



## RENEWABLE ENERGY

At **Hamer Environmental**, we use cutting edge technologies to assess potential impacts on wildlife and biological resources from renewable energy projects, transmission lines, communication towers and other developments. Our experience enables us to provide our clients with the environmental solutions they need to successfully develop their projects while minimizing impacts to the environment.



### Siting Issues and Project Feasibility

*Early stages of project development:*

- Scientific research and literature reviews
- Federal and state environmental permitting
- Environmental site screening
- Stakeholder consultations
- ESA consultations
- Mitigation solutions



### Technical and Scientific Surveys

*Overview of our multi-disciplinary skills:*

- Before-and-After-Control-Impact (BACI) studies
- Threatened & endangered species studies
- Amphibians, small mammals & fisheries studies
- Population level risk assessments
- Stream and riparian surveys and assessments
- Avian nocturnal migration studies
- Bat echolocation surveys & bat ecology studies
- Avian studies and habitat assessments
- Botanical/wetland assessments/noxious weeds
- Night-vision, infra-red and UAV surveys
- Natural community and habitat assessments
- Assessment of impacts and disturbances to wildlife
- Mortality monitoring



### Modeling and Statistical Analysis

*Models and analyses are applied to assess:*

- Avian & bat collision risk & mortality
- Population viability, demographics and survival
- Habitat modeling, quality and loss
- Model parameter sensitivity analyses
- Landscape level habitat attributes



### Geographic Information System

*We use GIS, remote sensing, cartography and landscape analyses to do:*

- Aerial photo interpretation
- Wildlife utilization analyses
- Habitat typing
- Habitat analyses
- GPS data generation
- Habitat projections



## ORNITHOLOGICAL RADAR

Wind turbines, solar towers, cell towers, transmission lines and other man-made structures face increased scrutiny because of their potential impacts to bird and bat populations. Rigorous evaluations are often required to determine if the project will have a significant biological effect on birds and bats. To assist clients with these environmental concerns, we design and conduct avian and bat surveys as well as auxiliary studies needed to meet permitting requirements and produce defensible results.

Our radar systems can be set up almost everywhere, from a self-contained and climate-controlled lab to fully adjustable and highly mobile 4WD research vehicles.



**Hamer Environmental** is one of the pioneers in using radar technology for avian and bat research. As such, we continually refine our survey methods to insure our clients are getting the best technology available. Our latest addition is digital radar with automatic target recognition, target tracking software, and associated algorithms. These systems are automated and can sample 24/7. The radar unit and associated software can be easily customized for your projects. With this technology we can:

- Assess and monitor impacts to migratory birds, and threatened & endangered birds.
- Identify flight corridors, passage rates, heights, ground speeds of birds and timing of migration.
- Monitor offshore and coastal sites, seabirds and seabird nesting colonies.
- Examine population size and trends, densities and behaviors of nocturnal and diurnal birds.

## Sample of Projects Using Radar Technology

A small sample of the biological evaluations and avian impact assessment projects conducted by Hamer Environmental are listed below. Avian impact studies include resident and migratory bird studies, breeding bird surveys, population monitoring, presence/absence studies, and rare species evaluations.



### Wind & Solar Energy

2013-2014 Warren County (NJ), EDM  
2012-2013 Huron County (MI), Geronimo Wind energy  
2012, Riverside County (CA), BrightSource Energy  
2011-2012, Stearns County (MN), Geronimo Wind energy  
2011, Molokai (HI), Pattern Energy  
2010-2011, Whatcom County (WA), Lummi Nation  
2010, L.A. County (CA), Element Power  
2010, Maui (HI), Sempra Energy

2007-2011, Pacific County (OR), Invenergy & Energy Northwest  
2009, Lake County (OR), GreenWing Energy  
2006-2009, Oahu, Maui and Hawai'i (HI), Hawaii Electric Co., Shell WindEnergy  
2007, Grays Harbor County (WA), Coastal Community Action Program  
2005, Curry County (OR), Horizon Wind Energy  
2001-2002, Douglas County (WA), Douglas County PUD #1



