

US EPA ARCHIVE DOCUMENT

Target Fish Communities and the MA Water Policy

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Wildlife

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MA Water Policy (2004)

Principle: Protect Fish and Wildlife Habitat



Recommendation:

Conduct Target Fish Community Assessments



EEA Funded 2 Employees
to Work with F&W

Developing a Target Fish Community

Goal: “Define the fish community that is appropriate for a natural river in southern New England” (Bain and Meixler, 2000)

Assumption: Biological Integrity should be Maintained and is defined by “a balanced, integrated, adaptive community” (Karr, 1991)

Rivers Should Have River Fish Communities

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What is a River Fish?



- **Fluvial Specialists- FS-**(Require Flowing Water - brook trout)

Rivers Should Have River Fish Communities

What is a River Fish?

- **Fluvial Dependents-FD-** (Need Flowing Water at Some time in Their Life Cycle - white sucker)



Rivers Should Have River Fish Communities

What is a River Fish?

- **Macrohabitat Generalists-MG**-(Don't Require Flowing Water - largemouth bass)





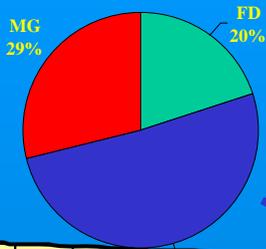
Reference Rivers

- Determine Potential Reference Rivers Based on Physical Characteristics
- Collect Existing Fisheries and Status Info
- Describe Reference River Fish Communities

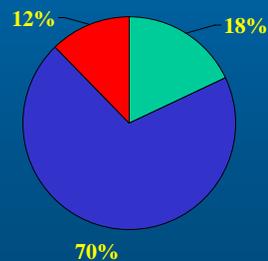
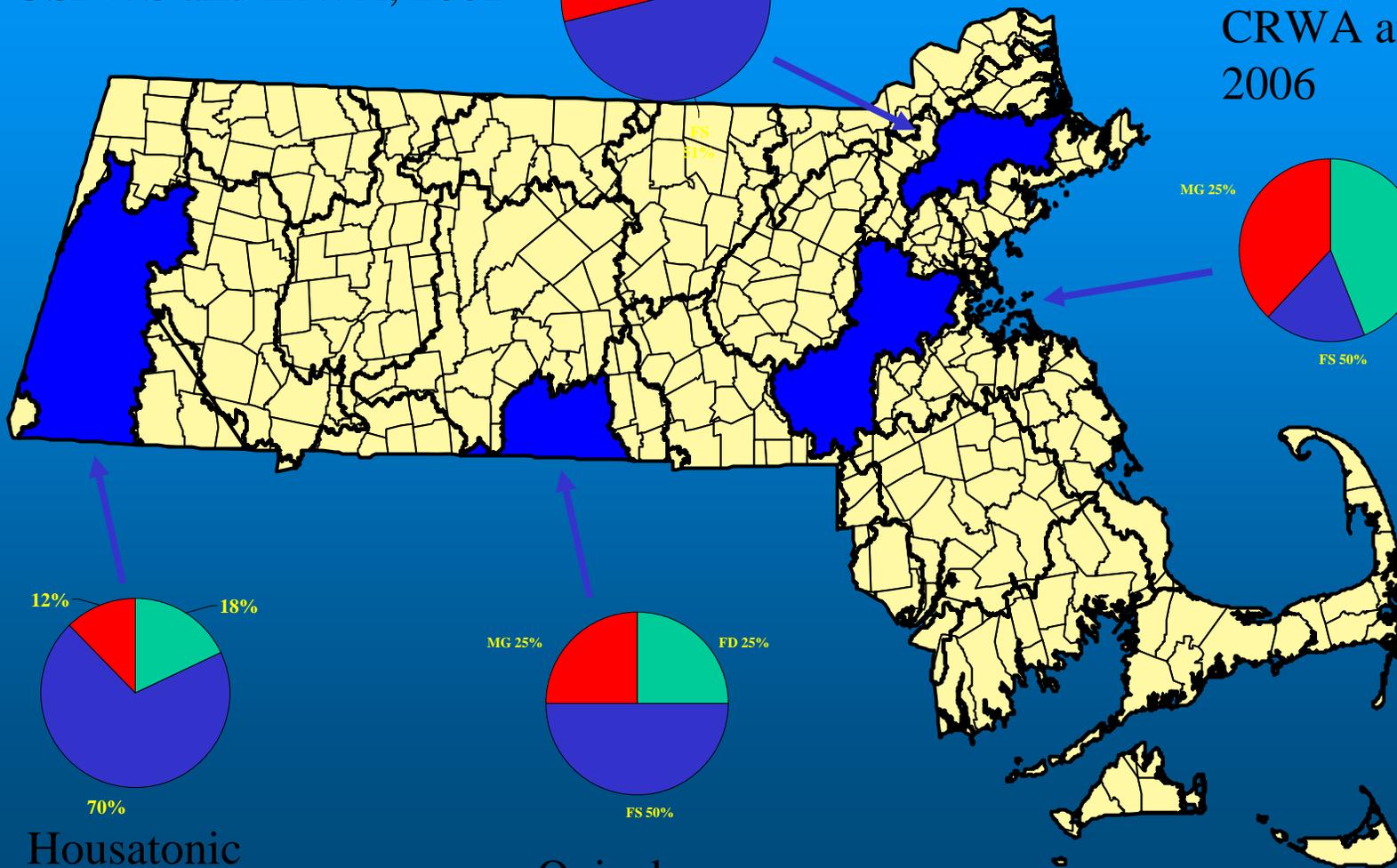
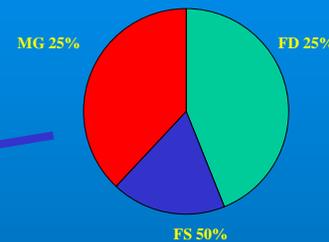
There are no true “references”

Completed Target Fish Communities

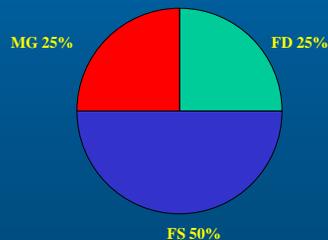
Ipswich
USFWS and IRWA, 2001



Charles
CRWA and Cornell,
2006



Housatonic
MA Riverways 2004



Quinebaug
Cornell, 2000

Data Contributions and Reference Consultation

- CT DEP – Connecticut Department of Environmental Protection-Fisheries
- MA DFW – Massachusetts Division of Fisheries and Wildlife
- NEIHP – Northeast Instream Habitat Program
- NH DES – New Hampshire Department of Environmental Services
- NYSDEC – New York State Department of Environmental Conservation
- RI DEM – Rhode Island Department of Environmental Management, Division of Fish and Wildlife
- USGS – U.S. Geological Survey National Water-Quality Assessment Program (NAWQA)
- VT DEC – Vermont Department of Environmental Conservation
- WPWA – Wood-Pawcatuck Watershed Association

