

# Mount Arrowsmith Biosphere Region

## 2018 Annual Report

*The Mount Arrowsmith Biosphere Region (MABR) inspires a positive future on the east coast of Vancouver Island, British Columbia, Canada, by facilitating collaboration, coordinating participatory research, and supporting community initiatives that promote environmental, social, cultural, and economic sustainability.*



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## MABR Vision, Mission, and Mandate

### Vision

The Mount Arrowsmith Biosphere Region (MABR) is a place where communities work together to inspire a positive future for people and nature.

### Mission

The MABR works with diverse communities and organizations to develop and implement policies, practices, and initiatives that promote environmental, economic, cultural, and social sustainability. Different worldviews and ways of knowing are shared to ensure that our mission has meaning for all.

### Mandate

The MABR's mandate is to promote the conservation of biological and cultural diversity, support the development of sustainable communities and livelihoods, and facilitate collaboration, reconciliation, and knowledge sharing in the MABR.

## MABR Governance

### Current Roundtable Members

Steve Adams, Mosaic Forest Management

Kim Burden, Parksville & District Chamber of Commerce

Chris Burger, MABR Liaison for the City of Parksville

'Ćumqwa:tun' (Lawrence Mitchell), Councillor, Snaw-naw-as First Nation

Ken Epps, Mosaic Forest Management

Neil Horner, Councillor, Town of Qualicum Beach

Marc Lefebvre, Mayor, City of Parksville

Geraldine Manson, Snuneymuxw First Nation, Elder in Residence at Vancouver Island University

Ceri Peacey, MABR Roundtable Community Representative

Michael Recalma, Chief, Qualicum First Nation

Thomas Reid, Vancouver Island Conservation Land Management Program

Pam Shaw, Research Director, MABRRI

Daniel Sailland, CAO, Town of Qualicum Beach

Graham Sakaki, Research & Community Engagement Coordinator, MABRRI

Ashley Van Acken, MABR Coordinator

Teunis Westbroek, Mayor, Town of Qualicum Beach

David Witty, Provost & Vice-President Academic, Vancouver Island University

Sonja Zupanec, Islands Trust

## Roundtable Governance

The MABR Roundtable meets quarterly and functions as the governing body of the MABR, providing direction to the MABR and the Mount Arrowsmith Biosphere Region Research Institute (MABRRI). The Roundtable aids MABRRI staff by identifying priority action areas and research to be pursued in the short, medium, and long-term. Through diverse representation, the MABR Roundtable itself sets a model for how people with different interests and mandates can work together in a respectful, collaborative, and effective way. Members have collectively developed a culture of engagement that ensures that everyone feels comfortable, engaged, and eager to return.

In 2018, the MABR Roundtable met for three quarterly Roundtable gatherings. The fourth Roundtable gathering, which was due to occur in November, did not take place due to overlap with the Canadian Biosphere Region Association's (CBRA) Fall Gathering, which was hosted in the MABR. All Roundtable members were invited to attend the CBRA Fall Gathering in place of attending a Roundtable meeting.

## MABR and MABRRI in the Community

### Regional Engagement

In 2018, the MABR coordinated, participated in, and facilitated numerous initiatives with the goal of engaging and collaborating with community groups and residents within our region. Engagement took many forms and involved a broad diversity of people. Examples of collaborative research can be found in a later section about MABRRI.

### *Educational Events and Celebrations*

- **Annual MABR BioBlitz** – On April 21<sup>st</sup>, 2018, we hosted the third annual MABR BioBlitz at two locations, Milner Gardens and Woodland, and the Englishman River Regional Park/Top Bridge Park Trail Head. In total, over 70 community members participated in a rapid biological survey of plant and animal species at both locations. The BioBlitz is a local citizen science based event that connects Vancouver Island University (VIU) students and expert knowledge holders with community members. The MABR BioBlitz runs annually in collaboration with the Brant Wildlife Festival and is supported by the Nature's Trust of British Columbia, VIU, Milner Gardens and Woodland, and the Regional District of Nanaimo (RDN). Moving forward, the goal is to continue to expand the geographic boundaries of the annual MABR event with new locations for biological surveys to be conducted.
- **Grandkids University** – On July 5<sup>th</sup> and 6<sup>th</sup>, 2018, MABRRI hosted Grandkids University at VIU. Children were accompanied by their grandparents for two days of fun and educational activities. They were taught about maps and map projections, as well as how to use compasses, GPS units, and weather measuring instruments. Additionally, they had the opportunity to learn how to geocache. Further, they were taught some of

the processes of associated with community planning; they had the opportunity to design their own parks.

- **Parksville Spring Mini** – On June 9<sup>th</sup>, 2018, the MABRRI team hosted a consultation event at Foster Park in Parksville for the Parksville Parks, Trails and Open Spaces Master Plan project. The “Spring Mini” was planned with the hopes of bringing community members together to gather their opinions on their local parks, trails, and open spaces. The primary displays for the open house included posters highlighting the history of Foster Park, the timeline of the project, and options for members of the public to provide their opinions on their favourite aspects of their local parks, trails, and open spaces. Additionally, the event included a picnic and activities such as an egg race, tchoukball, a scavenger hunt, a photo booth, basketball, colouring, and face painting.
- **G7 Tree Planting** – The goal of this national initiative is to off-set the emissions produced as a result of the G7 Summit that occurred in Quebec in June 2018. Biosphere reserves across Canada committed to planting 100,000 trees to sequester 600 tonnes of greenhouse gases. On April 6<sup>th</sup>, 2018, the MABR partnered with Island Timberlands, TimberWest, Snaw-naw-as First Nation, and the City of Parksville to plant 1,000 trees adjacent to Top Bridge Park. Planting involved youth from VIU’s Forestry Program, Snaw-naw-as First Nation, and the Rivers, Oceans, and Mountain School from Qualicum Beach. The trees that were planted should sequester approx. 143 tonnes of carbon dioxide.
- **Summer Community Outreach Program** – Members of the MABR team hosted a variety of different information booths throughout the summer beginning at the Seaside Street Market in Parksville. The focus was to educate the public on what a biosphere reserve is and increase local knowledge of the MABR, as well as highlight some of MABRRI’s current research initiatives. The MABR Community Outreach Team also hosted a booth at Qualicum Beach Farmers Market, Canada Day at the Community Park in Parksville, Coombs Fair, Lighthouse Fall Fair, and at an event at Qualicum First Nation.

