

Mount Arrowsmith Biosphere Region

2019 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.



United Nations
Educational, Scientific and
Cultural Organization



**MOUNT
ARROWSMITH**
BIOSPHERE REGION

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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

Ed Mayne, Mayor, City of Parksville

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

Michael Wyse, Snuneymuxw First Nation, Chief

Ceri Peacey, MABR Roundtable Community Representative

Michael Recalma, Chief, Qualicum First Nation

Pam Shaw, Research Director, MABRRI

Daniel Sailland, CAO, Town of Qualicum Beach

Graham Sakaki, Research & Community Engagement Coordinator, MABRRI

Haley Tomlin, Assistant Research & Community Engagement Coordinator, MABRRI

Mandy Hobkirk, MABR Coordinator

Brian Wiese, Mayor, Town of Qualicum Beach
Maureen Young, Regional District of Nanaimo
Sonja Zupanec, Islands Trust
David Witty, MABR Director

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 2019, the MABR Roundtable met for three Roundtable gatherings. The second Roundtable gathering did not take place due to overlap with the 2019 Regional Research Conference, which was hosted in the MABR. All Roundtable members were invited to attend the Research Conference in place of attending the Roundtable meeting.

MABR and MABRRI in the Community

Regional Engagement

In 2019, 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 the section below titled *2019 Research and Community Engagement at MABRRI*.

Educational Events and Celebrations

Annual MABR BioBlitz



On April 13th, 2019, we hosted the fourth annual MABR BioBlitz at Milner Gardens & Woodland. Roughly 30 community members and volunteers participated in a rapid biological survey of plant and animal species at this location. 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 & 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.

Summer Community Outreach Program



Members of the MABR team hosted a variety of different information booths throughout the summer, beginning at the Summer by the Sea 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 the Qualicum Beach Uptown Market, *Soft Shore – Where*

Land and Waters Meet exhibit at the McMillan Arts Centre hosted by ETHOS, and VIU's Sustainability Fair.

Grandkid's University



On July 4th and 5th, 2019, MABRRI helped host 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 associated with community planning when they had the opportunity to design their own parks.

Soft Shore – Where Land and Water Meet: ETHOS Summer Programs at the MacMillan Arts Centre



The MABR and MABRRI partnered with the Mid-Vancouver Island Habitat Enhancement Society (MVIHES), Deep Bay Marine Field Station, Arrowview Elementary School, and Fisheries and Oceans Canada to participate in the summer program hosted by ETHOS. The MABR Youth Program, focusing on marine sustainability, was offered three times through the month of August, on the 7th, 14th, and 21st, at the McMillan Arts Centre. The program introduced the

MABR and our coastal communities to children aged 8 to 12. Additionally, the MABR and MABRRI partnered with MVIHES to co-host three beach walks on August 6th, 13th, and 20th. Members from our team and MVIHES joined participants on a walk at the Community Park Beach, in Parksville, where we discussed local coastal communities. On these walks, MVIHES also conducted a beach seine, allowing participants to observe some of the intertidal species.

2019 Regional Research Conference



From June 12th to 14th, 2019 MABRRI hosted the Regional Research Conference entitled *Understanding our Biosphere Region: Collaborating on Initiatives for Sustainability*. The 2019 Regional Research Conference brought together individuals conducting research projects or initiatives related to the three pillars of sustainability - economic, environmental, and social and cultural - within the MABR and surrounding areas.

The goal of the event was to bring together people that strive to influence positive change in both practice and policy in the mid-Vancouver Island region. Attendees had the opportunity to connect with local researchers and professionals, as well as learn about the research occurring in their own backyards. Over the course of the three days, over 100 people attended the event, including 35 breakout room presenters, 3 keynote speakers, and 54 participants in the Traditional Plant Workshop.

The primary outcome of the 2019 Regional Research Conference was the development of an online interactive map, which showcases the location and basic details of all the research initiatives occurring within the MABR and surrounding areas. This map allows for those doing similar work to connect prior to applying for funding, or looking for resources, to partner together in a more sustainable manner, and to amplify their individual impacts thereby leading to more positive and tangible results.

