

RAP Rule Revision for Subsurface Tile Drainage Response to Comments**Required Agricultural Practices Rule Revision: Subsurface Tile Drainage****Section 12. Subsurface Tile Drainage General****Comment:**

Comment inquires why the State is addressing subsurface tile drainage through rule making, articulates concern about the overall impact and concept of subsurface tile drainage being misrepresented. Comment further explains that other states aren't using regulation to manage subsurface tile drainage, and that the Agency of Agriculture, Food & Markets (VAAFMM or the Agency) are not showing the whole picture of subsurface tile drainage, which comment states, is better than surface runoff for water quality.

Response:

The Agency is required to amend the Required Agricultural Practices (RAPs) to include requirements for reducing nutrient contributions to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. §4810a (b). The Agency acknowledges that benefits exist through the use of subsurface tile drainage, but must help to ensure that responsible land management decisions are being made surrounding subsurface tile drainage, and water quality in general, that will not create or maintain a resource concern.

Comment:

Comment requests that the Agency not add any additional rules impacting subsurface tile drainage installation on farm fields.

Response:

The Agency is required to amend the RAPs to include requirements for reducing nutrient contributions to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. § 4810a (b).

Comment:

Comment questions if there will be further rule making following this process. Comment also asks if there will be additional opportunity for public comment later in the rulemaking process, and if this language is the final draft. Comment states that it would be ideal to see the timing for the Secretary's decision making, regarding MFO GP related decisions, finalized before the rulemaking process is completed.

Response:

The Agency has been directed by the Vermont Legislature to create a certification program for Technical Service Providers (TSPs), which will require an additional amendment of the RAPs. The Agency plans to engage in rulemaking for TSP certification following the closure of this rulemaking process for subsurface tile drainage. Unless otherwise directed by the legislature, the Agency does not foresee any additional rulemaking at this point in time.

This proposed language amending the RAPs to include provisions addressing subsurface tile drainage will have an additional public comment period as prescribed by the Administrative Procedures Act. The proposed language, amended from the proposed language initially released for public comment, is not final. The proposed amendment will be sent to the Legislative Committee on Administrative Rules (LCAR), which will provide feedback and comments on the proposed language, at which point the Agency may make further amendments. Individuals may request to provide testimony at the LCAR hearing for the RAP Final Proposed Rule amendment.

The Agency is choosing to not include set timelines for the Secretary's decision-making processes on MFO GP decisions in this proposed amendment, as situations have the potential to vary greatly, and it is important for the Secretary to have flexibility in making determinations.

Comment:

Comment inquires whether all parties that introduce phosphorus into waters of the State are going to be involved with this process and if farmers should expect additional regulation on other topics following this proposed rule amendment on subsurface tile drainage.

Response:

The Agency only has regulatory authority over farming and farm operations, and does not have the ability to regulate other entities that may be contributing phosphorus to waters of the State.

The Agency has been directed by the Vermont Legislature to create a certification program for Technical Service Providers (TSPs), which will require an additional amendment of the RAPs. The Agency plans to engage in rulemaking for TSP certification following the closure of this rulemaking process for subsurface tile drainage. Unless otherwise directed by the legislature, the Agency does not foresee any additional rulemaking at this point in time. Implementation of the RAPs, effective December 5, 2016, remains the main focus of the regulatory and non-regulatory programs at the Water Quality Division at AAFM.

Comment:

Comment recommends that the Agency review the recent UVM Extension survey on the use and importance of subsurface tile drainage to Vermont Agriculture. Additionally, comment expressed the need for more research prior to any changes being made in the reporting of subsurface tile drainage, and mandates for those that use subsurface tile drainage. Comment feels it is imperative to let the academic research be completed and compiled prior to rulemaking.

Response:

The Agency has reviewed UVM Extension's survey relating to subsurface tile drainage. This research, similar to other on-going research locally focused, is still in its infancy and cannot be used at this point in time to inform rule making exclusively. The Agency has listened to feedback from farmers, environmental groups, other State agencies, subsurface tile drainage installers, and other interested parties and made changes to the proposed language for this amendment. While the Agency would ideally like to wait to promulgate rules for subsurface tile drainage until there are more clear results from ongoing research, the Agency is required to amend the RAPs to include requirements for reducing nutrient contributions to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. §4810a (b). The Agency is focused on including requirements in this amendment that promote and maintain the State's water quality and such requirements are widely supported by existing research and aligned well with standard industry protocol.

