

Thoughtful Landscapes in a Changing World EnviroTech 2019

Fred Rozumalski Landscape Architect/Ecologist Barr Engineering Company



Alberta's strengthening impacts of climate change are stressing landscapes

- Decline in severity and frequency of extreme cold
- Extreme rainfall events
- Heavy snowfalls
- Heat waves
- Drought



THE MOST COMPREHENSIVE PLAN EVER PROPOSED TO RFVFRSF GINRAI WA PAHI HAWKEN RY

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Project Drawdown, 100 Most Substantive Solutions to Reversing Global Warming by 2050

www.projectdrawdown.com

TOP 20, Land Use

- 1. Refrigeration
- 2. Wind Turbines (offshore)
- 3. Reduced Food Waste
- 4. Plant Rich Diet
- 5. Tropical Forests
- 6. Educating girls
- 7. Family Planning
- 8. Solar Farms
- 9. Silvopasture
- 10. Rooftop Solar

- 11. Regenerative Agriculture
- 12. Temperate Forest
- 13. Peatlands
- 14. Tropical Staple Tree Crops
- 15. Afforestation
- 16. Conservation Agriculture
- 17. Tree intercropping
- 18. Geothermal
- 19. Managed Grazing
- 20. Nuclear

TOP 20, Food

- 1. Refrigeration
- 2. Wind Turbines (offshore)
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Landscape Goals

- 1. Reduce/eliminate the burning of fossil fuels
- 2. Sequester carbon through photosynthesis
- 3. Bolster plant resilience

How?

- Regenerate the soil
- Capture and conserve water
- Plant a diversity of resilient plants
- Implement adaptive management

Build and maintain soil structure.



Pedons















Gabe Brown Farm, Bismarck, ND Water Infiltration Test Results

1995 – one inch/hour



Gabe Brown Farm, Bismarck, ND Water Infiltration Test Results

- 1995 one inch/hour
- 2015 one inch in 9 seconds



Gabe Brown Farm, Bismarck, ND Water Infiltration Test Results

- 1995 one inch/hour
- 2015 one inch in 9 seconds
 - second inch in another 16 seconds



Decline of Dietary Mineral in Vegetables Since 1950s

A 2004 <u>study</u> evaluated U.S. Department of Agriculture data for 43 garden crops from 1950 to 1999. The researchers found statistically reliable declines for six nutrients — protein, calcium, potassium, iron and vitamins B2 and C — but no change for seven others.

- Calcium down 45%
- Iron down 26-50%
- Magnesium down 10-24%
- Potassium down 16%

Five Principles of Soil Health 1. Limit Disturbance





Five Principles of Soil Health

2. Keep soil covered at all times







Five Principles of Soil Health 3. Strive for a diversity of plants and animals



Five Principles of Soil Health

3. Strive for a diversity of plants and animals





Root System of Corn 8 Weeks Old Grid equals one-square-foot boxes.

Source: *Root Development of Vegetable Crops*, by John Weaver & Wm. Bruner. 1927



Root System of Mature Corn Plant

Five Principles of Soil Health

4. Maintain a living root system as long as possible throughout the year



Five Principles of Soil Health 5. Integrate animals





Capture & Conserve Water

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10% Evapotranspiration

20% Infiltration

30% Evapotranspiration

60% Infiltration

Path to Water Wisdom

- Build soil structure
- Plant areas of *unused* lawn with alternative plantings
- Contour the landscape to catch water
- Reduce the footprint of hard surfaces
- Plant the right plant in the right place
- Mulch

Reduce Hard Surfaces

Mulch :

To prevent erosion To enhance water percolation To retain moisture and nutrients To keep soil cool

Image Source: Gaia's Garden; A Guide to Home-Scale Permaculture, by Toby Hemenway

Image Source: Gaia's Garden; A Guide to Home-Scale Permaculture, by Toby Hemenway

Eliminate Unused Lawn

Image from the Metropolitan Design Center Image Bank. © Regents of the University of Minnesota. All rights reserved. Used with permission.

Plant the right plant in the right place.

City of Minnetonka, MN, City Hall

City of Minnetonka, MN, City Hall

Northland College, Ashland, WI

Plan for adaptive management.

Conclusion

What to do in landscapes that become hotter, drier, more windy, with less frequent but more intense rain fall?

Regenerate the soil
Capture and conserve water
Plant a diversity of resilient plants

Reduce lawn

- Practice adaptive management

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