Avian Conservation on Military Lands Monitoring Modeling and Management

A landscape-level approach to managing landbird populations on military lands using MAPS demographic monitoring data

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DoD-PIF Goals and Objectives

- Facilitate cooperative partnership efforts in consonance with the requirements of the military mission
- Determine the current status of neotropical migratory bird populations on DOD lands and causes of population fluctuations
- Identify and maintain priority habitats on DOD lands for neotropical migratory bird populations
- Use information collected from this partnership program to better support DOD mission requirements
- Take proactive management actions to prevent neotropical migratory birds from reaching threatened or endangered status

Avian Conservation and Range Sustainment

Challenge	conserving natural resources vs military training
Issues	encroachment, public protection, range expansion
Management	range management both positively and negatively impacts ***Birds of Conservation Concern***
Implications	type, frequency, and timing of management (e.g. fire) is critical to conservation goals
Solution	monitor, model, and management of populations of ***Birds of Conservation Concern*** in *important habitats*
Impacts	many ***BCC*** *species* can benefit from controlled fire management of “disclimax” communities

Continental Network of MAPS Stations

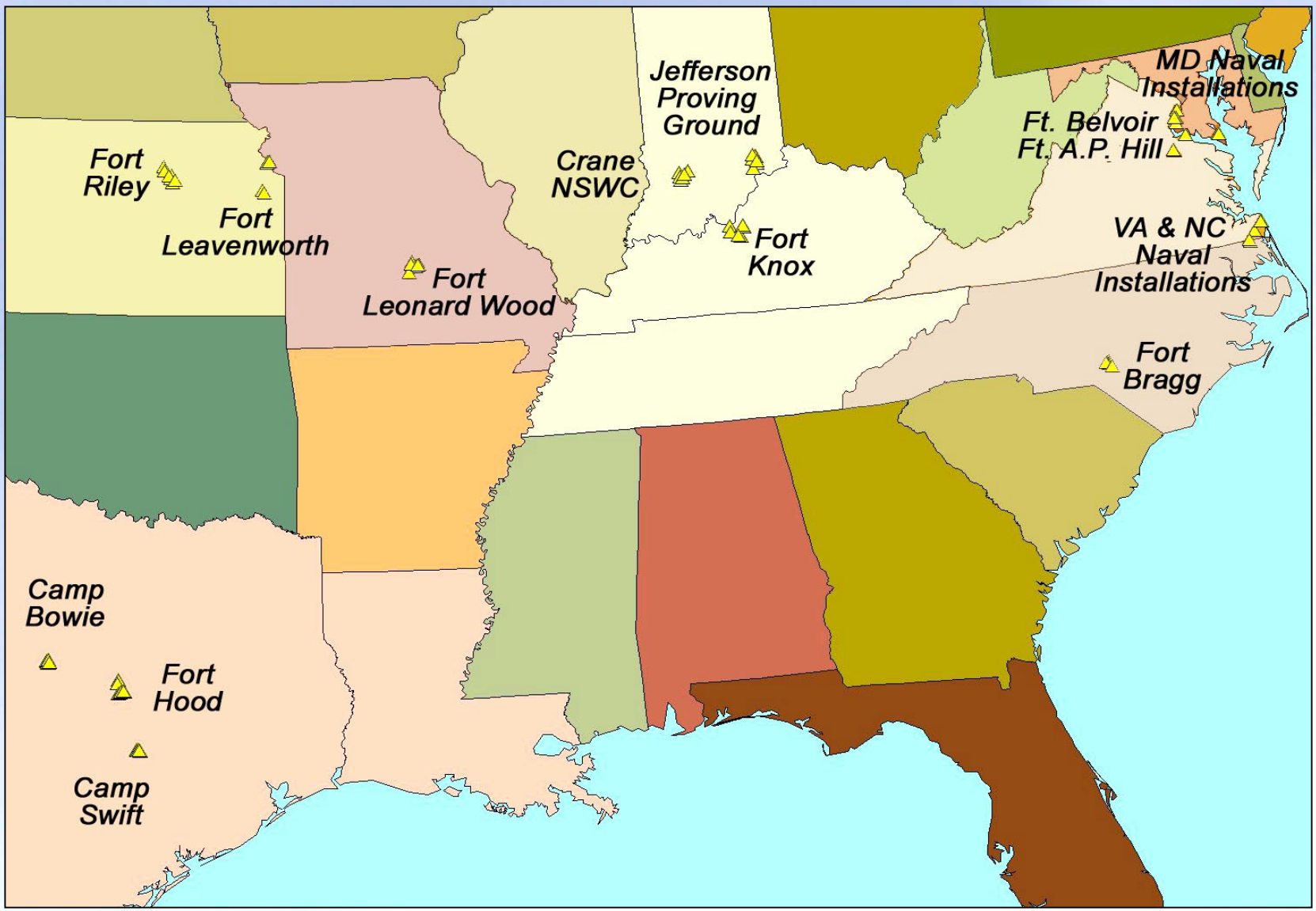
Why Monitor Primary Demographic Parameters ?

