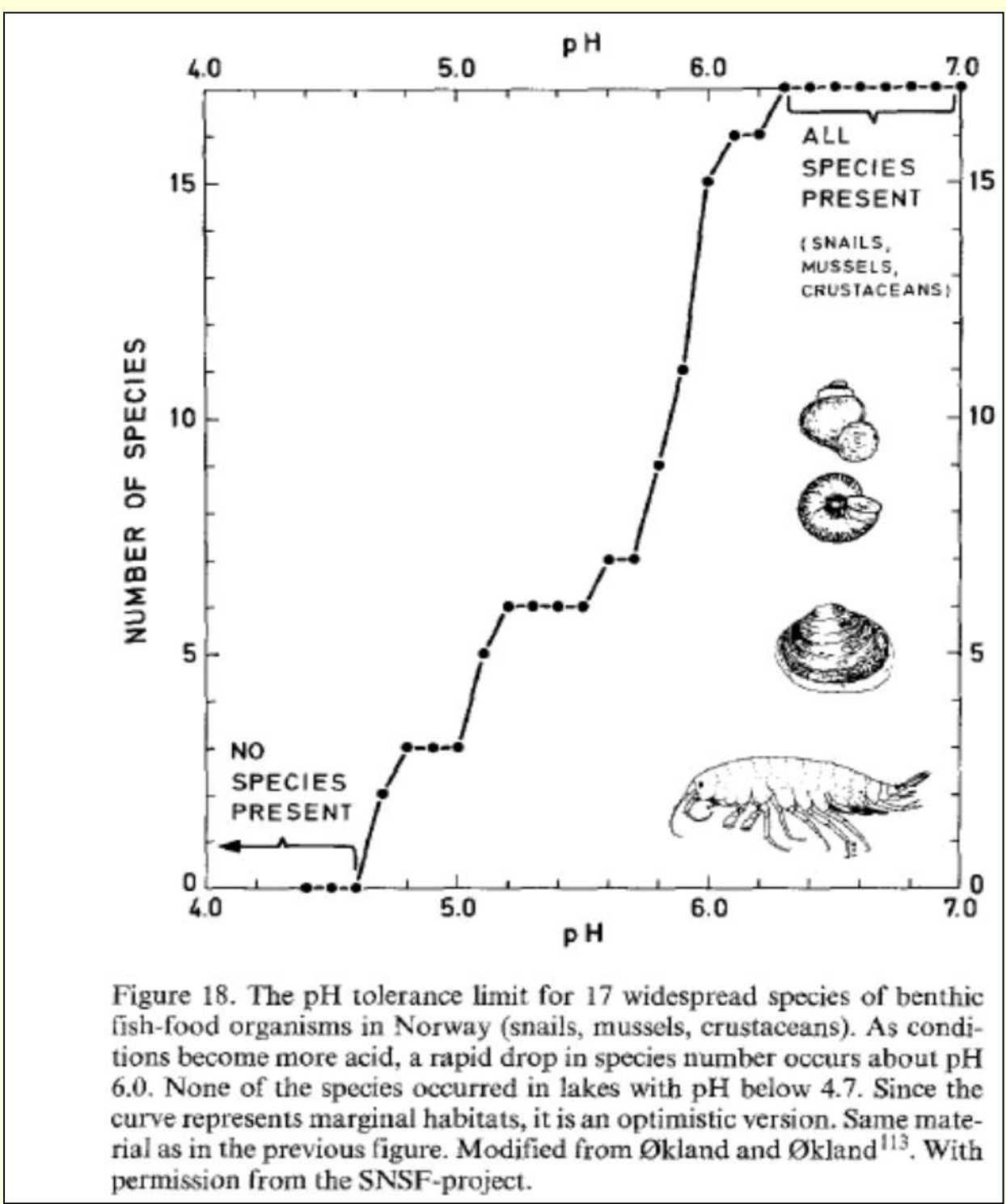


Acid Rain Related Problems are Inhibiting Salmon Recovery in Downeast Maine

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Abstract: Water quality surveys and an experimental liming project in Downeast Maine have shown that seasonal pH, yearly calcium and toxic aluminum are at or exceed threshold levels for salmon survival. Usually, calcium is more limiting than is pH or aluminum. Many other aquatic organisms are also impaired. In most streams, even brook trout are at or below survival thresholds. This results in many streams that are (1) without fish, (2) support only brook trout, or (3) have only limited fish species diversity. Restoration will involve a transition from fossil fuels to sustainable energy, and in the short term, watershed level liming is a cost-effective management strategy.

Stream pH is directly related to species diversity whenever pH is below 7.0. This graph is of invertebrates that are critical salmonid foods in Norway (from Økland & Økland 1986). Their abundance is graphed relative to mean pH. A similar graph can be drawn for fish species. Salmon are not found when waters are chronically below pH 6 and even brook trout are absent below pH 5.



Calcium is just as important and also has a direct relationship to species diversity (Fiske 1987, macroinvertebrate survey of VT lakes). Brook trout cannot be maintained in a hatchery (even with nutritionally balanced foods) when Ca is between 2-2.5 mg/L (Russ Danner 2004).

