CONNECTICUT RIVER WATERSHED COUNCIL
The River Connects Us
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May 14, 2014

Ms. Anne Margolis
Renewable Energy Development Manager
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Re: Connecticut River Watershed Council comments on "VT Low Impact Hydropower Screening" draft criteria – received 4/2/14

Dear Ms. Margolis:

The Connecticut River Watershed Council (CRWC) is a not for profit membership public interest organization founded in 1952 that has an interest in protecting environmental values that directly and indirectly support the State, regional, and local economies and the quality of life offered by the Connecticut River and its tributaries. CRWC members have an interest in all hydro facilities on the Connecticut River and its tributaries.

The interests represented by CRWC are: improving water quality; enhancing habitat for fish and other aquatic biota; safeguarding and improving wildlife habitat; protecting threatened and endangered species; protecting wetlands; preserving undeveloped shore lands; enhancing public recreation and promoting recreational safety; and maintaining any energy benefits that may exist at hydroelectric projects in the Connecticut River watershed.

General Comments:
CRWC is somewhat skeptical of the offer by the Public Service Department (PSD) to expedite the development of small and micro hydro projects. The impetuous for developing these sites hinges on the questionable premise that small hydro facilities cause little or no environmental harm. Further, in our experience with the development of small hydro facilities the reality is that such projects are not economically viable without significant state and/or federal subsidies. Having questionable projects littering our waterways that cannot support themselves without subsidy presages that there will be deadbeat dams harming the aquatic habitat for decades to come because someone suffered delusions of "hydropoliana" fueled by having someone else paying the bills.

CRWC calls on PSD to enforce the Vermont Water Quality Standards (WQS) in all applications regardless of their meeting the draft criteria. Even in those miniscule number of instances where small hydro might be feasible and where it has limited environmental impact the DPS should

review all applications not only for compliance with the WQS but with an eye to determine if a project meets the test of having a value to society greater than the harm it imparts to a river.

Our specific comments to the proposed criteria follow.

1. Will qualify for a FERC 10 Mw exemption
No hydro project that hooks into the power grid is exempt of federal environmental impact review under the National Environmental Policy Act (NEPA). "Exempt" in FERC speak just means one review and done for the life of the project. Applicants should not be allowed any compromises in meeting the VT WQS or federal EIS standards required under NEPA if for no other reason than the project would never be reviewed for environmental impacts again.

2. Located at an existing dam or project will not require a dam or other impoundment
This seems a minimal requirement but there should be close attention paid to the retrofitting of any facility in terms of the impact any necessary work has on the river, the shoreland and river aesthetics. In either dam redevelopment or a run of river development there should be a rigorous evaluation of any bypass reach including its length, the habitat that will be dewatered, its cumulative impact when considered along with other such intrusions on the river and the aesthetics of drying up of a reach of river.

3. Will not change the impoundment elevation
If this is to be true then flow limitations at the powerhouse must meet a true run of river standard on an instantaneous basis, water in is equal to water out at all times of year and at all flows.

4. Will be operated as true run of river
If this is to be true then flow limitations at the powerhouse must meet a true run of river standard on an instantaneous basis, water in is equal to water out at all times of year and at all flows.

5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure
ANR should only accept the U.S. Fish and Wildlife Service recommended minimum flows of 0.5 csm (cubic feet per second per square mile) (summer), 1.0 csm (fall and winter), and 4.0 csm (spring) to insure that all designated uses in a bypass reach of river are protected under the VT WQS. If the applicant wants to pursue other approaches to insure compliance with the WQS, then the widest possible number of interested stakeholders should be invited to review and comment on any such proposed study plans.

6. When the Agency of Natural Resources determines, based on a site-specific determination, that
   a. Fish passage facilities not needed
   b. Project will not affect threatened or endangered species
   c. Project does not significantly alter site aesthetics and
   d. Project is not located where there is a bypass of high habitat value

The widest possible number of interested stakeholders should review and comment on any such proposed determinations before they are issued by ANR.

7. Will comply with ANR Stream Alteration Standards

This is a minimum requirement for all construction. CRWC feels it is important that contractors doing the work on site and especially in river be certified as having completed the Standard River Practices Training for Contractors provided by VTRANS and ANR.

8. Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office

A minimum requirement since compliance with Section 106 is mandatory under FERC license rules. A FERC license is a federal action and consequently triggers Historic Preservation Section 106 review of the project. The question becomes which federal agency will be the lead agency under Section 106 under the PSD small and micro hydro scheme?

CRWC thanks the Public Service Department for the opportunity to comment on the draft criteria for small and micro hydro assistance. CRWC knows that the development of these criteria is an exercise that the legislature required of the Department so we are glad that it has chosen to involve a broad sweep of interested stakeholders when meeting that requirement.

Sincerely

David Deen River Steward

May 2014

Anne Margolis
Public Service Department
112 State Street
Montpelier, VT 05602

Re: Renewable Energy Vermont comments regarding "Vermont Low-Impact Hydropower Screening" document

Dear Ms. Margolis,

Thank you for the effort and thoroughness that is evident in the production of the "Act 165 Report: A Report to the Vermont General Assembly on Progress towards an MOU Program for Expediting Development of Small and Micro Hydroelectric Projects", dated January 15, 2014. The Report provides a helpful background as to the initial results pending from Act 165, and provides context from which to review the "Vermont Low-Impact Hydropower Screening" document.

Renewable Energy Vermont (REV) represents hundreds of renewable energy businesses developing clean energy in Vermont, including hydroelectric dam owners. REV also receives several phone calls every month from the general public regarding how communities and businesses may be able to retrofit an existing dam, and from homeowners living alongside streams seeking to switch to cleaner energy options. Providing more information and clearer guidance as to what is possible and what is not possible regarding hydro power will be helpful for many parties.

It is indeed disappointing to read that "it was made clear to the Team that there was no possibility of the State actually amending any of the statutory requirements of the Federal Power Act or any other relevant laws"[1]. Certainly, the title of Act 165, "An act relating to expediting development of small and micro hydroelectric projects" provided greater expectations for what Act 165 would achieve. Nevertheless, REV thanks the "Interagency Hydro Team" (Public Service Department (PSD), Agency of Natural Resources (ANR) and Agency of Commerce and Community Development (ACCD) for the time put into this endeavor thus far. Particularly, it is helpful to have a primary contact person within the PSD who can

[1] "Act 165 Report: A Report to the Vermont General Assembly on Progress towards an MOU Program for Expediting Development of Small and Micro Hydroelectric Projects", January 25, 2014, page 1

assist potential developers with questions to their answers, and not be caught in a conflict of interest as the ANR staff may be at times, given ANRs dual roles of addressing climate change through increased renewables while also minimizing localized environmental impacts.

General Comments Regarding Hydroelectric Power Development:

Balancing the benefits and costs of Hydroelectric Power:

The only form of energy that does not have impacts – be it to various ecosystems, or to water/air/soil/forestry quality and quantity, is not using energy. Every form of energy production – be it coal, gas or oil, or solar, wind, bioenergy or hydro – has impacts – from short-term construction impacts to (depending on the energy type) long-term catastrophic impacts such as climate change.

Hydroelectric dams are no exception. According to the Vermont Watershed Division[2], there are roughly 1,200 dams in Vermont, many of which are no longer being used, are falling into disrepair and, in the event of an uncontrolled breach, could pose a threat to downstream properties and life, while also impacting water quality and quantity, aquatic life and passage and sediment transportation.

However, a balancing act between restoring rivers and utilizing existing infrastructure should be achieved. This balancing act has three components.

- The benefits of removing the dam, or river restoration: From a personal perspective, until 2008, I worked to remove dams as part of the Riverways Program within the Massachusetts Department of Fish and Game. I am personally aware of the challenges of dam removal, which from my experience with the Neponset River in Boston, Massachusetts were cost, sediment remediation and community resistance. I am also personally aware of the multiple river ecosystem impacts that dams, bridges, culverts, roads, urbanization and human life creates.
- The benefits of retrofitting existing dams: The greatest environmental risk right now is that of climate change. Vermont has a state goal of reaching 90% renewables for *all* energy sectors (electricity, thermal and transportation) by 2050. To do this requires

[2] http://www.vtwaterquality.org/rivers/htm/rv_damremoval.htm

significant development of multiple technologies of different sizes, including the utilization of local hydropower. Perhaps this is the driver behind the legislature requiring that every dam be assessed for its hydro potential before considering removal.

- The risk of not doing anything: There is a significant financial cost and potential environmental cost to removing dams (for example, the release of toxic sediments), and there is a significant financial cost to retrofitting dams with an associated environmental benefit of reduced carbon emissions (particularly if retrofits include environmental mitigation factors such as prioritizing run of river operations, short bypasses, reduced impingement and entrainment to fish, focusing on Class B waters, etc.). There is also a cost to not maintaining a dam, or "letting the dam go". An uncontrolled breach during a large storm event may pose risks to downstream property and life.

Assuming we do not want the third option (having the dam fail due to negligence), then there are only two other options: dam removal or dam retrofitting so that the structure generates power. According to the Act 165 Report, there are 1200 inventoried dams in Vermont, of which FERC has issued licenses for 68, and ANR has determined 44 to be candidates for retrofitting. Of the remaining 1,088, how many are falling into disrepair and not slated for removal, but also not identified as possibilities for retrofit? What were the differences between the analysis done for the PSD that identified 300 dams as having the potential for retrofit compared to ANR's analysis resulting in 44 dams available for retrofit?

REV's position is:
The worst option is to let dams degrade such that they may fail, potentially causing downstream loss of property and life. Both dam removal and dam retrofits have significant financial hurdles and permitting challenges. Dams should be removed or retrofitted. Dams should not be left to fail with the next Tropical Storm Irene. The Dam Task Force has previously developed a list of dams that could be removed. This should be an attachment to the screening criteria. The prioritization of removal as compared to retrofit should be developed according to a matrix that assesses the overall health of the tributary and sub-watershed (which, if of high quality and integrity, could suggest removal as the

preferred choice) as compared to the ability to retrofit (cost implications, interest level in retrofitting the dam by the owner or municipality, level of degradation of the dam, etc.). Ideally, both dam removal and dam retrofitting would be completed based on a prioritized, targeted approach. REV understands that this is another study that could take years, and that there is no funding for this – all the more reason to utilize build upon existing analyses, such as the Dam Task Force list of dams for removal, and the previous studies reviewing dams that could be retrofitted. If there are dams that may be retrofitted at a financial cost to the developer or to the benefit of a Vermont town, as opposed to having the dam fall into disrepair, and if the dam is located on a river that is already severely impacted, then dam retrofitting should be made more accessible.

Ideally, a middle road could be found. For those who would prefer that all dams be removed, to recognize that the funding and practicality of removing all dams is simply not a current reality – and that electricity produced from a local, distributed resource along an already-impacted river at times will supersede a goal of removing all dams, particularly given the critical need to transition from traditional fuels to renewable resources. It would appear that this was the intent behind the legislature requiring that every dam be assessed for its hydro potential before removal. Meanwhile, for those who would prefer that all dams be retrofitted, for these parties to recognize that river systems may offer more value when returned to its natural, free flowing state of dynamic equilibrium, and that some dams are simply more expensive to retrofit than to remove, particularly if there are no willing parties interested in pursuing the costs and benefits of dam retrofitting.

Although these comments focus on dams, it should be understood that REV supports the language in the criteria that recognizes that dams are not required for hydro, and that damless hydro has been operating in Vermont for some time.

REV's specific comments regarding the Screening document, offered below, are provided in light of the above goal to find a middle road.

General Comments regarding "Screening" document:

1. Clarify the purpose of the document and expand the available resources: REV understands that the "Screening" document is one of several documents that will

be developed to assist interested parties in understanding the steps required to retrofit an existing dam, and in particular, navigate the permitting process. Although having the "Screening" document on one page is helpful, REV suggests that the document either be expanded so that it clearly explains (1) what the document is (a checklist for a site visit), (2) what it is not (a comprehensive explanation of the requirements needed to retrofit a dam), and (3) what the other steps may be for redeveloping an existing dam. Without objective criterion, the Screening Tool will likely only lead to additional questions by developers to state staff and may not be as helpful as it could be. The Team may already be working on this, but REV would suggest that documents like the Public Service Board's 1980 report "Vermont Hydroelectric Development Handbook"[3] be updated and provided in tandem to this Screening document and other resources.

For example, one area in which the document could be further clarified is in the preamble of the Screening document. The preamble mentions that the Interagency Team will "coordinate to assist developers with understanding the FERC hydropower permitting process and federal and state resource protection regulations that are part of that process", but does not mention other permits that may be required, the potential timeline for FERC processing, etc. REV understands that the Screening Tool is one of many that will be developed, but strongly advocates that additional documents be developed that address these other questions – otherwise the PSD staff person addressing questions from potential developers will be asked many of the same questions by different parties, ultimately resulting in an inefficient process. If the Team is already working on these other materials, REV thanks you in advance.

2. *When developing resources, provide them for two different audience levels:* REV has found that the parties interested in hydro development appear to fall into two categories – those who are experienced hydro developers and know a fair amount regarding existing challenges in the permitting process, and those who may have little experience in dam retrofitting, for example, an individual who works for a Town or volunteers for a Town Energy Committee who sees a dam in their municipality and are interested in retrofitting the infrastructure. These two audiences would be better served, and the goals of Act 165 better achieved, if technical resources were made available geared for these different expertise levels.

[3] Available here: http://www.communityhydro.biz/documents/HydroHandbook.pdf

Specific comments regarding the Criteria:

"Will qualify for a FERC 10 MW exemption": Does this criterion capture dams owned in full or in part by municipalities? If not, adding words to include municipally owned dams would be helpful, given the level of interest from Towns in retrofitting nearby renewable energy infrastructure.

"Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure": This would be clearer and more direct if it stated "Proposed flows in the tailrace will strive to meet 0.5 cfsm (cubic feet per second per square mile) in summer, 1.0 cfsm in fall and winter, and 4.0 cfsm in spring". Many Vermont rivers do not meet these standards already. REV assumes that the intent of this language is to ensure that a newly retrofitted dam does not significantly exacerbate flow issues. If this is the intent, providing objective criteria with a description as to the intent would be more helpful than what is currently drafted.

Criteria 6 – 8, REV has concerns with and suggests these be removed: These are broad statements implying a fair degree of subjectivity. How would a developer know which projects the ANR may find do not require fish passage, or will not threaten endangered species? Is there a list? If so, providing that with the Screening Tool would be helpful. If not, objective criteria should be provided for developers so that developers and regulators do not waste valuable time and resources. Additionally, very few fish passage alternatives have been found to work. What is the net benefit to potentially requiring a fish passage alternative that is likely to be ineffective at an existing dam that already has fish passage issues? It would appear that the effect of this would be to increase the costs of the dam retrofit, while not meeting the end goal of providing fish passage. If this is not struck, REV suggests editing so that it becomes an objective criterion (e.g. "velocities of less than X foot per second", etc.).

REV does not support the criterion that the "project does not significantly alter site aesthetics". This is a slippery slope and open to interpretation. For projects that may be retrofitting an existing dam, a new hydroelectric dam will likely look different than the current infrastructure. Meanwhile, dam removal <u>certainly</u> alters site aesthetics. Venturing into the discussion of "What is more historical – a

free flowing river or the history of New England hydropower" is a never-ending conversation, and one that seems more stringent than should be required for a Site Visit, which is the end goal of the Screening Tool.

The criterion that the "project is not located where there is a bypass of high habitat value" is very broad. How long is the bypass? The Federal Energy Regulatory Commission has chosen 500 feet in previous decisions.

From REV's perspective, criterion 6-8 should be removed from the Screening Tool or turned into objective criteria. These criteria, as currently drafted, require a significant degree of information and allow for a fair degree of subjectivity. The Screening Tool will be far more effective in achieving the goals of Act 165if it utilizes more objective criteria that gave potential developers a clear set of objective requirements and timelines.

Questions regarding Next Steps and Timelines: Upon requesting a site visit, will there be a timeline provided for a response to the Screening Tool, and a timeline for a potential site visit? If not, REV politely requests that a timeline be established and provided in the Screening document. The Act 165 Report mentions several additional items to be developed and provided regarding the dam retrofit process. What does the timeline look like for execution and release of these materials? It appears that the Screening Tool is one of many of these materials – understanding how and when the Screening Tool will fit into an overall toolbox developed by the Team, will be helpful. Also, given the significant role that the USFWS and Army Corps of Engineers has in river and dam management, respectively, how does the Team plan on providing more communication with these two agencies to streamline hydro permitting?

Thank you for the opportunity to provide comments. Please do not hesitate to contact me for additional information.

Sincerely,

Gabrielle Stebbins, Executive Director

VNRC Vermont Natural Resources Council

May 9, 2014

Anne Margolis
Clean Energy Development Fund Manager
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Sent electronically to: anne.margolis@state.vt.us

Dear Anne,

The Vermont Natural Resources Council (VNRC) is filing comments on the proposed Low-Impact Hydropower Screening Criteria. We appreciate the efforts that have gone into bringing the conversation to this point. We have two general comments related to the efforts and more specific comments related to the criteria.

Lower Impact and Resources Expended

We suggest that the title of "low-impact" provides the reader with the impression that a project ultimately approved under these criteria is, indeed, low impact. All hydropower projects have an impact and so it would be more accurate to title the document "VT Lower Impact Hydropower Screening Criteria".

