



## Adding Value to Data: The Use of Visualization Tools

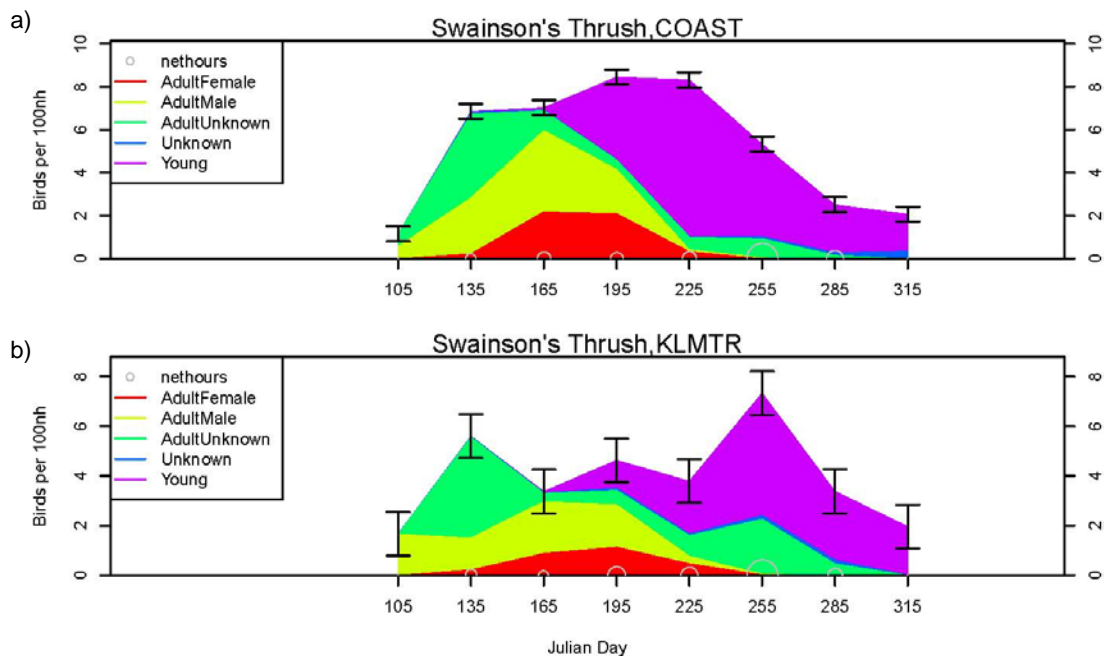
Visualization tools create maps, tables, and graphs, and are used to make analyses of data accessible to a wider audience. Because data are compiled through the LaMNA process into a specific format, programs creating visualization tools can easily be produced and used on any spatial, time, or taxonomic subset of data. The latest tool created by the Klamath Bird Observatory-Redwood Sciences Laboratory Avian Data Center (ADC) is called Summary Plots and Analyses Tables (SPLATS), funded by a grant from Pacific Coast Joint Venture. The SPLATS visualization tool was created using the R open source software environment for statistical computing and graphics (<http://www.r-project.org/>).

The tool contains two main functionalities: data exploration and output of graphics. The data exploration functionality creates a series of cross-tabulations between specific variables, which helps the analyst to assess data quality and explore the file contents. For example, before a species can be analyzed, an analyst might decide to explore what

age and sex classes are present in the database and how to categorize them for a demographic analysis. The second functionality is the display of metrics in a graphic format which displays the requested information in an intuitive way. Specifically, it calculates for a species at one or more stations (grouped into "regions") within a time interval you specify (e.g., 7-, 10-, 15-, or 30-day intervals) various physiological and life history metrics, such as age ratio, sex ratio, average percent of skull ossified in young, mean fat scores, and others. A small sample of these graphics is shown below. Additional visualization tools are available on the California Avian Data Center (<http://data.prbo.org/cadc2/>) and Avian Knowledge Network (<http://www.avianknowledge.net/content/>) websites.

### Swainson's Thrush Example

Here we demonstrate what the SPLATS visualization tool can do using a species subset of the data – in this case Swainson's Thrushes in northwestern



**Figure 1.** Average composition of the Swainson's Thrush population within each common age and sex class, by 30-day periods in number of birds per 100 net-hours, at (a) 5 coastal and (b) 8 inland stations in northwestern California. The number of net-hours for each 30-day interval is shown by the relative size of the half-circles at the bottom of each graph.

