



BRAES ANNUAL REPORT



2014-2015

UBC Okanagan Institute for
Biodiversity, Resilience, and
Ecosystems Services - BRAES



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

BRAES as a place of:

RESEARCH

BRAES is committed to producing world-class research that will distinguish UBC Okanagan as a place of excellence in the fields of biodiversity and environmental sustainability. We are continually striving to enhance our research capacity and impact, locally and globally. In so doing, we increase our ability to train, nurture and empower the next generation of leaders.

LEARNING

BRAES is a place of lifelong learning, creating opportunities for institute members and the broader community to engage in knowledge sharing activities. In addition, through its dedicated research facilities and organization of scientific activities, BRAES provides an enhanced training environment for undergraduate and graduate students.

ENGAGEMENT

BRAES values community engagement and non-academic partnerships as a means of leveraging the relevance and impact of our work. BRAES members have on-going collaborations with more than 40 government, non-government, community, and international organizations.

INTERNATIONALISM

BRAES aims to be a portal for global engagement, connecting our campus community to the world. Our members currently carry out research on seven continents, with active projects in places such as the Great Barrier Reef, the Galapagos Islands, the Nepalese Himalayas and the South African Succulent Karoo.

INNOVATION

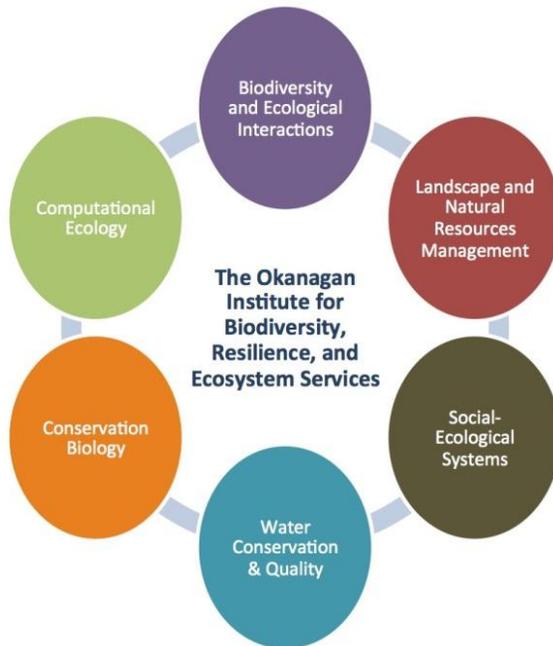
Today's environmental challenges are wicked problems, for which no clear solution exists. By facilitating interdisciplinary collaboration, BRAES creates a place for ideas to incubate, leading to innovative outcomes that respond to the needs and imperatives of today's society.



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

BRAES at a Glance



- ✓ 26 faculty members
- ✓ 80 postdoctoral trainees, graduate and undergraduate students
- ✓ Over 6000 sq. ft. of dedicated research laboratory space
- ✓ Numerous affiliated laboratories

Highlights of 2014-2015

- ✓ Over \$2 million in research funding
- ✓ Over 90 scientific publications
- ✓ Partnerships with more than 40 non-academic organizations
- ✓ Hosting of the Okanagan Water and Biodiversity Forum in partnership with the OBWB, including 2 full days of presentations with more than 40 presenters and 120 participants
- ✓ Launching of a Scientific Workshop Series
- ✓ Ongoing Invited Speakers Series
- ✓ BRAES events have been attended by more than 500 participants including the campus community and the general public

BRAES Goals and Challenges 2015-2016



- ✓ Contribute to developing a thriving research culture on campus
- ✓ Foster interdisciplinary collaborations that lead to innovative solutions for achieving environmental sustainability
- ✓ Provide an enriched graduate training environment through student participation in BRAES
- ✓ Seek additional sources of funding to support new initiatives
- ✓ Increase the Institute's national and international visibility
- ✓ Continue to pursue high impact, regionally and globally relevant research

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1. BRAES STRATEGIC DIRECTIONS



Photo: L. Parrott

1.1 Vision

To advance efforts to protect species and ecosystems through interdisciplinary research, training and community engagement.

1.2 Mission

To conduct fundamental and applied research in biodiversity and conservation that has regional and international impact.

