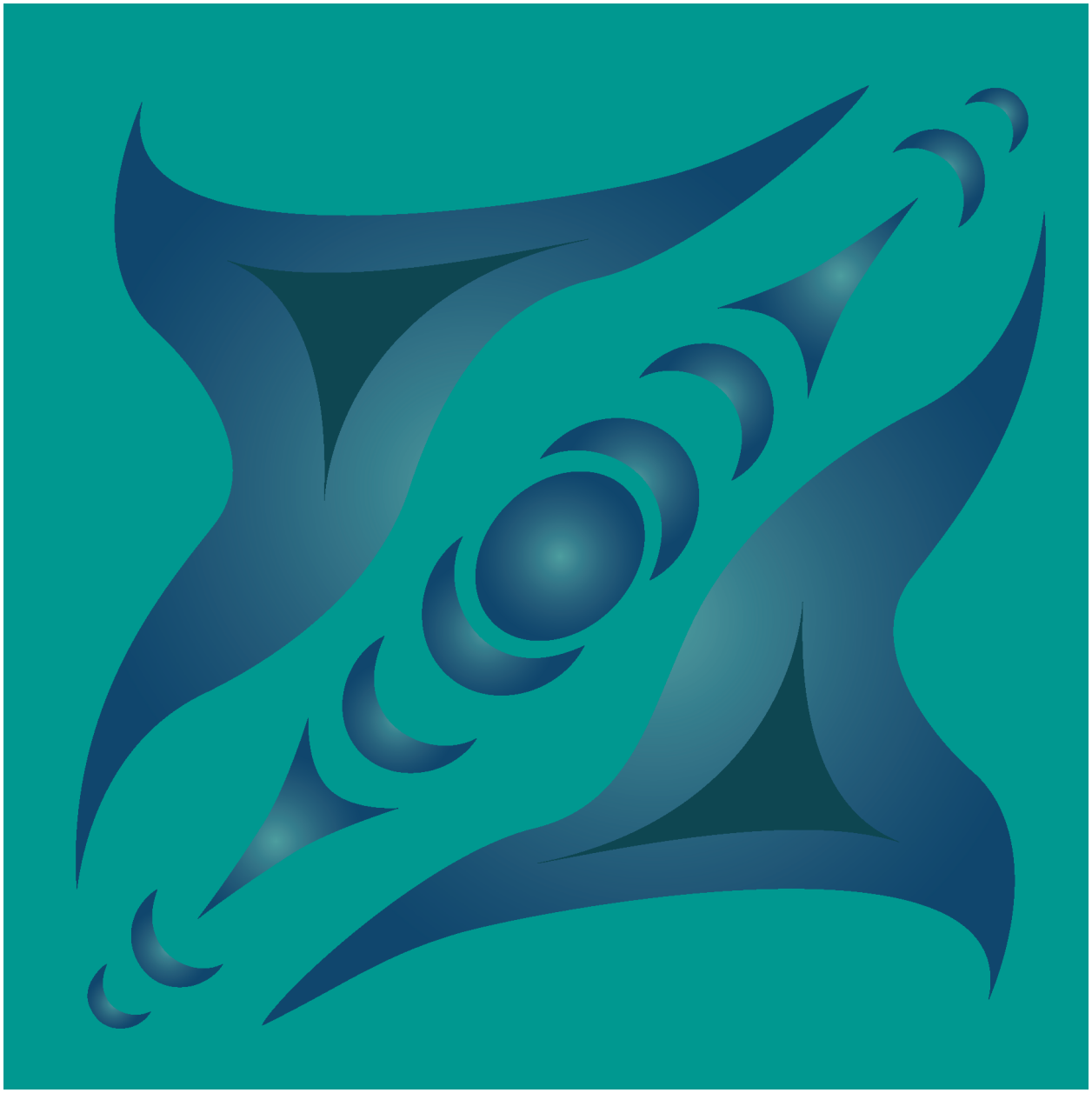
Part II: Biocapacity



This is a section of a larger report. Visit galianoconservancy.ca/oneisland/ for the full version

June 2022
Galiano Conservancy Association

Background

The **One Island, One Earth** project includes three separate but complementary analyses, each aimed at determining the **Biocapacity**, the **Ecological Footprint**, and the **Ecological Fingerprint** of the Galiano Island community. Part II of this report summarizes the results of our Biocapacity analysis; for the Ecological Footprint, see Part III, and for the Ecological Fingerprint, see Part IV.

Biocapacity represents the potential productivity of an area's biologically productive land and water surface.[1] Biocapacity is assessed in **global hectares (gha)**, a unit of measurement representing the productivity of an average bioproductive hectare on earth.[2]

What this means in practice is that areas of land (or water) that are above global average productivity will contribute more than one global hectare per hectare to the biosphere, whereas areas that are below global average productivity will contribute less than one global hectare per hectare. For example, a single hectare of a sagebrush desert ecosystem will almost certainly contribute fewer global hectares to the biosphere than a single hectare of tropical rainforest ecosystem. This system recognizes that, fundamentally, some surface areas of the planet have greater potential to support life than others.

Biocapacity is an annual measure of primary productivity, and therefore accounts only for those resources which are regenerated renewably on an annual basis. This is very important: it means that non-renewable resources which are used widely by humans, such as oil or copper, are not captured in a Biocapacity analysis. It also means that standing biomass, or the accumulated 'natural capital' of ecosystems, only *indirectly* informs biocapacity (by underwriting primary productivity), but does not in and of itself contribute to biocapacity totals.

