James McLean Oliver Ecological Centre
2001 Annual Report

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Cover: *The picture on the cover of the annual report is a researcher being lowered (on belay) from the top of the Oliver Ecological Centre Canopy Access System. While on the Canopy Access System each researcher has a climbing partner. In addition, their climbing harness is attached to other safety mechanisms. Photo courtesy of Sheena Symington.*

James McLean Oliver Ecological Centre
2001 Annual Report

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Director's Report for the Oliver Centre 2001 - Tom Hutchinson

In this third year of operation of the Oliver Centre, we have made a good deal of progress. The scale of the opportunities the field centre affords, have begun to be more fully explored both in research, undergraduate residential field courses, and in documentation of the biodiversity of the lands and waters that it encompasses. It is now a thriving centre for research of a diverse kind, from studies on the population dynamics of flying squirrels, amphibians, and plants, to the setting up of long-term experiments and observations on the successional changes occurring in the old agricultural fields as they gradually revert back to woodland. We have a first class automatic meterological station so the data will be collected over the long-term, while the researchers have access to this to relate to the experiments they are doing. We also are in the process of establishing a reputation for innovative, unique studies on environmental pollutants, their patterns of movement, occurrence of acute episodes, and effects on the forests. The funding from our major grant from the Canadian Foundation for Innovation (CFI) has allowed sophisticated instrumentation of the forest site, as well as the building of a cable access system into the tops of mature sugar maple trees, so measurements of the tree canopy's responses to such variables as air pollution, UVb light and climate warming can be made by researchers 70 feet above the ground.

The manager, Sheena Symington has made great progress in establishing this Trent Centre as part of the Kawarthas community and has by many direct contacts, open houses, visitors etc., helped the local people feel the Centre is part of their life.

Graduate students in residence have the opportunity for animated discussion and debate and find it a wonderful place to spend their summers. The response of the undergraduates at the field courses is equally enthusiastic. Annual documentation of plant and animal population is being assisted by local natural history groups and cottage associations. More and more Trent professors are finding its infrastructure attractive for locating their studies at the Oliver Centre.

On a lighter note, 2001 was the first year of our battle with the pileated woodpecker. They are a strong and determined bird, fixated on drilling large holes in March and April into our 85-foot support poles for the canopy access system. Plastic owls, noise, radios and even the presence of a back hoe have little effects. Ownership of the tallest trunks in the forest is their obsession. Encasing the poles in Hydro-recommended woodpecker deterrent plastic was treated with derision as no sooner done, than new holes were drilled right through the deterrent. Thankfully, the holes filled with epoxy prevent them from nesting.

We receive excellent advice from the Management Committee and enthusiastic support form our Trent President Bonnie Patterson, and from personnel of Physical Resources and the Development Office. The search for funding to support the Centre and its developing programmes, including building of new sleeping cabins is ongoing but achieving success. I feel it a privilege to be a part of this new Trent venture. We invite contact and encourage you to look at our web site at www.trentu.ca/olivercentre.

Trent's Acquisition of the Oliver Centre from Miss Marjorie Oliver

On October 8th, 1998, Miss Marjorie Oliver donated her 270-acre estate on the shores of Pigeon Lake, near Bobcaygeon, Ontario, to Trent University. Miss Oliver donated this property on her 90th birthday, with the intention that it be developed as a long-term ecological and environmental research centre. The property contains a wide range of natural ecosystems - 94 acres of woodlands, 3.7 acres of wetlands, 2000 feet of shoreline, and a unique range of historical agricultural fields representing old field successions from forty, twenty and ten years of abandonment. Altogether this represents a wide range of habitats suitable for the

teaching and research of both aquatic and terrestrial ecosystems. The 1903 majestic house and 1912 rustic cottage provide immediate accommodation for professors and students.

This property, named the James McLean Oliver Ecological Research Centre (in honour of Marjorie Oliver's father), provides a unique opportunity for researchers to conduct undisturbed short and long-term environmental and ecological research. The Centre provides a forum for multi-disciplinary research to take place amongst collaborating experts in ecology, biology, limnology, toxicology, entomology, ornithology, geography, hydrology, climatology, atmospheric physics, and chemistry. It also is the base for a number of annual residential undergraduate field courses.

Marjorie's Memories

The Oliver History - Sheena Symington
We have worked with Miss Oliver over the past five years to develop an archival history of the property and of the Oliver family. This includes letters, stories, diaries, photographs and other documents. We have five stories from Miss Oliver which provide a wonderful insight into life at the Oliver farm as it used to be. We are including these in the Annual Reports to provide a perspective on how it was, and how it is today, in its new use by Trent University.

 # 1. Memories, by Marjorie Oliver
Miss Marjorie Oliver has written a number to stories about aspects of her life growing up on Lakeview Farm, located on Pigeon Lake. The following is number one of Marjorie's stories.

"The Lake" by Marjorie Oliver

The lake has always shared in many of the events in the life of our family. Even our conversation could not get along without it. "Someone had gone down the lake; he had gone to the lake; he went up the lake; he crossed the lake; he swam the lake; the lake took him." Day after day we were aware of its many and different moods because it was ever in sight of our home. Between the house and it lay a rolling lawn, an orchard, a watering place for the animals, and a sand beach for us. In the summer we could sit on the veranda and hear the water slapping on the shore and the loons laughing hysterically or crying mournfully some where on the lake. Mother told us that when the loons laughed we would certainly have windy weather, and when they mourned we would certainly have rain in a day or so. In the fall and spring we could hear the honking of the geese and we would watch them skeining across the sky and over the lake to disappear behind the roofs. We would run around the house to keep them in sight as long as possible for they were always a source of wonder, announcing that spring was here, or that fall was on its way. In the winter we could hear a fierce wind blowing across the lake bringing with it snow and sleet that battered against the windows while we remained warm and secure within the solid walls of our house. Stiff and cold beauty was ours for merely looking at the ice-bound lake on a clear moon-lit night when God seemed close to our world indeed; it was ours also on a clear frosty morning when the sun caused the whole scene to glitter with tiny sparkling fires.

Storms came up suddenly on our lake and often we would watch a wall of rain advance steadily and sometimes swiftly from the far shore to ours. Thunder storms were one of my worst fears when I was a child, and at the first faint distant rumble I would run crying to the house to be comforted in my mother's arms. Father used to tell of paddling three miles to the village to buy a sack of seed corn which he placed in the bow of the canoe. As he emerged from the shelter of the wooded river shore into the open lake, a storm came up, and with each swell the corn in the sack shifted, and it was only with the utmost dexterity mixed with a certain amount of luck that he managed to reach the safety of the beach.

We felt that we had conquered the lake when Father bought his first and only launch with an inboard engine and seating room for twelve people. The motor was at the stern of the boat and the steering wheel was at the bow, but by pulling on a rope which was run through rings all around the inside of the hull Father could drive his boat all by himself no matter where he sat. The first day I was allowed to steer

- I had begged for some time - I could not keep on a straight course, but swung too hard to the right, and then in an effort to correct my error swung too far to the left. I gave up the helm in a scene of frustrating tears.

Sheep-washing day arrived when the lake water had lost its spring chill. Some sort of rail corral was built out into the water, and one by one the sheep were drawn into it. Father and a hired hand, having put on old overalls, would wade into the water, grab a sheep, give it a good scrubbing and then take it to the barn so that it would not get its wool soiled again. By the end of the day the whole flock would have been washed and in the barn for the night. The next day a table built especially for the purpose of shearing sheep was set up in the barn yard. A sheep was brought from the barn, placed on the table and held by the hired hand while Father carefully and quickly, but with seldom a nick or slip, sheared the fleece from the helpless sheep which, at last, was set free to look for its lamb, that by its bleating told the whole barn yard that it did not recognize its denuded mother. There was much merriment in our house-hold over an advertisement in the local newspaper announcing that a certain farmer was "in a position to shear sheep."

