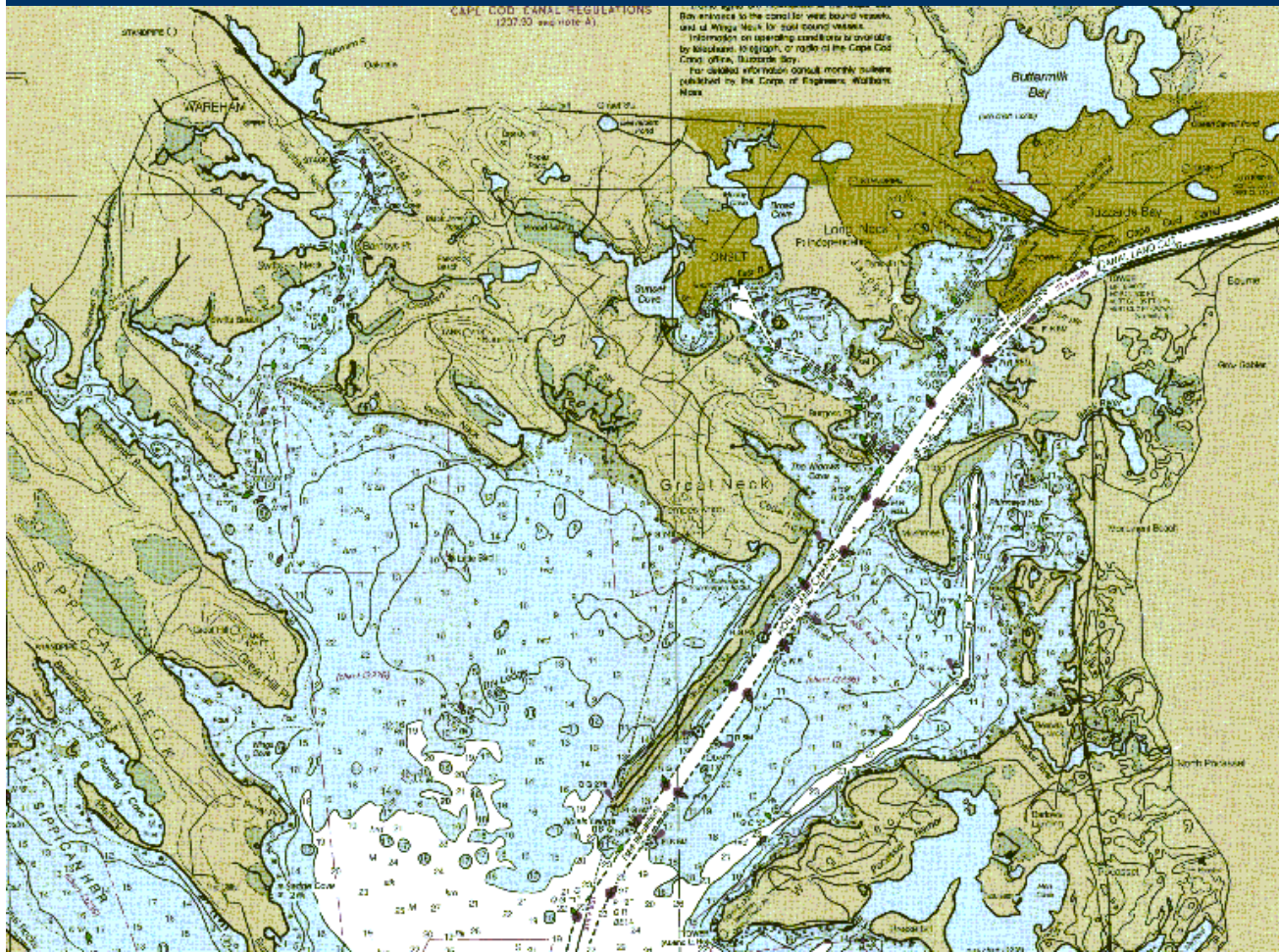


Proposed Wastewater Nitrogen Management Bylaw for Wareham, MA

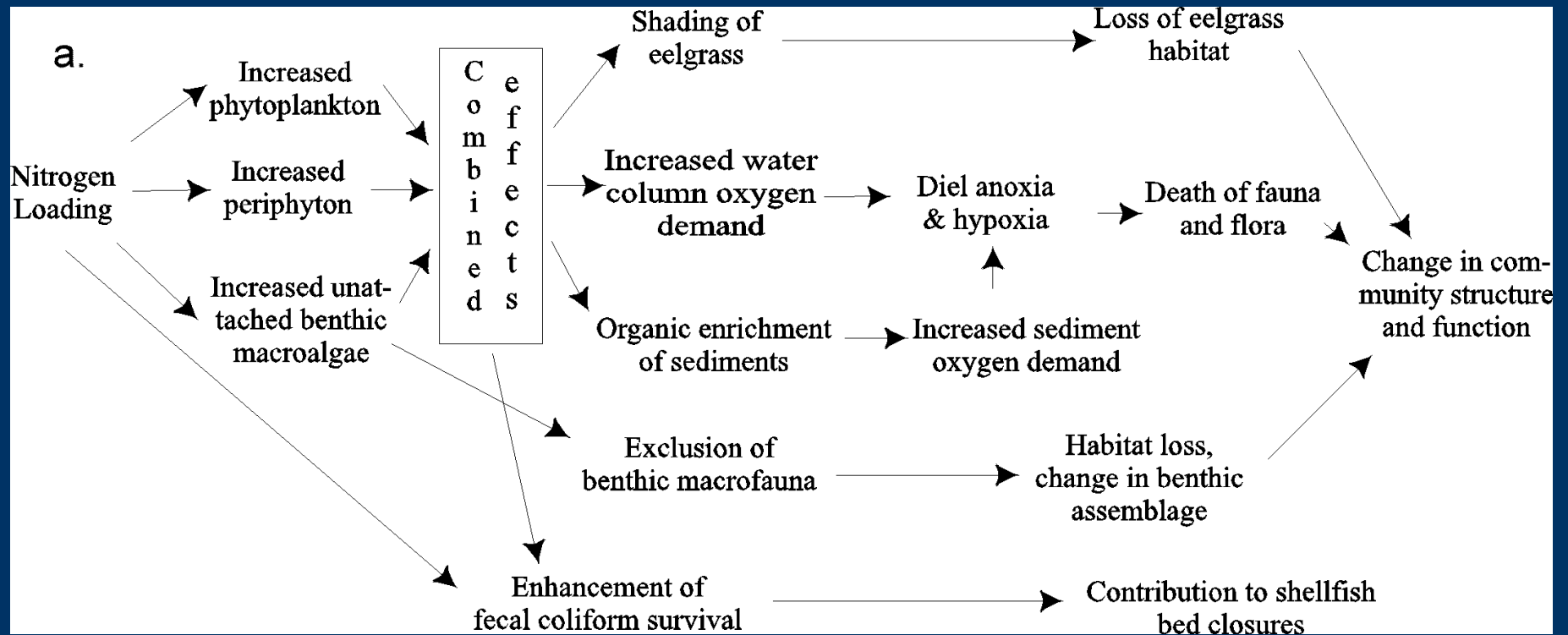


Presentation
to the
Board of Selectmen
/ Sewer Commissioners

Dr. Joe Costa
Buzzards Bay National
Estuary Program

