

Comparison of Reported Effects and Risks to Wildlife from Wind Power and Other Electricity Generation Types: A Life-Cycle Analysis (NYSERDA)

Presenter:

Christian Newman, MS, MBA, President, Pandion Systems, Inc.
cmnewman@pandionsystems.com

Study Authors:

Dr. Jim Newman, Pandion Systems, Inc./EBIF
Dr. Ed Zillioux, EBIF

Contributing Authors :

Christian Newman, MS, MBA, Pandion Systems, Inc.
Christine Denny, MS, Pandion Systems, Inc.
Peter Colverson, MS, Pandion Systems, Inc.
Karen Hill, Pandion Systems, Inc.
Dr. William Warren-Hicks, EcoStat, Inc.
Susan Marynowski, MS, Pandion Systems, Inc.

Project Managers:

Mark Watson, NYSERDA
Greg Lampman, NYSERDA



Pandion Systems, Inc.

- Environmental Firm Specializing In:
 - Wildlife-Wind Interactions
 - Wildlife-Utility Interactions
 - Environmental Communications & Public Involvement
- Key Associations & Clients
 - NREL
 - MMS
 - AWEA, CalWEA, NWCC



Why some say wind energy is good.



Why some say wind energy is bad.



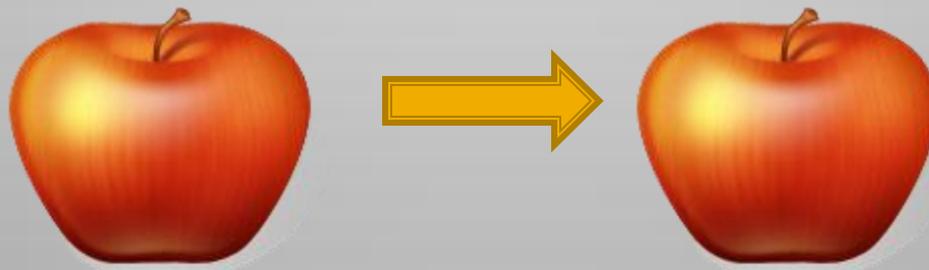
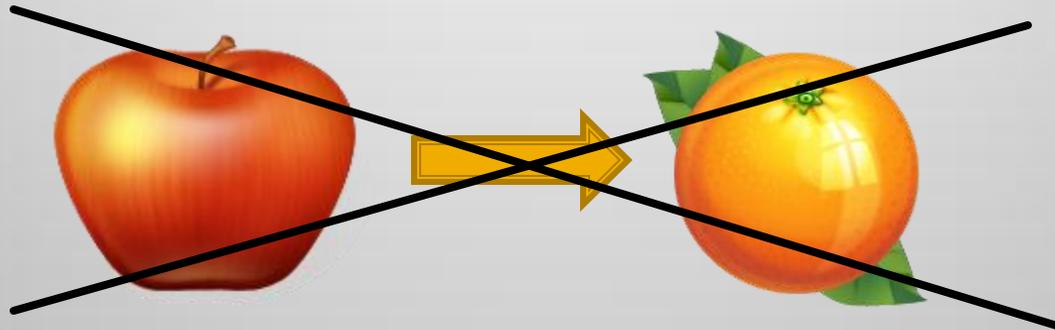
Typical advocate response?



