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A Preliminary Survey of the Sewage Pumpout Facilities in the No Discharge Areas of Massachusetts



Urban Harbors Institute
University of Massachusetts Boston
October 2001

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GOALS

This survey provides a preliminary review of the activities of pumpout facilities in the No Discharge Areas of Massachusetts. It highlights areas of concern, identifies potential improvements and focuses further research.

OBJECTIVES

- To assess if boaters are utilizing the pumpout facilities
- To assess boaters' satisfaction with local facilities
- To identify any areas where there are problems and areas for improvement and if the pumpout boats and facilities are being utilized effectively
- To assess if facilities are actively advertising their services and if boaters are aware of local pumpout facilities

METHODOLOGY

Survey Area

Based on data from Massachusetts Coastal Zone Management, there are 100 pumpout facilities in Massachusetts, located in 56 towns. Of these 52, have one or more pumpout boats. Due to financial limitations and the time available, any attempt to survey all these facilities was beyond the scope of this study. However, it had been suggested that from CZM's, DMF's and EPA's standpoint, the areas of greatest interest were those that are designated as, or have been proposed as, No Discharge Areas (NDAs). To this end, it was decided that the focus of this preliminary study would be the pumpout facilities located in or near to a No Discharge Area. There are 15 towns that fit these criteria. Within these towns there are 38 pumpout facilities of which 17 operate pumpout boats (Appendix 1).

Questionnaires

It was necessary to survey both the boaters and the pumpout facility operators. The Urban Harbors Institute (UHI) collaborated with CZM, DMF and EPA to develop two questionnaires; one aimed at the boaters and the other aimed at the pumpout facility operators (Appendix 2 & 3).

Operator Questionnaires

Due to constraints on the amount of fieldwork that could be implemented, the operator's were sent their questionnaires by mail. In this way it was hoped that they would have the time to gather any data that they did not have immediately on hand. Enclosed with the questionnaires was a document explaining the goals and objectives of the study and a pre-paid business reply envelope so that they would not have to incur the cost of postage. The questionnaires were mailed on 31 August.

Boater Questionnaires

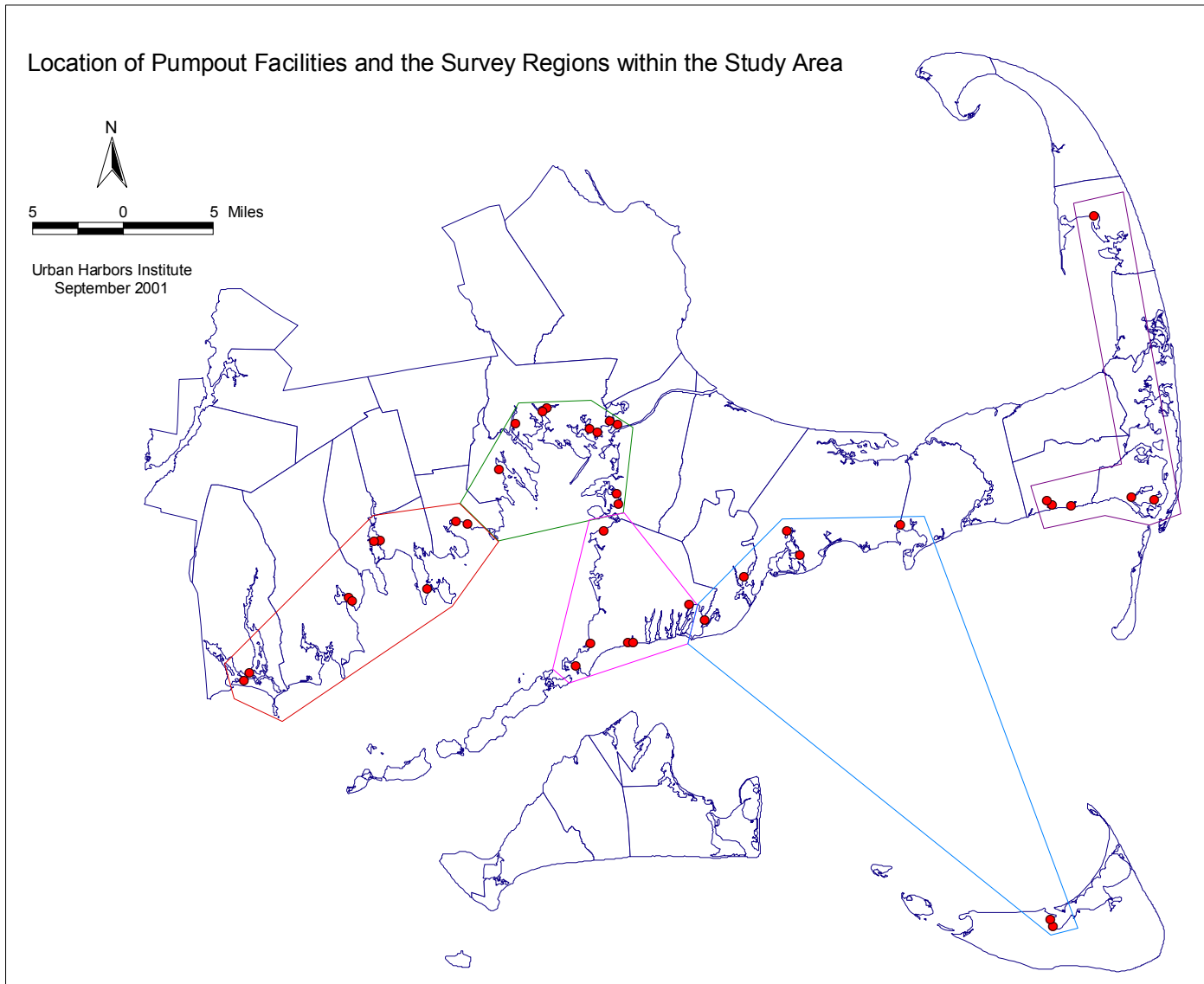
For the boater questionnaire it was necessary for researchers to conduct interviews in the field. The study aimed to conduct surveys in the vicinity of all the pumpout facilities in the study area. However, by studying the location of the facilities it became apparent that some facilities were located in close proximity to each other. It was therefore decided that where this occurred, only one survey would be conducted. There were 11 areas where this was the case. The personnel available to conduct the interviews consisted of 3 employees of the Urban Harbors Institute and 2 graduate students from UMass Boston. The pumpout survey sites were therefore divided into 5 regions based on their geographic location, with one researcher targeting each region (Figure 1).

There were a number of complications in selecting the best time and place to conduct the interviews. Initially, researchers planned to station themselves in the vicinity of a pumpout facility and interview boaters. Each researcher aimed to interview a minimum of 10 boaters at each of their survey sites. Prior to the fieldwork a number of locations were visited during the week and on weekends in order to ascertain when boaters were generally more in evidence. Although it was expected that there would be more boaters on the weekends, these boaters were also more likely to be out on the water and therefore unavailable for interview. Additionally, many boaters fuel their vessels either prior to or immediately after a trip. However, these are not necessarily the best opportunities to conduct interviews. Prior to an excursion, the boats are focused on getting out onto the water and on returning, they are on their way home and do not wish to be delayed. During the day, those boaters who are alongside the dock are frequently those who rarely venture out onto the water. As they spend most of their time in the marina they tend not to use the head on board, preferring to use the dockside facilities. "Access Point" interviews such as those conducted in this survey are notoriously difficult and time consuming.