All projects presented during the breakout sessions have been included in a preliminary version of this interactive online map, the [Mid-Vancouver Island Regional Projects Map](#). This first version is available for viewing, and feedback on the map is encouraged. In time, MABRRI hopes that more regional researchers will submit projects to be added to the map, thereby creating a dynamic database that is continually showcasing new research initiatives occurring in the area.

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 2019 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, the focus was on promoting mid-week and off-season visitation to the Amazing Places locations. This promotion began in December with the Amazing Places Mistletoe Trail, where mistletoe balls were hung in five of the Amazing Places in the MABR. Visitors were encouraged to go to the Amazing Places to find the mistletoe balls and take a picture underneath them with friends, family, loved ones, or pets.

In addition to this, planning of the Amazing Places Geocaching Adventure Lab began, which will take place in January, February, and March 2020. The aim of the Adventure Labs is to visit each Amazing Place, follow the story, and solve the clue on the app to complete the lab. Everyone who completes a lab has their name entered into a draw for a grand prize at the end of the season.

Indigenous Engagement and Knowledge Exchange

Throughout 2019, the MABR has continued to have opportunities to work alongside Snuneymuxw, Snaw-naw-as, and Qualicum First Nations.

The Coast Salish Traditional Place Names Project is a collaborative project with the Snuneymuxw, Qualicum, and Snaw-naw-as First Nations to establish a program that celebrates traditional

Indigenous language through signage. The project focuses on fostering and facilitating meaningful dialogue between Qualicum, Snaw-naw-as, and Snuneymuxw First Nations with the MABR's governing Roundtable body to continue building from developed protocols and best practices regarding language, traditional knowledge, and oral history. Furthermore, the project will focus on engaging with Indigenous Elders, Knowledge Holders, and the Roundtable to introduce traditional place names to the pre-established Amazing Places Program in the MABR.

National Engagement

2019 CCUNESCO and Canadian Biosphere Reserves Association (CBRA) Annual General Meetings

Climate Change Adaptation Forum and Summer Gathering of CBRA and the Indigenous Circle



On June 18th, representatives from Canada's 18 UNESCO Biosphere Reserves and members of the Indigenous Circle for Biosphere Reserves in Canada gathered in Sydney, Nova Scotia for the Summer Gathering. Each participant provided updates from each of their

respective biosphere reserves, as well as discussed any work completed or planned for the Other Effective Area-Based Conservation Measures (OECMs) projects. The day finished up with the group taking part in an activity to narrow down the strategic priorities for CBRA for the next 5 years.

Following the Summer Gathering, the participants joined locals from around the Cape Breton region in Baddeck for the Climate Change Adaptation forum from June 19th – 21st. The three-day forum was hosted by the Bras d’Or Lake Biosphere Reserve Association (BLBRA), and the Bras d’Or Collaborative Environmental Planning Initiative (CEPI). The question that participants were posed was how to adapt to the reality of climate change.

The forum began with examples of ways to function successfully in the face of climate change from a few of Canada’s UNESCO biosphere reserves and other knowledge holders. The goal was to gain a comprehensive view of climate change adaptation strategies in place throughout the world. Most importantly, the gathering of 100 participants was to produce a set of Climate Change Adaptations Guidelines to be published and applied within Canada's biosphere reserves and, ideally, in a wide range of communities beyond these regions.

International Engagement

EuroMAB 2019 Conference in Dublin, Ireland



EuroMAB is the largest and oldest of the Man and the Biosphere (MAB) Regional Networks, including 302 biosphere reserves in 36 countries. Meetings of the MAB National Committees and biosphere reserve coordinators of EuroMAB have taken place almost every two years since 1986.

From April 2nd to 5th, biosphere reserve representatives from Europe and North America gathered for the MAB Programme's bi-annual conference. This conference welcomed and inspired over 300 practitioners, managers, policy-makers, researchers, educators, ecologists, scientists, social entrepreneurs, creatives, and community leaders to Ireland to meet with the stakeholders of Dublin Bay Biosphere, and to experience the unique character of the bay, its communities, and its biodiversity.

