MONITORING THE MOVEMENT OF RIVER HERRING AND AMERICAN EEL IN THE PECONIC RIVER SYSTEM USING EDNA: A PILOT STUDY

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF MARINE RESOURCES

DIADROMOUS FISHERIES UNIT

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PROJECT DESIGN

- Research project conducted in collaboration with NYSDEC DMR and PEP
- Used eDNA sampling and established survey protocol to monitor fish movement and evaluate efficacy of fish passages in Peconic River system





PECONIC ESTUARY, RIVERHEAD, NY



(PEP, n.d.)

FISH PASSAGES



Grangabel Park Nature-Like Rock Ramp Fish Passage Camera Installation (PEP, n.d.)



Byron Young Denil Pass and Step Pool Fish/Eel Passage (L.K. McLean Associates, n.d.)

SMITH-ROOT EDNA CITIZEN SCIENCE SAMPLER



(Smith-Root, n.d.)



(Smith-Root, n.d.)



PROJECT DESIGN

- Sampled 3 sites from end of Feb to end of Jun 2026
- Three phases:
  - 1: samples taken once a week during last two weeks of Feb
  - 2: two sampling trips per week from first week of Mar to last week of May
  - 3: samples taken once a week during Jun
- One sample upstream and one downstream of barrier/passage at each site



Aerial view of Upper Mills (Suffolk GIS, n.d.)

LABORATORY METHODS

- Samples submitted to Center for Functional Genomics – University at Albany, Albany, NY
- Performed qPCR (quantitative polymerase chain reaction) analysis, 8 replicates per sample
- Unfortunately, the lab was unable to distinguish between alewife and blueback herring in the results

