Species Distribution Modeling Workshop

Southeast Biodiversity Conservation Forum
March 7, 2018
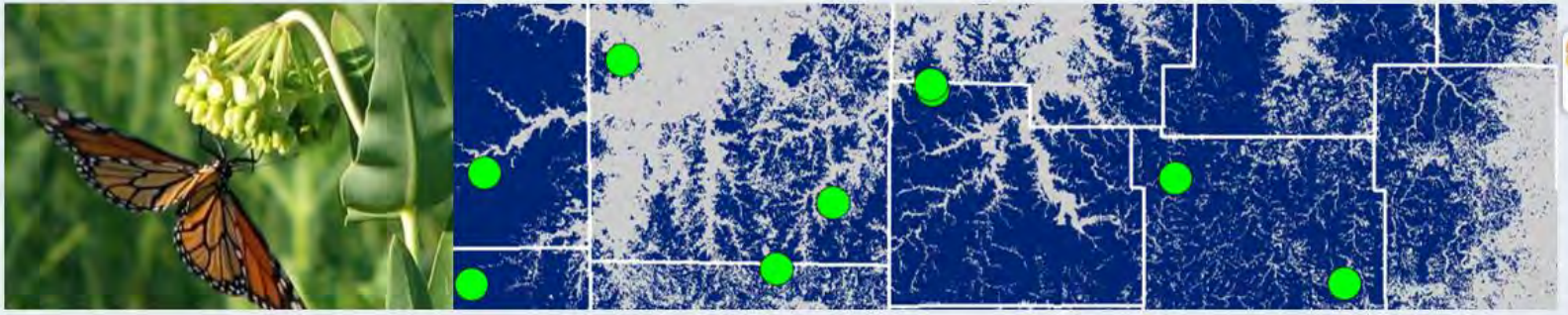
NatureServe

Agenda

- Round Robin: Current and Recent Distribution Modeling Efforts in the Southeast (15min)

- Network Resources for Modeling (15 min)

- The Use of Heritage Data in Modeling (30min)

- Time Permitting: Priorities for Modeling

Network Resources for Modeling

- SDM in the Network Webinars

- SDM Resolutions Team

- SharePoint: SDM in the Network

- Best Practices Wiki

- USGS/NatureServe Manuscript: SDM for Management Use

- Menu of SDM Network Services – under development

Welcome to the SDM Best Practices Wiki Library

The purpose of this wiki is to build an encyclopedia of knowledge of methods used for SDM across the NatureServe network. This information is intended to (1) guide netwo species and (2) support development and publication of a national standard for the use of distribution models in regulatory contexts.

Instructions on how to edit a wiki page are here. We've been using red text to denote places that need review or additional text. Please don't be shy about making edits! Anc

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Predictors ─┐
            ├─→  Modeling Process          →  Model Products
Species     │     Sampling Strategy             Probabilities
Inputs  ────┘     Algorithms                    Thresholding
                  Variable Reduction            Metadata and Interpretation
                  Evaluation Statistics
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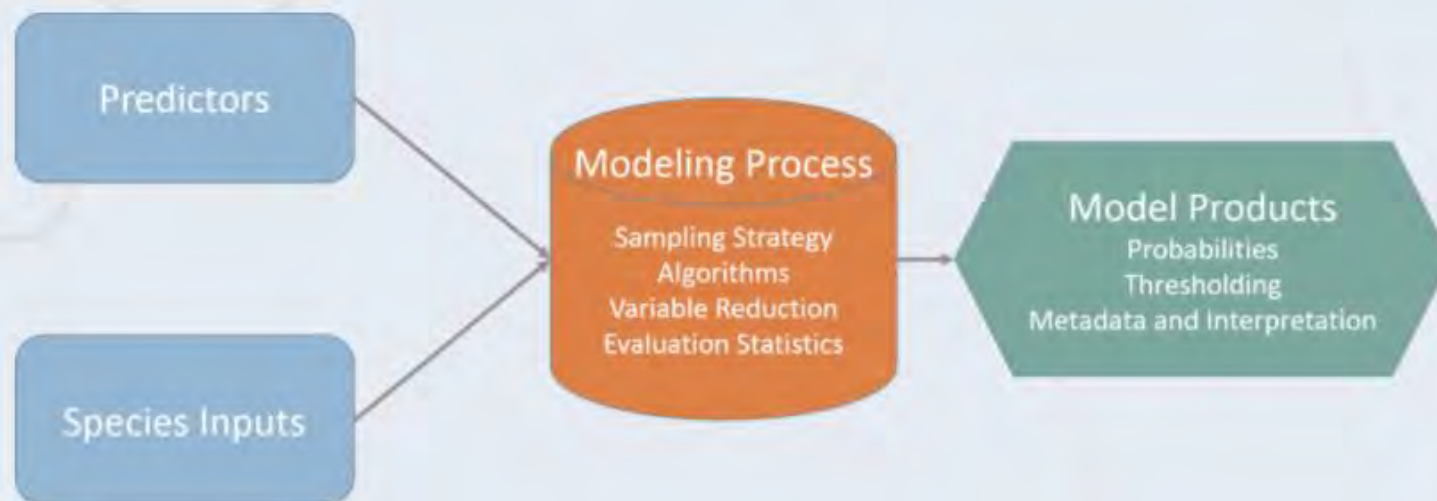
Predictors

