History of the Landbird Monitoring Network of the Americas

The Landbird Monitoring Network of the Americas (LaMNA) was a joint effort of individuals, organizations, and government agencies in the Western Hemisphere. The overall goal was to collect, archive, and make available the data and results of monitoring efforts from stations across the Americas. LaMNA stems from a meeting of the Migration Monitoring Council, a joint United States and Canada endeavor that set standards and objectives for migration monitoring in 1991. LaMNA was intended to be a complement to the Canadian Migration Monitoring Network and was formed under the auspices of the Monitoring and Inventory Working Group of Partners in Flight/Compañeros en Vuelo/Partenaires d'Envol.

The resulting Network was a program aimed at expanding knowledge of the status of landbirds by monitoring their populations with a network of interacting, constant-effort monitoring stations, notably for changes in population numbers and composition, migratory routes and stopover habitats.

The Network intended to address the understanding of bird population dynamics at continent-wide scales, an important gap in the present knowledge of migratory and resident birds. To do so, LaMNA promoted cooperation and collaboration throughout the Americas. It was designed to address basic questions of resident and migratory birds regarding life histories, migration patterns, species composition, population size, habitat relationships, trends, and ecology. Its formation recognized the urgent need for coordination among cooperating stations and, in particular, created a mechanism for central coordination to provide support, data management and sharing, archiving, and analysis.

We developed methods for archiving and exploring banding data, working alongside the Avian Knowledge Network, who pioneered data archiving for landbird census data. We facilitated communication between members with newsletters and meetings. Though the main intent of the Network was to increase our understanding of bird populations throughout the Western Hemisphere, we welcomed participation by all stations. LaMNA would not have been possible without the efforts of numerous cooperators and members, listed in the January 2017 "Listing of LaMNA Members with Data Summary".

More Than a Decade of Archiving and Making Data Available Online

LaMNA began receiving, archiving, and processing data to online databases in early 2005. Our earliest data contributors included Dr. Patrick Gould, Vermont Institute of Natural Science (now Vermont Center for Ecostudies), and Powdermill Avian Research Center, in addition to our core collaborators at Redwood Sciences Laboratory, Klamath Bird Observatory, and Costa Rica Bird Observatories. Our earliest data are 1918 checklist data from the Western Great Lakes Bird and Bat Observatory.

More than 10 years later, we have now archived almost eight million records from 10 countries and more than 100 contributors, over half of which are online or being processed to online databases. This includes over two million banding records and nearly five million census records. We have several kinds of bird-related data archived, including banding records, various census protocols, spot mapping, insect sampling, and vegetation at study plots, and others. In addition to the data, which have been submitted in hard and/or electronic formats, we archived metadata for each dataset received, including data collection protocols and geolocations. A full table of our archiving and processing progress is available at http://www.avianknowledgenorthwest.net/data/banding-data-archive/50-archive-services-view-and-request-banding-data.

The Power of a Network: Partnerships that Made a Difference

Networks bring together many partners and often the sum is greater than the parts. This has been the case for the Landbird Monitoring Network of the Americas, which has facilitated several wide-scale research and data archiving projects with the participation of its members and outside partners. Here, we would like to highlight some of the unique projects that show the effectiveness of large-scale partnerships.

California Avian Data Center and Point Blue Conservation Sciences

Our partnership with Point Blue Conservation Sciences has been integral to the data processing and archiving we have done over the past decade. From the inception of LaMNA, scientists from Point Blue (then PRBO Conservation Sciences) joined with scientists from Bird Studies Canada, Cornell Laboratory of Ornithology, Klamath Bird Observatory, and Redwood Sciences Laboratory to develop data schema and processing tools for integrating banding and census data from many cooperators into standardized, online databases. The Californian Avian Data Center (CADC, http://data.prbo.org/cadc2/), hosted by Point Blue, is one of several repositories for those now-integrated data sets, forming one of several "nodes" of the Avian Knowledge Network (http://www.avianknowledge.net/). CADC offers a variety of tools for visualizing data from

California and beyond, as well as tools for data owners to enter, edit, summarize, and analyze their data. CADC's multi-map tool (http://data.prbo.org/cadc2/index.php?page=137) allows users to select sampling stations and view data summaries and has served as a data portal for several network projects.