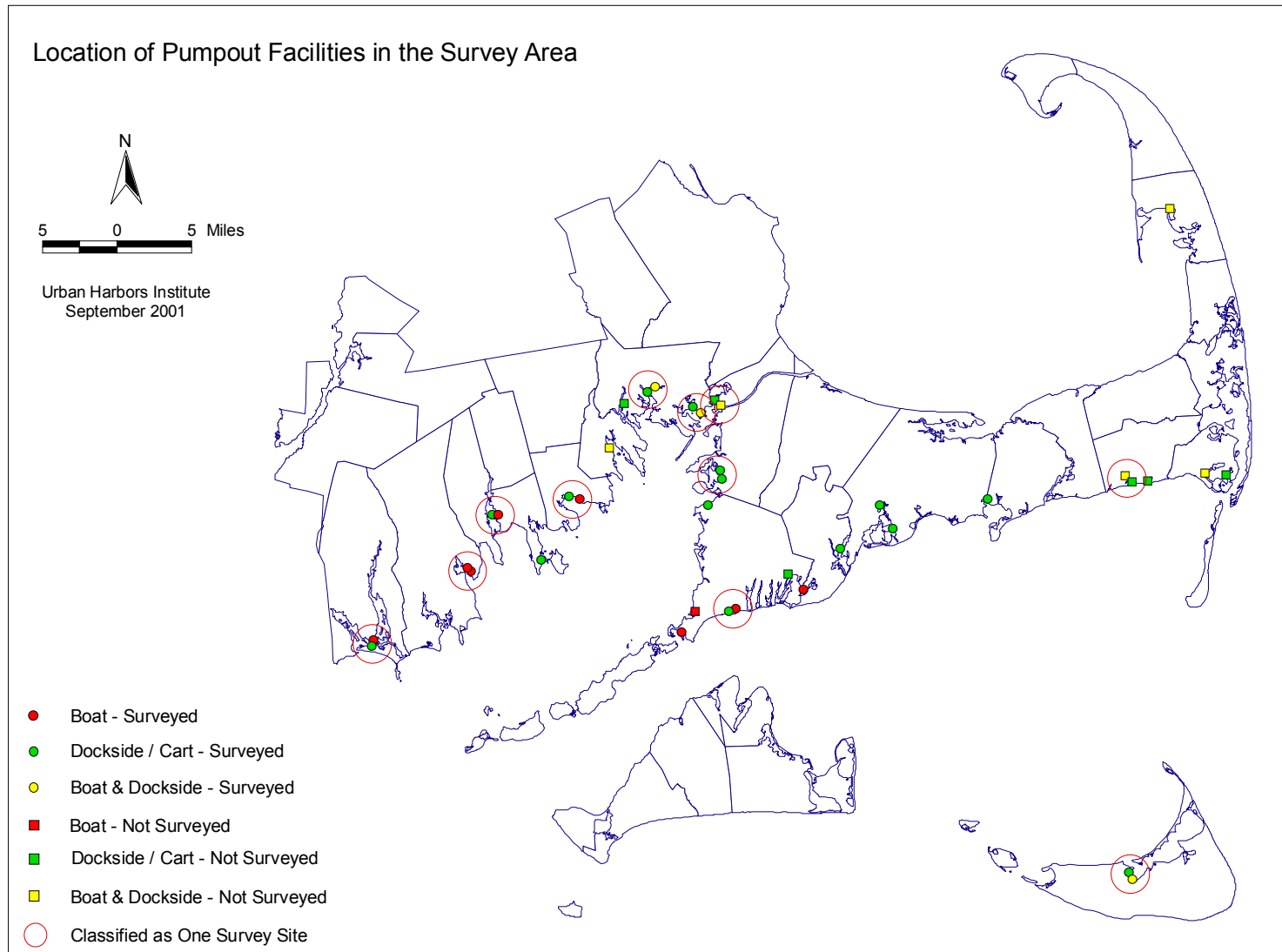
As there was no apparent “ideal” time to conduct interviews, they were conducted at times most suited to the researchers. The 3 employees of UHI and one graduate student conducted their research on weekends while the other graduate student conducted interviews during the week. There was no clear correlation between the day of the week and the level of success in conducting interviews.

There was a varying degree of success with the interviews. As the interviews aimed to evaluate the use of, and boater’s satisfaction with, pumpout facilities, the interviewers targeted larger vessels with cabins which were more likely to be fitted with a head. Vessels such as center console speedboats were not approached. However, at some locations there were very few suitable vessels and many of these did not have anyone on board. Therefore at a number of locations, despite attempting to carry out the survey, the researchers did not find any suitable candidates to interview. At no sites did the researchers succeed in conducting 10 interviews. The highest number conducted was 9 interviews at a site in Wareham and 9 interviews on Nantucket. At three sites no successful interviews were conducted. In 43 man-hours of fieldwork, 57 interviews were conducted at 17 sites, covering 26 pumpout facilities (Figure 2). All interviews occurred between 18 August and 8 September.

In addition to recording the responses to the questions, the researchers also noted down the views and comments of the boaters as well as observations as to the signs etc. visible at the facilities. They also distributed copies of the Massachusetts Office of Coastal Zone Management’s “2001 Boater Guide to Tides and Pumpout Facilities”. It is interesting to note that a number of local boaters had not seen these before and felt that they should be readily available at all fuel docks and marinas so that boaters, especially transient boaters, would have easy access to information on pumpout facilities.



ω Figure 1. Pumpout facility survey study area showing the location of facilities and the regions into which the area was subdivided



4 Figure 2. Location and type of pumpout facilities in the study and the sites where surveys were conducted

RESULTS

Boater Questionnaires

Generally, those boaters approached were happy to participate in the survey, especially when they were informed that the survey would only take a few minutes. A total of 57 interviews were conducted.

History of Being a Boater

One boater did not answer this question. Of the remaining 56, the maximum number of years as a boater was 55 years and the minimum was less than 1 year. In fact, this person had just bought his sailboat and had launched her for the first time the previous day. The average was just under 30 years.

Information on Marine Sanitation Devices (MSDs), Awareness of, Use of and Satisfaction with Pumpout Facilities

Of the 57 interviewed, 50 vessels (87%) were equipped with an MSD, two owners used to have an MSD (4%) and answered the rest of the interview based on their recent past experience. Five of the vessels (9%) were not equipped with an MSD and therefore the rest of the information that they provided has not been included in this report (Figure 3). Of the remaining 52, all but one vessel (2%) was equipped with a holding tank. Although not equipped with a holding tank, the vessel did have a portable head. The high percentage of vessels that were fitted with an MSD is to be expected as the researchers targeted vessels for which this was likely to be the case.

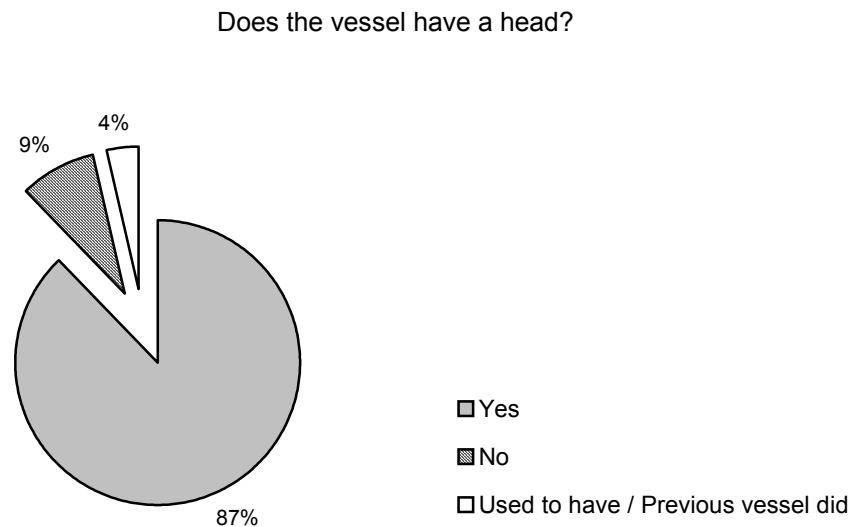


Figure 3. Percentage of boaters whose vessels were equipped with a head or Marine Sanitation Device

When asked if they were aware of the pumpout facilities, 94% of those interviewed responded positively (Figure 4). The data from the 3 owners who were not aware of pumpout facilities are not included in this report. One of them fished offshore and discharged when he was over 3 miles from shore, while the other 2 were simply unaware of the facilities. Of the remaining 49 owners, 88% reported that they use the pumpout facilities. Of those who did not use the facilities, one boater only used the marina's dockside restrooms. While aware of the regulations and the facilities, another had no use for them as he only discharged offshore when fishing. Four boaters reported that they did not know how to access the facilities. One of these was the boater who had just launched his vessel but was planning to contact the local Harbormaster to gather the necessary information (Figure 5).

Are you aware of the availability of pumpouts?

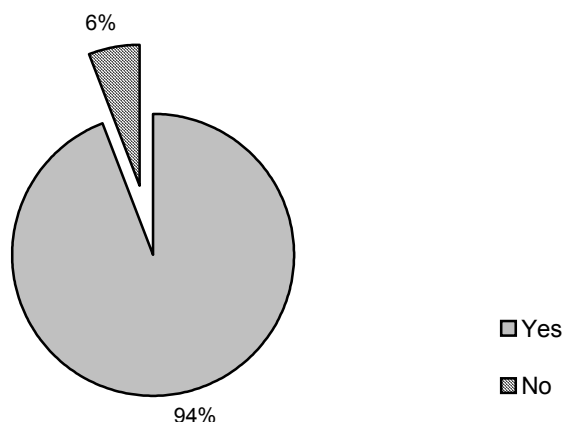


Figure 4. Percentage of boaters who were aware of the pumpout facilities

Do you use the pumpout facilities?

