Russell B. Doughty

Twist and Shout!

Week 1 Project Site Paper

In the early 1930's, my great-grandfather bought 120 acres of forested land in Southeastern Oklahoma. For 80 years my family has been very much linked to this piece of land and we have managed it in different ways. For example, cattle have not been run on the land for 20 years, we are managing second growth stands, and attempting to manage fire fuels without prescribed burning.

However, our legacy of land management has not benefited from the concept of ecosystem services. In the past, we may have attempted to enrich these services, but without the knowledge of how these services intertwine and affect each other. Moreover, we have rarely considered how our local land practices may affect our neighbors and the regional ecosystem. Thus, my goal for this term will be to identify the ecosystem services we wish to sustain, evaluate relative feedback systems, and develop a more comprehensive analysis of our sustainable management plan.

The ecosystem services that we wish to maintain are, 1) timber production, 2) biodiversity, 3) biotic habitat. The correct management plan for our property must unveil the relationships between our objectives for it to be a success. For example, timber production may have adverse affects on biodiversity if timber production is not adequately managed.

Our focus on timber production would not emphasis volume, but stress production of high quality timber. Such a regimen, in the pine dominated landscape, would encourage tighter stands to induce competing saplings to race toward the sun. Such a race typically produces straighter timber with smaller and fewer cat-faces.

Biodiversity has always been of vital importance when we consider land management projects. It is important for us to create, or maintain, an environment which is welcoming to all native wildlife species. Furthermore, diversification of native flora has been an objective for decades. With the intent to preserve and enhance Oklahoma's natural legacy, we have planted an attractive, native mosaic of nut trees and native hardwoods. Unfortunately, we are still combating privet (ligustrum), which gained a small foothold after my uncle threw clippings from the church's bushes behind one of our buildings 25 years ago.

Creating, or not destroying, native habitat has also been of prime importance when considering how to manage our land. We have introduced water systems by making five ponds and stocking them with fish from local Sardis Lake. Standing dead timber and large diameter ground "fuels" are left to ensure habitat for the birds, insects, micro-organisms and everything biotic.

As can be seen, this small project area demonstrates a host of ecosystem services: biodiversity, carbon storage, water cycling, and biotic habitat to name a few. But how

might this small plot be influenced by global processes? One unique, climactic aspect of this geographic region is known as “Tornado Alley”. Although not officially defined, the term has been popularized to describe the area of the United States which has a higher propensity to host tornadoes (Figure 1). As illustrated, the central United States is a unique hot-bed of turbulent atmospheric conditions. But what else is unique to this area of the country?

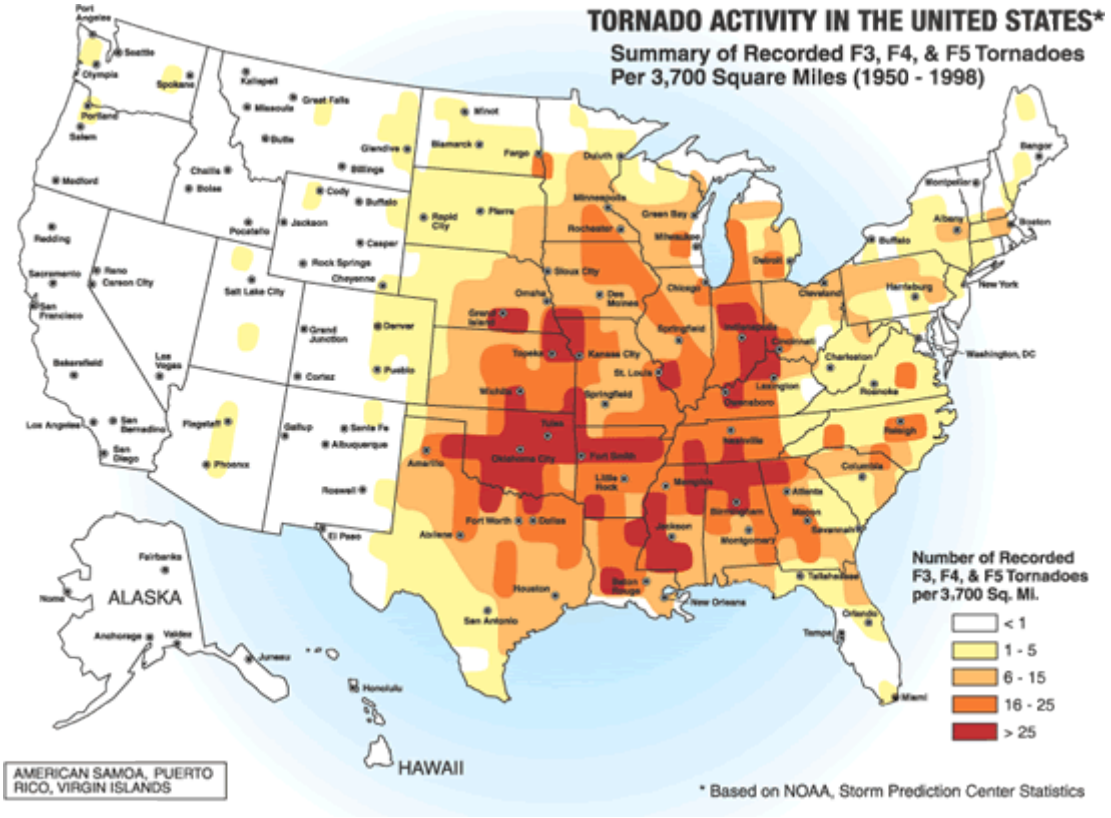
Forests!