California. Here, we show a comparison of data between two regions: coastal (Fig. 1a) and inland (Fig. 1b, along the Klamath and Trinity rivers) stations. These figures show the average number of birds captured per 100 net-hours of each age-sex class: Adult Female and Adult Male (of all adults, those that had active brood patches or cloacal protuberances); Adult Unknown (of all adults, those whose sex was unknown, largely migrants); Unknown (of all birds captured, those of unknown age); and Young (of all birds, those that were young).

One can see marked differences in the life history traits between coastal and inland stations over even this small geographic area. For example, locally-produced young on the coast in August (Julian days centered on 225) were quite abundant, whereas

at the inland stations, less than 100 kilometers away, many fewer locally-produced young were present.

These tools are being refined and adapted to other types of data such as area searches. The tool was created by C. J. Ralph with the help of Peter Ralph, Ana Paula Bertoldi Carneiro, and Brent Campos. A more detailed report on the SPLATS visualization tool can be found on the LaMNA website at [http://www.klamathbird.org/lamna/data\\_tools.htm](http://www.klamathbird.org/lamna/data_tools.htm).

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### **LaMNA Gets Recognition for its Contributions Towards “Establishment of a Network of Bird Monitoring in Costa Rica”**

In Kansas City, Missouri, LaMNA received recognition at the 76th North American Wildlife and Natural Resources Conference, held March 14-19, 2011. The award was crystal trophies and engraved certificates, and were accepted in person by Dr. Carlos Hernández, the Director General of Instituto Nacional de Biodiversidad (INBio), host of the Costa Rica Bird Observatories, as well as John Alexander from the Klamath Bird Observatory, and Carol Lively and C.J. Ralph from the US Forest Service.

The Network began in 1994 at Tortuguero and has expanded in the past decade, markedly so in the past two years, to include stations throughout the country, many of them operating with the direct efforts of the Costa Rica Bird Observatories with implementation by LaMNA.

The Observatories were recognized for playing the major role in establishing the “Red de Anilladores de Aves de Costa Rica” (Network of Bird Banders of Costa Rica), the first of its kind in Latin America. The resulting network has been a model for networks in other Latin American countries and facilitates cooperative research projects such as data sharing through LaMNA. It is an integral part of the Western Hemisphere Bird Banding Network (Red de Anillamiento de Aves del Hemisferio Occidental (RAAHO), and serves a coordinating role for this hemispheric network.

We also established and staffed a full-time director of the Costa Rica Bird Observatories and its monitoring stations with funds from USFS International Programs, as well as private foundations and individuals, both in Costa Rica and elsewhere. The bird monitoring station they began in Tortuguero in

1994 is one of several stations now under the umbrella of the newly-formed Observatories. This continues more than 15 years of monitoring and annually training dozens of Latin American biologists at several stations and habitats on the Caribbean Coast, San José, and the Highlands.

Our results are being used by bird researchers, land managers, and decision makers in Costa Rica and throughout the Americas for understanding resident and migratory species. Several publications appear annually in the literature, both in Latin America and elsewhere, using the data generated by the Network and the Costa Rica Bird Observatories. Over 3000 annual visitors interact with the bird monitoring process and educational bird-related activities at our bird observatories. This will continue to lead to a greater understanding of the biology of little-studied resident species of Costa Rica. It has allowed us to investigate effects of climate change on wintering migrants. The tool we developed for the Costa Rican network for tracking bird bands is being used by other developing bander networks, such as in Peru and Brazil.

Recipients of the award included: Pablo Elizondo (Executive Director of CRBO); John Alexander (Klamath Bird Observatory); Carol Lively (USFS International Program); Roxana Silman, Emma Harrison, and David Godfrey (Sea Turtle Conservancy -- formerly Caribbean Conservation Corporation); Dr. Rodrigo Gamez (President, INBio, Instituto Nacional de Biodiversidad); Eladio Elizondo (Finca Madre Selva, the Elizondo family); C.J. Ralph (USFS);  
*(continued at “Award” on page 6)*



## Bird Banding Workshop Held in Madre de Dios, Peru

Peru's avian diversity is mesmerizing –1800 bird species, approximately 20% of the Earth's total, reside within the political boundaries of this South American nation. Visitors commonly encounter Andean Condors soaring past mountain peaks one day and Hoatzin foraging loudly near Amazonian oxbow lakes the next. Peruvians have long-recognized their unique role as stewards of an incredible bird assemblage and recently Centro de Ornitología y Biodiversidad (CORBIDI, <http://www.corbidi.org/>), a Peruvian non-profit, instituted a nation-wide bird monitoring schema in order to further avian conservation efforts. CORBIDI in association with LaMNA, held the second annual Peruvian bird banding workshop in June 2010. Aspiring bird banders from Latin America, Europe, Canada and the United States traveled to Madre de Dios, in the Amazon Basin, for the one week banding workshop in order to learn the techniques necessary to safely and accurately monitor bird populations.