In the simplest terms, if all of the Earth's ecosystems represented the capital invested in a bank account, then the Earth's Biocapacity is the annual interest that accrues on that account. Earth's residents may then choose how to spend that interest, and these expenditures are captured by the Ecological Footprint. If Earth's residents choose to spend more than the amount of the interest / Biocapacity, they begin to draw into the capital of the account, lowering the interest-generating amount for future generations. This is called **Overshoot**.

We decided to undertake a Biocapacity analysis for Galiano Island in order to help contextualize the Ecological Footprint results (see Part III), as well as to quantify some of the benefits provided by island ecosystems to the Galiano Island community and, by extension, to the biosphere.

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[1] The Global Footprint Network defines "productivity" as the amount of biological materials useful to humans that is generated in a given area. Productivity that isn't useful to humans is not taken into account. See Global Footprint Network. (2022). Glossary. https://www.footprintnetwork.org/resources/glossary/#:~:text=It%20is%20the%20ratio%20of,primary%20product

[2] Ibid.

Methods

The following datasets were provided to the **Global Footprint Network**[3] and used to estimate the Biocapacity for Galiano Island.

- Aerial Imagery - 2017 Aerial Imagery (Open access through the **Islands Trust**)
- **Carbon sequestration** values
    - Evaluation of Carbon Storage within Forests in the Coastal Douglas Fir Zone[4]
    - Carbon and Biodiversity Mapping and Assessment for the Islands Trust Area[5]
    - Datasets are available upon request from the Islands Trust Conservancy
- Land Use Map - Using 2017 and 2021 aerial imagery, we updated the land use map of Galiano Island for the first time since 2004. Both land use maps can be found in Appendix A.
- Marine **Net Primary Productivity** - 2018 catch numbers for the Pacific West Coast of Canada. Requested from Sea Around Us.
- Marine Buffer - Unlike nation states, small islands in the Salish Sea do not assert an **Exclusive Economic Zone**, or EEZ. After much discussion, we decided to create a 2 km buffer around Galiano Island and the surrounding "satellite" islands (Parker, Gossip, Wise, Charles, Sphinx and Julia) to use for generating an estimate of marine Biocapacity. We created similar buffers around Valdes, Penelakut, Salt Spring, Mayne, Prevost, Wallace, and Secretary Islands, and wherever overlap occurred with the Galiano Island buffer, we reduced the buffer to the midpoint between shorelines. We made this delineation as an attempt to represent a reasonable, non-overlapping zone of marine Biocapacity to inform this analysis. It is not meant to imply or claim any form of exclusivity of use.

Figure 4. The buffer area used to calculate the marine Biocapacity for the One Island, One Earth project.

[3] See https://www.footprintnetwork.org/
[4] Seely, B. (2012). *Evaluation of Carbon Storage within Forests in the Coastal Douglas Fir Zone.*
[5] Schuster, R. (2014). *Carbon and Biodiversity Mapping and Assessment for the Islands Trust Areas.* https://islandstrust.bc.ca/wp-content/uploads/2020/11/carbonassessment.pdf

Results

The following is our summary of the results provided to us by the Global Footprint Network; for their technical report, please visit www.galianoconservancy.ca/oneisland.

Terrestrial Biocapacity

The natural, undeveloped landscape of Galiano Island has an area of **5,681 hectares (ha)** and a Biocapacity of **7,750 global hectares (gha)**. This means that a hectare of natural land on Galiano Island is approximately **36% more productive than an average bioproductive hectare on planet earth.**

*Table 1. Biocapacity results by land class. For descriptions of land classes, see Appendix A. **The biocapacity of developed land (roads, utility corridors, etc.) represents the biocapacity potential of the space, 100% of which is currently being 'used' by the infrastructure on top of it, and is not otherwise accessible.*

Summary By Land Class:	Area Hectares	Biocapacity Global Hectares	% of Total Biocapacity
Rural Settlement	699	**965**	7%
Herbaceous	11	**9**	0%
Woodland	137	**111**	1%
Agriculture	77	**44**	0%
Young Forest	1,597	**2,149**	14%
Mature Forest	1,522	**2,318**	16%
Wetland	79	**63**	0%
Pole Sapling	921	**1,239**	8%
New Young Forest	456	**614**	4%
Cliffs	38	**50**	0%
Littoral	5	**6**	0%
Lacustrine	20	**11**	0%
Old Growth Forest	4	**5**	0%
Recent Harvest	47	**63**	0%
Riparian	68	**105**	1%
Natural Land	5,681	**7,750**	52%
(Subset: Protected Areas)	*1,702*	*2,361*	*16%*

Marine	10,112	**6,596**	44%
(Subset: Rockfish Conservation Area)	*3,847*	*2,510*	*17%*
Total functional Biocapacity	15,793	**14,373**	97%
Developed Land**	312	**492**	3%
Total Biocapacity	16,105	**14,839**	100%

The above-average bioproductivity of Galiano Island is largely due to forested lands. A hectare of forest on Galiano Island is approximately **4% more productive** than an average hectare of forest globally, but is **48% more productive** than an average hectare of Canadian forest. This is because Canadian forests are less productive than average: a hectare of Canadian forest is 29% less productive than an average hectare of forest on earth, and is 11% less productive than a global hectare, considering all land-use types.

