MASSWILDLIFE

Tracking the condition of MA's large rivers

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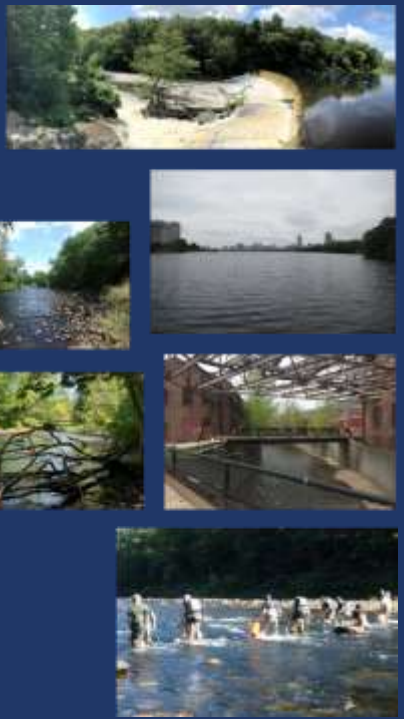
MassWildlife

- Mission:

The conservation – including restoration, protection, and management – of fish and wildlife resources for the benefit and enjoyment of the public

Outline

- Large rivers
- Evaluations of large rivers
  - Applications
  - Methods
  - Comparison of results
- Next steps



Examples of applications

MA DEP

Aquatic life use determination

- if >50% similarity score then river is "supporting aquatic life use"
- if similarity score <50% then river is considered impaired

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Develop potential restoration projects

- e.g., water quality vs. habitat alteration
- regulatory recommendations

Large rivers = major basins

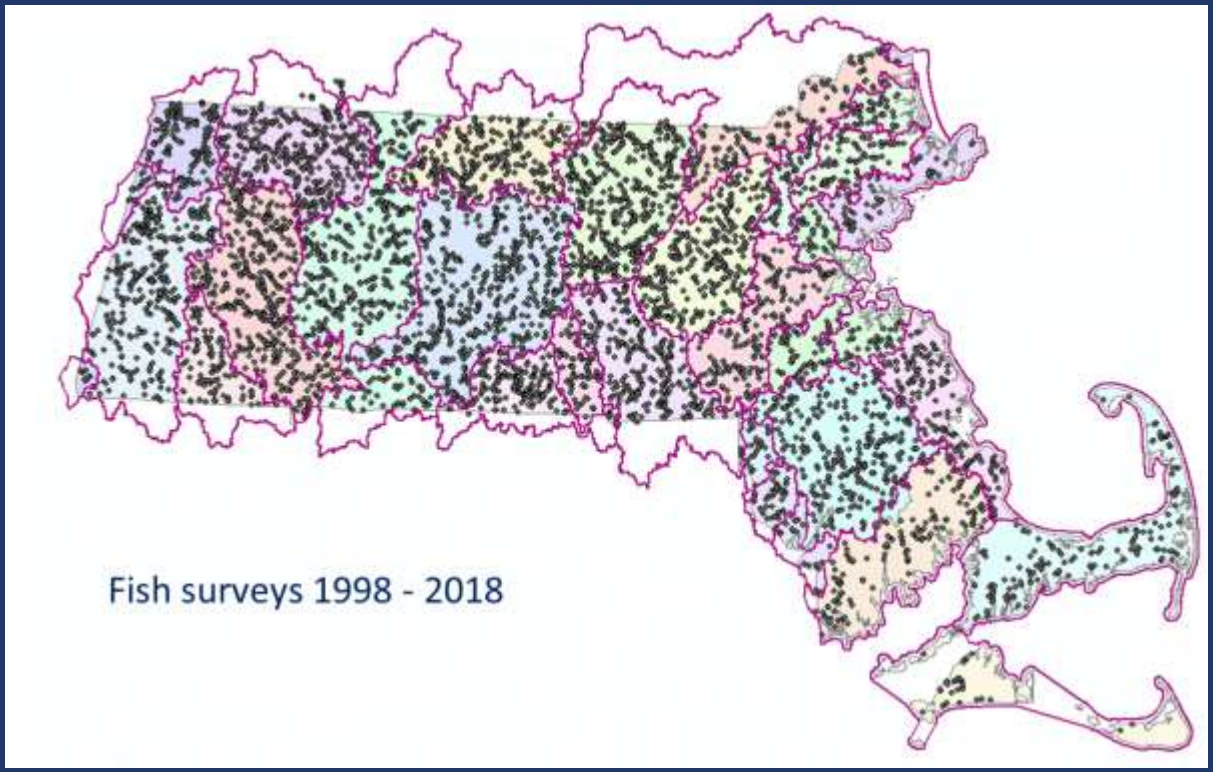
Methods

- Target Fish Community
  - Reference streams
  - Species composition
  - Rank order
  - Expected species proportions=

