Trout Unlimited Nor'East Chapter
eDNA Sampling, 2025

Method

The purpose of the eDNA sampling was to determine the richness of fish species on a selection of streams in Essex County, Mass. The Chapter used the services of Jonah Ventures (JV) to supply sampling kits and conduct DNA sequencing. Their website is: https://jonahventures.com/ .

Funding came from the local TU Chapter 154 – Nor'East. Funding also came by way of a donation from the Massachusetts State TU Council.

Data Collection

Samples were collected over a period of 11 days by four different members of the Nor'East chapter of Trout Unlimited: Neil Shea, Carl Soderland, Jim MacDougall, and Miles Cobb. Most of the locations were freshwater, however some were tidal. For these locations samples were taken within a few hours prior the end of ebb tide, to reduce the likelihood of samples being affected by eDNA pushed in from marshes or the ocean, i.e. fish that are not physically present in the river.

Trout Stocking

Miles Cobb acquired the trout stocking schedule from MassWildlife's website for the spring of 2025. The purpose of collecting this information was to document when and where the stockings took place to locate sources of non-wild trout that may show up in samples. Prior to eDNA sampling dates, stockings occurred between March 20 and April 14 with rainbow trout and brown trout. A table of this is attached.

Assumptions Made When Compiling eDNA Results Into Observations List

On the "read" reports provided by JV, some entries were provided with no Species listed, only a Genus or a Family. In such situations the following assumptions were made:

- In Cobbler's Brook, the observation Genus "Salvelinus" was brook trout.
- In Smallpox Creek, the observation Genus "Oncorhynchus" was rainbow trout.

- Excluded observations of Genus “Catostomus” or Family “Catostomidae” when Species “Catostomus commersonii” (white sucker) was in a separate observation.
- Excluded observations of Genus “Anguilla” when Species “Anguilla rostrata” (American eel) was present
- Excluded observations of Genus “Lepomis” when any specific sunfish Species was present; included it when nothing more specific was.
- Excluded all observations of only the Family “Leuciscidae” (minnows, shiners and dace).
- In Shawsheen River, Excluded observations of Families “Cyprinidae” (Carps and Minnows) and “Leuciscidae” (minnows, shiners and dace) because observations of the Genus “Cyprinus” (carp) were also present.
- In Skug River, excluded observations of the Family “Percidae” (Perches and Darters) because specific species were present.

Comparison To Historic Records

Locations for test sites were chosen based on a previous study done in 2020 by Geoff Day, another member of the Trout Unlimited Nor’East Chapter. His study covered a broader range of locations. For our study we intentionally avoided taking samples from the Ipswich River and from the Sawmill Brook and its tributaries in Manchester MA, as these bodies of water are already being sampled by the Ipswich River Watershed Association and other organizations.

This study is a comparison of historic records of freshwater fish documented by Hartel and Halliwell, “Inland Fishes of Massachusetts”, 2002, and this eDNA sampling. A lot more analysis can be done here, but a few observations are warranted in this draft report.

Most of the species found in this study confirm their occurrences noted in H&H and within the streams they noted. There are 2 fish in this study that were previously rare or absent in Massachusetts in 2002: Johnny Darter and Mosquitofish.

Johnny Darters and Tessellated Darters are very similar in physical appearance; in fact Tessellated darters were previously considered a subspecies. The known range of the Johnny Darter is the Great Lakes, Mississippi river drainage, and St. Lawrence river drainage. Tessellated Darters’ known range is east of the Appalachian mountains in the United States as well as the St. Lawrence river drainage in the U.S. and Canada. Johnny Darter eDNA was present in the tributaries of the Ipswich River at Miles River, Howlett Brook and Fish Brook. It is not clear to us how similar the eDNA is between these two fish however the data reports provided from JV listed each of their observations as being 95% - 100% match.

Mosquitofish are native to the southern central United States but have been naturalized throughout the world for mosquito larva control purposes. They are also available in the aquarium trade. They prefer warmer waters and in their native range have only been found as far north as Indiana and Illinois. The only known Mosquitofish population in Massachusetts was previously found in 1999 by Steve Hurley in the Quashnet River on Cape Cod. This is also the most northern known wild population in the world. This study found mosquitofish eDNA in the Smallpox Creek in Salisbury on April 23 and in the Howlett Brook in Topsfield on April 29. Given the time of year these observations were made it would be interesting to investigate these streams further to see if they are surviving the winters here.

Sculpin, or Slimy Sculpin, was only historically noted by H&H in Essex County and that was only in the Merrimack River. This study showed that it occurred in Cobbler Brook, East Meadow River, Smallpox Creek, tributaries of the Merrimack and Cart Creek in Newbury.

