

Purpose

This report is based on a study conducted by undergraduate students at the University of Southern Maine (USM) as a community service-learning project for an environmental economics course. This service-learning project was done in conjunction with the Friends of the Presumpscot River (FOPR), a local advocacy group dedicated to the restoration and preservation of the Presumpscot River in Southern Maine. The coordinator for the project is Michael Shaughnessy. Shaughnessy is currently on the board of directors of the FOPR, Professor of Art at USM, and resident of the town of Windham. The FOPR was formed in 1992, and has been actively involved in environmental issues associated with the Presumpscot River ever since. Their main focus has been on stricter regulations and standards revolving around the nine dams that provide hydroelectric power for South African Pulp and Paper Industries (SAPPI). To learn more about the FOPR and the Presumpscot River please visit their website at <http://www.presumpscotriver.org/>.

There are many negative environmental impacts associated with damming for hydroelectric power. Some of these include increased water temperature, unnaturally low oxidation levels, and shore erosion. Unfortunately this adversely affects many of the fish and wildlife species native to the Presumpscot River. It has also decreased the amount of recreational activities along the river such as swimming and fishing. Among the many consequences of damming has been the access of fish to move freely up and down the river that is necessary for spawning. To help counter this problem the FOPR has been focusing on increasing fish passage throughout the river. Although they have a plethora of environmental

arguments to support their efforts, their hope was to discover economic benefits that could be used to garner further support and help move their agenda forward. Therefore the purpose of this study is to find possible economic benefits that could result from additional river restoration and fish passage on the Presumpscot River.

Literary Review

As a guide for the study we turned to a book called Environmental Economics for River Restoration by Hale W. Thurston, Matthew T. Heberling, and Alyse Schrecongst. The book is based on economic studies of watershed restoration done in the Appalachia region. The purpose of the book is to offer local advocacy groups, such as the FOPR, a manual for measuring economic benefits that can be used in a cost-benefit analysis to determine whether watershed restoration makes economic sense.

Although the rivers and tributaries in Appalachia suffer from vastly different pollution sources than the Presumpscot, the authors make the point that the book is applicable for projects nationwide. In Appalachia the rivers endure high levels of mineral deposits from abandoned coal mines. This raises the acidity levels in the water making it uninhabitable to many of the native fish and wildlife. Therefore the overall consequences from coal mining are comparable to that of damming. In both cases there is deterioration in water quality making it challenging for native fish and wildlife to survive.

However what makes this book particularly useful is that it is meant for researchers with limited economic background and experience. It is a comprehensive handbook that covers all bases necessary for measuring the benefits of watershed restoration. This ranges from instructions on how to properly distribute a survey to a step-by-step description on how to conduct a complex economic procedure such as hedonic analysis. Further it describes economic

terms, offers a sample survey, describes various use and non-use benefits of restoration, as well as several valuation methods that can produce estimated economic value for a particular project.

Methods

Although we found the resources provided in the book to be applicable for an economic study on of the Presumpscot, we determined that following those procedures was unrealistic given the time restraints and resources allotted to us. Unfortunately placing actual economic value on the restoration of the Presumpscot River is far beyond the scope of this study.

However, we determined it was possible to evaluate whether there is a significant amount of use and non-use economic benefits associated with further restoration. In addition to that we wanted to assess whether the local community associates restoration with positive economic and environmental externalities. Therefore we decided to take a three pronged approach to the study: (1) a survey distributed primarily to, but not limited to, residents located near the Presumpscot River; (2) interviews with economic developers to determine whether they associated economic benefits with river restoration for their particular town; (3) interviews with a few local businesses to assess whether they directly or indirectly associate growth with the Presumpscot River.

One of the goals of the survey was to assess use and non-use values. The use values were primarily centered on recreational activities, however we did ask the respondents about hydroelectric power and the possible benefits for new businesses and tourism as well. The non-use values we measured were bequest value, option value, and existence value. Bequest value is the value of knowing a resource will be available for the use of future generations. Option value is the value derived from having the option of using a particular resource. Existence value is the value derived from knowing a certain resource exists.

