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**IDENTIFYING IMMIGRANT POPULATIONS AT RISK  
FROM EATING CONTAMINATED SHELLFISH**

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**and**

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## 1.0 INTRODUCTION

Potential health problems associated with eating contaminated shellfish are well recognized (citation). Concern for human exposure to pathogenic bacteria and viruses associated with sewage has led to the closure of many shellfish beds in coastal Massachusetts. These closures are enforced by local authorities as well as the Massachusetts Environmental Police. Despite these efforts, shellfishing occurs in a number of areas. Some of this activity is well organized and involves the harvesting and selling of contaminated shellfish to commercial establishments. These practices were highlighted several years ago in a series entitled *The Clam Scam* prepared by Sharon Wright of Channel 4 T.V. in Boston. The series focused on the illegal harvesting and commercial distribution of shellfish - a practice known as bootlegging - and the efforts of the Massachusetts Environmental Police to curtail these activities.

Less attention - at least in the media - has been given to shellfishing among populations who use shellfish for personal use or limited sale. In particular, recent immigrant populations, notably southeast Asians, have turned toward the sea as a source of food to supplement their diet. Many of these people have settled in the Boston metropolitan area where shellfish beds are within easy reach and also, unfortunately, contaminated.

As part of their cultural adaptation, Vietnamese and other southeast Asian groups, including Cambodians, frequently pursue familiar activities such as fishing and water activities for recreational and food-harvesting purposes. Throughout the Massachusetts coast areas and along river banks and waterways, entire families have been observed in the warmer months to spend afternoons and entire days shellfishing, fishing, wading and playing in local water areas even those which are off-limits with posted signs.

During 1993, we conducted a preliminary survey of such activities in the vicinity of Castle Island park on Boston Harbor in Dorchester. Park security personnel expressed exasperation over the difficulty of enforcing the flat closure for clamming and other shellfishing on the island as a result of illegal use by southeast Asian populations. We were told that the enforcement efforts by Park security personnel had produced frustrating results. As a consequence, Park security turned a 'blind eye' to the shellfish-diggers and the immigrant-residents played a 'cat & mouse' game with officials - both implicitly understanding that

the activities continued unregulated.

During our preliminary survey, we interviewed various people within the Dorchester Vietnamese community to learn more about their use of shellfish and methods of preparation. After sensing initial communication resistance, we found that the community's knowledge and identification of pollution risk were limited to observable characteristics such as smell and sight. This was based primarily on their association of contamination or pollution with decay, and waste disposal such as litter and rubbish. Microorganism contamination and chemical problems, not being readily discernible, was of little concern. Local methods of shellfish preparation included methods (of dubious effectiveness) to flush out impurities from the shellfish before consumption. One woman related to us how the placing of metal utensils and strong chilies in the pre-cooked shellfish water was a typical precautionary method.

These preliminary observations prompted us to investigate the extent to which immigrant populations are shellfishing in closed areas along Massachusetts Bay with emphasis on metropolitan Boston. This report identifies geographic locations and groups of people (principally southeast Asians) where there exists a potential for exposure to pathogens or toxic chemicals as a result of shellfishing. We also provide an initial ranking of areas where the potential for exposure exists.

## **2.0 METHODS**

The approach involved the following steps:

- 1) identifying the locations of closed shellfish beds along Massachusetts Bays;
- 2) determining the extent to which closed shellfish beds are used by contacting local authorities;
- 3) making direct observations of some of the beds in the Boston metropolitan area to obtain first hand information concerning shellfishing activities;
- 4) developing demographic information on southeast Asians in the Boston metropolitan area and other locations in coastal Massachusetts;
- 5) ranking locations and/or southeast Asian communities with regard to potential for exposure to pathogens or toxic chemicals associated with eating contaminated shellfish.

### ***2.1 Identifying the Locations of Closed Shellfish Beds and Areas of Deteriorated Water Quality Along Massachusetts Bay***

Data were obtained from the Massachusetts Division of Marine Fisheries (DMF) on the closure status of shellfish beds in Massachusetts Bay. These were provided to us in tabular form. We also relied upon the summary of coastal water quality conditions presented in the 1991 Menzie-Cura report on loadings of contaminants to Massachusetts Bay.

### ***2.2 Determining the Extent to Which Closed Shellfish Beds Are Used***

Local authorities in each town and city with closed shellfish beds were contacted and asked to respond to a series of questions concerning the use of closure areas. These individuals included shellfish officers as well as other officials. A list of Massachusetts shellfish officers was provided by Alan Marcy of the Massachusetts Shellfish Officers Association. In addition, we

contacted representatives on the Metropolitan Area Planning Council and Jack Wiggins of the Urban Harbor Institute.

The Massachusetts Environmental Police were especially helpful in identifying the extent and nature of illegal shellfishing activities. Lieutenant Kathleen Dolan arranged for us to meet with individual officers as well as to make site visits. The Environmental Police provided us with copies of the maps they use to determine areas that are open, conditionally opened, or closed.

### ***2.3 Making Direct Observations***

Based on information gathered in the previous step, we made direct observations of some of the shellfish beds in the Boston metropolitan area. Two of these site visits were made by boat with the Environmental Police and two were made by car. Areas visited included Revere beach, Point-of-Pines, Wollaston Beach, Carson Beach, Constitution Beach, Short beach, Pines River, lower Neponset River, Dorchester Bay, and Riverhead Beach. During field trips carried out with the Environmental Police, we were provided with historical information concerning illegal shellfishing activities in each of the locations.

### ***2.4 Developing Demographic Information on Southeast Asians***

To obtain demographic information for southeast Asian communities in the metropolitan Boston areas, various government agencies, resettlement agencies, refugee offices and University Institutes which collect and reduce population statistics for ethnic and immigrant communities were contacted. Numerical values were obtained and bar graphs provided extrapolated data on the relative composition and density of the Asian communities.

The following agencies provided us with the information used in our analysis: The Boston Foundation; The Institute for Asian American Studies; Massachusetts Office for Refugees and Immigrants; and The Asian American Coalition.

Information on the demographics of southeast Asians in the greater Boston area were obtained from the Massachusetts Office for Refugees & Immigration, the Boston Foundation, and the Asian American resource Workshop. Data

provided included population statistics and maps.

## ***2.5 Ranking Potential Exposure to Contaminated Shellfish***

We compared the proximity of southeast Asian communities to contaminated shellfish beds where shellfishing was occurring to establish an initial qualitative ranking of potential exposures to human pathogens or toxic chemicals. The ranking considered two factors: population size of southeast Asian immigrants and proximity of community to coastal areas with closed shellfish beds where harvesting activities have been reported. Population size was categorized as high, moderate, low, or negligible for the various cities and towns for which we had data. Proximity to closed or restricted shellfish beds with activity were classified as High, Moderate, Low, and Very Low. To provide a rough ranking these categories were assigned values of 1 through 4. Population size was given a weighting factor of 1.5 to account for the importance of having a concentration of people in a particular area who might share information on where to gather shellfish or who might share the shellfish. The weighted population value and the proximity values were multiplied and the communities ranked by increasing numerical value.

### **3.0 USE OF CLOSED SHELLFISH BEDS**

#### ***3.1 Status of Shellfish Beds in Massachusetts Bay***

The status of shellfish beds in Massachusetts Bay is summarized in Appendix A. From this data base, we have compiled the statistics on closed and restricted beds and ranked these in terms of acreage (Table 1). Rankings by town are provided in Table 2. Some towns (e.g., Revere and Lynn) share shellfish beds and statistics are summed under only one of the towns.

Most of the communities are located on the North Shore and metropolitan Boston area with some including on the south shore. As can be seen from Table 2, there are closed or restricted shellfish beds adjacent to many Metropolitan Area Planning Council (MAPC) cities and towns.

#### ***3.2 Interviews with Local and State Authorities***

A summary of interviews with local authorities and the Massachusetts Environmental Police is provided in Table 3. Based on these interviews, it appears that the use of closed or restricted shellfish beds by immigrant southeast Asian populations is concentrated in the metropolitan Boston area. The areas where activity appears to be greatest include: 1) Revere/Lynn/Winthrop, and 2) Quincy/Dorchester. Some activity occurs within Boston, in particular at Constitution Beach and Short Beach. The numbers of people involved in these more active areas are estimated to range from "dozens" to "hundreds" on a weekly basis. This general pattern has been reported by local authorities as well as the Environmental Police. One area that may experience increased use in the future is Nahant. Historically, this area has not been shellfished extensively by immigrant populations. But, the Environmental Police have reported increased activity and Nahant has extensive closed or restricted shellfish beds.

Outside of the metropolitan Boston area there are a few locations where shellfishing activity by immigrant populations has been reported. These include Gloucester and Marblehead.

Bootlegging operations still occur in some locations based on discussions with

the Environmental Police. Most notable locations include restricted or closed areas in and around Boston Harbor and the Pine and Saugus Rivers. The Environmental Police focus much of their investigative effort on these illegal commercial operations.

### **3.3 Site Visits**

Site visits of closed or restricted shellfish beds in the Boston metropolitan area were made on August 14, August 23, August 27, and August 30 1994. Two site visits were conducted by car and two by boat. The boat was provided by the Massachusetts Environmental Police and two officers participated in each of those visits.

