



Agency of Natural Resources

Department of Environmental Conservation



Wetland Delineation Consultant Improvements

Vermont Certified Public Manager Program 2017 – 2018

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Executive Summary

The Agency of Natural Resource (ANR) Department of Environmental Conservation (DEC) Wetlands Program retained consultation services from the Vermont Certified Public Managers Program (VCPM®) in November 2017 to assist with Wetland Consultant Accountability.

The State of Vermont has established laws and rules that regulate human impacts on wetlands. However; the Wetlands Program has evolved in such a way that it is very dependent on consultants to assist sectors of the regulated community successfully navigate the permitting process. Some consultants provide the regulated community poor quality work, which increases costs for their clients and increases the amount of time the Program spends correcting consultant work. The program has struggled with how to control the quality and cost of work that is submitted by consultants and how to legally provide recommended consultants.

Purpose:

It is the intent of this consulting project to review and make recommendations for improvement as to how the ANR Wetlands Program:

1. Presents these private sector consultants as options to the appropriate stakeholders, and
2. Provides an equitable and comprehensive list of wetland consultants that can be displayed, updated and maintained on the ANR website.

Expected Outcome (objective of the project):

Improve quality of wetland delineations DEC Wetlands Program receives

1. Hold consultants accountable for consistent work.
2. Foster better successful relationships between the program and the consulting community.
3. Develop a better candidate pool of consultants.

Deliverables:

Final Report including the following:

1. Uncover legal issues and parameters.
2. Research logistical issues and solutions; and
3. List of action items with pros and cons for each option.

Methods:

The research methods used for the project included:

- Initial meeting with DEC Wetland Manager
- Interviews with DEC Wetland staff
- Interview with ANR Secretary, Julie Moore
- Interview with DEC Wetland Program General Counsel, Hannah Smith.
- Interviews with Consultants – preparation of survey questions
- Interviews with Wetland Stakeholders
- Review of DEC website and consultant database, program materials
- New Hampshire Wetland research pertaining to the Certification Program for Consultants
- Web research of Army Corps of Engineers and VTC Wetland delineation course material, swamp school.

Key Findings:

Once the scope of the project was determined, the following issues were identified through the interviews and web-based research:

- Consultants and ANR staff genuinely feel a desire to improve consulting work.
- Improved delineations result in time and money saved.
- Improvements can be made in different areas:
 - Training
 - Education
 - Permitting
 - Rule Making/Statutes
- More clearly defining process.
- Providing adequate process review.

Conclusions and Recommendations:

Our recommendations fell into three topic areas:

Topic Area 1: Permit Application Improvement

In interviews with both DEC legal counsel Hannah Smith, ANR Secretary Moore, and Kevin Burke of the DEC Storm Water Program, it was suggested that changes to wetland permits may be the best way to improve the quality of wetland delineations.

Topic Area 2: Consultant Network and Oversight

In New Hampshire the Governor selects people for a Wetlands board that regulates the certification of the Natural Scientists who can perform delineations. Creating this process in Vermont would require statute changes that can be long and time consuming initially, but effective after implementation.

Topic Area 3: Improved Application Process for the DEC Consultant List

Initially, DEC Wetlands staff seemed to advocate for a certification process for consultants. When the VCPM team put together an initial project idea to certify consultants, staff feedback favored a more collaborative process.

Background and Context

The Vermont Wetlands Program was started in 1979 and was solidified in statute by the legislature in 1986 to further protect Wetlands (see Appendix C). The State of Vermont itself has been involved in management of wetlands for over 60 years.

After the creation of wetland rules in the late 80s/early 90s, wetland regulation became more formal. Originally, ANR staff went into the field to delineate wetland boundaries, but it was determined that it was more cost effective to use consultants for this work.

Currently the Wetlands Program, is responsible for the identification and protection of wetlands and regulates activities in wetlands. The program works with private sector consultants to review wetland delineations for both commercial and residential projects. The program ensures that the wetland delineation is defined and assigned accurately and consistently in accordance with best practices.

However, there has been quality issues with consultant's work leading to an increase of staff time on projects and increased cost of wetland permitting. Resources and time are drained when DEC visits sites 2 or 3 times due to incorrect wetland delineation boundary maps. This can delay the issuance of permits for months. More costs are incurred by the public, and their experience becomes negative - even though the permittee is ultimately responsible for accurately delineating a wetland (there is language in the permit that explains the onus is on the applicant).



Finally, Vermont previously had an active Wetlands Association that provided some organizational leadership and training for its membership and acted as an industry liaison with ANR. This Association dissolved several years ago, presumably due to lack of interest by the wetland consultants.



Methodology

The following data collection steps allowed the VCPM Team to develop recommendations for the Wetland Delineation Consultant Improvement project.

- Initial Meeting with DEC Wetland Manager
- Interviews with DEC Wetland staff
- Interview with DEC Wetland Program General Counsel, Hannah Smith.
- Interview with ANR Secretary Julie Moore
- Interviews with Wetland Stakeholders
- Review of DEC website and consultant database, program materials
- New Hampshire Wetland research pertaining to the Certification Program for Consultants
- Web research of Army Corps of Engineers and VTC Wetland delineation course material, swamp school
- Comparative research based on existing State Agencies. (Division of Fire Safety, Waste Water Program, eg.)

ANR/DEC INTERVIEWS

Interviews with DEC Wetland Staff

In the beginning of the project the VCPM team attended a staff meeting of Wetland staff. This yielded significant information regarding the consultants and how DEC staff know the quality of consultants' work, the competencies that DEC staff look for in a consultant, and the time, funds and other resources spent on inaccurate delineations. DEC staff explained their interest in improving consultants' work through several approaches: building relationships, helping consultants understand DEC staff roles, and explaining state regulations.

In addition, one in-person interview was also conducted with a District Wetlands Ecologist, Shannon Morrison. The interview explored further the idea of improving the Consultant List and discussed ways to do that in cooperation with wetland consultants.

Interview with DEC Wetland Program General Counsel, Hannah Smith.

Hannah Smith, the attorney for the wetlands program, was interviewed about the legal ramifications of poor wetland delineations and the options the Wetlands Program might have to improve the quality of delineations. The discussion covered the current rules and regulations of the Wetland Program. Attorney Smith explained that state statutes do not give the Program authority to create or regulate the wetland consultant profession, rather, it gives DEC clear direction to protect the resource and write rules for that purpose, i.e. through a permit process.

