The Meaning of the Nine Inch Rule

By David Marceau

Now that the dust has settled it is time to talk about the work that needs to be done in order to adjust to some of the changes that have been made in the Subsurface Wastewater Disposal Rules. For purposes of this article I would like to focus on section 400.4 of the code which is the modification of suitable conditions to limiting factor outside the shoreland zone from 12" to 9" (a/k/a the nine inch rule). As most of you know, I was a strong advocate for the nine inch rule. I stated this during our annual meeting as well as in my written and verbal comments to the department. The primary reason for me was that I have always felt that the subsurface rules should be about the treatment of wastewater and not be used as a land use tool. Therefore, where ever the proper treatment of waste water takes us is where I want the rules to be. I believe most of you agree with me on this point. However, we clearly don't all agree on the way to accomplish that goal**.** To me there is a lot of evidence that allowing the nine inch condition to come the standard does not compromise water quality in any way as long as site evaluators are capable of properly identifying design conditions. Having said that, I do believe there are issues with some site evaluator's level of knowledge and quality of work. However, I don't think the answer to the problem is to acquiesce to the people who are the problem. I believe we need to spend the time, money and effort it takes to insure that all parties involved understand and comply with the nine inch condition so we have proper treatment of wastewater and no water quality issues. I could write many more pages explaining my opinions on this and other issues; however, this is not what I want this article to be about.

Before I go any further, for those of you who are not familiar with me, I feel the need to explain my background a bit. I graduated from UMO in 1981 with a B.S. in Natural Resource Management and a minor in soils. I have been a Certified Soil Scientist in Maine since 1985, a Licensed Site Evaluator since 1987 and a Certified Wetland Scientist in NH since 1990. I have been delineating wetlands since 1988 and have permitted almost any type of wetland impact you can think of. My need to explain my back ground should be obvious in the next paragraph or two.

Allowing the nine inch rule to be the new standard means that many areas adjacent to wetlands, within old pastures, and other conditions that would not have previously passed muster will be scrutinized for potential septic systems. Many of these areas have dark surface horizons (to be defined later), possess spodic horizons or have deep plow layers. Each one of these issues presents a somewhat different set of problems which need to be overcome.

Perhaps the most prominent issue is the fact that the code does not allow first time systems to be placed within wetlands. Thus, areas adjacent to wetlands could be suitable for a system as long as the wetland issue is addressed. Depending upon a given site evaluators expertise this may or may not be a tricky one. If you are confident that any area within the leachfield and the fill extension associated with this leachfield meet the nine inch condition then you have addressed the primary issue for the design itself.

Note: *When making the determination that a given soil meets the nine inch condition you must remember that you are not just looking for mottles. If a soil has a dark surface horizon, plow layer or spodic horizon you will need to take some extra steps to know for certain that a seasonal high water table is at least nine inches deep in the soil profile* (*more on this later)*.

Soils are one of the three components that are necessary to identify a wetland and making certain that you have a minimum of a nine inch seasonal high water table eliminates it from being a hydric (wetland) soil. Therefore, if you don't have a hydric soil you don't have a wetland. However, you're still not off the hook by my way of thinking. You must somehow address any other wetland impacts (driveways etc.) for the rest of the project unless you specifically explain to your client that you are not doing so. The reason for this is that most people who hire us expect us to address their ability to build within a given area, and they do not know what other questions (if any) they should be asking in order to do so. Notice I said a site evaluator must *address* wetland impacts, that doesn't mean that the site evaluator has to do the wetland delineation, permitting or other associated work him/herself. However he/she does have to explain that it needs to be done by someone.

The standards that the State of Maine DEP and the U.S. Army Corp. require for identifying wetlands are outlined in the 1987 Army Corp. Manual. The morphological criteria for determining hydric soils are within the Maine Association of Professional Soil Scientist drainage class key **as soils that are poorly and very poorly drained. A copy of this drainage class key is incorporated as part of the subsurface code within table 400.1.**

As stated above, there are three criteria used to delineate wetlands. The first is soils, the second is vegetation and the third is hydrology. In my opinion, if you have hydric soils and a predominance of wetland plants (hydrophytes) then you will have a wetland. The reason for this is simple. If you have hydric soils and hydrophytes it stands to reason that you will be able to observe the evidence of these wet conditions (wetland hydrology). The way to determine whether vegetation in a given area meets the criteria is to identify the various vegetative strata (trees, saplings, shrubs and herbs) within the area you are examining and then determine their wetland rating, or, to put it another way, the percent chance of occurring in a wetland. For those of you not used to botany or dendrology this will be a challenge. Once this task is completed you need to tally the dominant plants and determine if more than 50 percent are rated as occurring in a wetland.