#### **August 14, 1994**

On this visit, observations were made of shellfishing activity on Revere Beach at low tide. People were shellfishing on the fringes of the beach outside of the normal bathing areas. The shellfish were being placed in white buckets. An older eastern European man was clamming but walked away as we approached. Two young men were digging worms for bait and commented on the illegal shellfishing that occurs on the beach. They noted that Cambodians from adjacent areas continued to clam even though they were periodically chased away. They remarked that some of these people had gotten sick according to the local Revere papers.

Two caucasian males in their 40s were observed digging quahogs. They indicated they came to the beach frequently to catch a few for their pasta. They were from East Boston.

A southeast Asian family was digging together, filling buckets with clams. Other southeast Asians were digging in the same area. On this day, approximately fifteen southeast Asians were observed digging clams. Overall, there were approximately two dozen people harvesting clams or periwinkles along the beach.

### August 23, 1994

Site visits were made with Keith Robinson and Robert Mercon of the Environmental Police. Evidence of recent clamming was observed at Constitution Beach near Winthrop. The officers commented on the bootlegging activities that take place as well as on the "bucket clammers". They noted that southeast Asians clam the areas and that they probably know the activity is illegal. When approached the people either do not understand English or simply fail to communicate. The Environmental Police often just confiscate the clams and warn the people.

Sergeant Mercon noted that although they put out warning signs, these are ignored by the bootleggers and may not be understood by the Asians. Most of the signs are eventually vandalized. Based on his observations, multilingual signs should be in Chinese, Vietnamese, Cambodian, Spanish, and Portuguese.

### August 27, 1994

A site visit was made to Wolloston beach in Quincy. No clamming activity was observed on the beach on this day. But, a number of people commented on the activity. The previous day a southeast Asian family had been escorted from the beach by the Environmental Police.

At the JFK library in Dorchester, we observed a southeast Asian family carrying a plastic bag of shellfish. They had apparently walked along the seawall from Columbia Point. A visit to Harbor Point, where there is a concentration of minorities, did not reveal any illegal shellfishing.

### August 30, 1994

A site visit was made by boat with officers Lisa Greany and Keith Robinson of the Environmental Police during low tide. It was a neap tide and the intertidal areas were not extensively exposed. The visit included Dorchester Bay, the lower Neponset River, East Boston, Winthrop, Revere, Lynn, and the Pines River. We did not observe active shellfishing although we saw signs of shellfishing near Point of Pines. We did not get close to Revere beach where we had previously observed a number of southeast Asians shellfishing. The officers described the level of activity that occurs in the various areas. There

appear to be a few places where shellfishing is an ongoing problem and a number of other areas where it is sporadic. These data are summarized in Table 3.

## **4.0 LOCATIONS OF SOUTHEAST ASIAN POPULATIONS**

### ***4.1 Historical Overview of Indochinese Immigration***

While the migration by Chinese and other Asians has a long history, the influx of Indochinese refugees in Massachusetts, like those in other parts of the United States is more recent--beginning in 1975. These immigrants which are mostly the Vietnamese, Cambodians, and Laotians come from lands intermittently torn apart by centuries of conflict, but the upheavals which characterized the Vietnam War caused waves of thousands to flee their homelands and to seek asylum in the West.

Starting in April 1975, the United States admitted more than 170,000 Indochinese refugees. The initial wave of immigrants were better educated more privileged coming as they did from the French-influenced and/or military classes. In subsequent waves, refugees in 1978 and 1979 consisted of "boat people" mostly from Laos and Cambodia, and in 1985 with the Family Reunification Act, brought less urbane farmers and fishing folk to American shores. Understandingly, in the Northeast, these immigrants tended to locate in coastal areas where they could practice their traditional subsistence lifestyles. In Massachusetts, small coastal towns as well as metropolitan Boston provide the anchoring communities for subsequent continuing arrivals.

### ***4.2 The Massachusetts Settlement Communities***

In spite of the intensive socio-cultural processing required under the 1975 Indochina Migration and Refugee Assistance Act, refugees resisted the pressure to abandon their traditional customs required to better assimilate into American society. While language and vocational skills led to satisfactory assimilation into the work force and into educational institutions, in specific ways, traditional lifestyle and familial constellation and relational patterns were the most resistant to Americanization. The traditional family consists of grandparents, parents, children, and other relatives. A single household may include up to 25 people or more. Resettlement agencies placed considerable pressure on family heads to split up their extended families into smaller units, with only partial success.

The resettlement agency (and its own location) plays a role in the final location of the refugee. The agency may identify refugee relatives and others who may orient and assist in the placement of the refugee. Counseling and referral orients the refugee to the community, specifically in areas of health, employment and training. A provision of basic necessities are provided for the first 30 days. In Massachusetts, many of these agencies are located in eastern Massachusetts: Lawrence , Lowell, Salem, Watertown, Brookline, Fall River, Worcester. A few others are located in the western part of the state: Wilbraham, Springfield.

Although it is difficult to count the number of refugees residing in Massachusetts, and even more difficult to count the number of refugees residing in the state by area of residency, we have compiled several data sets that indicate where populations are concentrated. Two of these data sets are given in Table 4. The towns and cities are ranked first in terms of the population sizes of southeast Asian refugees and secondly in terms of overall population size of southeast Asian and Pacific island populations. The table indicates that southeast Asian refugees have settled in a number of locations, most notably Lowell, Boston, Lynn, Worcester, Revere, Chelsea, Fall River, Lawrence, Quincy and Attleboro. Several of these communities are concentrated in and around metropolitan Boston. Additional information is provided below.

The Asian American Coalition, located in Boston thought that any distribution count is underestimated by 5,000 or 10,000 people. They provided the following population distribution for coastal towns: Boston---30,388 with 1/3 to 1/2 of that number possibly Vietnamese and ethnic Chinese; Quincy was next with an official count of 5,500 but unofficially is estimated to be over 9,300; Lynn hosts mostly Cambodian and Laotian numbering 3,000; Revere was next at a large Cambodian population of 1,600; Chelsea has both Vietnamese and Cambodians officially listed at 1,400; Saugus estimated under 1,000. The other towns such as Swampscott, Winthrop, Nahant, Milton and Braintree have very small populations.

Cities which are part of metropolitan Boston but which lie on rivers emptying into Boston Harbor also reveal high numbers of Asian residents: Cambridge lists 8,100 which like Somerville lists a count of 2,800 may be accounted for by the large number of students at Universities and colleges. Malden also shows a large number with 2,800 and Medford just under 1,200 Asians.

As a whole the Asian American population is one of the fastest growing minority groups in the United States. Further, as the population grows, the group has become more diversified into sub-groups. The Boston Foundation and the Institute for Asian American Studies at University of Massachusetts, Boston, noted that the Asian American community in Boston includes 40 different nationalities and ethnic sub-groups, each with its own language, culture and historical experience. The following countries and regions may be represented by any statistic on Asians and Pacific Islanders: People's Republic of China, Taiwan, Hong Kong, Macau, Philippines, Japan, Korea, India, Pakistan, Vietnam, Samoa, Tonga, Guam, Laos, Thailand, Malaysia, Singapore, and Cambodia. A sub-group such as Cambodian or Laotian itself may comprise a wide variety of ethnic groups and dialects such as Hmong, Khmer, Mon-Khmers, Muong, Nung, and Yao.

The Boston Foundation lists that Boston Asian community grew 89% in 1990, which was the eleventh highest increase among minority groups. These statistics which group the Southeast Asians and Pacific Islanders approximate a total of 31,000 people. The Boston Asian community is characterized by wide variations in socio-economic status.

In Boston, Chinese and Vietnamese predominate the sub-group distribution. Chinese are concentrated in Chinatown, South End, Mission Hill, Forest Hills, and Allston/Brighton. Vietnamese are most found in Dorchester, Allston/Brighton, and East Boston. Cambodians are also concentrated in East Boston.

## **5.0 POTENTIAL POPULATION EXPOSURES**

### ***5.1 Identifying Communities at Risk***

A simple method was used to identify and rank communities of southeast Asians with regard to potential population exposure to contaminated shellfish beds (Table 5). As discussed in Section 2, the factors considered were population size and proximity to closed or restricted shellfish beds known to be harvested by southeast Asians. The communities that ranked highest with regard to potential for exposure are Boston, Lynn, Revere, Quincy and New Bedford. The first four are all MAPC communities. Communities in Boston where recent immigrants have settled include Dorchester, East Boston, and Allston/Brighton.

A few additional communities worth noting with regard to potential exposure include Chelsea, Lowell, and Fall River. Chelsea scored slightly lower than the communities listed above because it does not have as direct access. However, it is fairly close to the shellfish beds and could easily be included with the above communities. Many recent southeast Asian refugees have settled in Lowell and it is one of the major centers for Massachusetts. However, it does not have direct access to the shoreline. People from Lowell can travel by train or by car to the beaches. Although this is known to occur, we do not know the extent to which the Lowell population makes use of shellfish beds. Fall River has a sizable refugee population and shellfish bed closures exist in this area. We have not contacted people in Fall River to determine the extent of activity.

### ***5.2 Location Factors***

The reported high incidence of shellfishing closed or restricted beds in Lynn, Revere, and Quincy suggests a function of proximity and immediate access to the waterfront. These towns have large southeast Asian populations. It would seem however, that these areas also receive a large number of shellfishing visitors. The factor of easy access to transportation plays a major role. Because shellfishing is often followed by intensive socializing by and among these families and subgroups, the visitor shellfish gatherers tend to congregate in the same areas where waterfront beaches provide easy access to clam flats for the

residential population. By 'word of mouth' these areas emerge as prime target locations for both residential and visiting illegal activity. These 'hot spots' identified from our own observations and from reports are revealed in Tables 3 and 5.