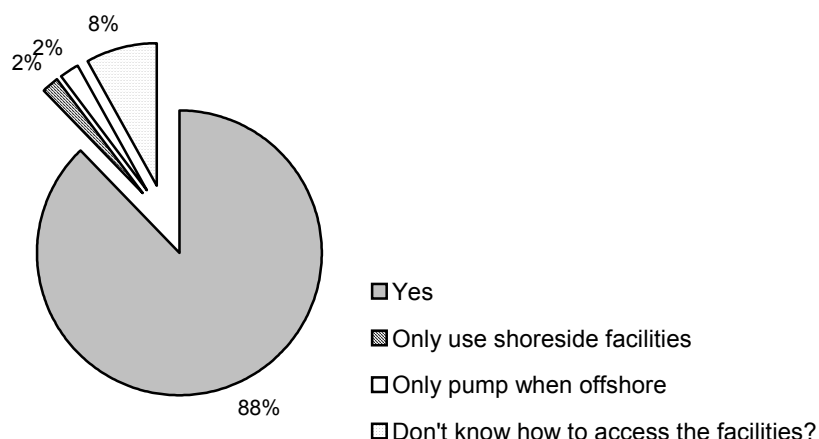


Figure 5. Percentage of boaters who used pumpout facilities

From the remaining 43 questionnaires, it was calculated that each owner accessed a pumpout facility on average 9.8 times per season. Some boaters responded that they “rarely” used the pumpout while others said that they used it “as necessary.” As it was necessary to quantify these responses, these were estimated as “once per season” and “twice per season” respectively. The highest frequency of pumpout was approximately 50 times per season with a boater who used the facility whenever he fueled his vessel.

Those boaters who used pumpout facilities were asked to quantify their level of satisfaction. To standardize their responses they were asked to base this on a scale from “zero” (extremely unhappy with the facility) to “ten” (extremely happy with the facility). The results ranged from 3 to 10, with a mean of 8.5 (Figure 6). Although the mean level of satisfaction is high, there are clearly some survey sites where the level of satisfaction is higher than others (Table 1).

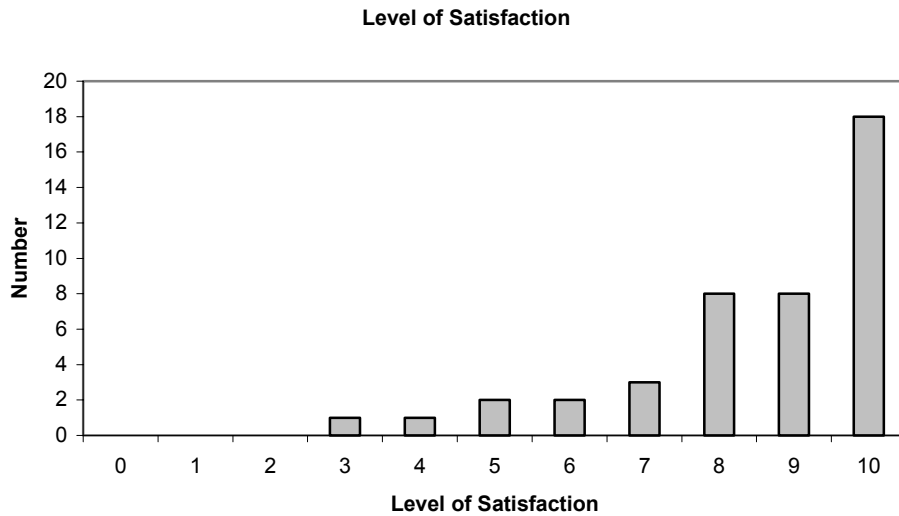


Figure 6. Level of satisfaction with pumpout facilities expressed by the boaters

Table 1. Mean level of satisfaction at the locations surveyed in the pumpout facility study

Town	Facility	Mean Satisfaction	SE	n
Westport	FL Tripp & Sons	7.5	0.5	2
	Westport Point Town Pier			
New Bedford	Pope's Island Marina	8.8	0.8	5
Fairhaven	Seaport Marina			
Fairhaven	Earl's Marina	5.3	1.9	3
Wareham	Warr's Marine	8.5	1.0	4
	Stonebridge Marina			
Wareham	Onset Bay Marina	9.7	0.3	9
	Onset Town Pier			
Cataumet	Kingman Marine	8.5	0.3	6
	Parker's Boat Yard			
Falmouth	Fiddlers Cove Marina	8.5	1.2	4
Mashpee	Little River Boatyard	6.0	1.0	2
Barnstable	Hyannis Marina	9.0	0.0	1
Nantucket	Nantucket Boat Basin	8.9	0.3	7
	Nantucket Town Pier			

It is important to note that the level of satisfaction cannot necessarily be attributed to the pumpout facility that is located in the survey site. Some boaters who use a number of facilities when using their vessel may be expressing a general level of satisfaction while others may be comparing the facility where they are located to a superior one they have used or have no experience of other facilities. Adopting a scale by which to measure satisfaction allows for analysis of the data. However, as with any all interview methodology, the boaters' responses are qualitative.

Views on Pumpout Facility Operations

When asked what they felt could be improved with the facilities, 80% of the boaters had no opinion or felt that there was nothing that could be improved. Two boaters (5%) expressed a concern that their vessel could sustain damage when the pumpout boat pulled alongside. Neither had experienced this but one boater said that even if a pumpout boat offered its services when he was not on board, he would not use this due to the risk of damage. One boater felt that increased signage was required, especially in order to attract transient boaters while another felt that more information on the regulations and reasoning behind NDAs was required in order to educate boaters. Three boaters (7%) felt that physical access to the facility needed to be improved although this is clearly an issue for the specific facilities. This is also true for the one boater who felt that there should be 24-hour access to the pumpout facilities. One boater also expressed the opinion that pumpout facilities should open earlier in the season. Again, this may be aimed at a specific facility (Figure 7).

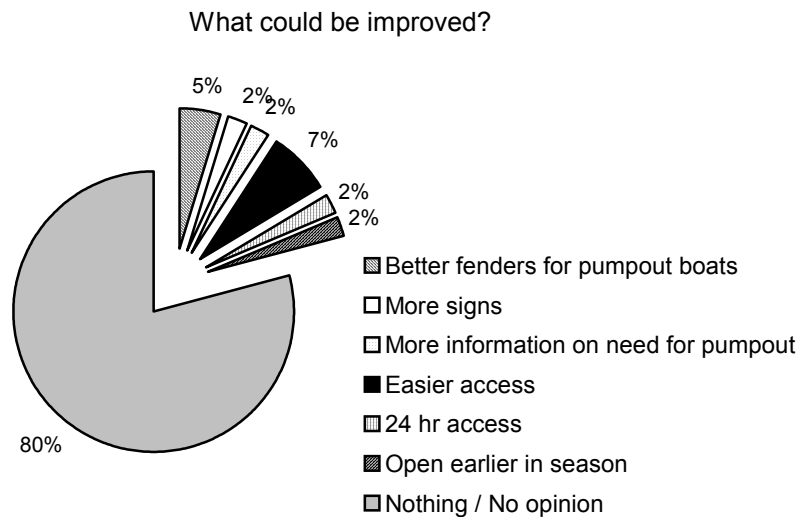


Figure 7. Boaters' views on possible improvements to the pumpout facilities

On what additional services are needed, 64% of the boaters had no opinion. However, 21% felt that there was generally a need for more pumpout facilities with one boater suggesting that every marina and harbor should have one located at the entrance. Of the remaining 6 boaters that expressed an opinion, there was an equal split (5% each) between having more pumpout boats, a service offering to pumpout a vessel when the owner was absent and a service where the operator would bring the boater's vessel to the facility for pumpout and then return it to its slip or mooring (Figure 8).

What additional services are needed?

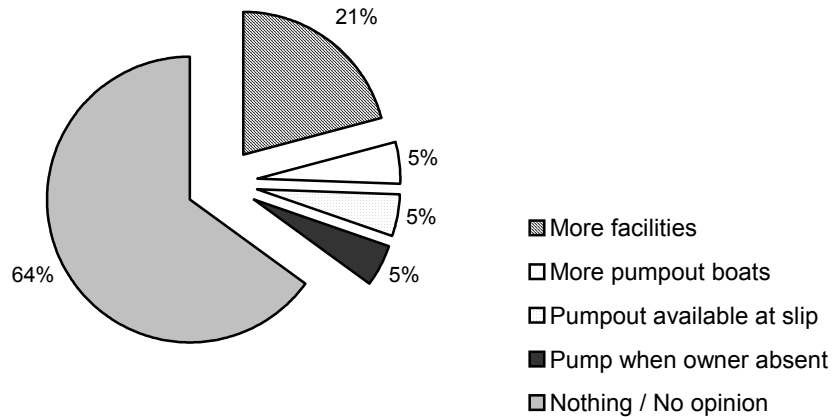


Figure 8. Boaters' views on what additional facilities or services were needed

The boaters were then asked if there was a complaints log and complaint resolution system. Here there seemed to be some confusion. Most of those interviewed thought that there wasn't a system (40%) or did not know (46%). However, when asked how they registered a complaint, 37% of the boaters said that they simply talked to the operator and they dealt with it (Figure 9 & 10). It was clear that although there frequently seemed to be no "official" complaints procedure, the boaters were satisfied that when they drew the operator's attention to any issues that were promptly dealt with.

Is there a complaints procedure?

