

Services that MABR/MABRRI Provides to the RDN

Land Acquisitions:

- Assisted the BC Parks Foundation and RDN with the purchase of the French Creek Estuary Nature Preserve.
 - The Mount Arrowsmith Biosphere Region Research Institute (MABRRI) is currently part of the working group for the French Creek Estuary Nature Preserve Management Plan, along with Save Estuary Land Society, Friends of French Creek Conservation Society, Arrowsmith Naturalists, and Mid Vancouver Island Habitat Enhancement Society.
 - The development of the management plan is underway and will guide the protection, restoration, and community enjoyment of nature at the Preserve.
 - Simultaneously, MABRRI has supported these community groups in conducting baseline surveys at the FCENP to help inform management recommendations, including: establishment of permanent forest plots to better understand forest and understory vegetation, baseline entomological surveys and avian aerial insectivore survey, and a nest tree identification and monitoring project.

Mount Arrowsmith Biosphere Region (MABR) Roundtable:

- The MABR Roundtable meets quarterly and functions as the governing body of the MABR, providing direction to the MABR and 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 is 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.
- The Roundtable currently has representatives from Town of Qualicum Beach, City of Parksville, Regional District of Nanaimo, Parksville-Qualicum Beach Tourism Association, Snaw-naw-as First Nation, Snuneymuxw First Nation, Qualicum First Nation, Vancouver Island University, Parksville and District Chamber of Commerce, Qualicum Beach Chamber of Commerce, Islands Trust, Mosaic Forest Management, The Nature Trust of British Columbia, and community representatives.

Mentoring and Partnership with Stewardship Groups:

- Mid-Island Stewardship Caucus (MISC):
 - A collaborative stewardship group which allows environmental organizations in the mid-Island region to connect, collaborate, and share resources and expertise. The caucus creates space for members to come together and discuss stewardship activities and initiatives, identify gaps, and support each other to achieve their goals. MISC provides a way for us to ensure we are doing our best work, collaborate where possible, and use various resources and the strengths of organizations to meet our goals collaboratively and effectively.
 - MISC is comprised of:

- Mount Arrowsmith Biosphere Region
- Mount Arrowsmith Biosphere Region Research Institute
- Arrowsmith Naturalists
- Mid-Vancouver Island Habitat Enhancement Society
- Save Estuary Lands Society
- Friends of French Creek Conservation Society
- Nanaimo and Area Land Trust
- Brown Property Preservation Society
- Regional District of Nanaimo Drinking Water and Watershed Protection Program
- BroomBusters
- Qualicum Beach Streamkeepers
- Hamilton Wetlands and Forest Preservation Society

Regional Projects and Initiatives:

Wetland Mapping & Monitoring in the RDN

- This project started in 2015 in partnership with the RDN’s Drinking Water and Watershed Protection (DWWP) program and MABRRI. This project began as a five-year research agreement to map and classify wetlands, while quantifying their potential relationship to groundwater recharge.
- In 2019, the MABRRI team completed the mapping of wetlands in each of the seven water regions and established six priority sites for continued monitoring in order to get a more holistic idea of how these wetlands function. These six priority sites are 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 these six selected sites are visited seasonally and within a week of one another, ensuring little variation regarding weather between sites. Additionally, at three of these six priority sites, instrumentation was installed which includes piezometers, trail cameras, and a rain gauge. This instrumentation helps to determine if these sites are connected to the aquifers below, and whether these wetlands are either recharging or discharging that aquifer. MABRRI relies on citizen science groups to complete the analysis of these sites, these groups include the Arrowsmith Groundwater Alliance, Qualicum Beach Stream keepers and the Quenell Lake Watershed Society. Moving forward these sites will continue to be monitored on a seasonal basis. This data will contribute to a holistic idea of the health of both wetland ecosystems and aquifer health in the RDN. MABRRI has been creating reports for the RDN that analyze and review the data found from monitoring on an annual basis.

Other Effective Area-Based Conservation Measures in the Mount Arrowsmith Biosphere Region

- This project is focussing on activities within the MABR, aiming to enable some of the buffer and transition zones within the region to meet the international guidance and standards needed to qualify them as Other Effective Area-based Conservation Measures (OECMs). Through collaborative engagement with key regional stakeholders in the MABR, such as First Nations, municipal governments, and other landowners, this project aims to protect areas of high conservation value, with overall support of Canada's biodiversity goals and targets.

Coastal Forest Plant Phenology Research and Monitoring

- This project is working to assess and monitor climate change impacts 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 native 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.
- We are monitoring phenological changes at seven research sites: Milner Gardens & Woodland, Thetis Lake Regional Park, Koksilah River Provincial Park, Bowser Ecological Reserve, VIU Woodlot, North Cowichan, and on Mount Arrowsmith. We collect the timing and intensity of all phenophases for each of our identified plant species using two observation techniques: in-person and field camera observations. The field camera observation technique is used at all of the study sites; however, in-person observations are only collected at Milner Gardens & Woodland. In-person observations occur biweekly during the growing season and monthly during the fall and winter.

Forage Fish Spawning Habitat Monitoring

- This project works to minimize existing data gaps by positively identifying active forage fish spawning habitat through collection of sediment samples from locations with known favourable habitat characteristics. Forage fish species, such as Pacific sand lance (*Ammodytes hexapterus*) and surf smelt (*Hypomesus pretiosus*), are very important in the Salish Sea as they are a critical linkage between the lower trophic levels and upper trophic level species, such as Pacific salmon and killer whales. Population declines in forage fish could cause widespread collapses in many marine species since many predators depend on them as a meaningful prey source. MABRRI, and our citizen scientists, collect data year-round from beaches on the eastern coastline of Vancouver Island, and several Gulf Islands.