The workshop covered basic and advanced methodologies: station set-up, station management, extraction, processing, bird first-aid, sexing and ageing techniques. Participants were fortunate to capture highly specialized insectivores like the Brown-billed Scythebill (*Campylorhynchus pusillus*), and charismatic frugivores, like the Band-tailed Manakin (*Pipra fasciicauda*, pictured). The workshop also provided participants a venue to exchange ideas and



Band-tailed Manakin (*Pipra fasciicauda*)

lay groundwork for future collaboration. LaMNA will continue to provide the increasing number of emerging bird monitoring schemas, like the new Peruvian initiative, with simple and powerful tools to ensure banding data is properly archived and available to the scientific community. Quality training coupled with powerful data management capabilities will ensure the success of Peru's next generation of bird monitoring and conservation advocates.

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## Network of Costa Rican Banders Plan Projects

In March of 2011, the Costa Rica Bird banding network held its second meeting. Through presentations and discussions, researchers and biologists were able to deeply discuss and agree on subjects relevant to bird conservation, banding, and censusing.



Meeting participants

The meeting was celebrated at INBioparque in Santo Domingo de Heredia at the headquarters of the National Institute of Biodiversity (INBio). INBio has provided office and administrative support for the network and has been its host over the past two years.

Eighteen participants from many different projects attended, representing most of the banding efforts in the country. These representatives included biologists from organizations like the Instituto Nacional de Biodiversidad (INBio), Ministerio de Ambiente, Energía y Telecomunicaciones (MINAET), Universidad Nacional (UNA), Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Asociación Ornitológica de Costa Rica, Unión de Ornítólogos de Costa Rica, Costa Rica Bird

Observatories, University of Utah, Klamath Bird Observatory, US Forest Service as well as independent cooperators. Each had an opportunity to share their experiences and vision about the future of bird monitoring in Costa Rica.

A very important achievement for this year's meeting was the active participation of the government representatives from MINAET who have ensured their commitment towards officializing and integrating the network with the conservation policies and existing regulations. They are the agency which issues banding and other research permits for the country.

The Costa Rica Bird Banding network promotes safe, coordinated and ethical procedures for bird monitoring. Currently the network distributes free bands for projects in Costa Rica and is fully integrated with LaMNA.

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## **Aquatic Site Descriptions: A New Resource for Biologists, Land Managers, and Bird Lovers**

Klamath Bird Observatory (KBO) is excited to announce the completion of site descriptions for important aquatic bird areas throughout Oregon and northwestern California. The descriptions were completed through the Oregon Coordinated Aquatic Bird Monitoring Program (OCABMP), led by the Klamath Bird Observatory and supported by a network of partners. This program seeks to provide more information for aquatic ecosystem and bird conservation in Oregon.

The first stage of the program included completion of site descriptions for important aquatic bird areas, which are available online at [www.klamathbird.org/science/aquaticbirds.html](http://www.klamathbird.org/science/aquaticbirds.html). They include information such as seasonal bird presence, water levels, conservation issues, existing monitoring programs, land ownership, contact information, and maps. They also identify knowledge gaps where future work is needed.

The 81 site descriptions were created by KBO staff and experts who volunteered to complete descriptions for their local area. Thirty-six of the descriptions were completed for sites in eastern Oregon, 39 for western Oregon, and 6 along the northern California coast. With help from partners, these site descriptions will continue to provide up-to-date information to land managers, scientists, and bird



American White Pelicans (*Pelecanus erythrorhynchos*)

enthusiasts.

This project was part of a west-wide effort initiated by the Intermountain West Coordinated Bird Monitoring Program and made possible through Oregon Department of Fish & Wildlife State Wildlife Grants, Charlotte Martin Foundation, Pacific Coast Joint Venture, and the US Fish & Wildlife Service. KBO would also like to thank the Audubon Society of Portland and all of the volunteers who generously contributed time writing site descriptions.