While the Public Service Department (PSD) and the Agency of Natural Resource (ANR) have done an admirable amount of work on drafting these criteria, VNRC is struck by the state resources that have gone into the development of these criteria when compared to what we believe is the potential for additional hydropower development in Vermont. We urge both PSD and ANR to consider the benefits to be realized given the time and effort involved.

Water Quality Standards

Since the Vermont Water Quality Standards (VWQS) are the foundation of water protection in Vermont, it is surprising that the criteria are silent on three important portions of them: existing and designated uses and the anti-degradation policy. The three are intertwined in the VWQS.

Generally, anti-degradation prevents back-sliding of "extra" healthy waters, protects high quality waters, protects existing uses/designated uses (as defined in the VWQS), manages assimilative capacity and evaluates cumulative impacts from multiple impacts.

Tier 1 provides protection and maintenance of existing uses and water quality supporting those uses. Tier 2, where the quality of water is better than the applicable water quality standards, those water bodies should be maintained at that existing high quality unless it is necessary to accommodate important social or economic considerations. If such a decision is made, existing uses must still be fully protected. Activities that lower water quality are only allowed with socio-economic justification. While not a criterion, potential developers should know up-front that it may be necessary to develop a socio-economic justification in order to develop a project. Tier 3 is the highest level of protection from pollution to waters specifically identified as very high quality. These water bodies are designated as Outstanding Resource Waters (ORWs).

The criteria must include compliance with the VWQS generally (ANR permits cannot be issued that would violate the VWQS) but also should provide prospective applicants with a "red flag" that if a project might impact an existing or designated use, then it is not lower-impact. Given the difficulty in determining existing or designated uses on a waterbody (due to a lack of implementation by ANR), this information seems like valuable input from the various state organizations involved in providing initial feedback via the criteria.

Additionally, no projects should be built on ORWs regardless of whether they have been designated for natural, recreational, cultural, or scenic values. Providing this guidance upfront to prospective applicants, though not likely to apply to a large number of projects, would be helpful information for them,

#3 Impoundment Elevation

This criterion states that for a project to be considered lower impact, the impoundment elevation will not be changed by the project. In some instances, a lowering of the impoundment might be an improvement over existing conditions. The criteria could be more plainly stated as "Will not increase the impoundment elevation or increase fluctuation in water level elevation".

#5 ANR Flow Procedure

It would be worth advising the prospective applicant that the ANR Flow Procedure is the minimum requirement. We suggest rewording the criteria to "Proposed bypass flows will meet or exceed hydrologic standards…."

#6 ANR site-specific determinations

Parts (c) and (d) of this criterion appears to provide standards that are different from the VWQS and the Clean Water Act. For example, the WQS do not rely on the level or "significance" of the alteration of aesthetics, nor do they consider "high" habitat value. The criteria must, at a minimum, be consistent with the VWQS.

That said, this criterion is an important part of the guidance provided to prospective applicants and should be clarified so as to provide the most value to those who are considering developing a project.

#7 Stream Alteration Standards

The link that the reader is referred to references a draft version of the standards. These standards have not been adopted so the link should be updated.

Renewable Energy Credits

If a project produces energy that counts toward Vermont's renewable energy goal, and the developer also sells the Renewable Energy Credits (RECs) out of state that contribute to a utility's renewable portfolio standard, which is double-counting the renewable production. In this instance, the project should not qualify for regulatory assistance by the Department or the Agency. We suggest that a criterion that addresses this instance may be warranted. It would seem that the sale of RECs would be inconsistent with Paragraph 8 of the PSD/ANR/ACCD MOU, which specifically cites Vermont's goals with respect to renewable energy, not generation that supports renewable energy goals in neighboring states.

Project Operations

None of the existing criteria address the ability or capacity of the developer to adhere to the operating restrictions necessary for a project to be lower impact in fact and not just in design. Unlike other renewable energy technologies, real environmental harm can result from poor compliance with operating conditions developed by ANR. There is a financial aspect (i.e., the financial capacity to make the necessary investments in modern equipment and controls) as well as having personnel with the necessary skill to properly operate the project. An assessment of both aspects should be made prior to providing special assistance.

Thank you for your consideration of these comments. Please let us know if we can offer any further clarification.

Sincerely,

Kim P. Greenwood

Kim L. Greenwood, CPESC
Water Program Director & Staff Scientist

Anne,

I will try to call you in the morning. See my comments-attached.

Thank you,

Lori

Lori Barg
Community Hydro

PROPOSED VERMONT Low-Impact Hydropower Screening

1. Will qualify for a FERC 10 MW exemption.1 *or be a municipally owned dam, or a municipal project.*
2. Will be located at an existing dam, **or** project will not require a dam or other impoundment.
3. Will not change the impoundment elevation.
4. Will be operated as true run of river.[2]
5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure.[3]a)the ABF in the tailrace and b) generally 7Q10 in the bypass reach.

6. Bypasses of less than 500 feet in length, shall have minimum 7Q10 flows in the bypass reach.

The simplified procedure should not apply to bypasses greater than 500 ft in length,

7. Fish: a) The velocities at intake should be less than 3 feet per second, to avoid impingement and entrainment.

b. Project will not affect threatened or endangered species;

c) A minimum flow of 1/4" over an existing dam will meet site aesthetics.

d) No hydro will be permitted in Class A waters, and a maximum bypass length of 500 feet is permitted in Class B waters.

7. Will comply with ANR Stream Alteration Standards.[4]

8) Sites must agree to meet standard terms and conditions

9) Decisions will be made with 60 days if proposed project meets low-impact criteria.

10) Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office.[5]

The Vermont Public Service Department, Vermont Agency of Natural Resources, and Vermont Agency of Commerce and Community Development will coordinate to assist developers with understanding the Federal Energy Regulatory Commission (FERC) hydropower permitting process and federal and state resource protection regulations that are part of that process. These state agencies will assist developers of low-impact hydropower projects that do not propose new dams and that protect natural and historic resources by organizing an interagency site visit to identify potential historic and natural resource issues.
To qualify for enhanced state agency assistance, a project must meet all of the following criteria:

http://www.watershedmanagement.vt.gov/rivers/docs/rv_fsreport2009.pdf

http://www.anr.state.vt.us/Dec/Waterq/rivers/docs/rv_smallhydroreport.pdf

Comments on VERMONT Low-Impact Hydropower Screening

1. Will qualify for a FERC 10 MW exemption.1 *or be a municipally owned dam, or a municipal project.*

Most municipally owned dams will not qualify for a FERC exemption-due to being located in a town, with multiple adjacent landowners. (The difference between the license and exemption-other than length, is primarily landownership. Municipalities should be included in the low-impact hydropower screening criteria.)

2. Will be located at an existing dam, **or** project will not require a dam or other impoundment.

3. Will not change the impoundment elevation.

4. Will be operated as true run of river.[2]

5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure.[3]

It is very important that this is clarified. ANR flow procedure is clear in providing different flow regimes, a)the ABF in the tailrace and b) generally 7Q10 in the bypass reach. This distinction is *very* important, recently some ANR staff have confused this, interpreting it to require ABF flows in the bypass reach. The ABF standard was not compiled from rivers located in Vermont. Any hydrologic study shows that about 70 percent of gaged rivers in Vermont can not meet ABF flows under natural conditions. Thus, it is like requiring 20 hours of sunshine a day.

Vermont hydrology should be used, not a standard developed from a few large rivers all over New England. ANR has completed a study of all permitted bypass flows, as well as a function of the length of the bypass. All existing permitted hydro meets Vermont Water Quality Standards. This study by ANR should be used as a guideline for this low-impact process.

The flow policy, and previous ANR decisions, show that the bypass reach should have "generally" 7Q10 flows. The numeric standards in the Vermont Water Quality Standards use this same flow criteria for all standard setting. ANR should reconsider turning the flow procedure into a rule, as ANR proposed in 1991. Unfortunately, it is still a policy-and has continued to be misinterpreted. The author of the Policy-Tom Willard should weigh in on this.

Another criteria should be added to the low-impact procedure: It should state:

6. Bypasses of less than 500 feet in length, shall have minimum 7Q10 flows in the bypass reach.

The simplified procedure should not apply to bypasses greater than 500 ft in length,

6. When the Agency of Natural Resources determines, based on a site-specific determination, that a. Fish passage facilities not needed;

This should be removed, at least until ANR has some scientific criteria developed, or the WQS have criteria. For example, ANR has not yet decided on the future of the Atlantic salmon program, although the USFWS terminated it years ago, and NH (which owns the Connecticut River) also terminated the Atlantic Salmon program. Fish passage could be a deal-breaker for a small project. In regards to trout, there is scientific disagreement as well, for example, there are dozens of peer-reviewed articles that say trout tend to hang out at home in their favorite spots-and only move for cold-water refugia. This criteria should be removed, and replaced with something to protect fish from impingement and entrainment.

(6) The velocities at intake should be less than 3 feet per second, to avoid impingement and entrainment.

http://www.watershedmanagement.vt.gov/rivers/docs/rv_fsreport2009.pdf

http://www.anr.state.vt.us/Dec/Waterq/rivers/docs/rv_smallhydroreport.pdf

b. Project will not affect threatened or endangered species;

c. Project does not significantly alter site aesthetics; (C-should be removed and replaced with:)

A minimum flow of 1/4" over an existing dam will meet site aesthetics.

Aesthetics are subjective. Previous decisions should be used, for example, the WRB decided in one case that flows could be turned "off" at night, and "on" during the day.

d. Project is not located where there is a bypass of high habitat value. (This should be removed and replaced with)

There should be no hydro in Class A waters, and a maximum bypass length of 500 feet should be permitted in Class B waters.

There is no definition of high habitat value in the WQS. ANR allows for multiple uses, and the SHIPP process , and WRP decision, and ANR's small hydro program, allows for multiple uses. It is almost impossible to regulate something for which there is no definition or criteria.

8. Will comply with ANR Stream Alteration Standards.[4]

Another criteria should be added:

There should be standard terms and conditions, and administrative timelines. See attached for standard terms and conditions. Decisions will be made with 60 days if proposed project meets low-impact criteria.

8. Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office.[5]

[1] See definition at http://www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/get-started/exemp-licens/project-comparison.asp.

[2] A true run-of-river project is one which does not operate out of storage and, therefore, does not artificially regulate streamflows below the project's tailrace. Outflow from the project is equal to inflow to the project's impoundment on an instantaneous basis.

[3] Reference for further detail: http://www.anr.state.vt.us/dec/waterq/rivers/docs/rv_flowprocedure.pdf and www.fws.gov/newengland/pdfs/Flowpolicy.pdf.

[4] See Environmental Protection Rule, Chapter 27, Vermont Stream Alteration Rule for further guidance: http://www.vtwaterquality.org/rivers/docs/rv_StreamAltRULE_DRAFT_07092013.pdf.

[5] For a discussion of direct and indirect impacts, see ACCD's *Criteria for Evaluating the Effect of Proposed Telecommunications Facilities*, *Transmission Lines, and Wind Power Facilities on Historic Resources* at: http://accd.vermont.gov/strong_communities/preservation/review_compliance/telecom_criteria.

Attachment:

Tier 1

If the water is Class A, or an Outstanding Resource Water; no new hydroelectric facilities shall be permitted.

Tier 2

If the bypass reach comprises >/= 10% of the connected riverine environment; then site specific data, or USGS gauge data on the stream, shall be used to determine appropriate minimum flows for the bypass reach.

Tier 3

If the bypass reach comprises < 10% of the connected riverine environment, then the Vermont statewide mean default flows in the table below; *or,* USGS gauge data on the stream may be used to determine the appropriate minimum flows for the

Here are examples of criteria that would work:

(2) Does not entail any increase in the normal maximum surface elevation of the impoundment pursuant to repair or reconstruction of a dam;

••

(3) Does not entail, for the purpose of generating electric power, any change from the prevailing regime of storage and release of water from the impoundment;

••

(4) Does not entail diversion of water from the waterway for more than 500 feet from the toe of the dam to the point of discharge into the waterway;

••

(6) Utilizes only a dam at which there is no significant existing upstream or downstream passage of fish;

••

(7) Will not cause violation of applicable water quality standards established by the U.S. Environmental Protection Agency or any state in which the project is located;

EXAMPLE-STANDARD TERMS AND CONDITIONS:

•I. The Exemptee shall operate the project in a run-of-river mode, whereby inflow to the project will equal outflow from the project on an instantaneous basis and water levels above the dam are not drawn down for the purpose of generating power. Instantaneous runof-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptce, the Vermont Agency of Natural Resources and the U.S. Fish and Wildlife Service.

•2. The Exemptee shall at all times provide a minimum now over the dam spillway equal to the 7QI0 now to protect water quality and fish habitat in the bypass reach. These flows shall be released upon commencement of project operation.

•3. The Exemptee shall, within three (3) months of the date of issuance of an exemption from licensing, prepare and file for approval by the U.S. Fish and Wildlife Service, a plan for maintaining and monitoring run-of-river operation and bypass now releases at the project. The plan shall include a description of the mechanisms and structures that will be used, the level of automatic operation, the methods to be used for recording data on run-of-river operation and bypass discharge, an implementation schedule, and a plan for maintaining the data for inspection by the U.S. Fish and Wildlife Service.

•4. The Exemptee shall implement a refill procedure whereby, during impoundment refilling after any drawdown for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining

10% of inflow to the project. This refill procedure may be modified on a case-by-case basis with the prior approval of both the U.S. Fish and Wildlife Service and the Vermont Agency of Natural Resources.

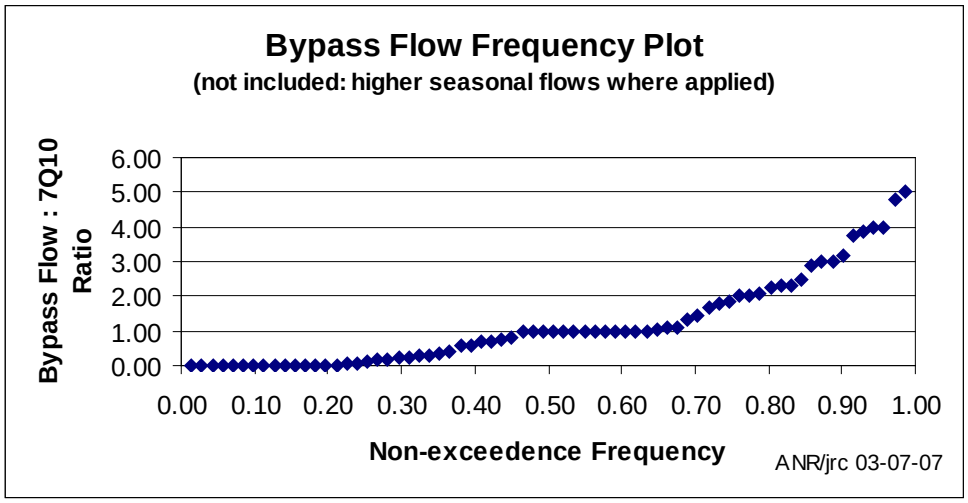
•5. The Exemptee shall be responsible for constructing, operating, maintaining, and evaluating upstream and downstream fish passage facilities at this project when notified by the U.S. Fish and Wildlife Service and/or the Vermont Agency of Natural Resources that such fishways are needed. The fishways shall be constructed and operational in accordance with the schedule identified by the agencies. Any fishways prescribed by the aforementioned agencies shall be designed in consultation with, and the designs shall require approval by, the U.S. Fish and Wildlife Service.

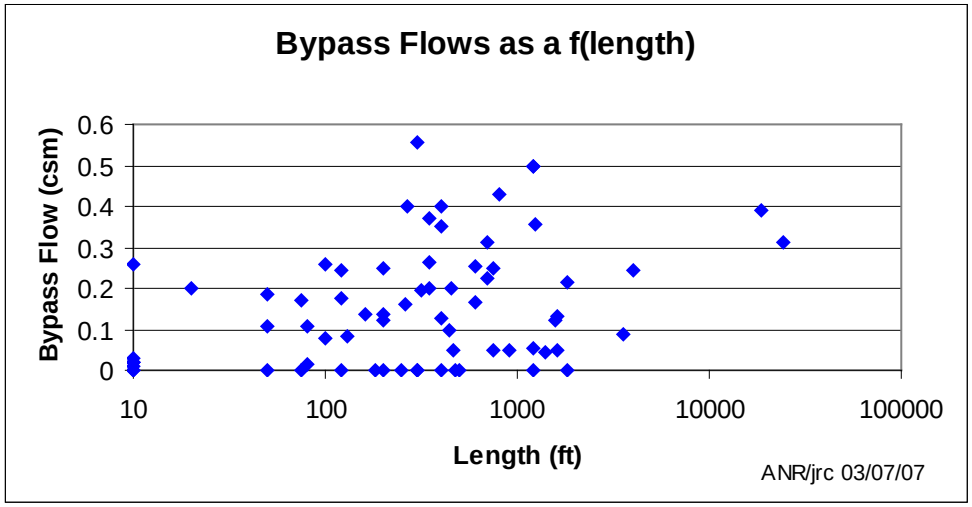
•6. The Exemptee shall notify the U.S. Fish and Wildlife Service in writing when the project commences operation. A set of as-built drawings shall be furnished with the notification. Such notice shall bc sent within 30 days of start-up to: Supervisor, New England Field Ot1ice, 70 Commercial Street, Suite 300, Concord, New Hampshire 03301.

