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Red-Breasted Sapsuckers at the Millard Learning Centre

Species Information

Ranging from southern Alaska to southern coastal California, the Red-Breasted sapsucker (*Sphyrapicus ruber*), a woodpecker with a unique taste for sap, inhabits a range of coastal and terrestrial ecosystems. This woodpecker, the Yellow-bellied sapsucker (*Sphyrapicus varius*), the Red-naped sapsucker *(Sphyrapicus nuchalis*), and Williamson's sapsucker (Sphyrapicus thyroideus) comprise the Sphyrapicus genus. Though four species of sapsucker live in North America, their ranges generally do not overlap (Cornell, 2017). The slight variations in appearance and foraging habits between the three subspecies of Sapsucker are likely attributed to the most recent glaciation (Rand, 1948). During the Pleistocene, populations of one sapsucker species were likely divided by the harsh glacial climate, causing the separated populations to quickly adapt to the niches of their rapidly changing environment (Rand, 1948). Even though the ice has now receded, each sapsucker species remains in the biogeoclimatic regions to which they have become so highly adapted since the Pleistocene, a geological epoch which ranged from 2.7 million to 11 700 years ago; however, most of the distinct biological characteristics of the sapsuckers we see today likely occurred during the holocene (10 thousand years ago to present). Mature red-breasted sapsuckers of coastal British Columbia have a completely redhead (juveniles have brown heads), with distinct red colourations covering their chest, and black-and-white-speckled body and wings. The red-breasted sapsucker is considered a subspecies listed as a "least concern" by the IUCN;

however, certain silvicultural practices and clear-cutting methods threaten the bird's distinctive ecosystem requirements (IUCN). Past large-scale clear-cutting logging practices by MacMillan Bloedel on Galiano Island greatly decreased the amount of suitable habitat for *Sphyrapicus ruber*, and certain replanting techniques also limit necessary tree diversity for the woodpeckers.

Ecological Services

Primarily noticed for its loud pecking on trees when boring holes for foraging or establishing territory (Cornell, 2017), *Sphyrapicus ruber* holds a complex and apparently important position in the ecosystems of Galiano Island, British Columbia. Red-breasted Sapsuckers bore series of shallow, horizontal holes (approximately 3 cm diameter by 4-5 cm depth) in living trees to later access leaching sap and insects that dwell inside the new habitat. Insects are not the only organisms to make use of these holes. Avian species such as the Rufous Hummingbird (*Selasphorus rufus*), a widely distributed and common hummingbird on Galiano, also prey on insects within the holes. The relationship between the rufous hummingbird and the red-breasted sapsucker is referred to as kleptoparasitism (the theft of another's food for individual benefit) (Brockmann & Barnard, 1979). This is commonly seen in species of spiders which share other spiders' webs and eat the insects that fly into the web before the web-spinning spider has a chance at the prey (Brockmann & Barnard, 1979). After the sapsucker is finished boring holes for later foraging, the rufous hummingbird will follow behind and steal the insects from the holes the sapsucker created.

Red-breasted sapsucker prefers forest edge habitats (Joy, 2000), so they often dwell adjacent to clearings, meadows, or swamps; this increases the diversity of flora and fauna the sapsuckers interact with. Apart from immediate benefits to its ecosystem, such as creating

habitat for insects and creating foraging grounds for insect-preying avian species, the red-breasted sapsucker serves as an indicator for the health, resilience, and integrity of an ecosystem. Sapsuckers only nest in dead trees, as the wood in dead trees is far easier to peck, yet they primarily feed from living trees (forage from 76.4% living and 23.6% dead trees) (Morrison et al., 1987). The sapsuckers also never return to the same nest the following nesting season, but they may return to the same tree (Joy, 2000). These reproductive and foraging demands suggest that ideal ecosystems for the success of the red-breasted sapsucker must contain forests with mixed successional stages, such as forests with dead trees and living trees of multiple species and an abundance of tree-dwelling insects. According to one study, the mean height at which these sapsuckers forage is 11.5m with the mean dbh (diameter at breast height) of these trees being 31.8cm (Morrison et al., 1987), which helps to estimate likely suitable habitat. With these habitat requirements in consideration, in order for an abundance of sapsuckers to inhabit (annually nest in, breed in, and forage around) an area, it best have an abundance of dead and living trees of multiple successional stages species in order for maximum available sap access, nesting grounds, and insect diversity. These are also all indicators of healthy, resilient, integral ecosystems. While unique cases where these requirements are fulfilled but the ecosystem is unhealthy, such as a forest which suffers from a lack of fauna (excluding sapsuckers) or herbaceous flora but still has an abundance of sapsuckers, may occur, but it is unlikely.

