



# Mount Arrowsmith Biosphere Region BioBlitz

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## 2021 Summary Report



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***The MABR acknowledges and thanks the Qualicum, Snaw-naw-as, Snuneymuxw, K'ómox, Tseshaht, Hupacasath, and Ditidaht First Nations, on whose traditional lands the Mount Arrowsmith Biosphere Region is situated within.***

*We would also like to thank our partners, including the Nature Trust of BC, and the Brant Wildlife Festival, with which we have held this event in collaboration and partnership with since 2016.*



## ⋮ The Mount Arrowsmith Biosphere Region

The Mount Arrowsmith Biosphere Region (MABR) is a UNESCO designated Biosphere Reserve located on mid-eastern Vancouver Island, and is known as a place where people live and work together in hopes of creating a sustainable future to thrive in harmony with nature (MABRRI, 2016). The MABR is situated within the traditional territories of seven First Nations communities and shares similar boundaries with the Regional District of Nanaimo. The vertical elevation spans just over 2,100 meters from the highest peak on Mt. Arrowsmith (1,817 meters) to 300 meters into the Salish Sea (MABRRI, 2016). This vertical range makes the MABR unique among Canadian Biospheres, containing many distinctive ecosystems ranging from high alpine and coastal forests to intertidal and marine habitats. Additionally, as the MABR spans a geographic area of 1,200 square kilometers, the region encompasses an ecologically diverse range of habitats and ecosystems within its watershed boundaries. These ecosystems hold special importance to the region culturally, environmentally, and economically.

In addition to promoting sustainability as a Biosphere Reserve, the Mount Arrowsmith Biosphere Region Research Institute (MABRRI) conducts applied research initiatives within the region and beyond. Our team at MABRRI strives to embrace and celebrate the diverse values of the MABR through research, education, and community outreach, promoting environmental conservation and awareness of this beautiful and extraordinary place that we all live and share.

## ⋮ Introduction to a BioBlitz

A BioBlitz is a rapid biological survey of flora and fauna that embraces citizen science, connecting local community members, students, faculty, knowledge holders, naturalists, and scientists to identify as many species as possible within an allocated time frame (MABRRI, 2019). The data collected from these biological surveys is important for gaining sound baseline knowledge of existing biodiversity in the region. Annual biological monitoring allows researchers to monitor trends and changes over time that can indicate the fluctuations in species at risk, invasive species, and overall species richness of a region (MABRRI, 2016). For instance, changes in habitat health from long-term climate trends and local weather patterns can significantly alter the state of the environment and can be detected over time with community monitoring initiatives (MABRRI, 2016). The main benefit of conducting a BioBlitz is that the data collected by participants provides a snapshot of biodiversity and species richness within the region. Other benefits associated with a BioBlitz include an increased regional knowledge of changes to species abundance and habitat for species at risk, as well as changes in invasive species distribution over time. The data collected during the annual event can help inform the management of sensitive habitats and ecosystems within the region.



## 🌿 MABR BioBlitz Events

The goal of MABRRI's annual BioBlitz is to promote citizen science-based research while celebrating wildlife and biodiversity within the MABR. The data collected during this annual event helps inform the management of sensitive habitats and ecosystems within the region (MABRRI, 2016). BioBlitz events have been held by MABRRI within the MABR since 2016. The MABR BioBlitz event supports the values of a UNESCO designated Biosphere Reserve as it is designed to connect people with nature through species identification and knowledge building. Prior events have been successful, and have provided an engaging opportunity for community members to connect with local experts and peers while learning about their surrounding environment. The event has successfully worked toward increasing participant's knowledge of biodiversity while equipping these individuals with basic stewardship field skills.

The MABR BioBlitz has the capability to expand local knowledge of biodiversity and wildlife habitat within the region, and contributes to a publicly available and transparent data set. This data set holds value and use for future generations and long-term species trend analysis. This research aims to promote the health and resilience of our natural systems, including the intricate and unique characteristics and relationships within these ecosystems (MABRRI, 2016). We wish to promote knowledge sharing, environmental stewardship, and critical thinking in communities beyond the academic environment to promote the longevity and relationships between people and nature. The aim of future BioBlitz events is to include a greater variety of ecosystems, habitats, and microclimates within the MABR year after year. This will provide an opportunity to observe and monitor trends in species inventory. Additionally, the MABR BioBlitz strives to increase student research and participation in the event coordination and grow the citizen-science based participation each year (MABRRI, 2016).

## ∴ The 2021 Biosphere-Wide Blitz

The 2021 BioBlitz was the fifth annual event held in conjunction with the Brant Wildlife festival. In previous years, the annual BioBlitz has been held at the Milner Gardens and Woodland site. However, due to the COVID-19 pandemic, the event was extended to the boundaries of the MABR, ranging from Nanoose Bay to Qualicum Bay, to allow for social distancing and to collect a broader view of the biodiversity within the region. The vision of the BioBlitz has always aimed to encompass the entirety of the MABR to capture a larger picture of the biodiversity residing within the Biosphere. With social distancing measures in place, and the 2020 BioBlitz cancelled, the 2021 BioBlitz was a unique opportunity to implement the new Biosphere-wide event. This year's BioBlitz event encouraged MABR community members to identify as many species as possible within the MABR boundaries – providing a snapshot of the species richness in different locations throughout the region. The 2021 Biosphere-wide Blitz spanned across three days from April 16 through 18 and employed the iNaturalist app to record observations of biodiversity from naturalists and citizen scientists in the MABR's boundaries. The data collected from the BioBlitz was compiled into a database (Table 1 and Table 2), and is useful in providing a snapshot of overall biodiversity within the MABR. The results of the participant data collected during the Biosphere-wide BioBlitz revealed 745 observations, including 389 distinct species.