Interview with ANR Secretary Julie Moore

The discussion with ANR Secretary Julie Moore covered ways to improve wetland delineations. Though the discussion was brief, the Secretary suggested discussing this matter with DEC's Storm Water section, who had also recently improved their permit applications to obtain better results. Further, she recommended reviewing EPA's enforcement alerts, which strive to achieve compliance through clear communication and both technical assistance and enforcement.

Interview with Kevin Burke, DEC Storm Water Program

Kevin Burke is an Environmental Analyst in the DEC Storm Water Program, and was interviewed on the recommendation of Secretary Moore. The discussion with Kevin focused on how improvements made to the Storm Water permit might compare to Wetlands permits and ways to improve delineation results.

CONSULTANT INTERVIEWS

The ANR website provides landowners with a list of environmental consultants who delineate Wetlands. The Consultant List is not inclusive, and that being on the list does not represent any endorsement by the State of Vermont. There are roughly 15 consultants listed.

Through meetings with Laura Lapierre, Wetland Program Manager, it became clear that there was a need to survey the consultants who do the wetland delineations in the state. This would help to determine how recommendations for changing the Consultant List and process may be received by them. The VCPM group asked Laura to randomly choose 9 of the 15 consultants and to notify them via email that they might be hearing from the VCPM group and to explain the purpose of our project.

The questions were vetted through Laura Lapierre to ensure that the questions were on target and would not pose a concern to the consultants. Surveys were conducted by one member of the VCPM consulting team over the phone. Six out of nine consultants responded to the phone calls and participated in the survey.

The consultants recommended that we also attempt to receive feedback from a couple of landowners or contractors that work closely with consultants on projects that may impact wetlands.

OTHER WETLAND STAKEHOLDER INTERVIEWS

Three names of interested outside stakeholders who have frequent interaction in this area were provided to the VCPM team. Successful contact was made with two of the three. Initially, questions were developed to ask each stakeholder, however it became clear that the targeted questions around the Consultant List for the DEC Wetlands program wouldn't be useful, as these stakeholders didn't often use the list. The conversation was then taken in a different direction.

NEW HAMPSHIRE DES INTERVIEW

The New Hampshire Department of Environmental Services (DES) was identified as another resource for gathering data. Phone interviews were conducted with Adele Fiorillo, Normandeau Associates, Inc., and with Bobbie Carter, Program Specialist of New Hampshire DES. Research and reading of the New Hampshire Office of Professional Licensure and Certification website also was conducted.

COMPARABLE SOV AGENCY:

Division of Fire Safety – in house

Many State Agencies/Divisions offer oversight to individual programs and/or trades people to ensure that they meet stakeholder needs and State requirements. As an example, and as adopted and defined by statute, the Division of Fire Safety has a licensing program that organizes and regulates electricians work as it relates to “Public Buildings” in the State of Vermont. This format could be utilized as a model for how the wetland consultants could be regulated as they relate to the interaction with stakeholders and Agency of Natural Resources (ANR) in the delineation, identification and definition of wetlands.

Web-based Research

The Army Corps of Engineers and Vermont Technical College, both have curriculum that includes wetland delineation and includes detailed course work, often referred to as “Swamp School”. This research was necessary to determine the level of training that is available to consultants and ANR staff. Training needed to be evaluated to determine if the course work could be utilized for initial training requirements and to maintain proficiency in the individuals that delineate wetlands.



Results/Findings

Interviews

Vermont DEC Wetland Staff

Initially, DEC Wetlands staff seemed to advocate for a certification process for consultants. When the VCPM team put together an initial project idea to certify consultants, staff feedback favored a more collaborative process. Staff suggested that additional information could be obtained from consultants to improve the Consultant List and that this information might include past wetland delineations, areas of expertise, etc. Staff seemed eager to work with consultants to find solutions to this.

ANR Legal Counsel Hannah Smith

In the interview with ANR Legal Counsel Hannah Smith, we discussed who is responsible for inaccurate wetland delineations and she confirmed that landowners are ultimately responsible. She said that identifying “significant wetlands” regulated by state statute can sometimes be difficult.

We then discussed the wetland Consultant List and possible ways to improve it. She wondered if the current Consultant List is valuable. Further, she felt that the DEC Wetlands Program has the clearest authority to regulate the wetland permit process and that Program could try to improve delineations by consultants.

Potential Permit Improvements discussed with Hannah Smith

Suggestions raised in this discussion:

- Could the permit require more accurate aerial photos of the property?
- Could it be submitted by a “wetland ecologist” that has been “certified” or attended some training or school? Smith explained that in court, judges appreciate the testimony of “certified specialists” like bona fide wetland ecologists to provide justification for a case.
- Could the Program amend their rules to require more specific or rigorous information as part of wetland permits to improve the quality of delineations?

Additionally, the discussion with Ms. Smith uncovered some of the implications of more rigorous wetland permit requirements.

- Increased cost to landowners if Wetland Consultants must meet stricter requirements
- Increased training needed by internal DEC Wetland staff so that they can properly evaluate and review wetland permits
- Increased need to document decisions made by DEC

ANR Secretary Julie Moore

In talking with Secretary Moore about ways to improve delineations, she understood the problem quickly and suggested that ideally the program would get to a place where they trusted the work of consultants, but that consequences might be required to drive improvements.

She thought that requiring more or better information upfront in the permit application would help save staff time reviewing poor delineations. As an engineer herself, the Secretary was familiar with being regulated by the PE board associated with the Secretary of State’s Office of Professional Regulation but acknowledged that there is no such regulation or certification of wetland ecologists.

The Secretary had three general recommendations:

1. Moore advised that the VCPM team reach out to the DEC Storm Water Program that had improved their permit process to obtain better results.
2. She suggested that the Wetlands program could consider compliance models that are used to improve outcomes, such as the EPA’s Enforcement Alerts (see Appendix D). These alerts provide notice of an issue that needs improvement, give time for technical assistance and usually provide a date by which enforcement actions will begin for noncompliance.

