

**USFWS INTERIM GUIDELINES
TO AVOID AND MINIMIZE
WILDLIFE IMPACTS
FROM WIND TURBINES**

A field perspective

North Dakota Facts

- North Dakota ranks number one in the U.S. in the production of: spring wheat, durum wheat, sunflowers, barley, all dry edible beans, pinto beans, canola, flaxseed, all dry edible peas, honey, lentils, oats and navy beans.....

North Dakota Wind....



North Dakota Facts

- According to the National Renewable Energy Lab, North Dakota ranks number one in the U.S. in wind energy potential.
- Followed by Kansas, Texas and South Dakota.

North Dakota Facts

- If you're proud that your state makes the national news primarily because it houses the coldest spot in the nation, you might live in North Dakota
- If you can drive 65 mph through 2 feet of snow during a raging blizzard, without flinching, you might live in N.D.
- If you've installed security lights on your house and garage and leave both unlocked, you might live in N.D.
- If you know all four seasons: almost winter, winter, still winter and road construction, you might live in N.D.
- If you consider it a sport to gather food by drilling through 30 inches of ice and sitting there all day long hoping that the food will swim by, you might live in N.D.

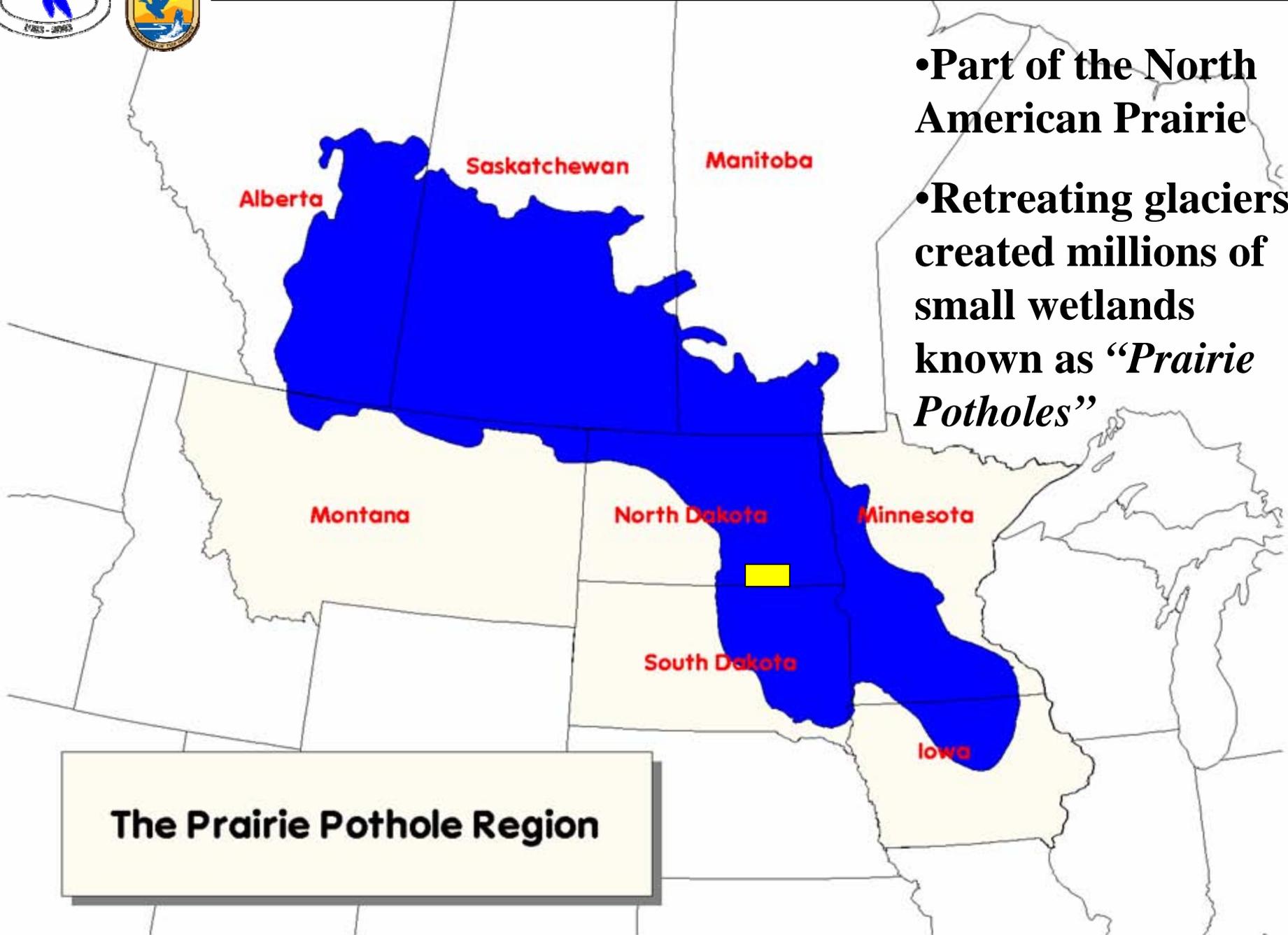
WELCOME TO NORTH DAKOTA





U.S. Fish & Wildlife Service

- Part of the North American Prairie
- Retreating glaciers created millions of small wetlands known as “*Prairie Potholes*”



The Prairie Pothole Region





**In the Prairie Pothole Region,
HABITAT
is the base for all our activities**



SMALL WETLAND ACQUISITION PROGRAM

- Authorized by Congress in a 1958 amendment to the Duck Stamp Act (72 Stat. 486, 16 USC 718d (c))

The purpose of the program is to ensure the long-term protection of waterfowl breeding habitat.

The focus is primarily on protection of wetlands by purchasing fee title and perpetual easements in the Prairie Pothole Region of the United States.





U.S. Fish & Wildlife Service

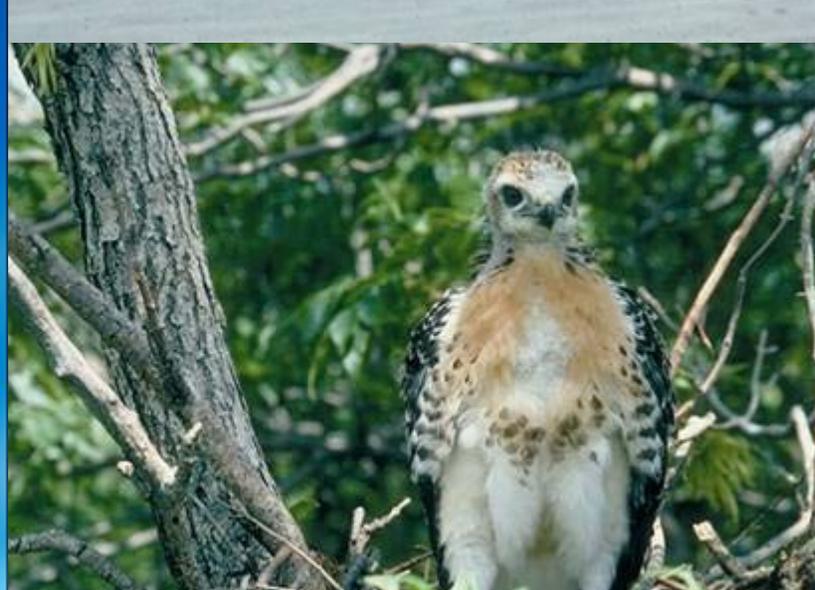
Easements



Grassland Easements



Wetland Easements



All provide wildlife and habitat benefits in perpetuity



The Wetland Easement Program: *The Contract*

“ is a perpetual agreement between the Service and the landowner which protects wetlands on private land from burning, draining, filling, or leveling.”

The background of the slide is a photograph of a vast, flat grassland landscape. The grass is a mix of green and brown, suggesting a natural, uncultivated area. In the distance, there are some small, dark structures or trees on the horizon. The sky is a clear, pale blue. The title text is centered in a white box with a black border.

The Grassland Easement Program: *The Contract*

“ is a perpetual agreement between the Service and the landowner which protects grasslands on private land from digging, plowing, disking, or other destruction of the vegetative cover. including haying/mowing prior to July 15”

What are the purposes of the Grassland Easement Program?

- Maintain upland cover on highly erodible soils
- Improve water quality by reducing soil erosion and by reducing the use of chemicals and fertilizers
- Provide feeding, nesting, and resting habitat for birds
- Provide an alternative to the purchase of uplands in fee title, thus maintaining land in private ownership

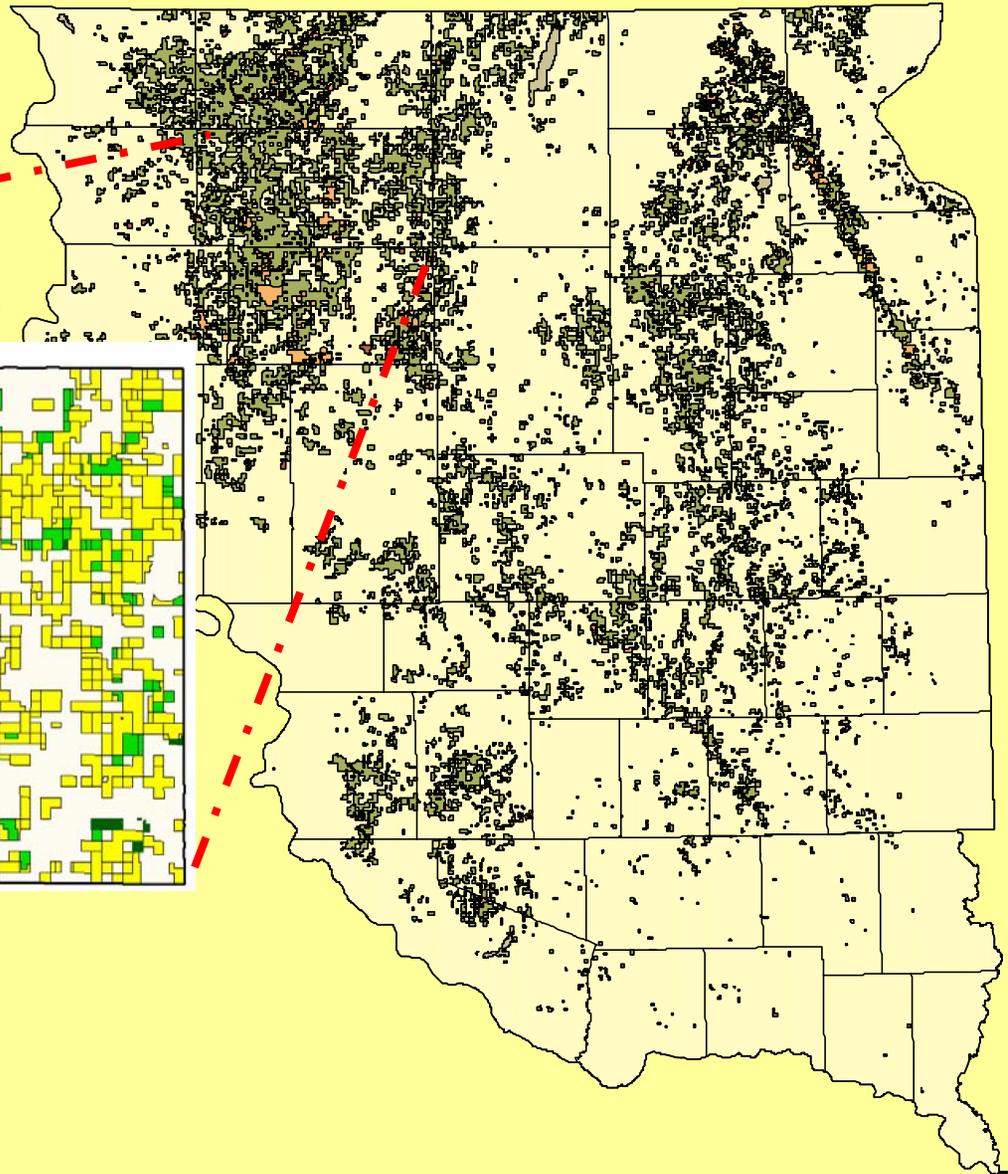
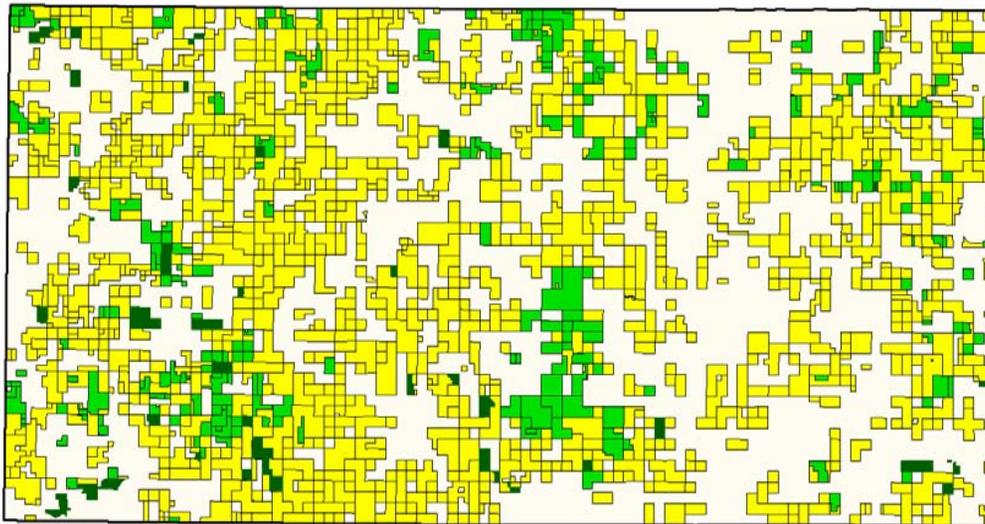