The sand beach that stretches along our shore was our favourite play ground for the summer. My sister and I spent day after day there dressed in our long-sleeved print dresses, stockings, and boots. Our toys were pails, shovels, and small tin dishes. We dug canals, built castles of sorts, and made sand cakes set in our tiny moulds. It was fun to dig channels from the lake and watch the water licking our shovels as it followed them; but I always felt a bit sorry for the water then we plugged up the channel and it had to turn back to the lake. I well remember having a hole in the toe of my boot and poking my finger into it in a fruitless effort to pull out the sand. Sometimes we would take off our shoes and stockings, hold up our dresses and petticoats and wade in the shallow water. If the water were chilly, we shivered and tingled in the anticipation of daring to wade out a little farther until, to our sorrow, our dresses and petticoats trailed and were wet in no time. There was always the unpleasant task of pulling stocking over wet legs because we never took towels to the lake - we were there only to play on the beach.

When Mother and Father were on the scene we could swim; I cannot remember learning to swim, but I do remember the constant caution that we must swim in a path parallel to the shore, and never swim out into the lake until we were in "over our heads". We went swimming early in the spring. It was only in later years that my sister told me how she feared those first swimming days because she was possessed by the thought that she might - just might- touch the drowned body of some unfortunate person who could have broken through the ice during the winter. I always dreaded putting my feet down and feeling weeds swirling and clinging to my legs. I quickly pulled them up, tried to keep head and feet well above the water and struck off for another area. Now that I have grown old and do not swim anymore, I dream at night of swimming through weeds and sunken trees that lined one shore of the river that passed through the village some three miles distant from our home.

In the autumn the lake changed with each new day. On one morning it would appear as an innocent expanse of still beautiful water under a clear blue sky and would reflect on its surface the crimson and golden forests. On the following morning it could be difficult to see the lake over which hovered a dense fog that our eyes could not penetrate no matter how hard we peered. Father had a good sense of direction and through the dripping air could navigate his boat anywhere on the lake. But when the sun broke through, the lake regained such a look of innocence it seemed to suggest that there had not been any fog at all to trouble us, and that we must have imagined the whole affair.

As winter drew near and the temperature went down, a coating of ice would form each night near the shore, but by noon it would have melted in the sun or have crushed in the wind. But sooner or later it remained all day and for each day thereafter it would extend farther and farther out until the whole lake was frozen from shore to shore. It was then when we skated - the whole family - Father, Mother Sister and I. Our dog, Ring, was wild with joyful excitement in being included in our fun. The winter words of caution echoed those of summer, "Skate along the shore, not out towards the river." When Father know the ice was thick enough, we travelled by horse and cutter across the lake to the village. But before any such trip the horses had to be "sharpened"; they were taken to the village blacksmith, who had a dark cavern of a shop beside the river, to have the corks on their shoes sharpened so that they could have a sure grip on the ice. Travel on the lake could be dangerous - especially for those who did not know the currents,

but Father knew all of the dangers and we always had faith in his judgement. "Wonderful Father". When we would return from the village, Father always stopped at the water hole near the shore, chopped it clear of ice to give the horse a drink, and then with no urging she would make a grand dash up the hill to the barn. On a very cold night in the early winter we would hear a roar and a growl from the lake and some one would be sure to say, "The ice is making tonight." Once in a while there could be heard a sort of thunderous crack and the next day could be seen a "bust" - a place where the ice had heaved from one shore to the other in a mighty crack. Drivers and their horses had to be very cautious when crossing one of these "bursts",; sometimes the ice which had heaved up and had no water under it would crack when the weight of horses and sleighs forced it down.

When the ice was well over a foot thick, it was time to fill the ice houses. Sometimes farmers exchanged work and helped one another. One precious neighbour often left the work of filling his ice house until late in the season; as some one said, "Nate always leaves his ice harvesting until spring break-up when he has to catch the pieces floating by with a pike pole." Lines were strung about twelve or fourteen inches apart; a sawyer, guided by the lines would cut long strips which in turn were cut into twelve or fourteen-inch blocks. These blocks were fished out of the water hole with a pike pole and ice tongs and slid up a plank onto a sleigh. The blocks were heavy and no one ever over-loaded the sleighs which were then drawn to the ice house. Again the blocks were slid down the plank and some one inside the ice house clasped them with his tongs and placed them in position on a layer of sawdust. I used to marvel at the beautiful blue coldness of the blocks, and it was only when I touched them did I realize that under that beauty was a cruel heart indeed. They were never allowed to touch the walls of the ice house because sawdust had to be shovelled all around the ice and on top to form an insulation against the heat of summer. If the summer heat wasn't too much, ice could last in the ice house through till August. In order to caution travellers on the lake that ice cutting was in progress, cedar branches were cut and placed around the hole. Cold days were the best for ice cutting because the men would not become soaked with melted particles of snow and ice.

I used to watch the rigs travelling on the ice and in those days there were many. If Father and Mother went to town, we could see them coming home from near the mouth of the river toward the house and as they neared the shore, the horses trotted faster at the thought of a full manger. I have watched sleighs go down the lake on a windy winter day; the figures of the men hunched against the storm; the heads of the horses lowered as they plodded steadily on scattering the snow in all directions; their mane and tails flying.

On each Friday winter night Father met the eight o'clock train which brought my sister and I from the town where we attended high school. He never failed to be on the station platform waiting or us to scramble down the steps of the train. He was well wrapped up against the cold- a fur hat pulled down over his ears; a fur coat over woollen shirt, sweater, coat and coarse woollen pants and heavy woollen underwear; two pairs of woollen socks knitted by Mother, boots, overshoes, woollen mitts, and leather mitts. Father seldom if ever spoke of his love for us, but on those nights as he laid the loving grasp on our arms, he cast an anxious look into our eyes to see if all was well with us. Together we walked down the street to a driving shed where the horse and cutter had been tied because Ginny had a great fear of trains. Father was always particular about the way we got into the cutter. Groceries, mail, and our grips were placed under the seat. Snow had to be kicked or knocked off our boots so that it would not melt on the floor of the cutter. Your stood up in the cutter with a corner of the buffalo robe in one hand; you would then wrap it around you; the person beside you would do the same with the opposite hand; both of you would sit down at the same time. If you did this properly, the wind would not get in under the robe. I usually sat in the middle and would hide behind Father's shoulder when a bitter wind blew. In spite of the robe and the closeness in the cutter, your feet could feel like blocks of ice; it was then that Father would suggest that you get out of the cutter and run for a while to get your blood circulation again.

Those Friday nights on the lake will always be remembered as happy interludes of close and deep family companionship. We told Father all about our successes, our failures, and our anxieties over our lessons; he told us of the happenings at the farm and of how he and "Mom" were faring during the winter storms; how the stove pipes had been on fire one morning; how the hens had started to lay again; and how "Mom" had made a big batch of bread that morning. Moon-lit nights were of exquisite beauty; stormy

nights were "talkless" nights when we strained our eyes to keep a watch on the horse to see that she would not stray off the track and wander out toward the river. No matter what the weather, as soon as we were beyond the shelter of the trees along the north shore of the river and were out on the great expanse of the lake, we looked for the light shining from our house. Without fail Mother saw that the part of the house facing the lake was lit so that we would be guided safely home. On a clear night we could see the smoke from the kitchen chimney and from the furnace chimney, and we remembered the Scottish prayer, "Lang may your lum reek" (Long may your chimney smoke). Such loving care and such anxiety for our comfort and safety against the numbing cold of those winter nights on the lake made our hearts warm and our souls bright.

It was the law of the land that during winter months, when one could not hear sleighs and cutters sliding over the snow-packed roads, each horse should have a strap of bells around its body or bells should be put on the shafts of the cutter. Father did not like noise, but he stayed within the limit of the law by having one bell on the shaft of his cutter. When, with the curiosity of childhood, I asked him why he did not have more bells to make a merry sound on those quiet winter trips, he replied that when he was alone in the cutter he liked to think and that the jingling of the bells interrupted his thinking - good Scottish reasoning.