To become a leading international centre for the training of highly qualified undergraduate, graduate and postgraduate personnel. These researchers will be uniquely positioned to bridge disciplinary barriers to inform and guide effective conservation research and management strategies.

To foster strategic partnerships with First Nations, government, industry, and non-governmental organizations and to maintain active engagement with community stakeholders through educational outreach and stewardship activities.

1.3 Links with UBCO Research and Strategic Plans

The BRAES mission and vision are closely aligned with the 2009 UBC Okanagan Strategic Research Plan. The UBCO Strategic Research Plan emphasizes the importance of interdisciplinarity, partnerships and excellence in research, all demonstrated strengths of BRAES. “Sustainable Environments and Populations” is noted as one of six Areas of Research Priority, specifically naming BRAES as an established entity of multidisciplinary strength

to lead “research on environmental quality, adaptive responses and sustainable development (to) inform management and policy decisions that contribute to healthy environments for people and other organisms.”

BRAES mission is also contributing to the UBC Strategic plan commitment of Research Excellence specifically with its goal of increasing the quality and impact of UBC’s research and scholarship, participating in actions such as:

- Supporting and enhancing UBC researchers’ grant funding competitiveness and success.
- Enhancing infrastructure to support leading edge research.
- Fostering UBC’s globally influential areas of research excellence.

2. BRAES OPERATIONS



Photo: L. Parrott

2.1 Governance

The Institute has a Director who is a tenured Associate Professor or higher rank and who is presently a UBC Okanagan faculty member. The Director is responsible for coordinating the operations of BRAES, including its administrative staff and budget. The Institute has a Steering Committee that consists of the Director (Chair), 3 or 4 faculty Institute members and 1 Graduate student member. Steering committee members are elected by the membership for a 3 year period. The graduate student member is elected by other student members of BRAES for a 1 year term.

The Director supervises the Coordinator who is responsible for the day-to-day Institute activities and for planning, coordination, and communication within the Institute.

Current Steering Committee Members:

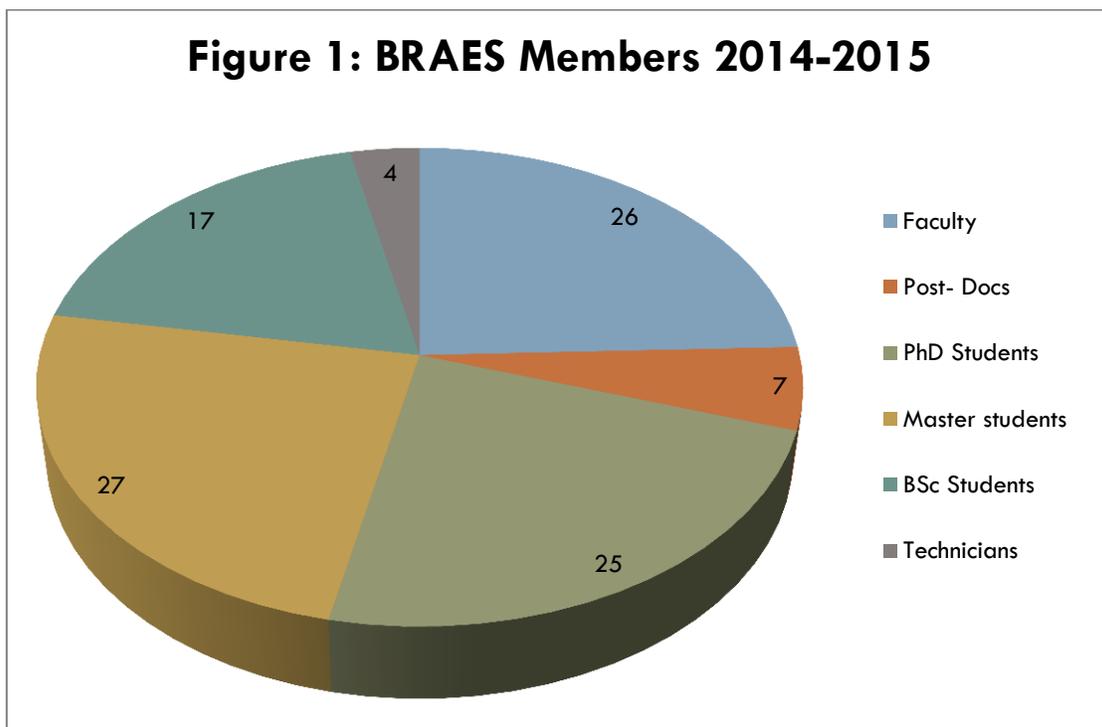
- ✓ Dr. Lael Parrott, Institute Director
- ✓ Dr. Greg Garrard
- ✓ Dr. Melanie Jones
- ✓ Dr. Bob Lalonde
- ✓ Dr. Rebecca Tyson
- ✓ Graduate Student (to be elected)
- ✓ Carolina Restrepo-Tamayo, Institute Coordinator