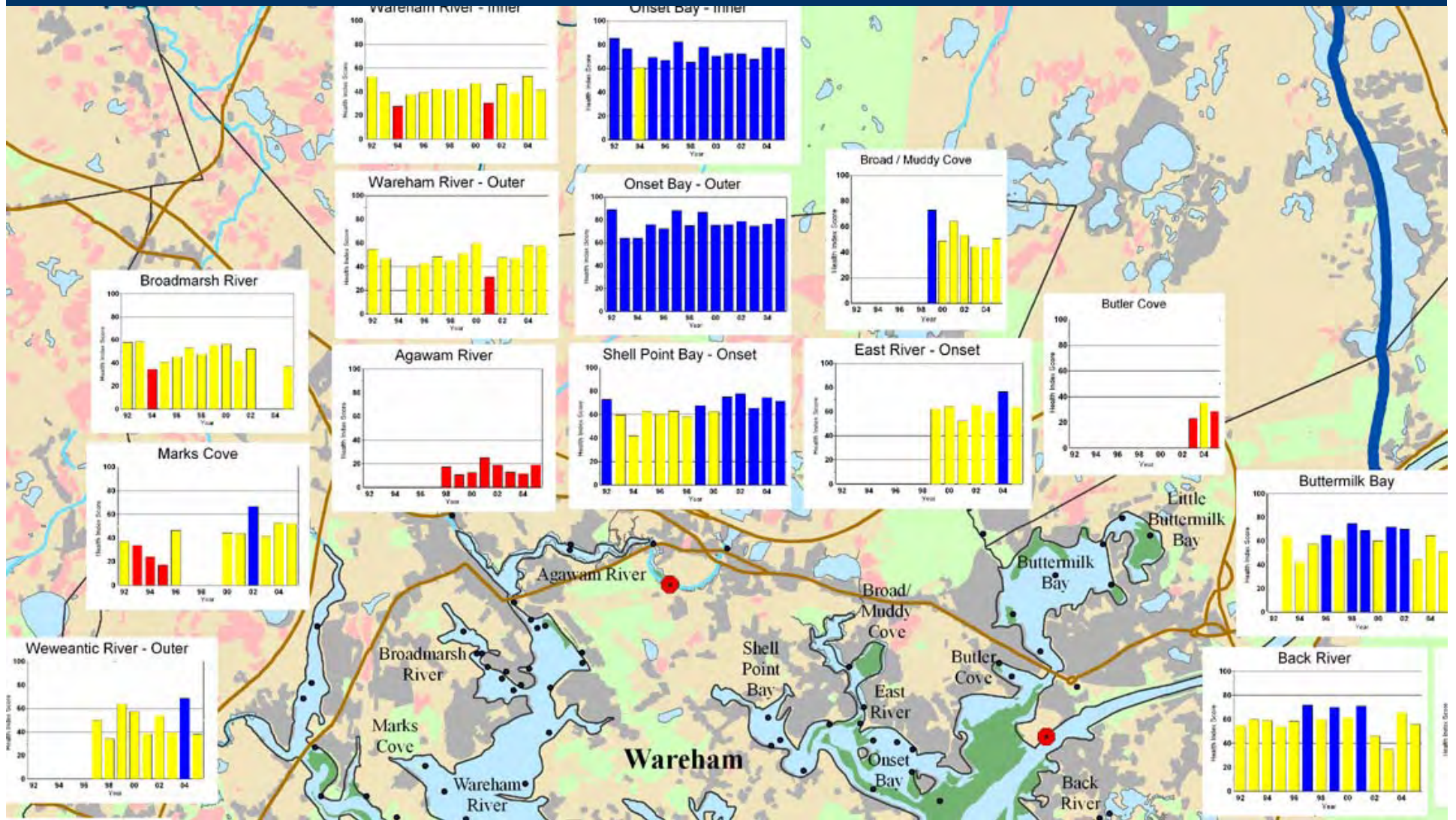
4/17/07

The Problem with Nitrogen



More Nitrogen >> More Algae
>> Less Eelgrass, Less Oxygen,
Less Shellfish Habitat, Poor Water Quality,
and even fish kills

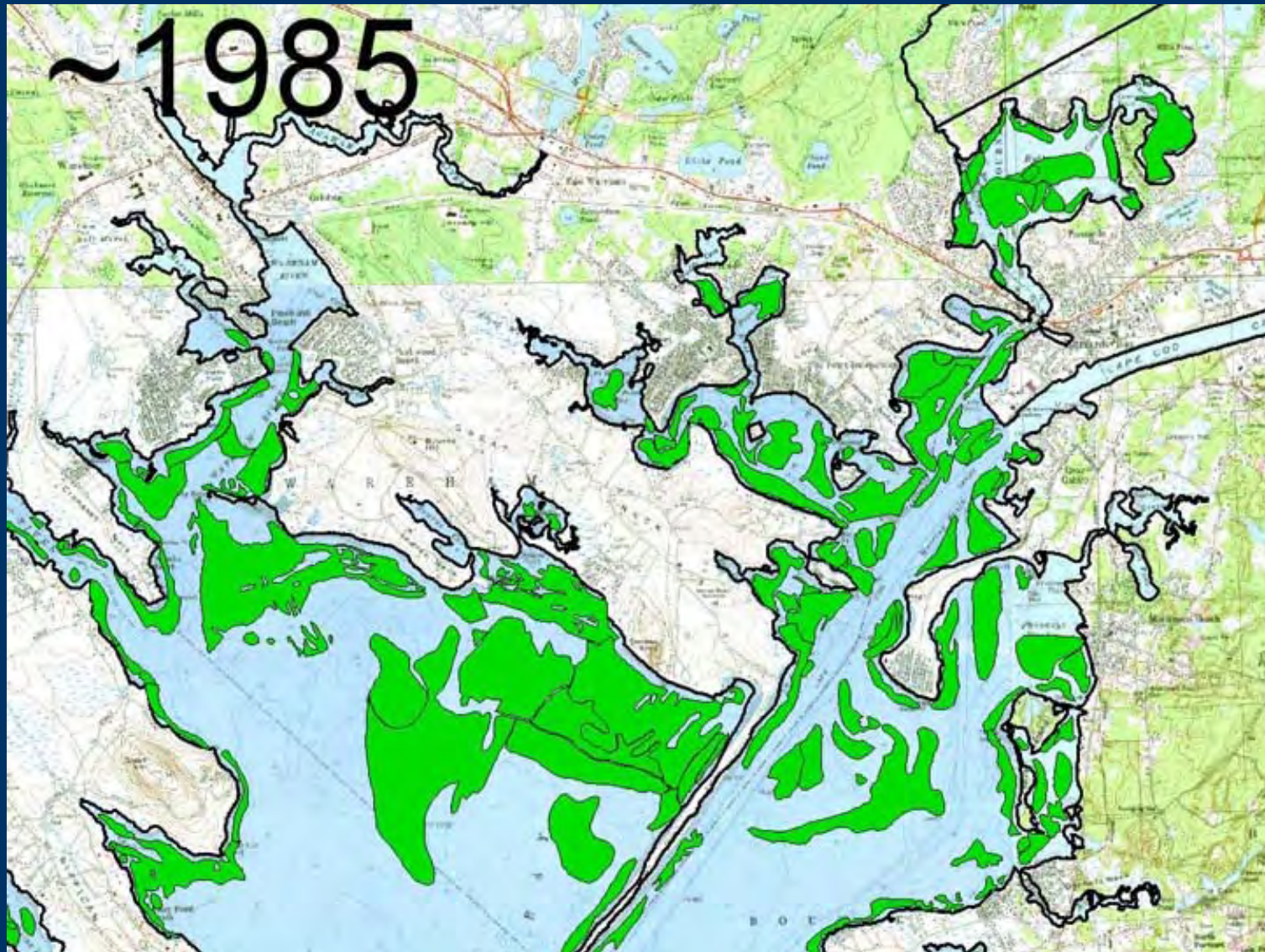
Coalition for BB Water Quality Monitoring