Concord River Summary

River Characteristics

Drainage Area: 400 sq miles

Stream Order: 5th

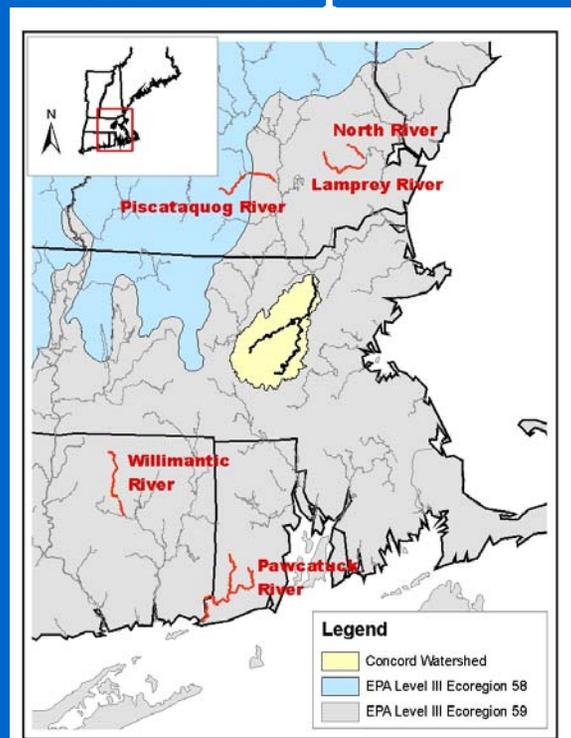
Mainstem Length: 131.2 km

Elevation: 0-800 ft

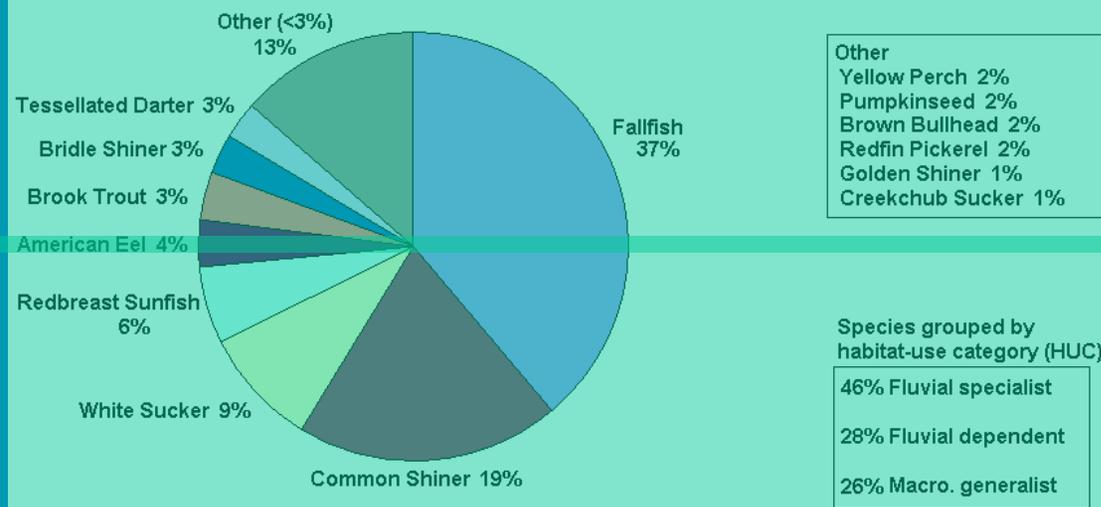
Gradient: 0-0.5%

EPA Level III Ecoregion: 59

River Basin Map



Target Fish Community



Reference Rivers

River	State	Drainage area (mi ²)	Stream order	Calcareous geology	Grad. class	Elev. class	Level III Ecoregion
Lamprey River	NH	135	4	Acidic	1	1	59
North River	NH	131	4	Acidic	1	1	59
Pawcatuck River	RI	275	5	Acidic	1	1	59
Piscataquog River	NH	216	5	Acidic	1	1	58
Willimantic River	CT	124	4	Acidic	1	1	59

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Figure 5a. Concord River summary