Avian Influenza and Migratory Connectivity

Together with University of California Los Angeles's (UCLA) Center for Tropical Research, Institute for Bird Populations, Klamath Bird Observatory, USFS Redwood Sciences Laboratory and others, we facilitated Avian Influenza (AI) sample collection from wild bird populations during banding operations using cloacal swabs from 2006-2009. The study was precipitated by an outbreak of AI in human populations in 2005. At the time, poultry and waterfowl were considered the primary reservoirs for the virus, but there were several lines of evidence that migratory passerines were also a reservoir. A total of 60 LaMNA members collected about 12,000 swab samples between spring 2006 and summer 2009 along with banders from other networks. Research results were summarized in Fuller et al.'s 2010 paper "Mapping the risk of avian influenza in wild birds in the US". They found that passerines are an important host of the influenza virus in the United States, suggesting that passerines should continue to be monitored as a potential transmission vector to humans. They also noted several hot spots for influenza, including the Plains states and the Pacific Northwest.

While collecting data for the AI study, members also collected 8,000 feathers for UCLA's Migratory Connectivity project. This long-term study at UCLA uses the DNA from the feathers to identify breeding and wintering locations of the individual bird using molecular genetic techniques, along with other data. This allows researchers to identify discrete populations of individual species, which in turn informs the research and management plans of biologists and managers.

North Pacific Landscape Conservation Cooperative

Point Blue Conservation Sciences, American Bird Conservancy and Klamath Bird Observatory joined to gather bird datasets from western Washington, Oregon, and northwestern California in order to create an online conservation tool for managers. Data were used to model current distribution and abundance of 26 species and, from those, model future distributions and abundance based on changing future climate scenarios. Funded by the North Pacific Landscape Conservation Cooperative, the Pacific Northwest Climate Change Avian Vulnerability Tool is now available online in the form of maps and downloadable zip files through the Avian Knowledge Northwest website at http://www.avianknowledgenorthwest.net/interactive-maps/1-nplcc-bird-distribution-model. LaMNA joined this effort by providing data processing tools and data archiving technology.

Western Hummingbird Partnership

In 2012, LaMNA, Point Blue Conservation Sciences, and the Avian Knowledge Network partnered with the Western Hummingbird Partnership to compile existing hummingbird data from Canada, United States and Mexico and make them available to the Partnership for conservation efforts. Over 50,000 census and banding records were compiled from 1951–2012. Data were collected

using various protocols: area search, checklist, point count, bird banding, Breeding Bird Atlas, Daily Estimated Totals, Great Backyard Bird Count, and Project FeederWatch. These data were from already-processed data in the Avian Knowledge Network and new data gathered from contributors across the Americas through outreach efforts.

Formation of the Network: The Migration Monitoring Network, LaMMNA, and LaMNA
The Migration Monitoring Council, a joint United States and Canada endeavor, met in 1991 to set standards and objectives for migration monitoring. In 1998, they solicited information from stations in North and Latin America that were actively monitoring bird migration by the use of capture and release, census, and other methods at intensive field sites. The resulting listing became the Migration Monitoring Network, and was the foundation of the current network of stations.

During 2005, the Klamath Bird Observatory and the U.S. Forest Service's Redwood Sciences Laboratory, with support from the Bureau of Land Management's Migratory Bird Program and Cornell University's Laboratory of Ornithology, PRBO Conservation Science, and many other individuals and organizations worked together to formalize the Network as the Landbird Migration Monitoring Network of the Americas (LaMMNA).

In May of 2007, we opted to remove the word “Migration” from the name, becoming the Landbird Monitoring Network of the Americas (LaMNA) because our efforts are not solely restricted to migratory birds. This was done with due acknowledgement that migration monitoring remains an important objective of LaMNA and an all-important link for conservation efforts across the Americas.

In the spring of 2016, LaMNA was placed in hiatus due to loss of funding for operation. Data are still available in online visualizations through data nodes, and may be available for analyses by contacting the data owner.