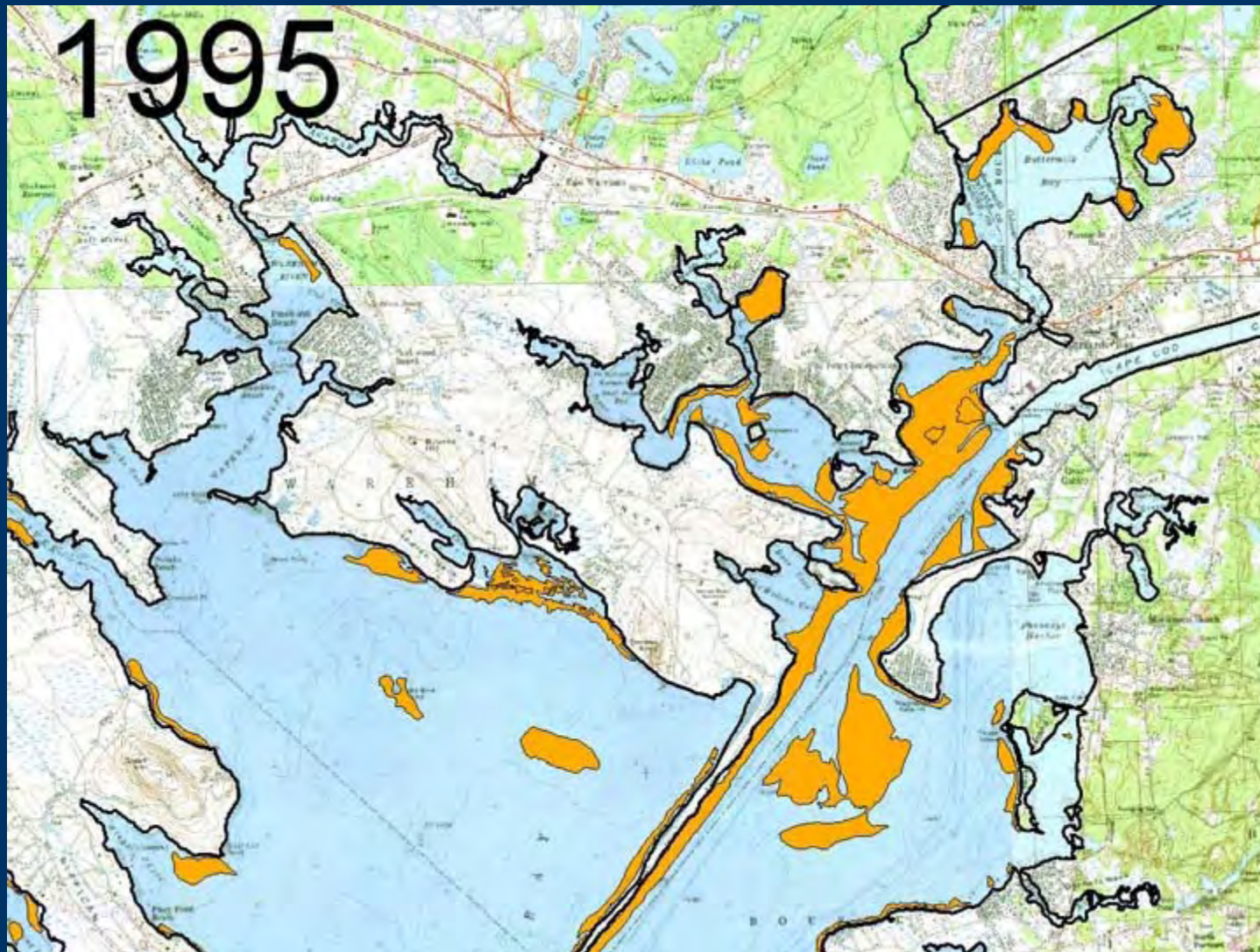
One Problem with Nitrogen: Eelgrass Loss



