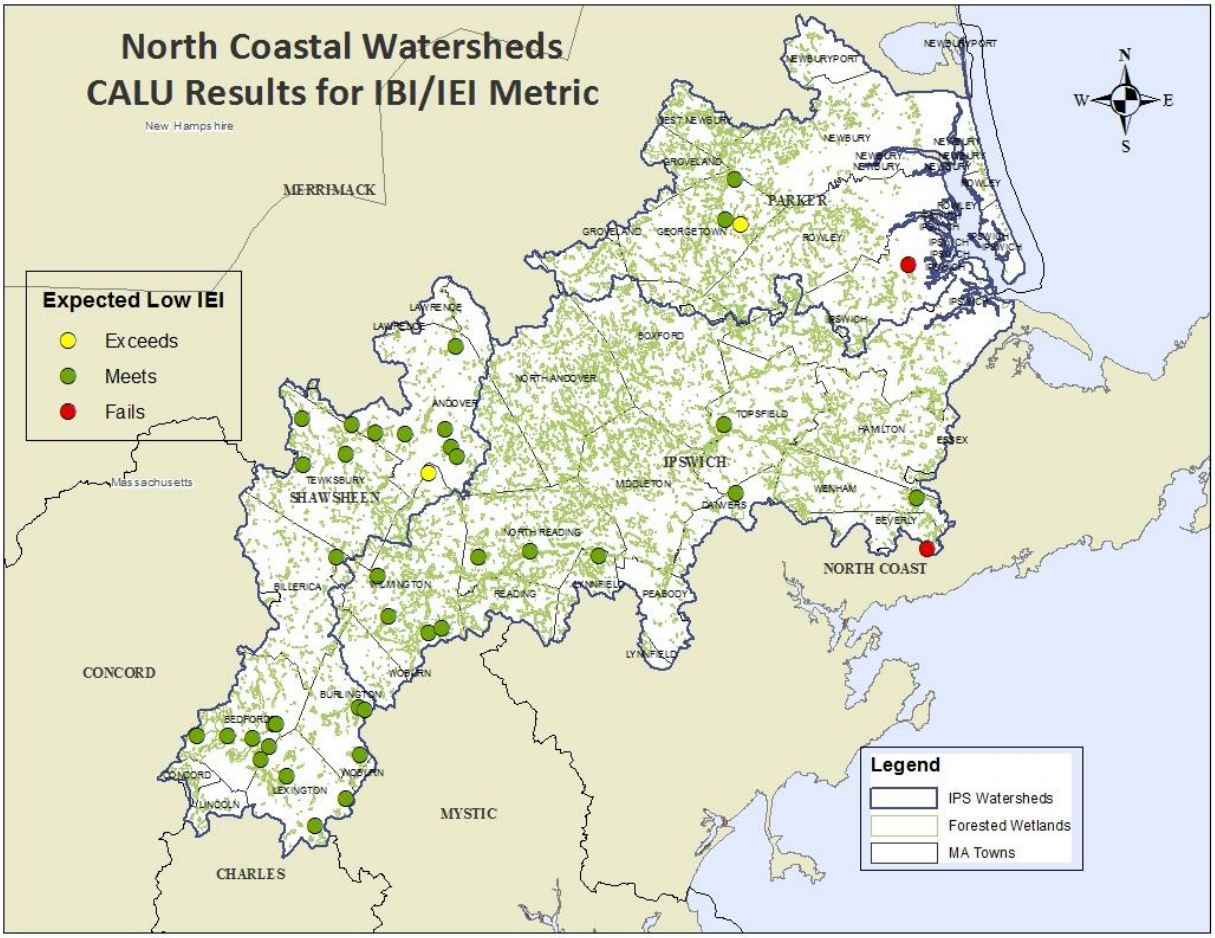
Appendix C:

IBI and CALU Assessment Results and Data For IEI Metric and Three Stressor/Resiliency Metric