- Environmental stressors and management actions affect primary demographic parameters directly and without time lags
- To identify the critical stage(s) of the avian life cycle at which population change is effected (survival or reproduction)
- To monitor the “health” and viability of populations across local and regional spatial scales
- To indicate the local habitat quality for a target species, guild, or community and monitor the effects of habitat change on avifauna
- To provide information about source-sink dynamics that estimates of adult density and population size cannot

MAPS Monitoring on Military Lands

- IBP established a network of 78 MAPS stations on 13 U.S. military installations, or groups of nearby installations, in which we :
  - established six constant-effort mist netting stations per location
  - operated each station once every ten days during the breeding season
  - recorded species, gender, age, fitness, and morphological data
  - recorded all other breeding birds seen or heard at each visit
- Eight-year dataset was proofed, verified, and analyzed to provide :
  - effort-adjusted annual numbers of adult and young individuals
  - estimates of apparent survival rates (at scales of cluster and region)
  - indices of reproductive success (ratio of young to adults)
  - breeding status lists (migrant, transient, occasional, usual, breeder)

MAPS Locations on Military Installations



DoD MAPS Data in Avian Conservation: Importance, Scale and Uses

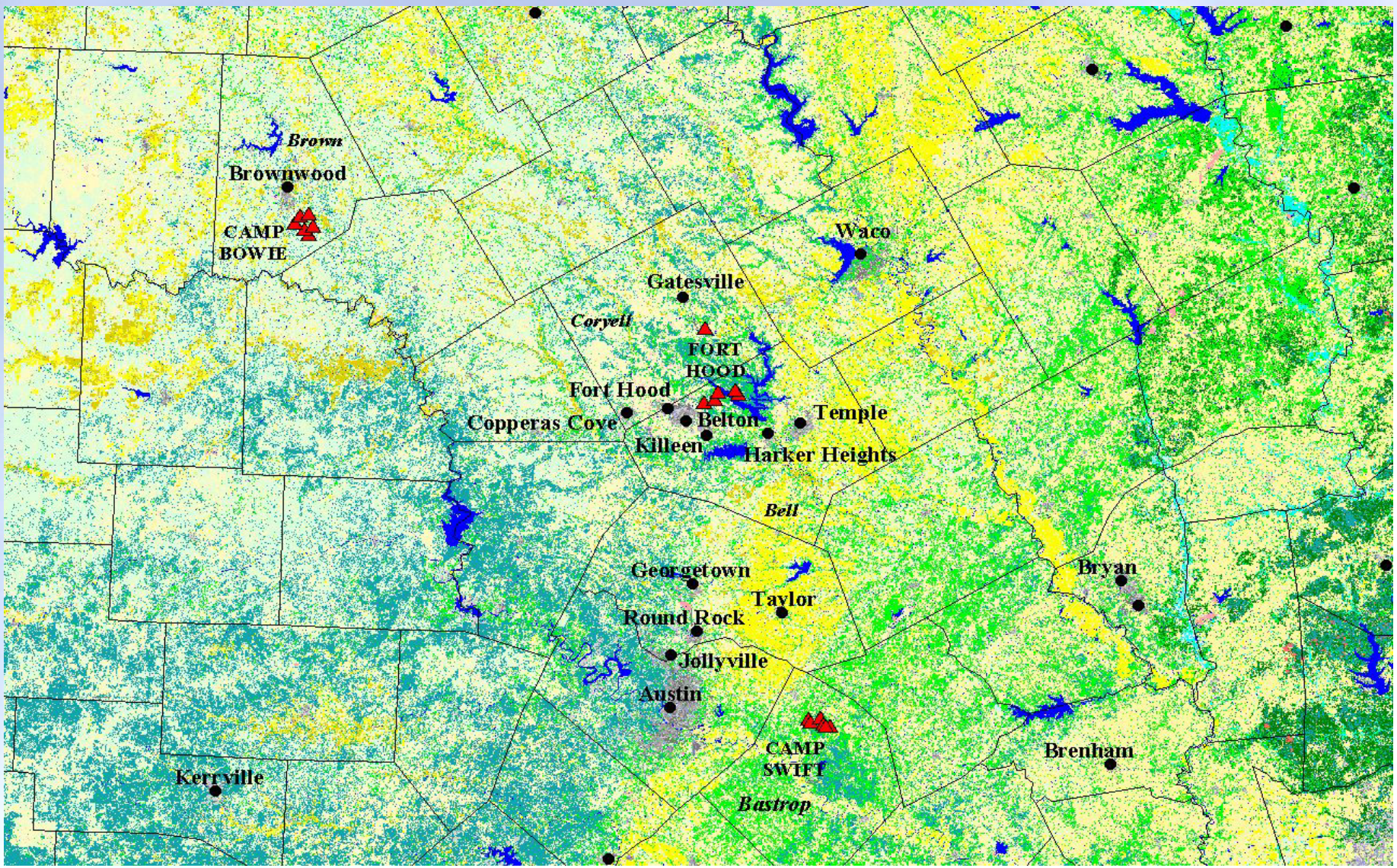
- DoD MAPS data represents 20% of the continental dataset.
- Clusters of six MAPS stations can provide useful installation-specific demographic estimates (trends, vital rates).
- Effectively monitors 30+ landbird species, of which 10 species are U.S. Fish and Wildlife ***"Birds of Conservation Concern"***
- Management models exist for five BCC species : 5 forest birds and 5 successional ("disclimax") species.
- These models can quickly assess management effects and support management decisions including compliance.
- Installation-specific specific demographic estimates can be used to evaluate "***ecosystem health***".
- Installation-specific demographic estimates can be compared to regional estimates to formulate "***performance measures***".

