Tools for Broadening the Scale of Mitigation Hierarchy Application

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IAIA
80+ NETWORK BIODIVERSITY CENTERS IN THE UNITED STATES, CANADA, AND LATIN AMERICA

1,000 CONSERVATION PROFESSIONALS

POWER OF THE NETWORK

www.natureserve.org

The network collects, analyzes, and distributes detailed scientific data about plants, animals, and ecosystems in their jurisdictions.
- Where is important biodiversity found?
- How do stakeholders access that information?
- Can we track success at landscape scales?
Advances in Mapping Potential Impacts: Species Distribution Modeling (SDM)
When observations are used:

- Underpredict occupied area
- Overpredict unoccupied area
- Accuracy depends on intensity & distribution of sampling effort
- Can be difficult to validate or test

When a range map is used:

- Overpredict occupied area
- Underpredict unoccupied area
- Can be difficult to replicate; often subjective
- Can be difficult to validate or test

MH: What to Implement Where?
The SDM alternative

Build a model of the environmental conditions at points of known occurrence…

… then identify and map all areas where those conditions occur
Building a Niche Model

Species Occurrence Points

Environmental Predictors

- Terrain
- Climate
- Soils
- Land Cover

Predicted Suitability
- Suitable Habitat
- Not Suitable Habitat

Low: 0
High: 1
Thresh-holding Options

100% of Known Occurrences

90% of Known Occurrences

Highest Probabilities

Predicted Suitability

Low: 0
High: 1
Karner Blue Butterfly
disclosed endangered

An examination of habitat overlap with pesticide use areas (orchards)
Arizona Ridge-nosed Rattlesnake
Fort Huachuca Air Force Base

Previously: 101 km² identified as potential habitat based on elevation requirements.

With SDM: 28 km² predicted as suitable habitat. 73% of the previously identified area has low likelihood of conflict for this species.
Panhandle Lily Eglin Air Force Base, Florida

Previously: 37,000 km² of off-site land required further evaluation to identify potential offset areas.

With SDM: area of focus narrowed to just 626 km² or <2% of original.
Identifying Priority Areas for Conservation Action
Example from the Tropical Andes

Entomodestes leucotis
White-eared Solitaire

Lestoros inca
Incan Shrew Opossum
Putting Information Into the Hands of Stakeholders
Biodiversity Hotspots / Cold Spots
Information on Potential Presence Available with Click of a Button
SDM data underlies decision support system facilitating smart approaches to habitat protection, restoration and management.

Pennsylvania Conservation Opportunity Tool

<table>
<thead>
<tr>
<th>Species</th>
<th>Habitat</th>
<th>Threat</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGCN 1</td>
<td>Interior Dry-Mesic Oak Forest</td>
<td>Loss of young forest to succession</td>
<td>Direct Management of Natural Resources</td>
</tr>
<tr>
<td>SGCN 2</td>
<td>Interior Dry-Mesic Oak Forest</td>
<td>Habitat loss to commercial &amp; residential development</td>
<td>Data Collection, Land Protection</td>
</tr>
<tr>
<td>SGCN 3</td>
<td>Appalachian (Hemlock)-Northern Hardwood Forest</td>
<td>Forest loss and fragmentation</td>
<td>Planning</td>
</tr>
</tbody>
</table>
Biodiversity Indicators Dashboard
http://dashboard.natureserve.org
The human footprint score was 0.09 in 2009, and 0.00 in 1993. The average annual rate of change is 35.08%.

Data sources: Venter, O. et al. 2016
Read full metadata
Human Footprint: Tomo

The human footprint score was 1.04 in 1993, and 2.34 in 1999. The average annual rate of change is -4.93%.

Data sources: Venter, O. et al. 2016
Read full metadata
Questions?
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