### Goals and Objectives

The objectives of the 2021 BioBlitz build upon the success of previous biological surveys and BioBlitz events hosted by MABRRI student researchers at Milner Gardens and Woodland, and apply them in the larger sphere of the MABR. The primary goal is to motivate a larger group of community participants year after year to take part in the event. The goals and objectives of the 2021 MABR BioBlitz are as follows:

1. To gain a broader view of biodiversity within our region;
2. Contribute to long-term monitoring of flora and fauna in the MABR;
3. Promote citizen science-based research while celebrating wildlife and biodiversity within the MABR;
4. Promote the health and resilience of our natural systems; and
5. Provide participants and the public with a finalized flora and fauna collection report, for species identified during the event.

Overall, the annual BioBlitz event aims to engage VIU students and local community members with the community and nature, enhancing their research skills by photographing and identifying local flora and fauna within the MABR. In addition, participants conducting individual biological surveys in the MABR can contribute to significant biological research along with being part of a regional community initiative.

### Methods

Local participants were self-selected by signing up for this event on the online BioBlitz EventBrite registration page. The event took place over three days (April 16, 17, and 18, 2021) in the MABR boundaries ranging from Nanoose Bay to Qualicum Bay. Over the three days, participants recorded observations in their own time using the iNaturalist mobile application (iNaturalist app). Observations were recorded through photos uploaded to the iNaturalist app, which were then identified by citizen scientists, VIU students, and volunteers using supporting identification materials, such as nature guides. Prizes were awarded to those who recorded the highest number of observations on each of the three days.



Image from: Georgia DNR



Image from: leftcoaster



# Collection of Data from the 2021 BioBlitz Across the MABR

The data collected in 2021 provides information on the biodiversity across the entirety of the Biosphere, rather than only focusing on Milner Gardens and Woodland as conducted in previous years. The increased scope of the 2021 BioBlitz contributes to long-term monitoring for the flora and fauna that live within the MABR. Participant observations from across the MABR are compiled into Tables 1 and 2 below. Table 1 consists of a complete list of the flora recorded and identified from April 17 to April 19. Note that invasive species are highlighted in RED, exotic species are highlighted in GREEN, and species at risk in BC are highlighted in BLUE.



**Table 1. Compiled Findings from April 17, 18, and 19, 2021 MABR BioBlitz Flora Species.**

Trees		
Species Common Name	Species Scientific Name	Number of Observations
Arbutus	<i>Arbutus menziesii</i>	5
Bigleaf Maple	<i>Acer macrophyllum</i>	3
Bitter Cherry	<i>Prunus emarginata</i>	2
Common Hawthorn	<i>Crataegus monogyna</i>	1
Douglas-Fir	<i>Pseudotsuga menziesii</i>	4
English Holly	<i>Ilex aquifolium</i>	1
Garry Oak	<i>Quercus garryana</i>	1
Grand Fir	<i>Abies grandis</i>	2
Green Alder	<i>Alnus alnobetula</i>	1
Bigleaf Maple	<i>Acer macrophyllum</i>	1
Noble Fir	<i>Abies procera</i>	1
Pacific Crab Apple	<i>Malus fusca</i>	2
Plums, Cherries, and Allies	<i>Prunus sp.</i>	1
Red Alder	<i>Alnus rubra</i>	2
Western Redcedar	<i>Thuja plicata</i>	5
<b>Total Number of Species</b>	<b>15</b>	
<b>Total Observations</b>		<b>32</b>



Red-flowering Currant - image by: melloueiro



Salmonberry - image by: court\_v

Shrubs		
Species Common Name	Species Scientific Name	Number of Observations
Baldhip Rose	<i>Rosa Gymnocarpa</i>	2
Barberry	<i>Berberis sp.</i>	1
Bearberry	<i>Arctostaphylos uva-ursi</i>	1
Blue Elder	<i>Sambucus cerulea</i>	1
Blueberries, Cranberries and Allies	<i>Vaccinium sp.</i>	1
Cascade Oregon Grape	<i>Berberis nervosa</i>	2
Common Snowberry	<i>Symphoricarpos albus</i>	1
Elderberry	<i>Sambucus sp.</i>	1
<b>Himalayan Blackberry</b>	<i>Rubus armeniacus</i>	3
Nootka Rose	<i>Rosa nutkana</i>	2
Ocean Spray	<i>Holodiscus discolor</i>	2
Oregon Grape	<i>Berberis aquifolium</i>	6
Oval-Leaf Blueberry	<i>Vaccinium ovalifolium</i>	1
Red-Berried Elder	<i>Sambucus racemora</i>	2
Red-Flowering Currant	<i>Ribes sanguineum</i>	1
Red-Huckleberry	<i>Vacciniuom parivolum</i>	6
Roses	<i>Rosa spp.</i>	2
Salal	<i>Gaultheria shallon</i>	4
Salmonberry	<i>Rubus spectabilis</i>	6
<b>Scotch Broom</b>	<i>Cytisus scoparius</i>	2
<b>Spurge-Laurel (Daphne)</b>	<i>Daphne laureola</i>	1
Thimbleberry	<i>Rubus parviflorus</i>	1
Trailing Blackberry	<i>Rubus ursinus</i>	3
<b>Total Number of Species</b>	<b>23</b>	
<b>Total Observations</b>		<b>52</b>