EuroMAB 2019 focussed on how communications and networking between biospheres can be enhanced, and how biospheres can best partner with stakeholders and institutions to address global issues with local actions. Participants collaborated on working sessions around three key topics: [1] Inspiring people to get involved; [2] Creating belonging to strengthen the network; and [3] Empowering stakeholders to take responsibility. Over four days, participants had ten workshops and six fieldtrips to choose from, specifically tailored to assist participants in taking local actions for global challenges.

There were a number of lessons and takeaways for the MABR: networking with other biospheres is very important to stay current and identify new emerging opportunities; senior government support is critical as demonstrated by many successful European Biospheres, where funding from senior government can be over 50% of revenue and whom are acknowledged by senior government to deliver key federal and state conservation initiatives; eco-tourism is a growing tourism economic generator in many of the European Biospheres; and associated hiking and biking aligned with B&B's and rural networks of lodging are stimulating rural communities in a sustainable food, accommodation, and service way.

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 701 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 2019 included three volumes.

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 2019, we added an “Events in the MABR” section to the newsletter. Each newsletter now includes a section to help engage our subscribers with events occurring in the MABR community.
- By the end of 2019, 478 people were subscribed to our e-newsletter, an increase of 22 subscribers from 2018.

Other Marketing Materials

- Website: mabr.ca
- Facebook: 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 [here](#), 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.

2019 MABRRI Research Team

In 2019, MABRRI welcomed a total of 36 researchers. Some of the projects they contributed to, included Coastal Forest Plant Phenology and Monitoring, the MABR BioBlitz, Wetland Mapping in the RDN, Forage Fish Spawning Habitat Monitoring, Snaw-naw-as Garden Café, and the MABR Youth Program.

Below is a list of MABRRI’s 2019 research team. A special thank you to the students who dedicated many hours to MABRRI and to the project coordinators who helped lead and coordinate projects (Names are in alphabetical order by last name).

*Names in **bold** are MABRRI’s full-time Coordinators and Senior Research Assistants

Table 1: 2019 MABRRI Research Team		
Carson Anderson	Kayla Harris	Chrissy Schellenberg
Chelsey Andrews	Alex Harte	Kidston Short
Molly Blower	Mandy Hobkirk	Steffi Sunny
Jason Bradley	Sarah Holden	Larissa Thelin
Alan Cavin	Colby Mahood	Becky Thiessen
Cliff Feng	Rachel McGinness	Dylan Thiessen
Emma Ferris	Brian McLoughlin	Haley Tomlin
Alisha Feser	Brittany Milner	Cassy Twiname
Jeffrey Fontaine	Jenica Ng-Cornish	Courtney Vaugeois
Cassidy Funk	Melanie Poerner Louriero	Ariel Verhoeks
Teneal Gagnon	Jessica Pyett	Alanna Vivani
Jayne Gretzinger	Brandon Riddoch	Megan White

2019 Research and Community Engagement at MABRRI

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 fourth year of a five-year research agreement to map and classify wetlands, while quantifying their potential relationship to groundwater recharge. The Technical Advisory Committee (TAC) on the project includes Julie Pisani, Coordinator of the RDN's DWWP program; Alan Gilchrist, VIU Geography Professor; and Jerome Lesemann, VIU Earth Science Professor.

The past year was very successful for the Wetland Mapping and Monitoring Project. The MABRRI team completed mapping wetlands in each of the seven water regions, including the Englishman River Water Region and the Gabriola Island Water Region. Reports that evaluate the mapped wetlands in these water regions were also completed, and can be found in the *Document Library* section of the RDN's Get Involved [webpage](#). Additionally, the team established six priority sites to monitor in order to get a more holistic idea of how these wetlands function. The six priority sites were spread throughout the RDN: two in the Big Qualicum Water Region; two in the French Creek Water Region; one in the Little Qualicum Water Region; and, one in the Cedar-Yellow Point Water Region. Each of the six selected sites are to be visited seasonally and within a week of one another, ensuring little variation regarding weather between sites. Further, the team installed instrumentation, including piezometers, trail cameras, and a rain gauge at one priority wetland to determine if the site was connected to the aquifer below, and if it was, was it either recharging or discharging that aquifer. Lastly, MABRRI conducted a literature review on existing policy, best practices, and ecosystem services with regards to wetlands at the federal, provincial, and local levels. The literature review can also be found in the *Document Library* of the RDN's Get Involved [webpage](#).