Dramatic Loss of Eelgrass in Wareham - 1985



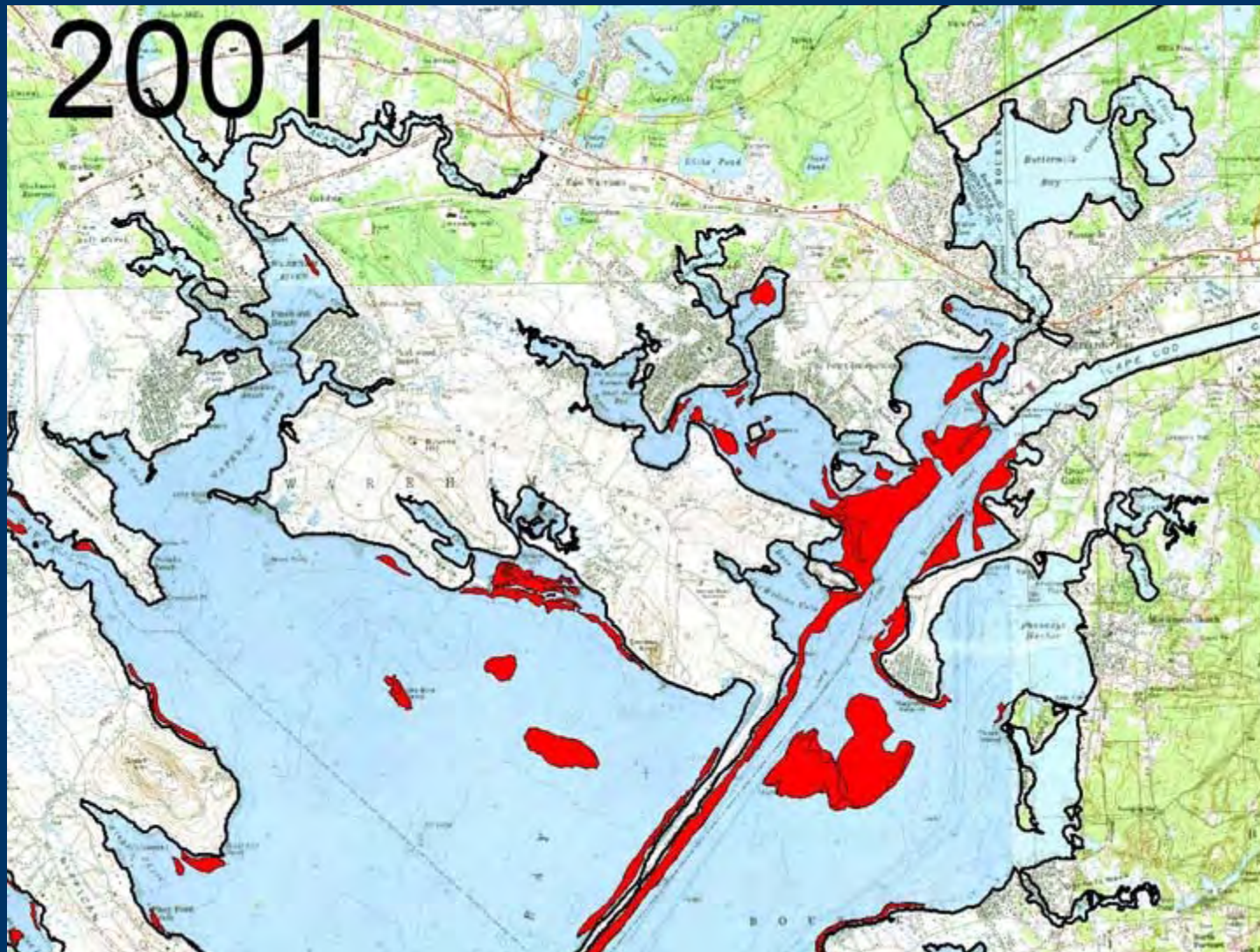
Dramatic Loss of Eelgrass in Wareham - 1995



Dramatic Loss of Eelgrass in Wareham -

2001

3,165 acres to 956 acres
=70% decline



Shellfish Loss Vs. Shellfish Closure

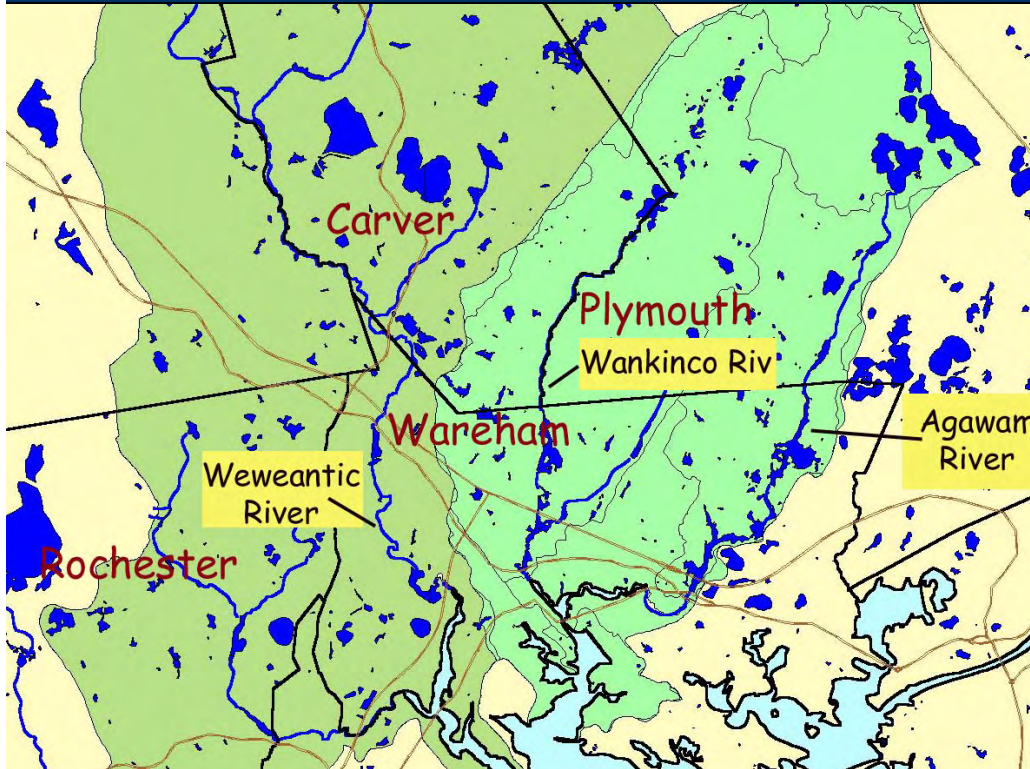
- Unlike bacteria pollution, the shellfish die
- Bottom like Black Mayonnaise
- Shellfish catch declines, shellfish permits

Management Tools

- Sewering, STF upgrades, community wastewater systems
- Zoning Overlay Management District requiring special permits limits limits on pounds per acre for pro, etc, enforced by Planning Boards
- BOHs adopt regs (e.g. all systems > 2000 gpd must discharge 10 ppm N or less)
- Protecting Open Space
- General Bylaw
- Better Stormwater regulations
- Agricultural and Turf BMPs
- Education (for lawns and other “non-point” sources)

Wait for the DEP estuaries project to be completed?