Monitoring, Models, and Management

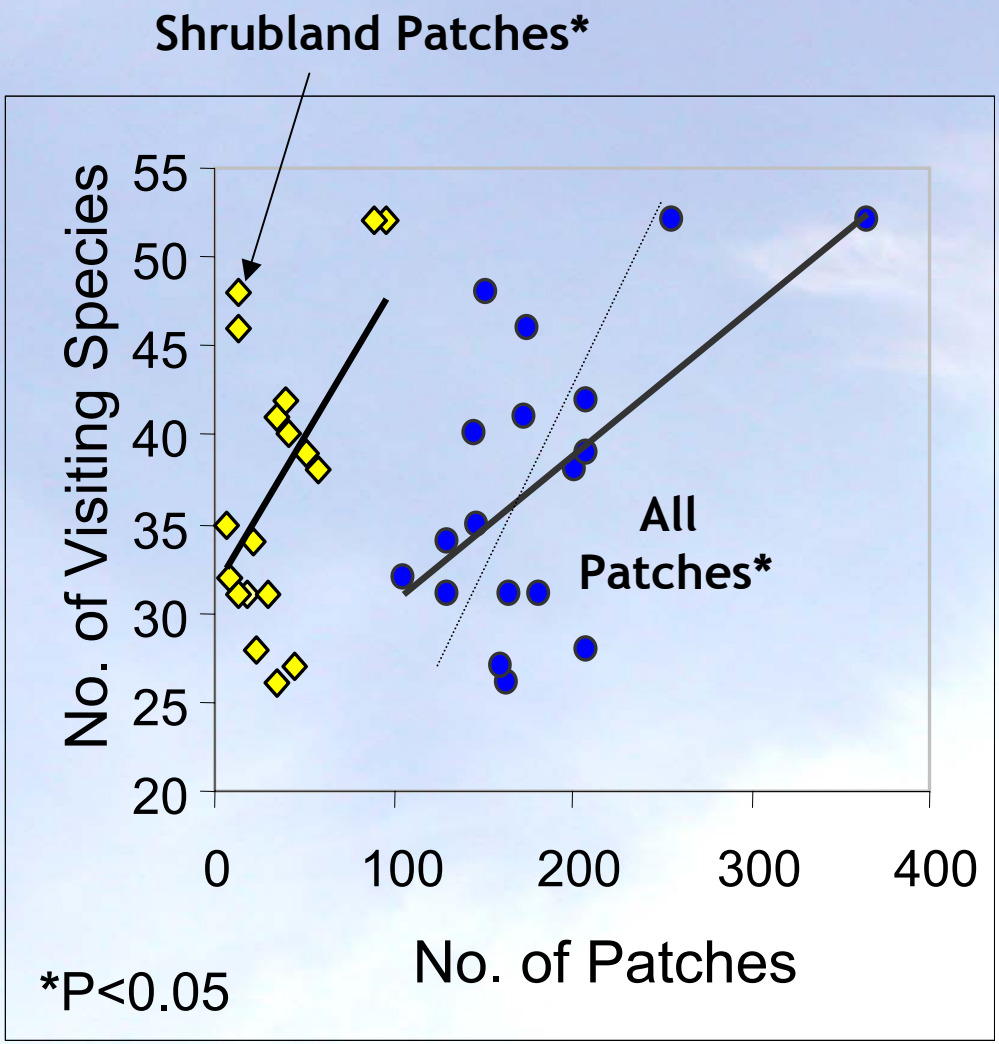
- Obtained study-wide, installation-specific, and station-specific demographic parameters from **monitoring** 31 species
- Selected 10 target species consistent with those identified by U.S. FWS (2002) as "**Birds of Conservation Concern**" (BCC)
- Collected spatial statistics from multiple radii of the National Land Cover (1992) landscapes surrounding each station
- Constructed "hypothesis-driven" species-landscape **models** to quantify the relationships between station-specific avian demographics and local landscape pattern and structure
- Identified and formulated **management** actions on DoD installations to reverse the declines in Neotropical migratory birds and other resident and migratory landbirds.

The National Land Cover Dataset :