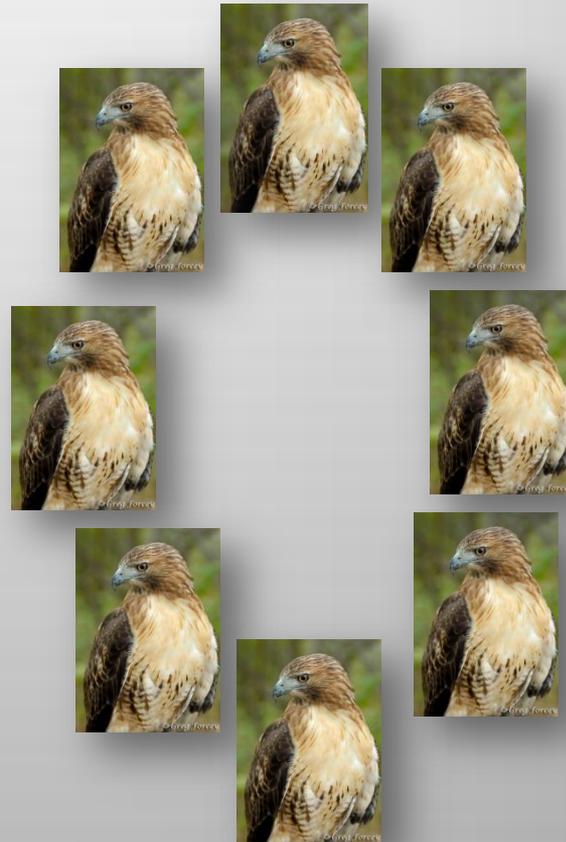
Typical advocate response?



Previous comparisons are not equal?



All energy sources affect wildlife.



Why create the NYSERDA report?

- Compare relative risks across major electricity generation types
- Include risks from resource extraction through decommissioning
- Assess relative risk potential at all life cycle stages
- Base analysis on available literature
- Impartial to electricity generation sources

Study Limitations & Assumptions

- Variability & Uncertainty
- Wildlife Assumptions
- Life Cycle Assumptions
- Data Gaps



