Soil Samples: Unearthing the consequences of strip mining
By Lew Carter, Soil Scientist

"It's in the soil, Katie Scarlett."
Remember the line from Gone With the Wind? A father presses a cup of rich soil into his daughter's hand and reminds her of her heritage and her future. While most of us no longer make our living from the land, and we're not particularly tied to it, even the casual backyard gardener knows that the quality of the soil dictates the possibilities for the plants.

Strip mining followed by failed reclamation practices change the soil fundamentally and forever. The changes are chemical, geographical, hydrological and qualitative.

Here's what happens. Strip mining takes what's under the ground and puts it on top. Soils that have taken hundreds or thousands of years to form are displaced with the oldest on top and the newest at the bottom. When mining is complete, different kinds of earth are relocated from their original place in the ecosystem. After mining, what began as an integrated functioning natural system with a diversity of plants and soils is segregated as sand tailings, phosphatic clays, overburden and unmined but disturbed areas. Only preservation areas—where the mining companies cannot go—are left as they were. Obviously, preservation areas are a fraction of the total mine.

It's because of this total disruption of the natural system that mining companies are required to "reclaim" the land. The law says they must restore the land, type for type, function for function. Soils are a key indicator of how well they've done their job.

As part of the technical team evaluating IMC-Cargill's proposed Ona Mine, it was my job to review reclaimed sites, evaluate the soils, and compare them to the proposed Ona site. The purpose was to see if present reclamation works—is the land restored and functioning? Without good soil, the land cannot recover from the trauma of strip mining. More important, because Hardee County, where the Ona mine is proposed, has an economy based on agriculture, the soils must be restored. Poor soils will have a direct and measurable effect on land use.

Based on months of research, observations, soil samples and analysis I have concluded that there is no soil on reclaimed sites. What's there is unconsolidated soil material—the stuff that should become soil, but never does. While that material minimally supports plant growth, the poor quality of what should be soil is reflected in the quality and quantity of vegetation.

Anyone can look at the sparse, and in some cases sickly, vegetation on reclaimed lands and see that something isn't right. Here's what the average observer cannot know:

- **The natural relationship between the soil and the water table does not exist in reclaimed sites.**
  In both uplands and wetlands there are variations in elevations and soil types. These natural variations create diverse habitats and function differently. Without

the variations, water can percolate through the ground too quickly, or fail to percolate at all. Based on my research of reclaimed sites, the water table is permanently altered and reflects neither natural systems nor the targets required by reclamation.

- **There is visual evidence that the quality and quantity of vegetation on reclaimed sites is poor. This has resulted from a dramatic change in pH, which has reduced the amount of soil organic matter (a basic component to make soil).**
  Strip mining changes the acidity of the soil. That changes the chemistry of the basic compounds that make soil. These compounds vary in their ability to hold moisture and therefore sustain vegetation through dry periods. The soils on all of the reclaimed sites are nutrient poor and do not support the diversity of microorganisms, vegetation or conditions necessary for native communities.

- **There will be a long-term effect from the unnatural water table. The lack of fluctuation causes a reduction in the quality and quantity of plants and animals on reclaimed sites.**
  Strip mining severs the normal water flow. This fragmented hydrology, coupled with the failure of reclamation to replace critical surface soils and effectively restore streams and wetlands, results in a complete disruption of the natural relationship between soil and water.

My point is that strip mining is what it is—the total disruption of the land and soils, resulting in the total disruption of the ecosystem including water resources and living things.

But reclamation isn't what it should be—the restoration of the natural functions of the natural systems. Reclamation doesn't work and that failure begins with the soil.

If the mining and reclamation of Ona proceed as planned by IMC-Cargill and tentatively approved by the Florida Department of Environmental Protection, the naturally rich soils of Ona will not be handed to the next generation. Rather, we will give them a handful of unconsolidated soil material—something that will not sustain agriculture and will never come close to the diverse, abundant natural systems we presently have.

Our future, and certainly Hardee County's, is tied to the soil and so we must insist that it be protected now and for the future.