

Excerpts of results for two marshes studied for multiple years during pre and post restoration phases: West Island in Fairhaven and Somerset marsh:

West Island

pre-restoration	Apr	May	Jun	Jul	Aug	Sep	Oct
Reference	21	24	17	25	35	27	25
study	11	8	8	17	25	18	15
post restoration	Apr	May	Jun	Jul	Aug	Sep	Oct
Reference	20	23	25	25	24	19	17
study	11	15	20	24	22	19	11

Comparison of mean monthly salinity (ppt) readings between pre (2008-2010) and post (2011) Restoration at target and reference marshes on West Island in Fairhaven, MA (Note: no April surveys until 2010).

Plant species (%/m2 plot) (Halophytes highlighted in bold)	2008-2010		2011	
	study	reference	study	reference
<i>Spartina patens</i>	35.66	29.54	28.46	30.59
<i>Spartina alterniflora</i> (all heights)	13.62	34.52	11.70	34.93
<i>Phragmites australis</i>	20.23	0.00	19.37	0.00
<i>Distichlis spicata</i>	5.55	16.85	1.25	12.57
<i>Toxicodendron radicans</i>	9.61	0.40	9.35	0.00
<i>Baccharis halimifolia</i>	7.33	4.13	2.52	3.97
<i>Triglochin maritimum</i>	0.00	6.96	0.00	6.53
<i>Plantago maritima</i>	0.00	5.07	0.00	2.77
<i>Salicornia spp(europea and or maritma)</i>	0.08	2.10	0.01	5.08
<i>Eleocharis spp.</i>	0.74	2.35	3.18	3.16
<i>Myrica pensylvanica</i>	4.03	0.00	1.90	0.70
<i>Juncus gerardi</i>	0.14	2.18	0.00	3.45
<i>Solidago sempervirens</i>	1.63	1.27	1.39	1.39
<i>Scirpus pungens</i>	3.14	0.06	2.31	0.00
<i>Solidago tenuifolia</i>	3.29	0.00	0.96	0.00
<i>Panicum virgatum</i>	0.27	2.59	0.01	1.32
grasses	1.88	1.30	0.33	0.60
<i>Agalinis maritima</i>	0.00	1.24	0.00	1.29
<i>Iva frutescens</i>	0.02	2.01	0.00	0.00
<i>Limonium nashii</i>	0.00	0.74	0.00	1.15
<i>Pluchea purpurascens</i>	1.05	0.00	0.00	0.00
other cover (dead, bare, water, panne)	49.09	17.30	67.77	35.43

Average percent cover for most commonly observed plant species during pre (2008-2010) and post (2011) restoration phases of the target and reference marshes at West Island in Fairhaven MA.

Nekton Species (#/m2 plot) (resident fish species in bold)	Reference		Target	
	Reference	Target	Reference	Target
<i>Fundulus heteroclitus</i>	7.10	12.07	9.2	10.6
<i>Menidia menidia</i>	2.50	2.07	2.8	8.4
<i>Cyprinodon variegatus</i>	5.30	1.73	0.6	2
<i>Anguilla rostrata</i>	0.20	0.93	1.8	2.8
<i>Lucania parva</i>	0.10	0.93	1	1.2
<i>Fundulus majalis</i>	0.40	0.27	1.4	0
<i>Pungitus pungitus</i>	1.10	0.40	0	0
<i>Apeltes quadracus</i>	1.10	0.33	0	0
<i>Carcinus maenus*</i>	1.30	0.07	0	0
<i>Gasterosteus aculeatus</i>	0.40	0.27	0	0
herring spp	0.20	0.00	0	0
<i>Callinectes sapidus*</i>	0.10	0.00	0	0
stickleback spp	0.10	0.00	0	0

Average abundance for nekton species observed during pre (2008-2010) and post (2011) restoration phases.

