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Using stable isotopes to determine resource partitioning and the role of anthropogenic food sources on urban populations of Seattle and North Tacoma raccoons (Procyon lotor) and opossums (Didelphis virginiana)

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Using stable isotopes to determine resource partitioning and the role of anthropogenic food sources on urban populations of Seattle and North Tacoma raccoons (*Procyon lotor*) and opossums (*Didelphis virginiana*)

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### Introduction

With increased urban space and human-wildlife interactions, there is a clear need for research directed towards urban wildlife in order to better manage land use, wildlife populations, and health concerns. No previous studies have quantified the role of anthropogenic food sources in raccoon and opossum diets. Corn, a C₄ plant, is not found in Seattle and Tacoma except in processed human food, making it an excellent proxy for determining anthropogenic influence on wildlife diet. Anthropogenic food sources could include any human provided diet (ex: garbage or pet food).

### Questions

- How dependent are individual raccoons and opossums on anthropogenic food sources in Seattle and North Tacoma?
- Are the diets of co-occurring opossums and raccoons similar?
- Does the sampling location (distance to park edge) have an effect on diet of Seattle animals?
- Are marine resources an important diet component for any of the study populations?

### Materials and Methods

- Hair samples were collected from live animals in Seattle Parks and Point Defiance Park using hair snares, and from from museum specimens (Slater) for Tacoma and Vashon.
- Environmental samples (plant, soil and insect) were collected from Seattle Parks.
- Samples were prepped for stable isotope analysis at the UCSC SIL.
- δ¹³C value was converted to % C₄ by solving for fC₄ (bolded) in the equation below.

\[
\delta^{13}C = (f_{C_4} \times \delta^{13}C_{C_4}) + (f_{C_3} \times \delta^{13}C_{C_3})
\]

\[
f_{C_4} = 1 - f_{C_3}
\]

- Literature value for C₄ food sources (-26)
- Literature value for C₃ food sources (-12)

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Samples</th>
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<tr>
<td></td>
<td>Vashon</td>
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<td>Plant</td>
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### Discussion

- Despite the assumed abundance of natural food sources on Vashon, human food seems to be the preferred raccoon diet in the three regions sampled.
- Seattle opossums choose to eat a natural diet and stay within the parks regardless of park size, may reflect an increased wariness of humans or a preference for a natural diet or both.
- The difference in co-occurring population of raccoons in opossums in Tacoma and Seattle may be due to the fact no opossums found in the urban matrix were sampled in Seattle and no park opossums were sampled in Tacoma.
- Raccoons are either encountering human food in large parks or travelling farther to seek out human food.
- Despite the accessibility of the Puget Sound, marine resources are not an important food source for Tacoma, Vashon or Seattle raccoons or opossums.

### Future Directions

In order to collect a larger sample size from Pt. Defiance, different hair snare designs and different bait could be tested to snare raccoons. It would also be beneficial to collect hair samples from small mammals in these habitats to look at the diet of a different organism for comparison.

### Acknowledgements

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