LANDFIRE & GAP: Partnership Addresses Challenges of Land Cover Mapping

Alexa McKerrow, an ecologist and remote sensing analyst, has been with the U.S. Geological Society (USGS) National Gap Analysis Program (GAP) since the mid-1990s. She started her USGS career in 2008 and now leads a team of geographic information specialists involved in a variety of projects for the Core Science Analytics and Synthesis Program. Alexa is on the LANDFIRE Remap Strategy Team, researching improvements in land cover mapping methodology.

Contact Alexa.

You work for USGS Core Science Analytics, Synthesis and Library - Gap Analysis Program. What is your role in GAP?

I coordinate the land cover mapping and species distribution modeling efforts. We need those datasets in order to do the analysis -- identifying species and plant communities that are under-represented in the conservation network. Our detailed land cover map is the basis for building habitat distribution models for the terrestrial vertebrates in the U.S.

Tell us about your work with the LANDFIRE Remap Strategy Team.

Over the past year, the Team has been working on updates to the methods and workflow for producing a new Existing Vegetation Type (EVT). The new map will be based on using the latest Landsat Imagery, reference data, and methods. Two USGS personnel have worked directly with the remap strategy team on testing algorithms and methods in several prototype areas. I've been primarily involved with the team on revising the map legend so that it supports the development of a vegetation dataset to better meet the needs for both programs. I am also in the working group overseeing the revision of the AutoKeys used to label the plot data in the LANDFIRE Reference Database (LFRDB) to existing vegetation types. Because another major focus of my work is implementation of the U.S. National Vegetation Classification (USNVC), I work with LANDFIRE, NatureServe, and The Nature Conservancy on strategies to link the Ecological Systems Classification to the Group Level of the USNVC.

What is the value of the GAP/LANDFIRE collaboration to the GAP user community?

Land cover mapping for the nation is a major challenge and partnerships are an important part of the equation. For more than two decades, the Multi-Resolution Landscape Characterization Consortium has been helping coordinate major land cover mapping efforts (Wickham et al. 2014; *Remote Sens.* 2014, *6*, 7424-7441; doi:10.3390/rs6087424). Initially the partners jointly purchased the base satellite imagery. Over time, the collaboration has evolved based on changing needs, and now there is an increased focus on partners taking on a stewardship role for the datasets for which they have the data and expertise. By working together to develop a common map, GAP and LANDFIRE can focus on the highly detailed maps that support both fire and fuels planning and modeling of wildlife habitats, especially with regard to individual classes that are relevant to each program's needs.

What do you think is the most important opportunity for improvement in LANDFIRE program products?

> With respect to the EVT dataset, the greatest opportunity is in the refinement of the reference data that are used in the modeling individual map units. Recently LANDFIRE has focused on revising the Auto-keys. Given the relatively "young" nature of the Ecological Systems Classification, revisiting the map legend has provided a chance to refine the concepts being mapped and redefine the criteria used to label the plots. Creating range maps for each of the ecological systems being mapped is important because they provide the team with a list, in advance, of systems that can be expected in a specific geography and the systems that might be under-represented in the LFRDB

We've heard talk of a new "identity." Please tell us about it.

> It's all in a name. Both GAP and LANDFIRE map vegetation across the U.S. at a high level of thematic detail, and each program has a name that its users understand. For GAP, the detailed dataset was simply called National GAP Land Cover; for LANDFIRE it was the Existing Vegetation Type dataset. Recently, members of the Federal Geographic Data Committee/Biodiversity and Ecosystems Theme proposed a name, National Terrestrial Ecosystems, that acknowledges the true ecological richness of that dataset and places it in the context of the Freshwater and Marine Ecosystems datasets that USGS is developing. In the coming year, GAP and LANDFIRE will work on formalizing the recognition of that name.

A few recent publications related to land cover, species habitat modeling, or fire

Costanza, J. K., R. C. Abt, A. J. M[c]Kerrow, J. A. Collazo. 2016. Bioenergy production and forest landscape change in the southeastern United States. Global Change Biology Bioenergy. DOI: 10.1111/gcbb.12386.

Tarr, N. M., M. J. Rubino, J. K. Costanza, A. J. M[c]Kerrow, J. A. Collazo, R. C. Abt. 2016. Projected gains and losses of wildlife habitat from bioenergy-induced landscape change. Global Change Biology Bioenergy. DOI 10.1111/gcbb.12383.

Terando, A., B. Reich, K. Pacifici, J. Costanza, A. M[c]Kerrow, J. Collazo. 2016. Uncertainty quantification and propagation for projections of extremes in monthly area burned under climate change: A case study in the coastal plain of Georgia, USA. AGU Monograph Series: Characterizing Uncertainty in Natural Hazard Uncertainty Assessment: Modeling and Decision Support. Hoboken, NJ, John Wiley & Sons. P. Webley, K. Riley, M. Thompson, A. Patra, and M. Bursik, Eds. http://www.wiley.com/WileyCDA/WileyTitle/productCd-1119027861.html

M[c]Kerrow, A., J. Smith, F. Fay. 2015. Coming Together for an All-Lands Dataset to Support Wildfire and Wildlife Conservation Planning. North American Bird Conservation Initiative All Bird Bulletin. Spring 2015 pp. 9-12.

Costanza, J. K., A.J. Terando, A. J. M[c]Kerrow, J. A. Collazo. 2015. Modeling climate change, urbanization, and fire effects on *Pinus palustris* ecosystems of the southeastern U.S. Journal of Environmental Management 151: 186-199.

Ecological Society of America Vegetation Classification Panel (21 members; Scott Franklin, Janet Franklin, Todd Keeler-Wolf, Esteban Muldavin, Robert Peet, David Roberts, Marianne Burke, Pat Comer, Julie Evens, Exequiel Ezcurra, Don Faber-Langendoen, Michael D. Jennings, Carmen Josse, Chris Lea, Alexa M[c]Kerrow, Serguei Ponomarenko, Ayzik Solomeshch, James Vankley, Alan Weakley). 2015. How a national vegetation classification can help ecological research and management. Frontiers in Ecology and the Environment 13 (May, 2015): 185-186. April 2015.

Costanza, J.K., R. C. Abt, A. J. M[c]Kerrow, J.A. Collazo. 2015. Linking state-and-transition simulation and timber supply models for forest biomass production scenarios. AIMS Journal 1/2015; 2(2):180-202. DOI:10.3934/environsci2015.2.180.

Martinuzzi, S., A. M. Pidgeon, V. C. Radeloff, A. J. Plantinga, J. D. Lewis,. J. Whitey, A. M[c]Kerrow, S. Williams, and D. Helmers. 2015. Impacts of future land-use changes on wildlife habitat: insights from Southeastern US. Ecological Applications 25(1)2015, 160-171.