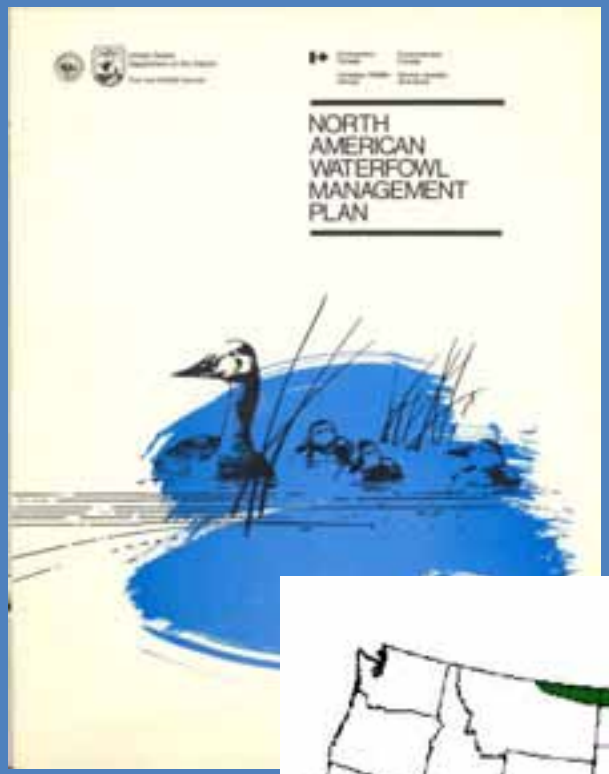
Joint Venture Partnerships and Their Application of Strategic Habitat Conservation

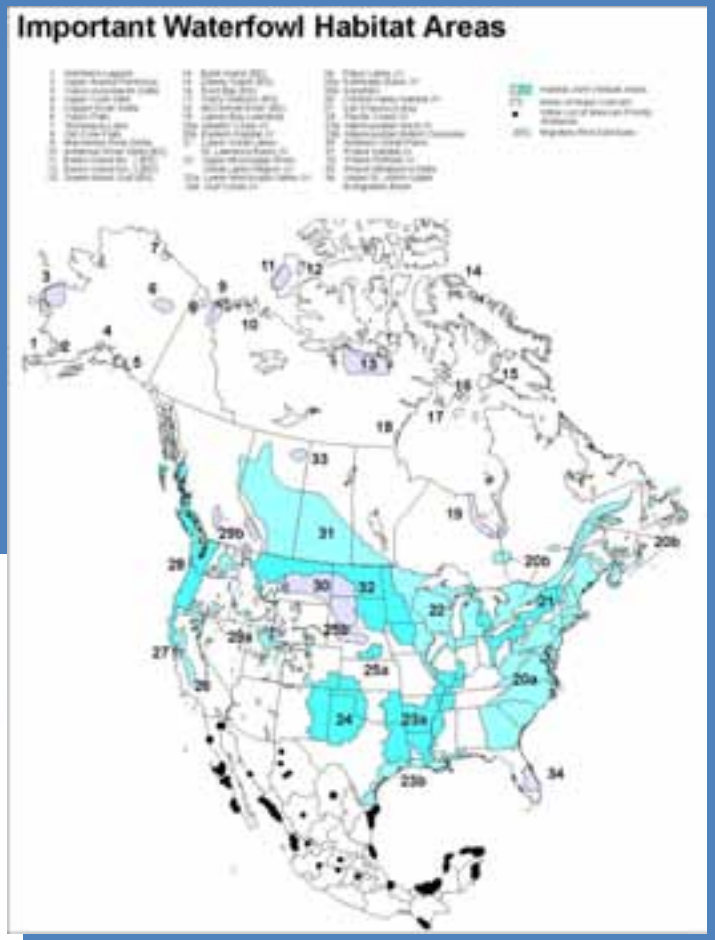
A presentation to USFWS Project Leaders
Working in the Appalachian Geography
26 January 2010

by Jane Fitzgerald, Central Hardwoods JV Coordinator

Central Hardwoods Joint Venture
partnerships for conservation

Started with the NAWMP in 1985





Today, bird conservation has multiple taxa-based initiatives as its foundation…

The North American Waterfowl Management Plan

Partners in Flight

The United States Shorebird Conservation Plan

North American Waterbird Conservation Plan

Northern Bobwhite Conservation Initiative

…and the North American Bird Conservation Initiative (NABCI) formed to:

- Foster communication among the various bird initiatives
- Foster coordinated planning, implementation, and evaluation at a hierarchy of spatial scales (regionally, nationally, and internationally)
- Speak to congress with one voice to increase funding for bird conservation (federal and state/provincial agencies; grant funds)

NABCI Vision: We envision populations and habitats of North America's birds that are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management.

NABCI Goal: We aim to deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.

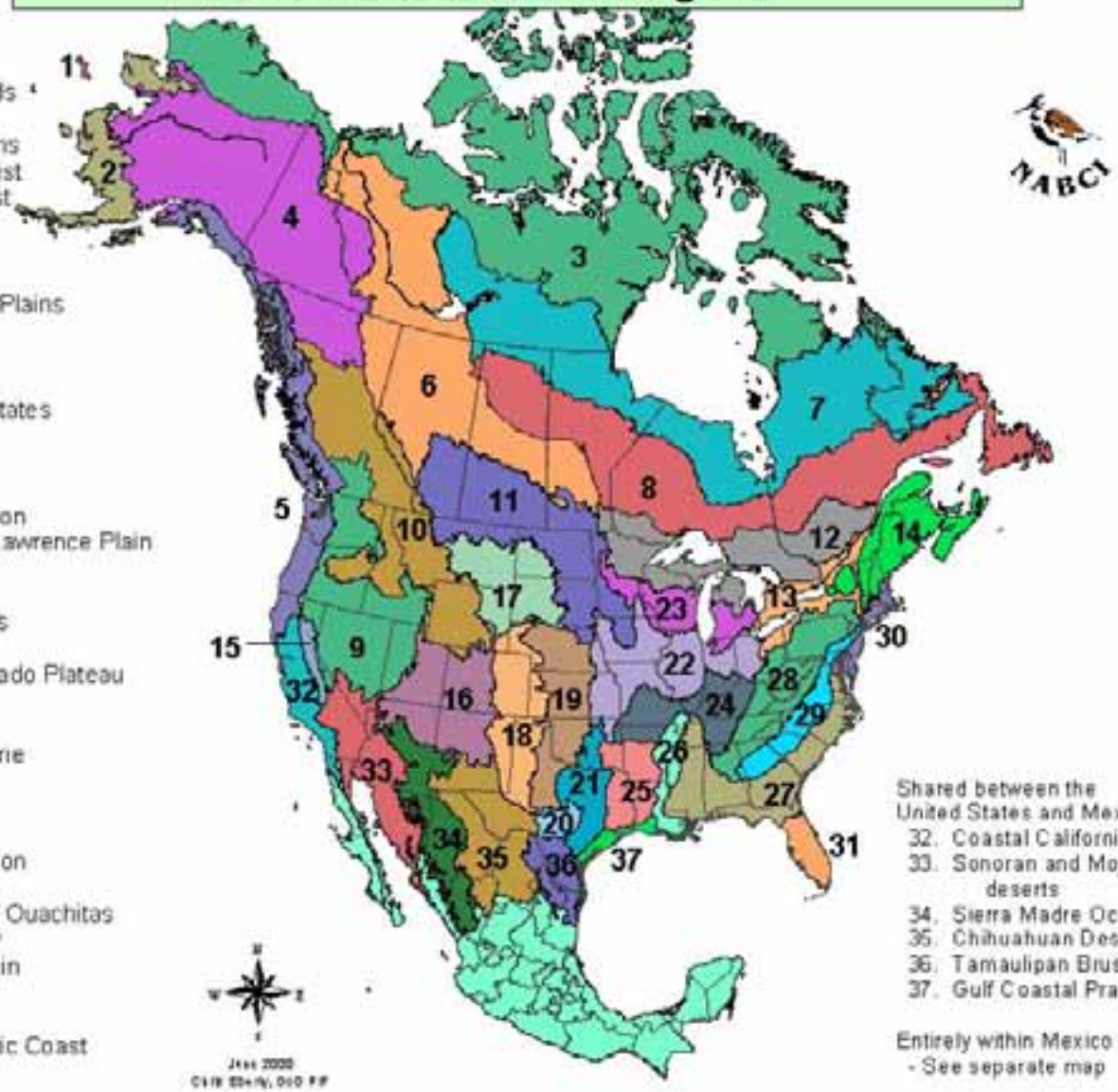
North American Bird Conservation Initiative
Bird Conservation Regions

Alaska and shared between Alaska and Canada
1. Aleutian/Bering Sea islands
2. Western Alaska
3. Arctic Plains and Mountains
4. Northwestern Interior Forest
5. Northern Pacific Rainforest

Entirely within Canada
6. Boreal Taiga Plains
7. Taiga Shield and Hudson Plains
8. Boreal Softwood Shield

Shared between Canada and the conterminous United States
9. Great Basin
10. Northern Rockies
11. Prairie Potholes
12. Boreal Hardwood Transition
13. Lower Great Lakes / St. Lawrence Plain
14. Atlantic Northern Forest

Entirely within the United States
15. Sierra Nevada
16. Southern Rockies / Colorado Plateau
17. Badlands and Prairies
18. Shortgrass Prairie
19. Central Mixed Grass Prairie
20. Edwards Plateau
21. Oaks and Prairies
22. Eastern Tallgrass Prairie
23. Prairie Hardwood Transition
24. Central Hardwoods
25. West Gulf Coastal Plain / Ouachitas
26. Mississippi Alluvial Valley
27. Southeastern Coastal Plain
28. Appalachian Mountains
29. Piedmont
30. New England / Mid-Atlantic Coast
31. Peninsular Florida



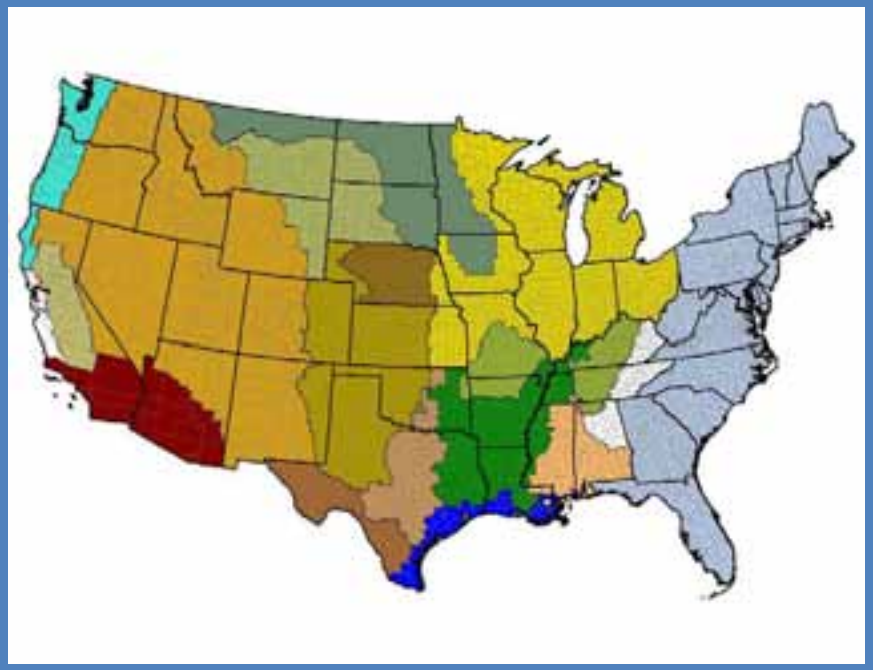
Shared between the United States and Mexico
32. Coastal California
33. Sonoran and Mojave deserts
34. Sierra Madre Occidental
35. Chihuahuan Desert
36. Tamaulipan Brushlands
37. Gulf Coastal Prairie

Entirely within Mexico
- See separate map

Why “Bird Conservation Regions”?

