Process & Review: SE-GAP Avian Distribution Models for the Southeast

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9 February 2007
SE-PIF Conference
Memphis, TN
Goals of GAP

◊ Primary goals:

- Keep common species common by identifying conservation gaps
- Provide information about conservation gaps and biodiversity to make informed resource management decisions
- Facilitate application of this information to resource management activities
SE Gap Project Goals

- Create consistent and current land cover products for the Southeast
- Create consistent presence/absence models for 600+ native terrestrial vertebrates
- Incorporate GAP data with ongoing conservation planning efforts
  - North American Bird Conservation Initiative
  - USFWS Refuges, Ecological Services, and CCP Planning Process
  - State Comprehensive Wildlife Conservation Plans
  - More…
SE-GAP’s contribution to the 2001 National Land Cover Dataset

- Seven mapping zones
- 21 Land Cover classes
- Impervious Surface (0 - 100%)
- Canopy Closure (0 - 100%)
SE-GAP Land Cover Map Units

◊ Ecological Systems - NatureServe
  • Matrix, Large Patch, and Linear Types
  • Small patch on a case by case basis
  • ~135 systems to be mapped

◊ “Modifiers” to the systems
  • Where phenology or structure vary

◊ Additions to the NLCD Classes
  • Where useful for vertebrate modeling
SE-GAP Land Cover Dataset

12 Map Zones
3 draft
4 review
3 ongoing
2 pending
Ancillary Data Development

♦ Ecological System Range Maps

♦ Landform Modeling

♦ Refining NHD

♦ Aerial Photo Reference Data Collection

♦ National Wetland Inventory Data Digitization
Vertebrate Data

- 608 Species (terrestrial)
  - 253 birds
- Known Range
- Predicted Habitat Models
- Presence/Absence Distribution Maps
- Knowledge Based Information
SE-GAP Known Range Maps

Blue-Headed Vireo
Vireo solitarius

Warbling Vireo
Vireo gilvus
Scattered breeding colonies exist throughout the region but most often in coastal areas along estuaries, bays, inlets, swamps, lagoons, marine islands etc. Also occurs inland along large reservoir and lake shores and slow-moving rivers. Nests within mats of emergent vegetation as well as in trees in standing water of swamps and lake margins. Forages in shallow waters and roosts in/onth trees, pier pilings, high-tension wires, typically within 30km of nesting sites. M. Rubino, 9 Nov 04.

Time of nesting varies geographically, with local variations, and among different years in a particular colony. Nesting begins in winter in Florida, as late as early June in southern Alaska. Clutch size usually 1-7 (average typically 3 or 4). Incubation 24-33 days (average around 28-30), by both sexes in turn. Hatching success was 54-75% in three studies. Survival from hatching to fledging was 72-95% in two studies. First flight to water at about 35-42 days. Independent at about 9-10 weeks. Usually first breeds at 3 years, sometimes at 2 years, rarely at 1 year. Renesting following loss of clutch is fairly common. Nests mostly in colonies. See Johnsgard (1993) for further information.
Map Unit Selection (243 types)
Map Unit Selection (243 types)
Map Unit Selection (243 types)
Ancillary Data Form

Sistrurus millarius

Land Cover Derivatives

Patch Size
- Contiguous: [ ]
- Min. Size: [ ] hectares
- Buffer In: [ ] meters
- Buffer From: [ ] meters
- Non-Contiguous: [ ]
- % In: [ ] hectares

Edge
- Edge Type: [ ]
- Buffer Values: [ ]
- Ecotone Width: [ ] meters

Hydrography
Type / Buffer
- Type: [ ]
- Buffer From: [ ] meters
- Buffer Into: [ ] meters
- Flowing Water: [ ]
- Open/Standing Water: [ ]
- Wet Vegetation: [ ]

Salinity
Type: [ ]

Stream Flow
Accumulation: [ ]
- Min: [ ]
- Max: [ ]
- Velocity: [ ]

Road Density / Urban Avoid Mask
- Level: [ ]

Elevation
- Minimum: [ ] meters
- Maximum: [ ] meters

Landforms
- Cliffs
- Steep Slopes
- Slope Crests
- Upper Slopes
- Flat Summits
- Side Slopes
- Coves, Draw:
- Dry Flats
- Most Flats
- Wet Flats
- Slope Bottoms

Modeling Notes:
- Check here if this species requires modeling by hand

View State
Modeling Criteria
Close Form
Ancillary Data Form

LAND COVER DERIVATIVES

Patch Size
Contiguous: Size, Buffers
NonContiguous: % in X area
Ancillary Data Form

LAND COVER DERIVATIVES

Patch Size
Contiguous:
  Size, Buffers
NonContiguous:
  % in X area

50ha minimum contiguous patch
Ancillary Data Form

LAND COVER DERIVATIVES

Patch Size
Contiguous: Size, Buffers
NonContiguous: % in X area

50ha minimum contiguous patch
Ancillary Data Form

LAND COVER DERIVATIVES

Patch Size
Contiguous: Size, Buffers
NonContiguous: % in X area

Edge
Edge Type:
- Forest/Open Ecotone Only
- F/O + Shrubland/Woodland
- Forest Interior
Ancillary Data Form