Concord River Summary

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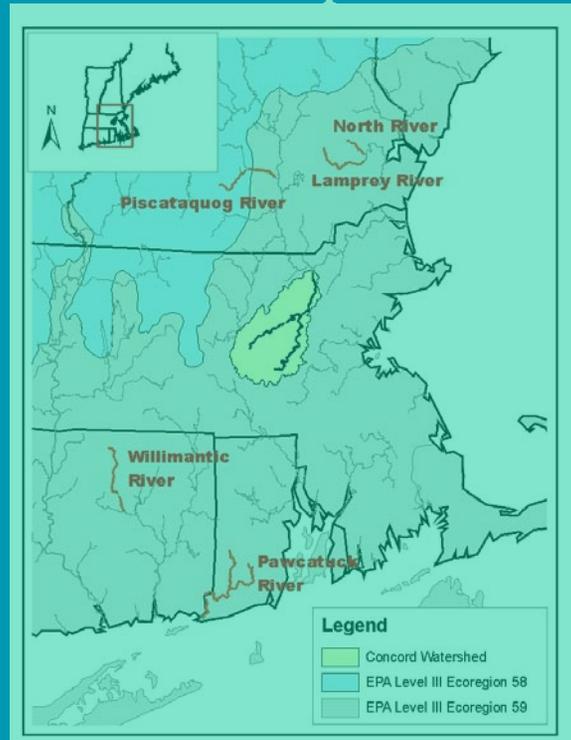
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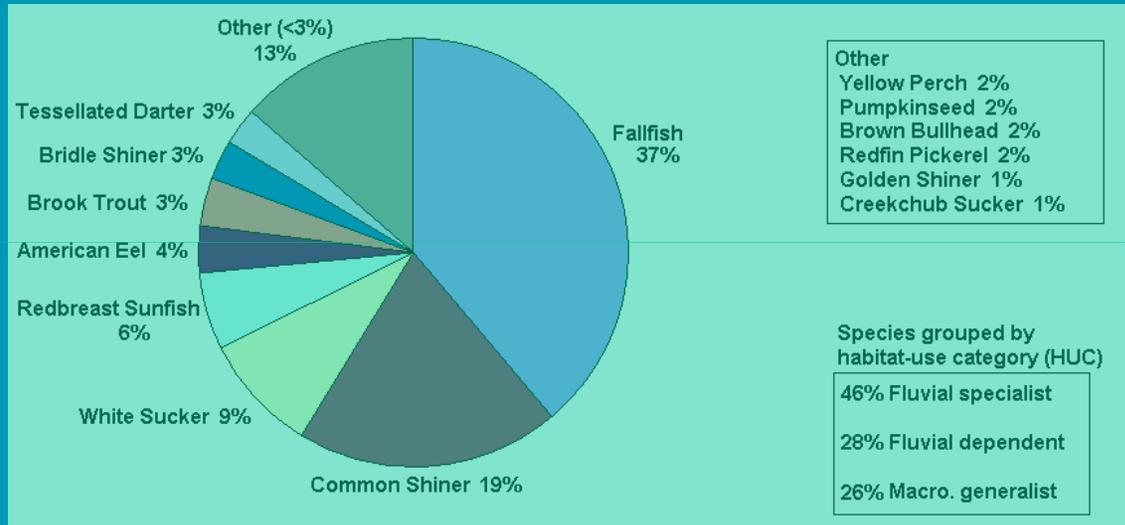
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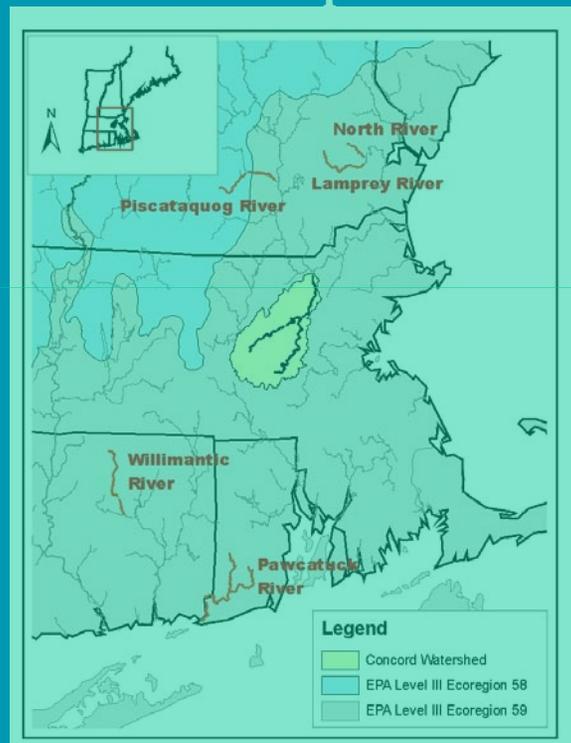
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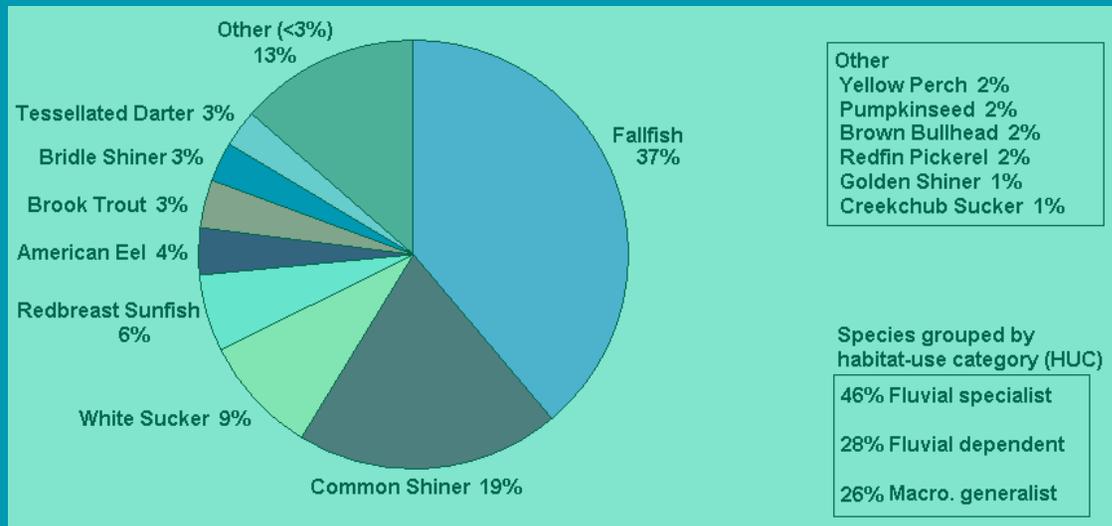
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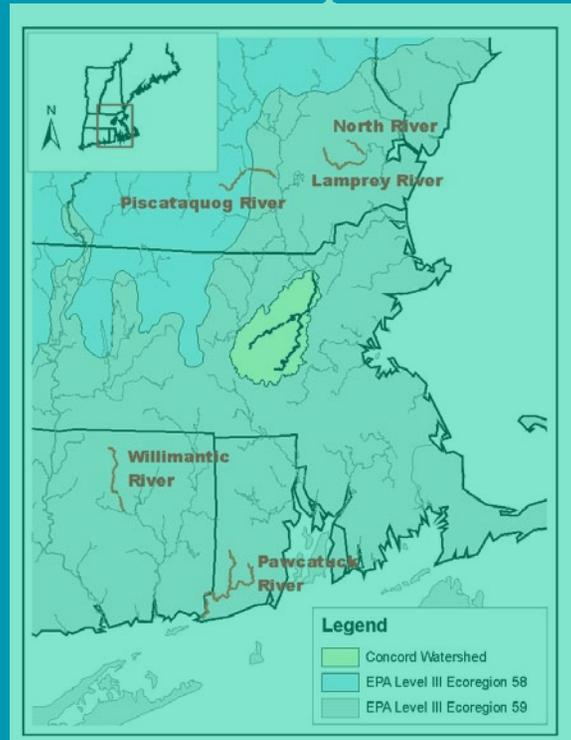
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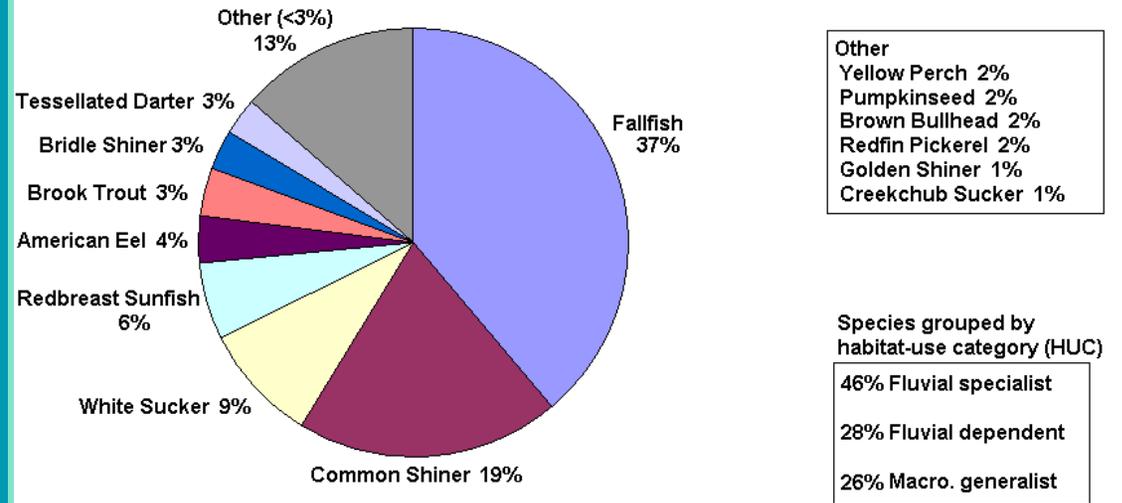
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River Basin Map



