Healthy Forests for our Future

Management Practices to Increase Forest Carbon Storage and Resilience

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American Forest Foundation

Family Forest Carbon Program

The Nature Conservancy

Mission

To conserve the lands and waters upon which all life depends.

Non-profit founded in 1951

TNC in New York

127 preserves, ~660,000 acres conserved

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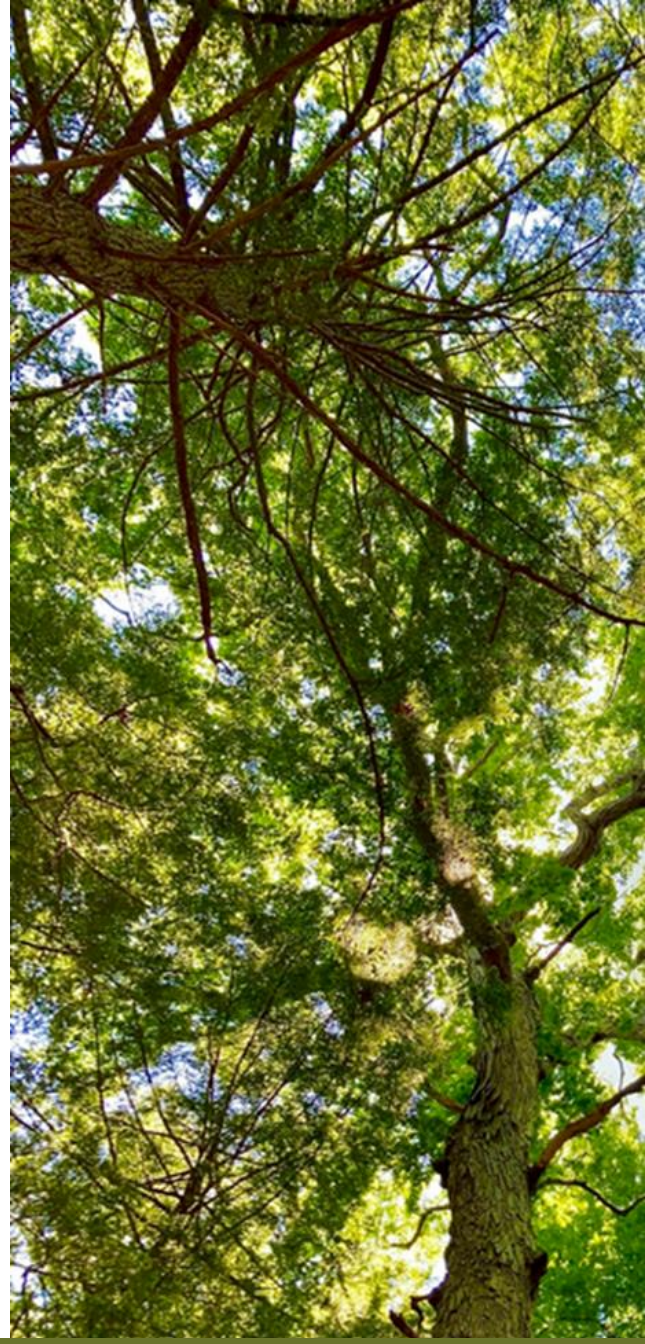
Overview

1. **Natural Climate Solutions**
2. **Climate Informed Forestry**
   - How is forest carbon sequestered and stored?
   - Attributes of forest health and resilience
3. **Practices to increase forest carbon storage and heath**
   - How the practices were developed
   - List of 10 practices
4. **Forest Carbon Markets**