### **Amazing Places Project**

The Amazing Places project is a Canadian United Nations Educational Scientific and Cultural Organization (UNESCO) biosphere reserve initiative brought to British Columbia in 2017 through a collaboration between the MABR, Parksville and Qualicum Beach Tourism Association, Destination British Columbia, and VIU. The project connects people with nature and educates residents and visitors about the ecological significance of our incredible local outdoor spaces.

The primary goals for the Amazing Places project in 2018 were to continue promotion of this national project among residents and tourists by engaging them in our website and



social media, as well as by encouraging visitation to the Amazing Places locations. This year, a geocaching activity was developed in order to bring more people to our local Amazing Places. Geocaching is a real-world outdoor treasure hunting game; millions of players use the Geocaching app or a GPS to find cleverly hidden containers called geocaches and log their experiences online. We partnered with Geocaching.com to establish this initiative. A Geotour Field Guide was developed to help participants through the geotour. The field guide is chocked full of helpful and interesting information, including instructions on how to complete the geotour, cache code collection pages, a map of the region, and tons of information on each Amazing Place and its geocache. The field guide aids the participants to complete the geotour so they can redeem their collection page for a prize – a customized Amazing Places Geotour geocoin!

### ***Indigenous Engagement and Knowledge Exchange***



Throughout 2018, the MABR has continued to have opportunities to work alongside Snuneymuxw, Snaw-naw-as, and Qualicum First Nations.

MABRRI has continued their work on the Snaw-naw-as Garden of Spiritual Healing, having completed building more garden boxes, a smokehouse, and a shaded sitting area by the end of the 2018 summer. This construction work will continue on in the coming years as more funding is made available; consultation with the community will continue to ensure that if the vision for the garden has changed at all, MABRRI is able to capture that.

In November 2018, Qualicum First Nation and Snaw-naw-as First Nation co-hosted the Canadian Biosphere Reserve Association's (CBRA) Fall Gathering in the MABR. Both Nations opened their doors to CBRA and the Indigenous Circle. To learn more about the CBRA Fall Gathering, refer to the *National Engagement* section.





Additionally in November 2018, we were awarded funding from the Social Sciences and Humanities Research Council (SSHRC) that will allow us to explore protocols used for Indigenous research, including but not limited to traditional knowledge and language. Traditional place names is a subject that has been discussed several times during Roundtable discussions; therefore, this is a project that will be contributed to by most Roundtable members, especially Snuneymuxw, Snaw-naw-as, and Qualicum First Nations. The goals of this initial project will involve revisiting our existing *Culture of Engagement* and *Guiding Principles for Collaboration with First Nations*. We will work with the three Nations that sit on the Roundtable to see if there are any modifications or updates that can be implemented in these documents. Once these documents are updated we can work towards identifying traditional place names in our region, in a respectful and appropriate manner.

## National Engagement

### ***2018 CCUNESCO and Canadian Biosphere Reserve Association (CBRA) Annual General Meetings***

In June 2018, Pam joined members and representatives from the Canadian Commission of UNESCO and the other 17 biosphere reserves across Canada to take part in both the CCUNESCO and CBRA Annual General Meetings in Ottawa, Ontario. The meetings were hosted back to back ensuring the greatest participation. We recognize the importance of these meetings and enjoy meeting up with representatives from the other biosphere reserves across Canada to ensure that we are all working together on important initiatives.

## 2018 Canadian Biosphere Reserve Association (CBRA) Fall Gathering



The 2018 CBRA Fall Gathering was hosted in the MABR. The gathering was an invitation-only event hosted from November 20<sup>th</sup> to 23<sup>rd</sup>, and included representatives from each of the 18 Canadian biosphere reserves, members of CBRA's Indigenous circle, members of the Man and the Biosphere (MAB) Committee, Canadian Commission for UNESCO (CCUNESCO) staff, and one representative from each of Canada's three prospective biosphere reserves.

The event was kicked off with a wonderful opening ceremony by Cúmqwitun' of Snaw-naw-as First Nation, and workshops for the following three days took place within Qualicum First Nation territory. The focus of the event was to develop a collective and strategic vision for the national UNESCO network of biosphere reserves.

We would like to send a big thank you to CBRA for allowing us to show off our beautiful biosphere region! Additionally, on behalf of CBRA, we would like to thank the Gold Tier Sponsors that have donated funds or in-kind support in excess of \$1,500.00, which helped make the event happen: Qualicum First Nation, Snaw-naw-as First Nation, Environment and Climate Change Canada, VIU, the MABR, and MABRRI. We would also like to thank our Silver Tier Sponsors who donated funds of in-kind support between \$500 and \$1,500: The Beach Club Resort, Clayoquot Sound Biosphere Region, Georgian Bay Biosphere Reserve, and Valerie Pankratz. Further, a thank you to our Bronze Tier Sponsors who donated funds of in-kind support up to \$500: Pacific Brimm Café & Catering, Mont Saint-Hilaire Biosphere Reserve, Greg Mason, Christian Bouchard, Ruth Simons and Anthony Johnston.



## International Engagement

### *International Journal of UNESCO Biosphere Reserves*

The International Journal of UNESCO Biosphere Reserves is, in perpetuity, a digital, Open Access, subscription-free publication, making this a cost-effective publication, reducing the ecological footprint of the journal and allowing for full-colour/full-spectrum production across a range of digital formats. This journal is part of a wave of new journals that are abandoning the confines of paper publications and embracing a digital future that includes video, audio, full-colour mapping, and interactive formats that are not limited by the challenges of publication costs and hard copy dissemination. This format also allows for a much shorter delay between submission and publication.

