Landscape Resiliency Toolbox

Strategies and Tools to Increase Resiliency to Climate Change and other Stressors

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Protecting and restoring landscapes that are resilient to climate change and other stressors has becoming increasingly important.   The following strategies outline ways we can develop projects that provide important landscape functions and services now and into the future. These strategies borrow from the disciplines of conservation, ecological restoration, landscape ecology, and sustainable farming and are key methods for planning, designing and managing landscapes that withstand both changing land use practices and extreme weather conditions.

Planning

1) Practicing Strategic Site Protection/Selection - Work with project partners to identify the prairie, forest, wetland and aquatic landscapes that are in greatest need of protection and restoration based on resource needs and ecological function. This may involves restoring habitat complexes or buffering key water resources to restore natural cycles and plant and animal populations.

2) Minimizing Landscape Stressors – Investigate opportunities to improve environmental conditions throughout watersheds . Site projects in locations where ecological stressors such as flooding, decreasing water tables, or invasive species will not significantly detract from key functions into the future.

3) Making Landscape Connections - Establish strong connections across landscapes. Create habitat and genetic dispersal corridors and decrease landscape fragmentation. Also create networks of conservation practices in agricultural areas. Pulling together important remnants plays a key role in restoring landscape resiliency and providing refuge for wildlife species.

Design

4) Maximizing Ecological Function - Be strategic in the selection of primary and secondary project goals. Be selective in making certain functions a priority, but remember that multiple functions including wildlife habitat, plant diversity, food production, stormwater treatment, soil quality and nutrient cycling can often be accomplished at once.

5) Matching Plant Communities to the Site - Match targeted vegetation to the native plant community that best fit site conditions. Also restore natural hydrologic regimes to aquatic and wetland systems. Historic plant community information can be used as a guide for decision making. Determine the kinds of native wildlife that can benefit from the project and include native plants that will provide food and shelter for many animal species.

6) Restoring and Maintaining Diversity – Plant diversity supports wildlife species and increases resiliency by helping plant communities continue to function as intact systems during climate variation. Filling niches by planting native species also prevents the establishment of invasive species. In addition to plant species diversity protect genetic diversity of individual plant species by using site appropriate sources that can adapt to future conditions. Diverse state seed mixes are available for a variety of project types and the Minnesota Wetland Restoration Guide summarizes restoration strategies for uplands and wetlands.

7) Providing Habitat for Pollinators and other Beneficial Organisms - Pollinators and other insects and organisms play an essential role in supporting ecosystems. Pollinators provide seeds and fruits that are relied on by a wide range of wildlife by pollinating around 70% of flowering plant. Support insect and soil microbes and other organisms that support ecosystems by minimizing pesticide use, buffering natural areas and diverse plantings from pesticide exposure, restoring habitat complexes and wide natural corridors, increasing plant diversity, and restoring clean water sources.

8) Guiding Effective Water Management, Treatment and Use - Implement a variety of practices such as perennial crops, conservation tillage, conservation drainage, cover crops, buffer strips, infiltration basins, raingardens and wetland restoration to manage water resources. Incorporate these practices in urban and rural landscapes to reduce runoff, recharge groundwater, maintain agricultural productivity, improve water quality, and reduce flooding. Promote the wise use of water resources and the use of catchment systems to help ensure adequate supplies into the future.

9) Preserving and Restoring Soil Health – Use cover crops and perennial vegetation in degraded soils to promote good soil structure, organic content and microorganism populations that translate into healthy soils that promote productive ecological and agricultural landscapes.

10) Working with Ecological Adaptation - Natural plant communities have the ability to adapt and develop a natural dynamic though genetic adaptation, succession and natural colonization. Promote these processes to provide desired ecological functions, and buffer the community during future changes in climate and associated disturbance. Use assisted colonization as needed to help maintain plant community integrity in plant communities.

11) Promoting Natural Disturbance - Restore natural disturbances that sustain specific natural plant communities such as prescribed fire, conservation grazing and hydrologic variation. These disturbances play a key role in maintaining diversity as well as plant community structure and wildlife use.

12) Managing Invasive Species Across Boundaries – Invasive species are effective at dispersal, giving them an advantage in adapting to climate change. Plan to work in partnerships and manage invasive species across ownership boundaries to restore resilient landscapes.

13) Practicing Adaptive Management – Adjust management practices based on monitoring efforts and experience with successes and failures to improve the long-term effectiveness of management practices and resiliency of plant communities. Practices such as prescribed burning, water level management and prescribed grazing and haying may replicate natural disturbances and promote diversity and resiliency

14) Learning from Front Line Experience - Information about project successes and innovative practices is valuable. What practices provide the most benefits in our landscapes? What common activities are not worth the cost or make a problem worse? BWSR's "What's Working" information collects practitioner information about real-world outcomes.

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