    Target Fish Community

- % Similarity =

  $100 - 0.5(\Sigma\,|\text{target P} - \text{observed P}\,|)$

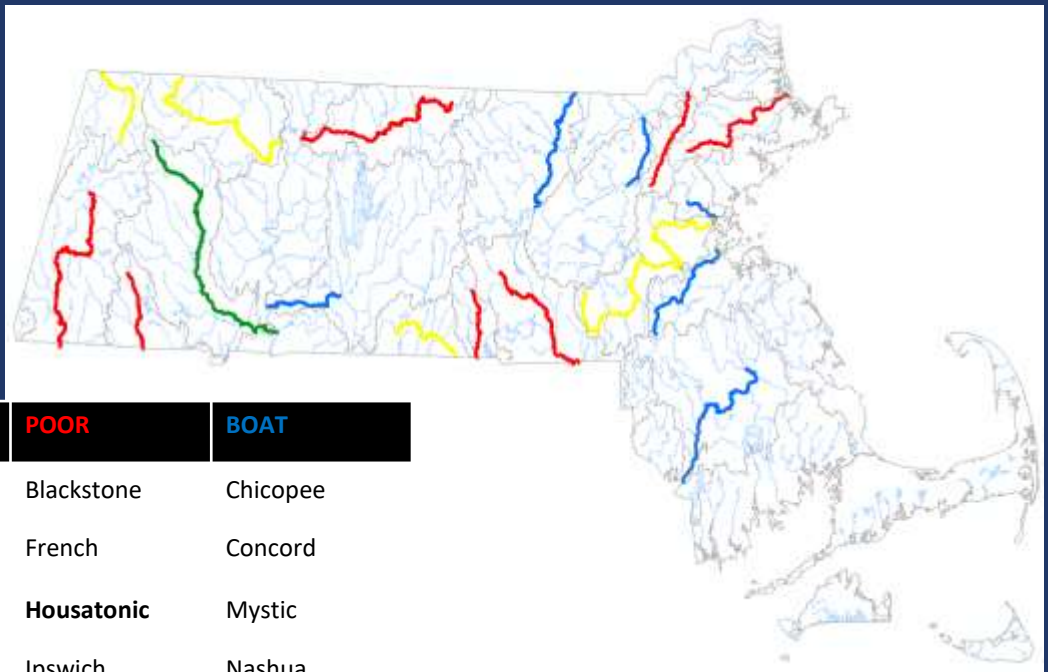

Fish surveys 1998 - 2018

Habitat Condition

Similarity score > 75% = GOOD

Similarity score 50-75% = FAIR

Similarity score < 50% = POOR



GOOD	FAIR	POOR	BOAT
Westfield	**Charles**	Blackstone	Chicopee
	Deerfield	French	Concord
	Farmington	**Housatonic**	Mystic
	Hoosic	Ipswich	Nashua
	Quinebaug	Millers	Neponset
		Shawsheen	Taunton