The journal is fully interdisciplinary and instead of focusing on a selected scientific research sub-area, it is a resource for sharing information across disciplines and into practice, promoting the cross-pollination of ideas and creating new research connections. It can therefore be regarded as a contribution to the implementation of the Lima Action Plan for the MAB Programme and its World Network of Biosphere Reserves (WNBR) (2016-2025). This calls for not only applied research in biosphere reserves, but also for an active and open interdisciplinary network of scientists and knowledge holders working in and with biosphere reserves, with a joint research and knowledge exchange agenda.

For researchers interested in the 669 biosphere reserves designated by the MAB Programme of UNESCO, an in-depth review initiated by Professor Martin Price in 2013 and continued by Dr. Pamela Shaw in 2015, revealed that a wealth of information across a wide range of disciplines was being published. However, given differences in terminology and the great diversity of publications involved, the materials developed were not always available to individuals involved in the WNBR. In addition, obtaining articles at no cost was not a simple matter for biosphere reserve staff and volunteers who were not affiliated with academic institutions. Beyond this, a mechanism to bring together information on a range of community-based and applied practical activities currently undertaken within many biosphere reserves, was simply not available.

The journal was launched in 2017, and by the end of 2018 included two volumes each with two issues.

## MABR Communications and Marketing

UNESCO biosphere reserves were conceived as model regions that exemplify how collaboration amongst human beings can create a more sustainable existence for people, animal and plant species, and the environments that we share and inhabit. The UNESCO designation honours all people and organizations whose collective efforts have earned this region its international status. The MABR seeks to communicate and celebrate this message through various media:

## MABR Newsletter

- Our e-newsletter is published every two months. All previous issues can be found at <http://www.mabr.ca>.
- In 2018, we added a “Did you know?” section to the newsletter. Each newsletter now includes a fun-fact to help engage our subscribers.
- By the end of 2018, 456 people were subscribed to our e-newsletter.

## Other Marketing Materials

- Website: [mabr.ca](http://mabr.ca)
- Facebook: [facebook.com/MountArrowsmithBR](https://facebook.com/MountArrowsmithBR)
- Twitter: @MountArrowBR
- Instagram: @mtarrowsmithbr
- Flyers and event posters



## The Mount Arrowsmith Biosphere Region Research Institute

### About MABRRI

MABRRI is the engine behind the MABR’s research and educational programs. MABRRI’s mission is to advance a program of inquiry that involves regional stakeholders in meaningful explorations of issues of local relevance. By harnessing the knowledge of the MABR community and the interdisciplinary strengths of students and faculty at VIU, MABRRI is a centre for collaborative research, innovation, and knowledge sharing that elevates the relationship between people and nature in the biosphere region.

MABRRI contributes to the success of the MABR through research and education, which is one of the four main functions of all UNESCO biosphere reserves. MABRRI envisions, funds, and coordinates research projects and educational programs or initiatives that advance environmental, economic and social (including cultural and spiritual) sustainability.

### Strategic Plan

MABRRI’s Strategic Plan for Research and Education aims to provide the foundation for the research institute to become a regional and international leader in community-based, student-led environmental, social, and economic sustainability research. The plan outlines the next steps for MABRRI, which include objectives for conducting research in the MABR, research themes and priority areas for research focus over the next three years, and our vision for collaborating with stakeholders in the region. A link to the strategic plan is available at [mabri.viu.ca](http://mabri.viu.ca) on the ‘resources’ page.

MABRRI is an academic entity at VIU that supports and conducts natural and social science research in the MABR and surrounding areas. MABRRI was established at VIU in 2014 when the MABR transitioned from a charitable not-for-profit model to a regional roundtable partnership model spearheaded by VIU and the City of Parksville. The research institute conducts, supports, and facilitates research that meets the environmental, social, cultural, and economic sustainability goals of the MABR and upholds the mandate of the UNESCO MAB Programme.

## 2018 MABRRI Research Team



In 2018, MABRRI welcomed a total of 42 student researchers. Some of the projects they contributed to, included Coastal Forest Plant Phenology and Monitoring, the MABR BioBlitz, Wetland Mapping in the RDN, Lake Monitoring in the RDN, Forage Fish Spawning Habitat Monitoring, MABR Garry Oak Ecosystems Mapping, Snaw-naw-as Garden of Spiritual Healing construction and the education and outreach program, and the Parksville Parks, Trails, and Open Spaces Master Plan.

We are grateful to the following exceptional students for being part of the MABRRI family in 2018. Names in bold are MABRRI's Senior Research Assistants or Project Coordinators, who helped lead and coordinate projects. A special thanks to team leaders! (Names are in alphabetical order by last name).



Table 1: 2018 MABRRI Research Team		
Carson Anderson	Mandy Hobkirk	Rachelle Shearing
Chelsey Andrews	<b>Sarah Holden</b>	<b>Kidston Short</b>
Robyn Bartle	Lindsay Huddleston	Samuelle Simard-Provencal
Stephen Baugh	Amanda Inglis	Jaimie Smythe
Jessica Big	Diana Jerop	Victoria Stuart
Colin Brown	Michelle Kloppenburg	Steffi Sunny
Alan Cavin	Sandra Lawson-Body	Dylan Swaikoski
Roxanne Croxall	Vanessa Lugin Moraes	<b>Larissa Thelin</b>
Kirby Delaney	Lindsay Malbon	Becky Thiessen
Trevor Dickenson	<b>Jessica Pyett</b>	Dylan Thiessen
Aaron Dixon	Tricia Reynes	Brian Timmer
Jeffrey Fontaine	Brandon Riddoch	<b>Haley Tomlin</b>
<b>Ryan Frederickson</b>	Chrissy Schellenberg	<b>Courtney Vaugeois</b>
Cassidy Funk	Erian Scott-Iverson	<b>Ariel Verhoeks</b>
<b>Kayla Harris</b>	Allison Shaw	Bronwyn Wydeman
Alex Harte	<b>Lauren Shaw</b>	Niccolai Zicong

## 2018 Research and Community Engagement at MABRRI

### 1. Wetland Mapping in the Regional District of Nanaimo



In partnership with the RDN’s Drinking Water and Watershed Protection (DWWP) program and VIU, MABRRI has completed its third year of a five-year contract to map and classify wetlands, while quantifying their potential relationship to groundwater recharge.