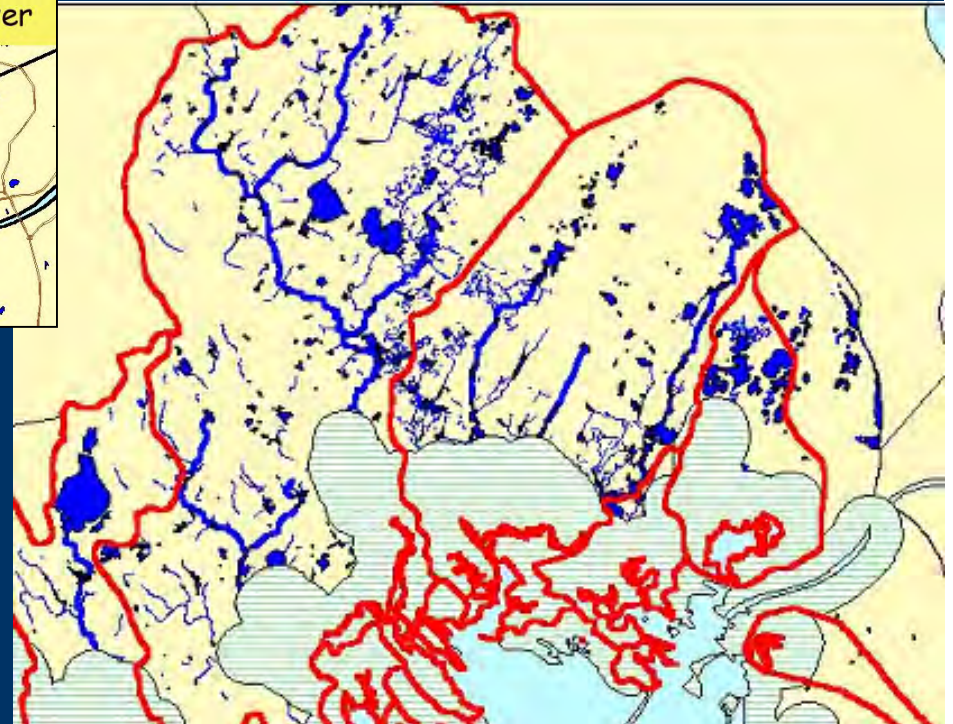
Nitrogen Strategy for Wareham



- Nitrogen Management Strategies**
- 1) Overlay district-their scientists report
 - 2) Objective loading worksheets and standards based on concentration (Cape Cod Commission model)
 - 3) Simplified General Bylaw

Wareham Watersheds:

- Weweantic
- Wareham River (Wankinko-Agawam)
- Onset Bay
- Buttermilk Bay



Nitrogen Management: Complex vs Simplified



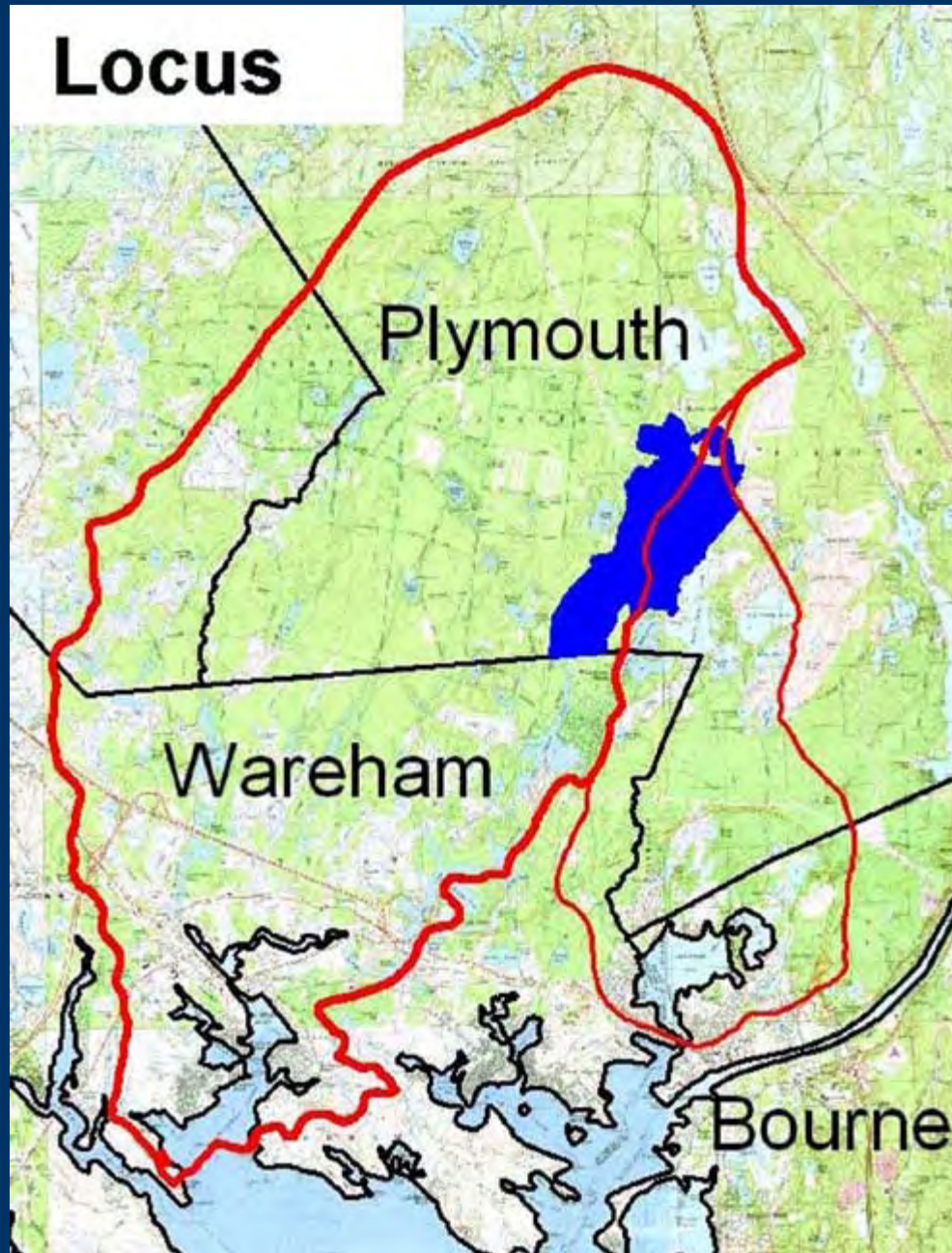
Our original Nitrogen Management Strategy:

Every subbasin has its own standard; separate standards for upper watershed and lower watershed. Town officials found it too complicated.

One page general bylaw is simple and elegant, but there are compromises.

BBNEP Recommended Goal: all new developments in Wareham should have a community wastewater system with advanced N removal.

Locus



Problems to watch out for

Given too large of density bonuses for cluster development.