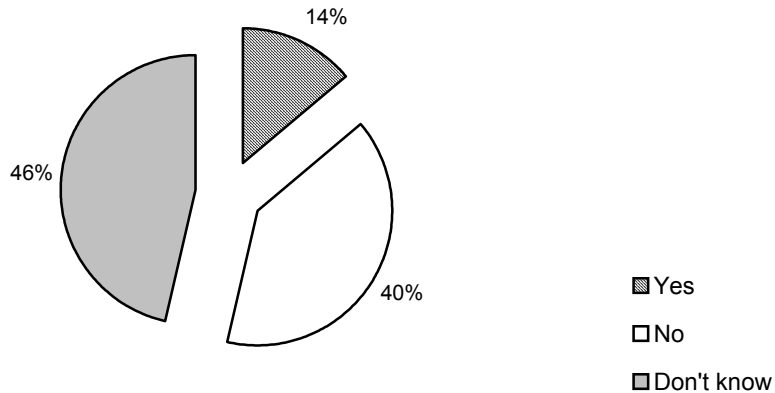


Figure 9. Percentage of boaters who knew of a complaints procedure

How does the complaints procedure work?

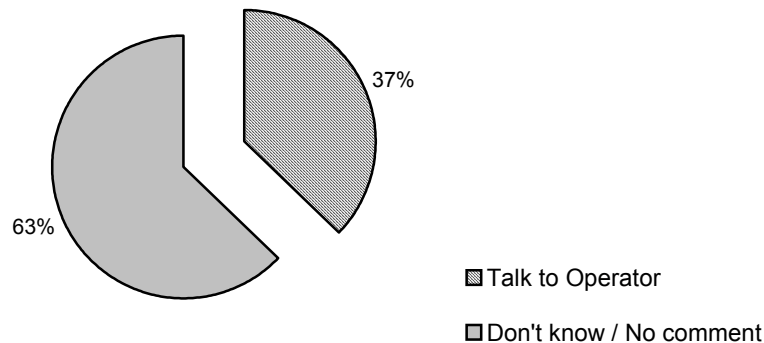


Figure 10. Boaters' views on how to deal with a complaint

When asked about the means by which boaters were made aware of the pumpout facilities, 58% did not know or expressed no view while 12% said that the information was disseminated by word of mouth, 16% by signs and 14% through boater's guides (Figure 11).

How do people know about the facility?

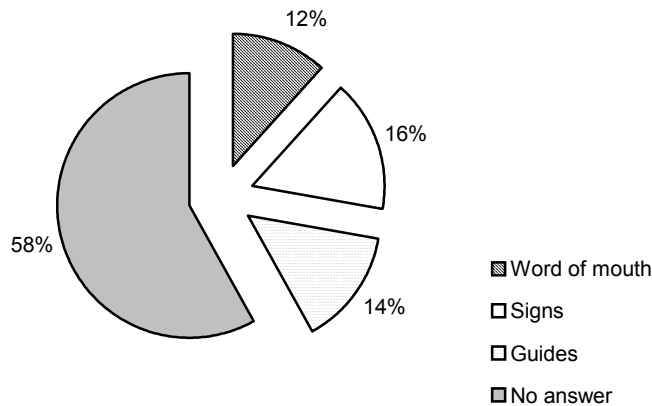


Figure 11. Boaters' view as to how people knew about the pumpout facilities

Of the boaters, 56% felt that the pumpout facilities were successful in their operation, with 44% having no opinion. There were no boaters who felt that the service was not successful. When asked why the facilities were successful 26% felt that it was due to the professionalism of the staff and 23% felt it was due to the convenience of the facilities. The efficiency of the facilities was cited by 2 boaters (5%), although this may be due to the professionalism of the operators. One felt that success was attributable to people's awareness of the issues and the need for disallowing discharge and another boater felt that the success was due to the number of visitors. Eighteen boaters expressed no view (Figure 12).

Why is the facility successful?

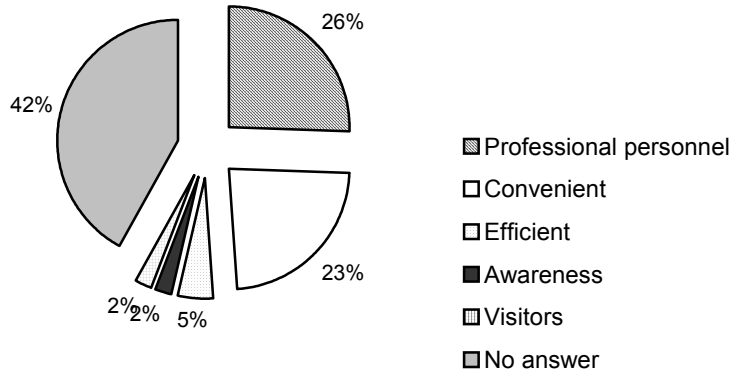


Figure 12. Boaters' views on why pumpout facilities were successful

Finally, the boaters were asked what they thought were the incentives for the operator to run such facilities (especially as there is normally no charge for the service). The most common response was that it was simply their job (26%). Four boaters (9%) felt that it was in the operator's best interests to maintain a clean environment and high water quality. There was an even split (7% each) between the incentive being the tips that the operator received and the fact that the law demanded that they offer the service. One boater felt that there might be a tax incentive. Of those interviewed, 49% did not know or had no opinion (Figure 13).

What is the incentive for pumpout operators?

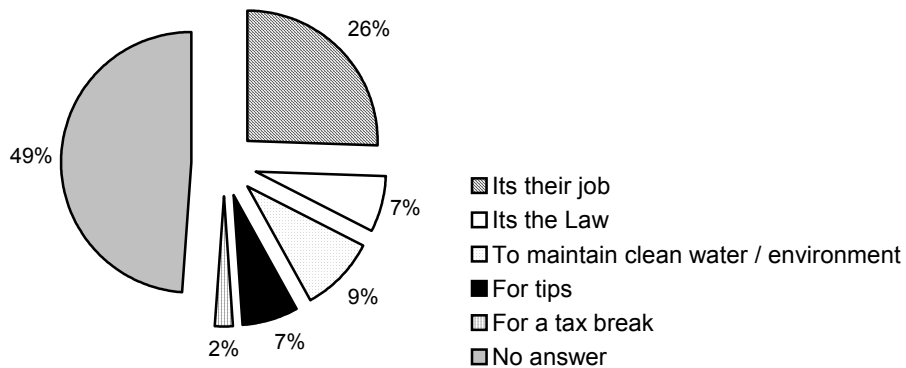


Figure 13. Boaters' views on the incentives for operators to run pumpout facilities

Comments and Anecdotal Data

The views and anecdotal information gathered from all the boaters interviewed cannot be analyzed. However, the information is presented below. Some comments are specific to a particular facility while others are more general.

F L Tripp & Sons and Westport Yacht Club (Westport)

Only one small sign was in evidence and this would not be visible from the water. One boater felt that transients would be unlikely to know about the pumpout facilities.

Davis & Tripps Inc (South Dartmouth)

No signs were visible. Most vessels did not have cabins and there was nobody on board those that did.

Pope's Island Marina (New Bedford)

No signs for pumpout were visible but there was a high level of satisfaction with the marina. For the previous 4 years the pumpout facility was frequently inoperable but a new system was installed this season and is reliable. One boater did not like the new floating dock, as it was difficult to approach single handedly.

Earl's Marina (Fairhaven)

This is a small marina with few vessels with cabin. There were no signs advertising the pumpout. Two boaters expressed the view that there were not enough pumpout facilities and those that did exist did not advertise themselves enough. These boaters were unaware of the CZM "2001 Boater Guide to Tides and Pumpout Facilities". When given copies, they suggested that these should be made available at all marinas and fuel docks. One boater commented that many facilities were frequently inoperable. He stated that one of the facilities on Martha's Vineyard was "always broken."

Mattapoisett Town Dock (Mattapoisett)

There were no signs for the pumpout. There were few boats at the dock and nobody on board the larger vessels. Many boats were on moorings.

Warr's Marina and Onset Bay Marina (Wareham)

One boater expressed the view that the Edgartown pumpout facility was not good. Another felt that the nearby sewage treatment facility and animals were responsible for poor water quality rather than boats. One boater stated that boaters frequently use a bucket and empty it overboard rather than use the head on board.

Kingman Marine (Cataumet)

One view was that locals comply with the No Discharge regulations but transients generally do not. Another view was that in general people were complying and that the No Discharge designation was successful. One boater felt that the dock was difficult to approach due to its small size.

Fiddlers Cove Marina (Falmouth)

It was suggested that this was one of the better facilities in the area and that Kingman Marine was not so good. One boater said that there used to be a pumpout on the main dock but this broke down so boaters all had to use the fuel dock.

Half Tide Marina (Mashpee)

It was reported that this facility was under new management and that the facility was inoperable at that time. They were waiting for a spare part from the State.

Little River Boatyard (Mashpee)

One boater felt that the access to the facility was difficult. Another felt that there should be pumpout facilities at the entrance to all harbors and that the main water quality problems were in Falmouth.