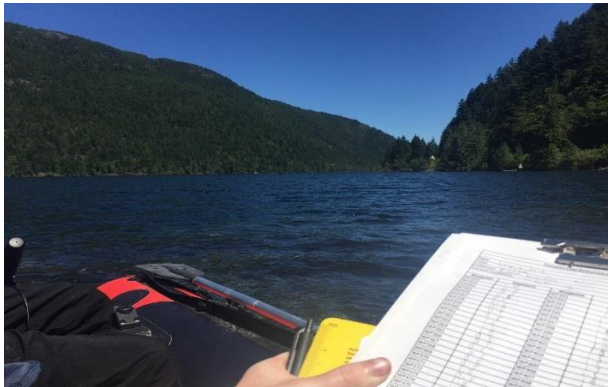
Project deliverables for 2018 included mapping and classifying of wetlands throughout the RDN, the creation of three wetland mapping classification and geologic assessment reports, identification and reporting on the possible priority site locations for long-term monitoring from both an ecological perspective and in regards to hydrogeology across the RDN, and the creation of a GIS layer, attribute table, and mapping of currently mapped wetlands within the RDN. In total, MABRRI has mapped over thirty wetlands in six water regions in the RDN: Big



Qualicum, Little Qualicum, French Creek, Englishman River, South Wellington to Nanoose, and Cedar Yellowpoint to Nanaimo River.

The Technical Advisory Committee (TAC) on the project includes Julie Pisani, Coordinator of the RDN's DWWP program, VIU Geography Professor Alan Gilchrist, and VIU Earth Science Professor Jerome Lesemann. In the spring of 2019, students will continue mapping wetlands in the Englishman River and Gabriola Island Water Regions of the RDN and establish priority sites for regular monitoring.

## **2. Cameron Lake Bathymetric Mapping**



MABRRI partnered with Dr. Max Bothwell, an Emeritus Research Scientist at the Pacific Biological Station who works for Fisheries and Oceans Canada, on the mapping of Cameron Lake. MABRRI produced an updated bathymetric map of Cameron Lake. Prior to this our new one, the most recent was produced in 1951. The bathymetric map was created following the Ministry of Environment's Bathymetric Standards for Lake Inventories, which requires the student research assistants to conduct transects back and forth across the lake, recording the depth along the transects. All of the data collected was input by MABRRI's GIS Specialists who analyzed and produced the map that showcases the lake's profile. This map noted there weren't many significant changes in Cameron Lake in the past 60 years.

The map was provided to Dr. Max Bothwell, prior to him and his team of researchers collecting core samples from Cameron Lake. The mapping ensured that the sites they had chosen from the older map were still ideal locations for their coring activity. The core samples will provide archival data regarding the past climate of the region, as well as historical changes in land cover. Dr. Bothwell is focusing on Cameron Lake because it is the largest surface water body in the Little Qualicum watershed, as well as in the MABR.

## **3. French Creek Estuary Project**

This study is focused on a portion of an undeveloped lot located just north of the French Creek estuary. In 2017, it was listed for sale by French Creek Estates Limited. Members of Friends of the French Creek Conservation Society (FFCCS) enlisted the help of MABRRI to determine the possibility of working alongside French Creek Estates Ltd. to establish a public park in the area. In 2018, a portion of the lot was sold, leaving the remainder of the lot, which contains a pond and runs alongside the estuary, open for potential development or the possibility of

establishing the aforementioned public park. Consultation with French Creek Estates Ltd. suggested interest in the formation of a public park, as long as liability of the land could be transferred to an organization who would take on the management of a park indefinitely. In order to help with this process, MABRRI developed a report, which outlines the historical, ecological, and community values of the property. The report is meant to illustrate the value of this space, in hopes of showcasing the importance of protecting it as public parkland.

#### **4. Forage Fish Spawning Habitat Monitoring**

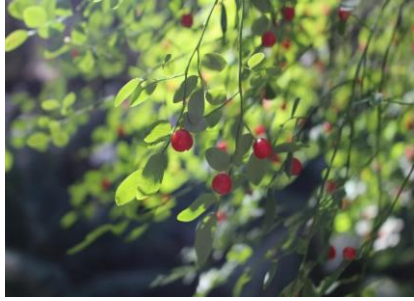


The forage fish project began in 2017 when Phillip Dionne from the Washington State Department of Fish and Wildlife travelled to Nanaimo to train the MABRRI team to sample for forage fish embryos, specifically Pacific sand lance and surf smelt. MABRRI began sampling in December 2017. Beginning in January 2018, two students from the Advanced Diploma in GIS Applications were hired to assist with the development of predictive mapping for forage fish spawning habitat. Over 30 maps were generated, depicting the areas of coastline that were identified as suitable forage fish spawning habitat via the model developed by Coastal and Ocean Resources Inc. (CORI). The maps covered the area that spanned from approximately Bowser south to Sooke, the Canadian Gulf Islands, and a small portion of the mainland, including Burrard Inlet.

In mid-2018, MABRRI began hosting training sessions for local community stewardship groups in order to build the capacity of the project. By involving citizen scientists, MABRRI is able to cover a lot more of the coastline than they would be able to do on their own. The project has quickly expanded in the past year, with MABRRI now having over 30 sampling sites along the Vancouver Island and Gulf Island coastlines. Further, MABRRI is working with 2 citizen science groups, however they are expecting that to increase in the coming year.



