Predicting shorebird habitat on the Arctic Coastal Plain of Alaska

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Objectives

- Document associations between the presence of shorebird species and large-scale physical and ecological variables
- Create predictive surfaces of shorebird species distributions on the Coastal Plain
Study Area

- Coastal Plain of Alaska: > 8.5 million ha area
As part of the Program for Regional and International Shorebird Monitoring (PRISM), randomly and non-randomly selected plots were surveyed during 9 years between 1998 and 2008.

Between 7 June and 1 July, shorebirds were surveyed using a single-visit, rapid area search technique.
We used presence-only models (partitioned Mahalanobis distance) to estimate and map habitat suitability of shorebirds.

Developed 28 ***a priori*** models with combinations of abiotic and biotic variables:

- Elevation
- Density of water bodies
- Distance to coast
- June temperature
- % water
- % riverine
- % wet meadow
- % moist meadow
- % upland tussock tundra
- % upland shrubby tussock tundra
- % upland scrub
Variable | Landscape mean | Plot mean
--- | --- | ---
Elevation | 60.29 | 21.95
% riverine | 0.08 | 0.14
% upland tussock tundra | 0.18 | 0.05
% upland shrubby tussock tundra | 0.09 | 0.00
% upland scrub | 0.08 | 0.03

Model results

Number of partitions | 5
Selected partition ($k$) | 1
Median calibration HSI | 0.94
Median validation HSI | 0.94
% accurately classified | 0.98
Dunlin HSI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Landscape mean</th>
<th>Plot mean</th>
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</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>60.29</td>
<td>10.71</td>
</tr>
<tr>
<td>% riverine</td>
<td>0.08</td>
<td>0.11</td>
</tr>
<tr>
<td>% upland tussock tundra</td>
<td>0.18</td>
<td>0.03</td>
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<tr>
<td>% upland shrubby tussock tundra</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>% upland scrub</td>
<td>0.08</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Model results

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<tbody>
<tr>
<td>Number of partitions</td>
<td>5</td>
</tr>
<tr>
<td>Selected partition ($k$)</td>
<td>1</td>
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<tr>
<td>Median calibration HSI</td>
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<tr>
<td>Median validation HSI</td>
<td>0.89</td>
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<tr>
<td>% accurately classified</td>
<td>0.87</td>
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Conclusions

- Baseline maps showing shorebird distributions within the Coastal Plain are now available for the first time.
- Incorporate habitat selection patterns and current distribution maps into future climate change and development scenarios.
- Improve maps by incorporating updated or new GIS layers.
- Expand the use of this technique to other locations throughout Alaska.