When we drove up to the kitchen door, Mother was standing there with a lit lantern which was taken from her and set on the snow near the cutter. We gathered all that had been stowed under the seat, helped Father out of his heavy coat and made our way with our loads through the shed and into the warm kitchen, while Father unhitched the horse and made his way to the stable. After he had attended to the needs of the horse and had put the cutter into the driving shed he, too, came stomping the snow off his overshoes to join his family in the kitchen. I can feel Mother's warm hands undoing our scarves and coats while we shivered and shook helplessly and blinked at the light. The fire in the wood stove crackled its comfort to us, the kettle sang its song as we settled ourselves beside the stove with our feet in the oven until we were thoroughly warmed. Sometimes the mail included all the newspapers from Monday's to Friday's editions. Father sat in his usual place at the head of the table, arranged his papers in proper daily order, asked to have the lamp "shoved down this way," and began to read the news which was already almost a week old. Toast was made, tea was brewed, and our chairs drawn up to the kitchen table; we buttered our toast and drank our tea, and thought of the two care-free days ahead of us when we could share all our cares, and worries, as well as our joys with "Dad" and "Mom".

Monday morning came early during those winters. A stove pipe led up from the furnace in the cellar, through the dining room and into the bedroom my sister and I shared. At five o'clock a sharp knocking on the stove pipe in the dinning room wakened us and we knew that Father was up, had the fire on in the kitchen stove and was off to the stable to feed the horse. Mother was up next to make breakfast - porridge, toast and tea. By the time we were downstairs, Father was in from the stable and we all ate breakfast which was usually a silent meal; our thoughts were concerned with being on time for the train. However, we need not have worried, Father always had us at the station a good half hour early. Father then drew the cutter out of the shed, took up the lantern and went to the stable for the horse. As soon as we saw the lantern coming up, we picked up our grips and Father's fur coat and went out into the cold and dark morning. After the horse was hitched to the cutter, we held Father's coat for him, put out the lantern and set it inside the shed, wrapped ourselves in the robe and we were off up the lake to catch the seven O'clock train that would take us to the town of Lindsay for our week at school. The station was a small room with several windows, a bench along two walls, and wicket out of which the agent poked his head to sell us our tickets, and a round stove that did its best to warm us with a blazing fire. Father let us out of the cutter, gave us a loving look, turned his horse around, and headed for home just as the train got up full steam for the trip. Each Monday morning in the new year showed us a sun rising earlier and earlier until we realized that with the coming of spring we would soon have to give up travelling on the lake.

In the spring, as the sun became stronger, the lake would "water up during the day; at night the water would freeze and the next morning the skating would be great. One Monday morning Mother was doing the family washing - tubs, boiler, wash board, home made soft soap were in full swing when Father come in and mentioned how good the skating was. I shall never forget Mother drying her water - soaked hands, getting out her skates and going with me to the lake for an hour of skating. Wonderful childhood!

The big question in the spring was, "When will the ice go out this year? It went out in the middle of April last year." The lake took on a gray and fearsome appearance; the river's current spread into the lake; the ice along the shore gave way and the stage was set for the ice to go out. Some years a strong west wind would drive it pell-mell onto the shore where it wrecked a dock or two just for the fun of it. Some years the sun would beat down day after day and even a good stiff breeze would carry the rotten ice down into the next lake and on the way it would be crushed or melted before it got very far. As soon as the ice had gone out, the land began to warm up and the lake had gone full circle again, and we were ready for spring. Big Island exchanged its gray tones for pale greens of various tones which grew stronger and deepened with each day until summer was well upon it.

The lake. At times we loved it for its caressing touch and its gentle swells and soothing sounds. At times we feared it for its tumult and its pounding when we strove to make our way across it to the shore. There were times when it took helpless fool-hardy people to its own depths. But to us, who respected its moods, it became a balm to our souls as we tried to sort out the "why's and wherefore's" of our lives.

2001 Updates: Development of Research Facilities

Access system into the Canopy of Mature Sugar Maple

Canadian Foundation for Innovation and Ontario Challenge Funding support allowed the construction of a unique canopy access system. Rarely are researchers able to access the tops of trees for research purposes. This canopy access system was developed to allow researchers to measure the response of a mature forest canopy to changing atmospheric chemistry and to monitor the biodiversity of this upper layer of the forest. Five, eighty-five foot Western Red Cedar Poles were erected into the forest floor in order to access the tops of mature trees in this sugar maple dominated forest. David Bishop from the Haliburton Forest and Wildlife Reserve created a "postman's walk" system by which you walk from pole to pole via heavy steel cables suspended 70ft above the ground. At the top of each of the five poles is a 6x6ft square platform. Safety inspection and certification was carried out by Challenges Unlimited of Bracebridge, Ontario. They also led a training course for those researchers that will be using it and they will be hired annually to provide these essential and important services. This structure allows researchers to take measurements while seated in their climbing harness with their hands "free" for instrument use. The platforms also serve as a base for researchers and sampling equipment. Examples of the current research opportunities available with this new canopy access system include: air pollution monitoring above, within and below the tree-top canopy, including gaseous pollutants and organic contaminants such as fire retardants; the measurement of physiological responses at the upper-canopy leaf surface; identification of mosses and lichens within the top canopy in addition to the bottom of trees, UVb measurements above, within and below the tree canopy.

Plate 2. Above the forest canopy: View from top of Oliver Ecological Centre Canopy Access System. This platform is approximately 70 feet above ground. This five-platform Canopy Access System provides access to approximately 20 mature tree canopies.