### **5.3 Monitoring Authority**

To a large degree, the level of illegal shellfishing of closed or restricted areas is dependent upon the available surveillance of these areas by law enforcement officials. In some towns, enforcement of regulations governing fisheries and in particular shellfishing is vested in the town official shellfish warden. S/he may be an appointed officer of the city's health or sewer department. This person may be then responsible for notifying the public of shellfish flat closures, and other pollution release which may potentially affect the harvesting of shellfish.

The Division of Environmental Law Enforcement ( Environmental Police) is the principal field enforcement arm for the Department of Fisheries, Wildlife and Environmental Law Enforcement. Its authority is vested in its 100 field officers who on the coast, patrol, enforce the registering and operation of privately owned boats, and other recreational water vehicles, and manage and protect saltwater commercial and recreational fisheries. Inland, the environmental police has jurisdiction to enforce the state's hunting, fishing and wildlife laws. Their enforcement authority to protect natural resources is equal to that of the state police. As a complement to the Environmental Crime Strike Force, these officers play a major role in prosecuting and deterring pollution violations as well.

Shellfish violations fall under several regulating areas: A failure to comply with permitting requirements (either to dig a maximum amount in an open area or to dig in a contaminated area upon condition of purification at the state designate plant): MGL 130 Sect. 17A and Sect 75 which govern the manner size and time to dig, the violator may incur a \$50 or \$200 fine.

322 CMR 7.1 (13) levies a \$50 fine if an individual fails to comply with the officer's request to produce the permit, or the shellfish, or in any other way appears non-cooperative when confronted with an officer. Digging at night was designated as a felony and is accompanied by a citation for a \$200 penalty.

While commercial digger bootlegger may be often levied with a \$200 fine, the immigrant family or individual who illegally digs a bucket or less may be given at most a \$50 fine- this after a warning on the first occurrence.

According to the environmental police statistician who made a count to identify Asian names for 1994, only 8% of the citations were issued to Asian Americans (15 of a total of 188 citations). Warnings, which are reportedly by far the most frequent disposition in the cases where Asians are involved, were not recorded.

#### ***5.4 Perspectives- monitoring, prosecuting, and/or communicating***

There has been little or no training for special handling of confrontations with minority sub-groups. Police are instructed to enforce the regulations and to prosecute violators. Nevertheless, currently, the operating policy reflects the ambivalence the police feels towards strict enforcement. On one hand, the officer seeks to convey to the Asian digger that the violation is serious, that there is substantial health risk involved, and that the citation requires a court appearance. However, where language is an apparent barrier, and where cultural norms makes some interactions incomprehensible to the officer, the officer who must decide whether to prosecute or not, may feel that destruction of the harvested contaminated shellfish is traumatic enough for the Asian family. Violent confrontations, while infrequent, have occurred said the police because the digger has expended many hours digging, and/or the threat of a felony or \$200 fine is worth a fight with the accusing officer.

As is with all criminal penalties, the regulating and enforcement policy attempts to deter the violator from further illegal activities such as the one being prosecuted. Educating the violator in this context is a by-product and not the goal of enforcement.

Efforts currently being made to bridge the gap between regulators and violators are minimal and rudimentary. The police has been and are currently aware of the impact of language and cultural barriers to effective enforcement of shellfishing violations. However, while multi-lingual signs have been recommended in the past, each summer comes without this suggestion being implemented. Signs are often vandalized and if they are to be effective, this would have to be solved. The police have been receptive and enthusiastic regarding the problem of bridging communication between the authorities and

the Asian communities.

Since southeast Asian groups have not been directly contacted for this phase of the study, all remarks made on their response to the environmental prosecution for shellfish violations as well as the confrontations they entail, have been from interviews and conversations with the environmental police. When confronted with illegal shellfishing, bootlegging, or other fisheries violations, the immigrant populations do not perceive that the police exist to protect them. Instead, the more common reaction to the police is one of distrust, anger and resentment.

The language problem appears to be the most troublesome for the police. Asian individuals have been reportedly too eager to use this as an excuse to exonerate themselves when confronted or prosecuted for shellfish violations said the police. Since most family violations occur with the assistance or in the presence of children, the police feel that children are often presented to the prosecuting officer as the culprits. The prosecuting officer is then even more reluctant to prosecute the child when s/he believes that the adult in fact is the guilty party. In some cases though, the adult is then cited. However, the officer finds the dynamic a particularly distasteful one to manage.

The police believe that in general, the fines do not serve as a deterrent. For commercial bootleggers, the fine may be perceived as a necessary cost of doing this type of business. Particularly where there is a cost anyway to decontaminate the shellfish after digging in designated contaminated flats, the risk of a fine may be balanced out by selling these clams outright to commercial markets. However, when commercial diggers are caught selling contaminated shellfish, the penalty goes beyond the financial loss because the police may then revoke their license to dig.

These problems of enforcement and deterrence are potentially exacerbated in cases of the immigrant population where language and culture are significant barriers to effective communication.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

This study is the first phase of a projected 3-phase study. Phase 1 has attempted to show the extent of the problem as it is revealed in the collected demographics and ethnographics and these statistics have been ranked in order to show their relation to the closed or restricted shellfish beds and fishing areas.

In designing further study it is hoped that these preliminary observations regarding the shortcomings of current police enforcement could be investigated in depth. In particular, our observations reveal the need to explore whether facilitating a more healthy interaction between the monitoring authorities and the population at risk will impact to effectuate enforcement and monitoring of environmental regulation.

Preliminary research suggests that an emphasis on enforcement training should focus on an approach that's more conducive to relationship building and communication between the regulatory authorities and the communities by providing the following:

1. Notification -- Accessing subgroups with necessary information on contamination, i.e. actively warning and posting shellfish bed closures in areas adjacent to high risk communities. To do this effectively, the authorities must seek to develop concrete measures to effectuate notice and warning by designing multilingual signage and other communication materials.
2. Education -- Designing cards and other materials which warn and teach users of the coastal areas of organic and chemical pollution, as well as potential violations in regard to fishing and shellfishing i.e. permitting requirements, fishing-including size and species prohibitions. These may take on a simplified 'show and tell' using examples and pictures of shellfish, short lobsters and striped bass, or any other protected sea life. Efforts need to be taken to insure that the signs are not vandalized.
3. Staff Diversity -- In order to accomplish their enforcement goals, the regulatory authorities must be both willing and have the capability to pursue active community outreach to these groups. Diversifying the environmental police force to include representatives from these subgroups is one way to

bridge the gap between community and regulatory authority. Recruitment and hiring of multilingual field officer who will serve to facilitate communication, and to breakdown cultural barriers will further insure that information on pollutants, prohibitive activities, and shellfish closures reaches the people most likely to engage in health-risk behaviors in coastal areas.

4. Cross-cultural training -- Further study will seek to examine in terms of the southeast Asian population their traditional values, diet in particular fish consumption practices, employment patterns and activities, as well as their attitudes and relationship to authority. We will also attempt to explore the use of community officials and members as bilingual liaisons and intermediaries who may serve to bridge the gap between the education authorities and the southeast Asian populations.

The concepts and theory base of Environmental Justice as it relates to illegal shellfishing, fishing and water activities will be further explored in Phases 2 and 3 . Recent news media focus on the problem of subsistence fishing in the Hudson and Potomac rivers reveal the wide incidence of the problem identified in our Phase 1 analysis. ("Anglers Ignore Hudson Warnings. Most Either Don't Know of Cancer Concern or Don't Care" New York Times, September 3, 1994 ( 21); "Warnings Sought for D.C. Waters. Groups Discourage Fishing,. Swimming", Washington Post, September 1, 1994 (C3) D.C.)

Other studies on fish consumption patterns by various populations such as in the great lakes ( Patrick C. West : "Invitation to Poison? Detroit Minorities and Toxic Fish Consumption from the Detroit River" p. 96 ; West et al: "Minority Anglers and Toxic Fish Consumption: Evidence from a Statewide Survey of Michigan" p.100 in Bryant and Mohair eds. Race and the Incidence of Environmental Hazards 1992) might offer useful comparisons for effective and sensitive policy formulation and regulatory enforcement.

In particular these studies suggest that further research should look at whether regulation formulated on the larger population's fish consumption patterns are less effective when enforced on minority populations. Further, attitudes of those who fish may be so entrenched that some people will continue ingesting contaminated fish in spite of warnings of the risk. This shows that the problem is more complex than just bilingual notification and may involve greater understanding of cultural attitudes and lifestyle.