Giant White Fawn Lily - image by: bradenjudson



Grape Hyacinths - image by: ehessels



Miner's Lettuce - image by: court\_v

Herbs & Wildflowers		
Species Common Name	Species Scientific Name	Number of Observations
Alpine barrenwort	<i>Epimedium alpinum</i>	1
Arctic Butterbur	<i>Petasides frigidus</i>	1
Beach Pea	<i>Lathyrus japonicus</i>	1
Bedstraws	<i>Galium sp.</i>	1
Blue-eyed Mary	<i>Collinsia verna</i>	2
Brittle Prickly-Pear	<i>Optunia fragilis</i>	2
<b>Bull Thistle</b>	<i>Cirsium vulgare</i>	1
Checker Lily	<i>Fritillaria affinis</i>	1
<b>Creeping Buttercup</b>	<i>Ranunculus repens</i>	2
<b>Common Daisy</b>	<i>Bellis perennis</i>	2
Common Dandelion	<i>Taraxacum officinale</i>	3
Common Yarrow	<i>Achillea millefolium</i>	1
Common Vetch	<i>Vicia sativa</i>	1
European Honeysuckle	<i>Lonicera periclymenum</i>	1
Fernleaf Biscuitroot	<i>Lomatium dissectum</i>	1
Foxgloves	<i>Digitalis purpurea</i>	1
Giant Horsetail	<i>Equisetum telmateia braunii</i>	1
Giant White Fawn Lily	<i>Erythronium oregonum</i>	5
Grape Hyacinths	<i>Muscari spp.</i>	3
Hairy Bittercress	<i>Cardamine hirsuta</i>	1
Hedge Mustard	<i>Sisymbrium officinale</i>	1
<b>Herb Robert</b>	<i>Geranium robertianum</i>	2
Indian Pipe	<i>Monotropa uniflora</i>	1
Italian Honeysuckle	<i>Lonicera caprifolium</i>	1
Largeleaf Sandwort	<i>Moehringia macrophylla</i>	1
Little-Robin	<i>Geranium purpureum</i>	1
Magenta Shooting Star	<i>Primula hendersonii</i>	1
Miner's Lettuce	<i>Claytonia perfoliata</i>	3



Wingstem Monkeyflower - image by: bradenjudson



Pacific Trillium- image by: carmenharper

Pacific Sanicle	<i>Salicornia crassicaulis</i>	2
Pacific Trillium	<i>Trillium ovatum</i>	5
Pink Purslane	<i>Claytonia sibirica</i>	2
Pipsissewa	<i>Chamaphila umbellata</i>	1
Pussytoes	<i>Antennaria plantaginifolia</i>	2
Queen Anne's Lace	<i>Daucus carota</i>	1
Ragwort	<i>Jacobaea vulgaris</i>	1
Red Dead-nettle	<i>Lamium purpureum</i>	4
Ribwort Plantain	<i>Plantago lanceolata</i>	1
Sea Asparagus	<i>Salicornia crassicaulis</i>	2
Shepherd's Cress	<i>Teesdalia nudicaulis</i>	1
Sitka Burnet	<i>Sanguisorba canadensis</i>	2
Snakes-Head Fritillary	<i>Fritillaria meleagris</i>	1
Stinging Nettle	<i>Urtica dioica</i>	2
Vanilla Leaf	<i>Achlys triphylla</i>	1
Wall Lettuce	<i>Lactuca muralis</i>	2
Western Buttercup	<i>Ranunculus occidentalis</i>	2
Western Fairy-Slipper	<i>Calypso bulbosa</i>	3
Western Hemlock-Parsley	<i>Conioselinum gmelinii</i>	1
Western Lily of the Valley	<i>Maianthemum dilatatum</i>	1
Western Skunk Cabbage	<i>Lysichiton americanus</i>	4
Western Star Flower	<i>Lysimachia latifolia</i>	1
White Clover	<i>Trifolium repens</i>	1
Wild Daffodil	<i>Narcissus pseudonarcissus</i>	2
Wild Strawberry	<i>Fragaria vesca</i>	1
Wingstem Monkey-flower	<i>Erythranthe alsinoides</i>	3
Woodrushes	<i>Luzula spp.</i>	1
<b>Total Number of Species</b>	<b>55</b>	
<b>Total Observations</b>		<b>93</b>





Lady Fern - image by: court\_v



Slough Sedge - image by: court\_v



Eelgrass - image by: melloureiro

**Ferns**

Species Common Name	Species Scientific Name	Number of Observations
Bracken Fern	<i>Pteridium aquilinum</i>	2
Deer Fern	<i>Struthiopteris spicant</i>	1
Goldback Fern	<i>Pentagramma triangularis</i>	2
Lady Fern	<i>Athyrium filix-femina</i>	2
Licorice Fern	<i>Polypodium glycyrrhiza</i>	3
Narrowleaf Sword Fern	<i>Polystichum imbricans</i>	1
Western Sword Fern	<i>Polystichum munitum</i>	3
<b>Total Number of Species</b>	<b>7</b>	
<b>Total Observations</b>		<b>14</b>

**Sedges**

Species Common Name	Species Scientific Name	Number of Observations
Bulrush	<i>Typha sp.</i>	1
Slough sedge	<i>Carex obnupta</i>	2
<b>Total Number of Species</b>	<b>2</b>	
<b>Total Observations</b>		<b>3</b>

**Grasses**

Species Common Name	Species Scientific Name	Number of Observations
Common Reed	<i>Phragmites australis</i>	1
Dog's-tail Grass	<i>Cynosurus echinatus</i>	1
Eelgrass	<i>Zostera marina</i>	5
Reed Canary Grass	<i>Phalaris arundinacea</i>	1
Soft Rush	<i>Juncus effusus</i>	2
Tufted Hair Grass	<i>Deschampsia cespitosa</i>	1
<b>Total Number of Species</b>	<b>6</b>	
<b>Total Observations</b>		<b>11</b>