RESULTS

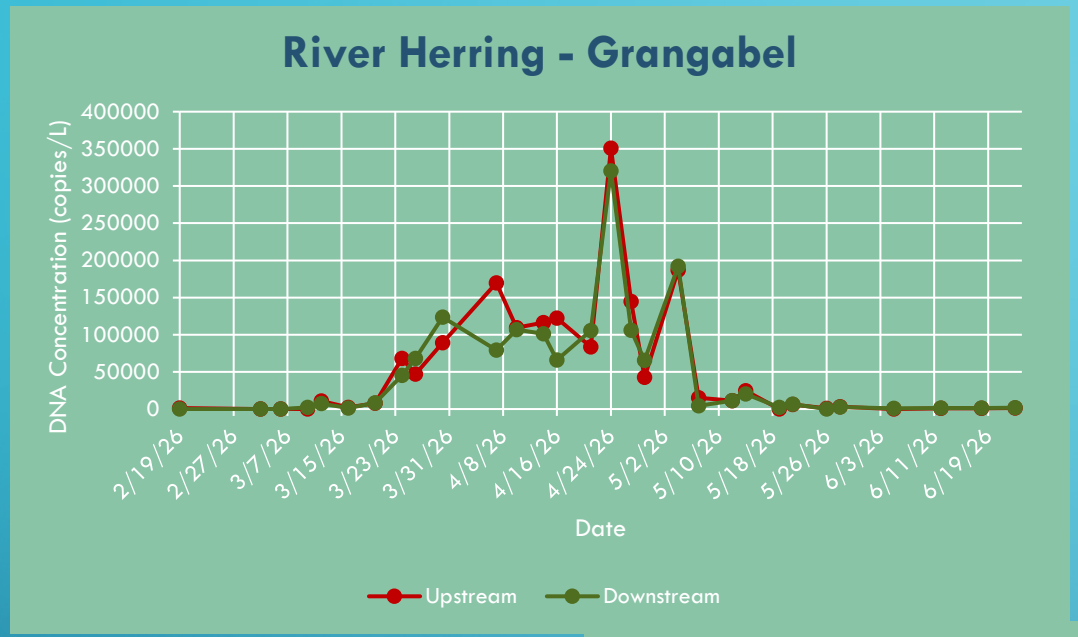
River Herring

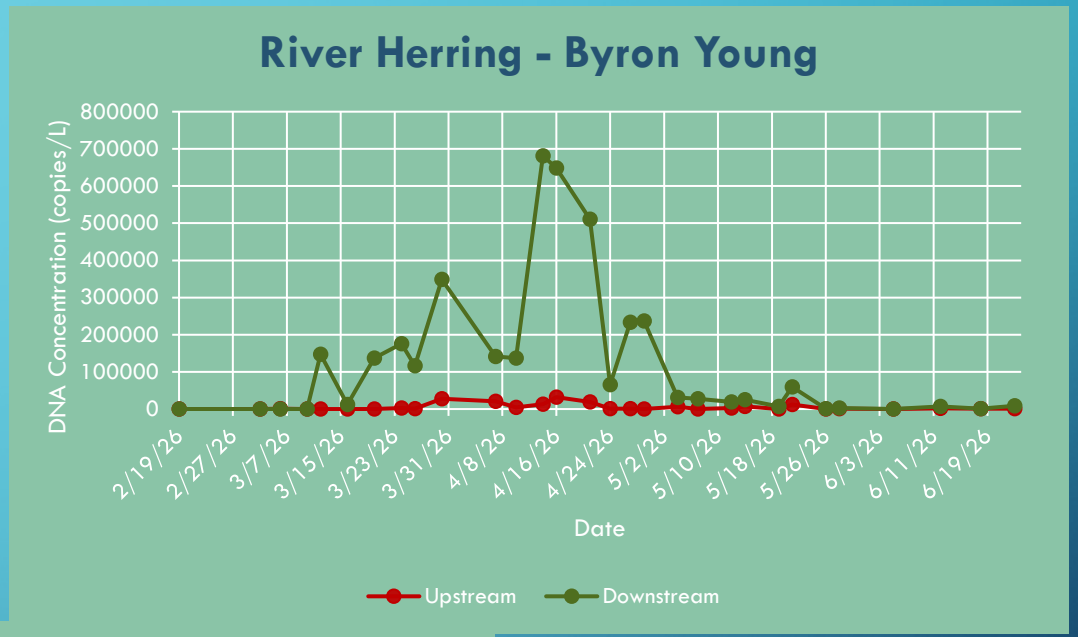
Site	Avg DNA Conc (copies/L)
GR- upstream	53,919
GR- downstream	48,371
BY- upstream	5,201
BY- downstream	126,143
UM- upstream	1,052
UM- downstream	42,124

American Eel

Site	Avg DNA Conc (copies/L)
GR- upstream	2,096
GR- downstream	4,095
BY- upstream	487
BY- downstream	2,287
UM- upstream	1,692
UM- downstream	1,768

RESULTS


River Herring - Grangabel
DNA Concentration (copies/L)
400000
350000
300000
250000
200000
150000
100000
50000
0
2/19/26
2/27/26
3/7/26
3/15/26
3/23/26
3/31/26
4/8/26
4/16/26
4/24/26
5/2/26
5/10/26
5/18/26
5/26/26
6/3/26
6/11/26
6/19/26
Date
Upstream
Downstream


River Herring - Byron Young
DNA Concentration (copies/L)
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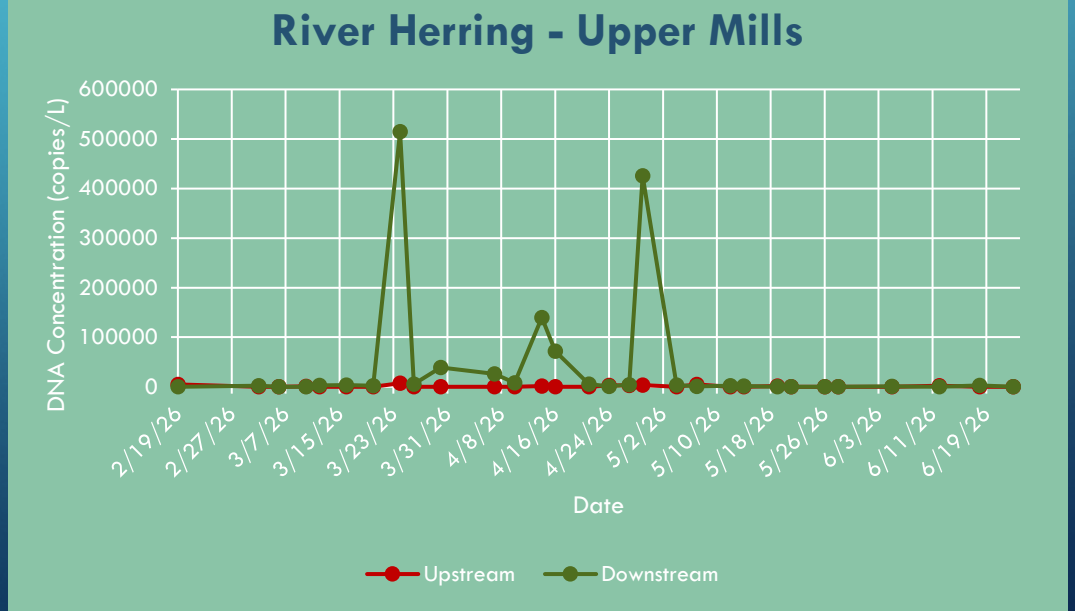
700000
600000
500000
400000
300000
200000
100000
0
2/19/26
2/27/26
3/7/26
3/15/26
3/23/26
3/31/26
4/8/26
4/16/26
4/24/26
5/2/26
5/10/26
5/18/26
5/26/26
6/3/26
6/11/26
6/19/26
Date
Upstream
Downstream