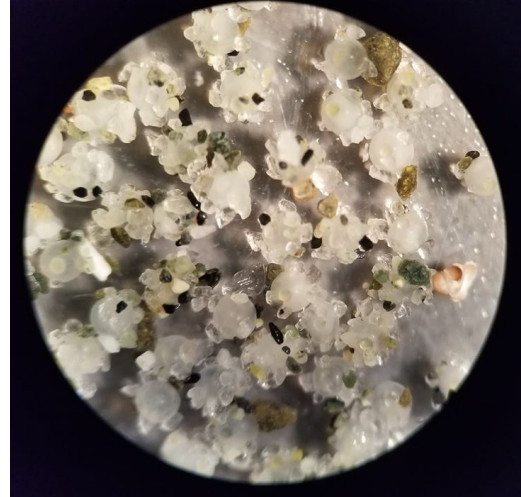
MABR Youth Program



The MABR Youth Program was developed in order to introduce the MABR to youth in the region. Although there are a few ecologically based education programs for youth in the MABR, none of them specifically discuss the MABR or biosphere reserves. The MABR Youth Program offers cost-free workshops to any school in the region, and brings the workshops directly to the classrooms. Two workshops were created initially: one exploring the coastal environment and how our actions on land are felt in the marine environment, and the other exploring the terrestrial environment, with a primary focus on biodiversity. In the fall of 2019, two additional workshops were created and implemented. The first was designed for elementary school students, and explores sustainable development. The second was designed for high school students, and it focusses on the United Nations' Sustainable Development Goals (SDGs). Each workshop consists of an in-class presentation accompanied by interactive learning activities. In the Coastal and Terrestrial workshops, students also go on field trips to partake in experiential learning opportunities. Each of the workshops highlight the MABR and sustainability within the region.

The youth program was a great success this past year. Each of the workshops generated a significant amount of interest, even outside the boundaries of the MABR. In 2019 alone, we were able to conduct 17 workshops, engaging 339 youth through this program. Our team is eager to continue to facilitate youth program workshops into 2020, and are hopeful we can reach even more students in the upcoming year.

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. 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 has been able to cover a lot more of the coastline than they would be able to do on their own. By the end of 2019, MABRRI had 6 dedicated citizen science groups (Gabriola Island Shorekeepers, Thetis Island Nature Conservancy, MVIHES, Qualicum Beach Streamkeepers, Dover Bay Eco-Club, and a group from Cowichan Bay). MABRRI hopes to continue to expand the citizen science component into the future.

The project has expanded rapidly in the last year, with MABRRI now having over 50 sampling sites along the Vancouver Island and Gulf Island coastlines. The project now includes sites from Cowichan Bay all the way to Deep Bay, including some on Gabriola Island and Thetis Island.

In addition to partnering with our citizen scientists, MABRRI recently began working with the Pacific Biological Station, Peninsula Stream Society, Ruby Lake Lagoon Society, Project Watershed, BC Parks, a student from UBC, and WWF Canada to work together on sampling efforts – sampling at the same frequency and informing all groups when the team sees positive results. This method allowed the team to focus sampling efforts during the times when positive results were occurring, which in turn increased the number of positive sites found.

Canadian Mountain Network

VIU has joined the University of Alberta and a handful of other universities across Canada as part of the Canadian Mountain Network (CMN). Established in 2016, the CMN aims to engage in collaborative, interdisciplinary research to address issues and relationships between mountain

environments, economies, and society. Since it was established, approximately 40 reports, all focusing on various topics, have been published and made publicly available. In 2019, the CMN was funded by the Networks of Centres of Excellence to continue research within mountain regions.