Menzies' tree Moss - image by: bradenjudson



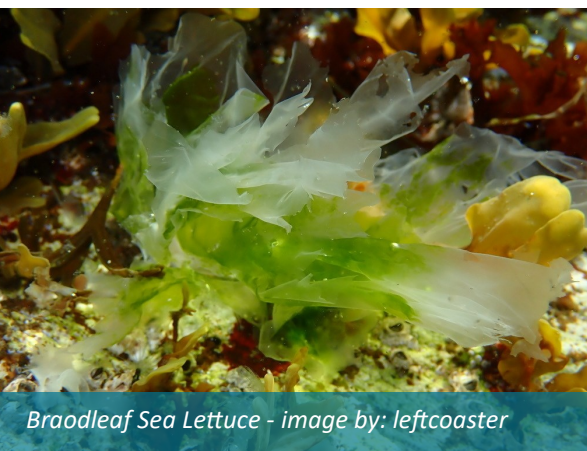
Reindeer Lichen - image by: garret293



Tree Lungwort - image by: bradenjudson

Mosses		
Species Common Name	Species Scientific Name	Number of Observations
Badge Moss	<i>Plagionium insigne</i>	2
Common Haircap Moss	<i>Polytrichum commune</i>	1
Common Pincushion Moss	<i>Dicranoweisia cirrata</i>	1
Drumsticks	<i>Aulacomnium androgynum</i>	1
Elongate Rock Moss	<i>Racomitrium elongatum</i>	1
Menzies' Tree moss	<i>Leucolepis acanthoneura</i>	1
Nuttall's Moss	<i>Homalothecium nuttallii</i>	1
Oregon Beaked Moss	<i>Kindbergia oregana</i>	2
Ribbed Bog Moss	<i>Aulacomnium palustre</i>	1
Rough Goose Neck Moss	<i>Hylocomiadelphus triquetrus</i>	1
Seductive Entodon Moss	<i>Entodon seductrix</i>	1
Stairstep Moss	<i>Hylocomium splendens</i>	2
Woolly Fringe Moss	<i>Racomitrium lanuginosum</i>	1
<b>Total Number of Species</b>	<b>13</b>	
<b>Total Observations</b>		<b>16</b>
Lichens		
Species Common Name	Species Scientific Name	Number of Observations
Bushy Lichen	<i>Ramalina sp.</i>	1
Common Lichens	<i>Lecanoromycetes sp.</i>	1
Hooded Tube Lichen	<i>Hypogymnia physodes</i>	1
Methuselah's Beard	<i>Usnea longissima</i>	1
Oakmoss	<i>Evernia prunastri</i>	2
Reindeer Lichen	<i>Cladonia portentosa</i>	1
Sarea Lichen	<i>Zythia resiniae</i>	1
Stonewall Rim Lichen	<i>Protoparmeliopsis muralis</i>	1
Tree Lungwort	<i>Lobaria pulmonaria</i>	5
Varied Rag Lichen	<i>Platismatia glauca</i>	1
Wirth's Beard	<i>Usnea flavocardia</i>	1
<b>Total Number of Species</b>	<b>11</b>	
<b>Total Observations</b>		<b>16</b>





Fungi		
Species Common Name	Species Scientific Name	Number of Observations
Alyxoria varia	<i>Alyxoria varia</i>	2
Corticoid Fungus	<i>Aleurodiscus grantii</i>	1
False Morel	<i>Gyromitra esculenta</i>	1
Rusty Firedot Lichen	<i>Blastenia ferruginea</i>	1
Stictis Mushroom	<i>Stictis radiata</i>	2
Veiled Polyphore	<i>Cryptoporus volvatus</i>	1
<i>Zythia resiniae</i>	<i>Zythia resiniae</i>	1
<b>Total Number of Species</b>	<b>7</b>	
<b>Total Observations</b>		<b>9</b>

Algae		
Species Common Name	Species Scientific Name	Number of Observations
Beanweed	<i>Scytosiphon lomentaria</i>	1
Black Pine Seaweed	<i>Neorhodomela larix</i>	1
Branched Red Algae	<i>Polysiphonia senticulosa</i>	1
Broadleaf Sea Lettuce	<i>Ulva latuca</i>	1
Delicately-Branched Red Seaweed	<i>Bonnemaisonia nootkana</i>	1
Coralline Algae	<i>Pseudolithophyllum sp.</i>	1
Green Rope Seaweed	<i>Acrosiphonia coalita</i>	1
Farlow's Seaweed	<i>Farlowia mollis</i>	1
Five-Ribbed Kelp	<i>Costaria costata</i>	1
Japanese Wireweed	<i>Sargassum muticum</i>	4
Mazzaella japonica	<i>Mazzaella japonica</i>	2
Purple Laver	<i>Porphyra umbilicalis</i>	1
Radial Centric Diatoms	<i>Thalassiosirales sp.</i>	1
Red Algae	<i>Pyropia sp.</i>	1
Red Eyelet Silk	<i>Sparlingia pertusa</i>	1
Red Seaweed	<i>Prionitis lanceolata</i>	1



Rockweed - image by: leftcoaster

Rockweed	<i>Fucus distichus</i>	7
Sea Cellophane	<i>Monostroma grevillei</i>	2
Sea Laurel	<i>Osmundea spectabilis</i>	1
Sea Lettuce	<i>Ulva spp.</i>	3
Seagrass Laver	<i>Smithora naiadum</i>	2
Sour Weed	<i>Desmarestia sp.</i>	1
Sugar Kelp	<i>Laminaria saccharina</i>	2
Turkish Tower	<i>Chondracanthus exasperatus</i>	1
Vesicled Rockweeds	<i>Fucus vesiculosus</i>	1
<b>Total Number of Species</b>	<b>25</b>	
<b>Total Observations</b>		<b>40</b>
<b>Total Flora Species Observed</b>	<b>167</b>	
<b>Total Number of Observations</b>		<b>290</b>

Table 2 consists of a complete list of the fauna recorded and identified from April 17 to April 19. Note that invasive species are highlighted in **RED**, exotic species are highlighted in **GREEN**, and species at risk in BC are highlighted in **BLUE**.



Belted Kingfisher - image by: ehessels

**Table 2. Compiled Findings from April 17, 18, and 19, 2021 MABR BioBlitz Fauna Species.**

Birds of Prey		
Species Common Name	Species Scientific Name	Number of Observations
Bald Eagle	<i>Haliaeetus leucocephalus</i>	5
Turkey Vulture	<i>Cathartes aura</i>	1
<b>Total Number of Species</b>	<b>2</b>	
<b>Total Observations</b>		<b>6</b>
Shore Birds		
Species Common Name	Species Scientific Name	Number of Observations
Belted Kingfisher	<i>Megaceryle alcyon</i>	1
Black Oystercatcher	<i>Haematopus bachmani</i>	2
Greater Yellowlegs	<i>Tringa melanoleuca</i>	2
Killdeer	<i>Charadrius vociferus</i>	1
<b>Total Number of Species</b>	<b>4</b>	
<b>Total Observations</b>		<b>6</b>