Millard Learning Centre (District Lot 57) Observations

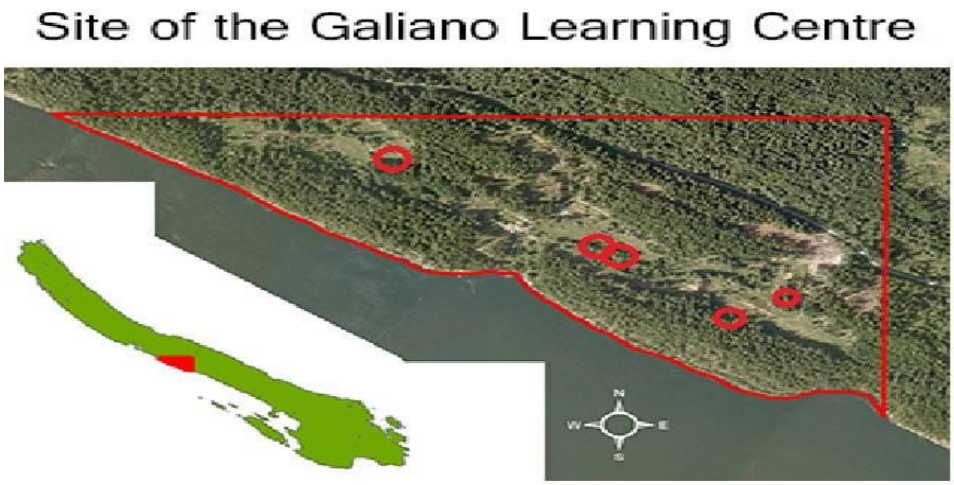

Figure 1 (*Sphyrapicus ruber* observations)

Figure 2

Figure 3

Figure 4

Figure 5

Over the course of several days, I monitored red-breasted sapsuckers throughout the Millard Learning Centre (MLC) property using several different methods; I performed acoustic monitoring by walking the MLC site, staying stationary for several minutes, then listening for red-breasted sapsucker calls and plotting where each call likely came from (see figure 1). I also observed and photographed the male and female sapsuckers foraging near and keeping watch over their nest (figures two three, four and five). One nest was located and there were several sightings of the sapsuckers both associated and unassociated with the nest. The male

sapsucker was most frequently seen outside the nest as the female was likely incubating her annual brood (Mike Hoebel, 2017). Though other nest sites likely exist on the property, the sapsuckers are territorial and have been observed hitting their beak against trees, road signs, and other objects with significant noise-amplifying abilities. The MLC sapsuckers foraged from a variety of conifers, primarily *Alnus rubra, Pseudotsuga menziesii,* and *Thuja plicata.* I also observed several rufous hummingbirds foraging insects from the holes the sapsuckers recently created.

Though the MLC property has several restoration projects underway and has a variety of ecosystems in varying states of recovery (from logging) as well as some old growth patches. Having been previously heavily logged at the mill site, and logged moderately throughout the rest of the property, much of the MLC property suffered habitat loss and ecological degradation. One area in particular, the Fuelwood Forest, is a perfect example of how a forest which appears healthy can have significantly limited biodiversity. The forest's purpose is to provide fuelwood for the Galiano Learning Centre, and it will shortly undergo a management process to fulfil this purpose; however, many past logging practices, such as clear cutting, lead to the large-scale replanting of trees (in replacement of the forests prior to clear-cutting) which produces similar forest dynamics to that of the fuelwood (limited biodiversity and successional diversity). Though excellent for producing fuelwood, silvicultural replanting aims to replant to replace, yet these are ecosystems that do not properly reflect, at least in early stages of recovery, the ecosystem structures that consist of diverse sizes and ages of trees. This ecosystem dynamic is essentially very fragile and at risk of collapse. Coincidentally, the red-breasted sapsucker requires an abundance of living trees for forage of sap and insects, and dead snags for forage of insects and nesting, meaning monocropped silvicultural techniques are not ideal for the

sapsucker either.

Conclusion

The combined knowledge of ideal foraging habitat and ideal breeding habitat suggest that the Red-Breasted sapsucker could serve as an indicator for resilient/integral ecosystems. By monitoring the characteristics of sapsucker habitat in a given area, one could potentially establish the composition of tree species while monitoring horizontal peck holes. The frequency of occurrence of these holes, their vicinity to the sapsuckers' nest sites, the level of habitation by bugs in the holes, and the amount of sap in each hole are all quantifiable factors which could both serve to monitor sapsucker populations and monitor ecosystem integrity. Since research was limited in the MLC site, further research could pursue the specifics of an equation capable of indicating sapsucker and ecosystem health; further monitoring of red-breasted sapsucker populations and nesting sites in MLC would assist in addressing exceptions and externalities to said equation.

Many tree-dwelling avian species are under threat by industrial logging in British Columbia considering "BC is the largest producer of softwood lumber in North America" (BC Council of Forest Industries). In order to maintain stable Red-Breasted sapsucker populations throughout ecosystems which have been degraded by logging practices, such as Millard Learning Centre, the local ecosystem restoration projects should consider the importance of a diverse species range of living and dead trees while considering future forest succession in order to maintain resilient ecosystems (logging should only occur in patches with corridors, on small scales over long periods of time). I recommend modeling this after Keith Erikson's Pebble

Beach restoration project (Galiano Conservancy Association, 2017). In this project, Keith experimented with regeneration ecology techniques such as installing snags in the ground and falling trees to maintain a sustainable abundance of both living and dead trees. These innovative ideas have proved wildly successful thus far; however, restoration is very place-specific. This will ultimately maximize the biodiversity by increasing the range of available habitats throughout the ecosystems of the MLC property. In order to ensure long term viability of suitable habitat around the MLC, human development must be limited, yet human intervention in restoration projects, such as at Pebble Beach, must continue.

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