Target Fish Community



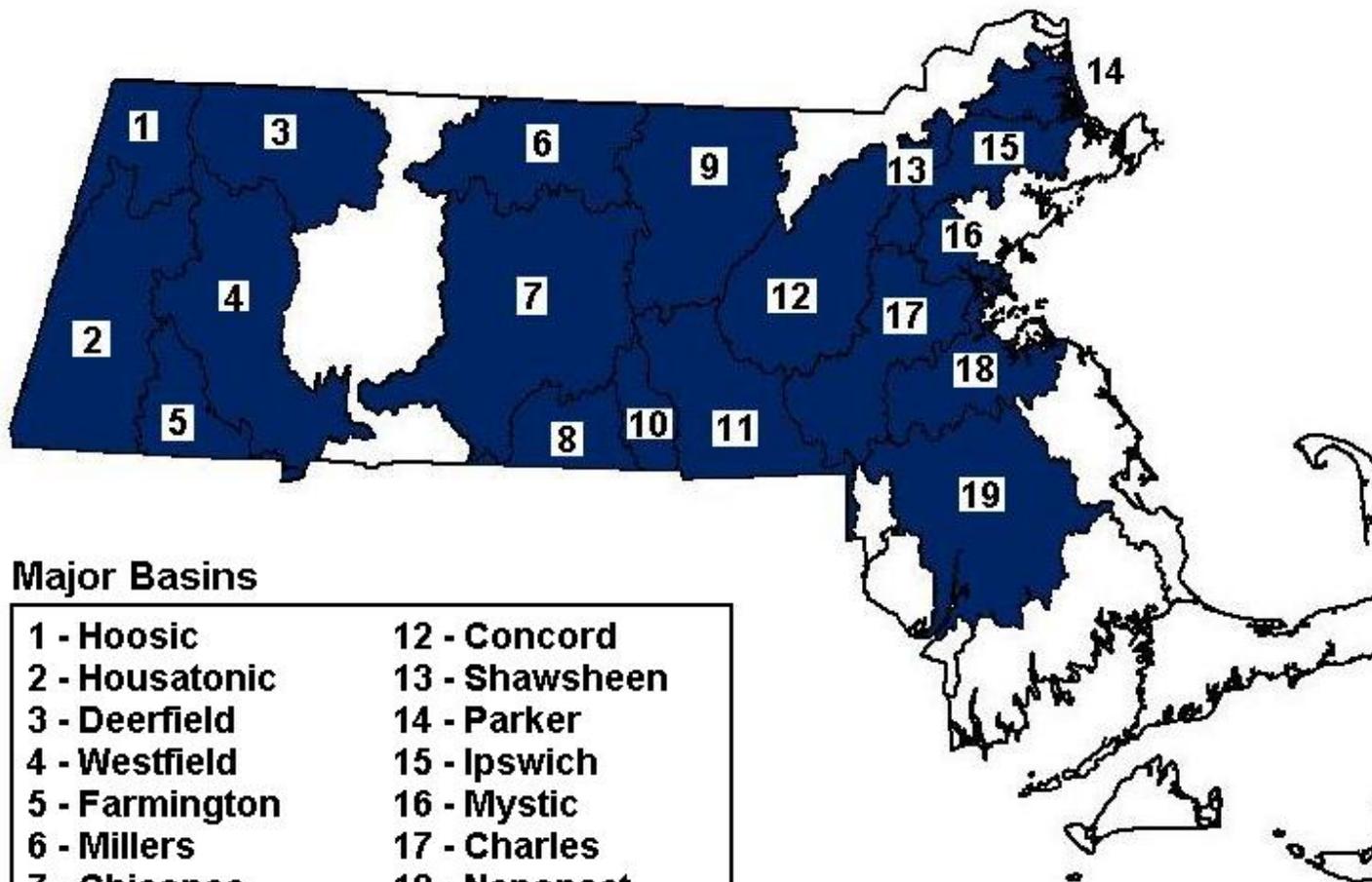
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Figure 5a. Concord River summary



Major Basins

- | | |
|-----------------|----------------|
| 1 - Hoosic | 12 - Concord |
| 2 - Housatonic | 13 - Shawsheen |
| 3 - Deerfield | 14 - Parker |
| 4 - Westfield | 15 - Ipswich |
| 5 - Farmington | 16 - Mystic |
| 6 - Millers | 17 - Charles |
| 7 - Chicopee | 18 - Neponset |
| 8 - Quinebaug | 19 - Taunton |
| 9 - Nashua | |
| 10 - French | |
| 11 - Blackstone | |

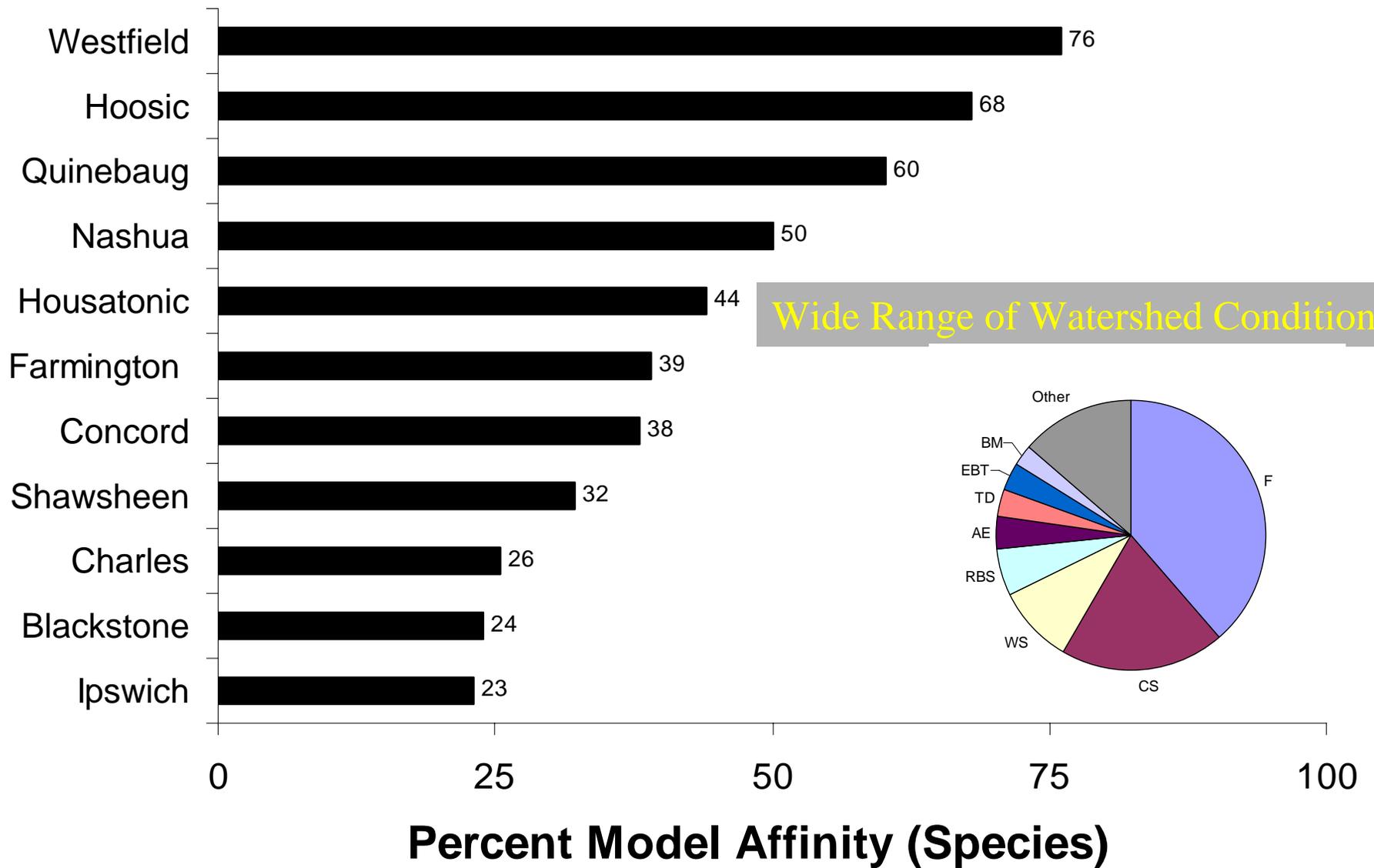
Fish Community Assessment: Identifying the Current Status