Brant - image by: salmonskyview



Wood Duck - image by: ehessels



Black-Throated Grey Warbler - image by: guymonty

Waterfowl		
Species Common Name	Species Scientific Name	Number of Observations
American Wigeon	<i>Mareca americana</i>	1
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	3
Brant	<i>Branta bernicla</i>	3
Bufflehead	<i>Bucephala albeola</i>	2
California Gull	<i>Larus californicus</i>	2
Canada Goose	<i>Branta canadensis</i>	3
Common Loon	<i>Gavia immer</i>	2
Common Merganser	<i>Mergus merganser</i>	3
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>	1
Glaucus-Winged Gull	<i>Larus glaucescens</i>	3
Great Blue Heron	<i>Ardea herodias</i>	2
Harlequin Duck	<i>Histrionicus histrionicus</i>	2
Mallard Duck	<i>Anas platyrhynchos</i>	4
Mew Gull	<i>Larus canus</i>	2
Northern Pintail	<i>Anas acuta</i>	1
Red-Breasted Merganser	<i>Mergus serrator</i>	2
Red-Necked Grebe	<i>Podiceps grisegena</i>	1
Wood Duck	<i>Aix sponsa</i>	2
<b>Total Number of Species</b>	<b>18</b>	
<b>Total Observations</b>		<b>39</b>
Forest Birds		
Species Common Name	Species Scientific Name	Number of Observations
Green-Winged Teal	<i>Anas carolinensis</i>	1
American Robin	<i>Turdus migratorius</i>	5
Anna's Hummingbird	<i>Calypte anna</i>	5
Black-Throated Grey Warbler	<i>Setophaga nigrescens</i>	1
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	1



Rufous Hummingbird - image by: ehessels



Red-Winged Blackbird - image by: mellouriero



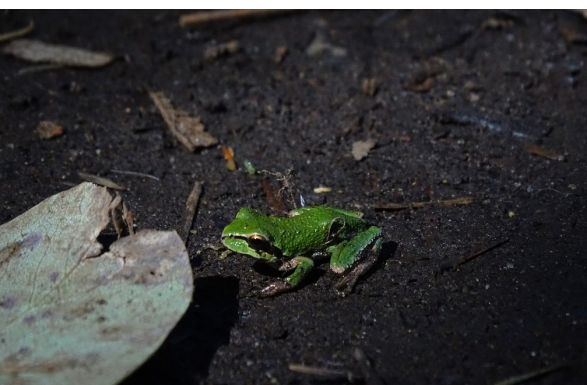
Yellow-Rumped Warbler - image by: ehessels

Brown's Creeper	<i>Certhia americana</i>	2
Chestnut-Backed Chickadee	<i>Poecile rufescens</i>	4
Common Raven	<i>Corvus corax</i>	2
Common Yellowthroat	<i>Geothlypis trichas</i>	1
Dark-Eyed Junco	<i>Junco hyemalis</i>	6
European Starling	<i>Sturnus vulgaris</i>	2
Golden-Crowned Sparrow	<i>Zonotrichia atricapilla</i>	1
House Finch	<i>Haemorhous mexicanus</i>	1
Northern Flicker	<i>Colaptes auratus</i>	1
Northwestern Crow	<i>Corvus caurinus</i>	2
Orange-Crowned Warbler	<i>Leiothlypis celata</i>	3
Pacific Wren	<i>Troglodytes pacificus</i>	1
Pileated Woodpecker	<i>Dryocopus pileatus</i>	1
Pine Siskin	<i>Spinus pinus</i>	2
Red-Breasted Nuthatch	<i>Sitta canadensis</i>	4
Red-Breasted Sapsucker	<i>Sphyrapicus ruber</i>	1
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	2
Ruby-Crowned Kinglet	<i>Regulus calendula</i>	1
Rufous Hummingbird	<i>Selasphorus rufus</i>	2
Song Sparrow	<i>Melospiza melodia</i>	2
Spotted Towhee	<i>Pipilo maculatus</i>	3
Tree Swallow	<i>Tachycineta bicolor</i>	1
Varied Thrush	<i>Ixoreus naevius</i>	2
Violet-Green Swallow	<i>Tachycineta thalassina</i>	2
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>	2
Yellow Warbler	<i>Setophaga petechia</i>	1
Yellow-Rumped Warbler	<i>Setophaga coronata</i>	4
<b>Total Number of Species</b>	<b>32</b>	
<b>Total Observations</b>		<b>69</b>





Northern Alligator Lizard - image by: bradenjudson



Northern Pacific Tree Frog - image by: ehessels



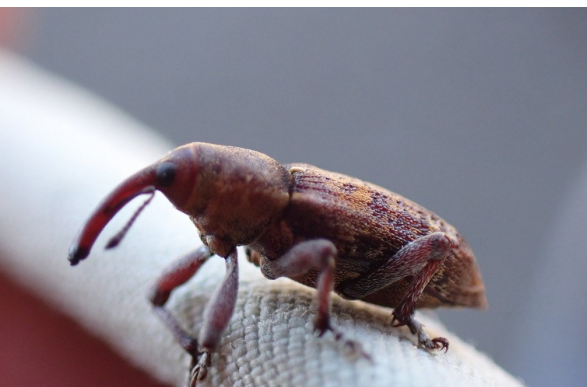
European Rabbit - image by: melloueiro

Reptiles		
Species Common Name	Species Scientific Name	Number of Observations
Common Garter Snake	<i>Thamnophis sirtalis</i>	3
Northern Alligator Lizard	<i>Elgaria coerulea</i>	2
Northwestern Garter Snake	<i>Thamnophis ordinoides</i>	2
<b>Total Number of Species</b>	<b>3</b>	
<b>Total Observations</b>		<b>7</b>
Amphibians		
Species Common Name	Species Scientific Name	Number of Observations
Northern Pacific Tree Frog	<i>Pseudacris regilla</i>	2
Western Toad	<i>Anaxyrus boreas</i>	1
<b>Total Number of Species</b>	<b>2</b>	
<b>Total Observations</b>		<b>3</b>
Mammals		
Species Common Name	Species Scientific Name	Number of Observations
American Red Squirrel	<i>Tamiasciurus hudsonicus</i>	1
California Sea Lion	<i>Zalophus californianus</i>	2
Columbian Black-Tailed Deer	<i>Odocoileus hemionus columbianus</i>	2
Domestic Rabbit	<i>Oryctolagus cuniculus domesticus</i>	1
Douglas' Squirrel	<i>Tamiasciurus douglasii</i>	1
Eastern Cottontail	<i>Sylvilagus floridanus</i>	1
European Rabbit	<i>Oryctolagus cuniculus</i>	1
Harbour Seal	<i>Phoca vitulina</i>	4
Mule Deer	<i>Odocoileus heminus</i>	1
<b>Total Number of Species</b>	<b>9</b>	
<b>Total Observations</b>		<b>14</b>