Another focus of the survey was to gauge the respondents' familiarity with the environmental issues associated with the river. In particular if they related damming for hydroelectric power as a contributing source of pollution. We were particularly careful when constructing the wording of questions and selection choices to try to avoid push polling. For example, when asking the respondents about the sources of environmental issues associated with the river, we were careful to blend the answer of 'damming from mills' in with several other options. We were also concerned that the respondents would automatically associate the choices given as a source of pollution simply because we had them listed on the survey. To address this problem we gave the respondents the option of answering "unsure" on whether or not a particular action was a source of pollution.

We distributed the survey through Facebook.com using Survey Monkey. We did this for several reasons. First, it was the most efficient way of maximizing the number of respondents. Second, we felt it was important to get as broad of a selection base as possible. In particular we wanted to make sure we got respondents from various towns instead of just one particular area. Finally, Survey Monkey automatically calculated the answers into percentages; that made it easier to analyze the data and reduced the risk of human error.

One of the more unique aspects of this study was to interview economic developers. We were able to meet with two, Theo Holtwijk from Falmouth and Tom Bartell from Windham. The purpose of meeting with the developers was to find out if they believe river restoration and fish passage would economically benefit their town. These two towns represent opposite ends of the spectrum along the river, both geographically and economically. Falmouth is an affluent town located at the mouth of the river where it pours into Casco Bay. Windham is a more rural area located at the upper part of the river by Sebago Lake. Even the water quality is different, in

Windham it is classified as A (better), while in Falmouth it is classified as C (worse). Due to their vast differences we thought these two towns were appropriate samples because they each have separate needs, and would most likely benefit in different ways.

We also spoke with a couple of small business owners in Westbrook. Westbrook is widely known as a town that has experienced recent economic rejuvenation. We were eager to know if the business owners in the area made any connection between the river and economic growth. We were able to speak to Chris Dougherty, owner of Doughboy's Deli. Doughboy's is conveniently located across the street from the Dana Warp Mill. We also spoke to the manager at Portland Pie Company, which is situated along Main Street. We targeted these two businesses because they provide lunch and take-out services to the other businesses in the area, and therefore are good indicators of the overall growth of the town.

Analysis

Please refer to table 1 to see a copy of the survey and the final results. There are a few numbers that stand out to us. For instance, in question two 80% of respondents have used the river five times or less for recreational purposes, and half of those people have never used it at all. Another interesting find was in question three, which asked respondents to rate how important certain aspects of the river were to them. 17% of respondents felt that using the river for hydroelectric power was of low (1) importance- by far the highest percentage for that rating. Only 38% of respondents thought it was of the highest importance (5) compared to over 50% for all of the other alternative uses. Question four of the survey revealed that roughly 70% of respondents were unsure as to whether there were any significant environmental issues associated with the Presumpscot River. Only 18% identified damming as a source of

environmental pollution, while 60% said they were unsure. Trash was the only option that was recognized by the majority as a source of pollution on the river.

Other interesting figures pulled from the survey relate to who is responsible for river restoration. Only 17% believe the Federal Government is responsible; all of the other choices received over 50%. Over 80% of the respondents believe it is up to the State of Maine and those who pollute the river. Although 76% of the respondents live near the river, less than 10% have ever participated in river clean up.

Our conversations with Tom Bartell and Theo Holtwijk proved to be significant to our research. Although Tom Bartell, the economic development director in Windham, recognized river restoration as important for the environment, he felt that it would have limited economic benefits for his town. He attributed this to the lack of public access to the river. However, he did mention that a negative impact on the economy is possible if the pollution were to increase. Mr. Bartell believes that the majority of the jobs created from river restoration in Windham would be in tourism. These jobs tend to be lower paying and seasonal. He also identified SAPPI as a source of employment for many of the citizens of Windham.

Theo Holtwijk, the long range planning director in Falmouth, believes that his town receives significant economic benefit from the river. He explained these benefits are derived from a general increase in quality of life as a result of the resource. Therefore it is possible that an increase in river quality would be accompanied by an increase in property values. Theo stated that the Falmouth residents have a willingness to pay for such things because of the “conversation ethic” in the community.