As part of the CMN, VIU's and MABRRI's research project titled *The View from 2117: Human Actions, Consequences, and Perspectives on Mountain Regions* will examine the ways in which individuals and collective behaviour, population growth, regulatory regimes, and societal change have affected and will affect First Nations, mountain communities, and mountain environments over the next century. The project will focus on the MABR, examining the human nature connection associated with the region. The methodology for this project will be multi-modal and will include demographic analyses, indicator development, field research, surveys, focus groups, and psychological assessments. Lead researchers for this project include: Pam Shaw (MABRRI and Geography), Geraldine Manson (Elder in Residence), Sylvie Lafreniere (Sociology), Lindsay McCunn (Psychology), Maureen Reed (UNESCO), Lindsay Chase (University of Victoria), and Maria Ines Paez Ferriera (Instituto Federal de Educação, Ciência e Tecnologia Fluminense, Brazil). Project partners include representatives from Qualicum, K'omoks, and Snaw-naw-as First Nations, industry partners, and local government representatives. With an interdisciplinary team and partners leading the research, the project will ideally result in lessened human/nature impacts and improved policy and regulatory frameworks in the MABR.

Coastal Forest Plant Phenology and Monitoring Project



In partnership with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development and Milner Gardens & Woodland, MABRRI is working to assess and monitor climate change effects on local plant phenology – the timing of seasonally reoccurring events such as bud break, leaf size, flower development, and ripe fruit. By monitoring the growing seasons of different coastal plants, and by comparing these growing seasons to microclimate data, we can

work to identify any potential changing trends in the growing seasons of Vancouver Island's ecosystems.

Since 2017, we have been monitoring phenological changes in native plant species at Milner Gardens & Woodland, Thetis Lake Regional Park, and on Mount Arrowsmith. Microclimate stations and a series of trail cameras have been installed at all sites to link phenological records to local climate. MABRRI, student researchers, and citizen scientists also collect in-person data weekly during the summer and biweekly during the spring and fall at Milner Gardens & Woodland. Data collection will continue for a number of years in order to see how growing seasons may be shifting with changing climate patterns.

MABRRI hosted a Plant Phenology Monitoring Training Session in May 2019, where volunteers were asked to help with in-person observations on the plant species of interest. There were 11 participants who volunteered at this training session, which gave plant enthusiasts an opportunity to learn and share knowledge of native plants with other citizen scientists, students, and researchers. Collecting in-person data is vital to this project as it allows us to ground-truth what we see on camera. It is also a great way to involve local citizens in hands-on real-life research. Since the training session in May, there has been a good turnout of new volunteers. Each session always has at least one other volunteer joining in on data collection.

Since data collection wrapped up in the fall, MABRRI hired several students to start the data analysis phase of the project. Students are hired to interpret and analyze field camera photos to determine the species' phenophase development and any other observable concerns. As mentioned above, the field camera observation technique has been implemented at all three study areas since 2017. The daily data collection with field cameras provides continuous phenophase development data through the growing season, whereas in-person data collection is not continuous and only occurs intermittently through the year.

Bull Kelp Monitoring and Enhancement Plot Project



MABRRI's bull kelp pilot project involves the installation of two bull kelp seeded lines planted at two different locations, one of which is within the MABR. The general purpose of the project is 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 for many vulnerable species. 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.

The MABRRI team had a successful second year with kelp growing at both sites (Dodd Narrows and Winchelsea Islands). For the 2019 growing season, we saw quick growth of individuals, although there was evidence that the kelp was experiencing some heat stressors with growth occurring on the individuals and the ends of the fronds beginning to become tattered. By the end of the summer, many of the individual bull kelp were producing *sori* (spores), which was exciting to see.

MABRRI would like to thank the following individuals and organizations that have helped them along the way, including Environment and Climate Change Canada, Project Watershed, Sundown Diving, Hornby Island Diving, Green Sea Kelp Co., and our volunteer divers. Their advice and services have enabled this project to be a success!