2.2 Membership

As of March 2015 BRAES has 106 members distributed as follows: 26 Faculty Members, 7 Post-Doctoral Researchers, 25 PhD Students, 27 Masters Students, 17 Undergraduate Students and 4 Technicians.

Over the past year 4 new faculty members have joined the Institute:

- ✓ Dr. Aleksandra Dulic, Faculty of Critical and Creative Studies
- ✓ Dr. Greg Garrard, Faculty of Critical and Creative Studies
- ✓ Dr. Kevin Hanna, Irving K. Barber School of Arts and Sciences
- ✓ Dr. John Wagner, Irving K. Barber School of Arts and Sciences



For a detailed list of faculty members please consult Appendix 1

2.3 Staff and Administration

Dr. Lael Parrott is the current director of the Institute.

Since December 2013 BRAES has a part-time coordinator. Carolina Restrepo-Tamayo is the current institute coordinator, who is responsible for planning, coordination, and communication within the BRAES Institute by:

- Organizing BRAES conferences, workshops, training sessions, retreats and annual general meetings

- Preparing the Institute's annual activity reports
- Preparing budgets and forecasting requirements
- Developing an annual budget
- Facilitating collaborative agreements involving researchers, granting agencies and departments within the institute
- Promoting BRAES research to the broader community, in collaboration with university media relations officers
- Securing industry and other partners of BRAES for long-term collaborations
- Writing grants for BRAES and working with the Development Office to secure external funding for BRAES
- Developing and maintaining the BRAES web site
- Coordinating and preparing a quarterly BRAES newsletter

3. BRAES RESEARCH



Photo: I. Walker

3.1 Context:

BRAES research has focused on identifying and managing species and habitats at risk, understanding and predicting biotic responses to environmental change, and sustaining resources and ecosystem services in natural and managed landscapes.

Our underlying motivation is to increase scientific understanding of ecological systems and to inform management and planning decisions that promote the preservation of biodiversity and ecosystem services in terrestrial, marine and aquatic systems.

BRAES members work from the genetic to landscape scales and use a wide range of field, laboratory and quantitative methods. BRAES facilitate multidisciplinary collaboration, leading to innovative research that transcends traditional approaches to ecology and conservation.

3.2. Research Themes:

BRAES research falls under six inter-related themes. See figure 2.



FIGURE 2: BRAES RESEARCH THEMES

Biodiversity and Ecological Interactions

This theme involves the study of the inter-relationships between biodiversity and ecosystem processes, from genetic to ecosystem and landscape scales. BRAES researchers working under this theme study diverse questions related to community assembly, invasive species, population dynamics and ecological connectivity, for example. A strong emphasis within this theme is on soil microbiology: understanding the contribution of mycorrhizal fungi and other micro-organisms to soil fertility and nutrient cycling in natural and agro-ecosystems. The fundamental work carried out under this theme provides the scientific foundation for conservation, restoration, and management efforts and for understanding relationships between biodiversity and ecosystem services provisioning.

Conservation Biology

Conservation biology focuses on the identification and description of habitats necessary to support species at risk, and the development of scientific tools to support the conservation of these habitats. BRAES researchers use a range of tools to examine how species may respond to changing environments, habitat loss, and modified landscapes. The results of this research are applied to address the effectiveness of conservation laws and policies and to inform decision-makers on how best to conserve biodiversity in terrestrial, marine and freshwater ecosystems.