River Herring - Upper Mills
DNA Concentration (copies/L)
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500000
400000
300000
200000
100000
0
2/19/26
2/27/26
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3/15/26
3/23/26
3/31/26
4/8/26
4/16/26
4/24/26
5/2/26
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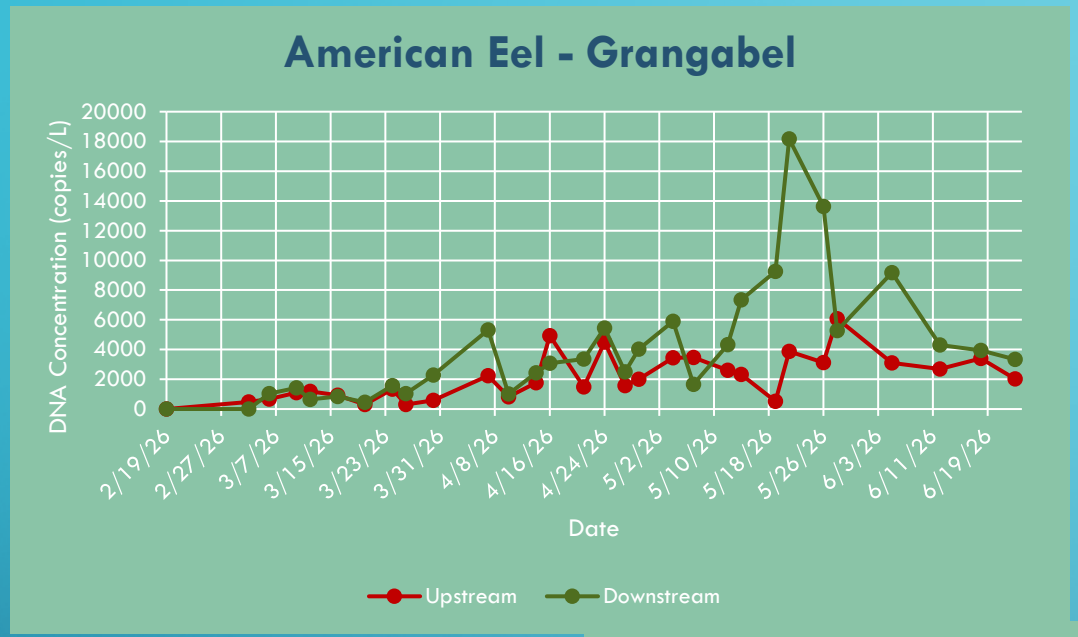
5/26/26
6/3/26
6/11/26
6/19/26
Date
Upstream
Downstream