## 5. Coastal Forest Plant Phenology and Monitoring Project



In partnership with Heather Klassen (Ministry of Forests, Lands, Natural Resource Operations & Rural Development), Matt Bowes (VIU), and Milner Gardens and Woodland, MABRRI is working to assess and monitor climate change effects on local plant phenology. By monitoring the growing seasons of different coastal plants, and by comparing these growing seasons to weather data, MABRRI can work to identify any potential changing trends in the growing seasons of Vancouver Island's ecosystems. Three data collection sites have been established at Milner Gardens & Woodland and one has been established at the summit of Mount Arrowsmith. A series of trail cameras have been installed at all sites to determine their feasibility in detecting changes in plant development. This study allowed us to analyze the effectiveness of both in-person and camera observations for the collection of plant phenological data. Weather stations at both locations allow for comparisons between data and local climate regimes. MABRRI's first year of data collection and student researchers collected data weekly during the summer and biweekly during the spring and fall was in 2017. Data collection will continue for a number of years in order to see how growing seasons may be shifting with changing climate patterns.

## 6. Bull Kelp Monitoring and Enhancement Plot Project



MABRRI's bull kelp pilot project involves the installation of one bull kelp seeded line planted at two different locations, one of which is within the MABR. The general purpose of the project is to attempt to re-establish bull kelp populations in the lower regions of the Strait of Georgia. Unfortunately, over the past few decades there has been a significant loss of bull kelp in this region. Bull kelp, when dense, forms forests that are rich in diversity, providing food and security. Since biodiversity within and surrounding bull kelp forests has been so well

documented, MABRRI has been conducting underwater surveys where species richness is documented. This will aid MABRRI in determining how quickly this type of ecosystem can be re-established and to what capacity. Our team checks on the kelp line and conducts underwater surveys every two to three weeks throughout the spring and summer months. These surveys are done in order to determine if there is a difference in species diversity before and after the establishment of the bull kelp lines.

## ***7. Snaw-naw-as Garden of Spiritual Healing***



MABRRI broke ground and began construction of the Snaw-naw-as Garden of Spiritual Healing at the beginning of May 2017. By mid-May there were Snaw-naw-as Elders in the garden planting vegetables in the garden boxes that had been finished and put in place. When the summer season was complete, MABRRI has made significant progress having built 14 garden boxes, a greenhouse, a toolshed, a pathway, and enclosed the garden with a wooden fence.

In the past year, MABRRI has gone on to build more garden boxes for both the vegetable garden and the native plant garden, a green house, a smokehouse, and a shaded area, where Elders are able to take a break from the sun. MABRRI will continue to work on the garden in the coming years and assist with maintenance when necessary.

## ***8. Garry Oak Mapping Project***

In partnership with Dr. Hannah Wilson from VIU's Geography Department, MABRRI completed the Garry Oak Ecosystem Mapping Project throughout 2018. This study aimed to use remote sensing techniques and geographic information systems to map the location and extent of vulnerable Garry oak ecosystems within the MABR. Due to limited resources, we were unable to purchase finer resolution imagery to use for the remote sensing aspect of this study and instead used freely-sourced Landsat 8 satellite imagery. This resulted in a coarse representation of the extent of these vulnerable ecosystems within the biosphere region. Although spatial scale restrictions imposed mapping inaccuracies, we did establish a methodology that can be used in the future when finer imagery becomes available. An extensive report was developed outlining this methodology, as well as the characteristics that define Garry oak ecosystems, their importance and vulnerability, and current conservation practices and resources on Vancouver Island. Given recent advances in methodological development, we hope to obtain



further funding in order to continue this research project to produce a more precise mapping in the future.

MABRRI is grateful for all the help that they received throughout this project, specifically from VIU Biology professor, Dr. Caroline Josefsson, for her assistance in identifying and delineating Garry Oak Ecosystems for the predictive mapping and for her plant identification assistance in the field, as well as Kent Anders for his assistance in the field work and groundtruthing component.

## **9. Student Blog**

Student researchers at MABRRI contribute to a student blog throughout the year. Although more often during the summer field season, the blog showcases their experiences and adventures while conducting research at MABRRI. With every posting, they included a photographic slideshow with a first-person narrative describing their adventures that day and any interesting experiences they had out in the field. The 2018 adventure blog continued to be an excellent way to highlight MABRRI's exceptional cohort of student researchers. The blog can be found at [www.mabrri.viu.ca/blog](http://www.mabrri.viu.ca/blog)

## **Acknowledging All Collaborators**

In 2018, MABR and MABRRI were fortunate to receive support from many individuals and organizations in the region. This support came in many forms, from networking and idea sharing, to providing funding and student learning opportunities. We would like to take this opportunity to thank these individuals and community groups for their ideas, inspiration, and most importantly their dedication to helping the MABR achieve its full potential as a model for sustainable development. Without their support, the MABR would not be able to achieve as much as it did in 2018.

## **We Could Not Do It Without You**

Many people have been involved in breathing life into the MABR in 2018. It is with heartfelt thanks that we recognize the following people and organizations for their time, ideas, perspective, hard work and collaborative spirit:

### **MABR 2018 Executive Team**

In 2018, the following people were involved in the day-to-day management and coordination of the MABR and MABRRI at VIU. The team received direction from Dr. David Witty, VIU's Provost and Vice-President Academic, as well as guidance from the Roundtable that was inaugurated in November of 2015.

