Freshwater Mussels

- Twelve species of freshwater mussels native to New England
- Healthy populations of six species occur in Lamprey
- State listed Brook Floater reported
- Triangle Floater suggested as possible
- Habitat stability

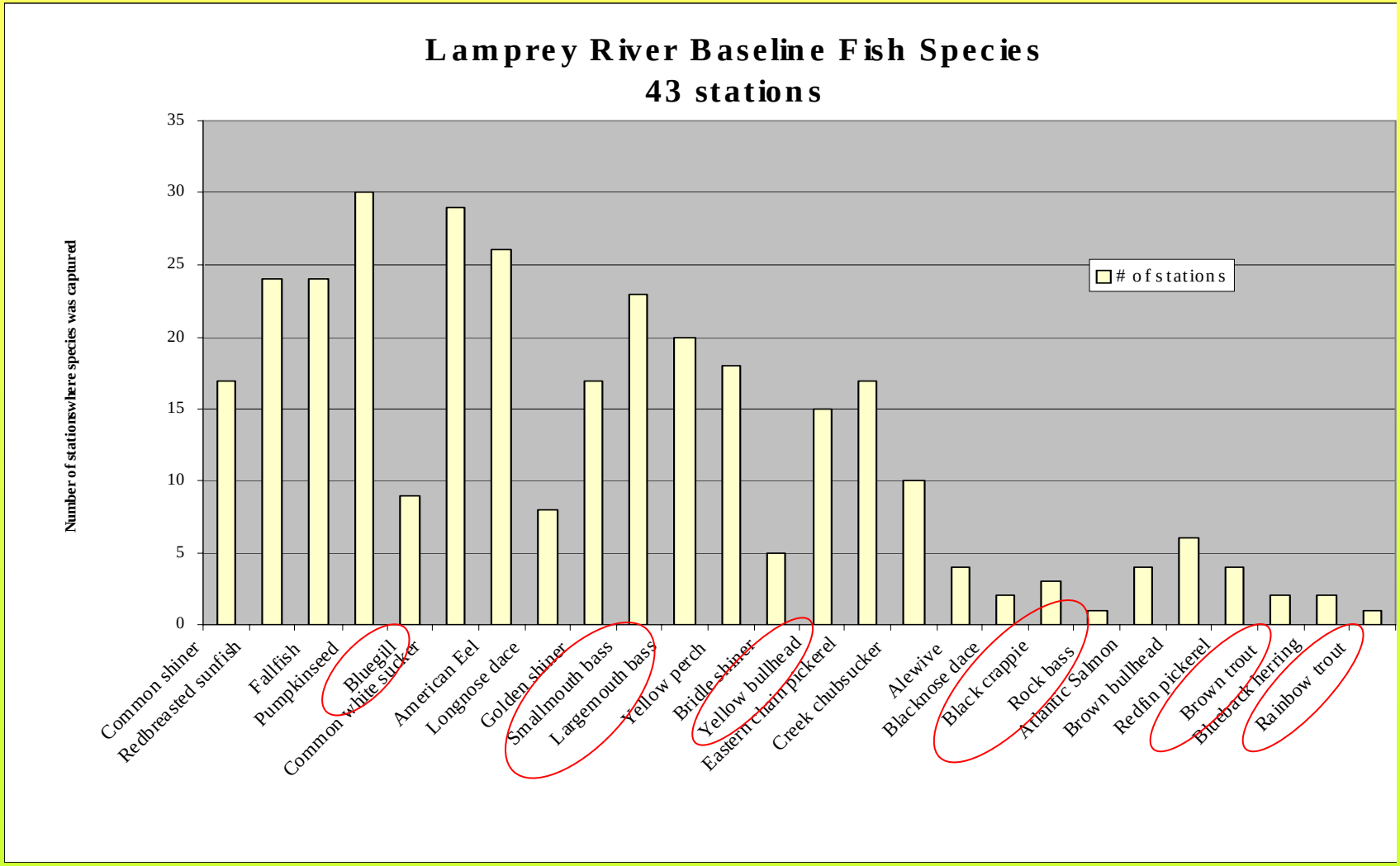
LIFE CYCLE OF EASTERN ELLIPTIO *(Elliptio complanata)*

After Burch (1975) and Pennak (1978)

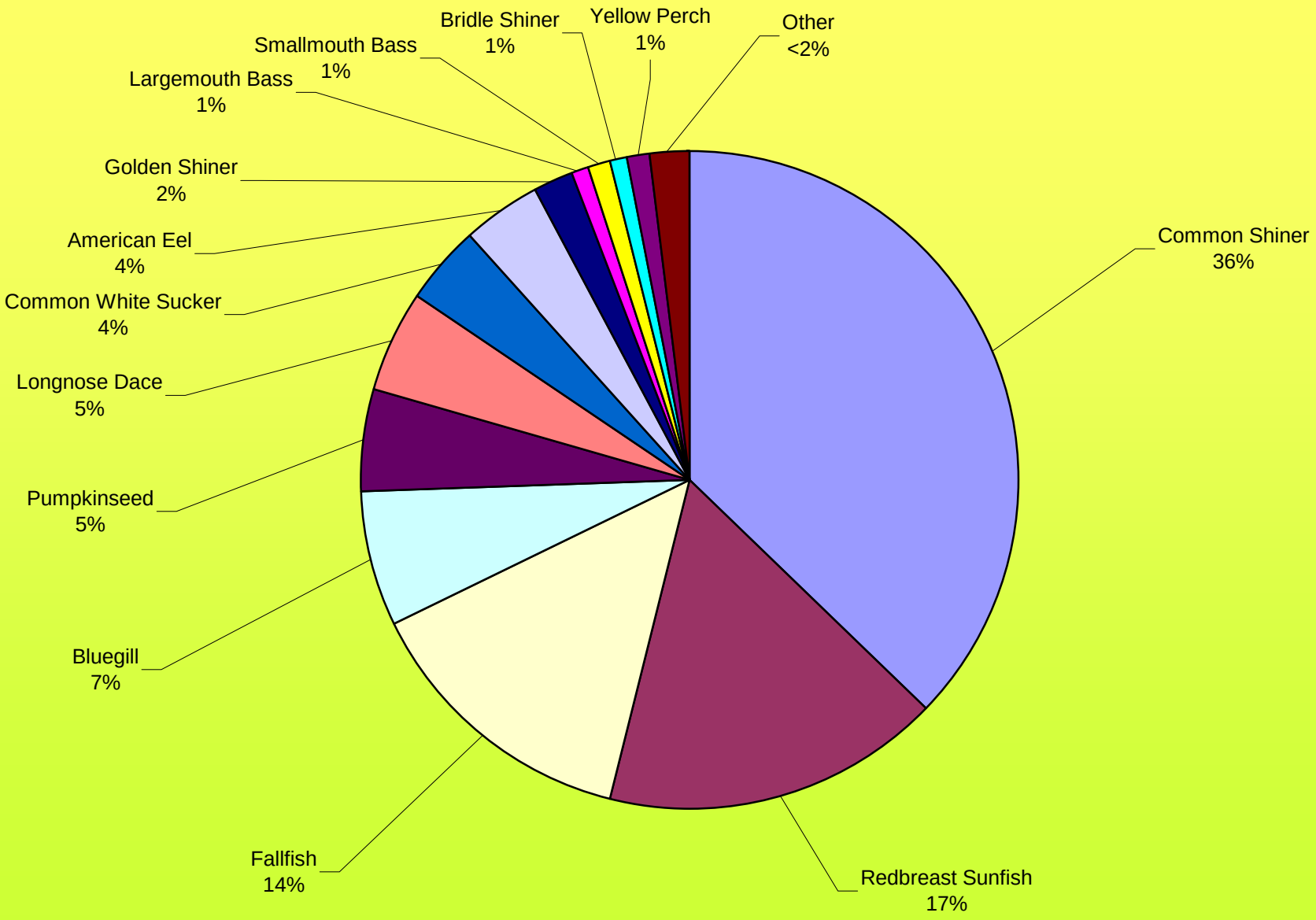
Fish

- Resident native
- Diadromous fauna
- Rare, Threatened and Endangered
- Spawning
- Juvenile

LAMPREY RIVER BASELINE FISH SAMPLING
AUGUST 25-29, 2003



Lamprey Baseline Fish Community (BFC)

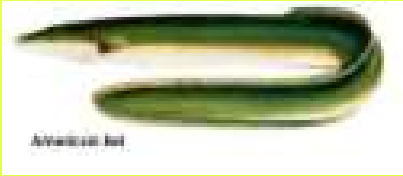


Diadromous species

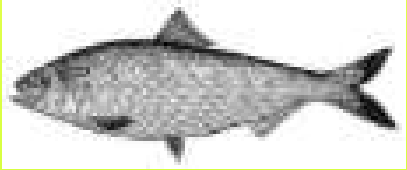
- Alewife

-
- Atlantic salmon

- American Eel



- American shad



-
- Blueback herring

- Sea lamprey

Brook trout

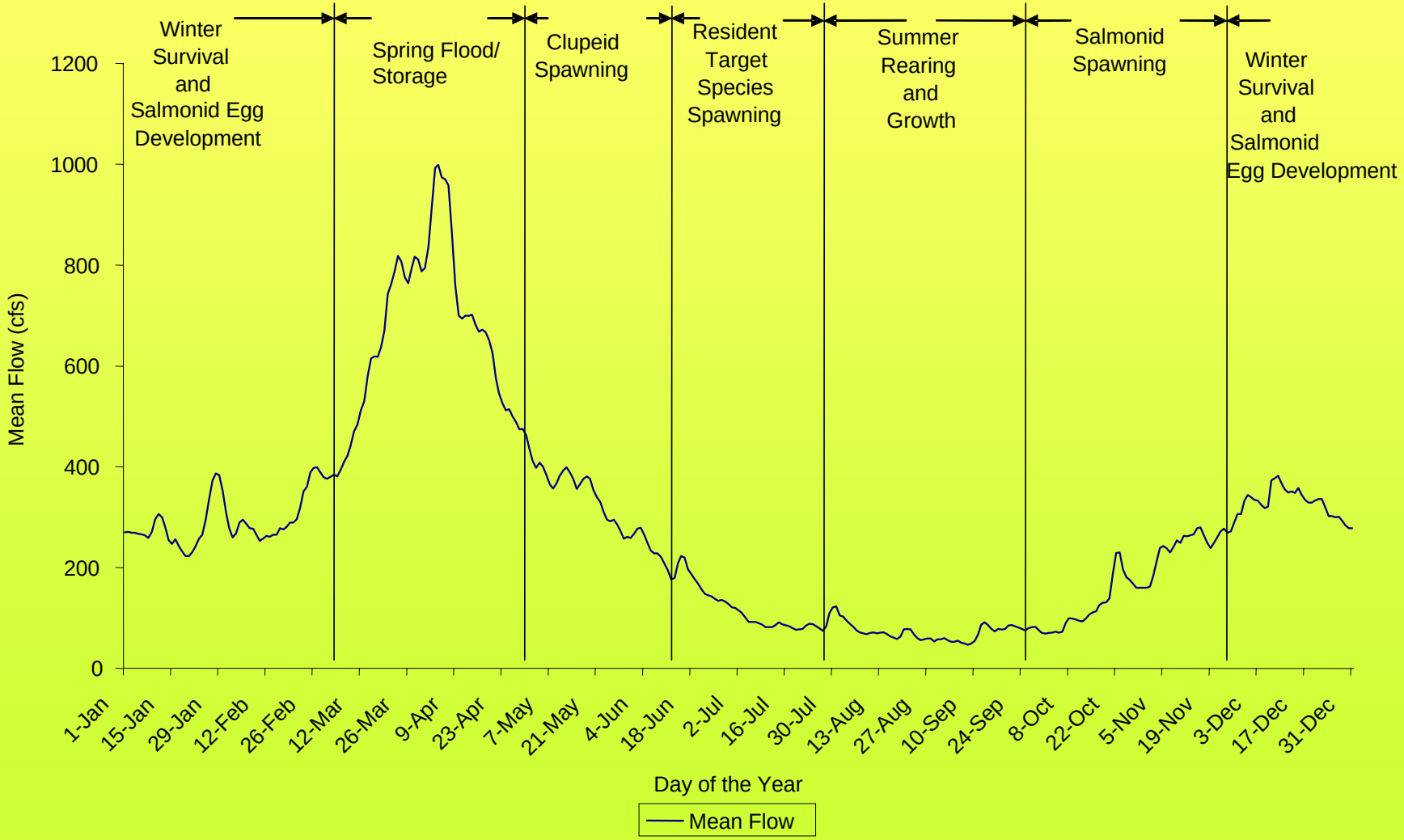
Banded sunfish

Bridle shiner

Swamp darter

Redfin pickerel

Bioperiods


Winter Survival and Salmonid Egg Development
Spring Flood/ Storage
Clupeid Spawning
Resident Target Species Spawning
Summer Rearing and Growth
Salmonid Spawning
Winter Survival and Salmonid Egg Development
Mean Flow (cfs)
1200
1000
800
600
400
200
0
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
9-Apr
23-Apr
7-May
21-May
4-Jun
18-Jun
2-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
8-Oct
22-Oct
5-Nov
19-Nov
3-Dec
17-Dec
31-Dec
Day of the Year
Mean Flow

Insects

- Dragonflies and damselflies
- Ringed bog haunter (?)
- EPT taxa
- Snails
- Seasonal flow and substrate needs

Overseas approaches to setting
River Flow Objectives

Institute of Hydrology

R&D Technical Report W6B(96)4

Institute of Hydrology

Environment Agency

Further copies of this report are available from:
Foundation for Water Research, Allen House, The Listons, Liston Rd, Marlow, Bucks SL7 1FD
Tel: 01628 891589, Fax: 01628 472711

R&D Technical Report W6B(96)4 1 04/06/98
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psystems: a global database - Mozilla

Help

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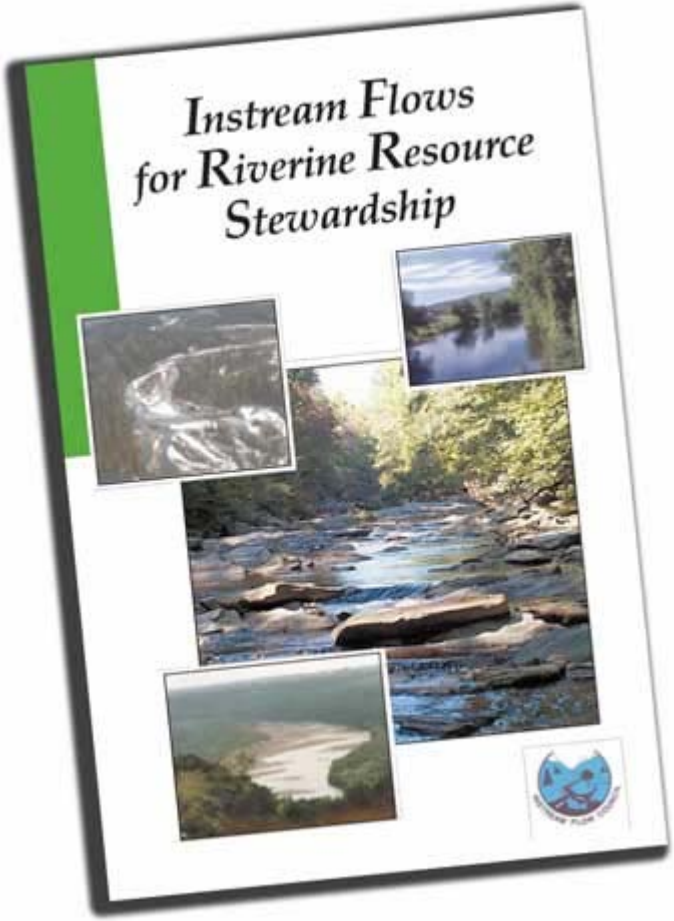
Go Search Print

g/ehd...