U.S. Fish & Wildlife Service

Refuge management on a landscape scale

Prairie Pothole Region of South Dakota

Edmunds County

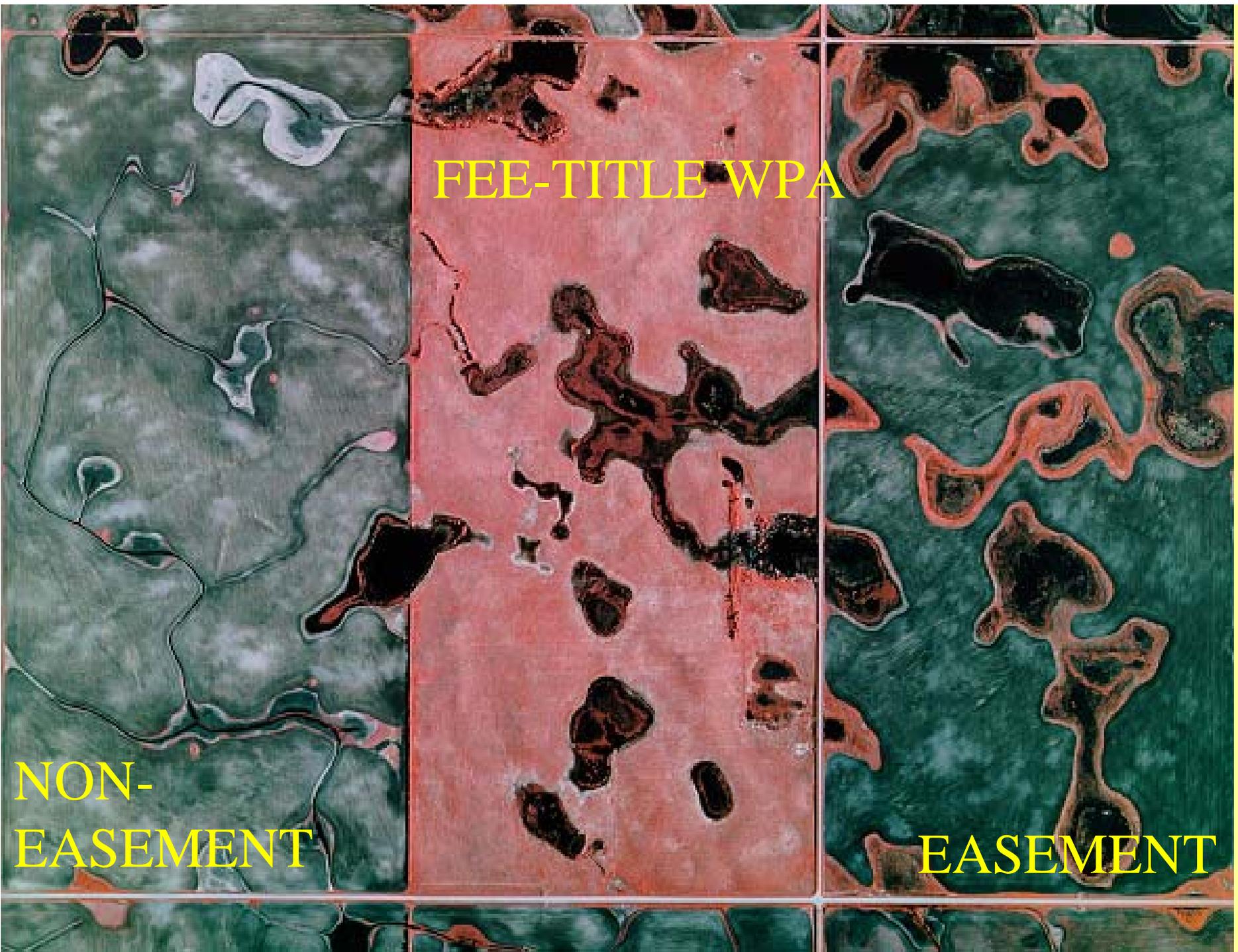


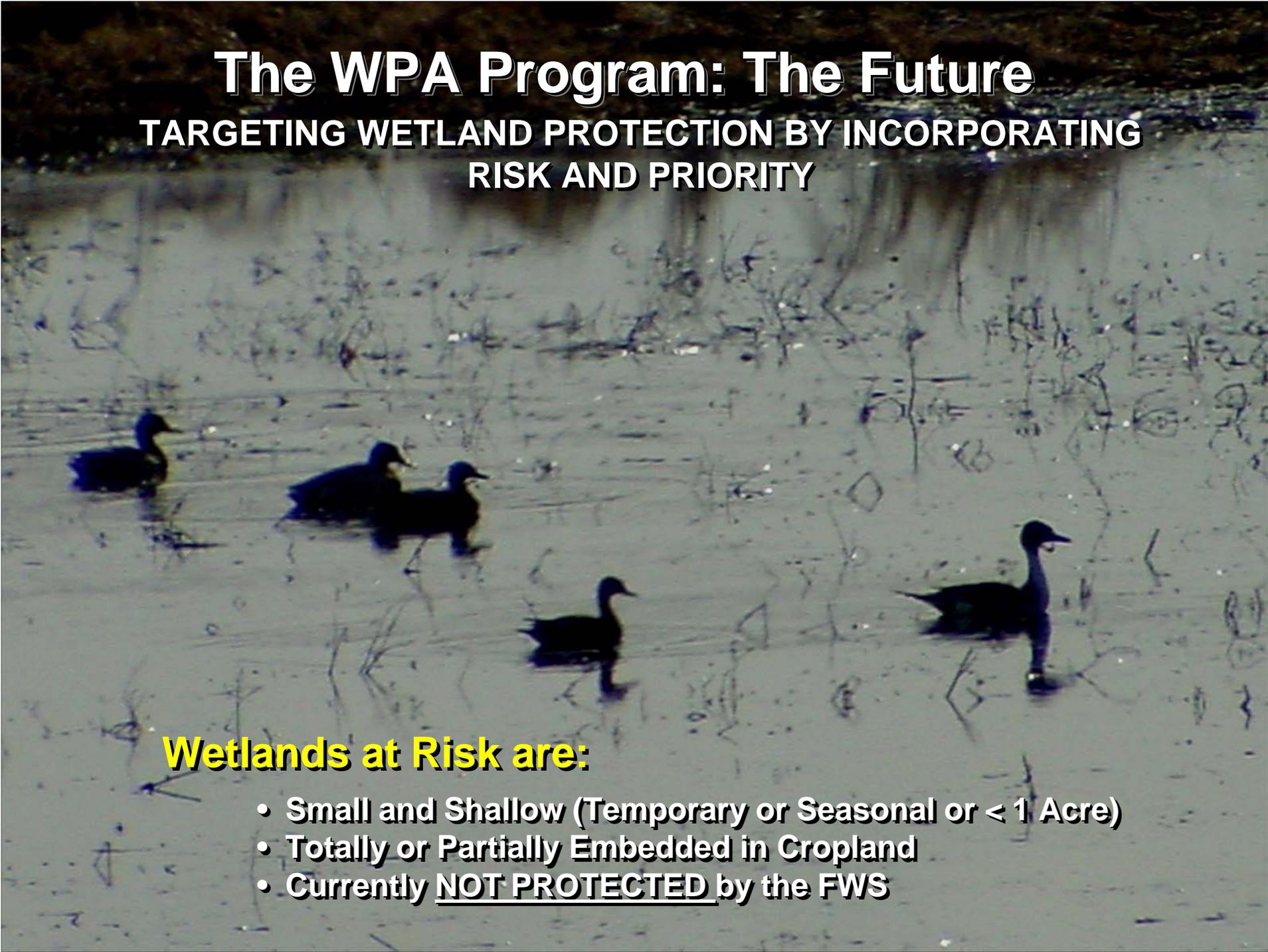
-  Wetland Easements
-  Grassland Easements
-  Fee-Title WPAs

FEE-TITLE WPA

NON-EASEMENT

EASEMENT





The WPA Program: The Future

TARGETING WETLAND PROTECTION BY INCORPORATING RISK AND PRIORITY

Wetlands at Risk are:

- **Small and Shallow (Temporary or Seasonal or < 1 Acre)**
- **Totally or Partially Embedded in Cropland**
- **Currently NOT PROTECTED by the FWS**

The WPA Program: The Future

SETTING WETLAND GOALS

	Wetlands	Duck Pairs
Unprotected	5,858,398 acres	3,098,522 pairs
At Risk	1,882,508 acres	1,626,498 pairs
Priority	1,357,547 acres	1,521,201 pairs

The WPA Program: THE FUTURE
SETTING WETLAND GOALS

WETLANDS

DUCK PAIRS

Goal is to Protect Approximately

Unprotected

3,973,161 acres

2,703,219 pairs

1.4 Million Additional Wetland Acres

At Risk

1,382,508 acres

1,626,498 pairs

Supporting

Priority

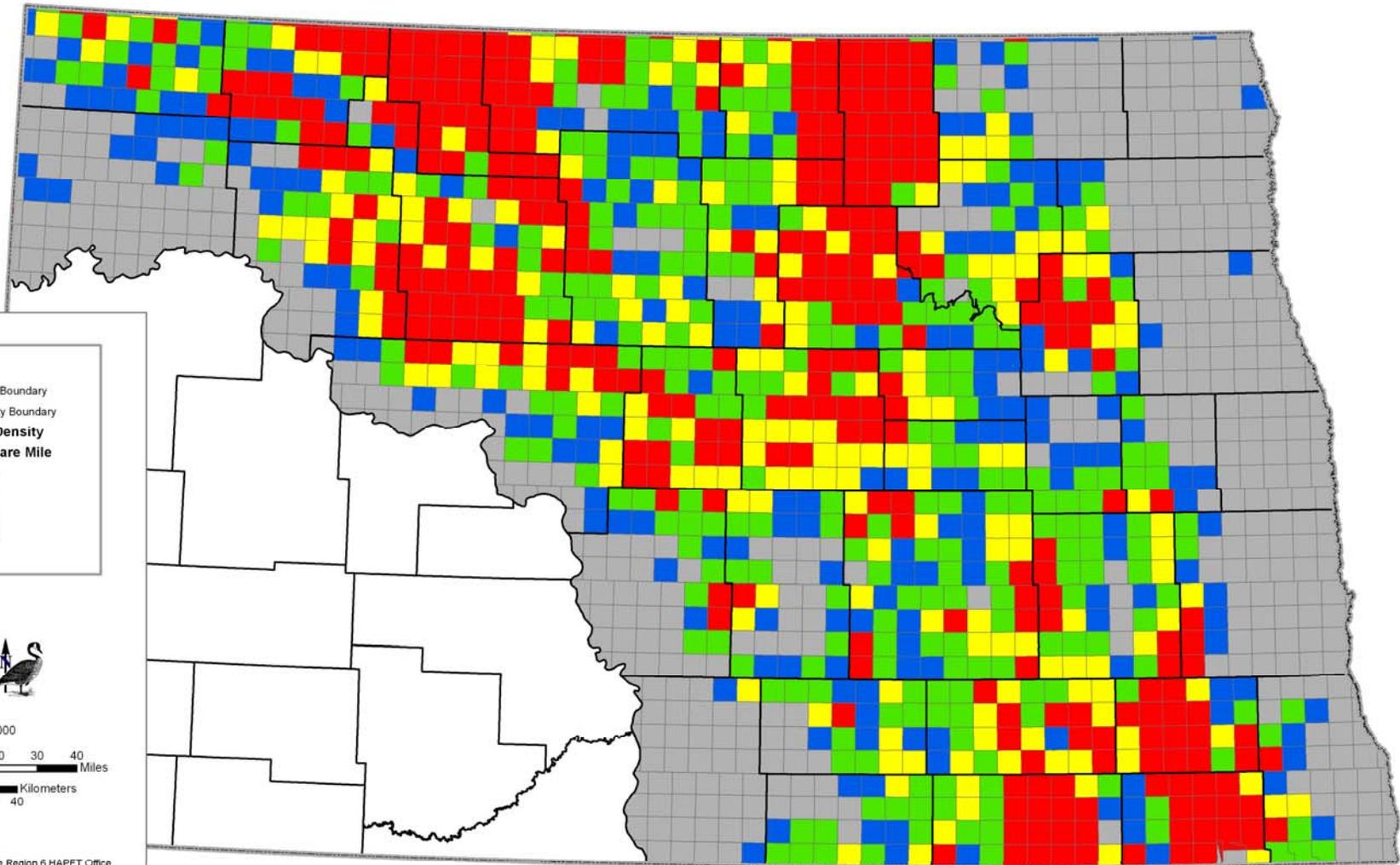
1.5 Million Breeding Pairs

1,721,201 pairs



U.S. Fish & Wildlife Service

Density of Wetland Basins Mapped By NWI in North Dakota Townships (36 square miles)