Changes in water quality

Habitat degradation

% species -> % guilds

Pollution Tolerances

- Intolerant

- Moderately Tolerant

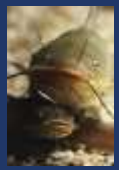
- Tolerant

Habitat Requirements

- Fluvial specialist

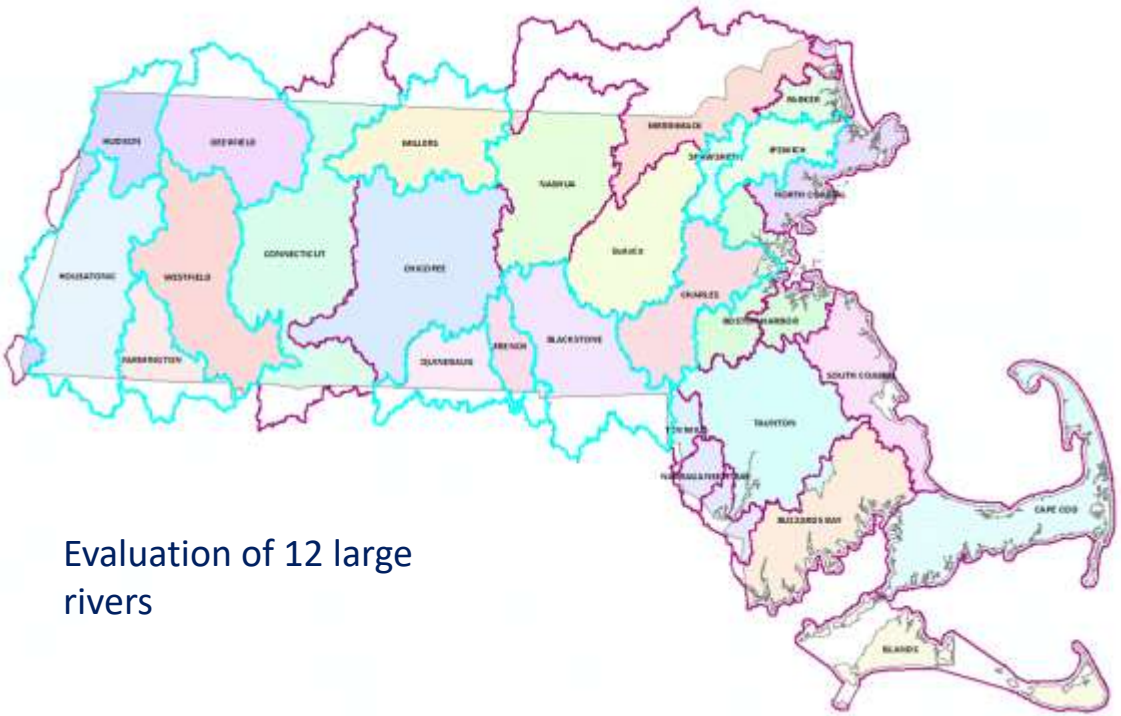
- Fluvial dependent

- Macrohabitat generalists



Additional analysis

- Two time periods
- NMDS to visualize
- PERMANOVA to test for significance
- Pairwise comparisons to test for differences among groups

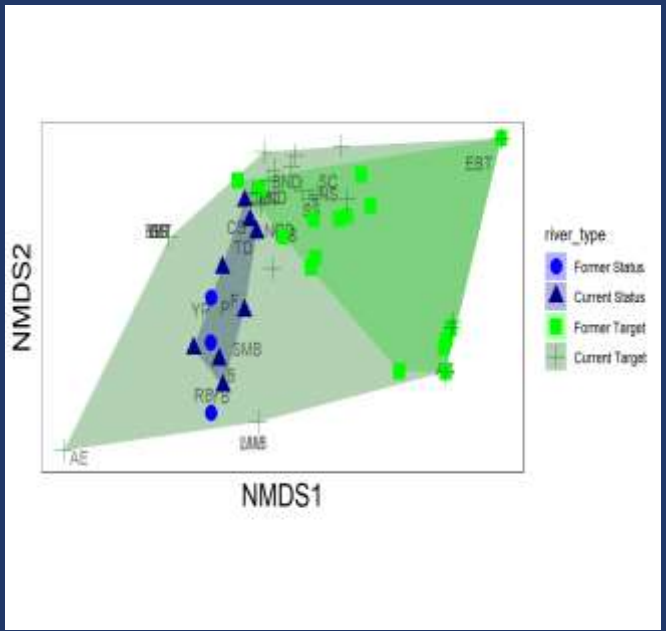


Evaluation of 12 large rivers

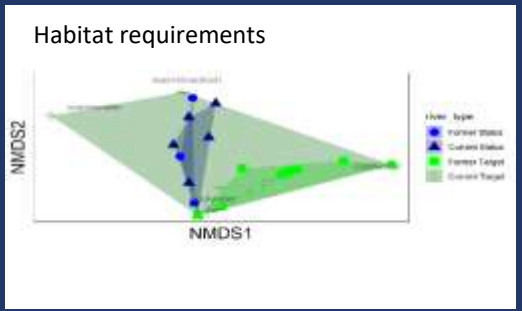
Westfield (Good)