Other ecosystem types on Galiano Island also contribute to the terrestrial Biocapacity of Galiano Island, albeit less so. Some ecosystems on Galiano Island are more productive per hectare than a global hectare (e.g. Riparian), and some are less (e.g. Agriculture). These values are derived in part from regional reports (see Methods section), and in part from the National Footprint and Biocapacity Accounts.[6]

Marine Biocapacity

The 2km marine buffer for Galiano Island has an area of **10,112 hectares (ha)** and a Biocapacity of **6,596 global hectares (gha)**. The Biocapacity of marine ecosystems is generally less per hectare than terrestrial ecosystems; nevertheless, marine biocapacity makes up at least **44% of Galiano Island's Biocapacity.**

Biocapacity Per Capita

Put together, the terrestrial and marine Biocapacity of Galiano Island yield a total functional Biocapacity of **14,373 global hectares (gha).** This value is derived largely from the highly productive forest and marine ecosystems that characterize the island. As of January 2022, **33% of this Biocapacity is in protected areas**. Approximately 3% of Galiano

A Note on How We Value Ecosystems

Through the lens of **Ecosystem Services,** ecosystems provide human beings with:

- Provisioning Services (ex. food production)
- Regulating Services (ex. carbon storage)
- Cultural Services (ex. recreation)
- Supporting Services (ex. nutrient cycling)

The metric of Biocapacity focuses narrowly on quantifying biological productivity in order to assess the human demand on ecosystems. It tells us nothing about biodiversity or other critical Ecosystem Services, such as air purification, water retention, or spiritual connection.

For example, while the 'Wetland' land class appears to make a low contribution to terrestrial Biocapacity in numerical terms, wetlands are incredibly valuable ecosystems in terms of biodiversity, water purification and storage, and flood mitigation.

It is also likely that current Biocapacity assessments underestimate the productivity of certain ecosystems, including wetlands and seagrass meadows, for which data are limited.

[6] The specific calculation factors (including Yield Factors) can be downloaded at www.footprintnetwork.org/licenses/calculation-factors-free/

Island's *potential* Biocapacity is currently tied up in human infrastructure, and therefore not included in the total.

Considering the effective population of Galiano Island (1,396 people full-time residents, plus 1327 full-time equivalent seasonal residents),[7] the Galiano Island community enjoys about **5.4 global hectares per capita.** This is a third of the Canadian average, but significantly higher than world average.

*Table 2. Galiano results in context. Source: Global Footprint Network National Footprint Accounts. 2018 values. *Land Area excludes the Biocapacity of marine areas. **See Part III of this report for a discussion of the Ecological Footprint of the Galiano Island community. This value accounts for 1396 full-time residents and 1327 full-time equivalent residents (based on estimates of part-time residents and tourists).*

Population	**Total Biocapacity** (gha/cap)	**Land Area* Biocapacity** (gha/cap)	**Total Ecological Footprint** (gha/cap)
Galiano Island	5.4	3.0	6.8**
Canadian Average	14.8	11.5	8.2
World Average	1.6	1.4	2.8

Land Use Change Over Time

To estimate the Biocapacity of Galiano Island, we updated the land use map for the island for the first time since 2004. We used the same categories employed in the Galiano Island UP-CLOSE report,[8] with some minor updates.

Notable changes over the past two decades include:

- **Forest succession of the majority of recently harvested areas** to pole sapling and pole sapling to young forest, with some conversion of recently harvested areas to rural settlement
- **8% Increase in wetland area** and increased flooding within wetland areas due to beaver activity
- **34% reduction in agricultural land use**, with conversion to rural settlement or wetland
- **37% Increase in rural settlement area** through conversion of other land uses

Small changes in the area of "Littoral" and other minor ecosystems are due to improvements in detection with access to higher quality 2021 aerial imagery, as well as the addition of Wise, Charles, Sphinx, and Julia islands, which were not included in the 2004 Land Use map. See Appendix A for a detailed description of the land use classes.

[7] See discussion of the Galiano Island population in Part III of this report.
[8] Emmings, K., & Erickson, K. (2004). *Galiano Island Landscape Classification and UP-CLOSE Workshop Series Final Report.* Galiano Conservancy Association, Galiano Island, BC.

*Table 3. Comparison of land use on Galiano Island from 2004 to 2021. * These % change values are attributable to improvements in mapping and the inclusion of Wise, Charles, Sphinx, and Julia Islands in 2021. ** 'Developed' includes roads, parking lots, gravel pits, utility corridors, exposed soil, and (sub)urban-style developments. 'Rural Settlement' includes the majority of island houses and associated developed areas.*

Land Use Class	2004 (%)	2021 (%)	Relative Change (%)	Overall Change (%)
Agriculture	1.94%	1.28%	-34%	-0.66%
Cliffs	0.64%	0.64%	-0.6%*	0.00%
Developed**	5.27%	5.33%	+1%	+0.06%
Herbaceous	0.20%	0.21%	+4%*	+0.01%
Lacustrine	0.21%	0.25%	+15%	+0.03%
Littoral	0.25%	0.27%	+7%*	+0.02%
Mature Forest	25.87%	25.31%	-2%	-0.57%
Old Growth Forest	0.07%	0.07%	-0.4%	0.00%
Pole Sapling	7.91%	15.30%	+93%	+7.38%
Recent Harvest	16.71%	1.45%	-91%	-15.26%
Riparian	1.17%	1.13%	-3%*	-0.04%
Rural Settlement	8.49%	11.64%	+37%	+3.15%
Woodland	2.32%	2.28%	-2%*	-0.04%
Wetland	1.30%	1.41%	+8%	+0.11%
Young Forest	27.63%	33.43%	+21%	+5.81%