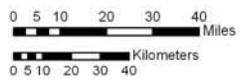


Legend

- State Boundary
- County Boundary
- Wetland Density**
- # Per Square Mile**
- 0-20
- 20-30
- 30-40
- 40-50
- >50



Scale: 1:1,500,000



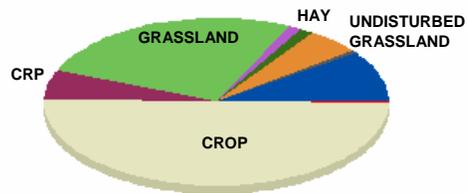
Produced by the Region 6 HAPET Office
Bismarck, ND

**LANDUSE/LANDCOVER:
PRAIRIE POTHOLE REGION
MONTANA, NORTH DAKOTA,
SOUTH DAKOTA**

Legend

-  Water
-  Urban
-  Undisturbed Grassland
-  Trees
-  Shrub/Grass (MT)
-  Hay
-  Grassland
-  CRP
-  Crop
-  Cloud
-  Barren

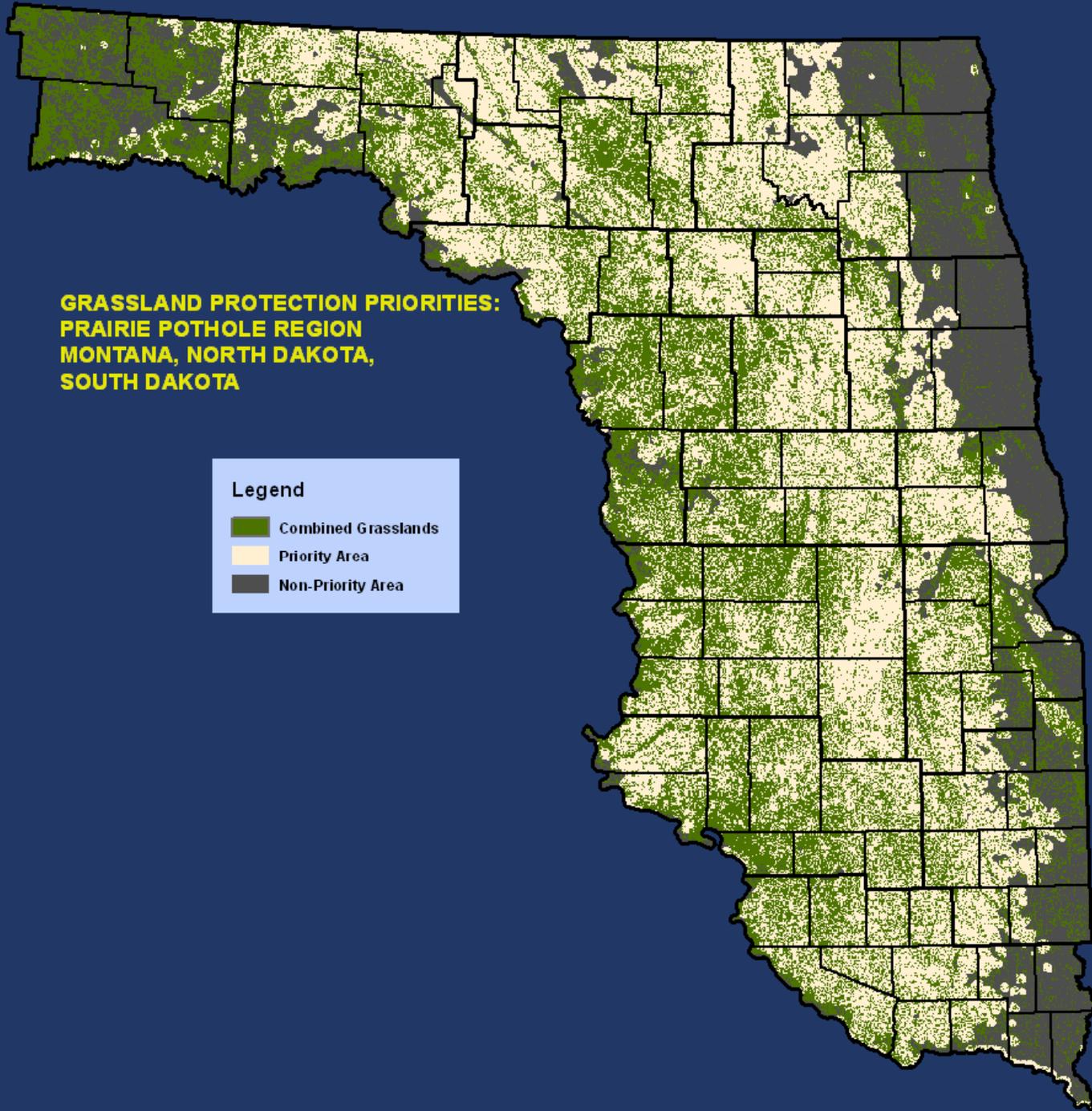
Landuse/Landcover



**GRASSLAND PROTECTION PRIORITIES:
PRAIRIE POTHOLE REGION
MONTANA, NORTH DAKOTA,
SOUTH DAKOTA**

Legend

-  Combined Grasslands
-  Priority Area
-  Non-Priority Area



Identifying Grassland Protection Priority Areas

Grassland in the PPR = 21,314,770 acres

Grassland Protection Priorities are:

- **Patches of Grassland > 55 Acres**
 - **Accessible to > 25 Duck Pairs / Square Mile**
 - **Currently NOT PROTECTED by the FWS**
-
- **Priority Grassland = 11,558,446 acres**
 - **Grassland Protected by FWS Easement = 701,259 acres**
 - **Grassland Protected by FWS Fee Acquisition = 508,423 acres**
 - **Priority Grassland Remaining = 10,400,000 acres**

Identifying Grassland Protection Priority Areas

Grassland in PPR = 21,314,770 acres

Goal is to Protect Approximately

10.4 Million Additional Acres of

- Priority Grassland = 11,456,180 acres
- Grassland Protected by FWS Easement = 670,000 acres
- Grassland Protected by FWS Fee Acquisition = 468,364 acres
- Priority Grassland Remaining = 10,400,000 acres