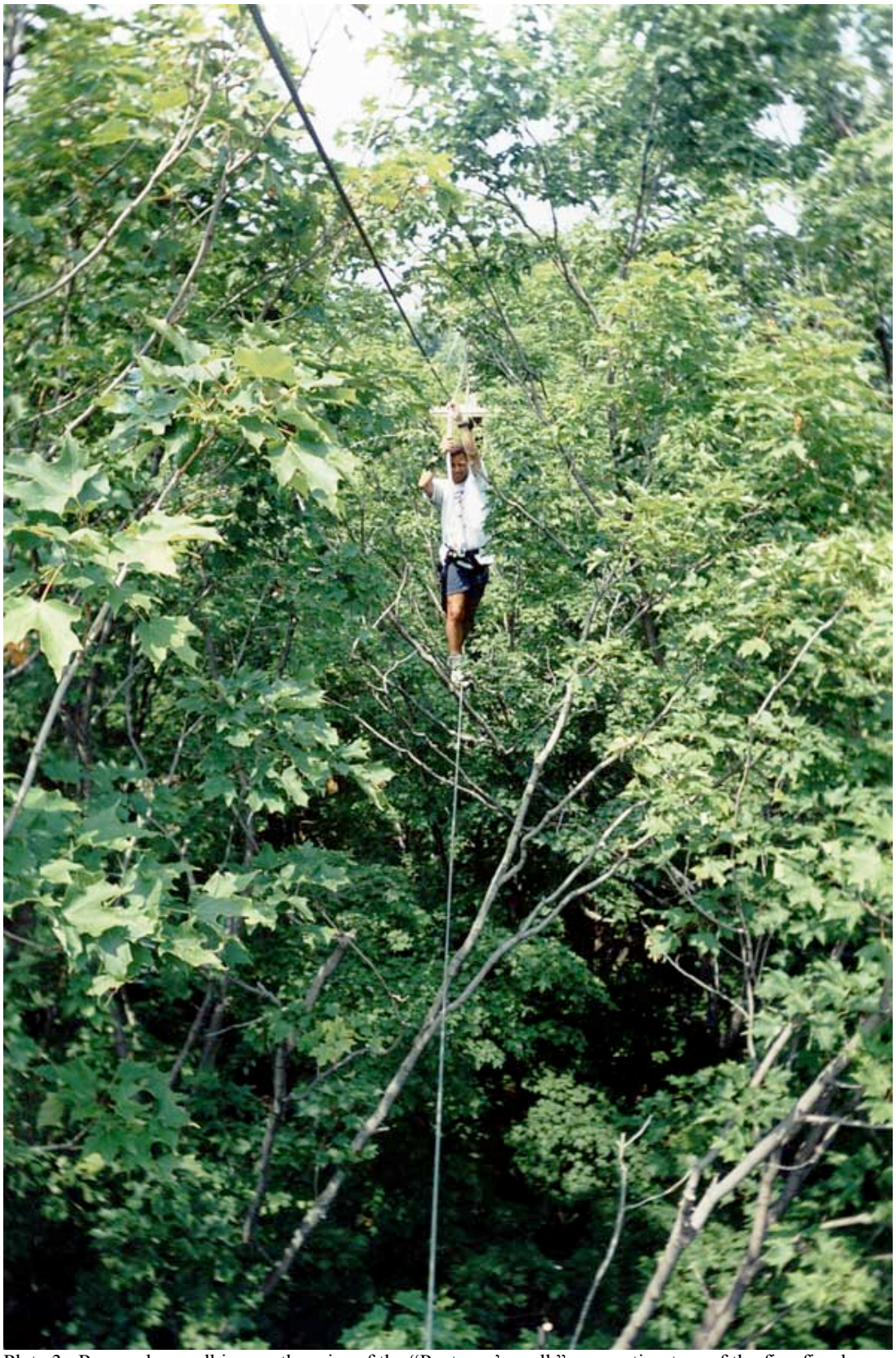

Plate 3. Researcher walking on the wire of the “Postman’s walk” connecting two of the five fixed platforms of the Oliver Ecological Centre Canopy Access System.

Plate 4. This photo is taken in March 2001, during the construction of the canopy access system. With the absence of vegetation the postman's walk and guy lines are clearly visible.

Richard Ivey Foundation Scholarships

In 1999 the Richard Ivey Foundation awarded $125,000.00 to graduate students undertaking theses research at the Oliver Ecological Centre in the area of biodiversity. This award will support graduate students at the Oliver Centre for five years. The recipients for the academic year 2001-2002 were:

Lisa Bridges (MSc candidate) who was studying the ecology and reproductive success of the squirrels on the property. Her thesis title is the *Ecology of Southern Flying squirrels (Glaucomys volans) and Eastern Grey squirrels (Sciurus carolinenis) at the James McLean Oliver Ecological Research Centre, in Central Ontario.* Her supervisor is Professor Jim Schaefer.

Eric Sager (PhD candidate) who is looking at *Interactive effects of increased UV-B and nitrogen on seedlings of Acer saccharum in temperate deciduous forests* at the Oliver Ecological Centre with supervisor Professor Tom Hutchinson (Environmental and Resource Studies).

Jude Phillips (MSc candidate), who is studying *The Effects of Land-use on Breeding Success in Woodland-nesting Birds* using the Oliver Centre as part of a larger study. Her supervisor is Professor Erica Nol (Biology).

Amy Grear (MSc candidate) who is researching the die-off of woodfrogs in ponds surrounding the Oliver Centre. The title of her thesis is *A World Out of Balance: Assessing the Cause, Occurrence and Implications of an Emerging Wildlife Pathogen.* Her supervisor is Professor Michael Berrill.

The Richard Ivey Foundation is located in London, Ontario and has made charitable contributions for more than 50 years especially in the areas that are not well supported by government and other foundation. More recently, the foundation has started to focus on environmental matters. For the period 1995 - 2000 it's focus was on forest biodiversity and has supported many university researchers as well as many non-governmental organizations like the Federation of Ontario Naturalists, World Wildlife Fund and the Sierra Club.

Organizational Structure of the Oliver Ecological Centre

A management committee, appointed by President Patterson, governs the Oliver Ecological Centre. The Director of the Centre is Dr. Tom Hutchinson. The Centre has a Manager, Sheena Symington, living on site in the main house where visiting researchers are also welcomed. The cottage on the property provides accommodation for field courses as well as graduate and undergraduate students conducting research at the Oliver Centre.

2001 Oliver Ecological Centre Management Committee
Professor Tom Hutchinson (Chair/Director) Environmental and Resource Studies and Biology
Professor Chris Metcalfe, Dean of Research and Graduate Studies
Professor Jim Schaefer, Biology (Alternate: Professor Erica Nol, Biology)
Professor Tom Whillans, Environmental and Resource Studies
Professor Colin Taylor, Dean of Arts and Science
Professor Peter Lafleur, Geography
Ms. Susan Mackle, Development Office Vice-President
Ms. Sheena Symington, Oliver Ecological Centre Manager
Mr. Robert van Dompseler, Physical Resources Manager
Mr. Mark Ridgway, Ontario Ministry of Natural Resources

2001 Receipts

User fees	$7,258.00
Individual donation for Loon survey support	$200.00
In kind donations- Bryan Patton - Toronto	 Furniture for cottage
The Scarborough Family (Mill Line Rd)	Outdoor/Underwater Video Inspection Camera with built-in Infrared Illuminators and 60 meter harness
Canadian Centre for Inland Waters, Dept. of Fisheries and Oceans, Burlington, ON	Boat Loan: 18 ft Boston Whaler

User Fees
User fees are $10/person for overnight accommodation for academic purposes.
Note: Fees for groups and conferences are negotiated directly with the Manager or Director

2001 Equipment Purchase
Significant equipment purchases for research at the Oliver Ecological Centre include:

- *Electrical and telephone lines were brought into the Canopy Access location in the Maple Forest to run air pollution monitoring equipment*
- *Construction of Canopy Access system and application of woodpecker- proof protection*
- *Trailer with temperature controls to house air pollution monitoring equipment, located in the maple forest*
- *Septic system upgrade for the Main House*

Community Involvement

An Open House organized by Sheena Symington on June 23, 2001 provided a great opportunity for local residents and cottagers to visit the Centre and meet the Oliver Ecological Centre researchers. Tom

Hutchinson, Director of the Oliver Centre provided an update on current research taking place at the Centre and a series of displays allowed graduate and undergraduate students to present their research projects.

Outreach
The James McLean Oliver Ecological Centre Web-page can be located at:
http://www.trentu.ca/olivercentre

Regular updates and announcements are published in local newspapers in both Bobcaygeon and Peterborough.

Summary of Conference, Meeting and Field Trip Use of Oliver Centre in 2001

Organizer	Function	Number of Participants	Duration
Vicky Mackay (Natural Heritage Information Centre- NHIC)	Red shoulder hawk and owl survey	2	April - 3 days
Tom Hutchinson (Trent ERS/Biology)	Summer Students – Forested Ecosystem: Kristy Hogsden – butterfly diversity and numbers; Dave Richardson – plant diversity	2	May - August
Stacey Crough and Eric Sager (Trent University) and Robert Sarginson	Loon Survey of Pigeon Lake	4	May – August
Sheena Symington (Oliver Centre Manager)	Meeting with teacher Kelly Whyte to discuss school trips/educational aspects at Oliver Centre	2	May 9
Chris Risely - MNR	NHIC field day	6	May 11
Robert Sarginson	Loon survey training/orientation	7	May 15
Joe Cebek – Trent Biology	Herpetology Field Trip	20	May 19
D. Woodfine, J. Cebek (Trent University)	Ecology of the Kawarthas, ON Field Course	12	May 20 –June 1
Robert Sarginson	Loon survey training/orientation – on lake	6	May 22
Sheena Symington (Oliver Centre Manager)	Canopy Access Inspection/Training	12	June 17
Jennifer Bowe (Trent Centre for Community Based Education)	Meeting	6	June 19
Deb Mills (Environmental and Resource Studies – Trent University)	ERS Faculty Retreat	30	June 20

Summary of Conference, Meeting and Field Trip Use of Oliver Centre in 2001 ……continued

