

Otter Ponds Demonstration Forest

Grade 11 and 12 Research Projects

OPDF wants to support long-term research into the impact of management decisions on the forest resources at Otter Ponds. The projects below are only meant to get you thinking about how the demonstration forest can provide a meaningful outdoor laboratory for your students.

We are interested in your ideas, and will work with you to obtain grant funding to support your research, if needed. For more information, **contact Andy Kekacs, the project manager, toll-free at 1-855-NS-WOODS or andy.nswooa@gmail.com.**

Relevant Curricula

Biology 11

Unit: Biodiversity

- *How are living things organized into groups for ease of study*
 - Use organisms found in a local or regional ecosystem to demonstrate an understanding of fundamental principles of taxonomy

Unit: Interactions Among Living Things

- *An understanding of Canadian ecology and geography promotes national awareness and good decision-making*
 - Describe and apply classification systems and nomenclatures used in the ecological hierarchy of an organization of living systems
 - Analyse the biosphere to interpret and explain its structure and dynamics
- *Ecosystems do not exist in isolation from each other*
 - Analyse interactions within and between populations
 - Use the concept of the energy pyramid to explain the production, distribution, and use of food resources
 - Propose and evaluate courses of action on social issues related to the natural balance of ecosystems
- *Population change over time can be expressed in quantitative terms*
 - Describe population growth and explain factors that influence population growth

Global Geography 12

Unit 5: Global Resources: The Good Earth

- **Unit Objective:** *To study the increasing exploitation of the world's resources and to examine methods and strategies that will preserve/conserves the planet's resources for future generations.*
- **5.3 Resource Management, pp. 114-117**

- 5.3.1
 - Select a local, national, or international conservation issue for examination. The point here is to have students come to an understanding of complexities of such issues, e.g., Atlantic salmon: what is the issue, who are the parties, what and why are their positions, are their positions backed by valid information and reasoning, what are possible solutions, what would be the impact of one choice, how would the choice be implemented, how would the outcomes of the choice be monitored/managed?
 - [...] take a local, national, and global resource and construct the business operation that would exploit that resource under sustainable development principles.
 - Compare their model with one portrayed in one of the print resources mentioned earlier.
 - Invite representatives of government, industry, and the university community to be on a panel in your school to discuss the challenges of the sustainable development model.
 - Organize a field trip to a local industrial or residential site where activity has challenged the local environment, e.g., Annapolis River Tidal Power project, or where industry has been pro-active in protecting the environment.

Entrepreneurship 12

- <http://drihg.srsb.ca/sites/default/files/user157/Draft%20PSP%202011-2012.pdf>
- NS Department of Education, Public School Programs 2011-2012, p. 100
- Entrepreneurship 12 focuses on active, experiential learning and on developing the attitudes, skills, and knowledge required to meet the many opportunities and challenges of being an entrepreneur. The course comprises three components: action, theory, and business planning. Students apply what they learn to organize, operate, and manage activities/ventures in four strategic areas:
 - school-based activities
 - business venture(s)
 - community-based learning
 - mentoring
- As well as the 110 hours of classroom time, students are expected to complete a minimum of 50 hours of entrepreneurial activities outside the classroom.

Examples of Long-Term Monitoring Projects

Wetland Monitoring Projects

Earth Rangers, Monitoring Wetlands, pp. 5-6

- http://www.earthrangers.org/wp-content/uploads/2013/06/monitoring_wetlands.pdf

- **Wetland Field Trip**
 - *Survey Procedure*
 - *Get your bearings*
 - *What does the wetland look like?*
 - *How does the wetland fit into the landscape?*
 - *Measure and observe*
 - *Temperature, water quality, signs of life, surroundings, signs of pollution and human disturbance*
- Good activity to teach students about wetlands at OPDF
- DUC's 'How to Deliver a Wetland Fieldtrip' would be a good additional resource for this
- Can discuss the kinds of wetlands present at OPDF
- Can look at ways to monitor wetlands to measure effects of external factors like harvesting
- Can discuss OPDF's role in the Tangier River watershed
- Can discuss ways to harvest wood which would avoid/minimize negative impacts to surrounding wetlands
- Explain the importance of vernal pools to the forest ecosystem
- **Curriculum Links:** Biology 11 (Biodiversity; Interactions among Living Things); Global Geography 12 (Global Resources: The Good Earth)

