



Ed DeWitt
Executive Director

March 2, 2012

BOARD OF DIRECTORS

Priscilla Geigis, Director of State Parks and Recreation
Division of Conservation and Recreation
251 Causeway St., Suite 900
Boston, MA 02114-2104

John Parker
President

Robert Cunningham
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RE: Letter of support for removal of culvert boards at Namskaket Salt Marsh on the Brewster/Orleans town line.

Susan Shephard
Clerk

Dear: Ms. Geigis:

On behalf of the Association to Preserve Cape Cod (APCC), I am writing to urge removal of the flash boards that currently restrict/inhibit the tidal flow to the upstream section of Namskaket Salt Marsh in Brewster and Orleans.

Kristin Andres

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In January of 2007 a one foot diameter culvert under the Cape Cod Rail Trail bike path was removed and replaced with two larger side by side box culverts which are less restricting of salt water at high tide. At the time of tidal restoration, flash boards were placed over the two new culverts. This is typically done as a means of slowly and gradually introducing increased tidal flow over time. However, in this case the flash boards were never removed, thus defeating the purpose of the tidal restoration and making the installation of the box culverts ecologically meaningless. When I recently toured the outer Cape with Secretary Sullivan, Namskaket Salt Marsh was one of the projects that we discussed – fantastic as far as it went (dramatic improvement), but coming up short considering the overall potential ecological benefit. APCC has been monitoring Namskaket salt marsh site since 2006, which includes one year of pre-tidal restoration monitoring, and four years of post-construction data. We monitor both the unrestricted (reference) side of the marsh and the side upstream of the culvert (study) for salinity, vegetation and birds. Based on the salinity and vegetation data there has been a minimal increase in salinity and negligible plant restoration.

Normally, the expectation when a small culvert is replaced with two larger culverts is that there will be a dramatic increase in the concentration of salt dissolved in the water (salinity). However, the salinity concentration of the water at Namskaket Salt Marsh has increased only minimally post culvert replacement. In 2006, prior to construction, the salinity concentration on the tidally restricted (study) side of the marsh averaged 2.3 parts per thousand (ppt).

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In 2007, the first year post culvert replacement, there was an increase in yearly average salinity to 9.4 ppt, however much of this increase is likely due to other factors since there was also an increase in salinity on the reference side of the marsh from 2006 to 2007 (15.3 and 20.9 respectively), Table 1. Since there was no tidal flow change on the reference side of the marsh, this increase can be attributed to other factors including yearly variation. When corrected for these factors, the change in salinity post culvert replacement on the study side only increases 2.2 ppt, subsequently the actual increase in salinity went from 2.3 to 4.5 ppt; still an increase, but not as dramatic as initially anticipated or might appear. It is important to note that even five years post culvert replacement, the salinity concentration on the study side has not increased beyond the initial increase in 2007, one year post culvert replacement. The tidal restoration has narrowed the difference between salinity on the study side and the reference side, however the tidal restoration it is not as effective or extensive as it could be.

Annual Average by Site		
	Ref	Study
2006	15.3	2.3
2007	20.9	9.4
2008	19.0	9.8
2009	19.1	8.0
2011	20.1	9.3

Table 1. Yearly average salinity concentrations on the study and reference sides of Namskaket Salt Marsh. A larger culvert was installed in January of 2007.

The lack of impact can also be seen in the plant community. There was an initial response to the increase in daily tidal inundation the first year after the culvert was replaced, but beyond that there has been no measureable impact. One of the indicators used to assess the health of salt marsh plants is the abundance of halophytes, salt-loving plants. In 2006 the percent of halophytic (salt loving) plants was at a very low 13%. In 2007, the first year post culvert replacement, the halophyte population increased to 32%, however subsequent years show a decline in halophytes to 30% and then 19% in 2008 and 2011, respectively (Table 2).

Year	% Halophytes	
2006	14	pre-restoration
2007	32	post-restoration
2008	30	post-restoration
2011	19	post-restoration

Table 2. Percent of halophytic plants on the impacted side of Namskaket Salt Marsh.

This tells us that although there was an initial response to the increase in salt water, the change is not sustainable. The amount of salt water that flushes the surface of the marsh upstream of the culvert is not enough to sustain a healthy salt marsh plant community. More salt water needs to be allowed in on a regularly basis to effectively change the upland area into a healthy functioning

salt marsh that will provide habitat for wildlife as well as filter pollutants and excessive nutrients. Even if we pooled the halophyte data and averaged it for comparison purposes we find that the change is not significant. The percent of halophytes on the reference, unrestricted, side of the Namskaket Marsh averaged over the post-construction years equals a substantial 97%, as compared to the percent halophytes on the study side of the marsh, post-construction, which averages 27% (Table 3).

% Halophytes	
Reference	97
Pre	14
Post	27

Table 3. Averaged percent halophytic plants at Namskaket Salt Marsh.

As the leading regional environmental advocacy organization on Cape Cod for 44 years, it is APCC's role to initiate and follow through on ecological restoration. Based on our monitoring of the site, APCC does not believe that the level of restoration possible has yet been achieved. Along these lines APCC encourages DCR to remove boards from across the culverts. A possible scenario would be to remove them one or two at time to allow assessment of tidal inundation in a step-wise fashion.

Sincerely,



Ed DeWitt
Executive Director