

Coastal Resources Planning and Management:

EDGARTOWN GREAT POND

Edgartown, Massachusetts

Final Report

(WHOI Proposal No. 6468.0)

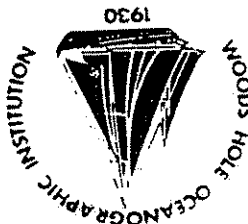
Prepared for

Board of Selectmen
Town of Edgartown, Massachusetts
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OBSERVATIONS ON WATER QUALITY

Water quality is a concern common to most restricted coastal waters. The four categories of contamination of most concern are: fecal material; nutrient enrichment; toxic metals; and hydrocarbons and pesticides. Of these we have focussed on nutrients, with some attention to fecal coliform contamination. Surveys of toxic metals, hydrocarbons, and pesticides remain for the future.

Composition of groundwater

The principal source of freshwater entering Edgartown Great Pond is groundwater discharge, and a principal source of waterborne materials and contaminants, therefore, could also be groundwater discharge (seawater entering the Pond cannot necessarily be disregarded as a source of contamination of the Pond).

Over 160 domestic and Town wells were sampled to determine the composition of groundwater. Analyses included: nitrate, nitrite, ammonia, urea, phosphate, silica, and sodium. The results of these analyses are given in Appendix 3. As the principal nitrogen containing nutrient, special attention was devoted to nitrate. Most wells were well below the EPA standard for drinking water (10 ppm) in their nitrate content. Only one well tested exceeded this standard. The nitrate data base for Edgartown was used along with a statistical method known as Kriging Analysis to estimate the distribution of nitrate in groundwater in areas surrounding Edgartown Great Pond. The results (Fig. 9) show areas of highest nitrate content in a broad plume lying between the Pond and Edgartown Harbor beneath Katama Plains. Another area of high nitrate corresponded with a residential development lying outside the Edgartown Great Pond recharge area. Lowest levels of nitrogen in groundwater lay beneath relatively undeveloped lands to the west of Great Pond.

Contaminant loading by Edgartown sewage treatment works.

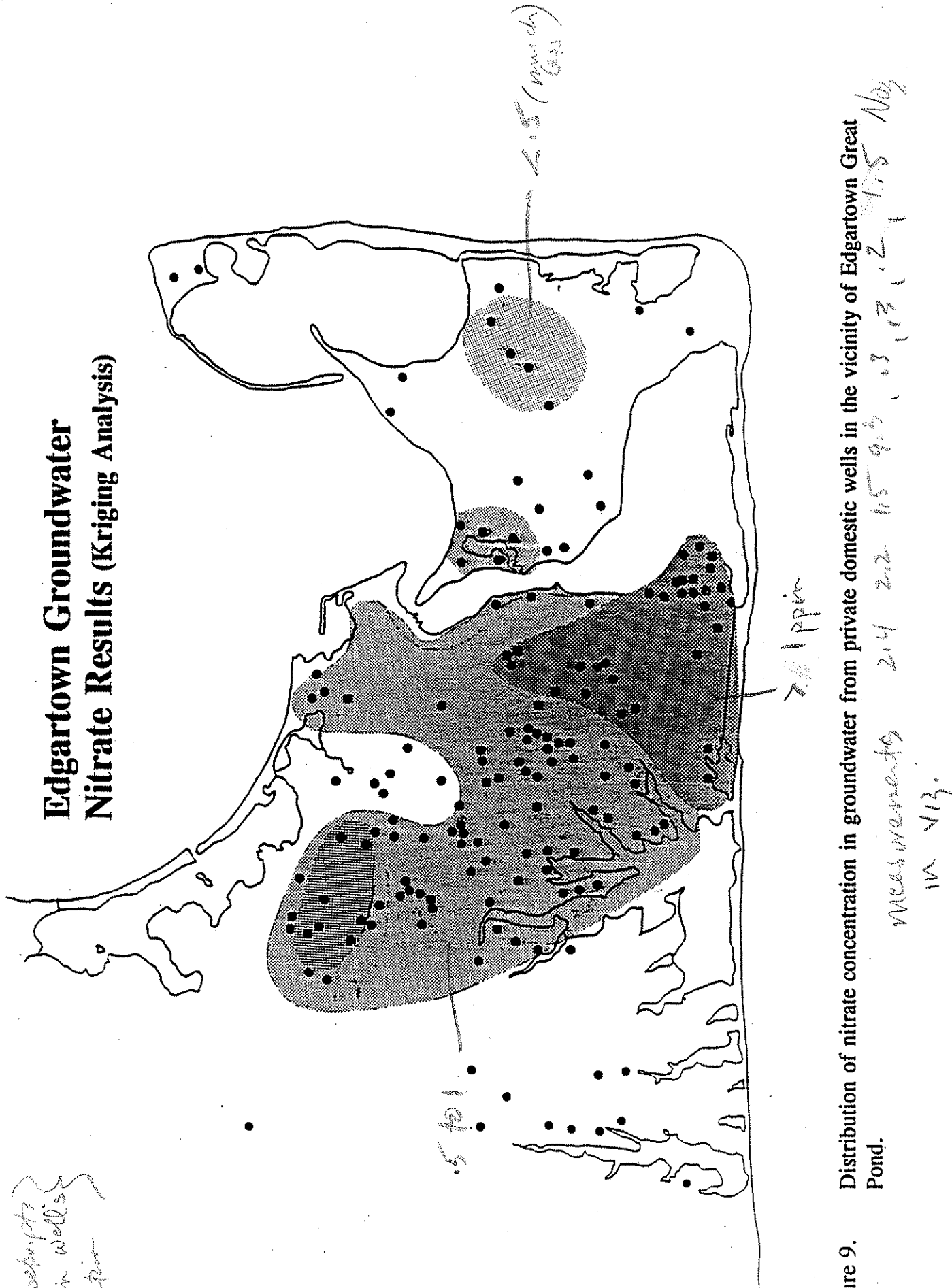
The operation of the Edgartown Sewage Treatment Facility within the watershed of Edgartown Great Pond presents an issue of special concern. This plant services over 300 residences and businesses, discharging a nitrogen-rich effluent into leaching beds, ultimately to become entrained into groundwater flow. It is notable that we did not find any evidence of this plume in the nitrogen data, even though samples were taken from several wells in the plotted path of the plume. While it is possible the plume passed between sampling wells, it is more likely it is deeper than the wells sampled. In view of the amount of nitrogen likely to be conveyed in this plume it is important to determine its exact configuration and prospects for discharge into Edgartown Great Pond.

Nitrogen loading of Edgartown Great Pond

Using estimates of groundwater discharge into Great Pond (Table 1) and the average concentration of nitrate in groundwater (1.37 ppm) we estimate a total watershed nitrate-N loading of 2,400 moles/day (= 33.6 kg/day) of nitrogen. Expressed on an areal basis, this amounts to 142 moles/km²/day (0.57 moles/acre/day) or, on a weight basis, 2.0 kg/km²/day (8.1 g/acre/day).

8.1 gms/acre/d

Edgartown Groundwater Nitrate Results (Kriging Analysis)



Sept. 1987
 conc. in wells
 correlation

Figure 9. Distribution of nitrate concentration in groundwater from private domestic wells in the vicinity of Edgartown Great Pond.