Natural Climate Solutions

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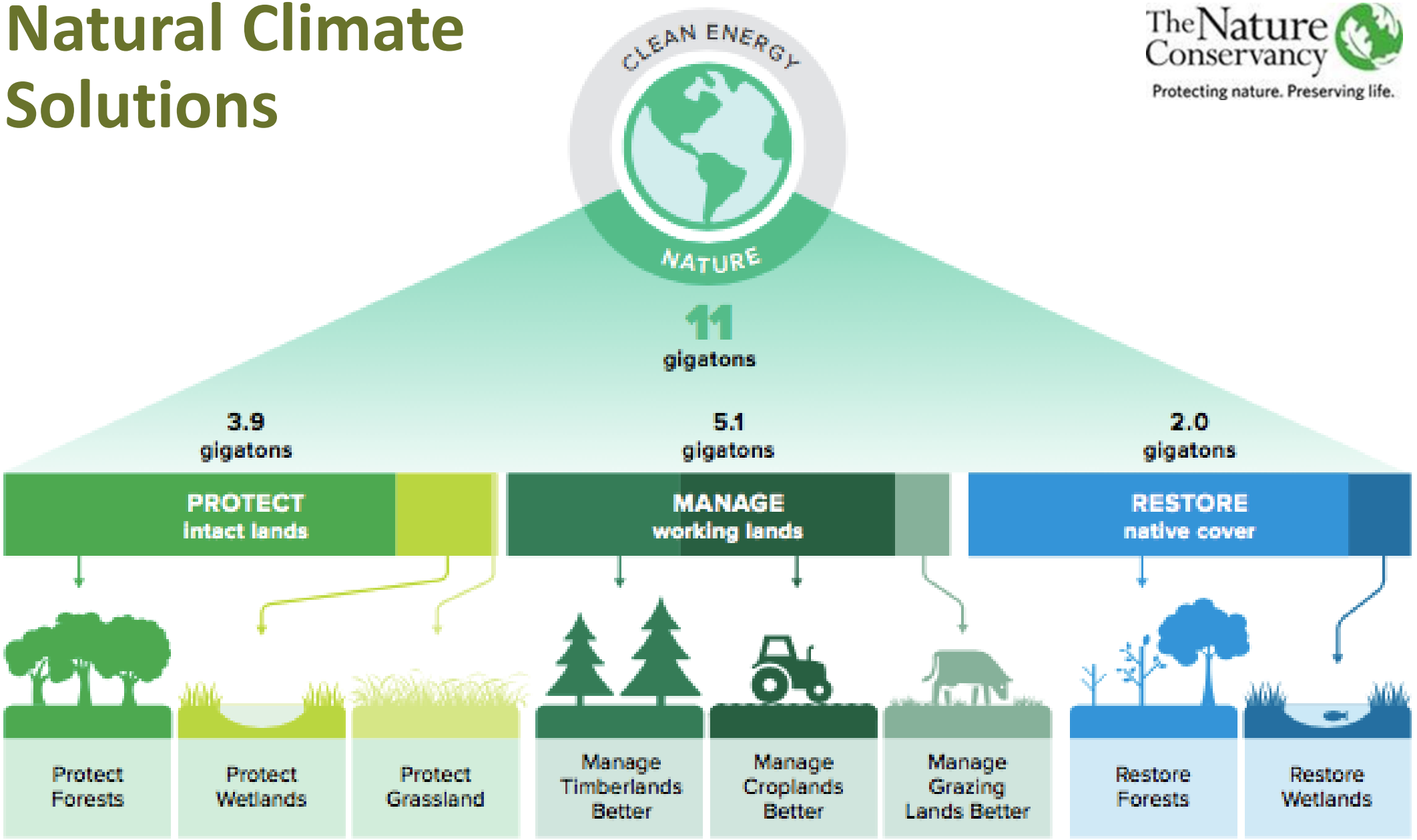
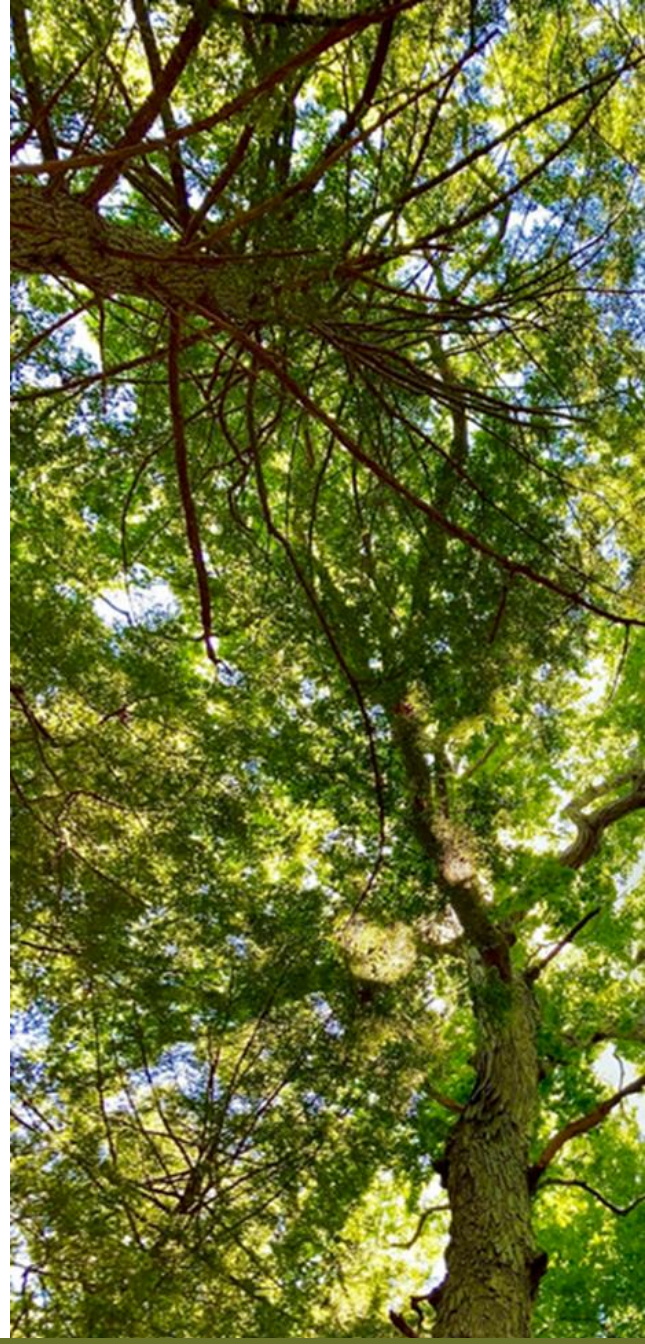


(Griscom et al., 2019 and Griscom, et al., 2020. Graphics from the Nature Conservancy Magazine.)