COST Action 626 Report

State-of-the-art in data sampling, modelling analysis and applications of river habitat modelling

Atle Harby, Martin Baptist, Michael J. Dunbar and Stefan Schmutz (editors)

March 2004

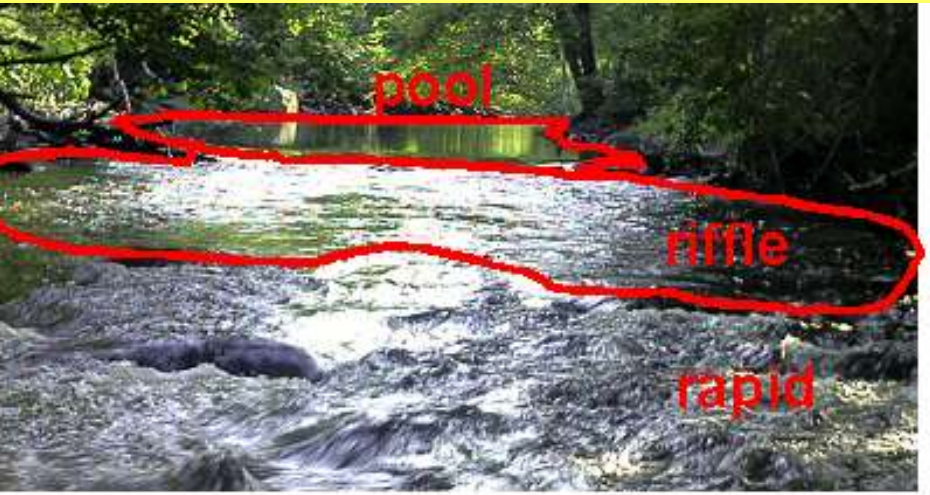
EARCH DATABASE

ENVIRONMEN
AQU
A DATAB

Environmental flows may
freshwater dependent eco
services and benefits in c
regulation and competitio

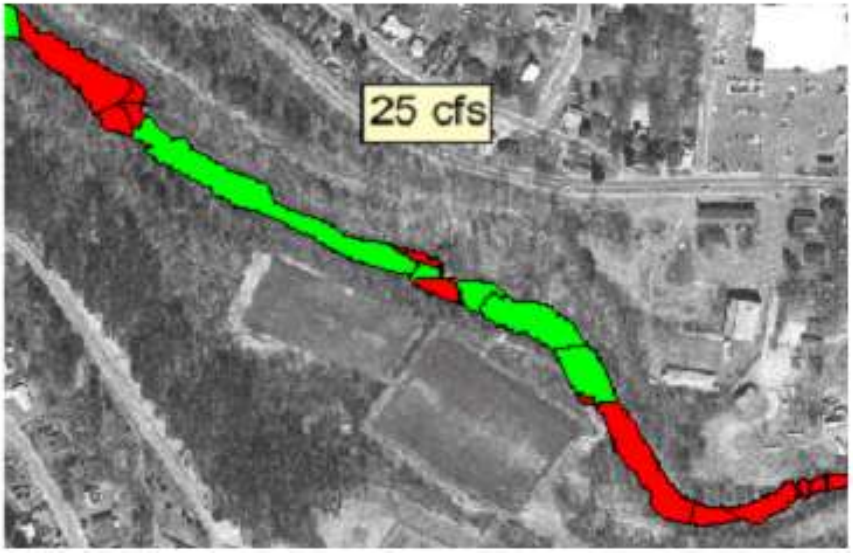
This database attempts t
topic of environmental flo
intends to provide a temla
The information presented
envisaged that available d
types of aquatic ecosystems (e.g. estuaries, lakes, inland deltaic systems, non-riverine wetlands) and the components they comprise (e.g. riparian vegetation, geomorphology, water quality) will be added in time. The inclusion of a section on environmental flow policy and legislation is envisaged in future.

MesoHABSIM

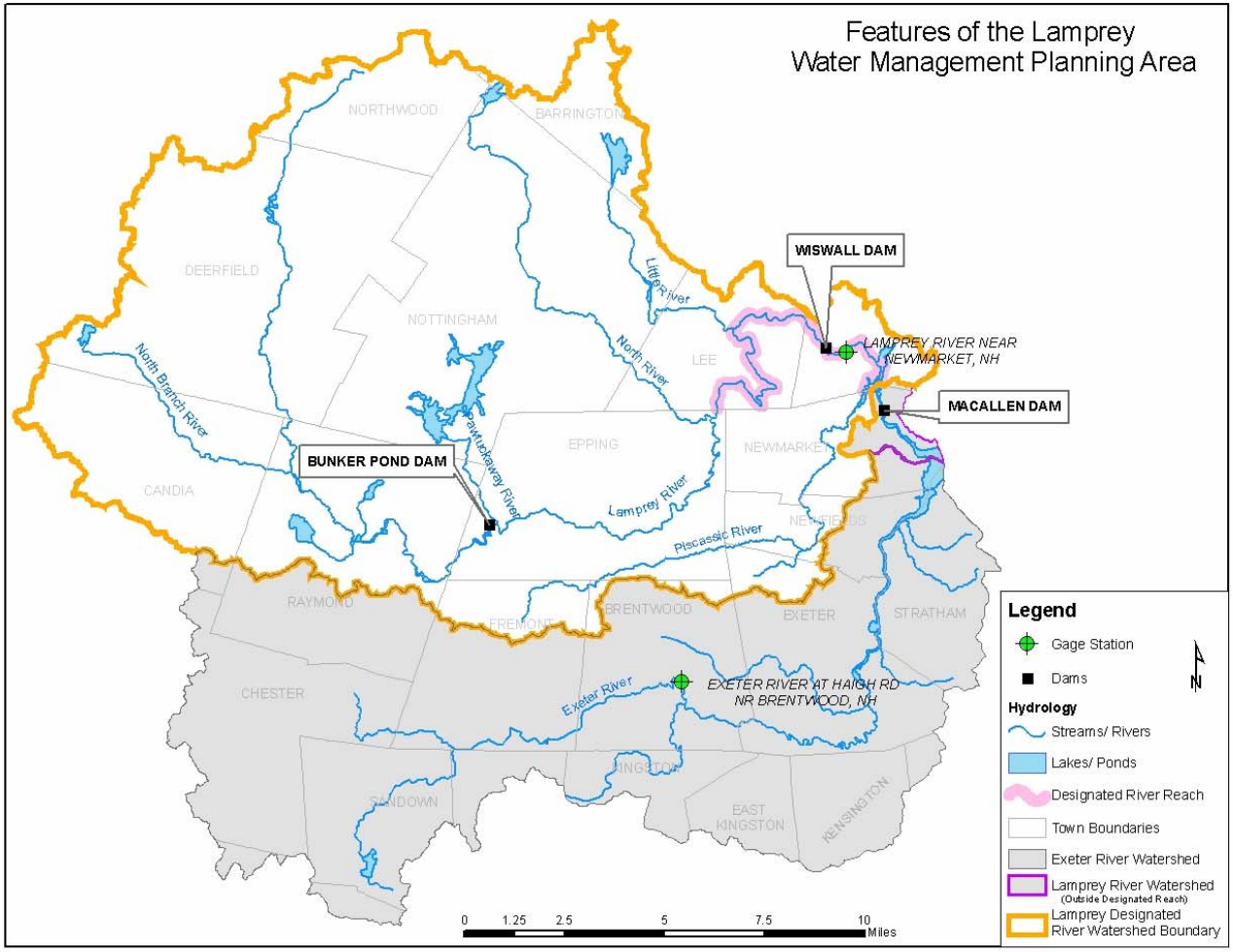


FALLFISH

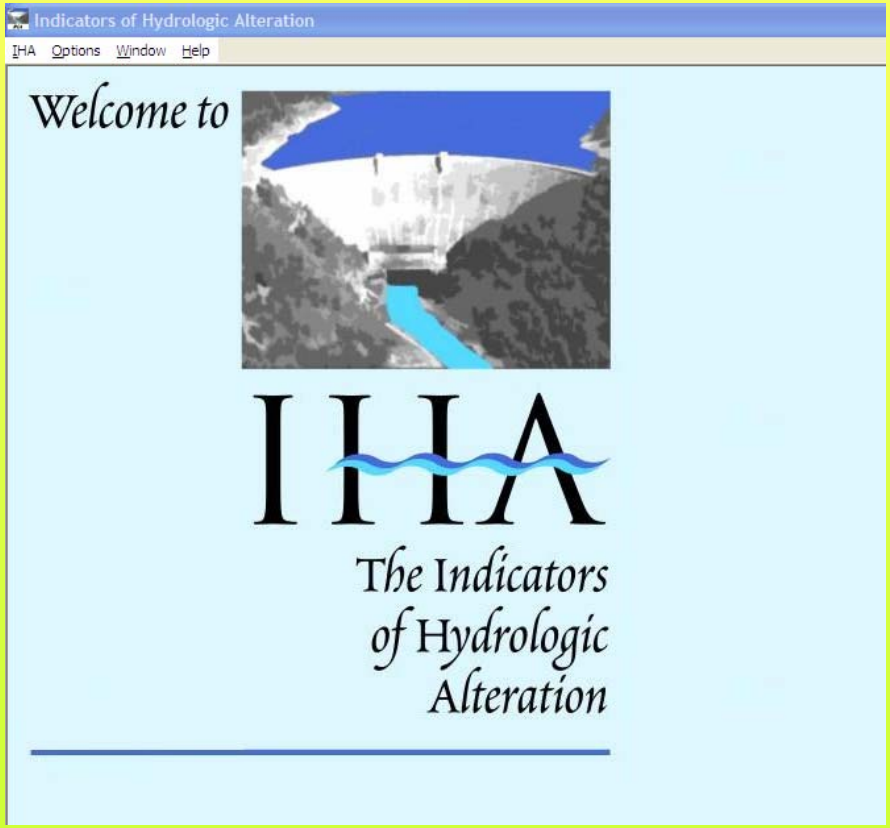
Presence (76%)		Beta
	BOULDER	1.95
	SHADING	-1.07
	DEPTH 0-25 cm	-1.76
	VELOCITY 45-60 cm/s	1.06
	RUN	-0.57
High abundance (60%)		
	Overhanging vegetation	-0.97



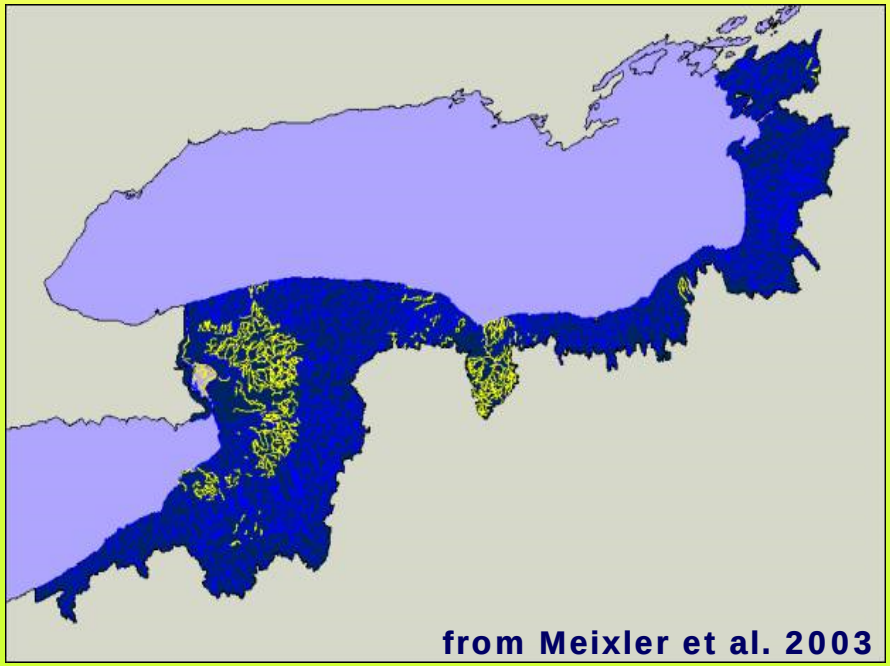
WMA and DR

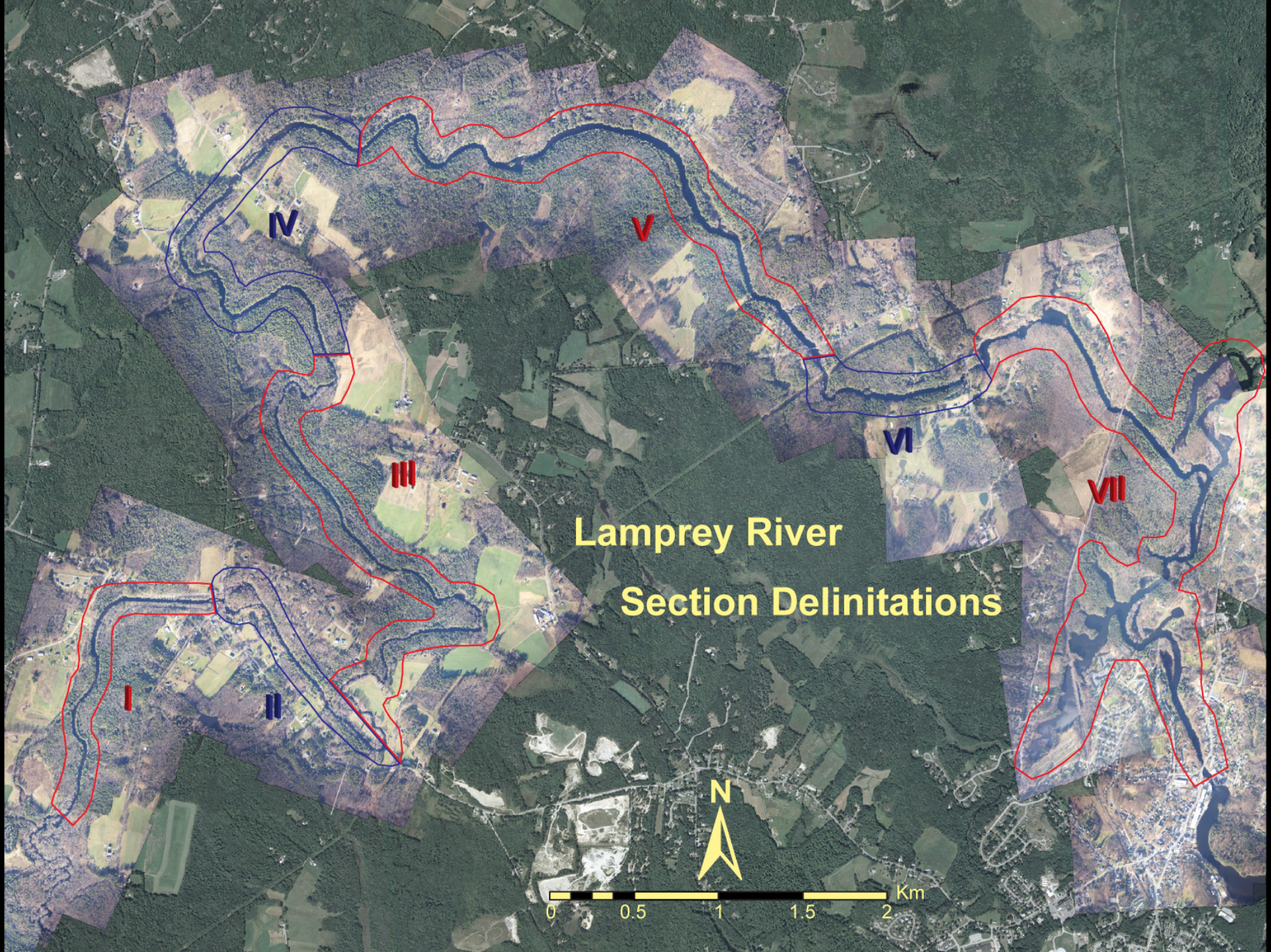

Features of the Lamprey
Water Management Planning Area
NORTHWOOD
BARRINGTON
DEERFIELD
NOTTINGHAM
LEE
EPPING
NEWMARKET
NEWFIELDS
CANDIA
RAYMOND
FREMONT
BRENTWOOD
EXETER
STRATHAM
CHESTER
KINGSTON
SANDOWN
EAST KINGSTON
KENSINGTON
WISWALL DAM
MACALLEN DAM
BUNKER POND DAM
LAMPREY RIVER NEAR NEWMARKET, NH
EXETER RIVER AT HAIGH RD NR BRENTWOOD, NH
Little River
North River
North Branch River
Pawtuckaway River
Lamprey River
Piscassic River
Exeter River
0 1.25 2.5 5 7.5 10 Miles
Legend
Gage Station
Dams
Hydrology
Streams/ Rivers
Lakes/ Ponds
Designated River Reach
Town Boundaries
Exeter River Watershed
Lamprey River Watershed
(Outside Designated Reach)
Lamprey Designated River Watershed Boundary

