Citizen Science Snapshot: Coyotes

Vashon Nature Center

August 2016

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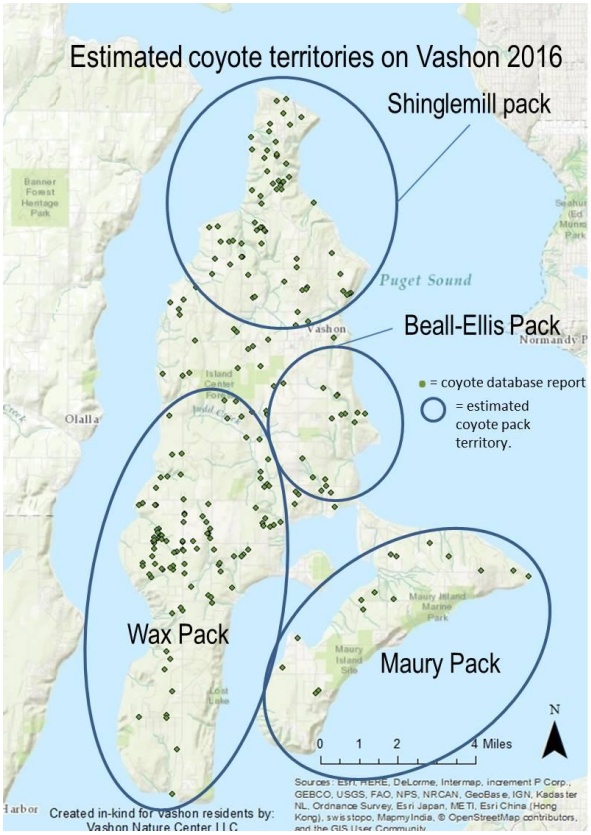
Introduction: Coyotes are fascinating animals that are highly social, incredibly adaptable, and learn quickly. As top predators on Vashon they carry the potential for multiple ecosystem benefits for our wild lands. Coyote activity can also cause challenges and considerable heartache for owners of domestic animals. We hope this information can be used to increase community awareness, and help us all become more effective at minimizing conflicts with coyotes. We also hope that this glimpse into coyote lives increases human appreciation for these animals. It is a joy to study our local packs, follow them through the years, and learn as much as we can about their lives and how they fit here as parts of our island community.

Citizen science research overview: This snapshot presents data collected through citizen science projects from 2011–August 2016. Data in this report comes from the following Vashon Nature Center organized, all-volunteer efforts: a citizen science database where community members report their sightings, hearings, and encounters with coyotes; a diet analysis of coyote scat with the help of local Vashon High School students and University of Puget Sound students and staff; two howling surveys; and a wild cam (wildlife cameras) study of coyote presence and identification of individuals. Vashon Nature Center has compiled this information for the community in the hope that it benefits us all and helps us make the best, most-informed decisions as we learn to live with our local wildlife.

Coyote distribution and population: Historical records indicate that coyotes have been on Vashon since at least the 1960s.The photo at right of a dead coyote ran in a May 1960 edition of the *Vashon-Maury Island Beachcomber*. There are anecdotal reports of sightings in the late 70's-80's, howls heard by equestrians at Paradise Ridge in early 2000's, and a road killed coyote confirmed in 2005.



Our best guess on pack territories in 2016 based on howling survey, wild cam, and reporting database data. Descriptions of likely pack ranges are provided in the text.

Combining information gleaned from our citizen science reporting network, howling surveys, scientific literature, and approximate coyote territory sizes; we estimate that currently Vashon-Maury Islands have about 45 coyotes. This is not a huge population of coyotes crammed into several small territories. Instead, our island population is likely comprised of 4 to 5 widely ranging family groups combined with a few loners or pairs that occupy the in-between areas. A howling survey is the most effective technique to determine pack ranges. These surveys, which involve playing recorded coyote howls and making note of any live coyote responses, are done in late June or early July. This is the best time to survey as this is when pups are just beginning to vocalize and they are quick to respond to any howls. In addition, it allows us to track whether or not packs are breeding (pups present or not). We cover

