EFFECTS OF INDUSTRIAL NOISE ON WILDLIFE: ISSUES AND CHALLENGES IN ALBERTA

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The expansion of industrial activity into rural and natural areas of the province is exposing wildlife to noise from industrial facilities, road & rail traffic, and construction at greater frequency and intensity levels than in the past. Noise impacts assessments from industrial developments generally focus on identifying and mitigating the effects on humans. Little attention is given to the potential effects that noise may have on wildlife.

This paper will present an overview of applicable peer reviewed research, information and current studies regarding the effects of noise from industrial activities on wildlife. Major challenges, key issues, and information gaps will be identified and discussed as they relate to Alberta and the Alberta Energy and Utilities Board (EUB) noise requirements. Conclusions and recommendations will identify areas for further research and opportunities to include wildlife in EUB noise requirements.

BAT MORTALITY BY WIND TURBINE COLLISIONS: A LITERATURE REVIEW OF NORTH AMERICAN RESEARCH

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In Canada, alternative forms of energy are being considered with ever greater scale to serve society's need for energy. The popularity of wind energy has increased across Canada due to the desire for a clean energy source and an alternative to fossil fuel consumption. There are over 381 wind turbines operating in southern Alberta with more being proposed every year. Although this type of renewable energy source is generally considered environmentally friendly, wind power development has been associated with high collision mortality rate of bats and birds. High bat fatality rates at wind turbines have been documented worldwide and occur throughout all regions and in varying habitat conditions. One wind farm in southern Alberta alone kills close to 500 bats per year. However, understanding the reason for collision mortality at wind turbines is far less understood for bats than other avian species such as birds.

To help combat this inadequacy, large scale research projects are being conducted to determine the effects of wind turbines on migratory bats throughout North America; one of the largest being the Bats and Wind Energy Cooperative (BWEC) study of 2005. This paper will identify current and past research that has been conducted to identify the major causes of at fatality so far, to identify missing research topics (such as LFN) and to explore possible implementations into Alberta wind farm regulations.

BOOMCAST: SONIC BOOM NOISE FORECASTING FOR FLIGHT PLANNING AND WILDLIFE IMPACT REDUCTION

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Noise from military training activities can adversely affect wildlife and other valued environmental components (VECs). This is even more so for training that involves supersonic flights by military aircraft involved in aerial combat training. Over the past year, the authors have been engaged in a multi-phase project aimed at developing: 1) a sonic boom climatology and long-range planning tool that accounts for seasonal trends in meteorological conditions over the Goose Bay training area of Labrador, Canada; and 2) a real-time forecast system that allows flight planners to assess where supersonic flight activities should be restricted based on short-term (48-hour) weather forecasts and coincident VEC locations and activities. This unique forecast system, dubbed "BoomCast", is a complex, integrated system built on: modified Environment Canada operational weather forecasts; a custom version of the PCBoom noise propagation model; and, a unique GIS-based mapping engine and user interface. Outputs from the Boomcast system are available via a secure, web-enabled interface and presented as maps depicting peak predicted noise at the ground, in conjunction with the probability that sonic booms that do reach the ground will exceed VEC-specific threshold noise levels.

This paper presents an overview of the project, highlighting some of the challenges and solutions developed to facilitate the prediction of impacts associated with sonic booms resulting from military aircraft engaged in aerial combat training in a 3-dimensional airspace under variable meteorological conditions.

MEASURING BAT DIVERSITY AND RELATIVE ABUNDANCE THROUGH ULTRASONIC DETECTION

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Most bat species communicate and navigate with high frequency calls using a sophisticated system called echolocation. Bat detection equipment allows researchers to convert these high frequency calls into frequencies that can be heard by humans and into sonograms that can be analysed. The echolocation call detection data can be used to compare the diversity and relative abundance of bats between habitats or regions. Unlike capture techniques where capture rates differ among species, call detection samples the entire bat community and is a valuable non-evasive sampling tool. Given that bats actively use a range of sound frequencies to perceive their environment, they may be more susceptible to a broad range of noise disturbances.