18 Military MAPS Stations in Southeast Texas

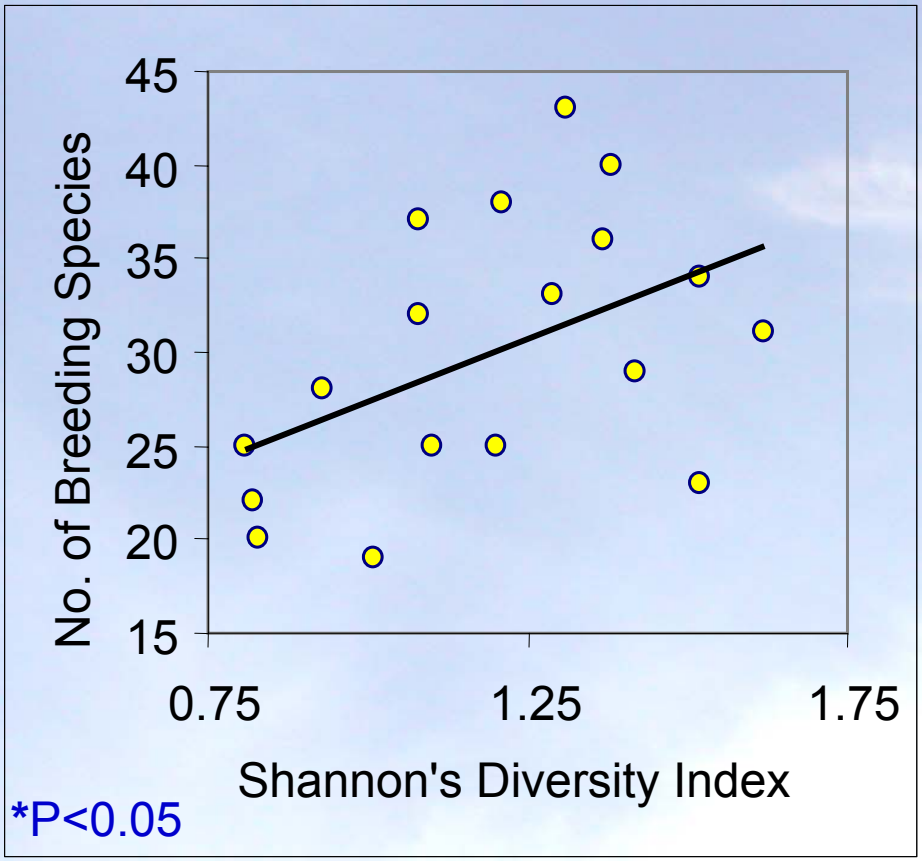


Landscape Pattern and Visiting Species Richness



- Visiting species utilize heterogeneous Texas landscapes (i.e., lots of types and sizes of patches):
- Number of shrubland patches and water sources are particularly important to transients and migrant species early in the year

Landscape Pattern and Breeding Species Richness



- Breeding species richness increases with habitat diversity (SDI) afforded by open habitat cover, shrub cover, and also by edge habitats (e.g. forest-shrub)
- BUT for many common species adult abundance/productivity increases with patch size of one or more cover classes
- Recommend maintaining large and varied patches in a state favorable for breeding

Managing Bewick's Wren Populations

- Bewick's wren populations benefit from managing a mosaic of shrubland and forest with small patches of grassland
- Shrubland component should be maintained as large patches with complex shapes covering 40% or more of the area.
- Forest component provides trees and snags with cavities for nesting, as well as song perches, and perhaps "fast food"
- Suggests relationships exist between the adjacency of forest and shrubland and various demographic parameters
- Developed areas and large core areas of agriculture should be kept to a minimum in the landscape
  - their edges are attractive to adult Bewick's wrens,
  - but have a negative effect on numbers of young and productivity,
  - so tend to reduce population trends, and
  - therefore appear to act as population sinks.


Fire
the critical tool of military land management
habitat restoration and wildlife conservation

The Role of Fire in Military Land Management

Fire is an essential weapon for military land management and integral to most major forms of land management that impact birds:

Timber management : logging leases or reforestation on some installations may impact populations of forest and woodland species

Physical treatments : ploughing, disking, removal, and grading treatments affect plant communities, habitat structure, and wildlife

Chemical treatments : fertilizer, pesticide, and herbicide treatments affect plant communities, habitat structure, and wildlife

Habitat restoration : restoration of critical habitat such as riparian corridors or prairie impacts communities in adjacent habitats

Development : natural habitat removal for roads, other asphalted areas, and buildings that permanently fragment the landscape