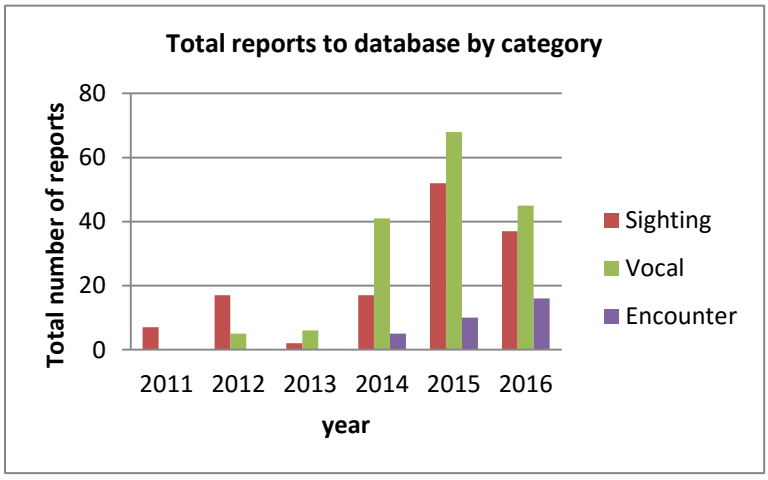
Vashon-Maury in one night, traveling much faster than a coyote pack could travel, to ensure that when we hear responses, we are hearing separate packs, not the same pack howling from a new area. In 2016, we obtained 4 separate responses indicating 4 packs on the island. Interestingly, we received a response from a pack all the way across Colvos Passage indicating that Colvos is not seen as a substantial divide to coyotes, but rather a place of interaction between coyote groups.

Wild cam studies point to a possible one-to-two-week cycle of travel for each pack of coyotes as they move through different areas of their range.

The above map represents our best guess of coyote pack ranges based on howling surveys, wild cam data, and database reports. We emphasize that this is only an estimate as none of our tools can provide a complete picture. We have named the following four potential packs; many of these packs seem to split into smaller sub-units for up to days at a time before converging together again. Additionally, coyotes mainly hunt alone when consuming their most common prey—rodents—so these packs should be considered quite fluid. Scientific estimates of rural coyote territory sizes range from 4-10 square miles which is consistent with our findings for Vashon:

- **Shinglemill Pack:** This pack is centered in Shinglemill drainage and likely covers all lands east and north including the north Colvos area, Bethel, Vashon Airport, Dilworth area, Muckleshoot lands, and north to the ferry.
- **Beall-Ellis Pack:** This pack is centered in the Ellis and Ellisport Creek drainages, and likely reaches west to Monument and Cemetery Roads, and into Island Center Forest.
- **Wax Pack:** This seems to be our widest ranging pack, centered in the Wax Orchards area but traveling throughout the whole Judd Creek drainage, Fisher Creek area and upper Burton, and all the way south to Tahlequah.
- **Maury Pack:** Records indicate that there is only one pack on Maury because there have never been howls heard in separate places on Maury at once.

There are areas on the above map that fall outside territory boundaries. Our boundaries are loose estimates as coyote territories expand and contract over time and between seasons. We also believe that there are some buffer areas between packs that lone transients occupy.



All reports in the database are broken down into 3 categories. Sighting=seeing a coyote; Vocal=hearing coyotes; encounter=interaction between domestic animals and coyotes.

