

Monitoring the American Eel on the Narrow River

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Springtime in Rhode Island marks the return of numerous animal species. In the Narrow River, the most familiar of the returning visitors are the river herring. However, a lesser known, lesser understood migration is also taking place – that is, the American eel.

To many, the American eel (*Anguilla rostrata*) is a well-known resident of ponds and lakes in the state of Rhode Island. But few are aware of the complex, fascinating life history of a fish whose journey begins with a trip hundreds (sometimes thousands) of miles on ocean currents before making landfall into the freshwaters of the Atlantic coast.

The American eel is a catadromous fish - the only one of its kind in North America. That is, they spawn in marine waters off of Florida, known as the Sargasso Sea, and those offspring migrate back into fresh and brackish waters to grow and mature. From the Sargasso, larval eel, at this point known as leptocephali, drift on ocean currents off the coast of the Americas. As they develop fins, and begin to look like tiny, transparent eels, they start to make landfall, crossing the continental shelf on their way inland. Referred to as glass eels, they disperse as far north as Greenland and as far south as northern South America, and everywhere in between. As they feed, grow, and become pigmented, they develop into elvers, and then into yellow eels – the phase most people encounter them at. Eels may spend upwards of twenty or more years inland before preparing for the long, arduous journey back out to sea to spawn. In the final transformation of the eel's life cycle, they begin to shift to a silvery-gray coloration, making them more difficult to see by marine predators. Now called silver eels, they will leave their freshwater homes, and begin their journey to spawn in the Sargasso, where a new generation will begin this complex life cycle all over again.

In recent years these spectacular fish have catapulted to the forefront of conservation efforts due to data suggesting that their populations have been declining for decades. Impacted by habitat fragmentation, predation, water contamination, over fishing, disease, and a host of other variables, numbers are thought to have plummeted. Important as both predator and prey, in both marine and inland waters, the U.S. Fish and Wildlife Service was tasked in 2007 and again in 2015 to review the species for listing under the Endangered Species Act. The Service found, in both reviews, that listing was not warranted for the eel. However, research efforts coastwide, particularly here in Rhode Island, have been greatly expanded to try to gain a better understanding of the populations of this mysterious fish. The first site to be officially studied for glass eels – the Narrow River.

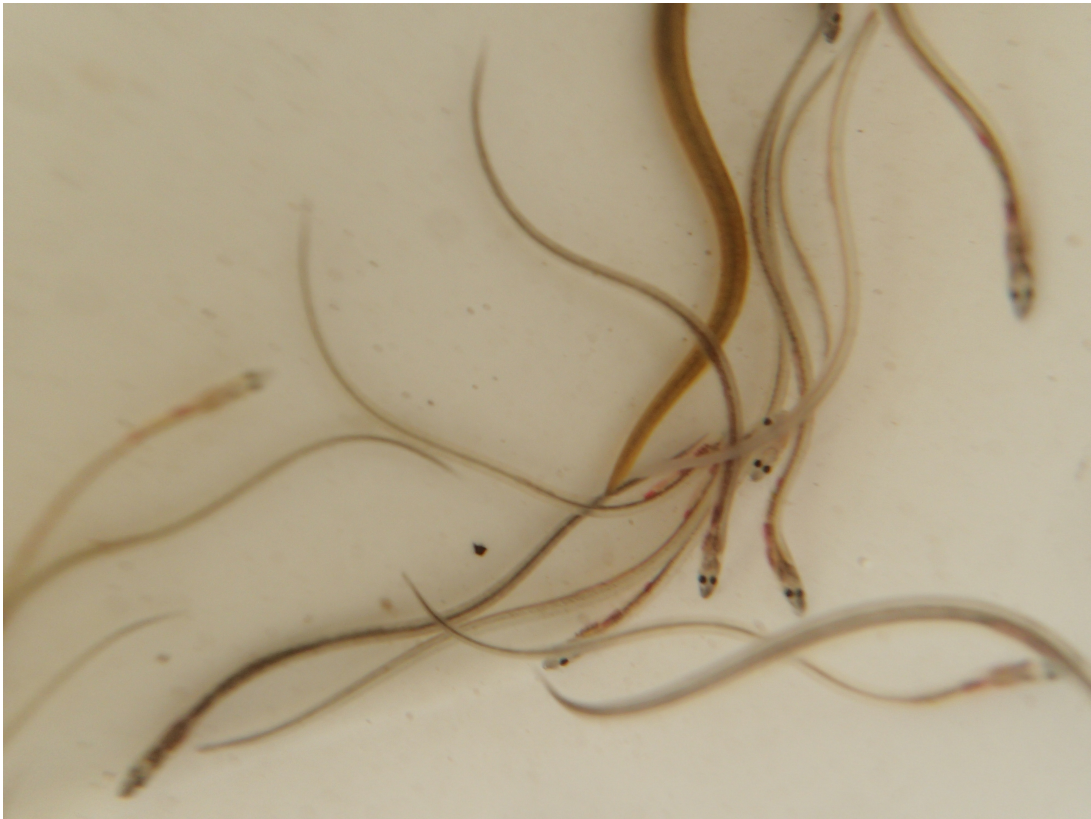
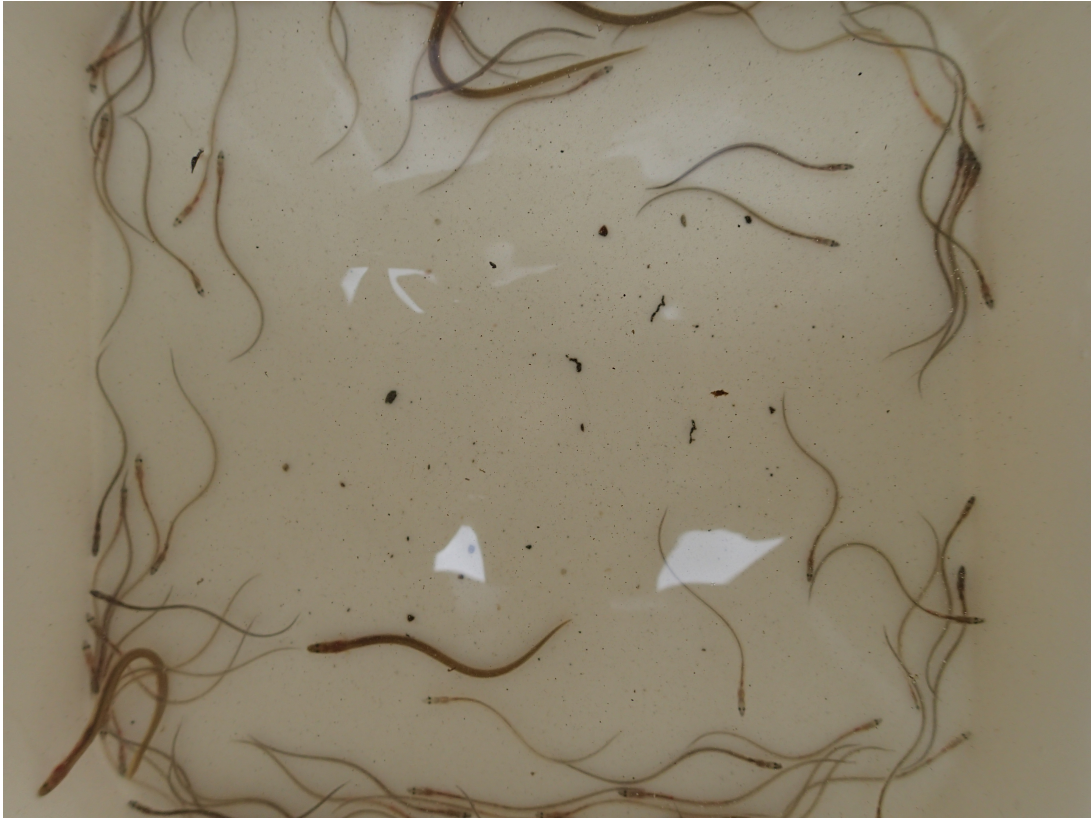
In 2000, the Rhode Island Division of Fish & Wildlife (RIFW) implemented an official glass eel survey, examining the migration of glass eels through the Narrow River. This survey requirement of the Atlantic States Marine Fisheries Commission (ASMFC) aimed to gain a better understanding of the number of glass eels entering the system, and the yearly fluctuations of migrants. Following the model created on the Narrow River, a second site was set on the Annaquatucket River four years later.

