



**Organization of Fish and Wildlife Information Managers**  
Annual Conference and Business Meeting  
October 27 - 30, 2008  
Albuquerque, New Mexico

*Using Innovative Technology to Move from  
Planning to Implementation*

**PROCEEDINGS**

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## Conference Overview

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Monday, Oct. 27	Morning/Afternoon Evening	Field Trips Welcome Social
Tuesday, Oct. 28	Morning/Afternoon Evening	Conference Sessions Hackers' Ball
Wednesday, Oct. 29	Morning Lunch Afternoon Evening	Conference Sessions Annual Business Meeting Conference Sessions Banquet
Thursday, Oct. 30	Morning	Conference Sessions

## Acknowledgments

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We would like to thank the Zia Pueblo of New Mexico for graciously allowing us to use their sun symbol on our conference t-shirt.

We would also like to thank the Albuquerque Grand Airport Hotel for their assistance and hospitality in hosting the conference.

Our field trip to Sevilleta National Wildlife Refuge would not have been possible without Mike Friggens, who developed the plan for the tour as well as helping with transportation and lunch.

Special thanks go to Inigo San Gil and the Long Term Ecological Research Network Office for helping to organize all sorts of on-site details that are so crucial for conference success. Thanks also to the rest of the 2008 Meeting Planning Committee (Robin Carlson, Jennifer Pollock, Julie Prior-Magee, Inigo San Gil, Sabra Schwartz, Keith Wethington, and Lila Wills) for helping to develop all aspects of the meeting.

We would like to thank Greg Wilke, the OFWIM Web Manager, for all of his work throughout the year keeping the OFWIM website up to date and functional.

Finally, a great thank you to everyone who has served on an OFWIM committee this year. Your hard work has been invaluable!

# Agenda

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## Monday, October 27

### Field Trips

- 8:00 – 4:00 Full day field trip: Sevilleta National Wildlife Refuge (meet in hotel lobby)  
12:30 – 4:00 Afternoon field trip: Sevilleta National Wildlife Refuge (meet in hotel lobby)  
6:00 – 8:00 **Welcome Social** (hors d'oeuvres will be served)  
8:00 – 9:00 Executive Committee Meeting

## Tuesday, October 28

### Opening Plenary Session

*Moderator: Sabra Schwartz*

- 8:30 – 8:40 President's Welcome – Sabra Schwartz  
8:40 – 8:50 Presentation of Student Scholarship Awards – Viv Hutchison  
8:50 – 9:10 Welcome to New Mexico – Bruce Thompson (Director, New Mexico Department of Game and Fish)  
9:10 – 9:40 Keynote Address – Bill Michener (Associate Director, Long Term Ecological Research Network Office)  
9:40 – 10:30 Networking With Your OFWIM Colleagues: Demonstration of the NBII Member Portal – Lisa Zolly  
10:30 – 10:50 **BREAK/RAFFLE**

### General Session: Responding to a Changing Landscape

*Moderator: Robin Carlson*

- 10:50 – 11:10 Black Bear and Florida Panther Habitat and the Effects of Climate Change – Andrew Whittle (OFWIM 2008 Student Scholarship Award Winner)  
11:10 – 11:30 Locating Potential Cougar (*Puma concolor*) Corridors in New Mexico Using a Least-Cost Path Corridor GIS Analysis – Kurt A. Menke  
11:30 – 1:00 **LUNCH** (on your own)  
1:00 – 1:10 **RAFFLE**  
1:10 – 1:30 Multi-scale Habitat Modeling: Delineating Mountain Goat Habitat in the Washington Cascades – Tana Beus (OFWIM 2008 Student Scholarship Award Winner)  
1:30 – 1:50 California's Vegetation Mapping Program – Tom Lupo  
1:50 – 2:10 iMapInvasives: A Web-based Solution for Invasive Species Mapping and Decisionmaking – Dean K. Jue

- 2:10 – 2:30      Becoming a Data Provider to the Global Invasive Species Information Network – Annie Simpson
- 2:30 – 2:50      **BREAK/RAFFLE**

**General Session: Emerging Technology for Data Collection and Management**

*Moderator: Keith Wethington*

- 2:50 – 3:10      A SchemaWalker Web Page Generator for the EML Metadata Editor – Raul Aguilar
- 3:10 – 3:30      The Database Management System (DMS) of the Missouri River Pallid Sturgeon Recovery Program (MRPSRP) – Yan Hong
- 3:30 – 3:50      Emerging Geospatial Technologies: Forward Looking Infrared Radiometry and Low Altitude Hyperspectral Remote Sensing – Keith Wethington
- 3:50 – 4:10      Animal-borne Video Systems: Recent Developments for Terrestrial Conservation Research – Joel Sartwell
- 4:10 – 4:30      Design and Implementation of Statewide Prairie Dog Surveys in Montana – Scott Story
- 4:30 – 5:10      **ROUNDTABLE DISCUSSION:** Data Collection Standards and Techniques Facilitators: Keith Wethington (Kentucky Department of Fish & Wildlife Resources) and Scott Anderson (North Carolina Wildlife Resources Commission).
- 6:00 – 8:30      **HACKERS’ BALL (Technical Demonstrations and Poster Session)**  
(hors d’oeuvres will be served)

**Wednesday, October 29**

**General Session: Innovative Online Multi-User Applications**

*Moderator: Mark Brunner*

- 8:30 – 8:50      EKey: Freshwater Fish Identification Made Easy – Bill Herrington
- 8:50 – 9:10      Indiana’s Fish Information System (FIS) – Jeff Dobson
- 9:10 – 9:30      Using ArcGIS Server and Google Maps to Quickly Deploy User-Friendly Fisheries Applications to the Public – Michael Bialousz
- 9:30 – 9:50      Customizing Data Delivery on the Web for Multiple User Types: California Fisheries Restoration Grant Program Data Queries – Robin Carlson
- 9:50 – 10:10      GIS Application for a Boating Access and Economic Study – Beth Stys
- 10:10 – 10:30      **BREAK/RAFFLE**
- 10:30 – 10:50      FWC Bald Eagle Nest Locator: Addressing Public Need Through Interactive Mapping Applications – Kristin Rogers
- 10:50 – 11:10      Web Innovations Adapted to Manage Wildlife Health Information: A Case Study with the NBII Wildlife Disease Information Node – Cris Marsh
- 11:10 – 11:30      Providing Access to Whirling Disease Data and Information through Mapping

- Application – Jennifer Pollock
- 11:30 – 11:50 NBII Bird Conservation Information Activities: Past, Present and Future – Elizabeth Martin
- 11:50 – 2:20 **LUNCH/BUSINESS MEETING**
- 2:20 – 2:50 OFWIM Vision Survey: Results and Discussion (Facilitator: Mark Brunner)

### General Session: Implementing State Wildlife Action Plans

*Moderator: Sabra Schwartz*

- 2:50 – 3:10 Grassland Vegetation Monitoring: A Minnesota Wildlife Action Plan Priority and a Multi-partner Adaptive Management Collaborative – Daren Carlson
- 3:10 – 3:30 Implementing Montana's Comprehensive Fish and Wildlife Conservation Strategy – Scott Story
- 3:30 – 3:50 Missouri's Quail Emphasis Area Geodatabase – Mark Brunner
- 3:50 – 4:10 **BREAK/RAFFLE**
- 4:10 – 4:30 Arizona's Areas of Conservation Priority as a First Step Toward Implementation of the State Wildlife Action Plan – Sabra Schwartz
- 4:30 – 4:50 Creating Awareness and Setting the Stage for Collaborative Implementation of the Comprehensive Wildlife Conservation Strategy for New Mexico – William Graves
- 4:40 – 5:10 General discussion about Wildlife Action Plans and opportunities for collaboration and partnership (Facilitator: Sabra Schwartz)
- 6:00 – 9:00 **BANQUET**  
 Speaker: Mike Friggens (GIS Analyst & Project Manager, Sevilleta Long Term Ecological Research Project)  
 Title: Reestablishment of Gunnison's Prairie Dogs to Sevilleta NWR: Conservation, Partnerships, and Ecological Research

## Thursday, October 30

### General Session: Wildlife Data: Can You Find It, Share It, and Trust It? A New Mexico Perspective

*Moderator: Janelle Harden*

- 8:30 – 8:50 SPECIEZnm.org: Information and Issues Concerning New Mexico Species – Janelle Harden and Anne Russell
- 8:50 – 9:40 **ROUNDTABLE DISCUSSION:** Wildlife Data: Can You Find It, Share It, and Trust It? A New Mexico Perspective  
 Facilitators: Janelle Harden (SPECIEZnm), Chuck Hayes (New Mexico Department of Game and Fish), and Kurt A. Menke (Bird's Eye View).

## **General Session: Data Management and Standards**

*Moderator: Scott Anderson*

- 9:40 – 10:00     The EcoTrends Web Portal on a Diet of PASTA – Mark Servilla
- 10:00 – 10:20     Making Data Available: The NBII Clearinghouse – Viv Hutchison
- 10:20 – 10:40     **BREAK/RAFFLE**
- 10:40 – 11:00     Increasing the Value of Genomics Data: From New Metadata Standards to Folksonomies – Inigo San Gil
- 11:00 – 11:20     General discussion about metadata and standards (Facilitator: Scott Anderson)
- 11:20 – 12:00     Where do we go from here? (Facilitator: Robin Carlson)
- 12:00             **ADJOURN/Close Meeting**

## **Paper Presentation Abstracts (in order of presentation)**

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*Tuesday, October 28, 2008*

### **Plenary Session: Welcome to New Mexico**

Bruce Thompson, PhD  
Director, New Mexico Department of Game and Fish  
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Dr. Thompson is Director of the New Mexico Department of Game and Fish headquartered in Santa Fe, a position he has held since April 2003. His education in wildlife ecology and sciences include a B.S. from the University of Wisconsin-Stevens Point, M.S. from Oregon State University, and Ph.D. from Texas A&M University. He has previously held natural resource management, administrative, and research positions with the New Mexico Cooperative Fish and Wildlife Research Unit, Texas Parks and Wildlife Department, Washington Department of Game, and the U.S. Marine Corps. Bruce has worked with a wide variety of wildlife and habitat research and management projects during the past 35 years. He has special interests in conservation communication processes and in developing and using large scale ecological data sets for conservation planning in the southwest. He played a long-standing role with Gap Analysis efforts in New Mexico during 1992-2003 and more recently with the Western Governor's Association Wildlife Corridors Initiative.

**Plenary Session: Keynote Address**

William K. Michener, PhD  
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Associate Director, LTER Network Office

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Dr. William Michener is a Research Professor in the Biology Department at the University of New Mexico and serves as Director of the New Mexico EPSCoR Program and Associate Director of the National Science Foundation's Long Term Ecological Research Network Office. He was PI for the Science Environment for Ecological Knowledge Technology Research Project which culminated in new metadata management software and scientific workflow solutions for the scientific community. He has authored four books related to ecological informatics and more than 70 journal articles and book chapters. He is a Certified Senior Ecologist and serves as Editor of Ecological Archives and Associate Editor of the International Journal of Ecological Informatics. His current research focuses on developing scientific data and information technologies for ecology and the environmental sciences.

## **Networking With Your OFWIM Colleagues: Demonstration of the NBII Member Portal**

Lisa Zolly

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In 2008, the OFWIM Executive Committee and the active standing committees began using the my.nbii.gov portal to collaborate, organize, and archive their respective activities. The portal has afforded OFWIM committees a secure environment in which to discuss, document, and develop activities that are internal to the organization, and thus not ready for, or appropriate to, the wider access provided by the public OFWIM Web site. The OFWIM portal community offers all members the opportunity to participate in committee activities, communicate with committee members, and pursue new opportunities for collaboration with other OFWIM members. See just how easy it is to use the OFWIM portal community, and find out how you can create new OFWIM community projects, in this tutorial session.

### **Biography**

Since 1999, Lisa Zolly has been the Knowledge Manager for the National Biological Information Infrastructure (NBII), a broad, collaborative program managed by the U.S. Geological Survey, whose mission is to provide increased access to data and information on the nation's biological resources. Her responsibilities include the development and oversight of content management standards and knowledge architectures for the Program; design and implementation of new tools and resources to integrate and manage biological content; and user-interface design.

Lisa has a BA and an MA in English from Virginia Tech, and an MS in Information Science from the University of Tennessee; she is currently completing an MS in Natural Resources Management and Policy from Virginia Tech.

