



Design with Nature for Cape Cod and the Islands

Jack Ahern
Landscape Architect, UMass Amherst

- Today's Main themes

Cape and Islands are distinctive landscapes under multiple stresses

Conventional landscape practices can be criticized, but.....can also be part of an environmental solution

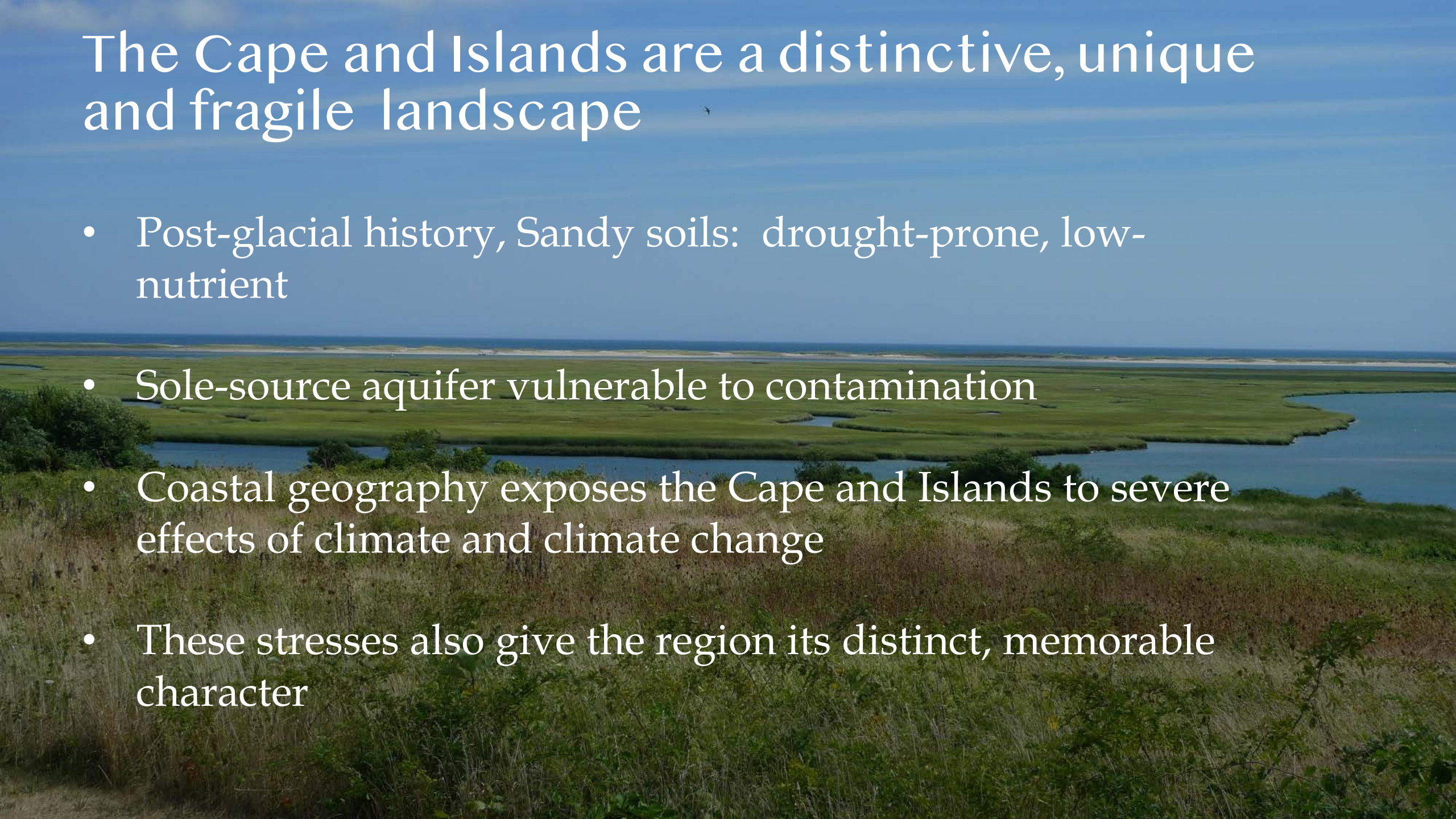
Ecological design presents an alternative approach – and can be beautiful through the seasons!

Keep the Cape and Islands, beautiful and healthy!



