Nantucket Zoning Board of Appeals

Surfside Crossing Application for Comprehensive Permit

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M.G.L. 40B of the Massachusetts Comprehensive Permit Act G.L. c. 40B §§20-23(act).

- Balancing the need for affordable housing vs. *local needs* of the community, including:
  - the need to protect the health or safety of the occupants of the proposed housing, or of the city or town;
  - to promote better site and building design in relation to the surroundings, *or*
  - to preserve open space.

CHANGE

Ecosystem Based Governance

Governance capable of integrating ecological protection and restoration with human needs to strengthen the essential connection between economic prosperity and environmental well-being.

Overview of EBG Characteristics

- Management for Resilience
- Significant, meaningful public participation
- Integrated, Collaborative Government Involvement
- Governance is Adaptive
- Overarching lead or joint institution
- Precautionary approach to decision making

EBG Characteristics

- Management for resilience
- Focus: the natural processes necessary to sustain ecosystem structure and function

Science of Surprise

(i) Wealth or the prospect of wealth generates political and social power that is used to promote unlimited exploitation of resources.

(ii) Scientific understanding and consensus is hampered by the lack of controls and replicates, so that each new problem involves learning about a new system.

(iii) The complexity of the underlying biological and physical systems precludes a reductionist approach to management. Optimum levels of exploitation must be determined by trial and error.

(iv) Large levels of natural variability mask the effects of overexploitation. *Initial overexploitation is not detectable until it is severe and often irreversible*

(Ludwig, Hilborn et al. 1993, 17).

Nantucket: What threats to aquifer?

Climate change

Development

Pollution

ACKPOOP_MHP-1.jpg (JPEG Image, 750 × 553 pixels) https://www.capecod.com/wp-content/uploads/NWS_ACKPO

Photo: CapeCod.com

Climate Change

- Sea Level Rise
  - Higher, more frequent, tidal surges
  - Salt water intrusion
- Changes in total precipitation via more frequent, intense storms
- Hotter summers with longer, more intense drought
- Stronger tropical storms

Development

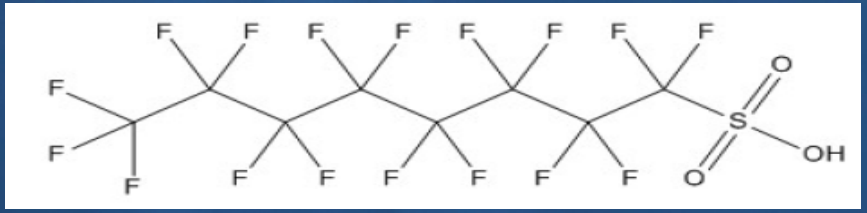
- Sole source aquifer
  - Current: 11,600 housing units: 64% seasonal, 36% year round
  - 16 multiunit developments approved by Town
    - 594 additional units over next 5 years
  - Additional water demand
    - 140,000 gallons per day (gpd)
    - 350,500 peak day demand (ppd)
  - Plus Surfside Crossing? 100 units?

Contaminants

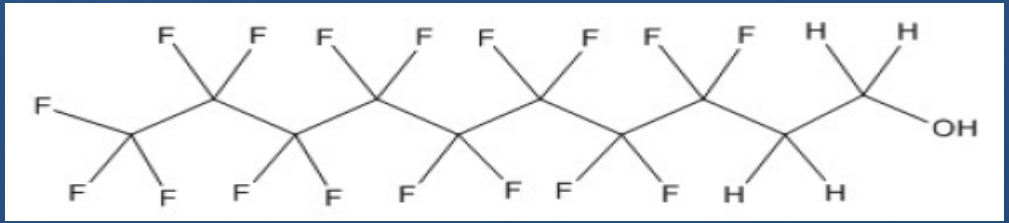
Sole Source Aquifer

- PFAS/PFOS/PFPA C8
- Stormwater runoff
- Water table rise
- Salt water intrusion

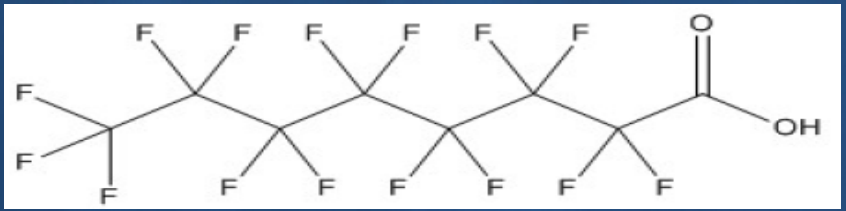
CHEMICAL STRUCTURES



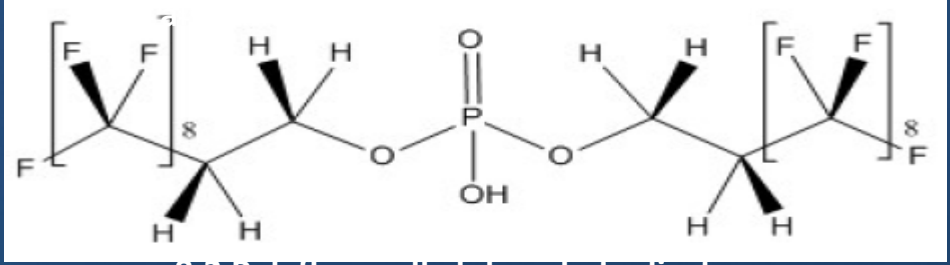
Perfluorooctane sulfonic acid (PFOS)