Figure 2 crudely illustrates that between the Rocky Mountains of the west, and the Appalachians of the east, lays a band of forests. However, let us take a closer look and see exactly where a few of these forests lay within the above Tornado Activity zones.

As is illustrated by Figure 3, we see that the most active zones (in red) follow forest boundaries. The one exception would seem to be the Ozarks of northern Arkansas. However, the Ozarks appear to produce more activity than is reality due to what we will term here as the “Ouachita Chute”. This corridor runs between the Ouachitas and the Ozarks, spawning tornadoes which dissipate into the Ozarks as they travel in a northeastern direction, as seen in Figure 4. To further illustrate that tornado activity closely follows forest boundaries, consider Figure 5’s lack of activity in southeastern Oklahoma. Visually, the Ouachitas seem to form a massive wall or void where tornadoes are not produced.

In conclusion, the forests of the Midwest may play a much larger roll in climate and weather than previously realized. One may assert that the intense weather patterns and turbulence is shaped most by the terrain itself rather than the forests upon them. However, in light of recent research, this assumption may be far from the truth.

As Nobre (2011)[1] stated in his lecture video, the Amazon could be considered the heart or lungs of planet because of its geysers. Trees are no longer just timber products or habitat, but an inseparable part of the biogeological engine. The sheer volume of vapor released by forests during transpiration is substantial and the affects of albedo are tremendous. Is it possible that the Midwestern forests are a regional heart, cycling biogeochemical nutrients within our biosphere?!



[1] http://www.youtube.com/watch?feature=player_embedded&v=HYcY5erxTYs

Figure 1 – Tornado activity 1950-1998. [2]