## **Black Bear and Florida Panther Habitat and the Effects of Climate Change**

Andrew Whittle

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(OFWIM 2008 Student Scholarship Award Winner)

Florida is an especially timely example of the potential negative impacts of climate change on biodiversity. Forecasted effects of global warming on Florida include increased hurricane intensity, an estimated temperature increase of nearly 3°F by 2025, sea level rise of 0.5 m – 5m, and a 10% annual decrease in precipitation - all of which could have profound ecological effects on Florida's unique peninsular ecosystems and biota. We applied several prominent climate change models to the habitats of Florida black bear (*Ursus americanus floridanus*) and Florida panther (*Puma concolor coryi*), two wide-ranging carnivores that have experienced dramatic post-Columbian range reductions. We also studied road and urban avoidance by Florida panther and black bear. We created categorical data that provides avoidance, neutrality, and utilization distances of landscapes surrounding roads and urban centers. The results indicated that if sea-level rose and these animals were forced to disperse roads and urban centers will be major dispersal blocks. We found that black bear were more adept to moving along or through roads and urban centers, utilizing habitats 500 m from roads and 150 m from urban centers. While panthers utilize habitats further from roads and urban centers at least 3,000m. Cost surface analyses identified likely migration routes that would link south Florida bear and panther populations to suitable habitat to the north, while traversing through fragmented landscapes. Without rapid conservation actions that establish populations to the north, we predict that the Florida panther may go extinct in the wild due to climate change effects.

### **Biography**

Andrew J. Whittle is currently a graduate student at the University of Kentucky, Department of Forestry. His current research concentrates on climate change effects on large carnivore habitat in Florida, specifically Florida panther and black bear. His undergraduate work was also at the University of Kentucky and he received a B.S. in Natural Resource Conservation and Management and a minor in History. He has spent several summers working in the field as a technician for research projects. His experiences consist of a black bear hair snare project and black bear trapping in eastern Kentucky.

**Locating Potential Cougar (*Puma concolor*) Corridors in New Mexico Using a Least-Cost Path Corridor GIS Analysis**

Kurt A. Menke

Bird's Eye View

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While a wildlife movement barrier assessment and several regional wildlands network designs have been completed in New Mexico, scientifically rigorous, spatially explicit least-cost corridor analyses had not yet been performed to identify potential dispersal corridors for any wide ranging species. This study, funded by the New Mexico Department of Game and Fish (NMDGF) Share With Wildlife Program, utilized ArcGIS 9.2 and the Corridor Designer tools, developed by the School of Forestry at Northern Arizona University, to identify potential cougar dispersal corridors throughout New Mexico. The corridors were modeled based on a cougar habitat suitability model produced by Bird's Eye View in 2006. A total of 26 potential corridors were modeled. The corridors were then compared with cougar and other large carnivore roadkill records obtained from the New Mexico Department of Transportation (NMDOT) and the results of the 2003 Critical Mass Workshop. The NMDOT roadkill data showed carnivore roadkills had occurred within 13 of the 26 potential corridors. Of those 13 potential corridors, 9 showed carnivore roadkills occurring within the most optimum corridor swaths. The results were also visually compared with habitat data for other large and medium carnivores to look for preliminary indications of whether they might be utilized by other species.

**Biography**

Kurt Menke is a GIS Specialist who has been working in the field for over a decade. He founded Bird's Eye View to apply his expertise with GIS technology towards solving the world's mounting ecological and social problems. Kurt works with many environmental organizations such as, the Wildlands Project, WildEarth Guardians, and the Northern Jaguar Project. He also volunteers his time for many organizations. Kurt has served as President of the New Mexico Geographic Information Council and is on the Board of Trustees for the Grand Canyon Wildlands Council. He is one of the co-founders of the Tijeras Canyon Safe Passage Coalition and currently serves as Chairman. Kurt also teaches GIS and Cartography at UNM's Division of Continuing Education, and is a member of the Society for Conservation GIS.

**Multi-scale Habitat Modeling: Delineating Mountain Goat Habitat in the Washington Cascades**  
Tana Beus

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(OFWIM 2008 Student Scholarship Award Winner)

Historical declines in mountain goat populations in Washington State have spurred the need for understanding goat-habitat relationships for effective habitat management. GPS data from 42 collared mountain goats across the native ranges of Washington State were used to explore relationships between the use and availability of habitat. Our analysis represents one of the most extensive landscape-level habitat relationship studies conducted on mountain goats. Multi-scale path analysis methodology allowed us to test various ecologically informed relationships between landscape structure and pattern and the temporal movements of mountain goats at the home range scale. Our analysis compares available paths with random paths of matched identical spatial topology using GIS. We use matched case logistic regression to determine the spatially and temporally explicit scales that are the strongest predictors of seasonal mountain goat habitat. The methodology of this analysis is transferable and applicable to other resource selection studies. Additionally, the original use of path-level methodology in a case-control framework contributes to knowledge of statistical analysis of resource selection studies.

**Biography**

Tana Beus is currently a graduate student at Western Washington University's Huxley College. She is working towards completing a Master's of Science degree in Environmental Science, specializing in regional, global and terrestrial ecosystems. Prior to coming to Huxley, she has worked as a biological field technician since 1998, employed on a variety of projects including working as a contract biologist for New Mexico Department of Game and Fish monitoring Desert Bighorn Sheep in the San Andres Mountains of New Mexico. Her current work involves analyzing mountain goat habitat in the Washington Cascades.

## California's Vegetation Mapping Program

Tom Lupo

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State, Federal and local agencies recently reinforced the need for a statewide detailed high quality vegetation map as one of their top data needs. Development of such a data layer is a large financial investment but serves a vast array of government business needs and pay returns on that investment very quickly. This vegetation data is a powerful component in analyses such as, regional conservation planning; wildland fire/fuels modeling for improved preparedness; identifying potential rare and endangered species locations; predicting the spread of invasive species; early scoping for transportation projects to avoid rather than mitigate impacts; prioritizing land acquisitions for parks and ecological reserves; identifying important wildlife corridors; setting a baseline for monitoring impacts of global climate change; and other uses. The California Department of Fish and Game has already mapped approximately one-fifth of the State in fine-scale, attribute-rich fashion. The mapping process uses extensive field data collection to refine the vegetation classification system of several hundred vegetation types and to label two acre minimum mapping unit polygons delineated using recently acquired large scale aerial photography. For maximum utility the mapping is done border to border across all types of land ownership and land uses.

### **Biography**

Tom Lupo, has an M.A. in Geography from SF State University and has over 20 years of professional experience working with GIS software and organizations. Most of his career has been spent with the California Department of Fish and Game, where he is now Chief of the Biogeographic Data Branch ([www.dfg.ca.gov/biogeodata](http://www.dfg.ca.gov/biogeodata)) in Sacramento. The branch is responsible for producing data, maps, analysis and tools regarding species and vegetation mapping and other biological information important to California's conservation community. In addition to his day job at Fish and Game, he is also an adjunct faculty member in Geography at American River College in Sacramento.

**iMapInvasives: A Web-based Solution for Invasive Species Mapping and Decisionmaking**  
Dean K. Jue

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Exotic invasive species are the greatest threat to biodiversity on lands and water that are already protected for the general public. These species can be either plants, such as Japanese Climbing Fern, or animals, such as Zebra Mussels. Although there are a number of efforts to inventory and map certain types or classes of invasive exotics (e.g., aquatics, plants), there are few such efforts that fully encompass the breadth of the problem from a land manager's standpoint.

The iMapInvasives project is a multi-agency project that will address many of the invasive exotics data needs of land managers. Specifically, iMapInvasives encompasses all taxa. It utilizes online mapping, query, reporting, and data entry capabilities over the Internet. One of the important features of this application for a land manager is the ability to easily customize the receiving of early detection and approaching region reports for invasive species of the user's choice.

The initial partners in this endeavor were the NY Natural Heritage Program, the Florida Natural Heritage Program, and The Nature Conservancy Invasive Species Team. The group has since expanded to include the states of Arizona, New York and NatureServe.

**Biography**

Dean K. Jue has a background in biology, public policy, and computer science. He has worked in the geographic information systems field for over 20 years. He works for the Florida Resources and Environmental Analysis Center at Florida State University. During his time there, he was worked on projects from statewide data needs assessments to building nationwide public library data sets for web mapping applications.. More recently, he has returned to his biological routes. He is currently directing a three-year state wildlife grant from the Florida Fish and Wildlife Conservation Commission to inventory for rare and threatened butterfly species on Florida conservation lands. He is also one of the principal developers within FREAC of the iMapInvasives project that is developing a national web-based invasive species mapping and decision support application for public land managers.

## **Becoming a Data Provider to the Global Invasive Species Information Network**

Annie Simpson,<sup>1</sup> Catherine Jarnevich,<sup>2</sup> Jim Graham,<sup>3</sup> and Elizabeth Sellers<sup>1</sup>

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The sharing of invasive species information is vital to improve our understanding of biological invasions and our coordination of effective control efforts. The Global Invasive Species Information Network (GISIN) is a collaboration of like-minded invasive species information managers interested in sharing data globally, currently funded by the Group on Earth Observations (GEO), the National Biological Information Infrastructure (NBII), and the National Aeronautics and Space Administration (NASA).

To date, three kinds of information are being shared in the GISIN system: Occurrences, Species Status, and Species Resource URLs. If you have an online database with invasive species information, moderate programming expertise, and a desire to share your information with others, you too can become a GISIN data provider. And if you are seeking an online repository for your invasive species project information, the National Institute of Invasive Species Science (NISS) accepts data of all formats, allowing you to map your fields for batch uploads.

The GISIN system's list of data providers currently includes the Great Lakes Indian Fish & Wildlife Commission and NISS, among others. We are seeking additional early adopters of the GISIN system and hope you will join us.

- Non-technical online interface, email listserv, and information repository:  
<http://www.gisinetnetwork.org>
- Technical documents repository and GISIN information system: <http://www.niiss.org/gisin>
- National Institute for Invasive Species Science: <http://www.niiss.org>
- Wiki for standards development:  
<http://wiki.tdwg.org/twiki/bin/view/InvasiveSpecies/WebHome>
- Technical email listserv for data providers: <http://www.hear.org/hearlists/gisintech.htm>

### **Biography**

Annie Simpson (M.A. Entomology, M.S. Library & Information Science), came to the National Biological Information Infrastructure (NBII) in May 2000 after living in Costa Rica for 20 years, where she worked in natural history tourism and facilitated biological field research. Her bilingual abilities have been helpful in her role as the US lead in the Invasives Information Network (I3N) of the Inter-American Biodiversity Information Network, and as the chair of the Steering Committee of the Global Invasive Species Information Network. She also coordinates the invasive species efforts of the NBII's regional and thematic nodes or working groups. She has experience in Web development, project management, and tropical field ecology, and is also the lead for the Group on Earth Observations Biodiversity Task 07-02, to create a near-real-time invasive species monitoring system.

## **A SchemaWalker Web Page Generator for the EML Metadata Editor**

Raul Aguilar, Corinna Gries and Inigo San Gil

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The Central Arizona Phoenix spearheaded a new metadata management system to include the advantages offered by latest technologies. An online editor for documents in the Ecological Metadata Language (EML) is being developed. Based entirely on XML, this smart editor offers auto-complete features from known choice lists, thesaurus automatic lookup, automatic save of typing, validation of metadata, and many other advanced features that are already showing in popular web applications. The editor accesses the EML files in a native XML database storing changes as the user enters them. The XML database is already being used to search for relevant datasets, display lists of datasets and metadata in the CAP website, and display selected XML data content.

The input forms are written according to the XForms standard using the Orbeon open source framework. A schema walker was developed that generates the XForms code based on a XML schema. Any XML schema, including EML, can be used as template to generate a multi-page online data-entry editor. The editor features tight access control in a multi user environment, a 'publish' function which will make the metadata available for public search, and conversion of the metadata into other standards. The metadata files are stored and accessed by the editor in 'eXist' an Open Source native XML database featuring efficient, index-based XQuery processing, automatic structural indexing, full-text search, and tight integration with existing XML development tools.

The project is currently in the last stages of development.

### **Biography**

Raul is a Java web developer at the Global Institute of Sustainability at the Arizona State University. He graduated with a Bachelors in Electrical Engineering here from our University of New Mexico in 1987 as can be seen on a plaque posted that year as a 'Paul Aguilar'. Raul is versed in a number of programming languages from the old days of machine language of various processes in the early days of computers, assembly, Fortran, Pascal, Prolog, Basic, Visual Basic, 'C', C++, C#, ASP, PHP, XForms, Java for real-time embedded, application, and web frameworks as well SQL for relational databases and XPath for eXist. Despite all the languages Raul has coded to, the SchemaWalker work presented has come closest to auto-code generate web pages for domain-experts.

