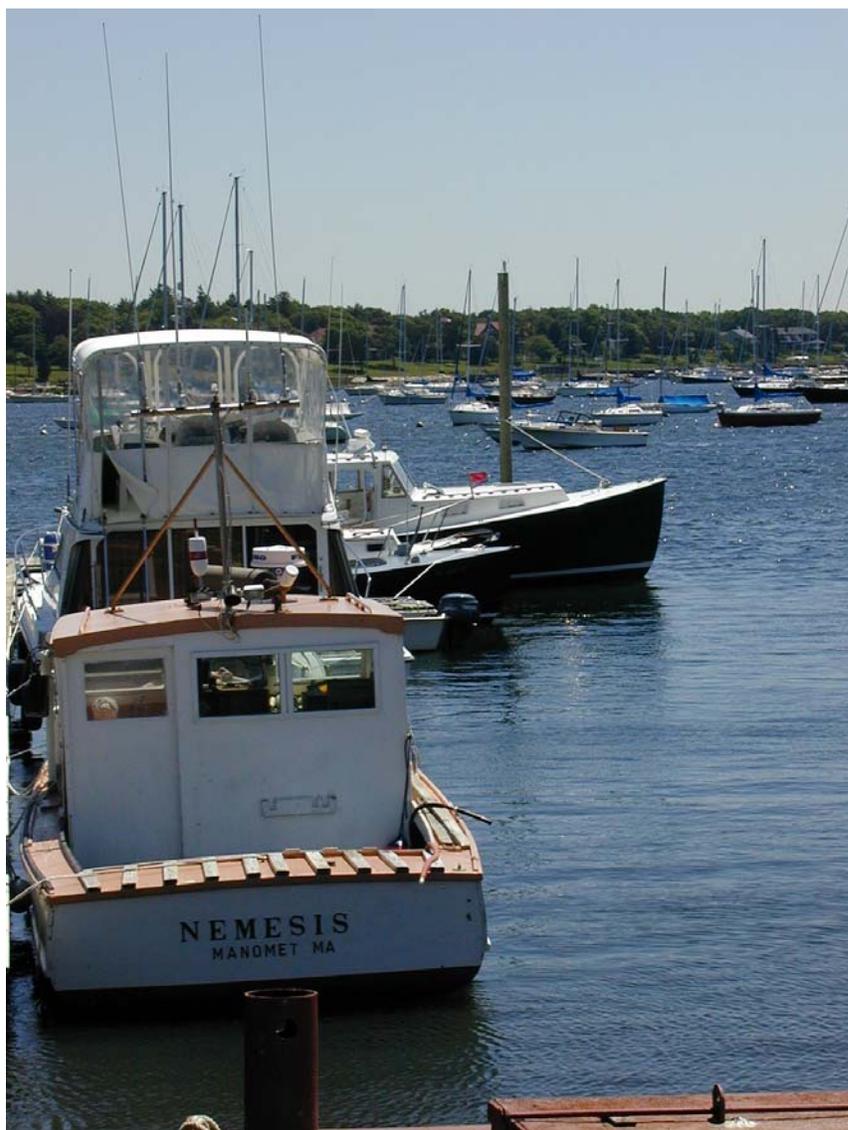


Buzzards Bay Disposal Site Report

COMPETING SITE USE ASSESSMENT

Report submitted to the
Massachusetts Executive Office of Environmental Affairs
Coastal Zone Management



Prepared for
Maguire Group, Inc
By

CoastalVision

215 Eustis Avenue
Newport, RI 02840

Lisa L. Colburn, Drew A. Carey, and Nancy Haley

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EXECUTIVE SUMMARY

This study characterized the uses of Buzzards Bay that might conflict with usage of one of two proposed dredged material disposal sites located to the east and south of the Buzzards Bay Disposal Site (a site used by the Corps of Engineers and the State of Massachusetts for previous disposal activities). Specifically the goal was to characterize commercial and recreational fishing activities in Buzzards Bay especially in relation to the proposed sites.

Based on interviews with key informants representing commercial and recreational fishing activities, patterns of use of Buzzards Bay are consistent across usage type. The central waters of the Bay support fish migration and are used extensively for a pot fishery based on the whelk or conch. As the waters shallow at the head of the Bay, the combination of increased currents, presence of structure and funneling of migratory species creates a prime recreational and commercial fishing area. The man-made connection between Buzzards Bay and Cape Cod Bay supports a diverse and enthusiastic fishing community that targets the focused movement of fish through the Cape Cod Canal. Another strongly focused fishery targets the water movements and structure present around the Elizabeth Islands on the southern margin of Buzzards Bay. This fishery specializes in striped bass and bluefish with a commercial focus on lobster. The western and eastern margins of the Bay are the haven of scup anglers and a growing group of light tackle specialists targeting exotic species that enter the Bay in late summer. The shallow waters around Cleveland Ledge still support fluctuating stocks of scallops and the surrounding embayments are the most important quahog areas of the Bay.

It is difficult to distinguish between the proposed sites based on usage for fishing activities although it is clear that the shallower, structure-filled areas of the old Cleveland Ledge Disposal Site are prized by scup fishermen, lobstermen and to some extent scallopers. The deeper, muddy areas of this region appear to be less valuable as fisheries habitat. Both proposed sites contain deeper, muddy bottom and are fringed by shallower coarser habitats. It appears that a site located as far south from Cleveland Ledge and west from the Falmouth shoreline as practicable would be desirable from a broad fish and shellfish habitat usage perspective. This suggests that while the

characteristics of Site 1 are not much different from Site 2, the location of Site 1 might be more desirable.

Although many informants expressed some concern about the re-establishment of a dredged material disposal site (principally the charter boat operators), there was little direct evidence that historic disposal activities has negatively affected the fishing activities or fisheries. Concerns about sediment-borne contamination and potential effects of suspended sediment on shellfish were raised by several informants, principally those with interests in nearby resources. The management and monitoring of any proposed disposal site should pay careful attention to these highly vulnerable resources.

1.0 INTRODUCTION

1.1 Dredged material management

The Massachusetts Office of Coastal Zone Management (CZM) is developing an Environmental Impact Report (EIR) to designate a dredged material disposal site in Buzzards Bay. CZM is collecting data to determine the baseline physical and biological characteristics of any proposed disposal site(s), including bathymetry, sediment grain size and chemistry, benthic community structure, bottom currents, fisheries, and water column chemistry. An initial goal was to determine the best potential sites for locating a disposal site in Buzzards Bay based on physical features.

High-resolution bathymetry and side-scan sonar was collected across a relatively large area encompassing the southern half of the historic Cleveland Ledge Disposal Site [Under contract to CZM, SAIC conducted a survey for Maguire Group Inc., in May 1998 (SAIC, 1998)]. The objective of this reconnaissance survey was to gather data on the physical characteristics of the seafloor to facilitate optimal siting of the proposed BBDS.

In general, the May 1998 study identified areas with water depths greater than 12 m as preferred disposal locations, because such areas have the potential to limit sediment resuspension and maximize long-term capacity while accommodating access by deep draft hopper dredges. The May 1998 bathymetric data revealed two locations in the surveyed area having water depths greater than 12 m: a basin located near the eastern boundary of the historic Cleveland Ledge Disposal Site ("eastern basin") and an area near the southern boundary ("southern basin"; Figure 1-1). SAIC conducted a second bathymetric survey in October 2000 to characterize in detail the bottom topography near the southern basin (SAIC 2001). The two candidate disposal sites selected for further study are located over the southern and eastern basins and designated as Sites 1 and 2, respectively (Figures 1-1 and 1-2).

The deeper parts of the southern basin occur just outside the southern boundary of the Cleveland Ledge Disposal Site (Figures 1-1 and 1-2). Since deeper areas within Buzzards Bay have the greatest potential to act as containment sites for deposited dredged material, a decision was made to establish candidate Site 1 (a square area measuring 1600 m × 1600 m) over this deeper part of the southern basin. Site 2 is a

rectangular area with dimensions 1000 m × 1700 m (Figure 1-2). It is under consideration as a potential disposal site because it has been affected by past dredged material disposal at the historic Cleveland Ledge Disposal Site and appears to have sufficient water depth and capacity.

Following definition of proposed sites, a series of site characterization studies were initiated. This report provides an analysis of uses of the potential sites that might compete with a use as dredged material disposal sites. The report is based on interviews with key informants and some analysis of commercial landings statistics for fisheries that occur in Buzzards Bay.

Disposal of dredged material in Buzzards Bay has occurred over many years with peak activities during the construction and maintenance of the Cape Cod Canal. From 1979 to 1984, dredged material from small harbors and marinas was placed at the Buzzards Bay Disposal Site (BBDS) with average disposal volumes of 22,500 cubic yards per year. In 1985, 73,800 cubic yards from the Mass Maritime Academy were disposed at BBDS (SAIC 1989). In 1986 2,200 cubic yards was disposed and finally, 800 cubic yards was disposed in 1989, the last year of disposal at the site (Dr. Thomas Fredette, personal communication).

The environmental effects of disposal activities have been studied extensively in New England estuaries (see SAIC 1995 for review). Providing that the material disposed at an open water site has passed testing requirements for unconfined disposal, effects can be predicted with considerable accuracy. Material considered suitable for unconfined aquatic disposal must pass tests based on biological standards (toxicity tests of direct exposure to sediments relative to reference sediments). The presumption of the tests is that the disposed sediments have equivalent effects on benthic resources as reference sediments collected from near the disposal site. Immediately after disposal, benthic resources buried by more than 10-15 cm of material are killed and the fresh dredged material is available for recolonization by larvae and mobile organisms. This initial response is frequently a strong attractant for demersal fish who feed on the recolonizing benthos and utilize the uneven bottom for refuge. Over time (1-3 years), the surface of the dredged material approaches the ambient conditions due to reworking by larger benthic organisms and may reach equilibrium with the surrounding sediments. If the dredged material is finer or coarser than the surrounding sediments, the habitat may be

altered for much longer periods, at least until sediment deposition (fines) or migration (coarse) modifies the surface material to equilibrate with the surrounding sediments. If deposition rates or coarse sediment supply is low, equilibration could take many years.

From a fisheries activities perspective, dredged material disposal has several potential impacts: habitat modification, local increase in food supply, bioaccumulation of contaminants contained in harbor sediments that have been placed at a site, displacement of fixed gear, barge interference with fishing vessels, suspended sediment drift to shellfish beds (Michael Ludwig, personal communication). While effective management of disposal activities at other New England disposal sites has proven effective in minimizing these negative impacts, it is important to characterize baseline conditions at proposed sites in relation to usage by fishermen. To complete the site assessment, the nature, timing and intensity of fishing use in Buzzards Bay will be characterized in relation to the activities at the potential disposal sites.

MCZM is required to collect data to determine the baseline physical and biological characteristics of any proposed disposal site(s), including bathymetry, sediment grain size and chemistry, benthic community structure, bottom currents, fisheries, and water column chemistry. Additionally, competing site uses and economic considerations must be evaluated prior to any site selection. An initial goal of these studies was to determine the best potential sites for locating a disposal site in Buzzards Bay.

1.2 Study Objectives

The primary objective of the study reported here was to characterize the uses of Buzzards Bay that might conflict with usage of one of these sites as a dredged material disposal site. Specifically the goal was to characterize commercial and recreational fishing activities in Buzzards Bay especially in relation to the potential sites.

2.0 METHODS

The target population for this study included anyone who uses Buzzard's Bay for either commercial or recreational fishing purposes as well as individuals knowledgeable about how the bay is used. Particular emphasis was placed on interviewing people well informed about uses of the bay in and around the existing Buzzard's Bay disposal site (Figure 1-1).

In order to efficiently reach a reasonable cross-section of the target population, we utilized a qualitative approach drawn from social science research methods. These qualitative interviewing techniques emphasize the importance of identifying key informants i.e., those people willing and able to better articulate and discuss the answers being sought (Spradley 1979).

In order to identify and track key informants, purposive network sampling, otherwise known as snowball sampling (Bernard 1994), was used to identify interviewees. Vincent Malkoski of DMF provided a preliminary list of potential contacts. Based on an informal discussion, key people from this initial list were contacted. This list was then appended and edited as new people were identified during the interview process. Each person interviewed was asked to identify additional people they considered knowledgeable about the issues being considered. Individuals recommended more than once were given higher priority for inclusion in this evaluation.

A questionnaire was developed through an iterative process that began by posing general yet guided questions as to how the Bay is used in and around the disposal site. As much as was possible, participants were asked to identify specific locations within the site and Bay where specific activities took place. These locations were then plotted on a map. With each of the initial interviewees, the questionnaire was revised to reflect greater accuracy (Appendix I).

Initial interviewing, which primarily took place by phone, was not as productive as we had hoped. Even with the familiarity of the Bay that most interviewees had, they struggled to identify specific locations without a nautical map readily available. Further, the specificity of the location of the disposal site was somewhat ambiguous in that it did not always equate to the same location in people's minds. Therefore, all further

interviews were carried out in person with a variety of maps that aided in achieving greater precision.

The list provided by DMF encompassed several categories of people including: commercial and recreational fishermen, harbor masters and shellfish officers, and bait and tackle stores. Those interviewed were selected to broadly represent the experience and opinions of people from each of these categories. An effort was also made to talk with people who fell into the above categories by township, particularly those townships closest to the disposal site. The questionnaire was developed to capture a variety of perspectives that people from these categories could provide. Because of this, some questions were designed to be answered by only people from a particular category. In several cases, a single person may be involved in activities that span several categories. Table 2-1 shows the categories of primary occupational pursuit and the number of people interviewed for each category (see Appendix II for list of respondents).

