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Duffy Dillon
Brennen, Steil & Basting, S.C.
One East Milwaukee Street, Janesville, WI 53547-1148

Project: Analysis of Shoreline Structures, Manitowish Waters Chain of Lakes, Wisconsin

Dear Duffy:

In July 2013, Ecological Research Partners prepared a report that detailed results from fieldwork that inventoried existing shoreline structures on the Manitowish Waters Chain of Lakes. The report was meant to assist the assessment of potential impacts of a proposed water level changes proposed by the Wisconsin Department of Natural Resources. The May 30, 2014 proposed order change, from a winter drawdown of 3.6 feet to a winter drawdown of 1 foot will expose several structures on the chain to potentially damaging ice and frost during the winter. To determine how many of the structures would be vulnerable to ice with a one-foot drop in water level, we examined photographs of piers and boathouses that were taken during field work in November 2012 and May 2013.

Our methods involved looking at photographs to locate water marks on stationary piers and all boathouses and determine if a water level one foot below the maximum water level (as determined by placement of the water marks) would still touch the structure. Chairs, steps, and pontoons were used for size reference to determine if any parts of a pier or boathouse would still touch water after a one-foot drawdown. Structures from the following lakes were analyzed: Rest Lake, Manitowish Lake, Spider Lake, Stone Lake, Little Stark Lake, Alder Lake, and a small part of Trout River. Pictures from Clear Lake and Wild Rice Lake could not be analyzed because of snow cover on structures. Structures that looked to end near a one-foot drawdown were labeled as "Possibly Vulnerable." The table below summarizes our findings:

Type of Structure	Count
Stationary Pier	692
Vulnerable Stationary Pier	641
Possibly Vulnerable Stationary Piers	27
Boat House	127
Wet Boathouse	82
Dry Boathouse	45
Vulnerable Boat Houses	75
Possibly Vulnerable Boat Houses	13
Vulnerable Wet Boat Houses	71
Possibly Vulnerable Wet Boat Houses	9

Vulnerability Calculations	Percent
% of Total Stationary Piers that are Vulnerable	92.6
% of Total Stationary Piers that are Vulnerable or Possibly Vulnerable	96.5
% of Boat Houses that are Vulnerable	59.1
% of Boat Houses that are Vulnerable or Possibly Vulnerable	69.3
% of Wet Boat Houses that are Vulnerable	86.6
% of Wet Boat Houses that are Vulnerable or Possibly Vulnerable	97.6

Based on the high percentages of vulnerable stationary piers and vulnerable wet boat houses (92.6% and 86.6% respectively), we predict that there will be costs to residents in order to replace or “winterize” their structures, or to repair them after winter.

One concern that we have is that many of the vulnerable wet boat houses were constructed with the knowledge that the foundations would not be exposed to flooded conditions and ice in the winter. For example some boat houses are constructed on concrete block foundations. Many of the wet boathouses may have to make substantive changes to their foundations to make them able to withstand the proposed winter water level conditions. Under state law wet boat houses are no longer allowed. Existing wet boat houses are grandfather in provided that the resident does only routine maintenance and do not make substantial changes. Replacing the entire foundation and improving the structure to withstand the new winter lake levels may result in the structure to have to be removed or converted to a dry boat house. Wet boat houses add significant economic value to a lake property, loss of these structures could be a significant economic loss to some property owners. To estimate the total potential needed repairs to these structures would require an evaluation of each structure by a structural engineer.

Tim Ehlinger and I would be happy to discuss our findings and recommendations further with you at your convenience.

Sincerely,

Neal O'Reilly, Ph.D., PH
Principal
Ecological Research Partners