Comment:

Comment questions what research and science exists that indicates that subsurface tile drainage is a problem that needs a solution in the first place and asks the Agency to review research originating from the Miner Institute.

Response:

While the Agency agrees it is necessary and is committed to more research in Vermont on tile drainage and already is seeing consistently low contributions from the sampling sites that have been in place since this RAP revision began, there have been a few instances of concerning results from some precipitation events where we will continue to focus research to understand what is causing the increased losses and to identify solutions to address it. The Agency has reviewed the Miner Institute's work and will continue to do so. In addition, there was the *Literature Review: Tile Drainage and Phosphorus Losses from Agricultural Land*, compiled by Stone Environmental, that illuminated other research showing similar results as those gathered recently in Vermont on the benefits and challenges of tile drainage on water quality.

Comment:

Comment requests that manure application and stacking take into account the location of subsurface tile drains; that all tiles, both pattern and individual, be specifically mapped and subject to monitoring.

Response:

The RAP Final Proposed Rule does take into account the location of all types of installed tile drains with manure application and manure stacking requirements included in the rule. The USDA nutrient management standard, which is required in these rules, does require identification of patterned tile drainage in fields as part of the NMP standard. The Agency chose not to require mapping of non-patterned tiles in fields as not all farms are aware of their presence and location

for mapping purposes. The literature supports the focus of the RAP Final Proposed Rule on requiring field-specific management on pattern tile drainage and individualized site-specific management for dendritic tile lines.

Comment:

Comment indicates concern regarding the location and distance of a subsurface tile drainage outlet from the high-water level of the lake, and how this proposed rule amendment would address this.

Response:

The most important component to ensure nutrients are not conveyed to waters of the State, is the promotion of responsible land management decisions. Focusing on source management is crucial to ensure that nutrients are not leaving farm fields through subsurface tile drainage, this is managed through appropriate nutrient application on fields and implementation of conservation practices to minimize transportation of nutrients.

Comment:

Comment asks the Agency to exempt legacy subsurface tile drainage that are no longer functional from this proposed amendment. Comment questions whether there could realistically be any cost-effective improvements to these non-functioning systems, many of which were installed over fifty ago and the current owner is often unaware of how much subsurface tile drainage was installed and where the outlets might be.

Response:

The Agency understands this concern and has moved the language: “The Secretary may authorize site specific standards,” to Section 12.2 of the proposed amendment, to allow for the Secretary to authorize site-specific standards which could be utilized to exempt non-functioning subsurface tile drainage from these requirements.

Comment:

Comment indicated concern that parties involved with rulemaking for subsurface tile drainage are not informed on the process or reasoning behind using subsurface tile drainage.

Response:

The Agency has sought insight and recommendations from the Tile Drain Advisory Group, the RAP Development Committee and visited with several farm organizations prior to creating a draft of this revised tile drainage RAP rule. These groups include farmers utilizing subsurface tile drainage and tile drainage installers. The Agency attempted to get informed on the process and

reasoning behind the use of subsurface tile drainage by reaching out to the groups to assist in creating a rule revision that was practicable while meeting the intended water quality goals.

Comment:

Comment requests that this proposed rule would require inventory, mapping, and reporting of all fields with a known presence of subsurface tile drainage (both system pattern and individual systems), including the outlets of the subsurface drainage systems.

Response:

Farm operations that are required to have a Vermont (VT) Natural Resources Conservation Service (NRCS) 590 Conservation Practice Standard Nutrient Management Plan (NMP), as required for Large Farm Operations (LFOs), Medium Farm Operations (MFOs), and Certified Small Farm Operations (CSFOs), indicate the presence of subsurface pattern tile drainage through the University of Vermont (UVM) Phosphorus Index (P-Index), this includes inventory of all fields that are drained or undrained. The Agency feels that requiring an inventory and mapping of all fields with a known subsurface tile drainage presence would be redundant, arduous, and wouldn't necessarily accurately indicate the quantity of *functioning* subsurface tile drainage in the State – as many subsurface tile drainage systems were installed decades ago, no longer function, and are no longer utilized.

