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CAPE COD
COMMISSION

**By Electronic Mail**

March 1, 2016

Matthew A. Beaton, Secretary
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office, Anne Canaday, Analyst
100 Cambridge Street, Suite 900
Boston, MA 02114

***Re: Environmental Notification Form - EEA No. 15474***
***Cedar Pond Water Quality Management Plan- Town of Orleans***
**(CCC Project No. 16003)**

Dear Secretary Beaton:

Cape Cod Commission staff has reviewed the ENF on the above-referenced project as a water quality management initiative, and provides the following water resource comments.

Cedar Pond lies within the Rock Harbor Watershed, a nitrogen-impaired watershed requiring a 59% reduction in total nitrogen load according to the Massachusetts Estuaries Project (MEP). The MEP analysis for Rock Harbor was conducted in 2007 and at the time of the MEP report, Cedar Pond was considered a brackish pond, providing nitrogen attenuation at a rate of 58%, effectively reducing nitrogen load to Rock Harbor. However, various interventions over time have resulted in increased salinity of the pond. With the increase in salinity, changes have occurred to its biogeochemistry, governing how nutrients interact within the Cedar Pond system. Currently, the pond exhibits evidence of nutrient impairment and acts as a net source of nitrogen to Rock Harbor during early summer.

Ortho-photos from 1947 indicate the pond was historically a freshwater system, likely unaffected by nitrogen concentrations. At that time, a flapper valve in Rock Harbor Creek (later replaced by a weir) inhibited tidal flow into Cedar Pond. A storm damaged the Rock Harbor Creek weir in 2005, but it wasn't until debris was cleared from the creek in 2007 that salt water was allowed to flow freely into Cedar Pond. A review of historical water quality data confirms that following the 2007 clearing, water quality parameters in Cedar Pond began to shift from exhibiting characteristics of a brackish regime to developing characteristics of a more saline regime.

In 2012, SMAST synthesized historical data and collected new data to further characterize the Cedar Pond system. Evidence of higher tidal exchange was evidenced by higher salinity measurements: on average, salinity measurements in Cedar Pond outflow increased from 7.5 ppt in 2007 to 20.9 ppt. in 2012. Additionally, increases in shallow chlorophyll-a concentrations

(a proxy for algae growth) and decreases in water clarity were indicative of nutrient impairment. Through measurements of both total nitrogen (TN) and total phosphorous (TP), SMAST found the eutrophying nutrient in Cedar Pond to be both nitrogen and phosphorous; the nutrient ratio is still in the range where addition of either nutrient could lead to phytoplankton blooms and worsen water quality conditions.

The proposed project intends to reinstall weird boards at the Cedar Pond Outlet to Rock Harbor Creek in order to inhibit tidal flows. The boards will be set at a height so as to allow only the highest tides to dispense saltwater into Cedar Pond. According to the ENF, the Town proposes to develop an adaptive O&M Plan for adjusting board height based on continuous monitoring of pond heights and salinity.

Installation of the boards will reduce saltwater flow to the pond, effectively reducing pond salinity to a brackish system (1-4 ppt). As such, it is anticipated that Cedar Pond will begin to attenuate nitrogen year-round and will no longer seasonally contribute nitrogen to the already-impaired Rock Harbor system. Restoring Cedar Pond's ability to attenuate nitrogen and thus reduce nitrogen loading to the nitrogen-impaired Rock Harbor aligns with Section 208 Areawide Water Quality Management Goals. In addition, lowering the salinity in Cedar Pond will enable Cedar Pond to support spawning herring. Also at the brackish concentration, Cedar Pond will no longer serve as a potential threat to the adjacent Atlantic White Cedar Swamp, whose ecosystem could be harmed by saltwater intrusion.

CCC staff support this proposed project and suggest that the additional recommendations from the SMAST 2013 report appear to be a reasonable approach to restoring the water quality and ecosystem of Cedar Pond.

Thank you for the opportunity to provide comments on the above-referenced ENF. Cape Cod Commission staff is available and happy to answer any questions about these comments.

Sincerely,

Patty Daley
Deputy Director

Cc: Project File
Brian Madden, LEC, Project Consultant via email
George Meservey, Orleans Town Planner via email
Town of Orleans Cape Cod Commission representative via email