Interview with Kevin Burke DEC Storm Water Program

Kevin Burke explained that the Storm Water Program has also experienced poor applications, and most of the discussion explored ways Wetlands could improve applications. Ideally, Kevin felt that permits could direct a landowner to “avoid and minimize” impact to a wetland without the need for a permit.

Suggestions from Kevin:

- Could Wetlands ask probing questions in a permit application that would identify difficult delineations that could then be treated differently?
- Could Wetlands ask more open-ended questions, e.g., “How much of the property would be considered wetlands?” Storm water stopped using check boxes as it tended to encourage checking without thinking.
- Could Wetlands find ways to fast track permits?
- Could Wetlands meet face to face with more consultants ahead of time to improve results, like a pre-application meeting?
- Could they ask are X types of plants present?
- Do photos help or are they even required? Consultants are less likely to fudge results if photos are sent in with the application.

Kevin explained that when storm water gets busy, they trust certain engineers and designers with whom they have long and good working relationships. He explained that it is a must in terms of managing workload and setting focused priorities. He said that they can always audit their permits to review compliance. He also had experience with referring one engineer to the Secretary of State’s Office of Professional Regulation, which meant the engineer couldn’t submit applications for a time.

Lastly, Kevin thought that training consultants would be key to a good application. He explained that storm water does not issue denials to permits, but they request changes that must be made for the approval of an application.

Other Wetland Stakeholder Interviews

It became very clear that larger firms and/or people who work frequently in developing land have relationships with consultants or larger firms who have become their go to for delineations for the landowner customers they work with. The list is the last resort option for people to go to if they need a consultant. Reasons for this were somewhat regional/geographical and timing/availability, but history with consultants was most important. Since Vermont is a small state, consultants visit the same areas and carry the history of the area with them. This history can be valuable to consultants and landowners in their process and permitting decisions. It was stated that word of mouth is far more effective than scrolling through a list of consultants.

There is an overall satisfaction with the number of consultants on the list, even though it isn't frequently used.

Finally, stakeholders report being very happy with the consultants that they work with and the DEC Wetlands Program. They feel they are responsive and turn permits around in a timely manner.

New Hampshire's Consultant Certification

The Laws governing licensing of the Natural Scientist were established in 1988 through legislative process and Administrative Rules. These created a Consultant Certification Program to better serve the State of New Hampshire citizens and maintain an acceptable standard of knowledge for soil and wetland properties.

It took approximately 1-2 years for adoption.

These are the rules of the legislative and administrative process that govern wetlands in New Hampshire:

- A Board of Natural Scientists was created that consists of 7 members elected by the Governor.
 - 2 Soil Scientists
 - 2 Wetland scientists that are not soil scientist
 - 3 Public members
- The Board of Natural Scientists oversees the certification program in full (not NH DES). Reported complaints from NH DES or individuals are referred to the Board. The board reviews for disciplinary action. This could lead to suspension from the certification program, reprimand or another variance of discipline, such as continuing education courses.
- The Board, however, cannot take any disciplinary action until a hearing is held and a written decision must be issued.
- The program requires the consultants to participate in continuing education classes. One important piece of the education is Ethics. Consultants must complete and pass a written and field exam. The certification program requires consultants to renew every 2 years.
- NH charges fees associated with the different type of activity a person is applying for, e.g.: Certified Soil Scientist compared to an Apprentice Soil/Wetland Scientist.
- If no renewal is made it will automatically cancel the certification, however, consultants may obtain reinstatement after paying any fees due.
- The consultants must demonstrate 24 hours of continued education or 12 continuing education hours within their first renewal period.
- The Board conducts audits of randomly chosen consultants, thus ensuring compliance.
- Interviewees report that the program has been successful and positive.

Consultant Surveys

Consultants currently doing delineation work who were surveyed indicated:

- A desire to have an improved Consultant List that demonstrated competency.
- Interest in requiring consultants to complete training like the UNH forty-hour training so the State would know that people completing delineations were working from a common education that would foster better consistency.

Consultants recognized the amount of work for ANR staff in their existing roles and were sensitive to adding additional responsibility. There was also a suggestion to take some of the regulation for the Consultant List out of the hands of ANR and onto a board who would have less frequent interaction with consultants and may help support working relationships between ANR and consultants.

Consultants indicated it was a meaningful and effective group and recognized the value in a group of people with similar work interests coming together.

Key Points:

- There was an overwhelming response and request for training.
- The recognition that there is a lot of knowledge and expertise in the field.
- Utilizing an association would be a way to get trainings off the ground from professionals doing the work.
- Consultants saw value in a board or an association group providing process evaluations and identifying any issues that arose through the work of the consultants and to assist in preventing questionable work in the future.
- Support the consultant in getting additional education/training to improve the quality of their work. Full results in Appendix A.

Regulatory Board - Division of Fire Safety

The Division of Fire Safety has a licensing program that organizes and regulates electricians work as it relates to “Public Buildings” in the State of Vermont

The Division of Fire Safety, by means of the Vermont Legislature, has established the “Vermont Electricians Licensing Board” by statute. See appendix B. The Board consists of the Commissioner of Public Safety and four individuals that are appointed by the Governor with the advice and consent of the Senate. The Board is responsible for maintaining, reviewing and updating the Electrical Rules, as required by statute and hearing any complaints about individual licensees and administering any revocations, suspensions or renewals. Through the Division of Fire Safety, the Board maintains a list of all Electrical certifications and licensures. The Board is required to meet monthly to conduct business that is required by statute, address any rule interpretation questions or to hear and deliver any disciplinary findings.



Conclusions/Recommendations

Topic Area 1: Permit Application Improvement

Conclusion:

In interviews with both DEC legal counsel Hannah Smith, ANR Secretary Moore, and Kevin Burke of the DEC Storm Water Program, it was suggested that **changes to wetland permits may be the best way to improve the quality of wetland delineations**. The Wetland permits, governed by the Wetland Program's Rules as empowered by state statute, provide a firm legal ground for regulation as opposed to attempts to regulate consultants. The Secretary suggested exploring models like the EPA's enforcement alerts to put stakeholders on notice regarding important requirements and desired outcomes for the protection or management of a resource such as wetlands. These alerts can clearly set expectations and provide ample time for those who wish to comply while holding those that don't accountable. The critical issues for the Wetlands Program to explore are what changes can have a positive effect on improving delineations.