- A shared concept of geography is critical to integrated planning and evaluation
- Bird Conservation Regions (BCRs) encompass landscapes with similar bird communities, habitats, and resource issues
- Joint Venture partnerships among conservation entities oversee the planning, implementation and evaluation processes within BCRs

Old JV boundaries have been changing over time to converge on BCR boundaries…



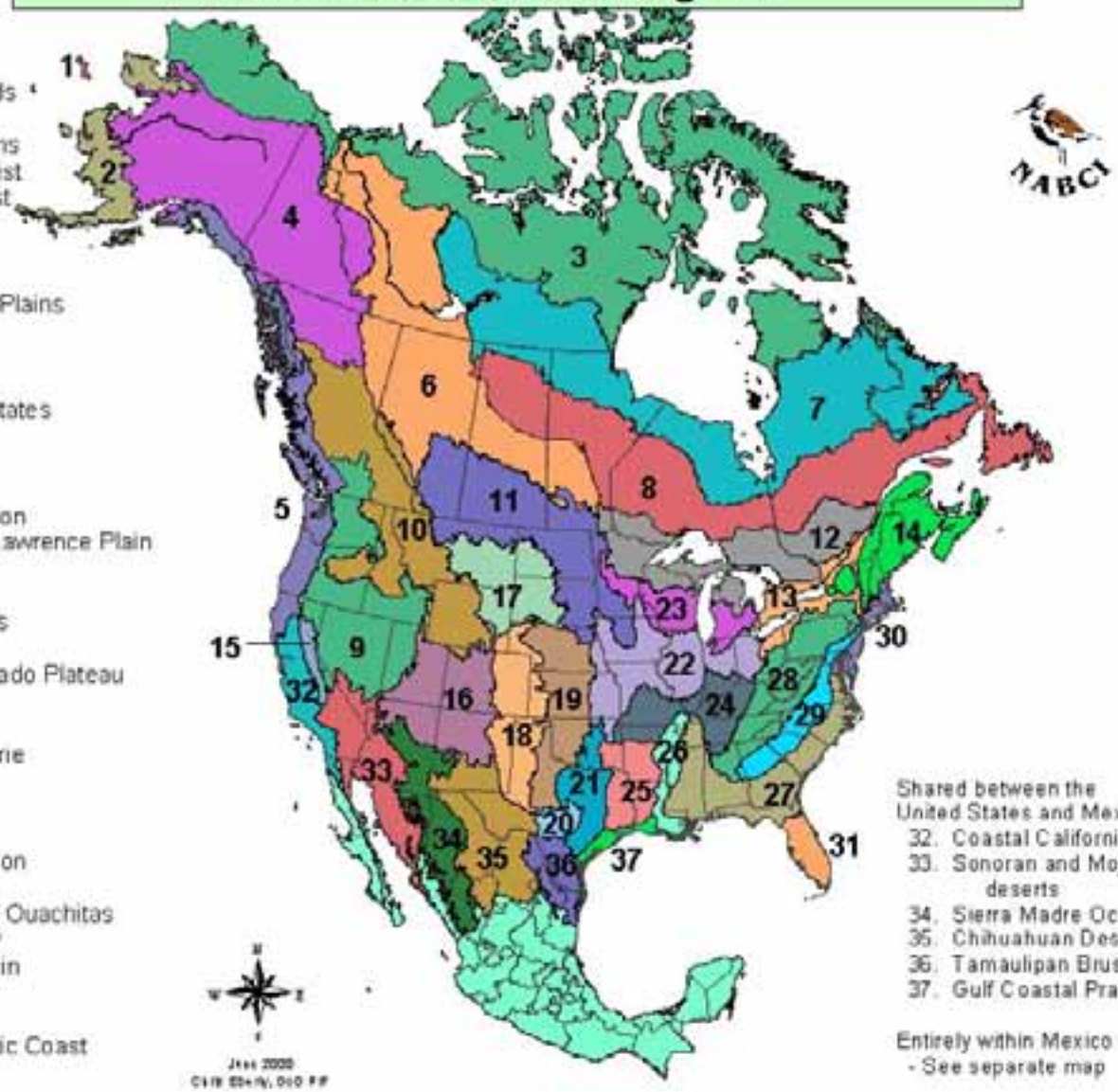
North American Bird Conservation Initiative
Bird Conservation Regions

Alaska and shared between Alaska and Canada
1. Aleutian/Bering Sea islands
2. Western Alaska
3. Arctic Plains and Mountains
4. Northwestern Interior Forest
5. Northern Pacific Rainforest

Entirely within Canada
6. Boreal Taiga Plains
7. Taiga Shield and Hudson Plains
8. Boreal Softwood Shield

Shared between Canada and the conterminous United States
9. Great Basin
10. Northern Rockies
11. Prairie Potholes
12. Boreal Hardwood Transition
13. Lower Great Lakes / St. Lawrence Plain
14. Atlantic Northern Forest

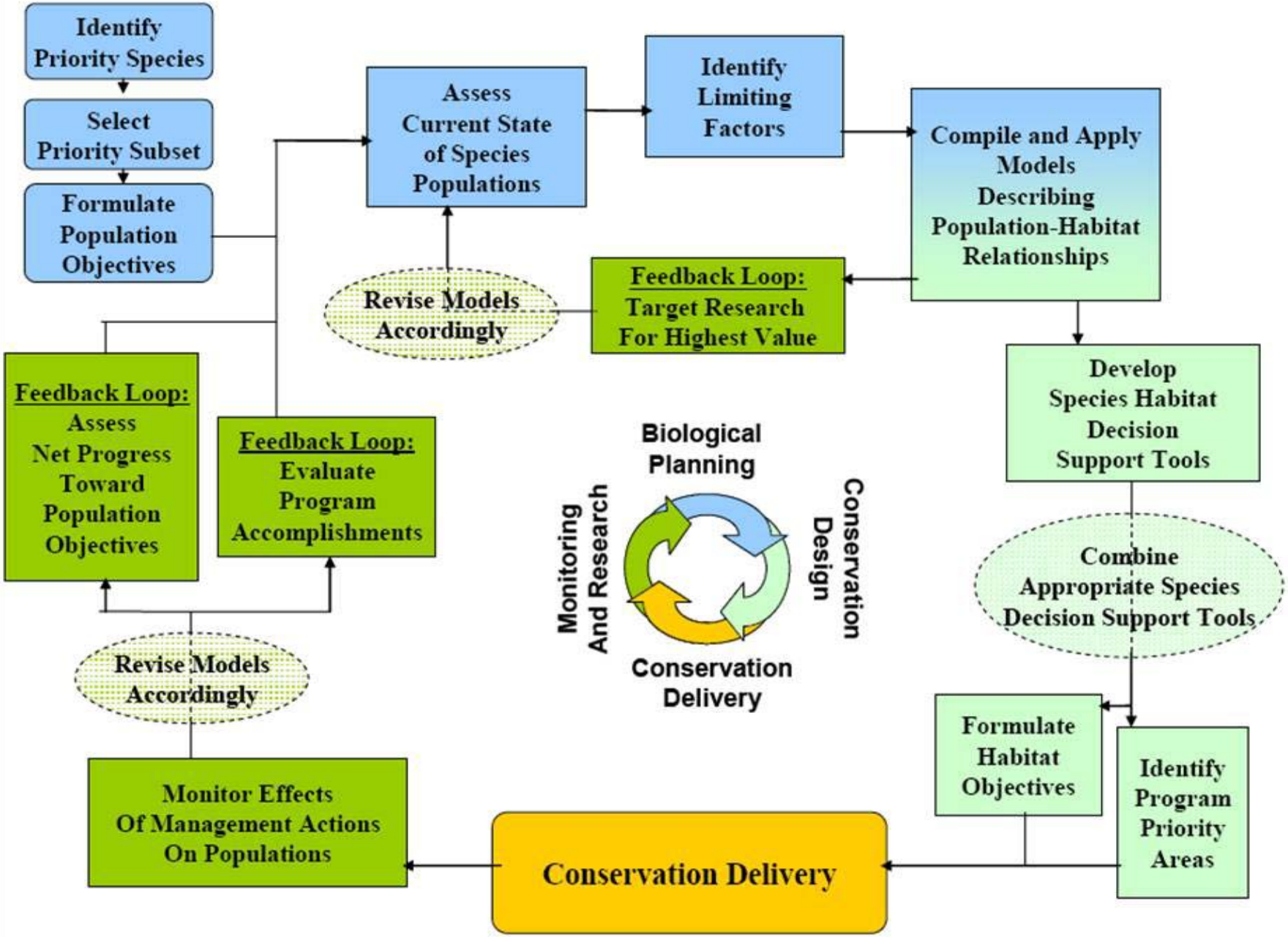
Entirely within the United States
15. Sierra Nevada
16. Southern Rockies / Colorado Plateau
17. Badlands and Prairies
18. Shortgrass Prairie
19. Central Mixed Grass Prairie
20. Edwards Plateau
21. Oaks and Prairies
22. Eastern Tallgrass Prairie
23. Prairie Hardwood Transition
24. Central Hardwoods
25. West Gulf Coastal Plain / Ouachitas
26. Mississippi Alluvial Valley
27. Southeastern Coastal Plain
28. Appalachian Mountains
29. Piedmont
30. New England / Mid-Atlantic Coast
31. Peninsular Florida



Shared between the United States and Mexico
32. Coastal California
33. Sonoran and Mojave deserts
34. Sierra Madre Occidental
35. Chihuahuan Desert
36. Tamaulipan Brushlands
37. Gulf Coastal Prairie

Entirely within Mexico
- See separate map

Strategic Habitat Conservation Diagram



Steps in SHC…

- *Identify species of conservation priority*
- *Formulate population objectives*
- Assess current state of populations (e.g. population sizes, growth potential, habitat needs and limiting factors); build habitat-population models
- Develop habitat assessments
- Combine appropriate decision support tools to link population and habitat objectives
- Test assumptions and refine models; monitor population response to management actions

Species Prioritization Process

- Relative abundance (inter-specific)
- Breeding distribution
- Non-breeding distribution
- Threats across breeding range
- Threats across non-breeding range
- Area Importance
- Population trend

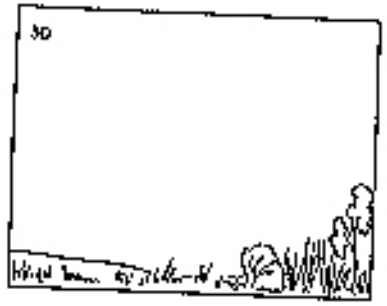
PIF Continental Plan population goals (based on range-wide trends)

- Declines of 50% or more for 30 years: double
- Declines of 15-50%: increase 50%
- Unknown or imprecise trends: increase 10%
- Stable or increasing populations: maintain

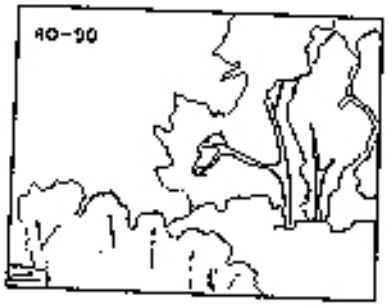
Do these make sense at the BCR level?