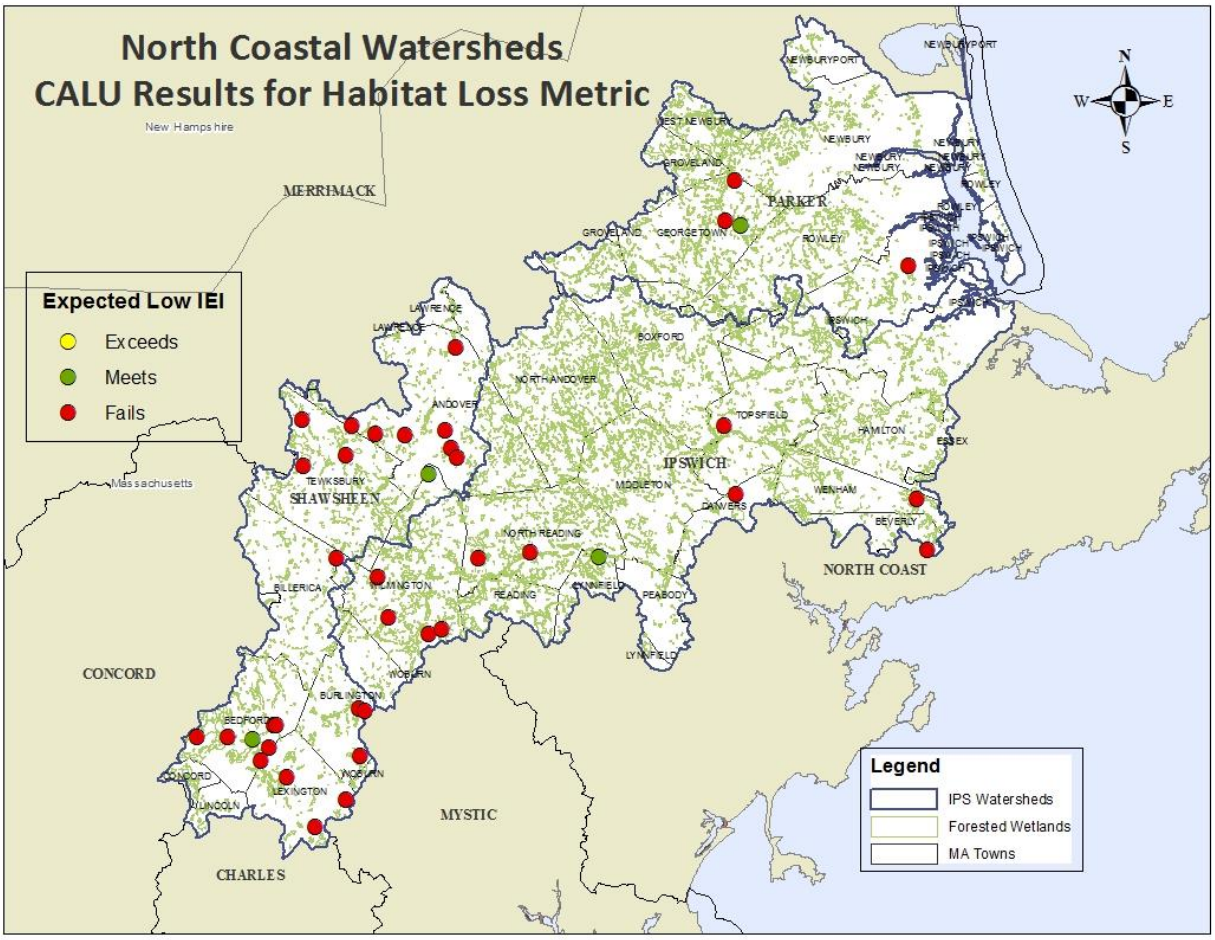
Index of Ecological Integrity Metric:



36 *of the 40 sites sampled in Low IEI forested wetlands met expectations. Two of the forested wetlands sampled in low IEI wetlands failed to meet expectations and two of them exceeded expectations.*