Large scale methods for their utility to watershed wide assessment

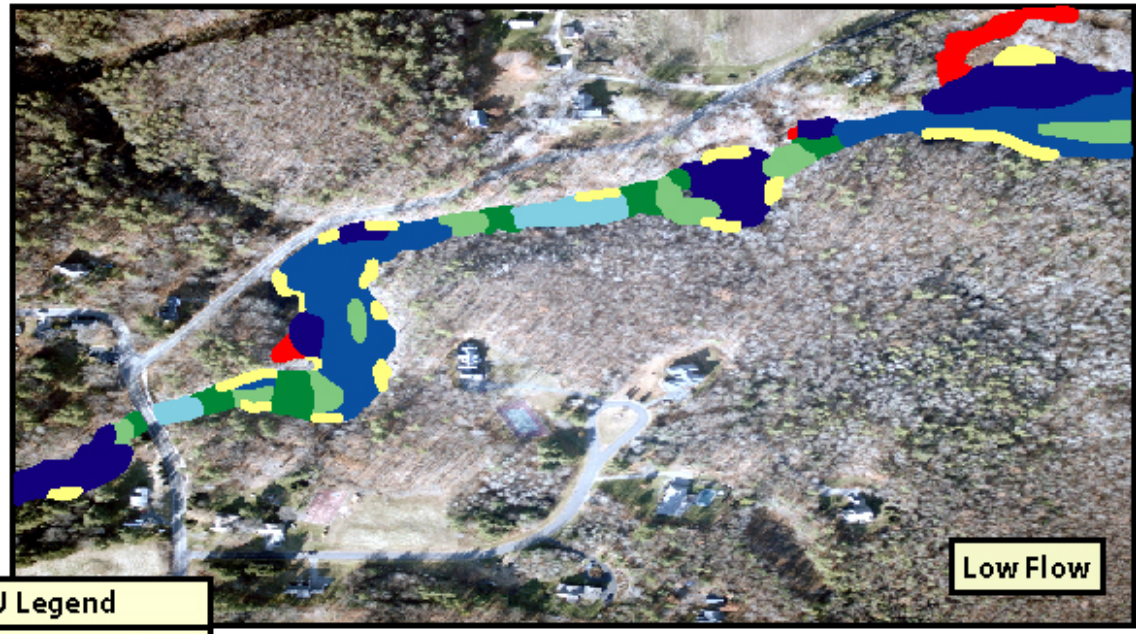


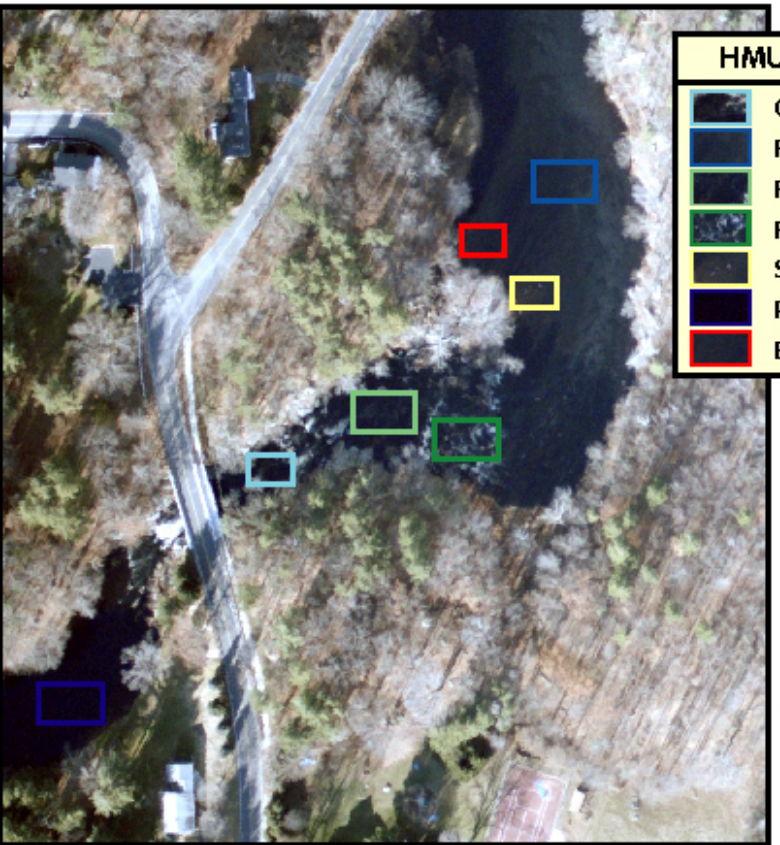
Hydroecology and conservation mapping




Lamprey River
Section Delinitations
I
II
III
IV
V
VI
VII
N
0
0.5
1
1.5
2
Km

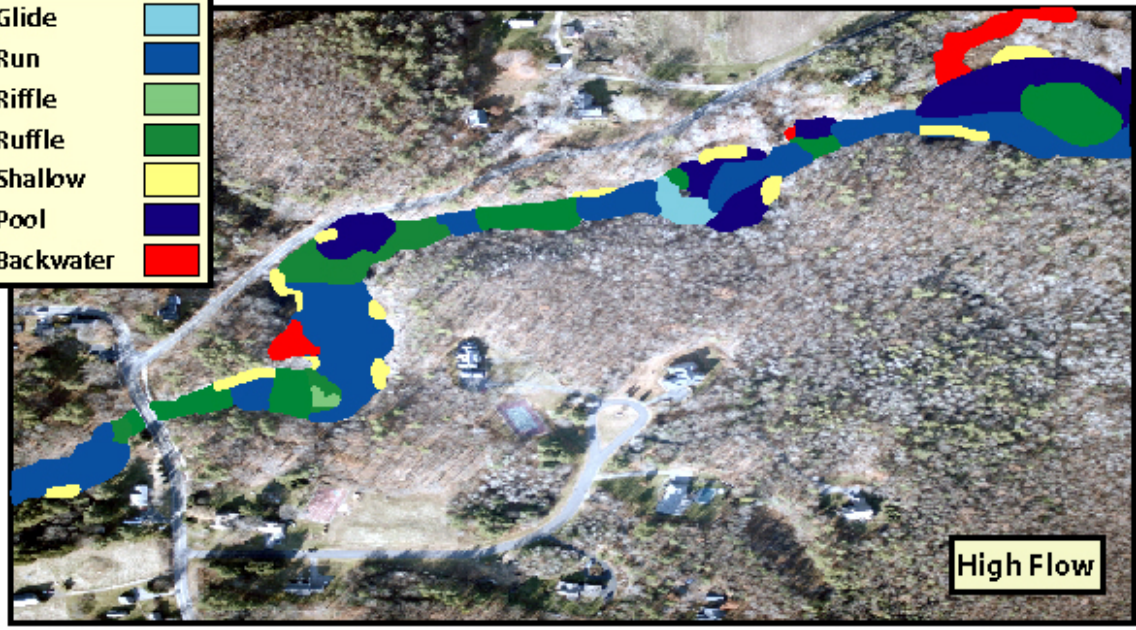
Simulated Multispectral HMU Mapping of Lamprey River



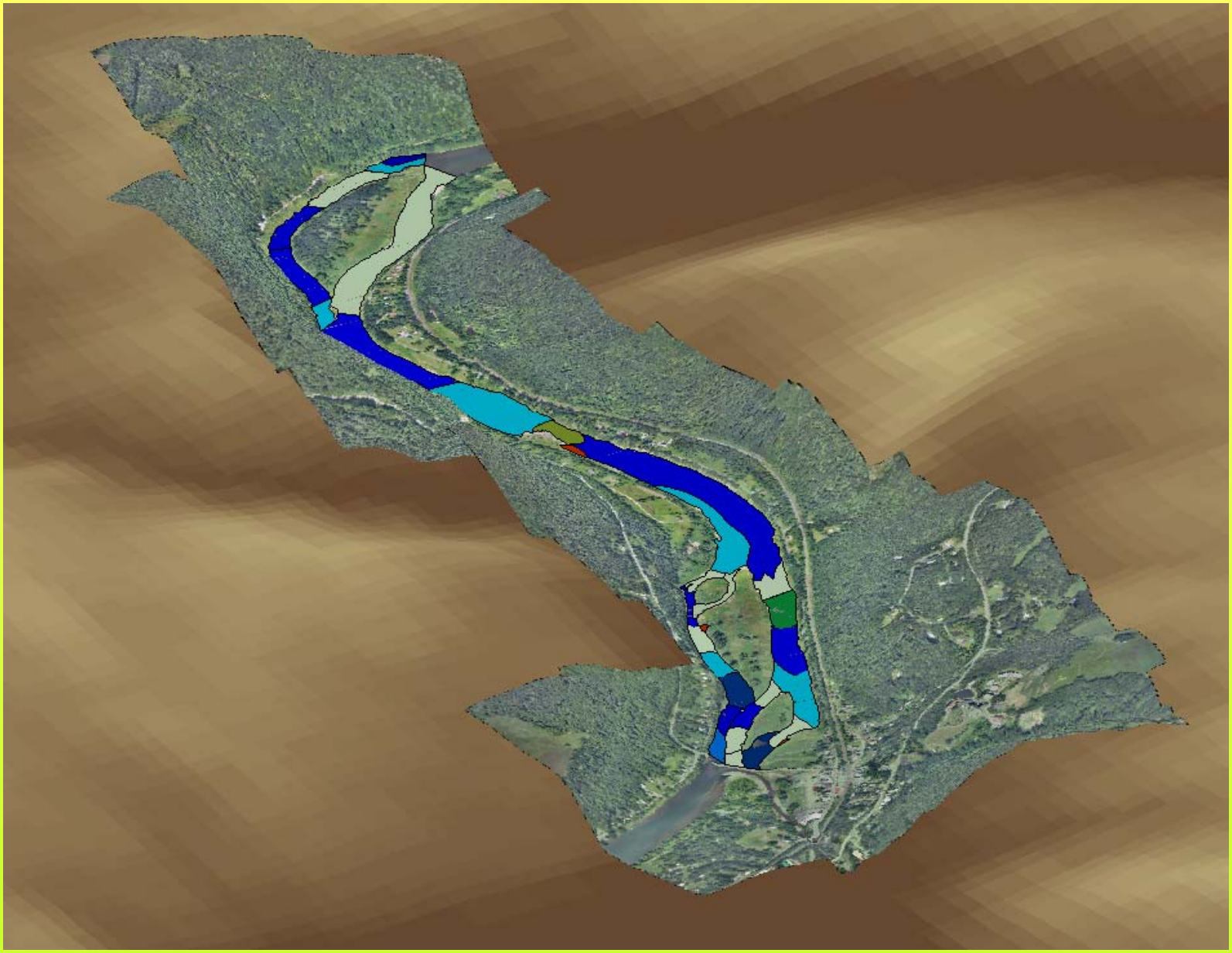


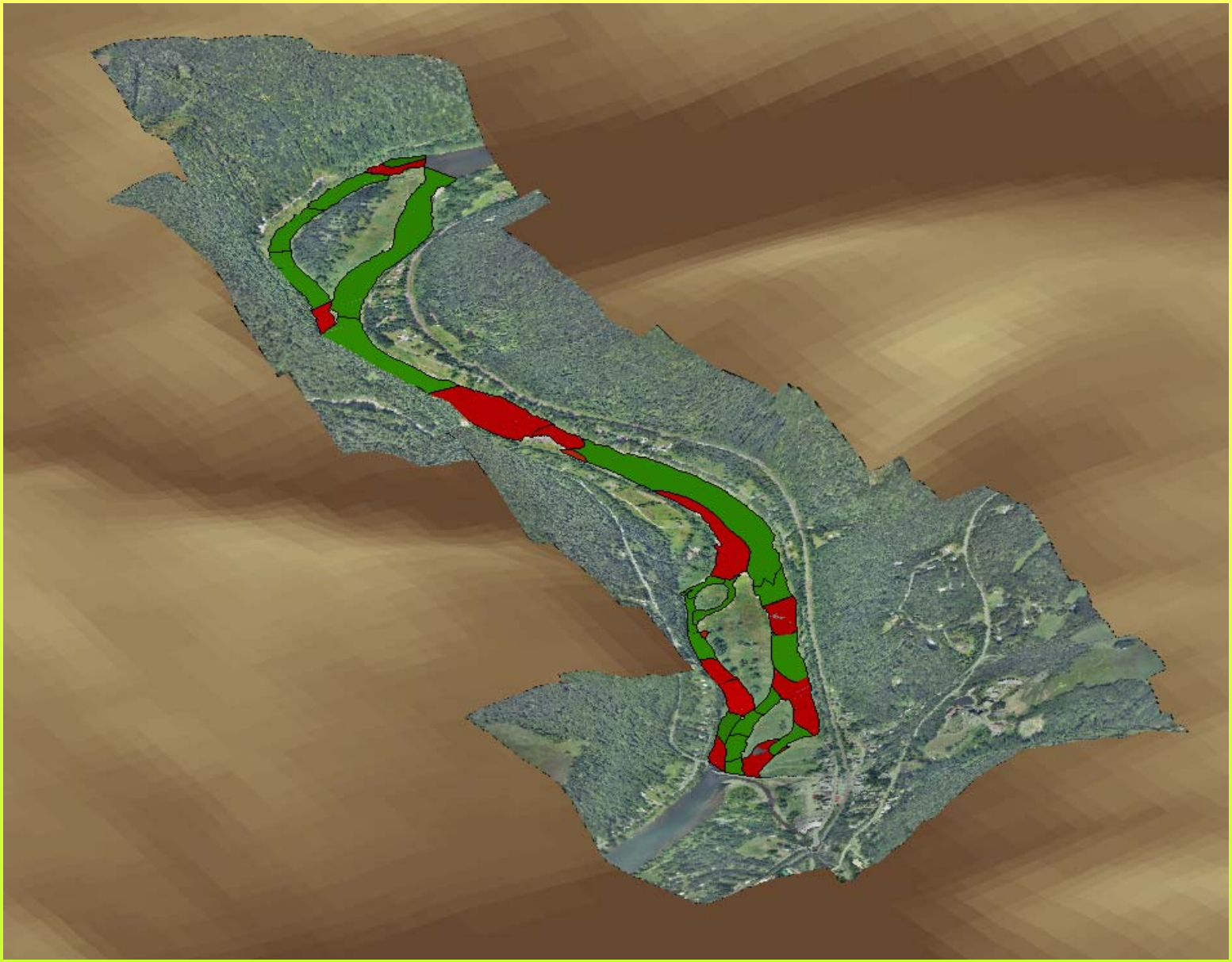
HMU Legend

- Glide
- Run
- Riffle
- Ruffle
- Shallow
- Pool
- Backwater

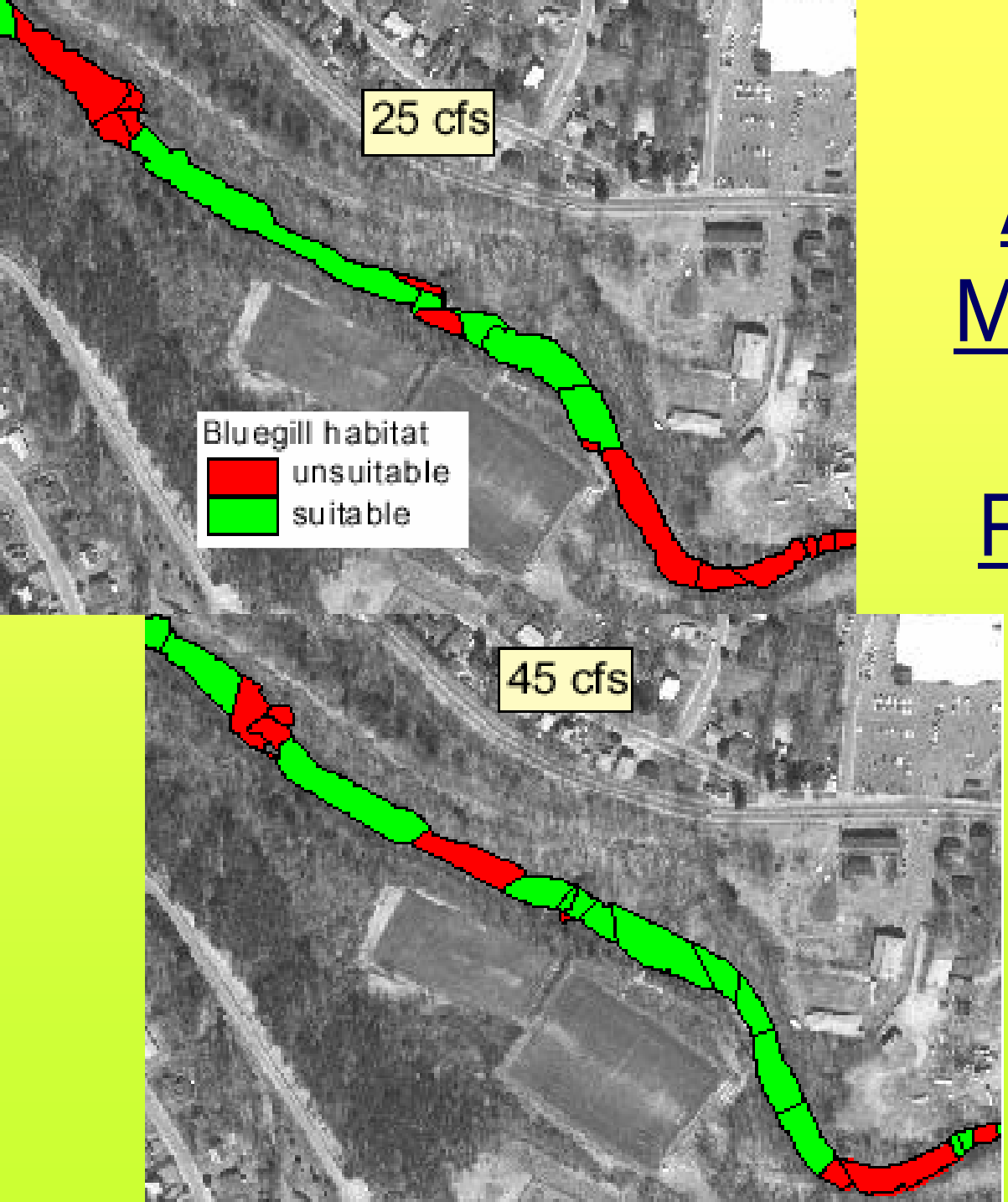


Example of proposed use of mutispectral high-resolution imagery to remotely classify hydro-morphological units. Close-up area (lower left) shows Packers Falls region along Bennett road.