What is Climate-Smart (Informed) Forestry?

Strategies or management actions that:

1. Increase the carbon storage and sequestration;
2. Increases forest health and resilience



Forest Carbon

Carbon Storage

Amount of carbon that is retained in a carbon pool within a forest

- Increases with age
- Typically peaks in NE forests at 200 years old

Carbon Sequestration

Process of removing carbon from the atmosphere for use in photosynthesis, resulting in maintenance and growth of plants and trees

- Rate changes over time, but continues through entire lifespan of a forest
- Typically peaks in young to intermediate aged forest (30 – 70 years old)

Where is Carbon Stored in a Forest?

A forest stores carbon in different pools, and the amount of carbon in these pools changes over time.

Five Forest Carbon Pools

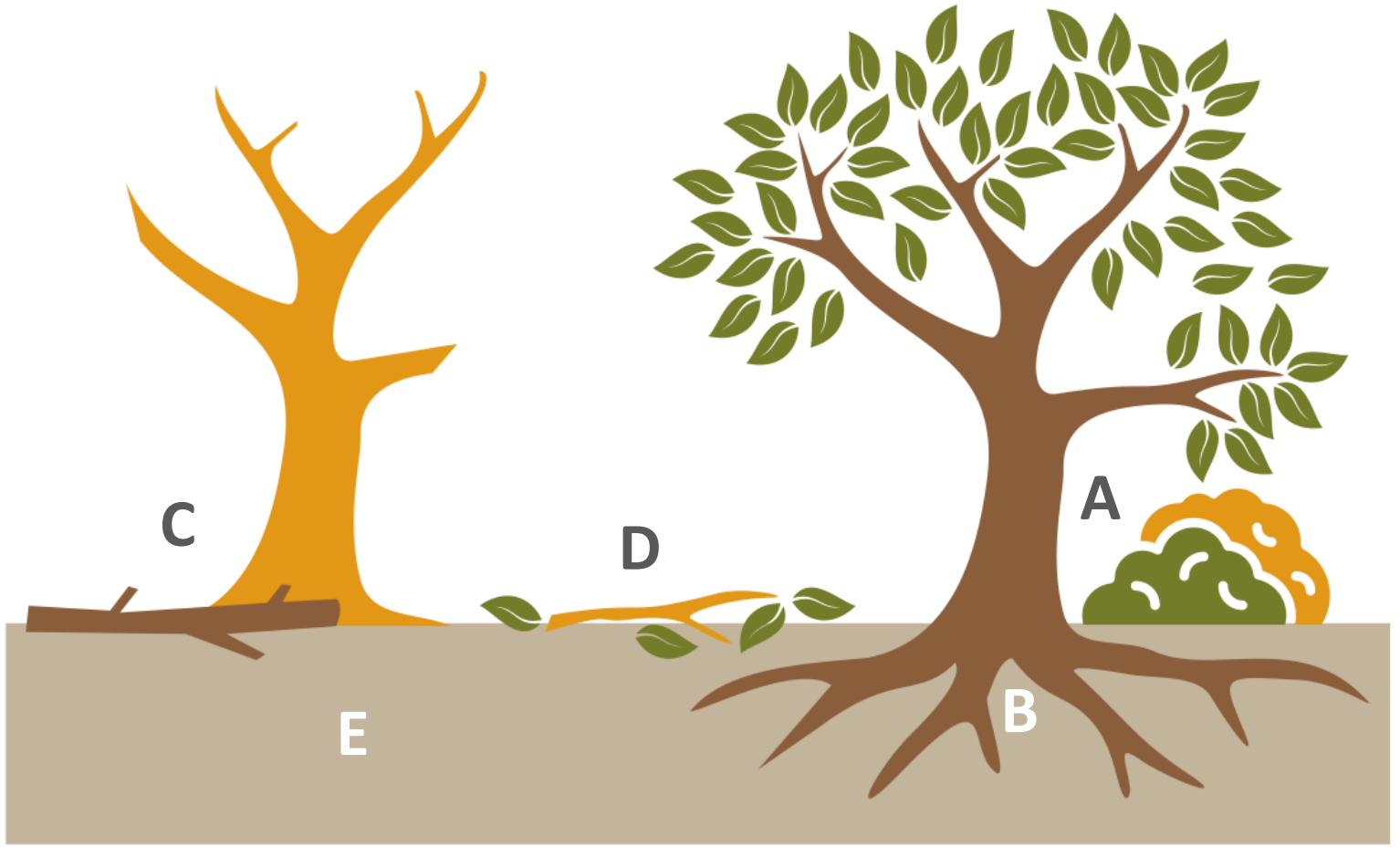
A. **Live above ground** (trees, shrubs and other plants)

B. **Live below ground** (roots)

C. **Deadwood** (standing down trees and dead logs)

D. **Litter** (leaves, needles, and small branches)

E. **Soil Organic Matter** (plant material and insects)



Carbon Storage in Harvested Wood Products

Carbon that trees stored during their lifetime continues to be stored in their wood *even after trees are harvested.*