Although Doughboys and the Portland Pie Company were unable to make any direct connections with the Presumpscot River and the growth in Westbrook they did give us some

useful information that we felt was applicable to this project. Both of these restaurants identified the numerous businesses located in Westbrook as a significant part of their clientele, particularly at lunchtime. They also claimed their volume of business has increased on a regular basis. Both businesses attribute this success to the overall growth in Westbrook. Doughboys credits a significant rise in business to the success of the Dana Warp Mill located across the street. The Dana Warp Mill has targeted art based businesses, and has grown steadily as of late.

Drawing conclusions

The survey provided us with an illustration of how people view the Presumpscot River and any environmental issues that may or may not be associated with it. The majority of respondents had not participated in recreational activities involving the river, with the exception of hiking alongside it. We wondered why the respondents, 75.9% of which were residents in towns directly along the river, weren't utilizing the river's offerings. Tom Bartell shed some light on a possible obstacle: public access. In Windham there is limited public access to the river due to private ownership and industrial zoning. In Falmouth, however, this is not the case. Due to a "conservation ethic", as Theo Holtwijk described, the town has bought and been donated several plots of land along the Presumpscot River to be preserved for recreational purposes. Therefore because the residents are able to access the river, they will likely benefit from it more. In Falmouth's case the benefits are derived from the quaint and private atmosphere, which is an important part of the town's community.

We found that a community's ability to rally and advocate for restoration is an essential aspect the process. Such a community exists in Falmouth and they have certainly benefited from it. Residents ability to enjoy the river and open land have simultaneously increased their willingness to pay for such amenities. As a result of their activism, Falmouth has seen new

benefits, such as being voted “The Best School for your Real Estate Buck” by Forbes magazine. Windham on the other hand has separate concerns, such as trying to create a more profitable business center and getting sewage into the northern regions of the town. It would be difficult to get the residents of Windham to rally for something that they wouldn’t directly benefit from, especially if it meant steering funds away from their more pressing needs.

For our concluding remarks, we would like to make some recommendations based on what we’ve learned. Firstly, time and ability narrowed the scope of what we were capable of producing for this project. It is clear that a comprehensive cost/benefit analysis using a wide array of methods would produce a much clearer picture of whether or not river restoration makes economic sense. Secondly, our research showed that the public is generally uneducated about possible pollutants in the river and their origins. Further education could increase awareness would increase demand for “conversation” within the community. Lastly, increased advocacy for more public access could lead to a heightened interest in river restoration. A combination of more public access, increased awareness, and further education will likely lead to more support in the restoring of the Presumpscot River.

We would like to thank all of those who set aside time to educate us throughout this project. Your contributions were extremely valuable. In particular, we’d like to thank Theo Holtwijk, Tom Bartell, and the local businesses in Westbrook. In a special thanks, we’d like to recognize Dr. Shaughnessy for guiding us through this process.

Table 1:

This survey is part of a community service-learning project being conducted by undergraduate students at the University of Southern Maine. This project is part of an environmental economics class in conjunction with the Friends of the Presumpscot River (a local advocacy group for Presumpscot River restoration). The purpose of this survey is to assess value of the Presumpscot River to the local community.

1.) Have you ever participated in any of these recreational activities in or on the Presumpscot River?

Fishing	33.3% Yes	66.7% No
Swimming	42.9% Yes	51.1% No
Hiking alongside the river	53.6% Yes	46.4% No
Kayaking or canoeing	28.6% Yes	71.4% No
Viewing wildlife	44.4% Yes	55.6% No
Picnic	40.7% Yes	59.3% No

2.) How often have you used recreational activities on or around the Presumpscot River?

41.4% None **41.4% 1-5** **10.3% 6-10** **3.4% 11-15** **3.4% 16-20+**

3.) Please rate how important each of the following aspects of the Presumpscot River are to you?

