

Ed Laurent*, Ashton Drew, Matt Rubino, Steve Williams and Jaime Collazo

Biodiversity and Spatial Information Center & North Carolina Cooperative Fish and Wildlife Unit
North Carolina State University, Raleigh, NC 27695-7617; *Ed_Laurent@ncsu.edu

Abstract. If you had access to practically everything published about a species at the touch of a button and it was organized in a simple, tabular format... how would you use it? This is the question and challenge we as a community face as peer-reviewed literature becomes better accessible via the Internet. At the Biodiversity and Spatial Information Center, we are exploring ways to integrate published studies of species' vital population rates and density estimates within a spatially-explicit (mappable) framework. One important component to this project is the development of a database to summarize literature reviews, where each record can be queried for information describing a study's date and location, method of data collection, species studied, land cover types and landscape relationships (e.g., patch size, distance to water), as well as qualitative descriptions of habitat suitability and quantitative demographic parameters (e.g., density, daily nest survival) under those conditions. Here we provide examples of how spatially-explicit rate and density estimates can be stratified by different attributes and lumped for use in statistical analyses and mapping applications.

Examples of How Lit Review Central Is Being Used

New Types of Summaries

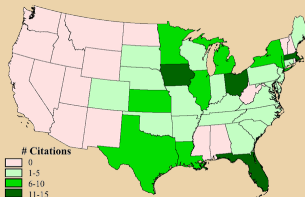


Figure 4. The distribution of published descriptions of where King Rail (*Rallus elegans*) were observed

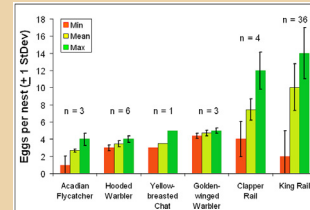


Figure 5. Number of eggs observed in nests, summarized using published values from multiple sources.

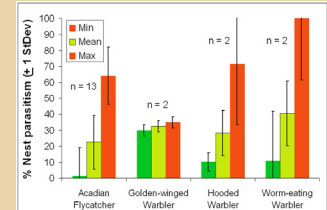


Figure 6. Tendency for nests to be parasitized by Brown-headed Cowbird (*Molothrus ater*), summarized by species from multiple sources.

Developing Research Hypotheses

Below is an example of how summaries of Acadian Flycatcher (*Empidonax vireescens*) population rates from multiple publications can be combined to lend support for new hypotheses regarding how populations are affected by their environment.

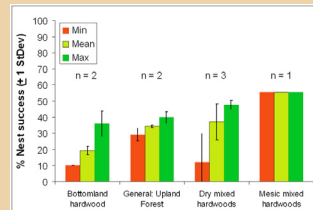


Figure 7. There is evidence that Acadian Flycatcher nesting success differs among land cover categories.

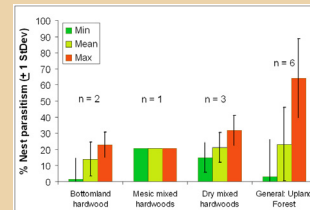


Figure 8. Nest parasitism rates vary widely for Upland Forest types but appears to be relatively low in Bottomland Hardwoods.

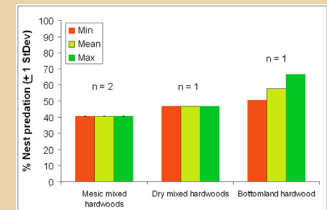


Figure 9. There is evidence that predation rates in Bottomland Hardwoods are relatively high, and possibly the most influential factor affecting nesting success in this cover type.

Figure 1. Users document the species of interest, method of data collection, and descriptions of where data were collected.

Figure 2. By clicking on different tabs at the top of the form, users are provided options for documenting conditional relationships among site descriptions, species densities and population rates.

Investigating Spatially-Explicit Habitat Associations

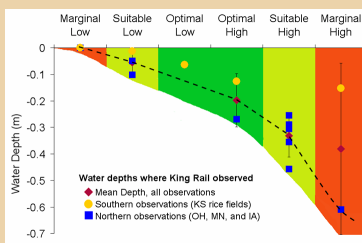


Figure 10. Do King Rail associations with water depth differ across its range? Do agricultural practices affect these associations?