The more rigorous the process is for wetland delineations to be submitted, the more expertise will be required both externally to DEC and internally, e.g. DEC Wetland staff will have to maintain the same credentials as consultants to be able to properly evaluate and review wetland permits. Smith felt that it was important for the DEC Wetlands program to record and document their decisions so that they were defensible and not viewed as arbitrary.

Improvements could be made to increase the quality of delineations for landowners. The recent switch by ANR to utilize an 'Atlas' listing system has been limiting and created a permit process that may not always be needed. The feeling was that this macro level view may cause extra work on landowners and consultants. Stakeholders felt that clearer regulations are

needed since the delineator will follow different processes when it comes to buffer areas and road shoulders. The cost for the permits to landowners is high and is complicated due to unclear regulations, e.g. people apply for the permit to make sure they are covered and therefore are spending money when they may not need to.

Recommendations:

1. Review the Wetland Permit for possible improvements, such as increasing required information that could better inform staff reviewers about possible delineation difficulties at the outset. Replace some check boxes with more open-ended questions that may lead to improved information. Additionally, remove unnecessary questions in exchange for required information that is of greater importance. Customers of consultants indicate the cost to complete a wetland permit is already high and requirements are unclear.
2. Seek advice from those outside the Wetlands Program for their input. Ask Storm Water (and other?) staff to look over the permit and find improvements that could improve the quality of delineations. Consider making photographs in the appropriate season a requirement.
3. Finally, consult your legal counsel. Hannah Smith seemed willing to explore this topic further with the Wetlands Program staff. She also highlighted the importance of good documentation of decisions by the Wetlands Program to ensure they are defensible.

Pros:

1. Wetland permit improvements seem most legally defensible and within the authority and scope of the Wetland Program to change in order to protect the resource.
2. Better quality of wetland delineations.
3. Clearer permit processing and regulations.
4. More outreach by ANR to landowners and consultants.

Cons:

1. The more rigorous the permit process, the more expertise might be required both externally amongst consultants and internally amongst DEC Wetlands staff who review wetland permits.
2. Further cost increase to landowners.

Topic Area 2: Consultant Network and Oversight

Conclusion:

New Hampshire interviews described a good system; however, the Governor selects people for a Wetlands board that regulates the certification of the Natural Scientists who can perform delineations. Creating this system requires statute changes that take a long time but could be effective after implementation.

The Division of Fire Safety format also could be utilized as a model for how the wetland consultants would be regulated as they relate to the interaction with stakeholders and the Agency of Natural Resources (ANR) in the delineation, identification and definition of wetlands. (See Appendix B). Another possibility is to create a board of people from the professional field who could comprise a board. There was also insight into taking some of the regulation of the Consultant List out of the hands of ANR and into a board who would have less frequent interaction with consultants and may help support working relationships between ANR and consultants.

Finally, through the process of surveying consultants, it has become clear that there is a desire to resurrect a wetland consultant association as there historically was.

Recommendations:

1. Support consultants in re-inventing an association within the profession by soliciting interest from overall Consultant List and other professionals working in the similar field. Stakeholders include people in the field who may have helped start up the former association and may have an interest in helping to get it going again. This would give consultants a say in how their profession is reviewed and what standards they want to create to complete better work in VT.
2. Support the establishment of an ANR-sponsored, comprehensive training program that utilizes the unique experiences and education of field qualified experts, ANR staff and consultants. This training program would be created to be available to all and would maintain continuity of information and understanding between the public and private sectors of wetland delineations.
3. Support and establish a “Wetland Delineation Governance Board” that would be responsible for the oversight of consultants, the delineation process (permitting) and ANR/stakeholder interactions.

Pros:

1. Professionals in the field would buy into processes, changes and trainings that impact their work and their reputations.
2. A more streamlined approach would offer consistency in the State.
3. Increased/Improved communications.
4. Increased accountability.
5. Support ANR by helping with organization and implementation of the Consultant List.

Cons:

1. Not everyone supports a change to the Consultant List.
2. Would take time and energy to initiate the formation of an association or a board, but in the future would be advantageous.
3. ANR may feel loss of control with some aspects of their work.
4. Process may be slowed, initially.

Topic Area 3: Improved Application Process for DEC Consultant List

Conclusion:

Initially, DEC Wetlands staff seemed to advocate for a certification process for consultants. When the VCPM team put together an initial project idea to certify consultants, staff feedback favored a more collaborative process. Staff suggested that additional information could be obtained from consultants to improve the Consultant List and that this information might include past wetland delineations, areas of expertise, etc. Staff seemed eager to work with consultants to find solutions to this problem.

Consultants currently doing delineation work who we surveyed indicated a desire to have an improved Consultant List that demonstrated competency

Is the current process to get on the consultant list effective?

-“Could be improved to show education and experience. Recently was certified in NH and there is a big difference in the quality control. VT’s process is easier, but it doesn’t help the profession.”

Anonymous Consult in VT

Recommendation:

1. Create a more in-depth application and process for wetland consultants who wish to be listed on the ANR website. Add a selection box on the application for whether the consultant/firm will provide additional information. If further data is provided, this could be used to categorize the Consultant List provided by ANR as a service to consultants and landowners (however would not indicate endorsement by ANR).
2. Information requested on the application would include, but not limited to, the education and experience of the consultant/firm, the number of delineations performed in Vermont or out of state, and a biography about the consultant/firm.
3. Consultant/Firm must provide 3 copies of delineations completed for review by ANR
4. ANR would create the Consultant List and have a link from the name of the Consultant/Firm to more detailed information, allowing landowners to make more informed decisions on the consultant/firm.

5. Have Consultants/Firms provide a new application and update every 2 – 3 years.
6. Staff suggested including information about a consultant’s training, education and work quality as well as any specialty areas or regions that they have experience in.
7. Seek statutory changes to regulate wetland ecologists like New Hampshire.

Pros:

1. More data being provided by the consultants/Firm, so landowners can make a more informed decision.
2. The Consultant/Firm has control over how much information they wish to provide.
3. ANR would have the ability to categorize the Consultants/Firms based on data provided on the application.
4. No cost to Consultant/Firms to complete the application process.
5. ANR is providing a service to the community by gathering and maintaining the Consultant List for public use.