HYDROGRAPHY

Type/Buffer
Buffer distances: 30, 60, 120, 250, 500, 1000, 2000, 4000, >4k

Salinity
Type: Freshwater Only, Brackish/Saltwater Only

Stream Flow
Velocity: Fast Only, Slow Only
Ancillary Data Form

ROAD DENSITY / URBAN AVOID MASK
Level: Low, Medium, High

ELEVATION

LANDFORMS
Ancillary Data Form

MODELING NOTES

<table>
<thead>
<tr>
<th>Ancillary Data Parameters</th>
<th>Ancillary Data Form</th>
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<tbody>
<tr>
<td><strong>Land Cover Derivatives</strong></td>
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<td>Buffer In: meters</td>
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<td><strong>Edge</strong></td>
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<td>Edge Type:</td>
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<td>Buffer Values:</td>
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<td>Ectoreic Width: meters</td>
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<td>From Patch: meters</td>
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<td>Min:</td>
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<td>Max:</td>
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<td><strong>Forest Canopy Closure</strong></td>
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<td>Mininum: percent</td>
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**Hydrography**

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<tbody>
<tr>
<td>Flowing Water</td>
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**Road Density/Urban Avoid Mask**

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<th>Level:</th>
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<tbody>
<tr>
<td>Minimum:</td>
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<tr>
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**Elevation**

| Minimum:      | meters      |
| Maximum:      | meters      |

**Landforms**

<table>
<thead>
<tr>
<th>Cliffs</th>
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<td>Dry Flats</td>
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<tr>
<td>Slope Crests</td>
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**Modeling Notes:**

- Check here if this species requires modeling by hand

[Blank box for notes]

**USGS snap**

| Biodiversity and Spatial Information Center | BaSIC |
Acadian Flycatcher, *Epidonax virescens*

Appropriate Vegetation (forested map units)
Acadian Flycatcher, *Epidonax virescens*,

Appropriate Vegetation (forested map units)

Elevation Mask (< 4000')
Acadian Flycatcher, *Epidonax virescens*

Appropriate Vegetation (forested map units)

Elevation Mask (< 4000')

Proximity to Water Mask (< 200m)
SE-GAP
Pres./Abs.
Distribution
Model

Prothonotary Warbler
*Protonotaria citrea*
SE-GAP Deliverables

- 2001 NLCD level land cover (20 classes)
- 2001 GAP level land cover based on NatureServe Systems (135+ classes)
- Digital photo library (30,000+)
- Ancillary data sets (NHD, NED, NWI, landform) used in spatial modeling
- Vertebrate database
  - Taxonomic information
  - Protection status
  - Habitat relationships
  - Textual descriptions of habitat
  - Spatial modeling criteria
  - Citations
- 600+ vertebrate species known range maps and distribution models (presence/absence)
Model Assessment

- Assessment of modeling done with comparing species lists of management areas with model output to produce Omission and Commission rates.
- Reviewer Agreement with model.
  - Need to keep it relatively simple and concise.
  - Assess major components models and overall model performance.
Reviewer Agreement with Model

1. The light green shaded area is an accurate representation of the known range extent of this species.
Reviewer Agreement with Model

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2. The parameters used to model the predicted distribution of this species accurately represent its habitat requirements in the southeastern United States.
Reviewer Agreement with Model

1. The light green shaded area is an accurate representation of the known range extent of this species.
2. The parameters used to model the predicted distribution of this species accurately represent its habitat requirements in the southeastern United States.
3. The spatial data adequately represent the species' habitat requirements.
Reviewer Agreement with Model

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2. The parameters used to model the predicted distribution of this species accurately represent its habitat requirements in the southeastern United States.
3. The spatial data adequately represent the species' habitat requirements.
4. The red pixels on the map adequately represent the distribution of this species' habitat within the identified range extent.
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5. The published literature adequately documents the breeding habitat requirements for this species in the southeastern United States.
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4. The red pixels on the map adequately represent the distribution of this species’ habitat within the identified range extent.
5. The published literature adequately documents the breeding habitat requirements for this species in the southeastern United States.
6. I am an expert in the natural history of this species.
Baysian Belief Network

Known Range
- 1 - Strongly Disagree
- 5 - Strongly Agree

Model Parameters
- 1 - Strongly Disagree
- 5 - Strongly Agree

Spatial Data
- 1 - Strongly Disagree
- 5 - Strongly Agree

Ample Literature
- 1 - Strongly Disagree
- 5 - Strongly Agree

Pred. Dist. Performance
- 1 - Strongly Disagree
- 5 - Strongly Agree

Reviewer Self-Confidence
- 1 - Strongly Disagree
- 5 - Strongly Agree

Composite Score

Weighted Composite Score
National Gap Analysis Conference 2007

Featuring the Southeast Regional Gap Analysis Project
(Kentucky, Tennessee, Alabama, Georgia, Florida, South Carolina, North Carolina, and Virginia)

http://gapanalysis.nbii.gov

Call for Special Sessions, Papers and Posters

Abstracts due: March 1st
September 10 – 13, 2007
Renaissance Asheville Hotel
Asheville, North Carolina