Required Sewage Treatment Facility upgrades already required in Wareham

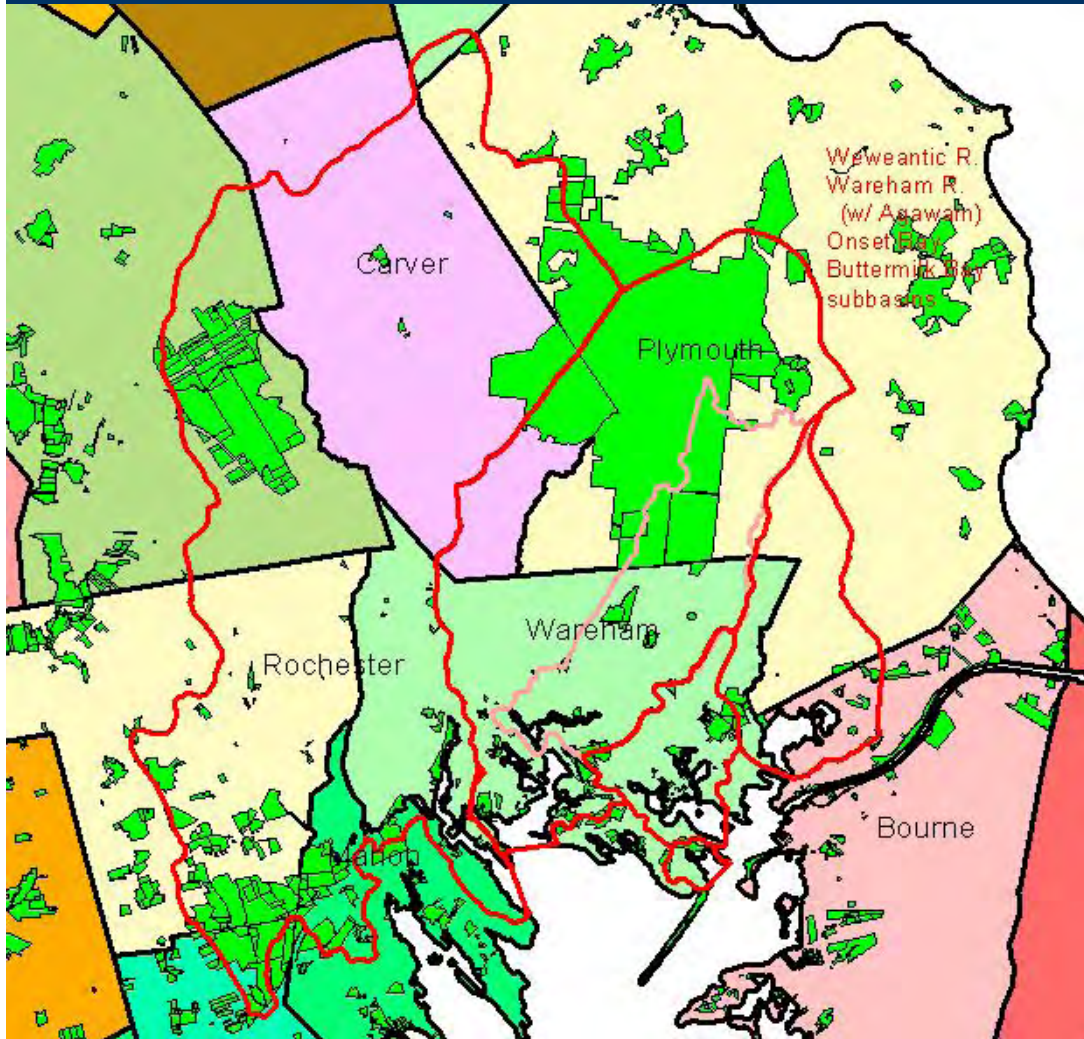
Expanded sewerage and better treatment will improve Wareham's waters during the next decade.

Wareham Nitrogen loading analysis: Benefits of sewerage of proposed assume sewage ppm = 5		(results independent)		
	existing units	potential units	existing (kg/y)	potential new (kg/y)
Inside of Watershed				
Beaver Dam (act. partial)	37	3	190	15
Cromset Park	93	0	479	0
Linwood/Ldd Ave	36	0	185	0
Mayflower Ridge	41	5	211	26
Oakdale	142	86	731	443
Parkwood Beach	280	157	1441	808
Tempest Knob	73	1	376	5
TOTALS:	702	252	3612	1297
NPS N loss (kg/y):			3612	1297
WTF gain (kg/y):			521	187
Outside of Watershed				
Agawam Beach	75	65	386	334
Briarwood Beach	136	23	700	118
Rose Point	201	23	1034	118
Sunset Island	17	7	87	36
Weweantic Shores	230	20	1183	103
TOTALS:	659	138	3391	710
NPS N loss (kg/y):			0	0
WTF gain (kg/y):			490	103