Cons:

1. ANR has no rules or statutes to regulate the Consultant List.
2. ANR has no control over the Consultant/Firm and what they do provide on the application, thus could hinder helping landowners.
3. Time and effort to review a more detailed application and updating the ANR Website.
4. Increased cost to landowners of Consultant List having to meet stricter requirements.
5. Increased training needed by internal DEC Wetland staff and Consultants to properly evaluate and review wetlands and permits.
6. Increased need to document decisions made by DEC.
7. The legal risk of changing the Wetland Consultant List to include more requirements could increase costs for landowners looking to conduct development or land use changes that may impact a wetland.
8. May be unlikely in this political climate.

What is the #1 thing that could improve the quality of wetland delineations in VT?

“Stronger review of practicing delineations, annual workshops or seminars and better communication between the group of professionals.”

Anonymous Consultant in VT



References

This is an alphabetical list of the books, papers, brochures, reports, and internet references used by the authors as secondary research and references.

Army Corps of Engineers Wetland Delineation / Regional Supplement / Waters of the United States Training - <https://www.richardchinn.com/acoetrng.html>

New Hampshire's program:

<http://www.nh.gov/jtboard/home.htm>

<http://www.nh.gov/jtboard/wslst.htm> (list of wetland scientists)

<http://www.nh.gov/jtboard/nsceu.htm> (continuing education)

<http://www.nh.gov/jtboard/natscien.pdf> (application for a wetland scientist)

<http://www.nh.gov/jtboard/wetland.pdf> (app for a wetland scientist apprentice)

Vermont Agency of Natural Resources

[Department of Environmental Conservation](http://dec.vermont.gov/watershed/wetlands)

<http://dec.vermont.gov/watershed/wetlands>

Vermont Technical College - Wetland Delineation Training

<https://www.vtc.edu/ag-course/wetland-delineation-training>

Appendices

- Appendix A - Consultant Survey Results
- Appendix B - Electricians' Licensing Board
- Appendix C – Evolution of Vermont's Wetland Program
- Appendix D – EPA Alert

Appendix A

Consultant Survey Results (6 individuals)

1. Do you feel that the current process to get on the Consultant List for DEC Wetlands Program is effective?

- a. Yes
- b. Yes, the list is fine in fact I don't think there should be a certification
- c. It shows you can do the work but doesn't prove competency. Process used to work for the program for 9 years, although there was more of criteria at that time.
- d. Could be improved-show education and experience. Recently was certified with NH and there is a big difference in the quality control. VT process is easier, but it doesn't help the profession.
- e. Yes-Laura is very responsive. The 40-hour UNH program is helpful and offers me a leg up since there is no formal certification process.
- f. Yes

2. Which parts of the process could use improvement?

- a. Unfamiliar, haven't had to do the process recently
- b. Not sure, short of certification
- c. Documentation of background or credential
- d. Formal review process, application with field test and a written and/or oral test, recommendations from other scientists with evidence to support it
- e. Certification in VT-although a big task
- f. Nothing-was a smooth process

3. On a scale of 1 to 5 (5 is high?), how satisfied are you with the number of referrals or business that you have received from the Consultant List?

- a. Unsure, not sure who comes from the list when we receive referrals
- b. 4
- c. 2 (think this depends on where you are on the list, it's alphabetical)
- d. 2 (multifaceted firm with experience, a lot comes from word of mouth)
- e. 5 I'm in high demand now
- f. Most people don't go through that list, 9.5 out of 10 referrals happen from another source

What could ANR do to make you more effective at your work?

“Invite ANR to rely on experience of people who are identified as the experts, let us be experts”

Anonymous Consultant in VT

4. What is the number one thing you think could improve the quality of wetland delineations?

- a. No answer
- b. Landowners don't know they have a wetland, so they must restore it back even though they didn't know better. Better PR to educate landowners!
- c. Statements of qualifications or certification. # of years a consultant has been practicing
- d. Stronger review of practicing delineations, annual workshops or seminars and better communication between the group of professionals
- e. Offer give and take, more leniency on the people who have damaged wetlands but are willing to restore. They may have done this inadvertently. Reward and educate with a reasonable penalty. Offer more trainings in categories that are helpful to the professionals doing the work.
- f. “Could give 50”, implement requirements for being a consultant, include certification process depending on their specific criteria

5. What could ANR do to make you more effective at your work?

- a. Invite ANR to rely on experience of people who are identified as the experts, “let us be experts”
- b. More trainings
- c. Pre-meeting with the application and permitting process to cut down on the amount of back and forth before permits go out. In NH this is mandatory
- d. Targeted training, refresher trainings. Bring in outside experts not ANR staff. Allow staff to exercise best professional judgement
- e. Be less of a nonmoving target, rules change too much
- f. Nothing

6. Is the feedback you receive from ANR on your delineations adequate?

- a. Yes
- b. I do good work, so I don't get feedback
- c. Yes
- d. Yes! Varies with ecologist. Improvement toward standardization and consistency
- e. Yes, because I'm on the right foot with them

- f. It isn't always timely. There are efficiencies to be gained in ANR. They need to be clear on their rule.

7. How does the work of other consultants impact your work?

- a. It doesn't- Resources charged with regulating and permitting overreach in their regulatory power, ex. consultants whose expertise isn't floods and rivers
- b. Makes me want to do things the right way, there are good people out there.
- c. Yes! More people equals more competition. If people aren't as good, it sets the bar lower and lower.
- d. ANR isn't staffed adequately to do a good job. People who do work with significant errors impacts VR resources
- e. Quality of their work impacts how the rest of us are treated
- f. It doesn't

8. Would there be an interest in a wetland consultant association like there was before?

- a. No, not in the form that it was anyways as I was a member then
- b. Yes, I received money to help the startup of this!
- c. Would be helpful. Maine has an effective one. They do newsletters and trainings
- d. Yes!
- e. Yes, anytime people with similar work interests come together there can only be a benefit. Maybe we wouldn't be so territorial
- f. Yes

9. Would you support a detailed Consultant List based on training, education, knowledge and historic work quality?

- a. Not opposed, maybe not needed?
- b. Beware of using term work quality, min. qualifications yes
- c. Yes
- d. Yes
- e. Yes
- f. No

10. Do you agree there should be a process for removing consultants from the list?

- a. No
- b. Yes, the association should do it if adjudicated complaints received
- c. Yes, via spot check if clear issues are brought to light
- d. Yes, if you aren't certified get off the list. Removal later through a review, or if they haven't practiced in so long or if they don't do continuing education
- e. Yes. Formal warning first to give a chance to react or amend
- f. Yes. If they aren't doing good work we want people to know. How does this prevent them from still getting chosen if not on the list?

11. Overall how satisfied are you with DEC Wetlands on a scale of 1-5?

- a. 2- people in ANR exercise too much personal power
- b. 4-they are helpful, their job isn't easy, and they don't have a lot of friends out there
- c. 3
- d. Good-given limitations
- e. Overall satisfied but increasingly dissatisfied- The State doesn't have the right to choose who does business. Until there is a licensing program, they should have no say.

Do you feel that the current process to get on the Consultant List for DEC Wetlands Program is effective?

"It shows you can do the work but doesn't prove competency. Process used to work for the program for 9 years, although there was more of criteria at that time."

Anonymous Consultant in VT

Appendix B

Title 26 : Professions And Occupations

Chapter 015 : Electricians And Electrical Installations

Subchapter 003: Licensing Electricians

(Cite as: 26 V.S.A. § 901)

- **§ 901. Electricians' licensing board**

(a) A board for the licensing of electricians is created, to be known as the "electricians' licensing board."

(b) The board consists of the Commissioner of Public Safety or a member of that department designated by the Commissioner and four persons appointed by the Governor with the advice and consent of the Senate. The four appointed members shall serve for terms of three years, beginning July 1 in the year of appointment, and they shall include one licensed master electrician, one licensed journeyman electrician, one person associated with the public electrical utility industry who is knowledgeable in technical as well as operational issues of the electrical utility industry, and one person associated with the fire insurance industry. No more than two appointed members' terms shall expire in the same year.

(c) The governor shall appoint one of the members of the board to serve as its chairman.
(Added 1969, No. 284 (Adj. Sess.), § 3; amended 1971, No. 14, § 14, eff. March 11, 1971; 1987, No. 274 (Adj. Sess.), § 12; 1993, No. 218 (Adj. Sess.), § 1; 2005, No. 8, § 9, eff. April 25, 2005.)

Appendix C

Evolution of Vermont's Wetland Program

The regulatory program is only the most recent aspect of efforts by the State of Vermont to protect Wetlands. For over sixty years the state has conducted wildlife management in wetlands, purchased important wetlands for habitat protection, conditioned permits through Act 250 and finally adopted its own Wetland Protection Rules.

1940 - 1970's Department of Fish and Game maps and describes important wetlands. Important wetlands purchased and managed (ongoing).

1970's DEC provides testimony to Act 250 commissions where wetlands are involved

1978 National Wetlands Inventory Maps provide an overview of the extent of wetlands maps in Vermont. Soil Conservation Soil maps provide further details.

1979 DEC initiates a specific Wetlands Protection Program compiling all previously completed Fish and Game maps and descriptions, university inventories, bog studies and conservation organization surveys for use in Act 250 testimony and wetland educational programs.

1982 Wetland education program obtains additional allocation of staff 1986 Act Protecting Wetlands enacted

1986 - 1990 Board and ANR research and develop Wetland Rules

1989 DEC studies mapped wetlands to determine the percentage which contain one or more functions at a significant level. (93.5% found to contain significant wetlands during brief field visits.

1990 Wetland Rules adopted.

1991 Wetland Rules amended to include grandfathering provisions.

1990 - 1993 Wetland Rules implemented through education, CUD's. Very little enforcement. No staff or funding provided by the General Assembly to implement the rules. Program funds found in section 104 (b) 3 of the Clean Water Act. Federal money continues as major source.

1991 - 1999 See tables attached for program data by year. Program obtains new positions, interprets rules more consistently, prepares fact sheets on interpretations and key issues, prepares color GIS maps for each town, conducts seminars for agencies organizations and individual landowners, works with Board to consider rule changes (1990, 1992, 1997). Changes are made only in 1990. Regular meetings are established with the Agency of Transportation, project data bases linked to GIS, threatened and endangered species maps become available on each pc. Detailed wetland maps prepared for towns, wetland air-photo lab set up for staff, consultants, students and applicants, program obtains geo-rectified ortho-photos and GPS field unit to aid delineation and mapping. (please see attached 1998 annual report for a more complete description of programs activities.)



Enforcement Alert

Volume 10, Number 5

Office of Civil Enforcement

August 2012

EPA Enforcement Targets Flaring Efficiency Violations

Purpose

EPA is devoting significant enforcement resources to correcting regulatory noncompliance at flares. This Alert is intended to inform flare owners and operators of this enforcement initiative and to educate them on proper flare operation. EPA hopes this Alert will spur improvement of flare operating practices, including better control and monitoring of supplemental gas, air, and steam, and thereby reduce harmful emissions to the environment. Better flare operation practices will have the potential to improve public health by: 1) reducing emissions of toxic air pollutants that may pose a health risk; and 2) reducing volatile organic compound emissions which will in turn reduce the formation of ozone which is potentially harmful to vulnerable populations including the young, elderly, and those with respiratory problems. Moreover, improving flare combustion efficiency can result in cost savings due to reduced steam usage.

Introduction

Chemical and petroleum facilities generate waste gases that need to be controlled safely, economically, and in a manner that protects the public health and the environment. The law requires facilities to use good air pollution control practices to minimize the emission of waste gases, see EPA's October 2009 Enforcement Alert, <http://www.epa.gov/compliance/resources/newsletters/civil/enfalert/flaring.pdf>.

Because, not all waste gases can be prevented or recovered, various control technologies are used to reduce the impact of these waste streams on the environment; one common technology is flaring. A flare is a mechanical device used to combust and thereby destroy volatile organic compounds, toxic compounds, and other pollutants at refineries and other industrial sites.

EPA investigations have found flares that were operated so poorly that there was likely no combustion taking place at all. In these circumstances the flare was merely venting pollution directly to the atmosphere.