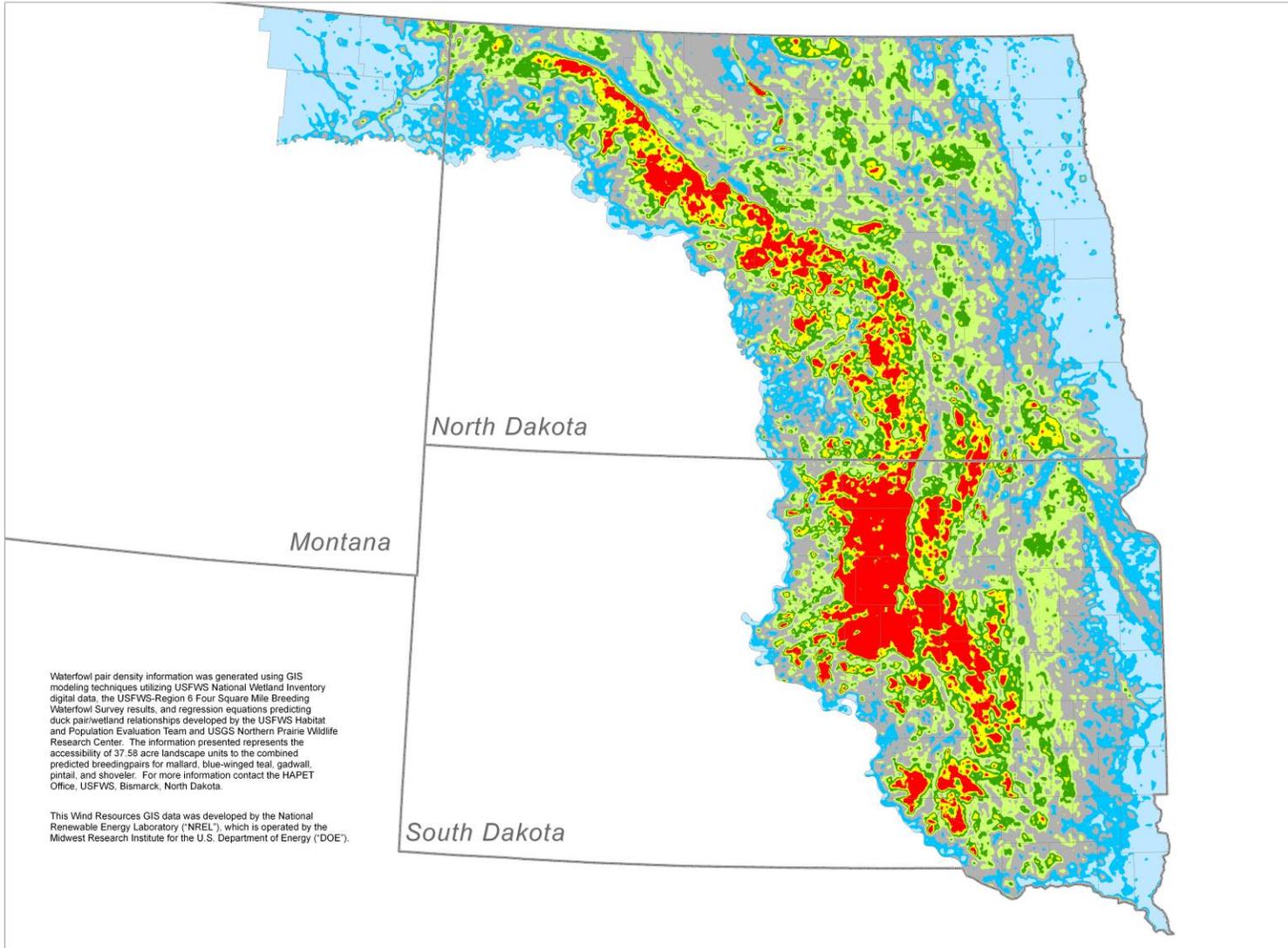




U.S. Fish & Wildlife Service

Upland Accessibility by Breeding Duck Pairs in the Prairie Pothole Region

Portions of Montana, North Dakota, and South Dakota

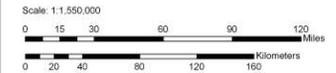


Legend

- State Boundary
- County Boundary

Duck Pairs / Square Mile

- > 100
- 80-100
- 60-80
- 40-60
- 20-40
- 10-20
- 0-10

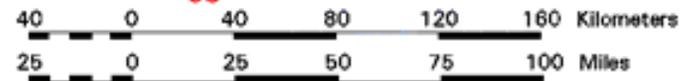
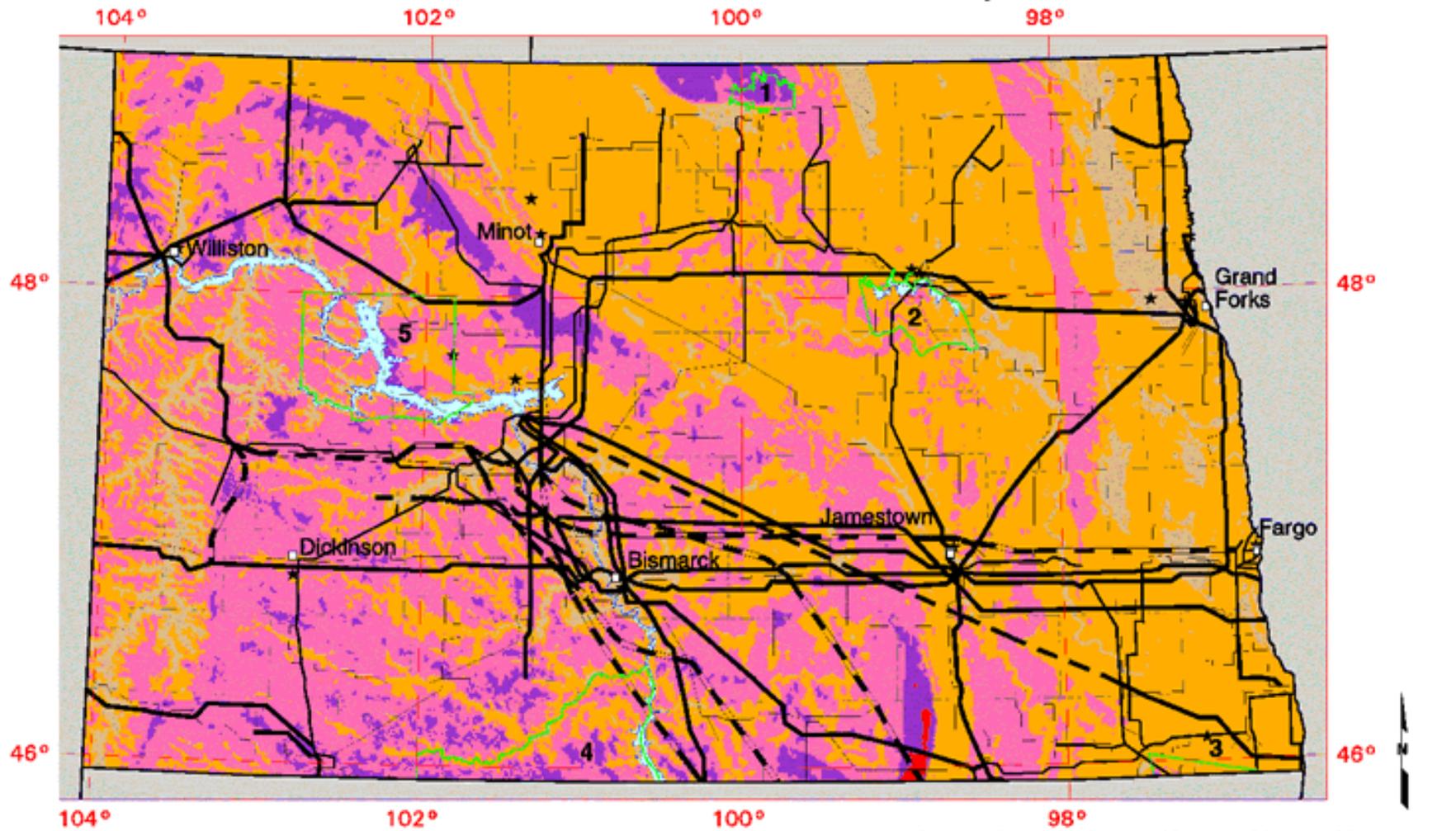


Waterfowl pair density information was generated using GIS modeling techniques utilizing USFWS National Wetland Inventory digital data, the USFWS-Region 6 Four Square Mile Breeding Waterfowl Survey results, and regression equations predicting duck pair/wetland relationships developed by the USFWS Habitat and Population Evaluation Team and USGS Northern Prairie Wildlife Research Center. The information presented represents the accessibility of 37.58 acre landscape units to the combined predicted breeding pairs for mallard, blue-winged teal, gadwall, pintail, and shoveler. For more information contact the HAPET Office, USFWS, Bismarck, North Dakota.

This Wind Resources GIS data was developed by the National Renewable Energy Laboratory ("NREL"), which is operated by the Midwest Research Institute for the U.S. Department of Energy ("DOE").

Produced by the Region 6 HAPET Office
Bismarck, ND
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North Dakota - Wind Resource Map



Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7

^a Wind speeds are based on a Weibull k value of 2.0

★ Meteorological Station with Wind Data
 □ City or Town

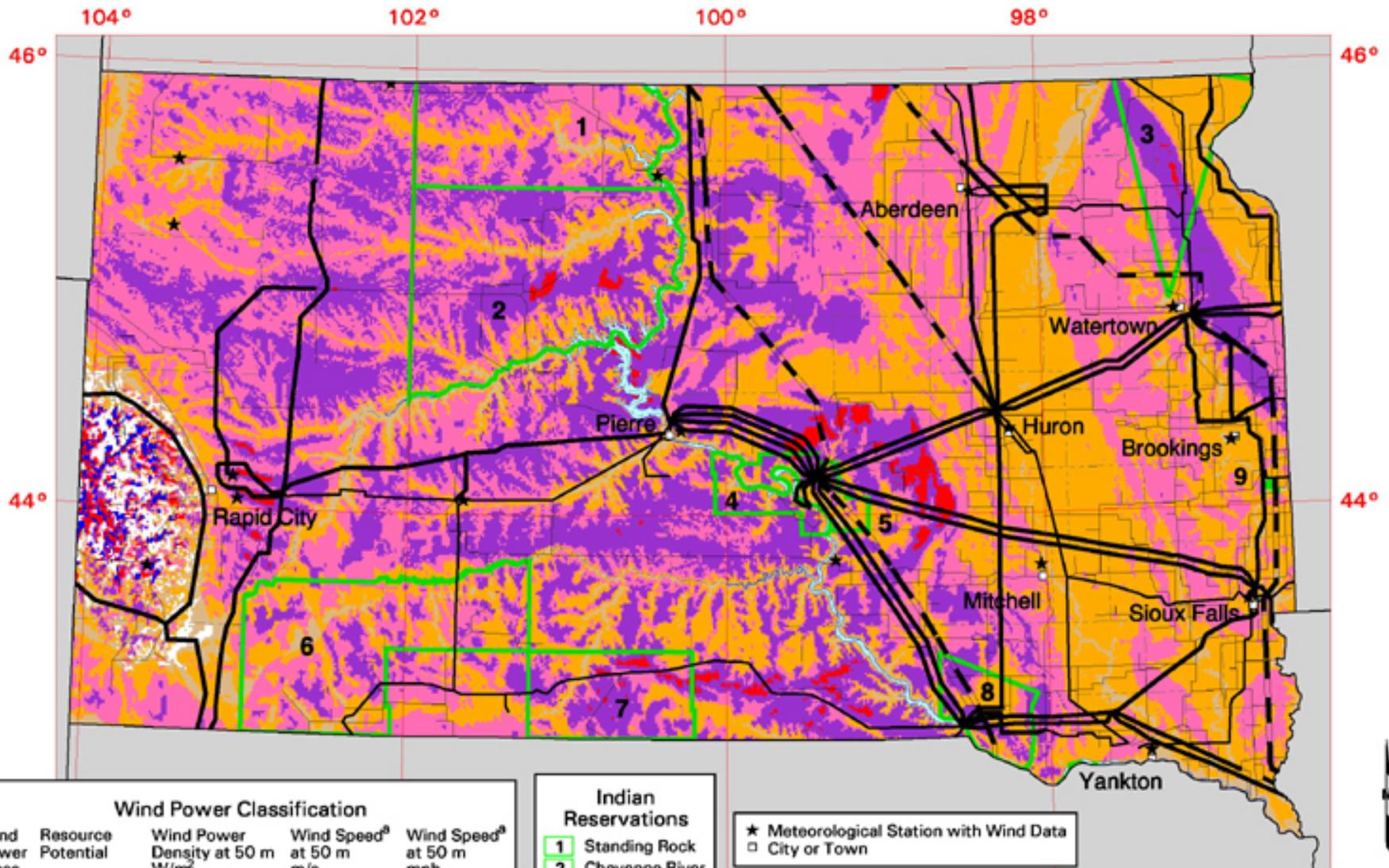
Transmission Line Voltage	
	69 Kilovolts
	115 Kilovolts
	230 Kilovolts
	345 Kilovolts
	Under Construction

Indian Reservations	
1	Turtle Mountain
2	Devil's Lake Sioux
3	Lake Traverse
4	Standing Rock
5	Fort Berthold

U.S. Department of Energy
 National Renewable Energy Laboratory



South Dakota - Wind Resource Map



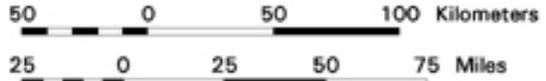
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4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

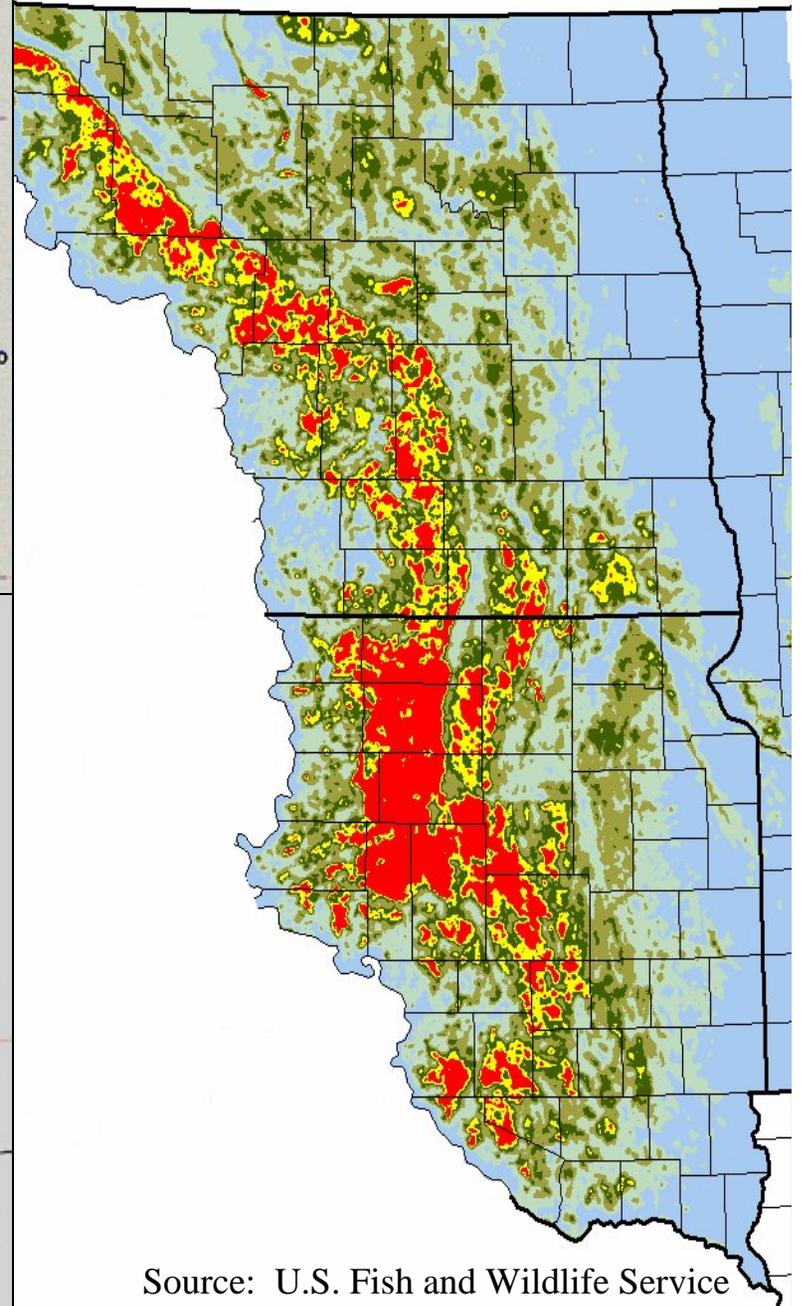
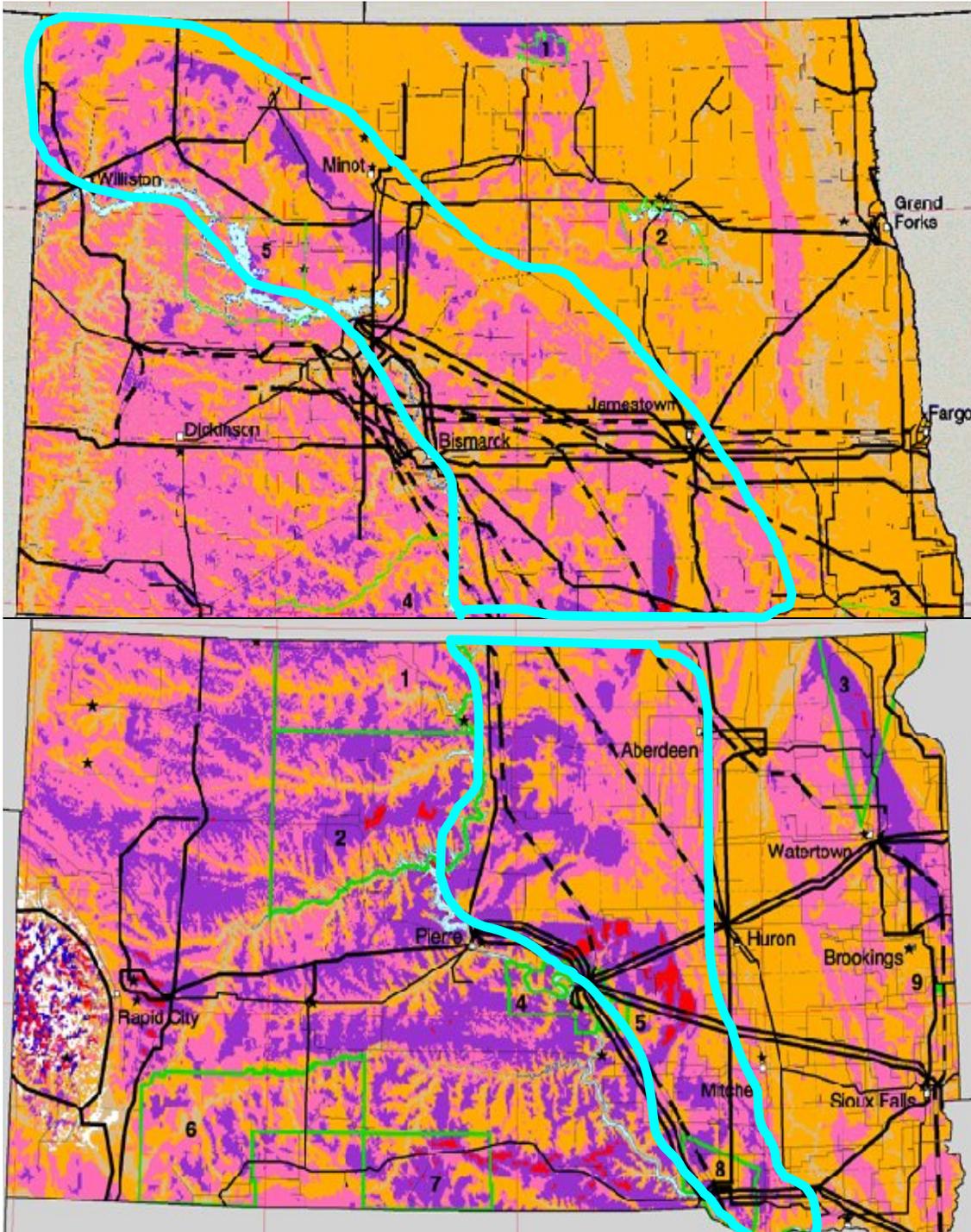
^aWind speeds are based on a Weibull k value of 2.0