Species Inputs

Modeling Process

Model Products

Tools - Options for Running Models

Special Considerations for Aquatic Species

Standard for Terminology

- Network has assessed ~2,000 T&E and petitioned species for suitability for modeling
- 800+ good candidates identified
- Many of those have existing models for at least a portion of their range

GNAME	GCOMNAME	INFO_TAX	ESA Group	NHP Reviewer(s)	Suitability for Modeling	Reason for Suitability Rank	Additional comments on suitability	Requires Aquatic Modeling	EO Count Category	Programs with Models	Comments on Existing Models
Allium munzii	Munz's Onion	Plants	T&E	NatureServe	High	>10 EOs, existing			10 - 29 EOs		
Allocapnia brooksi	Sevier Snowfly	Stoneflies	Petitioned	Chazal, VA NHP	Don't know			yes	<10 EOs		0
Allocapnia cunninghami	Karst Snowfly	Stoneflies	Petitioned	Chazal, VA NHP	Don't know			yes	<10 EOs		0
Allocapnia fumosa	Smokies Snowfly	Stoneflies	Petitioned	Chazal, VA NHP	Poor	no EOs?		yes	No EOs		
Alnus maritima	Seaside Alder	Plants	Petitioned	OK (Fagin)	Exclude	very limited range		yes	<10 EOs		
Alnus maritima ssp. georgiensis	Georgia Alder	Plants	Petitioned	FNAI	Medium	state hab, envl			<10 EOs		
Alnus maritima ssp. maritima	Seaside Alder	Plants	Petitioned						<10 EOs		
Alnus maritima ssp. oklahomensis	Oklahoma Alder	Plants	Petitioned	FNAI	Don't know	likely Poor			No EOs		
sonomensis	Sonoma Shortawn Foxtail	Plants	T&E	California	Poor	issues.			<10 EOs		
Alosa alabamae	Alabama Shad	Anadromous	Petitioned	FNAI	Medium	aquatic		YES	<10 EOs		
Amaranthus pumilus	Seabeach Amaranth	Plants	T&E	NatureServe	Medium	previously	restricted		>50 EOs	NY VA	have new model completed by end of
Amazona viridigenalis	Red-crowned Parrot	Birds	Candidate	FNAI	Don't know	FNAI doesn't track			No EOs		
Amblema neislerii	Fat Threeridge	Mussels	T&E	FNAI	Poor	<10 EOs; aquatic		YES	<10 EOs		
Amblyopsis rosae	Ozark Cavefish	Anadromous	T&E	Evans, NY	Poor	environmental			<10 EOs		
Amblyopsis spelaea	Northern Cavefish	Anadromous	Petitioned	Chazal, VA NHP	Poor	cave species			30-49 EOs		0
Amblyscirtes linda	Linda's Roadside-Skipper	Skippers	Petitioned	MI NHP: Enander	Don't know	/other insects =		No	No EOs		
Ambrosia cheiranthifolia	South Texas Ragweed	Plants	T&E	CNHP	Medium	<10 EOs,	few EOs,		<10 EOs		
Ambrosia pumila	San Diego Ragweed	Plants	T&E	NatureServe	Medium	endemic			10 - 29 EOs		
Ambrysus amargosus	Ash Meadows Naucorid	Other Insects	T&E						<10 EOs		
Ambrysus funebris	Nevares Spring Naucorid Bug	Other Insects	Candidate	California; Kagan, OR	Poor	Aquatic	species,	yes	<10 EOs		
Ambystoma barbouri	Streamside Salamander	Amphibians	Petitioned	MI NHP: Enander	Medium	narrow habitat	pool model	No	<10 EOs		
Ambystoma bishopi	Salamander	Amphibians	T&E	FNAI	High	distinct habitat	likely		10 - 29 EOs		
Ambystoma californiense	California Tiger Salamander	Amphibians	T&E	California	Medium	extensive data	pool	Yes	>50 EOs		
Ambystoma cingulatum	Flatwoods Salamander	Amphibians	T&E	CNHP	Poor	No EOs			No EOs		

Master_Spp_List | Sheet1 | README_suitability_assignment | README_program_assignment | README_EO_data | temp_SUMMARY | temp_HIGH_SUIT_SPP | temp_existing_models | COMMENTS | Spp_with_no_EOs | Capacity Matrix