Organizer	Function	Number of Participants	Duration
Sheena Symington (Oliver Centre Manager)	Oliver Ecological Centre Open House	70	June 23
Tom Hutchinson (Director of the Oliver Centre)	Lichen workshop – site visit and lichen identification	12	June 29
Robert Shipley (University of Waterloo)	Field Trip - British Students Exchange	15	July 7
Lisa Bridges (Trent University)	Graduate Student "Welcome" Party	32	September 6
Chris Risley (MNR)	Peterborough Field Naturalists Field Day and Tour of the Oliver Centre	30+	September 23
Tom Hutchinson (Biology Trent)	Plant Ecology Field Trip	20	September 26
Erica Nol (Trent Biology) and Sarah Dauncey	Saw whet owl banding	6	September 30 – five weeks
Tom Whillans (ERS Trent)	Ecuadorian Visitor Orientation	2	October 9
Tom Hutchinson (ERS Trent)	Plant Ecology Field Trip	20	October 10

Teaching at the Oliver Ecological Centre

Ecology of the Kawarthas, 2001
Twelve students attended the 2001 residential Field Course at the Oliver Centre, offered May 20 – June 1, 2001. This course is open to undergraduates from all Ontario universities. Taught by David Woodfine, Tom Hutchinson and Erica Nol, the focus was terrestrial plant ecology and aquatic ecology (limnology) and ornithology. The variety of habitats (wetlands, old abandoned fields, forests, shoreline and lake) in addition to proximity of the Oliver Centre to Trent University makes it an excellent site for one-day field trips. To date, field trips to the Oliver Centre include wetland ecology, limnology, herpetology and plant ecology courses.

Plate 5. 2001 Participants in the Ecology of the Kawarthas two-week residential Field Course.

Collection of Baseline Data at Field Station

Banding of Saw-whet Owls

Each fall since 1999 the banding of Saw-whet Owls has taken place at the Oliver Ecological Centre for a duration of five weeks. Volunteers and students have been responsible for mist netting and banding the owls under the direction of Erica Nol (Trent University) and Chris Risley (MNR). In 2001, Sarah Dauncey completed her honours project on the Saw whet Owls with her thesis title "Factors Affecting Habitat Use of Non-Breeding Northern Saw-whet Owls". This thesis abstract can be found in the student research section. The following is a summary table from Sarah's thesis.

Table 1. Northern Saw-whet owl captures by age, sex and age/sex class at the Oliver Ecological Centre banding station (1999-2001).

	Number of Owls Caught							
	1999	%	**2000**	%	**2001**	%	**Total**	Overall %
Age								
HY	**67**	51	**14**	19	**13**	35	**94**	39
AHY	**65**	49	**60**	81	**22**	60	**147**	60
U	**0**	0	**0**	0	**2**	5	**2**	1
Total	**132**	100	**74**	100	**37**	100	**243**	100
Sex								
M	**27**	20	**9**	12	**1**	3	**37**	15
F	**92**	70	**63**	85	**25**	67	**180**	74
U	**13**	10	**2**	3	**11**	30	**26**	11
Total	**132**	100	**74**	100	**37**	100	**243**	100
Age/Sex								
HYM	**23**	17	**3**	4	**0**	0	**26**	11
HYF	**38**	30	**9**	12	**10**	27	**56**	23
HYU	**6**	5	**2**	3	**3**	8	**11**	5
AHYM	**4**	3	**6**	8	**1**	3	**11**	5
AHYF	**54**	40	**54**	73	**15**	41	**123**	50
AHYU	**7**	5	**0**	0	**6**	16	**13**	5
UU	**0**	0	**0**	0	**2**	5	**2**	1
Total	**132**	100	**74**	100	**37**	100	**243**	100

HY and AHY age classes denote hatch-year and after hatch-year individuals, U is of unknown age
M sex categories indicating male, F indicating female and U is of unknown sex.

Pigeon Lake Loon Survey – Eric Sager

In Ontario, through the guidance of the Ontario Lakes Loon Survey, the Kawartha Lakes have been monitored for a number of years by local volunteers or "loon rangers". Pigeon Lake, has been under observation for the past decade by local naturalist Robert Sarginson. He has discovered that Pigeon Lake supports a seemingly stable loon population; however, certain threats have become of increasing concern, such as human development and recreation pressures, water level fluctuations and industrial chemicals.

A loon reproduction rate of 0.50 young fledged per pair is required for a healthy, stable population. On Pigeon Lake, Sarginson discovered that between 1992 and 2000 the production rate averaged 0.74, suggesting a stable and increasing population. On typical lakes used for both nesting and feeding territories, loons generally require a minimum of 40 ha to achieve moderate breeding success. During the nine years that all of Pigeon Lake was surveyed, 20.1 breeding pairs, on average, occupied active territories. This is equivalent to roughly one loon for every 133 ha of water surface. On a typical undeveloped, pristine lake with adequate loon habitat, one could expect to find one loon for every 21.7 ha. The reason for the lower density of birds on Pigeon Lake could largely be due to the high recreation and development pressures that exist.

During the summer of 2001, the James McLean Oliver Ecological Centre, with the help of funding received from the Community Fisheries/Wildlife Involvement Program, took over the administration of the Pigeon Lake Loon Survey to ensure that this long-term study was continued. Robert Sarginson has been our mentor and trained a number of volunteers with the methods of the Canadian Lakes Loon Survey and identified historical breeding territories for their continued observation. The survey was conducted by Robert Sarginson, Stacey Crough, Eric Sager and Sheena Symington. Twenty-one breeding pairs produced 19 young, of which 17 survived.

It is our intention to continue with this annual survey as it fits with the mandate for long-term studies for this research facility. The long-term monitoring of atmospheric chemistry and physics and of the biota

provides insights as to the changing state of our environment and the biological effects of continued ecological and climate change.

Table 2. Pigeon Lake Loon Survey 1989 – 2001 inclusive

Year	% Pigeon Lake	# Loon Nests	% Young Per Nest	Bass Tournament
1989	20% of lake	5 pairs, 4 DY, 3 LY	.6	July 1
1990	30% of lake	6 pairs, 5 DY, 3 LY	.5	late June or early July
1991	50% of lake	12 pairs, 8 DY, 6 LY	.5	June 29-30
1992	100% of lake and Pigeon River	22 pairs, 23 DY, 19 LY	.863	July 25/26 1st tournament
1993	100% of lake/river	21 pairs, 25 DY, 19 LY	.904	No tournaments June/July
1994	100% of lake/river	22 pairs, 23 DY, 11 LY	.5	July 3
1995	100% of lake/river	18 pairs, 11 DY, 7 LY	.388	July 1, 2, 9, 15, 30
1996	100% of lake/river	15 pairs, 20 DY, 18 LY	1.02	No tournaments June/July
1997	100% of lake/river	19 pairs, 19 DY, 11 LY	.57	June 29, July 12, 13
1998	100% of lake/river	20 pairs, 21 DY, 13 LY	.65	July 4, 5, 11, 12, 18, 19, 25, 26
1999	100% of lake/river	21 pairs, 23 DY, 16 LY	.762	July 10, 17, 18, 24, 25, 31
2000	100% of lake/river	23 pairs, 27 DY, 21 LY	.913	July 23-29
2001	100% of lake/river	21 pairs, 19 DY, 17 LY	.809	June 30, July 14, 15, 21

Documentation of Ecological Information

Nutrient cycling experiments- Professor Tom Hutchinson
Long-term nutrient cycling experiments have been set-up in the mature sugar maple forest. For two consecutive years (1999 and 2000), litter has been added to some plots and removed from others in order to assess the impact of litter on soil nutrient cycling and plant growth. During the fall of 1999 leaf litter was collected from the sugar maple area of the forest to be sorted, identified, dried and archived for future use/analyses.

Climate records - A MET station was established near to the house in June 2000. The software at this station records a reading every half-hour for average air/soil temperature and relative humidity, total rain fall and snow depth, wind direction and speed and solar irradiance. It is intended to establish the Oliver Centre as a regional climatological and air pollution centre.

