United States Department of Agriculture | Forest Service | National Forests in North Carolina

160A Zillicoa Street
P.O. Box 2750
Asheville, NC 28802
828-257-4200

File Code: 2580 **Date:** January 4, 2002
Route To: (2580)

Subject: Comments on Southern Forest Resource Assessment

To: Dr. David Wear

I have reviewed the Physical Factors (sections 2.6) of the draft Southern Forest Resource Assessment Summary Report. There are two conclusions that I would like to provide comment on.

The first conclusion states:

> While effects are variable, acid deposition does not pose a significant threat to forest vegetation or to stream chemistry through a vast majority of the South. The major exception is the Southern Appalachians where, because of soil conditions, increased acid deposition derived from oxides of nitrogen is expected to alter plant communities and stream chemistry.

I do agree with the statement that throughout most of the south that acid deposition will not pose a significant threat. However, the above conclusion has two points that I believe are incorrect based upon work conducted by the Southern Appalachian Mountains Initiative (SAMI). First, it appears there is an assumption that nitrogen oxides are expected to increase. Figure 1 shows the estimated nitrogen oxide reductions throughout the eight SAMI states (WV, KY, VA, NC, SC, TN, GA, and AL), which does correspond to a large portion of the region examined by the Southern Forest Resource Assessment. The three values to examine in the figure are the base, A2 in 2010 and A2 in 2040. The base case represents total estimated nitrogen oxide emissions for the 8 states, while the A2 emissions represent current laws, rules, and regulations that are being implemented. Clearly, it can be seen that nitrogen oxide emissions are expected to decrease in the future. Second, the conclusion states that nitrate deposition is expected to have a greater impact to terrestrial and aquatic systems then sulfate deposition. The SAMI analysis indicates nitrogen deposition is expected to decrease throughout most of the region; furthermore, sulfates will continue to play a significant role in base cation depletion due to mountainous soils retaining deposited sulfates and then releasing the sulfates in the future.

An additional conclusion statement I would like to comment on:

> Ozone pollution is forecast to increase anywhere from 20 to 50 percent between 1990 and 2025, but concentrations are and will continue to be highly variable across the South ... Ozone has reduced and will continue to reduce the growth of pine species in the South and future ozone damage could be exacerbated by a warming climate.

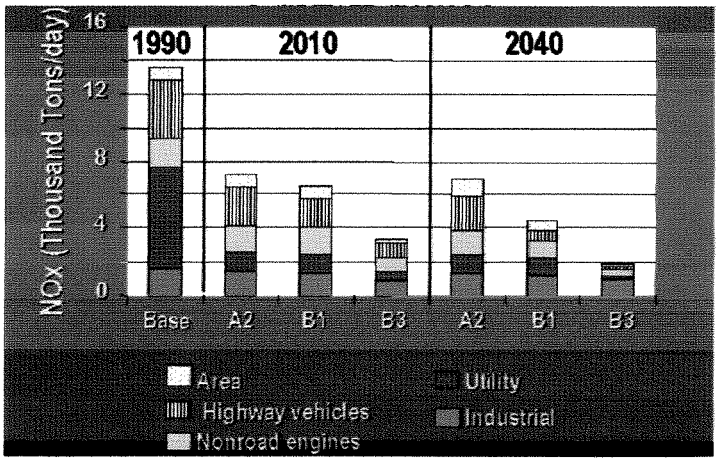

Figure 1. Future nitrogen oxide emissions for 8 states.

It is true that a warmer climate could lead to increased ozone formation due to warmer and sunnier days needed for ozone formation. Furthermore, high doses of ozone can result in the reduction in the amount of fine root formation and make the trees more susceptible to drought. These assumptions may be valid if nitrogen oxides are expected to increase, but as discussed previously, most likely nitrogen oxide emissions will decrease in the future. Certainly an anticipated increase in ozone (exposure) of 20 to 50 percent by 2025 will not occur and the cumulative ozone exposures (Figure 2) and peak ($\geq$0.100 ppm) concentrations are expected to decrease at low elevation (Figure 2) and high elevation sites in the SAMI domain.

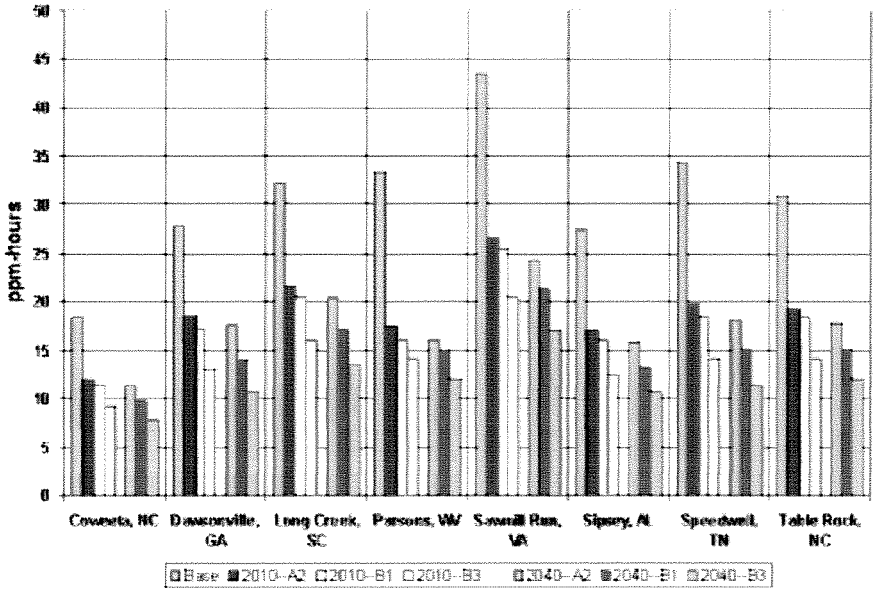

Figure 2. Response of ozone exposure (W126) to decreasing nitrogen oxide emissions.

Decreases in the ozone exposure will lead to increase growth for some pines depending of the forest type. The Draft SAMI report on ozone effects to forest trees presents this relevant finding after using the TREGRO and Zelig models. Between 1995 and 2010 loblolly pine is expected to **increase** (for OTW, or A2) in basal area by about 25 percent for two forest types in two ozone regions (Figure 3); and by 2040 the basal area is expected to increase by 55 percent in the loblolly-hardwood type in the Sipsey ozone region (Figure 4). Therefore, the SAMI results indicate that loblolly pine, in stands mixed with hardwoods, are likely to increase in basal area because the stress caused by ozone will be reduced and loblolly pine will be able to out compete neighboring tree species. The results from the SAMI analysis may be applicable to a larger region if the loblolly-hardwood and oak-pine types are found elsewhere in the South, and current and future ozone uptake is similar to the Sipsey and Dawsonville regions in the SAMI analysis.

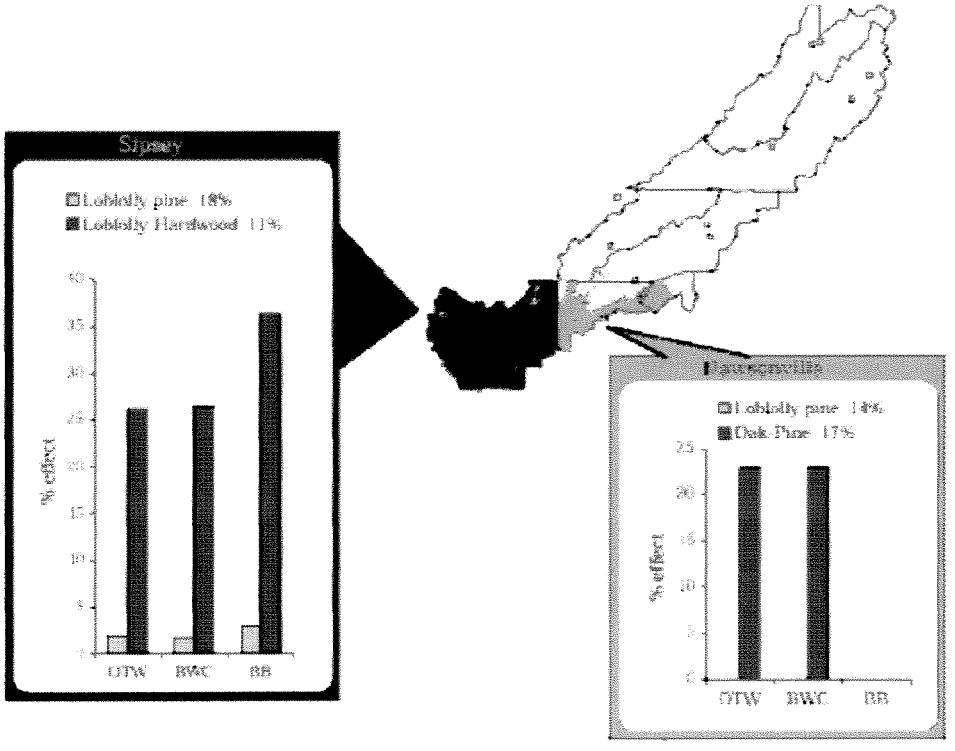

Figure 3. Loblolly pine response (OTW is the same as A2) to decrease nitrogen oxide emissions by 2010. The dark (black) area in Alabama used the Sipsey ozone monitoring data while the green area in Georgia, North Carolina, and South Carolina used the Dawsonville ozone monitoring data (see Figure 2).

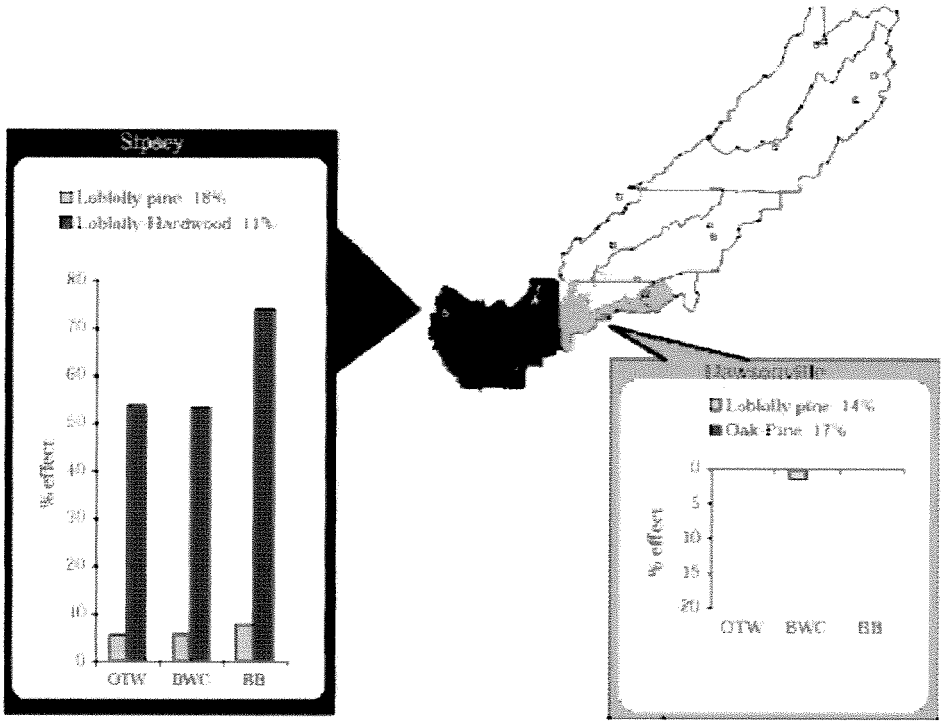

Figure 4. Loblolly pine response (OTW is the same as A2) to decrease nitrogen oxide emissions by 2040. The dark (black) area in Alabama used the Sipsey ozone monitoring data while the green area in Georgia, North Carolina, and South Carolina used the Dawsonville ozone monitoring data (see Figure 2).

Please contact me (828-257-4815) if you need to discuss further any of the points that I have made in this letter.

/s/ Bill Jackson
BILL JACKSON
Air Resources Specialist

Cc;

Bruce Bayle, R8	Keith Sandifer, Cherokee
Jerome Thomas, FM&S	Larry Hayden, NF in NC
Oscar Stewart, FM&S	Nancy Herbet, So. Station