An effort was made to interview people from different townships in the Bay with increased emphasis given to people from townships closest to the existing disposal site (Table 2-2).

2.1 DATA ANALYSIS

Survey results were compiled in two distinct, but interrelated methods. In the first method, interviews were recorded on questionnaires by survey staff and transcribed to electronic documents. Results from each interview were summarized in an electronic spreadsheet (one cell per interview and question response) for synthesis. Summary data on fisheries and seasonal use (see Appendix I) were tabulated for presentation and review. In some cases, follow-up phone calls were made to clarify points made during interviews.

In the second method, the description of usage and locations were recorded on maps included in the questionnaire. Informants were asked to look at nautical charts and spatially locate their usage or usage they had observed. These maps were then synthesized to create distribution maps of usage types and cross-referenced with the interview transcripts.

Tables and maps synthesizing usage provided the basis for general descriptions of fishing activities. Some of the key informants reviewed these maps and tables for

accuracy and the completion of data synthesis. However, it should be noted that the boundaries of areas of usage are generalized and are not intended to be definitive. Usage patterns may change from year to year and merely reflect the best judgment of the informants and analysts. In all cases, the areas of usage reflect patterns **described** by informants of a given category. For instance, the location of activities of the mosquito fleet was described in detail by several charter boat captains and is included in the map of activities described by charter boats. We were not able to interview any mosquito fleet captains and their usage is not included in the map of commercial fishing descriptions. Similarly, the location of conch pots was described by many recreational users and by commercial fishermen so this usage pattern is included on both maps. This data presentation represents the perceptions of each user group rather than a discrete, objective measurement of usage based on observation.

The list of fish and invertebrates described by informants with their common names and scientific names is included in Appendix III.

3.0 RESULTS AND DISCUSSION

3.1 Summary

The people interviewed for this study represent two types of informant sources. Commercial and recreational users described their specific activities. Bait and tackle shops, harbor masters and shellfish officers, and a journalist provided a more general commentary on how the Bay is used. It should be noted, however, that these categories of informants are not necessarily exclusive. For example, at least one commercial fisher described recreational activities.

The difference in scale of usage between commercial and recreational fishermen is an important component of the results. While individual commercial fishermen more intensively exploit larger areas than recreational fishermen do, there are a significantly greater number of recreational users.

After synthesis of all the descriptive uses of the Bay from informants, a generalized map of usage was compiled (Figure 3-1). There was remarkable conformance between locations described by direct users and by indirect informants (e.g. recreational users describing where they think commercial users operate and vice versa). This generalized usage map is presented here as a guide for orientation to fishing practices and patterns (Figure 3-1). The more detailed results are presented in each section.

3.1.1 Recreational Users

Recreational fishermen included anyone using the waters of Buzzard's Bay for sport or non-commercial fishing. Recreational fishermen are motivated by the pleasure derived from the sport of fishing. For some fishing represents a means to augment household food supply. Recreational users focus their efforts in the warmer months of the year with a much smaller number of stalwart fishermen making year-round trips. These users included: shore-based recreational anglers and shellfish gatherers; vessel-based anglers, lobster and fish potters, shellfish gatherers, and participants in charter vessel excursions.

3.1.2 Commercial Users

Commercial fishermen included those people using the waters of Buzzard's Bay for commercial fishing purposes. Commercial fishermen are motivated to fish as a means to earn a living. Fishing for many commercial fishermen is the primary means of achieving a household income and because of this they maintain an interest in maximizing their harvesting throughout the year when possible. These users typically included vessel based: fish and lobster potters, and shellfish gatherers. There were a small number of commercial fishermen using angling and scuba equipment to obtain certain species.

3.1.3 Seasonality and Location of Use of Buzzards Bay

In general, the margins of the Bay, particularly those with the greatest complexity of habitat structure and water movement are the most highly used areas for both commercial and recreational fishing (Figure 3-1). The central region, which contains the deepest water and most homogeneous habitat structure, had the lowest usage for fish harvesting or recreational use. Most informants described this area as a region with "conch pots". Two distinct areas in the southern portion of the Bay were described as unproductive due to the presence of a deep muddy hole. The western and eastern margins attracted lobstering and scup fishing, which for specific interests was a high usage but overall these areas did not support the diversity of use of the northern area of the Bay. The area around the Elizabeth Islands is consistently considered to contain prime sportfishing (striped bass and bluefish) and lobstering grounds.

The seasonal nature of use was evaluated for both recreational and commercial users of the Bay in order to identify potential conflicts in usage related to disposal activities. The nature of seasonality is defined in this study as including two components. First, the season during which users can legally (i.e., outlined by either federal, state, or municipal law) harvest specific species of fish was evaluated. The legal season often varies for recreational and commercial fishermen; and within each of these categories can further vary by gear type. Additional restrictions within a season may limit the number of days per week certain species may be pursued. Secondly, although legal harvesting season delimits the maximum allowable time species may be pursued there is great variation between recreational and commercial fishermen as to the extent that they fish the

maximum possible legal season. Given the discretionary nature of recreational fishing, activity is primarily focused during the warmer months. This contrasts with commercial harvesting activities that are more likely to be pursued year round. Nevertheless, the seasonal abundance of all finfish species and conch evaluated, resulting in the most intensive harvesting activities, falls during the summer months. This contrasts with the harvest of lobster which historically was a year round pursuit only curtailed by the icing over of harvest grounds during the coldest months. Although some shellfish types can be legally pursued year round, it appears to be primarily a fall, winter and spring pursuit.

3.2 RECREATIONALLY TARGETED FISHERIES

3.2.1 Demographics of recreational fishermen

Recreational fishermen are a diverse group of people coming from townships surrounding the Bay, as well as southeast New England, Boston, New York, New Jersey and further afield. Buzzards Bay supports a highly developed recreational fishery through numerous marinas, launch sites, bait and tackle shops and charter boat operations.



Recreational Marina at West Island

3.2.2 Location of Recreational Fishing in Bay

Recreational fishing is primarily focused in the shallow waters of Buzzard's Bay (twenty meters depth or less). The fishing activity is highest at the entrance to the Cape Cod Canal and seasonally in the shallow waters around the entrance to the Canal down to Cleveland Ledge (Figures 3-2, 3-3). Another high concentration of fishing activity is around the Elizabeth Islands at the southeastern margin of Buzzard's Bay. Specialized fisheries (scup, exotic species) are concentrated along the eastern margin of Buzzard's Bay from West Falmouth up to the Canal.

Recreational anglers described distinct patterns of usage based on season, interest and access. In general, anglers focus on access to "structure", submerged rocks, shoals and holes that is believed to appeal to some types of fish. For this reason, the center of the Bay, which is a relatively flat, featureless area, is of low interest to anglers. They described the center of the Bay as an area dominated by conch pots (Figure 3-2). The areas around the Elizabeth Islands, specifically Quicks Hole, Robinsons Hole, Woods

Hole, Cuttyhunk, Weepecket Islands and Sow and Pigs Reef, were frequently mentioned as the primary areas for striped bass and bluefish angling. The margins of the Bay, from Westport to Marion and West Falmouth to Bourne were generally of interest to scup and tautog anglers. Usage intensified and was described in more complex, specific terms, at the head of the Bay and the entrance to the channel. In these areas, individual anglers had strong preferences for certain locations, such as the flats near Cleveland Ledge and adjacent to the entrance to the Canal for fluke and flounder. Most anglers agreed that the presence of a variety of habitats and the strong currents flowing into and out of the Canal created ideal conditions for angling for the following species: scup, striped bass, bluefish, tautog, weakfish, black sea bass and fluke. The southern margin of this intensively used area was consistently described as Cleveland Ledge. Although anglers clearly fish the area surrounding the potential disposal sites, it was not described as a preferred area.

Another group of informants, charter boat captains, described similar usage patterns for recreational fishing but indicated that their preferred usage was around the potential disposal sites (Figure 3-3). Most of the charter activities focus on scup and tautog angling and the structure at the northern margin of the CLDS is apparently a strong attraction for these species. The captains indicated a more limited area for commercial conch potting and a more generalized area of sea bass potting but concurred that the center of the Bay was usually less productive for them than the margins. They described the location of the commercial “mosquito fleet” (see below) in detail and emphasized that this short-term activity overlapped with their primary area of interest. Two areas were noted as particularly unproductive: an area south of Great Ledge in the western Bay and a “mud hole” area off Gunning Point in Falmouth.

Proprietors of bait and tackle shops provided some of the greatest detail in describing recreational fishing activities (Figure 3-4). In general, they considered it part of their job to provide information about reliable fishing areas. The patterns they described did not diverge much from the combination of anglers and charter boat captains. None of the recreational anglers we interviewed specialized in scup, so the description of scup angling along the eastern margin of the Bay was much more specific. One proprietor noted the productivity of tautog fishing in Woods Hole, Cuttyhunk and south of West Island (Figure 3-4). Several proprietors took pains to describe the seasonal migration of fish through the holes of the Elizabeth Islands into the Bay in spring and migration back

out in fall. Bait and tackle proprietors and charter boat captains indicated that scup spawn south of Marion and juveniles recruit to the area south of Mattapoisett. Both of these areas abut Falmouth town waters and are north of the potential disposal sites (Figure 3-4).

3.2.3 Recreational Boat Fishing

By far the largest recreational fishing group is based on pleasure boats moored and trailered from the various launch sites, harbors, and marinas around the Bay. One informant conservatively estimated that at least 100,00 people fished in Buzzard's Bay each year. Respondents have estimated the number of motor vessels in the Bay in excess of 25,000 with an additional 10-15,000 trailered in annually. A substantial proportion of these pleasure vessels are used for recreational fishing, for at least part of the boating season. With 2-3 anglers per boat the number of active recreational boaters who are fishing in the Bay may be as much as 50-75,000. While these estimates are only based on interviews with experienced respondents, the numbers clearly dwarf any other usage type.



Sportfishing boats in Falmouth Harbor

Estimates of the number of people who use the bay for recreational fishing are difficult to pinpoint, as licensing is not required for saltwater recreational fishing in Massachusetts. The exception to this is for recreational shellfishing licensing that includes a state permit and a local permit that is managed by and restricted to, town level administration.

3.2.4 Six Pack Charters

From the recreational fishing perspective, “six pack charters or six packers” refer to the smallest scale charter operations in the Bay involving boats eighteen to twenty-four feet in length with “six” referring to the maximum number of passengers. It is primarily a catch and release fishery focused on sport rather than subsistence fishing. There are approximately twelve six pack charter operators working in the Bay doing an average of 50 trips per season with two to four anglers per trip.

Striped bass and bluefish are the key species targeted by six packers. It is estimated that there are about twelve six-pack charter operators who fish the Islands and beyond intensively, and to a lesser extent the Bay. These charters primarily focus on pursuing species found in the holes and structures that border the Elizabeth Islands, but may follow stripers (a.k.a. striped bass) and bluefish into the Bay. Six pack charters generally trailer and use launch sites convenient to their destination.

A more specialized charter operation targets additional species, often referred to as “summer exotic species” including bonito, false albacore, and Spanish mackerel. This group of fishermen is referred to as light tackle sport fishing specialists. The fishermen use fly rods or light tackle. On these charters, there are usually only one or two passengers and the charter operator (to permit room for fly casting). For these fishermen, the quality of the sport of fishing (in terms of the size of the catch and the fight involved in landing these species) is the most important characteristic of a successful trip. The target area for light tackle specialists is from W. Falmouth north to the Cape Cod Canal. Boats are frequently trailered and because of this, the launch location is determined by the accessibility of launch sites in this area (W. Falmouth, N. Falmouth, Cataumet, Pocasset). This specialized fishery has a narrow window of activity when exotics appear in the Bay, usually mid August to September. From May to June, they may also target striped bass in the West Falmouth area.

3.2.5 Head Boats

Head Boats (a.k.a. Party Boats) are larger-scale charter operators. Both boat size and client capacity is significantly greater than for six packers. Average boat size is sixty feet and ranges from thirty-one feet to one hundred feet. The client capacity ranges from twenty-five to one hundred people per trip depending on boat size. The charter season lasts about six months with the height of activity falling during the warmer summer months. Boats make from three to seven trips per week depending on demand.



Large "head boat" charter vessel operating in Buzzards Bay

Three operators take their clientele primarily to locations within Buzzard's Bay. One is based in Fairhaven and two others are based in Onset. There are two other head boat charter operators, forty feet in length, working out of the Falmouth area who occasionally fish within the Bay. Head boat charters tend to primarily target scup followed by black sea bass, tautog, and fluke. Although head boats cater to recreational fishermen (often brought by charter bus up from New York and New Jersey) the focus of their operation is

similar to commercial fishermen with an emphasis on profit rather than the sheer sport of fishing more frequently found amongst six packers and private boat fishermen. Head boat operators are likely to pursue licensed commercial fishing activities within, but not excluded to, the Bay outside of the charter season. The charter season is focused between May and September with lighter activity from March to May and October to December depending on target species. Recreational scup quotas are fifty fish per person per day. The sport for these day-trippers may be in the quantity caught. They may view their catch as an important source of food for their households.



