



# U.S. Fish and Wildlife Service



“Working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.”



# Divisions

**Ecological Services**

**National Wildlife Refuge System**

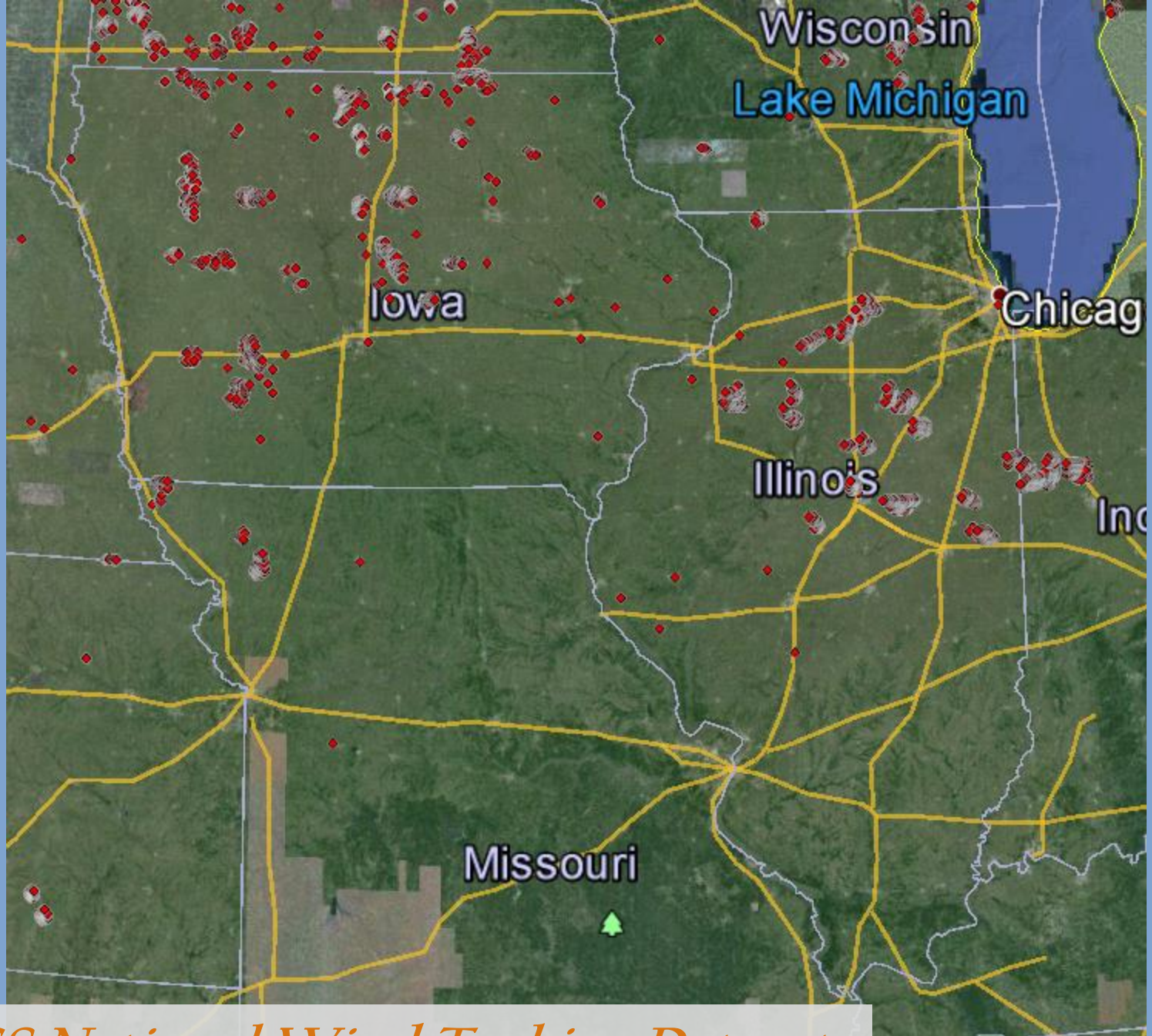
**Migratory Bird Program**

**Fisheries Program**

**Law Enforcement**



Base Map courtesy of Tibor G. Tsch (www.tschgraphix.com)



*USGS National Wind Turbine Dataset*

# Ecological Services Field Office

- Endangered Species Act
  - Protection
  - Recovery
- Fish and Wildlife Coordination Act
  - Natural Resources Protection
- Partners for Fish and Wildlife Program
  - Projects with Landowners
- Contaminants
  - Assessment, Litigation