- The Fish Tell the Story
 - Long-Lived
 - Reflect Stresses Over Time
 - Easily Recognized and Identified



Shawsheen River Similarity Index

Fish Species	TFC Percentage	Current Community Percentage	Absolute Difference
Common shiner	37.6	-	37.6
Fallfish	18.8	5.2	13.6
Tessellated darter	7.5	2.6	4.9
Redbreast sunfish	6.3	11.1	4.8
American eel	5.4	45.6	40.2
White sucker	4.7	1.3	3.4
Pumpkinseed	4.2	4.2	0.0
Creek chubsucker	2.0	0.6	1.4
Bridle shiner	1.8	0.1	1.7
Golden shiner	1.7	0.7	1.0
Brook trout	1.6	-	1.6
Redfin pickerel	1.6	10.6	9.0
Bluegill	-	9.3	9.3
Banded sunfish	-	0.4	0.4
Brown trout	-	0.2	0.2
Total			135.7
Percent Model Affinity (Novak and Bode)			32.2



Species Scarcity and Absence

- Examine 5 species predicted to be most abundant by TFC
- Scarce or absent species indicate ecological conditions severely lacking
- Species considered scarce if the existing fish community percentage was 10% or less than that predicted by the TFC

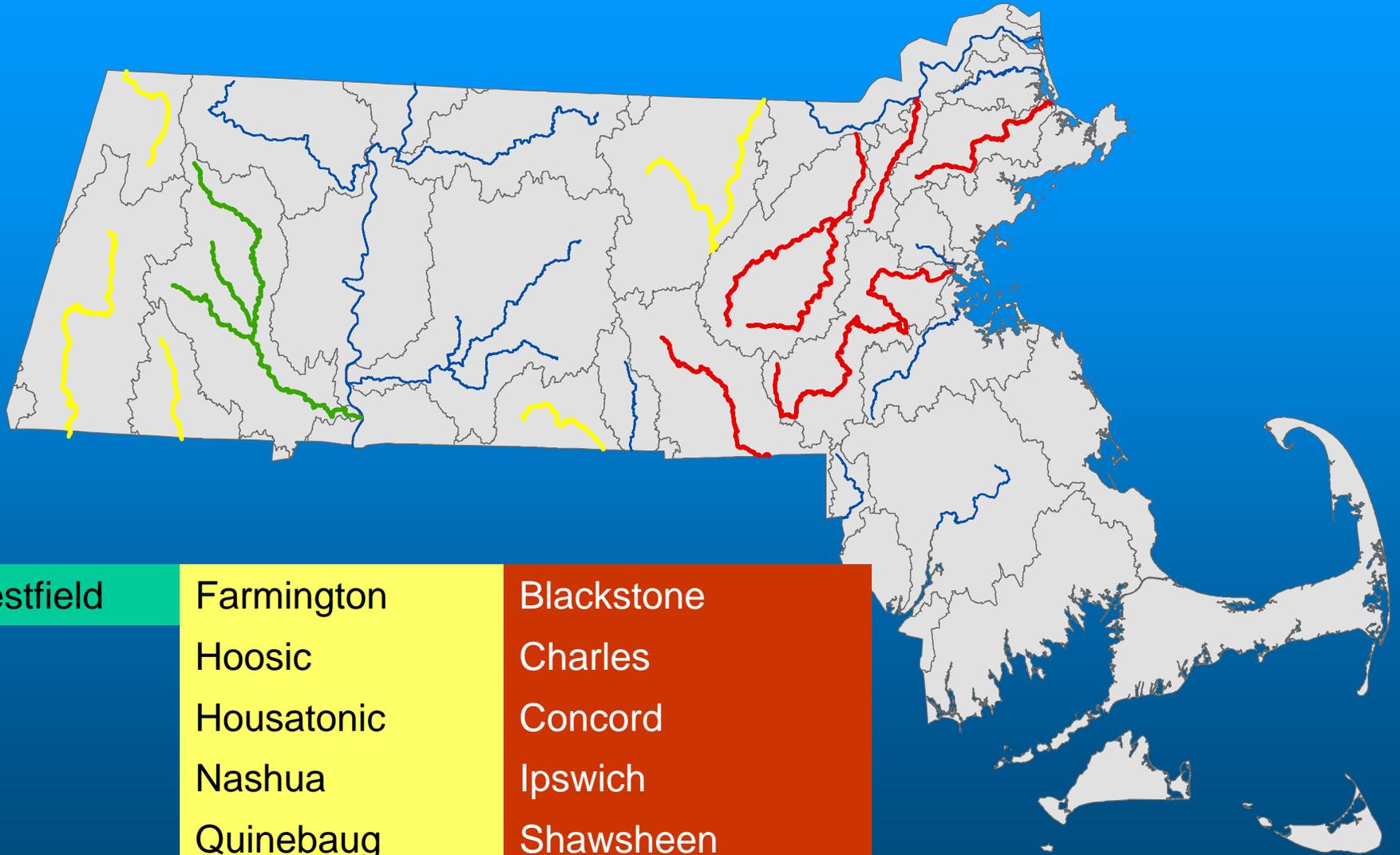
Scarcity Example

Table 36. Blackstone River species percentages for target fish community model and current community composition. Absolute difference values between model expected and current community percentages were used to calculate percent model affinity.