In my opinion, if a site evaluator is to address wetland related issues he/she will have to know precisely where a wetland boundary is in order to keep a system out of a wetland or, at a minimum, know how much impact a given proposal will have so that it can be permitted.

A primary issue which needs to be addressed in order to determine whether a given soils has a nine inch seasonal high water table (meets the nine inch condition) is making certain that the soil you are assessing is mineral and not organic. Since the code doesn't allow organic soils to be counted as part of the nine inches any organic has to be excluded from your point of measurement. Basically, soils that are wet tend to have dark surface horizons because the organic matter within them doesn't break down. Thus, soils that qualify as poorly or very poorly drained often have dark (***chroma 2 and value 3 or less*** as

determined by a munsell color chart) or very dark (***chroma and value of 2 or less***) surface horizons and have depleted or gleyed horizons directly below this surface horizon.

Note: ***I have not attempted to define depleted, reduced or gleyed matrixes in this article because they have rather long drawn out definitions. Very basically if you have chroma two or less and value four or more directly below the plow layer (depleted matrix) or redox features directly a spodic horizon that has dark colors you will not meet the nine inch criteria. The definitions for reduced and depleted matrixes can be found in the Field Indicators for Identifying Hydric Soils in New England, Version 3, April 2004; published by the NEIWPCC Wetlands Working Group; www.neiwpcc.org/hydric.htm.***

When the colors described above are found in surface horizons these horizons are high in organic content or may be organic and not mineral. As a frame of reference a fertile plow layer will generally come out as having a chroma and value of 3. It is only when this plow layer becomes saturated with water for a significant amount of time during the growing season that it possesses these dark and very dark colors which demonstrate that the soil has enough organic matter to qualify as being organic and not mineral. To the untrained eye the differences in color seem very subtle. However, if you spent some time looking at various conditions you can pick up potential problems reasonably quickly.

Another problem soil condition related to the nine inch rule is soils that mask their ability to demonstrate mottling (known as redoximorphic features to soil scientists) due to plowing or the process of forming spodic horizons (podzalization). The fact that a soil does not display any “mottles” that can be visibly observed does not necessarily mean that it is not saturated. In fact this is one of the reasons soils scientists have decided to describe wet soils by incorporating redoximorphic features rather than sticking to describing mottles. Signs of wetness can be oxidized rizopheres, organic staining or even an entire horizon which is depleted or gleyed (none of which are mottles). Thus, you need to be aware that some soil horizons mask the evidence that mottling is trying to produce.

We all know that soils take a relatively long time to form and thus any mixing process such as plowing will not allow the signs of wetness to be displayed for two reasons. First, the relatively high organic matter content of a plow layer masks the colors mottling produce and secondly the mixing of the soil caused by plowing has not allowed enough time for the mottles to form.

In the case of spodic horizon development you have iron, aluminum, and organic matter moving out of an albic horizon (grey ashy looking layer) and into a spodic horizon (reddish layer). Very often it is difficult to pick up evidence of wetness in these two horizons because the whitish color of the albic horizon cannot be seen from the whitish color the reducing process of mottling is causing and the reddish color of the spodic horizon cannot be seen from the reddish color the oxidation process of mottling is producing. Basically, the podzalization process is stronger than the mottling process so it usually wins out.

The key to figuring out whether a soil that you think could be wet, is wet, is to take a good hard look at what there is for evidence of wetness just below the plow layer, spodic horizon, or other condition (fill?) which you believe may have masked the evidence of mottling. If you find mottling directly below the plow layer etc. than in most cases all bets are off. Obvious evidence of wetness is when you find a

depleted or gleyed horizon directly below the horizon in question. This means that you have an entire horizon telling you it is wet not just a few splotches which mottling indicate.

So, we all have some catching up to do in order to retune ourselves for the new rules. You will be seeing me assisting in this process through the education committee. I welcome any comments, but remember I'm just a volunteer so I can't spend all of my time on these types of projects. The one thing every site evaluator is going to have to do is get used to using a munsell color chart to determine soil colors. These color charts can be purchased through several outlets; the ones I am familiar with are Forestry Suppliers and Ben Meadows. They cost in the range of $120.00. Until next time, I hope you and your family survive the economy.