The Cape and Islands are a distinctive, unique and fragile landscape

- Post-glacial history, Sandy soils: drought-prone, low-nutrient
- Sole-source aquifer vulnerable to contamination
- Coastal geography exposes the Cape and Islands to severe effects of climate and climate change
- These stresses also give the region its distinct, memorable character



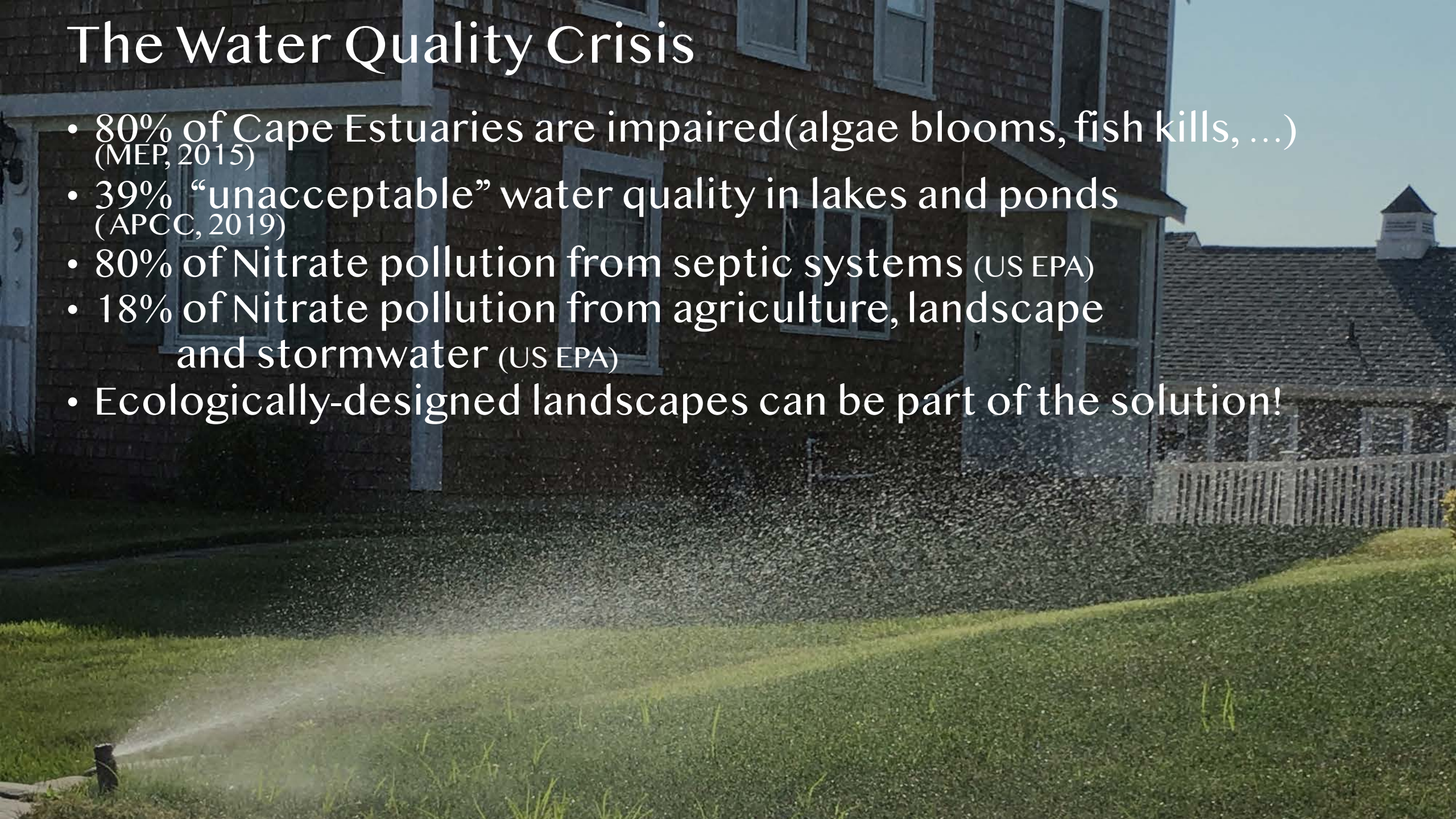


Issues with Conventional Landscape Design on the Cape and Islands

- Generic Plants “can be anywhere”
- Not well-adapted to inherent “stressful” conditions
- Rely on un-sustainable horticultural “props”
- The water quality crisis
- Displace native ecosystems and plant communities

The Water Quality Crisis

- 80% of Cape Estuaries are impaired (algae blooms, fish kills, ...) (MEP, 2015)
- 39% “unacceptable” water quality in lakes and ponds (APCC, 2019)
- 80% of Nitrate pollution from septic systems (US EPA)
- 18% of Nitrate pollution from agriculture, landscape and stormwater (US EPA)
- Ecologically-designed landscapes can be part of the solution!