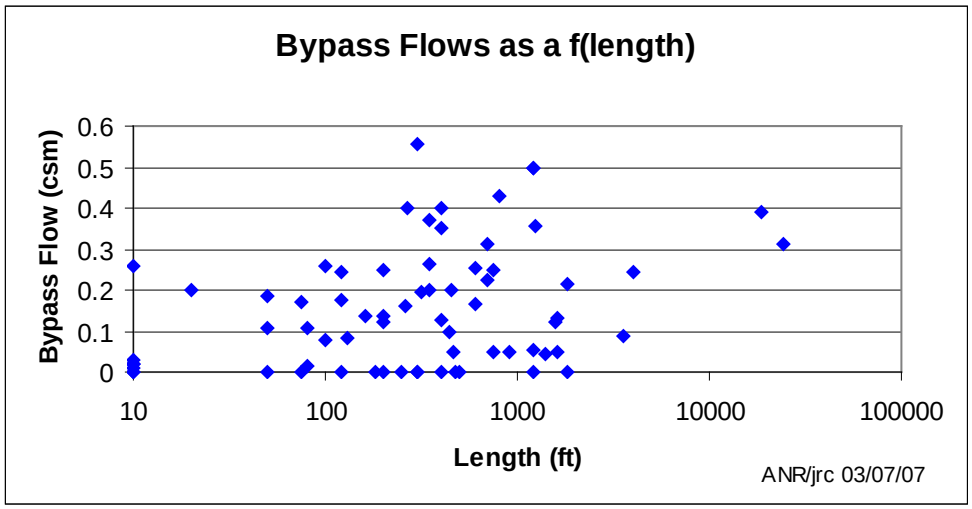
•7. The Exemptee shall allow the U.S. Fish and Wildlife Service to inspect the project area at any time while the project operates under an exemption from licensing to monitor compliance with their terms and conditions.

•8. The U.S. Fish and Wildlife Service is reserving the right to add to and alter terms and conditions for this exemption as appropriate to carry out its responsibilities with respect to fish and wildlife resources. The Exemptee shall, within thirty (30) days of receipt, file with the Federal Energy Regulatory Commission any additional terms and conditions imposed by the U.S. Fish and Wildlife Service.

•9. The Exemptee shall incorporate the aforementioned terms and conditions in any conveyance -by lease, sale or otherwise -of its interests so as to legally assure compliance with said conditions for as long as the project operates under an exemption from licensing.



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100000
Length (ft)
ANR/jrc 03/07/07

Community Hydro

Power In Every Drop

May 16, 2014

Anne Margolis
Vermont Department of Public Service
Renewable Energy Development Manager
VT Public Service Department
anne.margolis@state.vt.us
802-828-3058

RE: Draft Hydro Screening Criteria

Anne,

Thank you for meeting with me yesterday and encouraging me to submit additional comments. I was sorry to hear that many of the conversations you had during the inter- agency meetings were not recorded, and no summaries are available. It is more than disappointing that the Agency of Natural Resources did not provide objective criteria for hydro screening, and that the DPS did not advocate to the ANR and SHPO to provide objective criteria with administrative timelines and guidelines. ANR had promised to provide a "straw man" in 2008, at the end of the SHIPP process. It never happened.

I was also sorry to hear that ANR's team did not include representatives to advocate for addressing climate change, the importance of addressing our energy future, and integrating multiple uses. This process seems to have helped reinforce silos instead of developing an integrated approach that recognizes multiple uses. As you know, hydro is a permitted use, and precedent from both the WRP, and the WRB seems to have been ignored in the creation of this draft screening criteria. I hope that some of the climate change people from ANR review this next draft of the screening criteria. It is time to get out of the silos.

I feel like we are Nero, fiddling while Rome burns. DPS had a great public process years ago, and as you may remember, the majority of people wanted our energy from hydro. It is frustrating for me, to look back at notes developed since I did the 2007 study for DPS on undeveloped hydro potential in Vermont, only to find that the Agencies have failed to act, over and over, and over again. We have earlier ice-out, more frequent flooding, increased scour - destroying eggs, experts who expect brook trout to be history in this State by the end of this century, if not before, increase in invasive species, and change of species due to climate change. We talk about local, local food, local energy, and this subjective screening criteria continues to make it impossible for hydro to be economically developed in this State, a State whose economy was born on hydro. This is short-sighted.

This screening criteria could put the Agencies ahead of the curve, being pro-active to provide objective criteria that will enable a potential developer know whether or not it is okay to move

forward. We have thousands and thousands of operating years of hydro in this State, and no run of river hydro listed as causing water quality violations. If we can't develop objective criteria from almost a hundred projects all over the State, some running for over 100 years, then it is not for lack of data-but for lack of will to analyze that data, and make decisions that allow for multiple uses.

We need objective criteria to develop the remaining sites in the State. We can do this. We can walk and chew gum. We can develop objective criteria, and yes/no answers in a screening criteria that are protective of our resources.

Here are some suggestions: No hydro in Class A waters; no bypasses longer than 500 feet; minimum of 7Q10 in bypass reach (or 7Q2); Vermont accepting USFW's termination of the Connecticut River Atlantic Salmon program; inflow equals outflow in the tailrace, plants are run of river; Velocities at the intake of less than 3 fps to protect fish from impingement/entrainment; Develop standard terms and conditions, and a screening criteria similar to what I sent you last year-in the 1040 EZ form for hydro.

In terms of fish passage, develop a consistent approach to fish passage so that everyone pays the cost to install fish passage at whichever of the 1200 plus dams in Vermont that require it. If fish passage is important, then let's all pay for it. I met with the NY state ichthyologist decades ago, who has seen thousands of fish passages, and I asked him which worked, the answer is almost none (eel passage is getting increasingly successful, but eels can go over wet ground, and routinely do). As you probably know, Audubon in Massachusetts has been opposed to the Atlantic Salmon program because it has hurt the CT river fishery (Karl Meyer). If fish passage is so critical, and since the Vermont Department of Fish and Wildlife owns the largest number of dams in the State—why have they not installed any fish passage upstream or downstream, at any of their dams? If it is important, let's find a way to fund it, and make it happen at all dams that need it. Why put this cost only on hydro? is it only because of the FERC regulatory hook? and a way to enforce a double standard?

We have been saying for years, if the Agency requires an expensive fish or flow study-it is not economic to develop the small hydro that remains to be developed. The cherries have been picked, and the sites that remain are mostly under a megawatt, and cannot afford expensive fish or flow studies-which can cost hundreds of thousands (try to find the SHIPP proceedings for documentation-and study by FERC).

Beyond economics, there is no good science, nor scientific concensus behind short-term flow studies, nor any consensus on any fish study, as detailed in the Agency's recent report on fish for the legislature (link sent earlier). I can send you lots of cites on the science here, let me know if you would like them? What these expensive studies do is stop projects from being developed. That is it.

Have you heard the acronym "Bopsar"? I learned it years ago from ANR staff, it stands for Bunch of people, standing around a river. From the regulated communities perspective, it stands for a waste of taxpayers money, and regulators time. The subjective criteria in the draft screening criteria are an example of BOPSAR, no good science, no objective criteria, but lots of BOPSAR. The subjective screening criteria institutionalizes bopsar, let staff drive hours, take a look at a site, stand around, with no objective criteria, and drive back. Why not have good science? Why not build on existing precedent? Why not develop objective criteria that are easier on the regulators and the regulated communities? Why not have criteria –that allow hydro to be developed at 5% of the cost of developing hydro in the States.

I had asked for notes from your meetings, because I had provided you with information on hydro permitting in other countries, including where England and Scotland are able to permit a site, at 5% of the cost of permitting a site in the US. You said that there were no notes, only conversation, but that ANR staff said that England is not the US. That is true (but Scotland is an extension of the Appalachian Mtn chain) But it seems that this was an idea that was summarily dismissed, with little or no investigation. The purpose of objective criteria and administrative timelines is to make it easier for the regulators and the regulated.

In the public response, I look forward to understanding exactly how ANR looked at the data and decisions and policies and precedents for hydro in this state, and having DPS urge them to come up with objective criteria, instead of this subjective pseudo-screening criteria. And get out of the silos, and have other parts of ANR review the proposed criteria. This pseudo-screening criteria reflects narrow thinking, and is not reflective of the WQS, or existing precedent, or the threats to our rivers from climate change.

I have provided you with a lot of information, and background material-and I am sorry to be so frustrated, but it seems like a black hole. While I know you are pleased, that lines of communication are open with the Agency now, that in itself is distressing. Regulation should not be based on personal interaction, but objective criteria and administrative guidelines and timelines. We need good working relationships, but we must have objective criteria to make it easier on the regulators and regulated communities. Otherwise, we just get inter-agency bopsar.

The good news is that if DPS-which will have to be the advocate here-can ask Vermont to develop objective criteria, because Vermont has a large body of decisions, data and precedent to build on. I hope these comments, and all of the previously submitted comments are incorporated into the next version of this criteria, so that we have objective criteria. DPS can and should advocate for objective criteria. If numbers 5-8 are just incorporated into the preamble, this gets us nowhere-just more expensive babysitting. All criteria should be developed in a way similar to 1-4, so there is clear, objective criteria, that let both the regulators and regulated know if it is okay to move forward. I see it as similar to a dichotomous key in a field guide--------if this----then that. We need yes, no answers.

I am an environmentalist, and ANR should be proud to build on the decisions from previous 401's and WRB/WRP decisions to move forward with hydro in this State. The draft screening criteria proposed wastes regulators, and potential developers time, and taxpayer dollars. It is expensive babysitting-which I doubt will bring much tangible result in terms of addressing the problems that need to be addressed regarding climate change, nor in developing hydro.

I am also extremely disappointed to see that all the SHIPP information has been removed from the web. Years ago, at the request of the legislature dozens of us spent hours at the Water Resources Panel. The draft screening criteria ignores the work done at SHIPP, and is not even consistent with the Agency's own small hydro document, or ANR's presentations in Randolph at the small hydro conference that they sponsored.

It seems like history, and years of work have been forgotten in the development of this draft screening criteria. For example, ANR has previously written no hydro in: "*Class A or Outstanding Resource Waters. These projects would include sites which have one or more of the following characteristics: high quality fisheries or aquatic habitat; threatened or endangered species; rare and irreplaceable natural communities; existing (and exceptional) recreational uses, such as, a popular swimming hole; and high biodiversity or habit values in relation to the watershed"* This is just one example of previous work that seems to be ignored in the draft screening criteria.

As promised, I sent you the results of my public record request to ANR regarding violations to WQ, with sites that had 401's issued by ANR. Some of the "violations" were self-reported, by responsible hydro operators, some were not even violations. Given the thousands of years of operating hydro in this state, this very short list of violations is impressive. A review of the list shows problems mostly due to mechanical failure, flooding, ice-out, new operator etc.

I also searched the FERC elibrary for the last 5 years, and found, that FERC has not issued any violations to any hydro in Vermont. This record should make both hydro operators and regulators proud.

I know I am repeating myself, but I need to emphasize that the draft criteria is subjective, not objective-and will result in wasting regulators time, but probably won't result in the development of any hydro in this State. As someone who knows how many hundreds of thousands and millions of dollars it costs to get through ANR, it is a shame, and a sham to see these draft subjective criteria. The hydro that remains to be developed cannot afford site specific studies. And yes, even though we are not England, we can develop objective criteria, based on Vermont hydrology and 401 and WRP and WRB precedent-if there is the political will to do it. It does not come down to science, but to political will. I have sent you other e-mails with many attachments, with data, please make sure they are responded to point by point, or what I'd prefer is that DPS pushes ANR to use the precedent of

existing data to develop objective criteria, so that we can use locally-made renewable energy to help address Vermont's energy needs.

I have included a few attachments, from the thousands of files I have on hydro over the last 7 years or so, I hope they can be used to create a draft screening criteria with objective standards. Cueto developed similar files that were presented to SHIPP to analyze the agency's 401 decisions. I will send that along too.

I look back at the 2007 study I did for DPS, and I see a dozen or two sites that should be, and could be economically developed, but only if there were objective criteria and administrative guidelines and timelines. After my experience at Ball Mtn and Townshend fighting the Agency on everything from a request to use the Traditional Licensing Process (they fought that on both Ball Mtn and Townshend-sites at existing dams, although these sites have no penstock, no change, no bypass reach, no powerhouse etc); to a request for a 401 (they asked me to withdraw the request, which we ignored); I won't, and cannot go through that again for these few dozen smaller sites that I would love to see developed. I would not put myself through that tortuous process, nor could I or anyone afford the expense. However, I, and many others would move forward if there were yes/no, objective criteria that protected our resources and made sense.

I am sure there are many towns that would do the same. As you may recall, The Vermont League of Cities and Towns surveyed their members, many of who would develop hydro, if it was not such a nightmare getting through ANR. You've heard me say this many times, but the default ABF criteria cannot be met naturally in about 70% of Vermont streams, so that as a default criteria in the tailraces is like demanding the sun to shine 20 hours a day at 42 degree latitude-just not possible. ANR's default criteria cannot be met under natural conditions in Vermont today. Maybe if we wait a few geological decades, that will change. If we are fortunate, there might be some micro-organisms still around to populate the earth, as we fiddle.

Please don't hesitate to contact me with any questions. I previously submitted some specific recommendations on how to modify the criteria to make them objective. It included limiting the length of the bypass reach, maintaining velocities of less than 3 fps at the intake to avoid fish impingement/entrainment; standard terms and conditions etc. I hope to see these incorporated in the next version of the screening criteria.

It personally makes me crazy, that for some strange reason, all the talk is about buying local, but when it comes to electricity- we don't want it to come from within our borders. If we don't see it, it is ok-but listen to us squeal if our power is cut off. Let's have big hydro and big Canadian wind, let's send our energy dollars out of State. But Vermont has water, we have hills, and we can walk and chew gum, and we can develop objective criteria *and* protect our resources, and have non-consumptive uses like run of river hydro to provide local jobs and make local energy. We all decided

during the DPS public process, we want local energy, and hydro energy. Please develop objective criteria. DPS can advocate for this, I hope to see that objective criteria in the revised version of the screening criteria, I know it is possible, it will just take the political will to make it happen. I hope to see it in the next version of the criteria.

And while you are at it, how about advocating for some hydro pumped storage? There is no way to have renewable energy-without storage, and I have some ideas for small pumped storage in the Rutland and Burlington areas-where they are most needed. No expensive, toxic batteries, but proven technology, that can be done in an environmentally sound way.

Sincerely,

Lori Barg

Attachments:

Three-Tiered System for Applying Default Flow Standard

While not all participants agreed that at Vermont-based standard is necessary, the SHIPP recommends that Vermont flow standards be applied to these new run-of-the-river hydropower facilities in such a way as to recognize three categories of projects:

1. Projects that qualify for the use of the default standard,
2. Projects that will require site-specific studies, and
3. Projects which are not approvable.

++

October 8, 2008

Peter Young, Chair
Natural Resources Board,
Water Resources Panel
National Life Records Building
Drawer 20
Montpelier VT 05620-3309

Dear Chairman Young:

Thank you and the Agency of Natural Resources as well as others for your willingness to consider a Vermont-based flow standard for small hydroelectric projects. We look forward to working collaboratively to address concerns and to develop a workable standard for small hydro that is protective of the environment.

Our state's energy demand is not going to go away. As citizens and as government we must fully support the development of in-state sustainable generation sources, especially those that produce energy without producing CO2 emissions. Hydroelectric is a base load source of energy in contradistinction to solar and wind. As such, Vermont must include small hydro as part of a reliable mix of local energy sources. The permit application and decision making process for small hydro facilities must be transparent, efficient and reasonable in terms of cost. As was stated by one potential applicant, "*we have every intention of following every rule regarding redevelopment to the letter but have found the lack of clear rules extremely confusing and cumbersome".*

We believe Vermont's permitting system for small hydro is in great need of a set of standards similar to those outlined by the Low Impact Hydropower Institute of Maine. This organization has stringent, clear criteria that make it easy for all involved to understand those facilities that are appropriate and those that are not. Rules based on this kind of model would allow the state to quickly inventory sites for possible development.

Below please find additional reasons that we believe compel Vermont to adopt rules for permitting small hydroelectric facilities:

- The current process is circuitous and expensive, with no clear guidelines.
- Rule making for hydro would provide a formal public review process. The Instream Flow Procedure has never had formal public review.
- Rulemaking would be based on up to date sound science using up to date data.
- Applicants, interested parties and state staff administering the program need a transparent and predictable process.
- Rule making will apply a formal public process that relies on scientifically sound Vermont data to place hydro, the only non-consumptive use of hydrologic alteration, in a watershed context. The process will value instream flows and aquatic habitat in relation to other uses.
- The rule would apply to instantaneous run of river hydro at existing dams, and damless diversions, not to new dams.
- It is reasonable to utilize a "tiered" approach. Class A waters and Outstanding Resource Waters would not be eligible for hydro. Some projects would be able to proceed through the process administratively and the remaining projects could potentially be permitted under the new rule using defaults or standard conditions.
- The rule could place the length of the bypass in the context of a connected watershed as opposed to examining the bypass reach and associated habitat outside of that context.

- The rule could be comprehensive, addressing dissolved oxygen, temperature, aesthetics, anti-degradation and in-stream conservation flows. Sources of hydrologic alteration to be considered in a comprehensive review could include: climate change, stormwater. land use, roads, culverts and bridges, flood control, fish and wildlife, recreation; as well as consumptive uses including water supply, agriculture/golf course irrigation and snow making. Non-consumptive uses include peaking and run of river hydro. (See table at end of letter for more detail).

- There is an established legislative precedent to consider a use separately – snowmaking.