To view a short video that the MABRRI team created on this project, click [here](#).

Snow-naw-as Garden Café



The Snow-naw-as First Nation Garden Café is a collaborative partnership between Snow-naw-as First Nation, VIU, MABRRI, and Vancouver Island Health Authority. For this program, a chef was hired to offer several simple ways to prepare vegetables and demonstrate how to cook them. For example, the first week the chef focused on zucchini and provided recipes and cooking instructions on how to prepare zucchini Provençal, zucchini sage and brown butter, and zucchini and herbs.

The program was hosted six times from August to October 2019 during the Loaves & Fishes Food Bank at the Snow-naw-as Health Centre. The Garden Café was well-received by the community, and successfully taught the Snow-naw-as First Nation community simple, yet delicious ways to eat healthy.

Student Blog



*October 31, 2019 by
Jenica Ng-Cornish*

Wetland Mapping - October 4th and 25th

One of my favourite things about working at MABRRI is the opportunity to help with a variety of the different ongoing projects. On October 4th and 25th I joined Haley, Jess, and Alanna on trips to Gabriola Island for the Wetland Mapping project. The goal was to map some of the wetlands on the...

[Read More](#)

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 2019 adventure blog continued to be an excellent way to highlight MABRRI's exceptional cohort of student researchers. View the blog [here](#).

Acknowledging All Collaborators

In 2019, 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 2019.

We Could Not Do It Without You

Many people have been involved in supporting the MABR in 2019. It is with heartfelt thanks that we recognize the following people and organizations for their time, ideas, perspective, hard work and collaborative spirit:

MABR 2019 Executive Team

In 2019, 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



We can all be proud of the continued growth and work of the MABR, particularly MABRRI and its staff who continue to generate significant additional research monies and opportunities each year. Building on the hosting of the 2018 Canadian Biosphere Reserve Association meeting at Qualicum First Nation, graciously hosted by Chief Michael Recalma, we have continued to explore our First Nation collaboration by identifying two potential sites for welcoming totems of the Snaw-naw-as and Qualicum First Nations. That remains long term important work as we sort out funding and First Nation confirmation of sites and protocols. That work shines a light on the goodwill brought to the Roundtable by our First Nations, Mosaic Forest Management, Parksville and District Chamber of Commerce, the City of Parksville, Town of Qualicum Beach, and our community partners.

As we close out 2019 with this Annual Report, I offer my personal thanks for the opportunity to serve as your Director. We have come a long way over the past six years. I wish the MABR continued success in the future.

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.

Mandy Hobkirk, BSc – MABR Coordinator



Mandy had been a student employee with MABRRI since the fall of 2017. After graduating from Vancouver Island University with a Bachelor of Science degree in 2019, she transitioned into the role of MABR Coordinator. Mandy manages the MABR’s internal and external communications, coordinates community engagement events, manages the MABR’s youth program, and facilitates meetings and community forums for the MABR.

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>A1. The World Network of Biosphere Reserves consisting of effectively functioning models for sustainable development</p>	<p>A1.1 – Promote biosphere reserves as sites that actively contribute to achieving the SDGs.</p> <p>The MABR/RI has specifically contributed to six of the seventeen 2030 SDGs, and completed some overarching SDG work, as well:</p> <ul style="list-style-type: none"> • <i>Overarching SDG Work</i> In 2018, MABRRI initiated a project to identify how VIU is contributing to the SDGs. Through interviews with faculty and staff, a report was generated that identified some of the ways VIU was contributing. A second phase of this project took place throughout 2019, and is scheduled for completion in the beginning of 2020. • <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 nearly 40 students. These partnerships have substantially increased the number of youths who have received technical and vocational training for future employment opportunities. Further, the MABR developed workshops for our youth program, which were implemented into local classrooms in 2019; the program teaches students about the MABR, as well as flora and fauna in the region. • <i>Goal 6: Clean Water and Sanitation</i> Scientific findings from the wetland mapping project aims to provide recommendations for implementing integrated water resource management protocols, while increasing protection and restoration efforts within these ecosystems. • <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. • <i>Goal 11: Sustainable Cities and Communities</i> MABRRI developed the Gold River’s Parks, Trails, and Open Spaces Plan in 2019. This document highlights sustainable

