

**2012-2013 Annual Report of the Natural Resources and Environmental
Studies Institute
24 June 2013**

Overview of NRES Institute

The Natural Resources and Environmental Studies Institute (NRESi) is a formal association of UNBC faculty and affiliates that promotes integrative research to address natural resource systems and human uses of the environment, including issues pertinent to northern regions. Founded on and governed by the strengths of its members, the NRES Institute creates collaborative opportunities for researchers to work on complex problems and disseminate results. The NRES Institute serves to extend associations among researchers, resource managers, representatives of governments and industry, communities, and First Nations. These alliances are necessary to integrate research into management, and to keep research relevant and applicable to problems that require innovative solutions.

Our Mission

The purpose of the NRESi is to facilitate innovative and interdisciplinary research on issues relating to natural resources and the environment. Given that natural resources are the foundations of the economy of many communities in northern BC and other northern regions, and that the environment is increasingly subject to anthropogenic changes, it is important to direct efforts towards understanding these complex interrelationships to ensure environmental, social and economic sustainability. Therefore, the primary goal of NRESi is to integrate across perspectives to better understand the functions, viability, and values of natural resource and environmental systems. Helping communities affect their futures and challenging researchers to contribute to innovation through research are the consequences of this goal. NRESi fosters communication and interaction among faculty, graduate students, and associated researchers (e.g., those working at the UNBC research forests, and the Quesnel River Research Centre); it also promotes connections among local communities, management agencies, and research professionals from industry and government.

What We Do

By enabling communication among researchers and potential external partners, the NRESi provides a conduit for basic and applied research opportunities from outside of the University, as well as a means to synthesize research findings for dissemination beyond academia. In addition, NRESi creates an important bridge to the NRES Graduate Programs by providing graduate students with opportunities to interact with researchers and to showcase their own research activities. Synthesis and extension is encouraged through the peer-reviewed NRESi Extension Note and NRESi Occasional Paper Series. NRESi fills a crucial role at UNBC. Natural resources and the environment are central to UNBC's mission statement and research priority areas. The Institute is the UNBC body whose focus is to support research in this area.

NRESi provides a number of 'core services' to UNBC, its members and the community including: 1) communication about Natural Resources and Environmental Studies; 2) publication and extension; 3) providing a public face UNBC in Natural Resources and the Environment; and 4) facilitating research opportunities/networking/problem-solving. Although NRESi has

excelled at delivering core services 1 through 3, it is the 4th core service (expanding research opportunities) where NRESi has enormous potential to enhance research activities at UNBC.

Activities to Support the NRESi Core Services

Several activities that could better support the Institute's core services were outlined in the 2012 5-year Strategic Plan for the Institute:

1. Work with the Office of Research and with Graduate Programs to coordinate the logistics for post-graduate internship positions as part of bridging students from the University into their area of practice.
2. Advance forward-looking research initiatives at UNBC by hosting visionary conferences on emerging topics (e.g., cumulative effects). These events would be held jointly with other UNBC Institutes to showcase extant expertise.
3. Support the research agenda of UNBC Institutes by providing logistical support for major collaborative research grant proposals (both proactive and reactive).
4. Write policy briefs from completed Institute research.
5. Be an advocate for UNBC's research findings in helping to shape the future. This would be facilitated by maintaining links to the provincial and federal governments (at the levels of elected members and staff).
6. Coordinate logistics for Institute Post-docs and visiting fellow positions. This can include work on creating a funding allocation to support such positions.
7. Work with the Development Office to develop additional support for NRESi members and their graduate students.

As described below progress was made on several of these activities during the reporting period (i.e., items 2 [Peace Break workshop and tri-institute initiative on a cumulative effects framework], 3 [BMAP Contribution Agreement], and 7 [Development of a Funding Plan]).

Governance

The NRESi is overseen by a Director (3-year term). The Director works closely with an internal Steering Committee (three elected to 2-year terms by the membership of the Institute, one additional member representing the Pacific Institute for Climate Solutions, and another representing members of the NRES Graduate Program Committee), who reflect the perspectives of the members of the Institute and ensure that it functions in accordance with its vision statement and purpose. From its inception, the Institute has embraced a bottom-up governance model rather than a top-down approach guided solely by a Director. The incoming Director, Dr. Bill McGill assumes the position of Director on 1 July 2013. Members of the Steering Committee that served partial or full terms during FY 2011-2012 are listed in Table 1.