- There are no run of river hydro facilities with 401's on 303-D –impaired waters list. We know of no documented dissolved oxygen problems with run of river hydro in VT, nor documented temperature problems.

- There is existing data. Vermont has a database and reports that can help define stream type and high quality fisheries.

- Rule-making can define river reaches that have important existing uses to be protected under the WQS such as high quality habitat, endangered species, existing and designated uses.

- Rulemaking can retain the option of using site-specific studies and site-specific data (USGS gage data on the watershed for example, or if that is not available, state-wide numbers could be used).
- Formal public review through rule-making for hydro will help put all state and federal agencies as well as potential applicants on the same page.

- Water Quality Standards need to recognize all legitimate uses and to provide more direction for multiple uses.

- Water Quality Standards need to address the relative benefits to run of river hydro, including economic, job creation, and energy independence.

Thank you for your consideration of these issues as you consider the need for rulemaking to establish a reasonable permit process for small hydro facilities.

Signed,

Karen B. Horn, Director
Public Policy & Advocacy

Vermont League of Cities and Towns, writing for Parties Interested in Permitting Small Hydroelectric Facilities, including:

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dave@independentpowerllc.com

Hardy Merrill, Chief Administrative Officer
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Warren VT 05674
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Ben Gordesky
Earthbound Services, LLC
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Lori Barg
Community Hydro
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www.community hydro.biz

Karl Johnson
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Anders Holm
Middlebury Electric Company
#5 Frog Hollow Alley
Middlebury VT 05753

attachment.

CAUSES OF HYDROLOGIC ALTERATION		
Large-scale	**Aquatic Impacts (not including socio-economic impacts)**	**Means to address**
Climate change	Increased flooding, increased scour of eggs, increased water temperature, earlier ice-out. Change in frequency, duration, magnitude[1] change in species.	Kyoto protocol, some state laws, RGGI
Stormwater	Increased erosion, WQ problems, lower base flows, higher peak flows, increased flood damage etc. Change in frequency, duration, magnitude	numerous laws, rules, TMDL, NPDES, federal, state and local ordinances. http://www.anr.state.vt.us/dec//waterq/stormwater/htm/sw_impairedwaters.htm
Land Use	Increased erosion, flooding, change in frequency, duration, magnitude of hydrologic cycle.	Numerous laws: clear cutting, BMP's, AAP's etc
Roads, culverts and bridges	Altered hydrology, turn slow moving groundwater into fast moving surface water[2], drainage network becomes finer. Connectivity issues with culverts as well as backwater effects during some flows. Increase in velocities due to channel constriction.	Better Backroads Program.
Flood control	Reduces flood damage during peak events. Backwater provides recreational use at reservoirs. Change in frequency, duration, magnitude, backwater effects.	Numerous state and federal laws
Fish and Wildlife	Dams built to provide fish habitat, control environment to promote fish and wildlife. Backwater effects above dams in ponds, manipulation of water for habitat alteration. Silver Lake, Shadow Lake etc. Backwater effects, change in duration, magnitude, frequency.	Vermont Dept. of Fish and Wildlife, Vermont Dept of Environmental Conservation etc.
Recreation	Recreational use of ponds and lakes. Majority of natural lakes have artificial control. Flow manipulation to promote recreation, reduce aquatic nuisance weeds etc. Backwater effects, change in duration, magnitude frequency.	Dam safety division.
Consumptive Use-Surface Water		
Muncipal	Provides drinking water for municipalities. Water	Water Supply Division

[1] http://pubs.usgs.gov/of/2003/ofr03-245/pdf/ofr03-245_version1.01.pdf

See references for more documents

[2] http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.29.1.207?cookieSet=1&journalCode=ecolsys.1

Roads and their major Ecological Effects- Richard T. T. Forman, Lauren E. Alexander

Annual Review of Ecology and Systematics, November 1998, Vol. 29, Pages 207-231

Water Supply	eventually returns to different place in basin.	
Agriculture-Irrigation;	Provides water for irrigation for agriculture/golf courses during dry-seasons. Mostly evapo-transpired.	Agency of Agriculture
Snow making	Provides water for snow-making. Removed from ANR flow procedure after rule-making	Chapter 41: Regulation Of Stream Flow § 1031. Policy On Water Withdrawal For Snowmaking And Agency Of Natural Resources Environmental Protection Rules. Chapter 16 Water Withdrawals For Snowmaking
Non-Consumptive Use-Surface Water		
Run of River Hydro at existing dams, and damless diversions. No new dams	No alteration of flow below tailrace. Water use is instantaneous and returned to stream after making power. Operation should not contradict pre-existing agreements for water supply, flood management, recreation etc.	ANR Instream Flow Procedure with no formal public review.

April 30, 2007

A SINGLE STEP TO SIMPLER PERMITTING
FOR ENVIRONMENTALLY SOUND HYDRO

Is there one simple step that could be taken by the Vermont Agency of Natural Resources to simplify permitting of small hydro? Yes, ANR can change the default flows in the In-stream Flow Procedure.

This change could mean that small, environmentally sound, hydro could be permitted in a timely way -using hydrologic data from Vermont (instead of the regional New England data currently used). This will be protective of the aquatic resource, while at the same time encouraging distributed generation, reducing acid rain, mercury deposition, transmission losses, radioactive waste, global warming, greenhouse gases and a host of other environmental effects associated with reliance on centralized generation.

Every 600 KWH generated by hydro saves 1 barrel of oil. Each KW of hydro typically generates the equivalent of 7 barrels of oil a year (294 gallons) and about 22 lbs of greenhouse gases per gallon, or about 3.25 tons per year of greenhouse gases per KW of hydro generation!

So, even 100 KW of hydro means 325 tons less of greenhouse gases per year! And Vermont probably has at least 25,000 KW of hydro that could be developed relatively quickly.

What is this single step?

1) **Change the default flows in the In-stream Flow Procedures** to the 93% exceedance flow for bypassed sections over 300 feet (or so) and 7Q10 (7 driest consecutive days in a ten year period) for bypasses less than 300 feet for instantaneous run of river hydro for both damless diversions and at existing dams. (See the data on the last 2 pages).

This single step will greatly facilitate the ability of ANR to issue a 401 in a timely, predictable way that is protective of the aquatic resource. This will allow FERC to waive part of the licensing/exemption process. This change enables us to begin to develop small, environmentally sound hydro in Vermont. Vermont has had no new hydro in 20 years.

Impact on Aquatic Biota:

What is the biological reasoning behind this proposal? I'll start with the longer bypasses, and the 93% exceedance recommendation.

Vermont ANR biologist Len Gerardi of Vermont Fish and Wildlife wrote: *"one can conclude that up to the bankful point lotic production should increase with discharge. Conversely, the less water available to the system, the lower is the limit on aquatic production. The lowest flows of the summer, even when interrupted temporarily by high flows, appear to be a limiting factor in the system. "* (Feb. 1980 A Discussion of the Importance of Stream Flow to the Biology of Rivers and Streams in Northern New England)

If the lowest flows of summer are the limiting factor in an aquatic system, it is important that the low flows that occur in the bypass reach of a run of river hydro are the naturally occurring low flows, so that natural conditions *continue* to be the limiting factor in longer bypasses.

The recommendation of the 93% exceedance for the longer bypasses means that on average, there is almost a month a year (26 days) when naturally occurring flows are *below* this level. These naturally occurring low flows set the limit on aquatic productivity-not the permitted bypass flow. Thus, this flow level is protective of aquatic biota, because natural conditions *continue* to set the limit on productivity.

Another concern is low winter flows. The Table at the end shows that ANR at times has permitted lower flows in the winter (Brockway and Vergennes #9) than in summer. Why is this? My guess is that ANR set these low winter flows not because of the impact on the biological productivity in these (less than 400 ft. long) bypasses-but because of the aesthetic criteria of the Vermont Water Quality Standards.

High water flows are not really a concern for run of river hydro. Run of river hydro generally meet spawning and incubation flows naturally (due to the structural and mechanical limits of the penstock

and turbine). Very few of the ROR sites have seasonal flow requirements, even those with bypasses over 2000 feet in length and with site specific flow studies (see Table).

Why 7Q10 on the shorter bypasses? My take is that ANR has found that these shorter bypasses within miles of stream don't affect aquatic productivity within a river system. ANR has found that 7Q10 flows (or below) are okay 60% of the time (See Table).

So, why not use the August Median flow-upon which USFW's regional recommendations for the aquatic base flow are based for short or long bypasses instead of the 93% exceedance? This is also the basis of ANR's 1993 Instream Flow Procedure.
http://www.anr.state.vt.us/dec/fed/damsafety/docs/flowprocedure.pdf

Let's look at ANR's decisions in relation to the wettest large basin in Vermont –the Deerfield-with about 50% more rain, higher mean annual flows, and 6 miles (!) of bypass. This is a peaking facility, so the minimum flow is not regularly exceeded-like ROR hydro-but occurs *all the time* in the bypass.

The List shows that at this store/release peaking hydro plant ANR did not require the aquatic base flow (ABF). Rod Wentworth –aquatic biologist with ANR wrote the Vermont Water Resource Board

(September 27, 1996) that the Deerfield basin *cannot support* higher minimum flows (meaning the default aquatic base flow of 0.5 cfsm. On page 12 he wrote that: *"Even though flows above the August median flow provide more habitat for most target organisms, a higher flow cannot be sustained from natural inflow. Flows naturally drop below this level."*

"The natural hydrology does not provide sufficient water on a sustained basis to optimize habitat conditions.... " (page 21).

ANR did not require any part of the ABF (0.5 cfsm) in the Deerfield as the minimum flow. Although the August median flow would provide more habitat, it cannot be sustained under natural conditions. (I think this may be the only large basin in Vermont that can actually support this flow level).

Jeff Cueto, hydrologist of ANR confirms that Vermont rivers generally cannot support the regional ABF. His analysis found that 77% of Vermont's unregulated basins cannot meet the New England regional August median flow of 0.5 cfsm (let me know if you want the file?).

We also know that even the United States Fish and Wildlife service (USFW) does *not* recommend the ABF policy most of the time. The ABF regimes are 0.5 cfsm in the summer, 4.0 cfsm in the spring, and 1.0 cfsm in the winter.

How do we know this? Because the USFW and ANR confirm this via the FERC licensing process. There are no 401's issued in Vermont that completely meet the ABF requirements-except the smallest project-Baldin Brook, which has 2 of the 3 required flows in the ABF.

There was also a limited study by the USFW of recommended flows in bypasses, they found *"the ABF release regimes used in this study may overstate the requirements likely to be recommended by the USFW."* (June 1981, Study of the Interrelationships between minimum Flow Release Policies and Hydroelectric Power Development in New England for the New England River Basins Commission).

Other biological impacts to be considered include temperature and dissolved oxygen (DO) at dams (this does not apply to damless diversions-such as the 1200 sites with over 400 MW of potential capacity identified by the Dept. of Energy in Vermont in 2006). I asked ANR if there were any known temperature impacts from ROR hydro in Vermont? ANR wrote: *"A study was done on the Mad River that looked at the effects of the Moretown #8 dam. Despite the fact that this dam has a shallow impoundment that is exposed to sunlight, it did not have much effect on summer water temperatures because the temperatures were already so high (coming into the impoundment). This result would have been different if the Mad River was not so "open" upstream of the dam, and the incoming water were cooler."*.-Rod Wentworth e-mail to Lori Barg Jan 08, 2007.

I asked ANR for a list of DO deficits at the surface of any impoundment in Vermont. They sent me an excel file with lots of data, but no D.O. deficits at the surface of any impoundment in Vermont.

I asked for a list of all the violations at any ROR hydro plant for which ANR has issued a 401 water quality certificate. There are no temperature or dissolved oxygen problems on that list. I asked which of the 54 Dept of Fish and Wildlife dams have fish passage? None.

An Example:

The goal is to protect aquatic biota and to make power. The recommended flows do that. There are other aquatic impacts from global warming. Twinfield's small project will displace 385 tons of carbon annually. Who knows, we may be able to help keep our brooks cold, alkaline and mercury-free enough for trout with small renewables.

So, what does this mean for small projects such as Twinfield School's proposed damless diversion on Nasmith Brook? If we accept the current Instream Flow Procedure default of 0.5 cubic feet per second per square mile (cfsm), the project becomes uneconomic. From a purely practical view – based on long-term data. This basin can not provide as much water as required by ANR in the In-stream flow procedure. This basin does not have the precipitation needed to provide this much runoff for (on average) at least three months of the year – maybe much more.

If we accept the current default flow this project cannot pay itself back in even 20 years. Instead of 523 MWH a year, we can produce 388 MWH/yr, about 30% less power (and not enough to power the school which requires 495 MWH/yr). Under the current process Twinfield School does have another option - expensive, time-consuming, site specific studies ($100,000 to $1,000,000 dollars in consulting (estimates per Tom Sullivan at ANR hydro workshop 4/26/07). Then MAYBE after expensive studies ANR might permit flows that are more in-line with what the basin can provide. Twinfield will have to risk spending the money for the studies, but there is no guarantee that they will receive a 401 Water Quality Certificate- a necessary prerequisite for any hydro project in Vermont.

Why change the default? Look at the data below from all 401 Water Quality Certificates issued by ANR. ANR has required the smallest projects have the highest flows in the bypassed section. Is this because small watersheds have higher summer flows? No. In general, bigger watersheds have bigger base flows. Bigger projects do however have the money to perform expensive site-specific studies. When these studies are performed, ANR has permitted low flows in the bypassed section of stream. ANR has agreed by issuing the 401 that healthy aquatic life can be protected with flows as low as 7Q10 (or below) for bypassed sections up to 2000 feet in length.

The 7Q10 flow level is not a level I would recommend for long bypasses – but it is fine for short run of river bypasses, where the minimum flow is exceeded most of the time anyway. Why recommend the 7Q10 flow for short bypasses? Because a) with run of river hydro the minimum flow is exceeded the majority of the time; b) that is what the Agency of Natural Resources has found -most of the time on the basis of site-specific studies-to be protective of the aquatic resource. Run of River hydro is not like store and release- where the river can literally be turned on and off. Low bypass flows for short bypasses help balance out both the off-site and on-site environmental impacts of small hydro.

So what to do for longer bypasses? I'd suggest ANR accept the 93% exceedance flow as the default flow (or 90 or 95% exceedance flows). What is an "exceedance flow" anyway?

First, take a good hydrologic record (30 years of daily data) and sort it from the highest flood flows, to the driest summer flows. Then choose the flow that is exceeded 93% of the time, in other words, it is drier than this 26 days in a typical year (26/365), or about 7% of the time (about 1 out of every 15 days on average). Remember it is the lowest flows in the river that set the limit on aquatic productivity in the river- in other words, natural systems evolve to survive the leanest times –not the lush times.

Thus the limit on aquatic productivity is not set by the hydro withdrawal *but by naturally occurring lower flows*. (In Europe, they recommend the 95% exceedance (1 day out of every 20) for "normal fisheries" and 90% exceedance (1 day out of every 10) for anadramous fisheries (salmon, shad, american eels and striped bass according to Michael Spencer of FERC on 4/26/07) I'd suggest a

compromise of 93% (the average low flow that occurs 1 day out of every 15) since ANR has not mapped high quality fisheries.

What would changing these defaults do? a) It would give us a timely, predictable process based on long-term records from Vermont streams. This will enable small run of river, environmentally sound hydro projects at existing dams and damless diversions to move forward; b) It would save the need for expensive field measurements of flow (unreliable over a short period of time) and expensive studies of fish (BOPSAR (bunch of people standing around a river trying to think like a fish); c) It would avoid the expensive site-specific studies.

For example, on the Twinfield project, the regional default of 0.5 cfsm at this site can not be met 3 months of the year –an average of 1 out of every 4 days. The proposed flow of 93% exceedance, is the low flow that occurs on average 1 out of every 15 days. While the 7Q10 (or less) that ANR has permitted 60% of the time for run of river hydro often does not even occur in a single year.

Run of river hydro is a different animal then a peaking facility. In run of river hydro the majority of the time, there is more than the permitted minimum flow in the river (due to the structural limitation of the penstock and the mechanical limits of the turbine).

The Instream Flow procedure currently requires summertime flows of 0.5 cfsm based on a New England wide regional August median flow (the Aquatic Base Flow (ABF). Yet an ANR study found that 77% of Vermont's unregulated basins can not meet this requirement as an August median flow. The current instream flow procedure makes small hydro uneconomic to develop because ANR requires more water than most watersheds can actually produce.

For example, lets compare this to what ANR has permitted in the Deerfield basin—a very wet basin and an exported peaking facility where miles of bypasses ONLY have the amount of water permitted (because peaking facilities can literally shut off and turn on the river).

Interestingly enough, in the Deerfield basin-the wettest large basin in Vermont- is an export peaking facility, ANR permits summertime flows of between 0.31 and 0.38 cubic feet per second per square mile (cfsm). This in a basin with 57 inches of rain a year (compared to much of Vermont with 35 – 40 inches of precipitation annually (much drier), or Nasmith Brook with 41.6 inches of precipitation annually (see below). The Appalachian Mountain Club supported these relatively low flows in the miles long bypassed section of the Deerfield.

The Deerfield project probably spent a million dollars on consulting fees with lots of site-specific studies. We know that precipitation increases with elevation and orographic (mountain) influence. Base flow increases with the amount of the watershed in lakes and ponds, and due to the large reservoirs, almost 4% of this mountainous basin is covered with lakes and ponds (north of Harriman Reservoir). The Deerfield basin is high, wet and mountainous with 57.3 inches of rain annually.