Federal requirements for flares are found in the New Source Performance Standards (NSPS) in § 60.18 and National Emission Standards for Hazardous Air Pollutants (NESHAP) in § 63.11. At a minimum, these rules require flares to be:

- Designed and operated with no visible emissions using EPA Method 22 (except for periods not to exceed 5 minutes in 2 hours);
- Operated with a flame present at all times, confirmed by the use of a thermocouple or equivalent device;
- Used only when the net heating value of the gas to be combusted is 300 BTU per standard cubic foot (BTU/scf) or greater (if the flare is steam- or air-assisted), or 200 BTU/scf or greater (if the flare is nonassisted); and
- Designed for and operated with an exit velocity less than 60 feet per second (ft/sec). An exit velocity of greater than 60 ft/sec but less than 400 ft/sec may be used if the net heating value of the gas being combusted is sufficiently high.

Through its inspection and enforcement programs, EPA has identified many instances where flares have been improperly monitored and operated. The consequences are lower combustion efficiency and potentially significant quantities of excess emissions of volatile organic chemicals, sometimes including hazardous air pollutants.

Flare Design Characteristics

Flares are specifically designed to combust gases. Many flares employ steam or air to promote mixing of oxygen within the Vent Gas to ensure combustion occurs without smoke.

There are many parameters that affect the combustion efficiency of a flare. One important parameter is the heating value of the gases that are to be combusted, often measured in BTU/scf. The heating value is a measure of the combustibility of the gas. Generally, it is easier to maintain a stable flame and achieve high efficiency for gas streams with higher heating

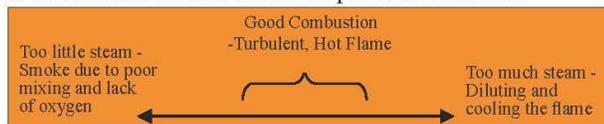
Smoke is an indication that hydrocarbons are not being combusted completely.

Enforcement Alert

values. The NSPS and NESHAP requirements regulate the net heating value and require gases contain at least 300 BTU/scf if they are being combusted in an air or steam assisted flare. If this heating value minimum cannot be met by the Vent Gases alone, then supplemental gas, such as natural gas, must be added.

Federal regulations prohibit extended periods of smoking at flares. Adding the proper amount of steam or air to avoid smoke is beneficial, but adding excessive amounts is detrimental. Excess steam or air mixed with the Vent Gas cools the flame and dilutes the Vent Gas thereby lowering the heating value. Steam addition is usually measured as the ratio of pounds of steam per pounds of Vent Gas (lb/lb). There is no single steam-to-Vent Gas ratio that is appropriate for all flares. The types of compounds being combusted, and to some extent the flare design, determine the proper ratio. There are, however, general guidelines that suggest appropriate ratios, with the most important being the manufacturers' recommendations, which tend to be between 0.1 and 1lb steam per lb of Vent Gas.

Vent Gas is the mixture of gases that are to be combusted, usually found just inside the flare. The Vent Gas consists of combustible process gases, supplemental gas, inert compounds, purge/sweep gases, and other material.



In addition to the numeric standards governing flares (e.g., net heating value, exit velocity), there are NSPS and NESHAP general provisions that require process and pollution control equipment be operated using good air pollution control practices to minimize emissions, and in accordance with the equipment's design. Since it would be impossible for EPA to list all "common practice" actions for equipment owners (e.g., keep equipment from freezing, keep electrical equipment dry), these two narrative standards minimally require a flare operator to follow the equipment manufacturers' specifications, and to stay abreast of and apply the current state of scientific knowledge on flare operation and combustion to minimize emissions.

Federal requirements for equipment operators' general duty are found in the NSPS and NESHAP.

- "At all times, including periods of startup, shutdown, and malfunction ...the operator shall operate and maintain any affected source, including associated air pollution control equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions." See, e.g., 40 CFR § 63.6(e), 40 CFR § 60.11(d).
- "Operators of control devices that are used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their design. See, e.g., 40 CFR § 63.172(e), 40 CFR § 60.482-10.

A number of studies have been conducted to assess flare efficiencies and to identify the factors that affect flare performance. One simple and critical parameter already mentioned is the steam-to-Vent Gas ratio. Another parameter with an even better correlation to combustion efficiency for steam assisted flares is the heating value of the combustion zone gas. EPA's recent settlements define combustion zone gas as all Vent Gas, pilot gas, and all steam just outside the flare tip, where combustion is supposed to take place. This parameter is not to be confused with the net heating value of Vent Gas found in current regulations which does not include steam or pilot gas and is measured just inside the flare. In the enforcement context, EPA may analyze the heating value of the combustion zone gas to estimate a flare's combustion efficiency. A finding of low combustion efficiency is indicative of a potential failure to comply with the general duty provisions discussed above.

Recent Flare Testing and the Net Heating Value of the Combustion Zone Gas.

- The net heating value in the combustion zone (NHVcz) gas correlates well with combustion efficiency for steam assisted flares. It is a better indicator of efficiency than the heating value of the Vent Gas alone.
- NHVcz is currently not a regulatory requirement, and is different from the current Vent Gas heating value minimum standards of 200 and 300 BTU/scf.
- NHVcz is calculated using the Vent Gas heating value, the flow rates of Vent Gas, steam and the pilot gas (as per recent settlements).
- NHVcz is closely related to another parameter, the Lower Flammability Limit of the Combustion Zone.
- Recent testing provides insight into NHVcz and its relationship to efficiency:
 - o "TCEQ 2010 Flare Study", Texas Commission on Environmental Quality, August 1, 2011. <http://www.tceq.texas.gov/assets/public/implementation/air/rules/Flare/2010flarestudy/2010-flare-study-final-report.pdf>
 - o "Performance Test of a Steam-Assisted Elevated Flare with Passive FTIR" for Texas City and Detroit, Marathon Petroleum Corporation, September 2009 and July 2010. <http://www.epa.gov/compliance/resources/publications/civil/programs/caa/texascity-report.pdf> <http://www.epa.gov/compliance/resources/publications/civil/programs/caa/detroit-report.pdf>
 - o "PFTIR Tests of Steam-Assisted Elevated Flares - Port Arthur", Flint Hills Resources Port Arthur, LLC, June 2011. <http://www.epa.gov/compliance/resources/publications/civil/programs/caa/portarthur-report.pdf>

Factors Affecting Flare Performance:

1. Flame Quenching in the Combustion Zone

Mixing is important because the Vent Gas and oxygen must be well mixed to complete combustion. Studies indicate that the assist-to-gas (steam-to-Vent Gas or air -to-Vent Gas) ratios are critical to combustion efficiency. Generally speaking, steam-to-Vent Gas ratios ranging between approximately 0.2 and 1.0 will result in the highest efficiency. Supplying a mass of air less than approximately 7 times the stoichiometric mass of air will result in the highest efficiencies.