Blue polygons = investigated river
Green polygons = Target Fish Community

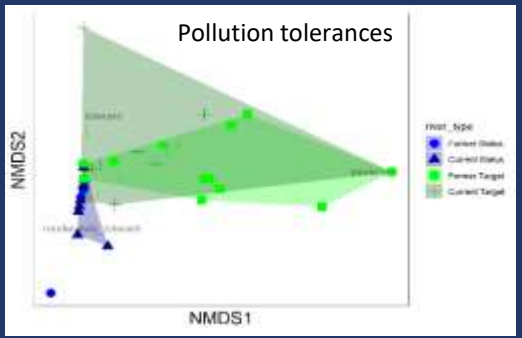
Former = 1998-2005
Current = 2006-2018



Habitat requirements



Pollution tolerances

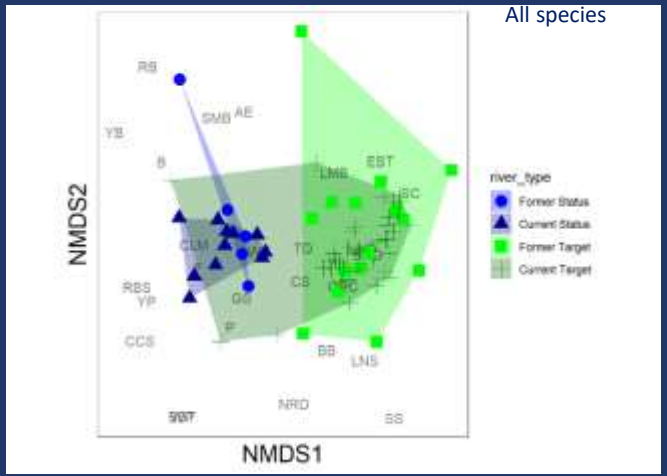


WB Farmington River (Fair)

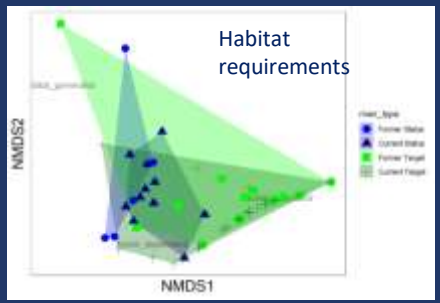
Blue polygons = investigated river
Green polygons = Target Fish Community

Former = 1998-2005
Current = 2006-2018

All species



Habitat requirements



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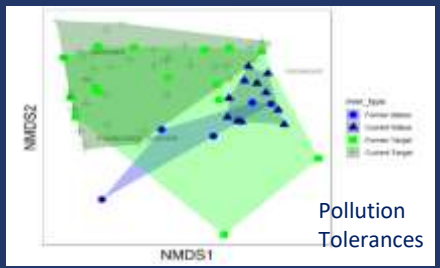
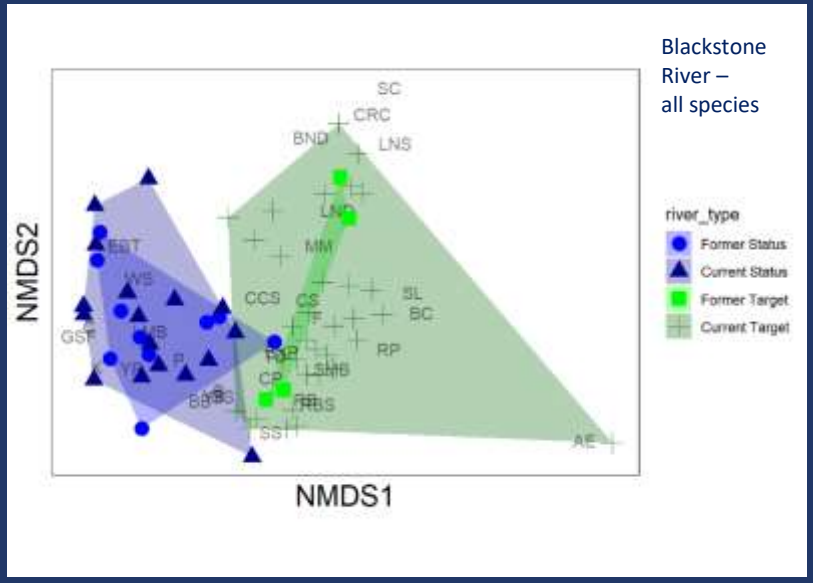
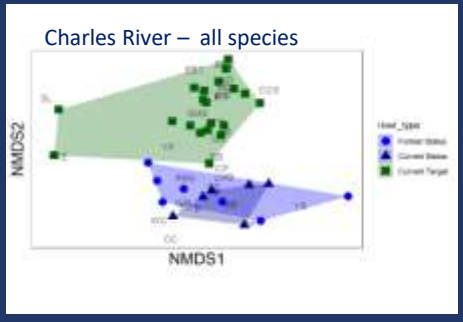
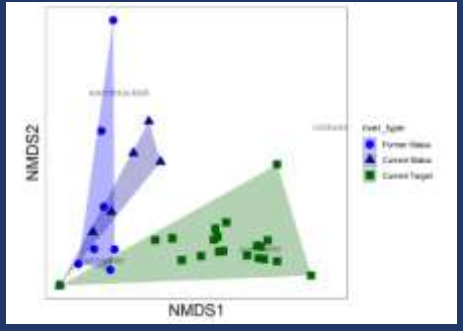