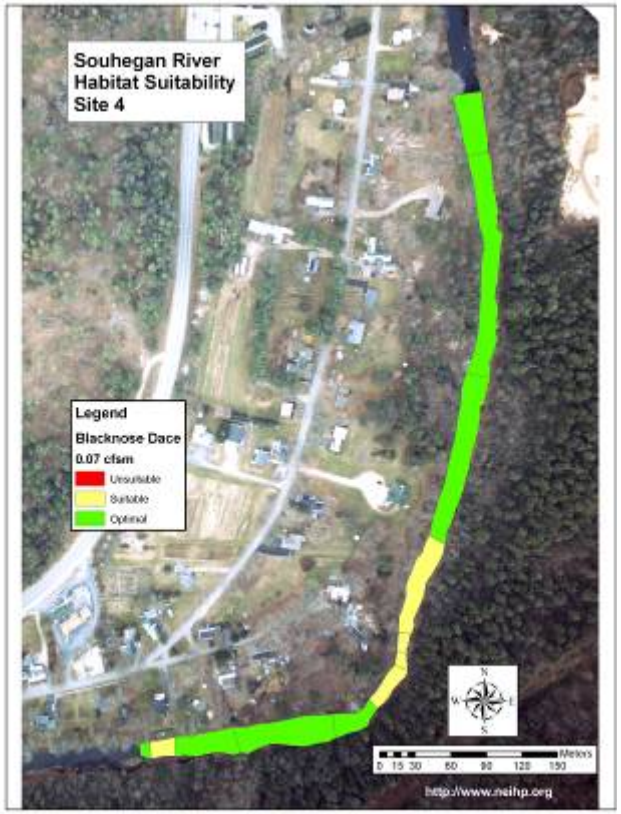


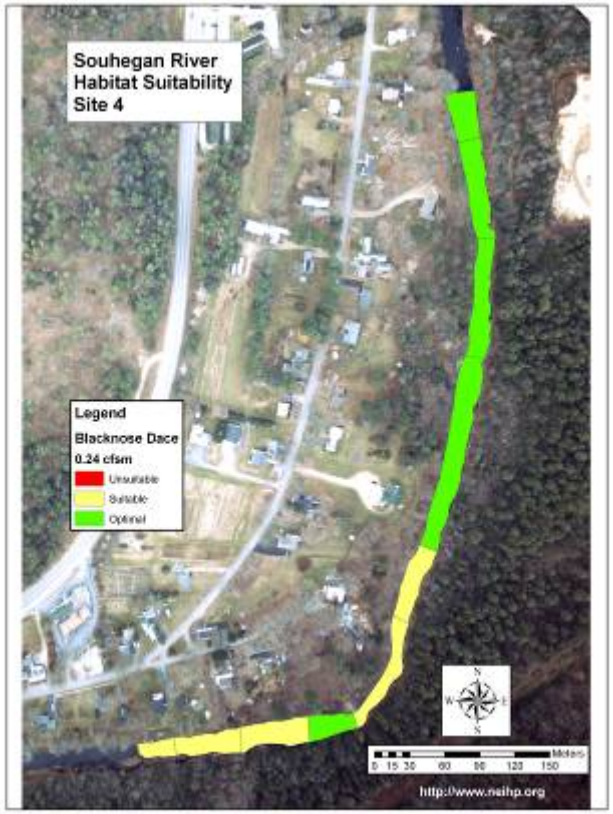


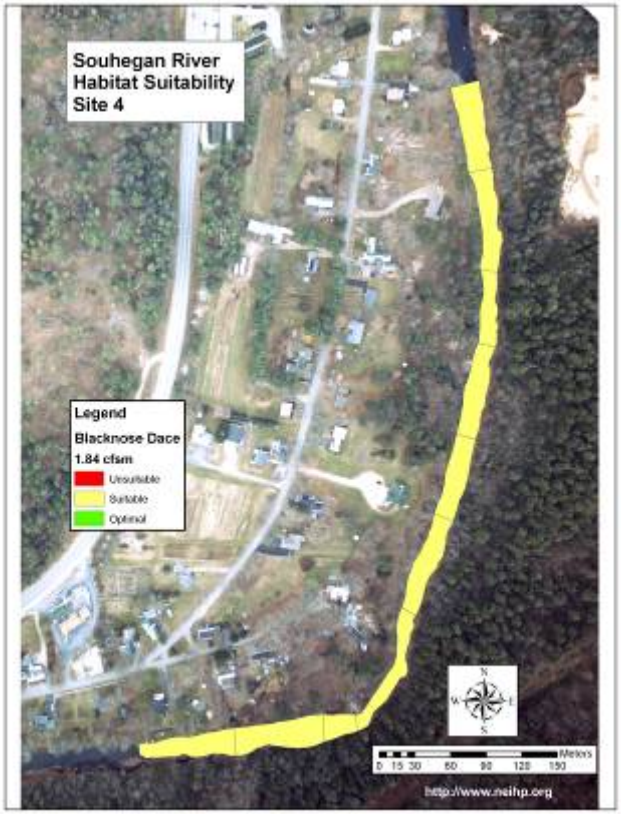
Habitat Assessed at Multiple Flows to Create Rating Curve