Steps in SHC…

- Identify species of conservation priority
- Formulate population objectives
- *Assess current state of populations (e.g. population sizes, growth potential, habitat needs and limiting factors); build habitat-population models*
- Develop habitat assessments
- Combine appropriate decision support tools to link population and habitat objectives
- Test assumptions and refine models; monitor population response to management actions

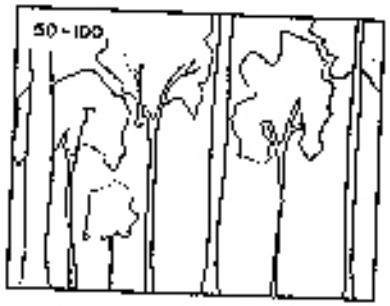


YELLOWTHROAT

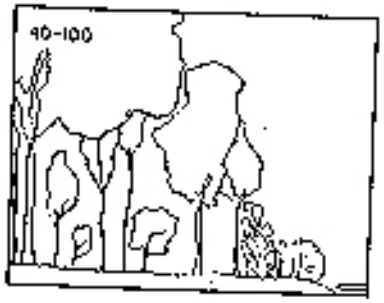


REDSTART

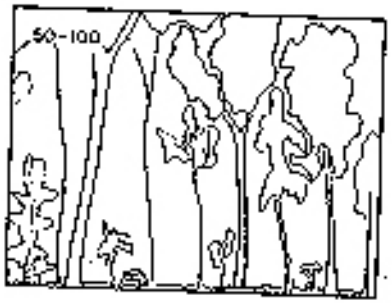
HOODED WARBLER



BLACK-AND-WHITE WARBLER



PARULA WARBLER



OVENBIRD

FIG. 2. Outline drawings of the niche-gestalt for six species of warblers, representing the visual configuration of those elements of the structure of the vegetation that were consistently present in the habitat of each. Numbers give the vertical scale in feet.

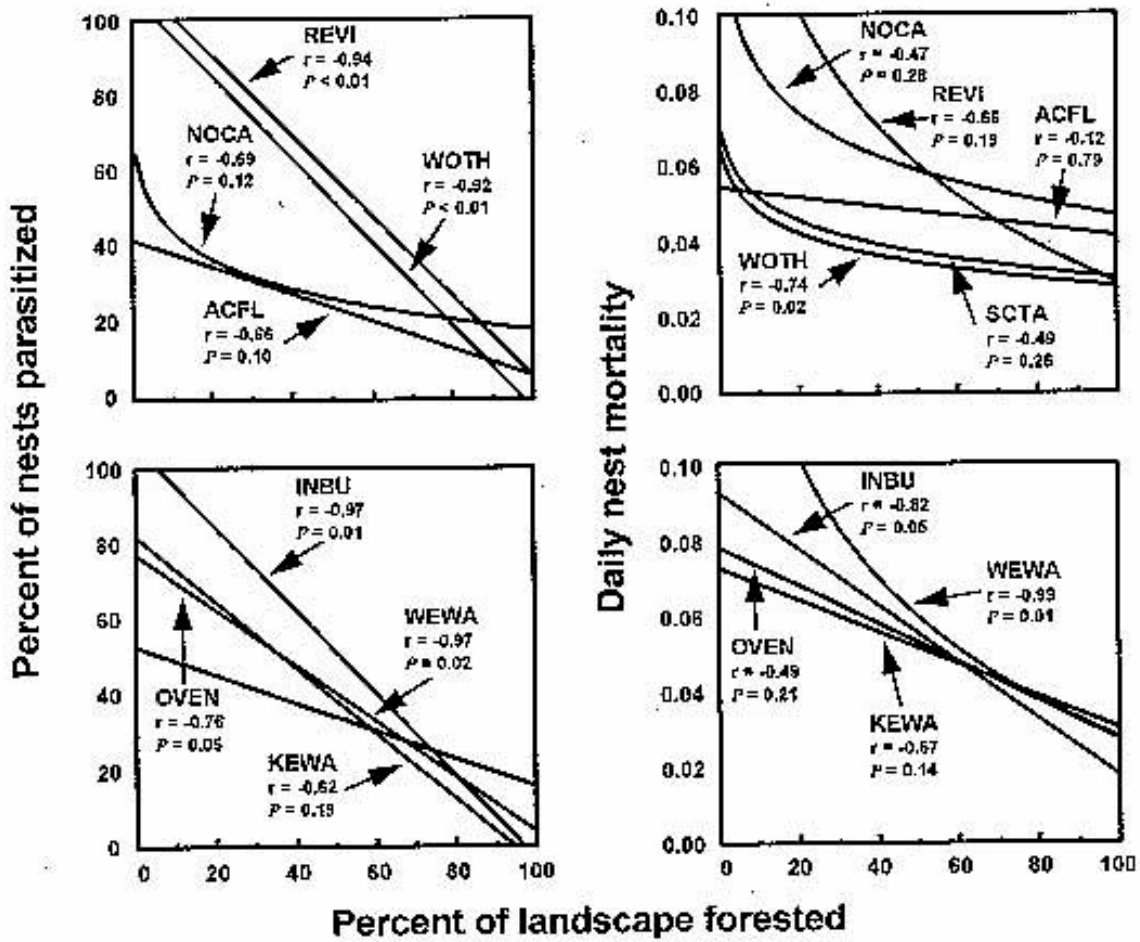


Figure 1.—*Correlations between levels of brood parasitism and nest predation with the percent of forest cover in nine Midwestern landscapes. Abbreviations are: ACFL, Acadian flycatcher; INBU, Indigo bunting; KEWA, Kentucky warbler; NOCA, Northern cardinal; OVEN, ovenbird; REVI, red-eyed vireo; SCTA, scarlet tanager; WEWA, worm-eating warbler; WOTH, wood thrush. Adapted from Robinson* et al. *(1995).*

From: Robinson, S. K., Thompson III, F. R., Donovan, T. M., Whitehead, D. R. and J. Faaborg. 1995. Regional forest fragmentation and the success of migratory birds. Science 267:1987-1990.

Example

- Prairie warbler
  - Neotropical migrant
  - Habitats
    - Early successional forest
      - Dense, shrubby vegetation
      - Open canopy
    - Absent from small patches
    - Avoids edges

Prairie Warbler HSI

- Density SI
  - SI_1: Landform, forest type, age class
  - SI_2: Edge occurrence
  - SI_3: Early successional forest patch size (ha)
  - SI_4: Small (<2.5 cm dbh) stem density (stems/ha)
  - SI_5: Canopy cover (%)
- Calculation
  - $HSI_{Density} = ((SI_1 * SI_4 * SI_5)^{0.333} * (SI_2 * SI_3)^{0.5})^{0.5}$

Site-scale factors Landscape factors

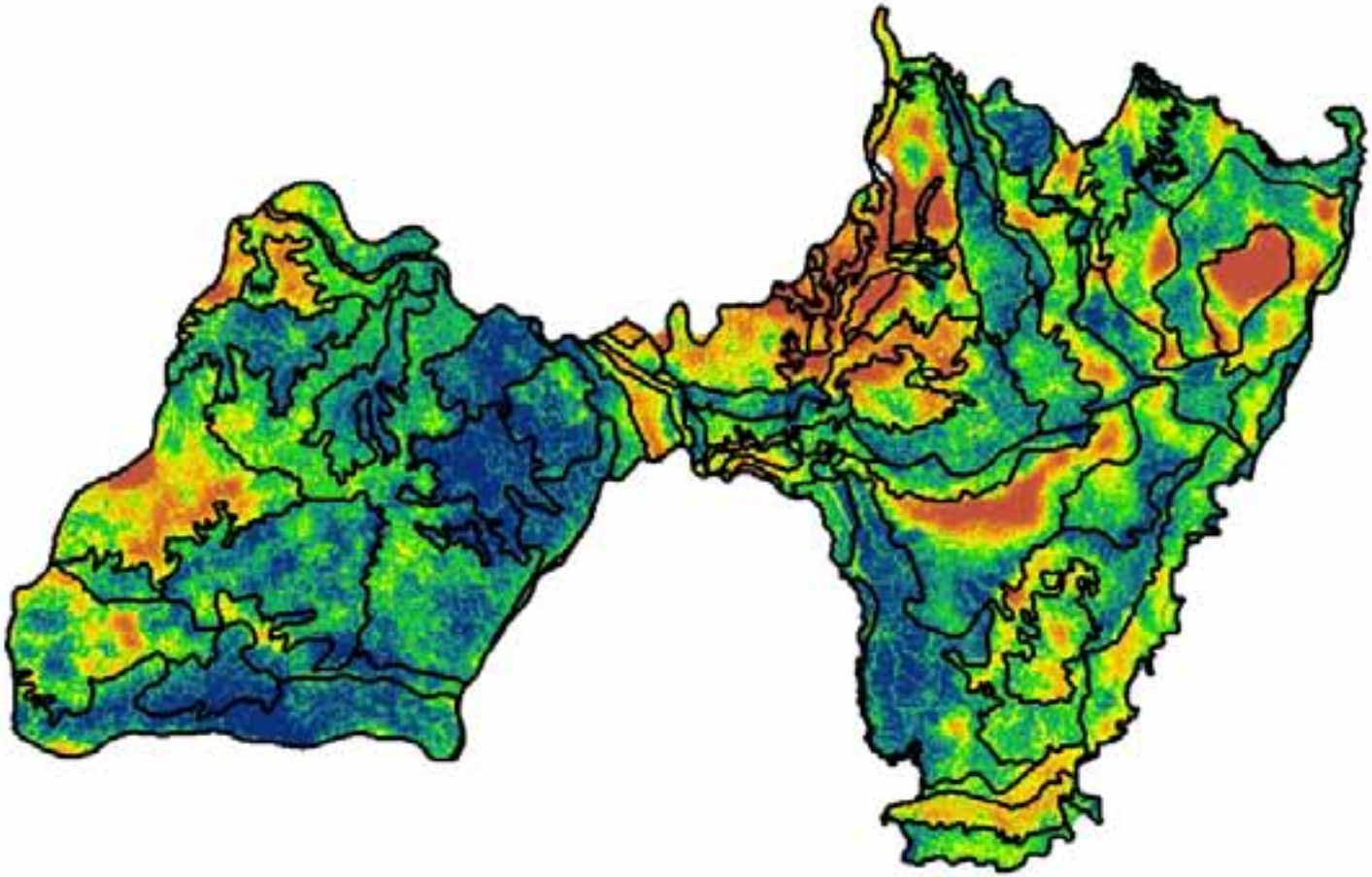
Model variables revised_new - Microsoft Excel

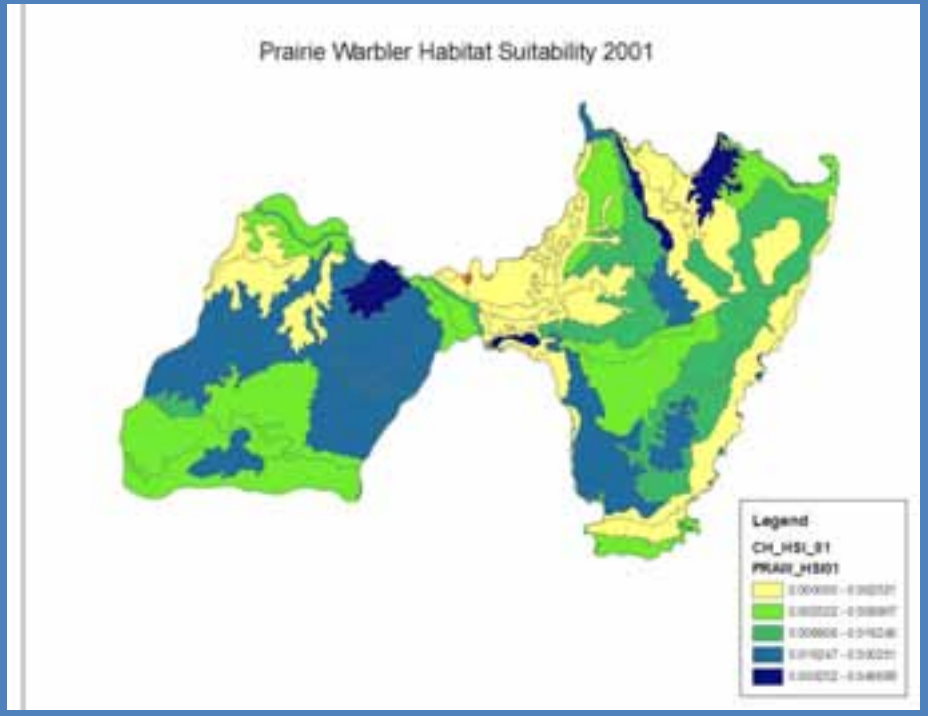
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1			FIA/NLCD	NLCD/SI maps									FIA													DEM	NHD		GPF		STATSGO				
2		General Habitat Association	Landform, landcover, and age class	Forest Patch Size	Early Successional Forest Patch Size	Landscape Composition	Landscape Composition - open habitat	Edge	Distance to Edge	Interspersion	Connectivity	Grassy Cover	Basal Area	Hardwood Basal Area	Pine Basal Area	Large (>50 cm dbh) Tree Density	Sawtimber Tree Density	Pole-sawtimber Tree Density	Large Pine Density	Dominant Tree Density	Canopy Cover	Midstory Tree Density	Snag Density	Large Snag Density	Small Stem Density	Slope	Distance to Stream/Water	Occurrence of Water	GPF - Landscape Composition - 10 km	GPF - Landscape Composition - 7X7	Soil texture	Soil moisture			
3	Bird name			ha	ha	%	%	Yes/no	meters		km	meters	m^2/ha	m^2/ha	m^2/ha	#/ha	#/ha	#/ha	#/ha	#/ha	%	#/ha	#/ha	#/ha	#/ha	%	meters	Yes/no	Edge	# pixels					
4	BACS	PS, ES	X	X							X										X								X	X					
5	BWWA	ES	X		X																X														
6	BHNU	PS	X											X									X		X										
7	CERW	BH, FI, R	X	X		X														X	X								X	X					
8	KEWA	BH, SF	X	X		X																			X				X	X					
9	PRAW	ES	X		X			X													X				X										
10	WOTH	FE, FI	X	X		X															X				X				X	X					
11	WEWA	FI	X	X		X																			X	X			X	X					
12																																			
13																																			
14																																			