	Low	High
A river that is safe to swim in	10.3%-1	3.4%-2 10.3%-3 13.8%-4 62.1%-5
A river that is free of trash	0%-1	0%-2 13.8%-3 6.9%-4 79.3%-5
A river that is accessible for recreation	0%-1	0%-2 6.9%-3 27.6%-4 65.5%-5
A river that supports fish and wildlife	0%-1	0%-2 6.9%-3 24.1%-4 69%-5
A river with free flowing water: waterfalls, riffles, rapids	3.4%-1	6.9%-2 17.2%-3 17.2%-4 55.2%-5
A river that provides hydro-electric power	17.2%-1	6.9%-2 34.5%-3 3.4%-4 37.9%-5

4.) Based upon what you know about the Presumpscot River, do you think there are significant environmental issues associated with it?

24.1% Yes **6.9%** No **69%** I don't know

5.) Do you identify any of these environmental issues with the Presumpscot River? (check all that apply)

50.0% unnatural color of the water

56.3% odor from the river

37.5% the lack of fish and wildlife

50.0% trash

37.5% unsafe to swim

18.8% stagnant water from damming

18.8% other _____

6.) In your opinion, what are some sources of pollution in the Presumpscot River?

Sewage	32.0% Source	0.0% Not a source	68.0% Not sure
Trash	61.5% Source	3.8% Not a source	34.6% Not sure
Damming from mills	28.0% Source	12% Not a source	60.0% Not sure
Agricultural Discharge	29.2% Source	8.3% Not a source	62.5% Not sure
Discharge from industry	42.3% Source	3.8% Not a source	53.8% Not sure

7.) There are many reasons for restoring the water quality of the Presumpscot River. For each of the reasons listed below, please check how important each one is to you.

		Low		High	
Providing habitat for fish and wildlife	3.6%-1	0%-2	0%-3	32.1%-4	64.3%-5
Recreational opportunities	3.6%-1	0%-2	17.9%-3	32.1%-4	46.4%-5
Pride of having a clean Presumpscot River	7.1%-1	7.1%-2	17.9%-3	25%-4	42.9%-5
So future generations will be					
able to enjoy the river	0%-1	0%-2	7.1%-3	28.6%-4	64.3%-5
The attraction to new business and visitors'	7.1%-1	14.3%-2	21.4%-3	28.6%-4	28.6%-5

8.) Who do you think should be responsible for restoring the Presumpscot River? (Check all that apply)

62.1% People who use the river

82.8% People who pollute the river

58.6% Friends of the Presumpscot River (Local advocacy group)

62.1% Cumberland County

86.2% State of Maine

17.2% Federal Government

9.) Have you ever volunteered in river clean up along the Presumpscot River?