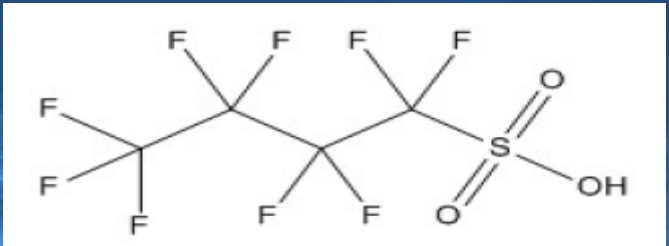
8:2 Fluorotelomer alcohol (8:2 FTOH);



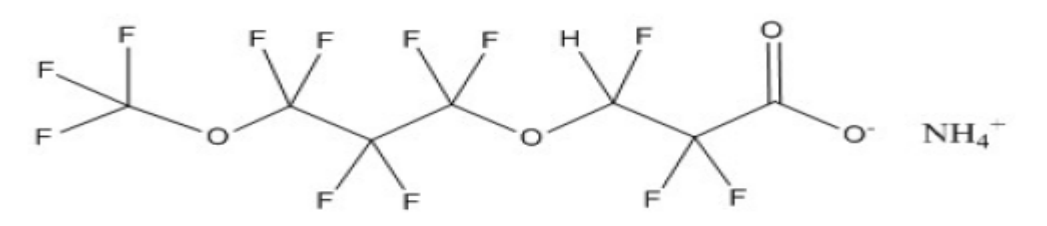
Perfluorooctanoic acid (PFOA)



8:2 Polyfluoroalkylphosphate diester



Perfluorobutane sulfonic acid (PFBS)

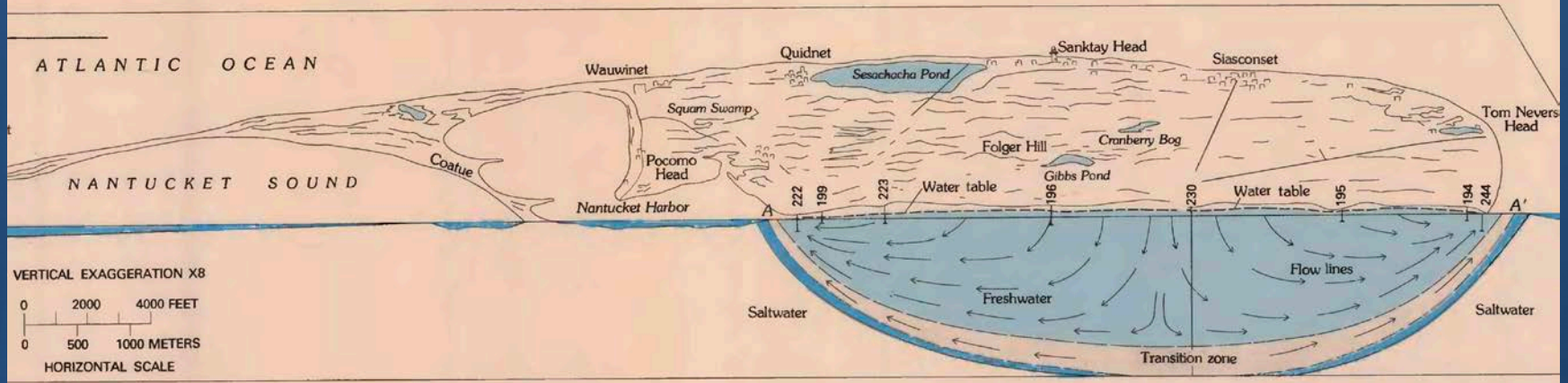


Ammonium 4,8-dioxa-3H-perfluorononanoate (ADONA)

Uncertainty

Where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation

Groundwater?



WATER BODY.—The fresh ground water in the porous deposits of Nantucket forms a lens-shaped body that is about 500 feet of the island and thins toward the shores to wedge out a short distance offshore. This lens of freshwater floats upon underlying reshwater is about one-fortieth less dense than seawater.

ch thinner, lens of freshwater underlies Tuckernuck Island, but its thickness has not been measured. Beneath peninsular areas of e freshwater lens may be very thin. For example, the Madaket area is bounded on the west by Madaket Harbor and saltwater and Pond, usually brackish, and the average thickness of the freshwater lens (to a depth where water contains 250 mg/L of chloride) to be 18 feet (Whitman and Howard, 1973a).

The freshwater lens is bounded by the water table on top and brackish water below. Where thickest, the freshwater len sandy beds of Tertiary and Cretaceous age beneath the glacial deposits of Pleistocene age. The salinity increases irregularly per thousand) at a depth of 520 feet to more than 25 ppt at a depth of 650 feet, indicating the zone of transition from fres about 130 feet thick. Using a static density model for describing the position of the freshwater to saltwater interface (Hubber hydraulic head of 11.9 feet from a piezometer open at 480 feet deep, the center of the transition zone was calculated to lie 485 feet below National Geodetic Vertical Datum of 1929. The observed depth of the center of the zone of transition (585 than the calculated depth (520 ft).

WATER

Walker 1980

And it ought to be remembered that there is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new. This coolness arises partly from fear of the opponents, who have the laws on their side, and partly from the incredulity of men, who do not readily believe in new things until they have had a long experience of them.

- Nicolo Machiavelli, The Prince, Chap. VI , 1499