Ecological Landscape Design

- Reinforces local landscape character
- Beautiful in all seasons
- Sustainable, water-friendly
- Adapted to environmental extremes
- Net-positive environmental footprint
- Supports local biodiversity



Why are native plants important?

Basis for the food chain

Plants>Insects>Birds

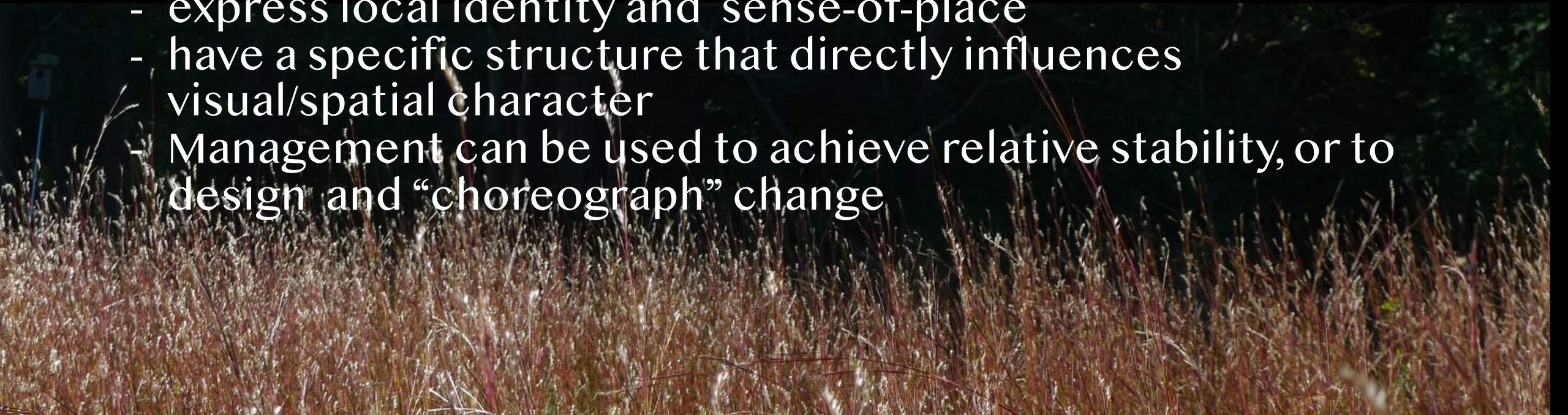
Native insects/Birds are highly selective
“specialists” about what they eat (native plants)



A Plant Community Approach to Landscape Design

Plant communities:

