MAINE DEPARTMENT OF AGRICULTURE, CONSERVATION

AND

FORESTRY

SOIL AND WATER CONSERVATION GUIDELINES REGARDING THE CREATION OF NEW AGRICULTURAL FIELDS OR THE EXPANSION OF EXISTING AGRICULTURAL FIELDS IN FORESTED AREAS

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From time to time, Maine farmers find themselves needing to expand an agricultural field or create a new agricultural field from a lot that is currently wooded. The Maine Department of Agriculture, Conservation and Forestry strongly supports these efforts but cautions that without proper planning and a good understanding of the soils and hydrology of the land, there may be unintended environmental impacts. In some cases, the environmental impacts result in water quality violations or violations of environmental laws leading to fines and costly remediation efforts. In addition, excessive erosion from a newly expanded or created crop field robs the farmer of their most valuable and productive soil layer.

The purpose of this guidance document is twofold; 1) to point out things to look for and how to avoid or minimize environmental impacts from the creation of new agricultural fields or the expansion of existing agricultural fields into wooded areas and 2) to prevent the degradation of the soil and water resources of the area they would like to convert from forest land to crop land.

ENVIRONMENTAL IMPACTS:

There are a number of things a farmer must consider before beginning the physical process of converting a forest into an agricultural field or expanding an agricultural field into a forested area. One of the issues, which may not be first and foremost on the farmers mind, is environmental impacts. The primary environmental issues associated with creating a new or expanded agricultural field are impacts to protected natural resources such as wetlands, significant vernal pools, streams, rivers, lakes and ponds. This includes direct impacts such as the alteration of a wetland, filling a significant vernal pool, redirecting a small stream or altering the buffer area around a protected natural resource. There are many rules and regulations, local, state and federal, concerning the alteration of wetlands, vernal pools and waterbodies. Indirect impacts are impacts which are not caused by the direct actions of the conversion process but happen at a later date as a consequence of the conversion. Though the impacts

may be indirect, if they affect wetlands, vernal pools and waterbodies, they may still trigger violations of local, state and federal regulations. The primary indirect environmental impacts are soil erosion/sedimentation and altering the natural hydrology.

Soil erosion is the loss of soil material from an area. This can be caused by wind, water, ice or gravity. In Maine, the primary cause of soil erosion is water though wind can also be a factor, particularly when the soil surface is dry and windy conditions prevail. The water based erosion process begins when the soil that was once protected becomes exposed to the forces of erosion. In a forested area, the soil is protected from erosion by plants, including their roots, and an organic duff layer comprised of leaves and twigs in various stages of decomposition. Trees intercept rainfall, slowing the velocity of the raindrops so they gently hit the forest floor where they are absorbed by the forest duff layer. An undisturbed soil, over time, develops soil structure which allows the rainfall and snow melt to infiltrate into the soil. Soil structure in the topsoil layer is formed by individual soil particles (sand, silt and clay) clumping together into various shapes and sizes. Pores between the soil structural units provide pathways for air and water to move freely into and through the soil. Surface horizon soils have the best structure because of the interaction of soil microbes and soil organic matter. They generally have many small structural units so there are many pores for air and water to move through in the soil. When the soil is disturbed, the soil structure is destroyed making it more likely that water will run across the soil surface than infiltrate into it. When the trees and other vegetation are cut and the roots pulled, the soil is disturbed and exposed to erosive forces.

Once a soil is disturbed, the degree or severity of erosion is a function of **soil texture; depth to hardpan, bedrock or seasonal groundwater table; degree of slope and length of watershed**. Soils that are comprised mostly of clay particles have low permeability compared to soils comprised mostly of sand or gravel. More water will run off from soils with low permeability than soils with high permeability. Soils with a shallow depth to hardpan, bedrock or a seasonal groundwater table can only hold a small amount of infiltrating water before they fill up and the water begins to run off over the soil surface. It is kind of like filling a container with water when the container has small holes in its sides (representing soil pores). A small shallow container will fill up quickly and spill over if the rate of water added exceeds the rate that water can go out of the small holes. A large and deep container however, will take longer to fill up and may be able to infiltrate the rain from an entire storm even if the rate of rainfall exceeds the rate that water can move through the small holes in the side of the container. It has much greater storage capacity. The steeper the slope of the area where soil is disturbed the greater is the likelihood that erosion will occur. This is because rainfall or snow melt will not sit in one place for long before moving across the soil surface and because the steep slope will cause the water to move faster across the soil surface giving it a greater ability to pick up and carry soil particles. Fast moving water can carry more and larger soil particles than slow moving water. Finally, the length of slope that water can run across is important because it determines how much runoff water from above will be added to the water falling as rain or snow melting on a soil surface. Much more erosion potential exists on a site where it is 200 yards to the upslope edge of the forest than for a site where it is 10 feet to the upslope edge of the forest.

