

Overview of Pre- and Post-Construction Surveys for Wind and Solar Projects

Terry VanDeWalle
Stantec Consulting Services
Independence, Iowa

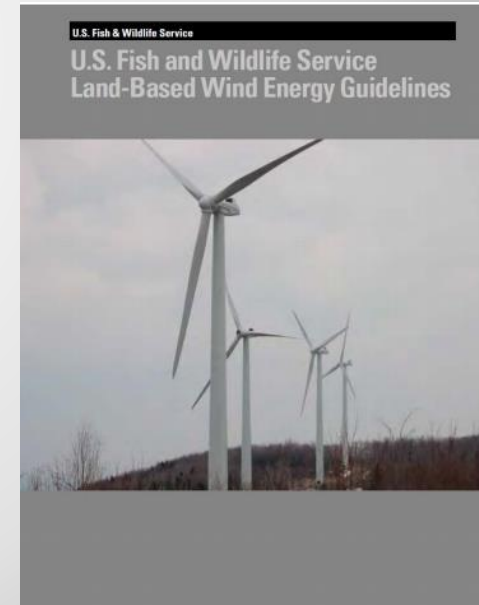


Site Characterization

Solar Projects – Critical Issues Analysis – Desktop review of a wide range of environmental issues concerning a solar project

Wind Projects – Site Characterization Report

- U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines
 - Tier 1 – Preliminary Site Evaluation
 - Tier 2 – Site Characterization
 - Desktop Habitat Assessments
 - Tier 3 – Field Studies
 - Point Counts for Birds
 - Acoustic Surveys for Bats
 - Tier 4 – Post-construction monitoring



Wetlands and Other Water of the U.S. Solar and Wind

Regulatory Driver: Clean Water Act Sections 404/401

Trigger: Placement of fill into wetlands or other waters of the U.S.

Assessment:

- Desktop Determination
 - Conducted early in the siting process
 - Use aerial photographs, soils data, National Wetlands Inventory
- Formal Wetland Delineation
 - Completed once final layout is known
 - USACE 1987 Manual and the Midwest Regional Supplement
 - Results used for wetland and waterway permitting, if needed



Avian and Eagle Use Surveys Wind

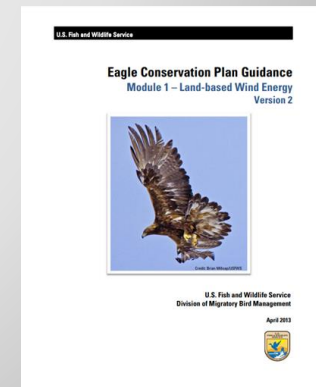
Regulatory Driver: Migratory Bird Treaty Act (MBTA)

Bald and Golden Eagle Protection Act (BGEPA)

Trigger: MBTA species and bald and golden eagles

Assessment:

- Small Bird Use Survey
 - Monthly 5-minute point count surveys for 1 year
 - Record all birds smaller than an American crow within 100 m of the survey point
- Eagle/Large Bird Use Survey
 - USFWS Eagle Conservation Plan Guidance
 - Monthly 60-minute point count surveys for 2 years
 - Record all birds larger than an American crow
 - Record number of minutes eagles are flying within the 800 m radius x 200 m height survey plot



Raptor Nest Search

Solar and Wind

Regulatory Driver: Migratory Bird Treaty Act (MBTA)

Bald and Golden Eagle Protection Act (BGEPA)

Trigger: MBTA species and bald and golden eagles

Assessment:

- Raptor Nest Search
 - USFWS Eagle Conservation Plan Guidance
 - Aerial and/or ground-based search
 - Solar – within project area and a 1-mile buffer
 - Wind – within project area and a 2-mile buffer



Threatened and Endangered Species Solar and Wind

Regulatory Driver: Endangered Species Act (ESA)

Illinois Endangered Species Protection Act (520 ILCS 10)

Trigger: Presence of state or federally listed species

Assessment:

- Desktop
 - U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) website
 - Returns a list of federally listed species whose ranges include the project area
 - Illinois DNR's Ecological Compliance Assessment Tool (EcoCAT)
 - Returns a list of state listed species with known records within, and in the vicinity of, the project area
 - National landcover database, aerial photography to map habitat types
- Site reconnaissance to field verify habitats

Bat Surveys

Solar and Wind

Regulatory Driver: Endangered Species Act (ESA)

Illinois Endangered Species Protection Act (520 ILCS 10)

Trigger: Presence of state or federally listed bat species

Assessment:

- Desktop – map suitable summer habitat
- Presence/Probable Absence Surveys
 - Acoustic Survey – record and identify bat calls
 - Ground-based
 - Meteorological Tower
 - Mist-Netting Survey
 - Capture bats
 - Radio-telemetry to identify maternity roost trees