Butterfly survey – Professor Tom Hutchinson
A survey of butterflies at 8 different habitat locations recorded 43 species at the Centre from June to September 2001. Butterflies were identified by Kristy Hogsden and Sheena Symington. Species list is provided in Table 5.

Long-term Salamander Survey – Professor Joe Cebek
Two species of the salamander, the red-backed and blue-spotted salamanders, are regularly found at the Oliver Centre. Salamanders have moist, sensitive skins that make them especially vulnerable to disturbances in their habitat. Ecologists have started using the abundance of salamanders to help them identify healthy forests; i.e. salamander densities can be high in mature, diverse forest stands. Since 2000, we have been monitoring salamander abundance at the Oliver Ecological Centre with a long term goal of tracking population trends at the site. On July 19th, 2001 cover boards were set out along the south side of an ephemeral pond. These boards will provide long term covers for salamanders. The data collected from this study will give an estimate of density and species composition of the local salamander population. Refer to Table 4 for list of species.

Location of cover boards: Three 55 m transacts along the south side of the Wood Pond.
Cover boards: 36 - 100cm^2 cedar boards. Placed 5 m apart. 12 boards/ transact.
Total area covered: 550 m^2
The four corners of the survey plot were flagged and GPS readings were taken.
Sampling frequency: 6 times each summer
Potential species: Northern Redback, Blue spotted, Four-toed, Spotted salamander, Red-spotted newt.

Annual Amphibian and Reptile Survey – Professor Michael Berrill
Over the next few decades we expect to monitor the distribution of the amphibians and reptiles at the Oliver Centre every year. We will assess the breeding success of all of the amphibian species, correlating key life history events such as breeding and tadpole metamorphosis with environmental variables such as air and water temperatures, UVB radiation, and precipitation. Our long-term goal is to determine the impact of climate changes in south central Canada on amphibian survival, and to use the Oliver Centre as a reference site for locations elsewhere in Canada and in North America where amphibian decline may occur in response to environmental contamination.

This research involves annual surveys of the various breeding sites on and near the Oliver Centre, determining when breeding begins and ends for each species, and then, with the amphibians, monitoring success at metamorphosis. We have a special interest in populations that may be stressed in some way. For example, bullfrog populations in the region appear to be in decline, wood frog tadpoles may not be metamorphosing before their ponds dry up, and American toads may be experiencing winter kill in winters with low snowfall. List of species is provided in Table 4.

Table 3. Oliver Centre Bird List

1. Common Loon
2. Canada Goose
3. Mallard
4. Hooded Merganser
5. Red-breasted Merganser
6. Common Merganser
7. Common Flicker
8. Pileated Woodpecker
9. Downy Woodpecker
10. Yellow-bellied Sapsucker
11. Great-blue Heron
12. Green Heron
13. Ruffed Grouse
14. Osprey
15. Red-tailed Hawk
16. Turkey Vulture
17. Merlin
18. Kestrel
19. Ring-billed Gull
20. Spotted Sandpiper
21. Ruddy Turnstone
22. Mourning Dove
23. Whip-poor will
24. Belted Kingfisher
25. Ruby-throated Hummingbird
26. Black-capped Chickadee
27. Rose-breasted Grosbeak
28. Cedar Waxwing
29. Eastern Kingbird
30. Least Flycatcher
31. Eastern Phoebe
32. Eastern Wood Pewee
33. Philadelphia Vireo
34. Warbling Vireo
35. Red-eyed Vireo
36. Chestnut-sided Warbler
37. Black-throated Green Warbler
38. Ovenbird
39. Yellow Warbler
40. Common Yellowthroat
41. American Redstart
42. Golden-winged Warbler
43. Black-and-white Warbler
44. Clay-coloured Sparrow
45. Field Sparrow
46. Song Sparrow
47. Chipping Sparrow
48. Savannah Sparrow
49. American Goldfinch
50. Bobolink
51. Baltimore Oriole
52. Purple Martin
53. Barn Swallow
54. Tree Swallow
55. Grey Catbird
56. Brown Thrasher
57. Eastern Bluebird
58. American Robin
59. Wood Thrush
60. Veery
61. House Wren
62. Black-billed Cuckoo
63. Red-winged Blackbird
64. Eastern Meadowlark
65. Common Grackle
66. Common Crow
67. Blue Jay
68. Northern Cardinal
69. Brown-headed Cowbird
70. European Starling
71. **Ruby-crowned Kinglet**
72. **Hermit Thrush**
73. **Yellow-rumped warbler**

***bolded denotes birds added during 2001**

Table 4. Oliver Centre Reptile and Amphibian Spring Checklist

Frogs/Toads:

Spring peepers (*Pseudacris crucifer*)
Chorus frogs (*Pseudacris triseriata*)
Leopard frogs (*Rana pipiens*)
Wood frogs (*Rana sylfatica*)
American toads (*Bufo americanus*)
Grey treefrogs (*Hyla versicolor*)
Green frogs (*Rana clamitans*)
Bullfrogs (*Rana catesbeiana*)

Salamanders:

Blue spotted salamanders (*Ambystoma laterale*)
Spotted salamanders (*Ambystoma maculatum*)
Red-backed salamanders (forest breeders; *Plethodon cinereus*)
Four-toed Salamander *(Hemidactylium scutatum*)

Reptiles:

Painted turtles (*Chrysemys picta*)
Snapping turtles (*Chelydra serpentina*)
Water snakes (*Nerodia sipedon*)
Eastern Garter snakes (*Thamnophis sirtalis sirtalis*)

Table 5. Oliver Centre Butterfly Checklist

Papilionidae (swallowtails)
- Canadian Tiger Swallowtail *Papilio canadenis*
- Black Swallowtail *Papilio polyxenes*

Pieridae (whites & yellows)
- Cabbage White *Pieris rapae*
- West Virginia White *Pieris virginiensis*
- Mustard White *Pieris napi*
- Orange Sulphur *Colias eurytheme*
- Clouded Sulphur *Colias philodice*

Lycaenidae (gossamer-wings)
- Harvester *Feniseca tarquinius*
- Spring Azure *Celastrina ladon*
- Silvery Blue *Glaucopsyche lygdamus*
- Eastern Tailed-Blue *Everes comnytas*
- Banded Hairstreak *Satyrium calanus*
- Coral Hairstreak *Satyrium titus*
- Acadian Hairstreak *Satyrium acadia*
- Bronze Copper *Lycaena hyllus*

Nymphalidae (brushfoots)
- Tawny Crescent *Phyciodes batesii*
- Northern Crescent *Phyciodes cocyta*
- Eastern Comma *Polygonia comma*
- Question Mark *Polygonia interrogationis*
- Mourning Cloak *Nymphalis antiopa*
- American Lady *Vanessa virginiensis*
- Red Admiral *Vanessa atalanta*
- White Admiral *Limenitis arthemis arthemis*
- Viceroy *Limenitis archippus*
- Eyed Brown *Satyrodes eurydice*
- Northern Pearly-eye *Enodia anthedon*
- Little Wood-Satyr *Megisto cymela*
- Common Ringlet *Coenonympha tullia*
- Monarch *Danaus plexippus*
- Great Spangled Fritillary *Speyeria cybele*
- Atlantis Fritillary *Speyeria atlantis*
- Meadow Fritillary *Boloria bellona*
- Common Wood Nymph *Cerecyonis pegala*

Hesperiidae (skippers)
- Northern Cloudywing *Thorybes pylades*
- Juvenal's Duskywing *Erynnis juvenalis*
- Dreamy Duskywing *Erynnis icelus*
- European Skipper *Thymelicus lineola*
- Least Skipper *Ancyloxpha numitor*
- Peck's Skipper *Polites peckius*
- Tawny-edged Skipper *Polites themistocles*
- Northern Broken-Dash *Wallengrenia egeremet*
- Hobomok Skipper *Poanes hobomok*
- Dun Skipper *Euphyes bimacula*

Graduate Student Research

PhD Candidate: 2001

The interactive effects of increased UV-B and nitrogen on seedlings of Acer saccharum *in temperate deciduous forests 1999-*

Sager, Eric (PhD Candidate) with Tom Hutchinson (Supervisor) Environmental and Resource Studies Program Trent University, Peterborough, ON, Canada.