Discussion

Terrestrial Biocapacity

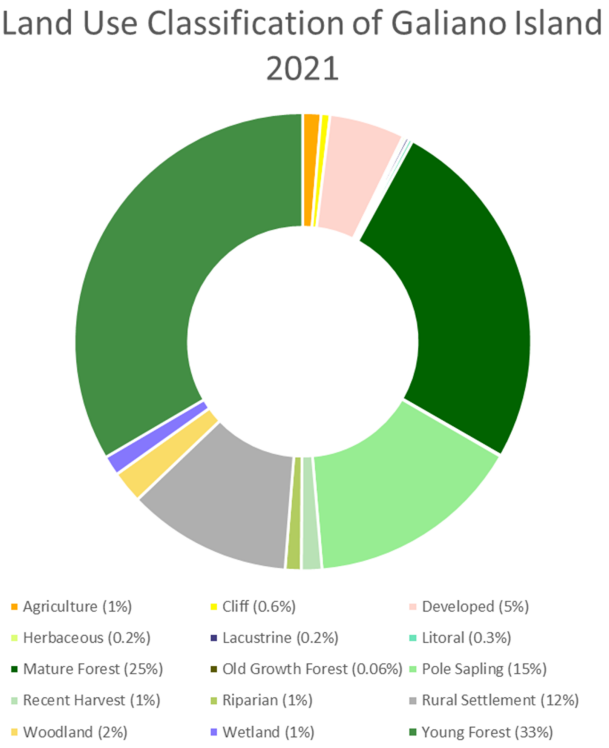

Figure 5. Galiano Islands Land Use, 2021

The terrestrial ecosystems that comprise Galiano Island are **36% more productive than the global average**, despite their location at the 49th parallel. This value reflects the incredible productivity and carbon sequestration potential of forested ecosystems within the Coastal Douglas-fir biogeoclimatic zone (CDFmm).[9] These results demonstrate that the Galiano Island community's efforts to prevent the continued clear-cutting and development of forested lands on the island (see section on 'Forests' in Part IV of this report) yielded significant benefits in terms of Biocapacity, as these forested ecosystems make an outsized contribution to the total. Although not considered in this analysis, it is well known that terrestrial ecosystems in the CDFmm, including Galiano Island, harbour a **disproportionately high species biodiversity value** as well.[10] Ecosystems that appear to have a low overall contribution to Biocapacity - including wetland, woodland, and littoral (shoreline) areas - make a high contribution to supporting island biodiversity and other important values.

While an expert has informed us that the regional analysis of carbon sequestration values of CDFmm forests that we use in this report underestimated carbon storage values,[11] it is likely that the terrestrial Biocapacity of Galiano Island presented here is an overestimate, as the methodology cannot and **does not take into account environmental degradation at the local scale**. This means that factors such as topsoil loss (erosion) and compaction, hydrological modification, biodiversity loss, pollution, and other impacts to ecosystem health are not captured. Ecosystem degradation may also be masked behind fertilisers or other energy intensive practices (for example, in agricultural land) that "prop up" regional productivity values for these land use types. Galiano Island's terrestrial ecosystems have a long history of clear-cut logging, agricultural drainage, gravel extraction, soil compaction, development and other practices.[12] This history of degradation may have lessened the overall functional Biocapacity relative to

[9] Seely, B. (2012). *Evaluation of Carbon Storage within Forests in the Coastal Douglas Fir Zone.*
[10] See Austin, M.A., Buffett, D.A., Nicolson, D.J., Scudder, G.G.E., & Stevens,V. (eds.). (2008). *Taking nature's pulse: The status of biodiversity in British Columbia*. Biodiversity BC.
[11] R. S. Brinkman (personal communication, January 14, 2022)
[12] See Emmings, K., & Erickson, K. (2004). *Galiano Island Landscape Classification and UP-CLOSE Workshop Series Final Report.* Galiano Conservancy Association, Galiano Island, BC. https://galianoconservancy.ca/wp-content/uploads/2016/11/final_report_complete.pdf

assumptions used for this analysis. Nevertheless, it is clear that the terrestrial ecosystems of Galiano Island continue to yield substantial benefits in terms of Biocapacity, well beyond the Canadian average and the global average.

Marine Biocapacity

The area we chose to consider in order to calculate Galiano Island's marine Biocapacity (10,112 ha) is almost twice as large as the terrestrial area (5,681 ha), and provides just under half of Galiano's Biocapacity (44%). This reflects the relatively low productivity of marine ecosystems per hectare when compared to terrestrial ecosystems, but also the outsized contribution marine productivity provides to coastal communities.

It is important to note that the Galiano Island community has no legal jurisdiction over the waters surrounding the island; indeed, the marine ecosystems of the Salish Sea have been shared since time immemorial[13] and cannot be claimed by any single community (see the 'Water' theme in Part IV of this report). With this understanding, and **solely for the purpose of this analysis**, we settled upon the 2km marine buffer that was used to generate these figures by employing a set of assumptions designed to (somewhat) equitably distribute the marine Biocapacity of the Salish Sea between the islands and coastal communities on the mainland. We wanted other neighbouring islands to be able to replicate this analysis without "double-counting" marine Biocapacity.