Site Number	TOWN	IBI Score (IEI Metric)	Target Score IEI	Compliance Level	Percentile IEI
1	North Reading	0.020	0.06	meets expectations	43
2	Tewksbury	0.270	0.37	meets expectations	34
3	Lexington	0.130	0.02	meets expectations	65
4	Andover	0.110	0.22	meets expectations	31
5	Lexington	0.010	0.02	meets expectations	48
6	Georgetown	0.079	0.16	meets expectations	36
7	Bedford	0.090	0.06	meets expectations	54
8	Tewksbury	0.010	0.17	meets expectations	21
9	Burlington	0.010	0.01	meets expectations	49
10	Andover	0.100	0.17	meets expectations	38
11	Bedford	0.020	0.03	meets expectations	48
12	Andover	0.080	0.02	meets expectations	58
13	Beverly	0.210	0.74	fails	4
14	Lexington	0.010	0.04	meets expectations	46
15	Andover	0.110	0.34	meets expectations	18
16	Topsfield	0.040	0.25	meets expectations	19
17	Georgetown	0.030	0.40	meets expectations	10
18	Wilmington	0.900	0.45	exceeds	94
19	Wilmington	0.040	0.03	meets expectations	50
20	North Reading	0.110	0.15	meets expectations	43
21	Danvers	0.300	0.30	meets expectations	15
22	Lynnfield	0.920	0.65	meets expectations	83
23	Wilmington	0.020	0.06	meets expectations	43
24	Andover	0.090	0.27	meets expectations	21
25	Wilmington	0.020	0.05	meets expectations	45
26	Wenham	0.050	0.15	meets expectations	34
27	Tewksbury	0.188	0.07	meets expectations	67
28	Wilmington	0.010	0.05	meets expectations	43
29	Burlington	0.050	0.25	meets expectations	21
30	Andover	0.010	0.15	meets expectations	25
31	Andover	0.020	0.07	meets expectations	42
32	Georgetown	0.930	0.18	exceeds	100
33	Ipswich	0.010	0.70	fails	0
34	Bedford	0.020	0.05	meets expectations	45
35	Burlington	0.050	0.06	meets expectations	48
36	Bedford	0.080	0.10	meets expectations	47
37	Bedford	0.020	0.04	meets expectations	47
38	Bedford	0.040	0.040	meets expectations	49
39	Wilmington	0.040	0.020	meets expectations	52
40	Bedford	0.040	0.240	meets expectations	21

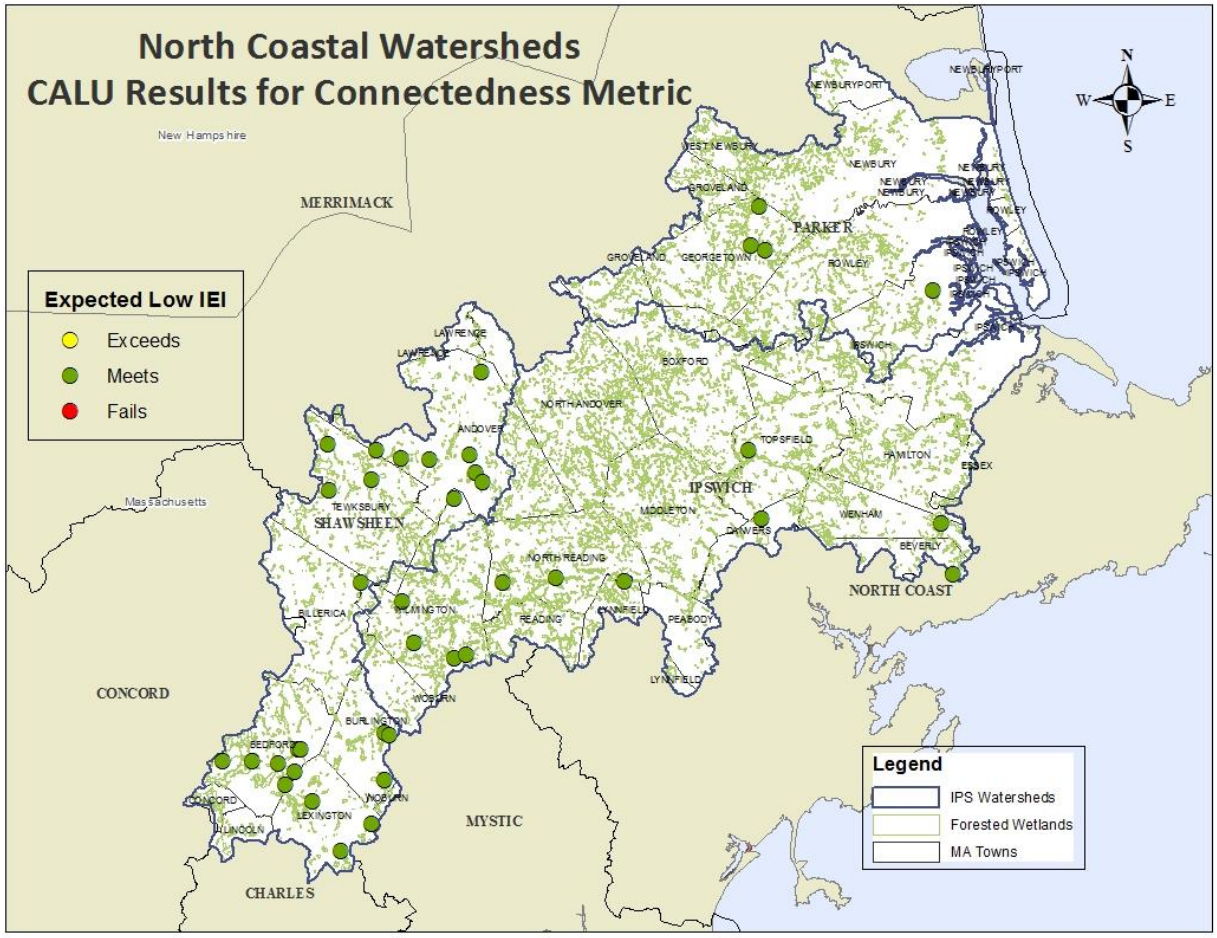
Habitat Loss Metric:



Habitat loss is a stressor metric. It measures the intensity of all forms of anthropogenic development in the neighborhood of and undeveloped area. Results of this metric analysis show three sites that meet expectations and 37 sites with significant loss of habitat.

Site Number	TOWN	IBI Score Habitat Loss	Target Score Habitat Looss	Compliance Level_Habitat Loss	Percentile Habitat Loss
1	North Reading	0.650	0.170	Fails to meet expectations	0
2	Tewksbury	0.350	0.014	Fails to meet expectations	2
3	Lexington	0.580	0.330	Fails to meet expectations	7
4	Andover	0.540	0.120	Fails to meet expectations	1
5	Lexington	0.530	0.230	Fails to meet expectations	3
6	Georgetown	0.770	0.160	Fails to meet expectations	0
7	Bedford	0.460	0.250	Fails to meet expectations	9
8	Tewksbury	0.550	0.220	Fails to meet expectations	2
9	Burlington	0.590	0.270	Fails to meet expectations	3
10	Andover	0.480	0.160	Fails to meet expectations	3
11	Bedford	0.360	0.250	meets	21
12	Andover	0.510	0.270	Fails to meet expectations	8
13	Beverly	0.410	0.001	Fails to meet expectations	1
14	Lexington	0.610	0.280	Fails to meet expectations	2
15	Andover	0.430	0.560	Fails to meet expectations	1
16	Topsfield	0.560	0.110	Fails to meet expectations	1
17	Georgetown	0.660	0.040	Fails to meet expectations	0
18	Wilmington	0.070	0.030	meets	38
19	Wilmington	0.550	0.230	Fails to meet expectations	3
20	North Reading	0.440	0.140	Fails to meet expectations	3
21	Danvers	0.610	0.100	Fails to meet expectations	0
22	Lynnfield	0.061	0.011	meets	33
23	Wilmington	0.650	0.170	Fails to meet expectations	0
24	Andover	0.445	0.134	Fails to meet expectations	3
25	Wilmington	0.614	0.277	Fails to meet expectations	2
26	Wenham	0.553	0.169	Fails to meet expectations	1
27	Tewksbury	0.453	0.192	Fails to meet expectations	6
28	Wilmington	0.590	0.250	Fails to meet expectations	2
29	Burlington	0.530	0.040	Fails to meet expectations	0
30	Andover	0.570	0.160	Fails to meet expectations	1
31	Andover	0.580	0.300	Fails to meet expectations	4
32	Georgetown	0.010	0.200	meets	90
33	Ipswich	0.650	0.010	Fails to meet expectations	0
34	Bedford	0.570	0.210	Fails to meet expectations	1
35	Burlington	0.450	0.190	Fails to meet expectations	6
36	Bedford	0.440	0.180	Fails to meet expectations	7
37	Bedford	0.650	0.180	Fails to meet expectations	0
38	Bedford	0.510	0.180	Fails to meet expectations	2
39	Wilmington	0.510	0.290	Fails to meet expectations	8
40	Bedford	0.540	0.180	Fails to meet expectations	1

