Collaborative Restoration Workshop
National Forest Foundation | April 2016

Monitoring | Remote Sensing Tools for Collaborative Monitoring

Key Topics: Modeling and GIS

Speakers
- **Lynne Bridgford**, GIS Developer, Ecosystem Management Coordination, U.S. Forest Service
- **Matt Trager**, NEPA Planner, National Forests in Florida, U.S. Forest Service
- **Karen Honeycutt**, Natural Resources Program Manager, Colville National Forest, U.S. Forest Service

Overview
This session introduced data modeling tools and metrics that have been successful in monitoring large scale forest projects. Remote sensing data continues to improve and modelling tools are becoming increasingly accessible. Large-scale monitoring tools not only assist in identifying management opportunities and priorities, they also add transparency and shared knowledge to collaborative efforts.

Lynne Bridgford – FSVeg Spatial Data Analyzer (DA)
FSVeg Spatial Data Analyzer (DA) is a GIS-based application for project and landscape-level analysis. The DA incorporates the Forest Vegetation Simulator (FVS) as the primary modeling tool to model current and future conditions on USFS lands.

This tool and others are currently available to Forest Service staff, but outside users can access them with assistance from agency staff. The DA is based in ArcGIS, but there is a wizard to help make it easy to use for non-technical people. The tool allows people to play "what if games" in terms of exploring different situations without affecting corporate data. In addition, the tool enables visualization of the data on a map. Natural Resource Manager staff provide technical support to Forest Service staff. Efforts are underway to make the Data Analyzer tool even more accessible outside the Forest Service. Other tools and data sources are described on the NRM webpage.

Matt Trager – Ecological Condition Modeling in Apalachicola National Forest
The National Forests in Florida developed a new tool called the *ecological condition model* (ECM) for the long leaf pine communities. This geospatial planning tool incorporates Forest Service stand data along with Light Detection and Ranging (LiDAR) and Landsat data to estimate vegetation structure of 0.52ac cells throughout the ~600,000ac forest. The Forest Service then compared the structure estimates to desired conditions for longleaf pine communities, generating a simple condition score (1-5, ranging from excellent to very poor) that can be used to assess forest health, identify project areas, and provide information to identify appropriate management actions.

The Forest Service validated ECM by field verification. One important validation factor for the model was comparing the ECM to the known territories of the red-cockaded woodpecker, which were found to be well aligned. This indicates that the model is credible and applicable for more in-depth research and management of this iconic species, and many others.

Lessons
- The agency is imprecise in data analysis. Rigorous historical data is necessary, but is not often used.
- Ground-truthing is important because the model doesn't always catch specific details of a stand. It provides a general picture.

Karen Honeycutt – LiDAR and the Northeast Washington Forest Vision 2020

The Colville National Forest (NF) has been working with the Northeast Washington Forest Coalition, which established Vision 2020 (now a Collaborative Forest Landscape Restoration project). Vision 2020 set specific goals to restore most of the landscape to Condition Class 1, rebalance structural stages toward the historic range of variability (in particular, increasing Old Growth Structure), and balance the road system needs with hydrologic and fisheries concerns. After initiating treatments across the landscape, the Colville and the collaborative were faced with a big picture, multi-scale question: *Did we shift the pattern, structure, and composition of vegetation at the stand, watershed, and CFLRP scale towards desired targets?*

The Colville NF identified 12 sites representing four different forest types for on-the-ground monitoring, and also used LiDAR technology to look at the landscape level. The resulting data has been extremely helpful in developing a joint understanding about the impact of treatments and planning for the future. LiDAR was originally funded through CFLR, but has now been made a priority for future use.

Lessons
- Collaboratives should not be afraid to ask the Forest Service for Geographic Information System (GIS) support in answering important questions.
- Universities can be extremely helpful – Derek Churchill at the University of Washington ran the GIS data analysis.

Panel Discussion
- The 2012 Planning Rule requires all forests to revisit their plans and monitor nine items every two years (terrestrial, water, rare species conditions).
- Questions are coming up about what level of precision and accuracy in data is required for this monitoring.
- While models are not 100% accurate, they provide a basis to get started over large spatial areas.
- Remote sensing is getting better, more accurate and cheaper. Techniques are always changing.

Resources
- [Natural Resource Manager (NRM) webpage, with links and descriptions of database tools](#)
- [LANDFIRE: LANDFIRE is a program that provides over 20 national geo-spatial layers (e.g. vegetation, fuel, disturbance, etc.), databases, and ecological models that are available to the public for the US and insular areas.](#)
- [Forest Service Document "Considerations for Using LIDAR"](#)
- [Forest Service LIDAR information page](#)