Rivers in Poor Condition



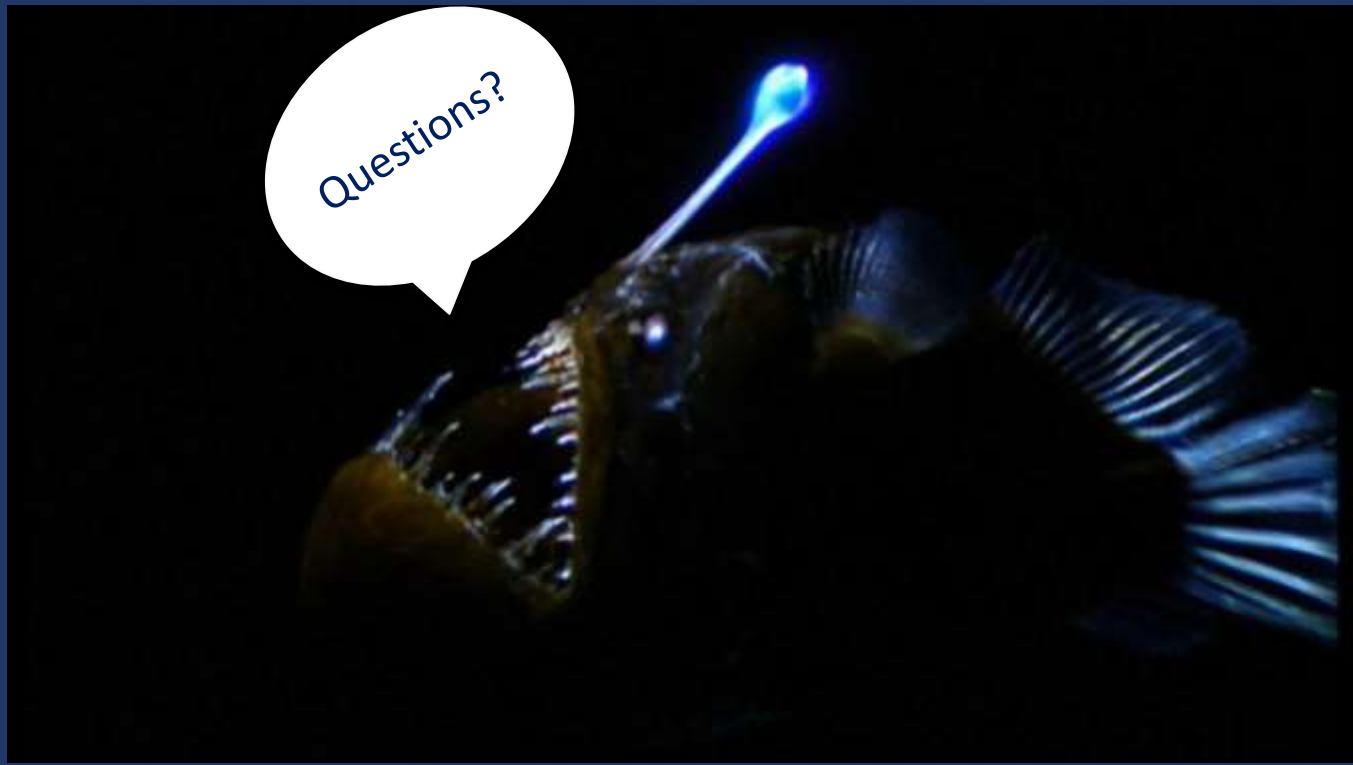




Next steps

- Understanding drivers of significant findings (GLzMs)
  - Δ Precipitation
  - ↑ Temperature
  - Land use
  - Water management
  - Barriers

- TFC's/similarity analysis for rivers with boat surveys


Questions?