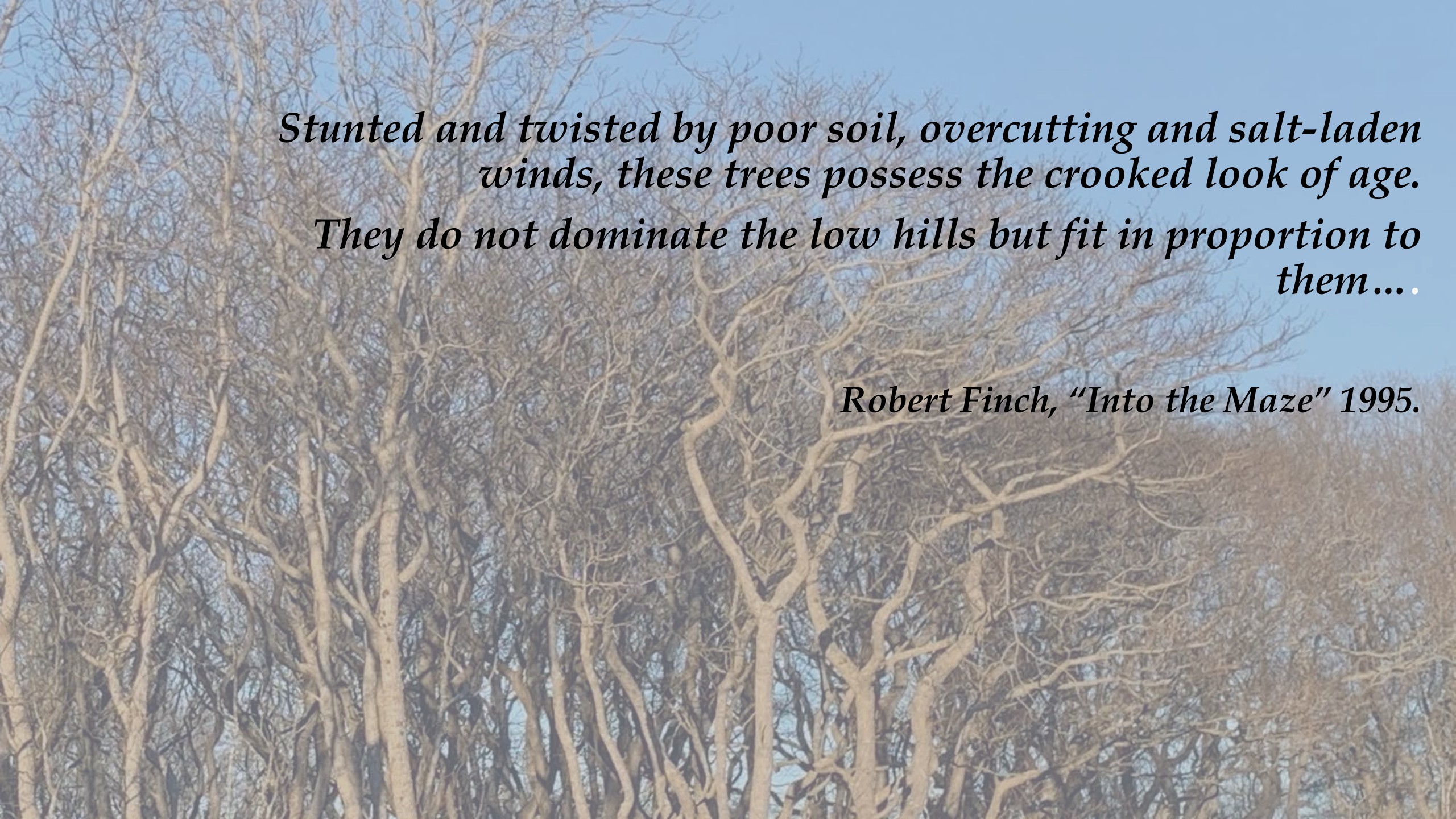
- have evolved with local conditions/species/ecology
- are adapted to specific growing conditions (sun, soil, water, light.....)
- express local identity and sense-of-place
- have a specific structure that directly influences visual/spatial character
- Management can be used to achieve relative stability, or to design and “choreograph” change





*These are the plants that have adapted themselves to the
..... sandy shore.....They are storm-tossed, gale-bent,
weather gnarled.....Exposure is the source of their
significant beauty.*

Edith Roberts, Elsa Rehman. American Plants for American Gardens (1997)

The background of the image is a photograph of a dense forest of bare, gnarled trees. The trees have a twisted, crooked appearance, with many thin, light-brown trunks and branches reaching upwards. The sky is a clear, pale blue. The text is overlaid on the upper right portion of the image.

Stunted and twisted by poor soil, overcutting and salt-laden winds, these trees possess the crooked look of age. They do not dominate the low hills but fit in proportion to them....