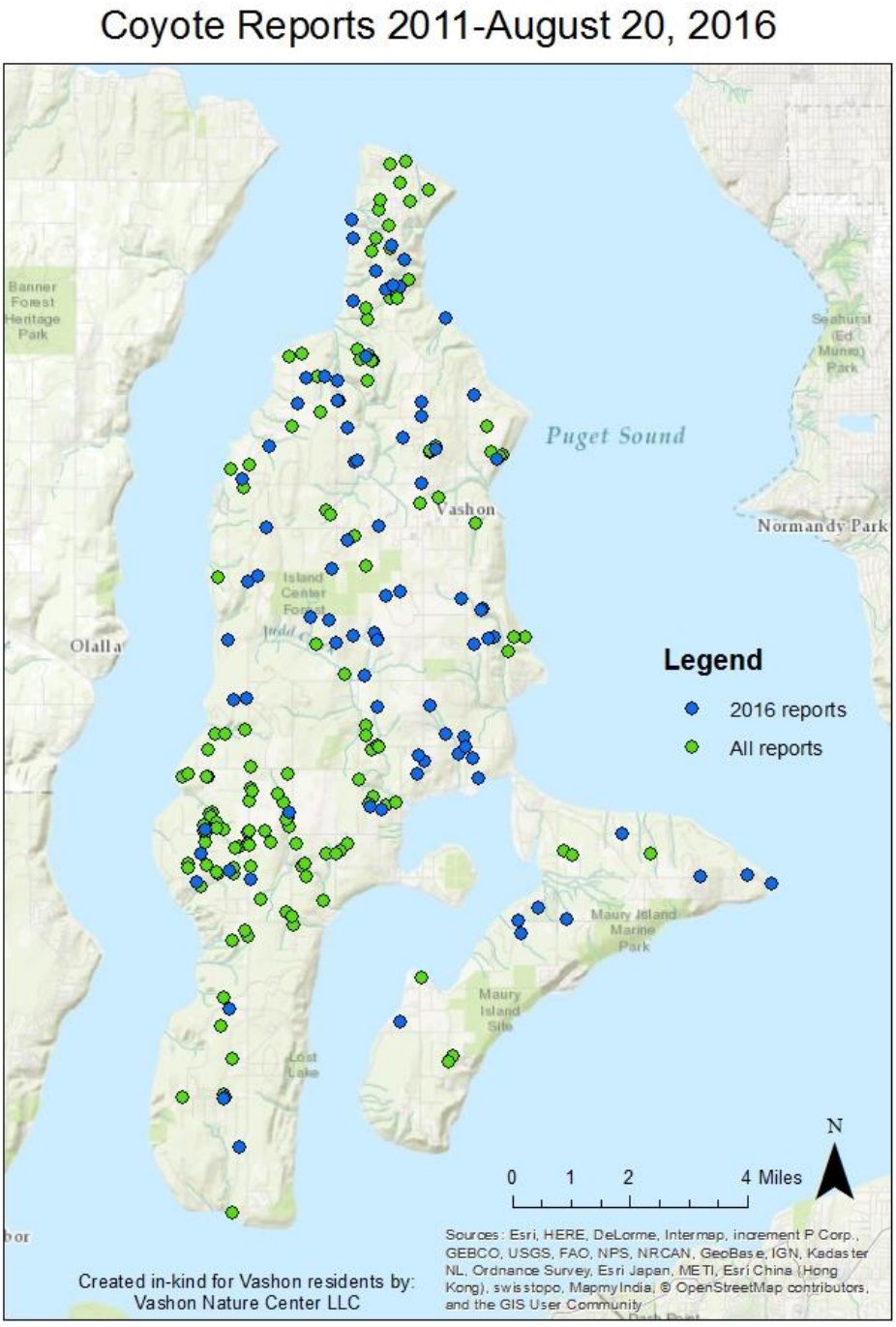
Our citizen science reporting network combines information from reports from more than 150 islanders from 2011–present, comprising 338 records. We are treating this as a representative sub-sample of the total coyote activities going on throughout the island, but qualify this by saying that the database is participation-based and only as good as the reports we receive.

- Notice the trend from only sightings in 2011 (indicating lone individuals) towards increased vocalizations in subsequent years. Lone coyotes don't howl, so howling indicates the presence of mating pairs or packs establishing territories.
- From 2011–August 2016 the number of encounters has increased indicating that coyotes have cued in to pets and livestock on Vashon, which were largely unprotected in 2011, many of which remain that way today. Encounters are conflicts between domestic animals and coyotes, for example, a coyote chasing a dog, or a coyote preying on a cat, sheep, or chicken. We only included reports of encounters with a high level of certainty. For example, if an owner reported a cat missing, we did not record it unless there was further evidence of a kill, as cats can go missing for many reasons. If an owner

reported a lamb killed and wound marks indicated a coyote interaction, we included it. This provides a conservative estimate of encounter numbers. The increase in encounters indicates that our community needs to work harder to safeguard our pets and livestock.

- Coyotes can be expected to be found anywhere on Vashon and Maury Islands.