Now, lets compare it to Nasmith Brook by the Twinfield School. Nasmith Brook only gets 41.6 inches of rain annually. The default procedure currently requires 0.5 cfsm, or 6.7 cubic feet per second (CFS) for this size basin.

Site	Precip. Inches	lakes and ponds. %	Over 1200 feet elevation	Length of bypass-feet	Permit Flow-bypass cfsm
Nasmith-Default-Instream Flow Procedure **Run of river hydro**	41.6	<1%	94.5%	2700	0.5
Deerfield-site specific studies **Peaking hydro**	57.3	3.7%	100%	30,000 +	0.31-0.36

See the data on the last 2 pages. It shows that ANR has required the 0.5 cfsm summer flow at two of the smallest sites in Vermont. This makes no sense from a hydrologic or ecologic perspective, because these small basins do not have the base flow of these larger basins. Vermont could have electric buses being trickle-charged by hydro traveling up and down our main roads (which tend to follow rivers). There are lots of possibilities.

This recommendation of 90 –95% exceedance in the bypass was developed in Europe which promotes small hydro.

The simplest step to promote small, environmentally sound, hydro is for ANR to change the Instream Flow Procedure. This could be done tomorrow-it is not statute, nor rule. These projects could then move forward in a timely, environmentally sound way. We could get a 401 Water Quality Certificate. And this would enable FERC to waive part of the process. Small hydro can move forward without the economically impossible and time-consuming burden of the current permitting system for small hydro. These flow levels are more conservative (they leave more flow in the bypassed sections) than ANR typically permits with expensive site-specific studies, and are thus more protective of the aquatic resource.
So, if someone asks you what to do, suggest changing the Instream Flow Procedure (ideally this week) to the 90 – 95% exceedance for long bypasses and the 7Q10 flow for shorter bypasses.

operation mode	ProjectName ROR w/401	Stream	401 CERTIFICATION DATE	FERC "Violation"	bypass reach length-ft	DA (Sq. Mi)	Bypass flow required. CFS	Ratio Bypass:7q10	7q10 (cfs)	minimu flow bypas cfsm
r-o-r	Baldin Brook	Baldin Brook-winter	4/29/1982		1200	2.4	2.4	76.9	0.03	1.00
r-o-r	Baldin Brook	Baldin Brook-summer	4/29/1982		1200	2.4	1.2	38.5	0.03	0.50
r-o-r	Killington		8/15/1984		400	5	2	2.9	0.70	0.40
r-o-r	Arlon Warner Hydro	Potter Brook	11/17/1983		1200	6	3	12.5	0.24	0.50
r-o-r	Flower Brook	Flower Brook	7/22/1982			19	5	6.6	0.76	0.26
r-o-r	Martinsville	Lull Brook	11/28/1983	1985	440	21	2	1.0	2	0.10
r-o-r	Ladds Mill	North Branch Winooski River	1/25/1985	1990	20	42	10	4.8	2.10	0.24
r-o-r	Emerson Falls	Sleepers R.	9/17/1984			43	15			0.35
r-o-r	Barnet	Stevens River	3/1/1982		700	48	15	3.0	5	0.31
r-o-r	Woodside Hydro	Gihon River	3/28/1983			56	0	0.0	12	0.00
r-o-r	Dog River-Nantana	Dog River	3/11/1985		130	62	5	1.0	5	0.08
r-o-r	Leveille	Little River	6/2/1982			82	0	0.0	9	0.00
r-o-r	Cavendish	Black R.	10/7/1993		1570	83	10	1.1	9	0.12
r-o-r	Wells River Hydroelectric	Wells River	2/29/1984	1985, 1986, 1987	600	94	5	0.4	13	0.05
r-o-r	Newbury	Wells River-spring	12/12/1982	1991	380	98.4	50	3.6	14	0.51
r-o-r	Newbury	Wells River-summer	12/12/1982			98.4	25	1.8	14	0.25
r-o-r	Brockways Mills	Williams River	12/1/1982	1989	400	103	13	2.1	6.18	0.13
r-o-r	Brockways Mills	Williams River	12/1/1982			103	5	0.8	6.18	0.05
r-o-r	Barton Village	Clyde R	5/19/2003	2006	800	108	45	2.0	22	0.42
r-o-r	Bethel Mills	Third Branch White River	7/21/1986		275	136	19	1.0	19	0.14
r-o-r	Moretown No. 8	Mad River	7/29/1987	1990, 1993, 1995	40	142	25	1.7	15	0.18
r-o-r	Fellows Dam	Black R.	3/23/1986			188	6	0.3	21	0.04
r-o-r	Slack Dam	Black R.	1/31/1985			190	3	0.1	21	0.02
r-o-r	Comtu Falls	Black R.	8/23/1982			190	4	0.2	23	0.02
r-o-r	Lovejoy Dam	Black R.	3/23/1986			190	4	0.2	21	0.02
r-o-r	Winooski 8	Winooski River	12/29/1982		200	200	25	0.8	30	0.13
r-o-r	Vail	Passumpsic River	9/13/2001	2007	120	200	31	0.8	41	0.16
r-o-r	Taftsville	Ottauquechee River	9/29/1993			200	15	0.6	26	0.08
r-o-r	Dewey's Mills	Ottauquechee River	7/12/1982			207	22	1.0	22	0.11
r-o-r	Downers Mill	Ottauquechee River	5/11/1982			207	22	1.0	22	0.11
r-o-r	Great Falls	Passumpsic River	2/26/1984			210	75	1.8	42	0.36
r-o-r	Pierce Mills	Passumpsic River	6/16/1994		350	237	88	1.4	61	0.37
r-o-r	Center Rutland	Otter Creek	4/13/1995		100	308	80	1.0	79	0.26
r-o-r	Canaan	Conn. R.	5/10/1984		1600	381	50	1.0	51	0.13
r-o-r	Gage	Passumpsic River-	6/16/1994		450	413	142	1.7	82	0.34
r-o-r	Gage	Passumpsic River-	6/16/1994		450	413	82	1.0	82	0.20
r-o-r	Passumpsic	Passumpsic River	6/16/1994		500	428	86	1.0	86	0.20
r-o-r	Clyde River	Clyde R.-winter	7/11/2003		1622	465	67	3.2	21	0.14
r-o-r	Clyde River	Clyde R.-winter	7/11/2003		1622	465	46	2.2	21	0.10
r-o-r	East Barnet	Passumpsic River	3/19/1982			500	85	0.9	100	0.17

operation mode	ProjectName ROR w/401	Stream	401 CERTIFICATION DATE	FERC "Violation"	bypass reach length-ft	DA (Sq. Mi)	Bypass flow required. CFS	Ratio Bypass:7q10	7q10 (cfs)	minimu flow bypas cfsm
r-o-r	Arnold Falls	Passumpsic River	6/16/1994			554	103	1.6	65	0.19
r-o-r	Middlebury Lower	Otter Creek	6/2/1999		750	629	157	1.0	157	0.25
r-o-r	Beldens	Otter Creek-Beldens	5/27/1986			632	6.32	0.0	161	0.01
r-o-r	Huntington Falls	Otter Creek-Huntington	5/27/1986			749	15	0.1	191	0.02
r-o-r	Vergennes No. 9	Otter Creek-	4/15/1999		75	866	150	0.7	216	0.17
r-o-r	Vergennes No. 9	Otter Creek	4/15/1999		75	866	100	0.5	216	0.12
r-o-r	Vergennes No. 9	Otter Creek-	4/15/1999		75	866	75	0.3	21	0.09
r-o-r	Vergennes No. 9	Otter Creek	4/15/1999		75	866	50	0.2	216	0.06
r-o-r	Chace Mill	Winooski River	5/5/1987			1081	168	1.0	168	0.16
r-o-r	Gilman	Conn. R.	7/28/1989			1514	210	0.6	373	0.14
r-o-r	Dodge Falls	Conn. R.	3/21/1986		2215	2644	530	1.0	530	0.20
r-o-r	Bradford	Wells River	10/3/1980			153				
peak	Harriman Station	Deerfield River	1/30/1995		12812	184	57	n/a	n/a	0.31
peak	Harriman Station	Deerfield River	1/30/1995		12812	184	70	n/a	n/a	0.38
peak	Searsburg Station	Deerfield River	1/30/1995		18412	98	35	n/a	n/a	0.36
peak	Searsburg Station	Deerfield River	1/30/1995		18412	98	55	n/a	n/a	0.56

Water Resources Panel

May 13, 2008

My name is Lori Barg, I'm a hydrologist and president of Community Hydro, a Vermont-based small business offering services for siting, constructing and operating small-scale hydro-electric generation plants. We work with communities, schools, other Vermont small businesses and farms. We also have clients and projects in several other states.

I work with the Twinfield students, who introduced the legislation to conduct rule-making for In-stream Conservation Flows, that ultimately resulted in the stakeholders process which is the subject today. We'd like rule-making that is a successful process for ANR and VNRC as well as Vermonters, including small business people like Sam Lincoln from East Bethel, Eddie Walbridge from Montpelier, Evans Sealander from Holland-who are also some of my clients. There are no small business people represented in the Stakeholders group, nor are there any municipalities, although our clients include the Towns of Plainfield, Fair Haven and others who are interested in using their dam to generate power to help reduce property taxes.[3] In addition, there are municipalities like Jacksonville Electric-that would like hydroelectric power in their towns.

Today, it is hard to turn around without hearing about renewables, carbon, and climate change. And yet, Vermont which used to get over 90% of its power from in-state hydro, has lost lots of hydro. We recognize the opportunities environmentally sound hydro presents for energy security and for the economic vitality of our communities. But we can not move forward. We are stymied, this time perhaps ironically, as small businesses, **due to the lack of a rule.**

We can't afford hydro[4] because without rules there is a changing bar, no clear guidelines, no performance-based standards, and no timetable for administrative responsiveness and decisions by the permitting authority, the Agency of Natural Resources. While I can download a stream alteration permit form, I cannot download a hydro permit application. Perhaps one of the biggest problems is that ANR relies on the Instream Flow Policy, which has *never* had any formal public review process, and although rule-making was considered in the early 1990's, ANR never followed through. At that time, municipalities, environmental groups, utilities and consultants all criticized the Instream Flow Policy. It is time for the Water Resources Panel to initiate rule-making.

We'd like it if we could be given clear direction- rules provide this. For example, Eddie Walbridge would like to redevelop his site in Montpelier that has used hydropower for well over a century. He said to me

[3] A recent survey by the Vermont League of Cities and Towns confirmed this interest in small hydro. Vermont Dam Task Force 12/07

[4] *"Licensing Costs. Based on our professional opinion, and having completed relicensing of similar projects in Vermont, the cost for licensing should range from $250,000 to $500,000…. The final cost is driven by agency requests and how those requests are dealt with by the license applicant"*-Pre-feasibility study Middlebury Project for Anders Holm from consultants Gomez and Sullivan. September 18, 2006.

the other day, that he was able to get both his veterans and social security benefits – which are both long, drawn out complex processes, in less time than it took to hear back from ANR. The letter he did get from ANR, still does not provide clear guidelines. In addition, the Twinfield students would like to see their school powered by renewables before they graduate.

Small businesses, towns, and schools can not move forward because there is no application, no guidelines, no administrative deadlines. For example, we could do whatever ANR requests and 2 years later, ANR can say, hey we're not happy with this, do it again with a different flow. This is what happened at one site, after the developer completed a $150,000 study, ANR said, do it again. The project never got built. The Town owned dam has been designated as a historic resource because the Town likes the dam. Wouldn't it be great if it could supply almost a MW of clean hydroelectric energy to help the Town?

We need rule-making because the current process is confusing, circuitous, expensive, drawn-out and full of contradictions. For example, on January 3, 2008, after submitting summary plans for several projects to ANR, the agency asked me to *"envision"* the next steps. I don't really want to envision the next steps; I want a clear, simple timely and predictable process.

It is my hope that this rule-making process could be quite short. We have 5 years of rule-making on the WQS and 2 years on the snow-making rules that provide a firm foundation. Here are some points of agreement.

ANR is concerned about relaxing standards to the detriment of the environment. We are too. We are not asking for a carte-blanche roll back of standards protective of the environment – we live here too! We are asking for rule-making to provide needed definition to the process for establishing in-stream conservation flows.

ANR lists seven criteria for low-impact hydro- a good thing, we agree- and promote low-impact hydro.

A 2006 study by the Dept of Energy found that Vermont can install over 400 MW of hydro-almost half of our baseload-without building a new dam, just using ½ the available water at existing drops. Think of the economic development potential there for low-impact hydro.[5]

Formerly, most hydro was developed at dams. We have over 1500 dams in Vermont, and no one is proposing building any more. There is a movement to start removing dams. Make no mistake, removing dams is expensive and brings along a host of problems -like who owns the sediment and toxic waste that could be released into the river when the dam is removed? And what happens when the vertical grade changes and there is property damage upstream to roads, bridges and houses, or the lake is lost?

[5] The Department of Energy studies are referenced in the study available from the Department of Public Service titled "Undeveloped Hydro Potential in Vermont". 2007. Lori Barg

Are dams good, or bad? If you get your drinking water from a water supply reservoir, get protected from floods, like to fish, boat or swim on a lake, or if the dam has set the grade to hold up your house, bridge or road you might think that dams are good, If you are a fish swimming upstream and you can't get to your spawning grounds, you'd think that dams are bad, cause you don't have anywhere to go, or if you are downstream from a dam that is not maintained and breaches in a flood, you may not have time to think that the dam was bad. In addition, Vermont also has no documented temperature or dissolved oxygen impacts at run of river hydro sites, two of the water quality problems that are often cited.

No one is proposing new dams, we are looking for rule-making to have a process so that we can add the incremental benefit of hydro at some of our over 1500 dams that already exist in Vermont. As well as using the tried and true technology of damless diversions, diverting some of the water from the river in a pipe using the natural drop to generate power.

We are also here because we don't like double standards. For example, if I want to put a hydro site on an existing dam, I have to consider whether or not ANR will require fish passage. Yet, the biggest owner of dams in the State, is the Vermont Dept of Fish and Wildlife, and they don't have fish passage at any of their dams, nor plans for it.

If it is important to have fish passage, let's not make it a requirement only for hydro – which has a regulatory hook, but let's put it on the lakes, water supply dams, flood control dams etc., and figure out a way to share that high cost. The rules could address this.

Rule-making will make this process a lot easier – for both ANR and applicants – by setting certain standards based on Aquatic Base Flow from state-wide data, existing 401's and other precedents, such as the snow-making rules. There are alternatives to expensive, site-specific fish and flow studies. For example, the snow-making rules came up with a statute for winter withdrawals. After 2 acrimonious years, everyone agreed on the state-wide February median flow.

Vermont watersheds are not vastly different from each other, and the variability can be measured using long-term gage data from the United States Geological Survey. Other than snowmaking, we apply concepts, rules, and standards *state-wide* for stormwater, for wastewater, for wetlands, stream protection, water supply well head protection, and many others. We can use state-wide numbers for hydro too. Hydro is not a consumptive use, the water returns to the river moments after generating power.

We need a clear, defined, objective process, based on science that is protective of the environment, what we have is an indeterminate, complex process, that is not as protective as what we are proposing. We are here for one reason. We are here because the ordinary person, school, town or small business person seeking to develop a small-hydro renewable energy project cannot afford it.

We are asking for rule-making to set in-stream flow standards based on precedent. These precedents include:

1. 401 Water Quality Certificates issued by the State of Vermont,
2. Snow-making legislation. Chapter 41: Regulation Of Stream Flow § 1031 and 1032 and the accompanying rule.

3. United States Fish and Wildlife Instream Flow Policy and
4. Vermont Agency of Natural Resources Instream Flow Policy

The existing legislation, previous decisions of the Water Resources Board, the 401 Water Quality Certificates can provide us with the permitted precedents we need.

Because we have these precedents to utilize in rulemaking, it is my hope that we can do this relatively easily and quickly because we are not starting from ground zero.

Lastly, there may be a belief that older 401 permits were not as protective of the environment. Let's look at the data from the 401's as they have been issued after extensive studies and reviews.