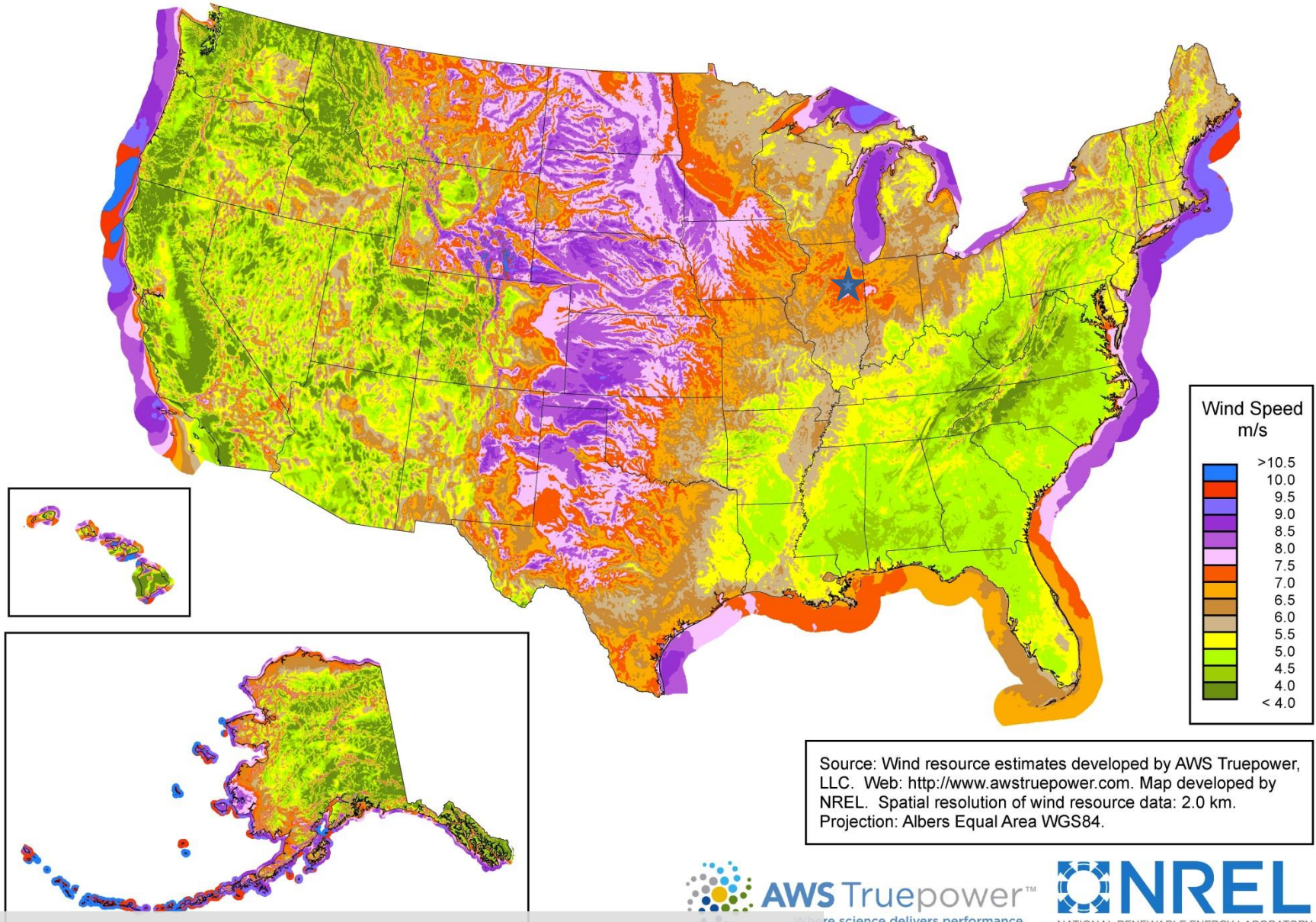
# Renewable Energy Coordinator

- Work with Wind Developers and Facility Operators to avoid and minimize impacts to protected species
- Follow the framework of the FWS Land Based Wind Energy Guidelines (published in 2012)
  - A 5-tiered approach to siting and operating with a wildlife impact perspective
  - Developer-led process, voluntary, but strongly encouraged
  - Documents coordination with FWS in case of a law violation (e.g. killing migratory birds, Eagles, or species protected by the Endangered Species Act)
  - Usually ends in a Bird and Bat Conservation Strategy, + a “Technical Assistance Letter” or take permit.
- I use this framework to guide wind developers to compliance with the Migratory Bird Treaty Act, Endangered Species Act, & Bald and Golden Eagle Protection Act