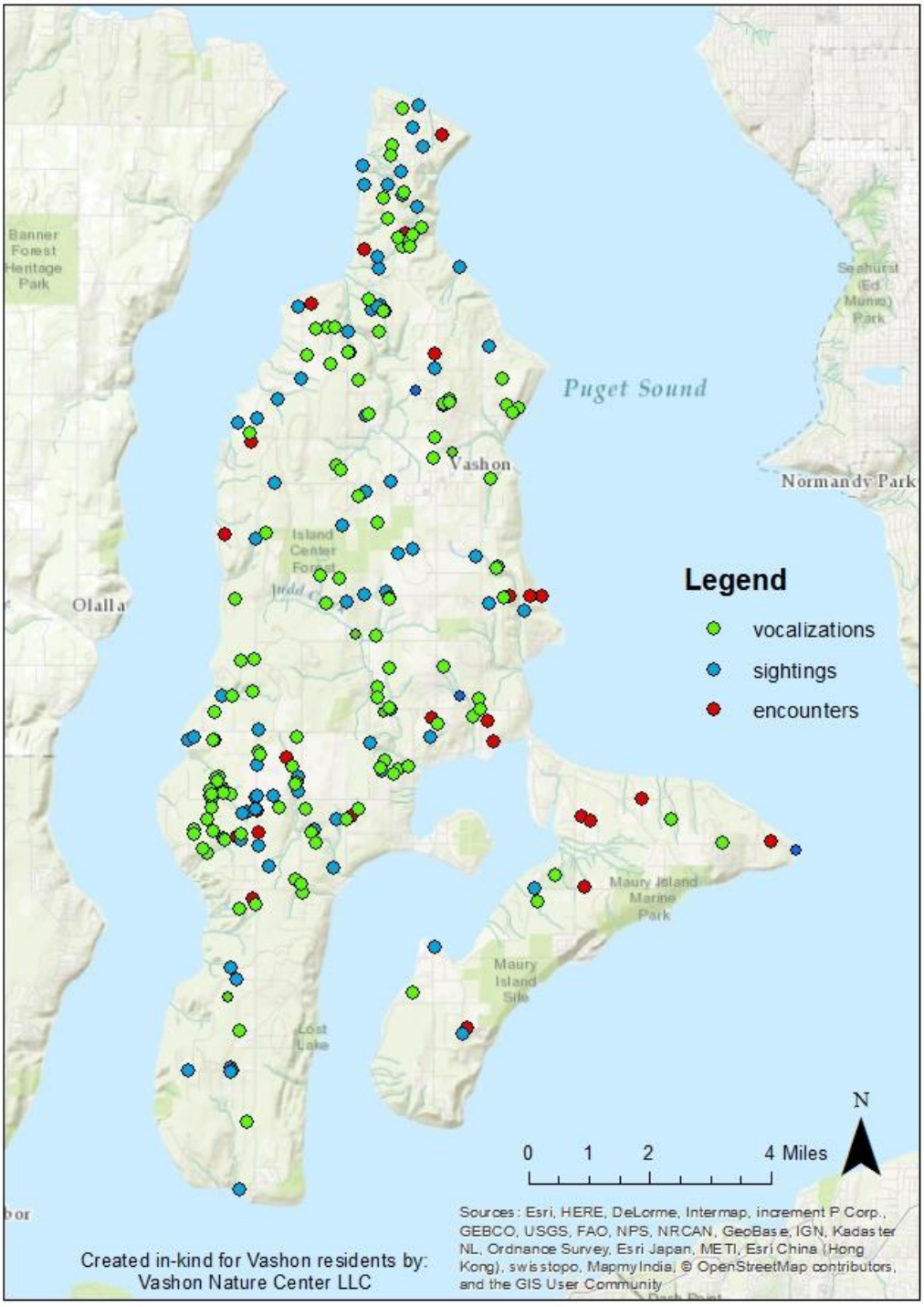
The following maps show coyote distribution throughout the island based on reports to our sightings network.



Coyote sightings, vocalizations, and encounters from 2011–August 20, 2016. 2016 reports are highlighted in blue. Currently, you can expect to find a coyote anywhere on Vashon, except for the Burton Peninsula.