The virtue of our approach is that every other small island community within the Salish Sea could employ it to generate a non-overlapping marine buffer in order to calculate local Biocapacity, while leaving a substantial portion of the surrounding waters to "serve" the larger urban communities of Vancouver Island and the Lower Mainland. Admittedly, however, there are many other approaches to this analysis that could have been taken (for example, by allocating marine biocapacity by community population as opposed to by coastline) that would certainly change the results.

Additional Marine Productivity

The Biocapacity methodology does not account for the productivity of kelp, eelgrass, and other non-fish productivity. If the methodology included bivalves, fish, algae, plankton, and eelgrass, it is likely that in our region marine Biocapacity would be higher than our current estimate.

Kelp and eelgrass ecosystems are extremely productive, and we are still learning a lot about them. Future assessments could incorporate new findings in this area to improve Biocapacity methods.

The average marine Biocapacity per hectare of western Canada's exclusive economic zone (EEZ) was used for this analysis. This may result in an underestimate, as marine primary productivity tends to be higher closer to the coast, and the EEZ includes both coastal and offshore areas. The 2km marine buffer around Galiano Island, which consists of productive near-coastal marine ecosystems of the Salish Sea, would be

[13] See Abramczyk, U. (2017). *Hul'qumi'num peoples in the Gulf Islands: Re-storying the Coast Salish Landscape* (thesis). Retrieved on May 9, 2022 from https://dspace.library.uvic.ca/bitstream/handle/1828/8507/Abramczyk_Ursula_MA_2017.pdf?sequence=1&isAllowed=y

expected to have higher Biocapacity than the average across the entire EEZ for western Canada. At the same time, our **Ecological Fingerprint** analysis (see Part IV of this report) suggests that many important fish, shellfish, and macroalgae species are less abundant today than they were in the past. This implies that, although the *potential* productivity of these ecosystems is quite high, these values are compromised by industrial overfishing, pollution, habitat loss (i.e., docks and coastal development), the effects of a warming ocean, and other impacts to the health of marine ecosystems.

We emphasize, then, that **the marine Biocapacity is meant to be illustrative**. We currently lack the locally relevant data to properly quantify marine productivity for the waters around Galiano Island, and we recognize that this productivity is shared among the many human and non-human members of the Salish Sea community. Ultimately, we made the decision to include marine Biocapacity in this analysis because we recognize that marine ecosystems have always been foundational to human communities, cultures, and economies in the Salish Sea, and continue to play an important (if diminished) supportive role.