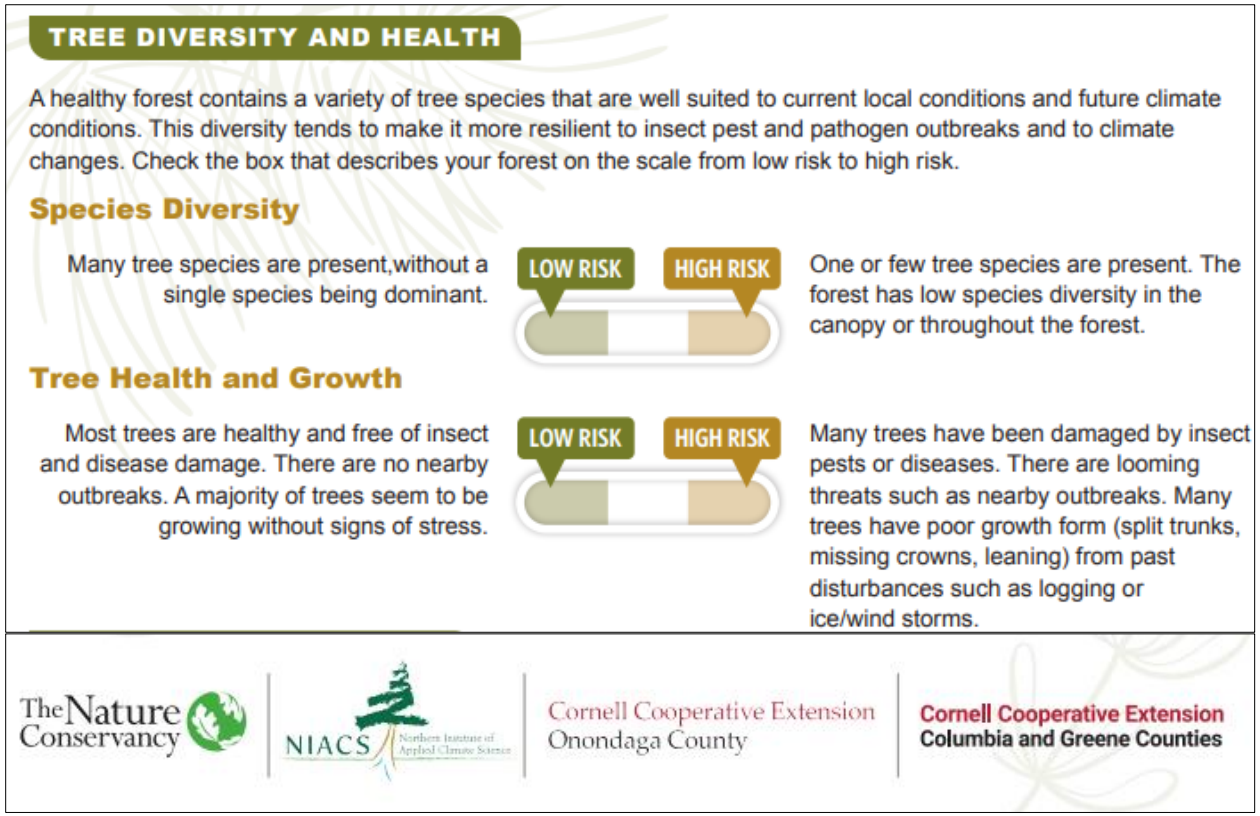
Forest Health and Resilience

Increasing Forest Resiliency
for an Uncertain Future

Paul Catanzaro | Anthony D'Amato | Emily Silver Huff

The capacity of a forest to respond to a disturbance by resisting damage or stress and recovering quickly.

Forest Health Survey Tool



TREE DIVERSITY AND HEALTH

A healthy forest contains a variety of tree species that are well suited to current local conditions and future climate conditions. This diversity tends to make it more resilient to insect pest and pathogen outbreaks and to climate changes. Check the box that describes your forest on the scale from low risk to high risk.

Species Diversity

Many tree species are present,without a single species being dominant.

LOW RISK HIGH RISK

One or few tree species are present. The forest has low species diversity in the canopy or throughout the forest.

Tree Health and Growth

Most trees are healthy and free of insect and disease damage. There are no nearby outbreaks. A majority of trees seem to be growing without signs of stress.

LOW RISK HIGH RISK

Many trees have been damaged by insect pests or diseases. There are looming threats such as nearby outbreaks. Many trees have poor growth form (split trunks, missing crowns, leaning) from past disturbances such as logging or ice/wind storms.

