FEWG – A WORKING GROUP FOR NCDFR MTM

NC Fire Effects Technote 01 – May 4th, 2009

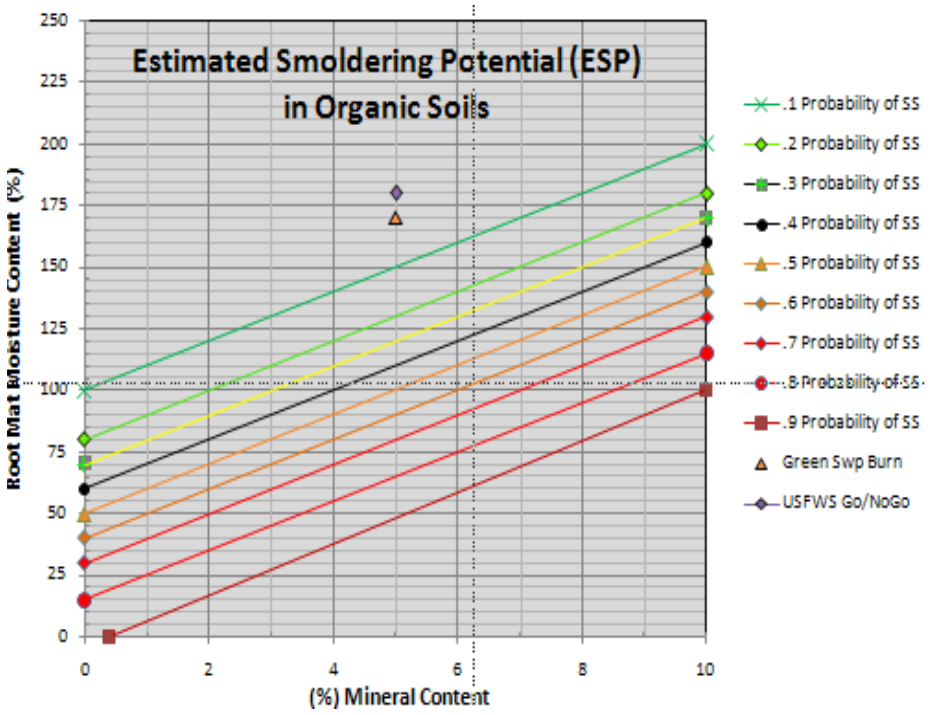
ESP – Estimated Smoldering Potential

"Research develops a tool to estimate the probability of sustaining a smoldering ignition in organic soils." Wetland communities (pocosins) with deep organic soils or mineral soils with thick organic horizons present a serious challenge to fire managers. One factor limiting the use of prescribed fire in these wetland communities and its acceptance as a natural resource tool, is the lack of knowledge about conditions leading to sustained organic soil consumption. Whether it be prescribed fire or wildfire, will mop up action be required and if so to what extent? Will it require an extensive as well as expensive water pumping operation?

At present, tools for evaluating the potential for ground fire in wetlands are limited. However, the use of better predictive models for smoldering combustion potential that are based on measurable soil properties can improve the effectiveness of burning and wildfire programs and increase management options and opportunities.

On February 11th 2009, the Division of Forest Resource successfully conducted the 1st operational prescribed burn in a pocosin forest type. This 618 tract was located within the Green Swamp Preserve of the Nature Conservancy in Brunswick County. In the past, other small scale research burns had been conducted. The purpose was to reduce hazardous fuel buildup & to successfully bring fire back into a fire dependent plant community type.

This operational burn applied current science and ongoing research to provide for a successful outcome. The ESP model was built through the efforts of Jim Reardon and many years of research in NC's pocosins as well as other places. The ability of organic soils to sustain smoldering is dependent on its moisture content and mineral content. As the moisture content of the organic soils increase, the ability to sustain a smoldering type fire depends on the mineral content as well. As the mineral content increases smoldering fires in organics can be sustained at higher moisture content levels. Please refer to the ESP Graph to see this relationship.



The duff / organic root mat moisture for the Green Swamp Burn averaged above 200%. The decision to burn or the "No go decision point" was set at ≤ 170%. The US Fish and Wildlife Service in eastern NC typically use a decision point of ≥ 180% moisture as their criteria. High duff/organic root mat moisture percentages provide fuel bed conditions that can limit the probability of sustained smoldering but this depends on the level of mineral content present.

The results from monitoring fire and fuel conditions will assist in validating predictive Models to estimate the smoldering combustion limits of organic soils in North Carolina. Any Model that is based on measureable soil properties will help Fire Managers when burning in pocosins or wetland community types and during wildfire events in similar fuel types. Predictive models would help managers conduct prescribed fires with confidence with minimal or limited mop-up resources. This is provided they can predict the probability of sustained smoldering. The ESP Model can also provide more cost-effective use of limited wildfire resources (personnel and equipment) if the potential for ground fire can be predicted in advance. Burning at a 30 % ESP level may be deemed to great of risk, produce long lasting residual smoke and costly to mop up, while burning at 150% moisture content at 5% mineral content with a less than 10% Probability of ESP would be an acceptable level of risk and cost.

The ESP cooperative research will be ongoing through 2011. It is to be applied to more sites for operational burning and validation. The applied results will hope to continue to demonstrate to natural resource managers that successful burning in wetland community types can be accomplished with limited risks of sustained smoldering if fuel bed conditions are properly measured and assessed with predictive models.