In previous studies, Brook Trout have been found in the Ipswich, Parker, Shawsheen, East Meadow, and Egypt Rivers; also, Alewife Brook in Essex. No Brook Trout eDNA was identified in samples taken from these bodies of water. Brook Trout eDNA was found in Cobbler Brook in Merrimac. Fallfish, the largest member of the minnow family and requires water conditions very similar to Brook Trout, was widespread in 2002 but only had eDNA identified in the Shawsheen River in North Andover.

Other Observations

- Smallpox Brook had a positive result for Rainbow Trout. Given the lack of stocking in or near this body of water an alternative explanation for its presence seems likely such as private stocking or food waste.
- Shawsheen River is by far the most diverse waterbody with observations of 25 different species. Next is the Powow River with 14 different species.
- Three-Spined Stickleback (19), American Eel (18), Creek Chubsucker (17), and Yellow Perch (17) are the most widespread species.
- Stocked trout eDNA was only found to be present in Shawsheen River even though stockings also took place in Fish Brook, Alewife Brook, Bachelder Brook, Parker River, Powow River, and Mill River.

TU Nor'East Chapter eDNA Sampling Spring 2025						
Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
Alewife Brook	**42.6256737**	**-70.7929592**	**4/28/25**	Carl Soderland	Bluegill	Lepomis macrochirus
					Crappie	Pomoxis sp.
					Creek Chubsucker	Erimyzon oblongus
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Batchelder's Brook	**42.7260972**	**-70.908675**	**5/4/25**	Miles Cobb	American Eel	Anguilla rostrata
					Creek Chubsucker	Erimyzon oblongus
					Sea Lamprey	Petromyzon marinus
					Swamp Darter	Etheostoma fusiforme
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Black Brook	**42.6474660**	**-70.8735937**	**4/27/25**	Carl Soderland	Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Four-spined Stickleback	Apeltes quadracus
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Cart Creek	**42.7606565**	**-70.9147269**	**4/26/25**	Miles Cobb	Alewife	Alosa pseudoharengus
					American Eel	Anguilla rostrata
					Banded Killifish	Fundulus diaphanus
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Mummichog	Fundulus heteroclitus
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Stickleback	Gasterosteus sp.
					Sunfish	#N/A
					Three-spined Stickleback	Gasterosteus aculeatus
Causeway Brook	**42.5795758**	**-70.7587596**	**4/28/25**	Carl Soderland	American Eel	Anguilla rostrata
					Banded Killifish	Fundulus diaphanus
					Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Johnny Darter	Etheostoma nigrum
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Cobbler's Brook	**42.8339791**	**-71.0007144**	**4/23/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Blacknose Dace	Rhinichthys atratulus

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Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
					Bullhead Catfish	Ameiurus sp.
					Char	Salvelinus sp.
					Creek Chubsucker	Erimyzon oblongus
					Golden Shiner	Notemigonus crysoleucas
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Three-spined Stickleback	Gasterosteus aculeatus
East Meadow River	**42.8111433**	**-71.0334535**	**4/23/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Black Bass	Micropterus sp.
					Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Golden Shiner	Notemigonus crysoleucas
					Mummichog	Fundulus heteroclitus
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Swamp Darter	Etheostoma fusiforme
Egypt River	**42.6985202**	**-70.8685539**	**4/27/25**	Carl Soderland	American Eel	Anguilla rostrata
					Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Crappie	Pomoxis sp.
					Creek Chubsucker	Erimyzon oblongus
					Mummichog	Fundulus heteroclitus
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Fish Brook	**42.64515**	**-70.98908**	**4/29/25**	Neil Shea	Creek Chubsucker	Erimyzon oblongus
					Four-spined Stickleback	Apeltes quadracus
					Johnny Darter	Etheostoma nigrum
					Redbreast Sunfish	Lepomis auritus
					Swamp Darter	Etheostoma fusiforme
					Yellow Perch	Perca flavescens
Howlett Brook	**42.66037**	**-70.93274**	**4/29/25**	Neil Shea	Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Johnny Darter	Etheostoma nigrum
					Mosquitofish	Gambusia affinis
					Tessellated Darter	Etheostoma olmstedi
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Johnson's Creek	**42.7541585**	**-71.0425526**	**5/3/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Killifish	Fundulus diaphanus
					Four-spined Stickleback	Apeltes quadracus