Prince's Cove Marina (Barnstable)

There were some signs advertising the pumpout facility. One boater felt that septic tanks were to blame for poor water quality. Another felt that all fuel docks should offer a pumpout service and they should be located at the entrance to harbors as boaters will not go out of their way to access the facilities. It was also felt that Harbormasters should not do pumpout as they have more important things to do.

Oyster Harbor Marina (Barnstable)

The view was that this was a better facility than many others.

Nantucket Town Pier and Nantucket Boat Basin (Nantucket)

The general feeling was that this was a good facility that was well advertised.

Operator Questionnaires

Fourteen responses were received from pumpout operators. This represents almost a 37% response rate, which is higher than is normally to be expected with a mail survey.

All the facilities were established between 1987 and 1999, with 1 running only a pumpout boat, 6 offering only dockside pumpout (including pumpout carts) and 7 having both a dockside facility and a pumpout boat. None of the facilities charged boaters for their pumpout services. Public funds paid completely for the installation of 10 of the facilities and covered 75% of the costs in 1 case and 50% in 3 other locations. In 8 cases, the running costs were totally covered by public funds. Three facilities reported that 75% of their running costs

were covered by public funds. Two facilities had 50% public funding while another was privately funded. This facility reported that their annual running costs were “very little since installation.” The estimates of annual running costs varied considerably from negligible to \$15,000 to \$18,000 per year (Table 2).

Table 2. Information on the 14 pumpout facilities that responded to the questionnaire

Facility	Date opened	Facility type				Cost of pumpout (\$)	% setup costs from public funds	% running costs from public funds	Annual running costs (\$)
		Boat	Dockside	Cart	Dump				
Allen Harbor Yacht Club (Harwichport)	1994			X		0	100%	100%	
Boat Basin (Nantucket)	1988	X	X	X		0	50%	50%	\$1.5K
Bourne Marina (Buzzards Bay)	1987	X	X			0	50%	50%	
Falmouth Marine (Falmouth)	1996		X			0	100%	100%	\$50
Little River Boat Yard (Mashpee)	1993	X		X	X	0	100%	100%	\$7.5K
Mattapoissett Boat Yard (Mattapoissett)	1996	X	X			0	100%	75%	\$9-10K
Onset Bay Marina (Wareham)	1992		X			0	100%	0%	little
Oyster Harbor Marina (Osterville)			X			0	100%	100%	
Parker's Boat Yard (Cataumet)	1998	X	X			0	100%	100%	
Pope's Island Marina (New Bedford)	1993		X			0	100%	100%	
Saquatucket Marina (Harwichport)	1990	X	X			0	100%	100%	\$1.5K
Town Pier (Nantucket)	1993	X	X			0	50%	75%	\$15-18K
Tripp's Marina (Dartmouth)	1998		X			0	100%	100%	\$3-500
Woods Hole Marine (Woods Hole)	1999	X				0	75%	75%	

The questionnaire asked for information on the number of boats serviced and the amount of sewage pumped. In order to facilitate comparison, this information was standardized into the numbers per month. There is clearly a wide range of estimates of the number of boats serviced per month with Allen Harbor Yacht Club pumping approximately 9 vessels and Nantucket Town Pier servicing approximately 692 boats. Nantucket Boat Basin had the second highest rate of 500 vessels per month (Figure 14). Saquatucket Marina provided no information on the number of vessels serviced. This number was estimated by dividing the total amount of sewage pumped per month by the average amount of sewage per vessel at the other facilities.

A similar pattern was apparent with the number of gallons pumped per month. The lowest figure was from Allen Harbor Yacht Club (15 gallons per month) and the highest was from Nantucket Boat Basin (10462 gallons per month). The second highest figure, 9200 gallons per month, was from Nantucket Town Pier (Figure 15). Bourne Marina, Parker's Boat Yard and Pope's Island Marina gave no information on the volumes pumped per month. These amounts were calculated by multiplying the number of vessels that they serviced per month by the average amount of sewage per vessel at the other facilities.

Number of Boats Serviced per Month

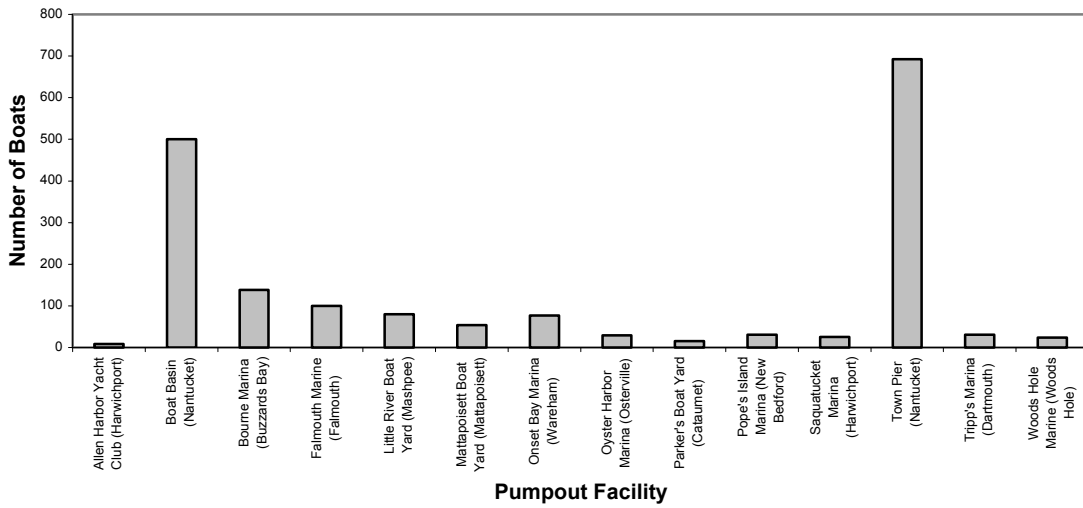


Figure 14. Number of vessels serviced each month by the pumpout facilities

Number of Gallons Pumped per Month

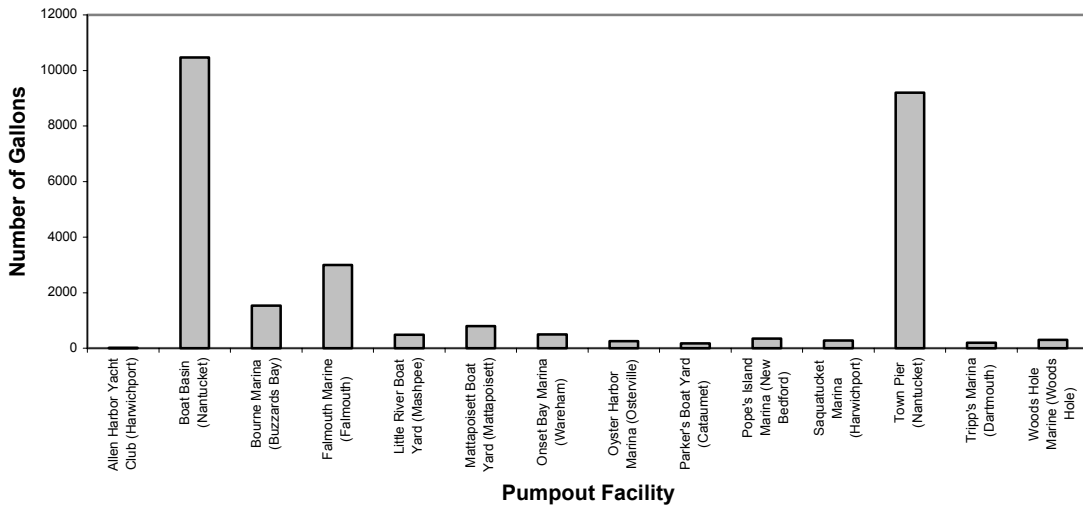


Figure 15. Number of gallons of sewage pumped per month by the pumpout facilities.

The average amount of sewage pumped from each boat was 12.1 gallons. Figure 16 shows that Falmouth Marine pumped on average, significantly more sewage per boat than the other facilities. It was thought that this could be due to Falmouth Marine servicing a higher number of larger vessels. There was no information on the proportion of large vessels serviced compared with small vessels. Figure 17 shows the range of vessel sizes that were reportedly serviced at each facility. While Falmouth Marine serviced vessels up to 72 foot, Bourne Marina, Nantucket Town Pier and Nantucket Boat Basin handled much larger vessels (120, 170 and 316 foot respectively).

The facilities estimated the proportion of local boaters that they serviced compared to the number of transient vessels. Six facilities reported that 75% or more of their customers were local boaters. Three reported an even split between locals and transients. Nantucket Town Pier reported that only 10 % of its customers were local with the remaining facilities reporting between 20 and 40% as locals (Figure 18).

The pumpout facilities operators were asked to quantify what they felt was their customers' level of satisfaction. As with the boater survey, to standardize their responses they were asked to base this on a scale from "zero" (extremely unhappy with the facility) to "ten" (extremely happy with the facility). The average estimated level of satisfaction was 8.7, which is very similar to the level expressed by the boaters (8.5). However, whereas the boaters' responses ranged from 3 to 10, the operators' lowest estimate was 5 (Figure 19). Of the boaters interviewed, 86% rated the facilities as 7 or higher while 93% of the operators felt that this was the case.