Medium size "head boat" charter vessel operating in Buzzards Bay

3.2.6 Shore fishing:

Shore fishing is largely limited to public access right of ways. Shore fishermen may view their catch as either or both sport and a source of food for their households. Shore anglers were not interviewed for this study, in part because they are not fishing near the BBDS. Nevertheless, based on indirect informants (bait and tackle shops), the species

targeted by shore anglers is similar to recreational boat fishermen: 1) striped bass, 2) bluefish, 3) scup, 4) tautog, and 5) fluke.



Shore fishing near West Island

3.2.7 Recreational Lobstering

Recreational lobstering is a popular past time in Buzzards Bay but most informants had a difficult time gauging the level of activity. A non-commercial license costs \$40 per year and allows the holder to harvest lobster anywhere in state waters using SCUBA gear, a maximum of 10 traps, or a combination of both. The catch may not be sold. Recreational lobstermen are asked to report on their license renewal application form the number of lobsters taken during the previous year, hours dived and number of traps fished (McBride and Hoopes 2000). A breakdown of catch or licenses by town was not available for this study but statewide statistics are informative. In 1999, 11,633 licenses were issued. Of these, 8,948 (77%) reported that they fished for lobster catching a total of 263,996 lobsters (about 2% of the commercial catch). Buzzards Bay commercial fishermen account for somewhat less than 3% of the total commercial catch, but

recreational lobstering in Buzzards Bay may represent a larger (or smaller) percentage of statewide effort. According to informants, most recreational effort was very close to shore and concentrated in the summer months. With the ten trap limit, mechanical pot haulers are not required and most traps are hauled by hand on boats that are used for other fishing or recreational uses.

3.2.8 Valuation of Recreational Species:

The value of specific species to recreational boat fishermen in the Bay can vary depending on a number of factors. Value may be applied by individual users to specific species of fish in terms of the following factors: 1) the sport (i.e., effort) involved in landing a particular species, 2) the size or quantity of catch, and/or 3) in terms of the perceived value as a contribution to personal household level food supply (Table 3-1). The ratings in this table are based on discussions with Gene Borque, the editor of, *On the Water: The Angler's Guide to New England*, a Falmouth based sport fishing magazine.

According to Borque, recreational fishermen are concerned about the fish stocks and the impacts (both negative and positive) of regulation of commercial fishing on the stocks. There were several bad harvest years of key sport species followed by several good. The recreational fishermen reported that overall harvest is lower than in past good years but that fish size is way up. They are very concerned about the future of the striped bass fishery. Those that target striped bass, more than any other fishermen, maintain a "striped bass culture" considered by many to be a lifestyle where last season's catch is the focus of winter conversation until the next season begins. There are several web sites (e.g., www.stripersonline.com and www.striped-bass.com) with chat rooms where the issues and concerns of those interested in this species express themselves. Many anglers expressed the opinion that improved catches were due to restrictive quotas on commercial fishing offshore allowing more fish to enter the Bay.

3.2.9 Seasonality of Recreational Species:

Seasonal harvesting for scup, sea bass, striped bass, bluefish, tautog, fluke, and summer exotics (i.e., bonito, false albacore, and Spanish mackerel) were evaluated. Of those species that are regulated, about half of them have a year round open season (Table 3-2). However, even though the legal recreational season allows for year round

harvesting, the actual period during which recreational users pursue these species is generally concentrated in warmer months spanning from April to November with increased intensity between May and October and the highest intensity of activity for most species focused in July. Tautog have two seasons, one on either end of the shoulder months of April/May and again during September/October.

3.3 COMMERCIALY TARGETED FISHERIES

3.3.1 Demographics of Commercial fishermen:

The commercial fishing industry in Buzzard's Bay is characterized by an aging population of fishermen who come from families where fishing has historically been a multi-generational pursuit. For those interviewed the number of years working in the industry ranged from twenty-five to fifty. The recent decline in the lobster fishery due to disease and lowered catch has resulted in many younger fishermen leaving the industry because they could not support their families.

3.3.2 Commercial Fishing (Fish potting, Lobster, Conch, Angling, Shellfish):

While there is ample historical evidence of substantial finfish landings, the primary commercial fisheries in the Bay are now lobster and shellfish (Howe and Goehringer 1996). Commercial finfish trawling has been banned in Buzzards Bay since the late 1800's (Howes and Goehringer 1996). However, this ban does not include fish potting and angling. Trawling and dragging have therefore been excluded from Buzzards Bay for over a century (with the exception of scallop and quahog dredging). The majority of commercial fishermen who homeport in the bay, fish offshore for lobster, scallops and groundfish in the coastal waters of Massachusetts and Georges Bank (New Bedford fleet). Declines in catch and regulatory restrictions have created significant contraction in the offshore fleet, but the tradition of commercial fishing in Buzzards Bay communities is one of the oldest and proudest in the country.

Although high/low cycles in all fisheries were acknowledged, the lobster fishery in the Bay has been in steady decline, apparently due to disease, since approximately 1997/98. Oysters and scallops had historically strong landings in the Bay and have seen some recovery in recent years after almost total collapse in the late 1980's. Scallops are particularly prone to large fluctuations in abundance due to a single spawning season

and a short life cycle (Howes and Goehringer 1996). Quahogs represent the largest shellfish landings in the Bay and have been fairly stable in recent years. Scup is on a cyclic high in the last year or two.

Unlike shellfish licensing and management, which is administered at the municipal level and restricted to town boundaries, the spatial boundaries for people pursuing lobster and finfish are larger. One large exclusion area is Upper New Bedford Harbor where no commercial lobster fishing has been allowed for twenty years due to contamination. Lobster fishermen must report catch from management area(s) within which they harvest and abide by the rules for those area(s). Buzzard's Bay is under the jurisdiction of Management Area 14 for the multi-state management plan (NMFS 2000). Management Area 14 consists of the waters of Buzzards Bay out to the Territorial Line (Figure 3-5). Catch landings for this Management Area represent the best estimate of American lobster harvest from Buzzards Bay.

3.3.3 Location of Commercial Fishing in Buzzard's Bay

Commercial fishing usage patterns are highly individualized and specific. Because the majority of commercial fishing activity in the Bay utilizes fixed gear (lobster or fish pots), usage areas are well defined (Figure 3-6). The location information for commercial fishing focused on activities near the potential disposal sites and does not include detailed information along the shorelines of Dartmouth, New Bedford or Fairhaven.

The central area of the Bay is used extensively for conch potting with some specific areas considered productive for lobster and other deeper muddy areas considered unproductive. One subarea, dubbed "5 acres", is a rocky shoal considered productive for lobster and scup located on the southwest corner of Site 1. Other areas were indicated by specific informants as general areas fished consistently. The northwestern portion of the Bay including the BBDS is fished in summer with pots for scup and black sea bass. One informant gave specific locations for scallop dredging, but most indicated that the location and quality of scallop sets was variable from year to year and this determined their effort and fishing locations. However, the scallop set is generally centered on Cleveland Ledge. Most shallow bays in the northern area are fished commercially for quahogs (see shellfishing section below). Angling for fluke and scup

overlaps with the potting areas and includes the grounds east of the navigational channel near the entrance to the Cape Cod Canal.

3.3.4 Commercial Lobster, Finfish, and Conch Harvest

3.3.4.1 Lobster Potting

While lobstering has deep historical roots in Buzzards Bay and many coastal lobster permits are still held by residents of Buzzards Bay towns, the perception of local fishermen is that active commercial lobstering within the Bay has declined in recent years. Informants reported many fishermen reducing effort or retiring in the last few years due to low catch. Another source of information is commercial licenses and lobster fishery statistics reported by Massachusetts Division of Marine Fisheries (DMF). Commercial lobstermen receive a detailed catch report form with their license renewal application (McBride and Hoopes 2001). The report requests information on method of fishing, effort, pounds caught, areas fished, ports of landing and number and type of gear used. A partial picture of lobstering effort in Buzzards Bay can be drawn from these statistics. Management Area 14 (Buzzards Bay to the Territorial Line) is a statistical area for commercial lobstermen to report landings. However, the results for Area 14 do not necessarily report on effort solely within this Management Area, but they are a reasonable estimate of relative effort (B. Estrella, personal communication).

Results of fisheries statistics from Area 14 do not indicate a steep decline in effort but low catch years of 1992 and 2000 coincide with the lowest number of fishermen pursuing commercial lobstering (94 in 2000 and 88 in 1992). The catch in 2000 (the year prior to the interviews) was unusually low (109,000 lbs, less than half most other years) and may have contributed to additional fishermen leaving the industry in 2001 (statistics not available at this writing).

Area 14 estimates of Catch Per Unit Effort (CPUE) are based on reported pounds per trap-haul per “set-over day” (a set-over day reflects the average time a trap is left in the water). The estimate for Buzzards Bay is generally below average for Massachusetts waters but is often comparable to seven or eight other statistical areas because the State average CPUE is raised by high CPUE in Boston Harbor and Massachusetts Bay (McBride and Hoopes 2001). Factors affecting catch rates are described in more detail in Section 3.3.7.

Apart from the year 2000 data, these statistics do not reflect the perception of lobster fishermen that catch has declined steeply in Buzzards Bay in the last ten years. Most informants indicated that a small number of older fishermen continued to work the waters around the potential disposal sites but many had stopped fishing in the last two-three years. The distribution pattern of catch and number of fishermen reporting catch in Area 14 by Buzzards Bay towns has stayed relatively constant over the last ten years with the majority registered in Fairhaven, New Bedford and Westport (Figure 3-7). Catch appears to track with the number of fishermen but may be due to a number of factors (type of vessel, areas fished, seasons fished).



Lobster boat in Buzzards Bay

3.3.4.2 Fish Potting (including Conch)

Fish pot fisheries utilize fish pots or traps to target the capture of sea bass, whelk and scup. Each of these species requires a separate permit, and many fish potters pursue all three species. In Massachusetts, the majority of fish potting occurs south of the Cape, including Buzzards Bay. Whelks are invertebrate snails also known as conchs that are used in a number of regional cuisines including Italian (scungilli) and Portuguese. The vast majority of whelks captured with pots are the channeled whelk as knobbed whelk do not pot well (M. Camisa personal communication). Their landings dominate the fish potting activities in Buzzards Bay, Vineyard Sound and Rhode Island Sound. In 1999, Management Area 14 (Buzzards Bay out to Territorial Line) 900,000 lbs of conch were landed as well as 600,000 lbs of sea bass. Many of the fish potters combine their efforts with lobstering, alternating seasons or areas between fish potting and lobstering. In general, the size of boats used in fish potting is very similar, and overlaps with, vessels used for lobstering.



Conch collected from fish pots in Buzzards Bay

3.3.5 Commercial Anglers

There is a diverse group of fishermen with commercial angling licenses. Boat size ranges from sixteen to fifty feet. Hook and line set-ups are targeted at the striped bass fishery. The actual numbers are difficult to pin point however it was estimated to encompass about 10 boats that seriously pursue the species with fewer than one-hundred who fish less intensively. This group was described as a diverse group of people pulling commercial licenses with only a small fraction relying on them intensively. This is a quota-based fishery with the season beginning the first Monday after Fourth of July weekend. It runs in four week cycles with three consecutive weeks open for fishing followed by a one week closure, repeating the cycle until the quota for the whole state is filled (802,000 pounds for 2000 and 2001). This fishery targets the Elizabeth Islands, especially Cuttyhunk and the area around the Weepecket Islands.

3.3.6 Mosquito Fleet:

The so-called “mosquito fleet” originates from Fairhaven and New Bedford Harbors. It is a hook and line fishery targeted on scup and black sea bass. For a period of two to three weeks starting in early to mid-May, twelve to thirty boats can be found in and around the disposal site (information provided by charter boat captains, see Figure 3-3). By Buzzard’s Bay standards, these are mid-size boats between 18 and 24 feet in length with approximately four people per boat. Historically, they pursued all species of fish but have focused on scup more recently. The mosquito fleet pursues these species as a source of food to be sold in smaller informal markets in the Fairhaven and New Bedford area, but the majority of the catch is shipped to the New York market.

3.3.7 Seasonality of Commercial Lobster, Fin Fish, and Conch Harvest:

The commercial species evaluated for this study include lobster, sea bass, scup, conch, striped bass, fluke, and tautog. Finfish are pursued between April and mid November with the highest abundance and harvesting activities during the warmer summer months (Table 3-3). Conch are harvestable between mid April and mid December with the highest intensity of activity between August and November. This contrasts with the harvest of lobster, which is pursued during all but the coldest months (Table 3-3). Although informants gave specific information about their own efforts, landings statistics suggest that the peak inshore lobster harvest in Massachusetts occurs between July and

November (McBride and Hoopes 2001). Some commercial lobster fishermen that have multi-species permits (fish potting) may pursue a shorter lobster season. Several informants referred to peak efforts in Buzzards Bay in late spring and fall in relation to “runs” or post-molt recruitment.