**The Database Management System (DMS) of the Missouri River Pallid Sturgeon Recovery Program (MRPSRP)**

Yan Hong

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Pallid sturgeon has been listed endangered since 1990. As a result, the comprehensive monitoring program on the Missouri River to assess survival, movement, distribution, habitat use, and physical characteristics of these habitat used by wild and stocked juvenile pallid sturgeon has been established. The database management system has been developed to provide a single centralized system for entry, storage, analysis and distribution of the data. All historical data has been compiled and imported to the system to ensure the data integrity and consistency. To meet the needs in the multi-user environment, a backend database has been created to host the data, and the front-end database applications implemented by VBA have been set up. A user-friendly interface has been designed and maintained through built in data validation routines to facilitate the data entry and improve QA/QC on data. The database management system was created in a relational data model which enabled us to provide rigorous query functionality to facilitate performing data analysis and completing the annual reports for the multiple contracting offices. SQL (Structured Query Language) was employed to conduct various queries for data verification and data summary and customized reports were generated.

**Biography**

Yan Hong is the Programmer/Database Manager with the Missouri Department of Conservation. She has Master degrees in Civil Engineering and Computer Science, both from the University of Missouri - Columbia. She has worked on the database management of Endangered Pallid Sturgeon Missouri River Recovery Program funded by U.S. Army Corps of Engineers since 2005. Her interest is in data analysis with SQL and SAS. She likes hiking and reading.

**Emerging Geospatial Technologies: Forward Looking Infrared Radiometry and Low Altitude Hyperspectral Remote Sensing**

Keith Wethington

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Emerging geospatial technologies are rapidly being deployed in the field of Fish & Wildlife Management. This presentation will share some experiences with two of these technologies: Forward Looking Infrared Radiometry (FLIR) and Low Altitude Hyperspectral remote sensing. FLIR In both cases private companies were contracted to gather and process data for the Department. FLIR data were used to identify deer and elk on surfaced mined lands while hyperspectral data were used for forest inventory of a wildlife management area. There are advantages but also disadvantages to using these technologies. Having specific contractual obligations is critical to achieve a satisfactory end product.

**Biography**

Program Coordinator for KY Fish & Wildlife Information System since 1998. Co-PI for KY-GAP, CO-PI-for Kentucky's State Wildlife Action Plan. BS Wildlife Biology Murray State University. MS Geography Oklahoma State University.

**Animal-borne Video Systems: Recent Developments for Terrestrial Conservation Research**  
Joel Sartwell

Missouri Department of Conservation  
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Knowledge of wild animal behavior and resource selection is most accurate when direct observations of animals are made. It is impractical, if not impossible, however, to directly and efficiently observe free-ranging animals for extended periods of time without affecting their behavior. To overcome these limitations, researchers have turned to directly mounting video cameras on the wild animals. Video cameras, commonly used in covert surveillance, are now small and rugged enough to withstand weeks of abuse while attached to a free-ranging wild animal without adverse affect on that animal. These animal-borne video systems allow researchers to record fine-scale movements as well as features of the surrounding environment and thus provide the context for how animals make decisions and how they interact with other individuals. I will discuss the developments and research potential offered by these video systems as well as a look at what we've recorded on white-tailed deer in Missouri.

**Biography**

Joel Sartwell is a systems analyst with the Missouri Department of Conservation. He received a B.S. in chemistry from the University of Missouri-Kansas City and his Ph.D. in physical chemistry from the University of Nebraska. His interests include scientific software development, user interfaces, simulation, and statistical wildlife biology. In addition to his work with animal-borne video cameras, his current projects include programming of hand-held computers using .Net for data entry and a cooperative project with Ducks Unlimited involving simulations of waterfowl habitat usage based on forage energy management.

## Design and Implementation of Statewide Prairie Dog Surveys in Montana

Scott Story

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Black-tailed prairie dogs (*Cynomys ludovicianus*) once thrived across the prairies of the United States. Black-tailed prairie dogs are now presumed extirpated, imperiled or vulnerable in many of the states within their historic range. The species has recently been petitioned for listing under the Endangered Species Act. Black-tailed prairie dog colonies have importance to a variety of other prairie species, including: ferruginous hawks (*Buteo regalis*), burrowing owls (*Athene cuicularia*), and the federally endangered black-footed ferret (*Mustela nigripes*). The Montana Prairie Dog Working Group (MTPDWG) was formed in 1996 to determine management goals for prairie dogs. One objective outlined by this group was to “develop statewide and regional prairie dog distribution and abundance standards.” Montana Fish, Wildlife and Parks is attempting to quantify the density of black-tailed prairie dog colonies in Montana based on methods utilized by the Colorado Division of Wildlife. Using Xplore Tablet PCs, Garmin Aviation GPS units, and a customized ArcObjects tool developed by Imap Solutions, LLC, Montana began collecting data on prairie dog colonies during the 2008 field season. Planning for the surveys included: optimizing aerial-transect allocation (effort) based on a fixed budget and existing information about prairie dog colony density, creating a stratified random sample using ArcGIS and R-GRTS, adapting the customized software for use in Montana, and planning of logistics with pilots and observers. During the 2008 field season near 57,000 km of transect will be flown. In this paper we present methodology, challenges we faced, and suggestions for future work.

### Biography

Scott is currently the Non-game Data Manager for Montana Fish, Wildlife, and Parks. He earned a B.S. in Wildlife Biology from Humboldt State University in 1999. His professional career has focused largely on fieldwork with birds in locations varying from Albuquerque, NM to Olympia, WA to the Frank-Church Wilderness in Idaho. Scott eventually settled in the central Rockies to work for the USFS Rocky Mountain Research Station in Boise, ID and this led to a masters degree program at Montana State University in Bozeman, MT. Scott received his M.S. in Biological Sciences in 2007. Scott’s current duties at FWP include maintenance of data that pertain to the non-game wildlife program, the Comprehensive Fish and Wildlife Management Strategy, and energy development and its potential effects on wildlife.

**Roundtable Discussion: Data Collection Standards and Techniques**

Facilitators: Keith Wethington and Scott Anderson

**Keith Wethington**

Program Coordinator for KY Fish & Wildlife Information System since 1998. Co-PI for KY-GAP, CO-PI-for Kentucky's State Wildlife Action Plan. BS Wildlife Biology Murray State University. MS Geography Oklahoma State University.

**Scott Anderson**

Scott is the Lead GIS Biologist at the North Carolina Wildlife Resources Commission. He has worked there since earning his MS in Wildlife Science from Oregon State University in 2004.

**EKey: Freshwater Fish Identification Made Easy**  
Bill Herrington

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One of the resources available through the NBII Mid-Atlantic Information Node is EKey, an electronic tool for identifying freshwater fishes. This application aims to serve the widest possible range of users in hopes of enhancing the enjoyment and understanding of our aquatic heritage.

Amateurs, students, and professionals should all be able to benefit from EKey. Through observation of teaching students in ichthyology laboratory courses, it has been shown that people approach freshwater fish identification in different ways. EKey offers several computer-assisted approaches to finding useful information about freshwater fishes of Virginia. Users can browse species by taxonomy, use a dichotomous key to identify a species, and conduct text-based searches that index species information.

Information available through EKey includes scientific and common names, physical descriptions, and life history information. Future enhancements will include the ability to conduct fish shape-based searches and upload a species image and find matches from the current database.

This presentation will demonstrate how to use some of EKey's features, and will also offer a brief overview of the technology upon which EKey is built.

**Biography**

Bill Herrington is a Web and database developer at the Conservation Management Institute (CMI) in Blacksburg, VA. Since joining CMI in February 2006, he has contributed to multiple projects including the BISON-M wildlife system for The New Mexico Department of Game and Fish, the EKey electronic dichotomous key website, and the WildlifeMapping application for the Virginia Department of Game and Inland Fisheries. Mr. Herrington holds a Bachelor of Arts degree in English and Philosophy from Virginia Tech, and is currently pursuing his Masters in Information Technology at Virginia Tech. His interests include watching basketball, playing videogames, and being amused by the cats he and his wife have adopted: Charlie, Chester, and Cali.

## **Indiana's Fish Information System (FIS)**

Jeff Dobson

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The mission of the Indiana Department of Natural Resources is to protect, enhance, preserve, and wisely use natural, cultural, and recreational resources for the benefit of Indiana's citizens through professional leadership, management, and education. This FIS application will enhance the agency staff access to information in real time from any location with Internet access. Additionally, FIS will enable the Fisheries Section to capture and retain data for analysis of water quality, habitat including vegetative coverage and fish community information in lakes, reservoirs, and streams. Other data including user information collected during creel surveys, and hatchery production and stocking records will also be supported by use of this web-based application. The overall application will enhance the usability and aid in the interpretation of collected data, speed data entry, and facilitate retrieval and analysis of information. Relative information about watersheds (land use and type), fish community, water quality and use, and aquatic vegetation distribution and abundance will enhance the utility of the application. Other information used in connection with all permit processes regulated by the Fisheries Section such as aquatic invasive species, aquaculture and private fish stockings, access sites, fish haulers and suppliers, will be easily accessible and can be related to ongoing management processes. Intentions are to reduce overall costs by using the automation of stored information in an SQL database in one location. By having the information stored in a database that will be accessed by remote sites, the Fisheries Section can view information that has been collected by other fish biologists. The database will facilitate analysis of data across administrative boundaries like management districts and eventually other agencies. This far outweighs the use of older technology and digging through the paper trail of historical records.

### **Biography**

Jeff Dobson is a Senior Programmer/Analyst at the Conservation Management Institute (CMI) in Blacksburg, VA. Since joining CMI in January 2006, he has contributed to multiple projects including the Bolivian Forestry Research Institute's forestry database, BISON-M wildlife system for the New Mexico Department of Game, Fish and the Wildlife Mapping application for the Virginia Department of Game and Inland Fisheries, the Shenandoah Fish Kill data analyzing application and Indiana's FIS application. After attending Virginia Tech, he decided to stay in Blacksburg where he currently resides with his wife and two boys. His interests include coaching baseball, playing softball, and photography.

## **Using ArcGIS Server and Google Maps to Quickly Deploy User-Friendly Fisheries Applications to the Public**

Michael Bialousz

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Recent advances in ESRI GIS technology have provided much simpler and quicker methods for deploying GIS data over the Internet. Using technologies, such as ArcGIS Server 9.3, GIS professionals can serve valuable data to the public in a wide variety of web application formats without directly developing much, if any, code. This presentation will highlight the new features of ArcGIS Server 9.3 with particular focus on the new ArcGIS Javascript API's that allow for presentation of GIS data and functionality with Google Maps, Microsoft Virtual Earth, and maps available via ArcGIS Online. Examples of how the Pennsylvania Fish and Boat Commission is utilizing the Google Maps API will be demonstrated, including the complete process of serving GIS data and functionality associated with Google Maps. Finally, an overview of the functionality that is capable of being served via the ArcGIS Javascript API will be covered. In particular, functionality that is valuable to fish and wildlife managers, such as access to fisheries data, habitat descriptions, sampling locations, and fish and boat access sites, will be discussed.

### **Biography**

Mr. Bialousz is the GIS Coordinator for the Pennsylvania Fish and Boat Commission and has over 13 years of experience in developing and implementing GIS systems, data, and applications. He is an ESRI Authorized Instructor for ArcGIS 9.X and has held positions in private consulting firms, as well as state and local governments. His current position has him involved in the development and deployment of data and applications related to fisheries, boating, and natural resources conservation issues throughout Pennsylvania. Originally from New York, Mr. Bialousz holds a Master's Degree in Geoenvironmental Studies from Shippensburg University, as well as undergraduate degrees in Geography and Forest Technology.

**Customizing Data Delivery on the Web for Multiple User Types: California Fisheries  
Restoration Grant Program Data Queries**

Robin Carlson and Stan Allen

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As the quantity of natural resource-related information made available via the web grows exponentially, it is of increasing importance to ensure that the tools to access those data are targeted to the appropriate audiences. The California Habitat Restoration Project Database (CHRPD), which currently supports two grant programs within the California Department of Fish and Game (CDFG), has been evolving to support the needs of several different groups of users on the web. This work has been carried out with critical support from the Information Technology Branch at CDFG.

The Fisheries Restoration Grant Program (FRGP), one of the grant programs supported by the CHRPD, has been customized to provide several levels of online data delivery.

1. Detailed data queries available to FRGP staff via an online custom interface that allows users to customize both the criteria to search (which may be multiple), as well as the fields they see in their results. Users may then move from their results to an online map viewer to see the project(s) location(s), or to a list of documents available online related to the project(s).
2. A more simplified map viewer is available to the public, showing past years' restoration project locations as well as fish passage barrier sites (from the California Passage Assessment Database, PAD). These data are intended to help both agencies and the public with proposing and prioritizing future projects.
3. Static maps are available to both FRGP staff and the public that provide immediate access to already formatted project location maps and attribute lists that can be pulled from the web for presentations or handouts. These maps are available at three different geographic scales.