Sedimentation is when eroded soil particles are deposited somewhere else. The particles might be deposited on the same property but can also be deposited on another person's property or in a stream, pond, wetland or road ditch. Sedimentation on another person's property or in a protected natural resource is a violation and may result in fines and expensive remedial costs. Sedimentation occurs when soil particles settle out from the water that caused the erosion. This happens because the velocity or speed of the water that caused the erosion slows down and no longer has enough energy to carry the soil particles. Runoff water speed can slow down because of a change in slope (steeper slope to a gentler slope), when the runoff water encounters resistance (manmade such as silt fence or hay bales or natural such as an area with thick vegetation and an uneven soil surface) or when the runoff water reaches a waterbody that is moving slower than the speed of the runoff water. Large particles such as sand grains settle out first and clay sized particles take the longest. It can take several months for clay particles to settle out of water that is no longer moving.

Groundwater Hydrology is the amount of water in the soil and how it moves through the soil. It can have a significant impact on the use and management of a soil. On soils that are well drained with a deep groundwater table, groundwater hydrology is not much of a concern. For soils with a very shallow depth to groundwater table, use and management are greatly affected. If the soil with a shallow groundwater table is located in a low and/or flat area, the site may be a wetland and may contain significant vernal pools. For the most part, wetlands cannot be altered (filled or drained) without first obtaining a permit. Also, altering a wetland may trigger a violation of the Natural Resources Conservation Services Wetland Conservation Compliance provisions commonly referred to as "swamp buster" and result in losing eligiblity for cost share monies or technical assistance from USDA agencies. Typically, these areas are relatively easy to identify in the field at the time of year when the groundwater table is the highest (spring and fall). You will get your feet wet when walking across them. Sometimes though, a property contains an area that is not technically a wetland but it has a high seasonal groundwater table that you don't see because it rarely or never comes to the surface. You may not be aware that the site has a high seasonal groundwater table until the soil is disturbed. Typically, these soils are found on long sloping sites in soils that have a shallow depth to hardpan or bedrock and are on the mid to lower part of the slope. These areas do not technically qualify as wetlands because the groundwater contains oxygen (it is moving and not stagnant) but if disturbed, these soils can be very wet and difficult to deal with. They can also be subject to extensive soil erosion and sedimentation because of the amount of water in them and the fact that they are located on a sloping landform. Quite often, the groundwater is actually flowing between and/or just below roots of trees and/or in between stones, just under the organic duff layer. Many of these soils have a very stony surface. Once disturbed, the shallow groundwater comes to the surface and becomes an erosive force particularly when added to surface water runoff from higher up in the watershed. These areas can be difficult and expensive to modify so that they can be used to produce agricultural crops including hay and they are not generally as productive as better drained soil.

Soil Degradation - When a farmer converts a forested area to an agricultural field, it is with the intention of eventually producing an agricultural crop. It is therefore, in the best interest of the farmer to maintain the maximum productivity of the land for producing the proposed crops. The productivity of a soil

depends on a number of variables but in almost all cases, the most productive part of the soil is the upper part or "topsoil" layer. It contains the best soil structure, most nutrients, highest percentage of organic matter and beneficial microorganisms. It is also the soil horizon most subject to erosion when a soil is disturbed by removing its protective cover and loosening it up. If significant soil erosion occurs, not only will the farmer lose the most valuable soil layer, it will likely be deposited in an area that may trigger a violation prompting fines and the need for remedial actions. Therefore, the farmer should take appropriate steps to minimize the loss of this valuable resource so that it does not become a costly liability.

STEPS TO TAKE BEFORE BEGINING TO CONVERT A FORESTED AREA TO AN AGRICULTURAL FIELD:

1. The first step to take before beginning to clear a forested area to create a new or expanded agricultural field is to do some research. Begin by checking local and state regulations (DEP for organized areas or LUPC for unorganized parts of the state) to see if there are any known protected natural resources on the property that are regulated. This includes buffer areas that can be as much as 250 feet from a protected resource that might be on a neighboring property. You should also find out if there are any local regulations that might affect the conversion process. Some town rules are stricter than state minimums. Another contact you should make is with the Maine Forest Service (MFS), particularly if you are going to be clearing 5 acres or more. You will need to fill out a "Forest Operations Notification Form" and send it to MFS before starting most harvests. You can reach MFS at 1-800 367-0223 (in-state) or by e-mail at forestinfo@maine.gov.
2. The second step is to learn as much as possible about the physical properties of your land. Those properties will have a direct bearing upon what you can and cannot do with the property and how you should go about doing it. Important physical properties include: soil type, hydrology, depth to groundwater table/hardpan/bedrock, size of contributing watershed, slope of land and length of slope, presence of protected natural resources or buffer areas and proximity of lot to protected natural resources on adjoining property. Every site is unique and you need to actually walk the property, looking at what is actually there to be able to figure out what to do and how to do it. You should get a copy of the County Soil Survey Map of your land to help in the process. This can be done by contacting your local Soil and Water Conservation District or by using the Web Soil Survey (the Soil and Water Conservation District can help you with this). The County Soil Maps are not site specific, they can only show areas of soils that are about 3 acres in size or more, due to the scale of mapping, but they can be used as a general guide. Keep in mind that many of the forested areas not currently agricultural fields or urban land are that way for a reason. The most common reasons are limiting soils, hydrology or other site conditions. Most of the best agricultural land is still in agriculture unless development pressure was too great and it was converted to urban land. The more marginal land was either not previously converted or has been allowed to revert back to forest land because it was not worth the cost and time to farm it, until now. If possible, you should walk the property with a soil scientist or other expert in soil erosion/ sediment control. If you do not know anyone or cannot locate a soil scientist or