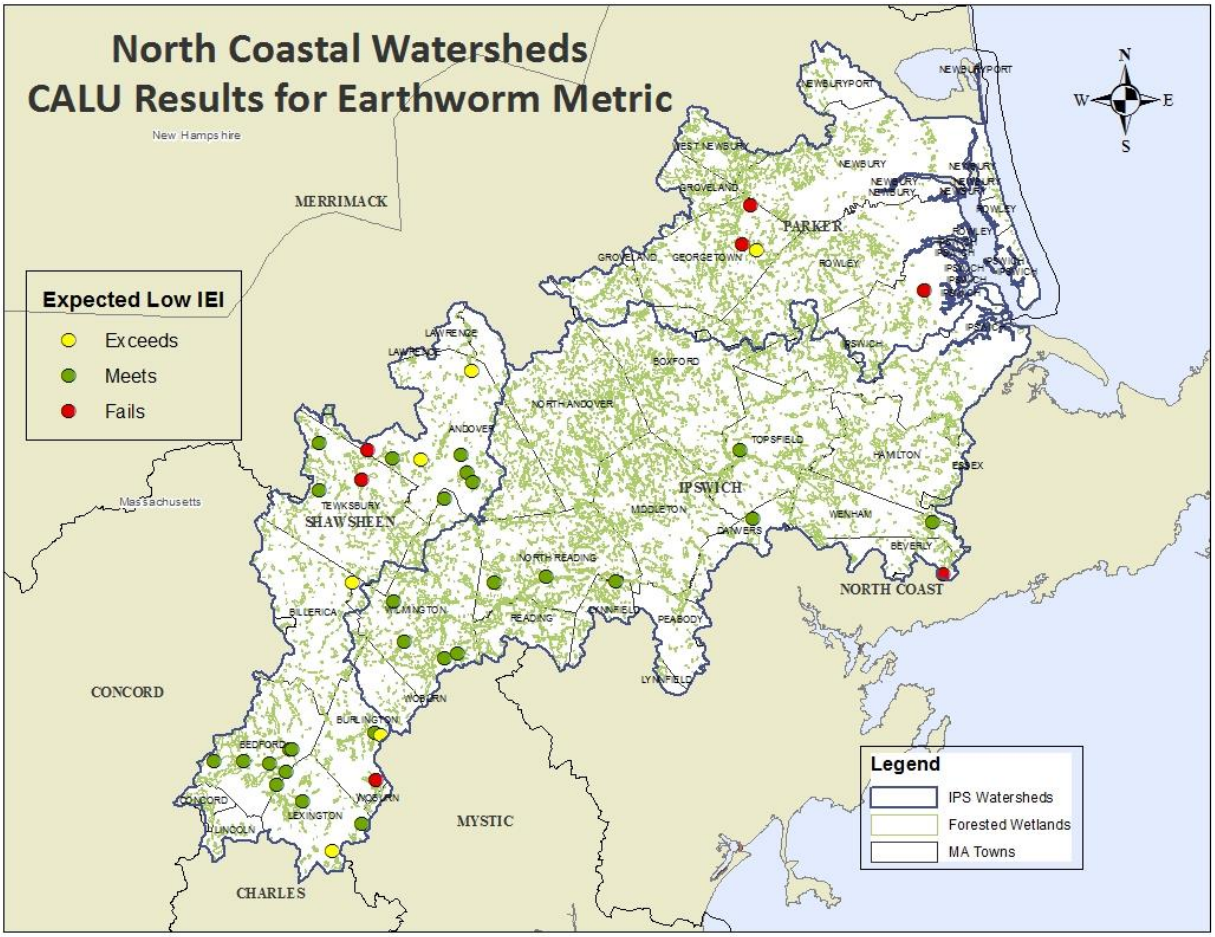
Connectedness Metric:



The connectedness metric is a resiliency metric, in that it identifies the degree that a wetland can recover or adapt to perturbations. It measures the disruption of habitat connectivity caused by all forms of anthropogenic development between and surrounding the undeveloped landscape. The results of this metric analysis show that, in all 40 low IEI sites, the loss of connectedness (fragmentation) of forested wetlands is impacting biological condition as predicted by the CAPS model.

