Overcoming Challenges to Conducting Meaningful Cumulative Impact Analysis

Approaches and Lessons Learned in Practice

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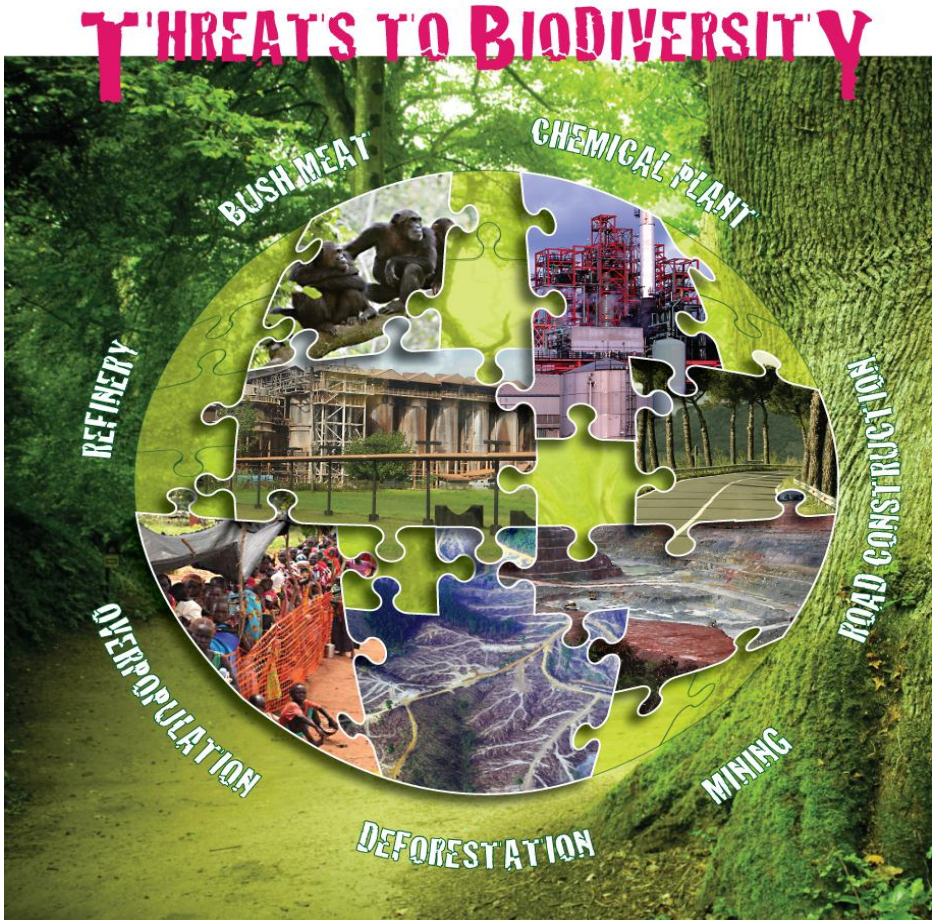
What are Cumulative Impacts?

- Incremental impact of a proposed action when added to past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such actions (40 CFR 1508.8)
- Cumulative impacts can be:
  - ✓ *Additive* (1+1=2)
  - ✓ *Countervailing* (multiple factors combined = less of an impact than sum of parts)
  - ✓ *Synergistic* (multiple factors combined = more of an impact than sum of parts)



Why do a CIA - Legal Mandate

NEPA/Council on Environmental Quality (CEQ)

- Sec. 1502.16 of the CEQ Regulations - The environmental consequences discussion will include "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity..." and shall include discussions of direct, indirect, and cumulative effects and their significance

Canadian Environmental Assessment Act, 2012

- In Canada, assessment of cumulative effects is now required when an action is subject to a federal environmental assessment. The total effect of the proposed action and other actions on Valued Ecosystem Components must be assessed

Permitting/License Requirements

- Most countries have environmental legislation requiring an EIA, including a CIA, be completed in order to obtain required licenses/permits

Why do a CIA – Financing Requirement

2012 IFC Performance Standards

- "To address potential adverse project impacts on existing ambient conditions, the client will consider…the potential for cumulative impacts with uncertain and/or irreversible consequences."
- Includes existing, planned or reasonably defined developments

Equator Principals, other Lender's requirements

Why do a CIA-Corporate Standards/Business Objectives

- Many companies now understand the business case for understanding cumulative effects
  - A good CIA should be viewed as an investment, not a cost
- Fertile ground for litigation – the most litigated part of EISs in the US, can cause major delays in project approvals, costing $$

Why do a CIA – Maintenance of Biodiversity & ES

Can the proposed action or activity be the tipping point for an imperiled resource?

Given the requirements for and importance of CIA, why is it often the weakest part of an ESIA?