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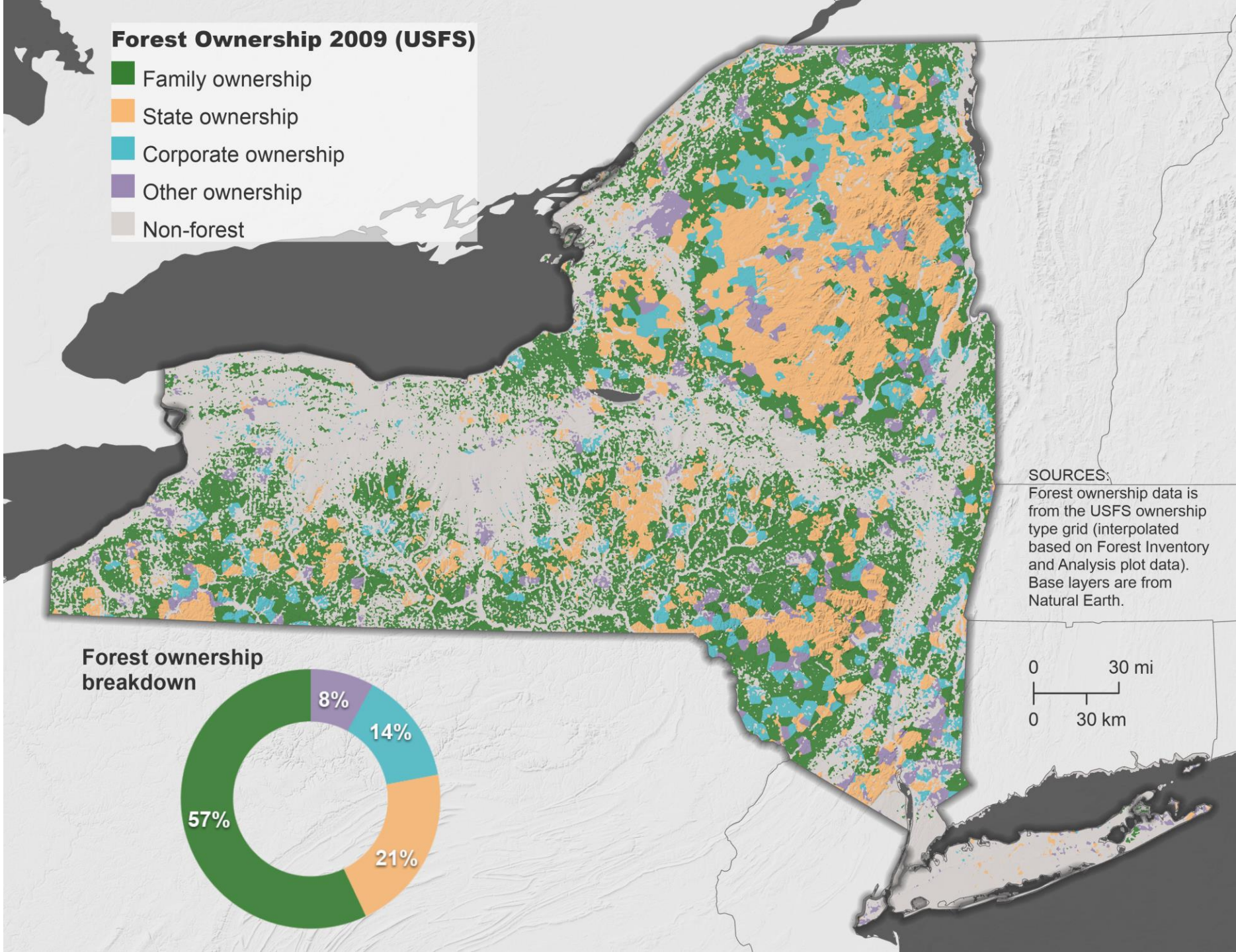
Attributes of Forest Healthy and Resilience

1. Forest is well connected
2. Minimal Forest Stress
   a. Impacts from pest and pathogens low
   b. Invasive plants absent or low density
   c. Deer impacts low
3. Diversity of Tree Sizes and Species
4. Ample Tree Regeneration

Figure @ Restoring Old-Growth Forest Characteristics

Forest Ownership in NYS



Healthy Forests for our Future:

A Management Guide to Increase Carbon Storage in Northeast Forests

How We Developed the Practices

ONE

Scientific Literature Review

TWO

Consideration of Regional Context and Forest Carbon Modeling

THREE

Evaluation & Refinement by a Team of Experts

Ten Climate-Smart Forest Management Practices

Purpose

Enable landowners and foresters to make climate-smart decisions

Contents

10 forestry practices to:

- Increase or maintain carbon stored in the forest within 20 years, in order to…
- Build the forests' ability to 'bounce back' from climate change impacts

Protect forests

1. Avoid forest loss

Grow new trees and forests

2. Green developed areas
3. Reforest
4. Plant trees to increase forest stocking

Reduce stressors

5. Remove invasive vegetation
6. Protect seedlings and saplings from deer browse

Manage forests

7. Establish forest reserves
8. Increase time between harvests
9. Create gaps to promote regeneration
10. Retain more carbon in a thinning

Plant Trees to Establish New Forest

Description

Returns tree cover to areas that were historically forested.

Carbon Benefits

Substantial sequestration after establishment

Wildlife Benefits

Food source (acorns, etc)

Increase Time Between Harvest

Description

Extended rotation for 20 years.

Carbon Benefits

Promotes the growth of large trees and increases the amount of carbon stored.

Wildlife Benefits

Grows large-diameter trees, snags, and large downed logs.

Create Gaps to Promote Regeneration

Description

- Group selection harvest that create canopy gaps covering less than 20% of stand.
- Retain 4 large trees per acre, tops, snags, and dead wood.