Comment:

Comment requests that rule would require subsurface tile drainage effluent monitoring of pesticides, phosphorus, and nitrogen through a monitoring program

Response:

The requirement of an individual farmer-specific monitoring program does not fall under the regulatory intent of this proposed rule amendment. The Agency is already authorized to and is currently engaged in monitoring for pesticides and is also contracting with water quality partners for the monitoring of nutrient losses from subsurface tile drainage. We will continue to support research into these areas.

Comment:

Comment requests that the proposed rule amendment develop a permit process for the installation of new subsurface tile drainage systems.

Response:

The Agency does not have authority to develop such a permit process, and would need statutory authority from the Vermont Legislature and additional staff resources to coordinate and implement such a program.

Comment:

Comment requests the Agency require adequate NMP and RAP compliance prior to future subsurface tile drainage installation.

Response:

Farm operation compliance with the RAPs and their NMP is required by law. The Agency inspects farms for RAP and NMP compliance on a set schedule and investigates all water quality complaints as they are received. Compliance may change rapidly on any farm operation as a result of many varying circumstances; just because a farm operation is in compliance at one point in time, it is not assured that would necessarily continue. Farm operations are continually working towards or maintaining compliance, and the Agency inspects to ensure compliance is achieved on a regular basis. Additionally, the notification and registration of subsurface tile drainage installation would need to occur through a new or revised permitting program, which the Agency does not currently have authority to require this at this point in time.

Comment:

Comment expresses concern that the farming community is undergoing stricter regulation regarding subsurface tile drainage, when many other industries, landscapes, and businesses utilize subsurface tile drainage as well.

Response:

The Agency was required to amend the RAPs to include requirements for reducing nutrient contribution to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. § 4810a (b). The Agency's jurisdiction only encompasses the agricultural realm and does not have authority to regulate subsurface tile drainage in non-agricultural fields.

Comment:

Comment indicates concern that the Agency had already decided on the language for the RAP rule revisions for subsurface tile drainage prior to the public hearing and commenting process.

Response:

The Agency reached out to several groups mentioned above prior to creating a draft, and then conducted three public hearings and a public comment period to hear feedback on the proposed language, which will be taken into account, considered, and used to inform changes to the proposed language before the proposed rule amendment moves towards finalization. The provisions that are reaffirming requirements from the RAPs are already, and have been, in effect. The Agency has revised the format of the RAP Final Proposed Rule in an attempt to streamline the rule and ensure redundancy is removed for clarity.

Comment:

Comment indicates that proposed language should be more strict, include buffer zones requirements, and require moving farms off the lake and away from critical drinking water sources. Comment also indicates that agriculture should not be exempt from the Lakeshore Protection Act.

Response:

The Agency has listened to feedback from farmers, environmental groups, other State agencies, subsurface tile drainage installers, and other interested parties and made changes to the proposed language for this amendment. The proposed language does include a required 25-foot buffer of perennial vegetation around pre-existing surface inlets. The Agency has no authority over the Vermont Shoreland Protection Act, which is regulated and enforced by the Vermont Agency of Natural Resources Department of Environmental Conservation.

Comment:

Comment expresses opinion that all runoff from subsurface tile drainage coming from an actively farmed field should not be allowed to be discharged directly into a water of the State without first being filtered through an appropriate wetland, retention pond, or other means of filtrations to remove nutrients. Comments also calls for monitoring of discharge from these systems.

Response:

Subsurface tile drainage, when functioning properly, allows for percolation of runoff through soils – removing many nutrients, similar to how rainwater is filtered through the ground before returning to the water table. When the water reaches the subsurface tile drainage system, excess nutrients have, by-in-large, been removed and utilized for crop growth. Research into additional filtration for water leaving a subsurface tile drainage outlet is ongoing and is supported by the Agency to explore whether this method could be an additional conservation practice used on farm operations to improve water quality.

A monitoring program does not fall under the regulatory intent of this proposed rule amendment. The Agency is already engaged in monitoring for pesticides and is contracting with our partners for monitoring nutrients. We will continue to support research into these areas.

Comment:

Comment questions how the proposed amendment will apply to non-certified small farms and farmland going out of production. Comment questions how proposed amendment will impact farmland recently purchased, where the farmland is going out of production and returning to brush, and the present subsurface tile drainage systems are no longer be utilized. Comment also asks who will follow up to a report of dirty runoff from subsurface tile drainage on a farm that falls below the threshold of a CSFO.