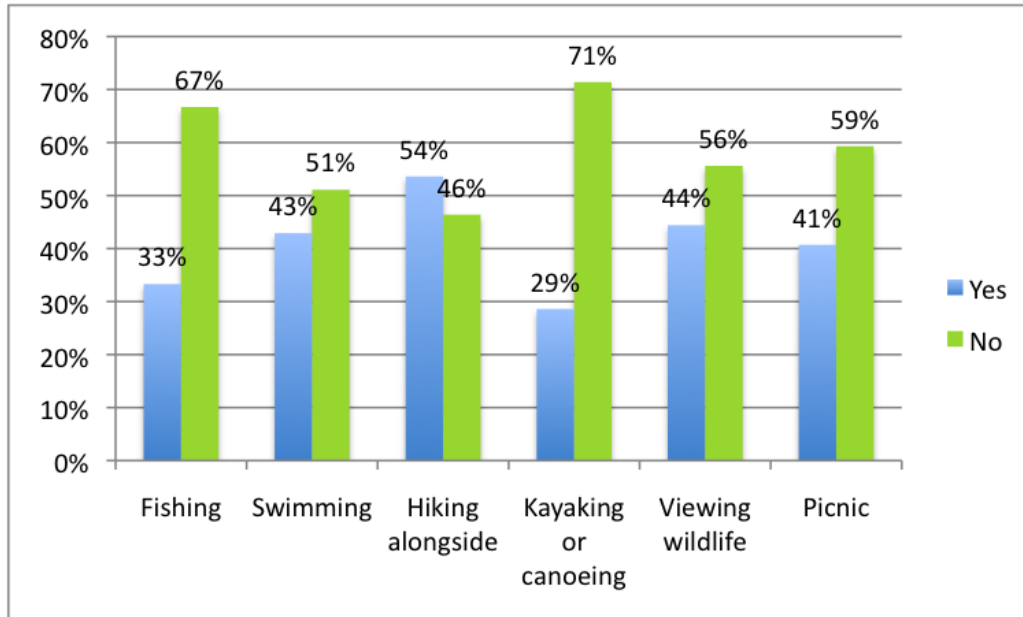
6.9% Yes **93.1%** No

10.) Are you a homeowner or renter in the area?