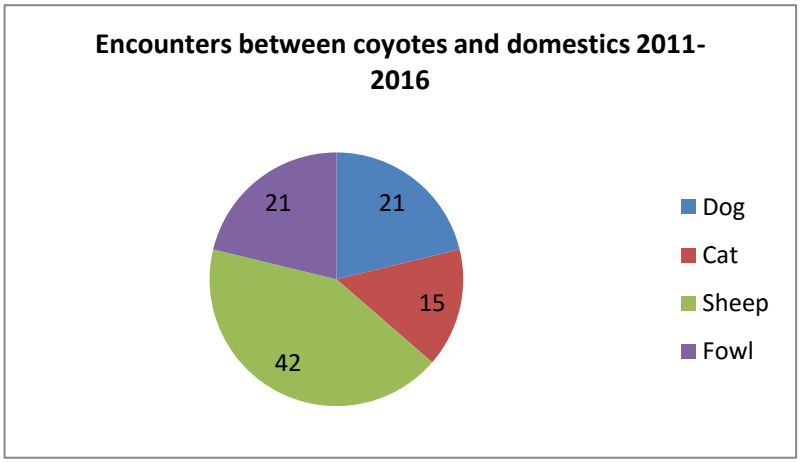
The map below divides all of our reports into 3 different categories: Sighting = seeing a coyote; vocal = hearing a coyote; encounter= interaction between a coyote and pets or livestock.

Coyote Reports 2011-August 20, 2016



All reports in database are shown separated into 3 categories. Sighting = seeing a coyote; vocal = hearing a coyote; encounter = interaction between coyotes and domestic animals.

Coyote interactions with domestic animals: The following analysis uses data from the citizen science reporting network.

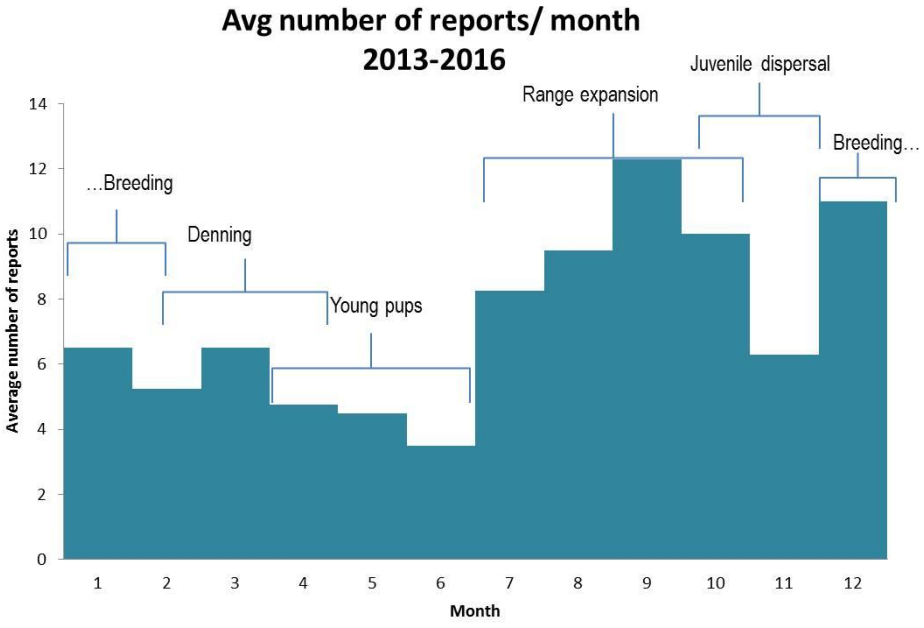


Encounters are defined as interactions between coyotes and domestic animals. In 6 years of reports (338 records), there have been 31 total encounters reported between coyotes and domestics (9% of all reports).

