Wetlands Background Information
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Prepared by Vermont Natural Resources Council (VNRC), Conservation Law Foundation (CLF), The Nature Conservancy in Vermont (TNC), Audubon Vermont, and Lake Champlain Committee (LCC)

- Lake Champlain Basin Program Clean Water Commitment brief video on wetland protection - https://www.youtube.com/watch?v=nwNsV8gEPUM&t=2s

- commentary in VTDigger on the importance of wetlands from The Nature Conservancy in Vermont's former Director of Science and Freshwater Programs, Rose Paul (retired)

- Graphic illustrating how wetland functions and values vary by their location in the watershed.

- Scientific paper entitle "Ecosystem services of wetlands" by Mitsch et al. (2015) in *International Journal of Biodiversity Science, Ecosystem Services & Management* provides a general overview of the ecosystem services of wetlands, supported by citations from the scientific literature.

- 2019 piece in *The Conversation* entitled Small streams and wetlands are key parts of river networks - here's why they need protection by Ellen Wohl, a nationally recognized scientific expert on freshwater systems, highlights the importance of small wetlands and streams. She uses the analogy of these small, often unseen, landscape features being like the capillaries of our own circulatory systems. Without the chemical and physical processes that occur in capillaries our bodies would cease to function. Small wetlands and streams play a similar role in nutrient processing in watersheds, and also play a vital part in flood control and providing habitat to a wide range of species.

- 2017 scientific paper entitled "Biogeochemical hotspots: Role of small water bodies in landscape nutrient processing" published in *Water Resources Research* highlights the importance of wetlands **as small as 10 m^2** in its analysis of hundreds of sites around the world (mostly from temperate sites in North America and Europe). The authors state "Results suggest that **small wetlands play a disproportionately large role in landscape-scale nutrient processing – 50% of nitrogen removal occurs in wetlands smaller than $10^{2.5}$ m^2** in our example." They continue "Based on a synthesis of data from lakes, reservoirs, and wetlands worldwide, we found that smaller water bodies tend to have higher nutrient removal rates. We applied our findings to the landscape scale and found that for the same wetland area lost, the **loss of small wetlands corresponds to a greater loss in wetland nutrient removal potential**." (p.5038) As a result, the authors note that "given the same loss in wetland area, the nutrient retention potential lost is greater when smaller wetlands are preferentially lost from the landscape" (p.5038) They conclude "Our study for the first time quantifies the **disproportionately larger role smaller wetlands can play in landscape nutrient processing, and highlights the need for valuing and protecting these smaller, often ignored landscape features**." (p.5053) [emphasis added]