Beyond Bioenergy – Developing a Conceptual Framework to Assess Ecosystem Services in Shrub Willow Fields.

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The potential benefits of shrub willow extend beyond the production of woody biomass. Not only does shrub willow impact air, water, and soil quality, but it also has implications for ecosystem services on local, regional, and national scales. We define ecosystem services in anthropocentric terms, focusing on the services willow provides that improve human well-being. Our study presents an original ecosystem services assessment of commercial shrub willow fields in Cape Vincent, NY where shrub willow has recently been replacing pasture, hay, corn, and idle land. This change in land management has implications for soil, air, and water quality in addition to direct and indirect ecosystem services. Through field measurements and a conceptual framework, we examined shrub willow's potential impact on ecosystem services at local, regional, and national scales through the lens of environmental science, and evaluated the relative benefits of shrub willow compared to conventional corn and hay at a local scale. Ecosystem services of shrub willow include access to recreation, aesthetics, biodiversity, energy security, soil formation, adaptability to climate change, and water, nutrient, and pesticide management. The results of this study indicate that willow provides critical ecosystem services on local, regional, and national scales beyond the provisioning of biomass. This research will provide decision makers operating on local, regional, and national scales with the quantitative and qualitative information necessary to evaluate the environmental impacts of transitioning to shrub willow within the context of varying policy goals.

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