# U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines

- Tier 1: Preliminary Site Evaluation (Desktop)
- Tier 2: Site Characterization (Desktop and Field)
- Tier 3: Field Studies to Document Wildlife/Habitat & Predict Impacts
- Tier 4: Post-Construction Studies to Estimate Impacts
- Tier 5: Other Post-Construction Studies

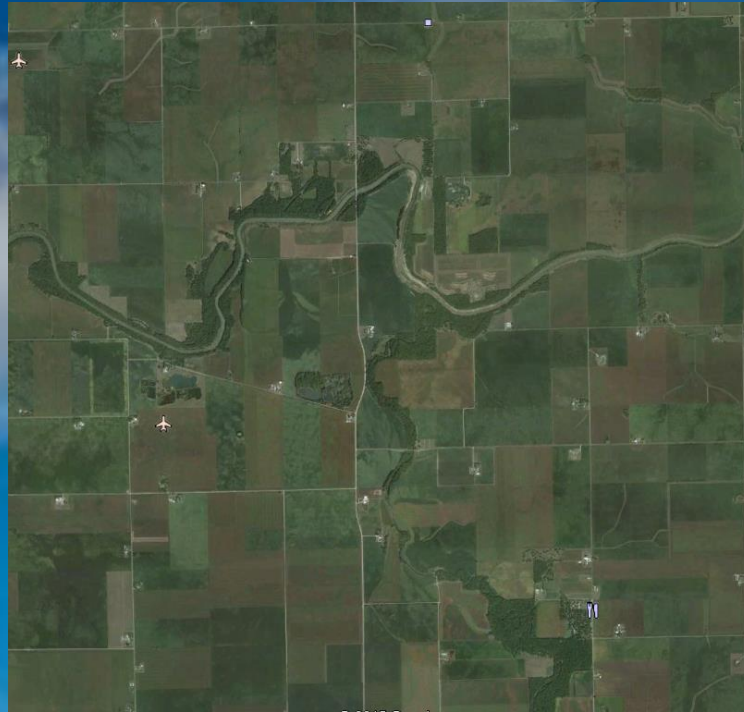
# United States - Land-Based and Offshore Annual Average Wind Speed at 80 m



*TIER 1: Preliminary Site Evaluation*



# *TIER 1: Preliminary Site Evaluation*



## **Habitat**

Cultivated Crops (e.g., corn, soybeans)

Developed

Deciduous Forest

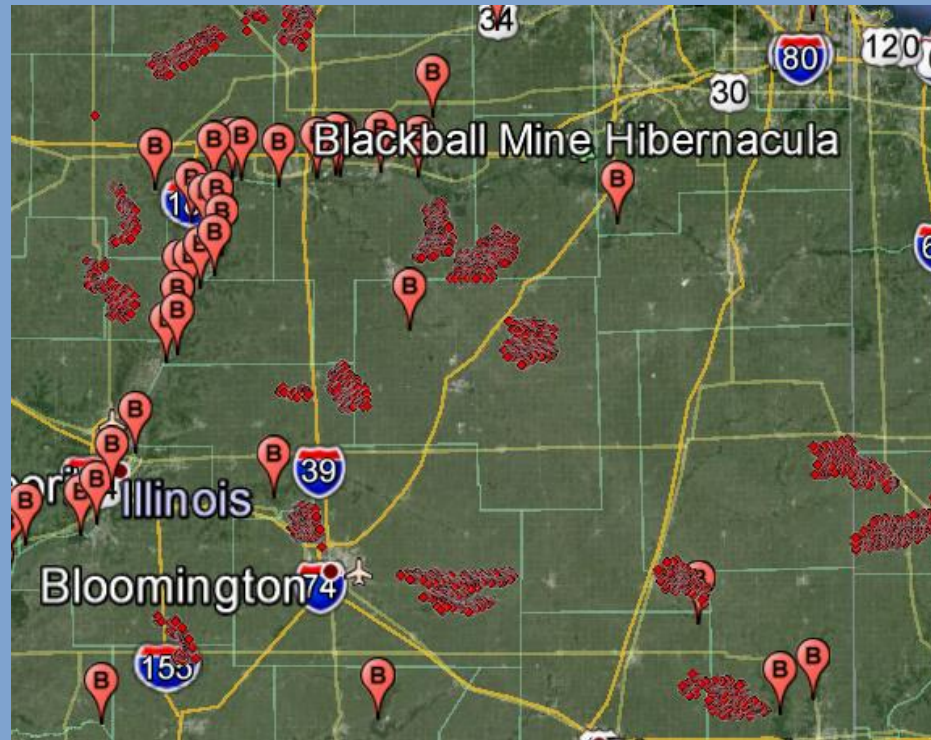
Hay/Pasture

Open Water

Woody Wetlands

Barren Land

## *TIER 2: Preliminary Site Evaluation*



Known Bald Eagle Nests, USFWS 2014

(Note any within 10 miles)