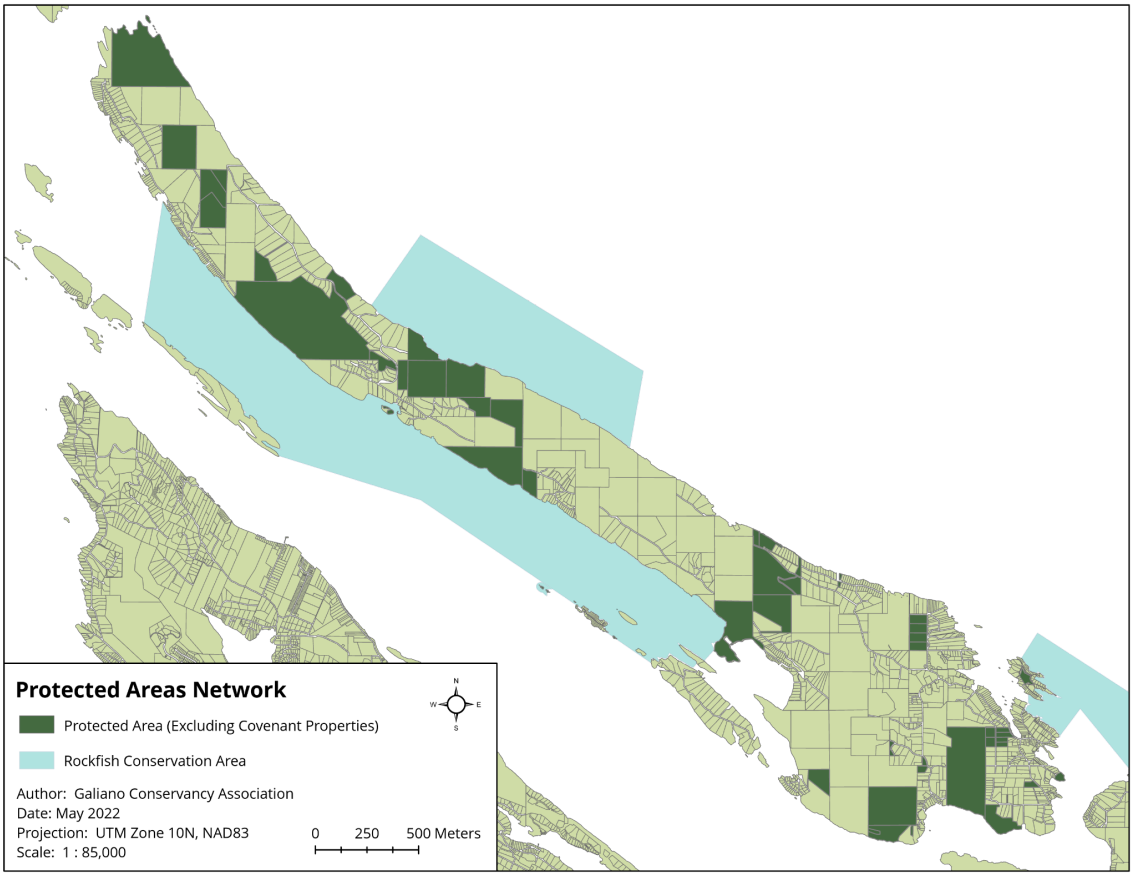

Figure 6. Protected Areas on Galiano Island Excluding Covenant Properties, 2022

Biocapacity Through Time

This report is a snapshot of Galiano Island's current Biocapacity, circa 2017-2021. The Biocapacity that we have estimated is not forever. Many factors can increase or decrease this value over time, including: development, land-use changes, ecological restoration, enhanced ecosystem management, climate change, natural disasters, pollution, and the unpredictable fluctuations of marine ecosystems.

As of January 2022, 16% of Galiano Island's Biocapacity existed within terrestrial protected areas, which comprised 28% of the island's land area.[14] **Rockfish Conservation Areas** in the surrounding waters accounted for an additional 17% of the Biocapacity. Therefore, **one third (33%) of Galiano Island's existing Biocapacity has some level of protection** in 2022.

A potential threat to Galiano's biocapacity is land-use change. In 2021, the land area of "Rural Settlement" on Galiano had increased by 37% relative to the 2004 area, or 3% overall. Newly "settled" areas were previously a combination of mature forest, young forest, pole sapling, developed land, agricultural land, and recently harvested forest land. This means that, while forest clearance and development are constrained on Galiano Island, some development continues to take place, with negative impacts on island Biocapacity. See Appendix A for land use maps from 2004 and 2021.

Comparisons

The relatively high Biocapacity of the lands and waters that comprise Galiano Island demonstrates that, if we were to treat the island as a microcosm of the world, 5.4 global hectares would be available to support each human community member (i.e., there are 5.4 gha/ca). In practice, of course, Biocapacity is fluid between contiguous areas such as the Salish Sea, and in a globalized economy **no community is "an island unto itself" in economic, ecological, and social terms.** Nearby cities such as Vancouver operate at a significant Biocapacity deficit[15] and require large areas of forest, farmland, ocean, and other natural and rural ecosystems to support them. In the past, many Galiano Island residents derived a significant amount of their basic livelihoods from the island itself (i.e., they relied *directly* on local Biocapacity), but in the present this is no longer the case, as the vast majority of resources are now imported to the island community from elsewhere. This regional and global interdependence means that looking at any community in isolation - as we do here - can only be done for educational and illustrative purposes, to understand the *relative* contributions made by local ecosystems.

Zooming out, Canadians on average have a Biocapacity of 14.8 gha/ca as a result of representing a relatively small population on a very large area of land and water. In contrast, Galiano Residents have only about one third of this Biocapacity available locally per capita. Globally, **the world's population has**

[14] This includes park lands, protected Crown lands, privately-held conservation lands, and conservation covenants.
[15] Rees, W., & Wackernagel, M. (1996). *Our ecological footprint: Reducing human impact on Earth*. New Society Publishers.

only about 1.6 gha/ca,[16] or much less than either Galiano Island or Canada enjoy. In the end, neither Galiano Island nor Canada are closed systems. While Canadians lay claim to a geographic area[17] that provides them with a disproportionate share of the Earth's Biocapacity, we argue that this does not necessarily entitle people who live in Canada to a disproportionate share of the Earth's productivity. Nevertheless, as we show in Part III of this report, that is exactly what Canadians - including the residents of Galiano Island - are using.

Conclusion

To our knowledge, this analysis represents the first time that a Biocapacity calculation has been attempted for a small island community. The results demonstrate that **Galiano Island contributes a disproportionately large amount of Biocapacity to the biosphere** relative to its size and geographic location**.** Most of this productivity is generated by intact forest and near-shore marine ecosystems, a significant percentage of which have some level of protection. This means that Galiano Island residents are acting as "stewards" of Biocapacity, and can take some pride in the accomplishments they have made in preserving productive natural areas. Efforts to maintain, restore, and enhance the productivity of island ecosystems will yield benefits for both Biocapacity *and* biodiversity.

At the same time, there are many threats to local, regional, and global Biocapacity that must be mitigated and addressed in order to maintain the productivity that the island community currently enjoys. Future work on this topic could examine how changes in marine ecosystems, and marine productivity in particular, impact Biocapacity calculations.

Finally, the concept of "Biocapacity" exists to provide a metric by which to judge the relative magnitude of the human Ecological Footprint - it is, simply put, the "numerator" in the equation of sustainability. At a global level, Biocapacity provides an annual "budget" for life on planet Earth; at a local level, Biocapacity represents Galiano Island's contribution to that budget. How island residents are currently spending (and exceeding) that budget is the subject of Part III of this report.

[16] See https://data.footprintnetwork.org/#/countryTrends?cn=5001&type=BCpc,EFCpc

[17] We note here that Canada is a settler colonial state, and its jurisdiction is contested by the many First Nations that fall within its self-defined "boundaries."