RESULTS


American Eel - Grangabel
DNA Concentration (copies/L)
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18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2/19/26
2/27/26
3/7/26
3/15/26
3/23/26
3/31/26
4/8/26
4/16/26
4/24/26
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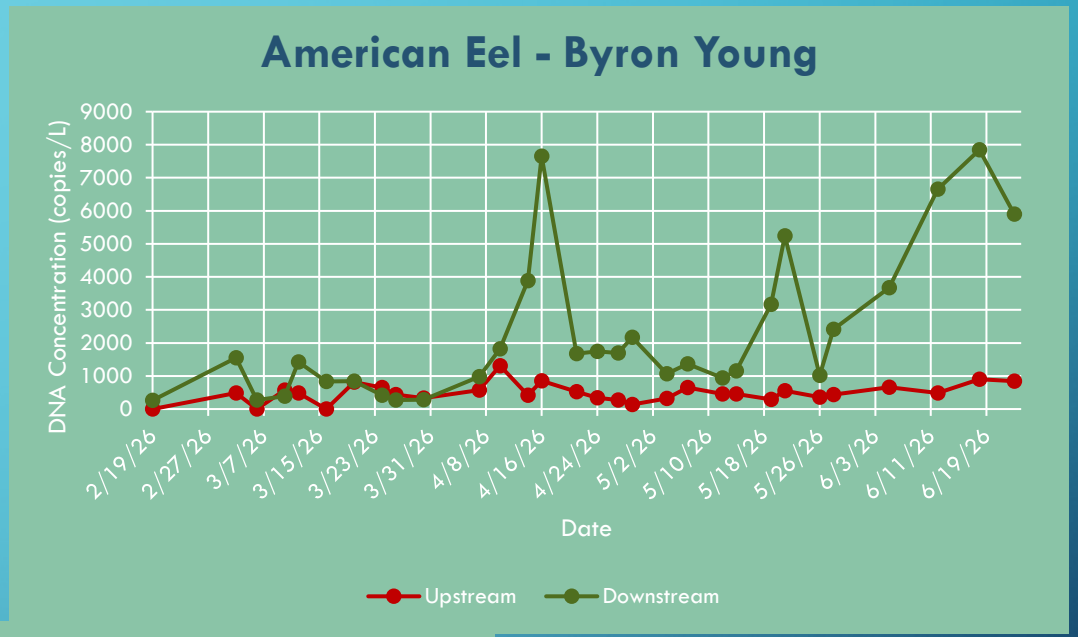
Date
Upstream
Downstream


American Eel - Byron Young
DNA Concentration (copies/L)
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8000
7000
6000
5000
4000
3000
2000
1000
0
2/19/26
2/27/26
3/7/26
3/15/26
3/23/26
3/31/26
4/8/26
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4/24/26
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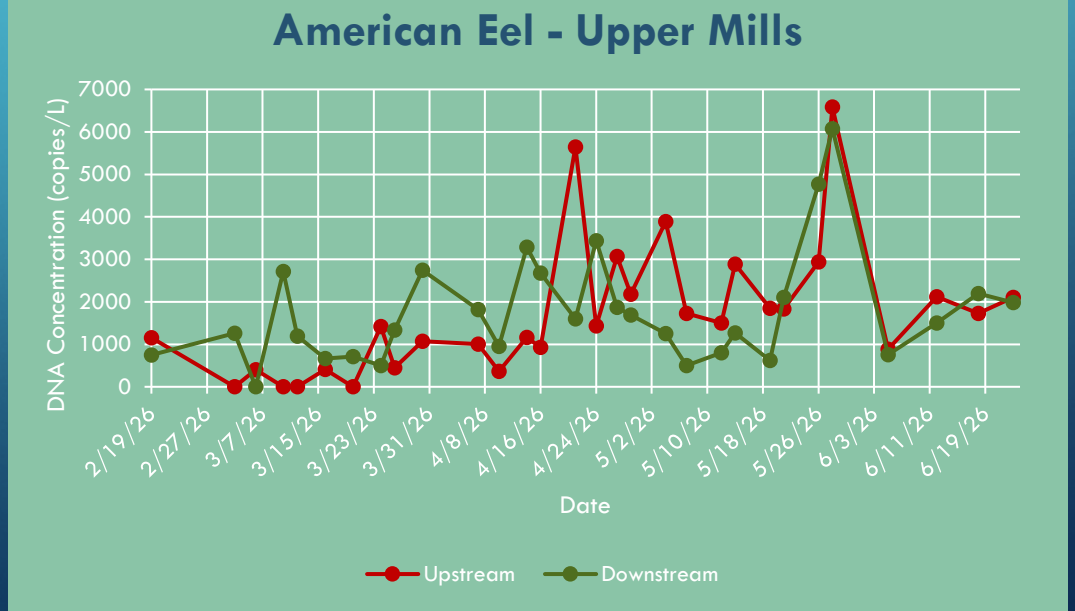
Date
Upstream
Downstream