TU Nor'East Chapter eDNA Sampling Spring 2025						
Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
					Johnny Darter	Etheostoma nigrum
					mummichug	Fundulus heteroclitus
					Redbreast Sunfish	Lepomis auritus
					Tessellated Darter	Etheostoma olmstedi
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Little River (Gloucester)	**42.6103134**	**-70.7080383**	**4/28/25**	Carl Soderland	American Eel	Anguilla rostrata
					Bluegill	Lepomis macrochirus
					Creek Chubsucker	Erimyzon oblongus
					Mummichog	Fundulus heteroclitus
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Little River (Newbury, Hanover St)	**42.7898398**	**-70.8778723**	**4/26/25**	Miles Cobb	Alewife	Alosa pseudoharengus
					American Eel	Anguilla rostrata
					Banded Killifish	Fundulus diaphanus
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Mummichog	Fundulus heteroclitus
					Pike / Pickerel	Esox sp.
					River Herring / Shad	Alosa sp.
					Sculpins	Cottus sp.
					Sunfish	#N/A
					Three-spined Stickleback	Gasterosteus aculeatus
Little River (Newbury, Newman Rd)	**42.7717262**	**-70.86179**	**4/26/25**	Miles Cobb	Alewife	Alosa pseudoharengus
					American Eel	Anguilla rostrata
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Mummichog	Fundulus heteroclitus
					River Herring / Shad	Alosa sp.
					Stickleback	Gasterosteus sp.
					Three-spined Stickleback	Gasterosteus aculeatus
					White Perch	Morone americana
Miles River	**42.6581835**	**-70.8431421**	**4/27/25**	Carl Soderland	Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Johnny Darter	Etheostoma nigrum
					Swamp Darter	Etheostoma fusiforme
					Tessellated Darter	Etheostoma olmstedi
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Mill River	**42.7438345**	**-70.897138**	**4/26/25**	Miles Cobb	Alewife	Alosa pseudoharengus

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Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
					American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Creek Chubsucker	Erimyzon oblongus
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Mummichog	Fundulus heteroclitus
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Swamp Darter	Etheostoma fusiforme
					Three-spined Stickleback	Gasterosteus aculeatus
					White Sucker	Catostomus commersonii
					Yellow Bullhead	Ameiurus natalis
Ox Pasture Brook	**42.7325414**	**-70.8797889**	**5/4/25**	Miles Cobb	Creek Chubsucker	Erimyzon oblongus
					Mummichog	Fundulus heteroclitus
					Swamp Darter	Etheostoma fusiforme
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Parker River	**42.7504455**	**-70.9297659**	**4/26/25**	Miles Cobb	Alewife	Alosa pseudoharengus
					American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Golden Shiner	Notemigonus crysoleucas
					Pike / Pickerel	Esox sp.
					Redbreast Sunfish	Lepomis auritus
					Swamp Darter	Etheostoma fusiforme
					White Sucker	Catostomus commersonii
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Powow River	**42.8469012**	**-70.9219297**	**5/4/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Killifish	Fundulus diaphanus
					Bluegill	Lepomis macrochirus
					Crappie	Pomoxis sp.
					Creek Chubsucker	Erimyzon oblongus
					Four-spined Stickleback	Apeltes quadracus
					Mummichog	Fundulus heteroclitus
					Redbreast Sunfish	Lepomis auritus
					Swamp Darter	Etheostoma fusiforme
					Tessellated Darter	Etheostoma olmstedi
					Three-spined Stickleback	Gasterosteus aculeatus
					White Catfish	Ameiurus catus

TU Nor'East Chapter eDNA Sampling Spring 2025						
Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Pye Brook	**42.67088**	**-70.96918**	**4/29/25**	Neil Shea	Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Perch	Perca flavescens
Saugus River	**42.4721128**	**-71.0068215**	**4/26/25**	Jim MacDougall	Alewife	Alosa pseudoharengus
					American Eel	Anguilla rostrata
					Black Bass	Micropterus sp.
					Bluegill	Lepomis macrochirus
					Carp	Cyprinus sp.
					Crappie	Pomoxis sp.
					Pike / Pickerel	Esox sp.
					River Herring / Shad	Alosa sp.
					Sunfish	#N/A
					White Sucker	Catostomus commersonii
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Shawsheen River	**42.6987262**	**-71.1440798**	**4/24/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Black Bass	Micropterus sp.
					Bluegill	Lepomis macrochirus
					Bullhead Catfish	Ameiurus sp.
					Carp	Cyprinus sp.
					Creek Chubsucker	Erimyzon oblongus
					Fallfish	Semotilus corporalis
					Golden Shiner	Notemigonus crysoleucas
					Margined Madtom	Noturus insignis
					Northern Pike	Esox lucius
					Pacific Salmon / Trout	Oncorhynchus sp.
					Pike / Pickerel	Esox sp.
					Rainbow Trout	Oncorhynchus mykiss
					Redbreast Sunfish	Lepomis auritus
					Redear Sunfish	Lepomis microlophus
					Sea Lamprey	Petromyzon marinus
					Spottail Shiner	Notropis hudsonius
					Sunfish	#N/A
					Swamp Darter	Etheostoma fusiforme
					Tessellated Darter	Etheostoma olmstedi
					White Perch	Morone americana
					White Sucker	Catostomus commersonii
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Skug River	**42.6116542**	**-71.0986138**	**4/24/25**	Miles Cobb	American Eel	Anguilla rostrata

