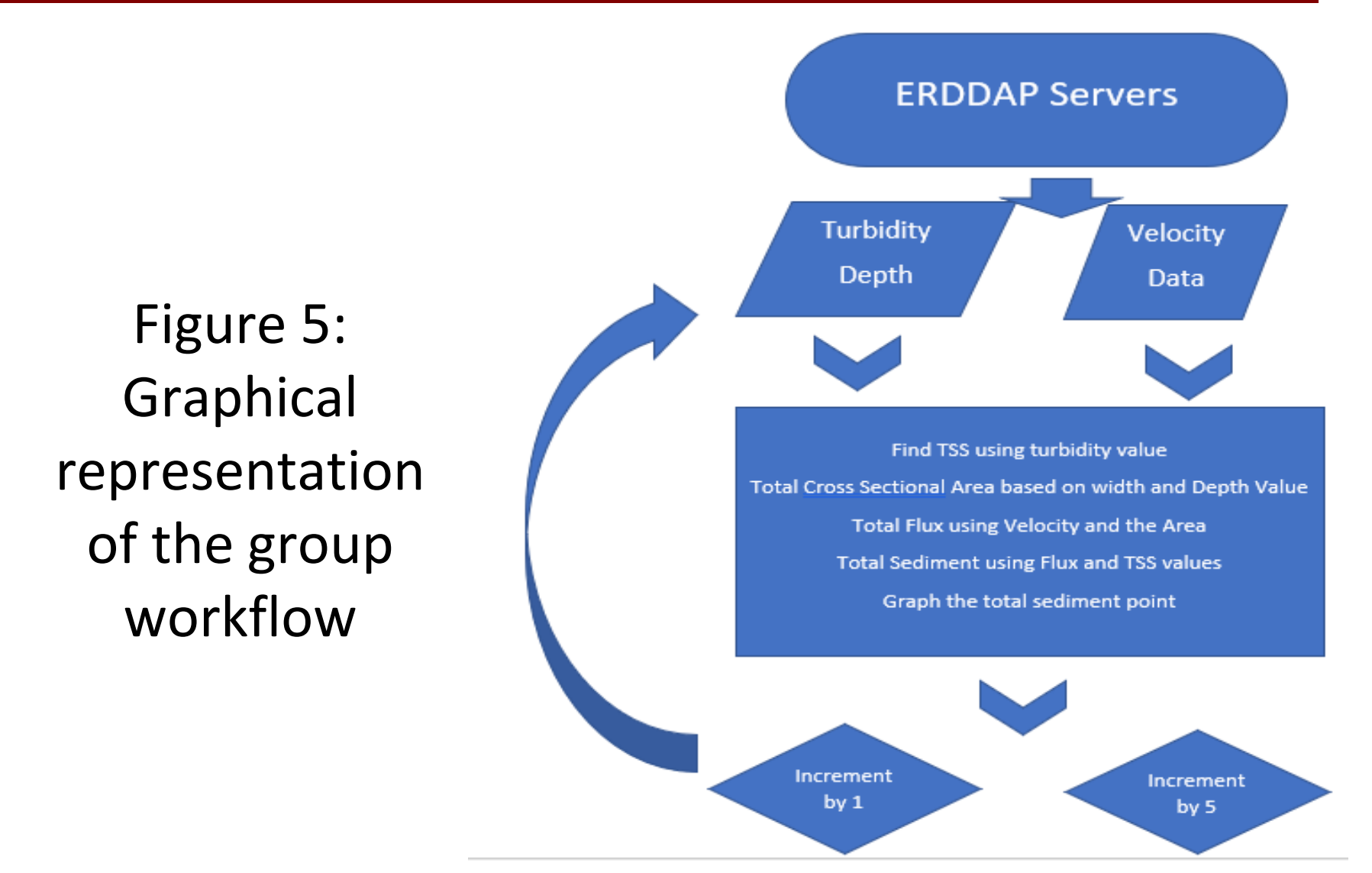
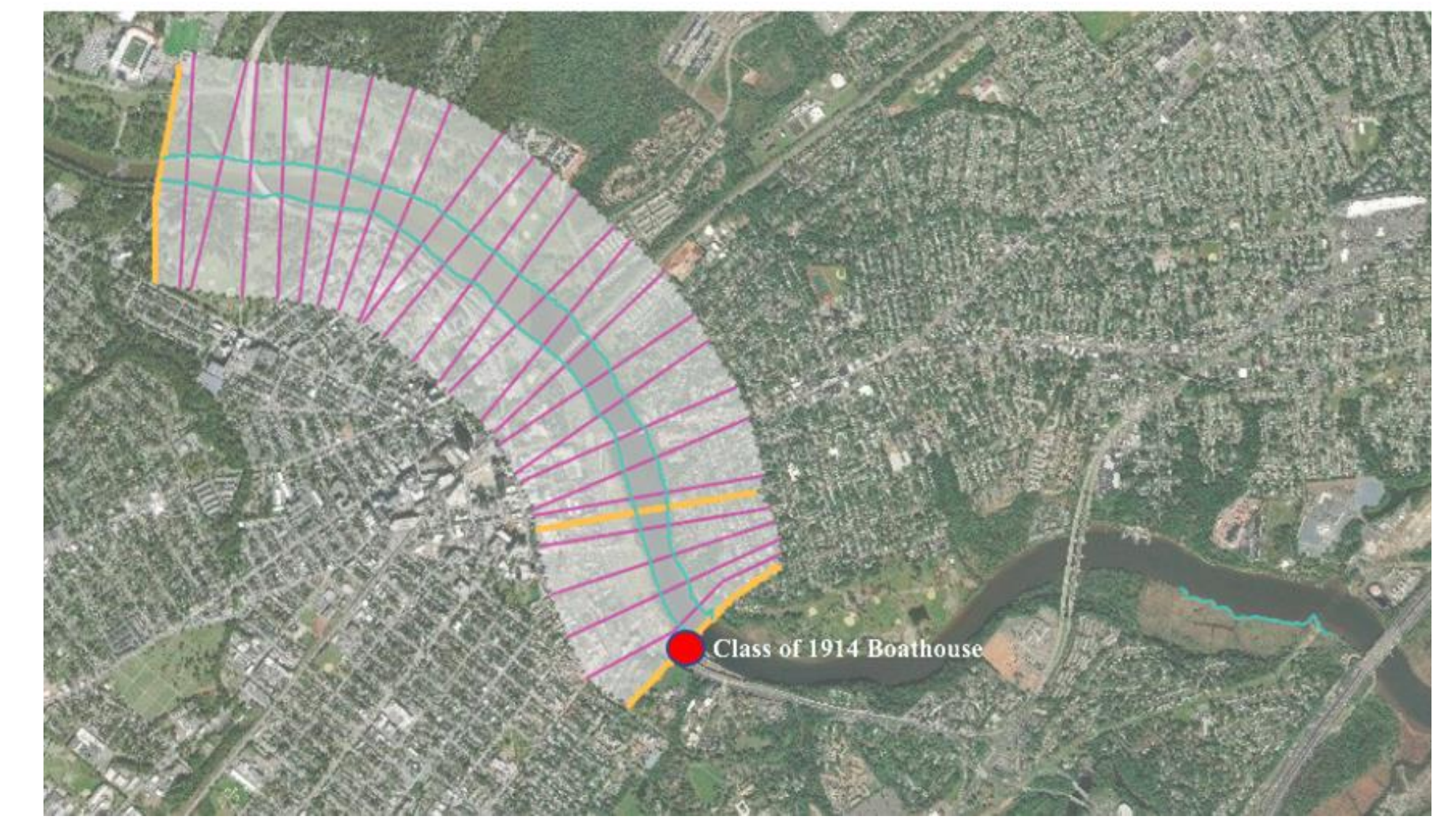


Figure 5: Graphical representation of the group workflow

Figure 6: Satellite imagery of the Rutgers Boathouse and cross-section sensor data of the Raritan.



Future Direction

Knowing when flux is greatest can help in flood planning surrounding land management.

Further research can also be conducted to discover additional reasons behind the patterns.

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