CIA is Challenging

- Lack of established framework
- Data, budget, and schedule limitations
- Requires communication and collaboration - client unease/reluctance to consult with and/or share information with other (potentially competing) parties
- Dealing with third parties and external influences beyond your control
- Specific methodological challenges
  - ✓ Defining appropriate geographic and temporal scope
  - ✓ Addressing additive or synergistic effects of climate change
  - ✓ Addressing community concerns
  - ✓ Dealing with multiple jurisdictions = potentially opposing needs and viewpoints on development

One Approach – CEQ/NEPA

- Council on Environmental Quality (CEQ) principles
  - ✓ Past + Present + Reasonably Foreseeable Future Actions
  - ✓ The CEQ guidelines acknowledge that while "in a broad sense all the impacts on affected resources are probably cumulative," it is important to "count what counts" and narrow the focus of the analysis to important national, regional, or local issues with direct influence on the Project and Project decision-making
- US based approach but can be applied anywhere
- Stepwise approach very similar to traditional IA (scoping, baseline, impact assessment, mitigation)

CIA Case Study – Wind Project

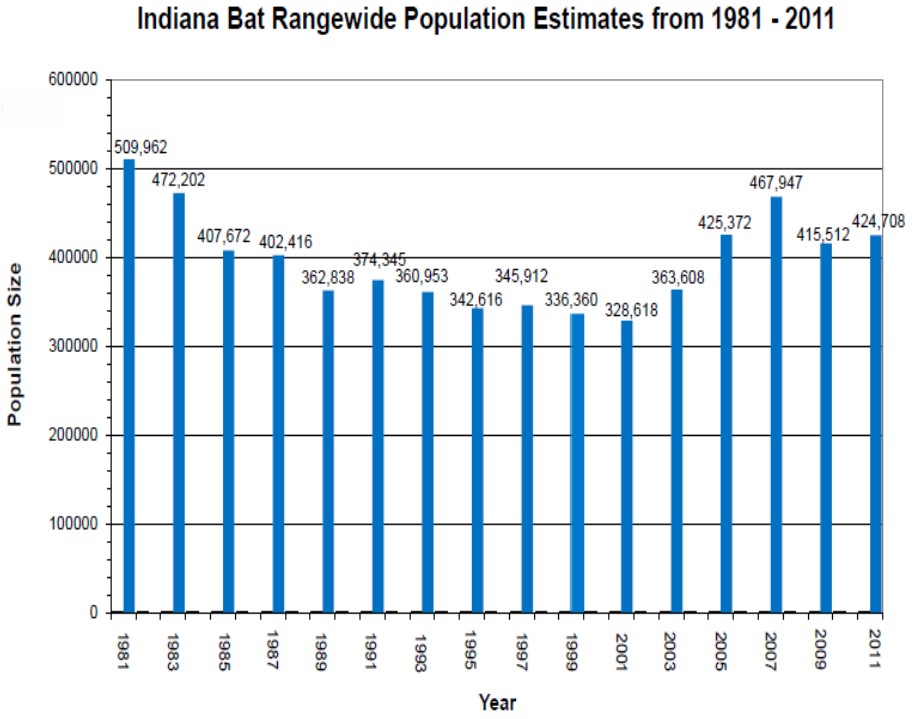
- The USFWS is considering issuance of an Incidental Take Permit (ITP) pursuant to the Endangered Species Act to authorize the incidental take of Indiana bats (*Myotis sodalis*) (federally endangered) associated with a proposed wind project in the Midwestern US
- Issuance of an ITP is a federal action that is subject to NEPA, which in this case included the preparation of an EIS
- Detailed CIA completed due to litigation concerns and burden of proof due to highly imperiled status of the species

CIA Case Study – Bat Component

- Step 1: Scope key Indiana Bat issues on a landscape scale, identify potential cumulative effects on summer resident and migrating bats
  - ✓ Wind projects
  - ✓ Land use changes/habitat loss
  - ✓ White Nose Syndrome
- Step 2: Determine spatial and temporal scale of analysis
  - ✓ Spatial Scale = Indiana Bat Midwest Recovery Unit (MWRU)
  - ✓ Temporal scale=30 years (ITP Term)

CIA Case Study – Bat Component (continued)

- Step 3: Establish baseline in unit of analysis (MWRU)
  - ✓ Collate historic (1960s and 1980s) and current (2006) data on land cover
  - ✓ Conduct historic trends analysis (land cover and Indiana Bat population)
  - ✓ Determine number and size (MW) of active wind projects within MWRU (AWEA and state data)