Catch rates of lobster from traps are the result of a wide number of variables: local abundance, effort, size at maturity, water temperature, bait type, soak time of gear, and the number of fishermen working an area. The local abundance of lobsters is also dependent on several variables of significance in Buzzards Bay: recruitment of young lobsters from larvae that settle in the area, migration of young and adults into an area (B. Estrella, personal communication). Buzzards Bay is not generally as productive a fishery as many other coastal areas of Massachusetts (e.g. Boston Harbor and Massachusetts Bay) but it may have significance as a source of larvae due to relatively early hatching in the warmer waters (Collings et al. 1983). The warmer water means that females mature at a smaller size and many of them can generate eggs at a sub-legal size (i.e. before they can be legally harvested). These “egggers” can enhance recruitment to legal size in Buzzards Bay and may supply larvae to other areas through the Cape Cod Canal. However, according to Bruce Estrella of DMF, the strong recruitment into legal size (when newly molted lobsters are just reaching harvestable size) also coincides with intense fishing effort in the warmer months and in the fall after each molt cycle in Buzzards Bay. His observations suggest that catch rates drop off when the production from each molt is exhausted, resulting in a “recruitment-dependent” fishery. Other inshore areas may see greater migration of adolescents and adults into suitable habitat or be better able to retain adults in colder months due to an abundance of high quality habitat.

3.3.8 Shellfish Harvest

3.3.8.1 Location of Shellfish Fisheries near the Buzzard’s Bay Disposal Site

The majority of shellfishing activity is located in shallow protected waters in Buzzards Bay. There are no extensive areas in the *open* Bay where bullraking or tonging for quahogs is pursued commercially (unlike Narragansett Bay). An exception to this is the scallop harvesting activities. Scallop sets are most common in the deeper waters around Cleveland Ledge with large fluctuations in the location and intensity of sets from

year to year. Scallop recruitment is known to be improved by the presence of eelgrass beds that have fluctuated in location and density in Buzzards Bay (Costa 1988). Mattapoisett, Marion, Bourne and Falmouth share the scallop beds but license activities within their own waters (Figure 3-8).

Inshore shellfishing consists of commercial and recreational gathering of oysters, quahogs, mussels and soft-shelled clams from the harbors and tidal and subtidal flats around the Bay. Because the potential disposal sites are located in Falmouth town waters, we focused our mapping activity in this area (Figure 3-8). The closure lines are based on expected water quality results from each harbor. In this region of the Bay there is no harvesting outside of the harbors except for scallops.



Shellfishing skiff



Town launch site used for commercial shellfishing in Marion.

3.3.8.2 Seasonality of Commercial Shellfish Harvest

With the exception of quahogs, which are harvested year round, the commercial harvesting of shellfish primarily occurs during fall, winter, and spring months (Table 3-4) with recreational harvesting highest during the warmer summer months. However, some shellfishermen work year round and would work the summer is areas were open to commercial harvests. Certain harbor areas are closed by the U.S. Food and Drug Administration (through DMF) because of the risk of transient releases of sewage by boaters. Although shellfishing is primarily managed at the town level, there are some circumstances where State mandated regulations are followed. State regulations for some shellfish types dictate the maximum allowable harvest season. The scallop fishery, in particular, is presently subject to State mandated harvesting restrictions. The maximum allowable scallop-harvesting season for any township is from October 1st to March 31^s. However, because shellfishing is managed at the town level, town administrators may choose to reduce the season, as needed, depending on the relative

health of specific shellfish types and any public health concerns for each shellfish type or harvesting area. In rare circumstance, towns may petition the State to increase a harvesting season.

The complexity and number of restrictions found in local shellfish regulations varies widely between townships. For example, Mattapoisett produces a one-page set of regulations and Marion produces ten pages. The legal season for harvesting each specific shellfish type should be considered a separate but related issue to area specific closures that occur during as well as outside of harvest seasons. Area closures are generally determined by local marine resource managers (e.g., shellfish officers) often in collaboration with information on water quality, resource health, and species propagation produced at either /or both the local and state level (e.g., Division of Marine Fisheries). It can be expected that runoff and untreated sewage, both of which can result in contaminated water, occur more frequently during the rainiest seasons. Coupled with septic systems (usage increases during summer tourist season) that may leak into town waters, these conditions may result in potentially unhealthy levels of fecal coliform and other pollutants.

Because the potential disposal sites are located in Falmouth town waters, a greater emphasis was placed on understanding the seasonal usage of shellfish resources in this town (Table 3-4). The highest frequency of closures in Falmouth town waters appear to occur during the summer months when population pressure due to tourist season is at its highest thus posing the greatest risk to human health. However, It should be noted that other townships surrounding the potential disposal sites might more commonly impose closures at specific times throughout the year (e.g., Bourne).

With exception to the closures described above, shellfish in Falmouth town waters are harvestable as follows (Table 3-4). Quahogs, soft shell clams, and mussels are, at present, harvestable year round unlike scallop and oyster seasons that are open from October 1st through March 31st.

Other shellfish harvesting seasons for townships surrounding the disposal site include Mattapoisett, Marion, Wareham, and Bourne. These towns are included because their shellfish resources may be affected by sedimentary drift from the potential disposal site. Deep-water shellfish (e.g., scallops and to a lesser extent quahogs) are the most

vulnerable. Scallops sets are common in and around the CLDS. Potential drift is affected by tidal flow and the directionality of wind (Maguire 2001b). Scallop harvesting appears to follow the State mandated season (October 1st through March 31st) for all towns except Mattapoisett where tighter restrictions are placed on the season, which does not open until November 1st. Like Falmouth, quahogs are harvestable year round for all towns. Softshell clam harvesting is more variable for these towns with Mattapoisett and Wareham showing the most restrictive season (September 15th to May 30th) followed by Marion. There appears to be no clam harvesting during the peak summer months for Mattapoisett, Marion, and Wareham. Bourne appears to be the only town with year round clam harvesting. Oyster season, approximately October to April, showed the most variability with the longest season (eight months) found in Marion and Bourne and the shortest in Mattapoisett (six months).

According to a resource biologist, there is a history of the harvesting of scallops, and to a lesser extent quahogs, in the deeper waters in and around Cleveland Ledge (Paul Montague personal communication). In addition to Falmouth, these waters encompass Mattapoisett, Marion, and Bourne town waters. Although the Marion shellfish officer reported the current year as showing a better than normal harvest (generally about 200 bushels per year for the last five years), there has been a steady decline in scallop harvests from ten years when one thousand bushels per year would have been typical.



Recreational shellfishing on West Island.

It is notable that shellfishing activities in Buzzards Bay are most active during the fall, winter and spring periods with low activity levels in summer due to closures (Table 3-4). This reverses the pattern for recreational angling where the greatest activity levels occur during the spring, summer, and fall.

3.3.8.3 Value of shellfishing activity

Falmouth reports that commercial value of commercial and recreational shellfish landings from all town waters exceeded \$ 2,200,000 in 1999 (Table 3-5). Estimates of landings for Buzzards Bay provided by the Shellfish Constable are 100% of oysters, 50% of scallops, 25% of quahogs and 5% of softshell clams. In addition to the revenue from commercial landings, the Town of Falmouth took in over \$ 68,000 in commercial and recreational licenses.

3.4 HARBORMASTERS (Fairhaven, Marion, Wareham, Bourne, Pocasset, and Falmouth)

Harbormasters were asked to provide an estimate of the number of commercial and recreational fishing vessels in each harbor and their impressions of intensity and location of usage (Figure 3-9). Commercial fishing vessels were limited to those that actively work in Buzzards Bay (excluding the large offshore fleet in New Bedford and Fairhaven). Harbormasters reported that commercial fishing vessels on the eastern side of Buzzards Bay were concentrated in Bourne (shellfishing) and Woods Hole (lobstering). A notable limitation for commercial activity along this coast is the absence of fuel depots between Woods Hole and Fiddlers Cove (Cataumet) as well as the dominance of seasonal recreational marinas in the small harbors. The northern part of the Bay favored for launching vessels at public and town launch sites in Wareham, Onset, and Bourne. This provides a large number of recreational vessels that target the entrance to the Cape Cod Canal down to Cleveland Ledge and beyond (faster boats will transit directly to the Elizabeth Islands in search of striped bass and bluefish). Many of the harbors on the western side of the Bay are large commercial centers (New Bedford and Fairhaven) or are oriented toward recreational pleasure boats (fishing, sailing and powerboating).



Quissett Harbor



State Fish Pier in Woods Hole

Harbormasters reported a general decline in shellfish fisheries. The loss of eelgrass habitat has contributed to the decline in the scallop fishery (Costa 1988). The loss of habitat is attributed by some harbormasters to increased boat traffic and “anti-fouling bottom paint”. The Marion Harbormaster reported a decline from 38 shellfishermen seven years ago down to one. Fin fishing was reported as stronger than in past years due to area closures and new quota regulations. The Wareham Harbormaster estimated that the fluke fishery had increased 10 fold in the last four years. In general, most harbors are dominated by pleasure craft (Figure 3-9).

3.5 INDIRECT EFFECTS

3.5.1 Economic Considerations:

Although all forms of fishing provide an important source of economic stimulus for local economies, recreational six packers and many shore fishermen should be noted. For these groups, fishing trips often last from several days to a week or more during which

time they stay in local hotels and use local amenities. Bait and tackle shops, seafood wholesalers, shore restaurants and tourist attractions all depend, in part, on the income generated by daytrippers and longer term visitors. Charter operations in Onset, Fairhaven and Falmouth both depend on the recreational fishery and provide incentive for visitors to stay and spend in the surrounding towns.

4.0 CONCLUSIONS

Based on interviews with key informants representing commercial and recreational fishing activities, patterns of use of Buzzards Bay are consistent across usage type. The central waters of the Bay support fish migration and are used extensively for a pot fishery based on the whelk or conch. As the waters shallow at the head of the Bay, the combination of increased currents, presence of structure and funneling of migratory species creates a prime recreational and commercial fishing area. The man-made connection between Buzzards Bay and Cape Cod Bay supports a diverse and enthusiastic fishing community that targets the focused movement of fish through the Cape Cod Canal. Another strongly focused fishery targets the water movements and structure present around the Elizabeth Islands on the southern margin of Buzzards Bay. This fishery specializes in striped bass and bluefish with a commercial focus on lobster. The western and eastern margins of the Bay are the haven of scup anglers and a growing group of light tackle specialists targeting exotic species that enter the Bay in late summer. The shallow waters around Cleveland Ledge still support fluctuating stocks of scallops and the surrounding embayments are the most important quahog areas of the Bay.

It is difficult to distinguish between the potential sites based on usage for fishing activities although it is clear that the shallower, structure-filled areas of the old Cleveland Ledge Disposal Site are prized by scup fishermen, lobstermen and to some extent scallopers. The deeper, muddy areas of this region appear to be less valuable as fisheries habitat. Both potential sites contain deeper, muddy bottom and are fringed by shallower coarser habitats. It appears that a site located as far south from Cleveland Ledge and west from the Falmouth shoreline as practicable would be desirable from a broad fish and shellfish habitat usage perspective. This suggests that while the characteristics of Site 1 are not much different from Site 2, the location of Site 1 might be more desirable. Because of the proximity of the scallop beds to CLDS and their sensitivity to deposition of sediment, this fishery is likely to be at the greatest potential risk from disposal activities north of BBDS. All shellfish beds are susceptible to disturbance from high-suspended sediment loads or sediment-bound contaminants that may spread through drift in the water column, but protected areas remote from the disposal sites have very low potential for disturbance (Maguire 2001b).

Those users of the Bay whose economic, and to a lesser extent subsistence, livelihood is dependent on the harvesting of marine resources found in the Bay should be considered vulnerable to any negative repercussion of disposal activities within the Bay. The commercial and subsistence fishermen that depend on marine harvests that are restricted to areas within Buzzards Bay should be considered the most economically vulnerable to loss of marine resources due to disposal activities.

Although many informants expressed some concern about the re-establishment of a dredged material disposal site (principally the charter boat operators), there was little direct evidence that historic disposal activities have negatively affected the fishing activities or fisheries. Concerns about sediment-borne contamination and potential effects of suspended sediment on shellfish were raised by several informants, principally those with interests in nearby resources. The management and monitoring of any potential disposal site should pay careful attention to these highly vulnerable resources.