Landscape and Natural Resource Management

Research under this theme integrates ecology with human impacts on the landscape, searching for the most environmentally sustainable methods to use our natural resources. Projects include studying the impacts of forestry on forest hydrology and biodiversity, ecological restoration following human disturbances, modeling the impacts of land use change on key ecosystem services, advanced agro technology, and land use planning to sustain biodiversity.

Water Conservation & Quality

Water provisioning is a key ecosystem service on which humans depend and which is critical to supporting all terrestrial life-forms. Research in this area focuses on sustaining this ecosystem service by enhancing the quality of the terrestrial and aquatic environments that filter and modulate fresh water supplies. Projects include studies of ecotoxicology in aquatic ecosystems, water quality monitoring, and relationships between land use and water quality and availability.

Computational Ecology

Research in computational ecology combines quantitative methods with data to model and describe population and community dynamics in time and space. Methods range from statistical modeling of diversity and heterogeneity to the development of dynamic models using analytical or simulation-based approaches. These tools can be used to predict the effect of natural or human-caused disturbances on species and ecosystems or to predict the spatial spread of an invasive species across a landscape, for example. This theme reflects the strong links in BRAES between the mathematical and ecological sciences, leading to development of innovative methods in environmental modelling and data analysis.

Social-Ecological Systems

This theme lies at the interface between the environment and society. The study of social-ecological systems relates to how humans shape and are reshaped by their natural environments, and includes the study of cultural perceptions of the environment. Research under this theme explores the nature of social-ecological resilience, adaptation of human communities to environmental change, and how cultural representations of nature influence human behavior.

3.3 Record of Publications, Students and Research Funding 2014-2015:

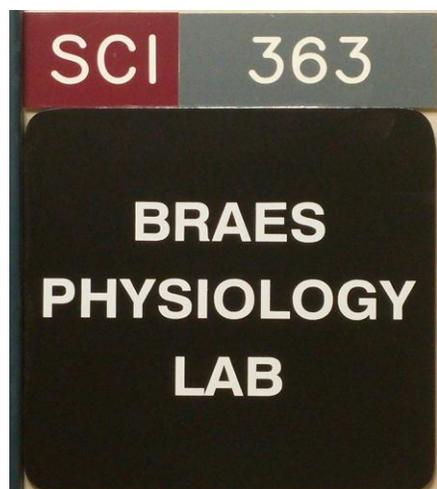


FIGURE 3: BRAES RESEARCH RECORDS 2014-2015

See Appendix 2 for a selected list of publications

3.4 Space and existing resources

A CFI grant was secured in 2004. This helped support the construction of the 3rd floor of the Science Building, including about 6000 square feet of BRAES laboratory facilities that are equipped with state-of-the-art instrumentation. More specifically, the facilities include:



- ✓ Molecular Lab
- ✓ PCR Product Room
- ✓ DNA Sequencing Room
- ✓ Prep Room
- ✓ Clean Cold Room
- ✓ Dirty Cold Room
- ✓ Equipment Room
- ✓ Dirty Ecology Lab
- ✓ Microscope Room
- ✓ Culture Room
- ✓ Computing/GIS Room
- ✓ Physiology Lab
- ✓ Radiation Lab

These facilities are being used by BRAES members to conduct their research and to accomplish the BRAES mission. BRAES members have been very productive in 2014-2015 with about 90 publications and over \$2.0 million in grant funding. This level of productivity would not be possible without the facilities.

3.5 Partnerships

BRAES values partnerships within the University and with government, non-government, community, and international organizations. Partnerships include activities such as joint research projects, funding agreements, student supervision, dissemination or application of research.