**Biography**

Robin Carlson has worked for the Pacific States Marine Fisheries Commission (PSMFC) since 2000, first as a Data Analyst/Programmer and since 2003 as a Project Leader. During her tenure at PSMFC, she has worked primarily on the California Habitat Restoration Project Database (CHRPD). Her work also includes oversight for the California Passage Assessment Database (PAD). Robin received a BA in Molecular, Cellular and Developmental Biology from the University of California, Santa Cruz in 1997, and an MA in Evolutionary Biology from the University of Chicago in 2000. In OFWIM, Robin has served as Newsletter Editor in 2005/2006 and Secretary in 2006/2007, and is currently President-Elect. She has served on the Communications Committee, the Awards and Nominations Committee and the Meeting Planning Committee.

## **GIS Application for a Boating Access and Economic Study**

Beth Stys, Brian Beneke, and Yue Cui

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The Florida Fish and Wildlife Conservation Commission working in partnership with the Recreation Marine Research Center at Michigan State University have developed a unique way to incorporate GIS mapping applications into on-line surveys. The system was used to capture resource economic information on trip origins and destinations for a comprehensive study of recreational boating demand in Florida. Until very recently, the majority of data collection used traditional research methodologies, including mail surveys, random digit dial (RDD) and field intercepts. These methods of data collection are expensive, time consuming and often unproductive. For example, in order to secure economic information, respondents were asked to draw on a survey map their points of origin and destinations using a pencil (relatively inaccurate, time consuming and a burden to the respondent). The new survey system employs a sequence of image maps which enables survey respondents to visually identify trip origins, land based destinations, and in this case even off-shore trip destinations by 'clicking' on the appropriate area. Hyperlinks are used to connect the statewide map of Florida to the individual county maps. Similarly each county map is hyperlinked to a smaller county segment map. When any land or near shore water location on a county segment map is clicked, the coordinates of the pixel that is clicked on and the county segment map number are recorded into the database. In this way, geographic coordinates for points on the image maps are identified and recorded. The information will be used to understand trip origin and destination behaviors, calculate trip distances and travel time, and estimate the cost of travel.

### **Biography**

Beth Stys has worked for the Florida Fish and Wildlife Conservation Commission for over 16 years. She holds a BS in Wildlife and Fisheries Ecology from Texas A&M University and a MS in Wildlife Ecology from Mississippi State University. She is currently a research administrator with the Fish and Wildlife Research Institute within FWC. Her group's primary focus is habitat mapping and vertebrate modeling, involving remote sensing, spatial analysis and GIS data.

Brian Beneke is a GIS technician for the Florida Fish and Wildlife Conservation's Fish and Wildlife Research Institute. He has a BA in Geography & Resource Management from Georgia State University. During his three years with FWC Brian has worked on a variety of species habitat mapping projects, a lake vegetation mapping project, and the boating access study.

Yue Cui is currently a fourth year PhD student at Michigan State University majoring in tourism and recreation management. Her research focuses on spatial issues in recreation management and geo-marketing. Yue is from China and earned a PhD in Geography from Peking University in 2002. She has applied GIS, spatial statistics and analysis, spatial econometrics and web technology to many projects regarding recreation boating studies.

**FWC Bald Eagle Nest Locator: Addressing Public Need Through Interactive Mapping Applications**  
Kristin Rogers

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The Avian Research Section of the Florida Fish and Wildlife Conservation Commission (FWC) has been conducting an annual state-wide survey of bald eagle nesting territories since 1972. Subsequently, the agency receives hundreds of request for bald eagle nest information each year. The majority of these requests come from developers, consulting firms, public interest groups, and concerned citizens and are very often quite similar in nature. In an effort to reduce the volume of requests received annually and to expedite the response process, we have designed a website that employs Google Maps technology to provide geographically referenced eagle nest location information to the public. The website provides users the opportunity to create customized maps of bald eagle nest locations throughout Florida based on user defined query criteria, such as nest activity status and proximity of nests to geographic areas of interest (i.e. counties, cities, zip codes, private lands, and managed areas). It is our expectation that this electronic solution will greatly reduce future efforts expended by FWC staff responding to public requests for bald eagle nest information.

**Biography**

Kristin Rogers is a Scientific Data Manger with the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute. She has a M.S. Fisheries and Aquatic Sciences from the University of Florida and has worked for FWC for 6-years as both a Fisheries Biologist and a Data Manger. She works with biologists to manage, store, and protect the integrity of the data they collect, while seeking solutions to maximize its usability.

**Web Innovations Adapted to Manage Wildlife Health Information: A Case Study with the NBII Wildlife Disease Information Node**

Cris Marsh<sup>1</sup>, Megan K. Hines<sup>2</sup>, F. Joshua Dein<sup>1</sup>, Laura Wynholds<sup>2</sup>

NBII – Wildlife Disease Information Node

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Like other professionals, wildlife managers are inundated with information; some of which is helpful, while too much of it is not. In either case, valuable time is spent sifting through information to find what is needed; time that could be spent on other priorities. The NBII Wildlife Disease Information Node (WDIN) has adopted a number of innovative, open source web-tools and social networking products to help its users, wildlife specialists and other professionals concerned about wildlife health issues to more effectively find, consume and manage information.

The open source applications WDIN has adopted include blogs, RSS feeds, social bookmarking, and the Google Maps API. These kinds of tools are products of the Web 2.0 trend to use the Internet and its web services for information exchange and collaboration, and hence have a broader scientific application.

WDIN is building a suite of tools which are not only beginning to centralize wildlife disease information for easy access, but also allow users to decide how they want the information presented for their individual needs. In addition to reviewing how these tools evolved and continue to adapt to changing user needs, there will be an overview of how these same tools also help to increase the visibility of WDIN by drawing the attention of new users and new partners.

**Biography**

Cris Marsh is the content manager for the NBII-Wildlife Disease Information Node. She has an undergraduate degree in zoology from the University of Wisconsin-Madison. Before returning the UW-Madison for her master's in library studies, she worked as a veterinary technician for many years. She is a member of the Special Libraries Association. In addition, she is a member of the following professional working groups, NBII – Species Knowledge Management Working Group, NBII – Content Leads working group and the Wildlife Disease Informatics Working Group.

## **Providing Access to Whirling Disease Data and Information through Mapping Application**

Laurie Trautman<sup>1</sup> and Jennifer Pollock<sup>2</sup>

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The whirling disease parasite *Myxobolus cerebralis* has infected Salmonid fish in 25 states. It was first detected in the United States in the 1950s, and whirling disease attracted national attention in the 1990s when it was linked to significant declines in trout populations in the Intermountain West.

The National Biological Information Infrastructure (NBII) partnered with the Whirling Disease Initiative and the Big Sky Institute to create and provide access to online resources for fisheries professionals and anglers. These resources provide unparalleled access to geospatial and research data related to whirling disease. Due to the severe effects of whirling disease on wild trout and fish hatcheries in the Western U.S., these states are the initial focus of these online resources, but efforts have expanded into other geographic regions.

This presentation will highlight the products associated with this project. They include an interactive map and static maps that provide comprehensive and current mapping resources of *M. cerebralis* detection data as well as the Data Repository, which houses the only publicly-available whirling disease research data and metadata available.

### **Biography**

Jennifer Pollock [presenter] works for the US Geological Survey National Biological Information Infrastructure Program. In her role as a Node Manager, she coordinates projects that provide access to natural resources data and information from partners across the country. She has encouraged federal and university collaboration to promote information sharing for managers and researchers.

Laurie Trautman is an education and outreach specialist for the Big Sky Institute at Montana State University. She has worked for the Big Sky Institute on a variety of internet based science education projects for over two years, with a focus on making natural resources data and information available through the Internet. She is currently assisting in a remodel of the Fisheries and Aquatic Resources Node of NBII. Laurie has an undergraduate degree in environmental economics from Western Washington University and a MS in Earth Sciences from Montana State University. She believes strongly in the concept that making objective scientific information more accessible to the public leads to better informed policy decisions and solutions.

## **NBII Bird Conservation Information Activities: Past, Present and Future**

Elizabeth Martin

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Access to data and information on migratory birds across multiple geographic scales and life cycle stages is required for identifying causes of population decline and for development and implementation of comprehensive bird conservation strategies. The data needs of the bird conservation and management communities are scale-dependent, as conservation planning at regional or national levels requires use and aggregation of comparable data collected across large geographic extents, while implementation of conservation actions at local levels require access to fine-grained and location-specific data. The National Biological Information Infrastructure (NBII) and partners in the bird conservation community have been working together over the past few years to increase access to data and information needed to support bird conservation. Past and current NBII bird conservation information activities have focused on supporting the needs of large-scale bird conservation planning by web-enabling datasets from broad-scale bird monitoring surveys, supporting the creation of data repositories and visualization tools that aggregate and summarize bird monitoring data at regional/national levels, and encouraging development and use of data sharing standards to facilitate data integration at broader scales. As effective bird conservation may ultimately depend on the success of on-the-ground implementation, future NBII bird information activities will also begin to address the data and information needs of wildlife and land managers on the ground. Future opportunities for collaboration exist and we welcome your input to begin this process.

### **Biography**

Elizabeth Martín is the manager of the NBII Bird Conservation Node. She has worked for the National Biological Information Infrastructure (NBII) program of the U.S. Geological Survey since 1999, and has over 10 years experience coordinating biological and biodiversity information networks across the Western Hemisphere. Elizabeth holds a B.S and M.S. degree in Biology and she is currently pursuing a Ph.D. in Wildlife Ecology and Conservation.

**Grassland Vegetation Monitoring: A Minnesota Wildlife Action Plan Priority and a Multi-partner Adaptive Management Collaborative**

Daren Carlson, Kim Bousquet (USFWS), Meredith Cornett (TNC), Robert Dana (MN DNR), and Sara Vacek (USFWS)

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Minnesota's wildlife action plan identified native prairies and surrogate (non-native or restored) grasslands as a top action priority as a result of both their rarity and the number of species in greatest conservation need (SGCN) that utilize these habitats. Management priorities include preserving and maintaining rare remnant native prairie, grassland restoration, and providing habitat for wildlife. Minnesota's prairies and grasslands continue to face many threats, including encroaching invasive species, effects from fragmentation, conversion for biofuels, and climate change. To address these threats, we have begun a long-term monitoring project on high-quality prairie, with 2 broad goals: 1) Provide long-term trend data on the status of high-quality prairie remnants and associated prairie animals and 2) Participate in a multi-partner adaptive management collaborative utilizing vegetation monitoring data. In 2007, a multi-agency group of grassland managers and scientists developed and tested standardized grassland vegetation monitoring methods for western Minnesota. These protocols are hierarchical, allowing partners to collect data at a level of detail that meets their own objectives, while providing a common set of core data useful for adaptive learning for the group as a whole. This presentation will provide information on the monitoring protocols, the format of the adaptive management collaborative, and provide preliminary results from the 2008 monitoring season.

**Biography**

Daren Carlson has worked for the Minnesota DNR since 2000. He has helped coordinate implementation of the Minnesota DNR Old-growth guidelines, leading to the protection of about 40,000 acres of old-growth forest on state land. He began helping with the development of Minnesota's State Wildlife Action Plan (SWAP) in 2003 as the lead ecologist and GIS analyst. Following completion of the Minnesota's SWAP, Daren now acts as the SWAP Monitoring Coordinator. He has joyfully spent this last field season on Minnesota's native prairie remnants testing and implementing monitoring protocols.

## **Implementing Montana's Comprehensive Fish and Wildlife Conservation Strategy** Scott Story

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The Montana Comprehensive Fish and Wildlife Management Strategy (CFWCS) was completed in Oct of '05. The implementation of the CFWCS is now underway including land acquisition efforts, restoration efforts, hiring of essential staff, continued monitoring on Tier 1 species, and continued collection of baseline information for neglected faunal groups. As pressure from development has increased in Montana, The CFWCS appears to be insufficient for use at a scale fine enough for specific land use decisions. Geographic focal areas identified in the Strategy, though beneficial for allocation of restoration efforts at a broad landscape scale, are not sufficient to serve the needs of local land managers (e.g., county planners). In addition, wildlife communities represented in the Strategy need to be refined based on new products such as ReGAP. To address new and emerging threats to wildlife in Montana, such as accelerating exurban growth and continuing fragmentation from oil and gas development, Montana Fish Wildlife and Parks is embarking on a statewide Crucial Areas - Fish and Wildlife Assessment. Information on terrestrial and aquatic wildlife communities will be developed using new stream assessment techniques and ReGAP products. Layers representing recreational opportunity, critical habitat for individual species, critical areas of connectivity, and threats to wildlife will be developed. Best management practices will be developed for areas where development is inevitable but where responsible development is prudent. We plan to complete the Fish and Wildlife Assessment within one year and will deliver many of the products through the web so that land managers and planners will have the information readily available.