**Dr. David Witty, PhD MRAIC FCIP RPP Provost and Vice-President Academic, Vancouver Island University—MABR Director**



Over the past five years, MABR has developed into a vibrant organization that has demonstrated a commitment to respectful engagement with its partners. That central value has enabled our Roundtable process to evolve into a model that other Canadian Biospheres are emulating. In particular, our work with our Indigenous partners has been especially rewarding as we learn to engage in Indigenous protocol, share in transferring traditional knowledge, and witness first hand through active engagement, such as Qualicum First Nation hosting the 2018 Canadian Biosphere Reserve Association meeting in their wonderful Community Hall. That was a special few days of idea sharing, feasting, and developing long term goals for CBRA’s work, all with an Indigenous focus. I remember vividly walking down to the Little Qualicum River and seeing eagles in the trees after they had fed on the remains of the recent salmon spawn. That lifecycle image was a very appropriate backdrop for a CBRA meeting. Thank you Chief Recalma. And thank you to Councillor Lawrence Mitchell, Cúmqwa:tun, for sharing a traditional food feast and drumming and dancing with our CBRA partners at Snaw-naw-as.

Our work is about promoting better understanding of the importance of living in harmony with our environment, celebrating our life and work, and promoting respectful discourse in our region. I am reminded at each of our Roundtable gatherings that we have so much to celebrate and so much to do to ensure our Mother Earth is nourished and cherished. But, there is still much to do. I look forward to working with our partners to keeping the dream alive!

**Ashley Van Acken, BSc – MABR Coordinator**



Ashley took on the role as MABR Coordinator throughout 2018. She managed the MABR’s internal and external communications, coordinated community-based events, facilitated meetings and community forums, and represented the MABR nationally. Ashley stepped down as the MABR Coordinator at the end of 2018 as she was accepted into a Master’s program at the University of Victoria where she will be putting her background in geoscience to work.

**Pamela Shaw, PhD MCIP RPP FRCGS – MABRRI Research Director**



Pam is the Director of the Master of Community Planning Program at Vancouver Island University and the Research Director of the Mount Arrowsmith Biosphere Region Research Institute (MABRRI). Pam has more than 30 years of experience in land use planning and facilitation, and is currently researching new forms of governance for biospheres and

community organizations. She brings ideas, connections, and experience to the research team.

**Graham Sakaki, MA – MABRRI Research and Community Engagement Coordinator**



Graham has been involved with MABRRI since it was established in 2014 and oversees the coordination of all ongoing research projects and research as the Research and Community Engagement Coordinator for MABRRI. In 2017, he completed his Masters in Community Planning at Vancouver Island University. Graham’s education background includes a degree in Natural Resources Geography and a diploma in Forest Resource Technology. The skills he acquired in the hospitality industry and in organizational management have transferred seamlessly to MABRRI.

## Contributions to the Lima Action Plan 2016-2025

Strategic Action Area A: The World Network of Biosphere Reserves consisting of effectively functioning models for sustainable development.	
<p><b>A1. The World Network of Biosphere Reserves consisting of effectively functioning models for sustainable development</b></p>	<p><b>A1.1 – Promote biosphere reserves as sites that actively contribute to achieving the SDGs.</b></p> <p>The MABR/RI has specifically contributed to six of the seventeen 2030 SDG’s, and completed some overarching SDG work, as well:</p> <ul style="list-style-type: none"> <li>• <i>Overarching SDG Work</i> MABRRI began a project in 2018, identifying how VIU is contributing to the 17 SDGs. Through interviews with faculty and staff, a report of generated that identified some of the ways VIU was contributing. A second phase of this project is planned for 2019.</li> <li>• <i>Goal 4: Quality Education</i> MABR/RI continues networking and collaborating with regional partners and community members, building connections and developing more projects. Through our established partnership with VIU, our team has had the opportunity to hire over 40 students. These partnerships have substantially increased the number of youth who have received technical and vocational training for future employment opportunities. Further, the MABR developed workshops for our youth program, which will be implemented into local classrooms in 2019; the program teaches students about the MABR, as well as the local flora and fauna in the region.</li> <li>• <i>Goal 6: Clean Water and Sanitation</i> Scientific findings from the wetland mapping and lake monitoring projects aim to provide recommendations for implementing integrated water resource management protocols, while increasing protection and restoration efforts within these ecosystems.</li> <li>• <i>Goal 8: Decent Work and Economic Growth</i> The Amazing Places Geocaching activity is expected to bring more tourists in the region, which could indirectly be linked to economic growth for the region.</li> <li>• <i>Goal 11: Sustainable Cities and Communities</i> MABRRI developed the Master Plan for Parksville’s Parks, Trails, and Open Spaces in 2018. This document highlights sustainable actions that can be implemented locally with</li> </ul>



	<p>regards to environmental, economic, social, and cultural sustainability.</p> <ul style="list-style-type: none"> <li> <p><i>Goal 13: Climate Action</i>  MABRRI’s Coastal Forest Plant Phenology Research and Monitoring project gathers data that will identify long-term changes that are occurring to our local forests with regards to climate change. We will be identifying if there are changes in growth patterns for 11 of our native plant species, which could have negative implications for many other species in our area, directly and indirectly.</p> </li> <li> <p><i>Goal 14: Life Below Water</i>  Two of MABRRI’s projects, within the MABR, Bull Kelp Sampling in the Salish Sea and Forage Fish Habitat Monitoring, are increasing regional scientific knowledge with the purpose of improving ocean health while also enhancing marine biodiversity.</p> </li> </ul>
	<p><b>A1.2 – Promote biosphere reserves as sites that actively contribute to implementing Multilateral Environmental Agreements (MEAs), including the Aichi Biodiversity Targets.</b></p> <p>The MABR contributes to Aichi Target 3, which states “by 2020, Canada's wetlands are conserved or enhanced to sustain their ecosystem services through retention, restoration, and management activities.” MABRRI has developed a 5-year partnership (2016-2020) with the RDN’s DWWP program to pursue wetland monitoring and restoration activities in the region. The project will determine how the wetlands in the MABR, most of which reside on privately owned lands, contribute to the freshwater system through groundwater recharge, natural filtration, and other naturally occurring processes. Anticipated outcomes include: [1] development of long-term processes for mapping, monitoring, conserving, and enhancing wetlands; [2] sustainable use and management of ecosystem services; and [3] contribute to informed decision-making and regional policy regarding wetlands.</p>
	<p><b>A1.3 – Establish alliances at local, regional, international levels for biodiversity conservation and benefits to local people taking into consideration the rights of Indigenous people.</b></p> <p>The MABR has established a close partnership with Snaw-naw-as First Nation to develop the Garden of Spiritual Healing with therapeutic, health, spiritual, and educational functions. The garden is constructed by members of the Snaw-naw-as</p>

