Unique **revegetation** challenges and opportunities exist with **converting farmland** for solar development

Revegetation Considerations when Converting Farmland for Solar Development

Main Author: Carla DeMasters, MS, CERP

Co-Authors: Michael Van Laeken, Alisa Baadsgaard, Kate Tillotson-Chavez, Allison Bryant

Key Takeaways

- Solar PV power potential greatest over croplands[1]
- A critical consideration in site land use history is revegetation planning
- Soil testing is vital to understand existing conditions and inform planning
- Additional site preparation likely needed
- Land condition can improve over time

Former cropland recently revegetated with diverse perennial vegetation.

Site Preparation

- Utilize conservation tillage to reduce soil disturbance, conserve soil moisture[2]
- If needed, decompact soils, or plant deep-rooted perennials to break up compacted soils/plow pan
- Plant cover crops prior to revegetation to control weeds, build soil organic carbon (SOC) and jump start nutrient cycling[3]
- Mulch to retain moisture and assist seedling germination and growth
- Limit fertilizers/use organic slow-release fertilizers to inhibit the establishment of noxious weeds or invasive species.

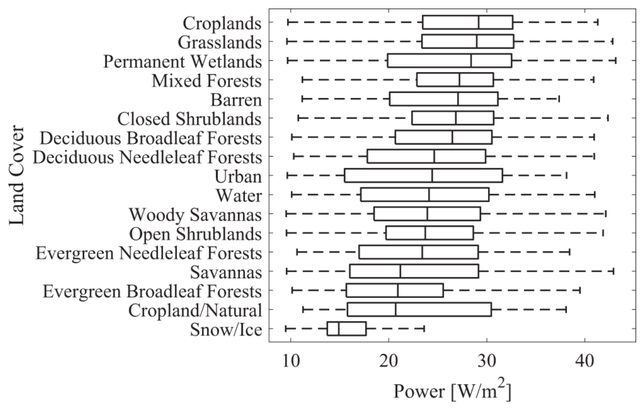

Figure 3 from Adeh et al. (2019)[1] "Solar power potential ranked by land cover classification. The centerlines, box height, and extended lines represent the median, the interquartile range and the full extent of the data, respectively. Boxes are colored by the underlying mean efficiency." Note the top three are croplands, grasslands and wetlands. Cropland/natural is a vegetation mosaic.

Opportunities

- Increases to soil organic carbon through reduced tillage and perennial vegetation[3,4]
- Increases to soil nutrients (nitrogen) through planting nitrogen-fixing species
- Improved land condition over time (increased biodiversity, reduced runoff, and increased nutrient retention[4])
- Opportunities magnified on abandoned farmland (versus productive farmland)[5]

References

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Contact Info

cdemasters@west-inc.com; mvanlaeken@west-inc.com

Effects of Cultivation

- Reduced soil organic carbon[6]
- Altered soil microbial communities[6]
- Compaction (bulk density)[6]

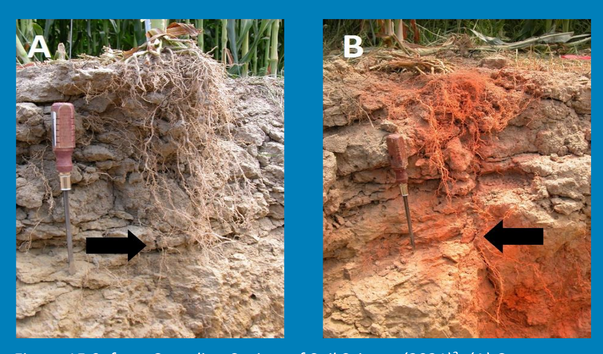

Figure 15.9. from Canadian Society of Soil Science (2021)[2]. (A) Corn roots are restricted from growing beyond the compacted layer (indicated by the arrow) preventing roots from accessing water and nutrients deeper in the soil profile. (B) Corn roots (painted orange) are able to grow through the layer of soil compaction because deep tillage with a chisel plow created a crack through the compaction layer (indicated by the arrow) enabling roots to grow deeper into the soil profile. © Yvonne Lawley, UManitoba.

- Reduced water-holding capacity and increased infiltration rate[6]
- Accelerated nutrient cycling and nutrient loss[6]
- Weedy annuals in seed bank[7]
- Herbicide resistance, e.g., Palmer amaranth
- Residual fertilizers/herbicides[7]

Palmer amaranth.
Ross Recker, UW-Madison, Bugwood.org

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