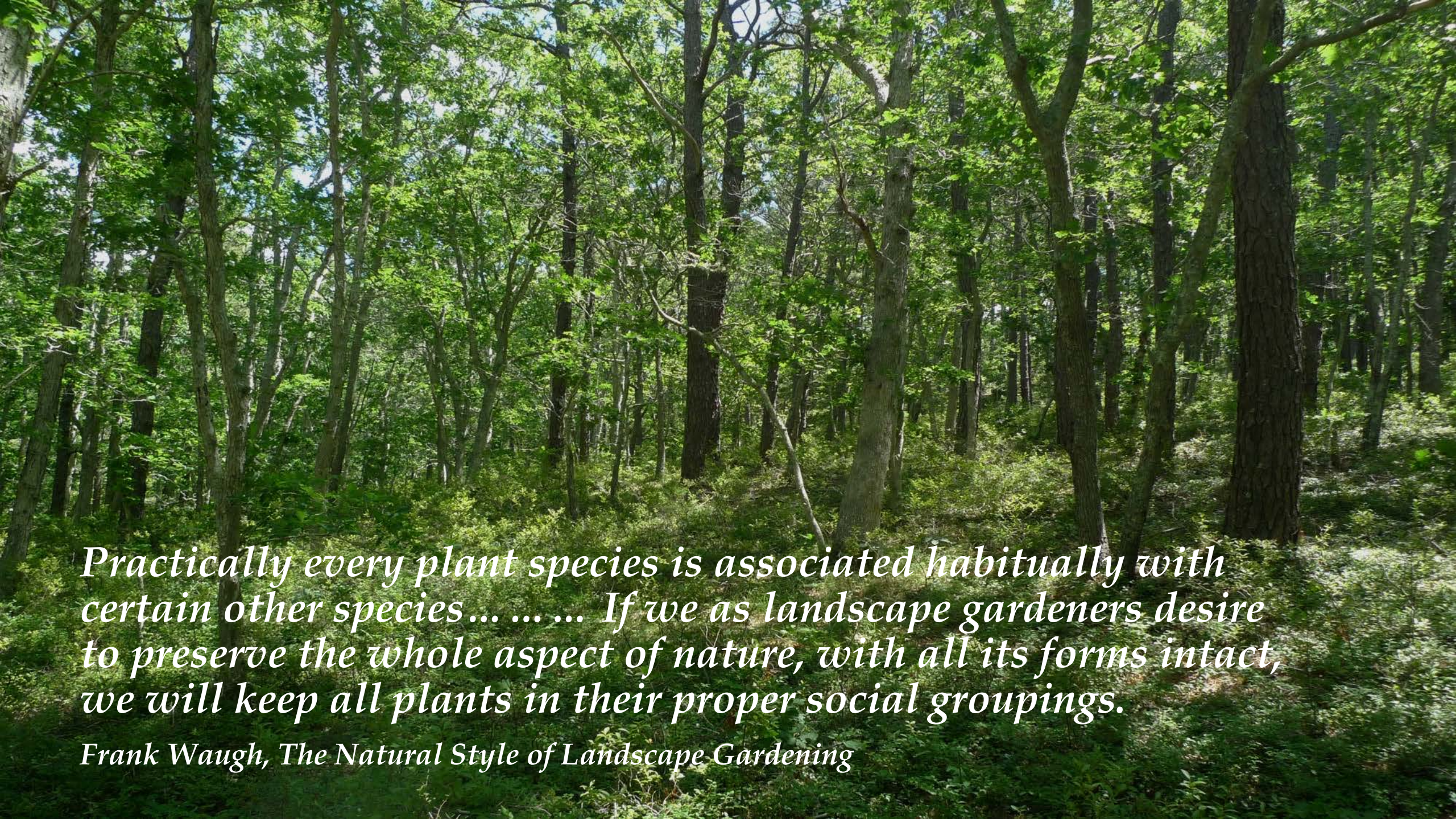
Robert Finch, "Into the Maze" 1995.

Plant Communities

- are the essence of **sustainable landscapes**
- require minimal care/maintenance
- can self-reproduce
- No fertilizing, No irrigation
- Adaptable to future climate conditions (diversity)

Reinforce regional / local landscape character

- Form/scale of landscape
- Color/texture of foliage
- Synchronicity/Phenology (time of bloom, fruit, fall color...)



Practically every plant species is associated habitually with certain other species... .. If we as landscape gardeners desire to preserve the whole aspect of nature, with all its forms intact, we will keep all plants in their proper social groupings.

Frank Waugh, The Natural Style of Landscape Gardening

The background image shows a coastal scene. On the right, a portion of a house with grey shingles and white window frames is visible. A paved path leads from the foreground towards the ocean in the distance. The foreground is filled with dry, brownish grass. The sky is blue with some light clouds.

“Designed” Plant Communities

- a translation of a native plant community into a “familiar” landscape
- “meeting nature halfway”
- Hybrid of design, ecology, and horticulture
- Plants are adapted to environmental conditions and competitive strategies
- Simplify plants or exaggerate natural patterns to make plantings more ordered and legible
- MAY include only native or a mix of native and exotic species

(Paine and West, 2015, p38-41)

How to design with plant communities

- Know your landscape context
- Consider prospective plant communities
(species composition, structure, soil, moisture, sunlight)
- Remember, related populations – not individuals
- Cover the ground. Densely.
- Management not Maintenance