A field experiment has been established to assess the impact of increased exposure to UV-B, due to stratospheric ozone thinning, and nitrogen fertilization on foliar characteristics and flavonoids on sugar maple seedlings. In the spring of 1993, surface UV-B reached levels that were 40% above normal and this was directly related to a reduction in total stratospheric ozone with the primary causal agent being the eruption of Mt. Pinatubo. While 1993 may be anomalous with respect to the high levels of UV-B experienced at more temperate latitudes, the continued loading of ozone depleting chemicals into the atmosphere could result in the annual occurrence of those conditions experienced in 1993. The fact that these large increases in UV-B are occurring in spring at a time when new plant foliar growth is occurring may present a risk to the long-term health of forests. The continued deposition of nitrogenous compounds, largely originating from automobile exhaust and industrial emissions, represents another potential stress to forests. The long term deposition of nitrogen to forest systems can lead to eutrophication, which leads to increases in plant growth and productivity, and eventual acidification of soils. Previous studies have demonstrated that prior land-use history and the buffering potential of the soil parent material plays a significant role in preconditioning the response of the forest of nitrogen fertilization and possible saturation. Therefore, experimental plots have been set up at two sites, the James McLean Oliver Ecological Centre, where the soils are highly alkaline, and the Haliburton Forest and Wildlife Reserve where the soils are much more acid sensitive. Native sugar maple seedlings are being exposed to ambient and sub-ambient levels f biologically effective UV-B radiation. Nitrogen fertilizer (NH_4NO_3) gas also been applied at levels equivalent to an additional 50 kg $N \cdot ha^{-1} \cdot yr^{-1}$ over the last two growing seasons.

For additional information please contact Eric Sager at (705)748-1101 extension 1647 esager@trentu.ca or Tom Hutchinson at (705)748-1634 thutchinson@trentu.ca

MSc Candidates: 2001

*Ecology of Southern Flying squirrels (*Glaucomys volans*) and Eastern Grey squirrels* (Sciurus carolinenis) *at the James McLean Oliver Ecological Research Centre, in Central Ontario, 2000-*

Bridges, Lisa (MSc Candidate) with Jim Schaefer (Supervisor) Biology Department, Trent University, Peterborough, ON, Canada.

Black bears, white-tailed deer, raccoons, porcupines, skunks, chipmunks and red squirrels have all been seen on the property. Research has primarily focused on populations of black-phase grey squirrels (*Sciurus carolinenis*) and southern flying squirrels (*Glaucomys volans*).

The research on populations of *S. carolinensis* and *G. volans* has two phases. The methodology includes a trapping survey to ascertain through mark-recapture the general sizes of the squirrel populations. The other section is to try and ascertain through radio collaring and radiotelemetry, behaviour and habitat distribution of individuals within the two squirrel populations.

Currently, there are 5 grey squirrels and 6 flying squirrels radio collared in the populations at the Oliver Ecological Research Centre. This research is being conducted by Lisa Bridges, a master's candidate at Trent, under the supervision of Dr. Jim Schaefer, Assistant Professor of Biology at Trent. It will continue through winter 2000 and through spring, summer and fall 2001.

If there are any questions regarding this research, please contact Dr. Jim Schaefer at (705) 748-1011, extension 1378 or via email at jschaefer@trentu.ca or Lisa Bridges via email at lbridges@trentu.ca.

The Effects of Land-use on Breeding Success in Woodland-nesting Birds, 2000-

Phillips, Judith (MSc Candidate) with Erica Nol (Supervisor), Biology Department, Trent University, and Dawn Burke (Supervisor), Ministry of Natural Resources, 659 Exeter Road, London ON, Watershed Ecosystems Graduate Program, Trent University, Peterborough ON.

As towns and cities increase in area, more and more houses are being built in the countryside along the edges of lakes, rivers, wetlands and woodlots. However, little is known about whether or not, and by what mechanisms this change affects wildlife inhabiting these relatively natural areas. This two-year study compares the effects of land-use immediately surrounding small, mature deciduous woodlots on the breeding success of birds nesting in the woodlots. Land-use is classified as ex-urban (5 or more houses within 100m of the edge of the woodlot) intensive agriculture, or less intensive agriculture. Nest searching and monitoring of Ovenbirds (*Seiurus aurocapillus*), Wood Thrush *(Hylocichla mustelina*) and American Robins (*Turdus migratorius*) will take place throughout the summer, along with invertebrate surveys, predator surveys, point counts and vegetation surveys.

In 2000, 5 Ovenbird nests were found at the Oliver Ecological Center, more than at any other site studied in the Peterborough region. By continuing field-work next summer (2001), we hope to establish why the woodlot at the Center is particularly favoured by Ovenbirds.

For more information, please contact Judith Phillips at juphillips@trentu.ca or Erica Nol at (705) 748-1011 extension 1640, enol@trentu.ca

A Native Predator for Eurasian watermilfoil, Euhrychiopsis lecontei*, 2000-*

Bell, Rhonda (MSc Candidate) with Michael Fox (Supervisor) Environmental and Resource Studies Program Trent University, Peterborough, ON, Canada.

Eurasian watermilfoil is an invasive perennial aquatic herb that entered the Kawartha Lakes system in the late 1960's. Since the invasion, various measures have been applied to control the spread of the species. Mechanical harvesting, dredging, herbicide treatments and smothering with aggregate materials have been among some of the control methods implemented. These procedures have not eradicated Eurasian watermilfoil and repeat treatments are required to render efforts beneficial.

A native biological control agent known as the milfoil weevil, *Euhrychiopsis lecontei*, has (within the northern United States) shown promise to suppress Eurasian watermilfoil populations. The milfoil weevil has a preference for using Eurasian watermilfoil for several stages of its life cycle in a manner, which harms the milfoil. During the summer months, milfoil weevils live underwater on watermilfoil, either attached to the plant or inside the stem. Adult weevils lay 2 to 3 eggs a day on the top of the plant. Four to 7 days after they hatch the larval insects emerge and begin to feed for the next 14 days upon the tissue of the plant by borrowing into the main stem. By borrowing into the stem, this little weevil disrupts the flow of nutrients, affecting the health of the plant and also making it less buoyant. The pupal stage of the weevil lasts up to 17 days and also takes place inside the stem. When this stage is complete, adult weevils 3 mm in length emerge. Once the main stem of a Eurasian watermilfoil plant has been damaged by the presence of feeding milfoil weevils, the loss of buoyancy causes them to sink toward the bottom where light is insufficient for survival of the weakened plant. As autumn approaches, the milfoil weevil ceases egg production and begins preparation for the migration towards the shoreline where they over-winter in the soil and under vegetative litter.

The Kawartha Fisheries Association and Parks Canada in conjunction with Trent University sponsored a study on the weevil and milfoil in the Kawartha Lakes that began in the summer of 1999. Milfoil beds in

Stony Lake and Pigeon Lake were mapped and classified by density and health and sites were picked out for a study of the terrestrial phase of the weevils life cycle. Adult weevils were found within the leaf litter and soil along shoreline areas adjacent to Eurasian watermilfoil beds up to 3 m. Although the weevil has been studied extensively in the United States, little is known about the over-wintering phase of the weevil. Specifically, it is not known what shoreline habitat is required for the weevil to successfully over-winter. It was suspected that undisturbed, natural areas are preferred. The two areas where weevils were studied extensively last fall on Pigeon Lake and Emily Creek were undisturbed shoreline sites.