American Eel - Upper Mills
DNA Concentration (copies/L)
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6000
5000
4000
3000
2000
1000
0
2/19/26
2/27/26
3/7/26
3/15/26
3/23/26
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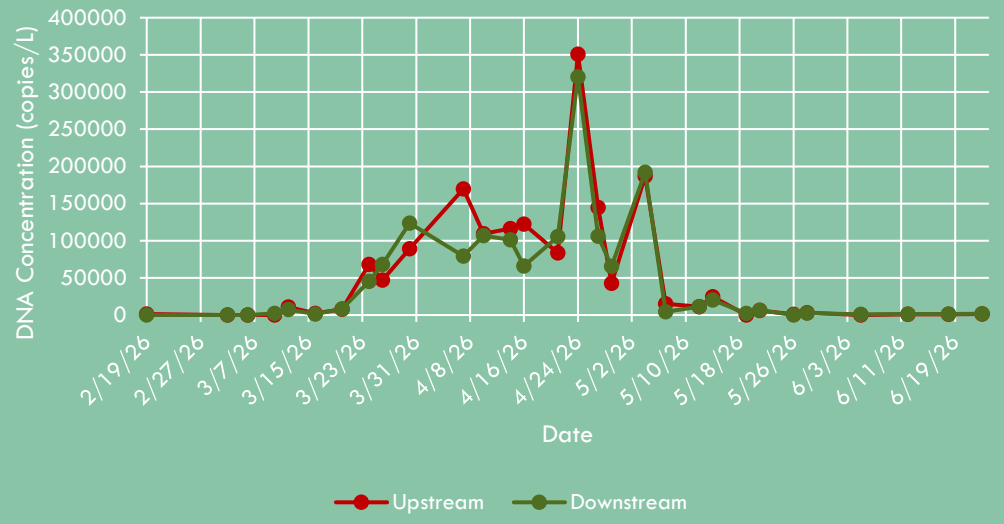
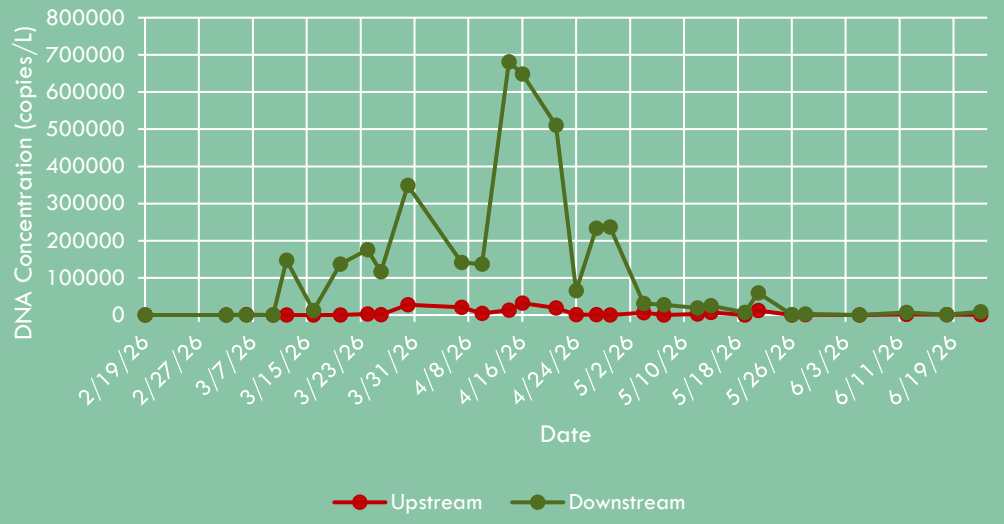
4/8/26
4/16/26
4/24/26
5/2/26
5/10/26
5/18/26
5/26/26
6/3/26
6/11/26
6/19/26
Date
Upstream
Downstream