Fish species	TFC Percentage	Current Community Percentage	Percent
Fallfish	31.8	1.3	4
Common shiner	15.9	1.1	7
White sucker	10.6	49.8	470
Longnose dace	8.0	0.3	4
American eel	5.3	-	-

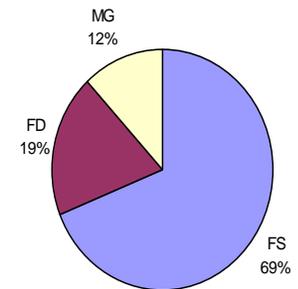
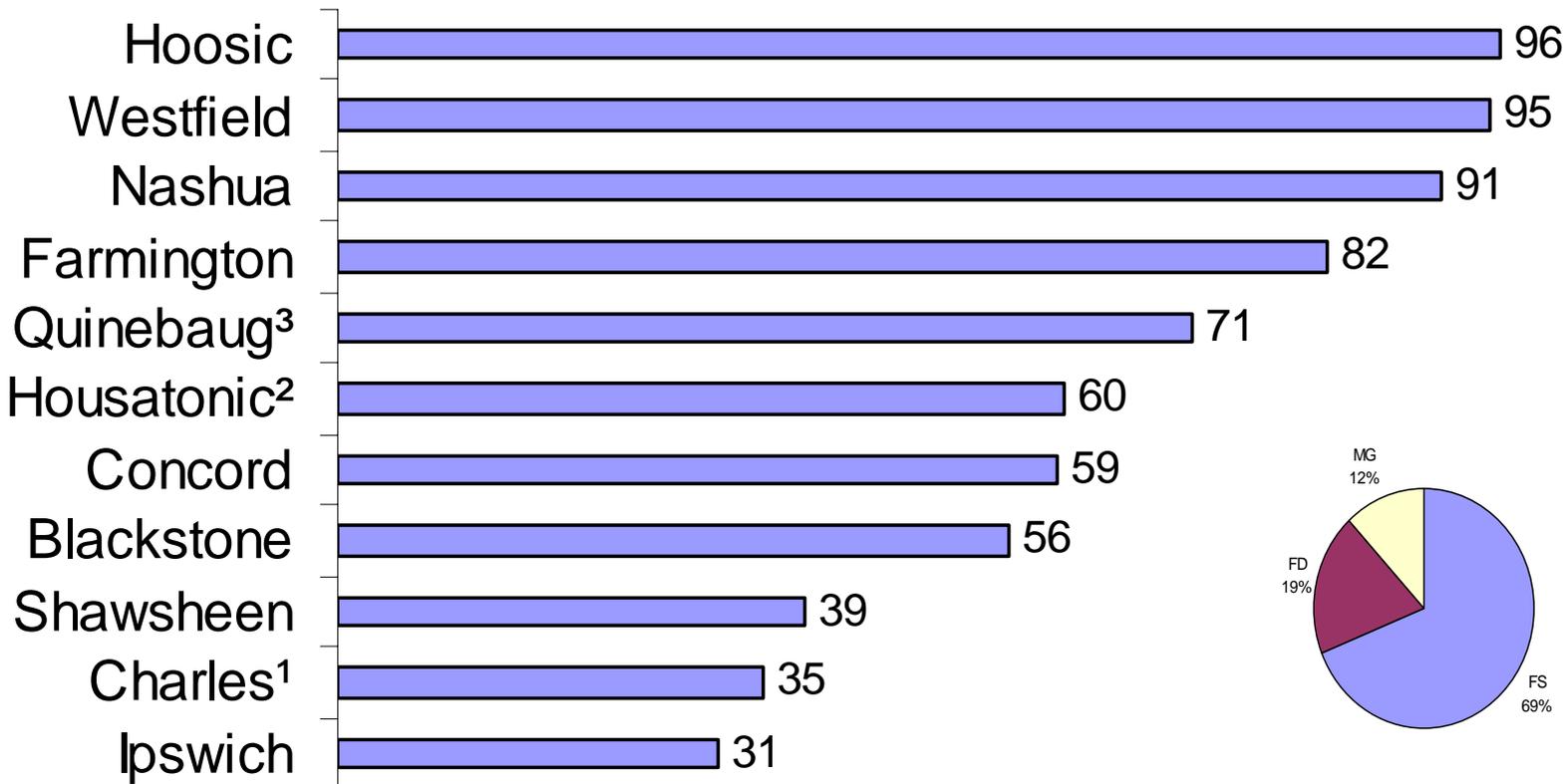
3 Scarce, 1 Absent

Mainstem River Condition



Habitat Use Category Similarity

Percent Model Affinity (HUC)

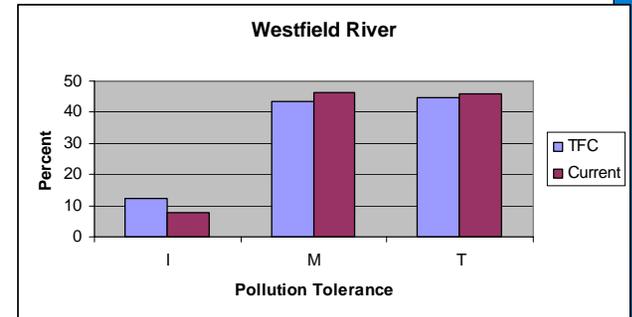
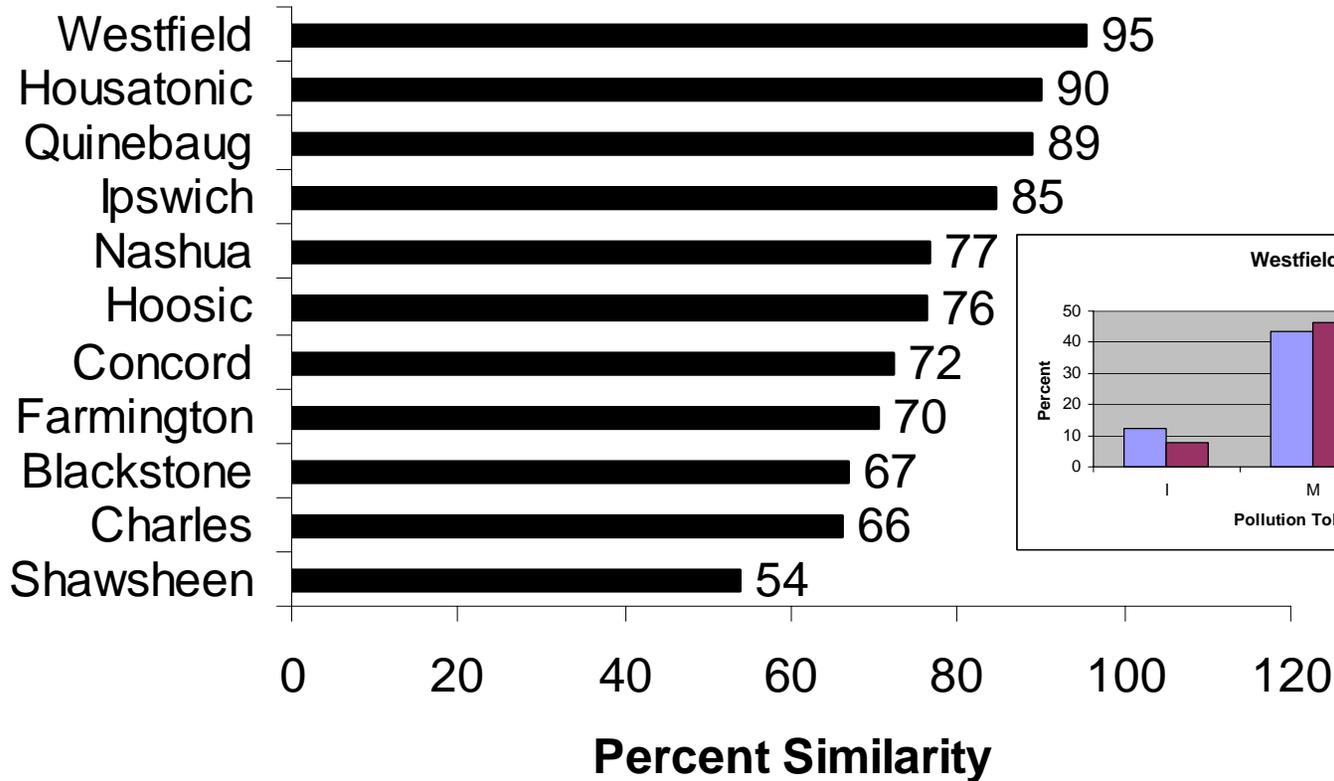