- Indian Reservations**
- 1 Standing Rock
 - 2 Cheyenne River
 - 3 Lake Traverse
 - 4 Lower Brule
 - 5 Crow Creek
 - 6 Pine Ridge
 - 7 Rosebud
 - 8 Yankton
 - 9 Flandreau

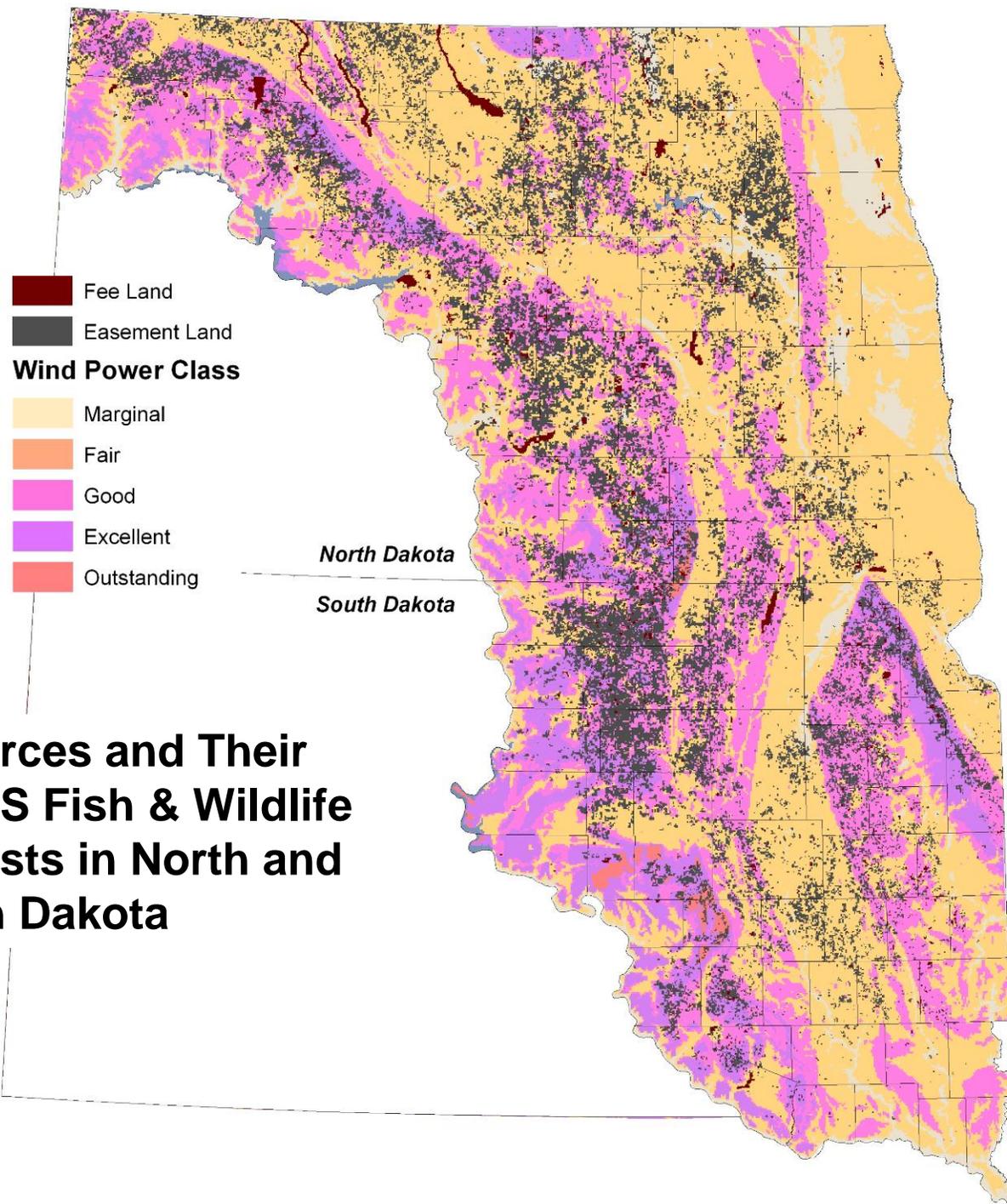
★ Meteorological Station with Wind Data
 □ City or Town

- Transmission Line Voltage**
- 69 Kilovolts
 - 115 Kilovolts
 - 230 Kilovolts
 - 345 Kilovolts





Source: U.S. Fish and Wildlife Service



Wind Resources and Their Proximity to US Fish & Wildlife Service Interests in North and South Dakota