Sheep-coyote interactions form the highest proportion of all encounters (42%), and most of these encounters resulted in death to the sheep—both lambs and adults. Domestic fowl predation was most plentiful for free range unprotected chickens, ducks and geese. But this was not always the case. At times, coyotes were able to find access to chicken coops. Coyotes will defend their dens and young from wandering domestic dogs, and notes in the database indicate that this is the most common reason for coyote-dog interactions. This underscores the need for dogs to be kept on leashes, especially during spring and summer when pups are young. Cats make up 15 % of encounters between coyotes and domestic animals. There is anecdotal evidence that cats have more success if provided places of escape (i.e. small entrances under the house or perches--poles with platforms can be built if trees are not available). However, the only guaranteed protection from coyote encounters with cats is keeping cats inside or in protected areas or "catios".

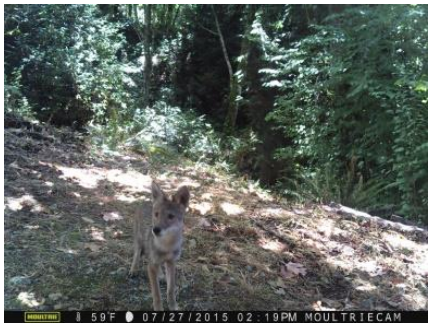
Coyote ecology and behavior:

Coyote activity levels (measured as the number of reports to our citizen science database) vary throughout the year. This variation coincides with the coyote life cycle. Coyotes are more frequently heard and seen in late summer when juveniles are dispersing and packs are increasing their territory sizes to accommodate new members (pups growing up). Coyotes are also seen and heard frequently during December when they start looking for mates. Coyotes tend to stay hidden during denning and when pups are young (February–June). Conflicts between domestic animals and coyotes happen all year round. However, we see an increase in late February and March (new pups in the den). We also see an increase from July to October when pups have grown older and can travel far with their parents rather than being kept in a protected spot (range expansion). While pets and livestock should be protected all year round, extra care should be taken during February–March and July–October. Dogs should not be allowed to wander from February–June because they could accidentally discover a den site or pups.

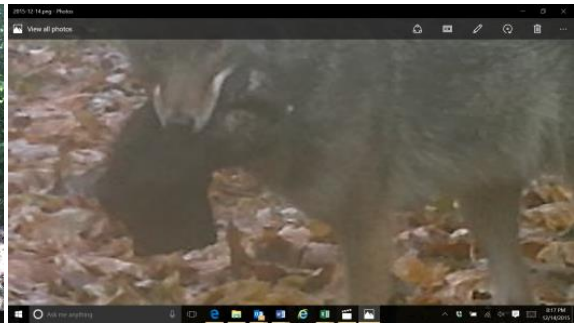


The average number of reports/month for our highest reporting years 2013-2016 shows a pattern of activity that corresponds to different phases of the coyote life cycle.

Coyotes are highly social animals and dedicated parents. Photos of island coyote families from our wild cam network:



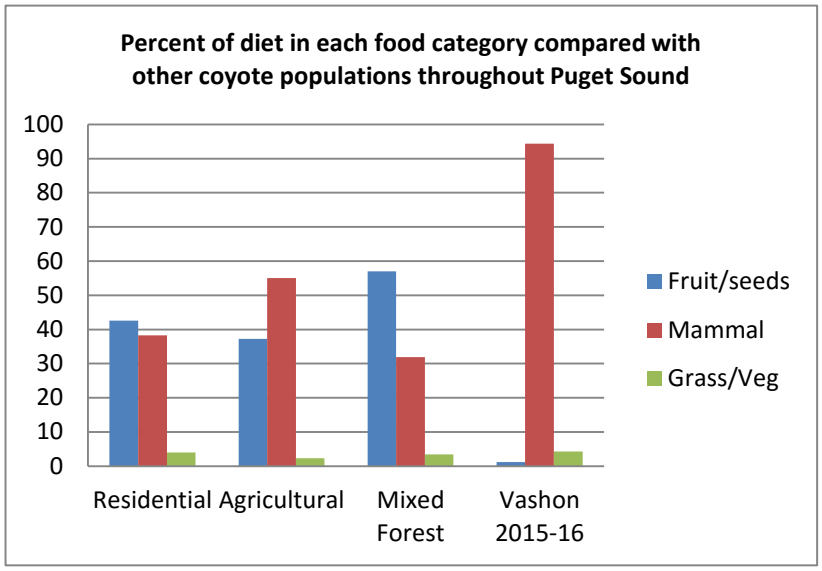
Young pup approx. 5 months old.