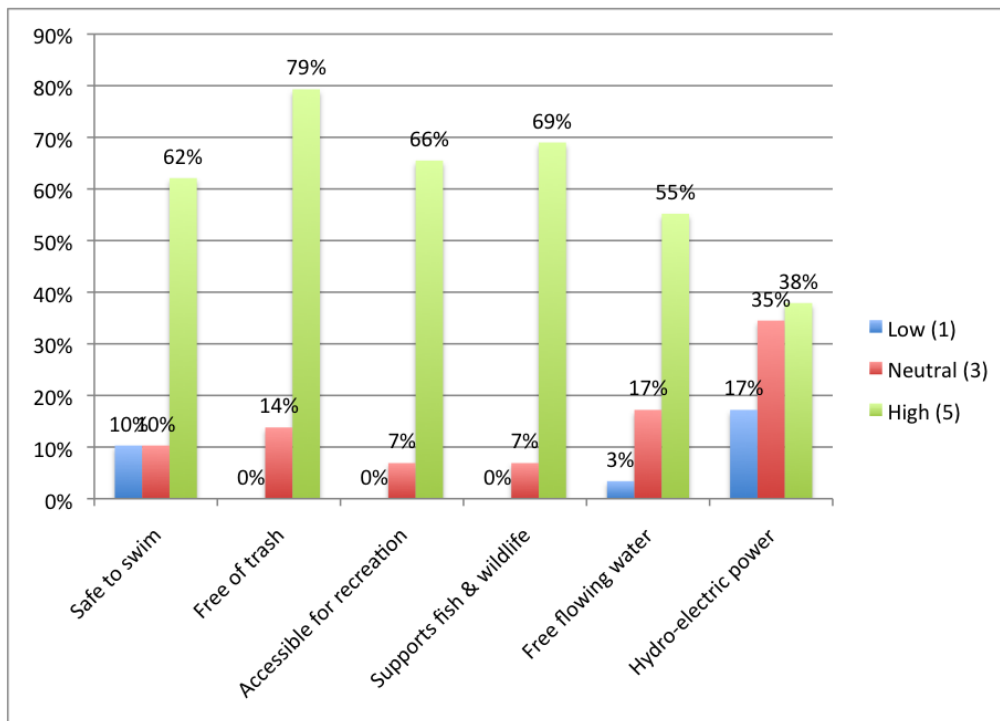
75.9% Yes **24.1%** No

Graphs from Survey

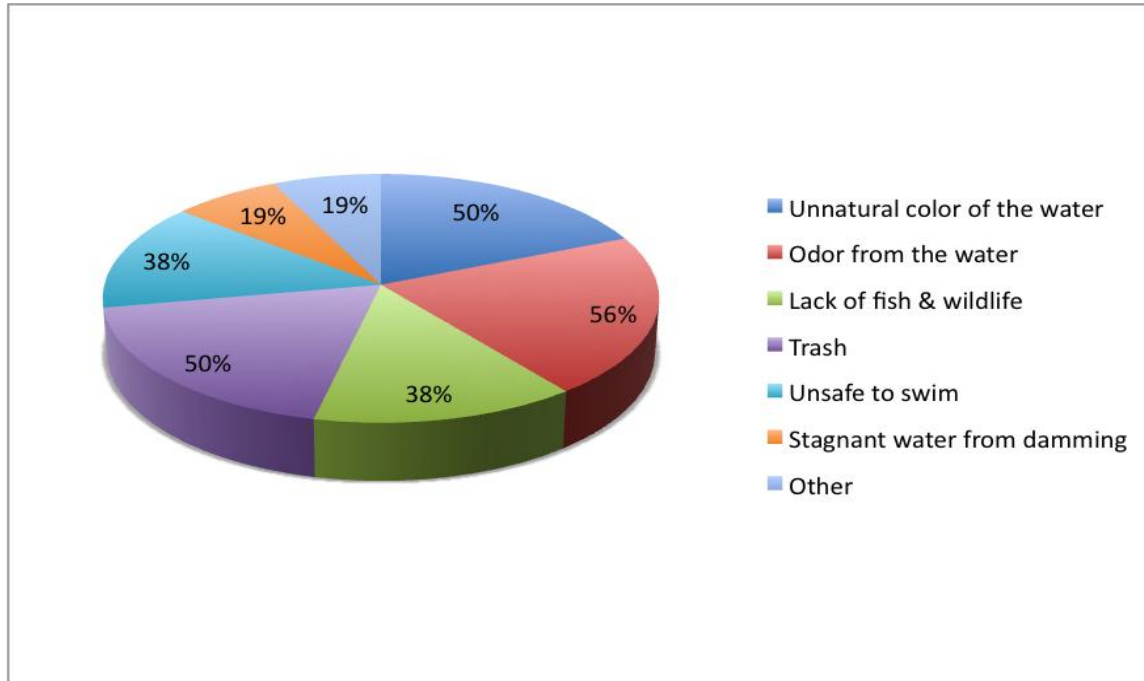
Question 1: Have you ever participated in any of these recreational activities in or on the Presumpscot River?



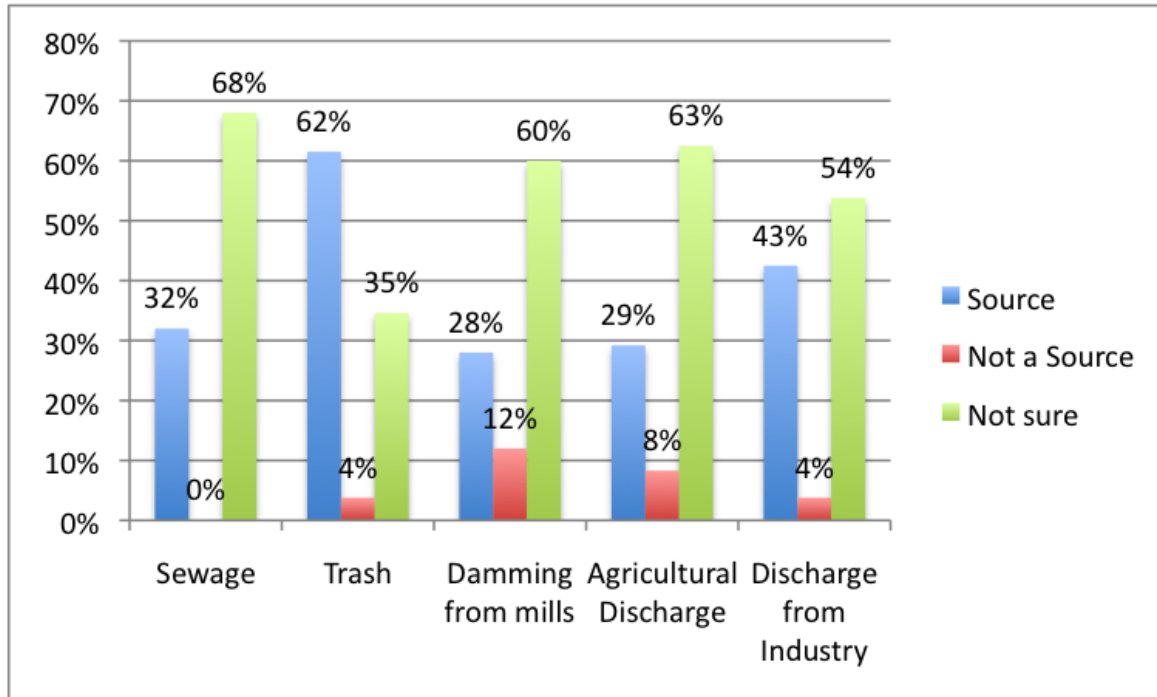
Question 3: Please rate how important each of the aspects of the Presumpscot River are to you.