EFFECTIVENESS OF FISH PASSAGES

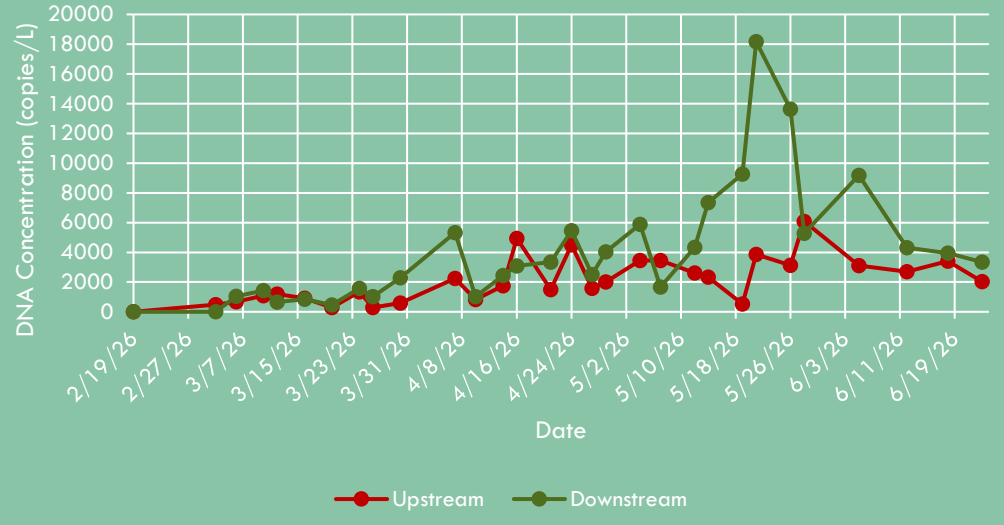
River Herring - Grangabel



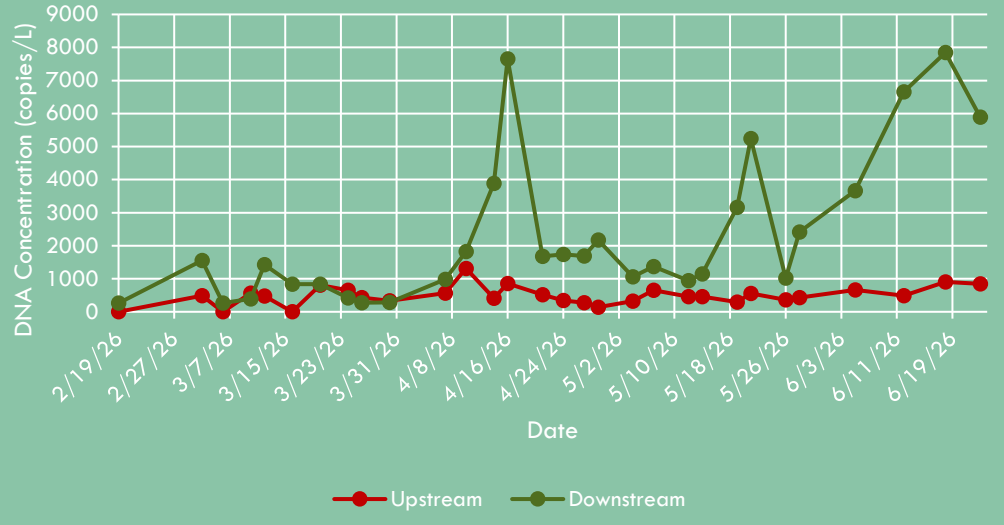
River Herring - Byron Young



American Eel - Grangabel



American Eel - Byron Young



EVALUATION OF PILOT STUDY/FUTURE RECOMMENDATIONS

- Limitation- lack of distinction between alewife and blueback herring
- Overall, successful study with some potential improvements
- eDNA is an effective tool to study health of river herring and eel stocks as well as migration and effectiveness of fish passages
- Can expand study to include more sites, but dependent on funding and staff time
- Important to continue this study in future years
  - Another passage is planned for Upper Mills
  - This year was difficult for river herring and American eel