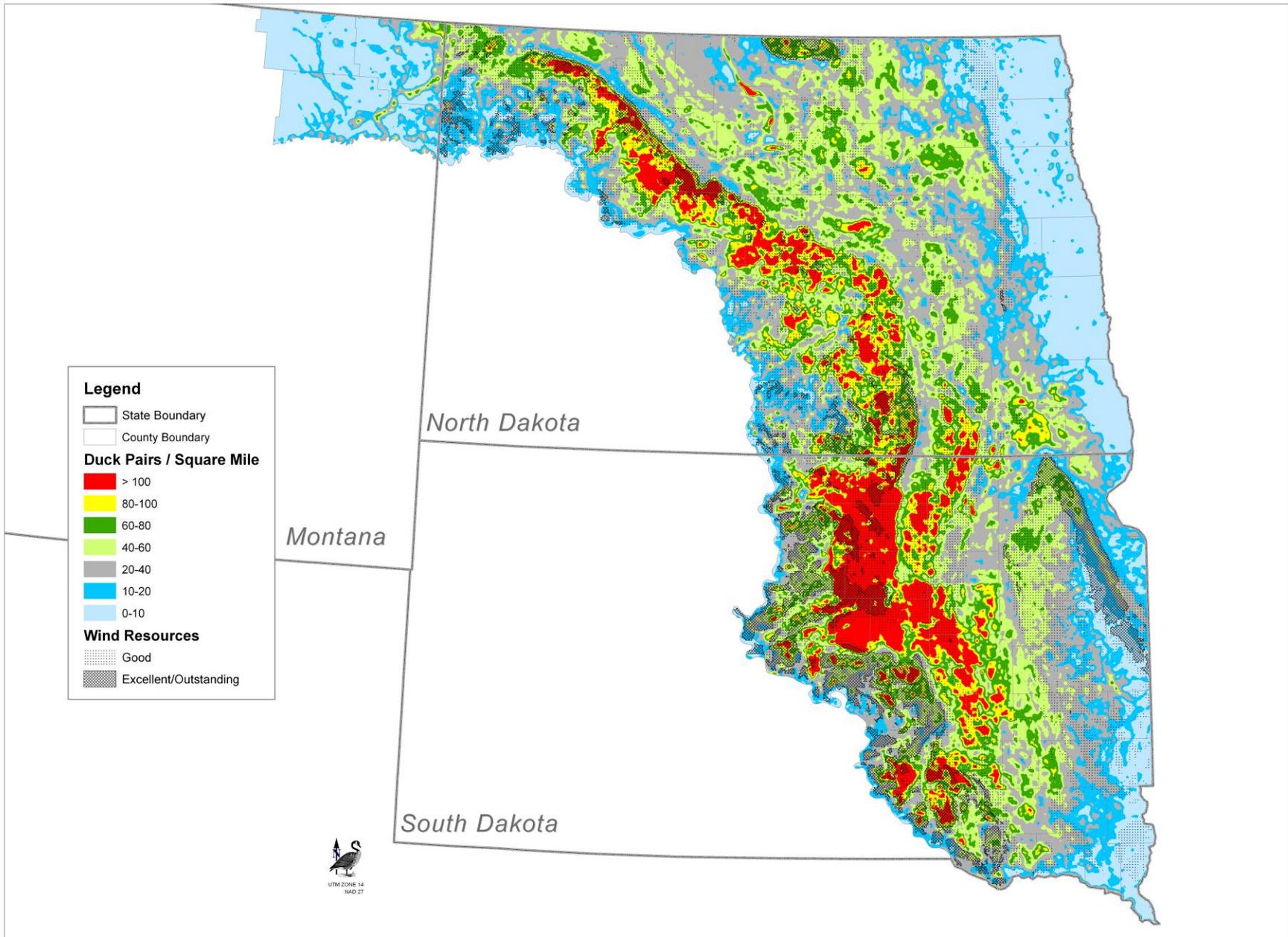




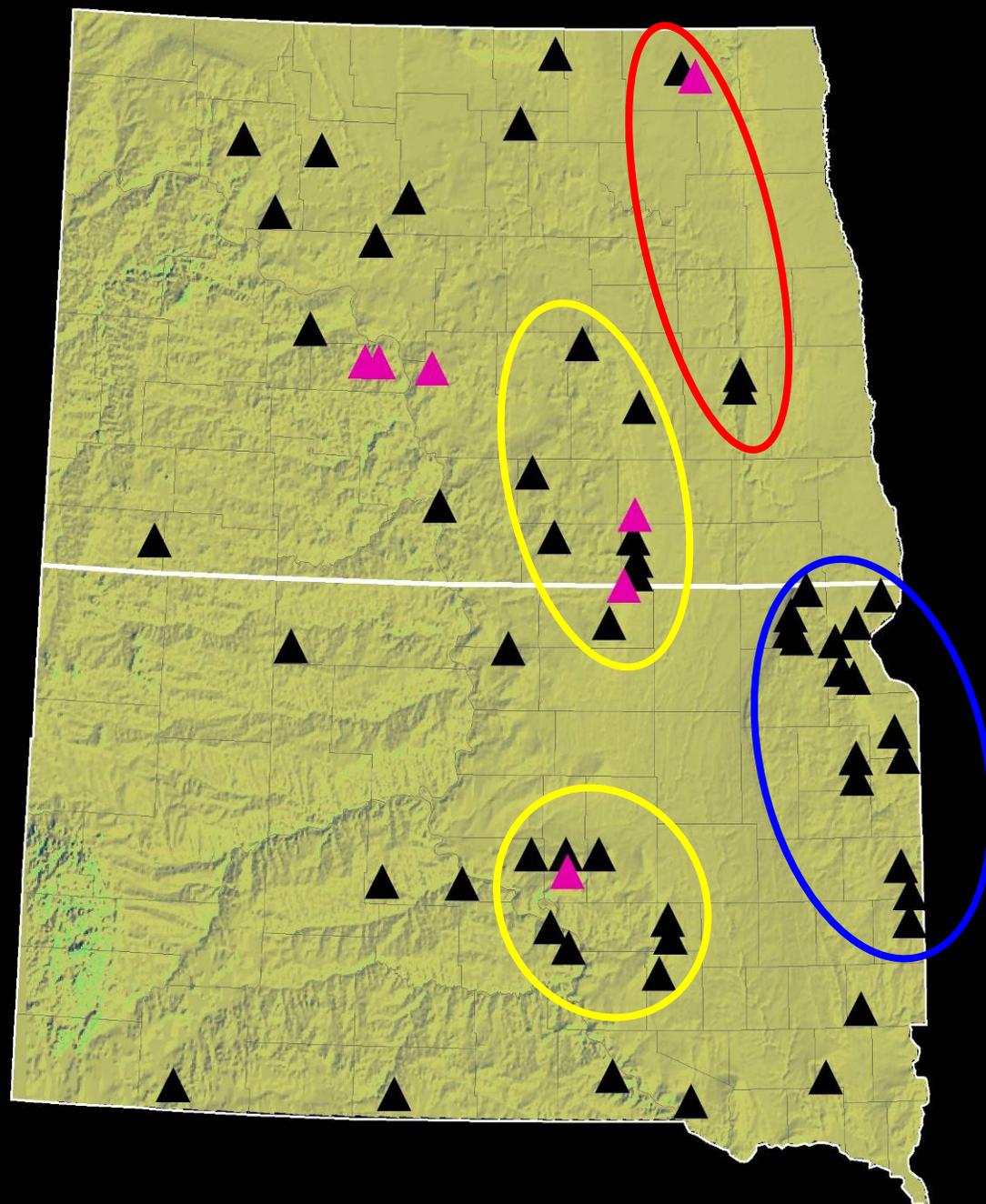
U.S. Fish & Wildlife Service

Upland Accessibility by Breeding Duck Pairs in the Prairie Pothole Region and Wind Resources

Portions of Montana, North Dakota, and South Dakota



Active and Proposed Wind Facilities in North Dakota and South Dakota





Grassland Loss and Predictive Models of Risk

Dakota Working Group

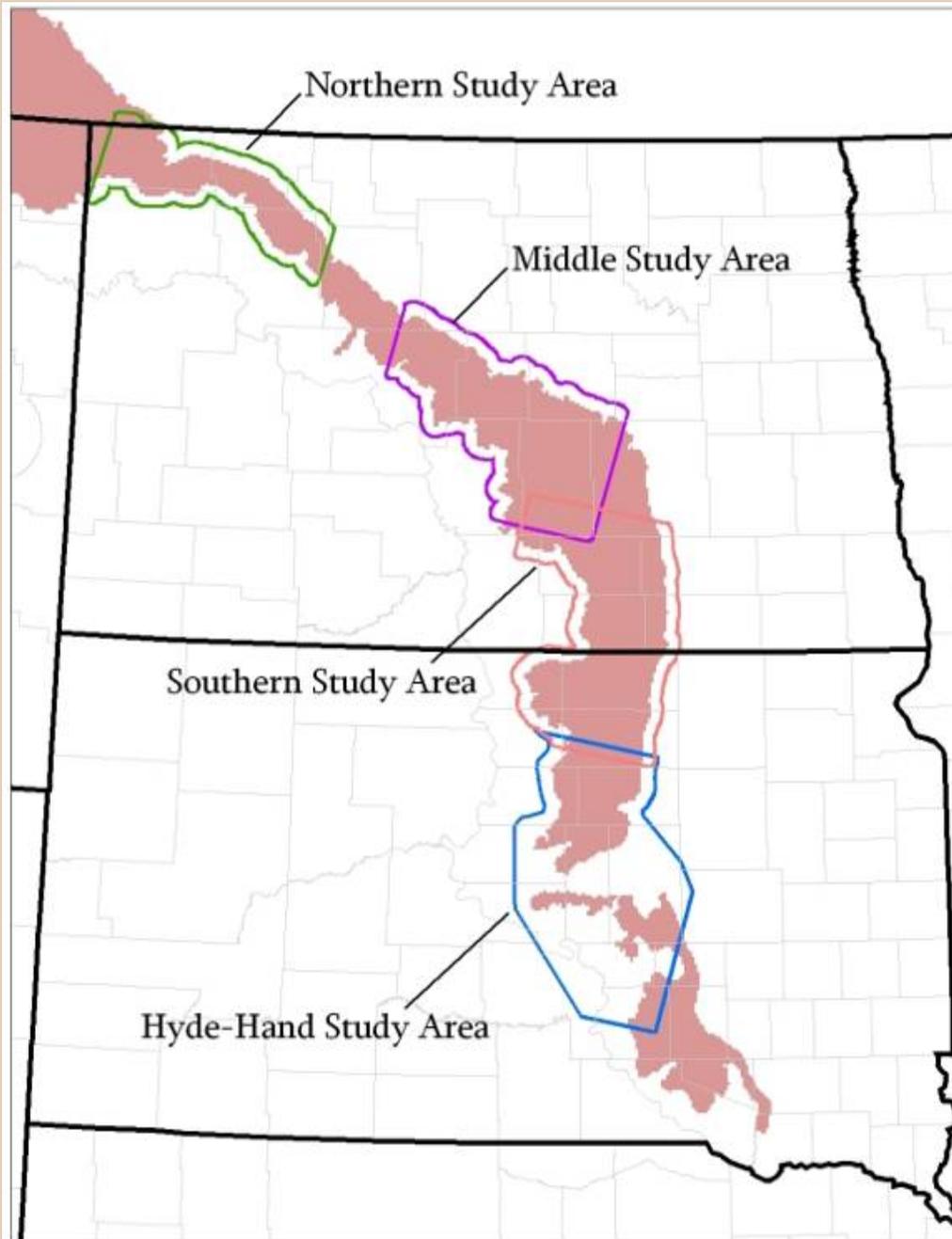
August 1st, 2007





Objectives for Prairie Conversion Research

- Estimate loss rates for native prairie across the Coteau from 1984-2003
- Develop predictive models of risk of conversion of native prairie



Satellite imagery available from 1984-2003.

Followed ~ 60,000 individual tracts of native grassland through time

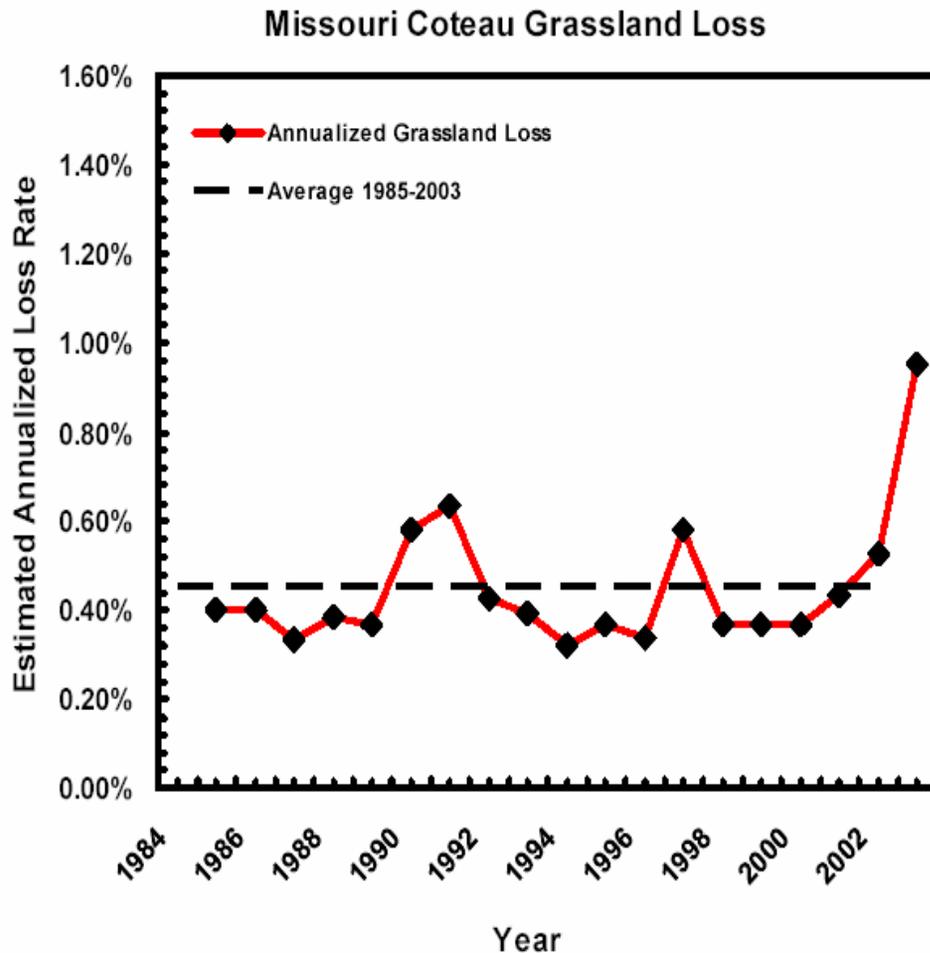
Conceptualized as a logistic regression problem with tracts either “living” or “dying” through a specified time interval

Missouri Coteau Grassland Loss Estimates

Total Acreage in Sample Lost from 1984 - 2003 **143,760**

Increasing trend in loss rate which was prior to ethanol boom

Loss rate of 2% (observed in several local areas) results in half the remaining grassland gone in only 34 years



Increasing Pressures on Grassland

Prices Received by Farmers, Corn, US

Dollars per Bu



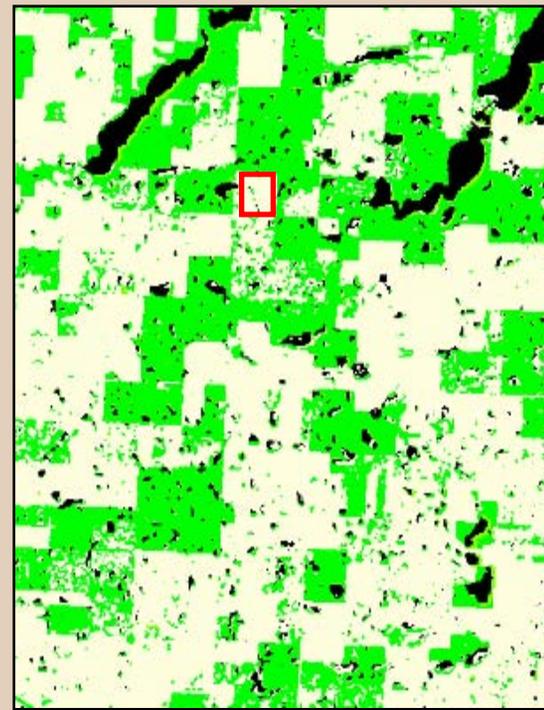
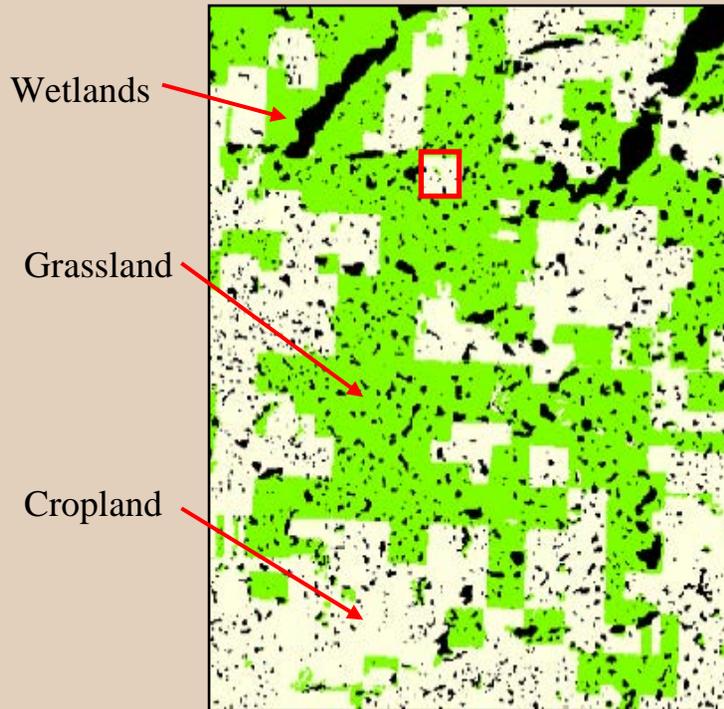
USDA: NASS
February 28, 2007