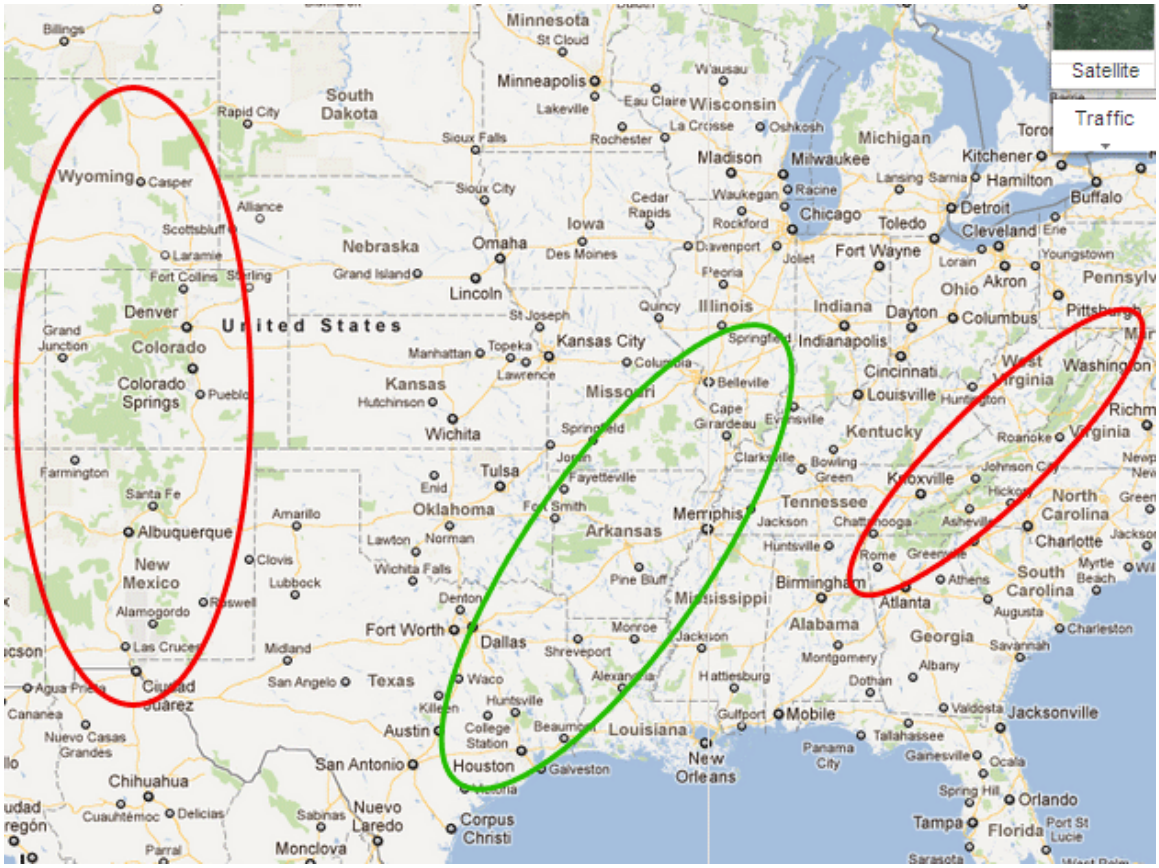


Figure 2[3] – Midwestern Forests. The red bands roughly encompass the Rocky and Appalachian Mountain Ranges. The green band demonstrates the rough distribution of Midwestern forests (not including the Great Lakes region).

[2] http://www.fema.gov/plan/prevent/saferoom/tsfs02_torn_activity.shtm

[3] Adapted from the "Satellite View" of maps.google.com.