Bird species (#/survey) (wetland specialists in bold) *=state-listed in Massachusetts	reference	reference	2008-2010	reference	reference	2011
	station 1	station 2	study	station 1	station 2	study
Red-winged Blackbird	0.35	2.21	4.00	y	y	y
European Starling	0.73	3.08	1.67			
Willet	0.69	1.43	0.55	y	y	y
Double-crested Cormorant	1.12	0.00	1.36	y		
Great black-backed Gull	0.88	0.62	0.67	y		y
Tree Swallow	0.62	0.38	1.03			
Common Grackle	0.81	0.31	0.64	y		
Common Tern*	0.77	0.38	0.55			
Mallard	0.31	0.00	1.24			
Salt Marsh Sharp-tailed Sparrow	0.69	0.46	0.39	y	y	
Song Sparrow	0.38	0.23	0.91	y	y	y
American Crow	0.88	0.38	0.00			
Herring Gull	0.27	0.23	0.55		y	y
American Goldfinch	0.27	0.08	0.61	y		

Abundance of most common bird species and wetland dependent birds observed during pre (2008-2010) and post (2011) restoration at the target and reference sites on West Island in Fairhaven, MA (portion of table)

Somerset

Reference	Apr	May	Jun	Jul	Aug	Sep	Oct
pre-restoration	13	10	11	19	20	14	16
post-restoration	12	15	15	17	22	17	14
Study	Apr	May	Jun	Jul	Aug	Sep	Oct
pre-restoration	7	10	9	17	18	15	11
post-restoration	9	14	17	17	22	16	13

Comparison of mean monthly soil salinity (ppt) readings between study and reference for pre (2008-2010) and post (2010-2011) restoration periods (pre-rest. = data prior to culvert install July 1, 2010).

Plant Species (% per m2 plot)	2008-2010		2011		2011	
Halophytes highlighted in bold * = species increased with T7	target	reference	target	Targ (T7)	ref	ref (T7)
<i>Distichlis spicata</i> *	16.65	43.43	13.70	13.00	34.0	35.44
<i>Spartina patens</i> *	16.07	3.38	21.90	20.27	5.3	19.49
<i>Phragmites australis</i> *	16.78	6.80	13.89	15.34	8.6	6.90
<i>Juncus gerardi</i>	0.07	6.52	0.70	0.62	17.5	16.55
<i>Scirpus robustus</i>	14.76	0.04	8.70	7.77	0.3	0.28
<i>Spartina pectinata</i>	10.88	1.63	7.45	6.60	1.1	1.14
<i>Iva frutescens</i> *	0.00	11.49	0.33	0.35	5.9	7.07
<i>Spartina alterniflora (tall)</i> *	0.00	9.27	0.00	0.00	8.3	9.58
<i>Salicornia europaea</i> *	8.48	0.00	10.44	9.78	0.0	0.37
<i>Pluchea purpurascens</i>	6.09	0.01	5.89	6.09	0.0	0.00
<i>Aster subulatus</i> *	6.03	0.18	3.53	3.67	0.0	0.01
hybrid <i>Spartina patens</i> *	2.09	0.46	3.95	3.50	1.6	1.76
<i>Atriplex patula</i>	1.87	0.73	4.13	4.04	0.9	0.86
<i>Lythrum salicaria</i>	4.79	0.27	2.65	2.35	0.0	0.00
hybrid <i>Solidago sempivirens</i>	0.00	3.01	0.00	0.00	4.1	3.89
<i>Panicum virgatum</i>	1.41	2.28	0.91	0.81	2.3	2.18
<i>Calystegia sepium</i>	3.37	0.06	1.89	1.78	0.7	0.58
<i>Ambrosia artemisiifolia</i>	2.96	0.00	1.24	1.10	0.0	0.00
<i>Scirpus_pungens</i> *	T	1.20	1.77	2.30	0.0	0.00
<i>Thelypteris thelypteroides</i>	2.02	0.00	1.12	0.99	0.0	0.00
<i>Eleocharis spp</i>	0.26	0.00	2.45	2.17	0.0	0.00
<i>Eupatorium dubium</i>	1.03	0.00	1.55	1.38	0.0	0.00
<i>hibiscus palustris</i> *	0.43	0.00	0.43	1.08	0.0	0.00
<i>Typha angustifolia</i> *	0.00	0.00	0.16	0.58	0.0	0.00
<i>Leptochloa fusca (listed species)</i>	T	0.00	0.00	0.00	0	0.00
other (dead, bare, panne)	23.5	35.6	38.4	39.7	41.2	45.6