Table 1. Steering Committee membership during FY 2012-2013. † indicates a Steering Committee member whose term was renewed by acclamation during the reporting period.

| Name | Role | Term |
|----------------------------|-------------------------|--|
| Michael Gillingham | Director | 1 July 2008 – 30 June 2011; renewed 1 July 2011 – 30 June 2013 |
| Peter Jackson [†] | Elected Member | 1 July 2013 – 30 June 2015 |
| Art Fredeen [†] | Elected Member | 1 January 2013 – 31 December 2014 |
| Phil Mullins | Elected Member | 1 July 2012 – 30 June 2014 |
| Annie Booth | NRES Grad Program Chair | No Fixed Term |
| Kyle Aben | PICS Representative | No Fixed Term |

The NRESi Management Committee, which includes the Vice-President Research, an NRES Graduate Student (current elected student is Alex Koiter), the Dean of the College of Science and Management (Dr. Dan Ryan), and all members of the NRESi Steering Committee (chaired by the NRESi Director), normally meets at least once annually to seek input on the performance of the Institute. Depending on her/his interest, the Dean of Graduate Programs has also participated in NRESi Management Committee meetings.

Membership

There are currently 70 members of NRESi (Table 2). Membership activity during the reporting period included the addition of 2 new full members, the loss of 4 associate member (had left UNBC), and the renewal of the terms of 6 associate members. Description of each member's research interests, and links to additional information on each member, can be found on the NRESi web site at <http://unbc.ca/nres-institute/institute-members>.

Table 2. NRESi members during FY2012-2013. The two new members are marked and ^R indicates a renewal during the year; Associate members are indicated by the start date for their current three-year term.

| Name | Membership | Name | Membership |
|-------------------------|-------------------|---------------------------------|--------------------|
| Aben, Kyle ^R | November 20, 2009 | Erasmus, Daniel | Full |
| Arocena, Lito | Full | Fondahl, Gail | Full |
| Aukema, Brian | August 1, 2010 | Fredeen, Art | Full |
| Booth, Annie | Full | Garcia, Oscar | Full |
| Burton, Philip | Full | Gillingham, Mike | Full |
| Connell, David | Full | Green, Scott | Full |
| Costello, Allan | Full | Haeussler, Sybille ^R | September 25, 2012 |
| Coxson, Darwyn | Full | Halseth, Greg | Full |
| Curry, John | Full | Hanlon, Neil | Full |
| Dawson, Russ | Full | Hardy, Anne ^R | February 17, 2012 |
| Déry, Stephen | Full | Hartley, Ian | Full |
| Egger, Keith | Full | Hawkins, Chris | January 1, 2013 |

| Name | Membership |
|-------------------------------|------------------|
| Heard, Doug ^R | March 7, 2010 |
| Helle, Steve | Full |
| Henry, Philippe ^N | October 31, 2012 |
| Huber, Dezene | Full |
| Hume, Harold | March 21, 2010 |
| Jackson, Peter | Full |
| Johnson, Chris | Full |
| Karjala, Melanie ^R | April 22, 2013 |
| Lautensach, Alex ^N | Full |
| Lavallee, Loraine | Full |
| Lewis, Kathy | Full |
| Li, Jianbing (Jason) | Full |
| Lindgren, Staffan | Full |
| Maher, Patrick | Full |
| Massicotte, Hugues | Full |
| McGill, Bill | Full |
| Meletis, Zoe | Full |
| Menounos, Brian | Full |
| Mullins, Philip | Full |
| Murray, Brent | Full |
| Nolin, Catherine | Full |
| Opio, Chris | Full |
| Otter, Ken | Full |