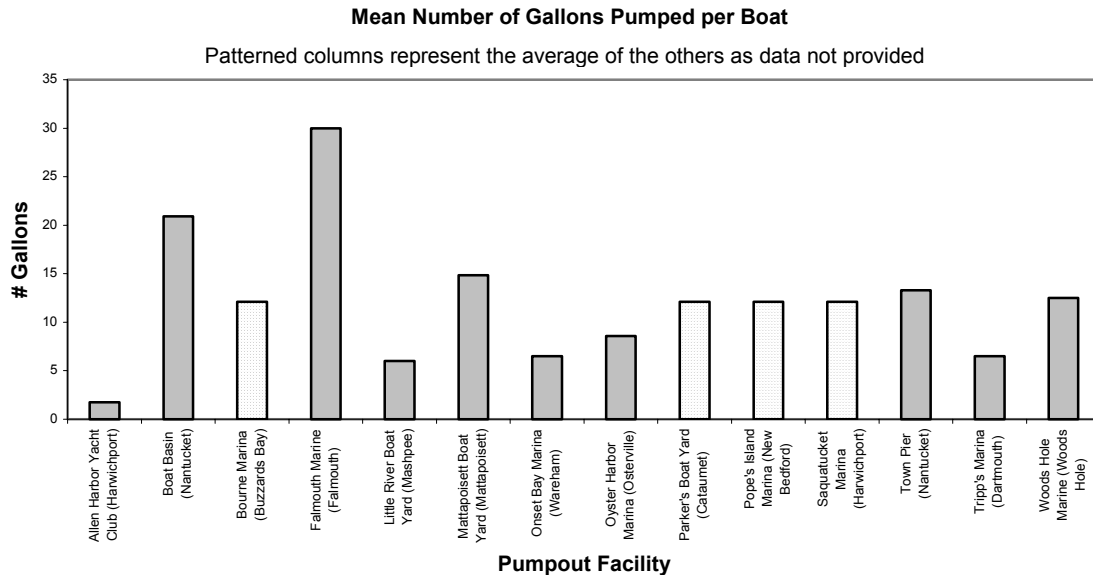


Figure 16. Average number of gallons pumped per boat at the pumpout facilities

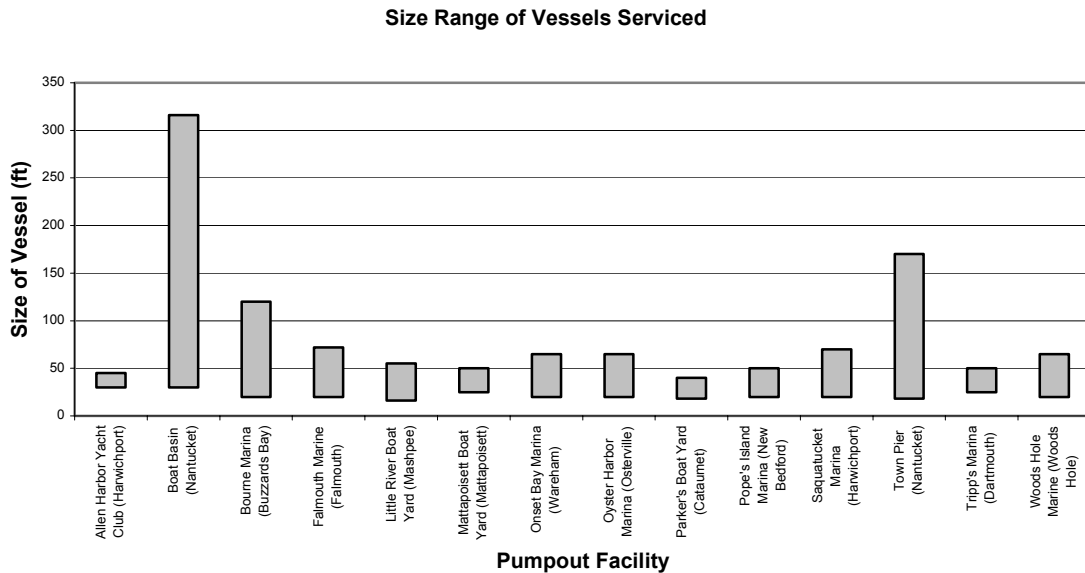


Figure 17. Range of sizes of vessels served at the pumpout facilities

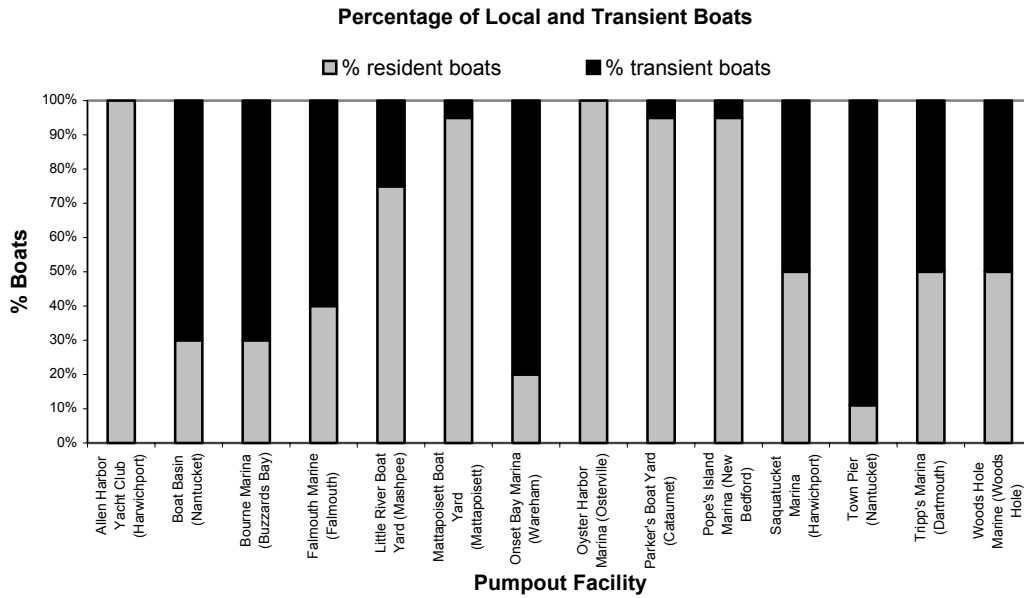


Figure 18. Percentage of local and transient boats serviced by the pumpout facilities

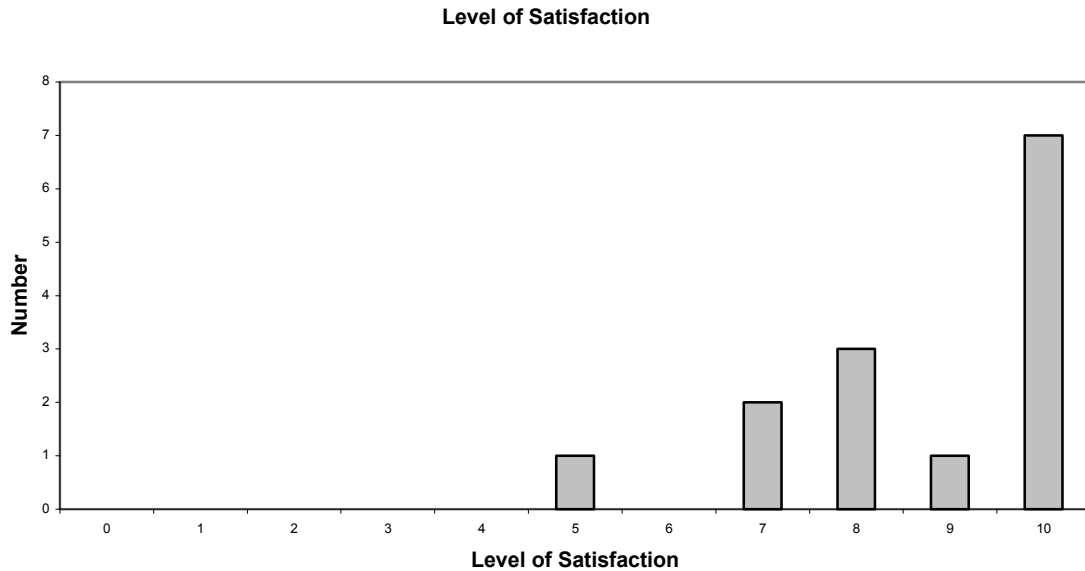


Figure 19. Pumpout operators' estimates of customers' satisfaction

Table 3 shows the remaining information provided by the pumpout operators. Only 3 operators reported having a complaints procedure. As discussed earlier, most facilities had an unofficial procedure in that boaters simply talked to the operator if they had a problem. Two operators reported that a lack of spare parts was a hindrance to the operation of the facility. One of these reported having been unable to pump sewage for 75% of the season while waiting for spares.