Prescribed Fire Management on Military Lands

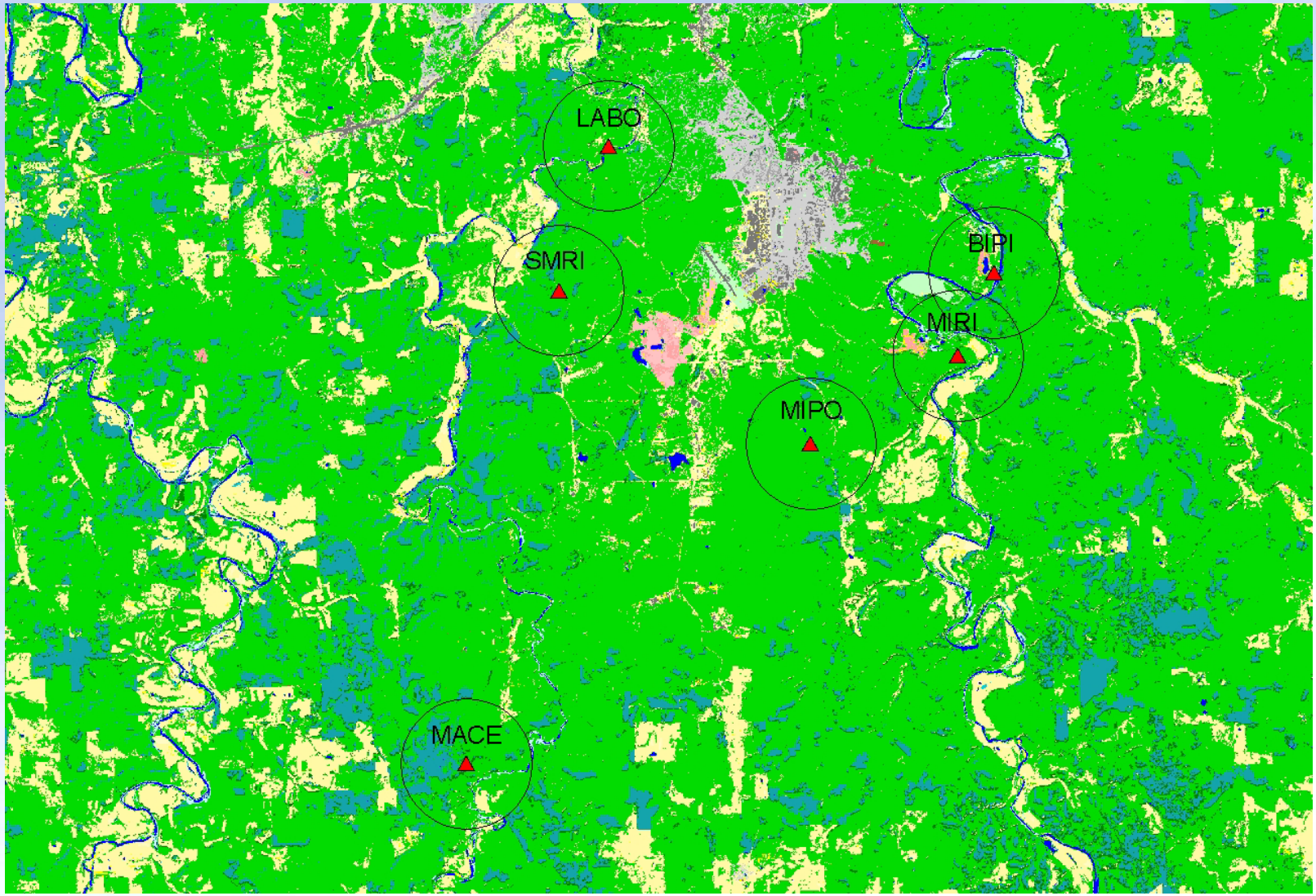
- The types of prescribed fire management activities on military lands can be grouped into three broad categories :

  Fuel reduction and maintenance - concerns areas on or adjacent to live fire ranges which could cause fire, and specialized military maneuver training areas which may need to be maintained as open grassland environments

  Wildlife habitat management - for threatened and endangered, game or wildlife diversity. Areas are burned to maintain a critical vegetation cover type to benefit community, guild, or species.

  Wildfire control – reduce risk of wildfire during live-fire military training exercises that might impact breeding populations on range habitat.