Problems occur when flame quenching takes place, sometimes termed “oversteaming” or “overaeration,” which occurs at high assist-to-gas ratios. The problems occur because:

- Facilities mistakenly believe that excess steam or air will allow good combustion.
- Facilities fail to reduce steam or air when Vent Gas flow transitions from high to low.
- Facilities have minimum steam addition rates to protect the flare tip from overheating. During low waste gas flow, the resulting steam-to-Vent Gas ratio can be very high, causing oversteaming.
- The steam control equipment associated with a steam-assisted flare lacks adequate flow adjustment precision, which results in excess steam flow at low waste gas flow.
- The air blower associated with an air-assisted flare lacks adequate flow adjustment, which results in excess air at low waste gas flow.

These problems lead to significantly lower flare combustion efficiencies.

To correct these potential problems, facilities can use one or a combination of techniques, including:

- Continuously measure the flow rate of the waste gas and continuously measure, and then control, the steam or air being added as assist gas. Follow the manufacturer’s recommendations and publicly available documents in setting proper assist gas rates.
- Utilize automatic damper actuators or variable frequency drives on the air supply system.
- Reduce the “minimum” or “cooling” steam rates as low as possible while still being protective of the physical integrity of the flare.

Factors Affecting Flare Performance:

2. Low Heat Value in Vent Gas

Vent Gas Heating Value is important because sufficient combustible material must be present to maintain flame stability and achieve high efficiency.

Problems occur because facilities use flares to control waste gases that have low heating value without adding supplemental fuel to raise the Vent Gas heating value to the regulatory minimum of 200 BTU/scf or 300 BTU/scf. *See, e.g., 40 CFR 60.18(c)(3)(ii).* This issue is not to be confused with NHVcz and flame quenching discussed above. Low heating value in Vent Gas occurs because:

- Facilities use flares to control a variety of streams with varying quality. When only one or a few low-flow sources are venting to the flare, the volumetric flow and combustible material concentrations can be minimal.
- Batch processes are inherently variable and will have periods of very low flow or high inert (*e.g., nitrogen*) concentrations. Inert gas lowers the heating value of the gas mixture.
- Supplemental fuel requirements can be costly; facilities may choose not to incur that cost and will combust the low heating value stream alone.
- Facilities conduct compliance tests under the maximum conditions where problems with low heating values are unlikely. In practice, flares are not always operated at these “ideal” rates.

These problems lead to lower flare combustion efficiencies.

To correct these potential problems, facilities can:

- Ensure that the Vent Gas meets the current regulatory heating value limits of 300 BTU/scf for assisted flares, and 200 BTU/scf for unassisted flares, at all times. This will require evaluating the heating value of Vent Gas over the full range of operating scenarios.
- Determine the heating value of the Vent Gas as a whole, not only the hydrocarbons in the Vent Gas, just before it leaves the flare tip. The heating value evaluation includes nitrogen and any other compounds that make up the gas mixture that is present just inside the flare tip.
- Monitor the Vent Gas flow and automatically supply supplemental fuel if the Vent Gas does not have sufficient heating value.
- Evaluate other control options and limit flare use to true emergency situations.



Well Operating Flare – High Combustion Efficiency

Marathon, BP North America, and Ongoing Enforcement

Two recent judicial settlements, one with the Marathon Petroleum Company and another with BP North America, include injunctive relief designed to address potential oversteaming issues and limit the level of future flaring. See, <http://www.epa.gov/compliance/resources/cases/civil/caa/marathonrefining.html> and <http://www.epa.gov/compliance/resources/cases/civil/caa/bp-whiting.html>. These settlements highlight, in addition to liability related to the general duty provisions discussed above, potential New Source Review (NSR) liability at flares. This liability stems from periods of low combustion efficiency that result in higher pollutant emissions. A source's failure to recognize and account for these emissions can result in NSR violations. In addition, oil refiners face possible NSPS Subpart J/Ja liability because of the potential of burning non-compliant gas in flares.

Flare compliance is an ongoing priority for EPA generally and under the Air Toxics National Enforcement Initiative specifically. <http://www.epa.gov/compliance/data/planning/initiatives/initiatives.html#airtoxic>. EPA encourages any company that believes it may have operated flares in a manner that resulted in poor combustion efficiency to expeditiously disclose and correct violations.

If Vent Gas is being sent to a flare but there is no visible flame, or if only a steam plume is visible, the flare may be operating at low combustion efficiency. It is better for the environment for a flare to produce a large orange/yellow flame than no flame at all when Vent Gas is present.

Penalties for Violations

Violating federal requirements for flares can result in a penalty, under the Clean Air Act, of up to \$37,500 per violation, per day. To knowingly violate a flare requirement, including knowingly making a false or fraudulent statement or omitting material information required concerning a flare and its operation, can subject a person to criminal prosecution. Convictions can result in fines, imprisonment, or both.

Conclusion

EPA Enforcement is investigating and seeking resolution of low heating value and excess steam or air addition at industrial flares. When flaring is unavoidable, Vent Gas must be monitored and its heating value adjusted as necessary in order to meet the current regulatory standards for the heating value of Vent Gas. Moreover, monitoring the Vent Gas and steam or air flow and applying steam or air and supplemental gas in an amount that results in high combustion efficiency helps assure compliance with the general duty requirements. Finally, flare owners are expected to operate in accordance with the manufacturer's recommendations and publicly available documents, including the long-available literature from EPA, and generally available documents regarding the current state of scientific knowledge on flare operation and combustion.



Poorly Operating/Over Steamed Flare - Low Combustion Efficiency

Disclaimer: This document puts EPA regulatory provisions in context with plain language. Nothing in this Enforcement Alert revises or replaces any regulatory provisions in the Rule, any other part of the Code of Federal Regulations, the Federal Register, or the Clean Air Act. For more information go to: www.epa.gov/compliance.