Below, we list a few of the groups with whom we have established collaborations:

Within The University of British Columbia:

- ✓ Okanagan Sustainability Institute (Okanagan)
- ✓ BC Regional Innovation Chair in Water Resources and Ecosystem Sustainability (Okanagan)
- ✓ Beatty Biodiversity Research Centre (Vancouver)
- ✓ Centre for Applied Conservation Biology (Vancouver)

Canadian governmental agencies:

- ✓ Environment Canada
- ✓ Canadian Wildlife Service
- ✓ Parks Canada
- ✓ Agriculture Canada
- ✓ BC Ministry of Forest, Lands and Natural Resources Operations
- ✓ BC Parks
- ✓ Canadian Food Inspection Agency
- ✓ Department of Defense
- ✓ City of Armstrong
- ✓ Natural Resources Canada
- ✓ Regional District of Central Okanagan
- ✓ City of Kelowna
- ✓ District of Lake Country
- ✓ Okanagan Basin Water Board
- ✓ BC Ministry of Agriculture
- ✓ Canadian Department of Fisheries and Oceans

International governmental agencies

- ✓ US National Park Service
- ✓ US National Forest Service
- ✓ Montana Fish, Wildlife and Parks
- ✓ US Department of Agriculture
- ✓ L'Institut National de la Recherche Agronomique (France)

Non-governmental entities:

- ✓ Island Conservation
- ✓ Conservation Northwest
- ✓ Okanagan Collaborative Conservation Program (OCCP)
- ✓ South Okanagan Similkameen Conservation Program (SOSCP)
- ✓ Wildlife Conservation Society
- ✓ American Museum of Natural History
- ✓ Water Stewardship Council
- ✓ Nature Trust of BC
- ✓ Get to Know FORREX
- ✓ Great Northern Landscape Conservation Cooperative
- ✓ British Columbia Institute of Agrology Okanagan Chapter

Industrial partners:

- ✓ Tolko
- ✓ Tree Fruit Growers Association Dobson Engineering Ltd.
- ✓ Summit Environmental
- ✓ Summerhill Winery
- ✓ Ecoscape Environmental Consultants Ltd.

3.6 Interdisciplinary Research

BRAES researchers work in a range of environments and locations around the globe. They maintain active affiliations with many partner organizations, including government ministries and NGOs. BRAES is committed to promoting research partnerships and carrying out interdisciplinary research that will directly inform environmental policy and management decisions.

Affiliated research groups and laboratories:

- ✓ Biodiversity and Landscape Ecology Research Facility
- ✓ Complex Environmental Systems Laboratory
- ✓ The Ecological and Conservation Genomics Lab
- ✓ Fragment Analysis and DNA Sequencing Services (FADSS)
- ✓ Forest and Mycorrhiza Ecology & Ecophysiology Research Group
- ✓ Soil Microbial Ecology Group

4. BRAES ACTIVITIES



Photo: L. Parrott

4.1 Speaker Series, Workshops, Conferences and Forums

4.1.1. BRAES partners in the classroom speaker series:

This speaker series brings BRAES' non-academic partners to campus to speak about the work they do and the challenges and issues they face in their professions. The talks are held during scheduled undergraduate class times so that our undergraduate students have the opportunity to interact with scientists and practitioners working in non-academic environments. All BRAES members and the general public are also invited to attend. An informal networking session follows each talk to facilitate discussion and interaction with the speaker.

Fall 2014 BRAES in the Classroom Speaker Series:

October 29th 2014: "Forest Carbon Offsets and their Potential Markets"

Speaker: Kelly Sherman, CEO ECORA (Local Forestry Consulting Company)

Host Professor: Dr. Adam Wei

Attendance: 45

November 24th 2014: "The role of the OBWB in coordinating water stewardship in the Okanagan"

Speaker: Nelson Jatel, Stewardship Director, Okanagan Basin Water Board

Host Professor: Dr. Lael Parrott

Attendance: 40

4.1.2. Invited speakers

Distinguished Guest Speakers:

BRAES hosts 2-3 distinguished scientists per year to speak on environmental topics of broad interest. The talks are open to the general public. The invited speakers for this year spoke during the BRAES Water and Biodiversity forum. They were:

Dr. Robert Sandford (Sept. 16)



Talk title: Canada's energized water cycle: climate change and its consequences

Dr. Sandford is EPCOR Chair of the Canadian Partnership Initiative in support of the United Nations "Water for Life" Decades and Director of the Western Watersheds Research Collaboration.