Menu of Network SDM Solutions

Under development via ongoing conversation with Network Programs

1. **Training Data** - derived from our EO and/or observation data (value-added MJD product that employs methods already developed as part of the SDM best practices)
2. **Training Data "Plus"*** – includes a more thorough review (by taxonomic experts) of data available from NatureServe *and other sources*, including more careful screening of data quality
3. **Full Model Development** – we run the models, using our well-developed data and methods, to provide both predicted probability surfaces, binary maps, and interpretive materials providing guidance on their use.
4. **SDM Consultation Services** – provide the guidance and expertise in creating training data, conducting the modeling process and/or model review and validation
5. **Packaged environmental predictor data for modeling** – outgrowth of our effort, supported by ESRI, to assemble a national library common predictor data sets

Discussion

- How can we better support SDM collaborations and keep communication open?

- Thoughts on menu of network SDM services?

Use of Heritage Data for Modeling

- Example: use of EO data as inputs to the SALCC modeling
- Discussion: how can we best manage core data and modeling products to be mutually supportive
- Time permitting: other data sharing considerations

Priorities for Modeling

- What is being modeled and why

- Discussion:

  - Where can models help the most?

  - What opportunities are on the horizon?

  - How can we better track what has been modeled and where?

Survey on Existing Models

- Listed Species: >200 models for 172 species*
- All Species: >2000 models for 1200+ species
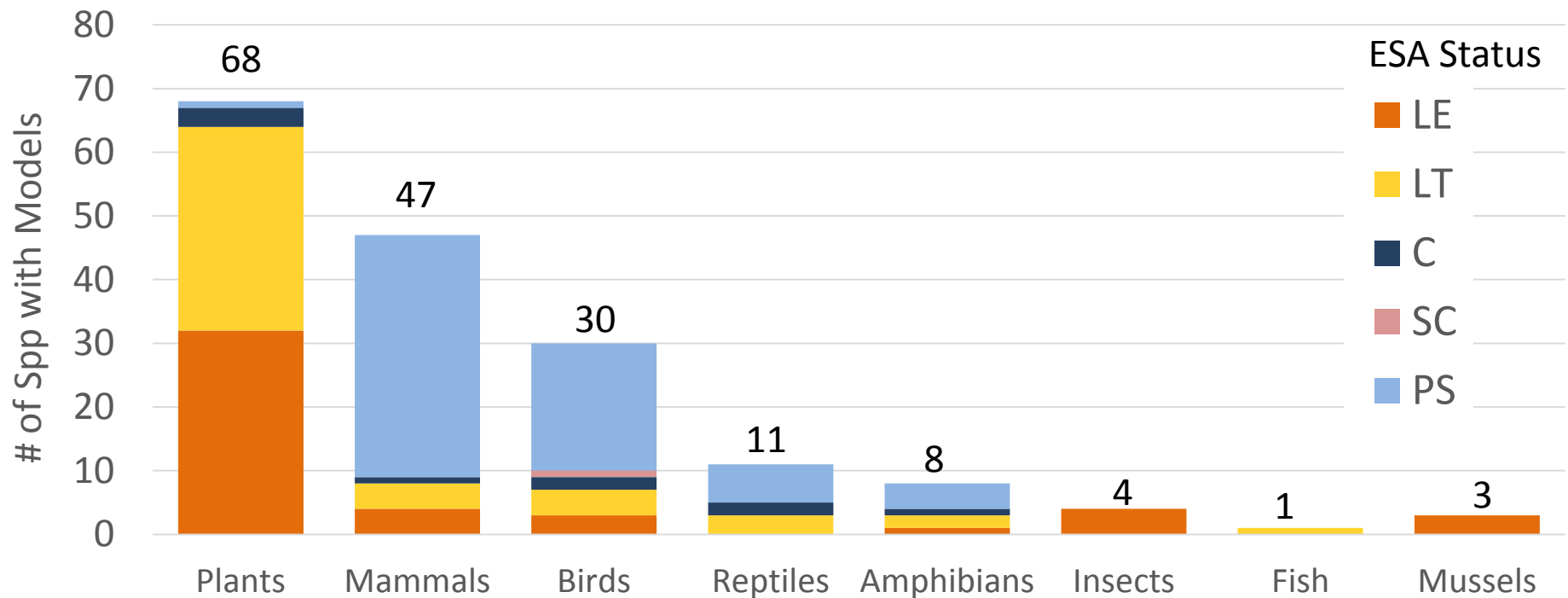
Reasons for Modeling

- Guide field surveys
- Species research (e.g. separation distances between subspecies, outer limits of range)
- Identify historic distribution
- Climate change studies
- Environmental review screening
- Management for T&E Species
- Broad management/planning applications
- Others?

Discussion

- Where can models help the most?
- What opportunities are on the horizon?
- How can we better track what has been modeled and where?