Source: King, A. USFWS, 2012

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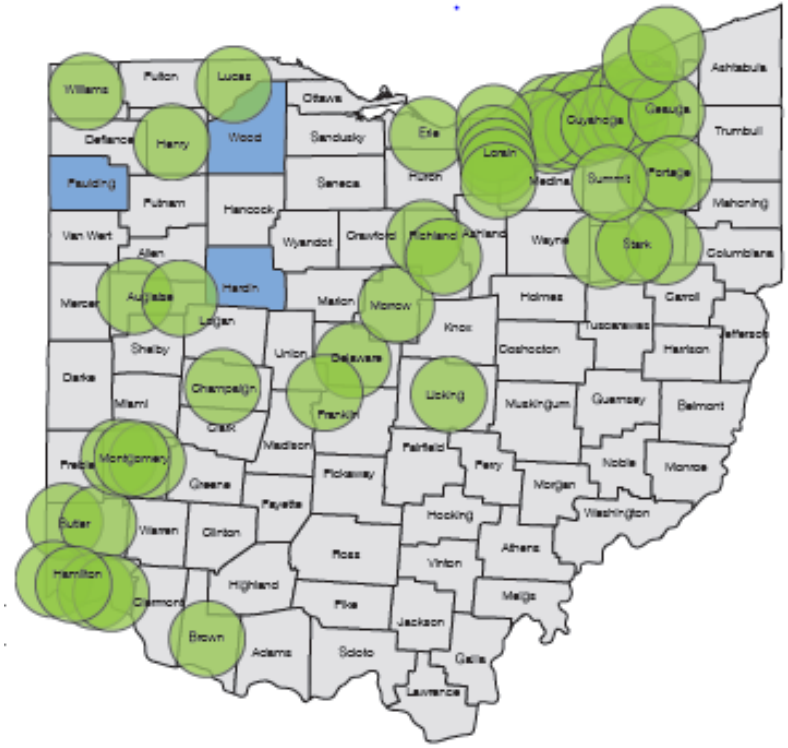
CIA Case Study – Bat Component (continued)

- Step 4: Determine RFFAs
  - ✓ Project land cover and Indiana Bat population trends into future
  - ✓ Determine number and size (MW) of permitted but not yet built and expected build out of wind projects (MW) within MWRU within 30 yrs
  - ✓ Filter out all but highly relevant actions



Source: AWEA 2012

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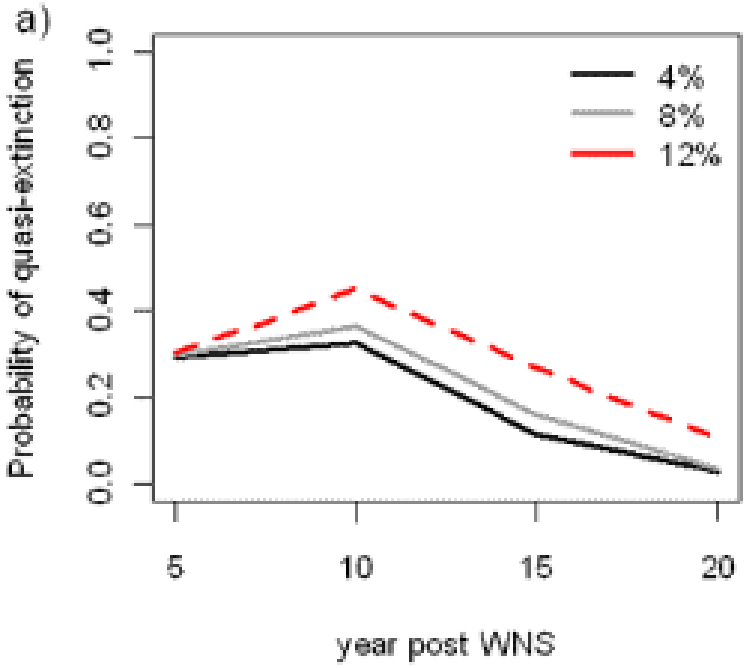
Ranking and Filtering RFFAs

RFFA	Region	Status	Phase	Probability	Resources Affected	Source
New Housing Units	Dillon	Fully funded	Preliminary; Some construction	High	2,3,13,15, 16	'05 CIP
Deforestation	Dillon	Ongoing	NA	High	3,5,6,7,8,1 3,15,16	L&PB '06 CIP "B" list
Bethel Airport Improve.	Bethel	Awaiting completion of Master Plan	Project Development	Medium/ Low	2,3	Bethel Airport Master Plan '04
Road Dev.	Bethel	Secured funds	Unknown	Medium	1,2,3,5,6, 10, 11,15	L&PB '06 CIP "B" list

Resources
1 – Lands
2 – Social
3 – Econ
4 – Rec
5 – Water
6 – Wetland
7 – Hydrol
8 – Flood
9 – Fish
10 – Wild
11 – Veg
12 – Sub
13 – Vis
14 – Noise
15 – Trans.
16 – Util.