TU Nor'East Chapter eDNA Sampling Spring 2025						
Location	**Lat**	**Long**	**Date**	**Collected By**	**Common Name**	**Latin Name**
					Banded Sunfish	Enneacanthus obesus
					Bullhead Catfish	Ameiurus sp.
					Creek Chubsucker	Erimyzon oblongus
					Golden Shiner	Notemigonus crysoleucas
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Stickleback	Gasterosteus sp.
					Swamp Darter	Etheostoma fusiforme
					Three-spined Stickleback	Gasterosteus aculeatus
					Yellow Bullhead	Ameiurus natalis
					Yellow Perch	Perca flavescens
Small Pox Creek	**42.8500834**	**-70.8644408**	**4/23/25**	Miles Cobb	American Eel	Anguilla rostrata
					Bullhead Catfish	Ameiurus sp.
					Four-spined Stickleback	Apeltes quadracus
					Golden Shiner	Notemigonus crysoleucas
					Mosquitofish	Gambusia affinis
					Pacific Salmon / Trout	Oncorhynchus sp.
					Pike / Pickerel	Esox sp.
					Sculpins	Cottus sp.
					Sunfish	#N/A
					Three-spined Stickleback	Gasterosteus aculeatus
Upper Skug River	**42.6251059**	**-71.1013166**	**4/24/25**	Miles Cobb	American Eel	Anguilla rostrata
					Banded Sunfish	Enneacanthus obesus
					Bullhead Catfish	Ameiurus sp.
					Golden Shiner	Notemigonus crysoleucas
					Pike / Pickerel	Esox sp.
					Yellow Bullhead	Ameiurus natalis

2025 Spring Trout Stocking			
Water Body	**Town**	**Fish**	**Date**
Alewife Brook	Essex	brown trout	4/14/2025
Bachelder Brook	Rowley	brown trout	4/14/2025
Baldpate Pond	Boxford	rainbow trout	4/23/2025
Baldpate Pond	Boxford	rainbow trout	3/20/2025
Berry Pond	North Andover	rainbow trout	4/7/2025
Boston Brook	Middleton	brown trout	4/14/2025
Dow Brook	Ipswich	brown trout	4/14/2025
Fish Brook	Topsfield	brown trout	4/14/2025
Fish Brook	Boxford	brown trout	4/14/2025
Ipswich River	Topsfield	rainbow trout	4/10/2025
Ipswich River	Ipswich	rainbow trout	4/10/2025
Ipswich River	Peabody	rainbow trout	4/10/2025
Ipswich River	North Reading	rainbow trout	4/10/2025
Ipswich River	Wilmington	rainbow trout	4/10/2025
Lake Pentucket	Haverhill	brown trout	4/24/2025
Lake Pentucket	Haverhill	rainbow trout	3/21/2025
Lake Saltonstall	Haverhill	brown trout	4/24/2025
Lake Saltonstall	Haverhill	rainbow trout	3/24/2025
Little River	Haverhill	brown trout	4/15/2025
Mill River	Rowley	brown trout	4/14/2025
Milvale Reservoir	Haverhill	brown trout	4/29/2025
Milvale Reservoir	Haverhill	rainbow trout	4/3/2025
Parker River	Newbury	brown trout	4/30/2025
Parker River	Newbury	rainbow trout	4/7/2025
Parker River	Georgetown	brown trout	4/30/2025
Parker River	Georgetown	rainbow trout	4/7/2025
Pentucket Pond	Georgetown	brown trout	4/30/2025
Pentucket Pond	Georgetown	rainbow trout	4/1/2025
Pleasant Pond	Boxford	rainbow trout	4/24/2025
Pleasant Pond	Boxford	rainbow trout	3/26/2025
Powow River	Amesbury	brown trout	4/15/2025
Rock Pond	Georgetown	rainbow trout	4/1/2025
Shawsheen River	Andover	rainbow trout	4/10/2025
Sluice Pond	Lynn	rainbow trout	4/24/2025
Sluice Pond	Lynn	rainbow trout	3/26/2025
Stiles Pond	Boxford	rainbow trout	4/23/2025
Stiles Pond	Boxford	rainbow trout	3/25/2025
Strangman Pond	Gloucester	brown trout	4/14/2025