Major Plant Communities of the Cape and Islands

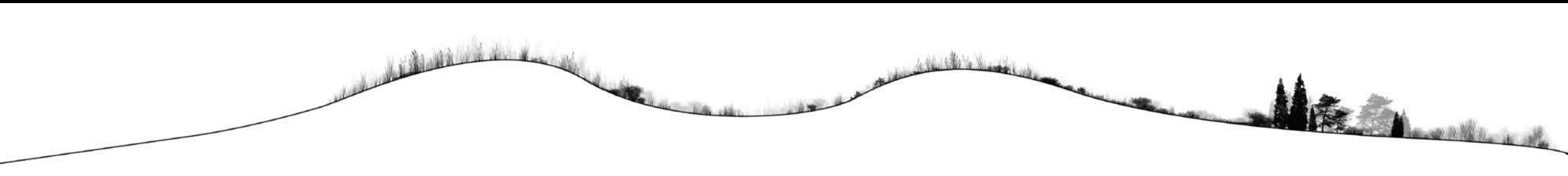
- Dunes
- Sandplain Grasslands/Heathlands
- Maritime Shrublands/Forests
- Pitch Pine Scrub Oak/ Pine Barrens
- Pine Oak Forest
- Coastal Hardwood Forest



Dunes



Dune Community



A photograph of a grassland or heathland. The foreground is filled with tall, thin, light-colored grasses that appear to be blowing in the wind. Several green stems with clusters of small yellow flowers are scattered throughout the grass. The background is a dark, out-of-focus area, possibly a body of water or dense foliage.

Sandplain Grasslands - Heathlands



Sandplain Grasslands - Heathlands





Maritime Shrublands – Forests



Maritime Shrublands – Forests





Pitch Pine - Scrub Oak Forest, Pitch Pine Barrens

Pitch Pine - Scrub Oak Forest, Pitch Pine Barrens







Pine-Oak Forest

Pine-Oak Forest





Coastal Hardwood Forest

Coastal Hardwood Forest



Ecological Landscape Design Toolkit



Plant Community Management (not maintenance)
Gardens are never finished, design evolves with management
expect change, be flexible



Now-mow Fescue Lawn



“Released Lawn”



American Beach Grass

Turf Alternatives



Bearberry



Huckleberry Understory



Lowbush Blueberry (Carlos Montoya)