### **Biography**

Scott is currently the Non-game Data Manager for Montana Fish, Wildlife, and Parks. He earned a B.S. in Wildlife Biology from Humboldt State University in 1999. His professional career has focused largely on fieldwork with birds in locations varying from Albuquerque, NM to Olympia, WA to the Frank-Church Wilderness in Idaho. Scott eventually settled in the central Rockies to work for the USFS Rocky Mountain Research Station in Boise, ID and this led to a masters degree program at Montana State University in Bozeman, MT. Scott received his M.S. in Biological Sciences in 2007. Scott's current duties at FWP include maintenance of data that pertains to the non-game wildlife program, the Comprehensive Fish and Wildlife Management Strategy, and energy development and its potential effects on wildlife.

**Missouri's Quail Emphasis Area Geodatabase**  
Mark Brunner

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As part of Missouri's strategic quail plan, 19 conservation areas have been identified as Quail Emphasis Areas. The goal on these areas is to maximize usable space for northern bobwhite, demonstrate proper quail habitat management and provide a quality hunting opportunity. These areas require a high level of disturbance and habitat work to provide good quail habitat. The areas are administered by 18 different managers that track accomplishments 18 different ways. Problems arose when new managers started or sometimes we forgot what we did last week, a month, a year or three years ago. Often when new managers started, the old data was unusable since there was no standard reporting system. We needed a consistent way of tracking habitat accomplishments and habitat types on these areas. A Quail Emphasis Area geodatabase was developed to standardize habitat accomplishments and management on these 19 conservation areas. The geodatabase also allows new managers to know what was accomplished in the past. The new system uses consistent cover types and scenarios that encompass every management practice we could possibly complete on the area (sometimes up to five different management practices on an acre). The geodatabase and bird monitoring data can also be used by Resource Science staff to run statistical analysis on songbird and quail locations in relation to habitat types, changes in habitat types (proximity to edge) and management practices.

**Biography**

Mark Brunner is the IT Architect for the Missouri Department of Conservation. He has a BS in Forest Management and an MS in Computer Science, both from the University of Missouri at Columbia. At the Conservation Department he is involved in developing technology solutions to assist in the management of Missouri's forest, fish, and wildlife resources. As the IT Architect Mark stays in touch with all folks throughout the department gathering and processing data. He is helping develop an application to provide department wide geospatial capture of resource accomplishments drawing from the success of Missouri's Quail Emphasis Area Accomplishments implementation.

**Arizona's Areas of Conservation Priority as a First Step Toward Implementation of the State Wildlife Action Plan**

Sabra Schwartz

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The Arizona Game and Fish Department has been working on the implementation of the State Wildlife Action Plan. The last year has focused primarily on developing a GIS based model to identify habitats of greatest conservation need. The Area of Conservation Priority model will be used to facilitate decision making in planning, land acquisition, and conservation. The concept for this was presented last year at the OFWIM conference. Since that time, staff focused on refining species and threat distributions to more accurately describe conditions throughout the state, and incorporate agency values not covered in the SWAP. Over 300 species distribution models and over 50 threat maps was combined to generate various iterations to answer questions for various management decisions. From this first product that was presented to the governor, the vision is to build a full geospatial decision support tool to utilize the full functionality of the various models developed during this process. With the inclusion of wildlife corridors and stewardship information, the SWAP should be revised to include a map component that was absent in the first CWCS plan.

**Biography**

Sabra Schwartz is currently the Program Supervisor for Arizona's Heritage Data Management System (housed within the Arizona Game and Fish Dept.). She started working with the HDMS in 1989, after receiving her B.S. in biology from Northern Arizona University. Except for two years spent working in the Penguin Encounter at Sea World of Florida, she has spent her entire career with the HDMS in Arizona, starting as data manager. Sabra serves on several technical teams for the AZ Game and Fish Department, including the Invasive Species Council, Roadkill Database Team, Smart Growth, Areas of Conservation Priority, and currently is chair for NatureServe's U.S. Section Council. Sabra has been an OFWIM member since 2002. She served on the Executive Committee as member At-Large for one year and is currently serving as president.

## **Creating Awareness and Setting the Stage for Collaborative Implementation of the Comprehensive Wildlife Conservation Strategy for New Mexico**

William Graves

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The New Mexico Department of Game and Fish has embarked on a two-year outreach project to make local, state, federal and tribal governments, non-governmental organizations, and interested individuals aware of the conservation guidance values of the Comprehensive Wildlife Conservation Strategy for New Mexico. In addition, the project seeks to promote action development by discovering ways in which the Department and target entities can collaborate in implementing the Strategy and to identify issues for consideration during future Strategy review and revision processes. In response to increasing demand for narrative, tabular, and spatial information from the Strategy, the Department has also created an interactive website that allows users to employ pre-designed or customized queries to obtain information from the Strategy database and its spatial datasets.

### **Biography**

Bill Graves currently serves as Planner/Director for the New Mexico Department of Game and Fish. In this capacity he led the development of the Comprehensive Wildlife Conservation Strategy for New Mexico and currently serves as Department contact in that regard.

His 35 years of professional experience also includes serving as:

- A contract consultant for the Natural Resources and Environmental Policy Project, U.S. Agency for International Development, in conducting an on-site management assessment of the Sri Lanka Department of Wildlife Conservation designed to strengthen implementation of Sri Lanka's National Wildlife Policy.
- Assistant Director for the Division of Public Affairs, Kentucky Department of Fish and Wildlife Resources.
- Director for the Division of Wildlife, Kentucky Department of Fish and Wildlife Resources.
- Assistant Director/Federal Aid Coordinator, Division of Wildlife, Kentucky Department of Fish and Wildlife Resources.
- Director, Summit County Extension, Colorado State University Cooperative Extension Service.

His educational background includes:

- A.A.S. in Forestry, Paul Smith's College
- B.S. in Wildlife Biology, Cornell University
- M.S. in Wildlife Management, Colorado State University

...and more in-service training in organizational management, decision-making processes, citizen participation, and conflict resolution than anyone would care to hear about.

**Banquet Speech: Reestablishment of Gunnison's Prairie Dogs to Sevilleta National Wildlife Refuge: Conservation, Partnerships and Ecological Research**

Mike Friggens

Project Manager, Sevilleta LTER  
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Mike Friggens is the Project Manager for the Sevilleta Long Term Ecological Research Program at the University of New Mexico. His career is marked so far by dogged dedication to biology, place and steady employment.

As an undergraduate in the Biology Department at UNM, Friggens worked in the Museum of Southwestern Biology, Division of Mammals (MSB) where he numbered bones, prepared museum specimens and assisted on field collecting expeditions led by Dr. Terry Yates, then Curator of Mammals of the MSB. Experience at the MSB opened a window on South America, and especially Bolivia, where Yates, Dr. Sydney Anderson and others were actively engaged in collecting expeditions. As a direct avenue to work in the neotropics, Mr. Friggens enlisted in the U.S. Peace Corps upon finishing his undergrad degree at UNM in 1990. As luck would have it, he was assigned to serve in a small rural town called Monteagudo, located in the eastern foothills of the Andes in southeastern Bolivia. His responsibilities as a beekeeper left plenty of time to run trap lines and nets in the mountains nearby, and before long he was sending vertebrate specimens to the *Collección Boliviana de Fauna* in La Paz. Prior to finishing his undertaking in Bolivia, Friggens had established some 200 beehives and sustainable income for 23 small-scale farmers, and had conducted biological inventories in 3 regions of the country. These inventories amounted to more than 250 prepared specimens and valuable survey data for both mammals and birds which were used in one case as part of the justification for the establishment of a new national park called P. N. Madidi. For Mike, the primary lesson learned from his experience in Bolivia was that he wanted to be an authority on a place, and that he wanted to use that expertise as a biologist and a manager wherein his capacity to operate in unfamiliar terrain would bring about new discoveries, facilitate studies for other researchers and build enduring capacity to care for temporal studies.

In 1995, Mr. Friggens took a job as a Field Research Technician leading a 4 person crew as part of the Sevilleta LTER program which focuses most of its field research on the Sevilleta National Wildlife Refuge in central New Mexico. At the time, he had no idea that this just might be the place where ideas developed in South America would come into play. Mike has remained part of the Sevilleta LTER in one capacity or another for 12 years now. During this time he has focused research interests on the population dynamics of desert dwelling rodents and on conservation science related to Gunnison's prairie dogs. Work for the LTER meant another close association with Yates and specimen collections in the early years, as well as considerable responsibilities related to field station management as a 'right hand man' first for Dr. Bob Parmenter and then for Dr. Scott Collins, both having served as Field Station Director at the UNM Sevilleta Field Research Station (UNM SFS) located at Sevilleta NWR. In 2003, Mr. Friggens finished his MS thesis on the population dynamics of small mammals found at six habitats on SNWR, and since the arrival of Collins as Sevilleta LTER Lead PI that same year, he has served as the Project Manager for the Sevilleta LTER Program.

Mike is an avid outdoorsman although the only animals he has hunted are housed in museum collections or recorded on tapes & film. He lives with his wife Megan (a PhD student of Dr. Paul Bier at NAU) and their two-year old daughter Abigail in the Sandia Mountains outside of his hometown of Albuquerque, New Mexico.

**SPECIEZnm.org: Information and Issues Concerning New Mexico Species**

Janelle Harden and Anne Russell

SPECIEZnm, Inc.

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The SPECIEZnm.org website was launched in August of 2006 in Albuquerque, New Mexico. The mission of SPECIEZnm is to provide New Mexico environmental professionals with the timely, best-available species information required for appropriate environmental compliance, thereby contributing to the conservation of this resource. To accomplish this, we gather and disseminate a wide variety of data. As our datasets grow and evolve, unique opportunities (such as the RAVEN Project) arise that allow us to apply species information to wildlife management concerns.

**Biography**

Janelle Harden and Anne Russell are both from Albuquerque and are avian rehabilitators with Wildlife Rescue of New Mexico.

Both have biology degrees, work in the environmental consulting field, and are co-owners of SPECIEZ New Mexico.

## **Roundtable Discussion: Wildlife Data: Can You Find It, Share It, and Trust It? A New Mexico Perspective**

Facilitators: Janelle Harden, Chuck Hayes, and Kurt A. Menke

### **Janelle Harden**

Janelle Harden is from Albuquerque and is an avian rehabilitator with Wildlife Rescue of New Mexico. She has a biology degree, works in the environmental consulting field, and is co-owner of SPECIEZ New Mexico.

### **Chuck Hayes**

Chuck Hayes works for the New Mexico Department of Game and Fish as the coordinator for the Biota Information System of New Mexico (BISON-M), and for the state's nongame tax checkoff program. He has been with New Mexico Game and Fish for about 12 years, previously serving a carnivore biologist and manager of the state's nongame and endangered wildlife program. Chuck has a Bachelor's degree in biology and environmental studies from Grinnell College in Iowa, a Master's degree in wildlife and fisheries science from the University of Arizona, and in his free time he is currently a Ph.D. student in biology at the University of New Mexico.

### **Kurt A. Menke**

Kurt Menke began his career in Geographic Information Systems (GIS) at the University of New Mexico's Earth Data Analysis Center (EDAC) in 1997. Recently, Mr. Menke founded Bird's Eye View to apply his expertise with GIS technology towards solving the world's mounting ecological and social problems. Towards this end, Mr. Menke focuses largely on conservation and minority public health applications. Kurt also teaches GIS at UNM's Division of Continuing Education, is a co-founder of the Tijeras Canyon Safe Passage Coalition and is Vice President of the New Mexico Geographic Information Council.

## **The EcoTrends Web Portal on a Diet of PASTA**

Mark Servilla, Duane Costa, Chrstine Laney, Inigo San Gil and James Brunt

LTER Network Office and Jornada LTER

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For decades, information managers have been looking into integration and synthesis to address new ecological questions. The challenging task of integrating data products from a diverse array of distributed complex datasets can now be addressed using the PASTA framework.