The research will continue in 2001 with a thorough search of the lakes to determine if weevils are able to exist in areas, which have been developed. By conducting this research it is hoped that a habitat index can be constructed which will allow cottage owners, Lake Stewards and scientists to address the potential to use the milfoil weevil as a biological control for Eurasian water-milfoil. For more information please contact Rhonda Bell at rhbell@trentu.ca or Michael Fox at mfox@trentu.ca

Nogies Creek Bullfrog Research 2001-

Ireland, David (MSc Candidate) with Michael Berrill (Supervisor) Biology, Trent University, Peterborough, ON, Canada.

Bullfrog (*Rana catesbeiana)* research has been a continuing process at Nogies creek since 1977. Anecdotal and observational evidence suggests a once "booming" population has undergone severe declines in numbers. The primary cause of such declines has been attributed to large commercial/illegal harvests during the 1950's and 1960's. Past research concentrated on life history and behavioural changes over time. Long term data of this nature aids in the understanding of a single, dynamically changing, "closed" population. Present research is focusing on the question of what constitutes a population. Without sufficient immigration/colonization from geographically distinct stocks, do the Bullfrogs of Nogies Creek have the ability to rebound from population reductions of the past? More specifically, have these Bullfrogs retained sufficient genetic diversity to adapt to an ever changing, increasingly contaminated landscape?

Methods used to test such questions include:

1. Gathering life history and behaviour information
2. Permanently marking individuals to gain data on local movement within and between the breeding seasons.
3. Extracting DNA, through blood acquisition, for individual genetic analysis.

Comparative, 'reference' sites, on the Pigeon River System are also being studied and the Oliver Ecological Centre provides a unique, accessible home base to conduct this research.

For more information please contact David Ireland direland@trentu.ca or Michael Berrill at mberrill@trentu.ca

A World Out of Balance: Assessing the Cause, Occurrence and Implications of an Emerging Wildlife Pathogen 2001-

Greer, Amy (MSc Candidate) with Michael Berrill (Supervisor) Biology, Trent University, Peterborough, ON, Canada.

The family Iridoviridae contains viruses that have been classified as diseases of amphibians, fish and invertebrates. The cause of an epizootic, systemic disease causing death within larval wood frogs and leopard frog metamorphs at three different locations within Southern Ontario was investigated. Liver tissues from affected animals were examined histologically for pathological tissue changes as well as tested for the presence or absence of an Iridovirus infection using molecular genetic techniques and analysis. Animals involved in die-off events at all three locations were found to exhibit characteristic clinical signs

and liver pathology indicative of a viral infection. Samples collected during die-off events from 1999 - 2002 at the Oliver Pond, Kortright Centre for Conservation, and Gannon's Narrows tested positive for a Ranavirus infection (Family: Iridoviradae). Wood frog egg broods from the Oliver pond were also found to test weakly positive for Ranavirus infection. This finding suggests that vertical transmission may play a role in maintaining the pathogen within a population. An Iridovirus has been identified as an agent that has the ability to cause disease and death within wood frog and leopard frog populations within Ontario. If these die-offs continue they may be of a magnitude so severe that this type of pathogen could be a direct contributor to amphibian population declines within Ontario as well as local or widespread extinction. For more information please contact Amy Greer amgreer@trentu.ca or Michael Berrill, mberrill@trentu.ca

Long-range Transport of Organic Contaminants: The role of air-surface exchange

Gouin, Todd (MSc Candidate) with Don Mackay (Supervisor) ERS, Trent University, Peterborough, ON, Canada.

This study addresses the prediction of the long-range atmospheric transport (LRAT) of organic contaminants with an emphasis on modelling their air-surface exchange or "grasshopping" behaviour. In a field study, atmospheric concentrations of polybrominated diphenyl ethers (PBDEs), which are a relatively new class of persistent organic pollutants, are observed to cycle diurnally in a manner similar to the polychlorinated biphenyls (PCBs). It is hypothesised that unusually high concentrations of PBDEs observed in the early spring are the result of an "early spring pulse" resulting from exchange of PBDEs between the terrestrial surface and the atmosphere following snow melt. This study showed that LRAT models must include a fast exchanging surface compartment to simulate air-surface exchange adequately. Based on this finding a novel model is developed for the "grasshopping" behaviour of organic contaminants, including for the first time an estimate of the average number and distribution of "hops". The model is applied to selected PCB and PBDE congeners, and the influence of temperature and vegetation on air-surface exchange of these compounds is the subject of detailed assessment. Model results are shown to generally agree with those from the field study. PBDEs are shown to behave similarly to PCBs, and are thus likely subject to "hopping" and LRAT to remote locations, such as the Arctic. For more information please contact Todd Gouin at tgouin@trentu.ca or Don Mackay at dmackay@trentu.ca.

Undergraduate Honours Theses Abstracts

The Physical and Biological Heterogeneity of the Environment: Investigation at the Local and Bioregional Scale.

Ashleigh Crompton April 2001. 4th Year Undergraduate Honour Thesis in Biology with Jim Schaefer, Trent University, Peterborough, ON, Canada.

Understanding the structure of habitats, communities and landscapes has been important to ecologists for decades. Traditionally, habitats have been viewed as a series of repeating patches over time and space. Recent studies have begun to challenge this view suggesting that environments are organized on gradients at all scales and the variance of physical and biological variables increases indefinitely as the spatial separation between sampling sites increases. The objective of this study was to examine the degree of heterogeneity of abiotic and biotic factors at two spatial scales: a local scale, at the James McLean Oliver Ecological Centre in south-central Ontario and bioregional scale, the southern portion of the province of Ontario. Physical variables included pH, percent moisture and temperature of soil as well as annual temperature and precipitation while biological variable were represented by both woody plant and mammalian species diversity. Most of the results from this study were consistent with those of past studies. That is, the variance of the variable tested displayed a definite as the spatial separation between sampling locations increased. The increase appeared to be continuous for most variables, for spatial separations of as little as 5 m up to more than 500 km. However, at the greater distances the variance of soil temperature and annual precipitation appeared to reach a level of spatial separation at which time the variance appeared to

suggest a random structure. Despite this, all abiotic and biotic variables displayed increasing variance at small spatial scales suggesting that at this level the environment is structured along gradients. The results obtained from this study do appear to support the idea that physical and biological environments are structured as gradients, not as repeating patches, across many scales.

Factors Affecting Habitat Use of Non-Breeding Northern Saw-whet Owls.

Sarah Dauncey, April 2002. 4th Year Undergraduate Honour Thesis in Biology with Erica Nol, Trent University, Peterborough, ON, Canada.

Mist nets were erected in both Forest and Field habitats of exposed and sheltered areas to test the effect that habitat has on the capture rates of Northern Saw-whet owls (Aegolius acadicus) during migration. Three years of data (1999-2001) were available for cumulative age and sex analysis, and significantly more females (74%) were captured than males in all three years of the study. Habitat did not influence capture rate of Northern Saw-whet owls; however daily capture rates were influenced by amount of cloud cover. Nocturnal owl surveys were conducted from January through February 2002 to assess wintering habitat use of the species. Too little data were found to determine any true habitat use; however results suggested that wind speed and vehicle traffic affected the detectability of calling owls.

Undergraduate Theses Completed

Bell, Rhonda. April, 2000. *Spatial and Temporal movement of the Aquatic Weevil* (Euhrychiopsis lecontei) *within the Kawartha Lakes: A potential Biological Control for Eurasian watermilfoil.* Environmental Resource Studies with M. Fox and T. Whillans.

McLeod, Brenna Annie, April 2000. *The influence of temperature on growth and behaviour of the adult green frog* (Rana clamitans) *and the pre-metamorph wood frog* (Rana sylvatica) *in ephemeral ponds.* Biology with Michael Berrill.

Newman, Daniel, April, 2000. *Island microhabitats in a riverine wetland near Nogies Creek, Ontario: the role of logs for species and community diversity.* Biology with Michael Berrill.

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Publications

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