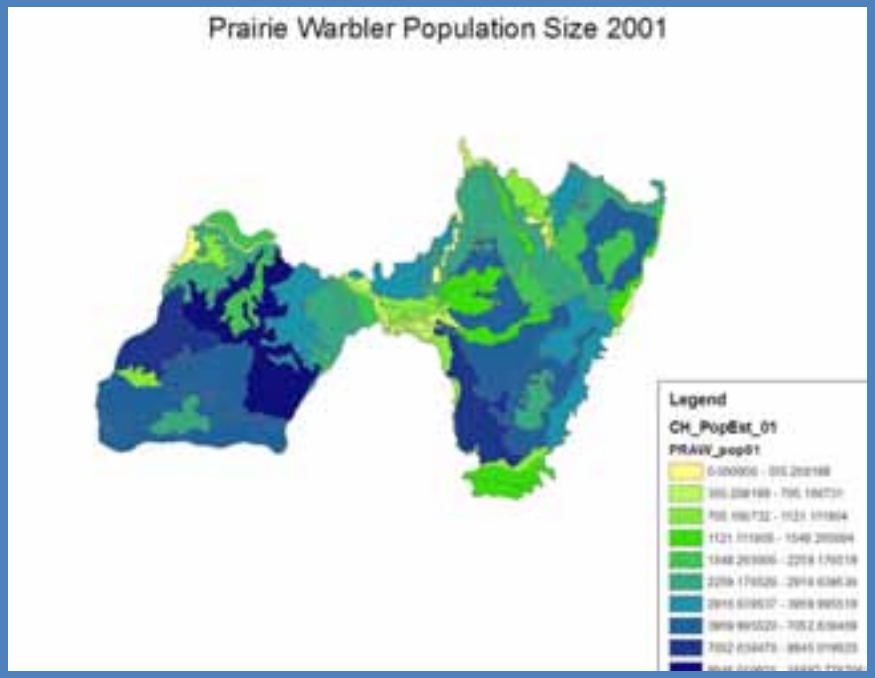
Bird-habitat variable grid | Implementation Birds only

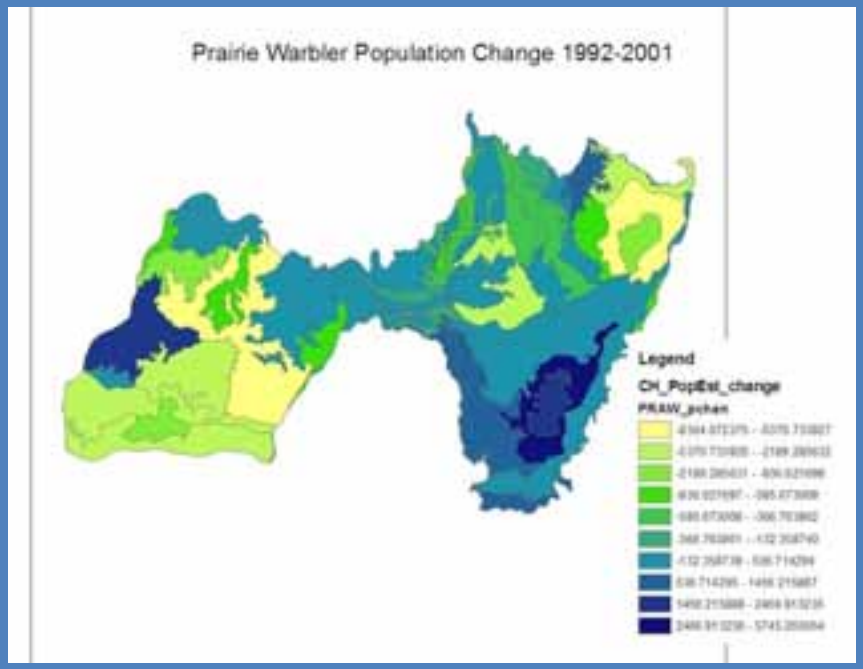
Ready

General Productivity Function




Prairie Warbler Habitat Suitability 2001
Legend
CH_HSI_01
PRAW_HSI01


Prairie Warbler Population Size 2001
Legend
CH_PopEst_01
PRAW_pop01


Prairie Warbler Population Change 1992-2001
Legend
CH_PopEst_change
PRAW_pchan

Steps in SHC…

- Identify species of conservation priority
- Formulate population objectives
- Assess current state of populations (e.g. population sizes, growth potential, habitat needs and limiting factors); build habitat-population models
- *Develop habitat assessments*
- *Combine appropriate decision support tools to link population and habitat objectives*
- Test assumptions and refine models; monitor population response to management actions

Modeling Ecological Potential to Guide Bird Conservation in the Central Hardwoods Bird Conservation Region

Lee O'Brien[1,2], Tim Nigh[3], Diane True[4], Jane Fitzgerald[1,5] and Todd Jones-Farrand[1,5]

[1] Central Hardwoods Joint Venture
[2] U.S. Fish and Wildlife Service
[3] Missouri Department of Conservation
[4] Missouri Resource Assessment Partnership
[5] American Bird Conservancy

Model

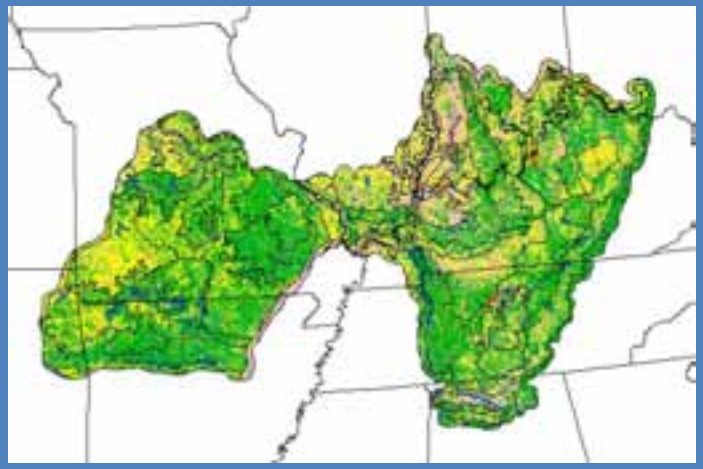
Land Type Associations (LTAs) – based upon geology, soils, topography, expert knowledge

Scale – 1,000 to 10,000 acres

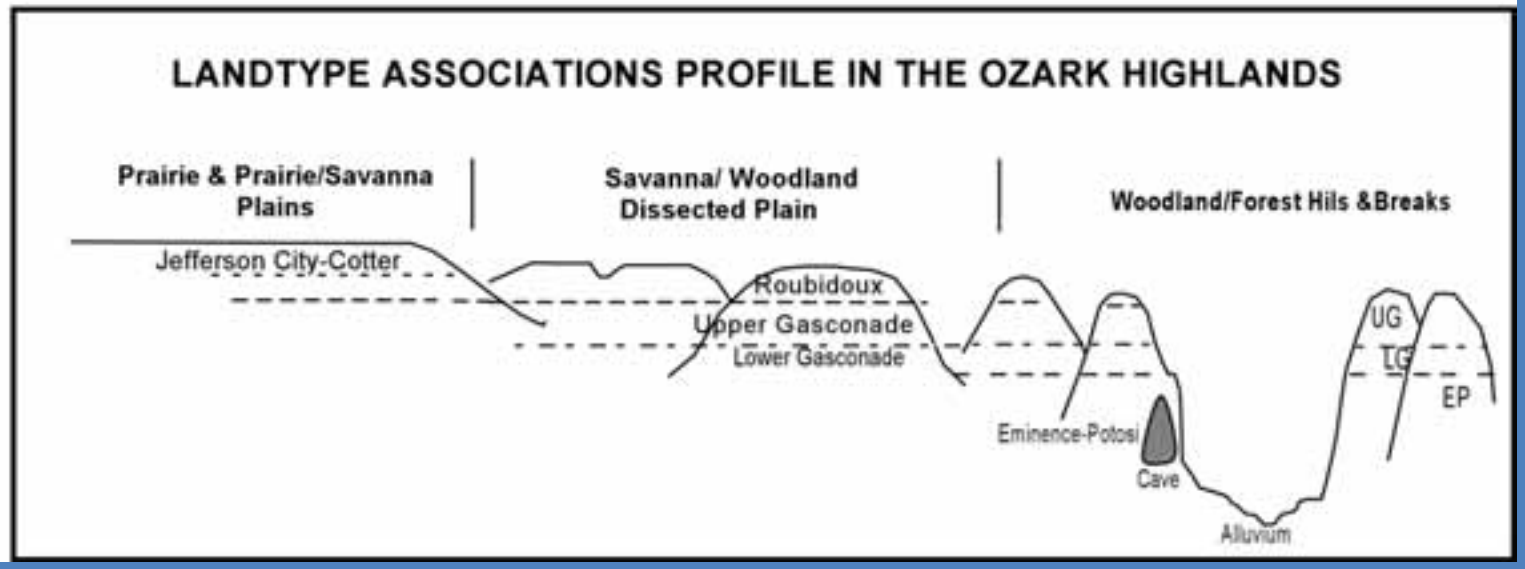
Landscape Positions – landform model based upon elevation, slope, aspect, solar exposure