0 20 40 60 80 100

Pollution Tolerance Similarity

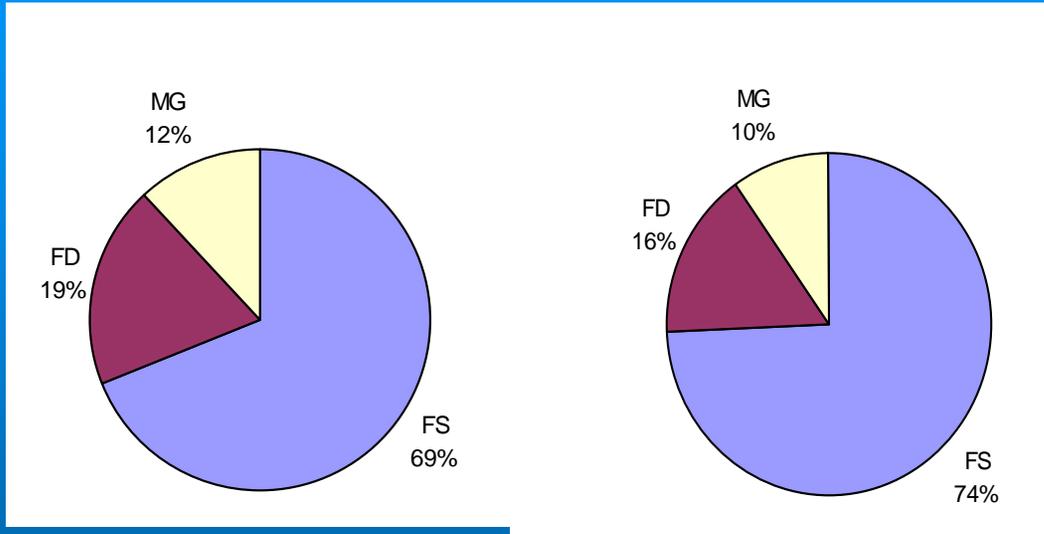
Watershed

Pollution Tolerance



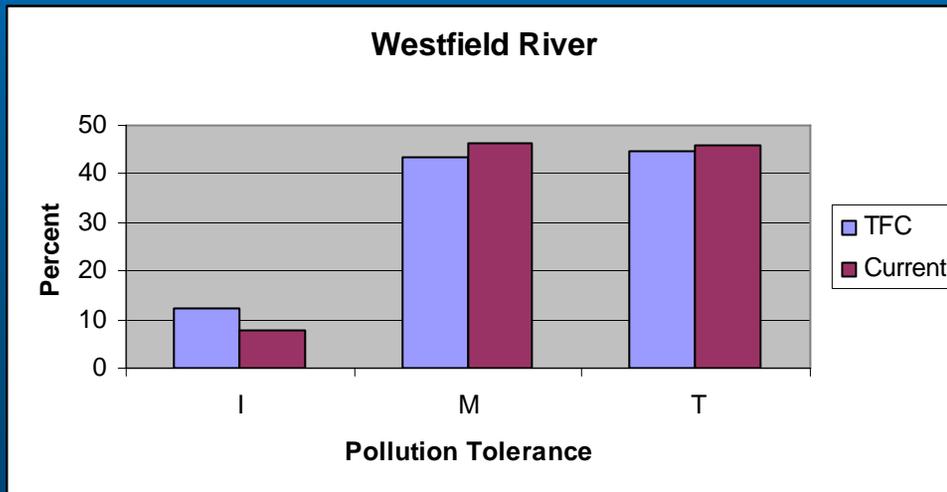
Prioritizing Restoration: Westfield River (Green)

Stream and River Species Proportions



Water Quantity
and Physical
Habitat

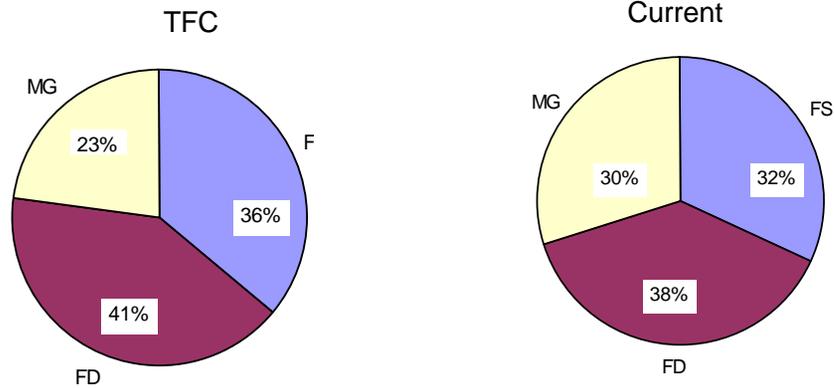
Measure of Pollution Tolerance



Water Quality

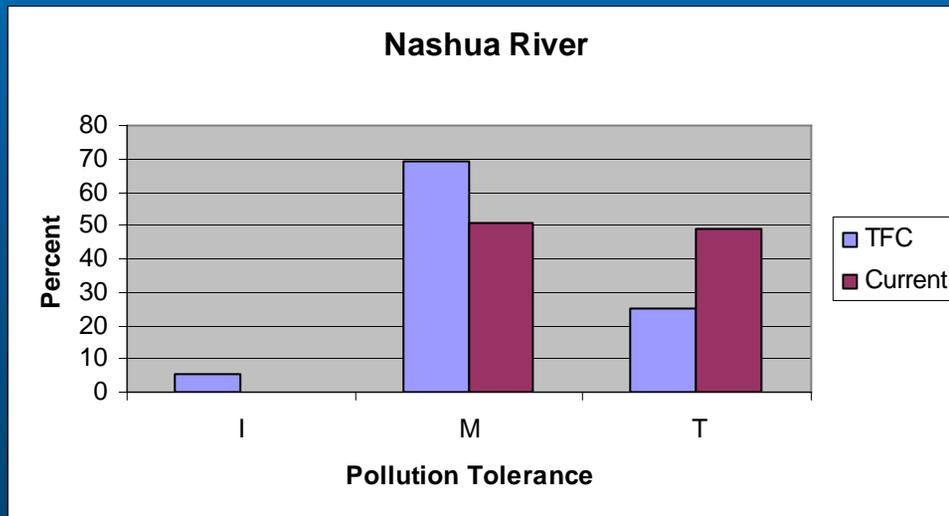
Prioritizing Restoration: Nashua River (Yellow)