Adult apparently carrying a stocking cap!! Making the den cozy?

A juvenile that seemed to be head supervisor of that year's pups, "all ears."

What do Vashon-Maury coyotes eat?



A comparison of Vashon coyote diets to mainland coyotes (Quinn 1997). Our coyotes eat more meat than mainlanders!

Foods found in coyote scat on Vashon 2015–2016

(foods are listed in descending order from most commonly to least commonly found):

Vole—*comprised 94% of coyote scat content*
Grass/vegetation
Deer
Shrew
Rat
Mouse
Seeds
Raccoon
Gray squirrel
Salmonberry
Sheep
Domestic cat

Bird (feather fragments, domestic?)
Olive pits!

A comparison of coyote diets throughout the Puget Sound in several different habitats (residential, agricultural, and mixed forest) reveals that Vashon coyotes eat much more meat than mainland coyotes (above graph). Most of this comes in the form of voles (94% of scat contents). We hypothesize that coyotes on Vashon-Maury have access to plenty of natural foods compared to mainland coyotes, and maintain the luxury of eating their preferred food of small mammals and deer rather than having to supplement with considerable amounts of fruits. An analysis of coyote scat and owl pellets shows considerable overlap in diets suggesting competition between coyotes and owls for rodents in the long-term. As time goes on, it will be interesting to see if Vashon coyote diets change.

Diet study results indicate that there is high potential for coyote populations to decrease island rodent populations and benefit biodiversity in island ecosystems. By helping to control deer populations, coyotes could help to decrease the over-browsing of island forests, stream sides, and meadows, increasing local plant biodiversity. Through controlling meso-predators (raccoons and unprotected cats), bird, reptile, and amphibian populations could experience benefits from less predation pressure. It is interesting to note that while Eastern grey squirrel was found in coyote scat, the native Douglas squirrel was not. Douglas squirrels are quieter and perhaps can avoid predation better than the larger, non-native grey squirrels. All of these are ripe areas for further study on potential ecological influences of coyote presence.

Left: Large male coyote from Shinglemill pack. Right: Bob—nicknamed for his/her distinctive bobbed tail. This coyote helped us identify the large size of local coyote territories as he/she appeared in photos from several widely placed wild cams.

Questions for future research:

- Who are each of our individual coyotes, and packs, and how are they related to each other?
- Where did our coyotes come from, and how will the population fare genetically in the long-run? How much/often do coyotes travel to and from the island?
- How are coyotes influencing local biodiversity (specifically plant communities, birds, raccoons, deer, and native amphibians)?
- Have suggestions? Email us with your ideas: info@vashonnaturecenter.org.

Want to help?

- Report sightings through our website or to the Vashon Island Coyote Watch Facebook page. We partner with Vashon Island Coyote Watch to gather sightings so use the format easiest for you.
- Contact us to share tips on what is working for you in protecting pets or livestock.
- Have a wildlife camera? Become one of our island wild cam monitoring stations.
- Learn more about coyotes and spread the word (you can start with our island coyote fact page). The pamphlets on this page were created by the coyote working group, vetted by agency and university biologists and hosted on the VNC website. Share with neighbors and friends. An informed community helps us act as responsible neighbors to our local wildlife.
- Join the coyote working group and help grow a volunteer group of people interested in helping the local community adjust successfully to coyote presence. We want this to be a varied and representative group. Please contact Michael Tracy to be added to the list: mltracy@comcast.net

For more information or to get involved in the citizen science aspects of our research, please visit our website: vashonnaturecenter.org.

A huge thank you to VNC science advisor John Rupp for partnering on this research and to John, Kelly Keenan, and JoAnne Hennessey for their help setting wildcams. Thanks to Chris Anderson (WDFW) and Andy Cleland (USDA) for guidance on wild cam placement and howling survey protocols. Thanks to Avi Rana for mapping assistance. Thanks to the members of the coyote working group for their initial work on public outreach about coyotes. Kathryn True and Alex Koriath thanks for the editing. To all Vashon residents who reported to our database, allowed cameras on their properties, and either turned in coyote scat or helped us sort through it, phew! Thank you!