| Name | Membership |
|-------------------------------|-------------------|
| Owens, Philip | Full |
| Parker, Katherine | Full |
| Petticrew, Ellen | Full |
| Procter, Dennis | Full |
| Psyllakis, Jennifer | March 1, 2011 |
| Rea, Roy | Full |
| Rutherford, Mike | Full |
| Ryan, Dan | Full |
| Sambaraju, Kishan | November 19, 2011 |
| Sanborn, Paul | Full |
| Shrimpton, Mark | Full |
| Shultis, John | Full |
| Stevenson, Susan ^R | April 12, 2012 |
| Sui, Jueyi | Full |
| Summerville, Tracy | Full |
| Tang, Youmin | Full |
| Thring, Ron | Full |
| Wheate, Roger | Full |
| Whitcombe, Todd | Full |
| Wilkening, Ken | Full |
| Wilkerson, Orland | Full |
| Wright, Pam | Full |
| Young, Jane | Full |

Report on Activities for 2011-2012

General Activities

- There are currently 70 members of NRESi made up of 58 Full members (not counting one Life-Time member) and 12 Associate members. Membership activity in 2011-2012 consisted loss of 4 Associate Member and the addition of two new Full members. The memberships of 6 Associate members were renewed for new 3-year terms.
- In 2011-2012 the Institute's Steering Committee undertook a Strategic Planning process in order to identify the Institute's longer-term requirements and identify a sustainable model for the resourcing of NRESi. That 5-year plan was approved by the Steering Committee on March 26th 2012 and early in 2012-2013 the Director began meeting with members of UNBC Administration to work towards obtaining the bridge funding needed by NRESi. President Iwama generously offered to meet those short-term needs (i.e., teaching relief for the director and administrative support) for five years. With a significant increase in overhead funds for NRESi, the Director has since indicated that the promised funds from Dr. Iwama for at least 2013-2014 will not be needed.
- The Institute hosted 23 colloquia as part of the weekly NRESi Colloquium Series (past abstracts available at <http://unbc.ca/nres-institute/colloquium-series>). Travel costs for one of the Colloquia speakers were shared by the Institute. Talks in the series also included the Annual NRES Grad Icebreaker, a lecture by the 2012 Doug Little Speaker (Dr. Fred Bunnell), the Peace Williston Compensation Fund lecture, as well as a

Colloquium that also served as the start of a 1 ½-day workshop on connectivity and cumulative effects co-hosted with the Yellowstone to Yukon Conservation Initiative.

- The ‘virtual’ audience attending the Elluminate broadcast versions of the Colloquia continued to grow. Weekly on-line attendance averaged about 10% of the in-room audience.
- The 8th Annual NRES Graduate Fall Research Social was held in October 2012 to showcase the work of NRES Graduate Students and to welcome new graduate students to the program. We continued the model of pairing this event with a presentation by a speaker nominated by the NRES Graduate Students – Dr. David Schindler from University of Alberta was the speaker in 2012.
- With the significant changes to the BC Hydro Peace Wildlife and Fish Compensation Program, program staff were no longer available to organize the annual Peace Williston lecture. Instead the NRESi Director worked with BC Hydro to arrange a gift from BC Hydro to fund this event in 2012-2013. Dr. Rick Cunjak was the speaker. NRESi will continue to work with BC Hydro to ensure that this event can continue in future years.
- With the financial support of Spectra Energy, NRESi and the Community Development Institute cohosted a panel discussion about sustainability of communities, culture and the environment. The panel featured Wade Davis (National Geographic Society), Paul Michel (Director UNBC First Nations Centre), and Gerry Thiessen (Mayor of Vanderhoof). Rather than trying to examine cumulative effects per se, we focused on a conversation about the relationship between people/communities and the natural landscape by asking “what do we wish from the relationship between our communities and the natural landscape both now and in the future?”.
- NRESi did not host an Annual Lecture during winter 2013. The speaker for the 2012 Annual Lecture (who cancelled at the last minute in 2012), took several months before informing NRESi that he would not be able to come in 2013. The Steering Committee then began discussions with another speaker who also cancelled at the last minute before the lecture scheduled for April 2013.
- There was one NRESi Research Extension Note (REN) published during FY 2012-13. This REN entitled “Foliar nutrient concentrations and potential limitations of white spruce (*Picea glauca* (Moench) Voss) in Yukon, Canada” by Alyson Watt, Art Fredeen, and Paul Sanborn was awarded the prize available for NRES student-submitted Research Extension Note. Papers in the peer-reviewed Research Extension Notes Series are available in PDF format from <http://unbc.ca/nres-institute/research-extension-note-series>.
- There were no NRESi Occasional Papers published during FY 2012-13. Papers in the peer-reviewed Occasional Papers Series are available in PDF format from <http://unbc.ca/nres-institute/occasional-paper-series>.
- During this reporting period, the NRESi continued to support and promote undergraduate thesis (NRES 430) presentations within the College of Science and Management. This year, with the partial financial support of the College of Science and Management, the Ecosystem Science and Management Program, and the Chemistry Environmental Science and Engineering Program, NRESi organized and hosted a College-wide presentation of