	<p>actions that can be implemented locally with regards to environmental, economic, social, and cultural sustainability.</p> <ul style="list-style-type: none"> <p><i>Goal 13: Climate Action</i> MABRRI’s Coastal Forest Plant Phenology Research and Monitoring project aims to 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> <p><i>Goal 14: Life Below Water</i> Two of MABRRI’s projects within the MABR, Bull Kelp Monitoring in the Salish Sea and Forage Fish Spawning Habitat Monitoring, are increasing regional scientific knowledge with the purpose of improving ocean health while also enhancing marine biodiversity.</p>
	<p>A1.2 – Promote biosphere reserves as sites that actively contribute to implementing Multilateral Environmental Agreements (MEAs), including the Aichi Biodiversity Targets.</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 help 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 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>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.</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 was constructed by members of the Snaw-naw-as community and VIU students, and overseen by Elders and</p>

	<p>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>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 Parties (COP) 21 Paris Agreement.</p> <p>The purpose of MABRRI’s Coastal Forest Plant Phenology Research and Monitoring project, in partnership with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, is to observe phenophases of plant species at select locations to understand how climate change may be altering seasonal timing of plant phenophases.</p> <p>A1.5 – Promote green/sustainable/social economy initiatives inside biosphere reserves.</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 2019, the Amazing Places Mistletoe Trail was launched, and planning began for the Geocaching Adventure Lab - adding another aspect to the Amazing Places initiative that attached tourists to the area.</p> <p>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.</p> <p>MABRRI is the research engine of the biosphere reserve. Between August 2014 and August 2018, MABRRI has conducted over 50 collaborative projects involving regional partners, community members, and VIU students and faculty. Additionally, another approximately 20 projects were completed in the summer of 2019. All projects study some aspect of the socio-ecological systems in the MABR. For a list of projects, visit mabrri.viu.ca/projects.</p>
<p>A2. Open and participatory selection, planning and</p>	<p>A2.2 – Ensure processes for selecting, designing, planning, and nominating biosphere reserves are open and participatory, involving all concerned stakeholders, taking into account local</p>

<p>implementation of biosphere reserves.</p>	<p>and Indigenous practices, traditions and cultures, and based on sound science.</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> <hr/> <p>A2.4 – Ensure that biosphere reserves have clear communication plans and mechanisms to implement these.</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>A3. Integration of biosphere reserves into relevant legislation, policies, and/or program complemented by support for the functioning of biosphere reserves.</p>	<p>A3.1 – Recognize biosphere reserves in legislation, policies, and/or programmes at national and/or subnational levels.</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> <hr/> <p>A3.2 – Support effective governance and management structures in each biosphere reserve.</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>A4. Research, practical learning, and training opportunities that</p>	<p>A4.1 – Establish partnerships with universities/research institutions to undertake research, especially UNESCO Chairs and Centres.</p>

<p>support the management of biosphere reserves and sustainable development in biosphere reserves.</p>	<p>MABRRI was founded at VIU in August 2014. MABRRI hires 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>A4.2 – Establish partnerships with educational and training institutions, especially UNESCO Chairs, Centres and Associated schools, to undertake education, training and capacity building activities aimed at BR stakeholders, including managers and rights holders, taking into account the SDGs.</p> <p>In collaboration with the Foundation for Environmental Stewardship, MABRRI hosted an SDG Training Session at VIU on November 30, 2019. This all-day event aimed to educate individuals on the UN 17 SDGs and challenge them to develop an action plan to implement the SDGs locally.</p>
	<p>A4.3 – Provide adequate research infrastructure in each biosphere reserve.</p> <p>MABRRI is a well-established research institute at VIU with space, research equipment, and funding.</p>
	<p>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.</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>
<p>A5. Financial sustainability of biosphere reserves.</p>	<p>A5.1 – Develop a business plan for each biosphere reserve including, generation of revenues and effective partnerships with potential funders.</p> <p>See A3.2</p>
<p>A7. Biosphere reserves recognized as sources and stewards of ecosystem services.</p>	<p>A7.3 – Implement mechanisms for the equitable payment for ecosystem services.</p> <p>See A1.3</p>
<p>Strategic Action Area B: Inclusive, dynamic and result-oriented collaboration and networking within the MAB Programme and the World Network of Biosphere Reserves.</p>	
<p>B1. Effective biosphere Reserve</p>	<p>B1.2 – Organize regional education, capacity building, and training programmes.</p>