	<p>community and VIU students, and overseen by Elders and members of a special garden committee. Goals of this project include increasing community and regional food security, the preservation of cultural knowledge including language, cross-generational knowledge sharing, and biodiversity conservation.</p>
	<p><b>A1.4 – Use biosphere reserves as priority sites/observatories for climate change research, monitoring, mitigation and adaptation, including in support of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parities (COP) 21 Paris Agreement.</b></p> <p>The purpose of MABRRI’s plant phenology project, in partnership with MFLNRO, is to observe phenophases of plant species at Milner Gardens &amp; Woodland to understand how climate change may be altering seasonal timing of plant phenophases.</p>
	<p><b>A1.5 – Promote green/sustainable/social economy initiatives inside biosphere reserves.</b></p> <p>In 2016, the MABR brought the Amazing Places Project to the west coast with funding from Destination BC, Parksville Qualicum Beach Tourism, and VIU. The project’s goal was to contribute to sustainable development in the region by promoting multi-day trips in collaboration with local businesses, which aim to increase overnight stays, particularly during the off and shoulder seasons. In 2018, the Amazing Places Geocaching was launched, adding another aspect to the Amazing Places initiative that attached tourists to the area.</p>
	<p><b>A1.6 – Undertake research and ensure the long-term conservation of the socio-ecological systems of biosphere reserves including restoration and appropriate management of degraded ecosystems.</b></p> <p>MABRRI is the research engine of the biosphere reserve. Between August 2014 and January 2017, MABRRI has conducted over 35 collaborative projects involving regional partners, community members, and VIU students and faculty. Additionally, another approximately 20 projects were completed in the summer of 2018. All projects study some aspect of the socio-ecological systems in the MABR. For a list of projects, visit <a href="http://mabrri.viu.ca/projects">mabrri.viu.ca/projects</a>.</p>
<p><b>A2. Open and participatory selection, planning and implementation of</b></p>	<p><b>A2.2 – Ensure processes for selecting, designing, planning, and nominating biosphere reserves are open and participatory, involving all concerned stakeholders, taking into account local and Indigenous practices, traditions and cultures, and based on</b></p>

<p><b>biosphere reserves.</b></p>	<p><b>sound science.</b></p> <p>Following its 2010 periodic review, the MABR underwent a major governance and structural transition, redeveloping both from scratch. The redesign process put Indigenous Peoples and principles at the forefront of the new governance model and was inclusive of a broad range of regional stakeholders. The Roundtable governance structure includes all major stakeholders in the MABR, as well as local community representatives.</p> <p><b>A2.4 – Ensure that biosphere reserves have clear communication plans and mechanisms to implement these.</b></p> <p>Every year, the MABR reviews and updates its marketing and communications plan to ensure that the maximum number of people are being reached through the social media platforms.</p>
<p><b>A3. Integration of biosphere reserves into relevant legislation, policies, and/or program complemented by support for the functioning of biosphere reserves.</b></p>	<p><b>A3.1 – Recognize biosphere reserves in legislation, policies, and/or programmes at national and/or subnational levels.</b></p> <p>The MABR has written Memoranda of Understanding with the City of Parksville and the Town of Qualicum Beach. In 2017, MABRRI worked with the City of Parksville on a major redesign of its main community park, engaging locals and Indigenous communities on each aspect of the design.</p> <p><b>A3.2 – Support effective governance and management structures in each biosphere reserve.</b></p> <p>Since 2014, VIU has been the financial backbone of the MABR, providing salary and office space for a full-time coordinator. In 2017, conversations with members of the Roundtable have begun to plan for the long-term financial security of the MABR. The financial vision for the MABR is a funding structure, which divides responsibility between those members of the Roundtable who can afford it, spreading annual funding support across a broader number of regional partners. This will create greater financial resilience, less of a dependency on one institution, and a greater sense of “ownership” of the biosphere reserve. It has been made clear, however, that financial contributions will come with greater power, as it is important that those Roundtable members who are crucial to the MABR’s governance are not limited by their financial capacity.</p>
<p><b>A4. Research, practical learning, and training opportunities that support the</b></p>	<p><b>A4.1 – Establish partnerships with universities/research institutions to undertake research, especially UNESCO Chairs and Centres.</b></p> <p>MABRRI was founded at VIU in August 2014. MABRRI hires</p>

<b>management of biosphere reserves and sustainable development in biosphere reserves.</b>	<p>students as research assistants, hosts visiting scholars from around the world, and engages community partners in participatory research projects that explore sustainability within the MABR.</p>
	<p><b>A4.3 – Provide adequate research infrastructure in each biosphere reserve.</b></p> <p>MABRRI is a well-established research institute at VIU with space, research equipment, and funding.</p>
	<p><b>A4.5 – Encourage managers, local communities and other biosphere reserve stakeholders to collaborate in designing and implementing projects that inform the management and sustainable development of their biosphere reserve.</b></p> <p>All projects at MABRRI are collaborative. Community members may submit their project ideas to MABRRI’s Research Coordinators using a form provided on the website. Many projects have Technical Advisory Committees that include community members and enable greater sharing of local knowledge and expertise.</p>
<b>A5. Financial sustainability of biosphere reserves.</b>	<p><b>A5.1 – Develop a business plan for each biosphere reserve including, generation of revenues and effective partnerships with potential funders.</b></p> <p>See A3.2</p>
<b>A7. Biosphere reserves recognized as sources and stewards of ecosystem services.</b>	<p><b>A7.3 – Implement mechanisms for the equitable payment for ecosystem services.</b></p> <p>See A1.3</p>
<p><b>Strategic Action Area B: Inclusive, dynamic and result-oriented collaboration and networking within the MAB Programme and the World Network of Biosphere Reserves.</b></p>	
<b>B1. Effective biosphere Reserve managers/coordinators and engaged stakeholders of biosphere reserves.</b>	<p><b>B1.2 – Organize regional education, capacity building, and training programmes.</b></p> <p>The MABR hosted educational sessions on watershed visioning, wetland training, forage fish sample training, and engages with Roundtable members to identify areas for capacity building.</p>
<b>B2. Inclusive regional and thematic networks.</b>	<p><b>B2.1 – Ensure the participation of all relevant stakeholders in regional and thematic networks.</b></p> <p>The MABR’s Roundtable collaborated on a number of projects in 2017, including the Snaw-naw-as Garden of Spiritual Healing, the</p>