Carbon benefits

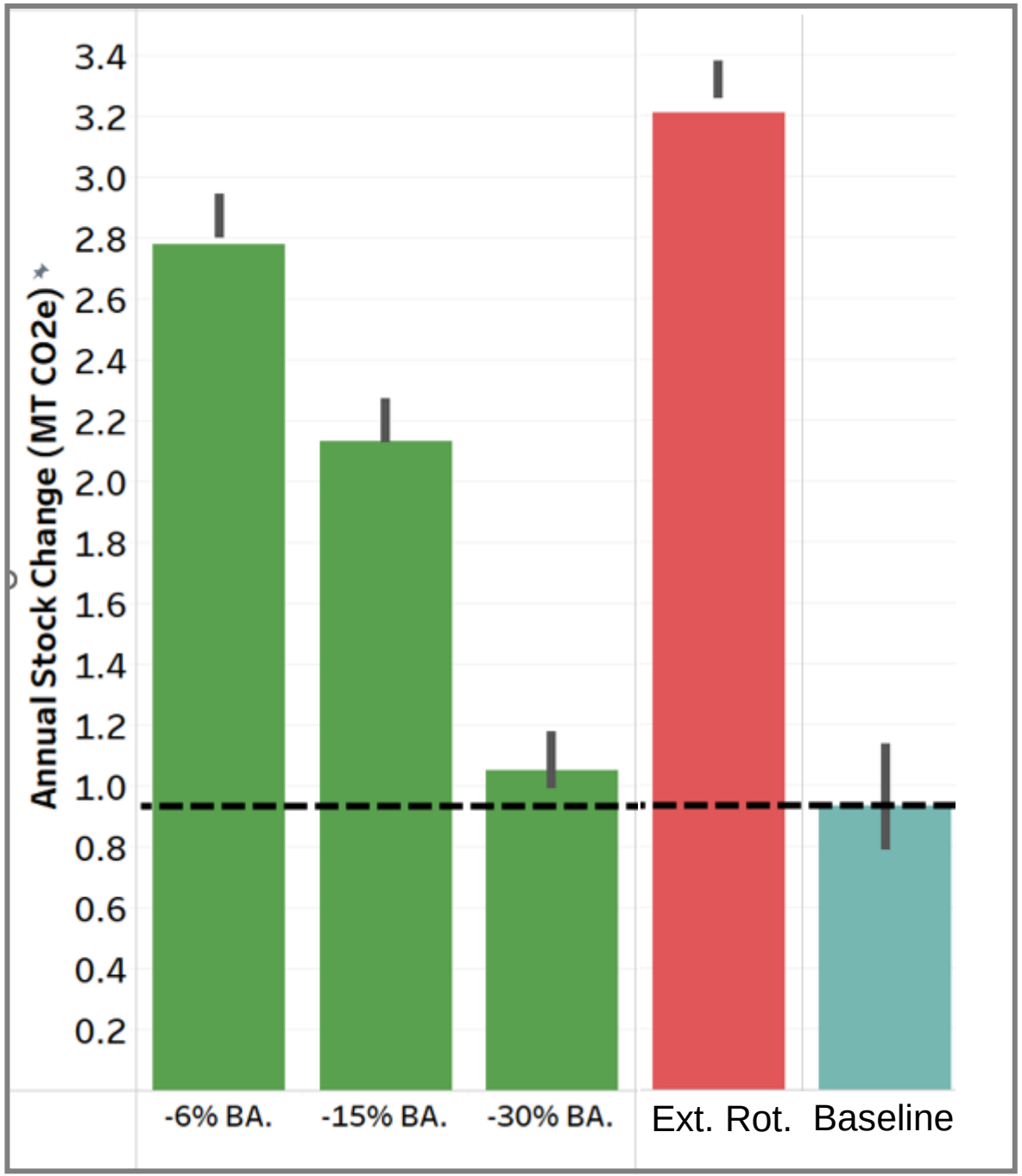
- Short-term decrease in forest carbon stocks, but carbon stocks recover in 20 years.
- Storage in long lived forest products.

Wildlife benefits

- Increases structural complexity which provides habitat for many bird and wildlife species.

Modeled Forest Carbon Benefit

- 284 FIA Plots in Northern Appalachia region (VT, NY, NH, MA) (M221)
- Maple/Beech/Birch Forest Type
- Baseline – mean stock change over 20 years
- Model in Forest Vegetation Simulator (FVS)



