

Connecticut Coastal Zone Management Program
GC97.8.C8C66 1983

Connecticut Embayment Study, Summary and Recommendations



P. Glasscock

GC
97.8
.C8
C66
1983

Department of Environmental Protection
Office of Planning and Coordination / Coastal Management
January 1983

COASTAL ZONE
INFORMATION CENTER

Connecticut Embayment Study

Summary and Recommendations

SUMMARY

In 1980 the Connecticut General Assembly passed Special Act 80-45 (entitled An Act to Study Pollution and Siltation in Coastal Waters). By passing this Act, the Legislature recognized growing public concern regarding the deteriorating environmental conditions of certain coastal coves, ponds and embayments. The Act required the Commissioner of Environmental Protection to study the environmental problems of tidal and coastal embayments, coves and ponds and to identify alternative corrective measures to these problems.

The study was funded by DEP's Office of Planning and Coordination/Coastal Management through state funds provided under S.A. 80-45 and a grant from the Federal Office of Coastal Zone Management. Actual field work and analyses were carried out by the consulting firm of Anderson-Nichols. The analysis was conducted in two phases: Phase I was an inventory and analysis of the problems while Phase II presented response options.

Phase I

In order to identify those embayments in need of review, a careful selection process was used. The DEP conducted an initial screening and this was followed by a second screening and nomination process made through written correspondence with coastal communities. The goals were to focus the study by eliminating embayments which were not subject to tidal influence, had been previously studied in detail, had no known history of problems, or had complex problems beyond the scope of the study. Also not considered were embayments that contained a federally maintained navigation channel. As a result of this selection process, thirty-five embayments were chosen for further study. (The embayments studied are listed by town in Table 1.)

The thirty-five embayments were then reviewed using a variety of field and office research efforts including aerial reconnaissance, on-site investigations, correspondence with appropriate local, state and federal agencies, as well as field consultation with local officials. With the assistance of DEP's Water Compliance Unit, an analysis was also made of records of discharges affecting the embayments. As a result of this review, seven general categories of problems were identified: erosion, siltation, eutrophication, wetland loss, fin or shellfish loss, pollution and flow constriction. These conditions were then given ranks of minor (3), moderate (2), or severe (1) within each embayment. In addition, the problems were then identified as either worsening (a), remaining stable (b), or improving (c). (The findings of this research effort are summarized in Table 2, and a summary of the general problem types and conditions is displayed in Table 3.)

One must use caution in evaluating this data since it is difficult to make accurate comparisons and evaluations among the different problem conditions and since judgments about public benefit and/or impacts can only be subjective. However, three major categories of problems have been found to exist: flow constrictions, siltation and pollution. The primary causes of these problems are summarized in detail in Table 4, and the leading contributors are, for the most part, directly related to upland development and use of adjacent land. The major causes of these problems include land uses that tend to cause or aggravate erosion, septic system failure, runoff from residential and agricultural areas, point discharges of stormwater drainage or sewage treatment systems, and construction of railroad and road causeways and bridges.

Phase II

The second phase of the study was designed to identify potential corrective measures for problems found to be moderate to severe. The study suggests a range

of alternatives for each problem. For example, the solution to a sedimentation problem may require in varying degrees three separate actions such as dredging, controlling upland erosion and improving tidal flushing. The specific costs and effectiveness of the remedial measures would be determined by the conditions found at individual sites, and must therefore be established by detailed study on a case by case basis. In addition, the corrective measures may have environmental impacts which must also be individually identified and addressed. (A summary of suggested remedial measures is given in Table 5.) The three most often recommended alternatives were better land use management, improved sanitary waste disposal systems and dredging.)

RECOMMENDATIONS

Efforts to restore the quality of Connecticut's embayments must focus on the three main problems identified in the report: (1) flow constriction, (2) siltation and (3) pollution. Further, it can be shown that in many of the studied embayments the latter two principal problems--siltation and pollution--are either caused or certainly exacerbated by flow constrictions. In most cases, the location of road causeways and bridges was the cause of the flow constriction, yet the remedial action (removal or reconstruction of these bridges or causeways) would be so extensive an undertaking that it would not be cost-effective, at least as a viable short-term solution.

Another primary cause of flow constriction is the accumulation of sediments in the embayments. Siltation, either natural or man-made or both, is not necessarily a problem as long as there are no negative environmental quality effects as a result of it. But when accumulation of sediments becomes excessive, controlled dredging and proper disposal should be studied as a possible short-term solution to flow constriction in embayments.

Dredging, of course, is not a panacea. It is expensive; disposal sites must

be chosen with care, and possible environmental impacts must be considered. In addition, both state and federal permits must be obtained. If the cause of flow constriction is man-induced, dredging will provide only a temporary respite from the problem unless the structure causing the obstruction is eventually removed. But with careful planning, organization and study, dredging may provide an interim solution to the problem of flow constriction in embayments.