Dr. Daniel Pauly (Sept. 17)



Talk title: The Impact of Fisheries and Global Warming on Marine Ecosystems, with Some Emphasis on British Columbia

Dr. Pauly is Professor in Fisheries & Zoology, UBC Vancouver and Principal Investigator of the Sea Around Us Project. He is internationally renowned for his work in documenting the diminishing resources in our oceans.

Research seminars

In addition to our distinguished speakers series, BRAES organizes research seminars (one per term) by visiting researchers. The two seminars held this year were:

***BRAES IN THE CLASSROOM
SPEAKER SERIES***

“Using Spatial Graphs to Determine Management Priorities in Fragmented Forest Landscapes”

Speaker: Dr. Elise Filotas
Assistant Professor Université du Québec

Friday, December 5th 1:00 – 2:00 PM
ROOM: SCI 396



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**UBC Okanagan Institute for Biodiversity,
Resilience, and Ecosystem Services**



Open to the public - Refreshments will be served.
For more information please contact: carolina.restrepo@ubc.ca

December 5th: Dr. Elise Filotas, University of Quebec

“Using Spatial Graphs to Determine Management Priorities in Fragmented Forest Landscapes”

BRAES SPEAKER SERIES PRESENTS:

“Economic value of Montreal’s green and blue belt non-market ecosystem services in a land use management and planning perspective”

Presenter: Dr. Jérôme Dupras
Assistant Professor, University of Québec

Friday, March 27th
10:30 – 11:30 AM Room: FIPKE 250
UBC Okanagan



Please **RSVP** with Carolina Restrepo at: carolina.restrepo@ubc.ca
Refreshments will be served
For more information please visit <http://braes.ok.ubc.ca>

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Resilience, and Ecosystems Services**

March 27th: Dr. Jerome Dupras from the University of Quebec.

“Economic value of Montreal’s green and blue belt non-market ecosystem services in a land use management and planning perspective”

4.1.3 Workshop Series:

This year, the Institute launched its very first “BRAES Workshops Series”, a succession of workshops that are offered during the school year on relevant topics of interest to researchers in the university community and BRAES partner organizations.

During this past year the Institute hosted 3 very successful workshops, which had a high participation not only from the university community but also from members of our partner organizations:

“Your First Steps in the Open Source Language R”

Was an introductory workshop that explored the basics of this popular platform for scientific data analysis and modelling in a very practical way. The Workshop was divided in two sessions of 3 hours each. There were two editions of this workshop held, one in December 2014 (25 participants) and the second one in March 2015 (20 participants). An advanced R Language workshop is planned for September 2015. Matthias Bass, a PhD student from the Complex Environmental Systems Lab under the supervision of Dr. Lael Parrott was the expert presenting in both workshops.



R LANGUAGE WORKSHOP PARTICIPANTS

“Accessing and Using the Provincial Forest Cover and other Natural Resource Datasets”



DATASETS WORKSHOP PARTICIPANTS

This interactive workshop explored the different datasets that are managed or administered by the Ministry of Forests, Lands and Natural Resource Operations. The workshop was delivered in one 3 hour session. Tim Salkeld, RPF, Team Lead, Data Management Group of the Forest Analysis and Inventory Branch, Ministry of Forests, Lands and Natural Resource Operations was the expert presenting the workshop.

4.1.4 Okanagan Water and Biodiversity Forum:



This dynamic forum brought together local, regional, national, and international researchers to share world-class research with the goals of building valuable partnerships, and create actionable solutions for the Okanagan.

The issues of focus included: ecology, conservation, management, and governance of biodiversity and water resources.

Over two full days, participants were engaged in presentations and panel discussions by more than 40 leading-edge experts from UBC's Okanagan and Vancouver campuses, international and national organizations, and three levels of government. All events took place at the Rotary Centre for the Arts in Kelowna.

Each day included plenary presentations during the day and keynote presentations at night. The average attendance for the daytime presentations was 85 participants and for the evening presentations the average attendance was 120.