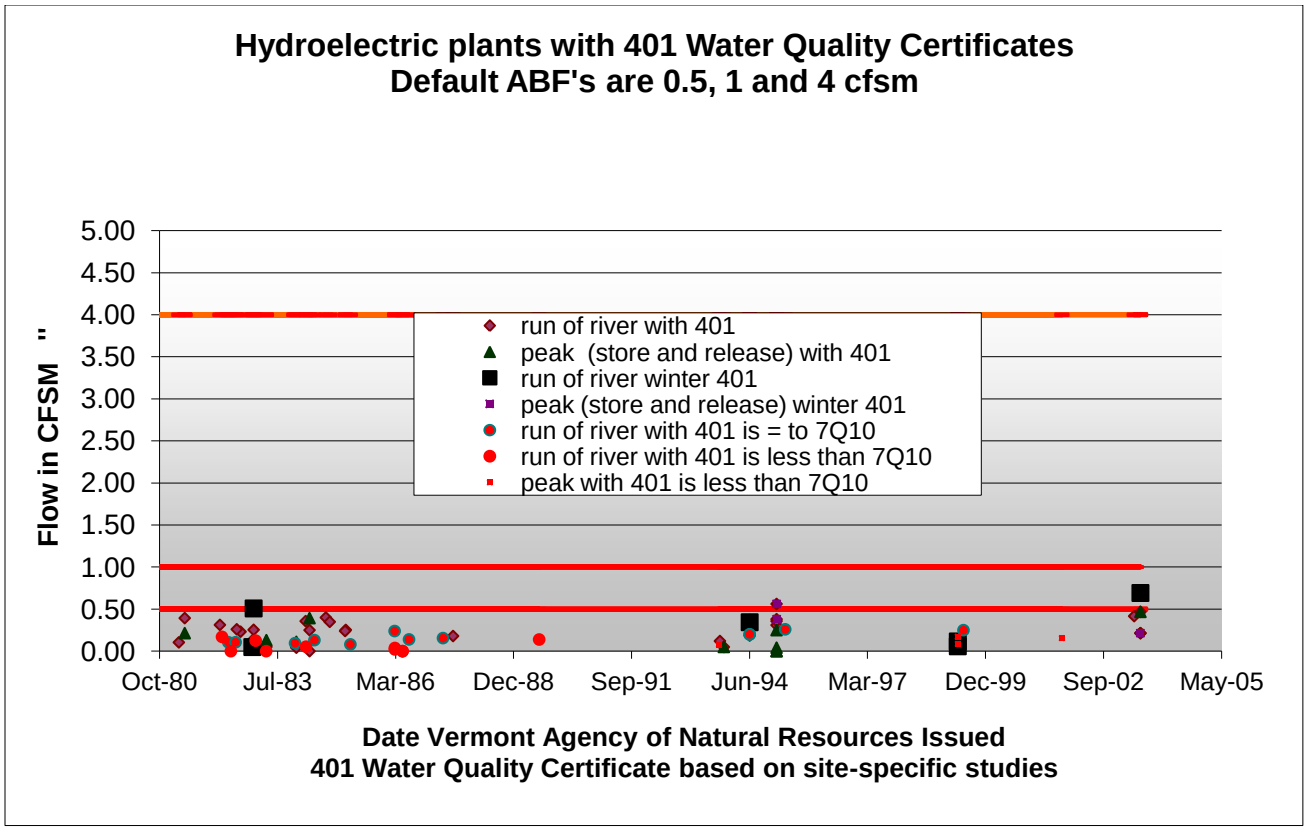
In comparison to the ABFs, and even to other methods for assessing instream flows' suitability, the permitted flows are less protective. These are arrived at after a very risky analysis that is expensive for the applicant and may use protocols like the IFIM –the Instream Flow Incremental Methodology, which have been successfully challenged in court. We can improve things for both the environment and for Vermont small businesses and municipalities by adopting a defined and predictable rule, based on science that is protective of the environment and does not needlessly punish the ordinary person, town or school that wants to develop low-impact hydro.

There are other benefits too, rules would help us to create technical jobs and keep our energy dollars in state, stabilize the grid and Vermont's energy future, and enhance Vermont's environment.

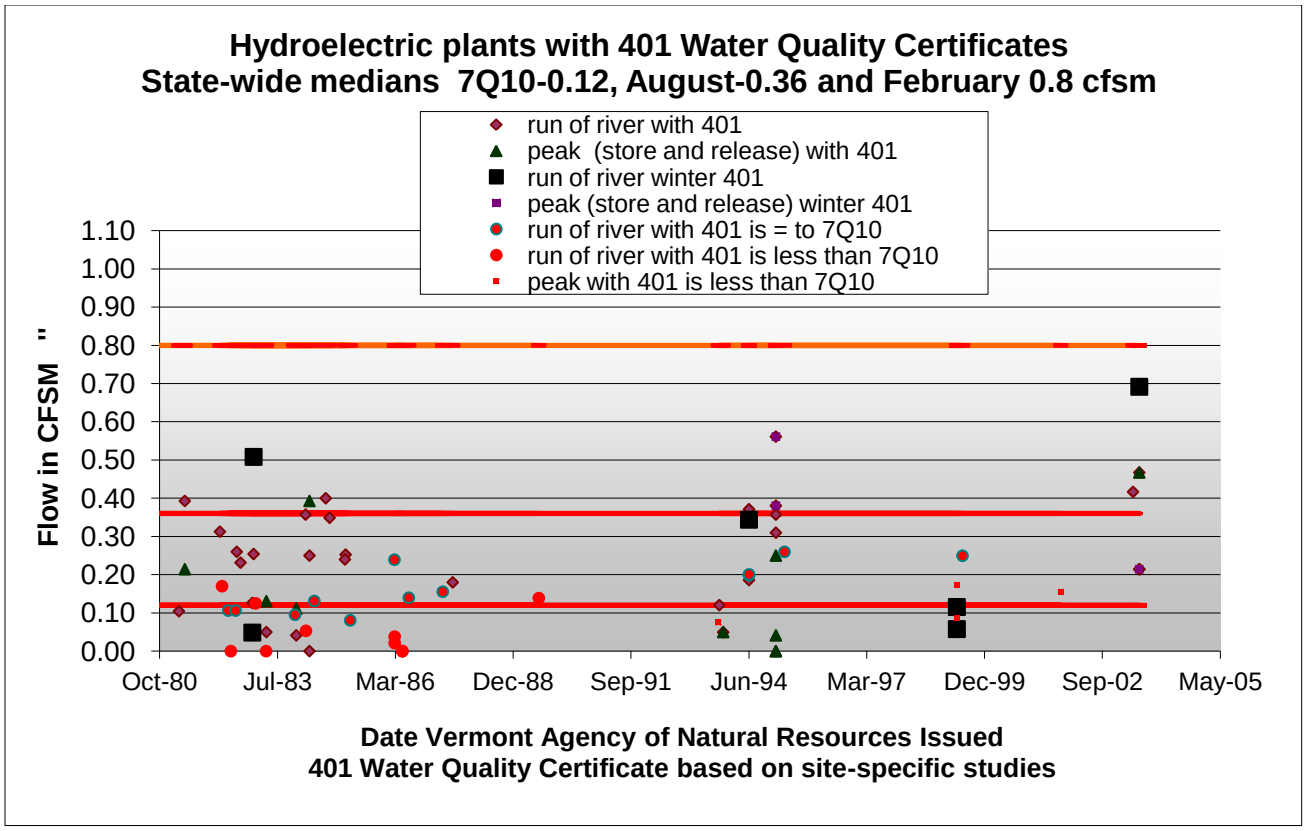
Wouldn't it be shame for small business to fail from lack of a rule?

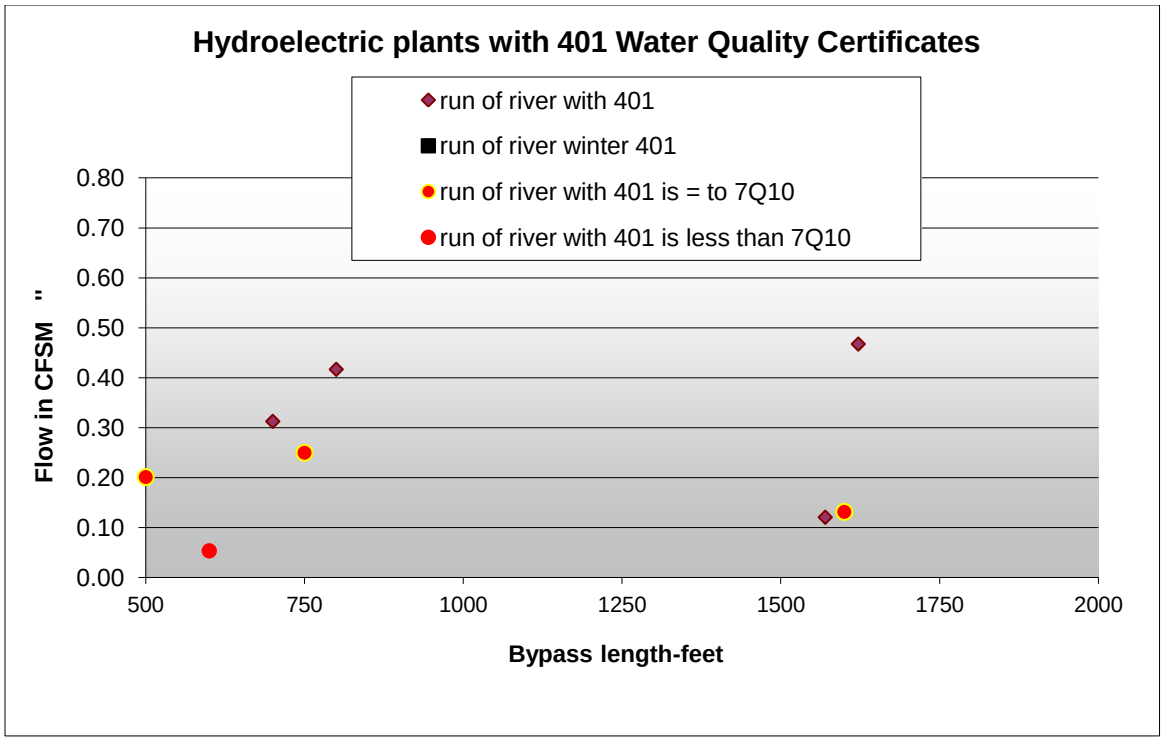
Thank you very much.

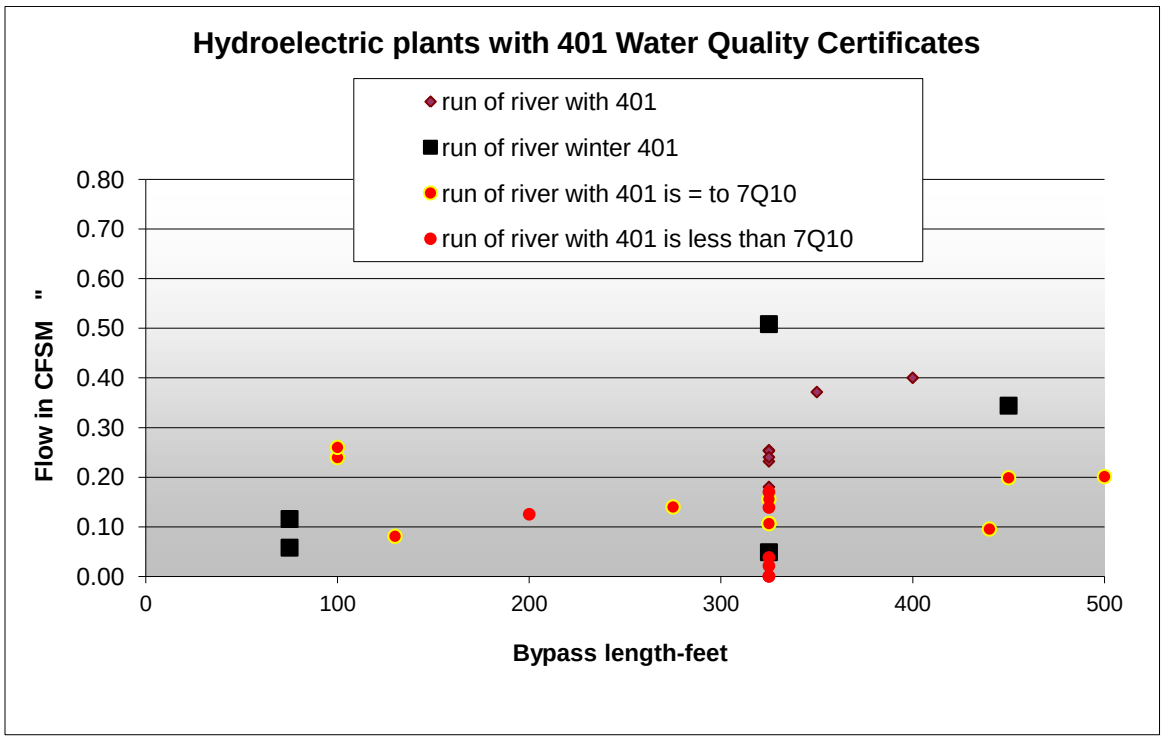
Lori Barg, lori@communityhydro.biz 802-454-8458



Same graph, different scale. Default ABF standards are 0.5, 1 and 4 cfsm. State-wide medians are 0.36 and 0.8 cfsm. The median 7Q10 flow is 0.12 cfsm.


Hydroelectric plants with 401 Water Quality Certificates
State-wide medians 7Q10-0.12, August-0.36 and February 0.8 cfsm
run of river with 401
peak (store and release) with 401
run of river winter 401
peak (store and release) winter 401
run of river with 401 is = to 7Q10
run of river with 401 is less than 7Q10
peak with 401 is less than 7Q10
Flow in CFSM "
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Oct-80
Jul-83
Mar-86
Dec-88
Sep-91
Jun-94
Mar-97
Dec-99
Sep-02
May-05
Date Vermont Agency of Natural Resources Issued
401 Water Quality Certificate based on site-specific studies


Hydroelectric plants with 401 Water Quality Certificates
run of river with 401
run of river winter 401
run of river with 401 is = to 7Q10
run of river with 401 is less than 7Q10
Flow in CFSM "
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
500
750
1000
1250
1500
1750
2000
Bypass length-feet


Hydroelectric plants with 401 Water Quality Certificates
run of river with 401
run of river winter 401
run of river with 401 is = to 7Q10
run of river with 401 is less than 7Q10
Flow in CFSM "
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
100
200
300
400
500
Bypass length-feet

TROUT UNLIMITED

Vermont Council

May 15, 2014

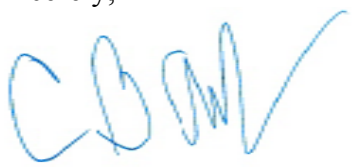
Ms. Anne Margolis
Renewable Energy Development Manager
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Re: Comments on *VT Low-Impact Hydropower Screening*

Dear Anne:

The Vermont Council of Trout Unlimited (VT TU), representing the conservationists and anglers of the five Chapters throughout the state, appreciates the opportunity by the Vermont Department of Public Service (DPS) to comment on the proposed *VT Low-Impact Hydropower Screening*. Further, we thank DPS for including us in the discussion of an issue that will have a direct impact on the environmental health and recreational opportunities of the streams and rivers of our state. Both general and specific comments are below. We hope for the opportunity to comment again when DPS develops more specific criteria.

Sincerely,



Clark Amadon
Chair

General Comments:

VT TU continues to oppose the general basis of "expediting development of small and micro hydro." This proposed program is based on the highly debatable premise that small and micro hydro cause little to no environmental impact. Further, it is unlikely such projects are economically viable without significant state and federal support and subsidies.

First, VT TU is concerned that an expedited process for small and micro hydro will come at the expense of environmental protection that it would otherwise be afforded. We believe it is shortsighted to sidestep proven processes to protect the environment in favor of expedited development of an energy source that may not in the public interest as it may do more environmental harm than public good.

Second, it is questionable whether such small and micro hydro projects are economically viable without outsized support by the state and/or federal government, as was seen in the Colorado pilot program. Colorado has more potential micro hydro sites than Vermont due to a large number of irrigation conduits; nonetheless, the program never became viable. Once the federal money ended, for all intents and purposes, so did the program. Vermont has neither the conduits nor the federal financial support upon which the Colorado program was based. Overall, it is difficult to see how a similar small hydro program will translate in the state of Vermont with any economic viability or any broad success.

Nevertheless, it is conceivable that small and micro hydro might nonetheless be feasible in very specific, narrow instances where it indeed has limited to no environmental impact and the overall public good exceeds its harm. Low impact hydro as a potential local energy source will only truly cause limited environmental harm if it can be developed within certain narrow parameters. Because of this, applicants must be carefully screened to determine if a project qualifies.

Specific Comments on *VT Low-Impact Hydropower Screening*

1. Will qualify for a FERC 10 Mw exemption:

This is a Federal Energy Regulatory Commission (FERC) categorical exemption with specific criteria. It appears that VT TU would support the consultations and requirements specified in the *FERC: Small / Low-Impact Hydropower Projects: Project Comparison Chart*, listed in Footnote 1 of *VT Low-Impact Hydropower Screening*. Among the requirements are some that are listed in the *Screening* document itself, such as the project must be located at an existing dam or natural water feature. Also listed in the FERC chart are requirements that a project must abide by mandatory "federal and state fish and wildlife conditions under section 30(c) of FPA," and for 3-stage consultation requirements under 18 C.F.R 4.38, including with all relevant Federal, State and interstate resource agencies. In all appropriate stages, VT TU believes consultation with these agencies is key for protection of water resources and aquatic habitat.

One of the key criteria listed is preparation of environmental documentation consistent with the National Environmental Policy Act (NEPA). This will determine the degree of environmental

harm caused by the action. Here, it must be asked: what type of initial studies will be required to ensure that proposed projects are within these criteria? How detailed of an environmental study must be conducted? What specific conclusions will it have to draw? These questions must be answered before any program can be undertaken.

Further, who will determine whether the potential environmental impacts are so significant as to meet a threshold that does not allow the project to continue? A developer, a nongovernmental organization, a third party consultant, and a relevant government agency will all likely have different views on subjective standards.

Finally, it goes without saying that all federal and state regulations must be followed, particularly compliance with the Clean Water Act and the Rivers and Harbors Act. Waters utilized by hydropower are waters of the state and many of those waters used by small and micro hydro are headwaters and tributaries of much larger watershed ecosystems.

2. Located at an existing dam, or project will not require a dam or other impoundment.

VT TU agrees with these criteria, with a preferred clarification. There should also be some language to prevent cumulative impacts due to multiple projects on a single segment of stream or river. This includes both water diversions and in-stream obstructions. Moreover, there should specifically be an additional qualification for diversions and in-stream projects regarding the amount of water used, or diverted, for the project and the amount of water remaining in the water body to maintain the aquatic habitat and for fish passage.