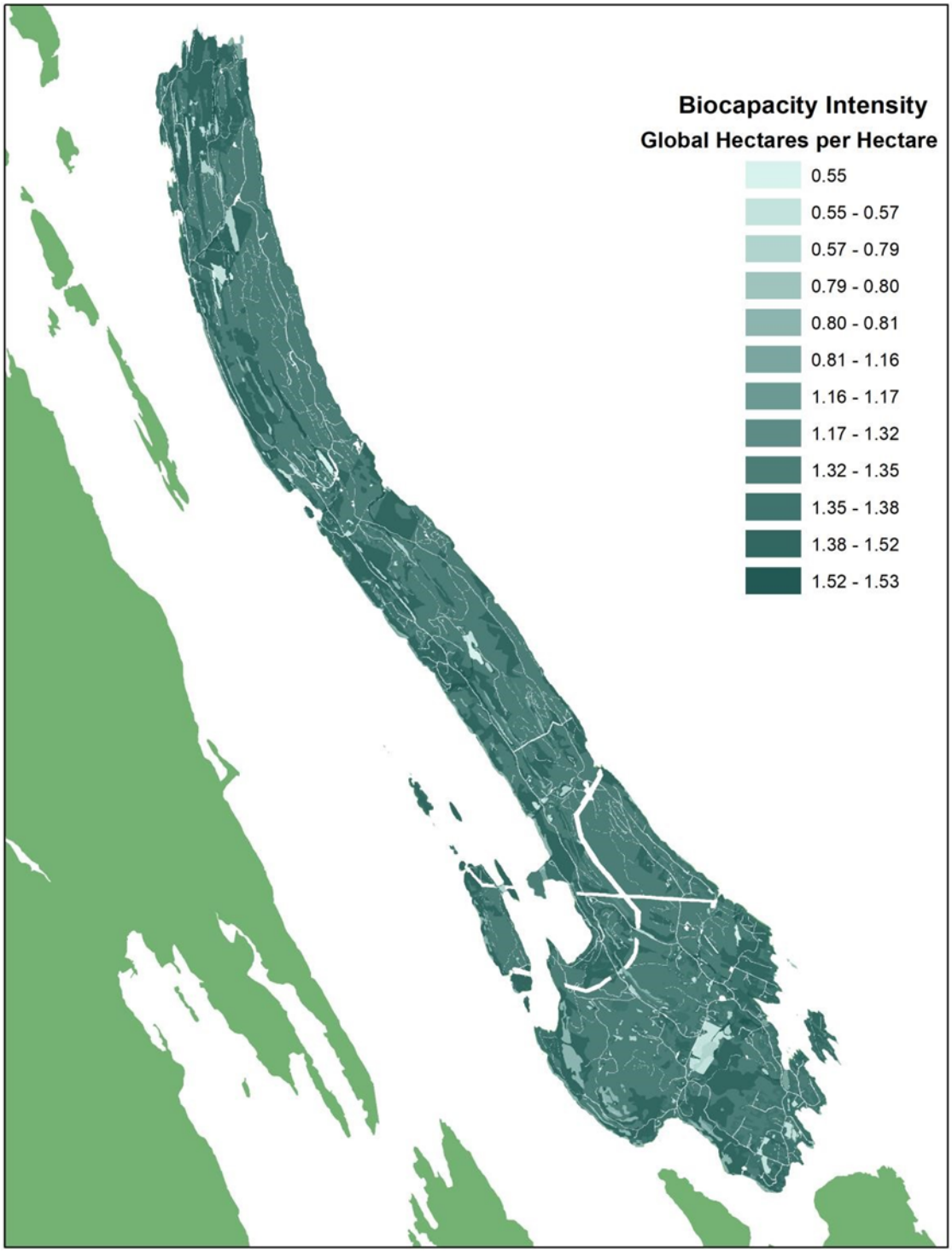

Figure 7. Terrestrial Biocapacity concentration across Galiano island ecosystems. Developed land areas and surrounding water areas are shown in white.

Glossary

Key Terms

Biocapacity - Biocapacity represents the productive potential of an area's biologically productive land and water surface; in other words, the capacity for ecosystems to regenerate plant matter. Biocapacity is measured in global hectares (gha).

BCIT Centre for Ecocities - An arm of the British Columbia Institute of Technology with the mission "to help cities and communities close their sustainability gap."

Tonnes of Carbon Dioxide Equivalent (tCO_2e) - Carbon Dioxide Equivalence expresses the impact of each different greenhouse gas in terms of the amount of CO_2 that would create the same amount of warming when released into the atmosphere. This enables reporting total greenhouse gas emissions with one measurement.

Carbon Sequestration - A natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form.

Carrying Capacity - The number of people, animals, or crops which a region can support without environmental degradation.

Climate Crisis - Refers to the planetary threat posed by continued anthropogenic emissions of greenhouse gases into the atmosphere; the term has come to replace 'climate change' and 'global warming' in discourses concerning global climate.