**Table 1**  
**Closed or Restricted Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Bed	Status	Closed (Acres)	North Shore Restricted (acres)	North Shore Conditionally Restricted (acres)	Total Closed or Restricted (acres)
N24.	Nahant		P	9,804			9,804
N16.	Beverly		P	9,120			9,120
N10.	Gloucester		P	8,664			8,664
N22.	Swampscott		P	6,384			6,384
N25.	Nahant		P	5,700			5,700
S1.	Hull		P	5,244			5,244
N23.	Lynn		P	2,280			2,280
N26.	Lynn/Revere	Lynn Harbor	P	2,280			2,280
	Plymouth	Plymouth Harbor, Duxbury Bay	P	2,004			2,004
N22.1	Swampscott		P	1,139			1,139
N9.	Gloucester	Gloucester Harbor	P	1,096			1,096
	Marshfield	Marshfield East Coastal MB:2.2	P	1,003			1,003
N21.1	Marblehead	Devereaux Beach	P	912			912
CCB43	Kingston	Kingston Bay	P	836			836
	Plymouth	CCB:41.1	P	756			756
N2.	Nbpt/Newbury/Salisbury	Merrimack River	P	748			748
	Plymouth	CCB:39.1	P	698			698
	Marshfield	Marshfield East Coastal MB:2.1	P	425			425
	Plymouth	CCB:39.3	P	363			363
	Duxbury	Kingston Bay	P	363			363
N17.	Beverly/Danvers/Salem	Danvers River	P	344			344
N20.	Marblehead		P	238			238
		Provincetown Inner	P	223			223
BH5.A	Quincy	Neponset River	P	209			209
MB3	Marshfield	Green Harbor	P	193			193
MB6	Marshfield	South River	S/P	192			192
MB11	Cohasset	Little Harbor	P	190			190
N18.A	Salem		P	186			186
MB7	Scituate	Scituate Harbor	S/P	177			177
	Plymouth	CCB:39.2	P	172			172
BH7.1	Quincy	Merrymount	P	144			144
BH20.	Hingham	Hingham Harbor	CR			130	130
N27.	Winthrop		P	126			126
BH2.	Boston/Winthrop	Airport	CR			119	119
BH9.D	Hingham/Weymouth		P	114			114
BH6.1	Quincy	Wollaston Beach	P	111			111
BH21.	Hull		CR			107	107
BH5.C.1	Quincy		CR			106	106
BH8.C	Quincy	Rock Island Cove	CR		106		106
N26.1	Revere		P	102			102
BH9.C	Weymouth	Weymouth Fore	P	100			100

**Table 1**  
**Closed or Restricted Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Bed	Status	Closed (Acres)	North Shore Restricted (acres)	North Shore Conditionally Restricted (acres)	Total Closed or Restricted (acres)
MB5	Scituate	North River	S/P	98			98
BH5.B	Quincy		CR			90	90
MB6	Scituate	South River	S/P	88			88
N9.3	Gloucester	Little River	P	86			86
BH4.	Boston	Carson Beach	P	86			86
CCB37	Sandwich	Sandwich Harbor	P	84			84
CCB28	Yarmouth	Bass Creek, Lone Tree Creek	P	81			81
BH9.	Weymouth	Wessagusset Beach	CR		81		81
BH16.	Weymouth		P	77			77
MB10	Cohasset	Cohasset Harbor	P	75			75
MB10	Scituate	Cohasset Harbor	P	75			75
CCB46	Duxbury	Bluefish River	P	75			75
	Kingston	Plymouth Harbor, Kingston Bay	P	73			73
	Duxbury	Duxbury Bay	P	70			70
N26.1A	Revere	Center Bar	CR		70		70
BH15.	Hingham	Weir River	CR			61	61
BH8.A	Quincy	Town River Bay	CR		59		59
BH14.	Hull	Clam Alley	CR			57	57
MB5	Marshfield	North River	S/P	56			56
N28.	Winthrop		P	55			55
N19.	Marblehead		P	55			55
BH1.S	Winthrop	Snake Island	CR			55	55
BH8.B	Quincy		CR		55		55
CCB7	Truro	Pamet Harbor & Little Pamet River	S/P	53			53
BH13.	Hull		CR			53	53
BH18.	Weymouth	Grape Island	P	52			52
BH5.	Quincy	Buckley's Bar	P	50			50
N15.	Manchester		P	47			47
BH12.	Hingham	Bumpkin Island	P	47			47
BH9.E	Hingham/Wymouth		P	44			44
N26.1B	Revere	Seaplane Basin	CR		44		44
BH14.1	Hull		CR			44	44
BH4.1	Boston		P	43			43
CCB15	Eastham	Herring River	P	42			42
BH5.C	Quincy		P	41			41
CCB29	Barnstable	Mill Creek, Hallets Pond & Short Wharf	P	40			40
N9.5	Gloucester		P	39			39
BH2.1B	Boston	Wood Island	CR			39	39
BH6.	Quincy		CR			39	39
	Duxbury	Eagle's Nest Bay	P	38			38
N18.	Salem	Salem Harbor	P	38			38
N26.1C	Revere	Gravel Guerties	P	38			38
CCB21	Brewster	Namskaket Creek	P	35			35

**Table 1**  
**Closed or Restricted Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Bed	Status	Closed (Acres)	North Shore Restricted (acres)	North Shore Conditionally Restricted (acres)	Total Closed or Restricted (acres)
		Herring River	P	34			34
BH3.	Boston	Governor's Island	CR			34	34
CCB29	Yarmouth	Mill Creek, Hallets Pond & Short Wharf	P	33			33
N5.A	Ipswich	Upper Ipswich River	P	33			33
N26.2	Winthrop		P	33			33
CCB16	Eastham	Boat Meadow River	P	32			32
BH15.1	Hingham		P	31			31
N1. A	Salisbury		P	30			30
BH9.A	Hingham		CR		30		30
BH1.	Winthrop	Winthrop Shores	CR			29	29
BH10.	Weymouth	Slate Island	P	28			28
N7.1	Essex	Essex River	P	26			26
CCB19	Orleans	Little Namskaket	P	25			25
CCB24	Dennis	Quivett Creek	P	25			25
CCB40	Plymouth	Ellisville Harbor	P	22			22
CCB21	Orleans	Namskaket Creek	P	20			20
CCB24	Brewster	Quivett Creek	P	20			20
N1.B	Salisbury		P	19			19
CCB32	Barnstable	Barnstable Inner Harbor & Marspin	P/MC	17			17
CCB44	Kingston	Jones River	P	17			17
N15.1	Manchester	Manchester Harbor	P	17			17
BH9.A1	Hingham		P	17			17
BH8.A1	Quincy		P	16			16
CCB22	Brewster	Stony Brook	P	13			13
CCB18	Eastham	Rock Harbor	P	11			11
BHE.	Boston	Constitution Beach	P	11			11
BH8.A2	Quincy		P	11			11
CCB44	Duxbury	Jones River	P	10			10
N11.1	Rockport	Rockport Inner	P	10			10
BHD.	Boston		P	10			10
BHC.	Boston		P	9			9
CCB10	Eastham	Hatches Creek	R	8			8
BH9.B	Weymouth	King's Cove	CR		8		8
		CCB:13.S		6			6
	Plymouth	Rocky Nook	P	6			6
BH1.1	Winthrop		P	6			6
CCB10	Wellfleet	Hatches Creek	R	5			5
		The Breakwater	P	4			4
CCB26	Yarmouth	Yarmouth North	R	4			4
CCB18	Orleans	Rock Harbor	P	3			3
N20.1	Marblehead		P	1			1
							0
BH7.	Quincy		CR				0

**Table 2**  
**Ranking by Town or City for Closed or Restricted Shellfish Beds**

<b>Town</b>	<b>Member of Metropolitan Area Planning Council</b>	<b>Closed or Restricted Shellfish Beds (Acres)</b>
Nahant	YES	15,504
Gloucester		9,885
Beverly		9,464
Swampscott	YES	7,523
Hull	YES	5,505
Lynn	YES	4,560
Plymouth		4,021
Marshfield		1,869
Marblehead		1,206
Quincy	YES	1,037
Kingston		926
Nbpt/Newbury/Sal isbury		748
Duxbury		556
Hingham	YES	474
Scituate		438
Boston	YES	351
Weymouth	YES	346
Winthrop	YES	304
Cohasset		265
Revere	YES	254
Salem		224
Yarmouth		118
Eastham		93
Sandwich		84
Brewster		68
Manchester		64
Barnstable		57
Truro		53
Salisbury		49
Orleans		48
Ipswich		33
Essex		26
Dennis		25
Rockport		10
Wellfleet		5

**Table 3**  
**Interviews Concerning Use of Closed or Restricted Shellfish Beds**

Town	Local Authority Contacted/Phone Number	Comments From Local Authorities	Comments from Environmental Police
Metropolitan Boston	Town Clerk	Has received no reports or made observations	Have observed activity beginning in this area.
Nahant			
Swampscott	Gerri Falco, 617-598-7154	Little or no activity.	Activity is infrequent.
Hull	Linda Beers, Shellfish Officer 617-925-5695	Some organized activity takes place on flat BH21 on bay side. Groups of at least five people have been observed. Activity is not considered high and was more frequent several years ago.	
Lynn	Steven Smith, 617-598-4000 Ext 435; Gerri Falco	Members of Vietnamese population in Lynn are using Red Rock area at low tide. Point of Pines area is also used.	Activity occurs in the bait areas from Nahant to Point of Pines.
Quincy	Andrew Ayer, Shellfish Officer 617-376-1283	Shellfishing occurs often by southeast Asians along Wollaston Beach and Merrymount Beach from Shore Drive to Satchum Street; activity may involve a few dozen people a week and is heaviest during weekend; the activity appears well organized	Shellfishing occurs on Wollaston beach. There is also sporadic activity along Neponset River.
Hingham	Robert Buotte, 617-741-1450, 1410	Little or no activity, perhaps twice since 1989 at the bathing beach.	Some activity along the Back River and in Beal Cove.
Boston	Lorraine Downy, 617-635-3850	Not able to contact.	Shellfishing by southeast Asians has been observed in a number of locations including Carson Beach, Constitution Beach, and Short Beach
Weymouth	Paul Milone, 617-331-6688	No observed activity in closed areas.	Some activity in Beal Cove and Back River. People from nearby communal housing have been observed shellfishing.
Winthrop	Robert Crawford, 617-846-1380; Mary Cochran, 617-846-6581	Shellfishing activity by Cambodians and Vietnamese from Shirley Avenue area in Revere near the Winthrop/Revere line; not much other activity in Winthrop's waters.	Not that much activity except near the boat ramp.
Revere	John Henry, City Clerk 617-286-8161	Shellfishing occurs continuously and may involve hundreds of people; areas include the front part of Revere beach near Winthrop, the Back, Pines, and Saugus Rivers; southeast Asians living near beach use shellfish for food	Activity Can be High Along Regions of Revere Beach