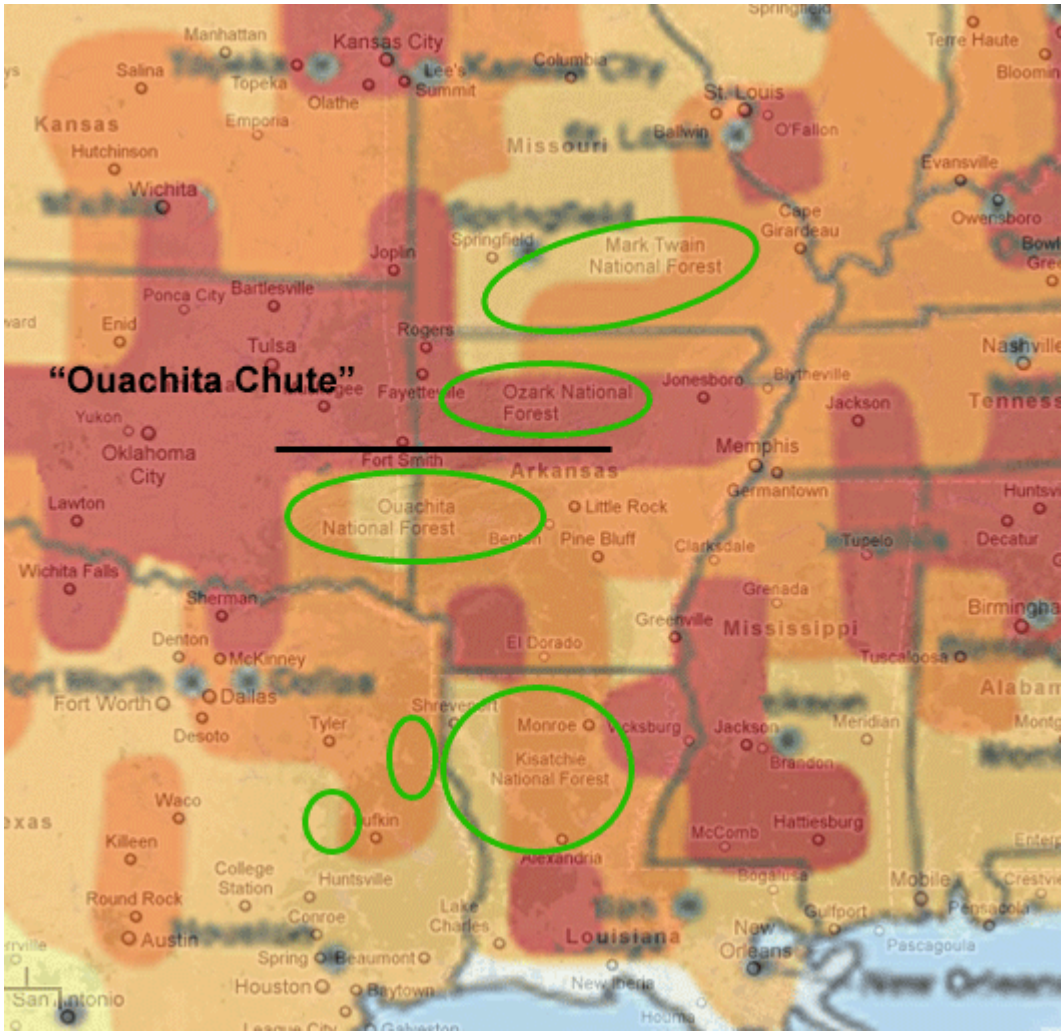


Figure 3 – An overlay of Figures 1 and 2. The green bands approximate the boundaries of the National Forests they encompass. The "Ouachita Chute", a tornado alley, is represented by the black line. Produced by author using Adobe Photoshop CS5.

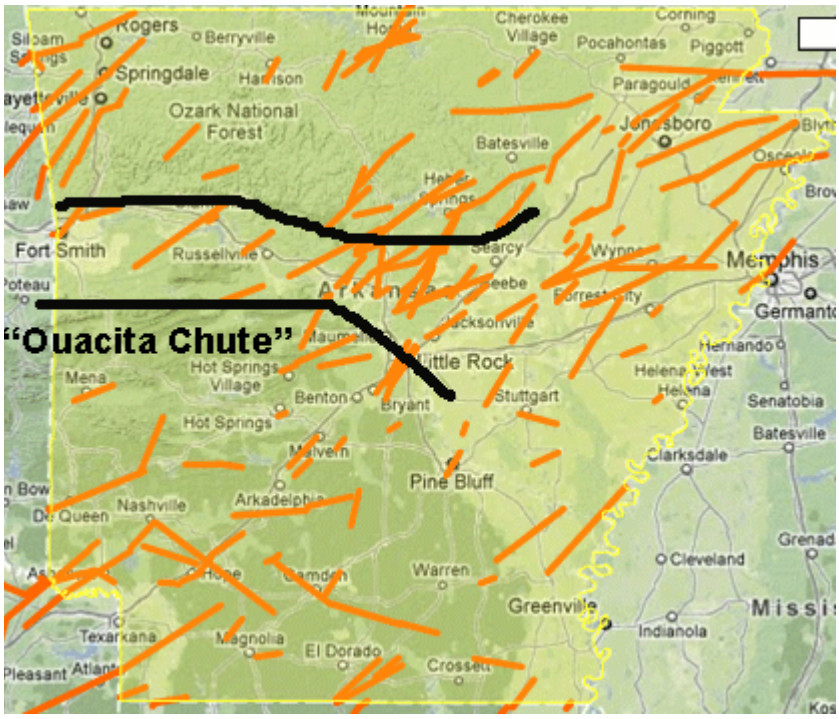


Figure 4 – Distribution and paths of F3 tornadoes documented 1950-2010 in Arkansas. Author outlines the "Ouachita Chute", an area of high activity lying between the Ouachita and Ozark National Forests.*

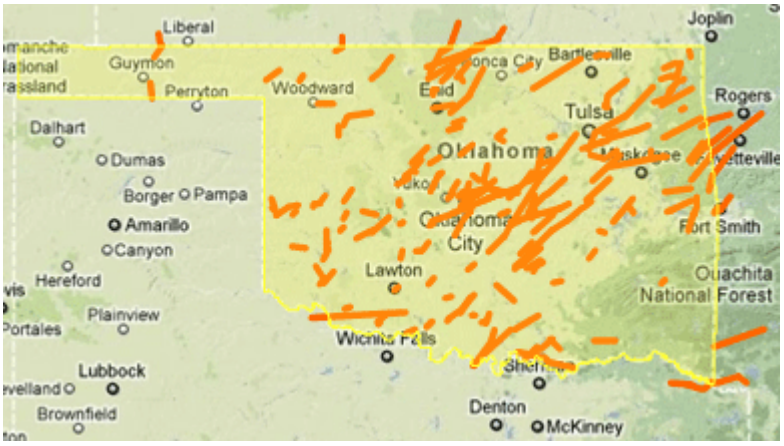


Figure 5 - Distribution and paths of F3 tornadoes documented 1950-2010 in Oklahoma. Notice the absence of activity in the forested southeast.*

*Figures 4 and 5 were obtained from queries initiated at http://www.tornadohistoryproject.com/, whose data sets are derived from the Storm Prediction Center's (SPC) historical tornado data file provided by NOAA.