In order to establish and implement a state-wide program for dredging degraded coves and embayments, the following guidelines are recommended. A state advisory board should be established to prepare and submit recommendations to the Commissioner of Environmental Protection and the General Assembly concerning the most efficient and cost-effective methods of implementing a dredging program. The Commissioner would act as the board's chairman and would appoint its members who should represent, for example, waterfront residents, the marine trades community, shellfish commissions, dredging experts, coastal management, flood and erosion control boards and local governments.

The board would be responsible for establishing a priority rating system of degraded coves and embayments to determine the need (if appropriate) for dredging. In setting up this rating system, the board should evaluate the potential degree of public benefit (including, for example, access by the general public), the availability of disposal sites and the environmental and economic benefits or impacts associated with the dredging. Included in this latter category would be the availability of matching funds from the municipality in which the embayment is located, either from public or private sources. It should also determine what effect the dredging operation will have on natural processes such as the anticipated rate of siltation in the cove. The board would also be responsible for assuring that any dredging will be compatible with existing policies and standards of property uses and land use plans, and especially

with any approved Municipal Coastal Programs and the Connecticut Coastal Management Act.

The advisory board would then recommend a strategy for implementing a state-wide dredging program. Part of this strategy will be to define the responsibilities to be assumed by state and local governments for the program. This will include determining how the program will be administered (priority assessment, obtaining permits and financing), and how the actual dredging will be accomplished (equipment, technology, labor and contractual obligations). The board should assign responsibility for the contracting for, leasing, purchase, operation and maintenance of equipment, as well as for the maintenance of completed projects. It should also determine who will be responsible for the required studies, surveys and engineering designs of the proposed and actual dredge and disposal sites.

Also included in the board's program strategy would be a consideration of the alternatives to dredging, an evaluation of alternative dredging techniques and equipment, and a study of existing disposal requirements. The board would recommend methods of financing the dredging program, considering alternatives such as cost-sharing based on accrued benefits, financing through an independent bonding authority, and the use of special taxing districts. And finally, the advisory board would offer other pertinent recommendations such as determining areas of the program which will require the enactment of legislation or the adoption of regulations by the Commissioner.

It is further recommended that should suitable financing be made available, a pilot project to test the Advisory Board's final recommendations should be considered before the state commits itself to a long term program of maintenance of degraded coves and embayments.

Limited copies of the complete technical report compiled by Anderson-Nichols are available on a loan basis through the Department of Environmental Protection's Office of Planning and Coordination/Coastal Management. Requests should be made to PC/CM, 71 Capitol Ave., Hartford 06106, 566-7404.

TABLE 1
Embayments Studied

STONINGTON	BRANFORD (East Haven)
Wequetequock Cove	East Haven River
Quiambog Cove	
GROTON	NEW HAVEN
West Cove	Mill River
Palmer's Cove	MILFORD
LEDYARD	Gulf Pond
Mill Cove	Wepawaug River
Poquetanuck Cove	STRATFORD
WATERFORD	Marine Basin
Smith Cove	Lewis Gut
Keeney Cove	Frash Pond
EAST LYME	FAIRFIELD
Smith's Cove	Ash Creek
Niantic River	Mill River/Pond
Fourmile River	Horse River Tavern
ESSEX	WESTPORT
Middle Cove	Bermuda Lagoon
CHESTER	Gray's Creek
Pattaconk Creek	NORWALK
OLD SAYBROOK	Canfield Island
Indiantown Harbor	Mill Pond
WESTBROOK	Village Creek
Menunketesuck River	DARIEN
GUILFORD	Holly's Pond
West River	Gorham's Pond
Little Harbor	GREENWICH
	Byram Harbor

Table 2

EMBAYMENT PROBLEM TYPE, SEVERITY, AND TREND

Name	Erosion	Siltation	Eutrophication	Problem Type		Pollution	Flow Constriction
				Wetland Loss	Fin/Shellfish Loss		
Wequet-egquock	-	2a	-	-	-	2b	1b
Quitamboq	-	2a	3b	-	-	3b	-
West Cove	-	1b	-	-	-	-	2b
Palmer's Cove	-	3b	-	-	-	2b	1b
Mill Cove	-	2b	-	-	-	2a	2b
Poquetanuck	-	1b	1c	-	-	-	2b
Smith Cove	2b	1a	-	-	-	2c	1b
Keeney Cove	-	2b	-	-	-	2b	-
Smith's Cove	-	2a	3b	-	-	2c	2b
Niantic River	-	2a	-	-	-	2c	2b
Fourmile River	-	2a	3b	-	-	2a	3b
Middle Cove	2b	2b	-	-	-	2b	2b
Indiantown	3b	2b	-	-	-	3b	3a
Menunketesuck	2a	2a	-	-	-	2a	3b
West River	1a	1a	-	-	-	2b	1a
Little Harbor	-	1a	-	-	-	-	2b
E. Haven River	3b	2a	-	2b	-	2c	2c
Pattaconk	-	1b	-	-	-	3b	1b
Mill River	-	1b	1b	-	-	1b	1b
Gulf Pond	-	3a	-	-	-	2b	2b
Wepawaug	-	2b	-	-	-	2b	1b
Marine Basin	-	3b	-	-	-	2a	-
Lewis Gut	-	-	-	1a	-	2a	2b
Prash Pond	-	3b	-	2a	-	3b	1b
Ash Creek	-	-	-	-	-	2b	2b
Mill River	-	-	-	-	-	1b	3b
Horse Tavern	-	-	-	2a	-	-	1a

(Continued on next page.)