NYSERDA STUDY METHODS



Electricity Generation Sources Studied

Electricity Generation Sources

Coal



Oil



Natural Gas



Nuclear



Hydro



Wind



Electricity Generation Stages

Life Cycle Assessment; Electricity Generation Stages

Extraction



Transportation



Construction



Power
Generation



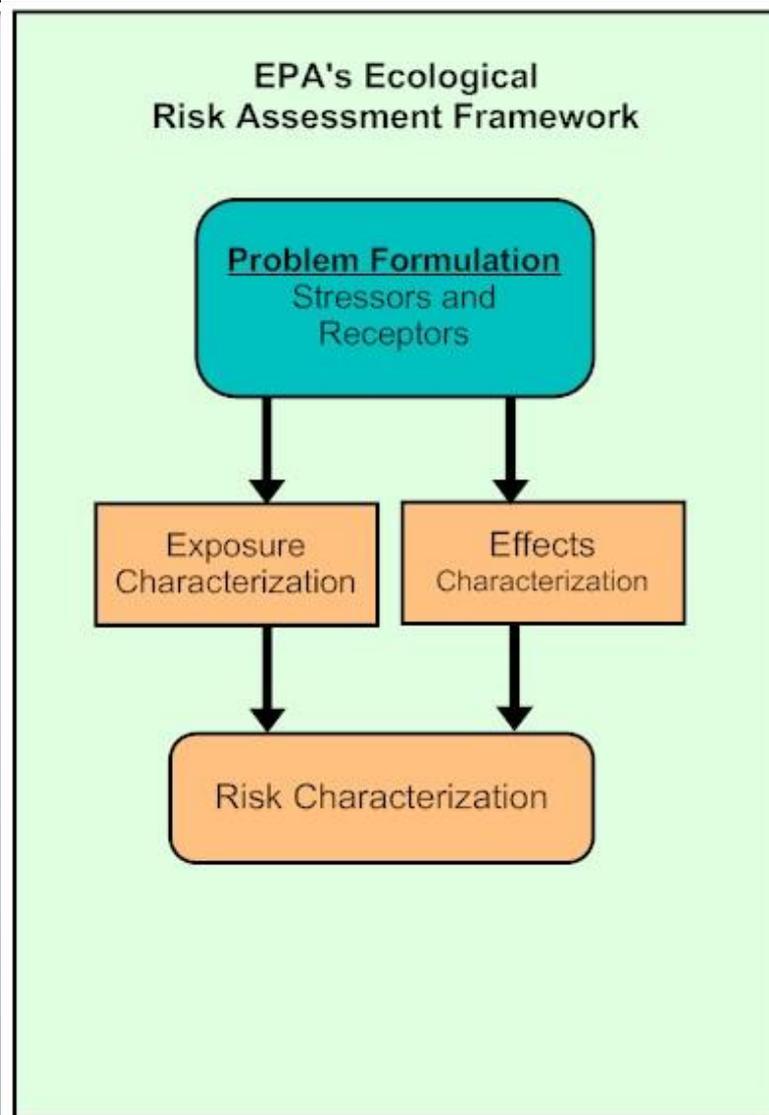
Transmission &
Distribution



Decommissioning

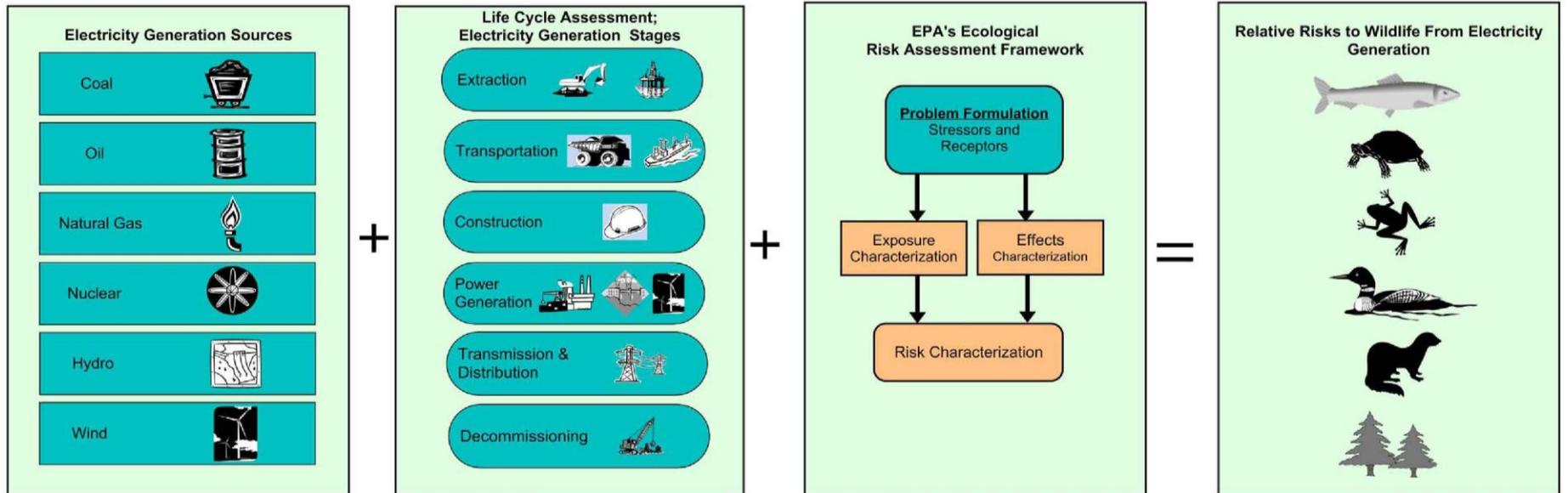


EPA's Ecological Risk Assessment Framework



Comparative Ecological Risk Assessment

COMPARATIVE ECOLOGICAL RISK ASSESSMENT



Relative Risk Level for Potential Harm	Potential Effects
Highest Potential	<p>Populations: Large scale injury or mortality</p> <p>Habitat: Large scale destruction</p> <p>T and E species: Biologically significant reductions</p>
Higher Potential	<p>Populations: Limited, but locally to regionally important mortality</p> <p>Habitat: Limited, but locally to regionally important destruction</p> <p>T and E species: Incidental mortality and habitat destruction</p>
Moderate Potential	<p>Populations: Limited and local, no population effects</p> <p>Habitat: Limited and local</p> <p>T and E species: Exposure possible, mortality unlikely</p>
Lower Potential	<p>Populations: Limited to no population effects, some individual affects</p> <p>Habitat: Limited to none</p> <p>T and E species: Exposure unlikely</p>
Lowest Potential	<p>Populations: Individuals only, if any</p> <p>Habitat: Limited to none</p> <p>T and E species: Limited to no exposure</p>