Average percent cover for most commonly observed plant species during pre (2008-2010) and post (2011) restoration phases of the Somerset Marsh.

Nekton Species (#/m ² plot) (resident fish spp in bold)	2008-2010	2011	2008-2010	2011
	Study	Study	Reference	Reference
<i>Fundulus heteroclitus</i>	15.94	39.71	7.14	29.50
<i>Anguilla rostrata</i>	0.69	1.00	0.64	0.83
<i>Menidia menidia</i>	1.69	0.00	1.00	0.00
<i>Fundulus majalis</i>	0.13	0.00	1.21	0.83
<i>Ilyanassa obsoleta</i> *	0.00	0.00	1.79	0.17
<i>Apeltes quadracus</i>	0.00	0.00	1.14	0.17
<i>Cyprinodon variegatus</i>	0.06	0.00	0.00	0.00
<i>Mugil curema</i>	0.19	0.00	0.07	0.17
<i>Callinectes sapidus</i> *	0.00	0.00	0.43	0.00
fish spp (chub)	0.00	0.00	0.00	0.33
<i>Gammarus tigrinis</i> *	0.00	0.00	0.00	0.17
<i>Gasterosteus aculeatus</i>	0.00	0.00	0.21	0.00
<i>Carcinus maenus</i> *	0.00	0.00	0.07	0.17
herring spp	0.06	0.00	0.00	0.00
<i>Pungitus pungitus</i>	0.00	0.00	0.14	0.00

Table 3. Average individual nekton species abundance for study and reference marshes during pre (2008-2010) and post (2011) restoration periods in Somerset, MA.

Bird Species	2008-2010	2011	2008-2010		2011	
	Study		Ref sta 1	Ref sta 2	Ref sta 1	Ref sta 2
Red-winged Blackbird	7.0	9.1	7.0	0.5	7.2	2.1
European Starling	10.4	6.3	8.4	1.4	0.9	2
Common Grackle	1.2	7.5	2.7	0.4	4	1.1
Mallard	4.9	1.7	0.2	3.3	0	3.6
Song Sparrow	3.0	4.2	1.0	0.5	0.8	3.8
Chimney Swift	2.3	3.5	0.6	0.0	1	0.3
Canada Goose	2.1	0.2	1.3	2.2	0	1.3
American goldfinch	2.0	0.3	1.7	0.1	2.9	0
American Crow	0.4	1	0.2	0.0	1.3	0
Ring-billed Gull	0.0	0	0.0	2.4	0	0
Herring Gull	0.1	0	0.2	0.7	0	0.4
Semipalmated Sandpiper	1.2	0	0.0	0.1	0	0
Salt Marsh Sharp-tailed Sparrow	0.5	0.3	0.4	0.0	0	0
Sparrow spp	0.9	0	0.1	0.0	0	0
Tree Swallow	0.3	0	0.3	0.0	0	0.1
Least Sandpiper	0.3	0.4	0.0	0.0	0	0
Great Egret	0.5	0	0.1	0.1	0	0
Green-winged Teal	0.6	0	0.0	0.1	0	0

Abundance of most common bird species, and wetland-dependent birds observed during pre (2008-2010) and post (2011) restoration periods for the study and reference sites in Somerset, MA