Table 3. Additional information provided by the pumpout facility operators

Facility	How advertised ¹	How request pumpout ²	Attendant?	Absentee pumpout?	Referral System?	Complaint Procedure?	Time out of operation (%)	Reason for non operation ³	Spares stored on site	Lack of spares a problem?
Allen Harbor Yacht Club (Harwichport)	FW	-	Both	No	No	No	-	-	No	No
Boat Basin (Nantucket)	SMFW	ARFPE	Yes	Yes	Yes	No	0%	-	Yes	No
Bourne Marina (Buzzards Bay)	SBIF	ARP	Both	Yes	-	No	-	-	Yes	No
Falmouth Marine (Falmouth)	SW	ARP	Yes	Yes	Yes	No	50% ⁴	E	No	No
Little River Boat Yard (Mashpee)	SBIF	ARPE	Yes	Yes	No	Yes	-	-	Yes	No
Mattapoissett Boat Yard (Mattapoissett)	SB	ARFP	Yes	Yes	Yes	No	0%	ES	No	No
Onset Bay Marina (Wareham)	S	AR	Yes	No	Yes	No	0%	-	Yes	No
Oyster Harbor Marina (Osterville)	W	A	Yes	Yes	-	No	⁵	E	Yes	No
Parker's Boat Yard (Cataumet)	G	RP	Yes	Yes	-	Yes	2%	E	No	No
Pope's Island Marina (New Bedford)	-	RP	Yes	Yes	No	No	50% ⁴	-	Yes	No
Saquatucket Marina (Harwichport)	SBF	ARP	Yes	No	Yes	Yes	-	E	No	Yes
Town Pier (Nantucket)	SBIF	ARP	Yes	No	No	No	2%	ESW	Yes	No
Tripp's Marina (Dartmouth)	SB	AR	Yes	Yes	Yes	No	75%	E	No	Yes
Woods Hole Marine (Woods Hole)	SG	ARPFL	Yes	Yes	Yes	No	-	S	Yes	No

¹ Signs / Buoys / Mailing / Internet / Flyers / Word of Mouth / Guides

² Ask / Radio / Form / Phone / E-mail / FLaG

³ Equipment / Staff / Weather

⁴ Believed to be scheduled closed periods

⁵ Out of service when tank is full

CONCLUSIONS

- A high percentage of boaters with MSDs reported that they used the available pumpout facilities. There were a small number who were unaware of the facilities or did not know how to access them. However, it is possible that the sampling methodology was biased towards local boaters who rarely left the dock. Ways to rectify this are discussed in the Recommendations. With any future survey, it is important to ensure that the broadest possible cross-section of the boating community be sampled.
- Boaters generally had a high level of satisfaction with the services provided. The operators also felt that this was true. The levels of boater satisfaction may have been closely linked to their experience at their local facility and may not reflect a general level of satisfaction.
- Although the level of satisfaction was high, there were a number of factors that boaters suggest could be improved such as more pumpout facilities, including more pumpout boats. Additionally, there were reports from both boaters and operators of facilities being out of service for periods of time. If there are too few facilities and some of those are not functioning, this is likely to increase the frequency of boaters discharging their sewage into nearshore waters. There were a few instances where boaters

commented on difficult access to a facility. This is an issue that should be addressed by the specific pumpout facility operator. Although it was not common for there to be a complaint procedure in place, there seemed to be a healthy dialogue between boaters and operators. An informal system such as this should be able to solve such problems.

- Generally the boaters were aware of the facilities but the operators seemed not to be greatly concerned with advertising their services. Information on facilities was frequently spread by word of mouth. This may be an effective method among local boaters but is more likely to exclude the transients. It is clear that information on pumpout facilities should be readily available and boaters should not have to "search". If it is going to take effort to find out about the location and how to access facilities, boaters are less likely to do so.

RECOMMENDATIONS

Due to financial and time constraints it was only possible to carry out a preliminary study during 2001. However, this study identifies issues that warrant a broader study. It is recommended that the study be expanded to cover the pumpout facilities throughout Massachusetts during the 2002 season.

It is felt that a further study should employ the same methodology as this pilot study with a few refinements.

Boater Survey Recommendations

In order to better understand boaters' use of pumpout facilities, the following additional information should be collected from the boaters:

- Which pumpout facilities the boater uses;
- If the boater uses a dockside service or a pumpout boat;
- How frequently the boater uses their vessel, differentiating between venturing out on the water and sitting alongside the dock;
- Where is the boat moored during the season;
- If they are a recreational or commercial boater
- If they are a seasonal boater or do they use the boat throughout the year;
- Is the boater a local or a transient;
- If they are a transient, where are they from, are they aware of the of the local discharge regulation and facilities and how frequently do they visit Massachusetts;
- The level of satisfaction with the boaters' primary facility and their level of satisfaction with how the system works in general.

It is clear from this pilot study that the question about the existence of a complaint log or complaint resolution system is irrelevant. If boaters have a problem with a pumpout facility they simply approach the operator. When the boaters were asked about the incentives for pumpout operators, 49% had no view or did not know and a further 26% responded that it was "their job." These answers do not provide any real insight into the boaters' views and should be excluded from any further surveys.

A common problem with "Access Point" surveys is finding suitable people to interview. Those boaters who are available for interview are frequently those who remain at the dock and generally use the dockside restrooms. It is therefore likely that the frequency of pumpout facility use will be underestimated. This methodology may also under sample the transient boater population. To try and rectify these problems it is recommended that any future survey collaborates with the staff at harbors, marinas and boatyards. Both local and transient boaters will access services such as fuel docks etc. Each fuel dock is a focus of boating activity and when fuelling, the boaters have time to fill in a brief questionnaire. Although their willingness to participate is unknown, if the operators were recruited to hand out the questionnaires and to collect the responses, a wider cross-section of boaters would be sampled. This would also reduce the need for time-consuming fieldwork as the completed questionnaires could be periodically collected or mailed to the researchers. Generally, boaters had a high level of satisfaction with pumpout facilities so the operators would have nothing to hide. It is also recommended that all fuel docks and marinas be provided with the latest "Boater Guide to Tides and Pumpout Facilities". These should be offered to all boaters who use the dock. In this way, boaters do not have to actively look for the information, as it will be readily available.

An alternative approach would be to leave a survey package on boats were the owners were absent. Such a package could be waterproof and contain an explanatory note, a questionnaire and a pre-paid business reply envelope so that the completed questionnaire could be returned. Alternatively, fuel docks etc. could be established as drop off points. It is likely that there would be a lower response using this method than if the fuel dock operators actively involved boaters who accessed their facility. Therefore, it is recommended that both methods be employed in any future survey.

In order to increase the number of boaters interviewed, any further survey should run for the complete season. Additionally the boating public should be made aware that the survey is being conducted and the goals and objectives of the study. This should be through notices and details being published in boaters guides, local newspapers etc.

This survey only addressed the recreational boaters and it is recommended that any future survey also interview commercial vessel operators such as fishermen and ferry operators. Although discharge regulations apply equally to recreational and commercial boaters, commercial vessels such as ferries have the potential to release large amounts of sewage if they choose to ignore the regulations. Many of these vessels are larger than recreational vessels yet some recreational boaters report difficulty accessing pumpout facilities. This problem will be greater for the larger vessels, making the inclusion of them in any future survey a necessity.

Operator Survey Recommendations

Although there were only 14 completed operator questionnaires, this is a high degree of success for a mail survey (almost a 37% response rate). If the operators were assisting in the boaters' survey, the number of operator responses would be expected to increase. Once again, the survey should be publicized in all possible ways to increase awareness. If the survey were conducted by an organization such as the Urban Harbors Institute, it is thought that most operators would be willing to participate.

Generally the questions were understood although there was some confusion with the question about the number of days in service versus the number of days out of service. Some operators simply listed the days or months when the facility was closed as scheduled.

The answers to the number of boats services and the amount pumped were frequently estimates. In order to acquire more robust figures for these it is recommended that the operators be asked to fill in a weekly log during the season. This information may already exist, as it is believed that some operators provide the State with such data.

The following additional information should be collected:

- The water depth in the approaches to the facility or any other restrictions to access;
- The number of vessels of different sizes that are serviced;
- The number of recreational versus commercial vessels serviced;
- The exact dates and reasons for any non-scheduled closures.

General Recommendation

In general, the researchers saw little in the way of signage advertising pumpout facilities and the operators seemed not to be proactive in persuading boaters to pumpout. Frequently pumpout is available at fuel docks and when vessels fuel up the operators should offer to pumpout the tank. The time that this takes is less than the time it usually takes to fuel a vessel so it will not delay the boaters.