PASTA stands for Provenance Aware Synthesis Tracking Architecture. PASTA builds on existing community infrastructure and experiences. Pasta is also integrative because it adopts standard interfaces and offers a uniform view of the otherwise diverse data to the general public. Finally, it incorporates data provenance and data quality into the design, leaving a clear paper trail for purposes of versioning, accounting and traceability of derived products

The PASTA data warehousing architecture has been prototyped against the dynamic part of the EcoTrends project as a case study.

The EcoTrends project goal is to simplifying the discovery and access to long-term ecological and sociological time series data that is collected through various local, state, and Federal agencies. Site-collected data is quality checked and then reformatted into a common data scheme as “derived data”. Documentation in the form of Ecological Metadata Language is generated for all derived data.

The EcoTrends Web Portal (<http://www.EcoTrends.info>) includes functionality for data discovery and access by registered users (the interface includes browse topics, and keywords search, with geo-temporal restrictors), integrating and plotting diverse data , downloading both summary and statistically annotated data in comma delimited and HTML formats, and keeping users data history (persistent shopping cart-like functionality) that simplifies future access. Currently, the EcoTrends project offers about 24,000 data products from a diverse array of sources.

### **Biography**

Mark is the Lead Scientist for the Network Information System (NIS). His primary responsibility is the implementation of the LTER Network Information System—a system of standards and applications that support the interoperability of distributed LTER research sites, thus enabling synthetic science at the Network level and beyond.

Mark's most recent role in the private sector at Photon Research Associates (PRA), Inc. was as architect of a web-based application (GeoServer TM) that provided the discovery, management, and use of geospatial data, including Earth observation imagery and GIS vector objects. Mark participated in numerous software development projects and was involved in the start-up of an Internet company that utilized satellite imagery for commercial agriculture.

Mark holds graduate degrees in Earth and Planetary Sciences and Computer Science, both from the University of New Mexico.

**Making Data Available: The NBII Clearinghouse – a Distributed Metadata Management,  
Data Discovery and Access System**

Viv Hutchison

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Metadata records, which describe scientific datasets in a standardized format, are a valuable way for scientists and researchers to discover completed or on-going research projects in a particular area of study. Record discovery can lead to new opportunities for collaboration and data sharing between scientists. Metadata records support data management requirements by preserving the data creation history in order that data can be re-used or adapted to new science. Clearinghouses provide a critical link to data sources in multiple agencies, and as a result, prevent duplication of scientific studies. This promotes collaboration and data sharing, benefiting both science and the financial bottom line.

In April 2008, a new, enhanced version of the NBII Clearinghouse (<http://mercury.ornl.gov/nbii>) with powerful search capabilities and updated features was developed. The NBII Clearinghouse makes available over 40,000 metadata records, all compliant with the Federal Geographic Data Committee's (FGDC) "Content Standard for Digital Geospatial Metadata", that has been contributed by 41 partners and it serves as a portal for record and data discovery. Users of the NBII Clearinghouse range from biologists in Federal and State Agencies, land managers, data managers, research scientists, and the public.

**Biography**

Vivian Hutchison has been with the National Biological Information Infrastructure (NBII), a program supported by through the US Geological Survey, since 2002. She is the Program Manager for the Biological Metadata Program, a position that involves overseeing a national metadata Clearinghouse, organizing metadata training sessions for biologists, and keeping up with standards in science for data organization and exchange. Viv has participated in OFWIM since 2003, and is most recently finishing a term as Past President on the Executive Committee. She is also currently the Chair of the Awards, Nominations, and Elections Committee.

Viv graduated from the Claremont Colleges in 1991 with a B.A. in Political Science. In 2002, she graduated from the University of Maryland with a Master's of Library and Information Science. She also earned a Certificate of Natural Resources from Virginia Tech in 2004.

## **Increasing the Value of Genomics Data: From New Metadata Standards to Folksonomies** Inigo San Gil

LTER Network Office

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There are estimates on the number of draft quality, complete genome sequences for 1,000 bacteria and archaea and 100 eukaryotes and for even larger numbers of viruses, organelles and plasmids by the end of 2008. This explosion of data urges the scientific community to ensure stewardship of these data for the long term.

Currently genome descriptions are incomplete for many reasons. We now know the minimum quality and quantity of information that is required to make each description precise, accurate and useful. It is no longer enough to describe sequencing methodologies and protocols; It is becoming necessary to provide geo-temporal references for the data, as well a number of other circumstantial descriptors (such as habitat conditions at the time of sample or specimen collection) that had been not included in genomic metadata descriptors in the past due to the limited ability to capture genomic data.

The Genomic Standard Consortium (GSC: an open-membership, international working body to promote mechanisms that standardize the description of genomes) is spearheading efforts to address these new metadata needs. LTER is participating in the Genomics Standard Consortium, and has offered guidance on the development and implementation of the new standard, code name GCDML. LTER is also recommending to the group of the Ecological Metadata Language developers specific enhancements to the EML standard to support better documentation of genomic data. Other LTER collaboration with the GSC focus on training and continue efforts to build on the similarities between the GSC's Genome catalogue (GenCat) tools and the LTER's Metadata Editor project.

In this presentation, we offer the highlights of the activities of the GSC group, as well as collaboration opportunities.

### **Biography**

Inigo provides assistance to LTER sites on Ecological Metadata Language (EML) standard data compliance, and legacy metadata standardization. He has updated the metadata crosswalks between the NBII Biological Data Profile (BPD) and EML. He has provided on-site EML help to about ten LTER sites and helped many other sites remotely.

Inigo's professional background includes database applications development while completing his B.S degree in Physics in Spain. He then moved to the US to pursue a Ph.D in Mechanical Engineering at Yale University. Inigo joined IBM Thomas Watson Research Center and Los Alamos National Lab, where he performed numerical simulations and data analysis on supercomputing facilities. Before joining the LTER, Inigo managed the Yale Core Facility for Bioinformatics where he developed web-enabled databases and data analysis tools for genomic research.

## **Poster Presentation Abstracts (in alphabetical order)**

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### **A SchemaWalker Web Page Generator for the EML Metadata Editor**

Raul Aguilar, Corinna Gries and Inigo San Gil

Central Arizona Phoenix LTER and LTER Network Office  
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The Central Arizona Phoenix spearheaded a new metadata management system to include the advantages offered by latest technologies. An online editor for documents in the Ecological Metadata Language (EML) is being developed. Based entirely on XML, this smart editor offers auto-complete features from known choice lists, thesaurus automatic lookup, automatic save of typing, validation of metadata, and many other advanced features that are already showing in popular web applications. The editor accesses the EML files in a native XML database storing changes as the user enters them. The XML database is already being used to search for relevant datasets, display lists of datasets and metadata in the CAP website, and display selected XML data content.

The input forms are written according to the XForms standard using the Orbeon open source framework. A schema walker was developed that generates the XForms code based on a XML schema. Any XML schema, including EML, can be used as template to generate a multi-page online data-entry editor. The editor features tight access control in a multi user environment, a 'publish' function which will make the metadata available for public search, and conversion of the metadata into other standards. The metadata files are stored and accessed by the editor in 'eXist' an Open Source native XML database featuring efficient, index-based XQuery processing, automatic structural indexing, full-text search, and tight integration with existing XML development tools.

The project is currently in the last stages of development.

### **Biography**

Raul is a Java web developer at the Global Institute of Sustainability at the Arizona State University. He graduated with a Bachelors in Electrical Engineering here from our University of New Mexico in 1987 as can be seen on a plaque posted that year as a 'Paul Aguilar'. Raul is versed in a number of programming languages from the old days of machine language of various processes in the early days of computers, assembly, Fortran, Pascal, Prolog, Basic, Visual Basic, 'C', C++, C#, ASP, PHP, XForms, Java for real-time embedded, application, and web frameworks as well SQL for relational databases and XPath for eXist. Despite all the languages Raul has coded to, the SchemaWalker work presented has come closest to auto-code generate web pages for domain-experts.

## **Indiana's Fish Information System (FIS)**

Jeff Dobson

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The mission of the Indiana Department of Natural Resources is to protect, enhance, preserve, and wisely use natural, cultural, and recreational resources for the benefit of Indiana's citizens through professional leadership, management, and education. This FIS application will enhance the agency staff access to information in real time from any location with Internet access. Additionally, FIS will enable the Fisheries Section to capture and retain data for analysis of water quality, habitat including vegetative coverage and fish community information in lakes, reservoirs, and streams. Other data including user information collected during creel surveys, and hatchery production and stocking records will also be supported by use of this web-based application. The overall application will enhance the usability and aid in the interpretation of collected data, speed data entry, and facilitate retrieval and analysis of information. Relative information about watersheds (land use and type), fish community, water quality and use, and aquatic vegetation distribution and abundance will enhance the utility of the application. Other information used in connection with all permit processes regulated by the Fisheries Section such as aquatic invasive species, aquaculture and private fish stockings, access sites, fish haulers and suppliers, will be easily accessible and can be related to ongoing management processes. Intentions are to reduce overall costs by using the automation of stored information in an SQL database in one location. By having the information stored in a database that will be accessed by remote sites, the Fisheries Section can view information that has been collected by other fish biologists. The database will facilitate analysis of data across administrative boundaries like management districts and eventually other agencies. This far outweighs the use of older technology and digging through the paper trail of historical records.

### **Biography**

Jeff Dobson is a Senior Programmer/Analyst at the Conservation Management Institute (CMI) in Blacksburg, VA. Since joining CMI in January 2006, he has contributed to multiple projects including the Bolivian Forestry Research Institute's forestry database, BISON-M wildlife system for the New Mexico Department of Game, Fish and the Wildlife Mapping application for the Virginia Department of Game and Inland Fisheries, the Shenandoah Fish Kill data analyzing application and Indiana's FIS application. After attending Virginia Tech, he decided to stay in Blacksburg where he currently resides with his wife and two boys. His interests include coaching baseball, playing softball, and photography.

**EKey: Freshwater Fish Identification Made Easy**  
Bill Herrington

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One of the resources available through the NBII Mid-Atlantic Information Node is EKey, an electronic tool for identifying freshwater fishes. This application aims to serve the widest possible range of users in hopes of enhancing the enjoyment and understanding of our aquatic heritage.

Amateurs, students, and professionals should all be able to benefit from EKey. Through observation of teaching students in ichthyology laboratory courses, it has been shown that people approach freshwater fish identification in different ways. EKey offers several computer-assisted approaches to finding useful information about freshwater fishes of Virginia. Users can browse species by taxonomy, use a dichotomous key to identify a species, and conduct text-based searches that index species information.

Information available through EKey includes scientific and common names, physical descriptions, and life history information. Future enhancements will include the ability to conduct fish shape-based searches and upload a species image and find matches from the current database.

This presentation will demonstrate how to use some of EKey's features, and will also offer a brief overview of the technology upon which EKey is built.

**Biography**

Bill Herrington is a Web and database developer at the Conservation Management Institute (CMI) in Blacksburg, VA. Since joining CMI in February 2006, he has contributed to multiple projects including the BISON-M wildlife system for The New Mexico Department of Game and Fish, the EKey electronic dichotomous key website, and the WildlifeMapping application for the Virginia Department of Game and Inland Fisheries. Mr. Herrington holds a Bachelor of Arts degree in English and Philosophy from Virginia Tech, and is currently pursuing his Masters in Information Technology at Virginia Tech. His interests include watching basketball, playing videogames, and being amused by the cats he and his wife have adopted: Charlie, Chester, and Cali.

## **iMapInvasives: A Web-based Solution for Invasive Species Mapping and Decisionmaking**

Dean K. Jue

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Exotic invasive species are the greatest threat to biodiversity on lands and water that are already protected for the general public. These species can be either plants, such as Japanese Climbing Fern, or animals, such as Zebra Mussels. Although there are a number of efforts to inventory and map certain types or classes of invasive exotics (e.g., aquatics, plants), there are few such efforts that fully encompass the breadth of the problem from a land manager's standpoint.

The iMapInvasives project is a multi-agency project that will address many of the invasive exotics data needs of land managers. Specifically, iMapInvasives encompasses all taxa. It utilizes online mapping, query, reporting, and data entry capabilities over the Internet. One of the important features of this application for a land manager is the ability to easily customize the receiving of early detection and approaching region reports for invasive species of the user's choice.

The initial partners in this endeavor were the NY Natural Heritage Program, the Florida Natural Heritage Program, and The Nature Conservancy Invasive Species Team. The group has since expanded to include the states of Arizona, New York and NatureServe.