NYSERDA STUDY RESULTS



© Greg Forcey



Regional and global wildlife effects and risks from electricity generation



- Climate Change
- Acid Deposition
- Mercury Bioaccumulation

General effects to wildlife from electricity generation

- Physical Injury and/or Mortality to Wildlife
- Chemical Injury and/or Mortality to Wildlife
- Disruption of Normal Behavior of Wildlife
- Destruction and Alteration of Habitat



Relative Wildlife Risk Level for Potential Harm: Highest Level of Relative Risk for Each Stage

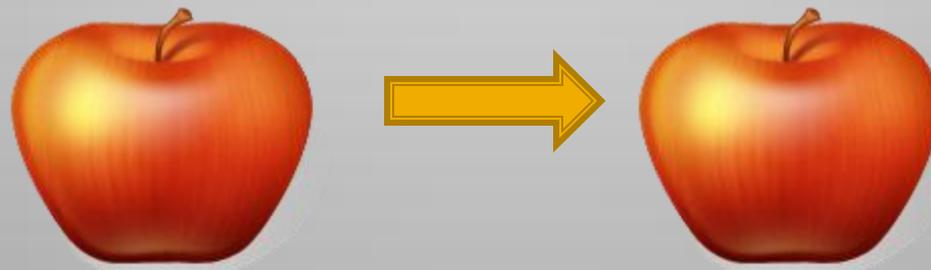
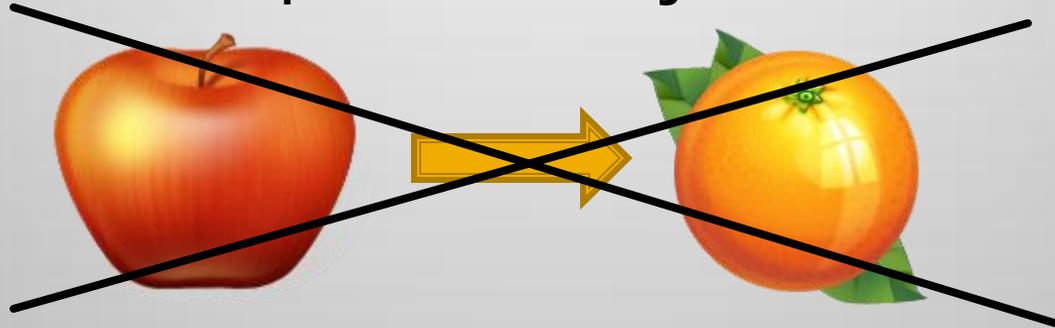
Does not reflect mitigation and future technology



Electricity Generation Source	Resource Extraction	Fuel Transportation	Construction of Facility	Power Generation	Transmission and Delivery	Decommissioning of Facility
Coal	Highest Potential	Lower Potential	Lower Potential	Highest Potential	Moderate Potential	Lower Potential
Oil	Higher Potential	Highest Potential	Lower Potential	Higher Potential	Moderate Potential	Lower Potential
Natural Gas	Higher Potential	Moderate Potential	Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential
Nuclear	Highest Potential	Lowest Potential	Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential
Hydro			Highest Potential	Moderate Potential	Moderate Potential	Higher Potential
Wind			Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential

What does this mean to you?

We need to look at electricity generation from a holistic standpoint - not just one or two stages.



NYSERDA Report Summary

- All electricity generation sources affect wildlife
- One cradle to grave approach
- Further analysis and studies needed to quantify impacts
- Creates a framework for rational discussion about comparative impacts



Thank you for your time.

Christian Newman, President, Principal
Pandion Systems, Inc.

Gainesville, Florida

Austin, Texas

Burnt Hills, New York

Whitingham, Vermont

352-372-4747

www.pandionsystems.com

cmnewman@pandionsystems.com

