

Opuntia fragilis in the San Juan Islands

In March 2017, I was on San Juan Island in Washington State for a few weeks at Friday Harbor Laboratories. This is a wonderful place, even at the end of winter with lots of rain most days, which meant I got a lot of work done that had nothing to do with cacti or succulents. The Friday Harbor Lab's housing and other facilities are very conducive to thinking and writing. But I also remembered from distribution maps (Benson 1982, Gorelick 2015) and a compendium of cactus herbarium records kindly compiled by Ben Legler of the Consortium of Pacific Northwest Herbaria that the diminutive brittle prickly pear cactus, *Opuntia fragilis*, was known from many parts of the San Juan Islands in the U.S., as well as from the Gulf Islands, which really are the same archipelago but in Canada. In fact, in the northern San Juan Islands and surrounding Salish Sea, cellphone coverage is now great if you have a Canadian phone plan ostensibly because of the large transmitting tower on Saturna Island in British Columbia.

Given that cacti were not my primary reason for being in Washington State, upon arrival, I only casually inquired about and looked for *Opuntia fragilis* when I had free time and the weather was to the standards of someone from a place with more blue skies. This turned out to be a case of mistaken nonchalance. While there are many documented locales for *Opuntia fragilis* in the San Juan Islands — see Figure 1 based on the aforementioned twenty herbarium records — this species is not common. It seems to grow almost, but not quite exclusively, on smaller islands, some tiny, i.e. fractions of an acre. Of the twenty herbarium records, only two were from large islands, one on private property at the southern tip of Lopez Island. The other specimen was from just south of Friday Harbor on San Juan Island, where the species is no longer found — that herbarium specimen was from 1923. The herbarium record from Waldron Island is also old, from 1908, and with vague locality information. For better or worse, the Washington State Ferries don't go to the smaller islands and



1. Locations of 20 herbarium records (▲) and one personal observation (■) of *Opuntia fragilis* in the San Juan Islands. Herbarium records courtesy of Ben Legler of the Consortium of Pacific Northwest Herbaria.



2. *Opuntia fragilis* on Jones Island with green stems in relatively rich moss and some soil.



3. *Opuntia fragilis* on Jones Island with orange stems in rock outcrop.

many of the documented locales are either on privately owned islands or on islands that you need a permit from the San Juan National Wildlife Refuge to visit. Even some modest sized islands, like Spieden Island that is two miles long, are privately owned. Furthermore, the few specimens on other large islands, such as on Whidbey Island, or on the mainland, such as



4. *Opuntia fragilis* on Jones Island with pinkish stems closer to the sea.

around Sequim, are apparently disappearing quickly.

It felt strange being in the San Juan Islands without a boat. I canoe to work and frequently boat to cottages in southern Ontario and even love being on an SUP (stand-up paddleboard) on the Pacific coast of California. So I did what any sane cactus enthusiast



5. My first view of *Opuntia fragilis* on Jones Island, looking like horse dung.

would do: hired a captain and a boat to see what we could find in places that were legal to visit. Given the size of the swells at times, I am glad that someone else was driving and that their boat was far more stable than any I own. It was a fun ride!

I only had a morning and started without much success. The Cactus Islands — yes these really exist on the Salish Sea — supposedly have a few prickly pears, but on islands managed by the San Juan National Wildlife Refuge. Next time I will plan ahead and try to get permits to visit there. After a few unsuccessful attempts at finding *Opuntia fragilis*, not having the right search image for where it might grow and not having the right search image for the plant itself, I finally found a massive and probably single clonal clump of them on the western side of Jones Island, which is a state park. I was dropped off at the campsite reserved for people arriving in non-motorized boats and only had to walk approximately 150 meters north along the trail to find them. These prickly pears were growing below the trail, at no more than 7 meters above sea level, with some cladodes growing down to what must be high tide levels in winter storms (Fig. 2).

There was lots of variation even in what I suspect was a single clone. Some cladodes on particularly rocky ledges had an orange-pink epidermis (Figs. 3 & 4). Those on richer soil or growing in moss were more green or at least greyish green. From a distance,

Opuntia fragilis growing on rocks closer to the sea (Fig. 5) looked like horse droppings! Some areoles were almost spineless, while others had four or five 1.5–2.0 cm spines.

This plant was different from ones that I have seen in Canada, Colorado, and Utah. The plant(s) on Jones Island had what struck me as enormous cladodes for this species, many of which were 5–6 cm long. Not only were they large, but they were almost spherical, resembling *Tephrocactus*, *Maihueniopsis*, and *Cumulopuntia* cladodes, not the flattened cladodes of North American *Opuntia* species, including many cladodes in this species. Then again, the San Juans get a lot more precipitation, almost all as rain, than do the grasslands, dry prairies, and high deserts where this species usually grows.