Site Number	TOWN	IBI Score Connectedness	Target Score Connectedness	Compliance Level Connectedness	Percentile Connectedness
1	North Reading	0.0060	0.030	Meets expectations	38
2	Tewksbury	0.0600	0.070	Meets expectations	48
3	Lexington	0.0200	0.008	Meets expectations	54
4	Andover	0.0060	0.060	Meets expectations	21
5	Lexington	0.0060	0.016	Meets expectations	46
6	Georgetown	0.0300	0.090	Meets expectations	18
7	Bedford	0.0300	0.050	Meets expectations	38
8	Tewksbury	0.0060	0.050	Meets expectations	27
9	Burlington	0.0060	0.020	Meets expectations	44
10	Andover	0.0300	0.050	Meets expectations	35
11	Bedford	0.0500	0.020	Meets expectations	64
12	Andover	0.0100	0.020	Meets expectations	46
13	Beverly	0.0400	0.110	Meets expectations	18
14	Lexington	0.0060	0.025	Meets expectations	40
15	Andover	0.0300	0.070	Meets expectations	29
16	Topsfield	0.0060	0.070	Meets expectations	19
17	Georgetown	0.0100	0.070	Meets expectations	19
18	Wilmington	0.0700	0.060	Meets expectations	54
19	Wilmington	0.0200	0.020	Meets expectations	52
20	North Reading	0.0500	0.050	Meets expectations	52
21	Danvers	0.0060	0.070	Meets expectations	19
22	Lynnfield	0.0430	0.094	Meets expectations	23
23	Wilmington	0.0120	0.023	Meets expectations	46
24	Andover	0.0150	0.068	Meets expectations	22
25	Wilmington	0.0090	0.034	Meets expectations	36
26	Wenham	0.0181	0.062	Meets expectations	25
27	Tewksbury	0.0426	0.050	Meets expectations	47
28	Wilmington	0.0100	0.020	Meets expectations	46
29	Burlington	0.0100	0.050	Meets expectations	27
30	Andover	0.0060	0.060	Meets expectations	22
31	Andover	0.0300	0.040	Meets expectations	46
32	Georgetown	0.0900	0.080	Meets expectations	56
33	Ipswich	0.0100	0.090	Meets expectations	10
34	Bedford	0.0060	0.040	Meets expectations	32
35	Burlington	0.0400	0.020	Meets expectations	58
36	Bedford	0.0300	0.040	Meets expectations	46
37	Bedford	0.0100	0.020	Meets expectations	40
38	Bedford	0.020	0.020	Meets expectations	50
39	Wilmington	0.020	0.010	Meets expectations	56
40	Bedford	0.020	0.050	Meets expectations	35