Fort Leonard Wood: NLCD landscape



Birds of Conservation Concern at Ft. Leonard Wood

Neotropical wintering		Temperate wintering	
Increasing	**Decreasing**	**Increasing**	**Decreasing**
White-eyed Vireo	**Acadian Flycatcher ***	*Northern Cardinal*	Downy Woodpecker
Red-eyed Vireo	Black & white Warbler		Carolina Chickadee
Blue-gray Gnatcatcher	**Worm-eating Warbler**		Tufted Titmouse
Wood Thrush *	Ovenbird		*Carolina Wren*
Blue-winged Warbler	**Louisiana Waterthrush**		***Field Sparrow***
Prairie Warbler *	**Kentucky Warbler**		
Yellow-breasted Chat	*Common Yellowthroat*		
Indigo Bunting			

- 21 landbird species are effectively monitored on FLW by MAPS
- 8 FWS Birds of Conservation Concern are effectively monitored
  - includes 5 forest and 3 successional BCC species
- Five species are declining locally: Neotropical (4), Temperate (1)
- Three successional species of particular management concern

Recommended Management Guidelines

- Maintain relatively small brushy openings in or adjacent to extensively forested habitat for Prairie Warbler
- Drop the upland sites and establish two new stations at the Hayfield and the Bradford Cemetery sites to monitor birds of conservation concern