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## Informing Conservation in the Context of Climate Change: Birds as a Tool for Adaptation (Partners in Flight Workshop)

A joint meeting of the Oregon/Washington and California Partners in Flight (PIF) chapters was held to promote information sharing, discuss the application of existing knowledge to inform ecological planning, and identify information gaps, monitoring needs, and priorities for future PIF conservation planning in Oregon, Washington, and California in the context of climate change. Held in Ashland, Oregon on October 19-20, 2010 this workshop was structured into three themed sessions.

First, *Our Current State of Knowledge* began with an overview of climate change science, with a west-coast perspective, followed by several examples of recent studies looking specifically at birds and climate change. The second session, *Tools and Applications*, focused on PIF conservation planning tools that are currently being designed to advance bird conservation within climate change planning. During the third session, *Management Recommendations for Dealing with Climate Change: What can we do?*, we discussed the use of birds to address current land management planning challenges. During this session, bird monitoring and conservation planning needs were identified.

At the workshop it became apparent that, through twenty years of PIF conservation planning, we have developed a message and set of tools that are relevant in the context of climate change. While on-point, it is important that the PIF conservation planning strategy progress and adapt to effectively meet conservation challenges that are becoming even more urgent in the face of climate change. The PIF conservation plans themselves continue to serve as a tool for integrating bird conservation into land management planning, serving as a platform to identify conservation opportunities. Continued bird monitoring efforts will augment data in ongoing data efforts such as LaMNA and the Avian Knowledge Network.

*State of the Birds 2010* demonstrated that the plans remain timely; the report showed that birds of conservation concern are among the most vulnerable and that conservation needs (stressors) are exacerbated by climate change. To receive a full workshop report contact the Klamath Bird Observatory at [KBO@KlamathBird.org](mailto:KBO@KlamathBird.org).

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### Featured Abstract: How Safe is Mist Netting? Evaluating the Risk of Injury and Mortality to Birds

1. The capture of birds using mist nets is a widely utilized technique for monitoring avian populations. While the method is assumed to be safe, very few studies have addressed how frequently injuries and mortalities occur and the associated risks have not been formally evaluated.

2. We quantified the rates of mortality and injury at 22 banding organizations in the United States and Canada and used capture data from five organizations to determine what kinds of incidents occur most frequently. Analyses focused on passerines and near-passerines, but other groups were included. We evaluated whether body mass, age, sex, mist net mesh size, month and time of day or frequency of capture are related to the risk or type of incident. We also compared the recapture histories over time



Banders at mist net removing birds. ©Lauren Tompkins

between birds that were injured and those that were never injured for 16 species.

3. The average rate of injury was 0.59%, while mortality was 0.23%. Birds captured frequently were less at risk to incident. Body mass was positively correlated with incident and larger birds were at greater risk to predation, leg injuries, broken legs, internal bleeding and cuts, while smaller birds were more prone to stress, tangling-related injuries and wing strain. Rates of incident varied among species, with some at greater risk than others. We found no evidence for increased mortality over time of injured birds compared with uninjured birds.

4. We provide the first comprehensive evaluation of the risks associated with mist netting. Our results indicate that (1) injury and mortality rates below one percent can be achieved during mist netting and (2)

injured birds are likely to survive in comparable numbers to uninjured birds after release. While overall risks are low, this study identified vulnerable species and traits that may increase a bird's susceptibility to incident that should be considered in banding protocols aimed at minimizing injury and mortality. Projects using mist nets should monitor their performance and compare their results to those of other organizations.

Full article available at:

<http://onlinelibrary.wiley.com/doi/10.1111/j.2041-210X.2011.00123.x/abstract>

**Erica N. Spotswood, Kari Roesch Goodman, Jay Carlisle, Renée L. Cormier, Diana L. Humple, Josée Rousseau, Susan L. Guers, and Gina G. Barton. 2011. Methods in Ecology and Evolution (In press).**



### **Award** (continued from page 2)

Judy Richardson (the San Vito Bird Club); Stephen Rumsey (the Wetland Trust, and Porzana Ltd.); Dr. Leo Salas (Point Reyes Bird Observatory – also known as PRBO Conservation Science); and Jared Wolfe (Louisiana State University).

For more information visit: [www.CostaRicaBird.org](http://www.CostaRicaBird.org).

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### **Upcoming meetings**

IXth Neotropical Ornithological Congress (NOC) and VIIIth Peruvian Ornithological Congress (COP), Cusco, Peru, 8-14 Nov 2011. For more information, please visit the congress web site: (<http://www.ixconperu2011.org>).

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**Interested in membership or learning more about LaMNA?** See our web page at <http://www.klamathbird.org/lamna/> for details and a membership application form.