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TABLES

Table 2-1 Categories and Numbers of interviewees

Commercial fishermen	7
Commercial Shellfishermen*	4
Recreational Charter	4
Recreational Fishermen	3
Bait and Tackle	4
Harbormasters	5
Shellfish Officers	3
Fisheries Scientist	2
Journalists	1
Total	33

* All commercial shellfishermen are also commercial fishermen

Table 2-2 Interviewee Townships

Dartmouth	1
New Bedford	2
Fairhaven	3
Mattapoisett	1
Marion	3
Wareham (Onset, Plymouth)	9
Bourne (Buzzards Bay)	3
Falmouth (Cataumet, N. and W. Falmouth, Woods Hole, and Falmouth)	7
Gosnold	0
Total	26

Table 3-1 Sport Values of Fish to Recreational Boat Fishermen

Value to Recreational fishermen in terms of sport and size.	Fish Species
1	Striped Bass
2	Bluefish
3	Fluke
3	Summer Exotics: Bonito False Albacore Spanish Mackerel
4	Scup
4	Black Sea Bass

Table 3-4 SHELLFISH FISHERIES NEAREST BUZZARDS BAY DISPOSAL SITE – TOWN OF FALMOUTH

FISHERY	Season											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SHELLFISH - Falmouth												
Quahogs				1	1	1	1	1	1			
Soft Shell Clams				1	1	1	1	1	1			
Oysters				1	1	1	1	1	1			
Scallops				1	1	1	1	1	1			
Mussels				1	1	1	1	1	1			
Level of Fishing				Legal Season			Active Fishing					Highest Fishing Activity

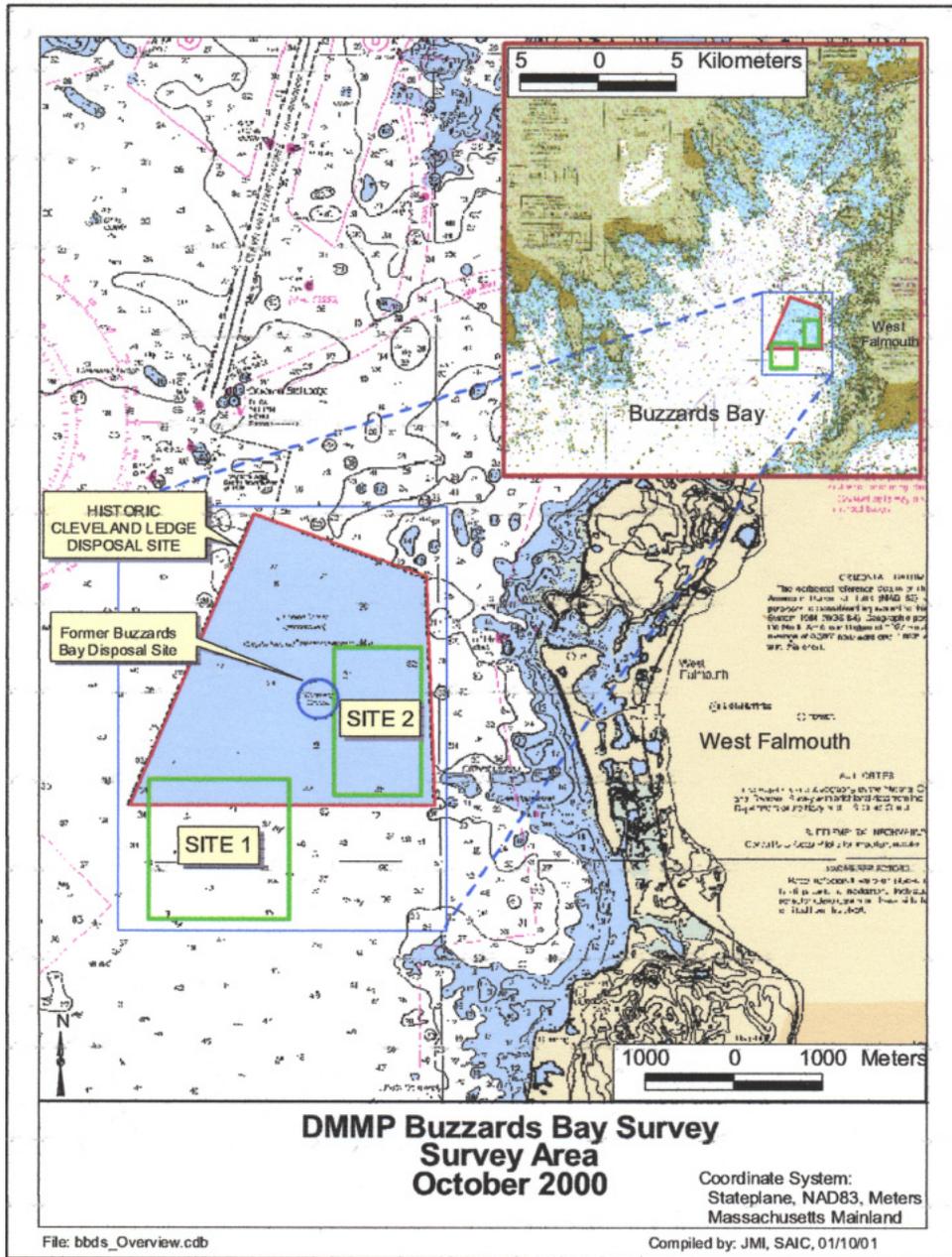
1 Due to poor water quality, Waquoit Bay, part of Bourmes Pond, and Megansett Harbor were among the only areas open to shellfishing during the summer of 2000.

Table 3-5 COMMERCIAL WHOLESALE VALUE OF SHELLFISH FISHERY TO TOWN OF FALMOUTH FOR 2000.

	Bushels	Wholesale Value	Bushels	Wholesale Value
Quahogs	13,522	\$1,216,980	916	\$73,280
Clams	3,889	311,120	376	30,080
Oysters	410	32,800	56	4,800
Scallops	5,997	503,748	440	36,960
Total		\$2,064,648		\$144,800
Grand Total				\$2,209,448

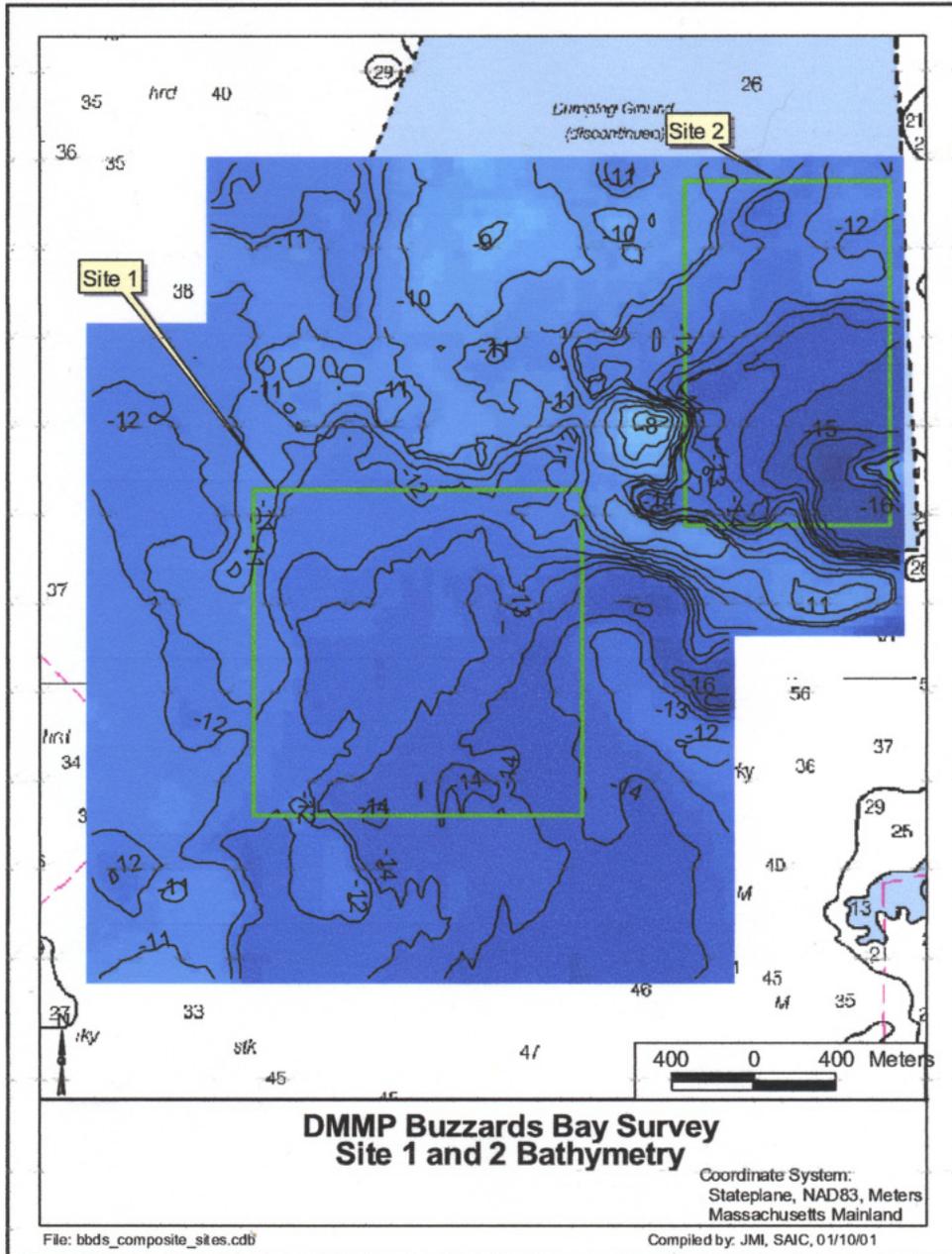
Recreational and Commercial permit sales totaled \$68,325 making the shellfish fishery and 2.3 million dollar industry for the Town of Falmouth.

Figure 1-1



Buzzards Bay Site Investigations Survey Areas (from SAIC)

Figure 1-2



Buzzards Bay Bathymetry Sites 1 and 2 (from SAIC)