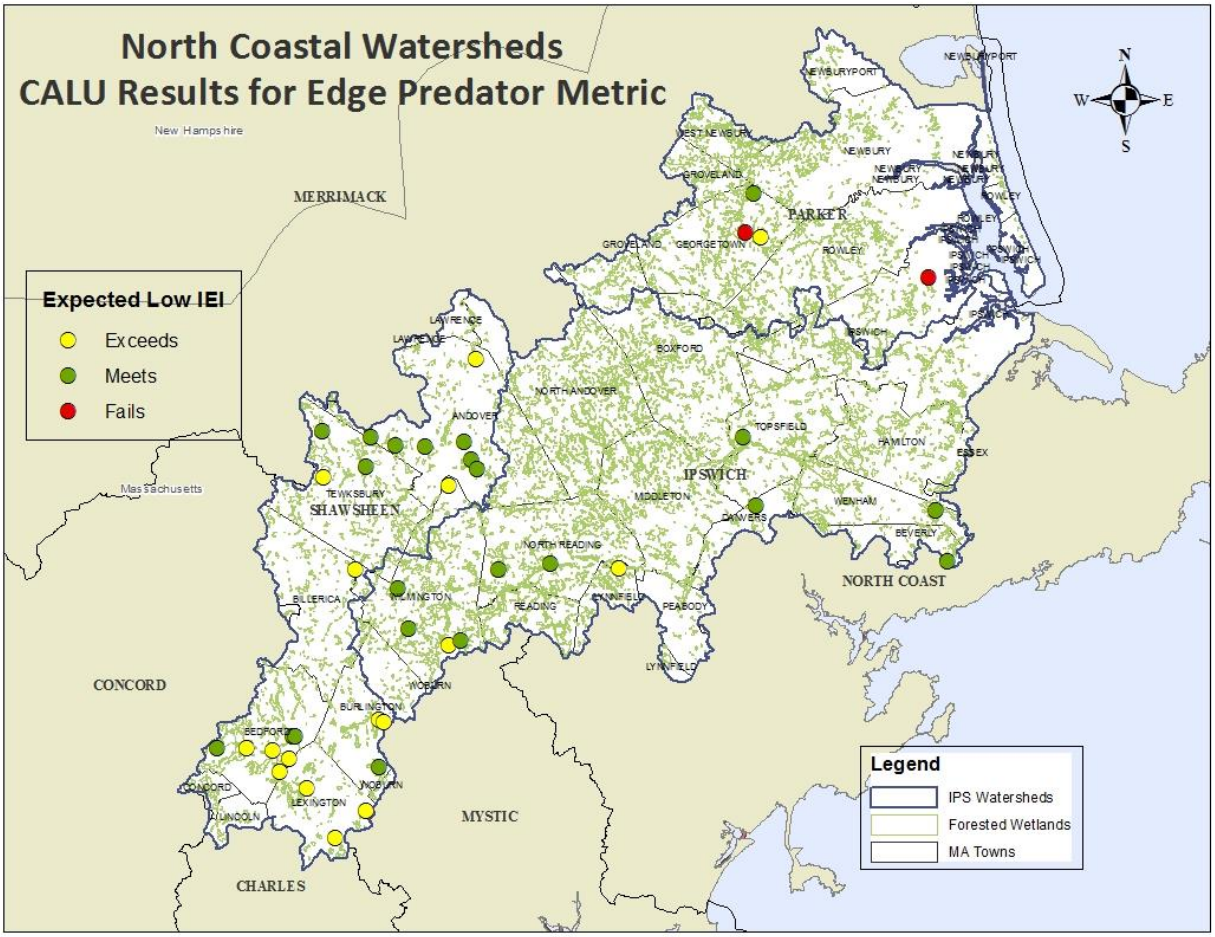
Earthworms Metric:



The invasive earthworm metric is a stressor metric. The results of this metric analysis were wide ranging. It showed that six of the 40 low IEI sites sampled exceeded expectations, which means that fewer invasive worm species were found than predicted indicating a higher ecological wetland condition. Seven sites failed indicating a greater invasive worm impact on the forested wetland than expected. Twenty seven (27) sampled sites met expectations.

Site Number	TOWN	IBI Score Invasive Earthworms	Target Score Invasive Earthworms	Compliance Level Invasive Earthworms	Percentile Invasive Earthworms
1	North Reading	0.300	0.240	Meets expectations	21
2	Tewksbury	0.170	0.037	Fails to meet expectations	6
3	Lexington	0.250	0.420	exceeds	97
4	Andover	0.250	0.150	Meets expectations	11
5	Lexington	0.240	0.330	Meets expectations	89
6	Georgetown	0.340	0.220	Fails to meet expectations	8
7	Bedford	0.320	0.310	Meets expectations	35
8	Tewksbury	0.270	0.290	Meets expectations	71
9	Burlington	0.290	0.440	exceeds	96
10	Andover	0.260	0.200	Meets expectations	21
11	Bedford	0.360	0.350	Meets expectations	35
12	Andover	0.200	0.330	exceeds	94
13	Beverly	0.150	0.001	Fails to meet expectations	4
14	Lexington	0.310	0.350	Meets expectations	74
15	Andover	0.240	0.080	Fails to meet expectations	4
16	Topsfield	0.250	0.190	Meets expectations	20
17	Georgetown	0.340	0.050	Fails to meet expectations	0
18	Wilmington	0.000	0.050	Meets expectations	80
19	Wilmington	0.260	0.300	Meets expectations	77
20	North Reading	0.310	0.190	Meets expectations	10
21	Danvers	0.270	0.160	Meets expectations	10
22	Lynnfield	0.000	0.040	Meets expectations	77
23	Wilmington	0.339	0.238	Meets expectations	11
24	Andover	0.208	0.164	Meets expectations	27
25	Wilmington	0.270	0.355	Meets expectations	89
26	Wenham	0.226	0.254	Meets expectations	72
27	Tewksbury	0.255	0.299	Meets expectations	79
28	Wilmington	0.300	0.310	Meets expectations	63
29	Burlington	0.240	0.080	Fails to meet expectations	4
30	Andover	0.300	0.220	Meets expectations	19
31	Andover	0.260	0.360	exceeds	92
32	Georgetown	0.000	0.280	exceeds	100
33	Ipswich	0.240	0.010	Fails to meet expectations	1
34	Bedford	0.270	0.320	Meets expectations	80
35	Burlington	0.340	0.260	Meets expectations	16
36	Bedford	0.320	0.200	Meets expectations	10
37	Bedford	0.290	0.270	Meets expectations	36
38	Bedford	0.280	0.270	Meets expectations	43
39	Wilmington	0.280	0.380	exceeds	92
40	Bedford	0.270	0.210	Meets expectations	23