FWS also advises that E-IL is a major stopover site for the American Golden Plover

Closest Known Bat Hibernacula  
(Indiana bats and Northern long-eared bats surveys?)

# *TIER 3: Field Studies and Impact Prediction*

## FIELD STUDIES

- Avian Point Counts and Nest Searches
  - Hired bird observer, scans multiple points in project area for set time (~20 min) periodically throughout the year
  - Searches for raptor & eagle stick-nests –driving or plane/helicopter surveys in spring, before leaf-out
- Acoustic Bat Surveys
  - Ultrasonic Bat Call Detectors
    - Mounted on Met Towers
    - In surrounding habitat
- Mist-Net Bat Surveys
  - In forested river and stream corridors or blocks of mature forested habitat

# TIER 3: Field Studies and Impact Prediction

## Example Study Results

- <90 species of birds
  - Handful of plovers
  - Average of less than 1 bird per point count session
  - Red-winged black birds, starlings, cowbirds, larks, only 1 or two hawks, no eagles
- NLEB's captured in riparian areas, but no I-bats
- <3 bat passes per detector night – ground, <1 bp/dn raised, >15 bp/dn in adjacent forest



# *TIER 3: Field Studies and Impact Prediction*

## Assess Impacts from Field Studies

- Low bird use + no raptor or eagle presence = no fatal flaws!
- Bat use (acoustics) was very low = not a fatal flaw!
- Presence of NLEB's in riparian areas = CAUTION!
- FWS says migratory (fall) risk to I-bat and NLEB's = CAUTION!

## Avoidance/Minimization Measures – Siting and Operation

- Presence of NLEB's in riparian areas = Avoid killing this species in the summer by setting all turbines back at least 1000' from any forested area.
- FWS says migratory (fall) risk to I-bat and NLEB's = (Feather all turbine blades below a threshold wind-speed (currently 6.9 m/s is recommended)).



## TIER 3: Field Studies and Impact Prediction



### KEY STEP! Document Findings and Submit to USFWS

- Bird and Bat Conservation Strategy
  - Describes studies and results
  - Documents anticipated risk
  - Commits to conservation measures
  - Describes post-construction monitoring plan
  - Adaptive management strategy for unforeseen event (e.g. eagle or listed bat take)
- Service Issues TAL

## *TIER 4: Post-Construction Studies*

### Mortality Monitoring

- Purpose: document turbine-related mortality of birds and bats.
- Timing: Spring and Fall, or Year-Round
- First 3 years
- All or a subset of the turbines.
- Roads and pad and full-plots (60 m – 100 m radius)
  - Results corrected for searcher efficiency, carcass removal rates, and proportion of wind facility searched.
- Share results with the Service & adjust consv. measures, if necessary.

## *Wildlife Impacts – Why are siting and conservation measures so important?*

- Turbines do strike bats
  - Range of bat fatalities in Midwest 2 bats/turbine/year to 30 bats/turbine/year.
  - Rough avg in IL: about 14 bats/turbine.
  - Potential for about 30,000 dead bats per year in IL alone. (Most common species killed are Hoary, Silver-haired, and Eastern red bat.)
  - Raising cut-in speeds to 5.0 m/s may reduce mortality by 50-75%! Reducing to 6.9 m/s may reduce mortality by > 90%!
- Turbines can strike eagles
  - Approximately 6 fatality events in Iowa to-date



## *TIER 5: Other Research*

### Cool Extras!

- Exploring the relationship of cut-in speeds to bird and bat mortality rates.
- Exploring effect of acoustic deterrents on bat mortality
- Migration studies to map migration paths of known Indiana and NLEB bat colonies.
- Exploring the temporal patterns of mortality.
- Tracking eagle movements across the landscape in relationship to wind-farm locations
- Pre- and post-construction American golden plover use (looking for displacement).

## Discussion – Questions?