This survey used the dam at the Gilbert Stuart Museum to set up a modified Irish elver ramp and trap. Essentially a ramp over the dam, the baby transparent eels use it to climb over the dam, and are collected in a bucket at the end. Checked daily, biologists and staff collect these eels, taking essential data such as weights, lengths, pigments, and counts, before releasing them over the dam to continue their journey upstream. In addition to this data, physical and environmental data are also collected, such as water temperatures, dissolved oxygen, water level, moon phase, and weather, in order to be able to correlate these factors with movements. Over the course of this twelve week survey, hundreds, often thousands of eels are sampled. The peak of this survey saw over 30,000 glass eels pass through the trap. The Narrow River and the Annaquatucket data are shared with the other Atlantic states through the ASMFC to gain a better understanding of the habits and populations of these fish.

Since its inception in 2000, the Narrow River glass eel survey has served as a model for new sites throughout the state. Going into its nineteenth year of data collection, the Narrow River is now one of six glass eel survey sites. Partly due to the data collected in these surveys, eel passage has gained a much greater level of importance in conservation efforts coast wide. As seen in the eel ramp installation at Horseshoe Falls fishway on the Pawcatuck River, eel passage has begun to be incorporated into permanent fish passage structures to assist the in-migration of young eels. While just a small step in the conservation of the species, Rhode Island has continued making strides to improve passage and expand habitat for the American eel.



American eel illustration by Robert Jon Golder



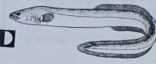
Glass eels and elvers caught in the Narrow River Glass eel survey.



Taking water parameters at Gilbert Stuart.

								wgt.	freq.	wgt.	freq.	
6/16	11		10:30	.56	19.6	8.25		0	0	0	0	1 crayfish
6/17	11	B	14:30	.50	23.9	12.80	1	-	-		7	0 eel
6/18	11	C	10:00	.5	19.6	11.48	1					
6/19	11	-	2:30	.45	22.8	12.46	1	-	-	-	-	0 eels
6/20	11	D	1 pm	.45	22.3	9.35	1		3	3		
6/21	12											
6/22	12	A	9:30	0.4	22.0	8.51	1		11		11	
6/23	12	B	2:00	0.4	23.6	9.20	1		3			3 eels
6/24	12											
6/25	12											
6/26	12											
6/27	12											

Gear Performance: 1 = Good 2 = Fair 3 = Bad
 Moon Phase: 1 = Full 7 = Waning 15 = New 22 = Waxing



American eel
(*Anguilla rostrata*)



Weights and lengths recorded for survey.



Eel ramp and collection bucket at Gilbert Stuart Museum.