**Table 3**  
**Interviews Concerning Use of Closed or Restricted Shellfish Beds**

<b>Town</b>	<b>Local Authority Contacted/Phone Number</b>	<b>Comments From Local Authorities</b>	<b>Comments from Environmental Police</b>
Braintree	Peter Lapolla, 617-848-1870	No activity observed.	Occasional activity in Fore River.
Chelsea	Charles McFarland Shellfish Officer, 617-889-1734; Frank Singleton, 617-889-8380; Police Department 617-884-1212	Police Department indicated that this was a problem in the past in Chelsea Creek but nothing reported recently.	Occasional activity in Chelsea Creek.
Everett	Mark Reich, 617-394-2230; Police Department 617-389-2120	Doesn't impact Everett directly. Police do not have a record of this activity in Mystic River or Island End River.	Not considered a problem. Little or no activity in Mystic River.
Saugus	Ed Collins, Town Manager, 617-231-4111; Rich MacDonald 617-231-4115	Unclear.	High level of activity all over the Pines River.
<b>Cities and Towns Outside of Metropolitan Boston</b>			
Gloucester	Robert Knowles, Shellfish Officer 508-281-9720	Immigrants have been observed shellfishing for blue mussels in Gulliver's Neck area; the areas are posted in various languages; such shellfishing occurs infrequently (maybe once/month) and tends to be observed during late evening tide or early morning	
Beverly	Chris Deeley, 508-921-6011	Shellfishing has not been observed; there is digging for sea worms	
Plymouth	Ralph Savery, Shellfish Officer 508-830-4182	Shellfishing occurs infrequently; has observed southeast Asians believed to be from Brockton area; beds are patrolled daily	
Marshfield	Bill Clark Shellfish Officer, 617-451-2770	No activity involving southeast Asian immigrants. Local people occasionally shellfish in closed areas.	Very little activity.
Marblehead	Stephen Willard, 617-631-7588	Some shellfishing is occurring by Vietnamese in closed areas; people are dropped off at night to shellfish but the frequency does not seem high; areas include Riverhead Beach on harbor side; thought some shellfish may be going to Vietnamese restaurant	
Kingston	Harbor Master, 617-585-0519	Not able to contact.	
Nbpt/Newbury/Salisbury	H. Vern Noyes, 508-465-9871; Richard Rocco, 508-465-4444	No activity observed.	
Duxbury	Donald Beers, Shellfish Officer 617-934-2866	Little or no activity in closed areas	

**Table 3**  
**Interviews Concerning Use of Closed or Restricted Shellfish Beds**

Town	Local Authority Contacted/Phone Number	Comments From Local Authorities	Comments from Environmental Police
Scituate	Joseph Strazdar, Shellfish Officer 617-837-0392	no observed use of closed beds	
Cohasset	Cliff Dickson	Currently little problem; they have observed Koreans shellfishing in Little Harbor and have asked them to leave; there could be a future problem	
Salem	Andy Syska Harbor Master, 508-741-0098	No activity observed, no need to enforce.	
Yarmouth	Morris Johnson, 508-760-4800	Very small activity; Vietnamese did use area years ago but not recently; activity used to occur in evenings on low tide.	
Eastham	Henry Blind, 508-255-1965	Not able to contact.	
Sandwich	Mark Galkowski, 508-888-4200	Local people and vacationers may occasionally shellfish closed areas, usually on weekends. Little or no activity involving southeast Asian immigrants.	No activity.
Brewster	Robert Mant, 508-896-3701 Ext. 781	Little or no activity.	
Manchester			
Barnstable	Douglas Kalweit, 508-790-6272	Locals have been occasionally observed shellfishing in closed areas; no observations regarding immigrant populations.	Illegal shellfishing is occurring but does not involve immigrant populations.
Truro	Marguerite Holway, 508-487-9095	Little or no activity.	
Salisbury	Edwin Hunt, 508-462-6072	Little or no activity.	
Orleans	Truman Henson, 508-240-3755	No activity observed.	
Ipswich	Philip Kent, 508-356-4343	No activity observed.	
Essex	Arnold Thistlewood, 508-768-6531	Little or no activity in closed areas	
Dennis			
Rockport	James Blake, 508-546-9334	No activity observed.	
Wellfleet	Paul Somerville, 508-349-0325	Not able to contact.	
Danvers	Harbor Master, 508-762-0210	Little or no activity, perhaps one-half dozen people per year.	

**Table 4  
Population Estimates for Southeast Asians in Massachusetts**

Town/City	Estimate of Southeast Asian Refugees in 1989	Asian/Pacific Islander Population Estimate for 1991-1992 (Massachusetts Municipal Profile)	Predominant Origins of Settlement Communities
<i>Communities with over 10,000 refugees</i>			
Lowell	16,979	11,493	Cambodians/Vietnamese
Boston	10,302	30,388	Chinese/Vietnamese/Cambodians
<i>Communities with over 500 refugees</i>			
Lynn	4,571	3,003	Cambodians/Laoitians
Worcester	4,384	4,770	Vietnamese
Revere	3,124	1,571	Cambodians
Chelsea	1,848	1,435	Vietnamese/Cambodians
Fall River	1,276		
Lawrence	1,040	1,358	
Quincy	792	5,577	Chinese/Vietnamese
Attleboro	792		
Malden	605		Chinese
Brockton	594	1,589	
Somerville	550	2,824	
<i>Communities with less than 500 refugees</i>			
Everett	286	641	
Waltham	280		
Brookline	264	4,585	
Cambridge	220	8,081	
Randolph	220		
Salem	198	522	
Newton	176		
Framingham	110		
New Bedford	110		
Medford	93.5		
Braintree	NA	527	
Weymouth	NA	486	
Beverly	NA	388	
Barnstable	NA	288	
Plymouth	NA	282	
Danvers	72	241	
Marblehead	NA	173	

**Table 4  
Population Estimates for Southeast Asians in Massachusetts**

Town/City	Estimate of Southeast Asian Refugees in 1989	Asian/Pacific Islander Population Estimate for 1991-1992 (Massachusetts Municipal Profile)	Predominant Origins of Settlement Communities
Hingham	NA	160	
Winthrop	NA	127	
Marshfield	NA	117	
Yarmouth	NA	84	
Sandwich	NA	81	
Swampscott	33	79	
Gloucester	NA	77	
Scituate	NA	76	
Duxbury	NA	72	
Hull	NA	67	
Ipswich	NA	51	
Newburyport	NA	44	
Brewster	NA	33	
Cohasset	NA	31	
Orleans	NA	31	
Rockport	NA	27	
Manchester	NA	23	
Nahant	NA	22	
Eastham	NA	17	
Provincetown	NA	17	
Kingston	NA	15	
Newbury	NA	15	
Essex	NA	14	
Salisbury	NA	13	
Wellfleet	NA	4	
Truro	NA	3	

**Table 5  
Ranking of Communities with Regard to Potential Population Exposure to Contaminated Shellfish**

Town/City	Population Level	Numerical Score for Population Level (1.5 weighting)	Proximity to Actively Worked Shellfish Beds	Numerical Score for Proximity	Overall Rank
Boston	High	1.5	High	1	1.5
Lynn	Moderate	3	High	1	3
Revere	Moderate	3	High	1	3
Quincy	Moderate	3	High	1	3
New Bedford	Low	4.5	High	1	4.5
Lowell	High	1.5	Very Low	4	6
Chelsea	Moderate	3	Moderate	2	6
Fall River	Moderate	3	Moderate	2	6
Braintree	Negligible	6	High	1	6
Weymouth	Negligible	6	High	1	6
Beverly	Negligible	6	High	1	6
Plymouth	Negligible	6	High	1	6
Marblehead	Negligible	6	High	1	6
Hingham	Negligible	6	High	1	6
Winthrop	Negligible	6	High	1	6
Marshfield	Negligible	6	High	1	6
Swampscott	Negligible	6	High	1	6
Gloucester	Negligible	6	High	1	6
Scituate	Negligible	6	High	1	6
Duxbury	Negligible	6	High	1	6
Hull	Negligible	6	High	1	6
Newburyport	Negligible	6	High	1	6
Rockport	Negligible	6	High	1	6
Nahant	Negligible	6	High	1	6
Kingston	Negligible	6	High	1	6
Newbury	Negligible	6	High	1	6
Attleboro	Moderate	3	Low	3	9
Malden	Moderate	3	Low	3	9
Brockton	Moderate	3	Low	3	9
Somerville	Moderate	3	Low	3	9
Everett	Low	4.5	Moderate	2	9
Salem	Low	4.5	Moderate	2	9

