Preserving Wetlands:
Their Biochemical Contribution to Heath and Intelligence

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Wetlands are under siege worldwide due to the effects of climate change (e.g. droughts and increasing water temperatures), farming practices, excess nutrients, and contaminants. Wetlands are also considered “valuable” because they are known to provide a variety of “ecosystem services”, for example: provisioning of drinking water, navigation and flood control, esthetic and recreational services, and mitigation of organic contaminants. One ecosystem service that has, so far, been under-appreciated is their ability to act as reservoirs and suppliers of essential nutrients. For example, docosahexaenoic acid (DHA; 22:6n-3) is a polyunsaturated fatty acid (PUFA) that has several unique properties. It comprises 40% and 60% of the PUFAs in the brain and retina, respectively, and 50% of the weight of the brain’s neuron plasma membranes. It has been shown to promote visual acuity and improve cognitive development (“intelligence”) in vertebrates. But where does much of the DHA in terrestrial organisms ultimately come from? Fish oils are rich in DHA, however, most of the DHA in fish and fish consumers (e.g. otters) originates from algae and generally becomes increasingly concentrated in aquatic organisms as it moves progressively up to higher levels in food chains. From there, essential nutrients (such as DHA and another fatty acid called EPA), can, by a variety of pathways, make their way onto terrestrial landscapes. It is important to document how these aquatic-terrestrial DHA transfers are brokered and to understand emerging threats to the global supply of these essential nutrients. Such an analysis leads to the conclusion that we must now add one heretofore unrecognized ecosystem service to the suite of services provided by wetlands; namely, the provisioning of essential PUFA to adjacent terrestrial systems. This newly recognized service provides conservationists and managers with a new outlook and justification for preserving our aquatic resources.

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McMaster Innovation Park
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