Daytime presentations were divided in eight sessions as follows:

- ✓ Connections Between Science, Policy and the Public
- ✓ Beyond Statistical and Agent-Based Modelling: What can we learn from a Continuous Model.
- ✓ Water, Agriculture and Climate Change in the greater Columbia Basin.
- ✓ Communicating Complexity with Models and Games.
- ✓ Forest Disturbance, Climate and Water resources in the Okanagan
- ✓ Water an Biodiversity Conservation
- ✓ Biodiversity and Water Resources in Agricultural Systems
- ✓ Sqilxw Apna (The People Now): Advancing a Model for Different Relationships and Empowered Decision-Making Between Indigenous and Non-Indigenous Peoples in the Northern Okanagan Territory

Our distinguished keynote speakers presented talks on separate evenings on the 16th and 17th of September. Attendances at these talks were free and open to the general public.

The event was sponsored by among others by the Office of Research Services at UBC Okanagan through a conference grant, the Okanagan Basin Water Board, The Okanagan Collaborative Conservation Program (OCCP), the South Okanagan Similkameen Conservation Program (SOSCP), Manteo Resort, Summit Environmental and Summerhill Wineries.

4.2 Outreach

The Institute has an active website that is being updated every day with the new information and activities of the institute. The website can be found here: <http://BRAES.ok.ubc.ca/>

Outreach Activities:

BRAES sponsored, and various BRAES members hosted and organized the 2015 World Water Day Celebration on the UBC Okanagan Campus. Our Institute specifically hosted the Keynote presentation of Eileen Delehanty Pearkes with her talk: “The Columbia River Treaty: Is it sustainable?”



2015 World Water Day keynote speaker, Eileen Delehanty Pearkes, presenting in the UNC ballroom

BRAES members were involved in other different activities such as conference presentations, invited talks, meetings and workshops, media interviews and publications among others:

More than:

- ✓ 40 Conference presentations as speaker or keynote. See Appendix 3 for a selected list
- ✓ 20 Invited talks and/or meetings
- ✓ 22 Media interviews and newspaper articles
- ✓ 10 Community presentations
- ✓ 3 conferences organized



BRAES Director, L. Parrott, participating in the World Water Day round table organized by the Okanagan Basin Water Board (March 2015)

5. BRAES CONTACT INFO

For general information or inquiries about BRAES, please visit our website at: <http://braes.ok.ubc.ca/> or contact:

Dr. Lael Parrott

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Fax: 250-807-8122

Email: lael.parrott@ubc.ca

or

Carolina Restrepo-Tamayo

Coordinator, The Okanagan Institute for Biodiversity, Resilience, and Ecosystem Services

Tel: 250-807-9023

Email: carolina.restrepo@ubc.ca

APPENDIX 1: BRAES FACULTY MEMBERS

- 1) Sylvie Desjardins, Arts and Sciences
- 2) Aleksandra Dulic, Creative and Critical Studies
- 3) Daniel Durall, Arts and Sciences
- 4) Greg Garrard, Creative and Critical Studies
- 5) Kevin Hanna, Arts and Sciences
- 6) Miranda Hart, Arts and Sciences
- 7) Karen Hodges, Arts and Sciences
- 8) Nancy Holmes, Creative and Critical Studies
- 9) John Janmaat, Arts and Sciences
- 10) Melanie Jones, Arts and Sciences
- 11) Nusha Keyghobadi, University of Western Ontario
- 12) John Klironomos, Arts and Sciences
- 13) Robert Lalonde, Arts and Sciences
- 14) Karl Larsen, Thompson Rivers University
- 15) Bruce Mathieson, Arts and Sciences
- 16) Susan Murch, Arts and Sciences
- 17) Lael Parrott, Arts and Sciences
- 18) Michael Pidwirny, Arts and Sciences
- 19) Jason Pither, Arts and Sciences
- 20) Scott Reid, Arts and Sciences
- 21) Mark Rheault, Arts and Sciences
- 22) Michael Russello, Arts and Sciences
- 23) Rebecca Tyson, Arts and Sciences
- 24) John Wagner, Arts and Sciences
- 25) Ian Walker, Arts and Sciences
- 26) Adam Wei, Arts and Sciences

APPENDIX 2: BRAES SELECTED LIST OF PUBLICATIONS

See attached list (file)

APPENDIX 3: BRAES SELECTED LIST OF PRESENTATIONS

See attached list (file)