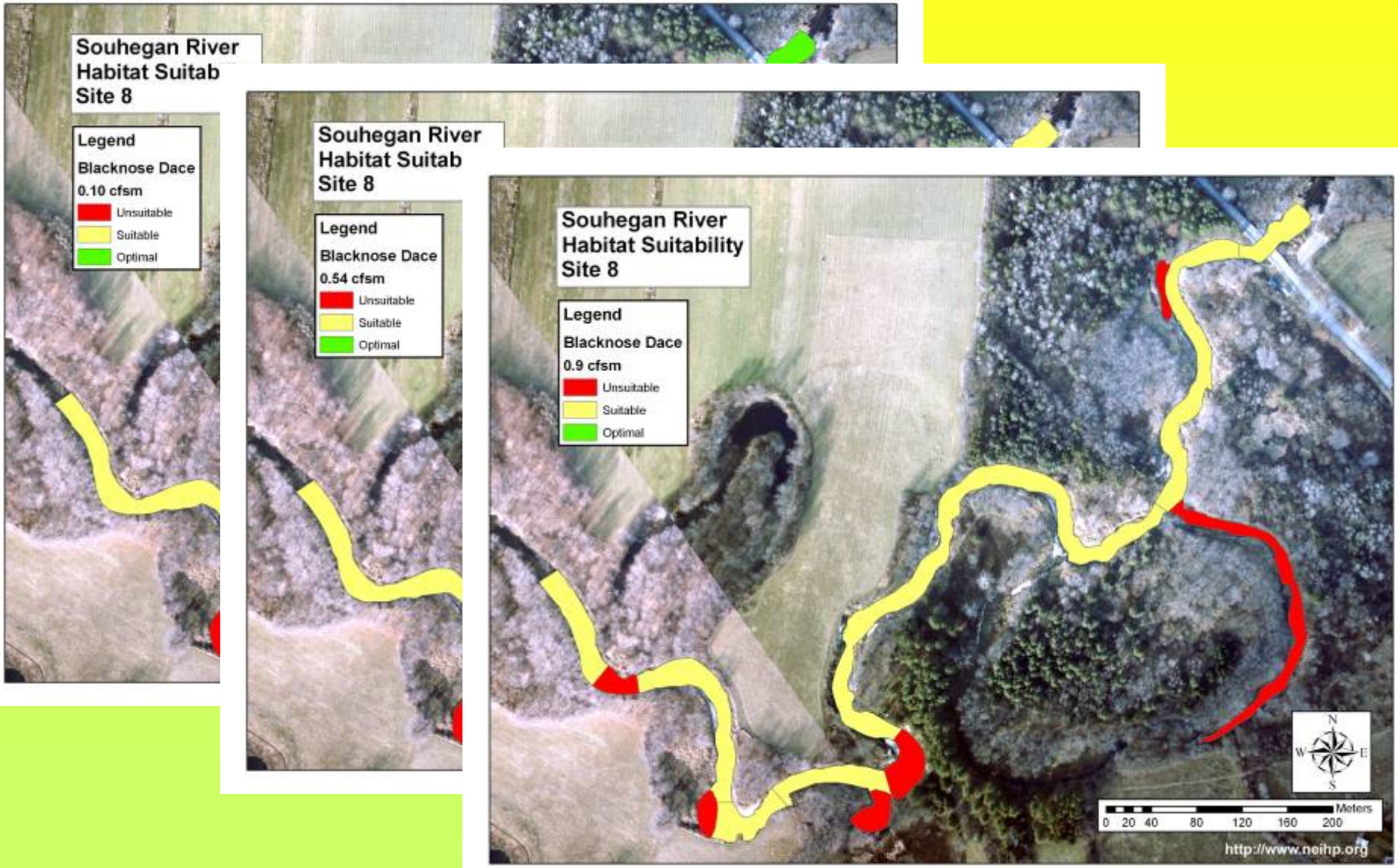
Site 4 Suitability: Blacknose Dace



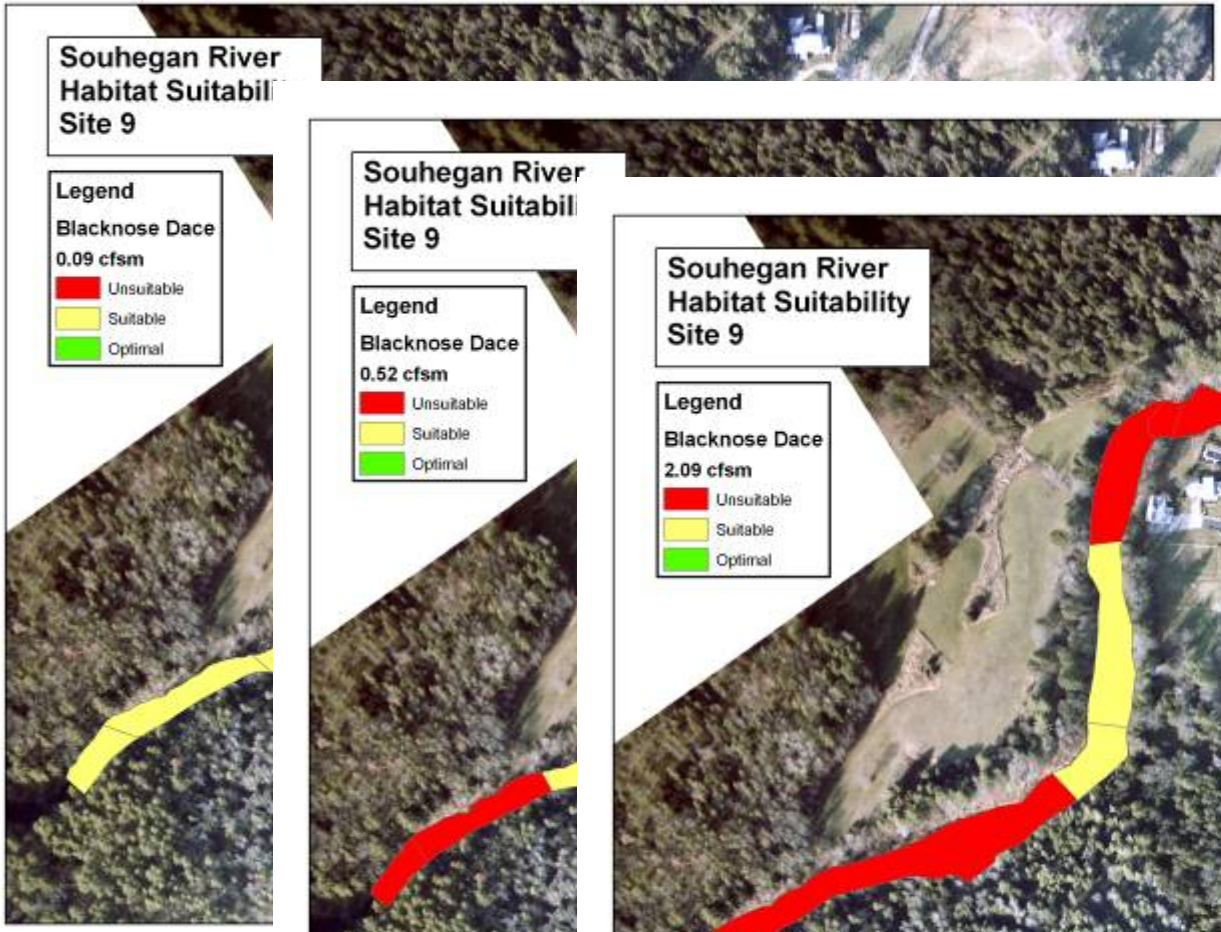


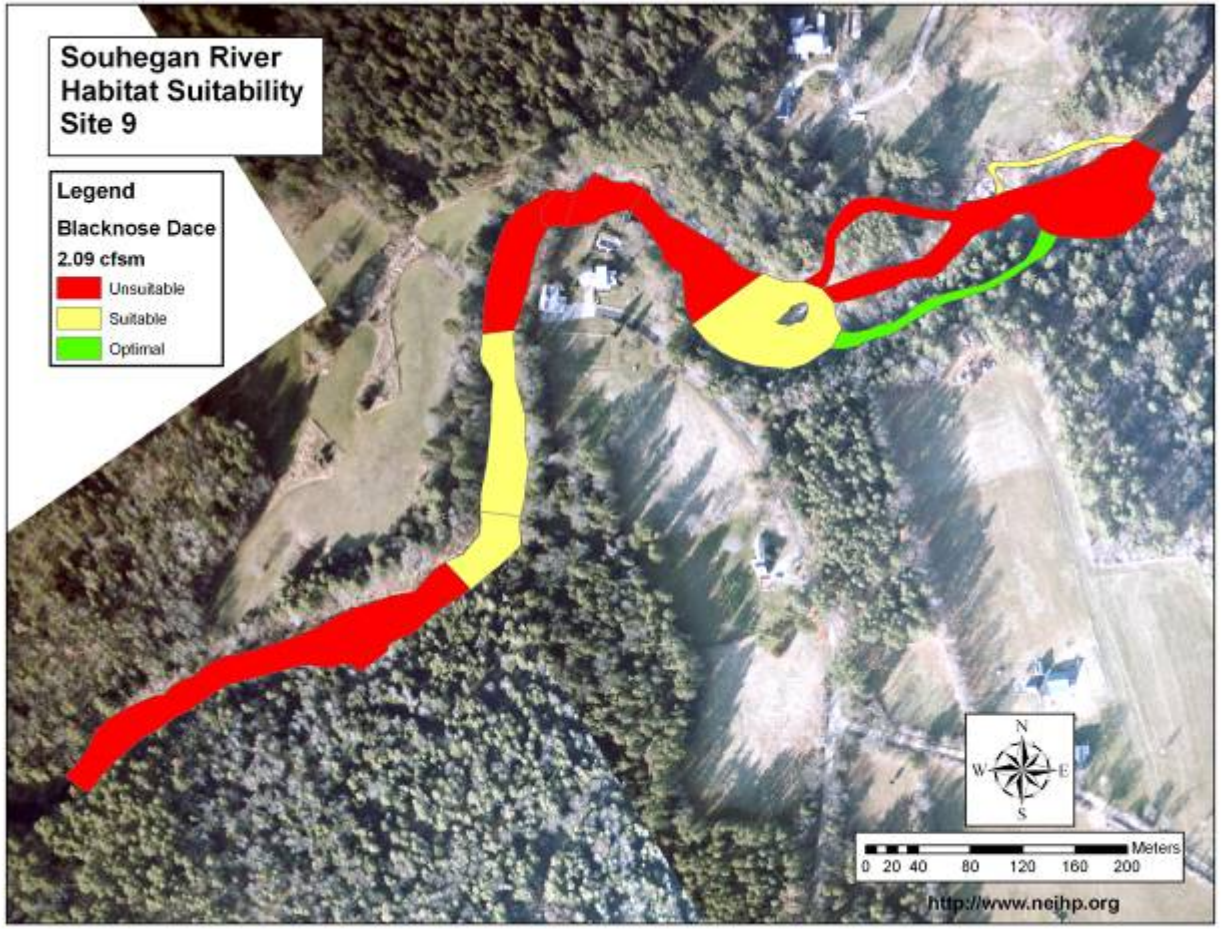


Site 8 Suitability: Blacknose Dace



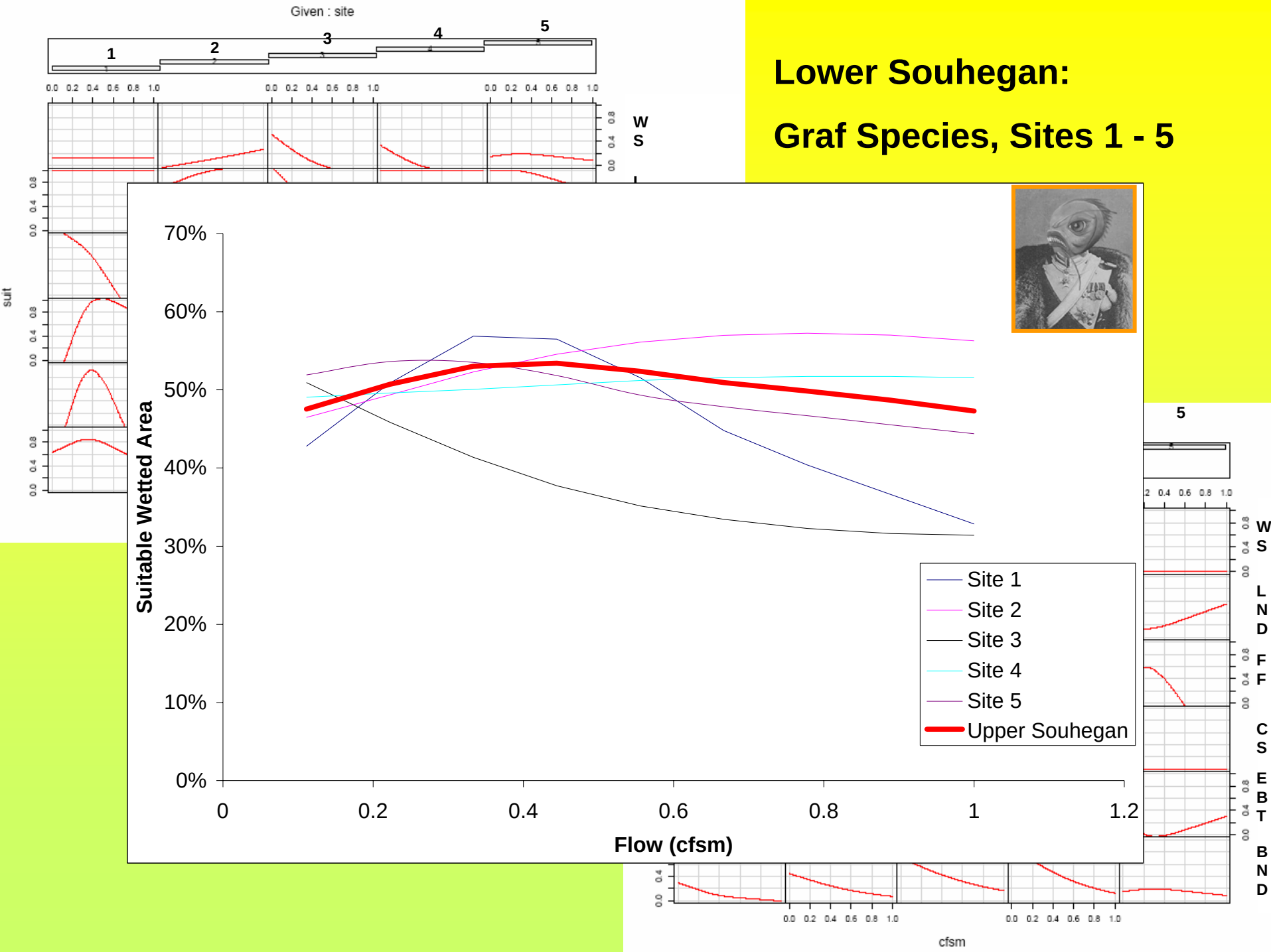
Site 9 Suitability: Blacknose Dace





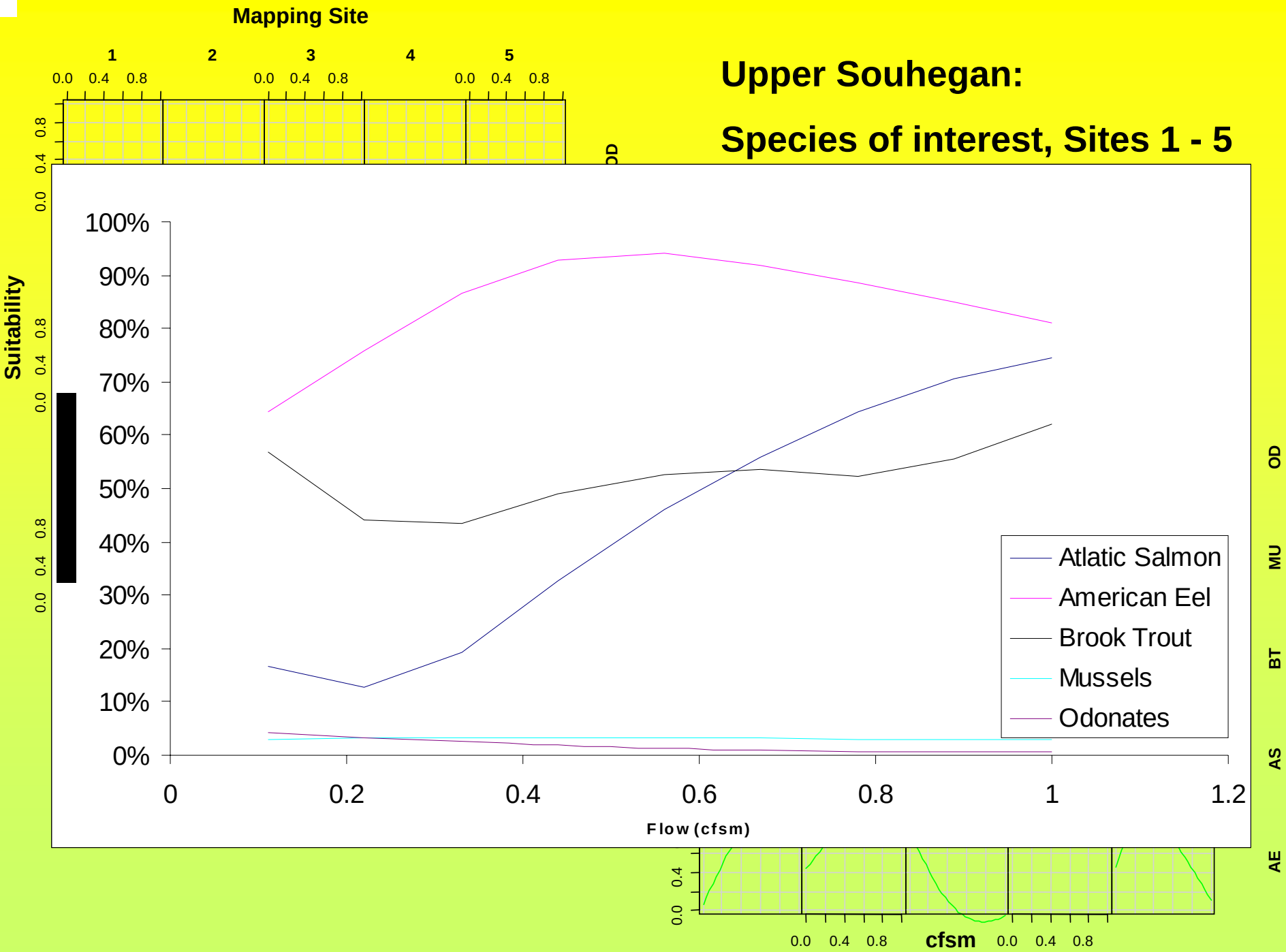
Lower Souhegan:

Graf Species, Sites 1 - 5



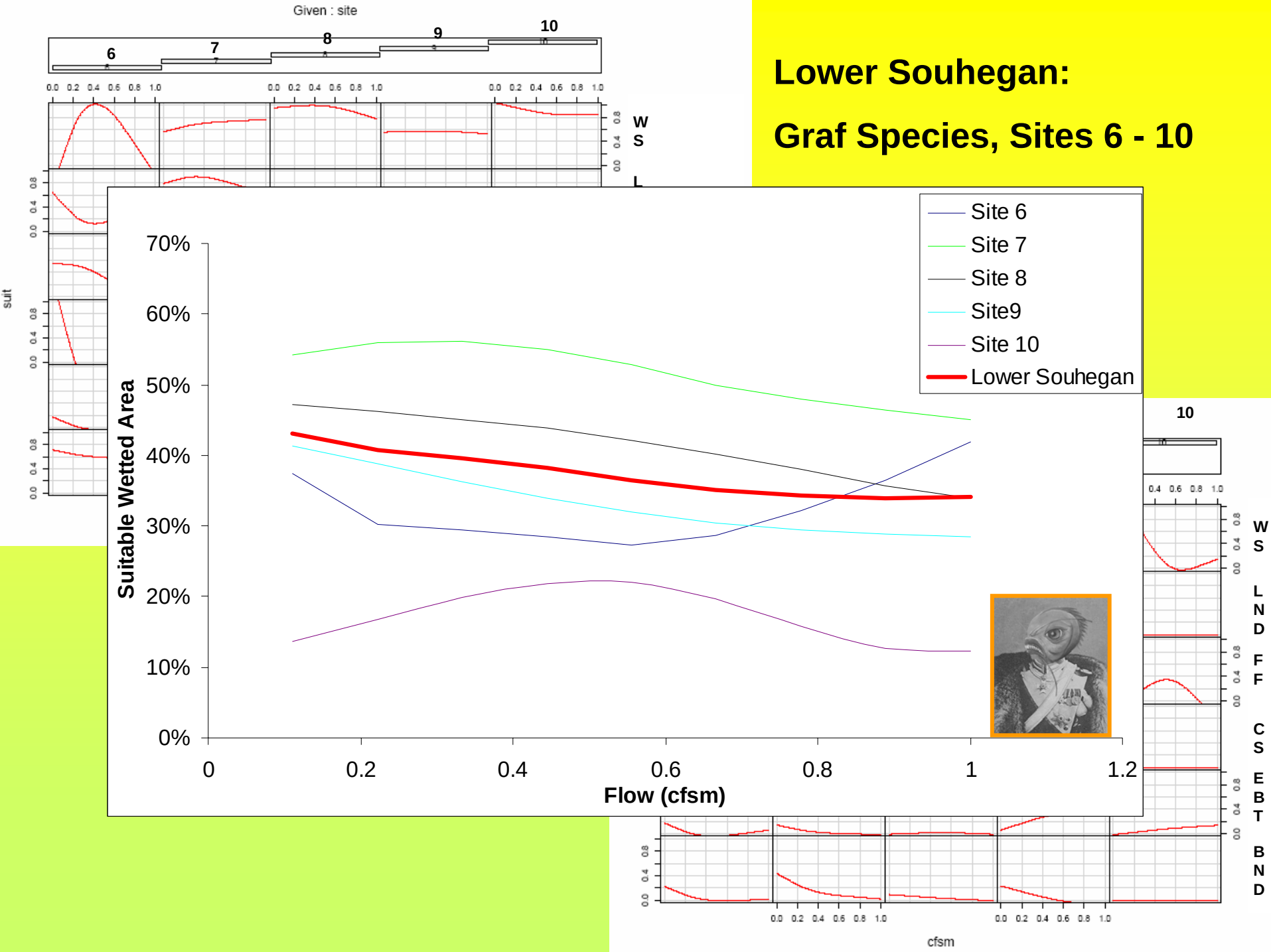
Upper Souhegan:

Species of interest, Sites 1 - 5



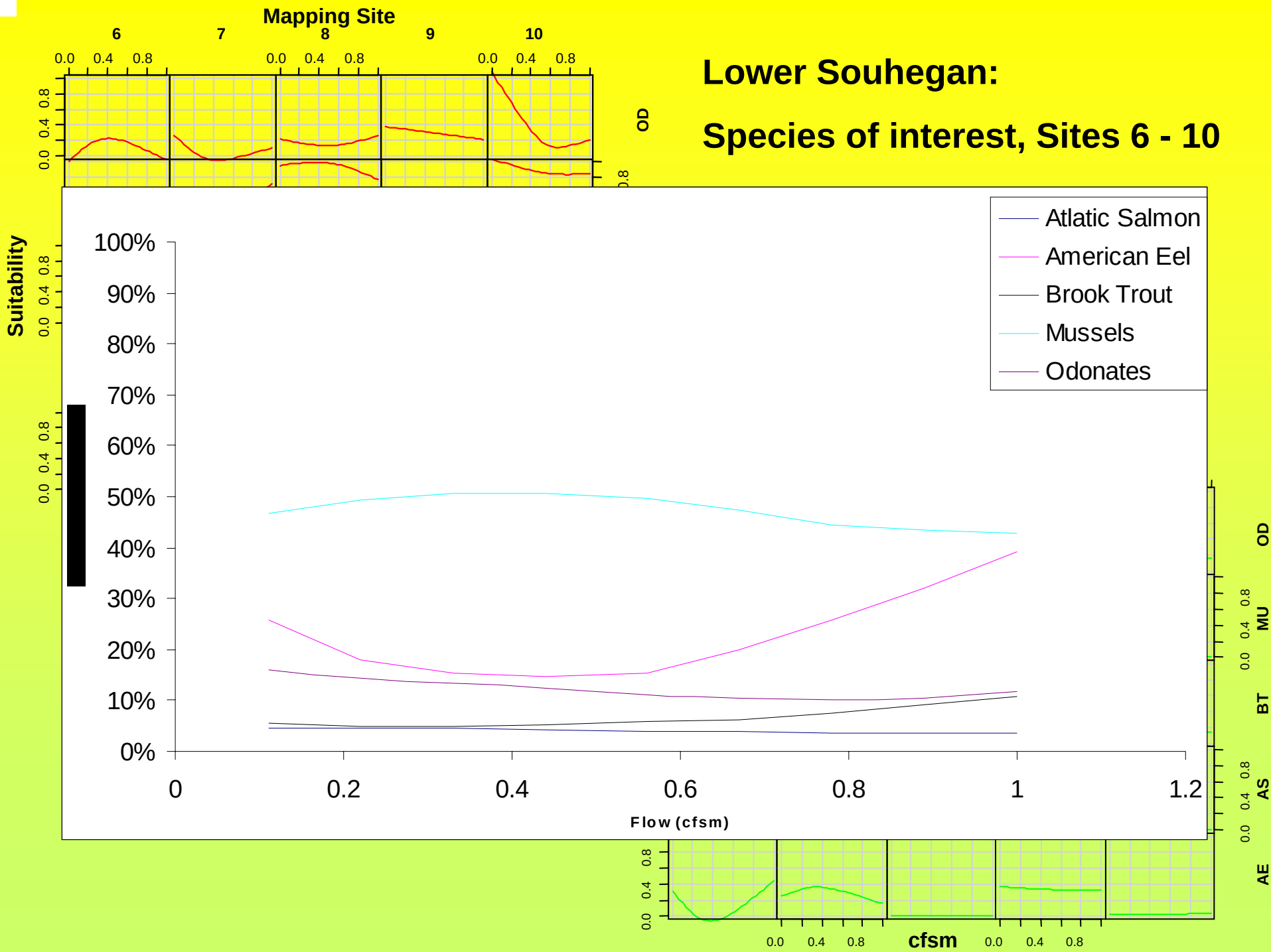
Lower Souhegan:

Graf Species, Sites 6 - 10

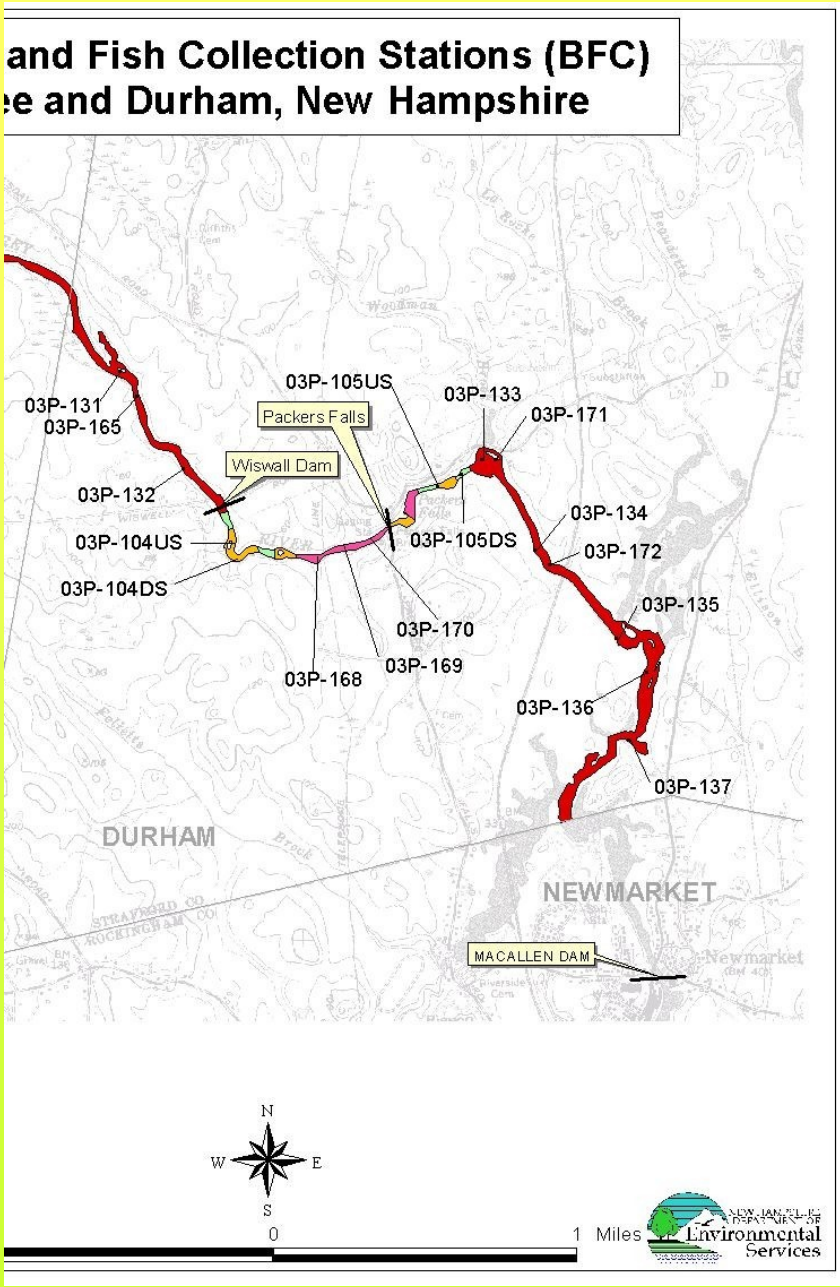


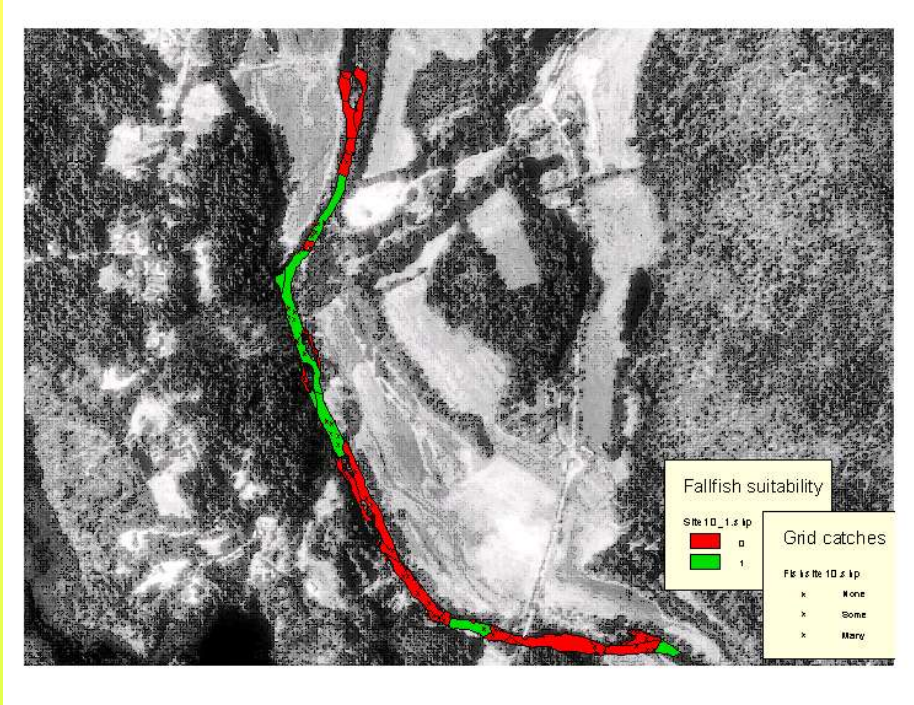
Lower Souhegan:

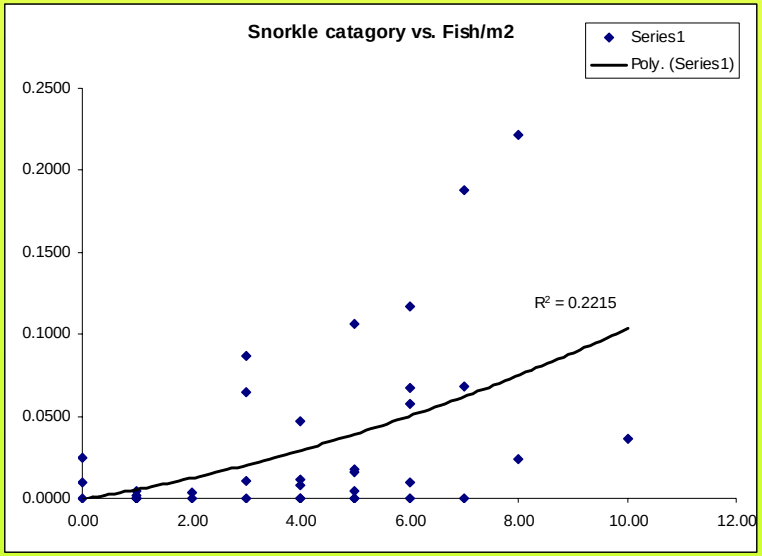
Species of interest, Sites 6 - 10

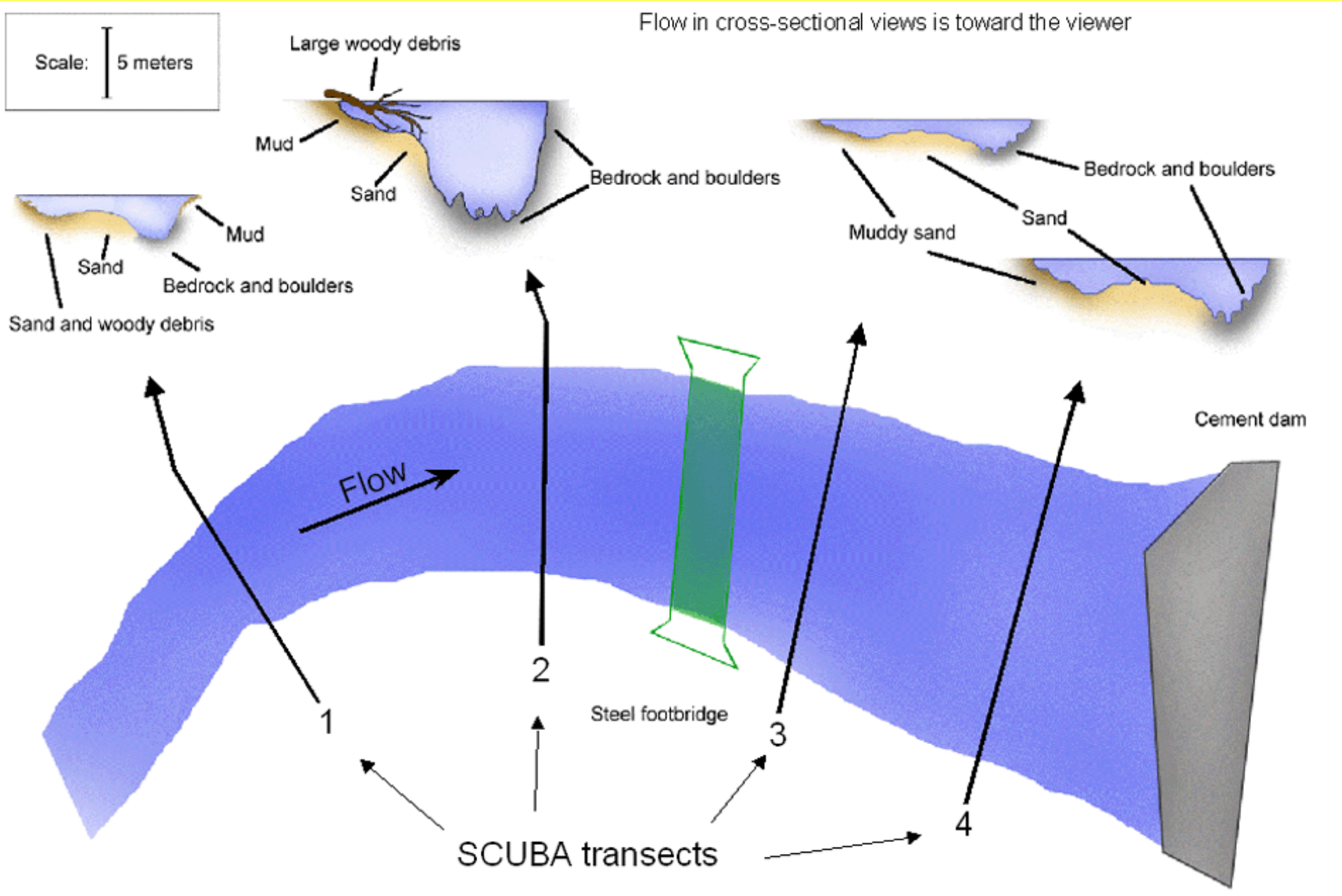


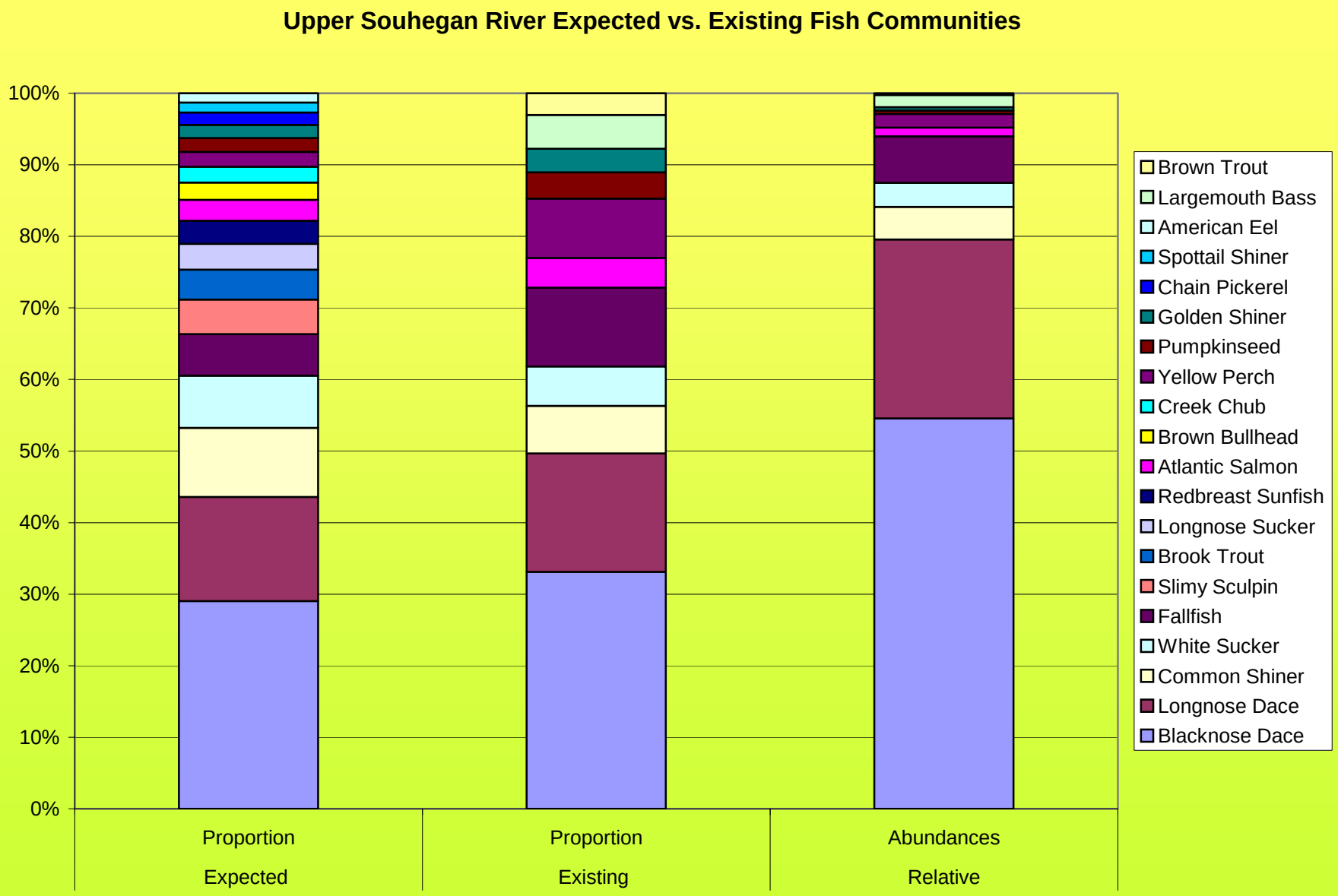
Model Validation



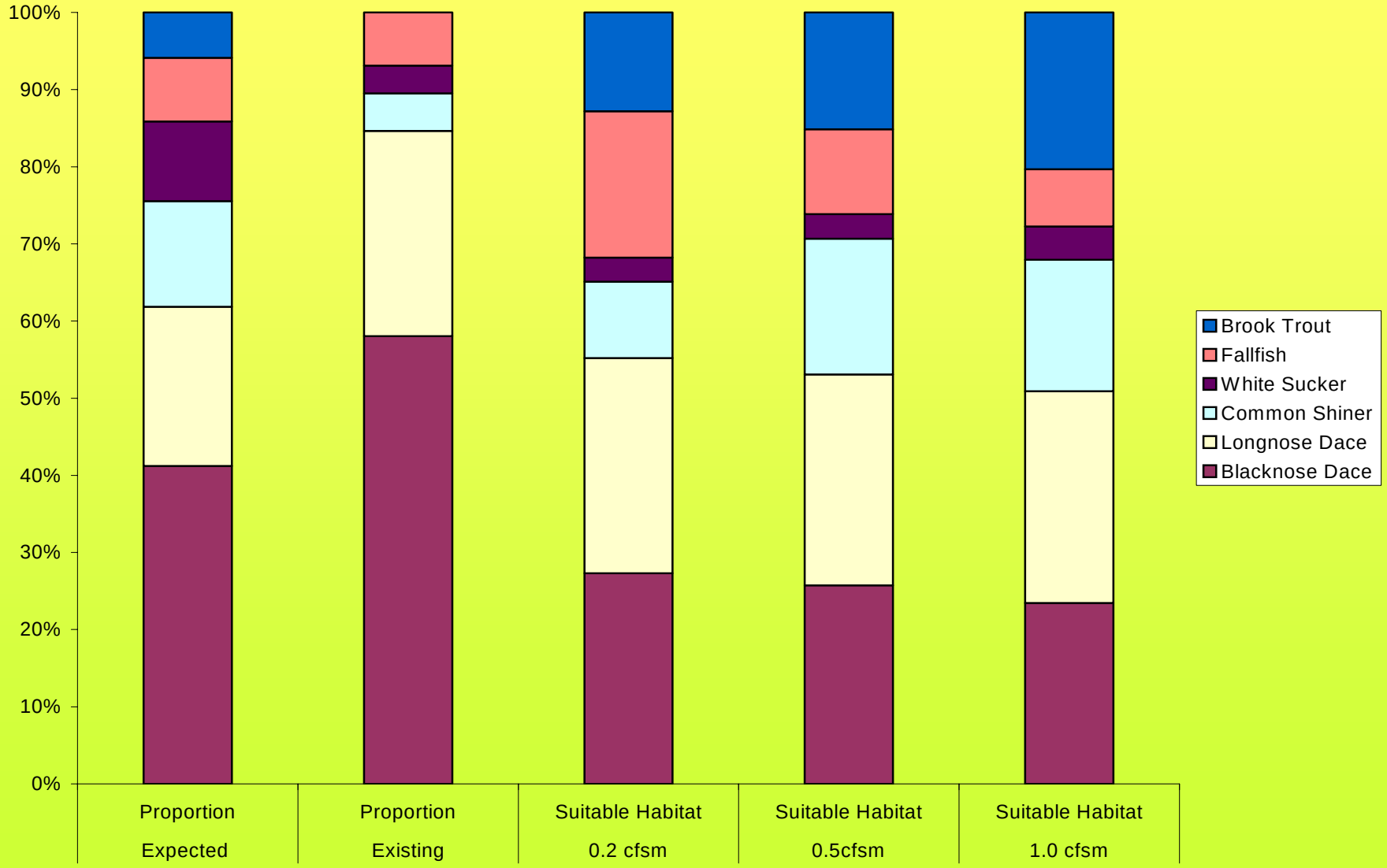




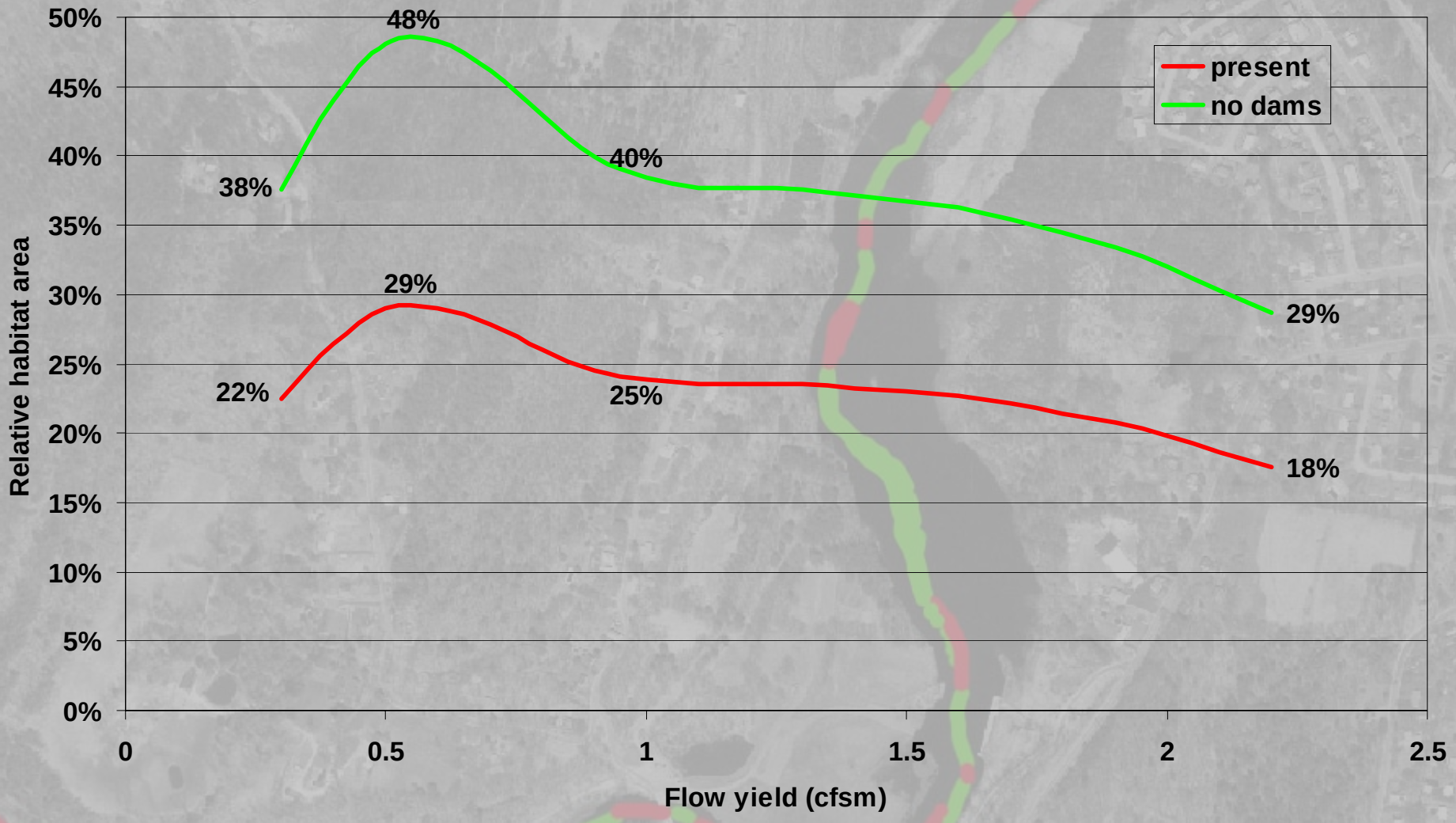

Scale:
5 meters
Flow in cross-sectional views is toward the viewer
Large woody debris
Mud
Sand
Bedrock and boulders
Mud
Sand
Bedrock and boulders
Sand and woody debris
Bedrock and boulders
Sand
Muddy sand
Flow
Cement dam
1
2
3
4
Steel footbridge
SCUBA transects


