The Community and Environmental Studies program is geared towards immersing students in yearlong analyses of environmental issues. This year students have been working with the Lake Sunapee Protective Association (LSPA). Founded in 1898, LSPA is dedicated to preserving the environmental quality around Lake Sunapee. Over the past several years LSPA has expanded its focus from primarily Lake Sunapee to include Lake Sunapee’s watershed. In collaboration with the Upper Valley Lake Sunapee Regional Planning Commission, LSPA has embarked on a multi-year initiative to inform stakeholders of the importance of Lake Sunapee’s watershed. In the project with LSPA, students have completed three major projects; the New Hampshire Comprehensive Lake Inventory for Lake Sunapee, a Watershed Investigation, and Natural Resource Inventory for Lake Sunapee. In June of 2003 the LSPA produced a newsletter describing the importance of the Lake Sunapee Watershed and how it must be protected. This newsletter follows that initial communication on the importance of watersheds and provides a summary of the significant findings of the student project.

For more information on this project please contact: John Callewaert (603)-526-3973 jcallewaert@colby-sawyer.edu. A copy of the final project report will be available in July at: https://www.colby-sawyer.edu/academic/ces/curriculum/thirdyearprojects/index.html.

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**New Hampshire Comprehensive Lake Inventory**

**Purpose:**
- Establish “baseline” information that objectively characterizes the watershed.
- Guide the collection of information to assess the status of the watershed.
- Create a foundation that facilitates a common understanding of watershed characteristics.
- Serves as a planning and educational tool.

**How does it work?**

The Inventory is organized into 10 primary attributes. Each attribute is designed to address a specific characteristic commonly evaluated when developing a watershed management plan. Within each attribute there is a series of questions with a listing of multiple-choice answers for each question. Most answers are then scored on a 1-5 basis.

There are 3 categories in which the questions are split into:

1. **Unique or Outstanding Value:** A lake scoring high in this category will have many unique, outstanding, natural or cultural features.
2. **Recreational Value:** A lake that scores high provides and/or supports a variety of passive and active recreational activities.
3. **Susceptibility to Impairment:** A high score indicates the vulnerability to detrimental changes or impacts or is threatened or stressed by one or more factors.

**How did Lake Sunapee score?**

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique or Outstanding Value</td>
<td>83/100</td>
<td>Lack of historical features</td>
</tr>
<tr>
<td>Recreational Value</td>
<td>75/100</td>
<td>Lack of angler usage/watercraft density</td>
</tr>
<tr>
<td>Susceptibility to Impairment</td>
<td>48/100</td>
<td>Presence of aquatic invasive species: Milfoil</td>
</tr>
</tbody>
</table>

The overall score for an individual attribute is determined by adding the scores from each of the questions under each category. The score can then be compared to the total number of points available (100) for that particular attribute.

Susceptibility to Impairment scored low, which indicates the lake has low vulnerability to damage. The other categories scored high; it is important for a lake to have these kinds of qualities to keep it active.

**Areas of Concern for Categories:**

- Lack of historical features
- Lack of angler usage/watercraft density
- Presence of aquatic invasive species: Milfoil

**Challenges:**

We have faced many challenges while doing research for the Inventory. GIS gave us a few difficulties as a result of the information was not up to date. A few of the questions were difficult to interpret, and some of the information was not available. Three questions of the Inventory gave us the hardest time to find the information needed:

- The rate of development question was a challenge since the six towns that surround Lake Sunapee do not follow the same recordkeeping for development. An interpretation and a standard methodology had to be developed by the class.
- Answering the soils question was difficult as current data for Merrimack County was not readily available.
- And finally, answering the impervious surface question proved difficult as there was not a clear protocol for handling the data nor a methodology for analyzing the findings.

The Inventory was developed by:
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NH Lakes Management and Protection Program
NH Department of Environmental Services
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Concord, NH 03302-0095
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Fax: 603-271-7894
Email: jcolburn@des.state.nh.us

One of the many maps created to illustrate an answer to an inventory question.
Knowing the rate of development within a watershed is an effective measurement that can be used in planning goals and objectives. Understanding the methods for compiling rate of development, and then applying this information into future development plans can be a useful tool in preserving the quality of a watershed. Analyzing new growth and rate of growth are key components in rate of development, yet another key factor is identifying land areas experiencing high rates of development. All of this information needs to be assessed on a per watershed situation and reflected upon in a manner that is useful to that watershed.

In order to measure the rate of development for the Lake Sunapee Watershed, several methodologies were developed to ensure the most accurate representation of rate of development. Two processes were followed in developing the final conclusions about the rate of development within this watershed, which included a windshield survey and a collection of new home building permits from each of the six towns. As information was gathered across the watershed, alterations in analyses had to be made in order to represent growth and development in the most accurate manner.

To obtain the percent increase of new homes in the watershed, the use of a 1987 USGS Topographic map was updated with the 2004 windshield survey. Overlapping these data layers allowed for a calculation of new homes to be determined over the 17 year period.