Response:

The proposed rule amendment applies to all subsurface tile drainage systems regardless of farm size, except Sections 6.03(d)(1) and 6.03(d)(2), which only impacts CSFOs, MFOs, and LFOs with subsurface pattern tile drainage. The proposed rule amendment only applies to cropland, so land that has gone out of production will not be subject to these regulations.

If there is a complaint made, the Agency will follow through with an investigation for all farm operations, including Small Farm Operations (SFOs), CSFOs, MFOs, and LFOs. For farms that fall below the SFO threshold, known as Non-RAP Operations (NROs), municipalities can create ordinances to manage these complaints. If a municipality does not have ordinances in place or chooses not to address the complaint, the Agency still has the authority investigate and enforce regardless of operation size when involving agricultural water quality concerns.

Comment:

Comment questions how runoff can be a concern for fields that are dry and cracked when subsurface tile drainage systems have been installed 5 or 6 feet in the ground?

Response:

This proposed rule amendment will apply to the entire State; in some areas, present soil types can be very concerning when dry and cracked fields provide a direct connection to the subsurface tile drainage systems through macropore flow. The Agency is addressing large cracks that can exist in fields, and the potential for macropore flow through Section 6.05(d) of the RAPs, which requires: “Manure or other agricultural wastes shall not be applied when field conditions are conducive to flooding, runoff, ponding, *or other off-site movement*, or can be reasonably anticipated to result in flooding, runoff, ponding, *or other off-site movement*, regardless of NMP recommendations.”

Comment:

Comment requests that the Agency revisit the RAPs in five years to update the best management practices (BMPs) for subsurface tile drainage, to adjust for current research, and to implement the BMPs that this research indicates.

Response:

The Agency will review the resulting science and update the RAPs as deemed necessary, or as required by the Legislature.

Comment:

Comment requests that the proposed Section 12 of the RAPs be reopened in 2022 to include the results of current, ongoing studies. Comment asks that once the current research is completed, it

should be used to update this Section to include improved BMPs, techniques and new treatment technology. Comment recommends that a certain date be set for this update to ensure it occurs. Comment recommends including language similar to language used in Section 1.6 of the RAPs, such as: ‘On or before January 1, 2022, the Secretary shall evaluate the current status of effectiveness Section 12 of the Required Agricultural Practices (RAPs), and will amend Section 12 of the RAPs to include the results of any subsurface tile drainage studies, including any new best management practices (BMPs) and findings.’ Comment indicates the importance of the regulation reflecting the results of this research, and that agricultural practices utilize any forthcoming BMPs as they are developed.

Response:

The Agency will review the resulting science and update the RAPs as deemed necessary, or as required by the legislature.

Comment:

Comment explains that vent pipes are built into subsurface tile drainage system pipeline to avoid the creation of suction in the vent pipes that can cause their collapse. Comment states that these vents should be clearly defined and separated from any requirements for surface inlets or other types of drainage involved with subsurface tile drainage.

Response:

Vent pipes, if installed in a manner that they do not convey water to transport it off the field, are not considered surface inlets. All vent pipes should ensure their elevation is set at a grade that would not allow surface runoff to enter during precipitation events. Any ‘vent pipe’ which is found to act as a surface inlet or open drain that is non-conforming with the requirements of the RAPs will be subject to enforcement by the Agency.

Comment:

Comment states that subsurface tile drainage provides such a large benefit to water quality in the State, that a requirement should be implemented requiring the installation of subsurface tile drainage in cropland.

Response:

The Agency does acknowledge the benefit subsurface tile drainage can provide to a farm operation, and also notes the potential resource concerns that can result from improper maintenance or management of subsurface tile drainage systems and cropland. A requirement for subsurface tile drainage installation falls outside of the regulatory intent of this proposed rule amendment.

Comment:

Comment indicates a need to control water leaving farm fields, and states that this proposed rule amendment is counterproductive in addressing this need. Comment indicates that this proposed amendment will not help control the water on farms that is conveying nutrients from fields to waters of the State, which subsurface tile drainage does a great job managing. Comment also states that cover cropping works well with tile, and this proposed amendment is getting ahead of the research.