Brown Elfin - image by: bradenjudson



Pine Weevil - image by: jey42



Stink Bug - image by: ehessels

Insects and Arachnids		
Species Common Name	Species Scientific Name	Number of Observations
Banded Carpet Moth	<i>Epirrhoe plebeculata</i>	1
Brown Elfin	<i>Callophrys augustinus</i>	2
Common Snakeflies	<i>Agulla spp.</i>	2
Digger Bee	<i>Anthophora spp.</i>	3
Giant House Spider	<i>Eratigena duellica</i>	1
Golden Paper Wasp	<i>Polistes aurifer</i>	1
Greater Bee Fly	<i>Bombylius major</i>	1
Green Comma	<i>Polygonia faunas</i>	1
Ground Beetle	<i>Amara convexa</i>	1
Ground Beetle	<i>Amara discors</i>	1
Julia Orangetip	<i>Anthocharis julia</i>	1
Madrone Skin Miner	<i>Marmara arbutiella</i>	2
Mayflies	<i>Ephemeroptera spp.</i>	2
Montane Conifer Fly	<i>Dasysyrphus pauxillus</i>	1
Pine Weevil	<i>Pissodes sp.</i>	1
Ribbed Pine Borer	<i>Rhagium inquisitor</i>	1
Rove Beetle	<i>Anthophagini sp.</i>	1
Speckled Duns	<i>Callibaetis sp.</i>	1
Stink Bug	<i>Chlorochroa granulosa</i>	1
Two Banded Checkered Skipper	<i>Pyrgus ruralis</i>	2
Vancouver Island Bumble Bee	<i>Bombus vancouverensis vancouverensis</i>	1
Western Pine Elfin	<i>Callophrys eryphon</i>	2
Western Thatching Ant	<i>Formica obscuripes</i>	4
Western White-Ribboned Carpet	<i>Mesoleuca gratulata</i>	2
Woodland Ground Beetle	<i>Pterostichus sp.</i>	1
<b>Total Number of Species</b>	<b>25</b>	
<b>Total Observations</b>		<b>37</b>



Copper Rockfish - image by: leftcoaster



Pile Surfperch - image by: leftcoaster



Northwest Ugly Clam - image by: leftcoaster

Fish		
Species Common Name	Species Scientific Name	Number of Observations
Blackeye Goby	<i>Rhinogobiops nicholsii</i>	1
Copper Rockfish	<i>Sebastes caurinus</i>	3
Kelp Greenling	<i>Hexagrammos decagrammus</i>	3
Lingcod	<i>Ophiodon elongatus</i>	2
Painted Greenling	<i>Oxylevius pictus</i>	2
Pile Surfperch	<i>Rhacochilus vacca</i>	1
Quillback Rockfish	<i>Sebastes maliger</i>	2
Rock Sole	<i>Lepidopsetta bilineata</i>	3
Saddleback Gunnel	<i>Pholis ornata</i>	1
Salmon	<i>Oncorhynchus sp.</i>	1
Scalyhead Sculpin	<i>Artedius harringtoni</i>	2
Shiner Surfperch	<i>Cymatogaster aggregata</i>	1
Striped Surfperch	<i>Embiotoca lateralis</i>	2
Tidepool Sculpin	<i>Oligocottus maculosus</i>	2
Tiger Rockfish	<i>Sebastes nigrocinctus</i>	1
Yellowtail Rockfish	<i>Sebastes flavidus</i>	1
<b>Total Number of Species</b>	<b>16</b>	
<b>Total Observations</b>		<b>28</b>
Bivalves		
Species Common Name	Species Scientific Name	Number of Observations
Blue Mussel Complex	<i>Mytilus edulis</i>	3
Butter Clam	<i>Saxidomus gigantea</i>	2
Fat Gaper	<i>Tresus capax</i>	2
Giant Rock Scallop	<i>Crassodoma gigantea</i>	1
Japanese Littleneck	<i>Ruditapes philippinarum</i>	6
North Pacific Lampshell	<i>Terebratalia transversa</i>	1
Northwest Ugly Clam	<i>Entodesma navicula</i>	1