### Transmission Corridors and Communication Towers

2008-2010, Clallam & Skagit Co. (WA), Verizon, Cascadia PM  
2007-2009, Hawai'i, Oahu & Kauai (HI), Verizon, DAGS

2007, Kauai (HI), Kauai Island Utility Cooperative  
2005-2007, Chelan County (WA), Chelan County PUD



### Conservation Studies

2009-2011, Joint Base Lewis-McChord, (WA), TNC  
1997-2010, Santa Cruz (CA), CDFG  
2003-2005, Eugene (OR), Bureau of Land Management

2000-2003, Channel Islands (CA), American Trader Oil Spill Trustee Council  
2002-2003, Grand Ronde (OR), Tribes of Grand Ronde



## OFFSHORE WIND

By the end of 2010, ten European countries had off shore wind energy projects. The number of and interest in these projects has expanded rapidly to reach the EU's 2020 renewable energy target. The recent approval of a wind project in Nantucket Sound demonstrates that the US is ready to deploy offshore wind projects and join the global community providing clean and renewable energy.

Increased provisions for offshore projects will require environmental assessments to determine potential impacts to birds, marine mammals and other marine resources. Issues such as avian collisions will need to be evaluated to determine population effects; with special consideration for vulnerable species and the cumulative effects of offshore wind developments. We are creating improved models to better predict population level effects of both individual projects and cumulative impacts of the industry as a whole.

Environmental data must be collected to inform the project developer and the assisting agencies of potential impacts for the successful permitting of the project. **Hamer Environmental** uses both traditional and cutting edge survey techniques including:

- Development of collision sensor technology
- Boat based diurnal seabird and marine mammal survey transects
- Thermal imaging
- Aerial high definition videography using fixed wing aircraft or helicopters to conduct marine mammal and seabird surveys
- Marine buoy or met tower based bat acoustic surveys
- Boat based nocturnal avian migration surveys using radar systems with auto-stabilizing platforms to reduce wave clutter
- Kinematic model-based approach for estimation of avian collision risk

Impacts on birds within a project area may include disturbance, displacement, barriers to movement, collisions, and habitat loss. **Hamer Environmental** can adequately evaluate such impacts and calculate the collision risks that may be influenced by the design, size, number, array and lighting of wind towers at each site.

Aviation warning lights on turbines can pose a risk to birds and must be carefully evaluated. Many birds migrate at night and are attracted to lights, especially during inclement weather. At such times, these nocturnal migrants can become disoriented and collide with the tall structures on which lights are mounted.

Additional considerations for offshore wind projects include potential impacts to other marine life and conflicts with traditional, commercial and recreational ocean use.







## How Can We Help



**Hamer Environmental** can assist clients by conducting studies to assess potential environmental impacts and use this data to make final siting decisions to reduce or eliminate these impacts. We provide:

- **Preliminary evaluation or screening of potential sites:** Identify regions that may pose risks to species of concern or their habitats; screening of other potential sites.
- **Site characterization:** Identify the presence of species of concern, designate and map critical habitats, determine if displacement is a concern and assess which species might be at risk.
- **Field studies to document wildlife use and predict project impacts:** project design to avoid or minimize adverse impacts; develop predictions of impacts and identify any compensatory mitigation measures.
- **Post-construction fatality studies:** determine the fatality rates of birds, bats and other species of concern; compare predicted and actual fatality rates within a project and with other similar projects; establish a relation of site characteristics to fatality rates and decide whether further specific measures should be taken to reduce fatality.



## Experience

**Hamer Environmental** has over 15 years of experience surveying in marine environments including:

- Assessments of impacts to seabirds and marine mammals from offshore construction projects for the Washington Department of Transportation
- Boat-based marine mammal and seabird surveys for the Makah Nation
- Monitoring seabird populations in the Channel Islands for a rat eradication project
- Monitoring of coastal seabirds using ornithological radar in NW France
- Development and analyses of boat-based transect survey techniques for seabirds in cooperation with the USFWS



## Contact Us

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