CIA Case Study – Bat Component (continued)

- Step 5: Determine impact significance thresholds
  - ✓ Mortality of Indiana bats considered significant if substantial reductions (>5%) in population size or distribution of this species was caused within the MWRU - 5% threshold considered the low reproductive rates typical of long-lived species, lower thresholds if future WNS impacts are significant in MWRU



Source: USGS, 2012

CIA Case Study – Bat Component (continued)

- Step 5: Conduct impact analysis
  - ✓ Analyzed *Myotis* mortality data from all available standardized (conducted according to USFWS protocol) post-construction monitoring data (15 projects) to estimate bat mortality - bat fatalities per MW per year ranged from 0.5 to 49.3, and averaged 9.6 to 16.1
  - ✓ The minimum and maximum bat fatality estimates were applied to 5,226 MW of operational, under construction, and proposed wind facilities in the MWRU to quantify predicted bat mortality rates
  - ✓ Applied proportional species analysis based on prior studies

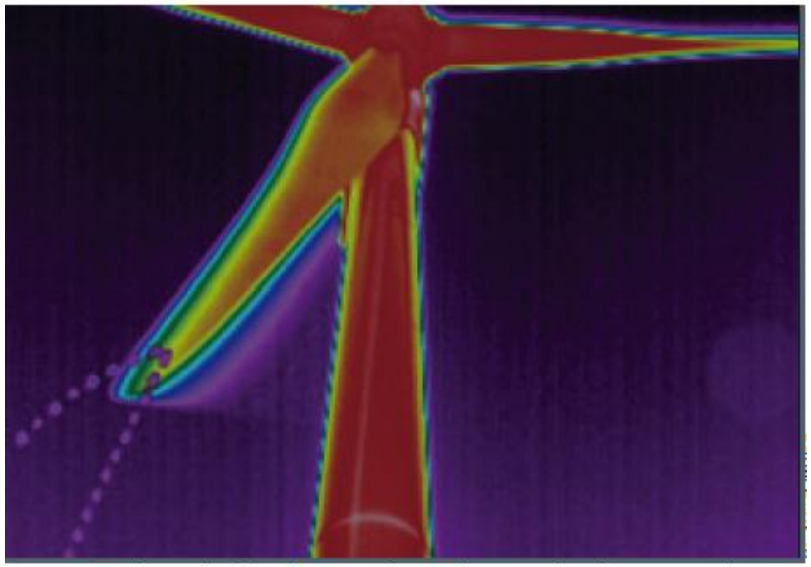


Figure 3. *Thermal infrared image of a modern wind turbine rotor, showing the trajectory of a bat that was struck by a moving blade (lower left).*

Source: BCI, 2012

CIA Case Study – Bat Component (continued)

- Results
  - ✓ ~12,539 and 21,029 *Myotis* and approximately 66 to 111 Indiana bats would be killed each year in the MWRU
  - ✓ Annual mortality of *Myotis* bats and Indiana bats at these levels may represent a significant cumulative effect
- Mitigation
  - ✓ Turbines in high risk bat areas removed from design
  - ✓ Project operation includes feathering and curtailment
  - ✓ Permanent conservation easement around hibernaculum

CIA Case Study – Bat Component (continued)

- Monitoring and Adaptive Management
  - ✓ Applicant has committed to reducing requested Indiana Bat 5-year take limits by 50% if the population of Indiana Bats in the MWRU is reduced by 50% or more from the 2009 pre-WNS level
  - ✓ Rigorous post-construction monitoring program and an adaptive management strategy to maintain take of Indiana bats at authorized levels
  - ✓ Third party verification

Source: BatsRus, 2012

CIA Case Study – Bat Component (continued)

- Overview
  - ✓ Rigorous CIA determined that cumulative impacts on Indiana Bats are potentially significant, whereas impacts of the project alone were determined to have no adverse effect
  - ✓ Result triggered more rigorous avoidance, minimization, and mitigation measures and adaptive management triggers
  - ✓ Landscape-level mitigation – offset of regionally important hibernacula and surrounding forest to benefit regional population of Indiana Bats and numerous other bat species as well. Could be added to and used as conservation bank.
  - ✓ Project moving through NEPA process with little opposition

Key Ingredients of a Good CIA

- Emphasis on landscape and global perspective
- Utilize a spatial approach - GIS & remote sensing
- Front load – start at scoping and carry forward, equal importance as direct/indirect/induced impacts
- Integrate cumulative impacts into stakeholder consultation – key source of information on past actions and future trends
- Optimize mitigation and management measures using a cumulative and landscape approach (e.g., aggregating offsets)

Thank you!

- Embrace CIA!
- It can be done effectively and robustly when prioritized from the outset

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