all undergraduate theses and projects. The day-long event featured 26 presentations and was a great success.

- The Director and members of the Steering Committee, assisted by a research associate hired to lead the effort, invested considerable time working with the UNBC Development Office to develop a strategy and then a plan to begin actively fund raising to support NRESi initiatives. Some of the suggested outcomes of that process are described below under Plans for 2013-2014.

Research

The NRESi links a community of researchers with varied backgrounds and research interests empowering them to pursue their disciplinary research in an interdisciplinary context. Consequently, many of the research initiatives undertaken by Institute members are collaborative efforts with other Institute members. Research endeavors can be broadly grouped into one or more of the following categories: *Ecological Patterns and Processes*, *Societal Structures and Values*, and *Earth Systems and Dynamics*. Individual members of the Institute have strong disciplinary expertise in the natural, physical, environmental and social sciences. The NRESi provides a forum to promote integrative research to address natural resource systems and human uses of the environment, including issues pertinent to northern regions.

Many of the projects currently being undertaken by Institute members can be viewed in a Google Earth format from the NRES website (<http://unbc.ca/sites/default/files/sections/nres-institute/projects.kmz>). The entire database was updated in 2013 and dates for the active research window have been added to each location.

Biodiversity Assessment

FY2012-2013 saw Institute members invest a considerable amount of time into a biodiversity monitoring and assessment program (BMAP) ultimately involving 15 NRESi members. Preliminary discussions were held with Pacific Trail Pipelines Limited Partnership (PTPLP; the discussions spearheaded by David Vexler who had been a key player in previous biodiversity monitoring programs associated with natural gas pipelines). The BMAP has the goal of developing best practices for pipeline and linear corridor construction and is in addition to any regulatory or First Nations' accommodations requirements.

Following these initial discussions, two workshops were held on the Prince George campus to first inform NRESi members of the potential BMAP work (April 20th 2012) and then to scope our preliminary goals and objectives for potential research contributions to the BMAP (May 24th, 2012). The first workshop, attended by about 20 NRESi members, included an overview of the project (provided by PTP), of a past BMAP partnership in Peru (presented by The Smithsonian Institute), and of some of the available biological data (presented by Westland). The second workshop considered possible approaches and research questions (by both PTP and from NRESi members) and resulted in moving the focus of a possible BMAP from one of species monitoring to one of maintaining ecosystem function. This approach recognized that individual species might change in some systems following disturbances, but that ecological function might be maintained if other species with similar ecosystem contributions take their place. At the end of the second workshop, the NRESi team indicated their commitment to a BMAP project, one that would address best practices.

Since then, UNBC has signed two agreements with PTPLP. The first was to develop peer-reviewed protocols to implement as part of the BMAP. Those protocols were all finalized as of 15 June 2013. UNBC has since signed a second agreement with PTPLP to begin implementing research on the following NRESi projects:

- Aquatic Communities Protocol – Evaluation of stream crossing from pipeline installation on aquatic communities and biodiversity
- Tailed frogs: A Model for Understanding Connectivity within Aquatic, Riparian and Terrestrial Ecosystems Protocol
- Soil Integrity and Revegetation Protocol
- Anadromous Movement and Estuarine Habitat Use of Coastal Cutthroat Trout (*Oncorhynchus clarkii clarkii*) in the Bish Creek Near-Shore and Marine Environments
- Restoration Protocol: Management to Increase Animal Movement Corridors and Decrease Invasive Vertebrate Species