The knowledge about pumpout facilities is frequently spread by word of mouth. Although this is successful, it is less likely to reach the transient boaters. The location of pumpout facilities should be highlighted by the use of signs so that boaters will see where the facilities are without having to search. Additionally, information on the location of pumpout facilities and how to access them should be readily available at all harbors, marinas and docks. This should be in the form of the CZM "Boater Guide to Tides & Pumpout Facilities". Information about local regulations should also be included. Increasing boaters' awareness of the facilities and the issues will reduce the number of boaters who can claim that they "don't know" about the facilities.

A number of boaters expressed the view that more facilities are needed. Locating pumpouts at all fuel docks would greatly increase the accessibility to such services. However, pumpout services should also be available at docks other than fuel docks. Fuel docks tend to become bottlenecks especially at the end of the day when most boaters are returning to shore. Those vessels that are not in need of fuel are unlikely to spend time

queuing if they feel that they can get away with discharging their sewage into the water. Establishing facilities at other locations will help minimize waiting times.

Generally it is important to make the whole process of pumpout as easy as possible for boaters. Increasing the number of facilities and signs advertising the service will go a long way to ensuring this. It is also important that existing pumpout facilities are operational. One operator who responded to the survey reported that his facility was not operable for 75% of the season due to equipment failure. It is essential that "down time" of facilities be kept to a minimum. The State should ensure that sufficient spare parts are kept in stock to keep State-funded facilities in operation. It is also important that if a facility is out of service, boaters can find this out before they motor to the facility. Therefore, a central record of which facilities are not operating would be beneficial. Although the logistics of establishing such a system are unknown, it may be possible for CZM to set up a pumpout "hotline." Operators or boaters could call CZM to report that a pumpout facility was inoperable. CZM could then have this as a prerecorded message on the pumpout "hotline." If boaters were made aware of this service they could be sure not to waste a journey to an inoperable facility.

APPENDIX 1 – Details of Pumpout Facilities (data from the CZM website)

Town	Location	Telephone	Pumpout Type				Season	Hours
			Boat	Dock	Cart	Dump		
Barnstable	Hyannis Marina	508-775-5662		X	X		3-Season	8 – 4
Barnstable	Oyster Harbor Marina	508-428-2017		X			3-Season	8 – 5
Barnstable	Prince's Cove Marina	508-428-5885			X		3-Season	8 – 5
Bourne	Bourne Marina	508-759-2512	X	X		X	3-Season	8 – 5
Bourne	Parker's Boat Yard	508-563-9366		X			3-Season	8 – 5
Bourne	Kingman Marine	508-563-7136		X			Year-Round	8 – 5
Chatham	Old Mill Boat Yard/Pleasant Bay	508-945-5185	X	X		X	June - Sept	9 – 5
Chatham	Stage Harbor Marine	508-945-1860		X		X	April - Dec	8 – 4:30
Dartmouth	Davis & Tripp's Marina	508-999-0759	X				Year-Round	8 – 8
Dartmouth	North Side Bridge, Town Dock	508-999-0759	X				Year-Round	8 – 8
Fairhaven	Seaport Marina	508-992-7985	X				3-Season	Call
Fairhaven	Earl's Marina	508-993-8600		X			3-Season	7 – 6
Falmouth	Brewer's Fiddler Cove	508-564-6327		X	X		3-Season	9 – 6
Falmouth	Quisset Harbor Boatyard	508-548-0506	X				3-Season	8 – 6
Falmouth	Woods Hole Marine	508-540-2402	X				3-Season	8 – 6
Falmouth	MacDougalls Marina	508-548-3146	X				3-Season	8 – 6
Falmouth	Falmouth Marine	508-548-4600		X			3-Season	8 – 6
Falmouth	Edwards Boat Yard	508-548-2216		X			3-Season	8 – 6
Harwich	Saquatucket Marina	508-430-7532	X	X	X	X	May - Nov	24 hrs
Harwich	Allen Harbor Yacht Club	508-432-1410			X		May - Nov	24 hrs
Harwich	Harwichport Boat Works	508-432-1322			X		May - Nov	24 hrs
Marion	Island Wharf	508-748-3535	X	X		X	3-Season	8 – 4
Mashpee	Little River Boat Yard	508-548-3511	X				3-Season	8 – 4
Mashpee	Half Tide Marina	508-477-2681			X		3-Season	Call
Mattapoisett	Mattapoisett Boat Yard	508-758-3812	X				3-Season	8 – 4
Mattapoisett	Mattapoisett Town Dock	508-758-4191		X			3-Season	8 – 5
Nantucket	Nantucket Boat Basin	508-228-1333		X	X		3-Season	8 – 5
Nantucket	Nantucket Town Pier	508-228-7260	X	X		X	3-Season	8 – 5
New Bedford	Pope's Island Marina	508-979-1456		X		X	3-Season	7 – 8
Wareham	Onset Town Pier	508-295-8160		X		X	3-Season	Call
Wareham	Point Independence Yacht Club	508-295-3972		X			3-Season	Call
Wareham	Stonebridge Marina	508-295-8003		X		X	3-Season	Call
Wareham	Bevans/Continental Marina	508-759-5451		X		X	Year-Round	Call
Wareham	Onset Bay Marina	508-295-0338	X	X			Year-Round	Call
Wareham	Warr's Marine	508-295-0022	X	X		X	Year-Round	Call
Wellfleet	Town Pier	508-349-0320	X		X	X	3-Season	Call
Westport	Westport Point (Town Dock)	508-636-1015	X				3-Season	Call
Westport	F L Tripp's Marina	508-636-4058		X			Year-Round	Call

APPENDIX 2 – Boater Questionnaire

Survey of Boat Users	Site:	Date:	Researcher:				
1	How long have you been a boater?						
2	Do you have a head on board? If "yes", what type?		<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO		
YES	NO						
3	Are you aware of the availability of pumpout?		<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO		
YES	NO						
4	Do you know how to access the service?		<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO		
YES	NO						
5	How often do you make use of pumpout facilities?						
6	Are you happy with the level of service?		(very unhappy) 0 1 2 3 4 5 6 7 8 9 10 (extremely happy)				
7	What could be improved?						
8	What additional services are needed?						
9	Does the facility have a complaint log and complaint resolution system? a. How does it operate? b. How is it advertised? c. Is it successful? If "yes" d. What do they do that makes them so successful?		<table border="1"> <tr> <td>YES</td> <td>NO</td> </tr> <tr> <td>YES</td> <td>NO</td> </tr> </table>	YES	NO	YES	NO
YES	NO						
YES	NO						
10	What do you think are the incentives for the pumpout operators?						
Comments:							

APPENDIX 3 – Operator Questionnaire

Urban Harbors Institute (UMass Boston) - Pumpout Facility Operator Survey

Please fill in the survey as accurately as possible. Feel free to add additional comments. If you have any questions, please contact Dan at the Urban Harbors Institute on 617-287-5570. Thank you.

Location:	Name of Person Completing Survey:					
1	In what year did this pumpout facility first open?					
2	What forms of pumpout are offered?	BOAT	DOCKSIDE	CART	DUMP	
3	What happens to the sewage?					
4	What are the hours of operation on which days of the week?	Spring				
		Summer				
		Fall				
		Winter				
5	What do you charge for pumpout?					
6	How many boats do you service		per			
7	How many gallons are pumped on a daily / weekly / monthly basis?		per			
8	What is the number of boats serviced?					
	And of these:					
	a. What is the range of vessel sizes?					
	b. What is the range of holding tank capacities?					
	c. Number of Resident vs. transient boaters					
9	How do the boaters know if service is offered?	SIGNS	BUOYS	MAILING	INTERNET	FLYERS
	a. How do/can boaters request pumpout service -	ASK	BY RADIO	BY FORM	BY PHONE	BY E-MAIL
		Other:				
	b. Is there an attendant or is it self-serve?	ATTENDANT	SELF-SERVE			
	c. Can boaters request pumpout when they are not on the boat?	YES	NO	How?		
	d. Is there a referral system within the harbor or for a nearby harbor?	YES	NO			
10	Is there a facility complaint log and complaint resolution system?	YES	NO			
	If "Yes" then:					
	a. How does it operate?					
	b. How is it advertised?					
	c. Is it successful?	YES	NO			
11	Do you think boaters are happy with the level of service?	(very unhappy) 0 1 2 3 4 5 6 7 8 9 10				
	What could improve?	(extremely happy)				
12	Number of days in service vs. the number of days out of service					
13	Reasons why a facility was not operated:	EQUIPME	STAFF	WEATHER	Other:	

	NT		
14 Are spare parts for the pump etc. kept on site?	YES	NO	
15 Does the cost / availability of spare parts interfere with consistent service?	YES	NO	
16 Are there incentives to proactively approach potential "customers"? If "Yes", what are they?	YES	NO	
17 Was the setup of the facility funded publicly or privately?	PUBLIC	PRIVATE	Comments:
18 Is the operation publicly or privately funded?	PUBLIC	PRIVATE	Comments:
19 What is the cost for maintenance each season?			
20 Are you required to provide pumpout by DEP as part of your permit?	YES	NO	

Additional Comments: