POLICY INVESTIGATIONS

Each student investigated a policy that has or could potentially affect Lake Sunapee. This assignment showed us the importance of being able to read as well as interpret policy proposals. We also learned, to a degree, the amount of work that goes into creating/fighting a proposal. We looked to address five issues pertaining to the policy we focused on. First, we did a short literature review where we found information on the policy and how it would affect Lake Sunapee or how the policy we chose affected the area in which it was adopted. We then identified the stakeholders that are/were or would potentially be highly interested and affected by the outcome of the policy. It is important to identify stakeholders when developing a policy in order to try and avoid any issues that may arise. This could save valuable time during the review process. Another vital reason to identify stakeholders is to gain support for your cause. After you’ve identified who will likely oppose or support the bill, it will be necessary to inform those stakeholders so you can gain more support and strength on your side of the cause. Next, we outlined the policy itself and its important aspects. This was then followed by our own critique on what we recognized as good or bad aspects and what needed to be changed, altered, or added. Finally, we provided some recommendations on the issue and whether we felt it is an important policy for the Lake Sunapee community to consider.

The topics that we covered for this assignment are as follows:

- Declining Fish Numbers and Possible Reintroduction.........3
- Lead Sinkers.................................................................8
- MTBE (methyl tertiary-butyl ether).................................18
- Invasive Species: Rock Bass...........................................37
- Two-stroke Motors and the Bowen Bill..............................41
- Water Access Permit.....................................................48
- Wild Goose: Issue of Public Access.................................51

Multiple students investigated some topics, such as MTBE, while other topics, such as the Wild Goose site, was looked at by a single student. This does not reflect the importance of these issues but rather the personal interests of the students.

This assignment showed us that there are several aspects that can potentially harm Lake Sunapee and its creatures but by the introduction of policy, some protection is made possible. In many cases, there are economic vs. environmental concerns that come into play, which is a recurring theme as to why a policy should or should not be passed. An imperative action for the further protection of Lake Sunapee is to continue to push for policy proposals in favor of conservation and protection and to also be aware of policies that are being passed in other areas. This will allow the Lake Sunapee area to foresee problems that may arise in the future and to take significant steps towards deterring those problems from becoming issues here.

Sources:


Institute for Community and Environment
Colby-Sawyer College
Declining Fish Numbers and Possible Reintroduction of Native Fish to Lake Sunapee

Paul Barrile

Overview of Topic
Lake Sunapee used to be a great lake for fishing. It had three species of trout, good size salmon, catfish, pickerel and bass as well as burbot for a prospective angler to try his skills at. The populations were fine and the fishing was fine as well. As Burt Bessey said when he came to retire at his home on Lake Sunapee, “I am really going to enjoy some good fishing now.” (Associated Press 1) And that was six years ago. But what Mr. Bessey found out was that, although he may enjoy the time spent on his boat in the pursuit of fish, good fishing is something that he has not enjoyed. The fishing on Lake Sunapee is not good anymore.

As many people in the area know, the fish populations in Lake Sunapee are very low. There is a wide array of reasons given for this issue, from natural evolution to rock bass infestation to the idea that the lake is too clean to promote a healthy fish population. No one doubts that there is a problem with the fish populations, but nothing or no one seems to be working to remedy the problem. Testing has been done, fish stocking continues every spring but still the populations are not getting better and they may be getting worse. It is possible that the downward trend of the fish populations and the subsequent fishing good be turned around, but for that to happen the populations need to be raised and then sustained; and the hearts of the local fisherman have to once again be won over.

Literature Review
No one can seem to put a finger on why the lake’s fish populations are so low. As Robert Wood, water quality steward with the Lake Sunapee Protective Association, said, “When you put all the information together, nothing really jumps of out as the problem” (Associated Press 2). Every test imaginable, such as water quality and plankton/algae population samples, has been done on the lake as well as its tributaries, in an effort to try and understand why the populations are so low. According to the Portsmouth Herald, some local anglers say it is due to environmental regulations that keep the water so clean that the necessary bacteria and phosphorus, that once produced a healthy smelt population is not able to enter the lake (Associated Press 1). This means the smelt have nothing to eat and the game fish, such as lake trout, salmon and smallmouth bass to name a few, have hardly anything to eat resulting in more fish dying off. Environmentalists say that the lake’s naturally low nutrient levels have stayed relatively constant during this loss of fish but as Dickie Wright, owner of Dickie’s Bait and Tackle, said “I’ve never seen worse conditions in the 53 years of this bait shop”(Associated Press 1).

When talking to him this past fall about why he thought the fish populations were the way they were he told me that, as mentioned, the phosphorus used to feed the smelt which in turn fed the bigger fish. But he hasn’t seen a smelt run in a while and with no food how can fish populations sustain themselves. He said Lake Sunapee is shaped like a bathtub and if the nutrients are low they won’t make it to the bottom where the smelt are. Jack Noon lends a theory of how the smelt populations can fall and why its effects the game fish:
A possible scenario – among many – is that of a shifting dependence of Sunapee’s game fish to smelt as a forage base and then the failure of smelt to spawn because of poor water levels in the brooks, low lake levels that exposed barrier sandbars at the mouths of brooks, siltation of brook beds from ground disturbances up in the watershed, or low numbers simply from over-predation. Any disruption of the smelt population would have had an immediate impact on the species that had regularly (since 1870) come to depend on smelt for food. (Noon 13)

If the smelt populations have been basically non existent for the past few years, as Dickie Wright said, it is no wonder that the game fish populations are falling and not recovering. The smelt need to be recovered in order to properly manage for successful game fish populations. Without food, no matter what is done the game fish will not be able to survive in any kind of acceptable numbers.

Fish and Game has been stocking the lake every spring with salmon but have started to release fewer in an attempt to reduce competition (Associated Press 2). One possibility to help stimulate populations would be to release a smelt population every year to help boost the smelt and hopefully provide more food for the game fish in the future, but I do not know if that is even an option.

Reintroducing native fish is a topic of interest across the country. In New Mexico, Gila trout, the only endangered trout in the country, is being reintroduced to some of its native streams. In Montana, Westslope cutthroat trout are being reintroduced to their native waters but the non-native species must be extirpated first (Roach 1). It is an issue that is all over the country and maybe it is a way to help boost the diminishing populations of native fish in Lake Sunapee.

Researching before reintroducing is a way of trying to limit the amount of failure as well as wasted energy. When trying to figure out the best way to reintroduce trout cod to its native rivers in Canada, researchers used a method called Adaptive Management (AM). “AM brings to management the philosophy of the scientific method: management actions are implemented within a well-defined framework for setting goals, monitoring, and evaluation of outcomes,” (Bearlin 1710). It uses a series of experiments and models to try and emulate the conditions in an attempt to develop the best practice for reintroducing a species, taking potential variables into consideration. For instance they contrasted aggressive strategies of stocking high numbers of individuals over a short period with conservative stocking of low numbers over a longer time frame. Through this type of experimenting, they were able to develop a good strategy for reintroducing the trout cod, without damaging the current population any further. They also said that, “In marine fisheries management and conservation, management strategy evaluation and simulation has been advocated for several years. In freshwater fish conservation, the consequences of simulating the management system and sociological elements, such as the implementation, monitoring, and evaluation stages, are rarely explored” (Bearlin 1710). Simulating what will happen as the result of a management plan before the plan is implemented is not often done for freshwater habitats like it is in marine habitats and it may be something that the Department of Fish and Game would want to look into, once the cause(s) of the population declines are known.
Stakeholders

There are many people who would like to see the fish population problem turn around. The scores of retired people who would like nothing better than to sit back on their boat and fish away the long summer days or the business man who would like to relax on a Saturday and leave all of his worries on shore and just focus on reeling in that trophy on the other end of his line. The local bait shops would definitely like to see the fishing improve because it will bring in more business. If the lake gets its fishing back, it will bring more and more people to the area who want to sit in the boat enjoy the scenery and lazily fish until the sun goes down. These people would need some where to stay, some where to gas up, somewhere to eat, and somewhere to get some local knowledge on what the fish are hitting. All of these types of services would increase there business if the fishing came back.

Some people do not mind the lack of fish in the lake. The lake is among the cleanest if not the cleanest in the state. The crystal clear waters are free from weeds which usually benefit fish. There are not fishing boats anchored at every point trying to catch their limit, obstructing the views across the water. There is virtually no worry of stepping on a fish hook because of the lack of fisherman. Some people just like the relaxing properties sitting by a body of water have, and could care less if the fishing is terrible. Boaters may not give the lack of fish a second thought either as they speed by or watch as their friend water skis behind the boat.

Fishing is not at the top of the charts for some people who enjoy the lake for other reasons such as its cleanliness, while other people can not stand the fact that nothing is biting at the end of their line. Depending on whom you talk to, the issues with the fish populations may not even be brought up but if you come across a fisherman I am sure you will here about it.

Policy

The policy that I found pertaining to the reintroduction of native fish is a policy found in Oregon. The Oregon Department of Fish and Wildlife has a, “Native Fish Conservation Policy” that was last updated September 12, 2003. In its first paragraph, it identifies the purpose of the policy: “To ensure the conservation and recovery of native fish in Oregon.”(Oregon Department of Fish and Wildlife 1) Its goals include preventing the serious depletion of any native fish, maintaining and restoring naturally produced native fish species, and fostering and sustaining opportunities for sport, commercial and tribal fishers (Oregon Department of Fish and Wildlife 1-2). In the instance of Lake Sunapee only sport fishing would be of concern. This policy states under what circumstances the plans will be implemented and how problems will be remedied. An example is that if scientific uncertainty concerning fish management is present, the Department will implement specific research to address management uncertainty as well as monitor, evaluate and conduct responsive management to keep biological risk within acceptable limit (Oregon Department of Fish and Wildlife 3). The policy contains a ten step agenda (which I will not list) for developing a plan for a particular species. It has interim criteria for areas or species that do not yet have a conservation plan or if a plan has not been approved yet. I feel that a policy like this one would help to provide a
structure for ways in which to deal with the population problems in Lake Sunapee because it has a system set up for dealing with the type of problems that Lake Sunapee is facing with its fish populations and could be of assistance in trying to prevent any further loss of native fish populations.

Policy Critique

Oregon’s Native Fish Conservation Policy is a good basis from which to begin developing a plan or policy to deal with the declining fish numbers in Lake Sunapee. It mentions that, “Conservation plans shall be based on the concept that locally adapted populations provide the best foundation for maintaining and restoring sustainable naturally produced native fish” (Oregon Department of Fish and Wildlife 3). It also talks about the fact that to help restore these natural populations, hatchery fish will be used in conjunction with the management of the already existing population. One thing I do not think that this policy mentions is how to deal with problems revolving around non-native fish that are out-competing the native fish. A possible way of dealing with non-native fish, although this is ideally suited for streams, is to do as Bill Fairhurst, a representative of the Public Lands Access Association in Montana, said to rid the waters of non-native fish out-competing the Westslope cutthroat trout, “Electroshock the non-native fish out,” (Roach 3). As mentioned this would work better on streams than a lake but if a way to get rock bass out and leave the native fish in was developed, it would greatly help the chances of the native fish. To my understanding rock bass eat the small baitfish other game fish depend on, possibly eat the eggs of other fish and with their large mouths can eat young fish that declining populations need to perpetuate the species, as well as take over structure used for habitat by other fish such as smallmouth bass (Schultz 1). If some how the rock bass was eliminated or the population was curbed, the reintroduction of some native fish, such as the brook trout (and possibly the Sunapee trout?), or attempts to introduce hatchery fish to boost populations would have a sizable advantage of being successful.

Another issue that this policy does not really allude to is, how to reintroduce a baitfish and what affects that would have on populations of game fish. If smelt were reintroduced or somehow brought back it would give the larger fish, the ones anglers care about, the much needed nourishment to help build their numbers.

This policy by the Oregon Department of Fish and Wildlife is very helpful in showing how to manage a population of a body of water from developing the problems that Sunapee has. It mentions how to recover populations but does not talk about it enough and in this day in age when a freak accident, such as a pollution leak or an invasive species can destroy populations in a short period of time, more needs to be developed on how to bring back a population once it is in need.

Recommendations

The fish population problem most likely is not going to fix itself. More needs to be done to figure out how to save the fish of Lake Sunapee. If the State of New Hampshire says there is not enough funding for research, they need to find a way to come up with at least some money. The first thing that needs to be done to fix this problem is to find out what is causing the problem in the first place. Most likely it is a combination of many things: rock bass, too much predation or competition, lack of nutrients, lack of...
baitfish or other food, lack of underwater habitat or structure. Whatever the causes, they need to be looked at and a way to deal with them needs to be established.

Once this happens, the stocking should have an impact. Stocking of multiple types of fish should be done for a couple years just to try to get the numbers of spawners up. As Craig Springer of the U.S. Fish and Wildlife Service said about staggered stocking in regards to the Gila Trout, “The purpose of stocking fish three separate times is to create populations of Gila trout made up of a variety of different ages, like what occurs naturally” (Springer 1). By stocking various ages of fish, the populations may be able to recoup better than say having 20,000 of the same age fish competing for food and habitat. Instead maybe 6,000 will be adult, 7,000 adolescent and 7,000 fingerlings so that there is not a huge amount competing for the limited resources. Each separate population will have its niche to live in until it ages and moves onto the next one and hopefully the cycle will continue from there. Baitfish should also be brought back or reintroduced as they are a major component in the success of game fish and the rock bass need to be dealt with.

A policy for the state of New Hampshire needs to be developed to deal with this sort of situation but a restoration and management plan needs to be developed for Lake Sunapee in the very near future. Getting the populations up to where they once were is going to take time, and may already be in the works but if people like Burt Bessey want to see the fishing become what it once was some things need to happen and they need to start happening now.

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Lead Sinkers: This is No Lead Zeppelin

Jenni Beaulieu

Overview of Topic

Bill SB 0487 has just been amended by New Hampshire legislation on February 19, 2004. The bill bans the sale and use of lead sinkers that are one ounce or less, which applies to all fresh water lakes, ponds, and rivers in the state of New Hampshire (“2004 Lake Related Legislation”). Lead sinkers have become an issue since studies have shown their effects on waterfowl; specifically loons and bald eagles. Lead is a soft, highly toxic, metal, typically used for fishing lures, jigs, and sinkers. Anglers tend to leave these lead sinkers behind due to fishing lines that become entangled or when the sinker is not secured tight enough and other human errors that are inherent on everyday fishing trips. Waterfowl are specifically in danger because of lead sinkers are miniscule, which enables them to be easily swallowed. Once the lead has been ingested the soft metal is quickly ground up and dissolved in the gizzard. The lead then enters the bloodstream; brain damage is immediate, and the fowl loses its ability to catch fish. Liver and kidney failures follow and the already weakened bird dies (Smith National Report, pg. J05). This is becoming an issue because researchers are unsure of the distribution of lead in the environment, which proves difficult to measure. Without knowing the amounts of lead in the environment, scientists are finding it equally difficult to measure the estimated effects of lead.

Literature Review

Like every issue that floats to the surface, there are those who oppose it and those who support it, and there are no exceptions on this issue of lead sinkers. Bob Hood, author of Regulations limiting lead shot, sinkers based on shot in the dark, states his argument against the ban on lead sinkers because of its apparent absurdity. On the opposing side is environmentalist Cameron Smith, who believes there is clear evidence that points to lead as a leading concern for the safety of waterfowl. Scientists, Adam Duerr and Stephen DeStefano, also support the ban on lead sinkers because of the data that proves negative effects.

Pro-Lead Sinkers: Hood claims, “Waterfowl ingest gravel, grit and similar materials for use in their digestive systems. But to believe that they find enough lead fishing weights in a lake to cause them to die from lead poisoning is absurd (Hood).” Hood further explains that there is no data supporting these concerns for waterfowls in danger of lead poisoning; rather, the idea comes from environmentalists who protest hunting. It seems that those against the ban on lead sinkers are not only few and far between, but also misinformed on the issue. What leads one to believe Hood is misinformed is his belief that the source of these concerns of lead poisoning came from a 1992 Tufts University School of Veterinary Medicine study, when in actuality, this issue is much older. Hood ends his argument with an inquiry, “I would like to see some data on how many ducks at Lake Worth, or Ray Roberts, or Possum Kingdom, Benbrook or any other lake have suffered from ingesting lead fishing weights. I also would like to see any future regulations for fishing based on common sense, not concerns (Hood).”

Anti-Lead Sinkers: Smith is an environmentalist who resides in Ontario, which is one of the few provinces in Canada that do not ban lead sinkers. The title of Smith’s article, Ontario's anti-loon lead-sinker policy seems perverse, accurately summarizes the
author’s feelings toward policy amendments on lead sinkers. Smith is saddened by the fact that Ontario will not budge on the issue and there is no evident reason why. Unlike Hood, Smith believes animals have intrinsic value, they offer more than what it can bring to the dinner table; “There’s little that touches the soul of a Canadian as much as the haunting call of a loon with its promise of untrammelled wilderness.” If it is possible to prevent the death of waterfowl, why not go forth and enforce a policy that protects them? Disgust is the undertone of Smith’s article, because it seems absurd not to protect the waterfowl, when it requires little change.

Duerr and DeStafano are also interested in preventing harm to waterfowl. They have performed in depth research studies and field experiments to achieve a better understanding of the effects of lead poisoning on waterfowl. Their concerns are not based on common sense, but years of studies carried out in the United Kingdom and Canada and first hand accounts. Ingestion of lead by waterfowl was identified as early as the 1950’s, and cases of mortality were recorded in the United Kingdom around 1979 (Duerr et al. 952-957). The UK and Canada identified the issues first, and their results encouraged scientists to focus their studies in the United States as well. Studies show that there is 8-52% mortality attributed to lead poisoning from lead sinkers in the United States, which is why Duerr and DeStefano are concerned with the amount of lead sinkers in waterbird habitats. Duerr and DeStefano do not state where they stand on the issue of banning the use of lead sinkers, but emphasize the importance of research to determine legislative actions; “Estimating abundance and distribution of sinkers in the environment will help researchers to under the potential effects of lead poisoning from sinker ingestion (Duerr et al. 952-957).” The results of these studies will illustrate whether or not legal action should occur.

**Stakeholders**

Stakeholders are those who have a vested interest in a specific issue or entity; their interest is important in the decision making process. There are numerous stakeholders interested in the issue concerning the ban of lead sinkers, including: anglers, ornithologists, environmentalists, and tackle shops. In addition to this list are organizations on a larger scale: state departments of environmental conservation, the American Sport Fishing Association, and the state departments of fish and wildlife. All of those who hold a stake in this should be taken into consideration because they are the ones who deal with the issue every day. Just because one is a stakeholder does not mean their opinion is the ultimate decision, but it is important to consider their views because others are most likely feeling the same way.

Anglers, ornithologists, environmentalists, and tackle shop owners are all concerned with the ban on lead sinkers because it directly effects their main interests. Anglers, in particular, are worried that the alternative sinkers are more costly. Bismuth is most similar to lead; however, its cost is substantially higher. Anglers also wonder what they will do with the lead sinkers they have already invested in, if they are banned where do these excess sinkers go? There have been efforts in some states, such as Vermont, to host a trade-in program where people can turn in their lead sinkers and receive non-toxic alternatives; however, this is a voluntary return and some anglers are not willing to give up their lead investment (VANR). This generalization should not be taken too far though, some anglers are interested in the well-being of waterfowl. Those who are
interested have made an effort to support the ban on lead sinkers by searching for new, successful, non-toxic alternatives. Others supporting the cause are ornithologists and environmentalists. Loons and Eagles are the main waterfowl affected by the lead and since loons and eagles are rare in some parts of the United States, it is important to these people to protect them. The people that make up local lake conservation organization consist of these ornithologists, fishers, and environmentalists. It is also these organizations who hold a large stake in the issue, which is important because it helps the “little man” get his voice heard.

Tackle shop owners also hold a stake in this issue because it is their product that may be banned. There are some tackle shops that agree with the ban on lead; therefore, they have begun to stock their shelves with alternate sinker. Jackfish Tackle is an online tackle shop specifically for the sale of lead free lures, in fact its web address is leadfreelures.com. Jackfish Tackle is a rare example, there are others that are not so supportive of the issue because lead is inexpensive and readily available. Non-toxic alternative are still being investigated, which means they are more expensive and harder to find. This makes life difficult for both fishers and tackle shops.

On a larger scale there is the Department of Environmental Conservation (DEC), American Sport Fishing Association (ASA), and the Department of Fish and Wildlife. These organizations are important because their voices are much louder than that of one angler. The DEC is responsible for administration and enforcement of the Environmental Conservation Law. The ASA’s mission is to safeguard promote the enduring social, economic, and conservation values of sport fishing in America (American Sportfishing Association). The Department of Fish and Wildlife strives to protect and conserve fish, wildlife, plants and their habitats. It sounds as if these organizations would be for the ban of lead sinkers; however, there is some opposition. Most state DEC’s and Fish and Wildlife Departments are for the banning of lead sinkers “to prevent waterbirds from being injured or killed from exposure to these potentially-toxic materials (New York State DEC).” The ASA, on the other hand, does not fully support the ban, but not because they are against waterfowl; rather, because the results of a cost/benefit analysis are insufficient. The ASA states,

“…lead toxicosis can kill water birds and lead fishing sinkers may contribute to this mortality. The American Sportfishing Association recommends that before further laws are enacted to restrict lead sinkers for fishing on a statewide basis, sufficient data must exist to demonstrate discarded lead sinkers are an actual threat to the sustainability of loons or other water bird populations (American Sportfishing Association).”

In summary, the ASA believes the ban of lead will cause more havoc in the fishing industry than it will benefit the sustainability of loons.

There are many stakeholders interested in the ban on lead sinkers, which can make the decision that much more difficult. Decisions regarding the environment are the most difficult because everyone has opposing world views. None of these stakeholders are wrong in their way of thinking, but ultimately a decision must be made; who is right? Should lead sinkers be banned? Who has a bigger stake in the matter? Who can compromise, is there a right decision?
Policy

February 19, 2004 New Hampshire Senate amended bill 487, regarding the use of lead sinkers. The amended bill prohibits a person from using a lead sinker or jig while fresh water fishing. The law previously prohibited their use only in fresh water ponds and lakes. The bill also prohibits the sale of lead sinkers and jigs (Johnson). Specifically, the bill states:

I. No person shall use any lead sinker or lead jig for the taking of fish in any fresh water lake or pond in the state, except as otherwise specifically permitted in this title.

II. A person using any such lead sinker or jig shall be guilty of a violation. Notwithstanding RSA 651:2, the penalty for a violation of this section shall not exceed $250.

III. The prohibition under this section shall apply to interstate waters pursuant to RSA [211:14] 211:4 and 211:5.

IV. For purposes of this section, "lead sinker" means any sinker made from lead, the lead portion of which has a mass of one ounce or less, and "lead jig" means a lead weighted hook that measures less than one inch along its longest axis. Lead sinkers and lead jigs shall not include lead fishing related items including but not limited to fishing line, flies, lures, or spoons.

339:77 Lead Fishing Sinkers and Jigs; Sale Prohibited. No person shall sell or offer for sale within the state of New Hampshire a lead sinker or lead jig. The definition of lead sinker and lead jig in RSA 211:13-b, IV shall apply to this section. Any person who violates this section shall be guilty of a violation.

This act shall take effect January 1, 2005 (Sen. Johnson).

Policy Critique

This policy has its strong points; however, it is lacking in some areas that make it weaker than it may appear. It is very clear cut and easy to understand, which makes it appear concrete and strong. It addresses the sale of lead sinkers, which is very important because that will prevent visitors from buying and using them here, while also preventing locals from conveniently buying them. The policy is strong because it addresses the sale of lead sinkers, which nips it at the bud, but there are some weaknesses that also shine through.

When one first reads the policy they may be intimidated because it is so cut and dry; however, a more informed person may not be so intimidated, thus its strength is diminished. The weaknesses in this policy come from the fact that there is no explanation regarding who or how this will be regulated. It is unrealistic to assume an officer will be searching every fisherman’s line or tackle box at every launching dock. Another weakness comes from the penalty. The penalty is up to a $250 fine, but if there is no one regulating this law, how many violators are going to be deterred from using the...
lead sinkers they have already invested in? With the amount of vacationers that visit New Hampshire’s lakes, it seems unrealistic to assume they will be informed on the new law and be well prepared with non-toxic alternatives.

Despite these inevitable weaknesses, the policy is a great step forward to better conservation. It would be a stronger policy if all of New England, or even the Nation, passed the same legislation. This policy is also in New York, Maine and our neighboring country, Canada (MOEA). The support of other states will only make this policy stronger; this is a healthy sign.

**Recommendations**

This policy seems like it could do no harm, but some stakeholders believe otherwise. It is important to keep in mind that some people are not fully convinced of the importance of this policy. The biggest argument is that there is not enough data supporting the theory that lead sinkers are significantly causing mortality in waterfowl (Hood). It would be a good idea to begin an education program in the state so that people are well informed as to why this ban is in effect. Minnesota is an example of a state that opted not to pass a law on this issue, but rather use education as a tool for regulation. Minnesota also offers opportunities to try out non-lead sinkers and jigs. What is important to note about this strategy is that it is supported by the cooperation of tackle manufacturers, retailers, lake associations, conservation organizations, sports enthusiasts, and government (Let’s Get the Lead Out). Since the law is already passed in New Hampshire, it would still be beneficial to offer educational programs because there are people who are misinformed on the issue. Included in the educational programs should be more on the effects of lead overall. Some people are not impressed with the fact that it harms waterfowl, but if the facts showed how lead could possible leach into our drinking water, or how a child could scoop it up with the sand, the point will it home and may make a bigger impact.

Another recommendation is to offer a return program, where people can turn in their lead sinkers for some new alternatives. This might be especially helpful to have during the busiest season, that way it also acts as an informative program that will reach many vacationers and locals, at the same time. A similar program like this has occurred throughout Vermont. The Vermont Fish and Wildlife Department, U.S. Fish and Wildlife Service, National Wildlife Federation, Vermont Institute of Natural Science, and Vermont Audubon worked cooperatively on a campaign to replace lead sinkers by hosting lead free sinker exchanges at various events (VANR).

If New Hampshire organizations coordinated educational programs, the policy would gain momentum and thus, be more effective. Education is a powerful tool, and misinformed individuals are where most of the opposition comes from. Education plus an exchange program would be especially encouraging, since people are worried about what they will do with their unused lead sinkers. Nobody wants to waste money; therefore, the exchange would really enforce the importance of the ban, while also advertising popular non-toxic alternatives.

**Sources**

Institute for Community and Environment
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Overview of Topic

Long have we been aware of the health risks that lead can have on humans. This has given over to a ban on lead based paints, fuel additives and lead used for household plumbing. Significant efforts have been made towards educating the public and health professionals about these hazards that we confront daily throughout our lives, but not until recently that we have come to the realization of the harm that lead can have on wildlife species, particularly waterfowl. As a result of this lead shot was banned national for hunting purposes in 1991, but it hasn’t been until very recently that lead sinkers and jigs were completely banned, and this is only in New Hampshire and doesn’t become effective until January 1, 2005. Other states are soon to be following our example but until this ban is nation wide waterfowl are at risk.

The reason that this is of such concern is because waterfowl, in particular the Common Loon, because birds commonly eat small stones and pebbles. Loons pick up small stones and grit from the bottom of lakes to help them digest their food. Lead sinkers are about the same size as these stones and as a result the loons often pick them up as well without knowing it. Loons and other waterfowl eat fish that have ingested lead or even ingest fishing line with lead in it. The birds then digest the lead, where their stomach juices and abrasion breaks down the lead, where it is then absorbed into the bloodstream. Since we know that lead is a toxic metal it can have a negative and often deadly affect on many body systems. Birds with lead poisoning will appear disoriented, and unable to dive or catch fish. It will have a slower reaction time than normal. Often, it can no longer digest its food and will have trouble breathing. As a result the bird will usually die within two to three weeks of ingesting the lead, (Loons and Lead Poisoning).

Literature Review

In New Hampshire lead poisoning is the chief killer of loons with over 50% of loon mortality, all of which is caused from lead sinker and jig ingestion. Waterfowl are not the only ones at risk for both Snapping and Painted Turtles also have been found to have higher then normal lead levels, (Lead Fishing Tackle). Bald eagles and certain other types of birds of prey are especially vulnerable to lead. Eagles eat fish, including the bottom-feeding varieties, which are the one that are most likely to scoop sinkers from the sediments. Roughly a quarter of the eagles brought to the University of Minnesota’s Raptor Rehabilitation Center have severe lead poisoning, (Enger). This high rate of mortality in loons and high levels of lead poisoning found among turtles and eagles has raised many concerns over the use of lead sinkers and jigs; as a result it has been the topic of study of many researchers and as a result of all this, the focus of this research paper.

Many researches, fisherman, and locals are calling the ban on lead sinkers a big step in protecting specific animal species as well as the natural environment. A twelve-year Tufts University study has found significant data backing the fact that lead from jigs and sinkers do indeed cause lead poisoning in waterfowl that digest lead fishing gear. Since 1987, over 600 dead and dying loons have been examined by veterinarians at the Wildlife Clinic at Tufts University School of Veterinary Medicine in North Grafton, Massachusetts. From these 600 examined, 44% of them have died from lead poisoning;
caused by fishing gear. This study has been the most influential, for New York, Maine and Massachusetts all have used these result to back their argument for bans of lead weights, sinker and jigs that measure less then one inch long, half and inch wide and weigh less than one ounce. These lead sinkers and jigs are roughly the size of stones and pebbles that are commonly ingested by loons for digestive purposes, (Loons and Lead Poisoning).

Stakeholders

Many are saying that with the banning of lead it will not only make a difference in the number in bird deaths but it will also reduce the amount of lead the has been building up in our stream, lakes and river over the past decades. If lead poisoning is this bad for humans and birds, how can it be good to be in the water that humans and animals drink, swim in, and provide life to the flora and fauna. Some estimates have on the amount of lead found within the say that roughly three million pounds or 1500 tons of lead sinkers and jigs are accidentally lost in US waters annually! (Gordon).

Yet others say that this ban of lead fishing gear is not needed, for how often do you come across a dead bird while fishing? It may not happen to everyone but it does happen occasionally. No studies show that keeping the lead sinkers and jigs will benefit the fishing industry or environment, and yet people are against it. These are the people that do not want to change; they see no problem with the current product and do not want to go through the hassle of the changing over to the nontoxic alternatives. These people see the how easy and convenient, as well as cheap it is to produce lead fishing gear. Why should they pay more for a product that they know works fine, if the alternatives are more expensive? And yes there are alternatives, but they are not as readily found on the shelves of our local tackle shops. Though they may cost more to buy, it is estimates that the price increase would only be ten dollars more per season at most, for these non-lead products. Some examples of non-toxic metals that have been considered and used for weights instead of lead include, tin, ceramics, bismuth, steel, natural granite, tungsten and recycled glass. Over time people will understand the reasoning behind the lead sinker ban, just as they learned to deal with the bean of lead shot for hunting and shooting purposes, (Loons and Lead Poisoning).

Policy

Back in 1994, the state of New Hampshire as well as the EPA first realized the rising concern of the this issue, proposed a ban on the sale of lead fishing sinkers except to persons with commercial salt water fishing licenses, effective as of July 1, 1995. This was the first step that was taken to control concern, and unfortunately it failed, in both the nation and in the state levels. This effort came to rise again in 1998 when the bill was resubmitted after learning that the original federal bill was not passed as originally stated, but rather ban was effective in just a handful of national wildlife refuges. This bill did indeed pass, and it became effective January 1, 2000 that not only the sale of such lead lures and jigs less the one ounce were prohibited but the use them as well was a crime in all state ponds and lakes waters, (Gordon). This bill also required that an educational program be put into effect with joint cooperation of the Fish and Game Department, Department of Environmental Services, the Loon Preservation Committee, the Audubon Society of New Hampshire, and the New Hampshire Wildlife Federation. This

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The educational effort was called “Lets Get the Lead Out.” This educational program was so far a success for not only was lead getting collected as people brought in their lead and switch to other materials, the state in during the summer of 200 only one loon death was linked to a lead sinker or jig. In previous years the loon mortality caused by lead products was averaging around nine or ten, (Tracy).

Bill SB 487 is before Senate committee today, prohibits the total use and sale of lead sinkers in fresh waters. If passed, the bill will become effective January 1, 2005, this first state in the country to do so in entirety. The bill reads as follows: I. No person shall use any lead sinker or lead jig for the taking of fish in any fresh water, except as otherwise specifically permitted in this title. II. A person using any such lead sinker or jig shall be guilty of a violation. Notwithstanding RSA 651:2, the penalty for a violation of this section shall not exceed $250. III. The prohibition under this section shall apply to interstate waters. IV. For purposes of this section, “lead sinker” means any sinker made from lead, the lead portion of which has a mass of one ounce or less, and “lead jig” means a lead weighted hook that measures less then one inch along its longest axis. Lead sinkers and lead jigs shall not include lead fishing related items including but not limited to fishing line, flies, lures, or spoons. No person shall sell or offer for sale within the state of New Hampshire a lead sinker or lead jig. Any person who violates this section shall be guilty of a violation, (Johnson)

Policy Critique

Reviewing the policy, there is little that is left unclear. For the most part the policy explains itself in a clear manner. The policy has little weaknesses, for what it proposes to do is for the good and benefit of humans and wildlife across the state. The only real weakness that appears is the enforcement of the policy, not so much with the sale of lead sinkers and jigs but rather the use of them. For it is easy to remove an item from a shelf and replace it with a legal, non-toxic one but who is there to make sure that the average fisherman, fishing in the middle of no-where up north, is using the correct sinkers and jigs. There is no real way of making sure that this doesn’t happen other than checking every single fisherman that casts a line, that they are suing the correct fishing gear. But those that do choose to break that law if it is indeed passed will be running the risk of a fine and have a guilty conscience.

The New Hampshire Lakes Association is very much in favor of this bill for they have been one of the people pushing to see this happen for some years. They will see the passage of this bill as a large achievement, for not only will it further ban a toxic substance, it will also provide additional protection to wildlife, mainly loons and other New Hampshire waterfowl, (New Hampshire Lakes Association).

Recommendations

The issue of lead poisoning is no small one, no matter where it is or where it happens no good comes of using lead sinkers and jigs. My recommendation to the people at Lake Sunapee Protection Association is to continue monitoring the progress of this bill as it works through the legislation system. I would also make it know to the people of the Lake Sunapee area the effects that lead has as well as urging them to contact local representatives. The more people that know about this bill the better, for more pressure would be put to congress to make a decision, the right one. Due to the toxicity and the
harm that it can cause to both humans and wildlife, we would be better off with using lead as sinkers and jig for fishing gear, considering that this lead is going directly into the water, the heart of all life. The ban that is before the House is one that we will all benefit from. Loons are creatures that are particularly venerable to the effects of lead, as studies have shown, and they will be one that will be better off with the ban in place. Whether or not the bill passes time alone can tell, but in the mean time we must do out part to stop using lead for sinkers and jigs. The sooner that we start the sooner we can make this area, this beautiful country of rolling hills, high mountains, cold streams, swift rivers, and deep lakes a safer place for all.

Sources


MTBE (methyl tertiary-butyl ether)  

Overview of Topic

Methyl tertiary-butyl ether, MTBE, is a synthetic chemical additive used as an oxygenated component in gasoline. The production of this octane booster was pursued in the early 1980’s as a means to increase the percentage of oxygen present in gasoline as a result of both the ban of leaded gasoline and issues concerning air quality. The Clean Air Act of 1990 later enforced the use of oxygenated fuels. MTBE became one of the primary additives, along with a few other alcohols and ethers, as a result of the low costs associated with production and blending processes. As of 2002, approximately 36% of all gasoline sold in the United States contained octane boosters, with 85% of that being MTBE (Vance). The use of MTBE increased as a combination result of the 1990 Clean Air Act and the 1992 Oxygenated Fuels Program. Both of these programs instituted that gasoline sold within the United States must contain higher levels of oxygen, as a result of the high levels of carbon monoxide being released from vehicles and smog issues in metropolitan areas. Since then, over the past three decades, MTBE has been used as a primary additive. Its effectiveness in boosting octane ratings in gasoline has helped to foster the US EPA’s regulations concerning the Clean Air Act (Squillace).

Today, however, the environmental issue concerning MTBE is not related to the quality of the air, instead the quality of the water supply. Leaking underground gasoline storage tanks have created problems across the country with drinking water supply contamination. Traces of high levels of MTBE are being detected and concerns about health risks, to both humans and the environment, are being questioned and evaluated. Within the past few years, issues have developed concerning the manufacturing and the release of MTBE into the environment. Prior to the present pending House Bill 1390, an act relative to MTBE, of banning the presence of MTBE in New Hampshire, the state filed lawsuits against the 22 companies that produced this chemical within the state. The quick history behind the development of these lawsuits is that the state presented the argument that these companies knew of the environmental risks that MTBE has, yet still opted for its production to achieve the required increase in oxygen ratings in gasoline. The New Hampshire Attorney General, Peter Heed, stated that “we [the state] will prove that the petroleum industry knew that MTBE spreads farther and faster than other components of gasoline, that it resists biodegradation and that it is difficult and costly to remove from groundwater” (Heed). In rebuttal to the state’s argument, the accused companies presented in their defense “that the EPA knew of the dangers of MTBE and that they were merely complying with 1990 federal law” (Huyter 2). The outcome of these lawsuits will recognize the parties responsible for the cleanup of MTBE contaminated water sources. The focus now is eliminating any sales of gasoline containing MTBE within the state to prevent further pollution.

To understand the reasons behind the development of a policy concerning the ban of this chemical, the physical characteristics must first be considered. MTBE is highly soluble in water at 4.3%. In comparison to other chemicals, that also enhance oxygen presence in gasoline, benzene is at 0.18%, toluene at 0.05%, and xylene at 0.02% (Vance). What this high degree of water solubility of MTBE means is that it is very mobile once it enters a water source. Along with this physical characteristic, the MTBE molecule is highly resistant to degradation, it does not breakdown easily.
Originally MTBE was also thought to be less toxic and carcinogenic than other octane boosters as well. Today this is being doubted as more research is being gathered on the presence of MTBE in groundwater. MTBE can reach sub-surfaces through leaks from tanks, pipes, and spills at gas stations, as well as from private uses such as snowmobiles, boats, and lawnmowers. There are preliminary indications that at high concentrations it may be a carcinogenic, a substance to be a cause of cancer. The US EPA classified a health advisory concentration of MTBE to be at 70 parts per billion (ppb), however the human detection can be between 15 and 135 ppb (Vance). Water with MTBE present has a foul smell and taste. These not-necessarily toxic indictors have caused for the public to be concerned about the effects of MTBE in drinking water supplies. If spilled on the ground, rain water can dissolve MTBE and carry it through the soil and into groundwater. Spills or leaks from storage containers can seep into deeper soil layers and pollute groundwater, especially near manufacturing sites, pipelines, and shipping facilities. “New Hampshire has a strict health-based standard of 13 ppb for MTBE” (Heed). As the New Hampshire Attorney General, Heed has made sure that where this standard is exceeded, appropriate treatment plans and/or alternative water is provided. State officials say MTBE has been detected in at least 15 percent of New Hampshire's ground water wells (Carleo-Evangelist). The production and use of MTBE is a prime example of how synthetic chemicals can initially appear to ‘fix’ a problem, and then later become the problem.

Literature Review

There are mixed opinions concerning the bill to put a ban on the sale and production of MTBE in New Hampshire. Supporters of this bill believe that MTBE presents risks to both humans and the environment. “The EPA has classified MTBE as a possible human carcinogen on the basis of studies that show MTBE to be a carcinogen in animals” (“Contaminants”). While studies have not solidly proven that exposure to this chemical could cause cancer, the possibility of it being a carcinogen has people concerned about its widespread presence in their water supply. The levels of MTBE that are present are high enough to allow for odor and taste to be a direct concern. Although the USEPA concludes that "MTBE poses a potential for human carcinogenicity at high doses" based on animal data, these animal data "do not support confident, quantitative estimation of risk at low exposure" (Toccalino). In other words, the tests that were conducted on animals involved doses of MTBE that were about one-thousand times higher than ‘naturally’ found in the water supplies. New Hampshire is taking a step in diminishing a potential hazardous situation. To date, New Hampshire is the only state that has sued over MTBE (Carleo-Evangelist). This action and the attention given to the banning of MTBE demonstrates the state’s environmental awareness. New Hampshire is not alone when it comes to banning the use of MTBE. California, Maine, New York, North Carolina, and Connecticut are other states that have taken the same initiative.

While there are evident reasons to ban the use of MTBE, a spokesperson from a MTBE production company stated, “Because of MTBE there has been a marked improvement in air quality and reduction in toxics in the air. And because of leaking underground storage tanks in some relatively few instances, MTBE found its way into places it shouldn't be. But that has nothing to do with the product, which has done exactly what it was designed to do” (AP). This is an interesting argument, and it is exactly what
happened. So while these companies argue that they are being criticized for contaminating the environment, they did achieve their goal of decreasing air pollution. This situation can be applied to almost any chemical produced. The effects of products are not necessarily fully understood completely until it is too late. In the case of MTBE, this a product which did its job, yet spread negatively. Regulations need to be instituted to accommodate for these misfortunes. Here, the banning of an effective product for its purpose due to the after effects of its use is essential in controlling and preventing future, more harmful threats.

**Stakeholders**

- **New Hampshire Lakes Association.**
  The NHLA is currently monitoring House Bill 1390. While it might seem evident that they should support the passing of this bill, MTBE does not pose a big of a threat to the lakes as initially thought. Shifting their views to supporting, could, however be in their better interest. This would make more people aware of the issues concerning MTBE.

- **Farmers that produce corn-based ethanol.**
  Corn-based ethanol is the only alternative to MTBE. These farmers support the banning of MTBE in favor of their industry (Jalonick 2508). When one industry is shutdown, another is bound to pop up, that’s the cycle of this economy.

- **Lake Sunapee Protective Association.**
  The LSPA should be aware of this bill and the outcome of the final hearing. While MTBE may be present in Lake Sunapee, the amount (unknown) is probably not a concern right now. Continuing the sale of MTBE could bring these levels up presenting a future risk. “Sources of MTBE in surface water include releases from recreational vehicles, storm water runoff, and spills” (Stocking 1131). With the lakes high recreational status, the water quality could be negatively affected without this bill being passed. However right now and for the most part, the water supplies that are contaminated in New Hampshire seem to be concentrated in the southern part of the state (Frothingham).

- **People who drink from lake water supply.**
  Even when low levels of MTBE are present, health complaints related to MTBE include headaches, dizziness, irritated eyes, burning of the nose and throat, coughing, disorientation, and nausea ("Contaminants"). Contaminated water tastes like turpentine.

- **Producers of MTBE**
  MTBE is third in production of all organic chemicals manufactured in the United States (17.6 billion pounds in 1995) (Vance). While it will only be banned in NH, there are 22 companies the manufacture this product. This will have a negative effect on the economy. Yet in return the ban will call for another industry to develop.

- **Real Estate Agents.**
  A house without potable water is a house with no value. Access to drinking water is a huge marketable aspect when it comes to selling homes. Realtors “need to be in-tune with ground water conditions” (Lieberman).
Policy

House Bill 1390: An act relative to MTBE.
Sponsors: Representative Derek Owen (Merrimack) and Representative James Phinizy (Sullivan).
Committee: Science, Technology and Energy

Date Introduced: September 4, 2003
Due Out of Commission: March 11, 2004
Status: In Committee

This bill:
I. Prohibits gasoline containing the fuel additive MTBE from being sold or offered for sale at wholesale in this state.
II. Requires the commissioner of environmental services to implement the provisions of the bill. Under this bill, such provisions are exempt from the requirements of the administrative procedure act.
III. Requires the commissioner of environmental services to develop a timetable by April 1, 2004 for the removal of MTBE from gasoline.

State of New Hampshire
Be it Enacted by the Senate and House of Representatives in General Court convened:
I. A person shall not sell or offer for sale at wholesale in this state any gasoline, as defined in RSA 259:37-b, that contains the fuel oxygenate methyl tertiary-butyl ether (MTBE).
II. The commissioner of environmental services, in consultation with the commissioner of health and human services, shall implement the provisions of this section. The provisions of this section shall be exempt from the requirements of RSA 541-A.
III. The commissioner of environmental services shall develop a timetable by April 1, 2005 for the removal of MTBE from gasoline at the earliest possible date and shall identify and ensure adequate sustainable supply of MTBE-free gasoline at a reasonable price prove to meet the needs of New Hampshire consumers.

Policy Critique

The policy to ban MTBE is straight forward. One interesting factor to take note of is the change in date of the implementation timeframe, from April 2004 to April 2005. Perhaps this year extension to put this policy into place will allow for more studies to be done, which will allow the public to become more aware of the issues at hand. On the downside of this time extension, MTBE now has another year to contaminate New Hampshire waters. It is also noteworthy that and ‘adequate supply of MTBE-free gasoline at a reasonable price’. The key component in this bill, is providing for the people an alternative oxygenate for fuel. While alternatives do exist, the transition between using MTBE and other oxygenates will cost money and time. One question that
should be, is what will happen to all the fuel that contains MTBE as of the final date? Is the chemical being phased out and just used up until this point, or is production and selling just ending at the final date? Questions like these have not been answered, but will hopefully be addressed at the conclusion of this bill's hearing.

New Hampshire will be the sixth state to institute a policy dealing with the control of MTBE, if the bill passes. In 1999, California was the first state to develop such an environmental policy concerning the banning of MTBE use. That law came into effect after the state already had established regulations concerning the levels of MTBE for several years before hand. Connecticut and North Carolina have both limited the use of MTBE.

**Recommendations**

Overall, I feel that MTBE is a concern for the Lake Sunapee Watershed. It is not necessarily a huge and immediate concern, but the passing of this bill should be supported by the LSPA. While it is very apparent that the lake is exposed to this chemical through mostly recreational uses and some underground storage tanks, the threat to the water supply and human and environmental health is not that large. The most important things to realize about MTBE are how the chemical is exposed to the environment and the risks that it holds towards people. “Surface water sources are impacted by MTBE primarily as a result of recreational boating use due to either leaks and spills during fueling, or releases of unburned fuel from watercraft during recreational activity” (Stocking 1131). With the high amount of boating activity this lake sees, there potential for contamination is high. However “MTBE concentrations in standing water bodies will generally diminish quickly…MTBE is not likely to accumulate, and thus will not pose a significant long-term threat to water quality in surface water sources” (Stocking 1135).

The passing of this bill can only benefit the lake’s quality. If the bill does not pass, I do not think that the lake system is at a huge threat. The LSPA should be aware of the outcome of this bill’s hearing. If the bill does pass, the LSPA should know what is being done to implement the use of MTBE-free gasoline, and where this ‘old’ gasoline is going.

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23
Methyl Tertiary Butyl Ether Policy (MTBE)  

Joe Jennings

Overview of Topic

Methyl tertiary-butyl ether (MTBE) was first used as a lead replacement in the late 1970s, to act as an octane-enhancer. This is simply MTBE raising the amount of oxygen in the gasoline, reducing toxic emissions coming from the tailpipe, and assist in the prevention of engine “knocking.” In 1990, Congress approved oxygenate requirements set forth by the Environmental Protection Agency (EPA), under the Clean Air Act Amendments. This led to a higher concentration of MTBE in gasoline, because it was an inexpensive to produce, and it fulfilled the necessary requirements for the prevention of emissions exiting the tailpipe. Presently, roughly 1/3 of the United State’s gasoline has MTBE in it (Tangley, 57).

In a classic case of good intentions gone bad, MTBE was found to have contaminated groundwater nationwide, and in some cases, contaminating drinking water supplies. This has forced communities to search for other sources of drinkable water, sometimes requiring buying it or going to near-by communities to acquire water.

Literature Review

MTBE in low concentrations can make water taste and smell like turpentine (Harder, 342). Ingesting contaminated water over an extended period of time can cause the human liver to convert the additive to formaldehyde and tertiary butyl, which are difficult for the body to eliminate. (Peschman, 24). At higher levels of inhalation, some research animals developed cancers or experienced non-cancerous health effects (EPA). Researchers have temporarily concluded that there is currently not enough data gathered to come to a final conclusion.

MTBE can contaminate soil and groundwater in one of many different ways. Possibilities include, but are not limited to; leaking underground storage tanks, automobile/tanker accidents, motorized recreation vehicles (snowmobiles, boats, wave-runners, ATVs, dirt bikes, etc), lawnmowers, spills/drips when refueling, and leaking above ground storage tanks.

MTBE dissolves quickly in water, soil, and the air, making detection and clean-up difficult, time consuming and expensive. MTBE has high water solubility and polar properties, making it difficult to remove through adsorption (Peschman, 25). Other technologies have been used to some success in clean-up efforts, and include granular activated carbons (GAC), atmospheric air stripping, among others.

The MTBE situation has affected everyone in one way or another. Even though groundwater in the Northeast has not yet been affected in the excess of other parts of the country, governments of all sizes, and citizens alike, need to be aware of the possible affects of an MTBE contamination. Instead of wondering “What if?” the focus should be on “What next and how do we deal with it?”.

The EPA has created and assigned the Blue Ribbon Panel to study the extent of the current MTBE situation. This panel consisted of leading experts in the public health fields, environmental and scientific communities, fuel industry members, water utility workers, and state/local governments. The panel concluded among other things, “MTBE detections have primarily caused consumer odor and taste concerns, and that in rare instances, was MTBE found in drinking water supplies at levels well above the EPA’s
drinking water advisory, and some state standards’ (EPA). Recommendations included, but were not limited to; removal of current congressional Clean Air Act requirements for 2% oxygen in reformulated gasoline, improve the nation’s water protection programs, substantially reduce the use of MTBE nationwide, and accelerate research on MTBE. The panel, more specifically former EPA Administrator Carol Browner and Agricultural Secretary Dan Glickman, encouraged immediate Congressional action to reduce or eliminate the use of MTBE and promote the use of renewable fuels, this in March of 2000.

In early March of 2003, Rep. Lois Capps of California and ten cosponsors proposed to the House of Representatives Bill HR1122. This bill called to amend the Solid Waste and Disposal Act to provide funding for MTBE clean-up, caused by leaking underground storage tanks, and for other purposes. The bill was referred to the Subcommittee on Environmental and Hazardous Materials on March 17, 2003. Others in Congress are advocating for the use of corn-based ethanol as a replacement for MTBE in gasoline. Opponents argue the use of ethanol would severely raise gasoline prices, and note that it takes more energy to produce ethanol than it provides. The most recent congressional action has been major discrepancy regarding provisions guaranteeing MTBE product liability. This would save MTBE producers and gasoline companies who use MTBE from paying for clean-up actions. The proposal has angered many Democrats because local, state, and the federal government would be paying for the clean-up bill. Current estimates exceed $29 billion.

Some states have made plans to stop or at least reduce the use of MTBE. These states include; California, Colorado, Connecticut, Maine, Michigan, Minnesota, New Jersey, New York and South Dakota. Other states have taken other actions.

New Hampshire is suing twenty-two (22) major oil companies for their possible role in the contamination of the states water supply (Peschman, 25). The suit holds the companies responsible for “remediation costs, which include investigative, clean-up, and punitive damages” (Peschman, 25).

Similarly, in California, a public utility district won a $69 million dollar settlement against major MTBE manufacturers and local refinerers. This, after public drinking water supplies were found contaminated with MTBE.

Chemist Yiling Tian, of Tianjin University in China, said he his colleagues “have developed a catalyst that makes dimethyl carbonate (DMC)”, as a replacement for MTBE, made from cheap and non-hazardous materials. (Service, 1) The catalyst is made up of methanol, dimethyl ether and a pressurized form of Carbon-dioxide (CO2), called supercritical CO2. The “catalyst and DMCs help burn gasoline even more cleanly, and reduce emissions more than MTBE. It is also non-toxic, making it a desirable replacement for MTBE. (Service, 2)

Stakeholders

There are numerous stakeholders involved in this situation. Proponents of the use of MTBE include the producers of it, the gasoline companies who use MTBE. All of the proponents are seeing the benefits of MTBE and all the good it does. MTBE is inexpensive so it is cheap to produce, ship, and use (Tangley, 57). This means gas prices are not influenced a great deal. A lot of jobs are involved in the use and production of MTBE. Therefore, disruption of use would cause jobs to be lost.

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Opponents include people who are concerned with the contamination of ground water, people concerned with lowering emissions to contribute in the reduction of smog and toxins, those seeking alternatives to MTBE, people who have lost drinking water because of contamination and those forced with funding the cleanup expenses. Chemist Yiling Ian and his colleagues’ work on developing DMCs and the numerous supporters and users of ethanol are making the effort to seek and promote these safer alternatives. Though drinking water contamination is a more serious concern, water contamination can lead to many possible outcomes. Contamination of a lake could lead to lowered algae populations, therefore lower fish populations. The lake could also develop an unpleasant color if contaminated (Rong, 76). Both would be detrimental to the lake and the communities that depend on it.

It is also going to be interesting to see who is going to be found responsible for the contaminations. Thus, who is going to fund cleanup and prevention efforts? Government levels of all sores could be, or could the producers and users at MTBE, or it could even be the tax payers paying for it. Future decisions will be interesting and will affect the stance of many proponents and opponents.

Policy

In the 2003 New Hampshire House of Representatives, Rep. Owen Merr and Rep. Sull Phinizy introduced HB 1309, that “prohibits gasoline containing the fuel additive MTBE from being sold or offered for sale at wholesale in this state” (Marr, Phinizy). The bill also calls for; “The commissioner of environmental services shall develop a timetable by April 1, 2004 for the removal of MTBE from gasoline and shall identify and ensure an adequate, sustainable supply of MTBE-free gasoline at a reasonable price to meet the needs of New Hampshire consumers” (Marr, Phinizy). Ethanol is a possible replacement for MTBE in New Hampshire, which is currently not under the EPA’s reformulated gas mandate, which requires such product as MTBE to help gasoline burn cleaner (Aronson). This Bill would entirely eliminate the presence of MTBE in gasoline which would substantially reduce the risk of drinking water contaminations and the existence of it in the air we breath. As of March 11, 2004, the bill is currently in the House of Representatives waiting a decision.

Lake Sunapee would benefit a great deal if indeed this Bill were approved into affect. With no MTBE permitted in gasoline, the chance for contamination would be virtually zero. This would eliminate concern for drinking water contamination as well, since numerous homes around the lake use it as a primary water supply. Aquatic species would be healthier without the presence of MTBE, possibly increasing the variety of species and populations of current species.

Policy Critique

This Bill is a large step in the positive direction in the elimination of the use of MTBE in New Hampshire. Such actions need to be taken promptly, and this Bill does just that. A concern is a substantial increase in gasoline prices (Sissell). These could be caused by the need to completely replenish the existing supply of gasoline with MTBE-free gasoline. Another concern is what is going to replace MTBE in New Hampshire gasoline? The lake would benefit with the passing of this Bill, so it is expected that all stakeholders concerned with the protection and health of the lake would support this Bill.
Recommendations

I would first recommend that the LSPA join forces with other concerned groups/organizations, possibly including the New Hampshire Lakes Association, New Hampshire Department of Environmental Services, and concerned citizens through donations. Extensive funding will be required to focus any sort of action on the MTBE problem, because testing and cleanup treatments are still uncommon and “new”, therefore un-proven and unreliable. Much effort would be required to carry out these testings and cleanup, which would also require substantial funding and man-power. I would also encourage to the fullest ability the approval of House Bill 1390, prohibiting the presence of MTBE in the state’s gasoline.

Testing the lake and its surrounding tributaries, groundwater, and soil would benefit all who use and enjoy Lake Sunapee. Learning as to the extent, if at all, or how severe the contamination problem is around the lake is important in the protection and effort to keep the lake healthy and prestigious. Granted, this will be time consuming and tedious, as well as require a large number of researchers, but the benefits of knowing the level of severity, if any, and would lead to a better basis of information for planning and carrying out future action.

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27
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Issues with MTBE and a Citizen’s Perspective

Gordon Krantz

Overview of Topic
Starting in 1990, the Clean Air Act led to new regulations regarding air pollution from vehicles in the most polluted cities of the United States. Methyl Tertiary Butyl Ether, a reformulated gas was used to combat pollution in large cities. MTBE is well known for its ability to oxygenate fuel and cut down on car emissions. However, MTBE is considered a hazard to groundwater because it is highly water-soluble (Frequently Asked Questions about Methyl Tertiary Butyl Ether). The Environmental Protection Agency describes different contamination sources where MTBE originates. Some of these sources include two stroke engines in watercraft, above ground storage tanks, gasoline spills from automobiles, lawnmowers, and tractors. MTBE may also spill in truck and tanker accidents (U.S. Environmental protection Agency Underground Storage tanks).

There are currently policies geared at regulating MTBE such as the Reliable Fuels Act, the hope is that these bills will eventually phase out MTBE and replace MTBE with other formulas to help fuel burn cleaner. However, there is much controversy over current congressional policies and some policies regarding MTBE may fail to regulate it in all states. If MTBE is not regulated the public may face more groundwater contamination in their wells and may suffer hidden health consequences as a result. We must educate ourselves about MTBE in order to avoid these health risks. The best way to address issues involving MTBE is by reviewing literature about this subject informing ourselves about MTBE and making careful judgments about the health risks of MTBE and the current policies for regulating it.

Literature Review

The United States Geological Survey’s toxic substances hydrology program has defined MTBE (Methyl tert-butyl ether) as “… a fuel oxygenate that is used in gasoline to reduce the atmospheric pollution associated with automobiles…” (USGS Toxic Substances hydrology Program). This definition gives us a simple definition of MTBE, but it does not tell us how it pollutes our water and makes people sick. The MTBE controversy has led to many different perspectives from health experts, biologists, businesses, politicians, citizens and organizations.

Health experts such as biologists give perspectives of the health risks related to MTBE. Larry Gerber, author of the “The Johns Hopkins News-Letter,” quotes and makes references to people who are for and against MTBE. He describes Elinor Fanning an environmental toxicologist who claims, “MTBE is an animal carcinogen, in our estimation” (Gerber). University of California experts also claim that there is evidence that MTBE may be linked to “testicular tumors” in male rats and Kidney tumors in female rats (Gerber). Other reports of health related symptoms caused by MTBE are “nausea, dizziness and headaches” (Toccalino). Although the UC experts claim that human health risks may occur, The EPA believes that there is no conclusive evidence to support that health risks will occur. However, significant health risks from MTBE have not been ruled out and there are still studies being conducted by the EPA on this subject (EPA).

Even though UC experts claim that MTBE is carcinogen, there are some people who believe that MTBE has positive effects on human health (Gerber). The oil
companies in particular claim that MTBE is good for human health. Don Olsen a manufacturer of MTBE owns the company called the Huntsman Corp and he claims, that MTBE has many health benefits.

Olsen criticizes the study at UCLA for the reasons that it does not take into account the health benefits of MTBE, he believes that, “...MTBE has been shown to help human health…it decreases exposure to harmful air emissions…” (Gerber 2). Another stakeholder who has opinions on the issue of MTBE is a citizens group concerned with the negative effects of MTBE or the economic effects. One such group is known as, Citizens for a Sound Economy (CSE). This group claims that although MTBE is being phased out, the damage has been done. They believe that MTBE was a quick solution to the problem of clean air and the EPA failed to address the health concerns related to MTBE, they also believe that this will inevitably lead to other economic concerns such as “raising the cost of gas to consumers and causing more environmental harm by reintroducing other forms of ethanol which may increase pollution (Burns 1).

Other groups that have a stake in MTBE policy include state governments. Examples of state governments that are banning MTBE are California, New York and Connecticut while others are partially banning it. They are banning MTBE based on the fact that it has been shown to contaminate water (Three States complete Ethanol, ban MTBE 2).

Stakeholders

The issue of pollution from MTBE affects many different stakeholders such as citizens. Health experts are other stakeholders who study the effects of MTBE. Congress also has a stake in MTBE because it initiates laws that are geared at regulating MTBE. And finally the oil companies have a stake in the issue of MTBE because they are the ones who make money off the use of it as a regulated fuel.

One major perspective on the effects of MTBE comes from citizen feedback. Citizen feedback is a method that towns can use to address the public issues related to MTBE. Listening to the feedback of citizens can help public officials restore the quality of life for the citizens who are suffering from MTBE poisoning. The citizen’s perspective has very helpful when the Town of Pascoag Rode Island faced issues related to MTBE. Jessica Gallante, Jessica Spiegal and Christina Zarcadoolas completed a case study in the town of Pascoag in September of 2001. The case study was a compilation of qualitative data pertaining to the experiences and opinions of residents in Pascoag and how the water contamination of MTBE was affecting their town. In this study the issues of “residential information sources, concerns, behavior modifications, satisfaction with government official’s perceptions of the community and thoughts towards the future were also discussed.”(Gallante, Spiegel, Zarcadoolas 1) The methodology described in this case study was a compilation of 34 questions, which dealt with five categories such as, “Background/Demographics; history of events; personal responses; official’s response and the future.”( Gallante, Spiegel, Zarcadoolas 2). In all there where 100 interviews were conducted of those 100 interviews, 72 were in person and 18 were telephoned. Contacts were also provided from a local activist group called Concerned Citizens for a Healthy Pascoag. The initial conclusions of this interview were that the people were upset about the way they were notified about the MTBE problem. 50 percent of the residents that went to town meetings complained that they were not adequately notified.
about the problem through the media. Other people herd the news and notified the rest of the people. One of the most frequent complaints was that citizens wanted more information of the health concerns related to MTBE and wanted more information about the contaminant from the utility district. Residents felt that they were not informed about the contamination fast enough and did not feel that they were getting the right treatments they felt that they were “… feeling a helplessness and lack of control.” (Gallante, Spiegel, Zarcadoolas 3). Other concerns of the town’s people were based on the symptoms that they encountered which they thought were related to the MTBE contamination. These symptoms were “headaches, skin irritations and reparatory difficulties along with other symptoms” (Gallante, Spiegel, Zarcadoolas 3). To the residence of the area, it was not just there health that they were concerned with the character of the town was another issue.

Some residents felt that the town would develop a reputation for being a contaminated town. In terms of the policy process in this case study, there was a reference made about the residents being angered with the response of government officials. The residents described how they were angered with Governor Almond. They felt that he did not address the problem correctly. The residence claimed, “the governor is useless… impervious to our needs and concerns. He never came to visit. I was completely unimpressed. Basically I was disgusted with him.” (Gallante, Spiegel, Zarcadoolas 4). Other residents felt that their lack of attention was based on the lack of affluence in the community. They specifically felt that they were being helped at a much slower rate then if the same contamination were to occur in another affluent community in Rode Island.

This case study concludes with residents adding in their own input of what they thought would be helpful in the policy process for their community, or other communities that are faced with contamination from MTBE. Their recommendations were, to create an effective plan that would “form a better emergency plan.” be honest, effective and include communication from government officials (Gallante, Spiegel, Zarcadoolas 5). They also felt that a citizens group should be formed and that MTBE contamination should get plenty of media attention. They finally concluded there input by saying that MTBE should be banned permanently to prevent a contamination from happening again (Gallante, Spiegel, Zarcadoolas 7).

Policy

A major policy that has been enacted is the Reliable Fuels Act introduced to the senate on April 3, 2003 (Reliable Fuels Act). The Act describes how the effects of contamination have been reported throughout the United States. The bill also describes how MTBE as a fuel additive will be phased out of production, but in a way that will promote “environmental protection” (Reliable Fuels Act), “adequate energy supply (and) reasonable fuel prices” (Reliable Fuels Act). The bill goes on to explain how it will take not more than four years to implement the banning of MTBE from motor vehicle. It would provide compensation for merchants who use MTBE and further assistance with grants of 250 million dollars in using alternative fuels, which are cleaner burning.
Policy Critique

This bill seems to be reasonable for regulating MTBE, but it does not completely ban MTBE use. Not only does this bill fail to address a complete ban in all states, the bill also does not address how or if money will be appropriated for the clean up efforts or the health problems that have resulted from MTBE use. There is no mention of who will pay for these problems across the country. In section 6A under grants, the bill references that the secretary of energy and administrators will appropriate money to merchants who use another fuel alternative (Reliable Fuels Act 4).

The article entitled, The American Public Health Association criticizes the renewable fuels act. Organizations such as the American Lung Association, American Public Health Association, American rivers, Clean water action, Consumers Federation of America, Defenders of Wildlife, Earth Justice, the Sierra Club and other associations oppose the Renewable fuels act (Opposition to Energy Bill).

In the Letter they describe that the bill protects ethanol companies and oil refineries from being liable for defective fuels that they produce. They view the bill as a “safe harbor” for polluters because it applies such loose standards to fuel companies, it also influences companies to not go through proper procedures in testing their products (Opposition to Energy Bill 1). As a result companies may produce new fuels that may be inexpensive but at the cost of human health. The agencies opposed to this bill also references a court case were companies were found guilty of acting in “malice” when they marketed MTBE knowing that the reformulated gas released toxins in groundwater. The companies eventually agreed to a settlement as a result of the court case (Opposition to Energy Bill 1).

Recommendations

The LSPA should consider that any existing, or new gas stations near Lake Sunapee might pose a threat to the water quality of the lake. Any new type of fuel compound at gas stations should be studied very closely. An even larger threat to the lake may come from personal watercraft or two stroke engines that release MTBE from unburned fuel during use. Lake Sunapee’s water quality may be affected by this problem since tourists from around the country come to visit the lake and use fuel that may come from other states that use MTBE. MTBE may be phased out over time, but there is still a risk that a new type of reformulated gas may be added to fuel at gas stations and a new fuel may have unintended consequences like MTBE (Stocking, Andrew J, Kavanaugh, Michael C 1).

Another recommendation for Lake Sunapee is involving citizens in the policy process. The success of the citizen’s perspective is very important to the policy process. The case study of the citizen’s perspective in the town of Pascoag Road Island gave the reader an understanding of how citizens viewed contamination in their neighborhood and how they came up with a thoughtful plan. This study would be most helpful for the LSPA because it would gain a citizens perspective. Citizens should have a role in creating policy and this study clearly shows what the citizens of Pascoag Rode Island felt about MTBE in their town. The LSPA could devise a study just like this one. The LSPA could
devise a study that looked at how people in town felt about other problems on Lake Sunapee, not just MTBE but Milfoil or boat pollution and ask a citizens perspective on it.

Sources
MTBE: Polluting to Save the Planet

Greg Van Steinburgh

Overview of Topic
The United States of America is the largest oil consumer in the world. To provide enough fuel for its transportation-based society, many different methods are used to increase vehicle efficiency. In the last 25 years, MTBE (methyl tertiary-butyl ether) has been the largest octane increasing gas additive. Most refiners have chosen to use MTBE over other oxygenates primarily for its blending characteristics and for economic reasons. Recently, questions have come up about MTBE’s negative effects on the environment that it is supposedly helping protect.

Lead additives were banned from gasoline in 1979 by the USEPA. Up until that point, lead was the primary octane booster in gasoline powered automobiles. MTBE was made through chemical reactions between methanol and isobutylene. It is a member of a group of chemicals known as “oxygenates” because of their ability to increase oxygen content in gas. MTBE was thought to be less harmful than lead, as well as benzene and xylenes (other oxygenates). Gas companies and states were encouraged to use the new gasoline additive, though there were no policies demanding it, (EPA).

In 1990, the Clean Air Act required for the first time that gasoline have various highly oxygenated blending agents including several ethers and alcohols. In addition, 39 metropolitan areas that did not meet carbon monoxide required more additives during winter months when CO2 levels were highest. In 1995, a second act (The Reformulated Gasoline Act) was passed requiring nine metropolitan areas to use reformulated gas throughout the year. Reformulated gas was used statewide in seven states, and used partially in 11, (Governors Ethanol Coalition).

By the late Nineties, people began to notice that in certain cases MTBE was making way into water supplies. Foul odors and carcinogenic concerns came up as a result of MTBE leaking from storage tanks, pipelines, refueling spills, and car accidents that damage the fuel tank. These issues were brought before congress in February of 2001 to decide on the fate of the gasoline additive, (EPA).

Literature Review
Although this topic was neglected for several years, the U.S. EPA has recently taken large steps to remedy the problem. The EPA was responsible for introducing MTBE, and thus made responsible for its clean up. Many issues were overlooked when choosing MTBE as an additive, creating several problems that now must be handled. Certain states have struggled to conform to new policies and regulations that restrict both emissions and MTBE, because gas costs have begun skyrocketed.

As more information comes out about MTBE and its potentially harmful effects, people have begun to take notice. Recently the EPA reported that humans can absorb MTBE through the skin,(Streater) another potentially devastating discovery. Because MTBE must be essentially vacuumed from soil and water must be filter several times over, clean up costs have been higher than most projects. This has also been very controversial in The House as energy bills are suffering because of the necessity to fund MTBE clean up.

There are many stakeholders in this case. In fact most Americans can potentially be affected. The emphasis on cars and transportation has created a large necessity for

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Breathing MTBE can cause headaches, nausea, dizziness and sore throat, as well as feelings of "spaciness" or confusion, according to federal health experts.(EPA).

**Stakeholders**

Since MTBE is one of the most cost effective oxygenates, gas producers will lost profits, as they will have to use more costly additives. Ethanol is more costly to produce than MTBE, thus contributing to increased overhead for production companies. Gas prices will reflect the change in operating costs of the gas producers, and rise substantially. In California and New York, prices have already begun to rise and are reaching over two dollars a gallon, (Bernstein).

Also, because MTBE penetrates the ground and contaminates water supplies, many more people could be affected. Although small amounts of MTBE are considered fairly harmless (20-40 PPM), larger concentrations have caused health problems as well as cancer in animal lab testing. MTBE can make water smell and taste like turpentine. It can also cause water supplies to be deemed unusable, and costs taxpayers billions to clean up, (Bernstein).

**Policy**

Because Federal Law required that MTBE be added to gasoline, the federal government has also been responsible for cleaning it up. A little less than a year ago a bill was introduced to the U.S. House to increase the amount of federal funding for clean up efforts. The bill reads:

“In order to protect human health, welfare, and the environment from release of methyl tertiary butyl ether (MTBE) from underground storage tanks, there are authorized to be appropriated from the Leaking Underground Storage Tank Trust Fund established by section 9508 of the Internal Revenue Code of 1986, notwithstanding section 9508(c)(1) of such Code, $200,000,000 for each of the fiscal years 2004, 2005, 2006, 2007, and 2008,”(Thomas).

Two hundred million dollars each year would be provided each year, over the next 5 years to aid clean up. The EPA administrator would disperse funds for assessment, remedial action, inspection of underground storage systems, and groundwater monitoring. Though it would seem this was a necessary action, some have argued that the problem is not that serious.

**Policy Critique**

The importance of keeping MTBE out of our water supply seems very evident to me. Experts have argued that because lab results have been inconclusive and no human cases of MTBE caused cancer have arisen, that the MTBE problem is not that serious. Even though it may not be a carcinogen, its negative effects on drinking water are more than significant enough to necessitate change.

Because testing and clean up is extremely expensive, the majority of Americans cannot afford to have their well or tap water purified. It is the EPA’s responsibility to provide the services as American tax dollars are used to remedy this crisis. The hardest thing is to look back and see how hastily actions were made, and important issues overlooked. MTBE should never have been introduced to gasoline, despite a few positive characteristics. Proper testing and experimentation should have been conducted
to identify potential issues to consider. Unfortunately, this instance is like so many in the history of the United States. It is not until after a problem fully unfolds until it is actually dealt with.

Recently state and federal officials have begun to go after oil companies and MTBE producers. There are currently billions of dollars of necessary clean up, and many of the nations energy reforms will be stalled as a result. If production companies were to fund the clean up efforts, the EPA would have billions of extra dollars of funding. The money then can be used to update energy sources, power grids, and to help lower gas prices. By suing the production companies, taxpayers hopefully will not have to spend additional money on MTBE clean up. Because the EPA is funding clean up efforts, money is essentially being taken from taxpayers,(Streater).

**Recommendations**

There are several gas stations on Lake Sunapee and in the watershed area, though none of them use MTBE any longer. Although New Hampshire never fully implemented the use of MTBE, some distributors may have used it. As stated above, MTBE can lower water quality by adding a foul odor and taste. There is also a potential for adverse health effect in humans. Over all, MTBE presents a significant threat to the lake provided there are any leaks in the area.

By conducting water and soil samples in the area of significant storage tanks, whether or not contamination has occurred can be established. If a leak has occurred in the past or at an existing station, sites can file for federal assistance and funding for assistance cleaning up. If the new policy H.R. 1122 is passed, there will be even more federal funding available for clean up projects, (EPA, #1).

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Invasive Species: Rock Bass

Emily Goodrich

Overview of Topic

Rock Bass has been a continuing problem in lakes around the United States. Why? This type of Bass is known to be an invasive species. This means that the fish is over-populating in a lake. The species does this by eating pretty much everything in sight, including many other kinds of fish. This makes it hard for other species, such as Lake Trout, to prosper in lakes because they are unable to re-populate in time.

Rock Bass got their name because they inhabit in rocky, vegetated areas of lakes and streams. They are identified as a brassy olive/brown color, usually with brown and black spots along its side and it has red eyes. A normal bass gets to be about 6-8 inches in length, and weigh less than a pound. One of the largest recorded Rock Bass was twelve inches long and weighed a little over a pound (Scarola, 106-107 and Page and Burr, 260).

One way for Rock Bass to become invasive is by how they reproduce. This species is known for the amount of eggs the female produces. In one hatchery a single female can create over 5000 eggs. Bass generally spawn during the month of June when the water reached between 60 and 70 degrees Fahrenheit. They have been distributed from the Mississippi River originally, and have also ranged throughout the Great Lakes and the Connecticut River (Scarola, 106-107 and Page and Burr, 260).

Most fish species in Lake Sunapee, NH were introduce on purpose by the state, though rock bass was not. No one knows why or how the species prospered in the lake. According to The Bassing of New Hampshire by Jack Noon, bass have been the most successful species in the lake, without re-stocking. The first person to stock Lake Sunapee was William Fletcher in 1868. He brought the fish by rail to Bradford and then by horse to Lake Sunapee. The bass were known to spread down the Sugar River and flow into the Connecticut River. With the rapid growth of the bass in the lake and in the rivers made it hard for other species such as, salmon and lake trout to thrive. “At the turn of the century, two commissioners examining bass at Lake Sunapee found young trout in their stomachs and had an explanation for why people in recent year had seldom seen small trout in the lake,”(Noon, 66). In September, 1873, bass fishing in Lake Sunapee was legalized, and the species has never suffered. It was recorded in 1875 that about three tons of just bass was caught in the lake, and yes, the species still survived (Noon, 59-73).

Literature Review

As mentioned earlier, Rock Bass tend to eat other fish species. People have done several studies on how “fish are what they eat,” (Keast, 78). In one study from Nature News Service, explains that the native Canadian Lake Trout has recently been forced to change their diet because of invading fish, of which are: smallmouth bass and rock bass. (Lawrence) Both species were introduced intentionally to “improve’ the fishing,” unfortunately they have been multiplying and dispersing themselves throughout the lakes. According to the article, no one thought about the consequences or impacts that the introduced species would have on other fish in a lake. They believed that since the lake trout and bass live in different habitats that there would be no problem (Lawrence).
Rock Bass are known to have larger mouths compared to other species, so they are able to consume larger objects for food. The older and bigger this fish gets, the bigger the appetite, making it hungry for large crayfish, bugs, mollusks, and medium-sized fish. And since the rock bass is one of the larger of lake fish species, they do not have many, or any, predators (Keast, 79 and Werner, 155).

Not only is there a problem with bass species in lakes of the United States, there is also a problem with snakehead fish, alien rats, and snails called Rapa whelks, which have each been separately invading areas around the world. These invasive species have encouraged Congress to finally fix the problem of the environments around the countries affected. “The list of invader species plaguing U.S. coasts is long, diverse, and growing,” (Cangelosi, 69). According to the author, aquatic invasive species have been at the top of the threat list to marine diversity, and are second in line as the top destructors of endangered species (Cangelosi, 69). Cangelosi says that one of the biggest providers of invasive species is ships and boats. The invasive species attach themselves to the boats and “hitch rides” to other waters, especially U.S. coastal waters. They do this by adhering to the hulls of the boats and by traveling in the ballast waters which is pumped into the bottom of the ship to provide stability when the boat is in choppy waters (Cangelosi, 70).

One problem is that there isn’t any sort of information as to what the ships and boats should do to prevent this from occurring. Fortunately, a newly found act, the National Aquatic Invasive Species Act (NAISA), will “mandate government action in a number of critical areas,” (Cangelosi, 72). These areas will set standards for ballast treatment. One requires that all ships will report their ballast operations as well as have an approved ballast treatment system. If the ballast system does not follow regulations then they must get a new one. Another one explains that the NAISA will make a screening process for all imported species, because many people purposefully move invasive species to other areas used for agriculture, aquarium trade, and fish stocking (Cangelosi, 73). This article has shown that there is something being done by someone to help with the populations of invasive species in many areas of the world.

Stakeholders

People who are generally concerned with the overpopulation of invasive species need to either keep on fishing for those species, or to start an act for these areas to put a burden on these species.

In the Cangelosi article (73), it says that stakeholders want “national legislation that provides a comprehensive response to the threat of invasive species.” If the stakeholder groups maintain their commitment of the policies then the NAISA might be approved in the 108th Congress. “If stakeholders press their individual demands,...then the bill would well stall, allowing invasive species the chance to cause further ecological and economic damage,” (Cangelosi, 73)

Stakeholders that are proponents of the reduction or removal of invasive species include local fishermen, EPA, U.S. Coastguard, commercial fishermen, and geological places, such as the Great Lakes (Cangelosi, 69). Those who are opponents of the reduction of invasive species might include many commercial fishermen, and those that are in the business of transporting and stocking of invasive species to areas.
Policy
H.R.1080 National Aquatic Invasive Species Act of 2003
This act is for the prevention of aquatic invasive species into waters of the United States by vessels. Policy H.R.1080 says that if a vessel that has operational ballasts and other towed vessels or structures is to have an inspection of the aquatic invasive species management plan. This plan is to make sure that no invasive species will be present on the craft before and after it leaves the water. I’m guessing that the invasive species they will be looking for are milfoil, and other plants of the like, and fish species, and their eggs. This will ensure that no invasive species will be transferred to or from any other body of water.

H.R. 266 National Invasive Species Act
This act is to establish the National Invasive Species Council. Policy H.R. 266 says that “no federal agency may authorize, fund, or carry out any action that would likely cause or promote the introduction or spread of an invasive species in the United States or any other location.” The Federal Government and state and local governments are trying to minimize any sort of impact that may induce invasive species to flourish more and cause the reduction of endangered species.

Policy Critique
Even though these policies are not directly about the Rock Bass species, they do relate by having policies on invasive species in general. Both policies have positive aspects to them. They equally stress the issues that invasive species are having on lakes, rivers and other bodies of water. They both have their own policies on how to fix these problems as well.

A weakness that these policies may have in the future is that not many places follow these types of rules. It is hard to ensure that rules will be followed and obeyed. These policies may be made, but will they actually be used and be stressed?

Recommendations
Some recommendations that I have for the LSPA to use to guarantee that invasive species never reach the Lake Sunapee waters are fairly simple. One is to continue the Lake Host program and to add some good enforcement to the boaters. This will help make sure that there are no plants or animal species attached to the boat or the trailers. The only problem that I can think of that would be negative in this situation would be if LSPA could not find anyone to volunteer to do this job, then they would have to deal with the employment situation.

Other ways to reduce the amount of Rock Bass specifically would be to restart the Rock Bass derby. Fishermen of all ages could have a contest to see how many Rock Bass can be contained in one day. This could be an annual contest. Then the fish could be used in a huge feast or for other purposes.

The LSPA probably already knows how the Rock Bass species “works,” pertaining to how it reproduces and eats. So I don’t think that there is much more information that I can give then about that. There is not much one can do to reduce the invasive species. They just need to be regulated and watched to make sure that the overpopulation doesn’t get out of hand.

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39
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Sarah Young

Environmental Concerns with Two-stroke Motors and the Bowen Bill

Overview of Topic

The topic I have chosen for this assignment is “should two-stroke engines be banned from American lakes?” It is a very controversial topic at the moment, partly because of the anger that surrounded California’s Bowen Bill, AB 2439. The Bowen Bill failed in early 1999 but the arguments continue, and will likely lead to a total ban of two-stroke engines, first on the water and then on land.

If the Bowen Bill passed, it would have banned the use of watercraft “propelled by a two-stroke engine that discharges unburned fuel or oil as a function of its design, with a power rating greater than 10 horsepower, from recreational uses on a lake or reservoir that serves as a domestic water supply or that is directly connected to a drinking water supply” (Valor).

The problem that the Bowen Bill tried to address is that two-stroke engines burn a mixture of gasoline and oil, and the oil, which is included as a lubricant, remains mostly unburned. A study by the United States Environmental Protection Agency quoted during the above floor analysis in the California Assembly, shows that about a quarter of the fuel/oil mixture from two-stroke engines just comes out as droplets in the exhaust (Valor). That is a lot of pollution to release into any environment, especially if the water was intended for domestic use.

The opposing arguments are focused on loss of liberty. For instance, if you have just spent all your money on a jet ski, you are not going to be happy to be told that you cannot use it anymore. Many Americans believe that the government has a duty to compensate individuals for losses due to government action. There are also huge numbers of two-cycle engines now in use, so that many people would be economically hurt by a ban.

While the basic argument is clear, there seems to be an even deeper reason that this issue has hit such a nerve. Two-stroke engines are very, very noisy, and fast jet skis, snowmobiles, all-terrain vehicles and similar adult ‘toys’ have now been made in great quantities, and seem to be everywhere. Their high-pitched noise can annoy other people from far away and bring pollution deep into wilderness areas. Given this increasing annoyance, we can wonder how much of the current concern over two-stroke engines is really environmental, and how much of it is a reaction against their unpleasant noise. Even though these ‘toys’ may be a lot of fun for those who own them, they show very little consideration towards those who would like to enjoy lakes and forests in peace and quiet. Is this apparently new controversy just another form of the ‘environmentalists vs. boaters’ argument so current on Lake Sunapee? When an environmentalist in his canoe, studying aquatic plants, is half-swamped by a speeding motorboat, is he too willing to argue that the speeding boat should be banned as a likely source of imported milfoil? Or is the hull of his canoe just as likely to be contaminated? In a similar perspective, there is nothing like a screaming jet ski to bring negative attention to the two-stroke engine.

Literature Review

The article, *How Two-stroke Engines Work*, has clear diagrams explaining two-cycle engines, and concludes that “two-stroke engines produce a lot of pollution; so much, in
fact, that it is likely that you won’t see them around too much longer” (Brain). It explains that all this pollution comes from two sources, of which the more obvious is the burning of the cooling oil. Even more important, when you look at the diagram, is the fact that with the piston on the down stroke, the engine exhausts at the same time as it sucks in more air/fuel mixed in the carburetor. So, a lot of the new fuel goes out the exhaust, unburned, before the piston can compress it on the new stroke. In a four-stroke engine, the exhaust cycle is separated from the intake cycle, so this does not happen. The sequence is different for a two-stroke and a four-stroke motor. A two-stroke goes: intake and exhaust, compress and burn, intake and exhaust again. A four-stroke goes: intake, compress and burn, exhaust, intake again. Besides creating pollution, a two-stroke engine will wear out faster because it has no real cooling system, will be much more expensive to run because lubricating oil costs a lot more than gasoline and it will be less efficient because of the unburned fuel. On the plus side, it is simpler and cheaper to build and will create more power for a given weight (Brain). What is needed be in this case is a lighter four-stroke engine, and internet sources seem to agree that this will be the short-term solution to the problem.

Marine motors are not the only two-stroke engines that give us concern, even if their pollution goes straight into our water. States have been looking at all sorts of other two-stroke powered vehicles, such as mopeds, snowmobiles, lawn mowers, etc. Even a chainsaw will produce as much smog-forming hydrocarbon emissions in two hours as driving ten 1995 cars for 250 miles each (Fact Sheet: Reducing pollution from small engines). While most of our motorcycles are four-stroke, several internet sites made me aware that pollution from two-stroke vehicle engines, like those that power the millions of rickshaws in Asia, are the chief source of concern in many parts of the world. An article posted by the World Bank on *Understanding the Problems of Small Engine Emissions* warns that the rate of urbanization (growth of population in cities) for South Asia is 3.2% per year as compared to an overall population growth of only 1.3% (Understanding the Problems of Small Engine Emissions). In the cities of South Asia, two-stroke engines power the majority of vehicles, producing a huge pollution problem. Vehicles are also growing even faster than urban population. In Nepal, a country that has little oxygen because of altitude, vehicles are increasing at a rate of 13.5% per year. (Understanding the Problems of Small Engine Emissions). In 1996, Delhi had about 500,000 cars and almost two million 2-wheelers, mostly powered by two-stroke engines. In 1999, all of Bangladesh had 94,300 cars vs. 268,000 two-stoke vehicles (Understanding the Problems of Small Engine Emissions). For instance, all this adds up to the fact that vehicles account for a very large proportion of pollution in South Asia: 48% of carbon dioxide in Sri Lanka, for instance (Understanding the Problems of Small Engine Emissions).

Given my focus on water pollution, data collected by KIMO, an international organization of local authorities in the U.K., Sweden, Germany, Norway, Denmark, Ireland, The Netherlands, the Faeroes and the Isle of Man dedicated to cleaning up the North Sea, was of particular interest (The Organisation). In 2002, KIMO passed a resolution urging all its governments to “take vigorous and appropriate measures in order to reduce emissions from two-stroke outboard engines” (KIMO Sweden). In arriving at this resolution, KIMO estimated that there were a million pleasure boats with two-stroke engines in the North Sea, emitting 40 million pounds of hydrocarbons into air and water.
every year, and that this resulted in poisoning the bottom sediments for marine life (KIMO Sweden). A four-stroke marine engine of the same power emits 97% less pollution than a two-stroke (KIMO Sweden).

Lastly, I found many Internet sources pertaining to U.S. lakes, and to the Bowen Bill, discussed under ‘Policy’, below. The Las Vegas Review Journal reported in December 1998 that two stroke engines had been found to contribute more than 70% of the gasoline pollution in Lake Tahoe, prompting a ban on them that would start in June 1999 (Associated Press). In 1997, the San Diego Earth Times reported that one hour of operation for an outboard motor is equivalent in pollution to driving 5000 miles in a modern automobile (Long). Five years later, the KIMO resolution already cited revised that estimate to 25,000 car miles for a 10 horsepower outboard (Long).

Stakeholders

When talking about the pollution of American lakes, there is a clue at the bottom of the first Bowen Bill analysis on the floor of the California Assembly. This clue consists of the list of registered supporters and opponents of the bill. Among the supporters is a long list of “green organizations,” some of which are The Bluewater Network, East Bay Municipal Utilities District, Friends of the Earth, etc. (Valor). Since these are environmentally friendly organizations, they speak for the public. Among the opponents is a list of recreational organizations, dealers association, committees, etc (Valor).

Policy

During the literature review, many sources were found concerning the Bowen Bill, AB 2439, as well as similar proposals in many other states. The actual text of AB 2439 is available in the records of the 1997-8 Regular Session of the California Legislature. Assembly member Bowen starts his bill by reminding everyone that:

“Existing law makes it unlawful to deposit, permit to pass into, or place where it can pass into the waters of the state any petroleum or residual product of petroleum” (California Legislature 1997-98 Regular Session).

This Act (as amended) would have prohibited the sale, after 1998, of “any new 2-stroke marine engine that discharges unburned fuel or oil as a function of its design” (Assembly Bill 2439). An additional prohibition against the operation of any two-stroke engines on California reservoirs after June 1st 2004 was wiped-out on amendment (California Legislature 1997-98 Regular Session).

The amendments left about 70% of the original bill omitted and it died through failure to find sponsors. the question is why? The answer to that emerges from the literature review is strong political pressure and lobbying. One important aspect among the lobbying was companies in the boating industry, who quoted eight hundred million dollars in last sales. A state site that summarizes press coverage of all bills helps to better understand popular concerns. On that site, under New Steps to Protect Water Supply EBMUD votes to use cleaner boat engines (Lee), it explained that the East Bay Municipal Utility District Board had authorized $425,000 “to convert 150 small craft,” mostly belonging to concessionaires from two-stroke to four-stroke engines (Lee). This sort of switch would reduce MTBE concentration by 40% (Lee).
MTBE, which is a chemical additive of gasoline that easily dissolves in water, is being found in drinking water, and could pose a serious threat to humans (Lee). This concern over MTBE has also been often cited here in New Hampshire, which is an interesting connection. California requires MTBE to be added to gasoline in a ratio of 11% in spite of the fact that it is a suspected carcinogen, and it also gives water a fowl smell (Lee).

Another article on the same site, “Capital Insider: Boat Industry in an Uproar about Proposed Motor Ban, explains the feared loss in sales, $660 to $880 million per year, and argues against the Bill 2439 on the grounds that the industry will develop cleaner four-stroke engines for its motors soon (York). While dealers are predicting the ruin of the entire California Boating Industry if the bill passes, boat owners are quoted making statements like, “is the state going to buy my boat? I don’t think so,” referring to a fishing boat with a two-stroke 200 horsepower motor (York).

The amendment of the Bowen Bill is discussed in another article, Bill to Ban Polluting Empire Altered, which appeared in the Contra Costa Times of May 23rd 1998. This acknowledges that assemblywoman Debra Bowen was “under pressure,” when she agreed to the changes. This article estimates that half-a-million boat owners would have been affected by the bill in its original form, and millions of other “outdoorsmen” were in sympathy. “Bowen became the target of intense lobbying,” the article explains, “and has dropped any effort to restrict the use of currently owned machines” (Bill to Ban Polluting Empire Altered). In other words, Bowen had decided to allow grandfathering of all existing motors, in an effort to open the door to mandatory production of cleaner engines.

On the other hand, another article in the Contra Costa Times of June 28th 1998 launched an even broader attack on the proposed bill under the banner “Clean Water Bill isn’t Exactly Crystal Clear” (Gandy). This article explains that recreational boating provides 184,000 jobs and eleven billion dollars annually to California and should be encouraged, not attacked (Gandy). The final defeat of Bowen Bill AB 2439 was discussed on May 28th 1998 on a website, the Northern California Bans Fishing Network. Their response was “Hear ye, hear ye … the masses have spoken! And spoken very loud” (Chris).

The basic policy of the Bowen Bill was put the responsibility for polluting not on the owners of two-stroke engines but on motor manufacturers. It aimed to set emission standards for boats, just like cars, and gradually reduce allowable pollution levels. A four-stroke engine is much cleaner than a two-stroke, but is more expensive. If goals gradually are raised, as they were for cars, people get used to spending more money on their boat engines. Improvements can also be phased in by gradually increasing the number of lakes that are restricted to unimproved motors.

It is also possible to introduce the policy gradually by using a mixture of federal, state, and local regulations. For instance, East Bay Municipal Utility District (EBMUD) made a policy to spend more money to buy clean boats for themselves, which is the similar to the Federal government’s use of cars powered by natural gas (Lee). In addition, since states make rules for state parks, Federal agencies make rules for national parks, and local cities and towns make rules for local recreational areas, new pollution limits can be phased in so as to have limited application. The Lake Sunapee Protective Association (LSPA), for instance, could influence lake towns to pass a rule about Lake

Institute for Community and Environment
Colby-Sawyer College
44
Lake Sunapee that did not apply to nearby lakes. So, if big motorboats with two-stroke engines were gradually excluded from Sunapee, they could still be used on lakes nearby.

Policy Critique

The policy presents both weaknesses and strengths. A weakness in the policy is that the policy makes boats more expensive. A strength of the policy is that it makes boats more expensive gradually.

One could compare this policy to dealing with auto emissions in many ways. First, auto emission goals were set a little bit higher every few years. Second, California always kept ahead of the rest of the country because they had more of a smog problem. This meant that car manufacturers had to produce a cleaner car for California, which allowed them to experiment with the next stage of development.

If we think that such a policy would work for boats because it already worked for cars, we would find out at what rate the auto industry was asked to improve emissions, and set similar goals for marine motor manufacturers. Even so, there are issues that are a problem because they set public goals against private rights. For example, how much freedom to pollute should the owner of a boat or car have? The final policy needs to strike a balance between absolute freedom and no freedom. We need to find what the acceptable balance between the individual good is and the good of society; for instance, the right of an individual to enjoy a jet ski versus his right to annoy others with noise and pollution. In New Hampshire, we say “Live Free or Die,” a cultural slogan based on the beliefs of General Stark during the Revolutionary War. The truth is that we are not really free to do a lot of things, such as drive 100 mph on route 89. So, rules can be made for Lake Sunapee that similarly restricts individual freedom. Speed limits for motor boats can be set to minimize the size of wakes that could overturn canoes, kayaks, and other light boats. On the other hand, is it valid to use assumptions drawn from emission policies for cars to regulate boats? There will be some adjustments to make and we will have to feel our way around this problem.

When we say that a two-stroke engine emits 25% of its fuel into the water, it sounds terrible, but if we express our statistic by comparing the volume of fuel being released to the volume of the water in the lake, it would sound much less terrible. Statistics can be made to lie. It is important to be fair and see things from other people’s point of view.

There is pollution in Lake Sunapee; there are boats on Lake Sunapee; therefore boats must be causing the pollution. Is this true? Going back to the Bowen Bill, supporters argued that since there were MTBE’s both in boat emissions and in lakes, one must be causing the other. Opponents, on the other hand, pointed out that equally high levels of MTBE’s were confirmed at lakes where there was boating and no boating (Valor). What does this mean? Our assumptions can prove wrong from an economic standpoint. For instance, the fact that cars are a necessity and boats are a luxury is likely to make acceptance of higher cost in boats less than that of higher cost in cars. So, will people accept higher costs in boats because they have accepted them in cars? An opposite conclusion could be based on the idea that, since recreational boats are a luxury, even a slight price increase might drastically reduce demand. That was the conclusion favored by opponents of the Bowen Bill, and the reason they predicted drastic economic results from its passage (Gandy).

Institute for Community and Environment
Colby-Sawyer College
45
Even without knowing who was right, we can still make some conclusions. Regardless of whether price increases in boats to reduce emissions are less acceptable than price increases in cars for the same reason, it seems to me that gradual price increases will always be better than sudden price increases. So, if we decide that something must be done to reduce lake pollution on the long run, it will still be better to try a gradual approach. And if telling someone that they cannot use something expensive that they have just bought is unfair, it will always be better to convince the motor manufacturers to improve the product available to the consumer, rather than sell them something they can’t use.

**Recommendations**

The arguments above suggest a couple of recommendations for the Lake Sunapee Protective Association. First, they should study the history of the auto emission control program in the United States to see how long it took to phase in pollution improvements. Second, they should talk to motor manufacturers to see how quickly they expect cleaner four-stoke outboards to be available at reasonable prices. Based on this, gradual goals for improving marine emissions could be suggested, since manufacturers would also gain from a switch to more expensive engines provided it does not drive too many customers away. If the LSPA and the manufacturers could agree on a timetable for pollution reduction, it could be jointly suggested to regulatory agencies around the lake, and this should head off the kind of reaction that killed the Bowen Bill.

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Water Access Permit Bill (SB159)  Matt Cummings

Overview of Topic

In New Hampshire (NH) the current law states that out-of-state boats registered in other state or county may use state water for 30 consecutive days without obtaining a NH registration. “These vessels, estimated to number between 20,000 and 60,000 per year, have an impact on the environmental health and safety of our lakes and ponds. Exhaust emissions, fuel spillage, gray water discharge and the spread of invasive aquatic species impact water quality and the recreational value of our lakes. These additional boats place increasing stress on access facilities and Marine Patrol staff responsible for safety on public waters,” (New Hampshire Lakes Association).

The problem with this issue is that out-of-state boaters are not familiar with NH state laws and environmental concern. One great concern is the spreading of invasive speeches. Variable milfoil is on of the most abundant aquatic invasive species found in NH. Boats commonly spread the milfoil, either by cutting it up, spreading it more throughout the waterbody they were in, or transporting it to another lake by trailer, (New Hampshire Department of Environmental Services).

Literature Review

Milfoil has greatly impacted the lakes and ponds of NH and is spreading rapidly. Over fifty lakes in the state have been found to contain invasive milfoil. There are six native milfoil species but now are two types of invasive milfoil, Variable milfoil and Eurasian milfoil. “There are only two accounts of Eurasian milfoil found in NH this due to NH having soft water. Eurasian milfoil usually is found in alkaline (hard) water but can be found in nearby in a number of waterbodies in Vermont and Massachusetts,”(New Hampshire Department of Environmental Services).

Variable milfoil can out compete the natural aquatic plants disrupting the natural balance in the water body. It can grow up to fifteen feet and spreads rapidly. Theories on how it got to New Hampshire are that it was brought from a boat or a trailer or was dumped out from a fishing tank in one of the water bodies. Once invasive milfoil has been established boat propellers cut the milfoil into pieces that are carried away by the wind or water current. These pieces will grow roots and if they reach the shore a new colony will be formed, (New Hampshire Department of Environmental Services).

Unfortunately there is no way to completely get ride of milfoil yet but milfoil there are some methods being used to control milfoil. Hand pulling is one won but must be done at early detection before plants are too large to work with. Another method is a benthic barrier that is placed on the bottom to blocks the sunlight and compresses the plants. An additional method us when plants are out of control is aquatic herbicide. This method could apply one to three years of control in a waterbody (New Hampshire Department of Environmental Services).

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All around the nation states are facing the problem with dealing with one of the types of the invasive milfoils. Facing the same issues of tangling fishing lines, disrupts fish habitat, ruins swimming and boating areas and disrupts the natural habitat. To try to get rid plants similar methods have been used. With the use of chemical algaecides you risk the quality of your water with eradication unusually only temporary prompting more chemicals. At Vermont’s Lake Fairlee volunteers and divers have logged many hours pulling the weeds out. After being pulled from the lake the milfoil makes its way to gardens as fertilizers. Another method is mechanical harvesting but that usually cuts it up and spreads it more but cost lest then manual labor. Other methods include research with biological answers such as insects and fish but they too could be just as invasive as the milfoil, (Matson).

Stakeholders
In the case of Lake Sunapee, the stakeholders are anyone who uses the lake. This includes this includes many of the recreation activities such as swimmers, boaters, anglers. In addition, tourist that comes here spend their money and go to the lake. The businesses the need the tourist and lake to survive are stakeholders. Also stakeholders are people who get water from the lake. The lake is a valuable drinking rescore for the entire watershed. In addition to anyone who has a house on the lake, the milfoil could make swimming difficult and cause decline in property value, (New Hampshire Department of Environmental Services).

Policy
The policy of the Water Access Permit Bill (SB159) could work for two reasons. One reason is because it informs the out-of-state public about milfoil and the second is because it will generate revenue for laws and other water departments in New Hampshire, (“Summary,” New Hampshire Lakes Association).

The proposed legislation is that “In an effort to educate out-of-state boaters, the NHLA is proposing that all motorized vessels (including sailboats over 12 feet in length), whether they are NH registered or not, must display a Water Access Permit to operate on state inland waters. Requiring this permit would provide a point of contact with visiting boaters and the unique opportunity to educate them before they enter NH's inland waters. For vessels registered in-state, the permit would be available at no additional cost”. The Water Access Permit may be purchased wherever boat registrations are currently available. The cost of the permit would be $15 when purchased from the state ($17 at a marina),” (New Hampshire Lakes Association). The new revenue generated from out-of-state boaters would help lessen the impact of boats on NH’s waters and fun and fund some of other NH’s areas in water. Also part of the funds would be used to supplement the new milfoil and other invasive species prevention and research grant that become effective in 2003, (New Hampshire Lakes Association).
Policy Critique
I think that this policy’s strengths would be that it creates an outside source for revenue that can fund water body programs or help with without raising in-state taxes or registration. We also benefit by informing out-of-states of milfoil problem in NH seeing that most out-of-state boaters are from states that have milfoil. This I believe would be an important issue in Lake Sunapee with all of the boats there. Considering that boating is a major recreation on the lake, it would be a cause for concern of the spread of milfoil. Though Lake Sunapee has milfoil monitoring initiatives, the rest of the smaller water bodies in New Hampshire may not. The weaknesses to this policy could be that the fee could turn away some out-of-state boaters. In addition how are we going to insure that they will clean off their boats and trailers? Some people might just not care or are too lazy to pull off the weeds. I think the people that would be in support of this would be most of the environmental legislation and the people of New Hampshire to help protect our waterbodies and earn out side income to help combat the milfoil problems.

Recommendations
I think that the LSPA should support the Water Access Permit Bill (SB159) and if it goes through it could help them keep the people that come from out-of-state to Lake Sunapee informed about laws and environmental issues of the lake. Also it could possibly help fund some of the duties or equipment that is needed to monitor the lake.

Sources
Wild Goose: Issue of Public Access

Stacey Philbrook

Overview of Topic

For over ten years there has been a dispute between Fish and Game and the local towns in the Lake Sunapee watershed over the development of the Wild Goose site. State regulations require Fish and Game to own and operate a boat launch area on all public New Hampshire lakes, which is what the Department is trying to accomplish. Though five public boat launch sites currently exist on the lake, all are town owned (Roberson, A5). The Department is fed up over the amount of money they have spent in the last decade over consultant costs and has finally decided to go ahead with their original development plans despite local concerns.

The 3-acre plot of land, known as Wild Goose, was given to the Department of Fish and Game after it was bought in 1990 by the Land Conservation Investment Program (LCIP). The LCIP purchased 133-acres, including Wild Goose, in an auction for $603,614. The remaining 130 acres were added to Mt. Sunapee State Park, which prior to the LCIP purchase, was being looked at as a potential site for large-scale development (NH F&G, 1-2). The land leading to Wild Goose is of a rather steep grade and is also located right on Route 103B, a fifty mile per hour road used for major trucking through Newbury. The land itself has evidence of old houses including foundations, a stone stove, and other debris. The land is uneven and seems to support very little terrestrial life.

William Bartlett, the Acting Executive Director for N.H. Fish and Game, claims that “the effort to establish a public boat-launching site on Lake Sunapee has already taken more than ten years and has cost thousands of dollars in consultants and staff time (NH F&G, 1-2).” One such consulting firm, B.H. Keith Associates of Freedom, N.H. looked into the suggestion that Fish and Game should further develop the Sunapee State Beach to fulfill their requirements. This idea was eliminated after the firm determined the site was less preferable than Wild Goose due to safety concerns of boating versus swimming and the fact that it would ultimately be less aesthetically pleasing with suggested uses of Jersey barriers and chain link fences. This separation would be necessary to divide Fish and Games’ free boat launch area from that of the state beach, which DRED collects a small fee for the use of parking and beach access (NH F&G, 1-2).

Local organizations opposed to the Wild Goose development are concerned that a new launching site will add to the increasing problem of invasive aquatic plant species. Volunteers currently staff each launch site around the lake to educate boaters about the possibility of invasive species being transported to the lake via boat propellers. With the addition of Wild Goose more volunteers would be needed which may pose a problem. Another reason locals oppose is because the increased impervious surface in combination with the surrounding steep slopes will cause more runoff and may have high negative effects on the lake (Durfey A1, A16). Human safety issues also arise as a concern. Visibility, steep grades going to and coming from the potential Wild Goose site in addition to a 50mph speed limit on route 103B could cause major accidents (Roberson A5).
Literature Review

With an increase in opportunity for trailer parking and access to the lake, public enjoyment and use will likely increase. Which is more valuable though, public access or preservation? One journal, *Environment*, discusses the importance to preserve conserved lands over allowing public access and recreation on them (“Which is More Important”, 1-2). The article argues that National Park legislation should be applicable to state conserved lands, at least in thought. It refers to the National Park Service Organic Act passed in 1916 which establishes the purpose of national parks: “… To conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (Summary of Legislation, 1).” If developed, the conserved Wild Goose site will be increasing public access but may negatively affect water quality and the overall health of Lake Sunapee. Can this act be applied, in thought, to this situation though Wild Goose is only 3-acres? And if so, is it fair to limit public access to a public lake in order to lengthen the life and quality of it? Though some launching sites exist around the lake, restrictive or undersized parking lots and shallow launching sites may make it difficult for public parties to access and use these sites.

The *Journal of Environmental Health* addresses the issue of development and its effects on local streams and lakes. A study conducted by the Environmental Protection Agency created a mock village on farmland by introducing structures to represent houses and plowed soil to simulate construction work. Samples were taken from nearby streams and lakes to compare water quality before and after the ‘urbanization’ of the land. Previous studies show that development including impervious surfaces and disturbed soil cannot soak up rainwater as effectively and therefore the runoff will consequently affect local water quality (Mock Village on Farmland Will Measure Runoff Effects on Water Quality, 1). Other articles such as *Impervious Surface Coverage* also include discussion on the impacts of paved roads and how this impervious surface is directly correlated with human population in a specific area. The article points out that this is one of the most recent impervious surfaces because only about a hundred years ago in 1904 over 93% of roads in America were unpaved. Some additional concerns that may result from pavement near a waterbody is the increased erosion of shoreline habitat and in combination with less tree coverage, and flashes of warmer runoff in the summer and colder runoff in the winter (Arnold Jr., 1-3).

Stakeholders

Local townspeople and organizations are the primary stakeholders that are in opposition to the project (Durfey, A1, A6). Locals feel that there is already adequate boat launching access and would like to discourage development on the shoreline and avoid overcrowding on the lake. Property owners on the shorefront do not want additional boats because of increased noise, congestion, and pollution. These factors decrease the aesthetic values of living on the water and may have additional impacts on property value.

The Lake Sunapee Protective Association (LSPA) is devoted to keeping the lake clean and healthy for everyone’s enjoyment. This organization puts a lot of effort into organizing programs such as water quality monitoring and keeping track of invasive species. If Wild Goose is established as a motorboat launching area the organization...
feels there will be an increased chance of invaders allowed into the lake which could have highly negative effects on the lake and its species (Durfey, A1, A6). Invasive plants such as milfoil quickly grow vertically and spread horizontally, and will soon overshadow other species. This prohibits sunlight from reaching the shorter aquatic plants and will ultimately kill them. One reason milfoil thrives in certain lakes is because it has no natural predators therefore nothing stops its growth. After milfoil has killed off native plants, fish and other aquatic animals will soon die if their major source of food has been eliminated from the lake. This process has the threat of carrying up the food chain and causing massive damage to effected species. Therefore, the LSPA feels this project could have enormous damage to the lake. Currently milfoil is LSPA’s main concern and development will allow more access points for this relentless invasive plant (Milfoil Update, 1).

In addition to the previous potential threat, runoff is also a very real concern. With high traffic on route 103B, a steep slope leading down to the Wild Goose site, and increased impervious surfaces because of new parking and roads, it is unavoidable that more sediment and pollutants will wash into the lake. Eutrophication or algae bloom can result from an increased amount of nitrogen or phosphorous in the water, lawn fertilizers are common chemicals that can have this effect on lakes. Algae bloom lowers water quality and aesthetic values which can be devastating to recreation and property values (A Cure for Those Eutrophication Headaches, 1).

Policy

Senate Bill 512 has been proposed to the State of New Hampshire’s General Court in order to solve the current dispute between the opposing parties. It currently is in the senate and there will be a hearing on March 2, 2004 to further address the issue (New Hampshire General Court, 1). The bill outlines requirements for the Department of Fish and Game pertaining to the development and management of the Sunapee State Beach and the Wild Goose site. Both the Lake Sunapee Protective Association and the New Hampshire Lakes Association in addition to several townspeople support the bill (New Hampshire Lakes Association, 1).

The bill states that Sunapee State Beach will be established as a motor boat launching site, while the Wild Goose site will be limited to non-motorized or car top boat access only. Provisions will allow for the construction of additional parking for cars and trailers at the state beach, expansion of the launch ramp, dredging the channel, and adding a loading dock. Regulations for the Wild Goose site will allow swimming, picnicking, and shoreline fishing, in addition to the car top boat launching. Several other regulations apply according to free vs. charged parking and operation hours for both proposed parks (New Hampshire General Court, 1).

Proposed figures for total projected costs for the development of both sites is $640,000. This figure is not final because some costs could not be determined. Such unknown cost will include safety improvements for the separation of swimmers and boaters, engineering/design, permitting, and construction (New Hampshire General Court, 1).
Policy Critique

The proposed policy has several attractive ideas. One, it solves the issue of Fish and Game needing to fulfill their state regulations by owning and maintaining a public boat launching site. Two, it maintains the amount of public boat launch areas to six, eliminating additional concerns for invasive species. And three, it still allows for the partial development of the Wild Goose site.

Though these are all very good compromises to the issue at hand, there still may be problems to this proposal. DRED, who is currently in charge of the Sunapee State Beach, and Fish and Game have had some problems working together in the past and this may drive F&G to push for the complete development of Wild Goose or further delay the project. Dredging the state beach channel has also come up as a problem in the past with the concern that it may be very costly to maintain a deep channel because there is no guarantee how long it will stay clear. It is difficult to determine if there is a significant difference between potential accidents due to cars pulling trailers and cars with car top boats. Each will have slower pickup and have the same low visibility. Therefore even if there is limited launching at Wild Goose, it does not assure that road reconstruction costs will be lower for F&G or decrease accidents. Additionally, no definite provisions have been set up for how to separate the launching area from the beach or how to address the safety of swimming issues. Finally, it is hard to determine how cost effective it would be for F&G to go about this project because so many costs are unknown.

Support for the bill from locals and environmental organizations such as the New Hampshire Lakes Association is high. Many support the bill because it decreases the amount of clearing on the Wild Goose site which will make it more aesthetically pleasing, and it avoids additional launches with the threat of additional invasive species.

Recommendations

I believe that the proposed policy has a great deal of potential if the concerns I listed above can be addressed. I also have visited the Wild Goose property and have seen that it needs some desperate attention because it has been developed in the past and much rubble is left on the property. It does have some great qualities such as the beautiful lake front area and the large stand of pines in the center. The potential for this to be a great swimming and picnicking area, with some parking and a small launch site will be a wonderful addition to the lake.

Some possible alternatives may be to decommission the launch site at the state beach and transfer it to Wild Goose. This would call for the reconstruction of 103B to increase driver safety, but it will eliminate the concern for swimming safety at the state beach. Swimming should be banned at Wild Goose to avoid safety problems in that area. Though there would be heavier development at Wild Goose, no further development at the state beach would be needed and the concern about repetitive dredging would be eliminated because the Wild Goose site is deeper. Volunteers who work to educate about invasive species could then work at the new site instead of the state beach.

Sources