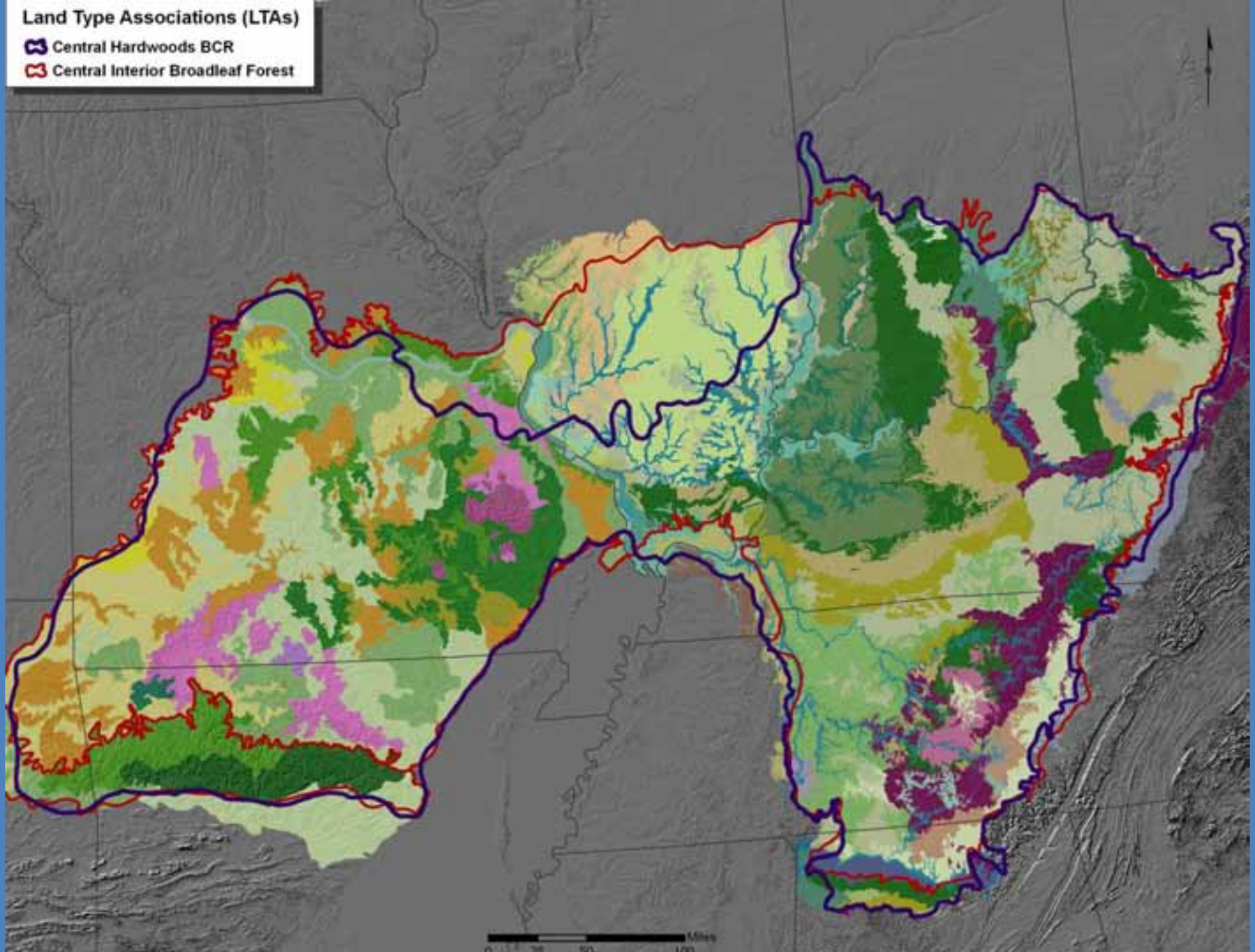
Scale – hillside

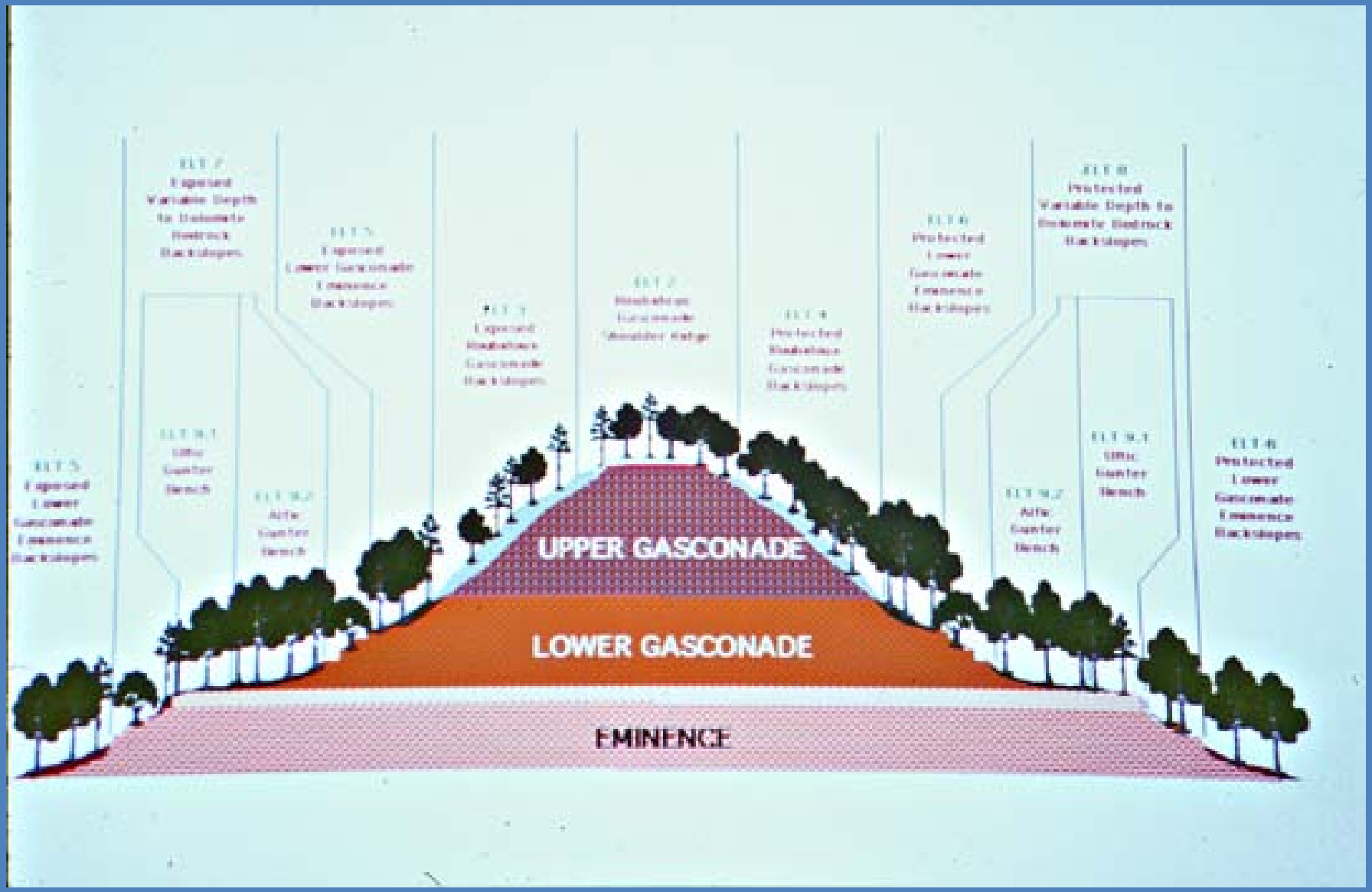
Matrix of potential natural vegetation for each landscape position in each LTA – based upon local community ecologists' expert opinion

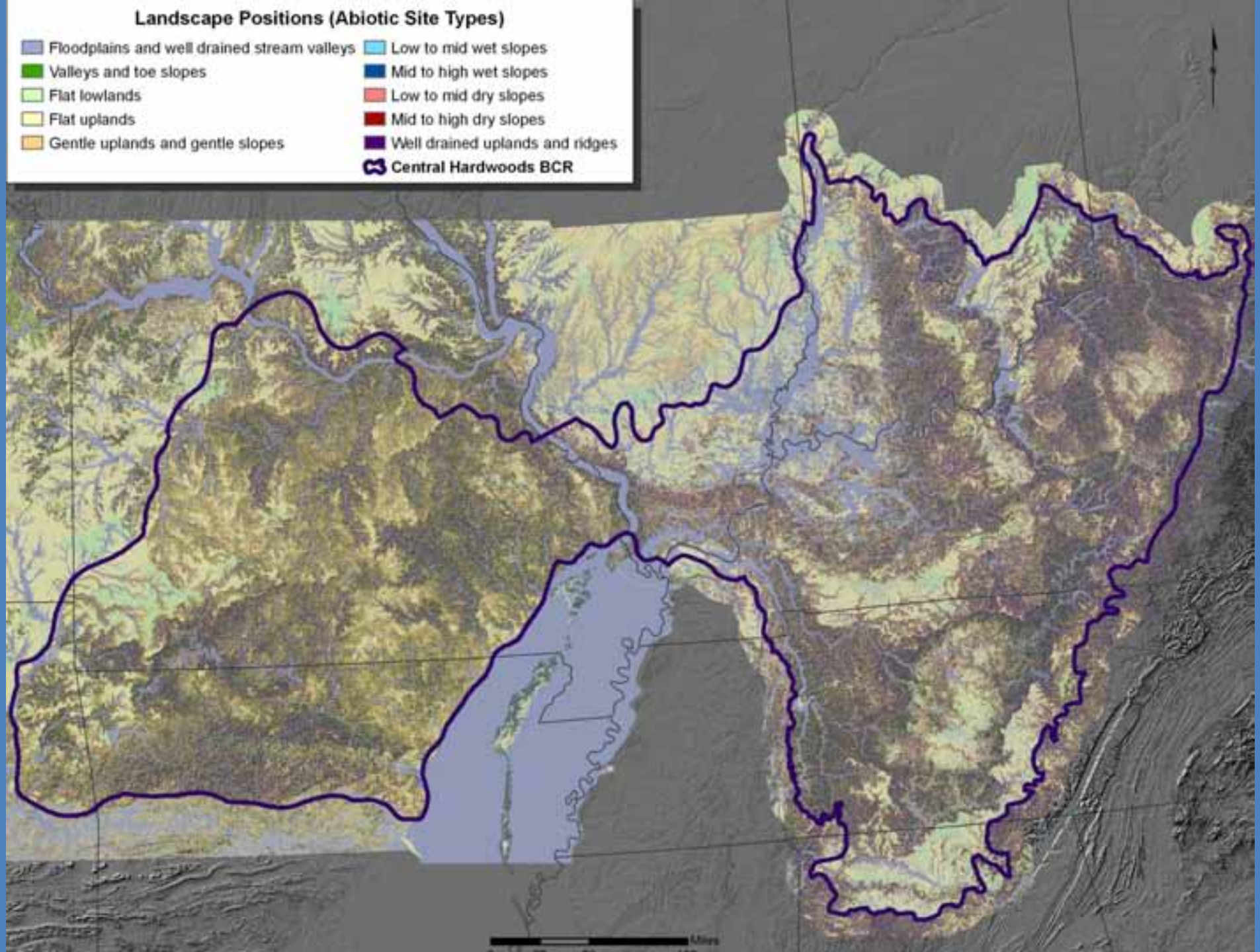


Landscapes and associated habitat types are largely a function of sun exposure, water accumulation and fire breaks and shadowing….