**Table 5  
Ranking of Communities with Regard to Potential Population Exposure to Contaminated Shellfish**

Town/City	Population Level	Numerical Score for Population Level (1.5 weighting)	Proximity to Actively Worked Shellfish Beds	Numerical Score for Proximity	Overall Rank
Worcester	Moderate	3	Very Low	4	12
Lawrence	Moderate	3	Very Low	4	12
Barnstable	Negligible	6	Moderate	2	12
Danvers	Negligible	6	Moderate	2	12
Yarmouth	Negligible	6	Moderate	2	12
Sandwich	Negligible	6	Moderate	2	12
Ipswich	Negligible	6	Moderate	2	12
Cohasset	Negligible	6	Moderate	2	12
Orleans	Negligible	6	Moderate	2	12
Manchester	Negligible	6	Moderate	2	12
Eastham	Negligible	6	Moderate	2	12
Provincetown	Negligible	6	Moderate	2	12
Essex	Negligible	6	Moderate	2	12
Salisbury	Negligible	6	Moderate	2	12
Truro	Negligible	6	Moderate	2	12
Waltham	Low	4.5	Low	3	13.5
Brookline	Low	4.5	Low	3	13.5
Cambridge	Low	4.5	Low	3	13.5
Randolph	Low	4.5	Low	3	13.5
Newton	Low	4.5	Low	3	13.5
Frammingham	Low	4.5	Very Low	4	18
Medford	Negligible	6	Low	3	18
Brewster	Negligible	6	Low	3	18
Wellfleet	Negligible	6	Low	3	18

## **APPENDIX A**

**Appendix A**  
**Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal Closed (Acres)	Seasonal Open (acres)	MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
MB1	Duxbury	Duxbury Beach	9/17/92	A	8,530								8,530
MB1	Plymouth	Duxbury Beach	9/17/92	A	1,925								1,925
MB2	Marshfield	Marshfield East Coastal		A	9,215								9,215
	Marshfield	Marshfield East Coastal MB.2.1		P		425							425
	Marshfield	Marshfield East Coastal MB.2.2		P		1,003							1,003
MB3	Marshfield	Green Harbor		P		193							193
MB4	Scituate	Scituate South Coastal		A	14,211								14,211
MB5	Marshfield	North River		S/P		56	120						176
MB5	Marshfield	North River		S/P		98	187						285
MB6	Marshfield	South River		S/P		192	111						303
MB6	Scituate	South River		S/P		88	151						239
MB7	Scituate	Scituate Harbor		S/P		177	96						273
MB8	Scituate	Scituate North Coastal		A	14,872								14,872
MB9	Cohasset	Cohasset North Coastal		MC					7,253				7,253
MB9	Scituate	Cohasset North Coastal		MC					2,545				2,545
MB10	Cohasset	Cohasset Harbor		P		75							75
MB10	Scituate	Cohasset Harbor		P		75							75
MB11	Cohasset	Little Harbor		P		190							190
	Cape Cod Bay												
CCB1	Provincetown	Herring Cove, Long Point	8/11/92	A	19,750								19,750
CCB2	Provincetown	Hatches Harbor	5/11/93	A/R			142				2		144
CCB3	Provincetown	Provincetown Outer Harbor	5/11/93	A	1,308								1,308
CCB3	Truro	Provincetown Outer Harbor	5/11/93	A	4,191								4,191
CCB4	Provincetown	Provincetown Inner Harbor	8/11/92	A	2,595								2,595
		Provincetown Inner Harbor	5/11/93	P		223							223
CCB4	Truro	Provincetown Inner Harbor	5/11/93	A	2,028								2,028
CCB5	Provincetown	The Breakwater	5/11/93	A	211								211
		The Breakwater	5/11/93	P		4							4

Appendix A  
Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal Closed (Acres)	Seasonal Open (Acres)	MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
CCB6	Truro	Truro West Coastal	8/11/92	A	7,333								7,333
CCB7	Truro	Pamet Harbor & Little Pamet River	5/1/94	S/P		53	55						108
CCB8	Wellfleet	Wellfleet West Coastal	6/9/94	A	16,580								16,580
CCB9	Eastham	Eastham Coastal Area	5/11/93	A	18,283								18,283
CCB10	Wellfleet	Hatches Creek	5/11/93	R		5							5
CCB10	Eastham	Hatches Creek	5/11/93	R		8							8
CCB11	Wellfleet	Wellfleet Harbor	5/11/93	A	5,069					161			5,069
CCB12	Wellfleet	Herring River	3/24/94	C									161
		Herring River	3/24/94	P		34							34
		Wellfleet Inner Harbor											
CCB13	Wellfleet	CCB:13	8/11/92	A	202								202
		CCB:13.1	5/1/94	S			54						54
		CCB:13.S	10/12/93			6							6
		Loagy Bay, Dummer Cove, & Blackfish Creek											
CCB14	Wellfleet	Loagy Bay, Dummer Cove, & Blackfish Creek	5/11/93	A	582								582
CCB15	Eastham	Herring River	8/11/92	P		42							42
CCB16	Eastham	Boat Meadow River	8/4/88	P		32							32
CCB17	Orleans	Orleans North Coastal	5/11/93	A	2,790								2,790
CCB18	Eastham	Rock Harbor	8/11/92	P		11							11
CCB18	Orleans	Rock Harbor	8/11/92	P		3							3
CCB19	Orleans	Little Namskaket Creek	7/7/88	P		25							25
CCB20	Brewster	Brewster North Coastal		A	9,055								9,055
CCB21	Brewster	Namskaket Creek	7/7/88	P		35							35
CCB21	Orleans	Namskaket Creek	7/7/88	P		20							20
CCB22	Brewster	Stony Brook	8/31/84	P		13							13
CCB23	Dennis	Dennis North Coastal	9/1/92	A/R									0
CCB23	Dennis	Dennis North Coastal	9/1/92	A	14,356								14,356
CCB23	Dennis	Dennis North Coastal	5/25/94	S			332						332
CCB24	Brewster	Quivett Creek	11/13/87	P		20							20
CCB24	Dennis	Quivett Creek	11/13/87	P		25							25
CCB25	Dennis	Sesuit Harbor	5/1/94	S			46						46
CCB26	Yarmouth	Yarmouth North Coastal	12/20/93	A/R									0
CCB26	Yarmouth	Yarmouth North Coastal	12/20/93	A	3,780								3,780

**Appendix A**  
**Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal		MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
							Closed (Acres)	Open (acres)					
CCB26	Yarmouth	Yarmouth North Coastal	12/20/93	R	4								4
CCB27	Dennis	Chase Garden Creek	6/15/94	S		140							140
CCB27	Yarmouth	Chase Garden Creek	6/15/94	S		78							78
CCB28	Yarmouth	Bass Creek, Lone Tree Creek		P		81							81
CCB29	Barnstable	Mill Creek, Halletts Pond & Short Wharf Creek		P		40							40
CCB29	Yarmouth	Mill Creek, Halletts Pond & Short Wharf Creek		P		33							33
CCB30	Barnstable	Barnstable North Coastal		MC				8,911					8,911
CCB31	Barnstable	Barnstable Harbor		A	1,764		384						2,148
CCB32	Barnstable	Barnstable Inner Harbor & Marspin Creek		P/MC		17							17
CCB33	Barnstable	Barnstable Marshes		A			255						255
CCB34	Barnstable	Scorton Creek		A	203								203
CCB34	Sandwich	Scorton Creek		A	30								30
CCB35	Sandwich	Sandwich North Coastal		A	9,820								9,820
CCB36	Sandwich	Scorton Harbor		MC				61					61
CCB37	Sandwich	Sandwich Harbor		P		84							84
CCB38	Bourne	Bourne North Coastal		A	3,380								3,380
CCB39	Plymouth	Plymouth South Coastal		A	18,071								18,071
	Plymouth	CCB:39.1		P		698							698
	Plymouth	CCB:39.2		P		172							172
	Plymouth	CCB:39.3		P		363							363
CCB40	Plymouth	Ellisville Harbor		P		22							22
CCB41	Plymouth	Plymouth North Coastal		A	18,863								18,863
	Plymouth	CCB:41.1		P		756							756
CCB42	Duxbury	Plymouth Harbor, Duxbury Bay		A	629	0							629
CCB42	Kingston	Plymouth Harbor, Duxbury Bay		A	249								249
	Kingston	Plymouth Harbor, Kingston Bay		P		73							73