River Species Proportions



Water Quantity
and Physical
Habitat

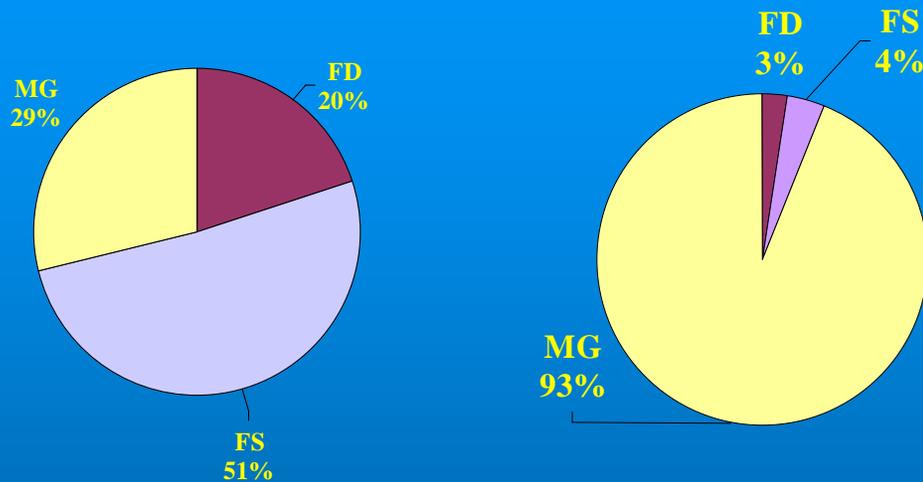
Measure of Pollution Tolerance



Water Quality

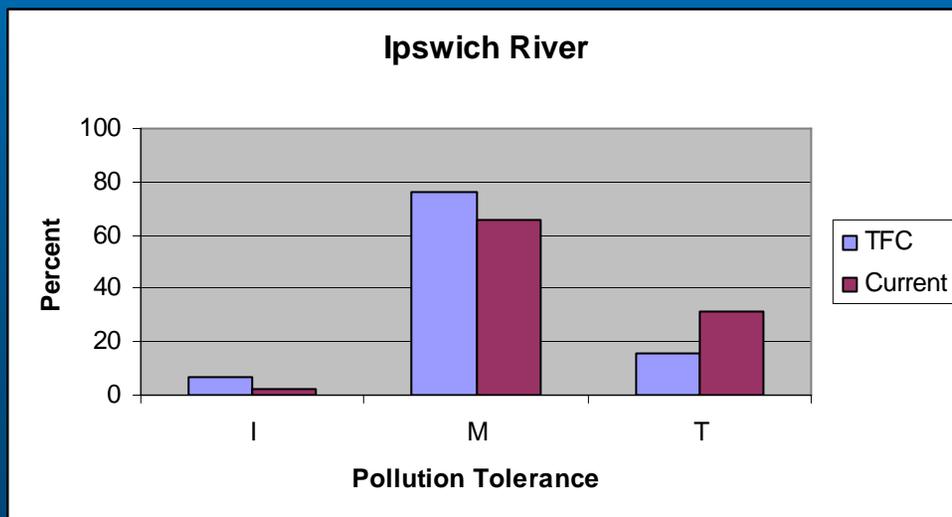
Prioritizing Restoration: Ipswich River (Red)

Stream and River Species Proportions



Water Quantity
and Physical
Habitat

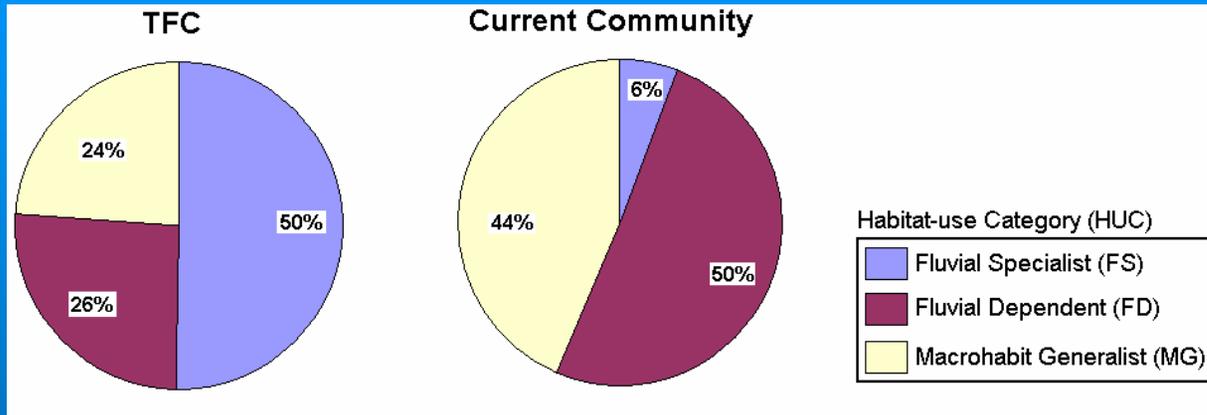
Measure of Pollution Tolerance



Water Quality

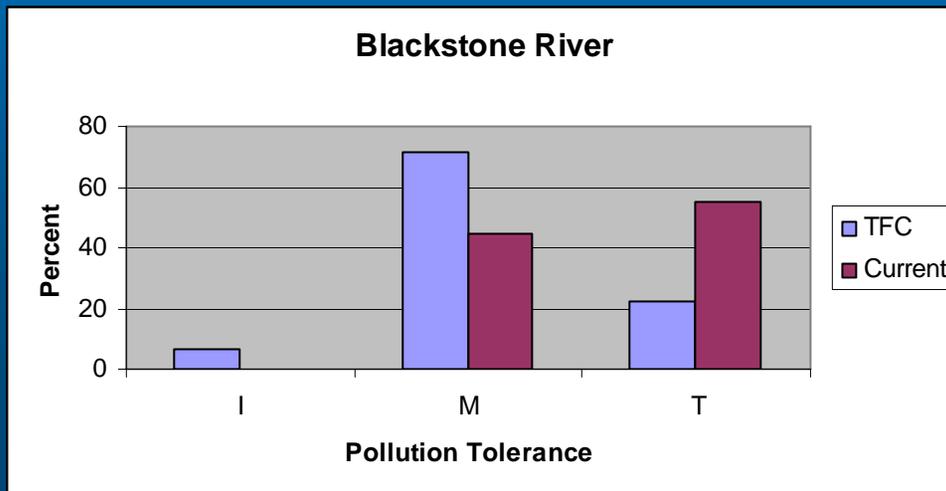
Prioritizing Restoration: Blackstone River (Red)

Stream and River Species Proportions



Water Quantity
and Physical
Habitat

Measure of Pollution Tolerance



Water Quality

Summary

- Completion of 19 Target Fish Community Models
- Comparison of 11 Current Fish Communities to Corresponding Targets
- Generalize Water Quality/Quantity issues
- Provide a Product that can be Incorporated into Water Policy and Water Quality Standards Applications