Natural Resources Advisory Board

Minutes December 1 2021

Approved December 16 2021, vote: 5-0

Attending: LHewitt, HGstalder, Jduane, JRiehl; excused TSlack

Guests: Andrew Gottlieb, JoAnn Muramoto – APCC

> Call to order 9:05 am

> Discussion with APCC about ponds issues & science (see below, with thanks to LHewitt)

> NRAB ATM issues

- Proposed article on harbor survey postponed until April ATM
- Discussion with Asst Town Manger on status of dredge alternative needs further details

> HDLTHA issues need clarification from Selectboard

> Minutes of October 13 2021 approved as drafted 4-0; 1 abstantion

> Next meeting for early December

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Nutrient loading

Run-off vs underground water flow

AG: Have good sense of influence of different sources of nutrient loading. General impressions but limited data (have more on estuaries where 85% of impact is from septic systems).

Storm water, land side fertilizer applications,

Look at base loading vs event type loading (heavy rain events – ponds more susceptible)

JAM- lack of pond water quality data for Wellfleet and the cape as a whole.

MA Estuaries and Wellfleet harbor watershed – assume all fed by groundwater – 5 of 8 ponds outside estuaries

Controllable Nitrogen – 82% septics, 8% storm water, 8% fertilized areas vs Cape as a whole – 78% septics…..0.3% from farm animals

Phosphorus big contributor – binds to soil, less mobile, but clearly does move as have lots of phosphorus water bodies. Think moves in "chunky" ways as once soil has bound phosphorus additional amounts flow over….AG: New septic buys you 2 to 3 years for phosphorus to be bound and then starts to move

Phosphorus doesn't break up easily. Promotes plant growth and then with cold weather plants die back and phosphorus settles back to the bottom of the water. Decomposes somewhat and becomes organic material that can release additional phosphorus into the water column to stimulate new plant growth. Slow deterioration and long cycle between solid and dissolved forms in the water and plants.

Nitrogen gets absorbed by plants and more soluble. De-nitrofication – happens when low oxygen in a pond or marine system - can convert into nitrogen gas which escapes into the ponds. Can be only in the sediments however…Can't rely on this as an escape mechanism.

Combination of N and P really key stimulant for nutrient loading and growth in ponds – need to monitor both. Ponds are connected to groundwater and can transport loading into other water sources. Can pollute drinking water wells. Other Cape towns monitoring both elements – paid for by estuary projects (some matching), some partnerships with CCCS.

Relationship between N and P – septic technologies different in controlling.

Septic systems

Title V does little to nutrient control. Designed to protect humans to pathogens on the surface. Takes all the nutrient load from the broken down waste and huge nutrient load into the soil. Cesspools still around ponds too but Title Vs not much better as respects loading.

Advanced systems in different points of development do bring down P and N. Currently better at N reduction than P. General use approval out on some systems. On N side, standard system vs general use – general use better….P way behind on mitigation. One system from Japan (1 in MA) has most promise. (De-nitrofy) AG to supplied names of general use systems that deal with P in email to Herb. [other stages for septics – 1 piloting, 2 provisional – agree to use for three years and have tested monthly to see effectiveness, 3 general use – have three years of data and approved]

IA systems – will give meaningful N reduction but leaves P problem. Different approaches. Cape, Chesapeake Bay…all have similar issues with both nutrients.

Effectiveness of siting septic systems back 300 feet – buys you time as P slower to move but will continue to move. Further back is better but not inexhaustible.

NRAB needs to meet with wastewater committee who have interest in this topic. Wellfleet estuary maps do not include most of the ponds.

Monitoring list –

[frequency – at least monthly April through October, bi-weekly for cyanobacteria]

Temperature

Dissolved Oxygen

Clarity

Cyanobacteria

Other bacteria

Coliform

E coli

Vegetation

Solids

PH and

Chlorophyll and phaeophytin

Total P and N

Quality assurance plan – approved by EPA recently

Alkalinity

Salinity

Nitrate/nitrite

Ammonium