Upper Souhegan River Expected vs. Existing Fish Communities
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Proportion Expected
Proportion Existing
Abundances Relative
Brown Trout
Largemouth Bass
American Eel
Spottail Shiner
Chain Pickerel
Golden Shiner
Pumpkinseed
Yellow Perch
Creek Chub
Brown Bullhead
Atlantic Salmon
Redbreast Sunfish
Longnose Sucker
Brook Trout
Slimy Sculpin
Fallfish
White Sucker
Common Shiner
Longnose Dace
Blacknose Dace

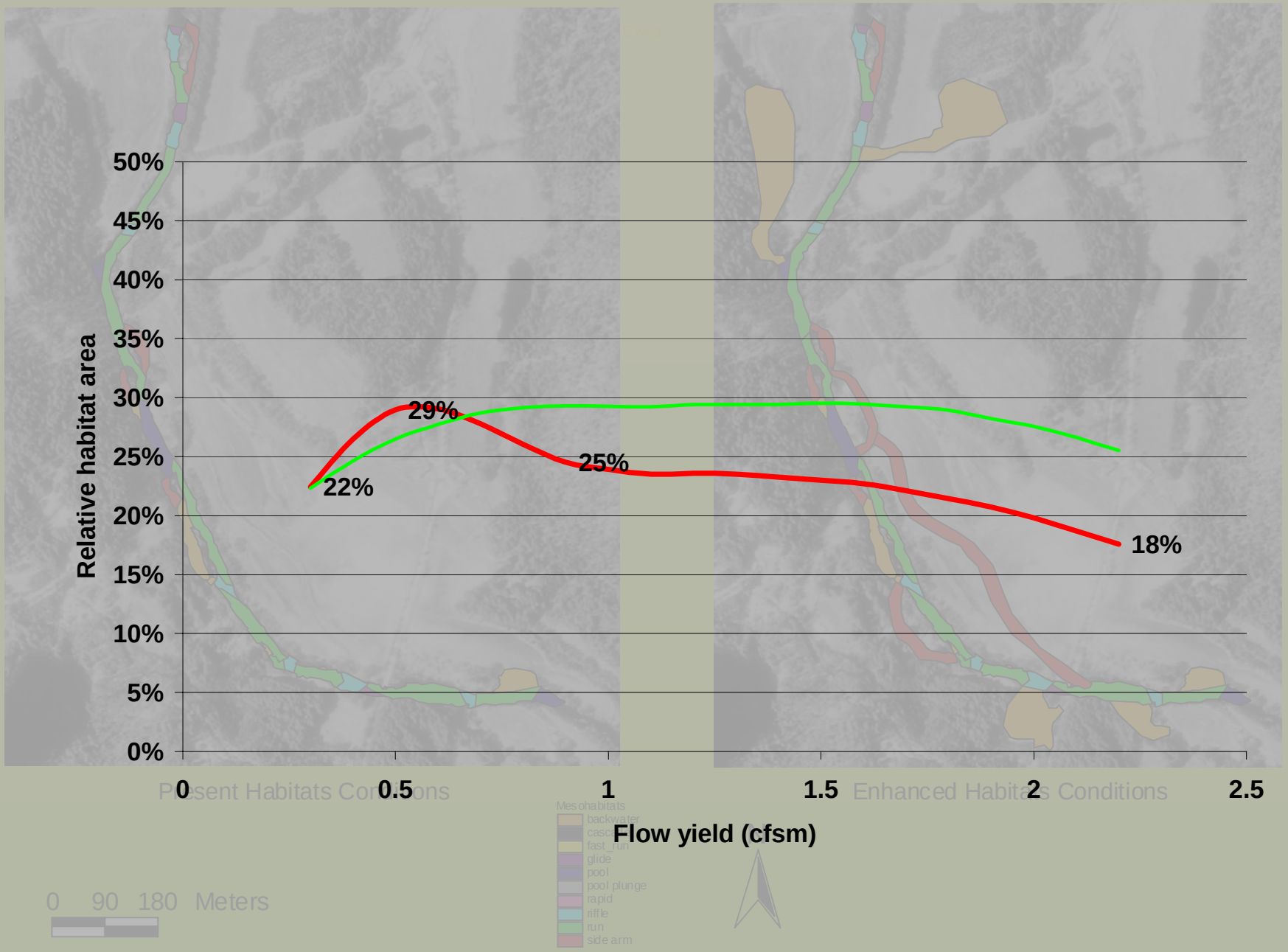
Upper Souhegan R. Fish proportions vs. Habitat proportions

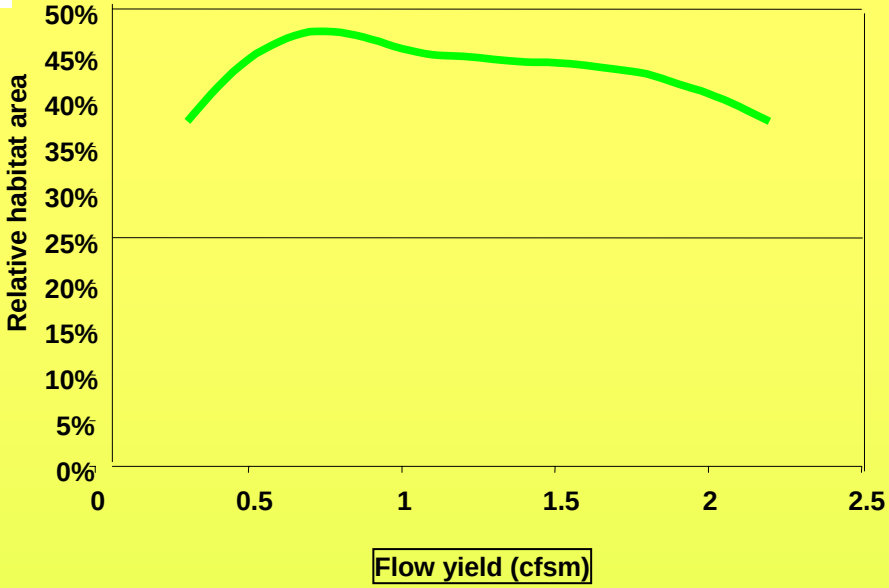


Simulation of impact of dams

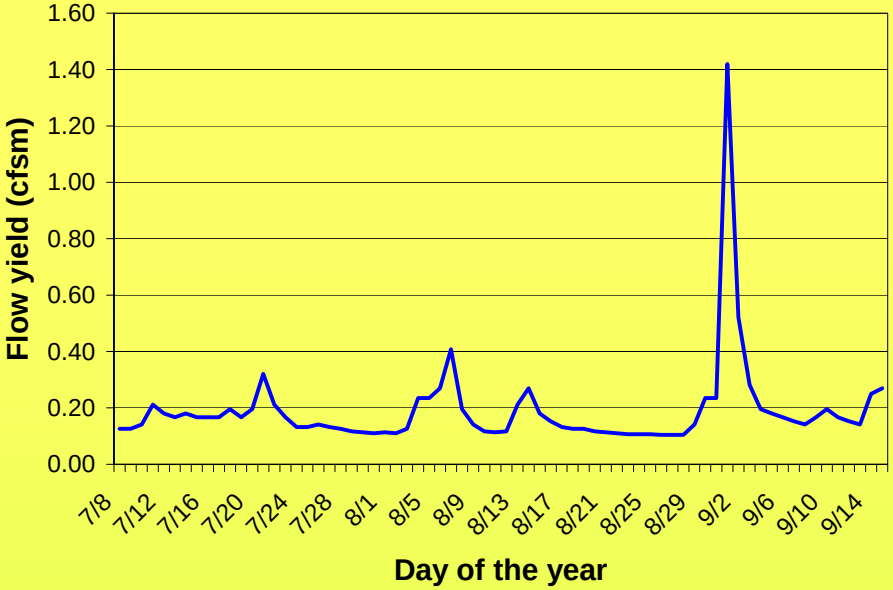


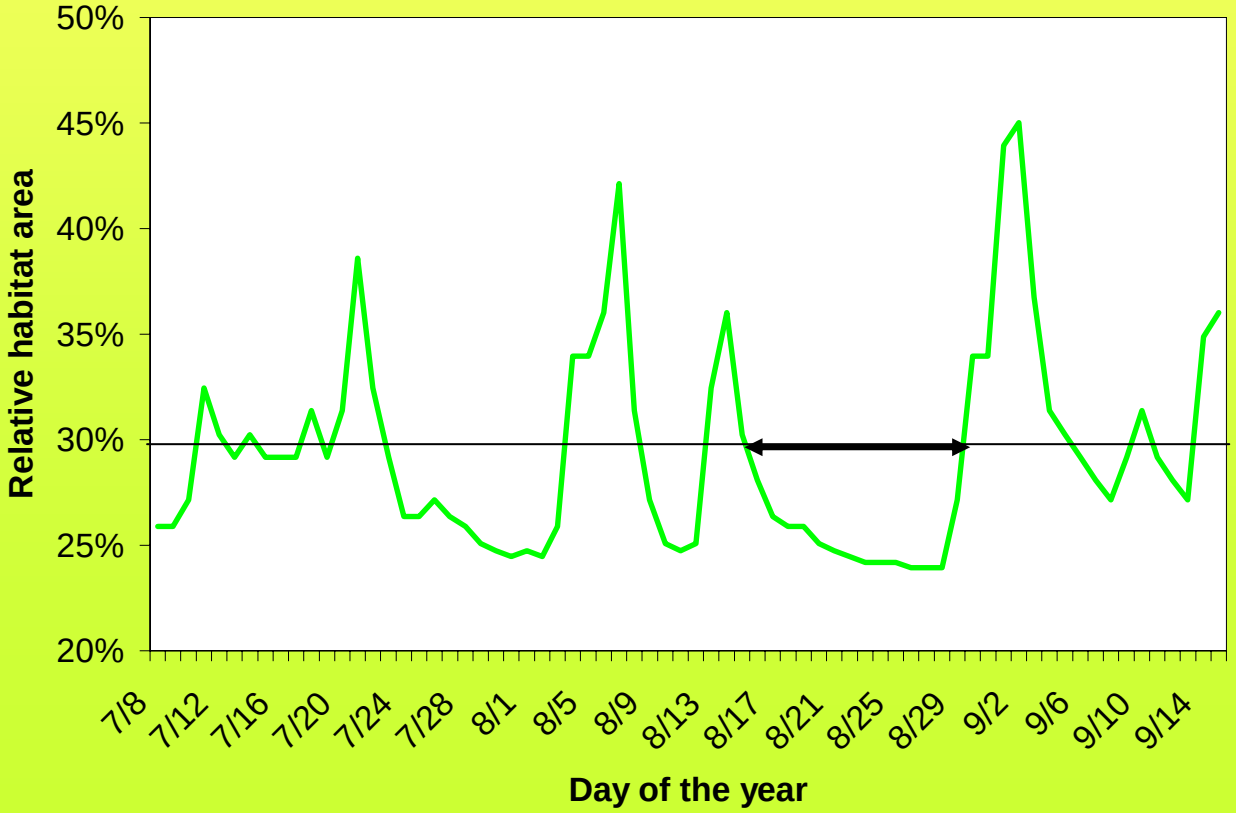
River corridor restoration in sites 7-10




Relative habitat area
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
0
0.5
1
1.5
2
2.5
Flow yield (cfsm)