Consumption-based Emissions Inventory (CBEI) - A form of greenhouse gas emissions inventory that enables a region to quantify the emissions that are attributable to activities of individuals that reside within that region. CBEIs do not replace traditional 'territorial' inventories (see below), but rather they are complementary to them. CBEIs include the emissions that are generated during the production, shipping, use and disposal of all goods consumed in the region, regardless of where they are produced, as well as the impacts of residents and local businesses while they are travelling outside the community's borders.

ecoCity Footprint Tool - A tool developed by Dr. Jennie Moore, with the capacity to create multiple outputs for a community using "bottom-up" data sets: a territorial greenhouse gas emissions inventory, a consumption-based greenhouse gas emissions inventory, and an ecological footprint. See ecocityfootprint.org

Ecological Fingerprint - An evaluation of the particular attitude, self-image and intrinsic values a community adopts with respect to global resource use.

Ecological Footprint - An estimate of how much biologically productive land and water area an individual or population needs to produce all the resources it consumes and to absorb the waste it generates; in other words, the area that would be required to support a defined human population and material standard indefinitely. It is measured in global hectares (gha), where a global hectare is a biologically productive hectare with globally averaged productivity for that year.

Ecosystem Services - The direct and indirect contributions of ecosystems to human well-being. Ecosystems services including provisioning, regulating, supporting, and cultural values.

Embodied Energy - Energy used in creating and delivering a material (e.g., consumable good or infrastructure), including energy used for extraction of raw materials, manufacturing and transportation of the end product.

Embodied Emissions - Greenhouse gas emissions associated with creating and delivering a material (e.g., consumable goods or infrastructure), including those associated with energy used for extraction of raw materials, manufacturing and transportation of the end product.

Exclusive Economic Zone (EEZ) - The area of the sea in which a given nation state asserts special rights regarding the exploration and use of marine resources. In Canada, the EEZ extends 370 kilometers offshore.

Food Miles - The distance food travels from where it is grown or made to where it is purchased or consumed by the end user.

Global Hectares (gha) - A global hectare (gha) is a unit of biocapacity, representing the productivity of a bioproductive hectare on earth with average productivity. There are just over 12 billion biologically productive hectares on Earth. Global hectares are often expressed in terms of global hectares per capita (gha/ca).

Global Footprint Network - An international nonprofit organization founded in 2003 with a mission "to help end ecological overshoot by making ecological limits central to decision-making."

Islands Trust - The Islands Trust is a special purpose government mandated to preserve and protect over 450 Islands in the Salish Sea. The Province of British Columbia created the Islands Trust in 1974 in response to the potential environmental effects of dense residential subdivisions that were in development in the Gulf Islands. The mandate of the Island Trust is "to preserve and protect the Trust Area and its unique amenities and environment for the benefit of the residents of the Trust Area and of British Columbia in cooperation with municipalities, regional districts, improvement districts, First Nations, other persons and organizations and the government of British Columbia."

Net Primary Production - The difference between the energy fixed by autotrophs and their respiration; most commonly equated to increments in biomass per unit of land surface and time.

One Planet Living - A lifestyle that, if adopted by everyone, could be supported indefinitely by the regenerative capacity of Earth's ecosystems.

Operating Energy - The energy used in the function of a product, building, vehicle, etc.

Operating Emissions - The greenhouse gas emissions associated with operating energy.

Overshoot - Global overshoot occurs when humanity's demand on nature exceeds the biosphere's regenerative capacity or supply. Such overshoot leads to a depletion of Earth's life-supporting natural capital, including the buildup of waste such as ocean acidification from excessive CO_2 or climate change from greenhouse gas accumulation in the atmosphere.

Rockfish Conservation Areas - Areas designated by Fisheries and Oceans Canada where any fishing activities that impact on rockfish, lingcod, or their habitat (including activities resulting in bycatch of these species) are prohibited.

Senior Government Services - Services provided by Federal and Provincial governments to the citizenry; in Canada, this includes military, health care, administrative, and other high-level services that aren't accounted for at the local level.

Sustainability Gap - The difference between the estimated Ecological Footprint of a population and the Ecological Footprint that would achieve "One Planet Living" (see above).

Territorial Emissions Inventory - Also known as a Sectoral Inventory, a territorial inventory identifies direct greenhouse gas (GHG) emissions from all sources within a region. This is the standard type of GHG emissions inventory compiled by local, regional, provincial and federal governments.
A standardized approach to territorial inventories is prescribed by the GPC (Global Protocol for Community-Scale Greenhouse Gas Emissions Protocol).

Two-eyed seeing - According to Mi'kmaw Elder Albert Marshall: " to see from one eye with the strengths of Indigenous ways of knowing, and to see from the other eye with the strengths of Western ways of knowing, and to use both of these eyes together

Acronyms

BCIT - British Columbia Institute of Technology

CBEI - Consumption-based Emissions Inventory

CRD - Capital Regional District

CSPGS - Coast Salish Peoples of Galiano Society

CO_2/Co_2e - Carbon dioxide/Carbon dioxide equivalent

EF - Ecological Footprint

eF Tool - ecoCity Footprint Tool

EEZ - Exclusive Economic Zone

GCA - Galiano Conservancy Association

GFN - Global Footprint Network

gha - Global Hectares

gha/ca - Global Hectares per Capita (person)

ghg - Greenhouse Gas

GIRR - Galiano Island Recycling Resources

GPC - Global Protocol for Community-Scale Greenhouse Gas Emissions Protocol

ICBC - Insurance Corporation of British Columbia

MSW - Municipal Solid Waste

NPP - Net Primary Production

RCA - RockFish Conservation Area

SSREC - Salish Sea Renewable Energy Co-op