Northern Long-Eared Bat
Endangered



Indiana Bat
Endangered



Tricolored Bat
Proposed Endangered

Cultural and Historical Resources

Solar and Wind

Regulatory Driver: National Historic Preservation Act (NHPA)

Illinois Historic Preservation Act (IHPA)

Trigger: Federal Action; IHPA Section 707 (20 ILCS 3420) requires SHPO coordination for projects requiring a state permit

Assessment:

- Phase 1A Survey – Literature and Records Search
 - Review historical and archaeological records for previously identified cultural resources – prehistoric Native American sites, historical farmsteads, standing structures, and other man-made features
- Phase 1B Survey
 - Shovel testing for buried cultural resources once layout is known
- Historic Structures Survey
 - Structures >50 years old that meet specific criteria



Sound Study

Solar and Wind

Regulatory Driver: 35 Illinois Administrative Code (35 IAC) Sections 900, 901, 910

Trigger: Exceedance of sound levels to residential land (Class A Land)

Assessment:

- Sound study
 - Calculates total expected sound and individual octave bands for Illinois compliance
 - Wind Turbines – Conservative Model Assumptions
 - All receptors are downwind of all turbines at all times (although not physically possible)
 - Maximum sound power level (although not emitted in low wind conditions)
 - Turbines emit less sound in some directions than others, but model assumes maximum in all directions
 - Solar Project
 - Evaluate sound produced by inverters and transformers

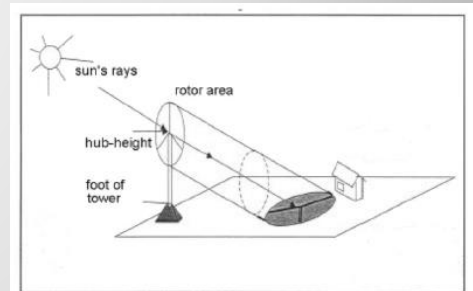
Shadow Flicker Study Wind

Regulatory Driver: 55 ILCS 5/5-12020 – Commercial wind energy facilities and commercial solar energy facilities

Trigger: Occupied community buildings or nonparticipating residences will not experience more than 30 hours per year of shadow flicker

Assessment:

- Shadow Flicker Study – Calculates the number of hours of shadow flicker expected at a receptor (e.g., residence)
 - Shadow flicker is the effect caused by shadows cast by the rotating blades of an operating wind turbine
 - Only occurs:
 - Daytime when skies are not cloudy or overcast
 - Wind is of sufficient speed for operation
 - Sun is aligned with turbine blades and receptor
 - Generally limited to early morning and late afternoon/evening when sun is low in the sky



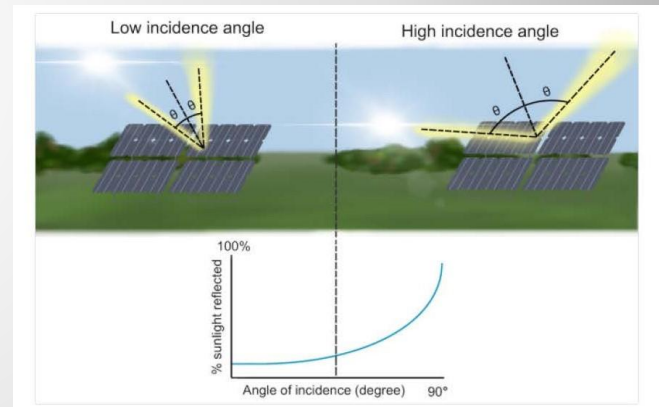
Glint/Glare Study Solar

Regulatory Driver: County Ordinance as applicable

Trigger: Potential effect of glint and/or glare from photovoltaic (PV) solar panels on pilots and airport operations, residents in the area, and drivers in the vicinity of the Project Area

Assessment:

- Glare Hazard Analysis
 - When and where glare will occur throughout the year for a prescribed solar project
 - Potential effects on the human eye at locations where glare occurs
- Though PV solar panels absorb direct sunlight, reflection can occur when panels are directed close to horizontal, which mainly occurs during sunset and sunrise when the incidence angle of the panels is highest



Phase I Environmental Site Assessment

Solar and Wind

Regulatory Driver: County Ordinance as applicable

Purpose: Evaluate a property's environmental conditions for the purpose of qualifying for landowner liability protections under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Assessment:

- ASTM “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, Designation E2247-16
 - Identify “recognized environmental conditions” (RECs) that may exist at a property. Specifically, the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property:
 - Due to any release to the environment;
 - Under conditions indicative of a release to the environment; or
 - Under conditions that pose a material threat of a future release to the environment.
 - 6-month shelf life

Post-Construction Mortality Monitoring Wind

- Searching under turbines for dead birds and bats.
- Used to evaluate the effectiveness of conservation measures and permit compliance.
- Searches are conducted on cleared plots and/or on the gravel turbine pads and access roads.
- Calculate bird/bat mortality per turbine or per megawatt.