Ducks Unlimited Wetlands Education Program, Wetland Ecosystems 3, pp. 18-19

- <http://www.ducks.ca/assets/2012/06/Grade9-12teacher.pdf>
- **Lesson 6:** Wetland Field Trip
 - *At the completion of this lesson, students should be able to:*
 - *work in field teams in a safe manner*
 - *draw field maps*
 - *set out study plots*
 - *collect animal samples*
 - *measure water clarity*
 - *measure and calculate water flow*
 - *identify and measure plant and animal specimens*
 - *identify adaptations of animals to their environment*
 - *identify wetland impacts*
- **Curriculum Links:** Biology 11 (Biodiversity; Interactions among Living Things); Global Geography 12 (Global Resources: The Good Earth)

Pre- and Post-Harvest Site Monitoring

Project Learning Tree, 'Forest Health Check-up'

- https://www.plt.org/stuff/contentmgr/files/1/980e616486db1e799dcd6bd6abc06ed2/files/forest_health_checkup.pdf
- Useful methods for a monitoring project
- Complete checklists on various indicators: tree and crown condition, forest diversity, lichen abundance, soil quality, regeneration, snags and coarse woody debris, wildlife
- **Curriculum Links:** Biology 11 (Interactions among Living Things); Global Geography 12 (Global Resources: The Good Earth)

Project Learning Tree, 'Monitoring Forest Health'

- https://www.plt.org/stuff/contentmgr/files/1/980e616486db1e799dcd6bd6abc06ed2/files/03_field_packet_no_photos.pdf
- Lesson is for another place but the methods are useful; can easily be tailored to OPDF
- Complete checklists on various indicators: size and diversity, layer diversity, lichen abundance, snags and debris, regeneration, tree height (clinometers)
- **Curriculum Links:** Biology 11 (Interactions among Living Things); Global Geography 12 (Global Resources: The Good Earth)

Other Ideas

- Species at risk surveys
- Wildlife surveys
- On-going photo documentation of specific sites (wetland, harvested site, etc.) to see how they change through the years, and why they change (Harvesting practices? Change in precipitation patterns? Change in wildlife populations?)
- Frog monitoring (see 'Monitoring Wetlands' resource by Earth Rangers.)

Useful Resources for Monitoring Methods

EMAN Ecosystem Monitoring Partnership, 'Soil Temperature'

- http://publications.gc.ca/collections/collection_2014/ec/En14-146-2004-eng.pdf

Environment Canada, 'PlantWatch'

- <https://www.naturewatch.ca/english/plantwatch/>
- Part of the NatureWatch series of volunteer monitoring programs

Manitoba Model Forest Report, 'Health of Forested Riparian Buffers Following Adjacent Upland Forest Harvesting and the Establishment of Long-term Forest Bio-monitoring Plots in the Boreal Forest of Eastern Manitoba and in Urban Forests of Winnipeg, Manitoba'

- <http://www.manitobamodelforest.net/publications/Health%20of%20Forested%20Riparian%20Buffers.pdf>
- Study has useful methods for collecting data for a monitoring project

EMAN Ecosystem Monitoring Partnership, 'Tree Health'

- http://publications.gc.ca/collections/collection_2014/ec/En14-147-2004-eng.pdf
- Useful methods for sampling and monitoring tree health

Nikki May, 'Volunteer Monitoring of Forest Restoration' (MSc Thesis)

- <http://www.tallgrassontario.org/Publications/Thesis050324SS.pdf>
- Analysis of sampling methods used for inexperienced volunteers monitoring forest restoration

Ducks Unlimited Canada Wetlands Education Program, Wetland Ecosystems 3

- <http://www.ducks.ca/assets/2012/06/Grade9-12teacher.pdf>
- Lesson 2: Wetlands and Environmental Quality, pp. 8-11