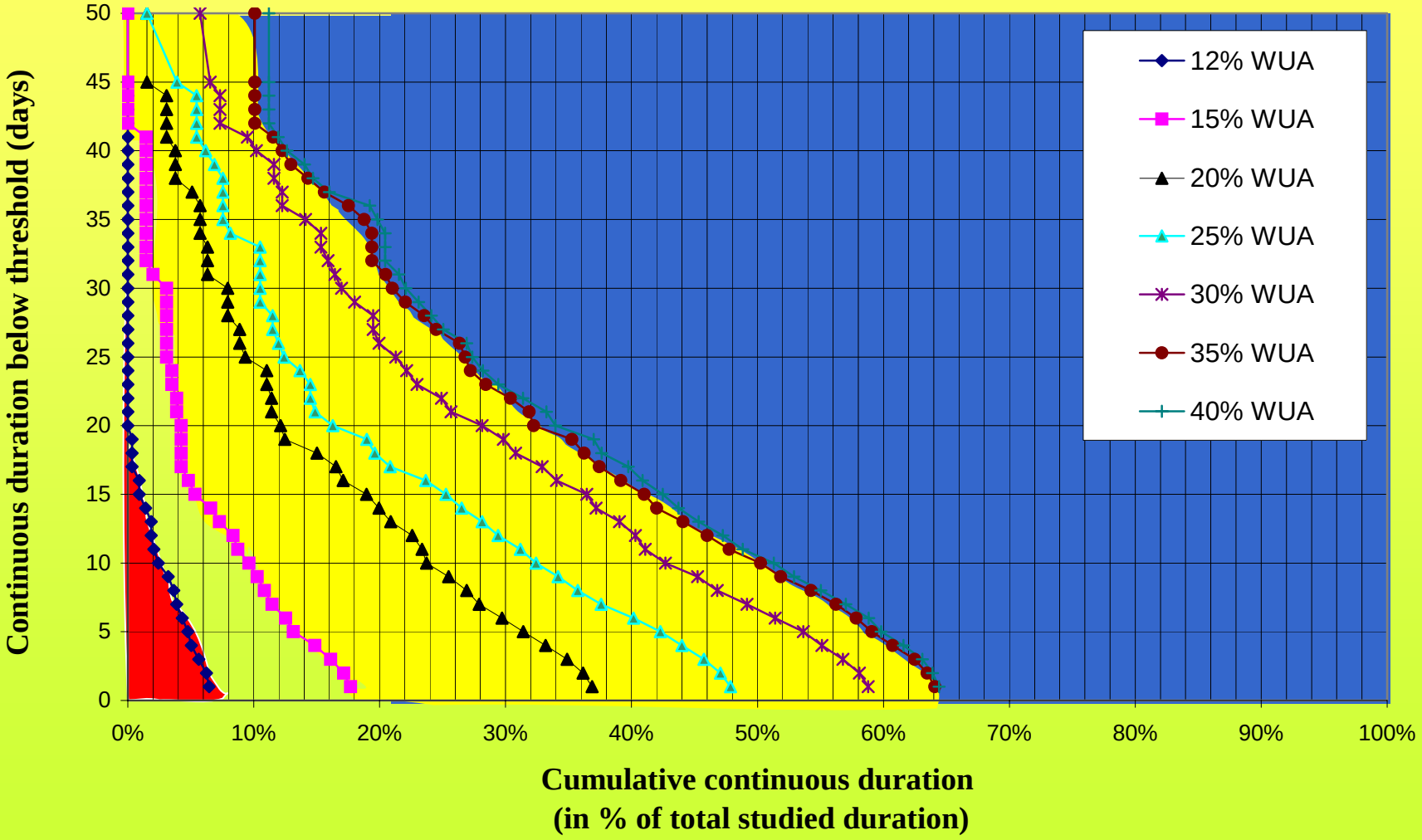
+

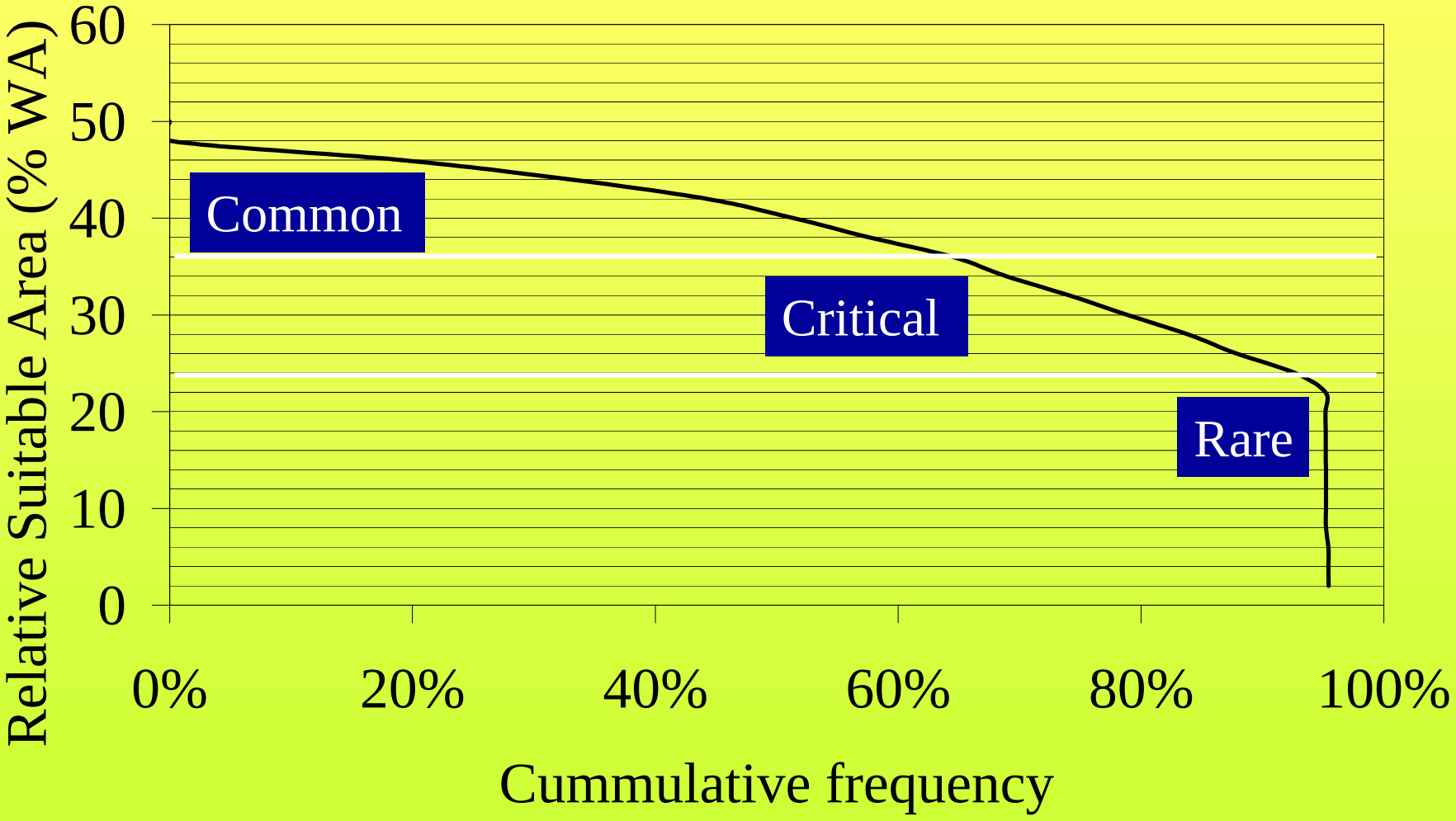

Flow yield (cfsm)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
7/8
7/12
7/16
7/20
7/24
7/28
8/1
8/5
8/9
8/13
8/17
8/21
8/25
8/29
9/2
9/6
9/10
9/14
Day of the year


Relative habitat area
50%
45%
40%
35%
30%
25%
20%
7/8
7/12
7/16
7/20
7/24
7/28
8/1
8/5
8/9
8/13
8/17
8/21
8/25
8/29
9/2
9/6
9/10
9/14
Day of the year

Brook trout UCUT

July 8 - Sept. 30, 1941 - 2003



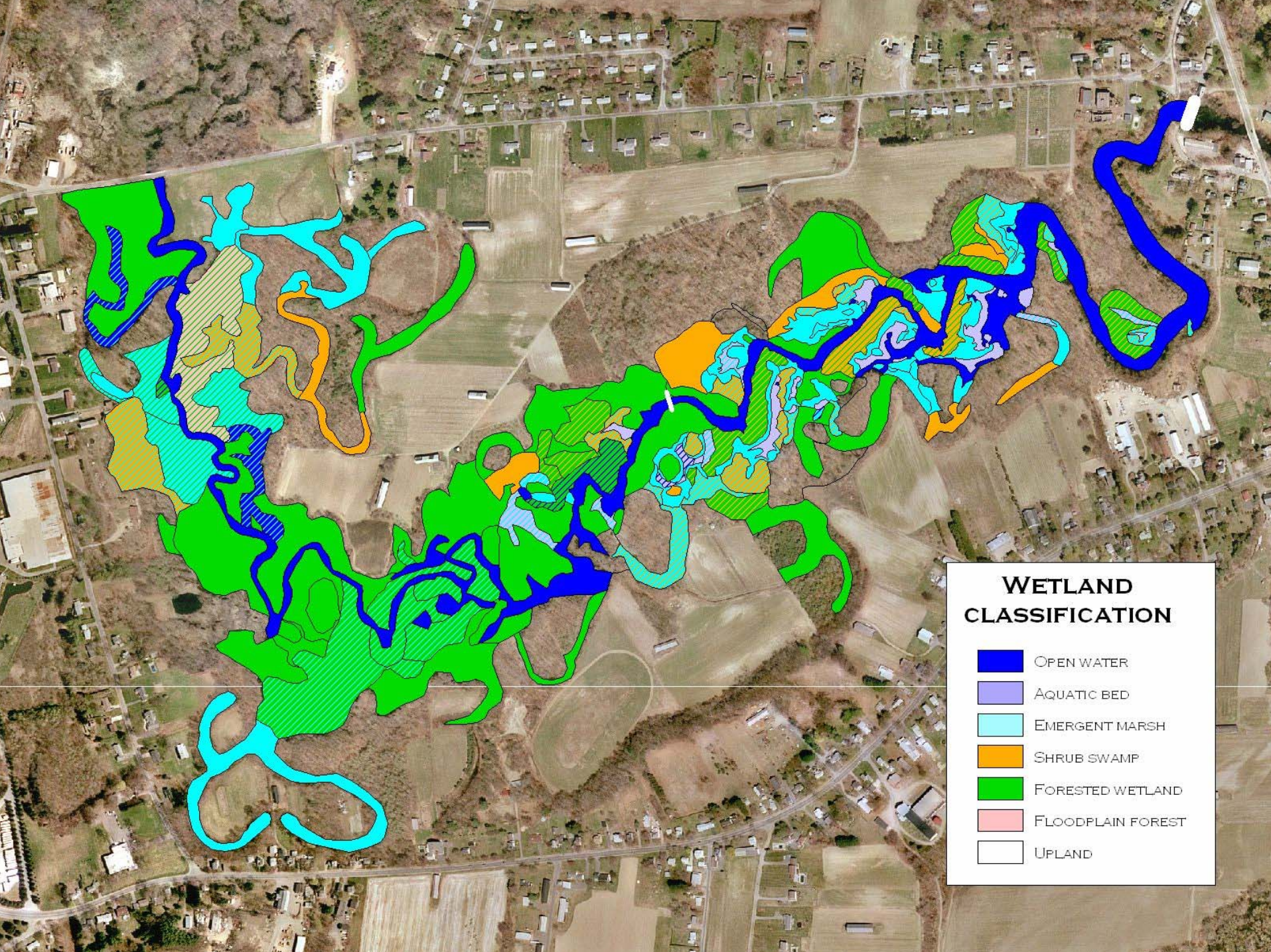

Relative Suitable Area (% WA)
60
50
40
30
20
10
0
Common
Critical
Rare
0%
20%
40%
60%
80%
100%
Cummulative frequency

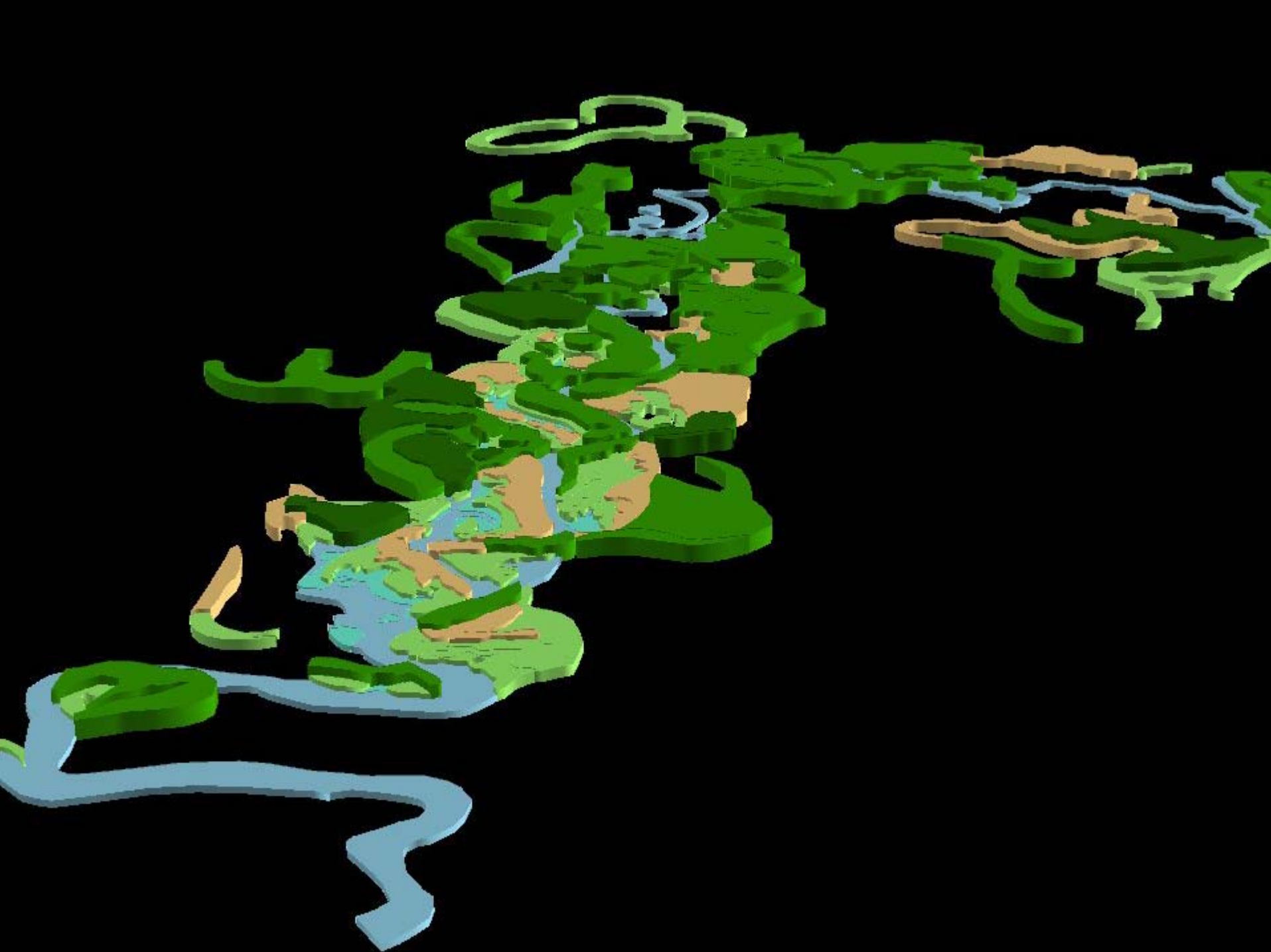
Habitat thresholds

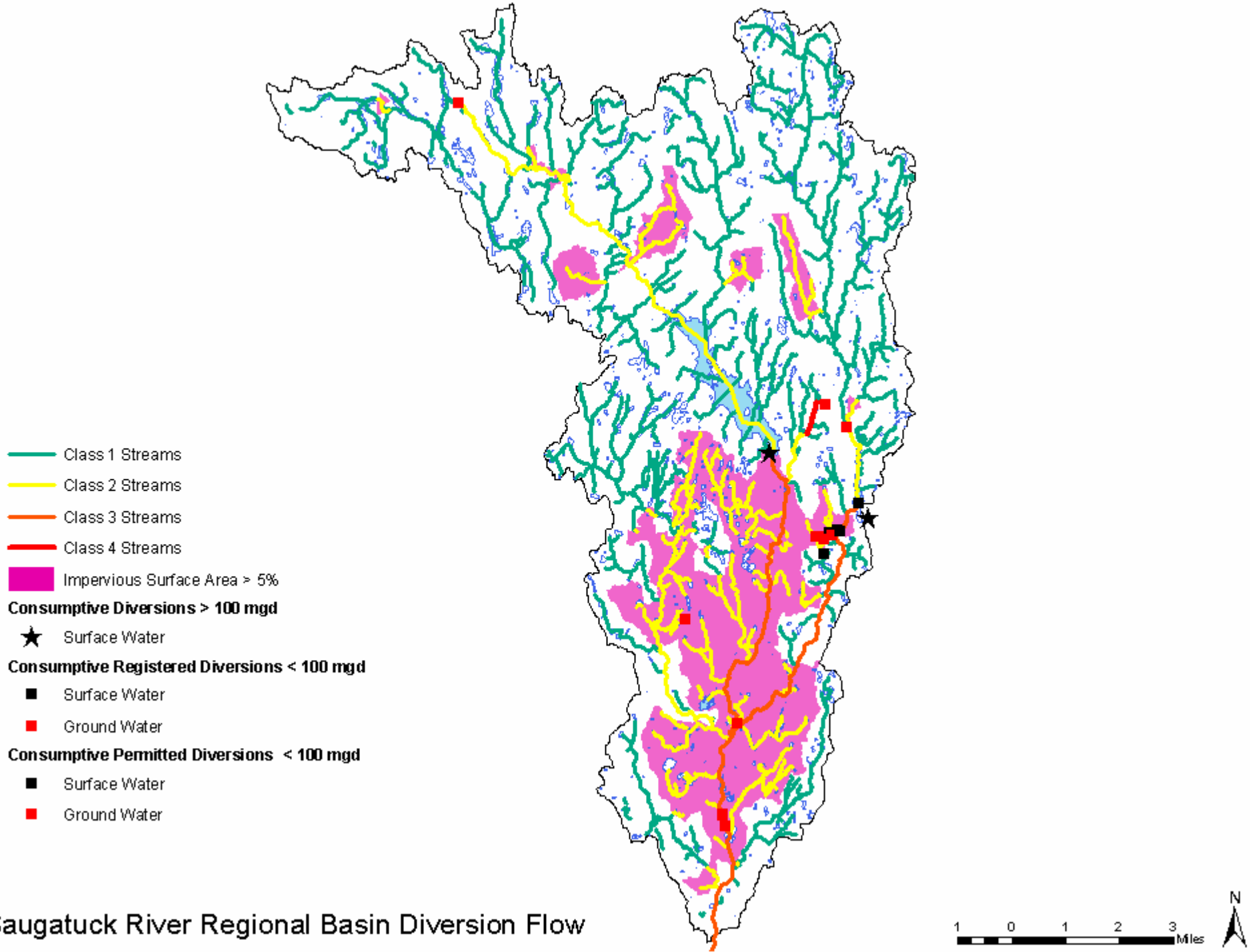
	Brown trout	Brook trout	Tesselated darter	Fallfish	Community
Common habitat (WUA)	40%	35%	45%	25%	35%
Max common duration (days)	42	40	40	40	40
Critical habitat (WUA)	20%	15%	15%	15%	15%
Max common duration (days)	17	15	17	15	15
Rare habitat (WUA)	15%	12%	10%	10%	12%
Duration of minimum (days)	17	10	5	5	5

Flow augmentation criteria (hypothetical result)

July-September	Typical	Critical	Trigger	Minimum
Habitat threshold (% area)	54	51	34	15
Corresponding flow (cfs)	600	400	350	200
Allowable duration below (days)	18	10	5	0
Duration of pulse (days)	2	2	2	2
Duation before triggering catastrophe (days)	37	31	28	1
Allowable recurrence of catastrophe (years)	7	15	30	0


Wetland classification
Open water
Aquatic bed
Emergent marsh
Shrub swamp
Forested wetland
Floodplain forest
Upland





Saugatuck River Regional Basin Diversion Flow