While just one project may not cause significant environmental impact, several diversions or obstructions within the same river or stream segment will have a larger, cumulative impact. For example, repeated diversions without adequate water left in the reach will dewater an entire segment of river, effectively eliminating aquatic habitat. Provisions must be included to mitigate or prevent these possible cumulative impacts.

3. Will not change the impoundment elevation.

VT TU also agrees with this factor. It seems likely that this criterion would only affect projects on existing dams, as a run of river project by definition has no impoundment. Nevertheless, it does raise a question: If the project is going to be operated year-round as true run of river (where the same amount of water enters into the impoundment as is passed through the hydro project), how can the project have no impact on the impoundment level when seasonal fluctuations impact the amount of water flowing into the impoundment? Will the project run continuously at the same rate despite seasonal water fluctuations, such as during a summer low period or a winter freeze? With this, how will the impoundment level stay constant? In order to ensure impoundment levels do not change, a project would have to cease operation when flow levels into the impoundment drop to the point that continuing to operate the hydro project will cause the impoundment levels to drop.

4. Will be operated as true run of river.

Again, VT TU agrees with this important factor. But also again, how is this applicable to seasonal flow fluctuations to diversions and conduits? A project should be maintained as run of river even if it results in diminished energy outputs when water flows are low in the summer or frozen in the winter. For diversion hydro projects, a certain minimal water level must be kept in the river or stream, or bypass reach, during times of low flow, thereby putting the health of the water body before the generation of power. Such scenarios must be considered to ensure environmental protection. And again, a continuing concern is how this applies to a possible accumulation of projects on one river or stream segment.

5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure.

These hydrological standards must be considered the floor, not the ceiling, for acceptable minimum conservation flows based on necessary summer, fall/winter, and spring flows. Preferably, the flows would meet levels needed for aquatic habitat and for all lifecycles of fish, particularly spawning. This will include enough flow left in a bypass reach due to a hydro diversion. It is also important not to sacrifice other uses of the river or stream, be they environmental or recreational, for benefit of only hydroelectric power.

6. When the Agency of Natural Resources determines, based on a site-specific determination, that: (a) Fish passage facilities are not needed; (b) Project will not affect threatened or endangered species; (c) Project does not significantly alter site aesthetics; and, (d) Project is not located where there is a bypass of high habitat value.

VT TU supports this, as these are all very important factors, most reinforced by federal statutes.

7. Will comply with ANR Stream Alteration Standards

The appropriate standards should be followed during construction and operation of any facility. Key concerns will be erosion, removal of riparian buffer vegetation, and/or alteration of the streambed during construction and installation of the hydroelectric facility.

8. Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office.

VT TU has no comment on these criteria as it is beyond our knowledge and mission.

In conclusion, these conditions show that there is only very narrow set of circumstances in which small and micro hydroelectric power is viable without causing environmental harm that outweighs any potential public good. The agency must develop a specific set of criteria that ensures minimal environmental impact without bypassing state or federal regulations.

Monday, May 12, 2014

William Scully Comments on:

DRAFT - VT Low-Impact Hydropower Screening

I agree entirely with the clear, thoughtful and comprehensive opening mission statement.

Regarding the criteria, perhaps some of those detailed are overly restrictive and contrary to the opening statement. Allow me to detail by bullet:

1. I believe the requirement should be for a 10MW Exemption *or* a Minor Hydro License (5MW or less). The Vermont Tissue Project, which will improve water quality and provide multiple other benefits to the habitat and community, does not qualify for an Exemption exclusively due to the fact that some of the upstream impoundment high water mark is not owned by the Licensee. For this reason, Vermont Tissue would thus not pass this screening. I am not arguing that Vermont Tissue is the poster project to expedite, but the point at which the project becomes disqualified (property rights on high water mark of impoundment) is not unique and does not raise any conflict in the Vermont Agencies that touch on hydro development.
2. I agree with this statement.
3. In certain circumstances this criteria would be in direct conflict with the mission statement. When Vermont Tissue is complete, it will raise the low flow impoundment by 5.5” and doing so will help to improve the water quality by turning an ephemeral river (dry some 18% of the year) into a permanent reach thus furthering part the mission statement of this document, “protect natural resources”.
4. I agree with this statement.
5. No comments.
6. See below:
    a. This Screening process is designed in large part for existing sites that are in some cases blocking passage. I would recommend removing this bullet largely because the net effect may be to reduce the number of completed projects with fish passage and therefore inhibit possible fish passage in Vermont. At best, it will make all sites in need of fish passage take longer to redevelop and by extension a longer time before passage is put in place. This again seems counter to the mission statement and improving waterways. I tend to see the redevelopment of extant facilities as an opportunity to rethink the habitat concerns.
    b. I agree with this statement.

    c. I agree with this statement, except it should reference some specific standard regarding aesthetic flows.
    d. I suggest reworking this to reference specific water Classes and bypass maximum lengths.
7. I agree with this statement.
8. I agree with the concept of this, but I would like to see at least a timeline for determination as to whether there are affected resources. Perhaps 30 days?

Additionally, I would like to see a timeline for Screening determinations. How long will this process take?

Dear Anne,
I received the following comments on your draft rules from Lori Barg.
My comments are: "What she said." :-)
Lori is the only person to get a hydro approved in the last 20 years and knows what she is talking about. Please consider seriously her recommendations to get workable hydro built in VT.

And also, BUY THE DAMS! That's 580MW going out of state. Eminent domain if you have to. We don't need TransCanada.

Sincerely,
Gary

--
Gary Flomenhoft, BSME, MPP, CEE
Affiliate Fellow, Gund Institute for Ecological Economics
508-237-4012 mobile

PROPOSED VERMONT Low-Impact Hydropower Screening

1. Will qualify for a FERC 10 MW exemption.1 *or be a municipally owned dam, or a municipal project.*
2. Will be located at an existing dam, **or** project will not require a dam or other impoundment.
3. Will not change the impoundment elevation.
4. Will be operated as true run of river.[2]
5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure.[3]a)the ABF in the tailrace and b) generally 7Q10 in the bypass reach.

6. Bypasses of less than 500 feet in length, shall have minimum 7Q10 flows in the bypass reach.

The simplified procedure should not apply to bypasses greater than 500 ft in length,

7. Fish: a) The velocities at intake should be less than 3 feet per second, to avoid impingement and entrainment.

b. Project will not affect threatened or endangered species;

c) A minimum flow of 1/4" over an existing dam will meet site aesthetics.

d) No hydro will be permitted in Class A waters, and a maximum bypass length of 500 feet is permitted in Class B waters.

7. Will comply with ANR Stream Alteration Standards.[4]

8) Sites must agree to meet standard terms and conditions

9) Decisions will be made with 60 days if proposed project meets low-impact criteria.

10) Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office.[5]

The Vermont Public Service Department, Vermont Agency of Natural Resources, and Vermont Agency of Commerce and Community Development will coordinate to assist developers with understanding the Federal Energy Regulatory Commission (FERC) hydropower permitting process and federal and state resource protection regulations that are part of that process. These state agencies will assist developers of low-impact hydropower projects that do not propose new dams and that protect natural and historic resources by organizing an interagency site visit to identify potential historic and natural resource issues.
To qualify for enhanced state agency assistance, a project must meet all of the following criteria:
http://www.watershedmanagement.vt.gov/rivers/docs/rv_fsreport2009.pdf

http://www.anr.state.vt.us/Dec/Waterq/rivers/docs/rv_smallhydroreport.pdf

Comments on VERMONT Low-Impact Hydropower Screening

1. Will qualify for a FERC 10 MW exemption.1 *or be a municipally owned dam, or a municipal project.*

Most municipally owned dams will not qualify for a FERC exemption-due to being located in a town, with multiple adjacent landowners. (The difference between the license and exemption-other than length, is primarily landownership. Municipalities should be included in the low-impact hydropower screening criteria.)

2. Will be located at an existing dam, **or** project will not require a dam or other impoundment.

3. Will not change the impoundment elevation.

4. Will be operated as true run of river.[2]

5. Proposed bypass flows will meet hydrologic standards as defined by the ANR Flow Procedure.[3]

It is very important that this is clarified. ANR flow procedure is clear in providing different flow regimes, a)the ABF in the tailrace and b) generally 7Q10 in the bypass reach. This distinction is *very* important, recently some ANR staff have confused this, interpreting it to require ABF flows in the bypass reach. The ABF standard was not compiled from rivers located in Vermont. Any hydrologic study shows that about 70 percent of gaged rivers in Vermont can not meet ABF flows under natural conditions. Thus, it is like requiring 20 hours of sunshine a day.

Vermont hydrology should be used, not a standard developed from a few large rivers all over New England. ANR has completed a study of all permitted bypass flows, as well as a function of the length of the bypass. All existing permitted hydro meets Vermont Water Quality Standards. This study by ANR should be used as a guideline for this low-impact process.

The flow policy, and previous ANR decisions, show that the bypass reach should have "generally" 7Q10 flows. The numeric standards in the Vermont Water Quality Standards use this same flow criteria for all standard setting. ANR should reconsider turning the flow procedure into a rule, as ANR proposed in 1991. Unfortunately, it is still a policy-and has continued to be misinterpreted. The author of the Policy-Tom Willard should weigh in on this.

Another criteria should be added to the low-impact procedure: It should state:

6. Bypasses of less than 500 feet in length, shall have minimum 7Q10 flows in the bypass reach.

The simplified procedure should not apply to bypasses greater than 500 ft in length,

6. When the Agency of Natural Resources determines, based on a site-specific determination, that a. Fish passage facilities not needed;

This should be removed, at least until ANR has some scientific criteria developed, or the WQS have criteria. For example, ANR has not yet decided on the future of the Atlantic salmon program, although the USFWS terminated it years ago, and NH (which owns the Connecticut River) also terminated the Atlantic Salmon program. Fish passage could be a deal-breaker for a small project. In regards to trout, there is scientific disagreement as well, for example, there are dozens of peer-reviewed articles that say trout tend to hang out at home in their favorite spots-and only move for cold-water refugia. This criteria should be removed, and replaced with something to protect fish from impingement and entrainment.

(6) The velocities at intake should be less than 3 feet per second, to avoid impingement and entrainment.

http://www.watershedmanagement.vt.gov/rivers/docs/rv_fsreport2009.pdf

http://www.anr.state.vt.us/Dec/Waterq/rivers/docs/rv_smallhydroreport.pdf

b. Project will not affect threatened or endangered species;

c. Project does not significantly alter site aesthetics; (C-should be removed and replaced with:)

A minimum flow of 1/4" over an existing dam will meet site aesthetics.

Aesthetics are subjective. Previous decisions should be used, for example, the WRB decided in one case that flows could be turned "off" at night, and "on" during the day.

d. Project is not located where there is a bypass of high habitat value. (This should be removed and replaced with)

There should be no hydro in Class A waters, and a maximum bypass length of 500 feet should be permitted in Class B waters.

There is no definition of high habitat value in the WQS. ANR allows for multiple uses, and the SHIPP process , and WRP decision, and ANR's small hydro program, allows for multiple uses. It is almost impossible to regulate something for which there is no definition or criteria.

8. Will comply with ANR Stream Alteration Standards.[4]

Another criteria should be added:

There should be standard terms and conditions, and administrative timelines. See attached for standard terms and conditions. Decisions will be made with 60 days if proposed project meets low-impact criteria.

8. Where there are direct or indirect impacts to historic and archaeological resources, projects are reviewed on a case-by-case basis by the State Historic Preservation Office, and adhere to recommendations made by that office.[5]

[1] See definition at http://www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/get-started/exemp-licens/project-comparison.asp.

[2] A true run-of-river project is one which does not operate out of storage and, therefore, does not artificially regulate streamflows below the project's tailrace. Outflow from the project is equal to inflow to the project's impoundment on an instantaneous basis.

[3] Reference for further detail: http://www.anr.state.vt.us/dec/waterq/rivers/docs/rv_flowprocedure.pdf and www.fws.gov/newengland/pdfs/Flowpolicy.pdf.

[4] See Environmental Protection Rule, Chapter 27, Vermont Stream Alteration Rule for further guidance: http://www.vtwaterquality.org/rivers/docs/rv_StreamAltRULE_DRAFT_07092013.pdf.

[5] For a discussion of direct and indirect impacts, see ACCD's *Criteria for Evaluating the Effect of Proposed Telecommunications Facilities*, *Transmission Lines, and Wind Power Facilities on Historic Resources* at: http://accd.vermont.gov/strong_communities/preservation/review_compliance/telecom_criteria.

Attachment:

Tier 1

If the water is Class A, or an Outstanding Resource Water; no new hydroelectric facilities shall be permitted.

Tier 2

If the bypass reach comprises >/= 10% of the connected riverine environment; then site specific data, or USGS gauge data on the stream, shall be used to determine appropriate minimum flows for the bypass reach.

Tier 3

If the bypass reach comprises < 10% of the connected riverine environment, then the Vermont statewide mean default flows in the table below; *or,* USGS gauge data on the stream may be used to determine the appropriate minimum flows for the

Here are examples of criteria that would work:

(2) Does not entail any increase in the normal maximum surface elevation of the impoundment pursuant to repair or reconstruction of a dam;

••

(3) Does not entail, for the purpose of generating electric power, any change from the prevailing regime of storage and release of water from the impoundment;

••

(4) Does not entail diversion of water from the waterway for more than 500 feet from the toe of the dam to the point of discharge into the waterway;

••

(6) Utilizes only a dam at which there is no significant existing upstream or downstream passage of fish;

••

(7) Will not cause violation of applicable water quality standards established by the U.S. Environmental Protection Agency or any state in which the project is located;

EXAMPLE-STANDARD TERMS AND CONDITIONS:

•I. The Exemptee shall operate the project in a run-of-river mode, whereby inflow to the project will equal outflow from the project on an instantaneous basis and water levels above the dam are not drawn down for the purpose of generating power. Instantaneous runof-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptce, the Vermont Agency of Natural Resources and the U.S. Fish and Wildlife Service.

•2. The Exemptee shall at all times provide a minimum now over the dam spillway equal to the 7QI0 now to protect water quality and fish habitat in the bypass reach. These flows shall be released upon commencement of project operation.

•3. The Exemptee shall, within three (3) months of the date of issuance of an exemption from licensing, prepare and file for approval by the U.S. Fish and Wildlife Service, a plan for maintaining and monitoring run-of-river operation and bypass now releases at the project. The plan shall include a description of the mechanisms and structures that will be used, the level of automatic operation, the methods to be used for recording data on run-of-river operation and bypass discharge, an implementation schedule, and a plan for maintaining the data for inspection by the U.S. Fish and Wildlife Service.

•4. The Exemptee shall implement a refill procedure whereby, during impoundment refilling after any drawdown for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining

10% of inflow to the project. This refill procedure may be modified on a case-by-case basis with the prior approval of both the U.S. Fish and Wildlife Service and the Vermont Agency of Natural Resources.

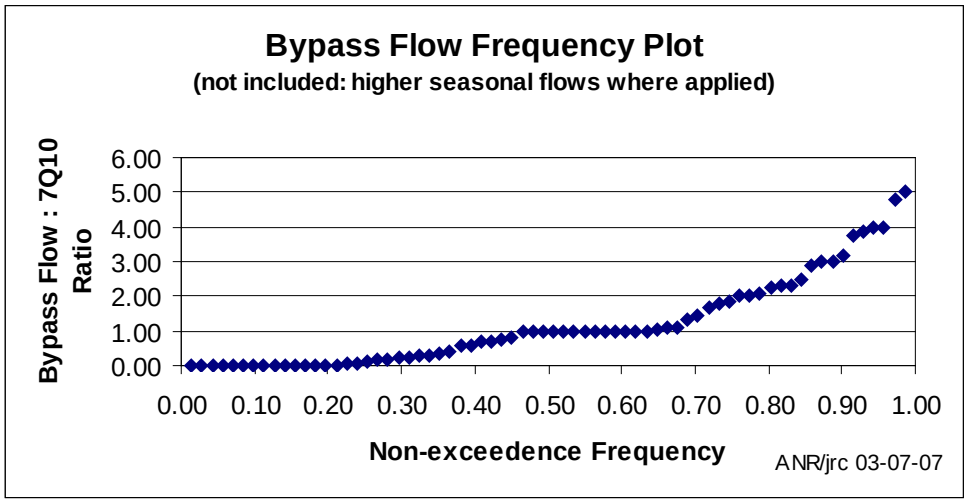
•5. The Exemptee shall be responsible for constructing, operating, maintaining, and evaluating upstream and downstream fish passage facilities at this project when notified by the U.S. Fish and Wildlife Service and/or the Vermont Agency of Natural Resources that such fishways are needed. The fishways shall be constructed and operational in accordance with the schedule identified by the agencies. Any fishways prescribed by the aforementioned agencies shall be designed in consultation with, and the designs shall require approval by, the U.S. Fish and Wildlife Service.