Response:

The Agency has reviewed ongoing research relating to subsurface tile drainage. This research is still in its infancy and cannot be used at this point in time to generate rule making exclusively. The Agency has listened to feedback from farmers, environmental groups, other State agencies, subsurface tile drainage installers, and other interested parties and made changes to the proposed language for this amendment for clarity and to ensure that standards are implementable while still meeting water quality requirements. While the Agency would ideally like to wait to promulgate rules for subsurface tile drainage until there are more clear results from ongoing research, the Agency is required to amend the RAPs to include requirements for reducing nutrient contributions to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. §4810a (b). The Agency feels the requirements included in this proposed amendment are widely supported by existing research, in addition to standard industry protocol, which will promote and maintain the State's water quality.

Comment;

Comment states that the Agency should be an advocate of the agricultural community, instead of only being a mechanism of the State. Additionally, comment indicates concern regarding the speed in which rulemaking for subsurface tile drainage is occurring, that regulation is getting ahead of the research.

Response:

The Agency has reviewed ongoing research relating to subsurface tile drainage and written three reports on the subject since 2015. This research is still in its infancy and cannot be used at this point in time to generate rule making exclusively. The Agency has listened to feedback from farmers, environmental groups, other State agencies, subsurface tile drainage installers, and other interested parties and made changes to the proposed language for this amendment. While the Agency would ideally like to wait to promulgate rules for subsurface tile drainage until there are more clear results from ongoing research, the Agency is required to amend the RAPs to include requirements for reducing nutrient contributions to waters of the State from subsurface tile drainage, pursuant to 6 V.S.A. §4810a (b). The Agency feels the requirements included in this proposed amendment are widely supported by existing research, in addition to standard industry protocol, which will promote and maintain the State's water quality. Should the Agency find it necessary, or is instructed to, amend the rules involving subsurface tile drainage in the future due to the results from ongoing research, the Agency will engage again in rulemaking for subsurface tile drainage at that point in time.

12.1 Definition

Comment:

Comment asks for clarity regarding the definition of subsurface tile drainage, and states that the current definition includes all individual and pattern conduits used to drain surface or subsurface waters. Comment recommends that if this definition does not include all individual and pattern conduits, that the Agency include an expansive and all-inclusive definition.

Response:

The Agency has revised the structure of the RAP Final Proposed Rule for clarity. A definition of Subsurface Tile Drainage is now included as section 2.34. A specific requirement for “pattern tile drainage” has been incorporated in Section 6.03(d)(2) and is defined within that subsection. Unless specifically indicated within the Rule, the requirements for the appropriate application of nutrients and the management of farm fields to prevent the runoff of nutrients or soils from farm fields are required for all cropland fields in Vermont – inclusive of subsurface tile drainage and pattern tile drainage.

12.2 Requirements for Subsurface Tile Drainage

Comment:

Comment asks whether rodent guards must be vertical.

Response:

No, the Agency does not have specific requirements for size, shape, or type of rodent guard, as long as they prevent rodents from entering into subsurface tile drainage systems.

Comment:

Comment notes that rodent guards are regularly installed already, this is a very common practice. Comment questions if the Agency is requiring metal rodent guards so it will be easier to find subsurface tile drainage outlets.

Response:

The Agency does not have specific requirements for size, shape, or type of rodent guard, as long as they prevent rodents from entering into subsurface tile drainage systems.

Comment:

Comment inquires if stacking of silage rot within 100 feet of subsurface tile drainage is also prohibited on sites not approved consistent with USDA NRCS Standards or not otherwise approved by the Secretary.

Response:

Yes, silage rot is considered an agricultural waste and would fall under the requirements listed in 12.2(a) of the RAP Proposed Rule, and cannot be field stacked within 100 feet of subsurface tile drainage unless approved consistent with USDA NRCS Standards or otherwise approved by the Secretary. This revised requirement can now be found in Section 6.02(e)(4)(F) of the Final Proposed Rule.

Comment:

Comment states that manure should not be stored near tiles, as they act as a conduit for pollution and asks that this provision be clearer. Comment asks the Agency to please include the definition of “vegetative treatment areas” within Section 12, and adjust the regulation to read, ‘no field stacking manure and no new or existing vegetative treatment areas within 200 feet of any subsurface tile drain.’

Response:

The rule has a provision for existing vegetative treatment areas and the installation of new subsurface tile drainage, however the Agency is “grand-fathering” existing treatment areas that may be too close to an already existing tile line as they were engineered and installed through state and federal conservation programs in conformance with the requirements at the time of installation. Manure stacking of ag waste from a subsurface tile drained line is a proposed 100’ setback to be consistent with current RAPs where manure cannot be field stacked within 100’ of a surface water or private water supply.