**New Treatment level
4ppm for 7 month:**

**Sewering and better
treatment:**

**Reducing 60,000
lbs/yr to the Wareham
River**

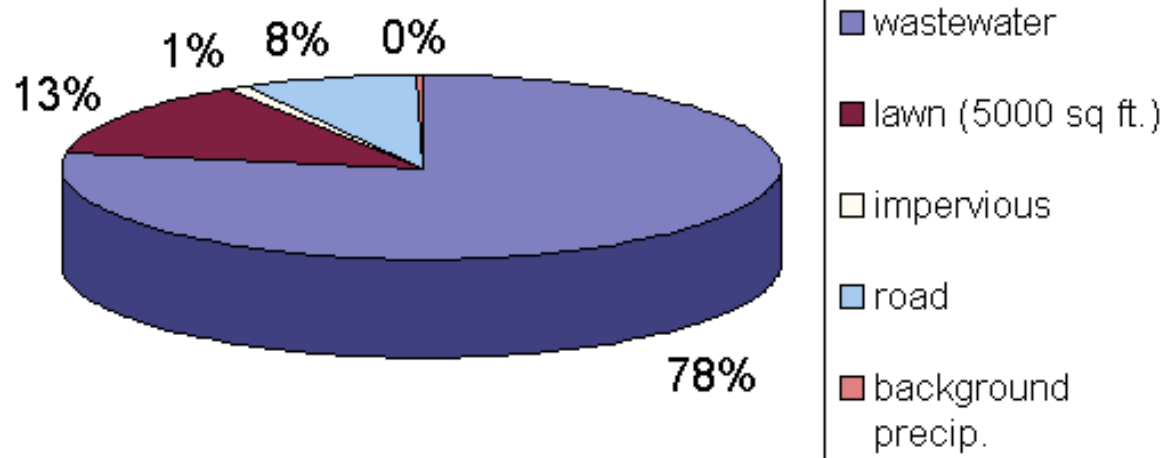


**But new
Development can
negate the benefits
of sewerage and the
Sewage facility
upgrade**

Assumptions about certain loading rates are more important than others

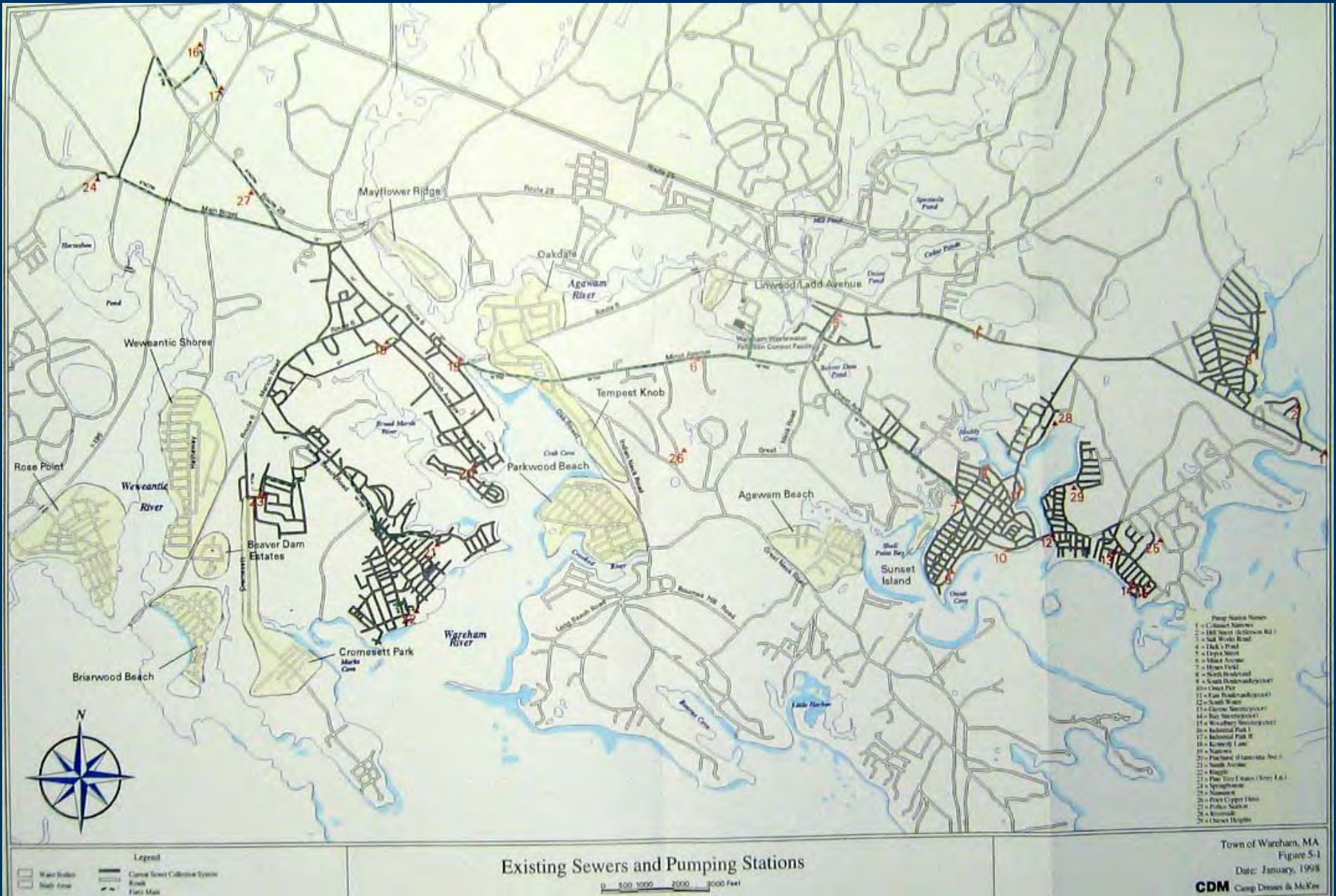
<u>Specific N loading source</u>		<u>units and rates</u>
Septic systems	2.7	kg yr ⁻¹ capita ⁻¹
Occupancy rate (area average) residential unit; use actual census data ^a	3.0	persons per
Lawns	1.4	per 5000sq. ft

Implications of BBP loading model Residential Lot Annual Loading= 10.4 Kg N



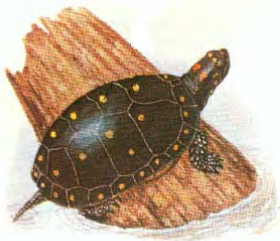
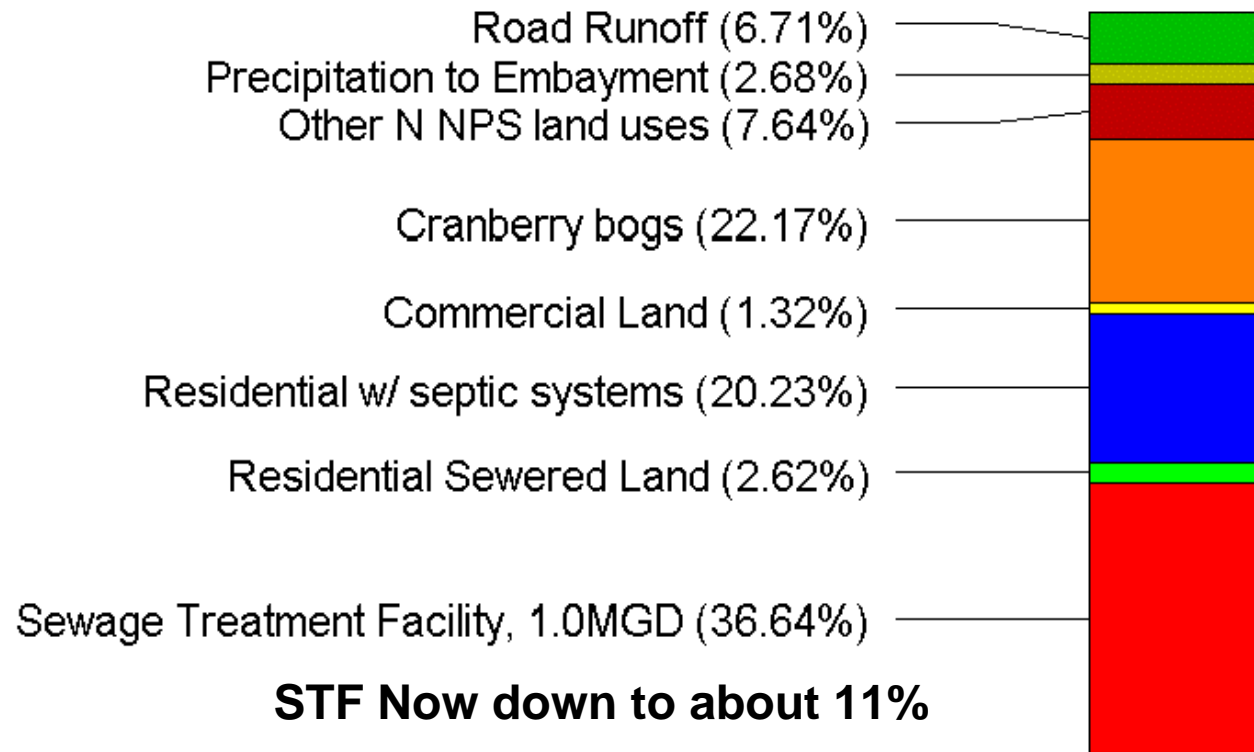
1/2 acre lot, 3 person occupancy, 5000 sq. ft lawn, 2 μ m GW