Edge Predator Metric:



Edge predators are animals mid-level on the food chain such as raccoons and skunks that prey upon other, smaller animals and are also predated upon by larger predators. When edge predator populations expand, it creates stress on the population of smaller animals on the food chain such as reptiles and amphibians and can degrade biological condition. Edge Predators benefit from the activities of humans, such as the clearing of fields for agriculture or suburbanization which results in increased food sources (i.e. garbage and trash). The edge predator metric is based on land uses that provide increased habitat and food sources. The CALU results indicate that many sites exceed expectations – possibly indicating restoration of land uses (e.g. agricultural reverting back to forest, etc.) – further investigation would be needed to make any conclusive finding.

Site Number	TOWN	IBI Score Edge Predators	Target Score Edge Predators	Compliance Level Edge Predators	Percentile Edge Predators
1	North Reading	0.420	0.520	Meets expectations	85
2	Tewksbury	0.250	0.310	Meets expectations	75
3	Lexington	0.320	0.790	exceeds	100
4	Andover	0.340	0.330	Meets expectations	39
5	Lexington	0.35.	0.630	exceeds	99
6	Georgetown	0.460	0.350	Meets expectations	18
7	Bedford	0.410	0.550	Meets expectations	90
8	Tewksbury	0.380	0.480	Meets expectations	86
9	Burlington	0.380	0.630	exceeds	98
10	Andover	0.380	0.380	Meets expectations	56
11	Bedford	0.450	0.680	exceeds	97
12	Andover	0.310	0.580	exceeds	99
13	Beverly	0.220	0.100	Meets expectations	17
14	Lexington	0.410	0.570	exceeds	92
15	Andover	0.340	0.430	Meets expectations	83
16	Topsfield	0.350	0.400	Meets expectations	73
17	Georgetown	0.450	0.190	fails	2
18	Wilmington	0.000	0.320	exceeds	100
19	Wilmington	0.380	0.650	exceeds	98
20	North Reading	0.390	0.390	Meets expectations	42
21	Danvers	0.400	0.370	Meets expectations	36
22	Lynnfield	0.000	0.156	exceeds	92
23	Wilmington	0.446	0.544	Meets expectations	85
24	Andover	0.277	0.308	Meets expectations	65
25	Wilmington	0.400	0.480	Meets expectations	82
26	Wenham	0.366	0.300	Meets expectations	27
27	Tewksbury	0.376	0.605	exceeds	97
28	Wilmington	0.400	0.500	Meets expectations	90
29	Burlington	0.320	0.330	Meets expectations	53
30	Andover	0.400	0.350	Meets expectations	25
31	Andover	0.390	0.500	Meets expectations	86
32	Georgetown	0.000	0.350	exceeds	100
33	Ipswich	0.350	0.060	fails	1
34	Bedford	0.400	0.570	exceeds	93
35	Burlington	0.450	0.600	exceeds	92
36	Bedford	0.370	0.440	Meets expectations	79
37	Bedford	0.450	0.630	exceeds	94
38	Bedford	0.390	0.600	exceeds	98
39	Wilmington	0.380	0.750	exceeds	100
40	Bedford	0.390	0.400	Meets expectations	63