- Hayfield will duplicate heavily forested sites (e.g. Big Piney)
- Bradford Cemetery is proximal to a pine forested area and previously managed for warm grassland species but will likely succeed towards pine forest
- Future monitoring on FLW will detect changes in demographics of blue-winged warblers, prairie warblers, and field sparrows
- Attempt to manage the Macedonia locality to benefit field sparrows by restoring native grassland cover

Field Sparrow - Landscape Model

Cover Classification	Classification Attribute	Proportional Contribution
2 : SHRUB	%Cover	0.08
3 : FOREST	%Cover	0.26
4 : FOREST	Core Area	0.00
5 : GRASS	%Cover	0.03
6 : GRASS	Core Area	0.24
7 : GRASS	Edge(m/ha)	0.11
8 : AGRI	%Cover	0.08
9 : AGRI	Edge(m/ha)	0.16
10: FOREST	Edge(m/ha)	0.05

Burn it and they will come !

Spring burn 2003 at FLW intended to restore diversity of warm-season grasses.

This action was intended to:

a) maintain firebreak adjacent to training area

b) attract breeding field sparrows

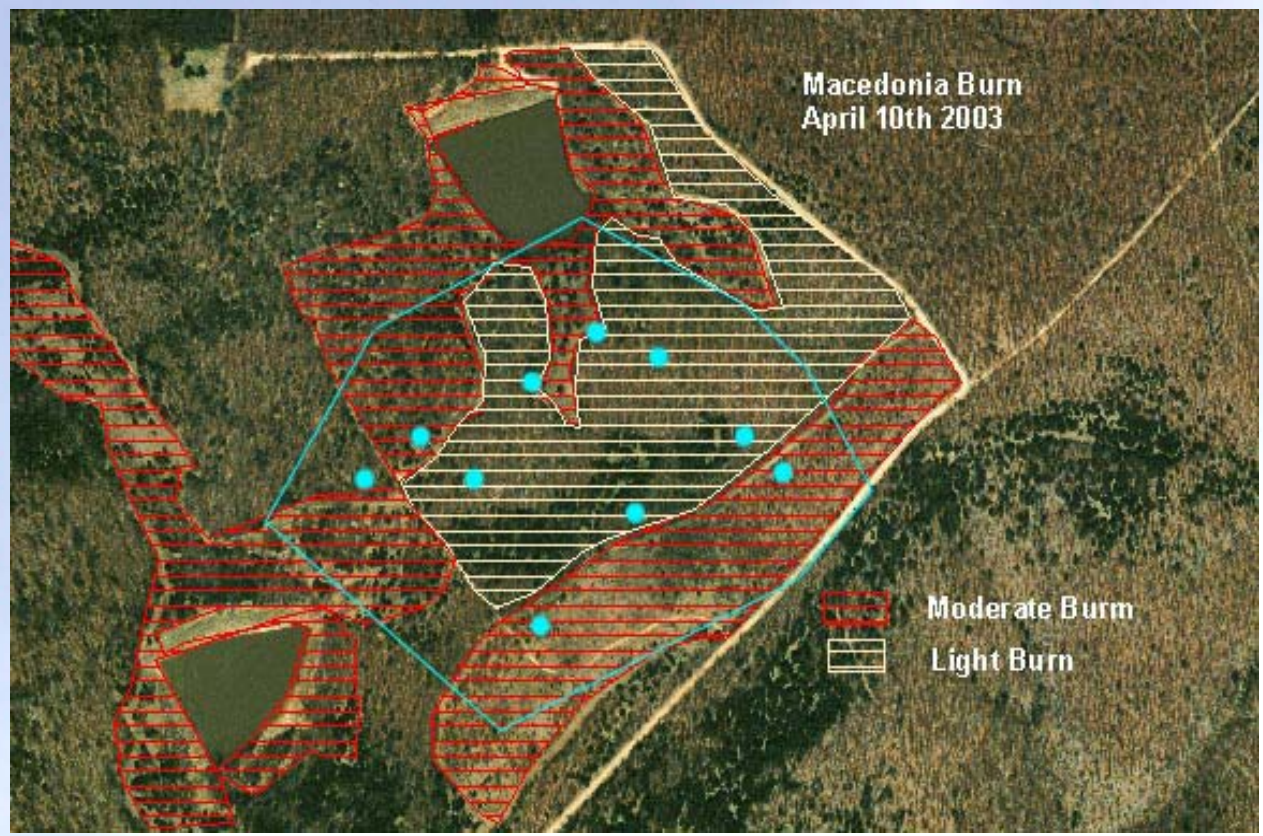
Resetting an oldfield community at Fort Leonard Wood in 2001