	forage fish monitoring project, and wetland mapping. Partners are always welcome to join MABRRI researchers in the work they are conducting.
<b>B4. Effective regional and thematic level collaboration.</b>	<p><b>B4.1 – Create opportunities for collaborative research, implementation, and monitoring.</b></p> <p>MABRRI creates these opportunities through the collaborative research projects and implementation of monitoring programs. All of MABRRI’s projects are in partnership with another local organization; they work together to collect the necessary data and fill existing data gaps.</p>
<b>B5. Visibility of regional and thematic networks and their activities.</b>	<p><b>B5.1 – Disseminate results of network activities internally, and externally including cases of good practice in biosphere reserves.</b></p> <p>The MABR produces a bi-monthly newsletter that provides updates on the MABR/RI initiatives that are currently are or were undertaken. Additionally, all MABR related reporting (annual reports, strategic plans, etc.) can be found on the MABR webpage. Further, all MABRRI related reporting (research reports, strategic research plan, etc.) can be found on the MABRRI webpage.</p>
<b>Strategic Action Area C: Effective external partnerships and sufficient and sustainable funding for the MAB Programme and the World Network of Biosphere Reserves.</b>	
<b>C3. Biosphere reserves and regional networks generating their own revenues.</b>	<p><b>C3.2 – Promote partnerships to raise funds from external entities with objectives that are compatible with those of the MAB Programme.</b></p> <p>The MABR and MABRRI obtain all their funding for project equipment and support through external funders.</p>
<b>C4. Recognition of the MAB Programme as a key partner by private sector.</b>	<p><b>C4.2 – Create opportunities for collaboration and partnerships with private sector which are open, accountable, and sustainable.</b></p> <p>The MABR has partnered with the private industry on climate monitoring, food security, and sustainable tourism projects. Additionally, the MABR’s governance model includes the regional Chamber of Commerce, as well as the two major forestry companies who own a substantial amount of land within the biosphere reserve. Further, the entire G7 Tree Planting initiative was completed because of the collaboration between private sectors (i.e. timber companies).</p>
<b>Strategic Action Area D: Comprehensive, modern, open, and transparent communication,</b>	

information and data sharing.	
<p><b>D1. Full availability of MAB documents, data, information, and other material.</b></p>	<p><b>D1.1 – Implement the open access policy adopted by the International Coordinating Council (ICC) (of the MAB Programme) in 2014.</b></p> <p>The MABR provides public access to governance documents on its website (mabr.ca), and MABRRI provides public access to project information and data on its website (mabrri.viu.ca). Furthermore, MABRRI is creating new open-access data collection tools to facilitate public contributions to data about regional sustainability. One example of this is our Collaborative Environmental Monitoring App.</p>
<p><b>D2. Increased awareness of all aspects of the MAB Programme.</b></p>	<p><b>D2.3 – Implement a coordinated publications programme to facilitate data and knowledge sharing.</b></p> <p>In January 2017, the MABR designed and launched the first international Journal of UNESCO Biosphere Reserves. The journal accepts bi-annual submissions in many forms, including: peer-reviewed journal articles, research notes, stories and narratives, photography, and videography. Visit <a href="http://www.biospherejournal.org">www.biospherejournal.org</a> to see the journal.</p>
<p><b>D3. Broader engagement and outreach.</b></p>	<p><b>D3.1 – Use social media and other novel information and communication technologies.</b></p> <p>The MABR uses Facebook and Twitter to communicate its activities and to engage the public.</p>

## Looking Ahead to 2019

This year, much like the previous, was a very busy and productive year. Both the MABR and MABRRI have accomplished so much and as a result, we anticipate 2019 to be another incredible year! The year will begin where we left off, busy in the field and the office. MABRRI will be installing their second year of cultured bull kelp lines in January and the MABR will be getting the ball rolling on the Traditional Place Names Project.

In February, the MABR Youth Program will be launched in the elementary classrooms in the MABR. The students will have the opportunity to learn about the MABR, as well as their local flora and fauna, taking part in mini bioblitzes and beach seining activities. Additionally in February, Pam Shaw and Geraldine Manson (Snuneymuxw First Nation and VIU Elder in Residence), will be attending and presenting at the SSHRC conference to give an update on the work that has been completed to date on the Traditional Place Names Project.

In April, Pam will be attending the EuroMAB Conference in Dublin, Ireland. Further, another member of the team will attend the CBRA Summer Gathering and Climate Change Forum in Nova Scotia in June. In amongst the biosphere reserve meeting and busy fieldwork schedules, the MABR will be completing our 10 year periodic review.

MABRRI's 2019 summer research team is expected to be about 15 people. We anticipate another busy summer, with approximately 30 projects on the go. All of these projects will include some aspect of either biodiversity conservation, sustainable development, and/or reconciliation within the MABR and the surrounding areas.

We are grateful for the lessons learned in 2018, for those organizations and individuals we were able to partner with, and for the continued excitement we have witnessed for the MABR and biosphere reserves, in general. We are eager to see what projects, connections, and success is coming our way in the coming year!