SIG Carbon

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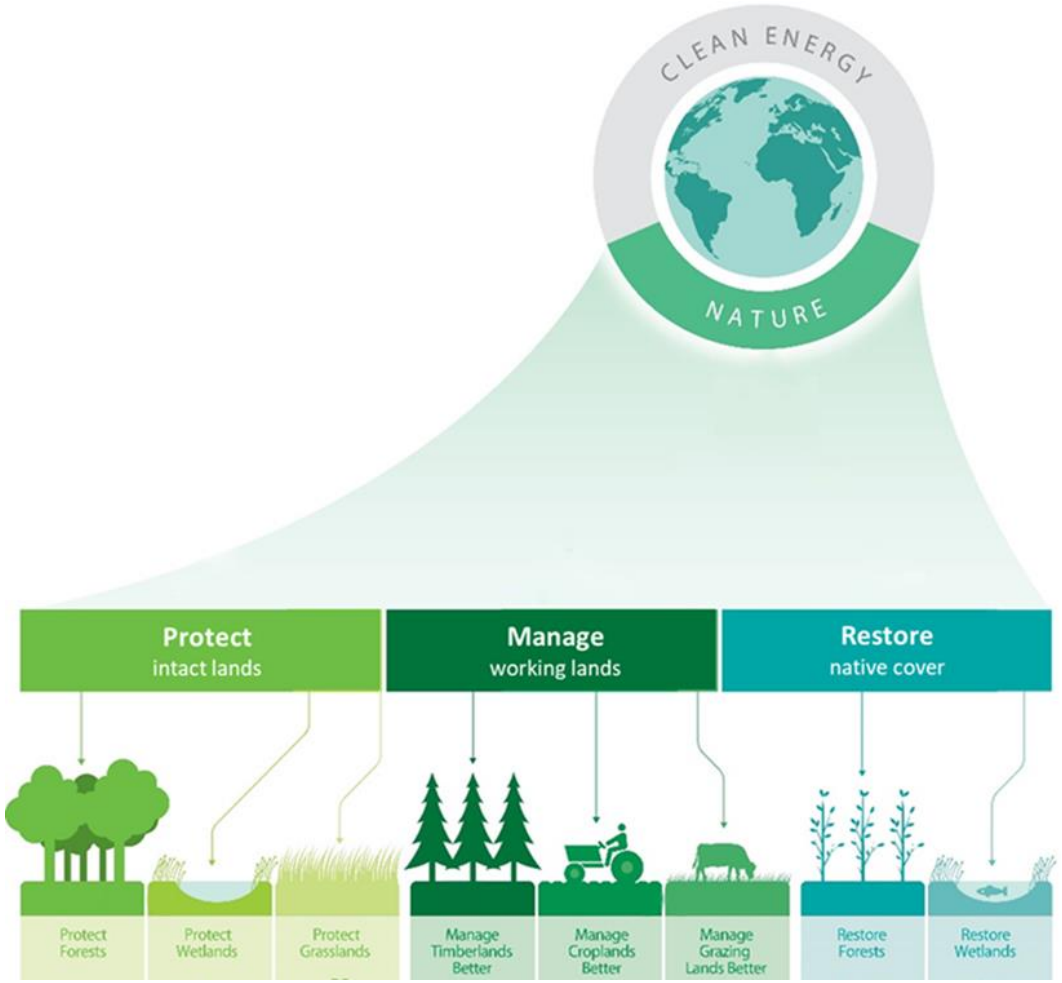
Forest Carbon Markets

Carbon markets are designed to incentivize good management and increased sequestration and storage



What is a forest carbon offset?

