

Remote Condor Observation Network (ReCON™)

www.condortracking.com

At Normandeau, we actively put our core values into practice:

Consistently delivering quality, results-oriented environmental services

Respecting the interests of all stakeholders, the public, and our natural environment

Demonstrating ethical work conduct and scientific integrity at all times

Maintaining our commitment to continuous improvement

Providing a safe and positive working environment

Fostering pride, investment, and accountability through employee ownership



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*Delivering Innovative,
Sound Scientific Solutions and
Services to Clients Nationwide*

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As the endangered California condor population increases, condors have been expanding their territory into southern California and Arizona to reoccupy more of their historic range. Because condor range expansion could one day lead to interactions with renewable energy facilities, planning has begun to address this concern.

What is ReCON™?

Normandeau designed ReCON as an early detection system that provides energy facility operations centers with real-time alerts of an approaching condor. The condor recovery program tags individual birds using unique VHF transmitter frequencies to distinguish condors from other species. ReCON creates a detection perimeter around the energy facility that provides enough time to confirm condor presence and initiate a response, if needed, to avoid injury or mortality.

Proven VHF Technology

The ReCON system uses proven VHF technology. VHF (Very High Frequency) is a common technology, has a very long range (depending on transmitter power), and has been used since 1963 to track terrestrial and avian wildlife (Cochran and Lord, J. Wildl. Manage.). Other benefits of VHF technology include:

- Detection distance (20 to 30 miles) is far greater than human observers (2 to 3 miles)
- No observer fatigue error
- Rapid deployment without the need to develop and prove new technology

How it Works

A detection event occurs when a VHF-tagged condor enters the monitoring area. Each tag emits a unique radio frequency that is picked up by the ReCON receiver. A standard ReCON scans all possible VHF-tag frequencies every 2 minutes, providing the opportunity for all tagged condors to be detected if they come within range of a facility.



California condor species occurrence

For over 40 years, Normandeau has earned a reputation for excellence in understanding and solving complex natural resource and permitting issues within the energy industry. We have been developing scientific tools to meet the demand for new, cost-effective ways to identify and address wildlife issues. This is evidenced by our innovative technology systems and services:

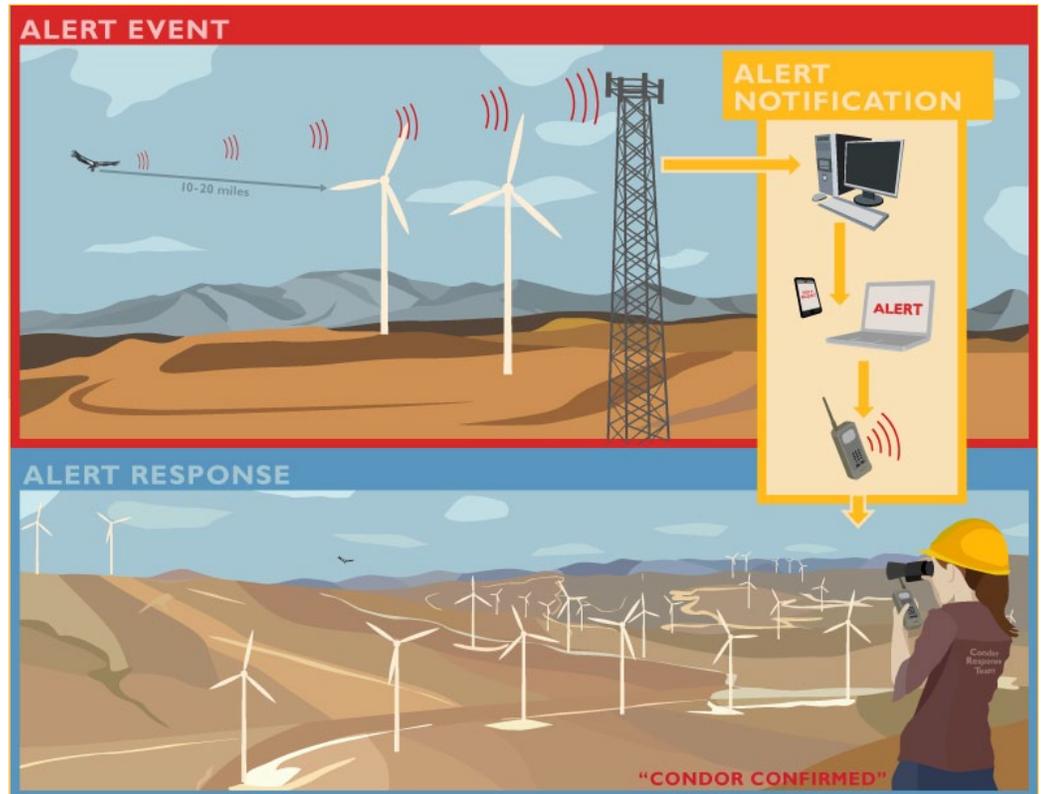
- Acoustic Thermographic Offshore Monitoring (ATOM™) system for wildlife surveys
- Remote Bat Acoustic Technology (ReBAT™) system for data collection and monitoring
- Turb’N Tag® technology for fish survival studies
- Remote Condor Observation Network (ReCON™) early detection system
- Aerial High Resolution Imaging team with APEM Ltd. of Manchester, England

Normandeau Associates, Inc. is one of the largest science-based environmental consulting firms in the United States serving both the private and public sectors. Founded in 1970, it is a trusted leader in delivering sound, innovative scientific solutions to a global clientele. Normandeau’s team of experienced field scientists, analysts, researchers, and permitting specialists delivers technically credible information to help achieve project goals, meet regulatory requirements, and promote sustainable economic development while protecting and restoring natural resources. Headquartered in Bedford, New Hampshire Normandeau has offices nationwide.

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When ReCON detects a condor, the frequency is transmitted to a computer that sends out an alert with the tag number, date, time, antenna(s) that received the signal, and the signal strength for each antenna. Signal strength is a rough indicator of proximity (i.e., stronger signal = closer), which provides some guidance on the location of the detected condor. All of this occurs within a few seconds of the detection.

The ReCON alert notifies the energy facility’s operations center and any other designated parties. The response taken by the energy facility can vary, but options include deploying a field team to visually locate the condor and assess the level of risk or implementing a preset automated response to reduce the risk. As long as condor is within the range, ReCON will reissue alerts every 2 minutes.



System Reliability

Normandeau designed the ReCON system using a platform of readily available and proven technology. We also built reliability into the ReCON system including:

- System health and function are verified every 15 minutes.
- A notification alert is issued if system health is not verified or is malfunctioning.
- If an individual receiver fails, its frequency table can be temporarily moved to the other receivers.

Customizable Options

ReCON can be customized to fit your needs. Current options include:

- Alerting methods include visual, radio transmission, and email. You can choose any one or a combination of the three.
- The number of systems deployed depends on terrain, energy facility configuration, and desired response time window, among other factors.
- Power and communication options include hardwired systems that use power from the grid and wired email communication or remote systems that use a solar power supply and wireless modem communication.
- System backup options include generators for power outages and installation of redundant ReCON and communication systems in case the primary systems fail.

Visit www.condortracking.com for more information.