Turf Alternatives



Hay-scented Fern

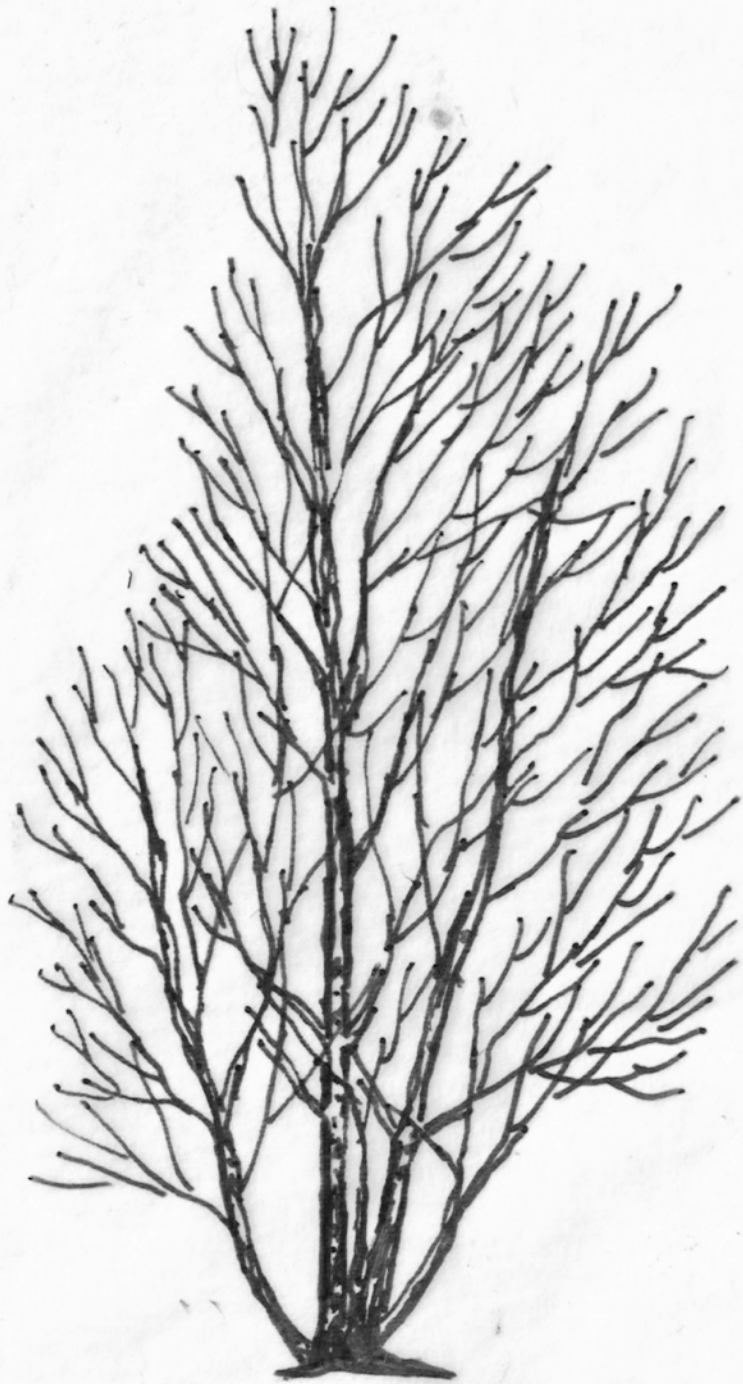


Moss Lawn



Sandplain Grassland (Carlos Montoya)