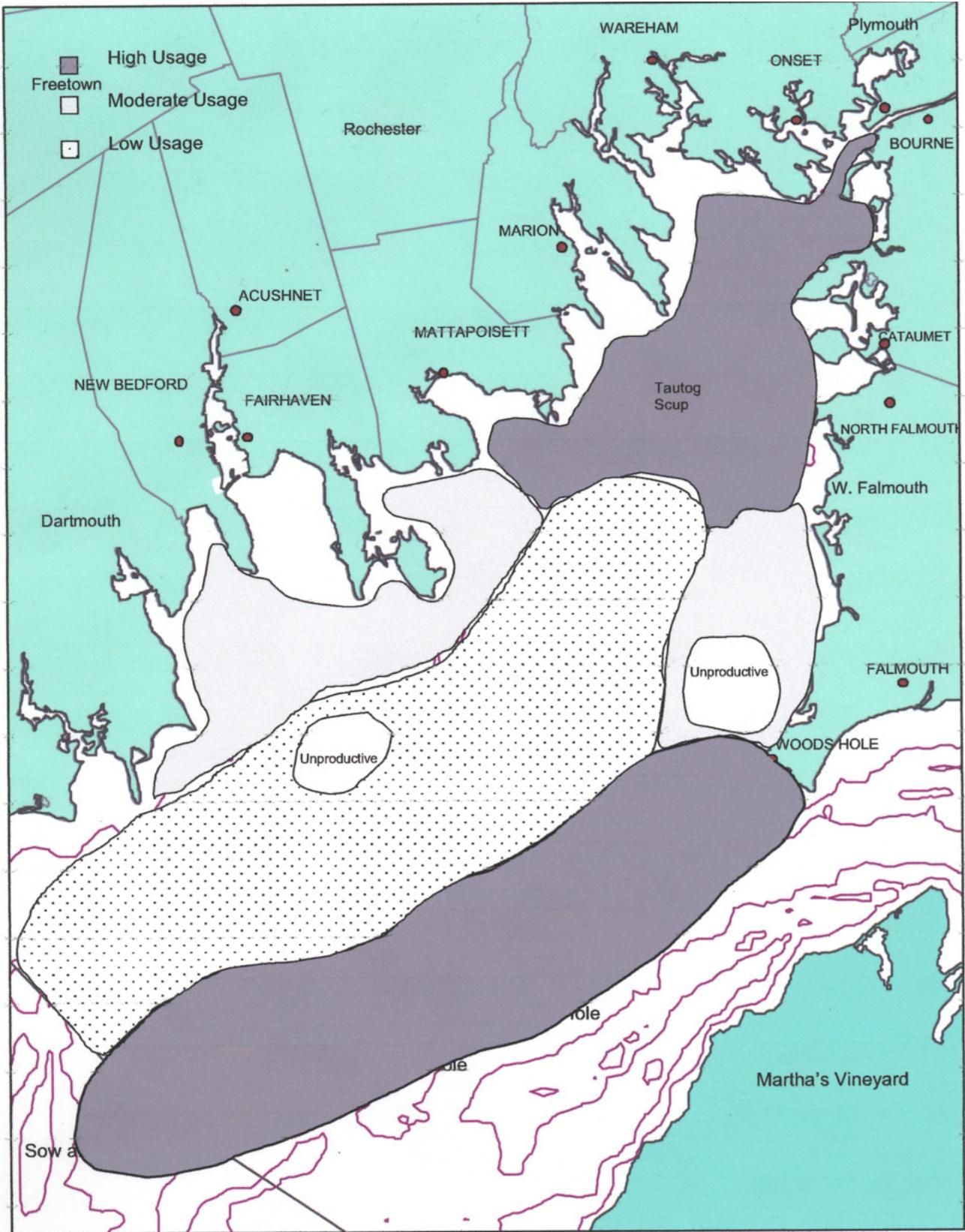


Figure 3-1 Generalized Map of Competing Uses in Buzzards Bay

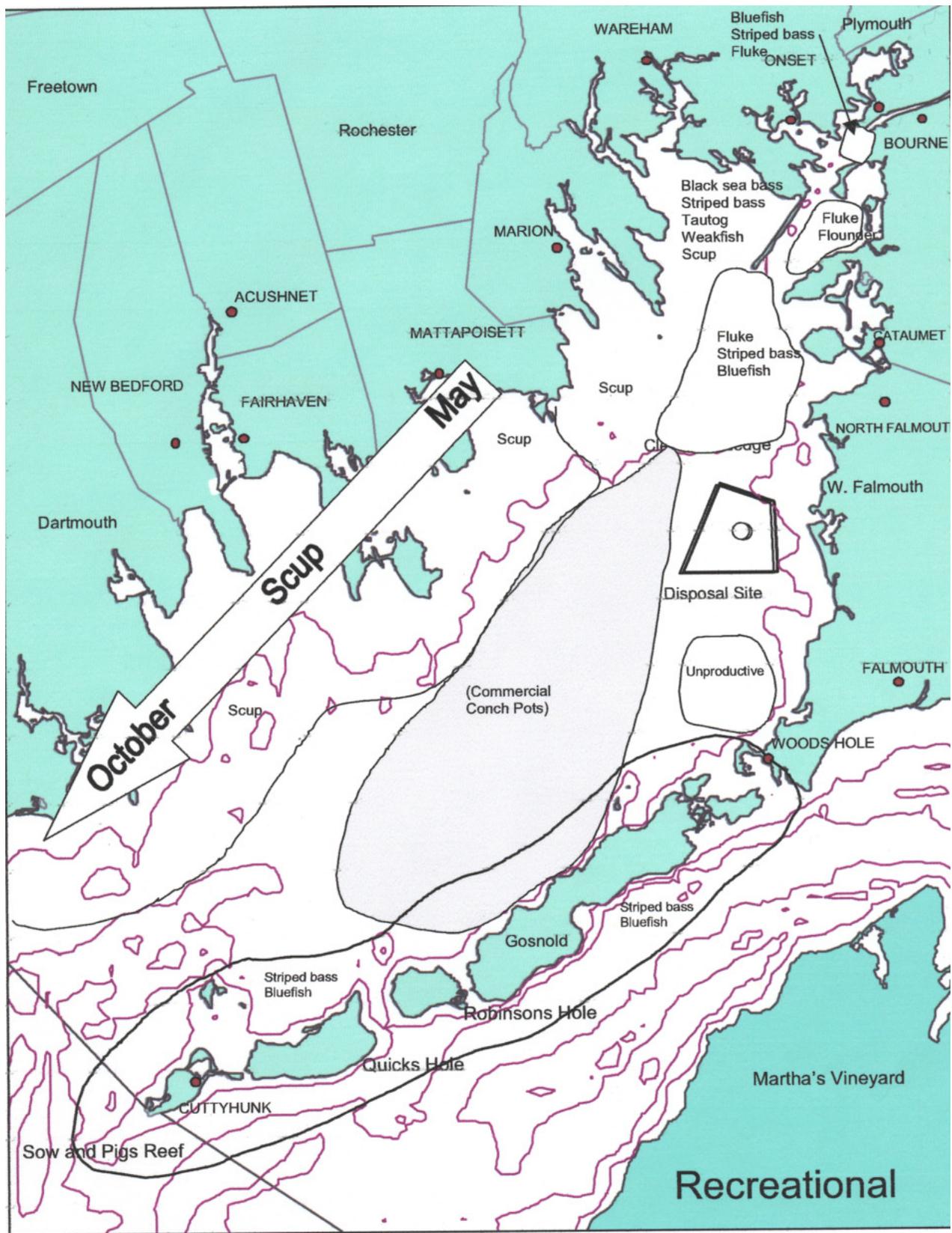
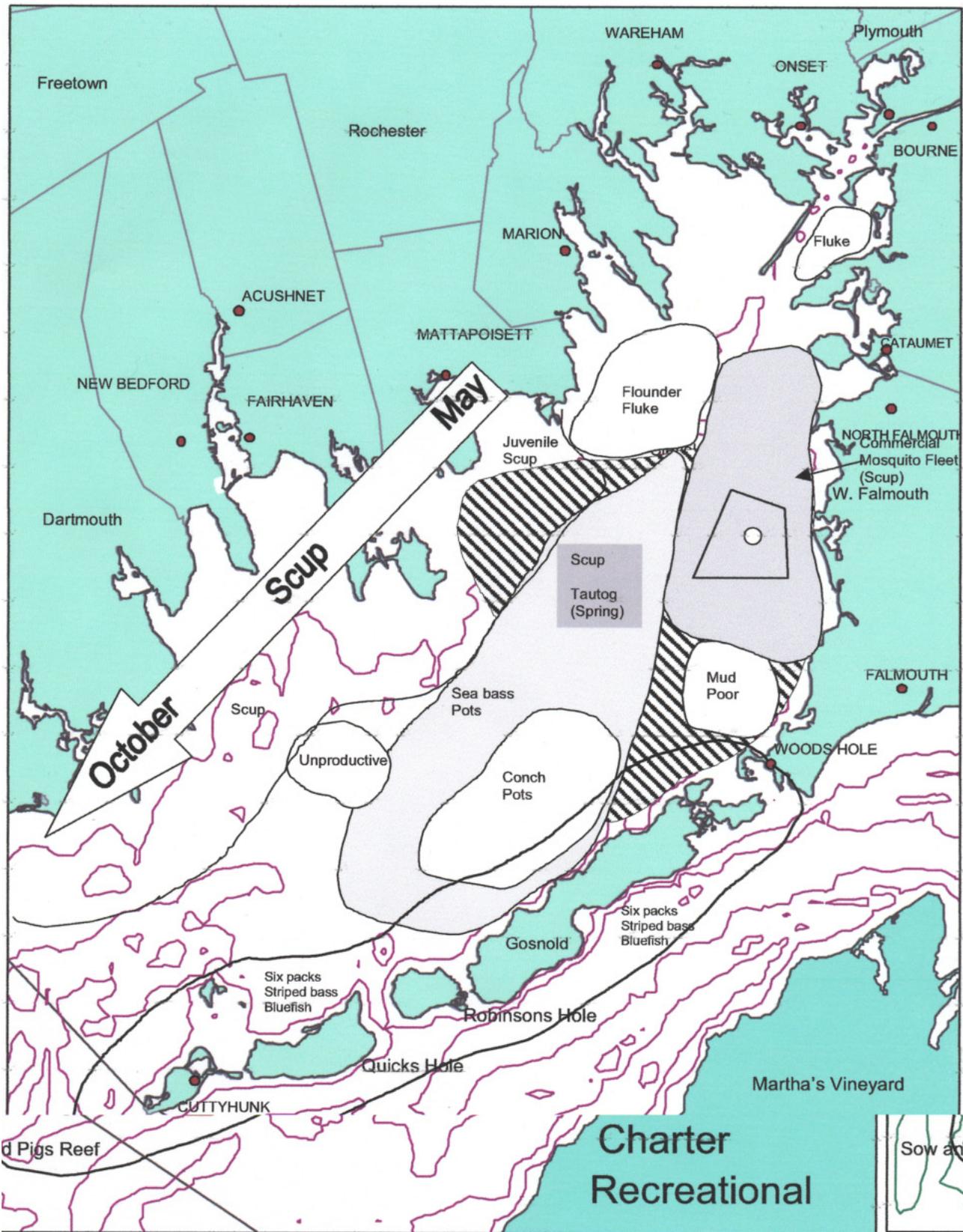


Figure 3-2 Usage Patterns Described by Recreational Anglers



-3 Usage Patterns Described by Recreational Charters

Figure 3

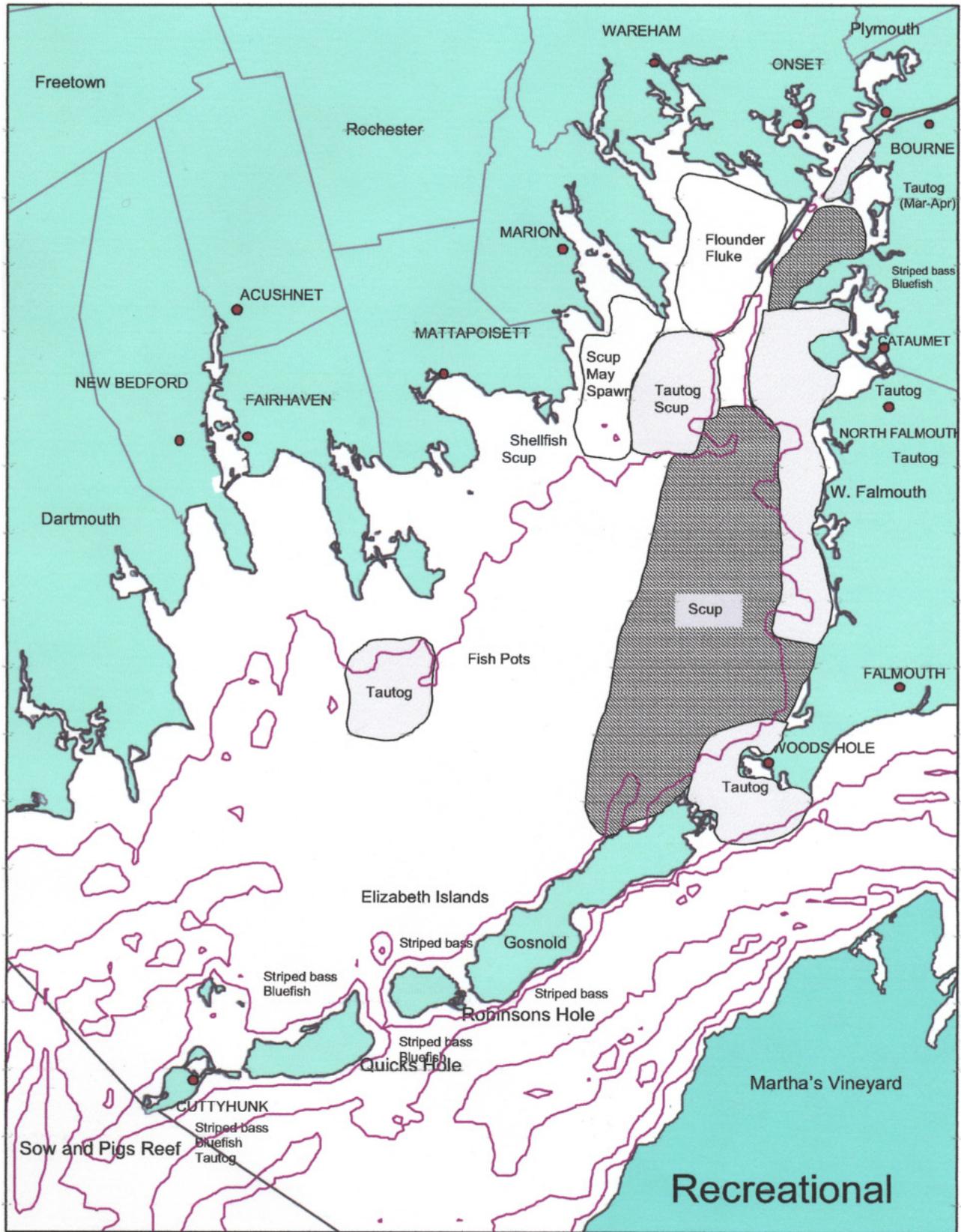
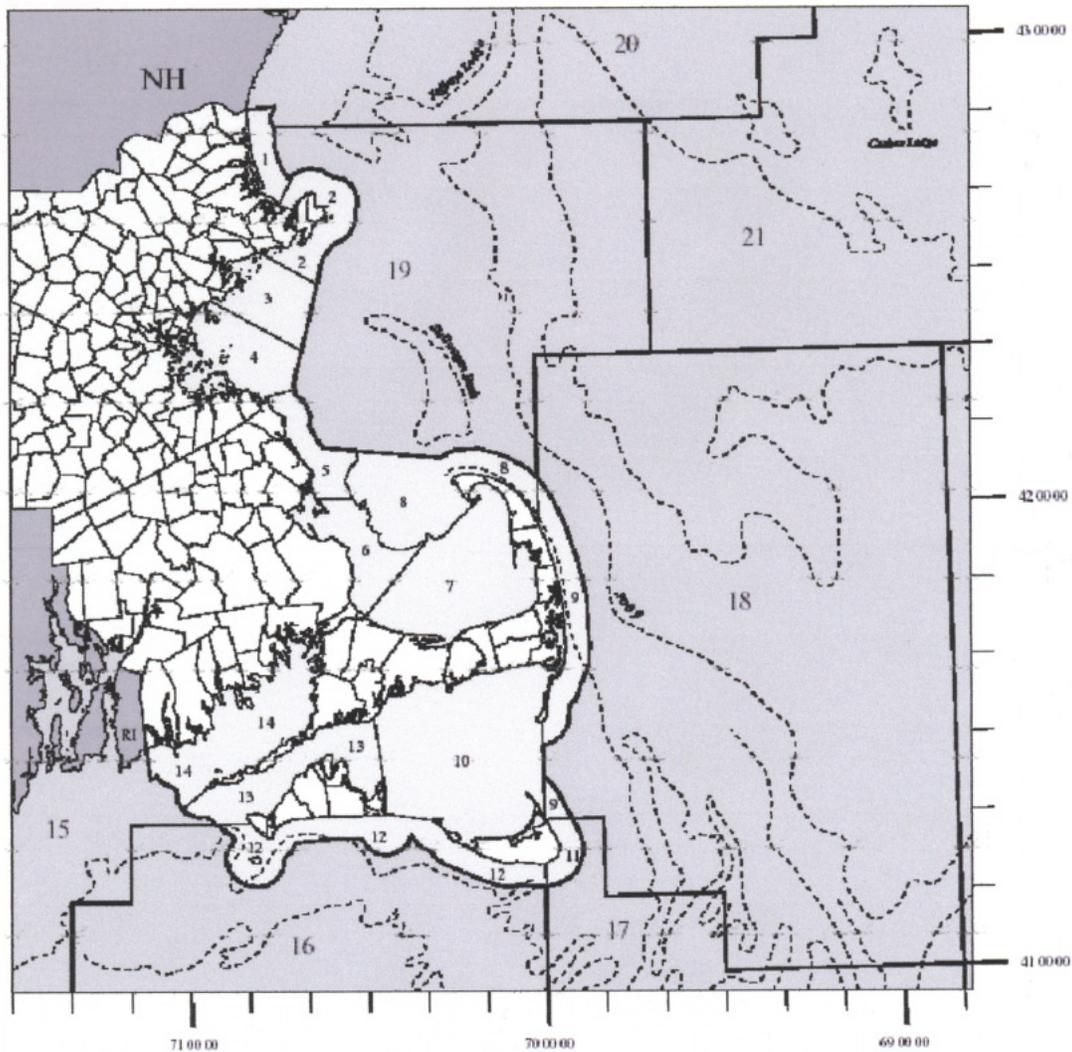


