USDA United States Department of Agriculture

Southern Research Station Experimental Forests Network Facts

Current Research in the Network - Hydrology and Upland Hardwoods

A weir in Coweeta Hydrologic Laboratory in North Carolina regulates a stream's water flow. USFS Photo.

An Introduction

Because each experimental forest houses a specific ecosystem or forest type, they each present scientists with different research opportunities. This versatility gives the Network the potential to answer big questions and compare findings across the region. The goal of this factsheet is to provide a brief summary of some of the research fields the Network contributes to.

Hydrology Research

Forest management decisions can have profound impacts on water quality and quantity in a region. Much of the nation's drinking water originates in forests so it is vital to understand how changes in forests influence the movement and quality of water. Much of this work is done at the level of watersheds – land areas that funnel water into a common stream. Various forests in the Network such as Coweeta Hydrological Laboratory, Santee EF, Alum Creek EF, and Hill Demonstration Forest are ideal places to conduct hydrology research because of the various watersheds and data collection equipment they have. The Alum Creek EF is an important experimental point in the interior highlands of the country and much of our understanding of water movement in the region comes from there. For example, subsurface water flow research

Key Messages

- Forests play a big role in maintaining water quality throughout the southeastern region
- Changes in forest composition or harvests can affect the movement of water in an ecosystem and the quality of that water
- A watershed is a land area that drains water into a common stream
- Hydrology, or the study of water movement, is often done at the watershed level in experimental forests
- Experimental forests can help us track and predict how watersheds are responding to climate change
- Experimental forests are managed by the various SRS research work units and they use the EF&RN to better meet their research priorities
- The EF&RN supports studies at various spatial and temporal scales

Various instrumentation is used at Coweeta to measure rainfall and other climate conditions. USFS Photo from 1980.

at Alum Creek EF has informed scientists about how water moves through the forest soils. Research here has allowed scientists to understand how macropores – conduits in forest soils – play a role in transporting herbicides into streams and bodies of water. These findings affect when and how managers apply fertilizers and herbicides to their land.

Other experimental forests such as Coweeta Hydrological Laboratory have reference watersheds – watersheds minimally disturbed by human activity. These watersheds are invaluable when it comes to studying long-term trends and watershed responses to climatic disturbances. Having long-term data on reference watersheds allows scientists to generate data that can be used by land managers to plan for increases in precipitation variability over the coming years. These variability increases have already resulted in extremely wet and dry years.

Upland Hardwoods Research

The Upland Hardwood Ecology and Management research group manages 4 experimental forests, including the Henry R. Koen EF in northern Arkansas. Multiple studies here focus on upland hardwood forest dynamics at the individual tree, stand, and regional scale. At the Bent Creek EF near Asheville NC, SRS scientists are currently working on oak and American chestnut restoration. Oak is important to the southern forestry industry, while American chestnut suffered devastating declines due to chestnut blight, a disease caused by invasive fungus.

An upland hardwood forest. Photo by Nicholas Tonelli, under CC license.

The Alum Creek EF has 10 small research watersheds. USFS Photo.

References

CompassLive
https://www.srs.fs.usda.gov/compass/2018/08/14/long-term-research-yields-understanding-and-insights/

SRS Publications
https://www.fs.usda.gov/treesearch/pubs/47030
https://www.fs.usda.gov/treesearch/pubs/52682
https://www.fs.usda.gov/treesearch/pubs/56966

EF&R Publication
https://www.fs.usda.gov/treesearch/pubs/7403

Other Resources

Upland Hardwood Research in Network
https://www.fs.usda.gov/treesearch/pubs/57748

Contacts

Johnny Boggs - EFR Network Co-lead
johnny.boggs@usda.gov

Stephanie Laseter - EFR Network Co-lead
stephanie.laseter@usda.gov

Factsheet by Ivan Garcia
PICS Summer Intern 2020