12.3 Requirements for Surface Inlets**Comment:**

Comment indicates opinions that prohibitions against future installations of surface inlets inhibits the ability to manage surface runoff.

Response:

The Agency has included a provision that will allow for site-by-site decisions to be made by the Secretary regarding water diversion structures to manage surface runoff, as covered in Section 12.2 of the RAP Final Proposed Rule, listed below:

12.2 Requirements for Surface Inlets

For all farming operations subject to this rule, no new installations of surface inlets shall be located within or adjacent to cropland. For the purposes of this section, surface inlets do not include drainage controls such as diversion structures or grade stabilization practices approved by the Secretary.

Comment:

Comment states that surface inlets, when used appropriately, can be useful to divert clean water, by sending it under the field instead of through the field. Comment questions how long approval from the Secretary will take for designation as a clean water diversion structure?

Response:

The Agency has included a provision that will allow for site-by-site decisions to be made by the Secretary regarding water diversion structures to manage surface runoff, as covered in Section 12.2 of the RAP Final Proposed Rule, listed below:

12.2 Requirements for Surface Inlets

For all farming operations subject to this rule, no new installations of surface inlets shall be located within or adjacent to cropland. For the purposes of this section, surface inlets do not include drainage controls such as diversion structures or grade stabilization practices approved by the Secretary.

The Agency is choosing to not include set timelines for the Secretary's decision making processes in this proposed amendment, as situations have the potential to vary greatly, and it is important for the Secretary to have flexibility in making determinations. The Secretary of Agriculture is committed to processing requests as expeditiously as possible once a complete determination request is received by the Agency.

Comment:

Comment requests that the Agency include a definition of "surface inlets," to avoid confusion between those used in agricultural practices and those used for other purposes. Comment further states that as surface inlets are a direct conduit from the surface to a stream or ditch, a minimum 25-foot buffer should be required, similar to the RAPs requirement for buffers, adjacent to surface waters. Comment also requests a requirement that surface inlets be closed immediately prior to and for a specified time after manure and fertilizer application to allow for absorption.

Response:

'Surface inlets' are defined in the RAP Rule effective December 5, 2016. That definition remains the same for the RAP Final Proposed Rule, now numbered Section 2.35. The Agency explained that a surface inlet is located within or adjacent to cropland, which does not include drainage controls such as diversion structure or grade stabilization practices approved by the Secretary. The proposed language does include a required 25-foot buffer of perennial vegetation around pre-existing surface inlets. The Agency has been engaged in learning about technologies surrounding opening and closing surface inlets, however the research is relatively new and not ready inclusion in a rule as a regulatory requirement.

12.4 Requirements for Subsurface Pattern Tile Drainage

Comment:

Comment indicates that provisions of this section seem to be redundant and covered already either by the RAPs or in previous provisions in this section.

Response:

The Agency intended these provisions to highlight the coverage that subsurface tile drainage risk management receives already under the RAPs. The Agency is reiterating language from the RAPs to further educate that practices in the RAPs, relating to surface water management, also apply to subsurface tile drainage water management. The Agency has revised the RAP Final Proposed Rule for clarity and brevity and to remove the possibility for confusion. The requirements outlined in Section 12.4 of the RAP Proposed Rule will still apply to all tile drained fields, however they have been reintegrated into Section 6 of the RAPs. The Agency will engage in significant education and outreach to ensure said requirements are understood by operators of cropland with subsurface tile drainage.

Comment:

Comment requests that this provision include language stating: 'Any land subject to the Required Agricultural Practices (RAPs) that has subsurface tile drainage is required to have a Nutrient Management Plan to the VT NRCS 590 Conservation Practice Standard. This includes any subsurface tile drainage used in house foundations, lawns, or parking areas that contribute as storm runoff.' Comment also recommends a permitting process that could be implemented, which would require an approved permit explaining subsurface tile drainage use before a retailer could make a sale on a subsurface tile drainage installation.

Response:

The RAPs and Agency authority only covers farm and farmland, and does not include house foundations, lawns, and parking areas, regardless of present drainage structures. Many farm operations that are required to comply with the RAPs - SFOs, CSFOs, MFOs and LFOS - already have a VT NRCS 590 Conservation Practice Standard NMP, with the exception of SFOs, whether a subsurface tile drainage system is present or not. The Agency has chosen to not require SFOs to have a VT NRCS 590 Conservation Practice Standard NMP, although they are required to have a plan for their farm operation that includes the following components:

- Date of applications
- Field location of applications
- Application rate
- Source of nutrients applied
- Weather and field conditions at the time of application

The Agency does not have authority to develop such a permit process for tile drain installation, and would need statutory authority from the Vermont Legislature and additional staff resources to coordinate and implement such a program.

Comment:

Comment questions why Section 12.4(b), the Phosphorus Index or P-Index, isn't based on factual evidence from the property?

Response:

The Vermont P-Index utilizes a host of site specific field considerations when determining the reduction strategy that will be most effective for that particular field. These site-specific considerations include metrics such as: geographic region of Vermont, elevation, soil test phosphorus level, presence of subsurface pattern tile drainage, crop being grown and manure type—in addition to many others. This index was most recently revised in October 2017 by UVM Extension, the new standard will be utilized by all farms planning a phosphorus reduction strategy

The following scientific literature was cited in the development of the Vermont P-Index and the establishment of the 20 ppm threshold for the “excessive” range of Phosphorus for crop fields in Vermont:

Bolinder, M.A., R.R. Simard, S. Beachemin, and K.B. MacDonald. 1998. Indicator of risk of water contamination: methodology for the phosphorus component. Report No. 24. Agriculture and Agri-Food Canada.

Coale, F, and S. Layton. 1999. Phosphorus site Index for Maryland. Report to Northeast Phosphorus Index Work Group. Univ. of Maryland., College Park, MD.

Gburek, W.J., A.N. Sharpley, and G.J. Folmar. 1998. Modifying the P index to account for transport pathways. Report to the SERA Transport Workgroup. USDA-ARS, University Park, PA.

Jokela, W.E., J.W. Hughes, D. Tobi, and D.W. Meals. 1999. Managed vegetative riparian buffers to control P runoff losses from corn fields. Agronomy Abstracts. Amer. Soc. of Agron., Madison, WI.

Jokela, W.E., F. R. Magdoff, and R. P. Durieux. 1998a. Improved phosphorus recommendations using modified Morgan phosphorus and aluminum soil tests. *Comm. Soil. Sci. Plant Anal.* 29:1739-1749.

Jokela, B., F. Magdoff, R. Bartlett, S. Bosworth, and D. Ross. 1998b. Nutrient recommendations for field crops in Vermont. Br. 1390. University of Vermont Extension, Burlington, VT. Web: <http://ctr.uvm.edu/pubs/nutrientrec/>

Klausner, S.D. 1995. Nutrient management: crop production and water quality. Cornell Univ. College of Agric. and Life Sci., Ithaca, NY.

Klausner, S., D. Flaherty, and S. Pacenka. 1997. Working paper: Field phosphorus index tools for the NYC watershed agricultural program. Cornell University. Ithaca, NY.

Lee, Y. S. and R. J. Bartlett. 1977. Assessing phosphorus fertilizer need based on intensity-capacity relationships. *Soil Sci. Soc. Amer. J.* 41:710-712.

- Lemunyon, J.L., and R.G. Gilbert. 1993. The concept and need for a phosphorus assessment tool. *J.Prod. Agric.* 6:483-486.
- Lory, J.A., and P.C. Scharf. 1999. Threshold P survey. On Web page for SERA-17, Minimizing P losses from agriculture:
http://ces.soil.ncsu.edu/sera17/publications/P_Threshold/Threshold_P_Survey_3_1_99.htm
- Magdoff, F.R. C. Hryshko, W.E. Jokela, R.P. Durieux, and Y. Bu. 1999. Comparison of phosphorus soil test extractants for plant availability and environmental assessment. *Soil Sci. Soc. Am. J.* 63:999-1006
- McFarland, A., L. Hauck, J. White, W. Donham, J. Lemunyon, and S. Jones. 1998. Manure management in harmony with the environment and society. SWCS, Ames, IA.
- McIntosh, J. L. 1969. Bray and Morgan soil test extractions modified for testing acid soils from different parent materials. *Agron. J.* 61:259-265
- Moncrief, J., P. Bloom, D. Mulla, N. Hansen, G. Randall, C. Rosen, E. Dorsey and A. Lewandowski. 2004. Minnesota Phosphorus Site Risk Index. Users Guide. p. University of Minnesota, St. Paul, MN.
<http://www.mnpi.umn.edu/downloadfiles/MNPIndexUserGuideNov2004.pdf>
- NRCS. 1994. The Phosphorus Index: A Phosphorus Assessment Tool
<http://www.nhq.nrcs.usda.gov/BCS/nutri/phosphor.html>
- NRCS. 1999. Nutrient Management. 190-GM, Issue 9, 3/99; Part 402. Web:
<http://www.nhq.nrcs.usda.gov/BCS/nutri/gm-190.html>
- Sims, J.T., R.R. Simard, and B.C. Joern. 1998. Phosphorus loss in agricultural drainage: historical perspective and current research. *J. Environ. Qual.* 27:277-293.

Comment:

Comment questions if provision 12.4(e) is intended to address surface runoff or land flow, which wouldn't be present on subsurface tile drained fields. Comment states that this provision shouldn't be present in proposed rules for subsurface tile drainage.

Response:

The Agency included the phrase, 'other off-site movement,' which is important in this provision to capture any water that may be moving through macropores into subsurface tile drainage systems and exiting from outlets. Education and outreach will be conducted to ensure managers of cropland with subsurface tile drainage systems are aware of the potential movement of water through macropores when conditions are conducive to soil cracking in certain soils, as well as the management techniques available to mitigate such flow.

Comment:

Comment questions provision 12.4(f) and indicates opinion that this requirement is already covered in NMPs through Revised Universal Soil Loss Equations (RUSLE) 2 calculations.

Response:

The Agency's intent in provision 12.4(f) is to promote good, healthy soils that will help prevent any losses from subsurface tile drainage systems; this language is reinforcing responsible land management practices. The Agency has revised the RAP Final Proposed Rule for clarity and brevity and to remove the possibility for confusion. The requirements outlined in Section 12.4 of the RAP Proposed Rule will still apply to all tile drained fields, however they have been reintegrated into Section 6 of the RAPs. The Agency will engage in significant education and outreach to ensure said requirements are understood by operators of cropland with subsurface tile drainage.

Comment:

Comment indicates concern with provision 12.4(f), and states that maintaining and promoting soil health can be problematic as soils can be saturated during certain times of the year.

Response:

Through the use of RUSLE2, calculations already include assessments for hydrologic characteristics of fields to promote BMPs for soil health, and create flexibility for choosing BMPs. The presence and absence of subsurface tile drainage in a cropfield is already a variable able to be planned for when using RUSLE2.

Comment:

Comment states that this proposed amendment impacts the control of runoff, when high concentrations and high volumes of water flow are the problem for water quality improvements. Comment states that the solution is to increase infiltration and decrease erosion through the use of subsurface tile drainage to improve soil health.

Response:

The Agency acknowledges subsurface tile drainage as an acceptable agricultural practice, as long as it is managed to prevent offsite movement. The only major changes that would occur through this proposed amendment in controlling runoff relate to surface inlets on new subsurface tile drainage installations. The Agency agrees increased infiltration and decreased erosion are both important to reduce nutrient losses from agricultural lands.

Comment:

Comment expresses concern with provision 12.4(g), that custom subsurface tile drainage installers already encounter challenges with wait time, but perhaps the wait time could be adjusted to fit respective growing seasons and land work seasons.

Response:

The Agency understands the ambiguity that can exist for crop seasons and subsurface tile drainage installations, and has removed this provision.

Comment:

Comment questions provision 12.4(g), indicating challenges with installers. Comment also indicates opinions that this provision is redundant and already covered in the RAPs and should therefore be eliminated.

Response:

The Agency understands the ambiguity that can exist for crop seasons and subsurface tile drainage installations, and has removed this provision.

Comment:

Comment indicates that 30 days before and 60 days after installation is the growing season, and being unable to fertilize the land is an additional hardship. Comment states that this provision is subjective, dependent upon soil type, and is an overreach. Comment indicates that generally after subsurface tile drainage is installed, it is ideal to grow some crop to help prevent soil erosion, and generally some nutrient is also applied to help promote growth, this wouldn't be possible under this provision.

Response:

The Agency understands the ambiguity that can exist for crop seasons and subsurface tile drainage installations, and has removed this provision.