Land Type Associations (LTAs)
Central Hardwoods BCR
Central Interior Broadleaf Forest
Miles


UPPER GASCONADE
LOWER GASCONADE
EMINENCE


Landscape Positions (Abiotic Site Types)
Floodplains and well drained stream valleys
Valleys and toe slopes
Flat lowlands
Flat uplands
Gentle uplands and gentle slopes
Low to mid wet slopes
Mid to high wet slopes
Low to mid dry slopes
Mid to high dry slopes
Well drained uplands and ridges
Central Hardwoods BCR

Ecological Potential Model

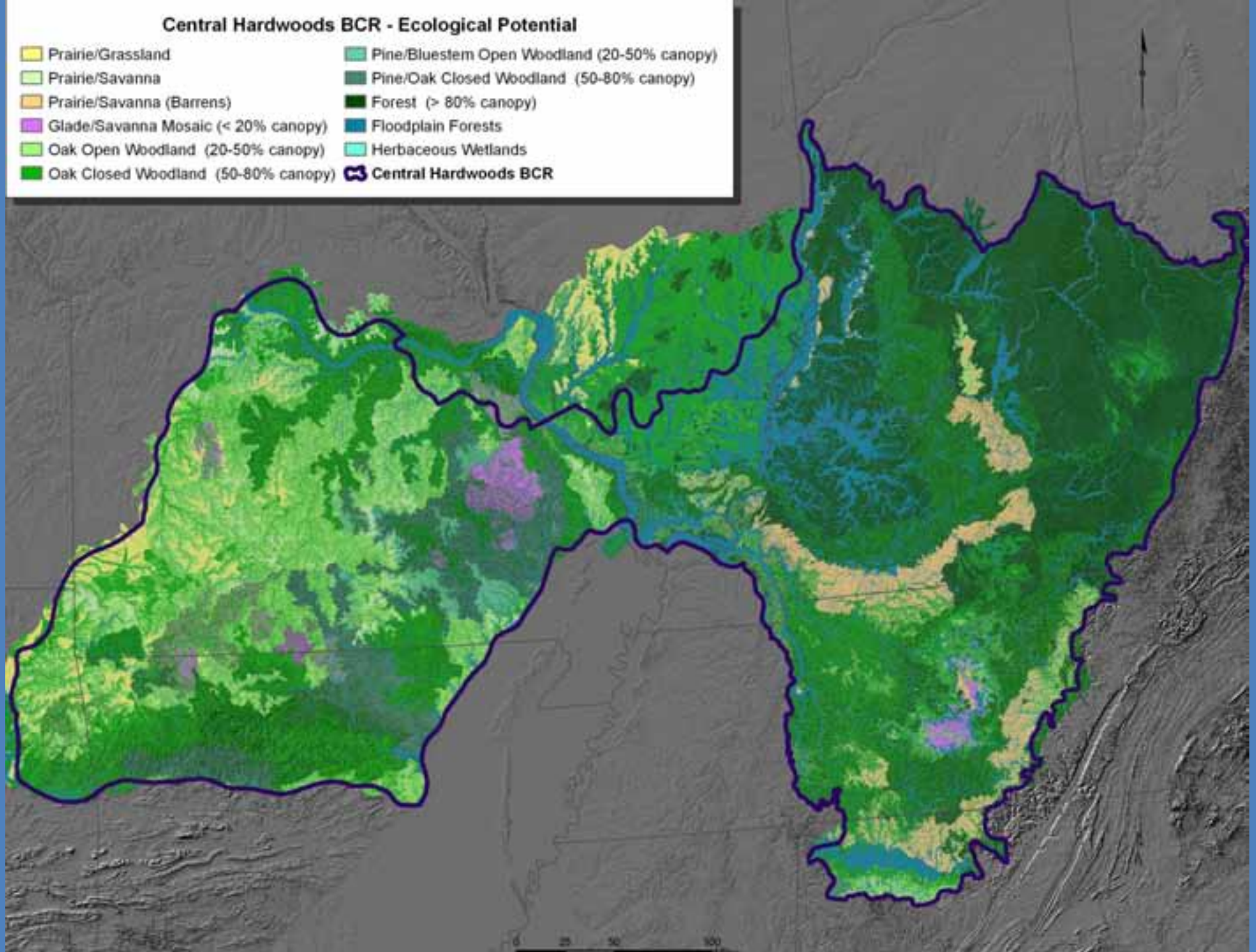
Potential Vegetation Types

1) Prairie/Grassland
2) Glade/Savanna (< 20% canopy)
3) Oak Open Woodland (20-50% canopy)
4) Oak Closed Woodland (50-80% canopy)
5) Pine/Oak Closed Woodland (50-80% canopy)
6) Forest (> 80% canopy)
7) Pine/Bluestem Open Woodland (20-50% canopy)
8) Prairie/Savanna (Barrens)

LTA Types

OZ Alluvial Plains
OZ Prairie Plains
OZ Prairie/Savanna Plains
TP Loess Prairie Hills and Blufflands
OZ Oak Savanna/Woodland Dissected Plains
OZ Pine-Oak Woodland Dissected Plains
OZ Oak Woodland Dissected Plains and Hills
OZ Glades/Woodlands
OZ Igneous Knobs
OZ Oak Woodland/Forest Hills
OZ Forest Breaks
OZ Oak-Pine Hills

Land Type Associations	Landscape Positions								
	Floodplains	Valleys	Low wet slopes	High wet slopes	Low dry slopes	High dry slopes	Gentle uplands	Flat uplands	Ridges
Tipton Upland Prairie Plain	6	4	4	4	3	3	8	1	3
Southeastern Oak Savanna/Woodland Plain	6	6	6	4	4	4	4	4	4
Wappapello Oak-Pine Woodland/Forest Hills	6	6	6	5	5	7	7	8	5
West Bollinger Oak-Pine Woodland/Forest Hills	6	6	6	5	5	7	7	8	5
Grandin Pine-Oak Woodland Dissected Plain	6	5	5	5	5	7	7	8	5
Lake Ozark Oak Woodland/Forest Breaks	6	6	6	4	4	4	4	6	4
Niangua R. Oak Woodland/Forest Breaks	6	6	6	4	4	4	4	6	4
Lower Sac River Oak Woodland Hills	6	4	4	4	4	3	3	8	4
Middle Osage River Oak Woodland Hills	6	4	4	4	4	3	3	8	4
Truman Lake Oak Woodland Hills	6	4	4	4	4	3	3	8	4
Lower Osage R. Oak Woodland/Forest Hills	6	6	6	4	4	3	4	6	3
Middle Gasconade River Oak Woodland/Forest Breaks	6	6	6	6	4	4	4	6	4
Ft. Wood Oak Savanna/Woodland Plain	6	4	4	4	4	4	3	8	4
Middle Gasconade River Oak Woodland Benchland	6	4	4	4	4	4	3	8	4
Big Piney Hills Oak Woodland Dissected Plain	6	4	4	4	4	3	3	8	3
Upper Gasconade Hills Oak Woodland Dissected Plain	6	4	4	4	4	3	3	8	3
Upper Gasconade Oak Woodland Hills	6	6	6	4	4	3	4	6	3
Lower Gasconade River Oak Woodland/Forest Hills	6	6	6	4	4	3	4	6	3
Roubidoux Creek Oak Woodland/Forest Hills	6	6	6	4	4	3	4	6	3
Big Piney River Oak-Pine Woodland/Forest Hills	6	6	6	5	5	7	7	8	5
Little Piney River Oak-Pine Forest Hills	6	6	6	5	5	7	7	8	5
Big Piney Pine-Oak Woodland Dissected Plains	6	5	4	5	5	7	7	8	7
Meramec River Oak Forest Breaks	6	6	6	6	4	4	6	6	4
Cherryville Oak Savanna/Woodland Plain	6	4	4	4	4	3	3	8	3
Indian Prairie Oak Savanna/Woodland Plain	6	4	4	4	4	3	3	8	3
Potosi Oak Savanna/Woodland Plain	6	4	4	4	4	3	3	8	3
Huzzah-Courtois Oak Woodland Dissected Plain	6	4	4	4	3	3	8	8	3
Big River Oak Woodland/Forest Hills	6	6	6	6	4	4	4	3	4
East Meramec Oak Woodland/Forest Hills	6	6	6	6	4	4	4	3	4
Huzzah Oak Woodland/Forest Hills	6	6	6	6	4	4	4	3	4


Central Hardwoods BCR - Ecological Potential
Prairie/Grassland
Prairie/Savanna
Prairie/Savanna (Barrens)
Glade/Savanna Mosaic (< 20% canopy)
Oak Open Woodland (20-50% canopy)
Oak Closed Woodland (50-80% canopy)
Pine/Bluestem Open Woodland (20-50% canopy)
Pine/Oak Closed Woodland (50-80% canopy)
Forest (> 80% canopy)
Floodplain Forests
Herbaceous Wetlands
Central Hardwoods BCR

Central Hardwoods Joint Venture
partnerships for conservation

AMERICAN BIRD CONSERVANCY

Draft Objectives

- Draft habitat objectives
  - Protect source forest
  - Increase Savanna, Glade, & Open Woodland types
    - 15% of Prairie/Savanna & Barrens, Glade/Savanna, & Oak Open Woodlands
    - 20% of Pine/Bluestem Open Woodlands
  - No loss of other communities
- Implies restoration goal of 1.1 million acres & approximately 0.5 million acres mitigation

Central Hardwoods Joint Venture
partnerships for conservation

AMERICAN BIRD CONSERVANCY

Draft Objectives

- Population Objectives

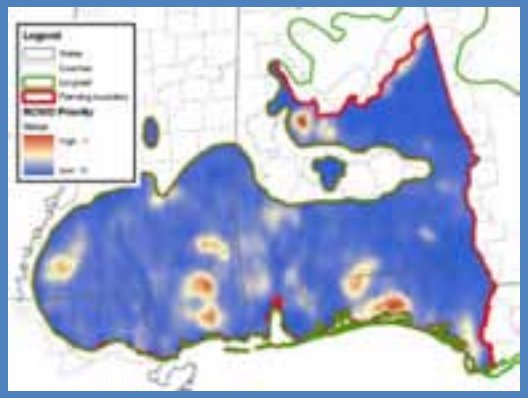
Species	Baseline Population	New Population	Population Change	% Change	Objective
BACS	7,659	21,299	13,640	178.1	Inc. 100%
BHNU	17,420	18,918	1,498	8.6	Inc. 10%
BWWA	1,528,769	1,560,592	31,824	2.1	Stable
CERW	1,087,913	1,064,140	-23,773	-2.2	Stable
KEWA	1,253,636	1,218,020	-35,616	-2.8	Stable
PRAW	713,321	797,442	84,121	11.8	Inc. 10%
WEWA	725,162	705,208	-19,954	-2.8	Stable
WOTH	1,498,091	1,467,087	-31,004	-2.7	Stable

Landscape Prioritization for Longleaf Restoration in the East Gulf Coastal Plain JV

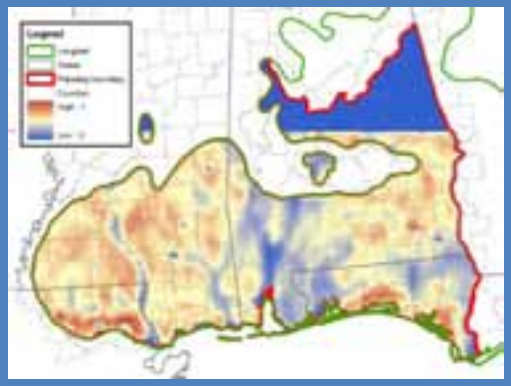
- Higher priority areas for restoration, conservation & management should be **nearer to larger**:
  - Existing open pine habitat (where is open pine habitat now – AL GAP data)
  - Clusters of sites that are suitable for growing longleaf
    - (historic range / landform data – upland vs riparian)
  - Areas that can be managed with fire
    - (urbanization and road information)
  - Areas that can be managed for conservation in the future
    - (conservation estate assessment – public lands)
  - Sustainable source populations of umbrella species
    - (using territory size, MVP)

Species priorities

Red-cockaded Woodpecker



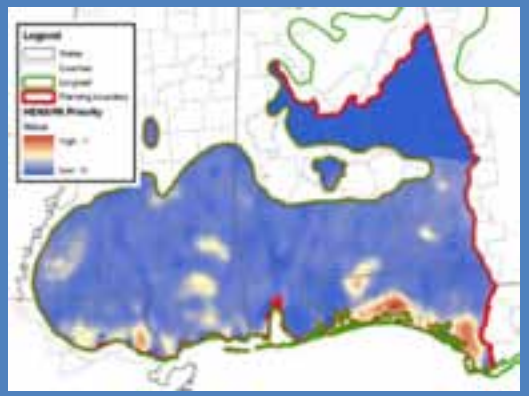
SE American Kestrel



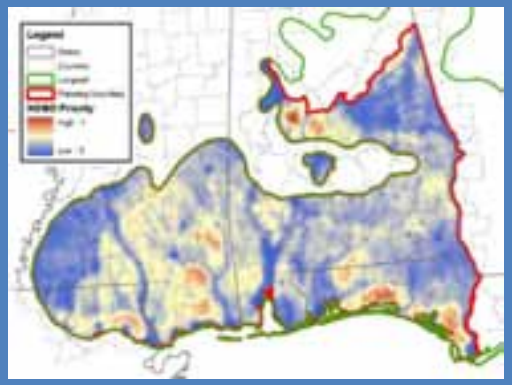
Bachman's Sparrow

Brown-headed Nuthatch

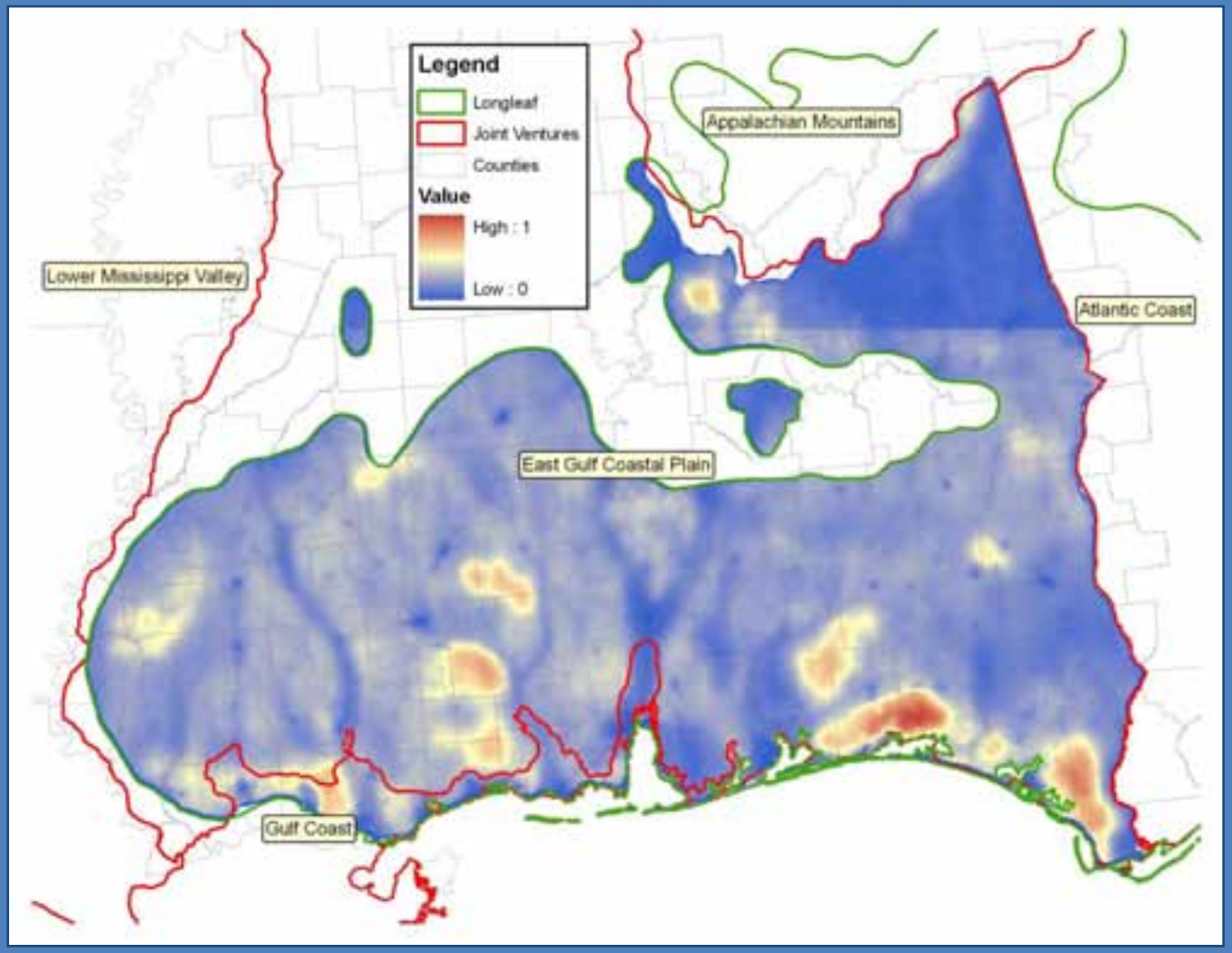
Henslow's Sparrow



Northern Bobwhite



Overall priority



Steps in SHC…

- Identify species of conservation priority
- Formulate population objectives
- Assess current state of populations (e.g. population sizes, growth potential, habitat needs and limiting factors); build habitat-population models
- Develop habitat assessments
- Combine appropriate decision support tools to link population and habitat objectives
- *Test assumptions and refine models; monitor population response to management actions*

Iterative Model Validation

- CH/WGCP HSI models validated at sub-regional scale w/ BBS
  - Tirpak et al. 2009

  JWM 73(8):1307-1315

Management and Conservation Article

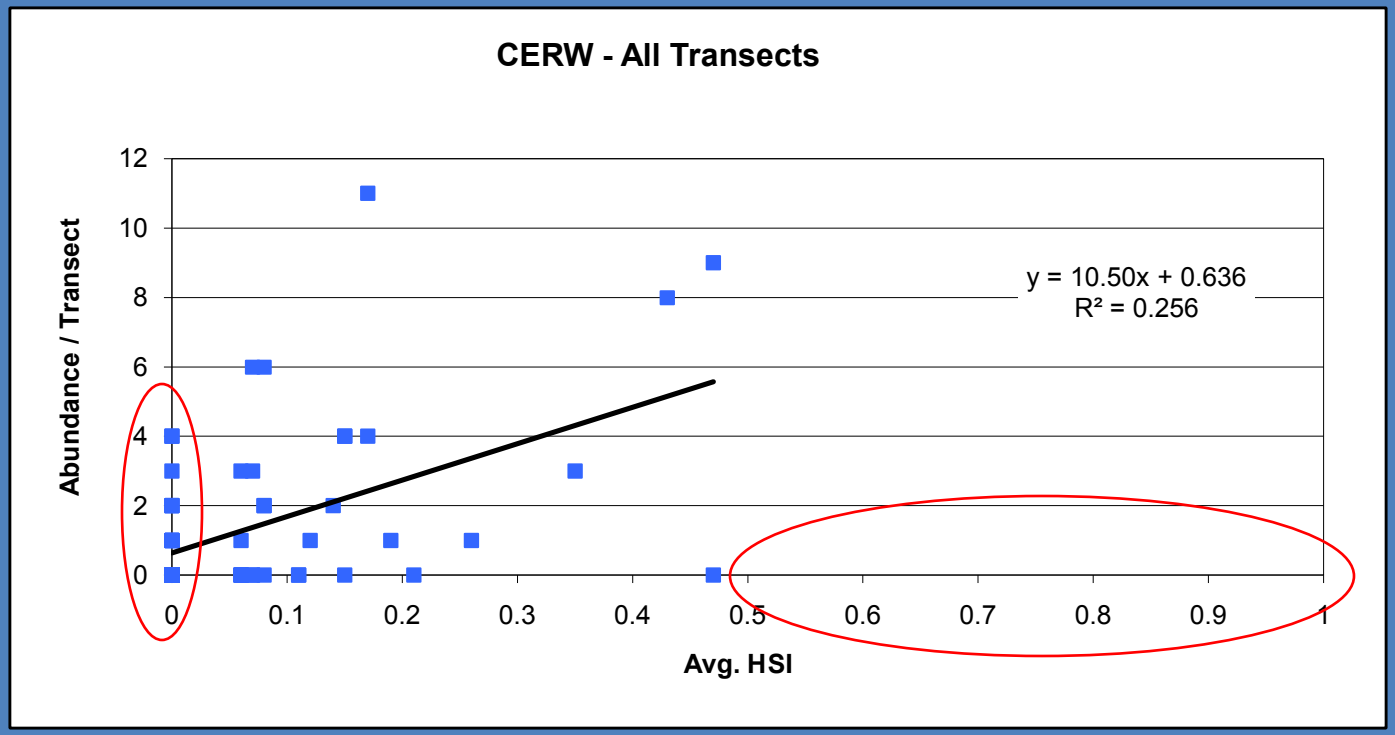
Assessing Ecoregional-Scale Habitat Suitability Index Models for Priority Landbirds

JOHN M. TIRPAK, D. TODD JONES-FARRAND, FRANK R. THOMPSON, III, DANIEL J. TWEDT, CHARLES K. BAXTER, JANE A. FITZGERALD, WILLIAM B. UHLEIN, III

ABSTRACT

- But, BBS is not a good data set for testing model relationships
- So, test models with Coordinated Bird Monitoring projects
  - Point count transects
  - Collect data on habitat variables in model at each point
  - Calculate abundance and HSI value for each transect

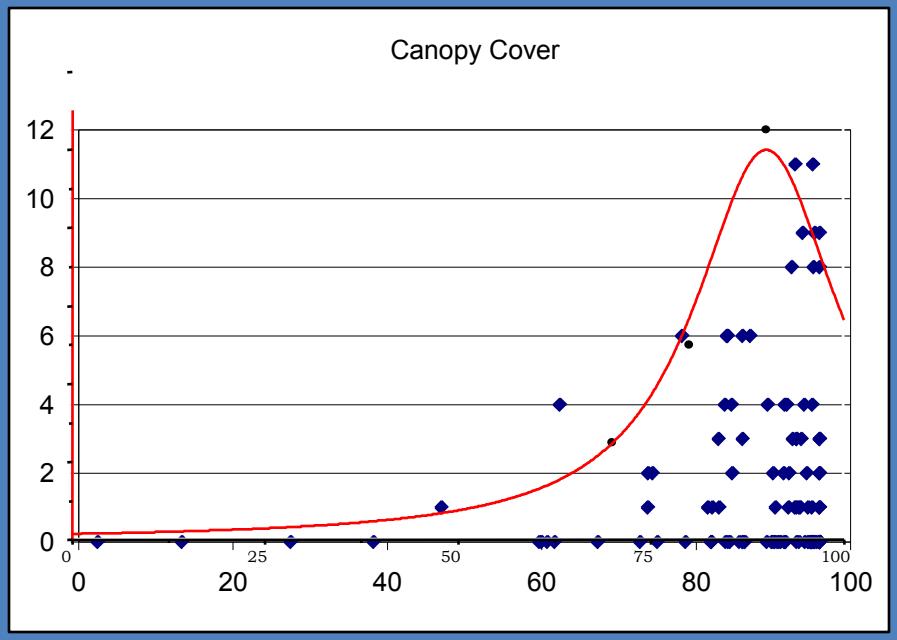
Preliminary Results - CERW

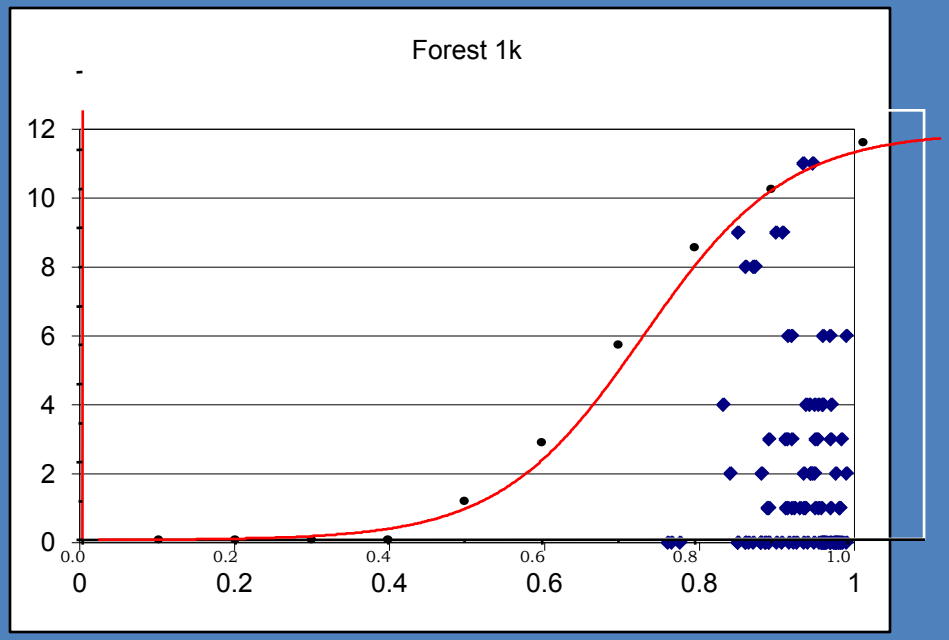


Interpretation:

1. Nice positive relationship.
2. Not all habitat occupied.
3. Identifies problems with model.

Abundance by Model Variables

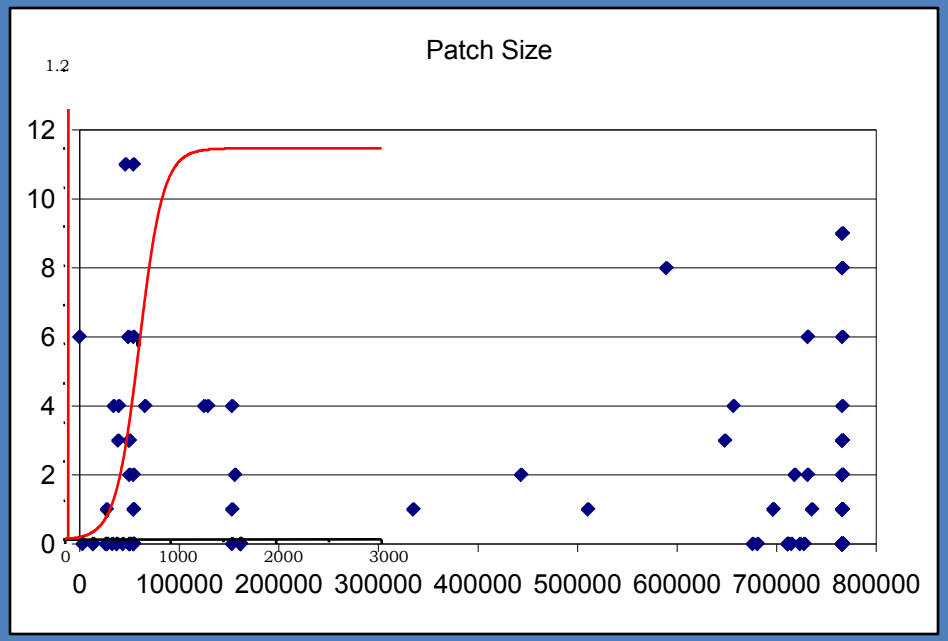


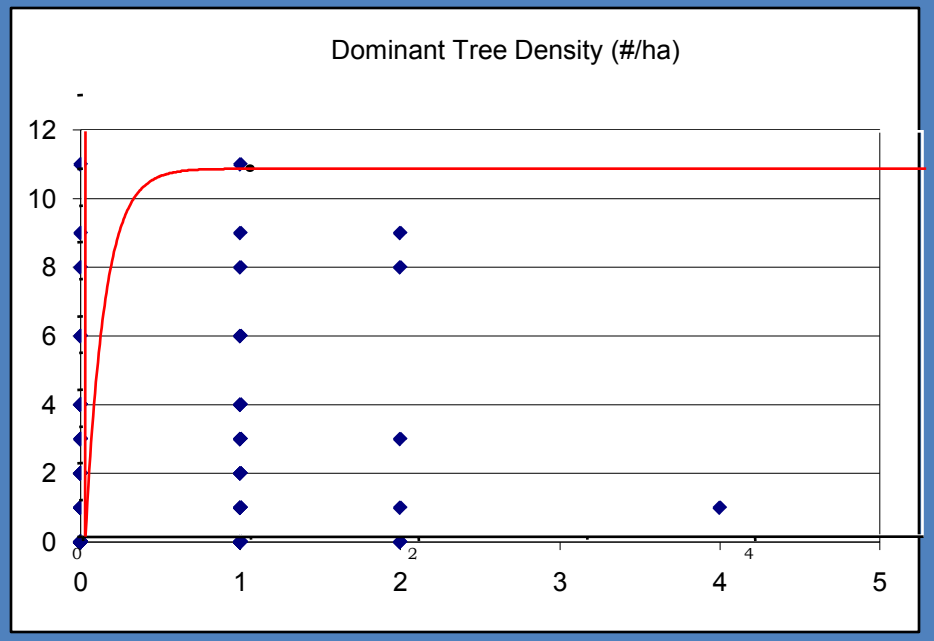


Good overall fit,
some habitat unoccupied

Good fit, but need more data
in more fragmented landscapes

Abundance by Model Variables

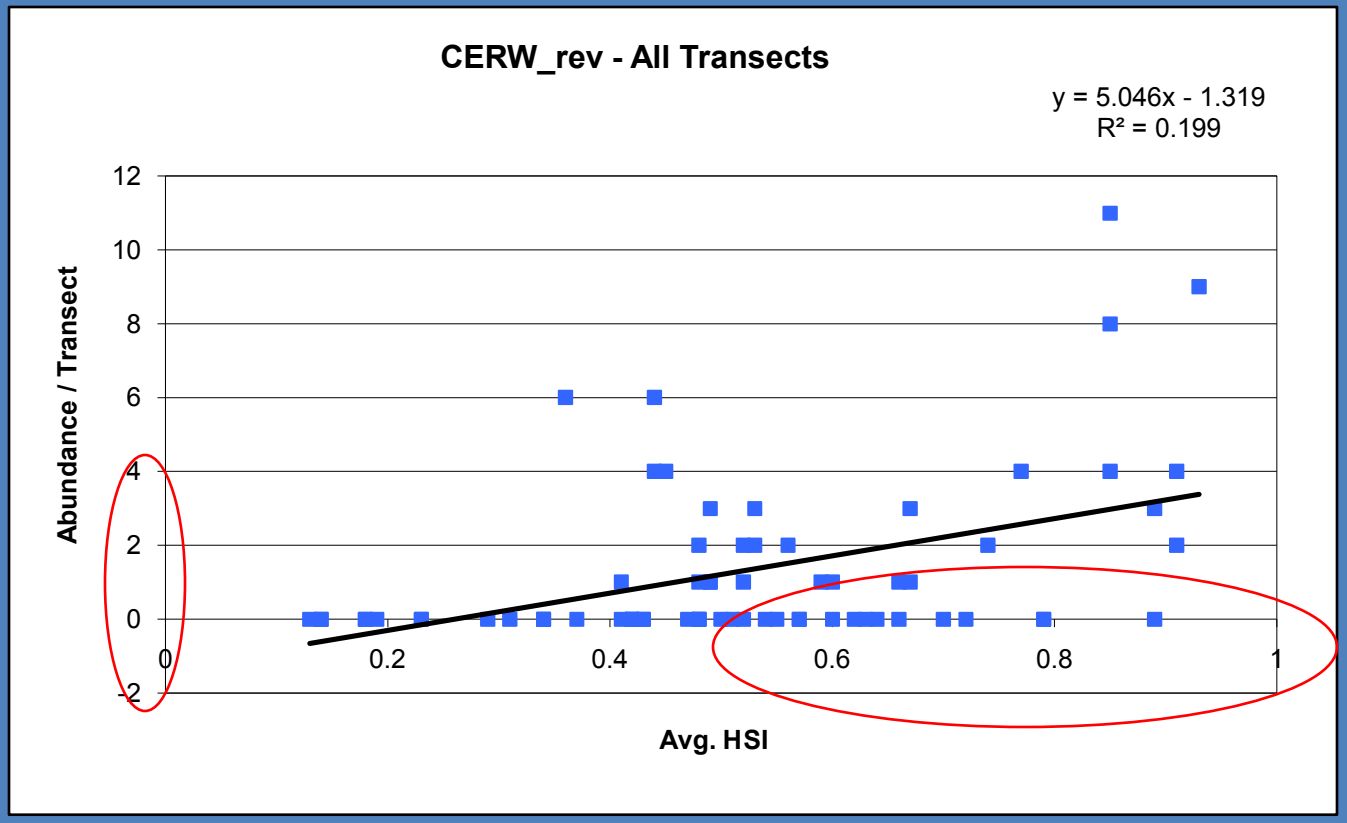




Poorer fit, could be problem with underlying data

Very poor fit, likely a problem with variable parameterization

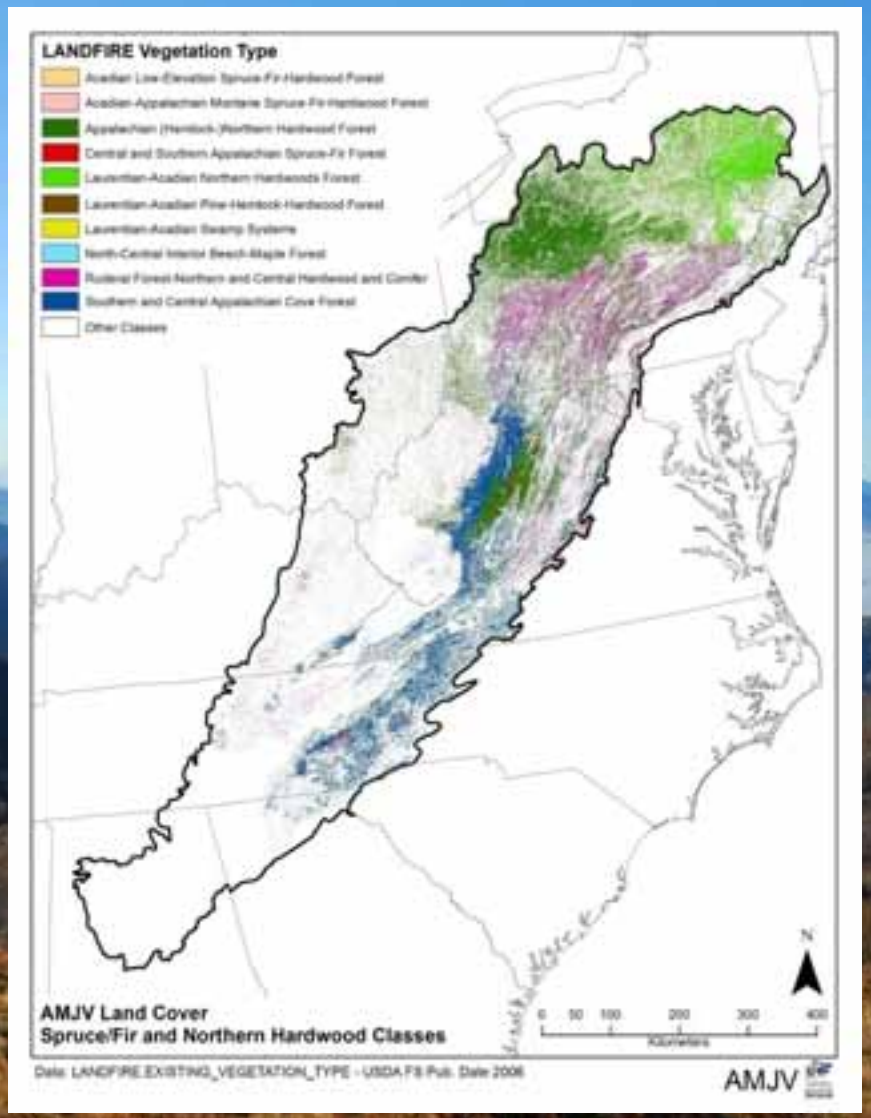
Preliminary Results - CERW



Removing Dominant Tree Density eliminates some problems with model, but creates others. We need to revise this parameter, not drop it.

High Elevation Working Group

- High elevation communities: Spruce/Fir, N. Hardwoods, ecotone, balds, etc.
- Biological planning underway (focal species, major limiting factors, bird/habitat models)
- Monitoring framework
- DST to prioritize actions



Energy in the AMJV…

Questions???