But what really struck me as different is that you could brush up against or (accidentally) step on cladodes of this plant on Jones Island without the cladodes detaching from the clump and then sticking to your clothing. I always check my shoes and socks, if I am wearing them, for hitchhiking cladodes when leaving a patch of *Opuntia fragilis*, but oddly found none doing this on Jones Island. The epithet ‘fragilis’ derives from this easy detachment of cladodes. With my index finger, I pressed on a few cladodes, but none fell off (as with almost all opuntiods, it is safe to touch the base of a cladode, without getting spines in your skin). It is as though there more vascular traces

or at least more lignified vascular traces in this specimen than I have seen in conspecifics. Admittedly, it still looks like cladodes do occasionally become detached and roll down the hill on Jones Island, but this seems to happen less readily than for conspecifics in more eastern parts of the species range, i.e. in grasslands, dry prairies and high deserts.

The distribution of *Opuntia fragilis* in the San Juan Islands, Gulf Islands, Puget Sound, Salish Sea, and Georgia Strait (all are more or less the same place) is peculiar. The sensible part is their living on rocky outcroppings that are not too shaded by trees. The specimen on Jones Island certainly qualified, with a few distant trees being not very big, mostly small madroñas (*Arbutus menziesii*) and stunted douglas firs (*Pseudotsuga menziesii*). Some of the known locales that I could not go to because of lack of a permit from the San Juan National Wildlife Refuge, such as the well-named Barren Island and Little Cactus Island, looked like barren rocks, without trees. But it is the occurrence on small islands and exclusion from similar looking habitats on larger islands that is perplexing, including their absence from bare rock outcrops along the coast of larger islands. One of the local naturalists, Phil Green from Yellow Island, where this species is native, suggested that *Opuntia fragilis* may be dispersed by sea otters (*Enhydra lutris*, Fig. 6) and maybe American mink (*Neovison vison*; a species I occasionally see while canoeing to work in Ottawa). I wonder whether sea otter dispersal is true, especially in light of the human extirpation of most sea otters and the extremely slow recovery of otter populations, especially in the Salish Sea (*Enhydra lutris kenyoni*). That might explain the lack of regeneration and dispersal of *Opuntia fragilis* in the past century. While the cladodes in the Jones Island plant(s) do not detach as readily as some — making the monikers ‘brittle’ and ‘fragilis’ a bit of a misnomer — I suspect an otter walking or sliding on these plants could dislodge a cladode. And, once detached, this species has spines that stick to things as would velcro, something I tested with one of the very few dislodged cladodes I found on Jones Island, before placing it back on the ground from where it came. Mammal dispersal is not that surprising. Historical ranges of *Opuntia fragilis* and American bison (*Bison bison*) are virtually identical. Benson (1982) proffered that *Opuntia fragilis* were probably dispersed by bison, while Barnett and Barnett (2016) proposed that extirpation of bison may have caused decline of *Opuntia fragilis* populations.

Another possibility is that *Opuntia fragilis* dispersal is via winter storms. The cladodes closest to the



6. Sea otter, *Enhydra lutris*, Cayucos, California (N.B. California sea otters are sometimes considered a separate subspecies from those in Washington, Oregon, British Columbia, and Alaska).

water at Jones Island certainly are frequently sprayed with sea water, which they seem to tolerate. Frego and Staniforth (1985) documented how *Opuntia fragilis* cladodes can be transported by both terrestrial mammals and by rivers. Why can't *Opuntia fragilis* also be transported by sea currents, like tiny wet temperate coconuts? If this species can survive 40 days in bearers of distilled water (Frego and Staniforth 1985), could they also survive a few days or even a few weeks floating in salt water? That would be a fun experiment to try. While dispersal by otter, mink, or winter storms on the open sea are currently just untested hypotheses, they are at least interesting hypotheses that are consistent with existing observations.

While naïveté got the better of me in hoping to see *Opuntia fragilis* in the San Juan Islands, lack of seeing these plants, except at Jones Island, raised interesting questions about their distribution, dispersal, and maybe even about their anatomy. During my next trip to University of Washington's Friday Harbor Laboratories, I will have to be better prepared, with permits, with more of a focus on this almost comically charming brittle prickly pear that manages to live so far from deserts and so close to the sea.

Acknowledgments

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