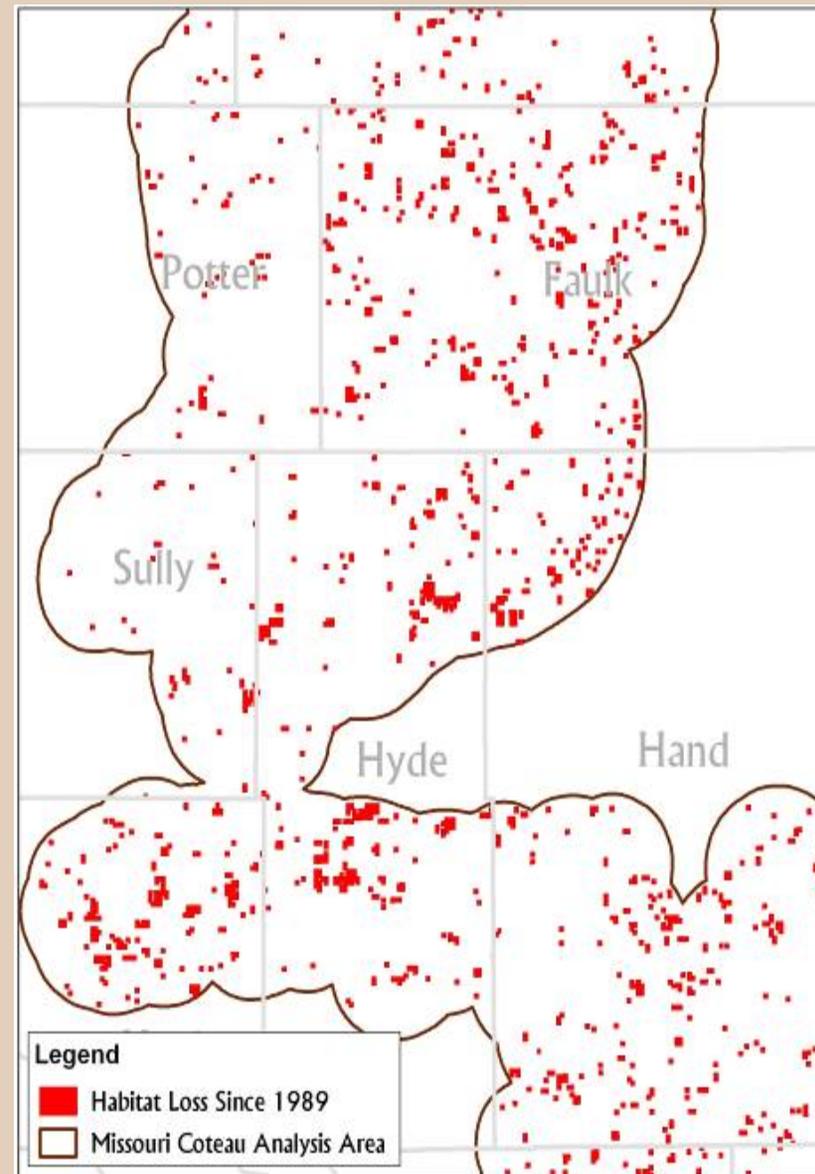
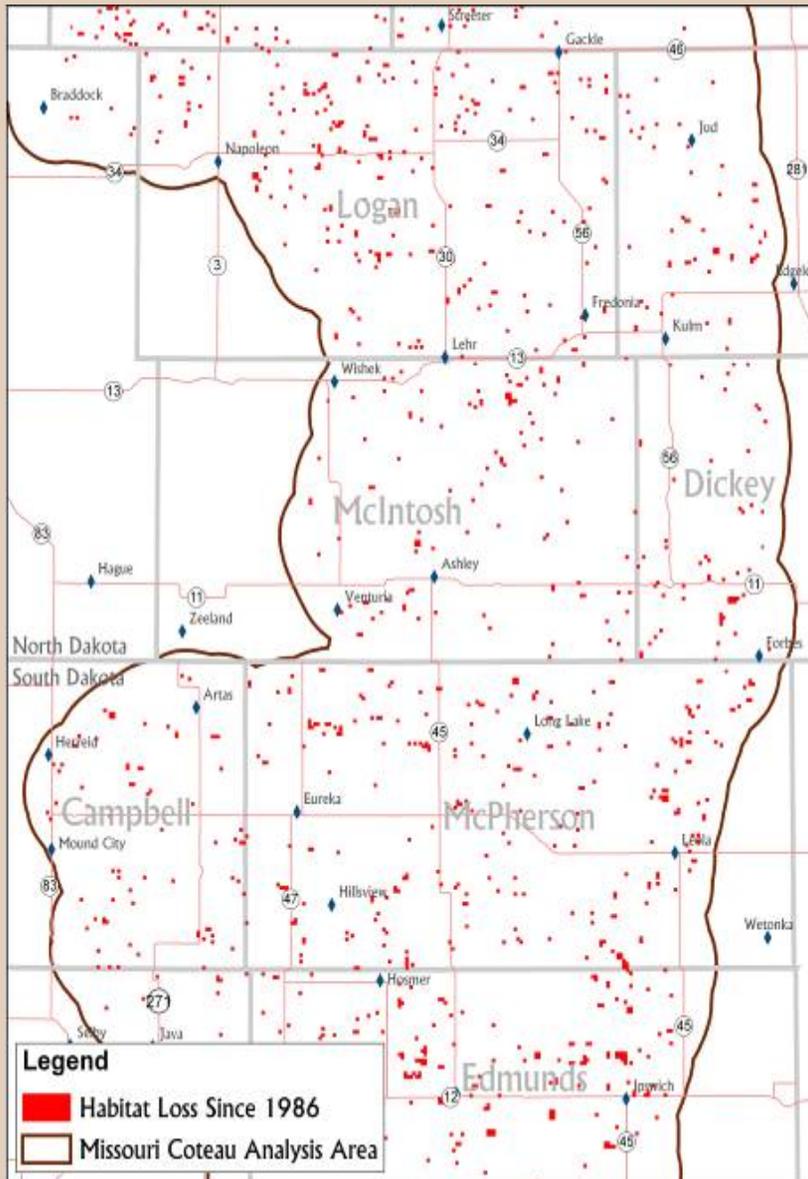
Fragmentation impacts

1994

2003



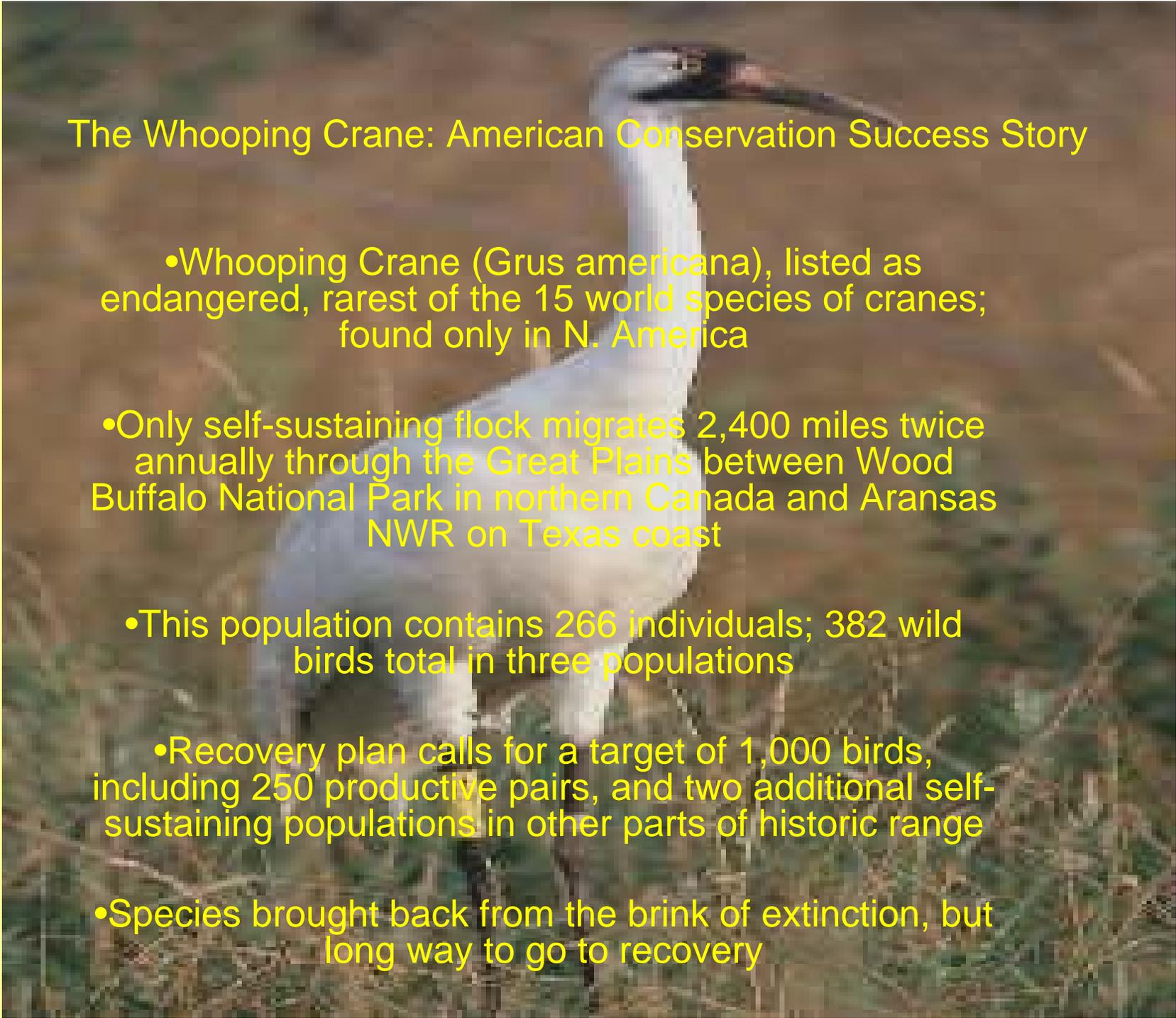
Broad-scale fragmentation impacts





Can We Have Both?





The Whooping Crane: American Conservation Success Story

- Whooping Crane (*Grus americana*), listed as endangered, rarest of the 15 world species of cranes; found only in N. America
- Only self-sustaining flock migrates 2,400 miles twice annually through the Great Plains between Wood Buffalo National Park in northern Canada and Aransas NWR on Texas coast
- This population contains 266 individuals; 382 wild birds total in three populations
- Recovery plan calls for a target of 1,000 birds, including 250 productive pairs, and two additional self-sustaining populations in other parts of historic range
- Species brought back from the brink of extinction, but long way to go to recovery



