THE AVIAN KNOWLEDGE NETWORK: A PATHWAY FOR AVIAN-SOLAR DATA MANAGEMENT AND SHARING

In 2016, the Multiagency Avian-Solar Collaborative Working Group (CWG)[1] released an Avian-Solar Science Coordination Plan (Plan) that established a framework for avian-solar research activities by identifying a collective set of information needs and establishing research priorities. Among the priorities identified by the CWG and stakeholders were measures to promote transparency and availability in avian-solar data collection and assessment. The CWG discussed a number of data sharing mechanisms, including the development and maintenance of a stand-alone avian-solar database or leveraging an existing database that could support avian-solar monitoring and mortality data. The CWG identified the Avian Knowledge Network (AKN) as one existing platform that could be leveraged to meet the CWG's data sharing priorities.

The AKN is a non-profit partnership facilitated by Point Blue Conservation Science that supports the conservation of birds and their habitat based on data, adaptive management, and best available science. Through the AKN, partners (including members of state and federal agencies, nongovernmental organizations, industry, and others) can improve the awareness of, access to, and use of data and tools at multiple spatial and temporal scales.


Utility-scale power tower solar facility (left) and photovoltaic solar facility (right). Photo credit: R. Sullivan, Argonne National Laboratory.

There are four main data components of the AKN that can facilitate the evaluation of and access to various types of avian data (**Figure 1**):
   (1) **Data Collection and Capture** – Partners provide data to the AKN through bulk uploading capabilities.
   (2) **Data Maintenance** – The AKN maintains a data organization and sharing infrastructure.
   (3) **Data Analysis** – The AKN has developed off-the-shelf tools to quickly evaluate avian data (e.g., histograms, charts, etc.).
   (4) **Data Sharing** – The AKN provides services and/or portals for data access (both public and restricted access permissions). Examples include the California Avian Data Center, ECOS iPaC integration, and the National Node.

The types of data currently supported by the AKN are primarily observational data of species occurrence from avian point counts and checklists, area searches, or linear transects. Data on vegetation and habitat are also commonly included. Discussions between the CWG and AKN developers have focused on ways to integrate avian mortality data commonly collected during solar project-specific systematic avian monitoring, and have identified mechanisms to integrate these solar-specific data into the AKN's existing data framework. The AKN currently uses "nodes" or projects to manage data for specific regions or purposes. One recent example data node is the National Node (**Figure 2**), which was developed with the purpose of improving avian data sharing and decision support among federal agencies. Federal agencies such as the Bureau of Land Management, Bureau of Ocean Energy Management, National Park Service, and the Fish and Wildlife Service have provided funding to extend the AKN's existing infrastructure to develop the National Node system in order to help federal agencies and their constituents achieve their conservation and compliance goals.

Figure 1. The four data framework components of the Avian Knowledge Network. (1) Data Collection / Upload - The AKN provides a means for the collection of avian observational data through various uploading options. (2) Data Management - The AKN maintains a data organization and sharing infrastructure. (3) Data Analysis - The AKN hosts tools to quickly evaluate data. (4) Data Sharing – the AKN provides services/portals for data access.
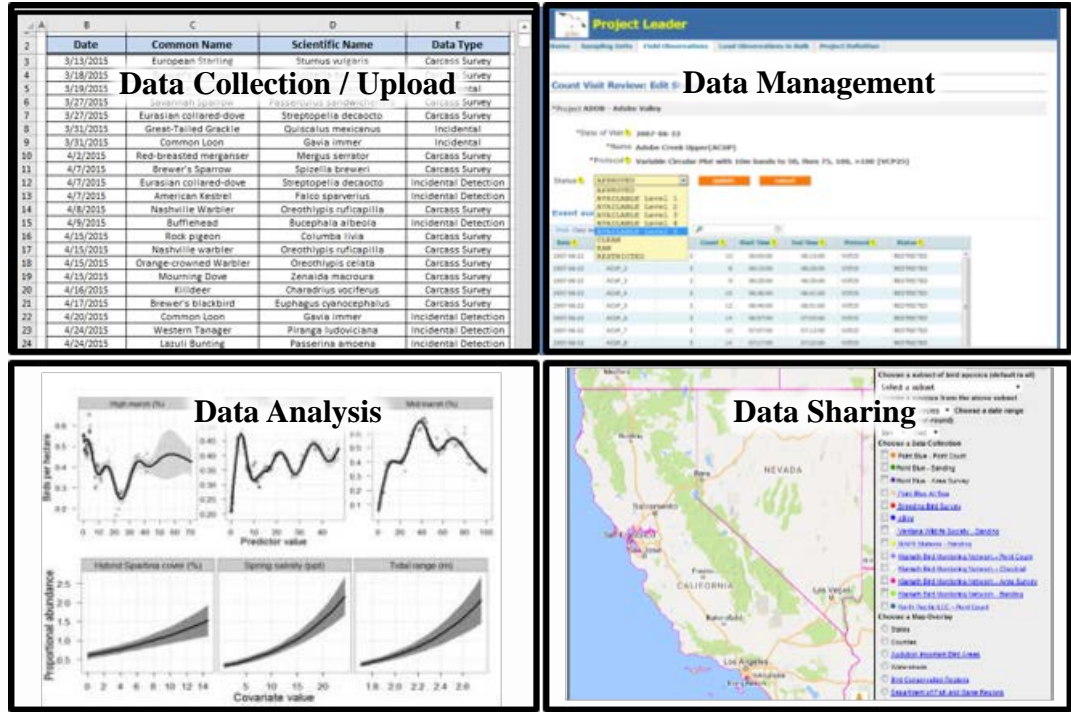
Figure 2. The National Node of the Avian Knowledge Network (https://data.pointblue.org/partners/natnode/).

The sharing and management of solar-related avian data can be facilitated through the AKN, either through the National Node or within a separate "avian-solar node". This structure should allow for the integration of solar-specific avian observation and mortality data. The node can be developed such that various partners can provide and access the data. The AKN's data management structure can provide a secure method for data transparency and sharing, and the embedded AKN tools can assist researchers in addressing impacts of solar development on avian populations, comparing and contextualizing impacts with other sources of mortality, evaluating where important migration flyways may intersect with existing or planned solar energy development, and developing avoidance, minimization, and mitigation measures.

[1] For more information about the CWG, including the Avian-Solar Science Coordination Plan, see the CWG webpage: http://blmsolar.anl.gov/program/avian-solar/.