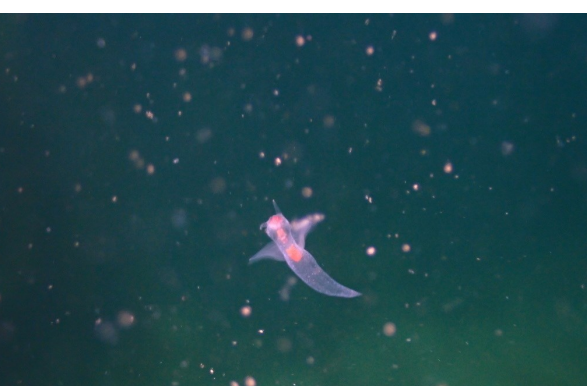




Spiny Scallop - image by: leftcoaster



Giant White Doris - image by: leftcoaster



Naked Sea Butterfly - image by: leftcoaster

Nuttall's Cockle	<i>Clinocardium nuttallii</i>	3
Pacific Oyster	<i>Magallana gigas</i>	10
Purple Mahogany Clam	<i>Nuttallia obscurata</i>	5
Reddish Scallop	<i>Chlamys rubida</i>	1
Spiny Scallop	<i>Chlamys hastata</i>	3
Straight Horsemussel	<i>Miodiolus rectus</i>	1
<b>Total Number of Species</b>	<b>13</b>	
<b>Total Observations</b>		<b>39</b>
<b>Mollusks</b>		
Species Common Name	Species Scientific Name	Number of Observations
Cancellate Hairysnail	<i>Trichotopis cancellate</i>	1
Carinate Dovesnail	<i>Alia carinata</i>	2
Channeled Topsnail	<i>Calliostoma canaliculatum</i>	1
Checkered Periwinkle	<i>Littorina scutalata</i>	1
Common Periwinkle	<i>Littorina littorea</i>	1
Giant Pacific Octopus	<i>Enteroctopus dofleini</i>	1
Giant White Doris	<i>Doris odherni</i>	1
Green False-jingle	<i>Pododesmus macrochisma</i>	1
Hooded Puncturella	<i>Puncturella cucullate</i>	1
Japanese False Cerith	<i>Batillaria attramentaria</i>	6
Lacuna Snails	<i>Lacuna sp.</i>	1
Leafy Hornmouth	<i>Ceratostoma foliatum</i>	1
Lewis' Moon Snail	<i>Neverita lewisii</i>	7
Lottini Limpet	<i>Lottini sp.</i>	1
Mask Limpet	<i>Lottia persona</i>	1
Milky Slug	<i>Deroceras reticulatum</i>	1
Monterey Doris	<i>Doris montereyensis</i>	6
Mossy Chiton	<i>Mopalia muscosa</i>	1
Naked Sea Butterfly	<i>Clione limacuna</i>	1



Pacific Banana Slug - image by: court\_v



Red-Fingered Coryphella - image by: leftcoaster



Pacific Blood Star - image by: leftcoaster

Pacific Banana Slug	<i>Ariolimax columbianus</i>	2
Plate Limpet	<i>Lottia scutum</i>	3
Predaceous Aeolis	<i>Himatina trophina</i>	1
Rainbow Nudibranch	<i>Dendronotus iris</i>	2
Red-Fingered Coryphella	<i>Coryphella verrucosa</i>	2
Rock Snail	<i>Scabrotrophon maltzani</i>	1
Rocking Chair Limpet	<i>Lottia instabilis</i>	1
Sea Lemon	<i>Peltodoris nobilis</i>	1
Sea Lemon	<i>Peltodoris lentiginose</i>	3
Sitka Periwinkle	<i>Littorina sitkana</i>	1
White Lined Chiton	<i>Tonicella insignis</i>	1
Wrinkled Purple	<i>Nucella lamellose</i>	2
Yellow-Edged Cadlina	<i>Cadlina luteomarginata</i>	1
<b>Total Number of Species</b>	<b>32</b>	
<b>Total Observations</b>		<b>57</b>
<b>Sea Stars, Urchins, and Sea Cucumbers</b>		
<b>Species Common Name</b>	<b>Species Scientific Name</b>	<b>Number of Observations</b>
Armoured Sea Cucumber	<i>Psolus chitonoides</i>	1
Eccentric Sand Dollar	<i>Dendraster excentricus</i>	9
Feather Star	<i>Florometra serratissima</i>	1
Giant California Sea Cucumber	<i>Apostichopus californicus</i>	2
Giant Pink Sea Star	<i>Pisaster brevispinus</i>	2
Green Sea Urchin	<i>Strongylocentrotus droebachiensis</i>	1
Grey Brittle Star	<i>Ophiura luetkenii</i>	1
Leather Star	<i>Dermasterias imbricata</i>	16
Mottled Star	<i>Evasterias troschellii</i>	13
Ochre Sea Star	<i>Pisaster ochraceus</i>	1
Pacific Blood Star	<i>Henricia leviuscula</i>	5
Pacific Purple Sea Urchin	<i>Strongylocentrotus Purpuratus</i>	1





Vermilion Star - image by: leftcoaster



Pacific Sea Gooseberry - image by: leftcoaster



Umbrella Jelly - image by: leftcoaster

Pallid Sea Cucumber	<i>Cucumaria pallida</i>	1
Red Sea Urchin	<i>Mesocentrotus franciscanus</i>	2
Rose Sun Star	<i>Crossaster papposus</i>	4
Sand Star	<i>Luidia foliolata</i>	4
Slime Star	<i>Pteraster tessellatus</i>	2
Striped Sun Star	<i>Solaster stimpsoni</i>	1
Sunflower Sea Star	<i>Pycnopodia helianthoides</i>	4
Vermillion Star	<i>Mediaster aequalis</i>	5
Wrinkled Star	<i>Pteraster militaris</i>	1
<b>Total Number of Species</b>	<b>20</b>	
<b>Total Observations</b>		<b>77</b>

#### Jellies and Anemones

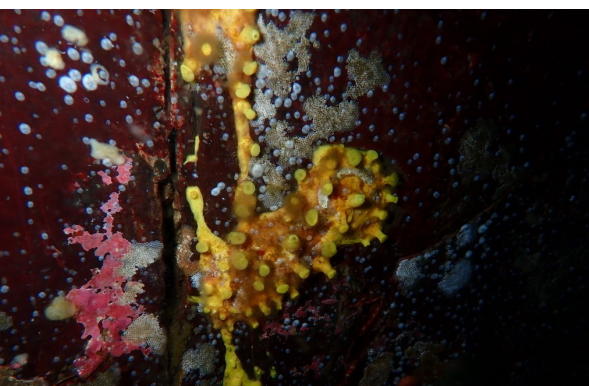
Species Common Name	Species Scientific Name	Number of Observations
Aggregating Anemone	<i>Anthopleura elegantissima</i>	1
Common Northern Comb Jelly	<i>Bolinopsis infundibulum</i>	3
Crystal Jelly	<i>Aequorea victoria</i>	2
Fringed Cerianthid	<i>Pachycerianthus fimbriatus</i>	1
Giant Plumose Anemone	<i>Metridium farcimen</i>	1
Moonglow Anemone	<i>Anthopleura artemisia</i>	5
Orange Sea Pen	<i>Ptilosarcus gurneyi</i>	1
Pacific Sea Gooseberry	<i>Pleurobrachia bachei</i>	1
Pacific Stubby Rose Anemone	<i>Urticina clandestina</i>	1
Pink-Mouth Hydroid	<i>Ectopleura marina</i>	1
Plumose Anemone	<i>Metridium senile</i>	1
Siphonophore	<i>Nanomia bijuga</i>	1
Small Planktonic Medusas	<i>Sarsia sp.</i>	1
Umbrella Jelly	<i>Eutonina indicans</i>	2
<b>Total Number of Species</b>	<b>14</b>	
<b>Total Observations</b>		<b>22</b>