Cumulative Effects

Beginning in February the NRESi and CDI assisted an internal UNBC process for identifying potential projects that could be supported with short-term monies from the BC Oil and Gas Commission (OGC). One of the outcomes of that process was that funds were allocated to support an initiative jointly involving the NRESi, CDI, and Remote Health Institute (RHI). That initiative is examining possible frameworks for cumulative effects that include not only environmental, but also community and health perspectives. This joint effort is attempting to assemble a series of book chapters that will propose potential a potential framework for including the environment, communities, and health into a cumulative effects framework. Several Institute members are becoming involved in this work and it may well lead to additional funding to further explore some of the concepts that come out of the initial work.

Budget Report

Total revenues for FY 2011-2012 came from overhead (Institute projects) and overhead redirection (member projects), residual funds from the Northern Land Use Institute (\$34,3368), a gift from BC Hydro and the Peace Wildlife and Fish Compensation fund to continue a lecture series (\$4500), and from the President's Initiative Fund (\$53,500). Overhead and overhead redirection from the Office of the Vice-President Research and matching overhead redirection from the Ecosystem Science and Management Program (A. Booth, A. Costello, D. Coxson, R. Dawson, A. Fredeen, M. Gillingham, S. Green, C. Johnson, B. Murray, C. Opio, K. Otter, K. Parker, and R. Rea), Geography Program (B. Menounos), and from the Environmental Science Program (M. Rutherford) totaled \$19,390.86. The overhead contributions to NRESi were assisted by the Institute's ability to now split overhead revenues with the Office of Research on Institute projects, and by the addition of a checkbox for overhead redirection on the Grant/Contract Approval Cover Page.

Total expenditures (\$42,470.98) included the teaching relief to the Director, sponsorship of the NRESi Colloquium series, advertising, support for the Fall Grad Ice Breaker, support for the NRES 430 Undergraduate Thesis presentations, co-hosting the Yukon-to-Yellowstone Peace Break Workshop, office costs, and the partial support of the other special events. Our year-end

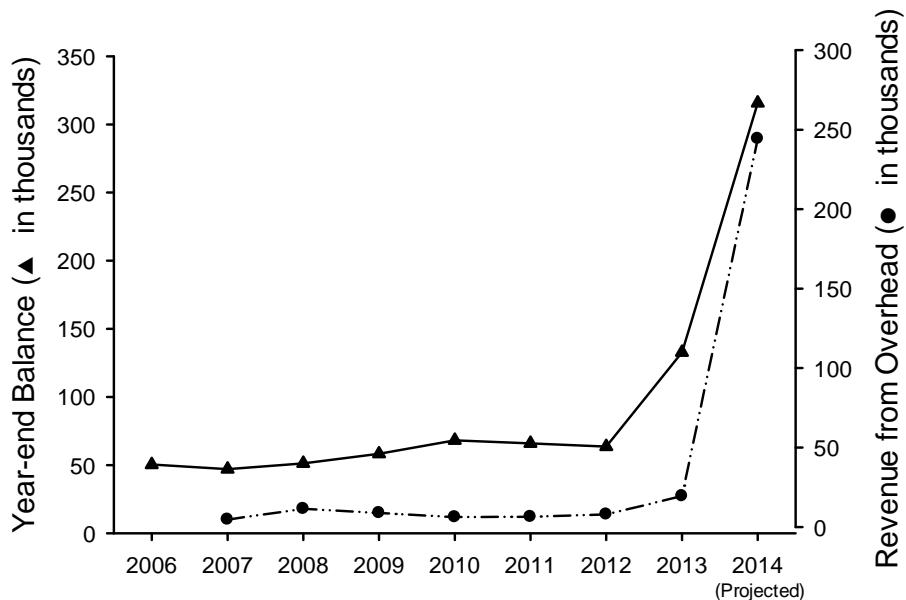
closing balance was \$132,784.60 (Table 3; Figure 1).