### **Biography**

Dean K. Jue has a background in biology, public policy, and computer science. He has worked in the geographic information systems field for over 20 years. He works for the Florida Resources and Environmental Analysis Center at Florida State University. During his time there, he was worked on projects from statewide data needs assessments to building nationwide public library data sets for web mapping applications.. More recently, he has returned to his biological routes. He is currently directing a three-year state wildlife grant from the Florida Fish and Wildlife Conservation Commission to inventory for rare and threatened butterfly species on Florida conservation lands. He is also one of the principal developers within FREAC of the iMapInvasives project that is developing a national web-based invasive species mapping and decision support application for public land managers.

## California's Vegetation Mapping Program

Tom Lupo

California Dept of Fish and Game, Biogeographic Data Branch  
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State, Federal and local agencies recently reinforced the need for a statewide detailed high quality vegetation map as one of their top data needs. Development of such a data layer is a large financial investment but serves a vast array of government business needs and pay returns on that investment very quickly. This vegetation data is a powerful component in analyses such as, regional conservation planning; wildland fire/fuels modeling for improved preparedness; identifying potential rare and endangered species locations; predicting the spread of invasive species; early scoping for transportation projects to avoid rather than mitigate impacts; prioritizing land acquisitions for parks and ecological reserves; identifying important wildlife corridors; setting a baseline for monitoring impacts of global climate change; and other uses. The California Department of Fish and Game has already mapped approximately one-fifth of the State in fine-scale, attribute-rich fashion. The mapping process uses extensive field data collection to refine the vegetation classification system of several hundred vegetation types and to label two acre minimum mapping unit polygons delineated using recently acquired large scale aerial photography. For maximum utility the mapping is done border to border across all types of land ownership and land uses.

### **Biography**

Tom Lupo, has an M.A. in Geography from SF State University and has over 20 years of professional experience working with GIS software and organizations. Most of his career has been spent with the California Department of Fish and Game, where he is now Chief of the Biogeographic Data Branch ([www.dfg.ca.gov/biogeodata](http://www.dfg.ca.gov/biogeodata)) in Sacramento. The branch is responsible for producing data, maps, analysis and tools regarding species and vegetation mapping and other biological information important to California's conservation community. In addition to his day job at Fish and Game, he is also an adjunct faculty member in Geography at American River College in Sacramento.

## **Global Wildlife Disease News Map: Putting Wildlife Disease on the Map!**

Cris Marsh<sup>1</sup>, Megan K. Hines<sup>2</sup>, F. Joshua Dein<sup>1</sup>, Laura Wynholds<sup>2</sup>

NBII – Wildlife Disease Information Node

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(608) 270-2459; cmarsh@usgs.gov [presenter phone and email]

The NBII Wildlife Disease Information Node (WDIN) is a collaborative project working to develop web-based tools to provide state and federal resource managers, animal disease specialists, veterinary diagnostic laboratories, physicians, public health workers, educators, and the general public with access to data on wildlife diseases, mortality events, and related information.

This new WDIN Google Mapping application creates a visual way to explore wildlife health news provided by the WDIN Wildlife Disease News Digest. The Google Map application captures the last 45 days of geo-referenced entries from the Digest, and allows users to filter the contents shown on the map by wildlife health topic, wildlife/human topic, domestic animal/wildlife topic, disease type, species, or country.

WDIN populates the map by combing through authoritative RSS news service feeds and email alerts, and then cataloging the metadata into a Dublin core-based database. The relevant articles are also tagged with keywords which the user can select to filter the content shown on the map.

The geo-referenced articles are displayed with unique pushpin icons that inform the user what level of geographic detail the article refers to. The locations are referenced by Place, County, Administrative Unit, Country, or Continent. Locations are geo-referenced with latitude and longitude values from geonames.org. Places that cannot be successfully geocoded with those two authorities are often approximated using Google Earth or referenced at the next available geographic level. Polygon level geographic information is geocoded as a geographic center of the feature (centroid).

An XML file is generated on-demand from the published articles which organizes the contents by unique latitude and longitude locations called markers. Each unique marker is linked to the associated article which populates the information windows when an icon is selected.

The Google Map application connects to an initial XML file containing markers for all geo-referenced entries in the last 45 days. If a user selects an available filter topic, the XML file with the filtered results is requested via Asynchronous JavaScript (AJAX) XMLHttpRequest and the map display is refreshed to display those markers where the filter is present.

With no global surveillance system in existence for the monitoring of wildlife health, this tool helps to fill the void by harvesting unstructured, disparate information about disease outbreaks and other wildlife related topics. The application is expected to be useful to professions working in the wildlife, domestic animal, and human health communities.

### **Biography**

Cris Marsh is the content manager for the NBII-Wildlife Disease Information Node. She has an undergraduate degree in zoology from the University of Wisconsin-Madison. Before returning to the UW-Madison for her master's in library studies, she worked as a veterinary technician for many years. She is a member of the Special Libraries Association. In addition, she is a member of the following professional working groups, NBII – Species Knowledge Management Working Group, NBII – Content Leads working group and the Wildlife Disease Informatics Working Group.

## **Locating Potential Cougar (*Puma concolor*) Corridors in New Mexico Using a Least-Cost Path Corridor GIS Analysis**

Kurt A. Menke

Bird's Eye View

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While a wildlife movement barrier assessment and several regional wildlands network designs have been completed in New Mexico, scientifically rigorous, spatially explicit least-cost corridor analyses had not yet been performed to identify potential dispersal corridors for any wide ranging species. This study, funded by the New Mexico Department of Game and Fish (NMDGF) Share With Wildlife Program, utilized ArcGIS 9.2 and the Corridor Designer tools, developed by the School of Forestry at Northern Arizona University, to identify potential cougar dispersal corridors throughout New Mexico. The corridors were modeled based on a cougar habitat suitability model produced by Bird's Eye View in 2006. A total of 26 potential corridors were modeled. The corridors were then compared with cougar and other large carnivore roadkill records obtained from the New Mexico Department of Transportation (NMDOT) and the results of the 2003 Critical Mass Workshop. The NMDOT roadkill data showed carnivore roadkills had occurred within 13 of the 26 potential corridors. Of those 13 potential corridors, 9 showed carnivore roadkills occurring within the most optimum corridor swaths. The results were also visually compared with habitat data for other large and medium carnivores to look for preliminary indications of whether they might be utilized by other species.

### **Biography**

Kurt Menke is a GIS Specialist who has been working in the field for over a decade. He founded Bird's Eye View to apply his expertise with GIS technology towards solving the world's mounting ecological and social problems. Kurt works with many environmental organizations such as, the Wildlands Project, WildEarth Guardians, and the Northern Jaguar Project. He also volunteers his time for many organizations. Kurt has served as President of the New Mexico Geographic Information Council and is on the Board of Trustees for the Grand Canyon Wildlands Council. He is one of the co-founders of the Tijeras Canyon Safe Passage Coalition and currently serves as Chairman. Kurt also teaches GIS and Cartography at UNM's Division of Continuing Education, and is a member of the Society for Conservation GIS.

**A GIS Model to Prioritize Prescribed Burning**  
Marion Noble

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Prescribed fire has been used for many purposes, including grassland maintenance, invasive species control, and habitat management for endangered species. However, it can be difficult to balance these sometimes competing objectives, which may require different fire return intervals. Furthermore, prescribed burning resources are often limited, so objectives must be prioritized. We developed a burn prioritization model to guide prescribed burning efforts on Fort Hood Military Reservation, Texas. Our prescribed burning objectives include fuel reduction, grasslands maintenance, and management of shrubland habitat for endangered species. The model uses a GIS to calculate time since the last fire and then compares the calculated and desired fire return intervals for a specific vegetation type. Because each objective was assigned an influence value (or weight) by a team of experts, the model can rank the necessity of burning each site. This model ensures that our limited prescribed burning resources are used most efficiently because burn units with the highest priority are burned first. It will also ensure that fire return intervals are maintained within the desired range for each vegetation type. GIS models such as our burn prioritization model can easily be adapted to incorporate a variety of burning objectives and fire return intervals.

**Biography**

Marion Noble graduated from Humboldt State University in Arcata, CA with a B.S. in Natural Resources Planning and Interpretation with most of her coursework in GIS. She was hired by the Fort Hood Project office of the international environmental non-profit The Nature Conservancy as a GIS Specialist in 2005. Her role is to support the endangered species research and monitoring program, which is focused on the Golden-cheeked Warbler and the Black-capped Vireo.

## **Sharing Natural Resources Information through Partnerships in the Mountain Prairie Region**

Jennifer Pollock

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The National Biological Information Infrastructure (NBII) <[www.nbio.gov](http://www.nbio.gov)> is an electronic information network that provides access to biological data and information on our nation's plants, animals, and ecosystems. NBII implementation occurs through nodes that serve as interconnected entry points to the NBII and the information held by partners. The Mountain Prairie Node partnerships have created collaborative opportunities that span beyond the geographic region and support national data efforts. This poster will describe current data management projects and partnership by the NBII Mountain Prairie Node that focus on a variety of biological issues and data needs including whirling disease, butterflies and moths, birds, fisheries, fire, and wildlife.

### **Biography**

Jennifer Pollock works for the US Geological Survey National Biological Information Infrastructure Program. In her role as a Node Manager, she coordinates projects that provide access to natural resources data and information from partners across the country. She has encouraged federal and university collaboration to promote information sharing for managers and researchers.

## **Mapping Threats to Florida's Freshwater Habitats**

Cathy Ricketts and Beth Stys

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The Florida Fish and Wildlife Conservation Commission's Comprehensive Wildlife Conservation Strategy (CWCS) is an action plan for conserving the state's wildlife and natural areas. In 2005 the CWCS identified 27 threats to Florida's freshwater habitats. This project assembled statewide geographic datasets representing 15 out of 27 of these threats. Creating a comprehensive database of threats is an essential step toward achieving the overall goals of improving strategic habitat conservation planning and addressing causes of low abundance and decline of species in aquatic habitats. These data were used to determine the relative level of individual threats to each subwatershed (HUC 12 unit) within Florida. Ten uncorrelated data layers depicting unique threat categories were combined to create a composite Freshwater Threats Index. Based on the composite index map a distinct gradient of increasing threat level is evident progressing from Northwest Florida to the east and south. At a regional scale road density dominates as the most common reason for high threat values in northern Florida, while agriculture dominates in the west-central region and waterway modification dominates in east-central and southern Florida. This multi-scale assessment is effective at both highlighting local conditions which may instigate further investigations and illustrating regional trends.

### **Biography**

Cathy Ricketts has a BS in Biological Sciences from Florida State University and is in the process of completing her MS thesis in Geography at Georgia State University. She completed the freshwater threats mapping project during her year of employment with the Florida Fish & Wildlife Conservation Commission. She is currently pursuing a second MS at the Warnell School of Forestry and Natural Resources in Athens, GA.

Beth Stys has worked for the Florida Fish and Wildlife Conservation Commission for over 16 years. She holds a BS in Wildlife and Fisheries Ecology from Texas A&M University and a MS in Wildlife Ecology from Mississippi State University. She is currently a research administrator with the Fish and Wildlife Research Institute within FWC. Her group's primary focus is habitat mapping and vertebrate modeling, involving remote sensing, spatial analysis and GIS data.

**Availing Oneself of Hands-on Training Opportunities: A Case Example with Regards to Remote Sensing Capabilities and ITTVIS' ENVI Suite of Image Processing Programs**

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Remote sensing based spatial analysis has become an integral part of wildlife information management. A number of commercial and open source software packages are available for use by resource analysts. ITTVIS (in Boulder, Colorado) provides a number of such analytical capabilities associated with their ENVI 'suite' of programs. They have recently offered free workshops (MindShare '08) to introduce potential users to these packages; on such 'course' offered was entitled 'Vegetation Analysis for Land Management Applications'. It touched on the ENVI analysis interface, the program's functional capabilities (image display, contrast stretching, image classification, use of Landsat data to map burn severity, and vegetation analysis using multispectral imagery). The workshop also covered use of a new tool, ENVI Zoom for performing 'Feature Extraction'. A powerpoint presentation 'overview' from the workshop will be available for review, as well as a limited number of copies of the workshop CD, providing interested parties with a PDF of the workshop manual, and it's relevant data sets. OFWIM attendees that may be interested in obtaining an evaluation copy of the ENVI software (and an 'evaluation 'keycode' file) will be encouraged to contact ITTVIS; and information will be provided regarding such. (The 'poster session information' is being provided by an independent wildlife ecologist, for technology transfer purposes only, but with the gracious input and materials support from ITTVIS staff.)

**Biography**

Don Schrupp is a wildlife ecologist, recently retired from the Colorado Division of Wildlife, after 32+ years, having developed their geographic information systems and remote sensing based programs, as well as their database management programs for their Habitat Section. His hobbies include hunting, fishing, listening to bluegrass music, motorcycle touring, geocaching and exploring open source (and commercial) geospatial software, and its use in protecting wildlife resources.