Timing Windows

- This project aims to educate the public and protect species throughout the MABR and surrounding area. There is a special focus on two species at risk, the Western painted turtle (*Chrysemys picta bellii*) and the Western Screech Owl (*Megascops kennicottii kennicottii*). Their populations face threats such as habitat loss and interspecific competition.

- In addition, our team will be raising awareness and educating the public on other species that are locally and ecologically important to the region and local Indigenous communities.

Nanoose Bay Recreational Shellfish Reserve Harvest Monitoring

- In collaboration with the Nanoose Economic Development Corporation, this project aims to determine whether recreational and commercial clam harvesting pressures could be impacting clam populations and habitat in the public use area at the Nanoose Bay Recreational Shellfish Reserve. This study aims to provide a comprehensive look at the current harvesting practices in the study area and provide recommendations to improve the sustainability of harvesting practices.

Marine Debris Monitoring

- In 2021, MABRRI began conducting marine debris surveys along beaches within the MABR. The survey approach follows the National Oceanic and Atmospheric Administration's (NOAA) methods for marine debris surveys, as part of their Marine Debris Monitoring and Assessment Project. Through NOAA's survey methods, rather than solely making sure the MABR's beaches are clean, we are providing data to an international database that amalgamates data collection from local beaches into a larger context. The goal of NOAA's initiative is to utilize data collected from beaches around the world to develop more effective mitigation strategies to prevent the impacts of marine debris.
- MABRRI currently conducts debris surveys at two sites in the MABR (French Creek and Qualicum Beach) 4 times per year, once each season. Funding has recently been obtained to expand this program to include additional sites, expand the citizen science/volunteer network, and incorporate a microplastics study in the program.

Amazing Places Program

- This project was brought to British Columbia in 2016 through a collaboration between the MABR and Parksville Qualicum Beach Tourism. A community nomination process took place in September 2016 to select 10 Amazing Places in the MABR. Following the do no harm model, Amazing Places are chosen in locations that can handle increased visitation without compromising what makes the place Amazing.
- The 10 Amazing Places within the MABR include: Top Bridge, Heritage Forest, Cathedral Grove, Parksville Community Park, Little Qualicum Falls Provincial Park, Milner Gardens & Woodland, Englishman River Falls Provincial Park, Cameron Lake, Notch Hill, and Rathtrevor Beach Provincial Park. These Amazing Places have received interpretive signage, online promotion, and high-quality photo and video coverage. Our region is also promoted across Canada through the national UNESCO biosphere reserve network.

Snaw-naw-as Highway Signage Program

- The goal of this project is to celebrate and preserve the culture and heritage of Snaw-naw-as First Nation (SFN). This project is being undertaken in partnership with the Nanoose Economic Development Corporation, which is governed by SFN. This project

involves implementing two Welcome Poles and accompanying traditional/informative signage. Both the carvings and signage will tell the story of SFN, along with the history of the surrounding lands.

Ecological Accounting Process (EAP)

- In partnership with the Partnership for Water Sustainability in British Columbia (PWSBC), the Ecological Accounting Process (EAP) project examines how the natural commons, such as riparian areas surrounding streams, impact property values through the proximity to streams and the ecosystem services they provide. Additionally, the EAP analyzes the value of the land underlying the natural commons, areas where the riparian setback area and stream channel fall, as well as the investment of maintenance and management that is put into the stream by property owners, the local government, and stewardship groups. Resulting from this project are reports detailing the EAP results providing research to inform decisions regarding ecological assets, as well as evidence to support management of the natural commons from a financial perspective.
- The team is focusing on three watersheds – Bowker Creek in Victoria, the Millstone River in Nanaimo, and Bings Creek in the District of North Cowichan. Currently only Bings Creek remains, with studies on Bowker Creek and the Millstone River being completed.

Traditional Plant Workshops

- These workshops are a knowledge mobilization initiative that aim to enhance our understanding of traditional values, language, and knowledge surrounding native plants on Vancouver Island. This project focuses on locally traditional plants and medicines. The four main objectives of this project are to: [1] build a collaborative team of Indigenous Knowledge Holders; [2] identify the team's pertinent knowledge of traditional plants; [3] disseminate findings at a public workshop; and, [4] summarize lessons from the workshop into a final report for future use.
- Workshops focus on plant names, known locations for gathering, and techniques and tools for harvesting, as well as the cultural, nutritional, and medicinal properties of native plants and how they are prepared.

TRANSECTS Transdisciplinary International Learning Laboratory (TILL)

- TRANSECTS is an international partnership between Germany, South Africa and Canada.
- Hosted by Vancouver Island University and MABR in 2024, the TILL is a fully funded international and intercultural learning experience for Senior Undergraduate and Graduate students to build skills in sustainability research and practice.

Karst Aquifer Mapping in Area F

- MABRRI is supporting RDN Area F in a study to identify possible connections between karst landscapes and freshwater availability, with a focus on the potential impacts of logging operations.

- The study will identify presence and significance of karst landscapes in the region to provide a baseline indication for future research that can enable a greater understanding of the vulnerability of drinking water as it relates to karst landscapes.
- MABRRI will work with VIU's Geoscience department to undertake background research to learn from previous studies and compile spatial data to create maps. The outcome will be a discussion paper outlining future research recommendations.