Table 3. Brief budget summary for the NRESi’s operating budget (30181) in FY 2011-2012.

| | |
|-------------------------------------|--------------|
| Opening Balance (April 2012) | \$66,528.00 |
| Total Revenues (FY 12-13) | \$111,727.58 |
| Total Expenditures | \$42,470.98 |
| Year End Balance | \$132,784.60 |

Two things during the reporting period have greatly improved the financial outlook and resources available to NRESi. The first was the implementation (initiated by Dr. Fondahl when she was VP Research and passed by PEC) of a shared overhead model on Institute projects. Research projects that meet the criteria of Institute projects (including the approval by the VP Research) result in an equal sharing of overhead between the Office of Research and the Institute. The second event was the signing of a large contribution agreement for an Institute project (15 principle investigators from NRESi) that includes a large amount of overhead. As a result, projected revenues for NRESi in FY2013-2014 exceed \$240,000.

Figure 1. NRESi year-end balances (▲) and revenues from overhead redirection (●) from 2006 projected through 2013 with a projection for FY2013-2014. The Institute was funded with initial, one-time financial support (\$50,000) from the Ecosystem Science and Management Program and the Dean of the College of Science and Management. Further one-time infusions from a residual NRES Faculty fund in 2009 (\$9,562), from a portion of the residual funds in the Northern Land-Use Institute (\$18,500 in 2010 and \$34,337 in 2012) and from the Presidents Initiatives Fund (\$53,500 in 2012).



The Institute has three additional endowments. The main endowment (70105) is the Northwood/Canfor endowment. This endowment gained approximately \$9000 in value during 2012-2013. Because we were unable to schedule the 2013 NRESi Annual Lecture, the only expenditures were the purchase of the NRES pins for the graduates of the NRES Graduate Program. The NRESi Endowment (46055) has an FY 2011-2012 year-end balance of \$5583 (a gain of approximately \$800 as a result of an additional donation by Art Fredeen). In addition, the Linnea Fund (34164), which is also administered by NRESi, remained with a balance of \$4,350. The Linnea Fund permits the spending of the principle while the NRESi Endowment is a traditional endowment fund in which only interest can be used.

Plans for 2013-2014

With the increased funding that NRESi will enjoy for at least the next couple of years, it now has the resources to move past 'maintenance' and to begin to proactively explore opportunities for support for both additional research collaborations and also for the resources to better support NRESi members in their research endeavors. Such support, if suitable donations can be identified could include:

1. Support of a Visiting Scholars program to foster linkages with other researchers
 - a researcher in residence program
 - Enhance Institute areas of expertise with new expertise
 - Encourage Institute growth in areas of benefit to the Institute
 - Opportunity to choose scholars whose specialization will benefit the greatest number of Institute members
2. Support for Graduate Research Assistantships (5 RAs)
 - Ensure training in areas/projects where it is otherwise difficult to support graduate students (i.e. interdisciplinary or difficult to categorize research)
 - Training of greater numbers of graduate students in a rich interdisciplinary environment
 - Increase the number of entirely objective research projects
3. Support to enhance and grow the Colloquium Series
 - Encourage community engagement with the Institute
 - Exposure of students, faculty, and public to each other, and to ideas, topics, controversies
 - Brings new people to the Institute, and to UNBC
4. Support for an Annual Symposium or Workshop
 - Focus researchers on new ideas
 - Access external experts for a meaningful period of time
 - Additional flexibility to address current topics
5. Institute Support to assist Member Publications and Member Travel Costs and

Increased Visibility

- Encourage extension and outreach, for broad dissemination of research outcomes
- 3 x \$5,000 travel grants plus 10 x \$500 awards to offset publication costs

The Steering Committee believes that the Institute can continue to play a lead role in interdisciplinary research, particularly around the concepts of cumulative impacts and sustainability – not only from an ecological and resource perspective, but also from the perspective of northern communities, and First Nations. The ongoing collaboration with the CDI and the NRHI will continue during FY2013-2014. The outcomes from the joint cumulative effects framework may lead to a ranged of funding opportunities for Institute members.

NRESi will continue to sponsor the Colloquium Series, an NRES Graduate Student Icebreaker early in Fall 2013 (the guest lecturer has already been identified and scheduled), as well as the Annual Lecture during Winter 2014.