Ossipee Watershed Water Quality Monitoring Presentation
Thursday, August 21st 2008
Ossipee Town Hall
Co-sponsored by the Ossipee & Freedom Conservation Commissions
with Sara Sumner from NH DES VLAP and Tara Schroeder from GMCG

The following is a summarization of the water quality monitoring results for the Ossipee Watershed presented by NH DES and GMCG. The results include information and recommendations for the Ossipee Lake system, tributaries and rivers of the Ossipee Watershed. ***Please pass this information on to others in your town, association, neighborhood, etc. and encourage others to attend the Ossipee Watershed Water Quality & Source Water Protection Project Presentation on November 20th from 6:30-8:30 p.m. at Runnells Hall in Chocorua where NH DES, UNH and GMCG will provide a comprehensive look at what we know about the area's water quality and what we need to do to address some of the issues.***

GMCG RIVERS & OLT, VBAP Results:

- Data has been collected for 35 sites for 18 different chemical and physical parameters since 2002
- Biomonitoring at 11 sites began with NH DES VBAP in 2006 and is done every fall
- Year-round monitoring at 7 sites is providing better understanding of seasonal fluctuations and year-round conditions at sites
- After 10 years of data collection (2012), statistical analysis will show if any significant changes or trends are occurring at sites
- ***Some trends are apparent from the data to date, most notably:***
  Elevated nutrient, turbidity, sodium & chloride, and conductivity levels occur most frequently at the following sites which may be attributed to human activities such as road salting, dirt road runoff & sedimentation, snow dumping in surface waters, and possibly faulty septic systems: Square Brook off of Ossipee Lake Road in Freedom; Phillips Brook off of Route 25 in Effingham; Frenchmans Brook off of Granite Road in Ossipee; Banfield Brook off of Route 113 in Madison.
- Annual biomonitoring since 2006 (VBAP) of macroinvertebrates has shown mostly good-excellent conditions at the 11 sampling sites.
- ***Recommendations include:***

  1. Continue collecting data and perform statistical analysis in the coming years

  2. Promote the use of Best Management Practices to prevent non point source pollution from entering surface and groundwater in runoff. (Visit: BMPs for Groundwater Protection: http://www.des.state.nh.us/factsheets/ws/ws-22-4.htm; BMPs for Surface Water Protection: http://www.des.state.nh.us/wmb/was/manual/; UNH Stormwater Research Center w/ LIDs & BMPs: http://www.unh.edu/erg/cstev/; LRPC Aquifer Protection BMPs/Guide for Developers: http://www.lakesrpc.org/services_resources_aquifer.asp.) BMPs can include limiting or using alternatives to road salt/road salting strategies, the use of vegetative buffers, coving salt/sand piles, preventing snow dumping directly in surface waters, and proper treatment of runoff before it enters surface and groundwater.

  3. Encourage the use of Low Impact Development in the Watershed. LID can include such things as permeable pavement which reduces the need for salting in the winter and increases infiltration and groundwater recharge. A study in Derry/Londonderry/Salem & Belham from 2002-2006 showed that deicing of parking lots and roads accounted for 90% of salt imported into this watershed, with deicing parking lots being the single largest source. Brooks in the watershed were experiencing more than one hundred times the historic background level of chloride and chronic water quality violations.

  4. Stabilize stream banks, lake shorelines, disturbed soils (especially dirt roads located next to rivers, tributaries and the lake system. Visit: http://www.des.state.nh.us/CSPA/ for more details on the Comprehensive Shoreland Protection Act and 2008 updates.

  5. Encourage town officials to develop and adopt erosion and sediment control ordinances, watershed district ordinances/aquifer overlay districts, LID and BMP guidelines across the watershed.

  6. Continue to educate watershed residents about the sources of pollutants in a watershed and the ecological, recreational and economical impacts they can have on our lakes, ponds, rivers & streams.

VLAP Program/Results Summary:

- Deep spot samples collected at five stations (Ossipee Lake, Broad Bay, Berry Bay, Leavitt Bay and Lower Danforth Pond).
- Ossipee Lake, Berry Bay and Lower Danforth have been monitored since 2003. Broad and Leavitt Bays have been monitored since 1990.
- Ossipee Lake deep spot shows a stable chlorophyll-a trend, decreasing (worsening) transparency trend, slight increase in epilimnetic total phosphorus, stable hypolimnetic total phosphorus, and a slight decrease in epilimnetic conductivity levels.
- Berry Bay deep spot shows a stable chlorophyll-a trend, variable transparency trend, slight increase in epilimnetic total phosphorus, stable hypolimnetic total phosphorus, and a slight decrease in epilimnetic conductivity levels.
- Broad Bay deep spot has greater than 10 years of data and therefore statistical trend analyses can be performed. These analyses show a variable chlorophyll-a trend, a significantly decreasing (worsening) transparency by approximately 3.004%, and variable epilimnetic and hypolimnetic total phosphorus trends. The epilimnetic conductivity appears to be increasing slightly, however statistical analyses were not conducted.
- Leavitt Bay deep spot has greater than 10 years of data and therefore statistical trend analyses can be performed. These analyses show an increasing (although not significant) chlorophyll-a trend, a significantly decreasing (worsening) transparency by approximately 2.279%, and variable epilimnetic and hypolimnetic total phosphorus trends. The epilimnetic conductivity appears to be increasing slightly, however statistical analyses were not conducted.
- Lower Danforth Pond deep spot shows a variable chlorophyll-a trend, a variable transparency trend, variable epilimnetic and hypolimnetic total phosphorus trends, and a slight decrease in epilimnetic conductivity levels.
- Average yearly concentration of all parameters (chlorophyll-a, transparency, total phosphorus, and conductivity) remain in a low (good) to average range for New Hampshire lakes.
- Nutrients (mainly total phosphorus in NH lakes) drive growth and productivity in lakes. Too many nutrients promote algal and plant growth, in turn decreasing lake clarity.
- Some watershed activities that can add nutrients to water bodies are: construction, road runoff, shoreline erosion, lawn fertilizing, car washing, faulty/leaking septic systems, agriculture, urban development and impervious surfaces, and sand dumping/beach construction.
- ***Recommendations include:***

1. Prevent nutrient loading by good planning at the local level (watershed associations, local government), utilizing low impact development techniques and best management practices in the watershed, and develop and pass local watershed ordinances.

2. Properly maintain septic systems, don't bathe yourself or pets in the water, keep land clearing to a minimum, plant native vegetation along the shoreline, don't feed ducks/geese, pick up pet wastes, and don't use powerful outboard motors in shallow area.

Questions & Suggestions from the Audience:

1. Add sampling sites of the lake system near Cassie Cove/Spindle Point to investigate impacts of large number of boaters/people recreating here as possible contributor to Broad/Leavitt Bay trends.

2. Investigate salt imported into watershed for salting activities – how much is being used, where and by who?

3. Can GMCG, NH DES & Freedom work on a strategy for investigating increased plant growth/milfoil in Danforth Pond? How can the town proceed with a plan to find a solution to this growing problem?

For full reports, power point presentations, and testing location information, please visit www.gmcg.org.
Questions? Call (603) 539-1859.

Thank you for your program support and to the Watershed towns, NH DES, UNH, foundations, and the many volunteers who donate their time to make these programs possible.