expert in soil erosion/sediment control, contact your Local Soil and Water Conservation District Office or the Maine Department of Agriculture, Conservation and Forestry, at (207) 287-3891.

3. Carefully plan how you are going to convert the land to an agricultural field. It is not wise to just go ahead when the urge strikes or the contractor first becomes available. That may result in unintended consequences to both your field and protected natural resources (remember the saying "Failing to plan is planning to fail"). Following are a few things you should include in your planning considerations before beginning the clearing and conversion process:
    a. Time of year to begin the process is very important. The spring and fall are generally not good times to have a lot of bare soil exposed to the elements. We usually get our heaviest rainfalls in the spring and late fall. Sometimes, we experience a dry spring but that is subject to change at a moment's notice. In fact, the one thing certain about weather is that it is hard to accurately predict. You do not want to be caught with a lot of exposed ground that can suddenly be subject to heavy rains. If possible, do the conversion in the drier summer months when it is easier to stabilize the soils by seeding the area. Work done in the fall will make it difficult to stabilize the soils with vegetation due to our short growing season. It is fine to cut trees in the fall or winter when the ground is frozen but don't pull the stumps or do any grading until the ground is thawed and you can stabilize it to prevent erosion.
    b. Do not begin the conversion while the soil is saturated. Soil structure is much more easily destroyed when it is wet than when it is dry which is why they rut up and compact easily. Once compacted and rutted up, the soil permeability is greatly decreased making them much more subject to erosion than soils with their soil structure still intact. Even well drained soils can be wet right after a storm event or during thawing conditions such as in the spring ("mud season").
    c. Begin the conversion process on the highest part of the land, leaving the lowest part for last. The highest part of the land is usually the driest and receives little runoff because there is not much higher ground in the watershed from which to receive runoff from. The lowest part of the land to be converted is usually the wettest. If the upper part of the land is converted first, measures can be used to divert runoff from them to suitable buffer areas so it does not impact the lower and wetter areas. It may also be possible to divert some of the groundwater impacting the lower areas. Doing this however, should be done carefully so that no unintended impacts result. In most cases, it is best to consult an expert in soil erosion/sediment control for advice on how to properly lower the groundwater table.
    d. Limit the size of the area to be cleared at any one time. In general, the larger the area cleared at one time, the greater the potential for a significant erosion problem. You should also be aware of the Forest Practices Act (FPA) a law that limits the size and distribution of clear cuts. FPA requires a Forest Operation Notification to be submitted to the Maine Forest Service. Any clear cut over 5 acres in size must meet certain standards unless the purpose of the clear cut is to convert the land to another use. In that case, you have two years to complete the conversion or you may be in violation.
    e. Stabilize each section (so it is protected from erosion) before beginning work on the next one lower in the watershed. If you encounter wet soil conditions while working on the conversion, stop until the soil dries up or the hydrology can be altered to make the soil drier

and firmer. Do not just dig ditches to dry up the soil unless it is under the direction of a qualified professional. Digging ditches in wet ground can cause a number of problems including alteration of a wetland and/or causing significant erosion at the outlet end of the ditch. If a ditch directly enters a stream channel, even a seasonal stream, it can cause erosion of the stream banks due to too much water and can cause sedimentation of the stream or the waterbody that the stream enters.

f. Install temporary erosion controls before beginning to pull stumps and disturb the soil. Do not remove the erosion controls until the soil has been stabilized.
g. If something goes wrong or you have a question, contact the Maine Department of Agriculture, Conservation and Forestry at (207) 287-3701.

For a list of rules and regulations pertaining to the expansion of existing or creation of new agricultural fields, see “Regulatory Issues Regarding Farm Ponds, Creating New And The Expansion Or Renovation Of Existing Agricultural Pasture Or Crop Fields” developed by the Maine Department of Agriculture, Conservation and Forestry. For information about ways to stabilize soil and protect water quality during tree cutting operations, see the publication “Best Management Practices for Forestry : Protecting Maine’s Water Quality”, available from the Maine Forest Service by calling 1-800 367-0223 (in state) or e-mail to forestinfo@maine.gov.