<table>
<thead>
<tr>
<th></th>
<th>2004 Total Homes</th>
<th>1987 Total Homes</th>
<th>Difference</th>
<th>Percent Change in 17 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Permits</td>
<td>2,865</td>
<td>2,324</td>
<td>541</td>
<td>24%</td>
</tr>
</tbody>
</table>

This graph displays the number of new home building permits by each town in the watershed from 1997 through 2003. An exception that needs to be considered in examining this graph, is that Springfield’s building permits are not specifically representing only new homes, like the five other towns. Their records only tally the number of permits issued, not what kind.
**Fun Facts**

- Watershed Size: 30,024 acres
- Lake Sunapee: 4,090 acres
- Approximately 2,996 households within the watershed.
- Development within the watershed experienced a 29% increase in new homes over a 17 year period.
- The John Hay National Wildlife Refuge is the largest stretch of undeveloped shoreline (nearly 1 mile!).

**How Can You Help?**

- Use reduced phosphate or phosphate-free detergents
- Use lawn fertilizers sparingly
- Keep compost piles away from waterbody
- Minimize amount of bare soil on property
- Have septic tank cleaned out at least every five years
- Dispose of hazardous household liquids properly — DO NOT DUMP THEM DOWN THE DRAIN!!

**Contacts**

This is a list of some of the organizations contacted in order to retrieve the information needed to answer the inventory questions appropriately. They are also useful contacts for watershed residents.

- Lake Sunapee Protective Association (http://www.lakesunapee.org)
- New Hampshire Department of Environmental Services (http://www.des.state.nh.us/)
- Upper Valley Lake Sunapee Regional Planning Commission (http://www.uvlsrpc.org/)
- New Hampshire GRANIT (http://www.granit.sr.unh.edu/)
- New Hampshire Fish and Game Department (http://www.wildlife.state.nh.us/)
- New Hampshire Natural Heritage Bureau (http://www.nhdfl.org/formgt/ghiweb/)
- New Hampshire Lakes Association (http://www.nhlakes.org/)
- New Hampshire Department of Resources and Economic Development (http://www.dred.state.nh.us/)
Currently there are several state bills that could potentially affect Lake Sunapee if ratified. Listed are those most significant to the watershed.

**Senate Bill 512**
Relative to improving boat access to Lake Sunapee. This bill was proposed in reaction to the Wild Goose site development plans set forth.

**Senate Bill 487**
Bans the sale and use of lead sinkers one ounce or less; applies to all NH fresh water lakes, ponds, & rivers. Concerns over lead sinkers include health effects for waterfowl. If lead is digested by birds such as loons and bald eagles it can result in death. The Committee just recently passed this bill by a vote of 9-5. They adopted an amendment (7-6) to the bill that would move the effective date from January 1, 2005 to January 1, 2006. The amendment was a comprise to allow small tackle shops ample time to deplete their supply. The bill will be heard by the full House of Representatives on April 29, 2004.

**House Bill 1390**
Prohibits gasoline containing MtBE from being sold in NH. This chemical is both highly soluble and difficult to extract from water. MtBE does not breakdown easily and is believed to be carcinogenetic where high amounts exist.

For more information on lake related legislation visit the New Hampshire Lakes Association website at: [http://www.nhlakes.org/other_bills.htm](http://www.nhlakes.org/other_bills.htm)

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Over the past nine months, the eleven students and professors enrolled in the CES 3rd Year Project have dedicated their energies and time into investigating the Lake Sunapee Watershed. This task was presented to us by the LSPA, and has not only left them with valuable information, but has also impacted each and every student in a special way. Every one of us was exposed to the outdoor classroom in a way that we have never known. While there are grades to be determined, there is a higher driving force to excel; which is the idea that we are producing professional work that will be utilized in the real world. No grade or paper can ever compare to the feeling that is obtained when your work has a real impact on decision making processes. This project is more than being enrolled in a class, it is work related experience. We were exposed to deadlines, having different priorities than some of our information providers had, and the daily challenges of group dynamics.

Although we each have different places that we call home, this watershed has become our second home. Unlike many other students at Colby-Sawyer, we have confidence in saying that 'we know where we are.' From back roads to old-growth forests to deep-water testing sites on the lake, we have covered this 30,000 acre watershed from ridgeline to ridgeline. Overall, we have not only bonded with each other, but with the land, and the Lake Sunapee area. It is a place that we will all remember, and every day we express our jealousy for those that permanently live here. It is a special place, and we hope that our work will provide support for future preservation and conservation management plans to ensure it stays this way. We are grateful to all six communities for helping us and listening to our findings and recommendations.

Sincerely,

*CES Class of 2004*
Looking to gain these benefits?

- Participate in the National Water Monitoring Day, October 18 and receive a Year of Clean Water Kit.
- Join your local watershed organization, such as the LSPA.
- Educate yourself and spread the word!

1. Clean drinking water
   - Nearly 200,000 households and businesses rely on public drinking water from surface water supplies. This generates approximately $75 million to $150 million in annual Household Income.*

2. Cleaner environment fit for recreational activities
   - The Total Sales generated by recreational uses (i.e., boating, fishing, swimming) of New Hampshire’s freshwaters, and by public drinking water supplies, range from $1.1 billion to as much as $1.5 billion annually.*

3. More money brought in by more anglers/tourists
   - Annually, there are approximately 14.7 million visitor days spent by both residents and non-residents in New Hampshire boating, fishing, and swimming. Days spent boating, fishing, and swimming collectively generate approximately $320 million to $340 million in annual Household Income.*

What’s it Worth?

Check out these state statistics:

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*New Hampshire Lakes Association Estimates of Select Economic Values of NH Lakes Rivers Streams and Ponds
(http://www.nhlakes.org/docs/EcoStudyPhaseII.pdf)