Figure 3-4 Usage Patterns Described by Bait and Tackle Shops

Figure 3-5 Statistical Reporting Map showing Territorial Waters and Outlying Areas



Description of Boundaries for Territorial Areas	
Between Areas	Boundaries
1 & 2	Castle Neck, Ipswich - Territorial Line
2 & 3	Gales Pt., Manchester - Territorial Line
3 & 4	Red Rock, Lynn - Territorial Line
4 & 5	Starbuck Pt., Cohasset - Territorial Line
5 & 6	High Pines Ledge, Plymouth - 120 Foot Line
6 & 7	Scusset Beach, Sandwich - 120 Foot Line
5, 6, 7	
8 & 8	120 Foot Line
8 & 9	70 Degree Longitude Line
9 & 10	70 Degree Longitude Line
9 & 11	41 Degree 20 Minute Longitude Line
10 & 11	41 Degree 20 Minute Longitude Line
10 & 12	Wasque Pt., MV - Muskeget Island, Nantucket
10 & 13	Succunesset Pt., Mashpee - Cape Poge, MV
Between Areas	Boundaries
11 & 12	70 Degree Longitude Line
12 & 13	41 Degree 20 Minute Longitude Line
13 & 14	Elizabeth Islands and Sow & Pigs Reef to Territorial Line
14 & 15	70 Degree Longitude Line to Territorial Line

NOTE:
Parts of Area 10 (Nantucket Sound) are federal waters, but are managed by DMF.

☐ - Territorial Waters

Division of Marine Fisheries
DIRECTOR PAUL J. DEBARTI

Scale - 1:1,320,000

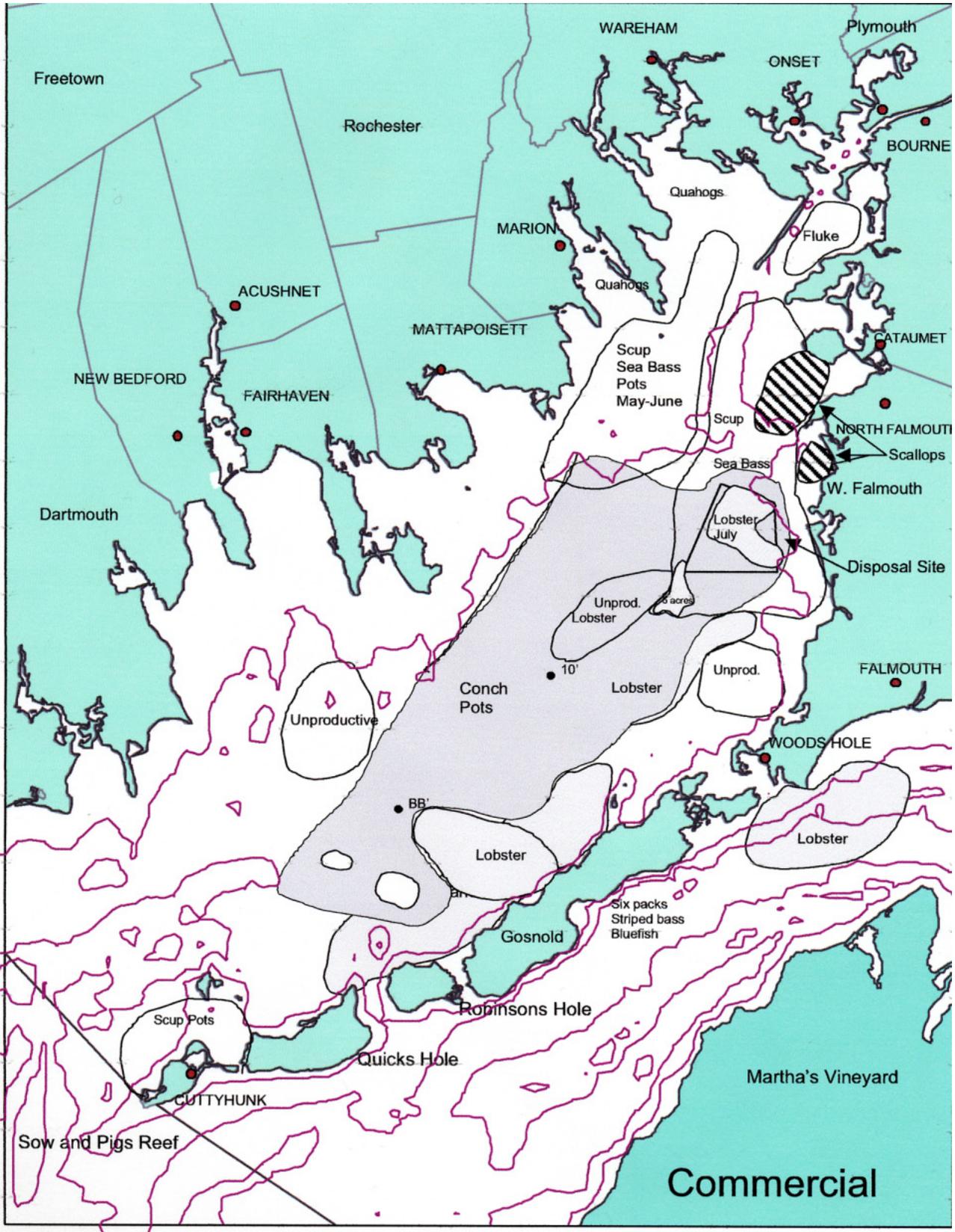


Figure 3-6 Usage Patterns Described by ~~Boat and Tackle Groups~~

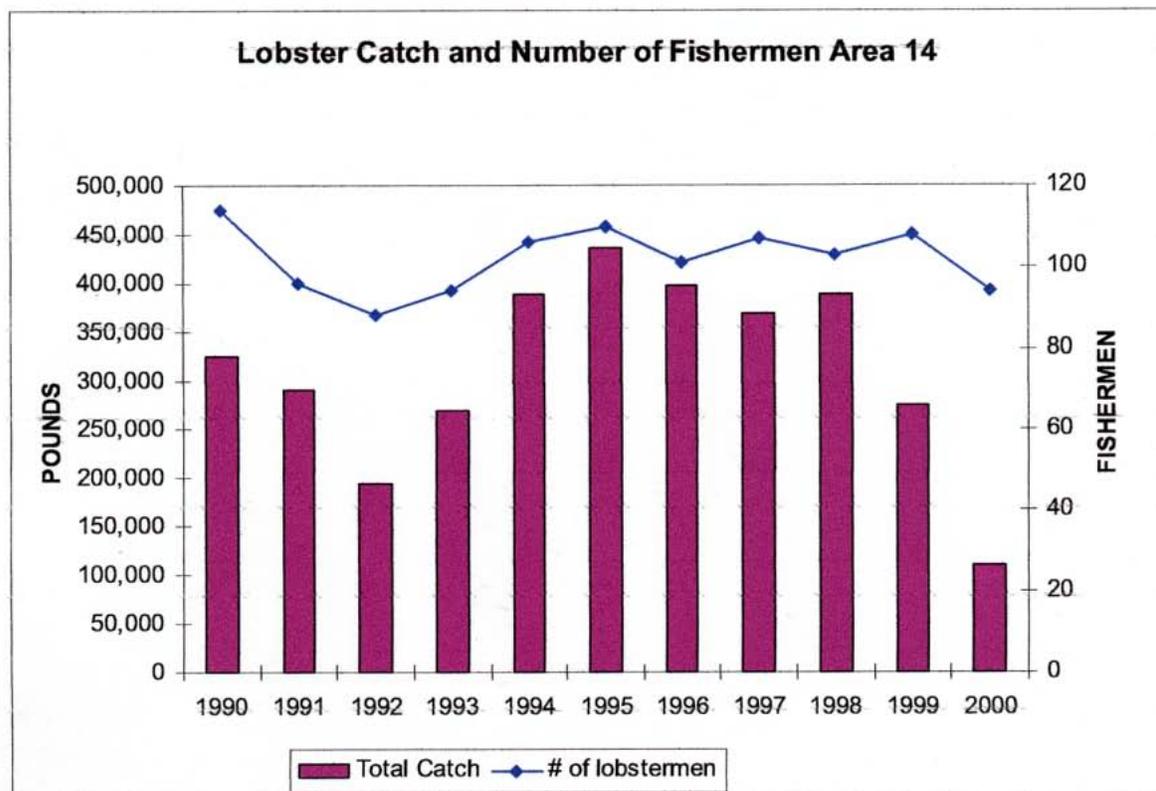
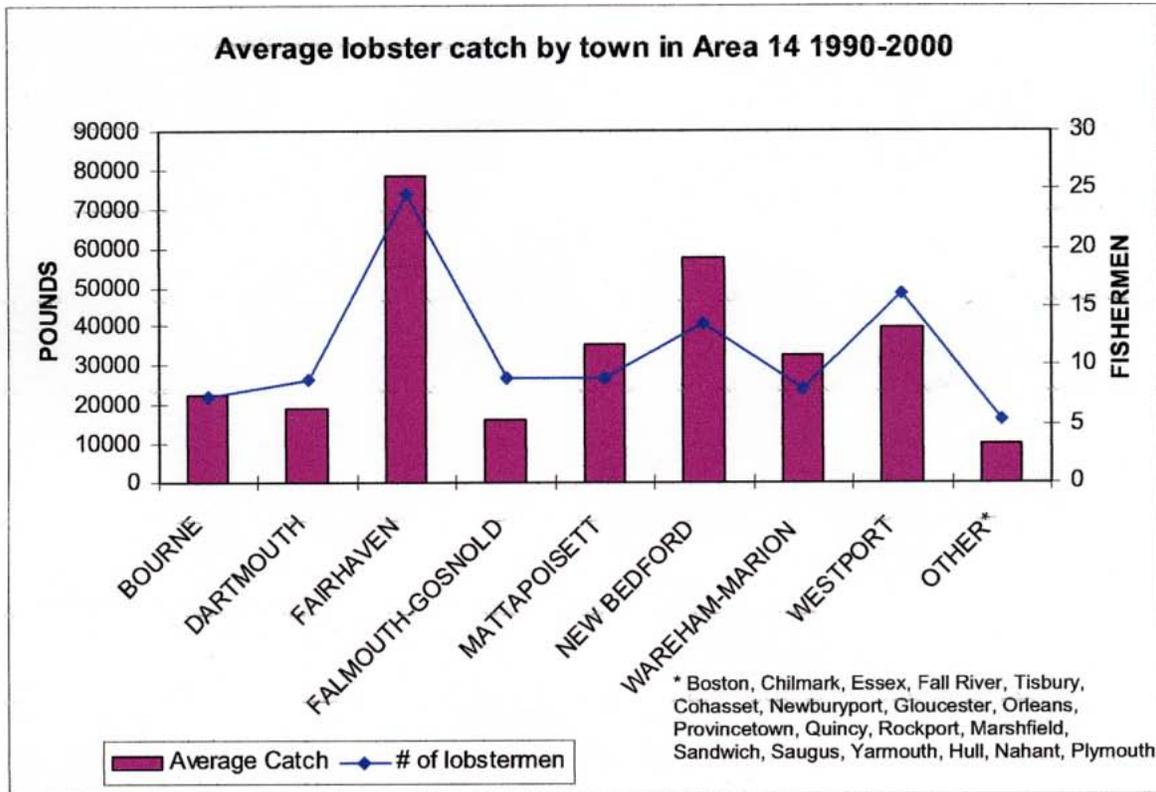


Figure 3-7 Commercial Lobster Catch Statistics from Area 14, 1990 – 2000 (from H. McBride personal communication)