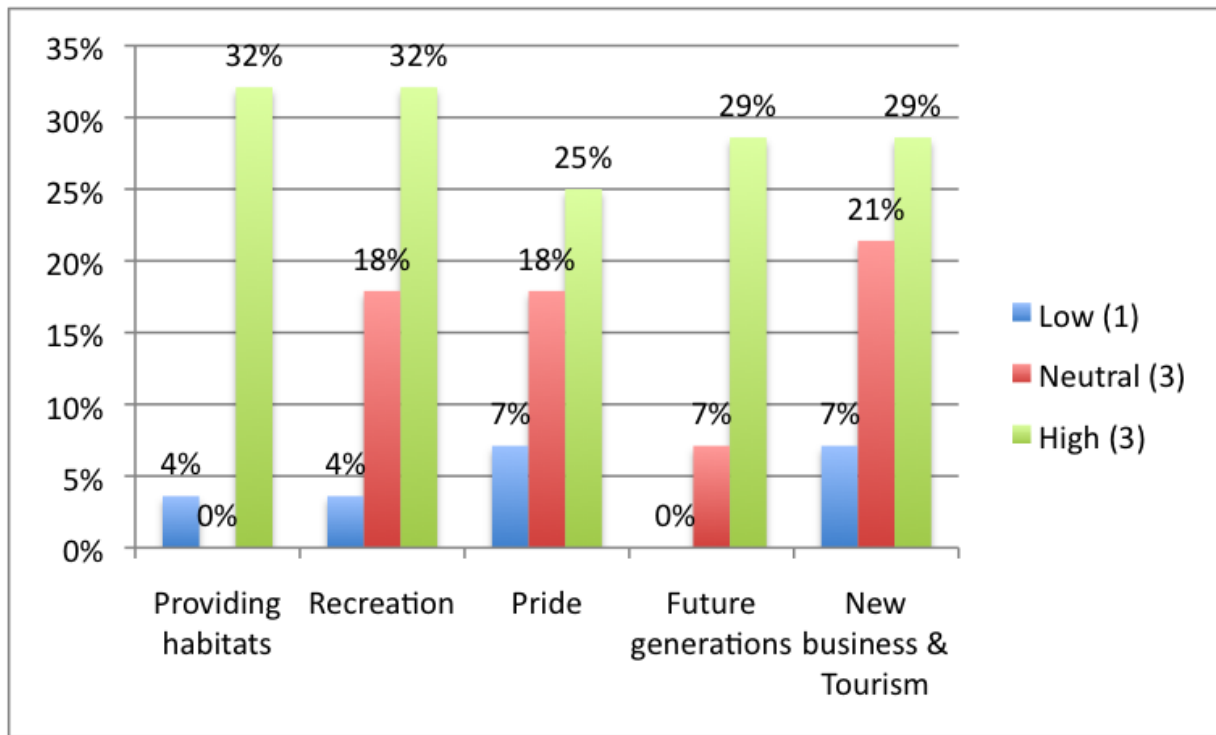
Question 5: Do you identify any of these environmental issues with the Presumpscot River?



Question 6: In your opinion, what are some of the sources of pollution in the Presumpscot River?



Question 7: There are many reasons for restoring the water quality of the Presumpscot River. For each reason, please check how important each is to you.



Question 8: Who do you think should be responsible for restoring the Presumpscot River?