**The PAD-US Design Project: What It Is, Who's Encouraged to Participate; a Project Overview and Contact References**

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Currently 8090 % of the publicly protected open land in the U.S. is accounted for in national scale geographic information systems (GIS). Existing inventory efforts by the US Gap Analysis Program, the Conservation Biology Institute's Protected Areas Database program, federal agencies, individual states and other national nongovernmental organizations all establish a strong base of information and contacts. The PADUS Design Program was launched in the Spring of 2008 to build a strategy to address issues of a) aiding, expanding and updating inventories in particular states, b) institutionalization of effective technologies, expansion of inventories to locally protected lands, the improvement of data accuracy, and creation of a business model to effectively sustain such an inventory. 'PADUS' has developed a website for access by interested resource managers and individuals (the URL is: [www.protectlands.net](http://www.protectlands.net)), and hopes that OFWIM member organizations will feel free to contact them through their website, or the provided Project Contacts (Orman – Greeninfo Network, Strittholt (Conservation Biology Institute, or Mosesso – USGSGap Analysis Program).

**Biography**

Don Schrupp is a wildlife ecologist, recently retired from the Colorado Division of Wildlife, after 32+ years, having developed their geographic information systems and remote sensing based programs, as well as their database management programs for their Habitat Section. His hobbies include hunting, fishing, listening to bluegrass music, motorcycle touring, geocaching and exploring open source (and commercial) geospatial software, and its use in protecting wildlife resources. Don has recently been asked to join the PADUS Steering Committee to provide input on State resource agency needs, concerns and perspectives.

## Becoming a Data Provider to the Global Invasive Species Information Network

Annie Simpson,<sup>1</sup> Catherine Jarnevich,<sup>2</sup> Jim Graham,<sup>3</sup> and Elizabeth Sellers<sup>1</sup>

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The sharing of invasive species information is vital to improve our understanding of biological invasions and our coordination of effective control efforts. The Global Invasive Species Information Network (GISIN) is a collaboration of like-minded invasive species information managers interested in sharing data globally, currently funded by the Group on Earth Observations (GEO), the National Biological Information Infrastructure (NBII), and the National Aeronautics and Space Administration (NASA).

To date, three kinds of information are being shared in the GISIN system: Occurrences, Species Status, and Species Resource URLs. If you have an online database with invasive species information, moderate programming expertise, and a desire to share your information with others, you too can become a GISIN data provider. And if you are seeking an online repository for your invasive species project information, the National Institute of Invasive Species Science (NISS) accepts data of all formats, allowing you to map your fields for batch uploads.

The GISIN system's list of data providers currently includes the Great Lakes Indian Fish & Wildlife Commission and NISS, among others. We are seeking additional early adopters of the GISIN system and hope you will join us.

- Non-technical online interface, email listserv, and information repository:  
<http://www.gisinetnetwork.org>
- Technical documents repository and GISIN information system: <http://www.niiss.org/gisin>
- National Institute for Invasive Species Science: <http://www.niiss.org>
- Wiki for standards development:  
<http://wiki.tdwg.org/twiki/bin/view/InvasiveSpecies/WebHome>
- Technical email listserv for data providers: <http://www.hear.org/hearlists/gisintech.htm>

### Biography

Annie Simpson (M.A. Entomology, M.S. Library & Information Science), came to the National Biological Information Infrastructure (NBII) in May 2000 after living in Costa Rica for 20 years, where she worked in natural history tourism and facilitated biological field research. Her bilingual abilities have been helpful in her role as the US lead in the Invasives Information Network (I3N) of the Inter-American Biodiversity Information Network, and as the chair of the Steering Committee of the Global Invasive Species Information Network. She also coordinates the invasive species efforts of the NBII's regional and thematic nodes or working groups. She has experience in Web development, project management, and tropical field ecology, and is also the lead for the Group on Earth Observations Biodiversity Task 07-02, to create a near-real-time invasive species monitoring system.

## **Fire Data Management Tool: Documenting and Monitoring Fire Program Success**

James L. Smith, Marjorie Bennett, and Kevin Thomas

The Nature Conservancy Global Fire Team  
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The Fire Data Management Tool was developed by The Nature Conservancy and deployed in April of 2008. The FDMT is a web-based, spatially-enabled system designed to store, analyze and report fire management data, such as fire weather, fire observations, activity objectives, personnel and equipment used on the fire, and more. This tool is only available to TNC employees at present, but we hope to open the tool to our partners sometime in the future. This poster outlines how the system was developed, and describes how the system functions.

### **Biography**

Jim Smith is The Nature Conservancy's LANDFIRE project manager. LANDFIRE is a collaborative 5 year project with the USFS and DOI aimed at developing geospatial data for fire regime restoration, fire management and conservation planning, and hazardous fuels reduction using a consistent and repeatable methodology nationwide. Jim is responsible for managing the various project budgets, representing The Nature Conservancy at leadership and professional meetings, developing LANDFIRE reports, and coordinating 10 LANDFIRE application projects. Jim also serves as the Modeling Lead for the Southern Appalachian region.

## **LANDFIRE Vegetation Modeling**

James L. Smith, Kori Blankenship, Darren Johnson, Randy Swaty, and Elena Contreras

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LANDFIRE is a nation-wide multi-partner project designed to map and model vegetation, fire, and fuel characteristics using a consistent, peer-reviewed, scientifically based methodology. One product of the LANDFIRE project are vegetation models. A vegetation model was developed for each ecological system in each map zone. These vegetation models describe succession and disturbance pathways for pre-European settlement vegetation systems. The models can be updated for current conditions, such as climate change, invasive species, and management activities, and thus may be useful for many non-fire related applications as well.

### **Biography**

Jim Smith is The Nature Conservancy's LANDFIRE project manager. LANDFIRE is a collaborative 5 year project with the USFS and DOI aimed at developing geospatial data for fire regime restoration, fire management and conservation planning, and hazardous fuels reduction using a consistent and repeatable methodology nationwide. Jim is responsible for managing the various project budgets, representing The Nature Conservancy at leadership and professional meetings, developing LANDFIRE reports, and coordinating 10 LANDFIRE application projects. Jim also serves as the Modeling Lead for the Southern Appalachian region.

**LANDFIRE: Collaborative Landscape Fire Management Data**  
James L. Smith, Kori Blankenship, Darren Johnson, and Randy Swaty

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LANDFIRE is a nation-wide multi-partner project designed to map and model vegetation, fire, and fuel characteristics using a consistent, peer-reviewed, scientifically based methodology. LANDFIRE project products are potentially very useful for conservation planning and conservation activities, including those not directly related to fire. This poster provides a general introduction to the LANDFIRE process, products, and potential applications in a conservation setting.

**Biography**

Jim Smith is The Nature Conservancy's LANDFIRE project manager. LANDFIRE is a collaborative 5 year project with the USFS and DOI aimed at developing geospatial data for fire regime restoration, fire management and conservation planning, and hazardous fuels reduction using a consistent and repeatable methodology nationwide. Jim is responsible for managing the various project budgets, representing The Nature Conservancy at leadership and professional meetings, developing LANDFIRE reports, and coordinating 10 LANDFIRE application projects. Jim also serves as the Modeling Lead for the Southern Appalachian region.

## **Fisheries Information Systems Convergence and Fish Data Compilation for NFHAP Assessment**

Jeff Smith<sup>1</sup> and Andrea Ostroff<sup>2</sup>

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The need exists among fisheries managers and decision makers for comprehensive data and information of fish species in the United States to aid fisheries and aquatic resources conservation and restoration efforts. There have been many attempts to fill this need from various sources in the US, resulting in numerous datasets that target regional or species specific issues. National programs and initiatives need to have one source where this information is compiled to provide nationwide information for conservation and management decisions. The National Fish Habitat Action Plan (NFHAP) serves as a catalyst for such an effort. The assessment of the nation's fish habitat status is underway and Fish Habitat Partnerships are already implementing projects to support the goals of the NFHAP. Organizations, agencies, and partners involved in the NFHAP have an increased need for this information to be made available. The goals of this project are two-fold. First, to consolidate several fisheries information systems into an integrated system that will provide summarized fisheries data nationwide to fisheries managers and decision makers. Second, we will provide those who are conducting the assessment of fish habitat status with a layer of fisheries data. This will fulfill the need to incorporate a biotic component into a full assessment that will be completed in 2010.

### **Biography**

Jeff Smith is a 15 year employee of the Conservation Management Institute (CMI) at Virginia Tech. From 1993 until 2008, CMI provided Jeff's services to the New Jersey Division of Fish and Wildlife, where Jeff worked as the IT coordinator for the Division. During that time Jeff worked on many GIS and database projects for the Division, including the Fisheries Management System, Law Enforcement Summons Administration System, and most recently served as the project manager for the Division's Integrated Electronic Licensing System. In 2008, Jeff accepted a position funded by the USGS NBII working on a data convergence project. The project aims to consolidate several regional fisheries databases and make their data available via MARIS (Multi State Aquatic Resources Information System).

Andrea Ostroff is the manager of the Fisheries and Aquatic Resources (FAR) and Mid-Atlantic Information nodes of the US Geological Survey's National Biological Information Infrastructure program. Andrea came to USGS from the Association of Fish and Wildlife Agencies where she was hired as the National Fish Habitat Liaison to gather conservation project information from state fish and wildlife agencies in support of what became the National Fish Habitat Action Plan. Andrea has been involved with the Science and Data Team since its formation. She has identified the National Fish Habitat Action Plan as a priority of the NBII's FAR node and continues to support its efforts with FAR resources and support.

## Data Collection and Database Management for a Missouri River Monitoring Program

Lauren Williamson

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Due to anthropogenic changes to the Missouri River, many aquatic species have been negatively impacted, including the pallid sturgeon (*Scaphirhynchus albus*). The pallid sturgeon was listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1990. In 2000, the U.S. Army Corps of Engineers received results from the USFWS 2000 Missouri River Biological Opinion. As a result, the USACE began funding a long-term, comprehensive program to monitor habitat use, distribution, movement, and survival of pallid sturgeon, as well as several other native fish species. The program encompasses the Missouri River from the Fort Peck Dam (Fort Peck, MT; River Mile 1771.5) to the confluence at the Mississippi River (St. Louis, MO; River Mile 0) and includes four separate projects within the program: the Pallid Sturgeon Population Assessment Project, the Habitat Assessment Monitoring Program, the Mitigation Project, and the Spring Rise Evaluation Project. Collaborative standard sampling is conducted by federal and state agencies located in six states surrounding the Missouri River. All data collected in the field is sent to a centralized office (Missouri Department of Conservation) to be entered into one main database. All incoming datasheets are reviewed and sorted. During this step, problems with data recording are found, documented, and sent back to their respective field office for correction by the field crew. Documented errors are logged and periodic error reports detailing error rates for each field crew and each individual data recorder are produced for the USACE. Corrected data is then entered into the main database through two blind data entry runs and verified. Data is returned in electronic form to each office periodically as well as summarized in an annual report to the USACE.

### Biography

Lauren Williamson received a BS in Fisheries and Wildlife from the University of Missouri in 2004 and an MS in Natural Resources (Fisheries) from the University of Wisconsin – Stevens Point in 2008. She is a Resources Analyst for the Missouri Department of Conservation and is currently working at the Missouri River Field Station on pallid sturgeon recovery efforts.

## **Networking With Your OFWIM Colleagues: Demonstration of the NBII Member Portal**

Lisa Zolly

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In 2008, the OFWIM Executive Committee and the active standing committees began using the my.nbii.gov portal to collaborate, organize, and archive their respective activities. The portal has afforded OFWIM committees a secure environment in which to discuss, document, and develop activities that are internal to the organization, and thus not ready for, or appropriate to, the wider access provided by the public OFWIM Web site. The OFWIM portal community offers all members the opportunity to participate in committee activities, communicate with committee members, and pursue new opportunities for collaboration with other OFWIM members. See just how easy it is to use the OFWIM portal community, and find out how you can create new OFWIM community projects, in this tutorial session.

### **Biography**

Since 1999, Lisa Zolly has been the Knowledge Manager for the National Biological Information Infrastructure (NBII), a broad, collaborative program managed by the U.S. Geological Survey, whose mission is to provide increased access to data and information on the nation's biological resources. Her responsibilities include the development and oversight of content management standards and knowledge architectures for the Program; design and implementation of new tools and resources to integrate and manage biological content; and user-interface design.

Lisa has a BA and an MA in English from Virginia Tech, and an MS in Information Science from the University of Tennessee; she is currently completing an MS in Natural Resources Management and Policy from Virginia Tech.

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