Sewered areas

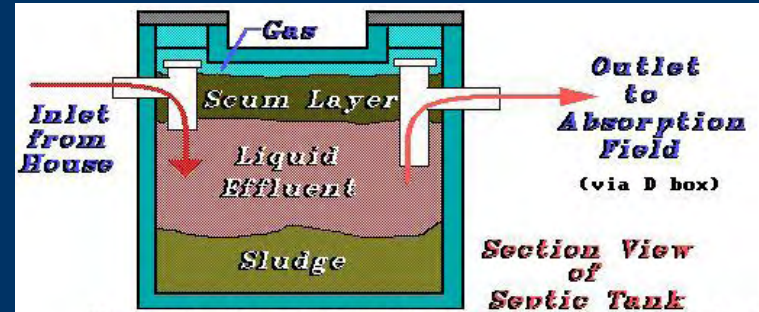


Wareham River Nitrogen Sources- from 1998 report, before upgrades

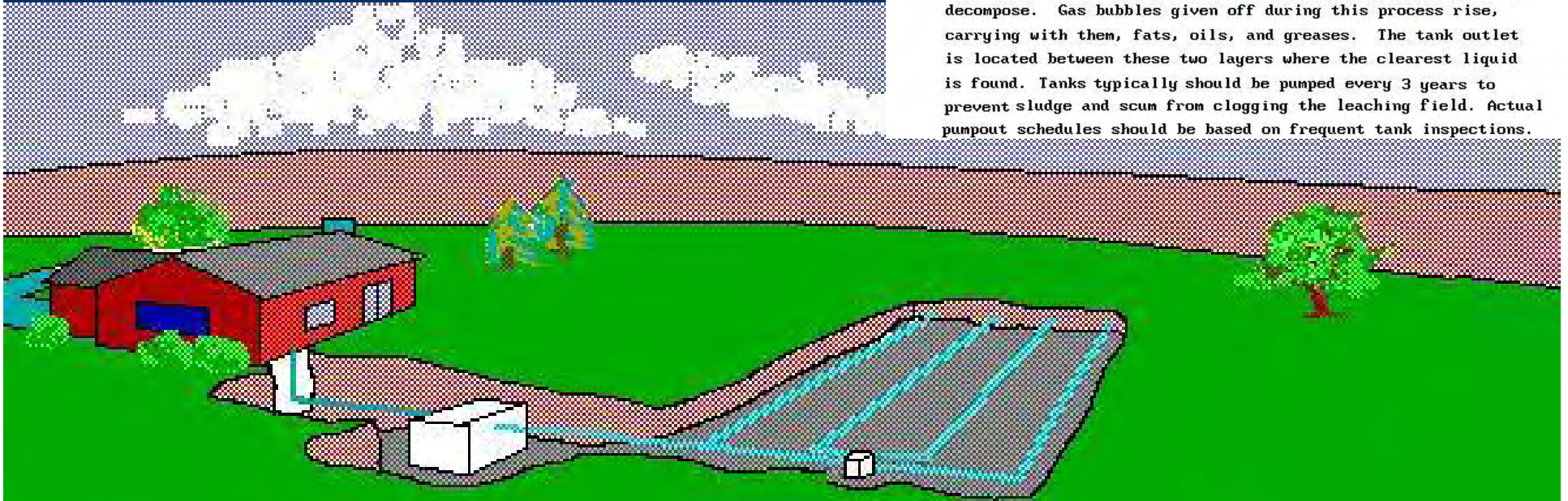
N sources in the Wareham River Estuary



Conventional Septic System loses Little N



The solids that settle to the bottom of the septic tank slowly decompose. Gas bubbles given off during this process rise, carrying with them, fats, oils, and greases. The tank outlet is located between these two layers where the clearest liquid is found. Tanks typically should be pumped every 3 years to prevent sludge and scum from clogging the leaching field. Actual pumpout schedules should be based on frequent tank inspections.



A typical septic system has three main components.

MA Septic Test Center Completed, Testing Commences 1999



Alternative Septic System Nitrogen Removal

**Approved and certified by DEP, many available,
more on the way. (see packet)**

- Better alternative systems discharge less than half the nitrogen (or better) of a conventional system Title 5 system. Some better ones are in the way.

Wastewater N Management General Bylaw 1

Simple Majority for Approval

Can be amended on the floor (as opposed to a zoning article)

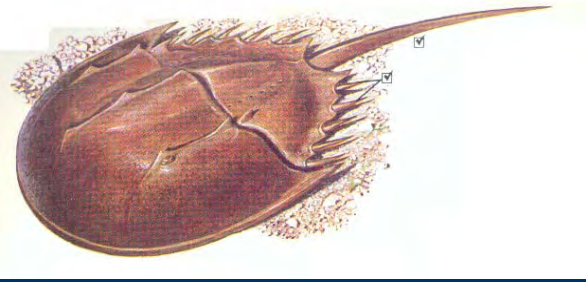
No town board, officer, or employees thereof shall issue a permit or approval for the installation, repair, or replacement of an onsite wastewater disposal system, or use thereof, that will result in the discharge of a wastewater nitrogen loading rate that exceeds 7.5 kilograms per acre.

Enforced by multiple Boards, but especially building department and Board of Health.

Wastewater N Management General Bylaw 2

Sets a nitrogen standard of 2.5 bedrooms per acre or equivalent for commercial permits

- 1) Sewered areas, and planned sewered areas are exempt from the bylaw
- 2) Existing homes unaffected (except for bedroom expansion)
- 3) 4 bedroom homes on 1.6 acres or greater unaffected
- 4) Guarantees a 3 bedroom lot on any parcel on any small lot, irrespective of size, but require a N removal system
- 5) Would require N removal systems on most bigger projects, but encourages creative solutions by developers like open space protection and transfer of development rights.



END