**Appendix A**  
**Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal Closed (Acres)	Seasonal Open (acres)	MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
N9.FC	Gloucester	Freshwater Cove		MC					22				22
N9.S	Gloucester	Sandbar		CA						38			38
N9.1A	Gloucester			MC					34				34
N9.2	Gloucester			MC					21				21
N9.3	Gloucester	Little River		P		86							86
N9.4	Gloucester			CA						164			164
N9.5	Gloucester			P		39				7			39
N9.5B	Gloucester			CA									7
N9.5BC	Gloucester	Back Creek		MC					14				14
N9.5M	Gloucester	Mill River		MC					37				37
N9.5LF	Gloucester	Lower Flat		CA						16			16
N9.5P	Gloucester	Plummers		A	12								12
N9.5WC	Gloucester	Whealers Cove		MC					9				9
N11.1	Rockport	Rockport Inner Harbor		P		10							10
N15.1	Manchester	Manchester Harbor		P		17							17
N17.	Beverly/Danvers/Salem	Danvers River		P		344							344
N18.	Salem	Salem Harbor		P		38							38
N18.A	Salem			P		186							186
N19.	Marblehead			P		55							55
N20.	Marblehead			P		238							238
N20.1	Marblehead			P		1							1
N22.1	Swampscott			P		1,139							1,139
N23.	Lynn			P		2,280							2,280
N25.	Nahant			P		5,700							5,700
N26.	Lynn/Revere	Lynn Harbor		P		2,280							2,280
N26.1	Revere			P		102							102
N26.1A	Revere	Center Bar		CR							70		70
N26.1B	Revere	Seaplane Basin		CR							44		44
N26.1C	Revere	Gravel Guerties		P		38							38
N26.2	Winthrop			P		33							33
BHC.	Boston			P		9							9
BHD.	Boston			P		10							10

**Appendix A**  
**Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal Closed (Acres)	Seasonal Open (acres)	MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
BHE.	Boston	Constitution Beach		P	11								11
BH1.S	Winthrop	Snake Island		CR								55	55
BH1.	Winthrop	Winthrop Shores		CR								29	29
BH1.1	Winthrop			P	6								6
BH2.	Boston/Winthrop	Airport		CR								119	119
BH2.1B	Boston	Wood Island		CR								39	39
BH3.	Boston	Governor's Island		CR								34	34
BH4.	Boston	Carson Beach		P		86							86
BH4.A	Boston	Pleasure Bay		MC					8				8
BH4.1	Boston			P		43							43
BH5.	Quincy	Buckley's Bar		P		50							50
BH5.A	Quincy	Neponset River		P		209							209
BH5.B	Quincy			CR								90	90
BH5.C	Quincy			P		41							41
BH5.C1	Quincy			CR								106	106
BH6.	Quincy			CR								39	39
BH6.1	Quincy	Wollaston Beach		P		111							111
BH7.	Quincy			CR	151								151
BH7.1	Quincy	Merrymount		P		144							144
BH8.	Quincy			MC					47				47
BH8.A	Quincy	Town River Bay		CR							59		59
BH8.A1	Quincy			P		16							16
BH8.A2	Quincy			P		11							11
BH8.B	Quincy			CR							55		55
BH8.C	Quincy	Rock Island Cove		CR							106		106
BH9.	Weymouth	Wessagusset Beach		CR							81		81
BH9.A	Hingham			CR							30		30
BH9.A1	Hingham			P		17							17
BH9.B	Weymouth	King's Cove		CR							8		8
BH9.C	Weymouth	Weymouth Fore River		P		100							100
BH9.D	Hingham/Weymouth			P		114							114
BH9.E	Hingham/Weymouth			P		44							44
BH10.	Weymouth	Slate Island		P		28							28

**Appendix A  
Status of Shellfish Beds in Massachusetts Bay (DMF, 1994)**

Area	Town	Name of Town	Date of Change	Status	Open (Acres)	Closed (Acres)	Seasonal Closed (Acres)	Seasonal Open (acres)	MC	Conditional (Acres)	NS Rest	NS Cond Rest	Total Area (Acres)
BH11.	Hingham			MC					18				18
BH12.	Hingham	Bumpkin Island		P		47							47
BH13.	Hull			CR								53	53
BH14.	Hull	Clam Alley		CR								57	57
BH14.1	Hull			CR								44	44
BH15.	Hingham	Weir River		CR								61	61
BH15.1	Hingham			P		31							31
BH16.	Weymouth			P		77							77
BH18.	Weymouth	Grape Island		P		52							52
BH20.	Hingham	Hingham Harbor		CR								130	130
BH21.	Hull			CR								107	107
S1.	Hull			P		5,244							5,244

## **APPENDIX B**

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Merrimack River Rocks Bridge to Routes 1 and 1A Bridge, Newburyport	11.8-3.0	SB	PS	Fecal Coliform bacteria Lead	Upstream sources	----- -Further research needed to confirm and locate sources of metal contamination
Route 1 and 1A Bridge to the Atlantic Ocean Newburyport	3.0-0.0	SB	NS	Fecal Coliform bacteria Shellfishing banned	-Untreated wastewater discharges in Salisbury. -Upstream	-Plan and specifications complete for Salisbury secondary WWTP. Expected plant completion in 1989.
North Shore Drainage					sources	
Ipswich River Basin Drainage Sylvania Dam, Ipswich to mouth in Ipswich Bay, Ipswich	4.5-0.0	SA	NS	-Total coliform bacteria, Shell- fishing restricted	-Surface runoff. -Illegal connections or leakage into Farley Brook, Ipswich.	-----

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Parke River Central Street Newbury to its mouth at Plum Island Sound Newbury	9.0-0.0	SA/AD	S	Dissolved oxygen Fecal coliform bacteria	-Natural conditions -Untreated discharges	-----
Wetzel's River from headwaters to confluence with Danvers River, Danvers	2.0-0.0	SB	PS	Fecal coliform bacteria, Heavy metals in sediments	-Unknown	-Needs investigation
Headwaters Crane Brook to Mill Pond, Danvers	3.9-1.6	B/WWF/AD	NS	Fecal coliform bacteria Metals	-Unknown -Landfill upstream	-Needs further investigation
Crane River from Mill Pond to Danvers River, Danvers	1.6-0.0	SB	NS	Fecal coliform bacteria, Heavy metals and PAH's in sediment	-Unknown	-Needs further investigation
Porter River from Frost Fish Brook to confluence with Danvers River, Danvers	1.5-0.0	SB	PS	Fecal coliform bacteria, Heavy metals and PAH's in sediments	-Unknown	-Needs investigation
Goldwall Brook from Cedar Pond to North River, Peabody	3.3-0.0	B/WWF/AD	NS	Fecal coliform bacteria, Metals Nutrients, Low D.O., PAH's and heavy metals in sediments	-Landfill -Industrial complex -Former tanneries -Sediment	-Needs further investigation

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
North River from confluence of Goldthwait Brook and Proctor Brook to confluence with Danvers River, Salem	2.7-0.0	SB	NS	Fecal coliform bacteria, Metals Oil and grease Low D.O. Nutrients, PAH's PCB's and heavy metals in sediments	-Former tanneries -Sediment -Unknown	-Needs further investigation
Bass River, from headwaters to confluence with Danvers River, Beverly	3.7-1.3 1.3-0.0	BWWF/AD SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Sediment -Unknown	-Needs investigation
Danvers River from source to mouth	1.9-0.0	SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Sediment -Unknown	---
Forest River, Salem	0.5-0.0	SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Unknown -Sediment	-Needs investigation
Essex River from source to mouth	4.9-0.0	SA	PS	Fecal coliform bacteria	-Unknown	---
Annisquam River from source to mouth	3.6-0.0	SA	NS	Fecal coliform bacteria, Shell-fishing restricted	-Domestic sewage -Vessel discharges -Combined sewage overflows	

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Saugus River from source to mouth	8.6-4.3 4.3-0.0	B SB	NS	Fecal coliform bacteria, Dissolved oxygen, Metals	-Urban runoff  -Unknown	-Needs further investigations.
Pineas River from source to mouth	6.4-0.0	SB	NS	Fecal coliform bacteria	-Unknown	
Essex Bay	1.15 MI(2)	SA	U	-----	-Essex river tributary to bay has known coliform problems	-----
Rockport Harbor	0.019mi(2)	SB	U	-----	-Rockport secondary waste water treatment plant discharges to bay	-----
Gloucester Harbor	2.24 mi(2)	SB	PS	Fecal coliform bacteria Low D.O. PCB's and PAH's in sediment	-CSOs -Vessel discharges -Urban runoff	-New WWTP recently completed construction, outfall and diffuser to be extended
Manchester Harbor	0.29 mi(2)	SB	PS	Fecal coliform bacteria	-Vessel discharges -Polluted tributary water	-Stop tributary contamination.

**WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.**

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Beverly Harbor	0.78 ml(2)	SB	S	Some heavy metals in sediment	-SESD	-Upgrade SESD extend outfall.
Salem Harbor	1.62 ml(2)	SB	PS	Fecal coliform bacteria PAH'S and heavy metals in sediment	-SESD -Sediments -Vessel discharges -Polluted tributary	-Upgrade SESD extend outfall. -Stop tributary contamination.
Marblehead Harbor	0.58 ml(2)	SA	S	Heavy metals found in sediments	-Possible problem from vessel discharge -Sediment contamination from SESD -Marinas	-Upgrade SESD -Extend outfall.
Lynn Harbor	6.67 ml(2)	SB	PS	Fecal coliform bacteria	-CSOs Lynn raw discharge -Urban runoff	-Upgrade Lynn treatment plant and extend diffuser outfall.
Nahant Bay	5.27 ml(2)	SA	PS	Fecal coliform bacteria	-CSO's -Lynn raw discharge	-Upgrade Lynn treatment plant and extend diffuser outfall.
Salem Sound	10.01 ml(2)	SB	PS	Fecal coliform bacteria, Heavy metals, Nutrients	-SESD not operating well	-Upgrade SESD to secondary treatment and extend ocean diffuser.

**WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.**

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
<b>BOSTON HARBOR DRAINAGE</b>						
Mystic River Inlet Upper Mystic to Amelia Earhart Dam, Somerville	8.8-2.0	B/WWF	NS	Nutrients Fecal coliform bacteria	-Runoff -CSOs	-NPS control -Eliminate CSOs.
Charles River Charles Basin Watertown Dam to Charles River Dam Boston	9.8-0.0	C/WWF	NS	Fecal coliform bacteria, Dissolved oxygen	-CSOs -Urban runoff -In-place sediments	-CSO elimination. -BMP
Neponset River Mother Brook to Milton Lower Falls Dam, Milton-Boston	7.9-4.2	B/WWF	NS	Fecal coliform bacteria Nutrients Dissolved oxygen	-Combined sewer overflows	-Combined sewer elimination or treatment.
Milton Lower Falls Dam to Dorchester Bay, Boston-Quincy	4.2-0.0	SB	NS	Dissolved oxygen Fecal coliform bacteria, Nutrients	-Combined sewer overflows	-Combined sewer elimination or treatment
Mother Brook Mother Brook Dam, Dedham to confluence with Neponset River, Boston.	3.1-0.0	B/WWF	NS	Fecal coliform bacteria Nutrients	-Urban runoff -Sewer system problems	-Detailed study of area is needed.
Outer Harbor (President Roads & Nantasket Roads)	23.0 mi <sup>2</sup>	SB	PS	Fecal coliform bacteria, Metals	-Deer Island WWTP Nis Island	-Stop sludge dumping -Secondary treatment

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS WWTP	ABATEMENT NEEDS TO MEET CLASSIFICATION
Inner Harbor Includes: (Fort Point Channel and Reserved Channel)	2.3 ml (2)	SC	PS	Metals, Fecal coliform bacteria Aesthetics, Oil and grease Dissolved oxygen	-Combined sewer overflows -In-place sediments -Water traffic -Tributary pollutants	-CSO treatment.
Dorchester Bay	4.6 ml(2)	SB	PS	Fecal coliform bacteria Dissolved oxygen Metals	-Combined sewer overflows -Moon Island Pumping station	-CSO separation and treatment
Quincy Bay (portion designated SA)	1.0 ml(2)	SA	NS	Fecal coliform bacteria, Shell-fishing and swimming restricted	-Storm drains	-----
Quincy Bay (excluding portion designated SA)	4.7 ml(2)	SB	PS	Fecal coliform bacteria	-Storm drain discharges -Nut Island WWTP	-Nut Island discharges to Nut Island WWTP to Deer Island WWTP -O&M correction.
Hingham Bay vicinity Nut Island WWTP	1.0 ml(2)	SB	PS	Fecal coliform bacteria	-Storm discharges -Tributary pollutant	-O&M correction.
Hingham Bay	5.8 ml(2)	SB	S	-----	-----	-----

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Hingham Harbor	1.1 mi(2)	SA	NS	Fecal coliform bacteria Restricted shellfishing	-Storm drains	-O&M correction.
Hull Bay	2.3 mi(2)	SB	S	---	---	---
Winthrop Bay	1.5 mi(2)	SB	PS	Fecal coliform bacteria, Metals	-Combined sewer overflows	-CSO treatment
Weymouth & Weir River	12.4-5.1	BWWF/AD	NS	Dissolved oxygen Fecal coliform bacteria	-Runoff	-BMPs
Weymouth Fore River					-Faulty sewer lines	-Rehabilitation of sewers.
Mary Lee Brook at Union St. to Mukusea St. Braintree	6.1-3.2	BWWF/AD	S	---	---	---
Weymouth Back River Whitmans Pond to Fresh River, Weymouth	4.7-1.5	SB	N	Fecal coliform bacteria	-Runoff -Faulty sewer lines	-BMPs -Rehabilitation of sewers.
Town River Old Quincy Reservoir to Route 3-4A, Quincy						
<b>SOUTH SHORE DRAINAGE</b>						
South River						
Above Main Street Marshfield	10.6-6.7	B/AD	S	---	---	---

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Main St. to Bourne Park Ave., Marshfield	6.7-4.6	SA/AD	NS	Fecal coliform bacteria Dissolved oxygen	-Storm drains -Subsurface disposal -Wetlands	-Eliminate sources. -Maintenance
Bourne Park Ave. to Broad Creek, Marshfield	4.6-1.2	SA/AD	PS	Fecal coliform bacteria Dissolved oxygen	-Carry over -Wetlands	-----
Broad Creek to Marshfield	1.2-0.0	SA/AD	PS	Fecal coliform bacteria, Shellfish bars Dissolved oxygen	-Subsurface disposal near Broad Creek -Wetlands	-Maintenance
Green Harbor River, Marshfield	2.5-0.0	B/WWF/AD	PS	Dissolved oxygen Nutrients Fecal coliform bacteria, Shellfish bars	-Wetlands -Falling septic systems	-Septic system rehabilitation/maintenance
Jones River to Elm St. Kingston	7.0-3.4 3.4-2.5	B/SCWF/AD B/SCWF	S	Dissolved oxygen	-Wetlands	-----
Jones River Estuary, Kingston	2.5-0.0	SA	PS	Fecal coliform bacteria Shellfish bars	-Untreated domestic wastewater discharges	-Eliminate/treat sources.
Duxbury Bay, Kingston	13.46 mi/2	SA	PS	Fecal coliform bacteria Shellfish Bars	-Untreated nonpoint runoff	-Identify sources, recommend appropriate abatement needs.

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Plymouth Harbor Plymouth	2.61 m(2)	SA	PS	Fecal coliform bacteria Shellfish bans	-Plymouth WWTP -Combined sewer overflows -Boating discharges -Storm drains	-Treatment/ elimination of known discharges to harbor, including those from boats
Plymouth Bay Plymouth	---	SA	S	---	---	---
Bound Brook, Source to outlet, Hunter Pond, North Scituate	4.6-0.0	B/CWFI/AD	S	---	---	---
Gulf River, Outlet Hunter Pond to Cohasset Harbor	2.4-0.0	SA	S	---	---	---
North River Curtis Crossing Dam to Third Herring Brook Hanover	11.6-9.6	SB/AD	PS	Deoxygenated Fecal coliform bacteria	-Wetlands -Storm drains -Subsurface disposal	Study underway to address sources and recommend plan to eliminate/treat these sources

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.						
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Third Herring Brook Hanover to Dwellways Creek, Norwell	9.8-6.5	SA/AD	NS	Fecal coliform bacteria	-Septic disposal -Practices -Illegal dumping of seepage	-Develop seepage management plan.
Dwellways Creek to Rte. 3A, Scituate	6.5-2.0	SA/AD	NS	Fecal coliform bacteria	-Storm drains -Subsurface disposal	-Study will address problems
Route 3A to Mouth	2.0-0.0	SA/AD	PS	Fecal coliform bacteria, Shellfish bars	-First Herring Brook sources	---
First Herring Brook Outlet, Old Oaken to Simms Marina	4.0-2.2	SA/AD	NS	Fecal coliform bacteria	-Septic system leaching -Storm drains	-Cooperation with town of Scituate.
Simms Marina to Scituate WWTP Channel	2.2-0.5	SA/AD	PS	Fecal coliform bacteria	-Watercraft -Septic systems	-Pump out facility. -Eliminate sources.
Scituate WWTP to North River	0.5-0.0	SA/AD	PS	Fecal coliform bacteria Nutrients	-WWTP	---
<b>CAPE COD COASTAL DRAINAGE AREA</b>						
Barnstable Harbor Barnstable	2.56 mi <sup>2</sup>	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP

**WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.**

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Bumps River Barnstable	---	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	-BMP
Centerville Harbor Barnstable	1.44 mi(2)	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Maraphin Creek Barnstable	---	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	-BMP
Prince Cove Barnstable	---	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	BMP
Shoestring Bay Barnstable	---	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	-BMP
Red Brook Harbor Brewster	2.18 mi(2)	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	-BMP
Quivett Creek Brewster	---	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Stoney Brook Brewster	---	SA/AD	PS	Fecal coliform bacteria Shellfish bars	-Surface runoff	-BMP
Seeult Creek Dennis	---	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Swan Pond River Dennis	---	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP

WATER QUALITY PROBLEMS IDENTIFIED IN NEAR COASTAL AND RIVER WATERS BY MASSACHUSETTS DWPC.							ABATEMENT NEEDS TO MEET CLASSIFICATION
SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS		
Boat Meadow River Eastham	-----	SA/AD	PS	Fecal coliform bacteria	-Surface runoff		-BMP
Rock Harbor Creek Eastham	-----	SA/AD	PS	Fecal coliform bacteria	-Surface runoff		-BMP
Provincetown Harbor Provincetown	3.82 m(2)	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Septic systems -Marinas		-BMP
Old Harbor Mill Creek, Sandwich	-----	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Surface runoff -Boats		-BMP
Soortan Creek Sandwich	-----	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Surface runoff -Septic systems		-BMP
Pamnet River, Truro	-----	SA/AD	PS	Fecal coliform bacteria	-Surface runoff		-BMP
Duck Creek Wellfleet	-----	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Surface runoff		-BMP
Herring River Wellfleet	-----	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Surface runoff		-BMP
Wellfleet Harbor Wellfleet	7.27 m(2)	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas		-BMP
Mill Creek Yarmouth	-----	SA/AD	PS	Fecal coliform bacteria, Shellfish bane	-Surface runoff		-BMP