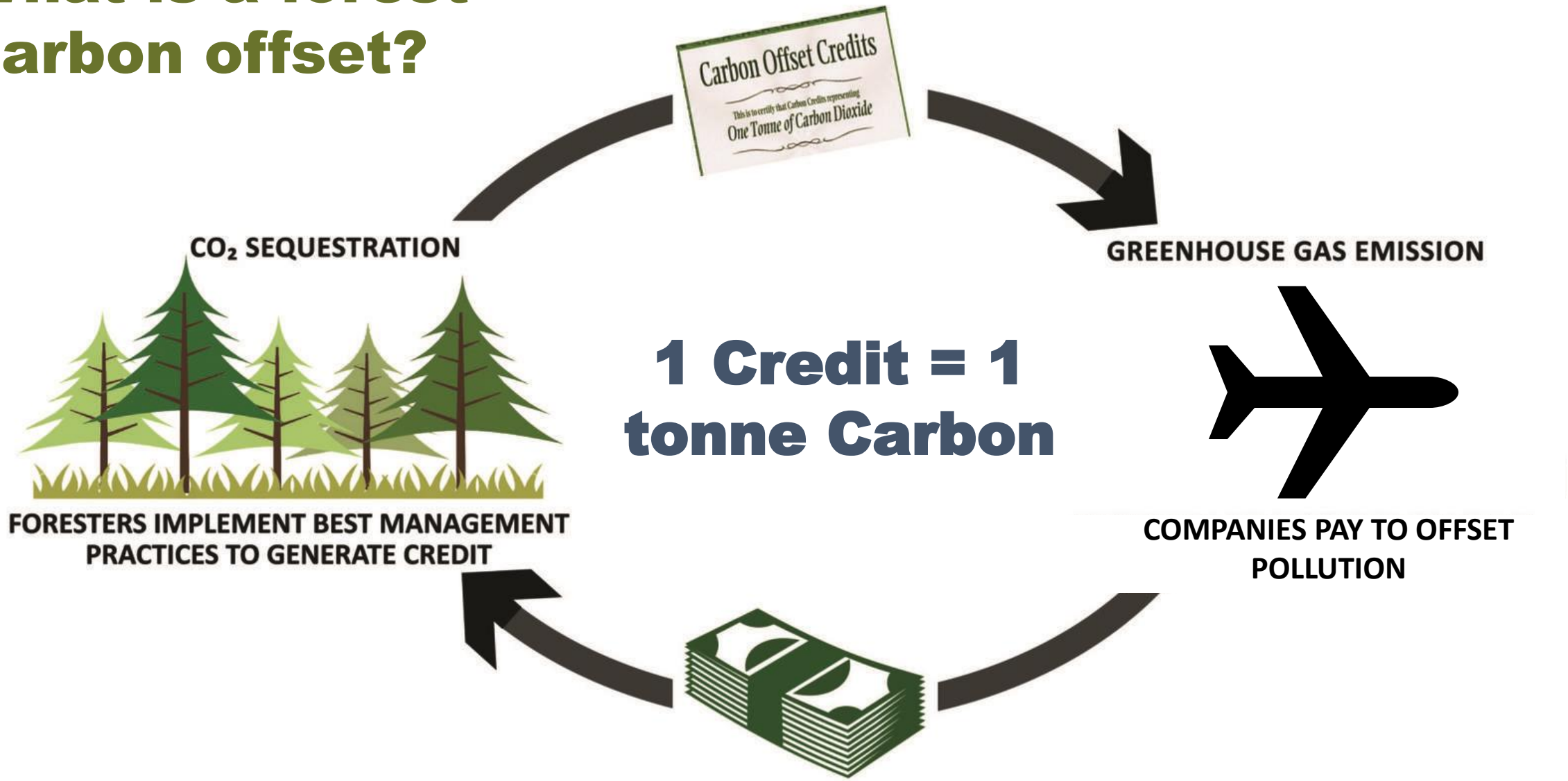


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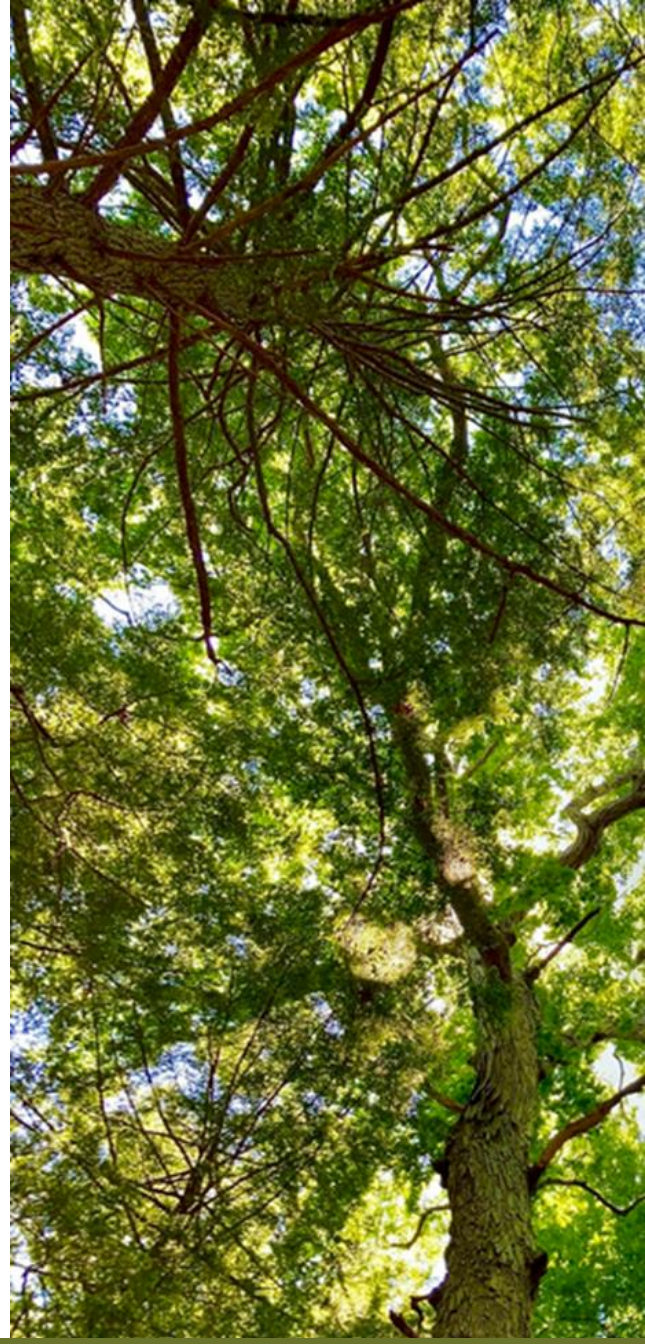
Image credit: South Carolina Audubon Society

Forest Carbon Programs for Family Forest Landowners

	Program administrator	Minimum acres	Registry	Methodology	Project duration	Revenue	Notes
Family Forest Carbon Program	American Forest Foundation	>30 ac	Verra	Improved forest management with dynamic baseline	20 years	$200 - $300 per acre over the course of 20 years	Provides a forest management plan to landowners; compatible with easements
Forest Carbon Works	Chestnut Carbon	>40 ac	Verra	Improved Forest Management	125 years	$10/ac for first 25 years	Requires FSC and ATFS certification to harvest
CORE Carbon	Finite Carbon	>40 ac	-	-	-	-	Not yet available in NY

Concluding Thoughts

1. Climate informed (smart) forest management
2. Healthy Forests for our Future: Management Guide provides a range of practices.
3. Forest carbon markets part of the solution.
4. The Family Forest Carbon Program provides opportunity for landowner to:
    - Support landowner's goals
    - Improve forest health
    - Address climate change



Questions?

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