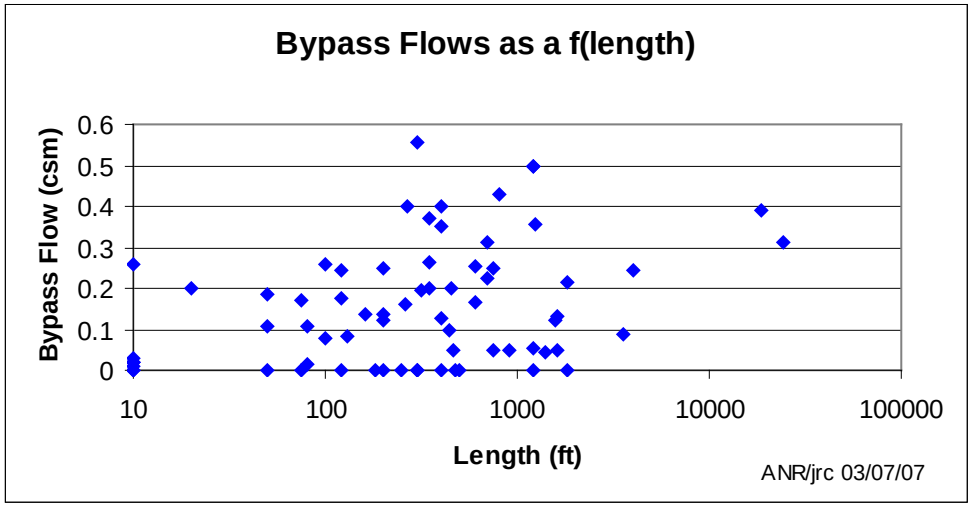
•6. The Exemptee shall notify the U.S. Fish and Wildlife Service in writing when the project commences operation. A set of as-built drawings shall be furnished with the notification. Such notice shall bc sent within 30 days of start-up to: Supervisor, New England Field Ot1ice, 70 Commercial Street, Suite 300, Concord, New Hampshire 03301.

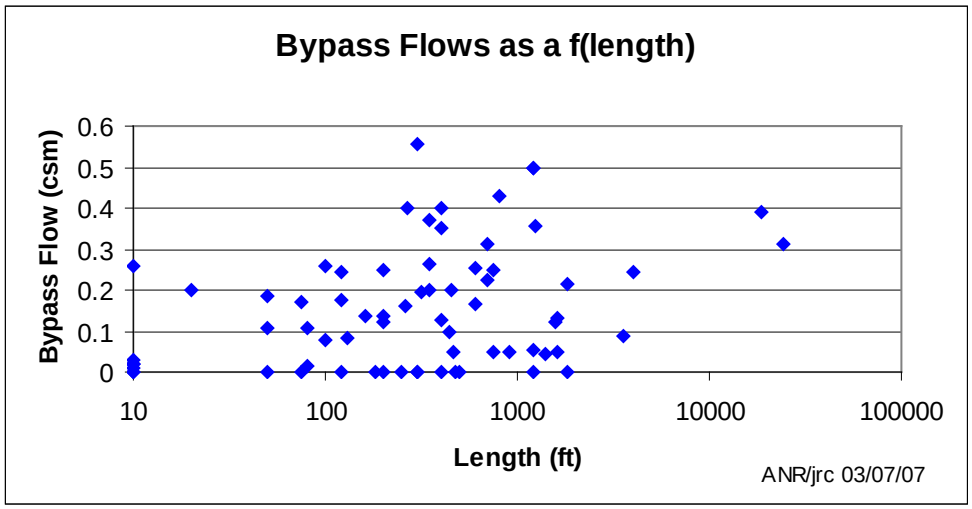
•7. The Exemptee shall allow the U.S. Fish and Wildlife Service to inspect the project area at any time while the project operates under an exemption from licensing to monitor compliance with their terms and conditions.

•8. The U.S. Fish and Wildlife Service is reserving the right to add to and alter terms and conditions for this exemption as appropriate to carry out its responsibilities with respect to fish and wildlife resources. The Exemptee shall, within thirty (30) days of receipt, file with the Federal Energy Regulatory Commission any additional terms and conditions imposed by the U.S. Fish and Wildlife Service.

•9. The Exemptee shall incorporate the aforementioned terms and conditions in any conveyance -by lease, sale or otherwise -of its interests so as to legally assure compliance with said conditions for as long as the project operates under an exemption from licensing.



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Bypass Flow (csm)
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Length (ft)
ANR/jrc 03/07/07

LOW IMPACT HYDROPOWER INSTITUTE

Dr. Michael J. Sale, Executive Director
704 Potters Falls Road, Wartburg, TN 37887
865-719-4794, mjsale@lowimpacthydro.org

May 15, 2014

Anne Margolis
Renewable Energy Development Manager
Planning and Energy Resources Division
Vermont Public Service Department

Comments on Vermont Screening Criteria for Hydropower Assistance

Dear Ms. Margolis:

I am replying to an e-mail request from you to provide comments on a proposed screening procedure to identify hydropower projects that could receive assistance with the FERC process. I am offering my comments as Executive Director of the Low Impact Hydropower Institute (LIHI) and as a professional with 35 years working in the hydropower industry in the U.S.

First of all, I commend you and Vermont for offering assistance to small hydropower developers. Development of new hydropower is a very important component of our response to climate change, and it can be done in ways that protect and enhance local aquatic ecosystems. With your new assistance program, you are positioning your state among others, such as California and Colorado, who have taken action to simplify hydropower regulations.

This said, I see that you may be causing some confusion with the name you have selected, "VT Low-Impact Hydropower Screening," because it may leave the impression that these are the screening criteria for "Low Impact" Hydropower in Vermont, in other words, these are the criteria for hydropower eligibility for Vermont's SPEED. I could foresee a situation where a project in Vermont was LIHI certified and therefore qualified for participation in one of the New England states' RPS programs, but could not qualify for your new "VT Low Impact Hydropower Screening" assistance. More clarification is needed to distinguish these proposed screening criteria from SPEED standards. Some of the confusion could be avoided if you changed terminology to avoid the "low-impact" terminology. For example, the title could be "Screening Criteria for Hydropower Enhanced Assistance."

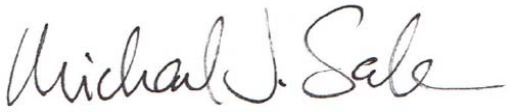
With regard to the criteria, please note that the criteria you outline differ significantly from those we have been using now for fifteen years in LIHI. Some of the key differences include are:

- You propose a capacity size limit; we do not;
- You propose no change in reservoir elevation and run-of-river operation (RoR); we use a more flexible approach that ensures downstream aquatic habitat is not degraded without requiring strict RoR operation.
- You seem to be proposing to exclude any dams where fish passage is required; we allow fish passage if it is well-designed and operated.

Our criteria are designed to encourage investments in rivers by project owner/operators even if they are not required to do under their FERC license or exemption. What is the rationale for offering enhanced assistance to only those projects that meet very strict limitations? Perhaps it would be helpful if the type of assistance you will offer is explained better. The purpose of the screening is not really clear. Your criteria are very strict, so you may not get many applicants. Why are such severe limitations needed? In our experience, it is possible to protect the environment and promote more clean hydropower without resorting to such strict limitations.

If I can be of further assistance in design of your new assistance program, please give me a call. I would be happy to discuss these points in more detail. We at LIHI know by experience how challenging the design of hydropower standards can be!

Sincerely,



Michael J. Sale, Ph.D.
LIHI Executive Director

c: Dana Hall, LIHI Deputy Director

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HYDROPOWER REFORM COALITION
Putting water, wildlife, and people back in rivers.

May 15, 2014

Anne Margolis
Renewable Energy Development Manager
Planning and Energy Resources Division
Vermont Public Service Department
112 State Street Third Floor
Montpelier, VT 05620-2601

Subject: Comments on Vermont Low-impact Hydropower Screening Criteria

Dear Anne,

The Hydropower Reform Coalition submits the following comments on the " VT Low-impact hydropower screening" criteria developed by the Vermont Public Service Department (PSD) in collaboration with Agency of Natural Resources (ANR), and Agency of Commerce & Community Development (ACCD).

The Hydropower Reform Coalition is a consortium of more than 150 conservation and recreation organizations that represent more than one million conservationists, anglers, boaters, and homeowners. Since 1992, we have advocated in numerous cases to improve the operations of hydropower projects around the country. We have also engaged in policy discussions surrounding hydropower and renewable energy.

General Comments

We appreciate the attempt by the State of Vermont to facilitate development of responsible hydropower in the state of through passage of Act 165 in 2012 and a subsequent Memorandum of Understanding (MOU) between Public Service Department, Agency of Natural Resources and Agency of Commerce and Community Development in July 3, 2013.[1]

Needless to say, our nation needs renewable energy resources. However, development of renewable energy resources, including hydropower, should be done in a manner that also protects the environment. While most of the suitable sites for hydropower development in Vermont have already been utilized, there may be some opportunities to develop new hydropower, especially to develop hydropower at existing dams that do not currently have hydropower.

[1] Act 165 Report: A Report to the Vermont General Assembly on Progress toward an MOU Program for Expediting Development of Small and Micro Hydroelectric Projects.
http://www.leg.state.vt.us/reports/2014ExternalReports/296068.pdf

We generally believe that the proposed "low-impact hydropower screening criteria" will help the developers in developing responsible hydropower. They provide hydropower developers with good guidelines to follow when conceptualizing hydropower development on rivers in Vermont. The screening criteria coupled with the MOU will help hydropower developers in not only selecting good sites for hydropower development but also in expediting the permitting process through better support and collaboration. These criteria will also provide good guidance during coordinated site visits by state agencies to inform the applicant of potential environmental and recreational issues that need to be studied or addressed during the application development process.

While we generally support these goals, we also want to stress the importance of a transparent and inclusive process for selecting hydropower projects under this program and considering the full impact of the proposed project on all resources.

Specific Comments

We provide comments only on a selected few criteria and not on those that we support or have no comments on.

Criteria 2: Will be located at an existing dam, or project will not require a dam or other impoundment

Given that the purpose of the criteria is to assist in the development of new low-impact hydropower projects, the criteria should clarify that existing hydropower projects seeking license renewals are not eligible for inclusion in the program.

Criteria 6: When the Agency of Natural Resources determines, based on a site-specific determination, that:

A. Fish passage facilities not needed

While it is important that new projects not be sited on facilities where fish passage may be needed, it is also important that the operation of the new project or construction of new facilities not create an impediment to fish movement. For this reason, we recommend that the criteria be revised as "Fish passage facilities not needed and new barrier(s) to fish passage not created."

B. Project will not affect threatened or endangered species

We recommend that the 'threatened or endangered species' in this criteria include those listed as threatened or endangered under the Endangered Species Act (ESA) as well as under Vermont Endangered Species Law pursuant to 10 V.S.A., Chapter 123.[2] To make it clear, we recommend that the criteria be restated as "project will not affect threatened and endangered species under the Endangered Species Act or Vermont Endangered and Threatened Species List."

C. Project does not significantly alter site aesthetics

Hydropower projects can create or limit and eliminate recreational opportunities on rivers. While existing dams may have negatively impacted the aesthetics and recreational opportunities, we believe

[2] Wildlife Diversity Program, Vermont Fish and Wildlife Department.
http://www.vtfishandwildlife.com/wildlife_nongame.cfm

that adding a hydropower provides an opportunity to roll back the damage. In fact, we think that a proposed new project should be operated in a manner that enhances the aesthetic and recreational opportunities. For this reason, we recommend that this criterion be changed to "project does not negatively alter but enhances site aesthetics and recreational opportunities."

Additional Criteria

We propose that the following additional criteria be added to identify and avoid potentially controversial projects early on:

Criteria 9: Project should not be proposed on a river reach that is designated as a protected reach under federal or state statute.

The proposed project should not be proposed on a river reach that is designated as a protected reach under federal or state statute[3], has been found eligible for National Wild & Scenic River status by a federal agency, or is included on the Nationwide Rivers Inventory[4] by the National Park Service. Such rivers have either been determined to have outstanding wild and scenic value or other recreational values and should be off limits for hydropower development.

Criteria 10: Project should not be proposed on infrastructure that has been deemed a safety hazard by federal or state agencies or has been considered for removal for safety or other reasons

Public safety should be the utmost concern during development of new hydropower projects on existing dams. To address public safety concerns it is important that dam where a project is being considered or proposed be safe as determined by federal or state officials. The proponent of the hydropower project must be required to produce evidence that the dam under consideration for power development is a Class 3 (Low)[5] Hazard under the VT Department of Environmental Conservation's Dam Safety Program. In addition, the dam must not have been considered for removal for safety or other reasons.

We appreciate the opportunity to provide comments on the draft screening criteria. We look forward to working with the PSD and other stakeholders as the state develops and finalizes these screening criteria to help developers bring more hydropower online in a responsible manner. Please contact Bob Nasdor at bob@americanwhitewater.org or me at rupak@hydroreform.org if you have any questions.

Sincerely,

Rupak Thapaliya
National Coordinator

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[3] This should include rivers designated as "outstanding resource waters" by the State of Vermont under 10 V.S.A. §1424a.
[4] Nationwide Rivers Inventory. National Park Service. http://www.nps.gov/ncrc/programs/rtca/nri/index.html
[5] Inspection of Dams, VT Department of Environmental Conservation. http://www.anr.state.vt.us/dec/fed/damsafety/docs/inspectioninfo.pdf

Anne,

John Warshow and I endorse the comments made by Lori Barg.
The proposed screening criteria make development economically impossible
We appreciate your good efforts, but fear that the exercise has as its real purpose the prevention, rather than encouragement, of any new hydro projects in VT.

Best,
Mathew Rubin

To whom it may concern,

We are very concerned about the Vermont draft low-impact hydro screening criteria.
This draft criteria only discourages hydro in Vermont, with its subjective, open-ended criteria, and no timeline.

At a time when the IPCC report shows that Climate Change is at a very dangerous level, we are concerned about the future of Vermont and it's inability to take advantage of the gold mine that especially Micro-hydro can offer our state with a resource for a clean renewable energy technology that will only benefit our state and future. Micro-hydro - as can be accomplished with systems such as what *Little Green Hydro, Corinth, VT* offers are a great example of what can be accomplished with doing absolutely no harm to the streams and waterway or the fish or wildlife. It is a 24/7 solution that can fill the gap that will be left open with the closing of Vermont Yankee.

Indeed, we are at a point where we can clearly be developing more hydropower in Vermont. The US Department of Energy has increased its estimate of the potential in the state by a very large percentage, using small hydro and underdeveloped or neglected systems, and we should set about finding ways of developing that.

Why is this not being given a timeline, when every day matters? It is a great solution that is being implemented in other states with a much simpler process because of it's low or no impact.

What are we afraid of? Meeting our goal? This can help to reduce our energy costs. The systems referenced above from *Little Green Hydro,* cost less than the price of an average solar system and can produce a lot of energy!

We hope that you will look into the advancement of Microhydro and Small Hydro with their potential benefits to our state. Many countries are benefiting from this natural resource now. We can, too... with your help.

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Ann: The draft screening matters look acceptable, certainly for a draft. Please consider adding a requirement somewhere regarding decommissioning and removal of any hydro facility placed in

streams. Without that requirement, small operations can easily be abandoned with deleterious impacts on the stream and its inhabitants for years following. Thanks for the opportunity to commit. Bill

William Wellman
wellman1985@charter.net

I am very supportive of the comments made by Lori Barg. This process has dragged on far too long. Just imagine that we are in a war for survival and energy dependence. Would you wait ten or twenty years to have a forester determine which trees you might cut in order to fill your wood box? Perhaps not. It is now public knowledge that there are a multitude of sites which are suitable for small and mini hydro development. Changing patterns of rainfall and stream volumes caused by climate change will continue to alter historical data. Any standards created should be flexible as should be the infrastructure based on them. Water power is just one of the elements of a world-wide system of energy production which does not depend on fossil fuels, but we need to move forward now. Lori's expertise is based on many years of experience and frustration with the anachronistic federal and state response to hydro in Vermont. Please give her suggestions the highest value. Thank you.

It has been a number of years since I was a selectman for Glover, and attended the original stakeholder meetings. At that time the town was actively interested in small hydro at Shadow Lake, and possible smaller installations at Daniels Pond and Lake Parker. Those facilities could have been in service long ago if the bureaucratic machinery had been functional. I am hopeful that with your leadership, and that of others, we can finally utilize the dormant hydroelectric potential in Vermont.

Nicholas Ecker-Racz
eckerracz@gmail.com

With such short notice, I will not be able to attend the meeting or participate in the Webinar, due to prior commitments.

I have been trying to formulate a workable plan for hydroelectric development on property I own at Northfield Falls, Vt on the Dog River. My site may be too large to qualify but I support any changes to make it easier to develop hydro power in Vermont.

I received notice of the meeting from Lori Barg today. I received a copy, read and fully understand her comments on the Draft Criteria. I strongly agree that the proposed changes need to be further modified to include her recommendations, in order to allow easier hydro development in Vermont.

How many Projects have been approved in Vermont in the past 20 years? How many have been approved and constructed in other states? Please ask yourself, "Why are we lagging so far behind in development of renewable energy in Vermont"?

Can you please forward this to Anne Margolis and other officials at the meeting?

Would you please include me on the mailing list for any future correspondence. I have spoken with, had meetings and even a site visit, concerning my project with Vt Agency of Natural Resources and wonder why I am not on the list.

Thanks

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AM

H. Paul Berlejung
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May 9, 2014

Anne Margolis
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Re: proposed low impact hydro screening

The proposal will not facilitate the growth of hydro facilities in Vermont, the proposal should not be implemented but should be further studied (and I hate further studies).

I come to this conclusion as a person highly interested in small scale hydro systems and from my years as an attorney with the Corps of Engineers at the Louisville District and Headquarters, Washington, D.C., who learned much about rivers and dams in that capacity.

Very truly yours,

H. Paul Berlejung

H. Paul Berlejung