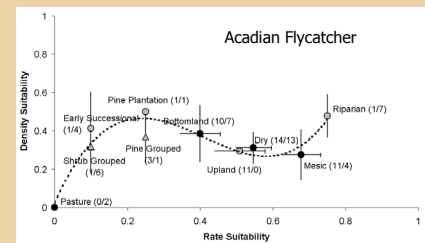


Figure 11. Is there a positive relationship between density and vital population rates that lead to fledging success? Does the relationship vary among land cover types?

Land cover descriptions can be crosswalked to map legends for spatial analysis

Values are summarized from text, tables and figures.

Measurement units are stated

Values can be automatically converted to standard units using a divisor

Cover Type	Spacing Var	MinSpacing	MeanSpacing	MaxSpacing	StDevSpacing	SESpacing	NSpacing	Units Spacing	Spacing Unit Divisor	Standard Spacing Units
Pine: Pine Barwoods	Abundance		0.07				0.03	40 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Pine: Pine plantations	Abundance		0.49				0.06	40 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Wet: Riparian	Abundance	0	0.8	3.5			0.1	10 indiv in 30-m radius	0.7853982	indiv/males/pairs/terr per ha
Wet: Bottomland hardwood	Density	4	5	7			0.04	1 pairs / 10 ha		10 indiv/males/pairs/terr per ha
Wet: Bottomland hardwood	Density		0				0	1 pairs / 10 ha		10 indiv/males/pairs/terr per ha
Shrub: Early-successional hard	Abundance		0				0	6 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Upland: Dry mixed hardwood	Abundance		0.04				0.04	3 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Wet: Riparian	Abundance		0.5				0.5	3 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Shrub: Mammally-disturbed (e:)	Abundance		0.27				0.27	3 captures/100 net hrs		1 captures/100 net hours
Shrub: Early-successional hard	Abundance		1.02				1.56	3 captures/100 net hrs		1 captures/100 net hours
Upland: Dry mixed hardwood	Abundance		0				0	3 captures/100 net hrs		1 captures/100 net hours
Wet: Riparian	Abundance		0.76				0.76	3 captures/100 net hrs		1 captures/100 net hours
Shrub: Early-successional hard	Abundance		0				0	3 captures/100 net hrs		1 captures/100 net hours
Upland: Dry mixed hardwood	Abundance		0.08				0.08	3 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Wet: Riparian	Abundance		0.38				0.38	3 indiv in 50-m radius	0.7853982	indiv/males/pairs/terr per ha
Shrub: Mammally-disturbed (e:)	Abundance		0.53				0.53	3 captures/100 net hrs		1 captures/100 net hours
Shrub: Early-successional hard	Abundance		1.02				1.02	3 captures/100 net hrs		1 captures/100 net hours
Upland: Dry mixed hardwood	Abundance		0				0	3 captures/100 net hrs		1 captures/100 net hours
Wet: Riparian	Abundance		0				0	3 captures/100 net hrs		1 captures/100 net hours
Upland: Mesic mixed hardwood	Territory Size		1.8	2.97			4.2	80 ha		1 ha
Wet: Riparian	Density	0.05	0.08	0.01			0.02	31 indiv / ha		1 indiv/males/pairs/terr per ha
Upland: Dry mixed hardwood	Density	0	2	3.5			1.57	14 indiv / 20 ha		20 indiv/males/pairs/terr per ha
Upland: Hemlock/white pine/	Density		1.27				1.57	11 pairs / 10 ha		10 indiv/males/pairs/terr per ha
Pine: Other pine forest - capture	Density		68					1 pairs / km2		100 indiv/males/pairs/terr per ha

Figure 3. Each entry is added as a record to a table that can be exported for statistical analysis and graphing.

Progress

To date, Lit Review Central has been used to document 63 literature searches for publications mentioning 9 species. Over 3000 articles were identified through these searches and over 1100 of those publications have already been summarized. Summaries include more than 900 mappable habitat associations, 350 spacing relationships (e.g., density, nests per ha), and 300 vital population rates (e.g., eggs per nest, fledging success).

Aspirations

Widespread access to Lit Review Central via the Internet will offer a freely accessible means for anyone conducting literature reviews to contribute to a centralized repository of information. This process will reduce redundant efforts among groups, freeing those resources for other purposes. Furthermore, the information contained within the repository will grow over time to provide a comprehensive picture of what is known, as well as what is not known, about species and their relationships with their environment.