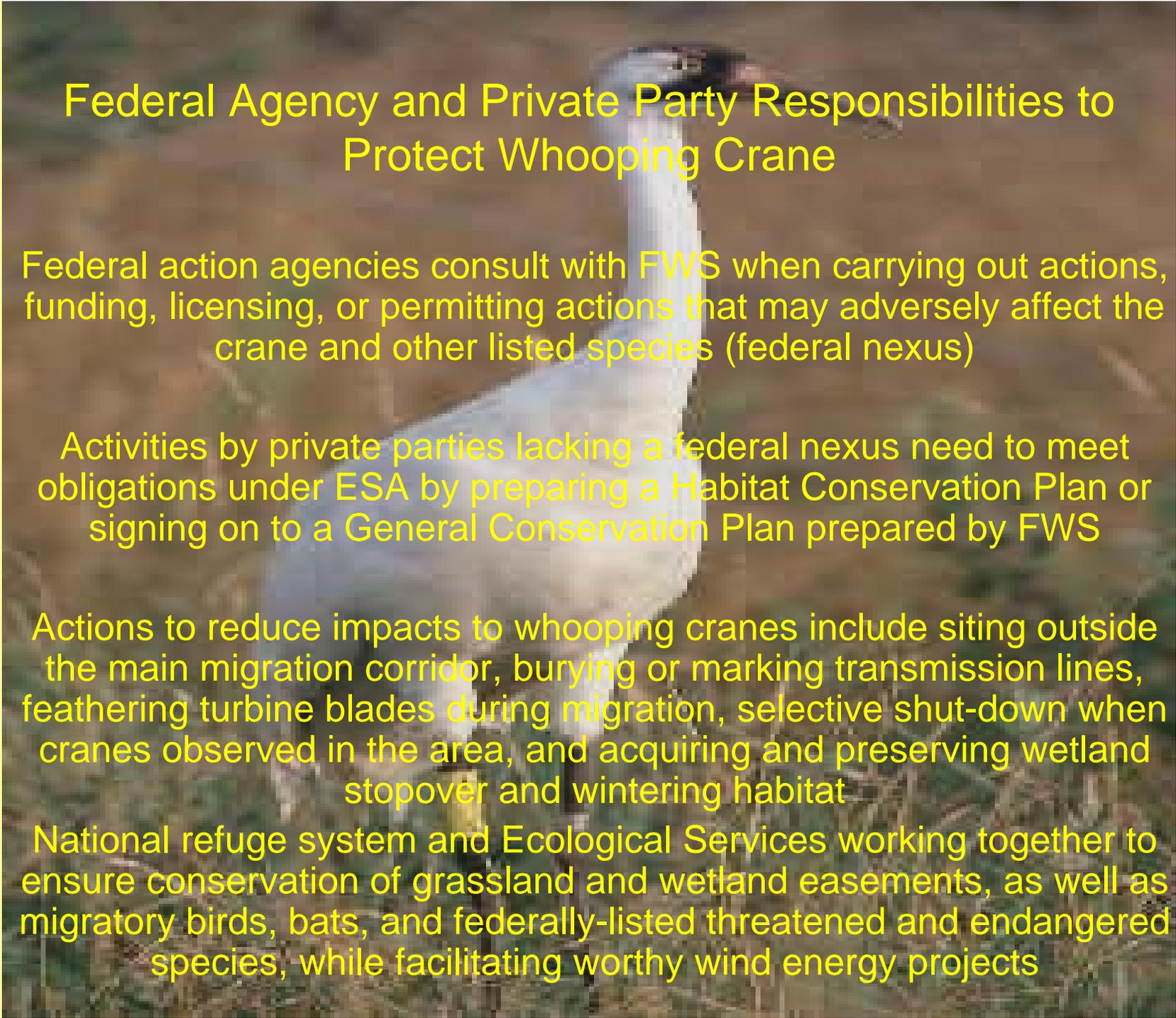
Windpower Threats to Whooping Crane

Powerline strikes greatest known source of mortality to fledged whooping cranes and surrogate species sandhill crane

Risk of turbine strikes unknown, but likely, to this large-bodied, slow-flying bird

Some evidence that cranes avoid turbines, potentially denying them wetland stopover habitat on migration route, when wind turbines located among wetlands

A 3% increase in annual mortality (approximately 8 birds) will lead to non-viable population over the long term; additional mortality incompatible with recovery of the species

A photograph of a Whooping Crane standing in a field. The crane is white with a long, thin neck and a dark cap on its head. It is facing right. The background is a blurred field of grass and trees.

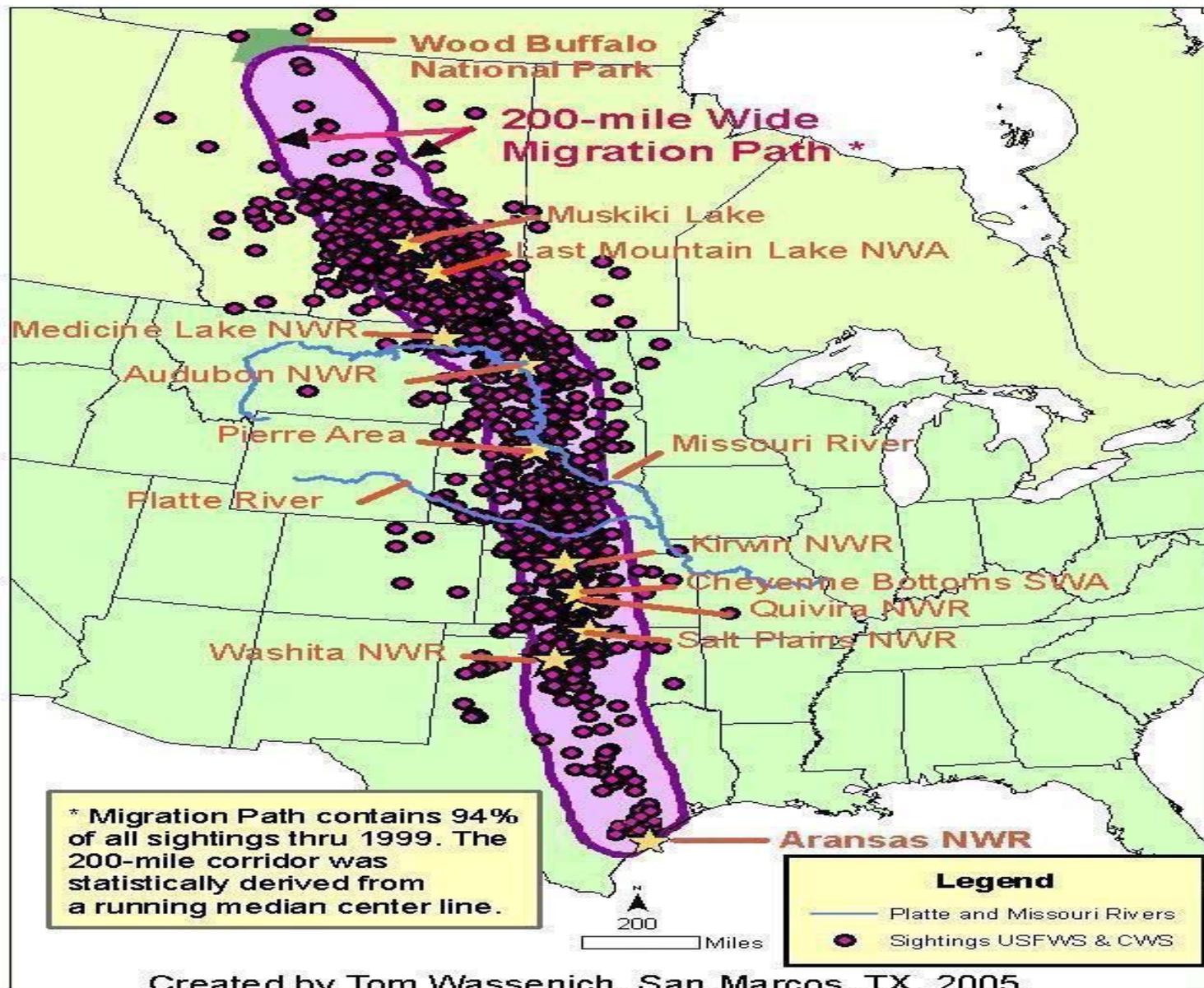
Federal Agency and Private Party Responsibilities to Protect Whooping Crane

Federal action agencies consult with FWS when carrying out actions, funding, licensing, or permitting actions that may adversely affect the crane and other listed species (federal nexus)

Activities by private parties lacking a federal nexus need to meet obligations under ESA by preparing a Habitat Conservation Plan or signing on to a General Conservation Plan prepared by FWS

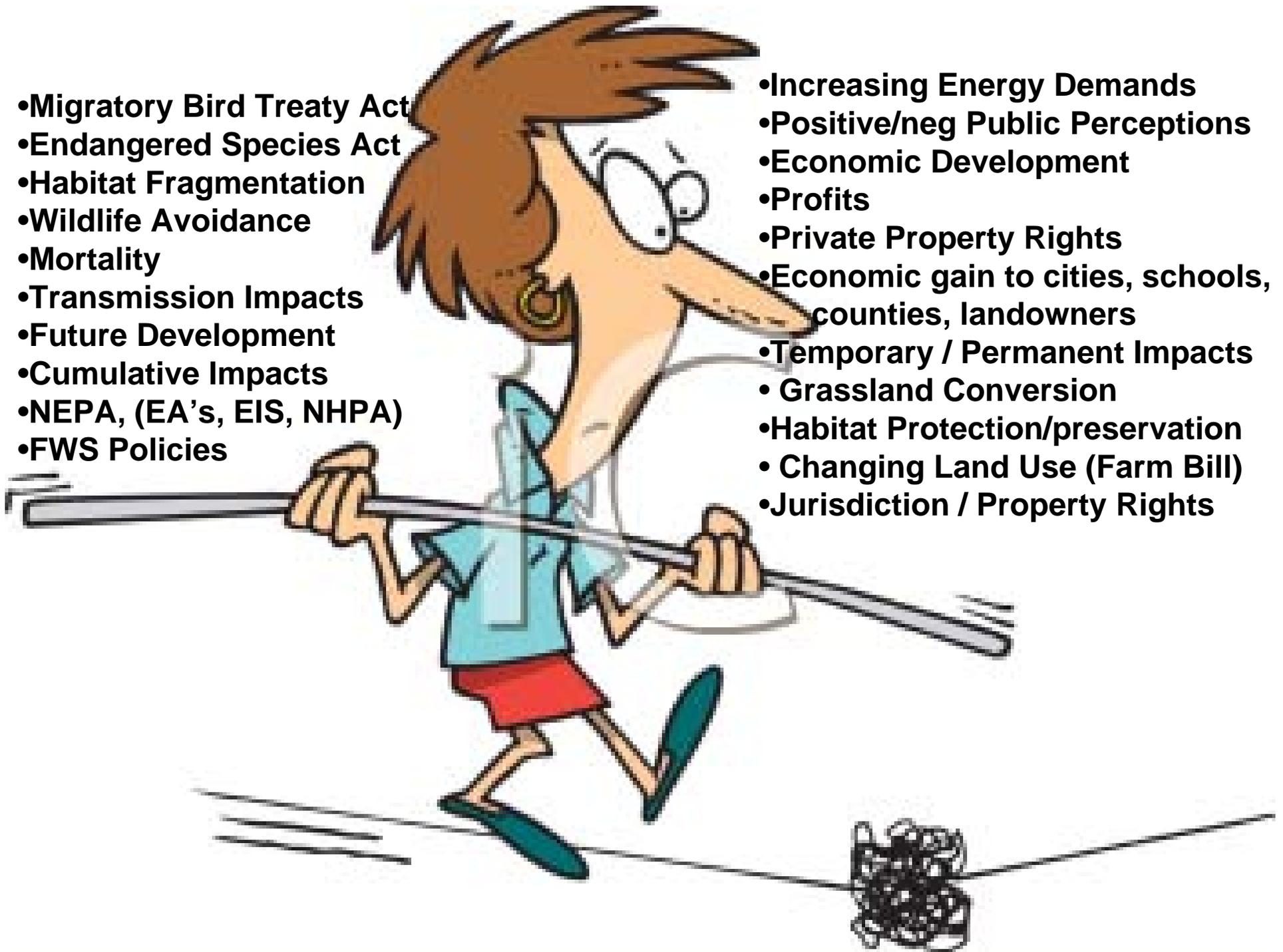
Actions to reduce impacts to whooping cranes include siting outside the main migration corridor, burying or marking transmission lines, feathering turbine blades during migration, selective shut-down when cranes observed in the area, and acquiring and preserving wetland stopover and wintering habitat

National refuge system and Ecological Services working together to ensure conservation of grassland and wetland easements, as well as migratory birds, bats, and federally-listed threatened and endangered species, while facilitating worthy wind energy projects



- Migratory Bird Treaty Act
- Endangered Species Act
- Habitat Fragmentation
- Wildlife Avoidance
- Mortality
- Transmission Impacts
- Future Development
- Cumulative Impacts
- NEPA, (EA's, EIS, NHPA)
- FWS Policies

- Increasing Energy Demands
- Positive/neg Public Perceptions
- Economic Development
- Profits
- Private Property Rights
- Economic gain to cities, schools, counties, landowners
- Temporary / Permanent Impacts
- Grassland Conversion
- Habitat Protection/preservation
- Changing Land Use (Farm Bill)
- Jurisdiction / Property Rights



Challenges with current guidelines

- The current guidelines are voluntary.
- Service is not involved in the pre-planning of wind projects.
- Jurisdiction and private property
- Lack of state laws or guidelines
- Federal nexus versus no connection
- Lack of adequate staff and funding to coordinate and act on all wind projects.

Challenges with current guidelines

- Required research? How much? What kinds? Timing concerns. BACI research is fine but we tend to chase turbines
- Whatever guidelines we adopt, keep in mind that we may be jeopardizing landowner relationships, perpetual habitat preservation, and other future conservation opportunities.