Table 2

EMBAYMENT PROBLEM TYPE, SEVERITY, AND TREND

<u>Name</u>	<u>Problem Type</u>						
	<u>Erosion</u>	<u>Siltation</u>	<u>Eutrophication</u>	<u>Wetland Loss</u>	<u>Fin/Shellfish Loss</u>	<u>Pollution</u>	<u>Flow Constriction</u>
Bermuda Lagoon	3a	-	-	-	2b	2b	-
Gray's Creek	-	2a	-	-	-	2b	-
Canfield Island	2a	2a	-	2a	-	-	-
Mill Pond	2a	1a	-	-	-	-	1b
Village Creek	-	2a	-	1a	-	-	-
Holly's Pond	-	-	-	-	-	2a	1b
Gorham's Pond	2a	-	-	-	-	-	2b
Byram Harbor	-	2b	-	3b	-	1c	-

Table Symbols

1 = Severe

2 = Moderate

3 = Minor

a = Conditions Worsening, b = Conditions Stable, c = Conditions Improving

TABLE 3

Summary of General Problem Types and Conditions

<u>Problem</u>	<u>Severe</u>	<u>Moderate</u>	<u>Minor</u>	<u>None</u>
1. Flow Constriction	9(26%)	14(40%)	4(11%)	8(23%)
2. Siltation	7(20%)	16(46%)	4(11%)	8(23%)
3. Pollution	3(9%)	20(57%)	4(11%)	8(23%)
4. Wetland Loss	2(6%)	4(11%)	2(6%)	27(77%)
5. Erosion	1(3%)	5(14%)	2(6%)	27(77%)
6. Eutrophication	2(6%)		2(6%)	31(89%)
7. Finfish/Shellfish Loss		3(9%)		32(91%)

Note: First number indicates the number of embayments with each particular problem and degree of severity; the second number (in parenthesis) shows in what percentage of the total embayments studied this condition is found.

Because of multiple problems in several embayments, totals do not equal 35 embayments or 100%.

TABLE 4
Problem Causes

<u>Problem</u>	<u>Siltation</u>	<u>Pollution</u>	<u>Flow Constriction</u>
Upland Erosion (42%)	Septic Failure (28%)	R.R. Causeway (33%)	
Wave Transport (21%)	Residential Runoff (24%)	Bridge (30%)	
Flow Constriction (7%)	Point Discharge (15%)	Natural Bar Formation (11%)	
Bank Erosion (9%)	Landfill Leachate (11%)	Jetty/Groin (7%)	
Current Transport (9%)	Agricultural Runoff (4%)	Natural Configuration (7%)	
Earlier Land Use (3%)	Boat Discharges (4%)	Tide Gates (4%)	
Deteriorating Bulkhead (3%)	Transport From Other Areas (4%)	Marsh Filling (4%)	
	Urban Runoff (2%)	Filling (4%)	
	Marina Spills (2%)		
	FLY Ash (2%)		
	Contaminated Bottom Sediment (2%)		

Note: Percentages above refer to percentage of the total number of COVES and embayments studied.

TABLE 5

Summary of Potential Practical Solutions to Problems

	Number of Times Recommended
1. <u>Flow Constriction Solutions</u>	
A. No Practical Alternative Exists	16
B. Tide Gate Management	4
C. Dredging	2
D. New Culvert	1
2. <u>Siltation</u>	
A. Dredging (in many cases, this may not be cost-effective, no assessment of environmental impacts has been performed)	22
B. Land Use Management/Storm Water Management/Soil Erosion Controls	14
3. <u>Pollution</u>	
A. Improved Sanitary System	17
B. Storm Water Management	7
C. Boat Pump Out Facilities	5
D. Land Use Management	1
E. Landfill Management	1
F. Tide Gate Management	1
4. <u>Wetland Loss</u>	
A. Tide Gate Management	3
B. Boat Wake Control	1
5. <u>Erosion</u>	
A. Land Use Management/Soil Erosion Controls	2
B. Boat Wake Controls	3
C. Structural Stabilization	1
D. Beach Nourishment	1
E. Storm Water Management	1
6. <u>Finfish/Shellfish Loss</u>	
A. Tide Gate Management	1
B. Pollution Control	1