Prescribed fire regimes for military range sustainment can produce a mosaic of different aged old field (disclimax) communities that provide breeding habitat for several birds of conservation concern

Managing for Field Sparrow in 2003

Extensive springtime fire management of Macedonia area will reduce fire risk from training exercises and produce “disclimax” plant community that is preferred by field sparrows

Attracted migrating LOWA and WOTH, breeding BGGN (3), and NOPA juvenile



Long term burning of this frequency can produce a community more typical of pre-settlement oak savannah habitat common in this region

Range Management and Old Field Communities

Range Management and Post-Oak Savannah

Species of Management Concern by Installation

	Forest-woodland					Successional				
Military Installation/complex	ACFL	WOTH	WEWA	LOWA	KEWA	BEWR	BWWA	PRAW	FISP	PABU
Ft. Belvoir	X	X		X						
Navy MD/VA	X	X	X		X					
Tidewater Complex	X	X								
Fort Bragg		X						X		
Jefferson PG (FWS)		X	X		X		X	X	X	
Fort Knox			X	X	X		X			
Crane NSWC							X	X	X	
Ft. Leonard Wood	X		X	X	X				X	
Fort Leavenworth					X				X	
Fort Riley	BEVI									
Camp Swift (TNG)										X
Fort Hood						X			X	
Camp Bowie (TNG)						X			X	X

Landbird Conservation on Military Lands

- **Military installations** feature large patches of "source" habitat
  - mission necessitates frequent management of large patches
- **Forest** bird populations are generally stable, however
  - many installations have active timber management
  - the conservation goal is to maintain "source" sized forest patches
- **Successional/grassland** bird populations are generally in decline
  - Military land management creates and maintains successional habitat
  - Conservation goal is to increase "source" habitat for these species
- **Responsibility** for conservation of critical habitats and remnants
  - forest types (upland and bottomland)
  - aquatic/wetland/riparian/lacustrian
  - grassland/prairie
  - successional habitat mosiacs

Successful Conservation on Military Lands

- **Mission** does not necessarily conflict with installation managers ability to create and maintain prime habitat :
  - for threatened/endangered birds
  - for birds of conservation concern (state, regional, local listings)
  - to keep common birds common
- **Collaboration** between ecologists and natural resource managers fosters responsible land stewardship using "*best available science*"
  - identifying and assessing ecologically important habitats
  - identifying conservation target species, guilds or communities
  - setting conservation goals for conservation targets
  - implementing management practices to meet conservation goals
  - monitoring efficacy of management plan implementation