<p>managers/coordinators and engaged stakeholders of biosphere reserves.</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. Additionally, in 2019, the MABR team hosted the Regional Research Conference, bringing together researchers and stakeholders from across the region to share their research and interests.</p>
<p>B2. Inclusive regional and thematic networks.</p>	<p>B2.1 – Ensure the participation of all relevant stakeholders in regional and thematic networks.</p> <p>The MABR’s Roundtable collaborated on a number of projects in 2019, including the Snaw-naw-as Garden of Spiritual Healing, the Regional Research Conference, and wetland mapping. Partners are always welcome to join MABRRI researchers in the work they are conducting.</p>
<p>B4. Effective regional and thematic level collaboration.</p>	<p>B4.1 – Create opportunities for collaborative research, implementation, and monitoring.</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. Currently, MABRRI has the Forage Fish Spawning Habitat Monitoring project that depends on over 40 volunteers along the coast to collect samples and contribute data to the project.</p>
<p>B5. Visibility of regional and thematic networks and their activities.</p>	<p>B5.1 – Disseminate results of network activities internally, and externally including cases of good practice in biosphere reserves.</p> <p>The MABR produces a bi-monthly newsletter that provides updates on the MABR/RI initiatives that are currently 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>
<p>Strategic Action Area C: Effective external partnerships and sufficient and sustainable funding for the MAB Programme and the World Network of Biosphere Reserves.</p>	
<p>C3. Biosphere reserves and regional networks generating their own revenues.</p>	<p>C3.2 – Promote partnerships to raise funds from external entities with objectives that are compatible with those of the MAB Programme.</p> <p>The MABR and MABRRI obtain all their funding for project equipment and support through external funders.</p>

<p>C4. Recognition of the MAB Programme as a key partner by private sector.</p>	<p>C4.2 – Create opportunities for collaboration and partnerships with private sector which are open, accountable, and sustainable.</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 major forestry company who owns a substantial amount of land within the biosphere reserve. Further, the entire G7 Tree Planting initiative in 2018 was completed because of the collaboration between private sectors (i.e. timber companies).</p>
<p>Strategic Action Area D: Comprehensive, modern, open, and transparent communication, information and data sharing.</p>	
<p>D1. Full availability of MAB documents, data, information, and other material.</p>	<p>D1.1 – Implement the open access policy adopted by the International Coordinating Council (ICC) (of the MAB Programme) in 2014.</p> <p>The MABR provides public access to governance documents and meeting minutes from Roundtable meetings 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>D2. Increased awareness of all aspects of the MAB Programme.</p>	<p>D2.3 – Implement a coordinated publications programme to facilitate data and knowledge sharing.</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 www.biospherejournal.org to see the journal.</p>
<p>D3. Broader engagement and outreach.</p>	<p>D3.1 – Use social media and other novel information and communication technologies.</p> <p>The MABR uses Facebook, Twitter, and Instagram to communicate its activities and to engage the public.</p>

Looking Ahead to 2020

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 2020 to be another incredible year! The year will begin where we left off, busy in the field and the office. MABRRI will be completing the fifth and final year of the Wetland Mapping project in 2020. The MABR will be moving forward on the MABR Highway Signage project – a collaborative project between members of the Roundtable, where we intend to place informative signage in Nanoose and Qualicum to welcome people to the biosphere and to showcase the traditional territory of the Nations.

MABRRI's 2020 summer research team is expected to be about 12 people. We anticipate another busy summer, with approximately 20 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 2019, 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!