Grainy Hermit Crab - image by: leftcoaster



Northern Kelp Crab - image by: leftcoaster



California Yellow Boring Sponge - image by: leftcoaster

### Crustaceans and Arthropods

Species Common Name	Species Scientific Name	Number of Observations
Bay Barnacle	<i>Amphibalanus improvans</i>	1
Bering Hermit Crab	<i>Pagurus beringanus</i>	1
Butterfly King Crab	<i>Cryptolithodes typicus</i>	2
Dungeness Crab	<i>Metacarcinus magister</i>	5
Giant Acorn Barnacle	<i>Balanus nubilus</i>	3
Giant Sea Spider	<i>Nymphon pixellae</i>	1
Grainy Hermit Crab	<i>Pagurus granosimanus</i>	1
Northern Kelp Crab	<i>Pugettia producta</i>	4
Pacific Acorn Barnacle	<i>Balanus glandula</i>	4
Purple Crab	<i>Hemigrapsus sp.</i>	1
Red Rock Crab	<i>Cancer productus</i>	4
Rhinoceros Crab	<i>Rhinolithodes wosnessenskii</i>	1
Yellow Shore Crab	<i>Hemigrapsus oregonensis</i>	3
<b>Total Number of Species</b>	<b>13</b>	
<b>Total Observations</b>		<b>31</b>

### Sponges

Species Common Name	Species Scientific Name	Number of Observations
California Yellow Boring Sponge	<i>Cliona californiana</i>	1
Glass Sponge	<i>Rhabdocalyptus dawsoni</i>	1
Rough Scallop Sponge	<i>Myxilla incrustans</i>	1
Orange Puffball Sponge	<i>Tethya californiana</i>	1
Spotted Grey Sponge	<i>Penares cortius</i>	1
<b>Total Number of Species</b>	<b>5</b>	
<b>Total Observations</b>		<b>5</b>





Red-Trumpet Calcareous Tube Worm - image by: leftcoaster



Wrinkled Tunicate - image by: leftcoaster



Fan Bryozoan - image by: leftcoaster

Worms		
Species Common Name	Species Scientific Name	Number of Observations
Feather Duster Worm	<i>Myxicola sp.</i>	1
Red-Trumpet Calcareous Tube Worm	<i>Serpula columbiana</i>	1
Tube Worm	<i>Protula pacifica</i>	1
<b>Total Number of Species</b>	<b>3</b>	
<b>Total Observations</b>		<b>3</b>
Tunicates		
Species Common Name	Species Scientific Name	Number of Observations
<i>Ascidia paratropa</i>	<i>Ascidia paratropa</i>	1
Bristly Tunicate	<i>Boltenia villosa</i>	1
Chain Tunicate	<i>Botrylloides violaceus</i>	1
Icy Tunicate	<i>Corella willmeriana</i>	1
Sea Hedgehog	<i>Halocynthia igaboja</i>	1
Shiny Red Sea Squirt	<i>Cnemidocarpa finmarkiensis</i>	1
Taylor's Social Tunicate	<i>Metandrocarpa taylori</i>	1
Wrinkled Tunicate	<i>Pyura haustor</i>	1
<b>Total Number of Species</b>	<b>8</b>	
<b>Total Observations</b>		<b>8</b>
Bryozoans		
Species Common Name	Species Scientific Name	Number of Observations
Branching Bryozoan	<i>Schizoporella errata</i>	1
Fan Bryozoan	<i>Dendrobeatia murrayana</i>	1
Orange Ripple Bryozoan	<i>Schizoporella japonica</i>	2
<b>Total Number of Species</b>	<b>3</b>	
<b>Total Observations</b>		<b>4</b>
<b>Total Flora Species Observed</b>	<b>222</b>	
<b>Total Number of Observations</b>		<b>455</b>



## ⋮ Future Blitzing

Our future goals are to continue to Blitz the entire Biosphere region, while highlighting core areas such as Wildlife Management Areas, and Provincial, Regional and Municipal parks. These areas maintain some level of protection and may be able to be consistently surveyed year after year to allow for an accurate comparison between species data. Using the iNaturalist application to record observations was a success and could be implemented again in future BioBlitz events.

The Mount Arrowsmith Biosphere Region is a stunningly beautiful and diverse region with a myriad of species to discover and steward. The incredible vertical range of the MABR allows for 2,100 meters of discovery from the highest peak of Mount Arrowsmith to the depths of the Salish Sea. Our team at the Mount Arrowsmith Biosphere Region Research Institute is inspired and eager to explore, engage, and educate one another about these important ecosystems and habitats that we all live in and share. The MABR BioBlitz has proven to be a well-received success within the community and our team at MABRRI looks forward to continuing the event throughout the MABR for years to come.

## ⋮ References

MABRRI. 2016. [prepared by: Jefferies, A., Lovestrom, N., & Harris, K.] 2016 MABR BioBlitz Summary Report. Vancouver Island University

MABRRI. 2019. [prepared by: Tomlin, H., & Vivani, A.] 2019 MABR BioBlitz Summary Report. Vancouver Island University

: Appendix A: Map of the Mount Arrowsmith Biosphere Region Boundary for the 2021 BioBlitz

