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Testimony to the Vermont Senate Committee on Natural Resources and Energy

Senator Robert M. Hartwell, Chair
Senator Diane Snelling, Vice Chair
Senator Peter W. Galbraith
Senator Mark A. MacDonald
Senator John Rodgers, Clerk

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Honorable Chairperson Hartwell and members of the Committee, thank you for this opportunity to provide this testimony related to stormwater management for high-elevation alternative energy systems. My name is Andres Torizzo. I am a stormwater hydrologist and Principal of Watershed Consulting Associates in Waitsfield, VT. My firm specializes in modeling, designing, and permitting stormwater management systems. I have conducted water quality research and designed stormwater systems in high elevation watersheds. I have also closely reviewed stormwater designs and permit applications for the Sheffield Wind, Kingdom Community Wind, and Deerfield Wind Expansion projects.

High elevation areas of Vermont include numerous seemingly insignificant seeps, where groundwater oozes from the subsurface and begins to concentrate to form discrete stream channels. These headwater streams and wetland areas are the birthplace of our surface water resources. They constitute the greatest percentage of total stream length in an undisturbed river system, but are also mostly unmapped. They are vitally important for providing clean and cold water, habitat, and flood control; however, they can only provide such services if they are protected from disturbance. Headwater streams offer the greatest opportunity for interaction between water and land; and it is with this interaction that numerous biological, chemical, and physical processes are constantly occurring to clean stormwater runoff. These are the processes which are responsible for maintaining water quality downstream. With continued development in Vermont and our nation, conversion of undeveloped pervious surfaces to impervious, and the potential impact to the hydrological water balance from climate change, protection of these headwater resources is a very wise investment for a sustainable future.

Stormwater management has evolved rapidly in the past decade. We now know the best way to keep pollution out of our surface waters and to preserve stream hydrology is to control the overall volume of stormwater being generated on a developed site, by designing sites to replicate natural conditions. Current State stormwater regulation was not developed on this premise. The Watershed Hydrology Protection Credit developed after the Statewide Manual in 2011, did introduce certain site design requirements that, if implemented correctly, could help to mitigate stormwater volume and preserve hydrology after development, including limitations on impervious surface and stream buffer requirements. However, the Credit is also seriously flawed by allowing the use of level spreading devices for water quality management on excessively steep and uneven slopes, up to 30%, which is contrary to level spreader research and regulation in other jurisdictions across the nation. None of the industrial wind

turbine projects I have reviewed, which include Sheffield, Lowell, and Deerfield, can meet the Credit, given that they create too much impervious surface and do not continually maintain stream buffers. Still, as in the case of Lowell, the project was permitted to rely on just one component of Credit as the primary means of runoff control, level spreaders, while failing to meet the most critical aspects of the Credit, the preservation of buffers and minimization of impervious area. In my opinion this strategy is not sufficiently protective and will ultimately fail. Preserving high elevation hydrology cannot be successful by playing defense; the approach must be holistic and include minimizing the project footprint as the primary consideration.

In general terms, projects must be required to adapt to the site, rather than the site adapting to the project. Lowell, Sheffield, Deerfield, and Georgia Mountain will result in the creation of 81 acres of new impervious surface, not considering the acres of newly exposed bedrock. This is more than eight Williston Wal-Mart facilities combined. I ask the developers, is there a way to eliminate or substantially reduce the need for the massive road and turbine pad infrastructure, which will remain in place forever, but will be infrequently utilized aside from during project construction? The only solution to water quality protection is to down scale the infrastructure required for these projects.

More comprehensive and effective high elevation stormwater regulation must be developed to build off of the positive aspects of the Watershed Hydrology Protection Credit. This new regulation should provide requirements for the installation of stormwater structures specifically designed to return surface runoff to groundwater. The regulation should be based on a runoff volume reduction approach, and compliance should be measured by evaluating if a project successfully controls overall stormwater volume generated. If a project fails to meet all aspects of the regulation, including site design elements such as reduction of impervious surface and preservation of stream buffers, the project should not be permitted, period. Monitoring, before and after development, is an absolutely key component to a successful strategy. A procedure for monitoring must be part of this new regulation, one that meets specific, scientifically-based standards that evaluate hydrology, geomorphology, water quality, and biology. This monitoring plan must allow for in stream testing on the project site, where the small headwater areas are located and at the points of stormwater discharge, not just at locations a mile or more downstream of the project site, as was done in Lowell and Sheffield, where the impacts of the development may not be as pronounced or not yet occurring.

Projects must also be designed, and compliance must be measured, using standard, accepted practices. I remain very concerned about the under estimation of runoff generated from the projects I have reviewed. Many acres of roads have been constructed to service the Lowell and Sheffield projects. Shortly after construction, these roadways have compacted to form an impervious surface akin to pavement. These surfaces are not pervious to allow for the penetration of precipitation and reduction of runoff. Modeling runoff from the site, both prior to and following construction, is a required practice to design the stormwater system and gauge compliance with the standards. If these road surfaces are not represented as impervious surfaces in the runoff model, the treatment system designed will be undersized, and compliance with stormwater management standards will not be achieved. This will lead to degradation of water resources. This is precisely the scenario at the Lowell project. Using the accepted values for gravel road surfaces in the runoff model, I have predicted there will be a minimum of 20% more runoff from the site as compared to model used to design and permit the Lowell stormwater system. I have repeatedly expressed my concerns to ANR on this issue but have been disregarded. If, as predicted, precipitation

events intensify with the onset of climate change, the inaccurate modeling of runoff from these projects will result in even more water quality impact, and downstream flooding impacts as well.

I have reviewed biological data collected by ANR within the receiving waters of the Sheffield project following construction, and also read the press release issued by the project developer stating that this report demonstrates the Sheffield project has not impacted water resources. I truly wish we could come to such definitive conclusions based on relatively modest efforts. In fact, while this dataset may support that biology remains intact at these particular sampling stations, one unfortunately cannot conclude that water resources have not been impacted, and will not be impacted in the future by this project. These sampling locations are located approximately 1-2 miles downstream of the development activity. Conditions in the headwater areas, just downstream and adjacent the project site, may be vastly different. Also, it may be years before the discharge of excessive stormwater volume works to de stabilize the receiving waters and impact downstream water quality.

A three year moratorium on high elevation wind energy development makes sense from a stormwater management perspective, given the current situation in Vermont. This time will allow us to evaluate the performance of the stormwater systems at Sheffield and Lowell, as well as the stream response. The moratorium would allow opportunity for a re assessment of the Watershed Hydrology Protection Credit, and the development of smarter and more protective strategies that follow the global trend in stormwater management – runoff reduction.