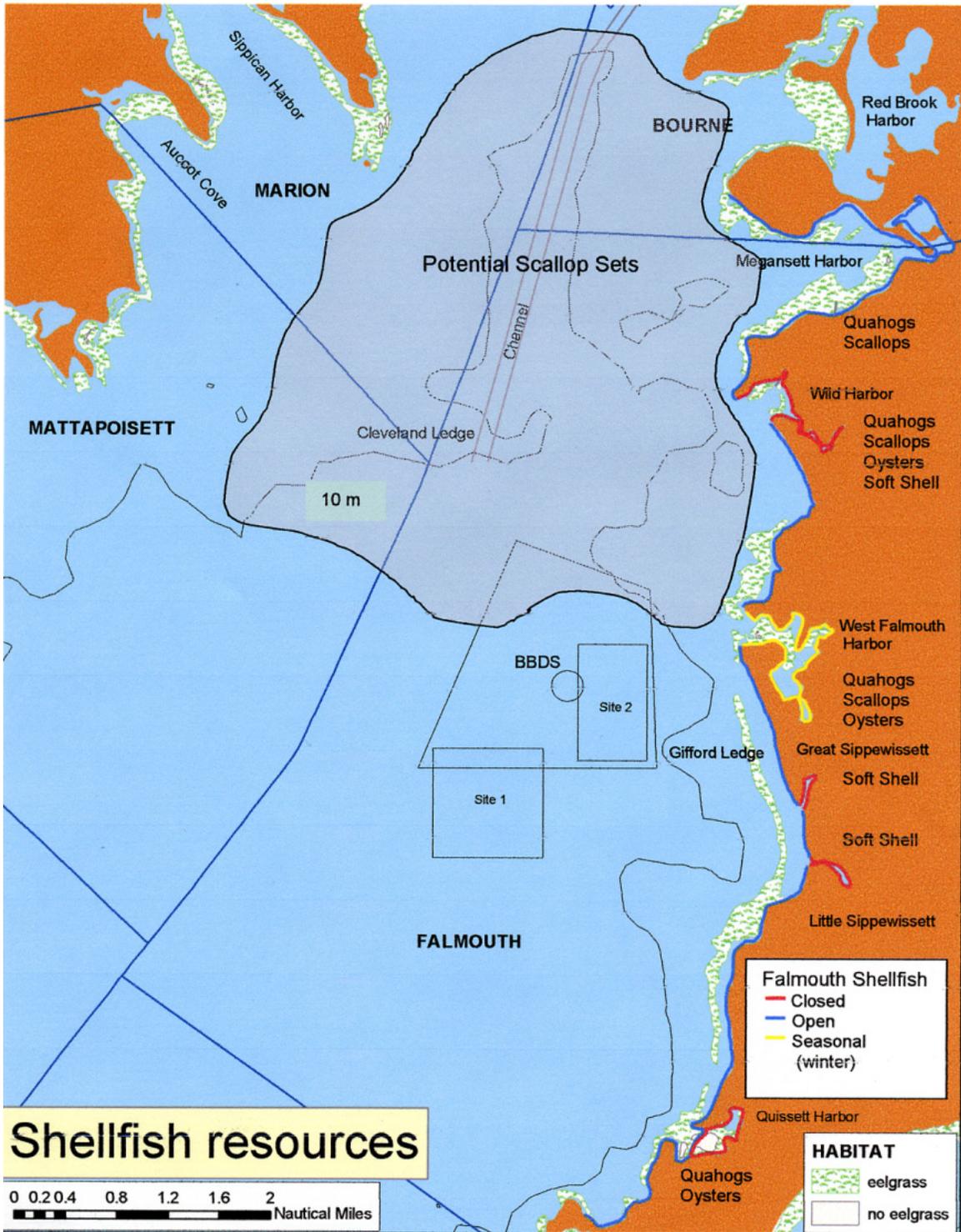


Figure 3-8 Shellfish usage areas near the proposed disposal sites

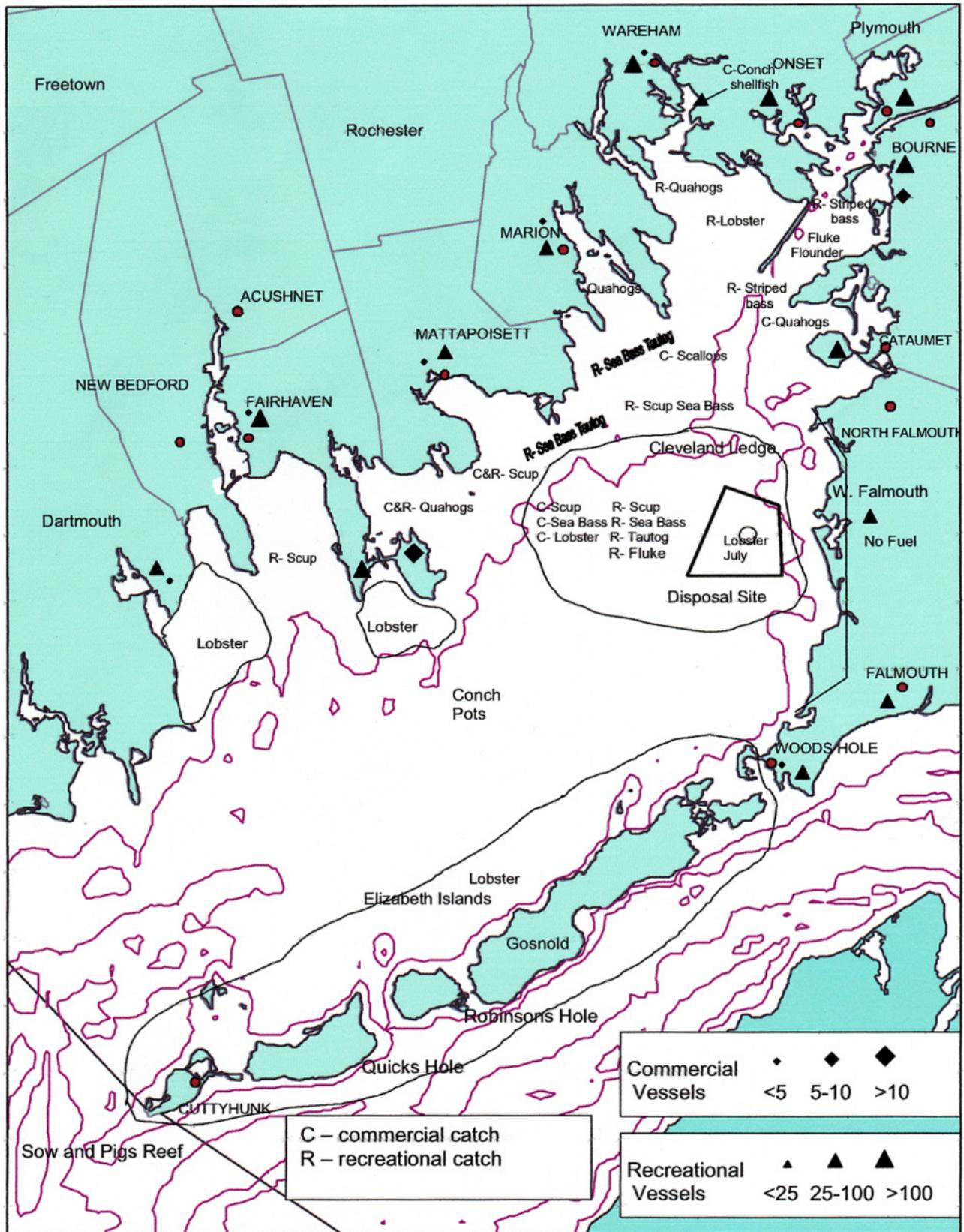


Figure 3-9 Usage Patterns Described by Harbormasters

APPENDIX I

Questionnaire

Fishing Activities Telephone Call Summary Sheet

CoastalVision

Name:	Date:	
Address:	TOWN	
Phone:	Fax:	
Email:	Cell:	
Type of User (circle): Commercial or Recreational or Harbormaster or Association Representative or Bait & Tackle or Other		

I am a marine/social scientist from Rhode Island/ Mass. calling to find out if you are interested in discussing your experiences with fishing and dredged material disposal in Buzzards Bay. I am working on behalf of Massachusetts Coastal Zone Management who are preparing a study on disposal sites in the Bay. I am interested in how fishermen use the Bay and how that might be affected by disposal activity. Are you willing to talk with a colleague and me about your experiences and knowledge of the Bay?

If you want to have an influence on the decision to designate disposal sites, this is an opportunity to get involved early. I hope to get wide input from the fishing community to help with the decision on siting a disposal site.

- (Others) Location of home port(s)/marinas?
 - (B&T) Where do customers of your shop launch or begin fishing trips?
- How far (in miles) do you or your clients usually travel on day trips one way?
- (All) How long have you been doing your present job / or fishing?
- (All) Have you seen changes in the type and number of fish caught Buzzards Bay in your career?
- What areas of the Bay do you/ your clients fish?
- (C & R) How many others fish in this area from your harbor?
- What is the percentage of commercial to recreational use of your primary harbor (HM & A) or harbors under your jurisdiction)?
 - Commercial % _____
 - Recreational% _____

10. What areas within the BBDS are most heavily used?

- a. Area/location(s)? _____
- b. By whom? _____
- c. Species harvested? _____
- d. Where do harvesters come from? _____

11. Have you ever experienced difficulty fishing an area after disposal activity?

- 12. a. Do you fish near the existing disposal area?
- b. If you fish in or near or outside of the BBDS please describe the location.

13. What have you noticed about fishing near disposal sites?

14. Are there areas of the Bay that you think would be more suitable for dredged material disposal sites?

15. Would you rather see the site remain where it is?

16. Any other thoughts?

17. Can you recommend other people who are knowledgeable about this or Associations?

Name: _____
Profession: _____
Phone: _____
Address: _____

Codes: C = Commercial fisher
R = Recreational (party/head boat charters, six pack charters, private or rental boats, shore fishing)
HM = Harbor Master
A = Administrator (ex. Shellfish constable)
B&T= Bait and tackle shops
AS = Association representative

Follow-up:

(Put here –

1. any additional information provided that seems potentially relevant that does not fit else where,
2. any ideas or connections that clicked during this interview,
3. any next steps that need to be taken with this person, etc...),
4. your sense about the level of accuracy and honesty of the individual interviewed.

APPENDIX II

Respondents

*

Respondents

First Name	Last Name	Job	Town	Organization	User Type
Chuck	Merritt	Harbormaster	Bourne	Bourne	Harbormaster
Elizabeth	Stromeyer	Red Top Sporting	Buzzards Bay	B&T shop	Bait and Tackle
Anonymous		Commercial fisherman	Buzzards Bay		Commercial fisherman
Vinnie	Hemingway	Asst shellfish constable	Dartmouth		Shellfish Constable - Assistant
Anonymous		Commercial fisherman, site surveyer	Fairhaven		Commercial fisherman, Interviewer for federal program-inventory of launch sites.
Anonymous			Fairhaven		Commercial fisherman, Marina Operator
Gary	Golas	Harbormaster	Fairhaven	Fairhaven	Harbormaster
Greg	Fraser	Harbormaster	Falmouth	Falmouth	Harbormaster
Anonymous		Recreational fisherman	Falmouth		Recreational - fisherman
Paul	Montague	Shellfish Officer	Falmouth		Shellfish Officer
Kevin	Snow	Shellfish Officer	Marion	Marion	Shellfish Officer
Anonymous		Fisherman	Marion		Commercial fisherman
Charles	Bradley	Harbormaster	Marion	Marion	Harbormaster
	Dockside	Bait and Tackle	N Bedford		Bait and Tackle
Brian	Flatus	Capt Leroy	N Bedford	Charter Boat	Recreational - Charter
Dick	Hopwood	Maco's B&T	Onset	B&T shop	Bait and Tackle
Anonymous		Commercial Fisherman	Onset		Commercial fisherman
Bob	Braun	Onset Chief II	Onset		Recreational - Charter
Eric	Morrow	FINS/Neat Lady	Onset		Recreational - Charter
Robert	Keese	Onset Chief II	Plymouth	Charter Boat	Recreational - Charter
Rob	Johnston	Fisheries scientist	Pocasset	Division of Marine Fisheries	Fisheries scientist
Greg	Sawyer	Fisheries scientist	Mattapoisett	Division of Marine Fisheries	Fisheries scientist
Bill	Thomas	M&D Bait	Wareham		Bait and Tackle
Gene	Borque	Journalist	Falmouth	On the Water	Journalist
Michael	Parola	Harbormaster	Wareham	Wareham	Harbormaster
Anonymous		Recreational fisherman	Wareham		Recreational fisherman
Anonymous		Recreational fisherman	Wareham		Recreational fisherman
Anonymous		Commercial fisherman	Woods Hole		Commercial fisherman
Anonymous		Commercial fisherman	Woods Hole		Commercial fisherman

* Commercial and recreational fishermen were assured that their identities would remain anonymous.

APPENDIX III

List of species discussed

Appendix III

List of species discussed in this report. Zone indicates the species predominant association with the benthic (B) or pelagic (P) zone.

Common name	Scientific name	Zone
American lobster	<i>Homarus americanus</i>	B
Bay scallop	<i>Argopecten irradians</i>	B
Black sea bass	<i>Centropristis striata</i>	B
Bluefish	<i>Pomatomus saltatrix</i>	P
Bonito	<i>Sarda sarda</i>	P
Channeled whelk	<i>Busycotypus canaliculatus</i>	B
False albacore (little tunny)	<i>Euthynnus alletteratus</i>	P
Knobbed whelk	<i>Busycon carica</i>	B
Longfin squid	<i>Loligi pealeii</i>	P-B
Northern quahog	<i>Mercenaria mercenaria</i>	B
Ocean quahog	<i>Arctica islandica</i>	B
Oyster	<i>Crassostrea virginica</i>	B
Scup	<i>Stenotomus chrysops</i>	B
Sea scallop	<i>Placopecten magellanicus</i>	B
Spanish mackerel	<i>Scomberomorus maculatus</i>	P
Striped bass	<i>Morone saxatilis</i>	P
Summer flounder (fluke)	<i>Paralichthys dentatus</i>	B
Tautog	<i>Tautoga onitis</i>	B
Weakfish	<i>Cynoscion regalis</i>	B
Winter flounder	<i>Pseudopleuronectes americanus</i>	B