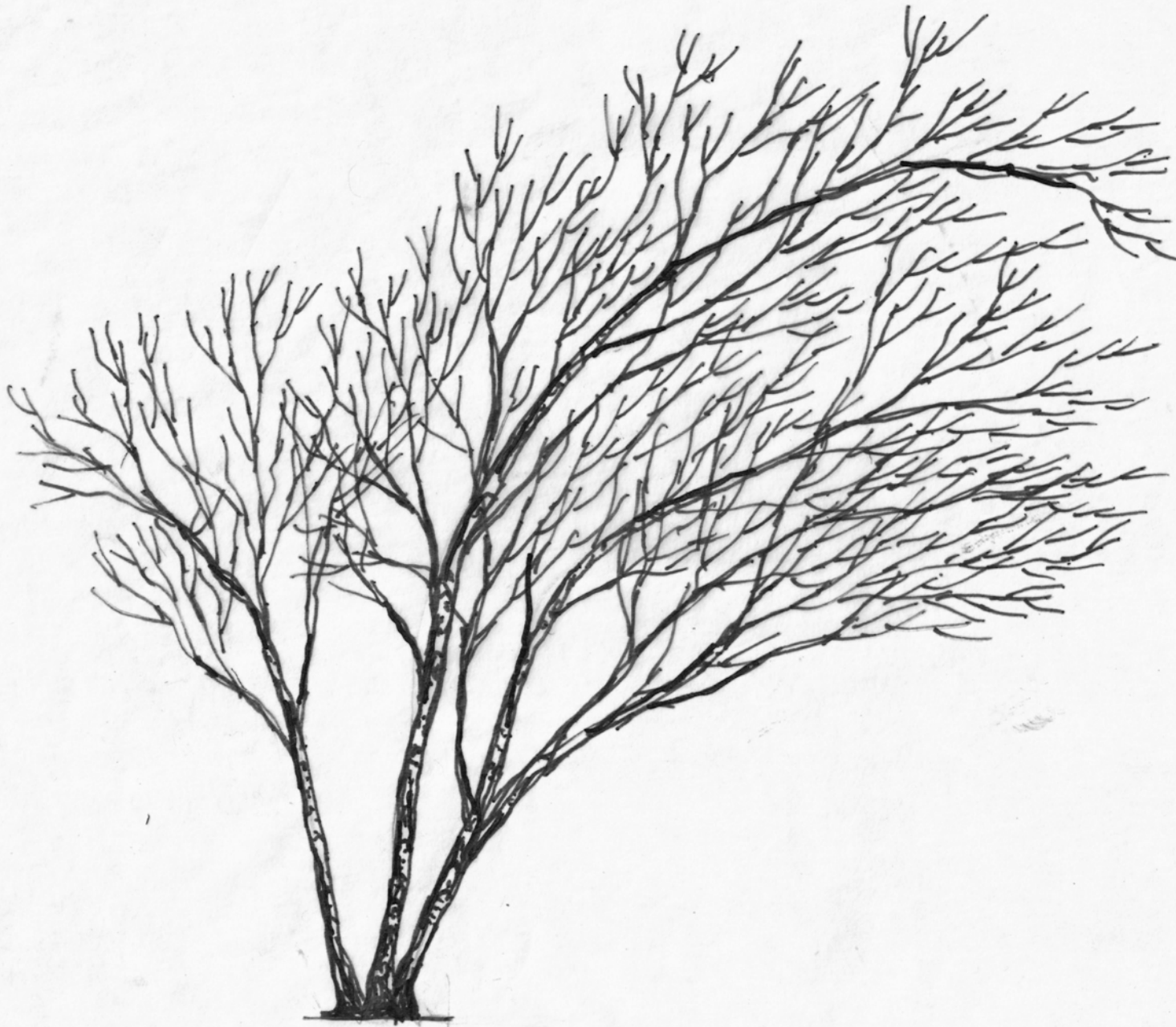
Turf Alternatives



- Mature Grey Birch

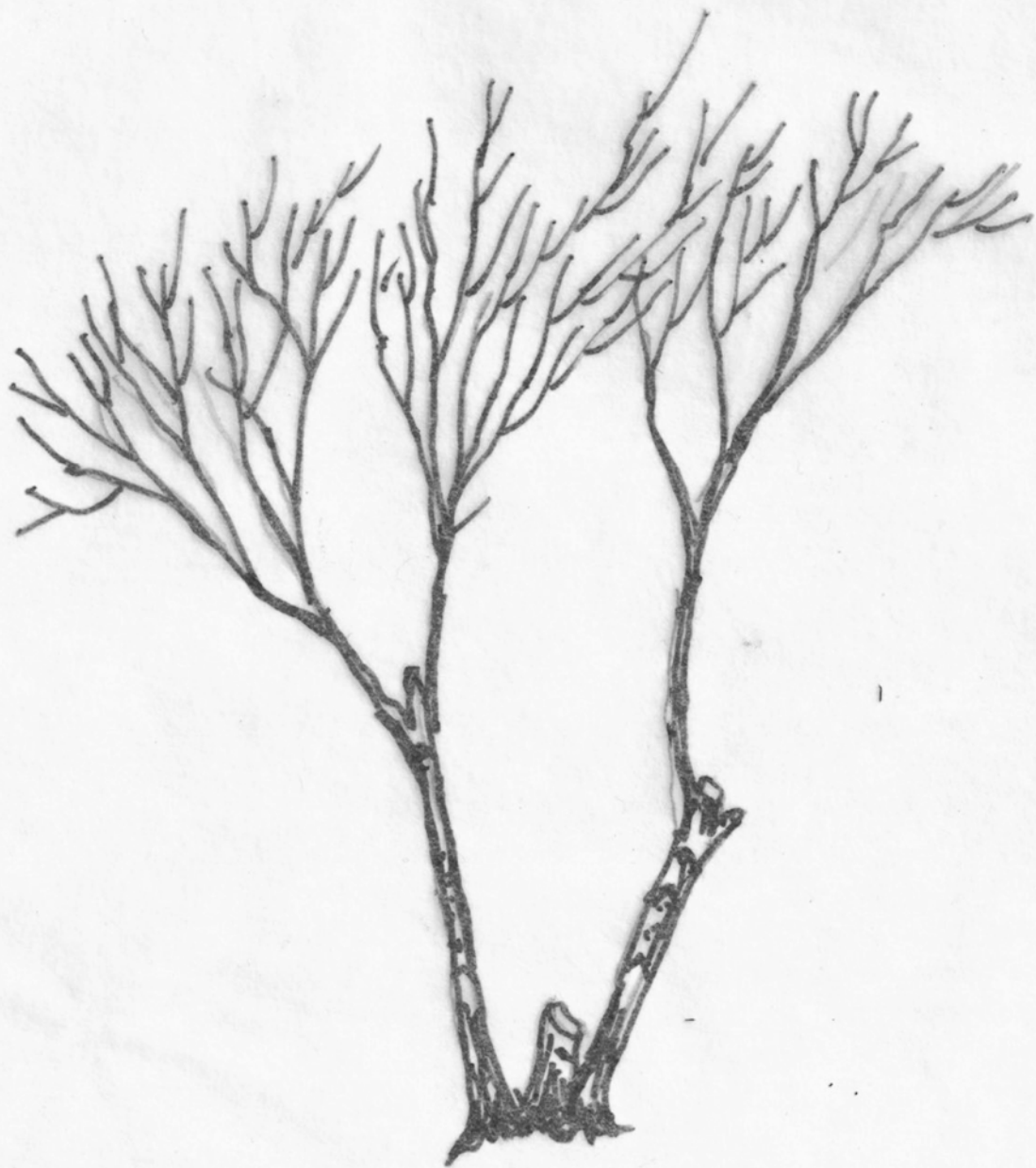
Betula populifolia

- *multi-stemmed*
- *Upright*
- *Dense branching/foliage*
- *Successional species – not long lived*



Over-mature Grey Birch

- *Main leaders bend from weight +*
- *Snow/ice loads*
- *Main leaders don't recover*



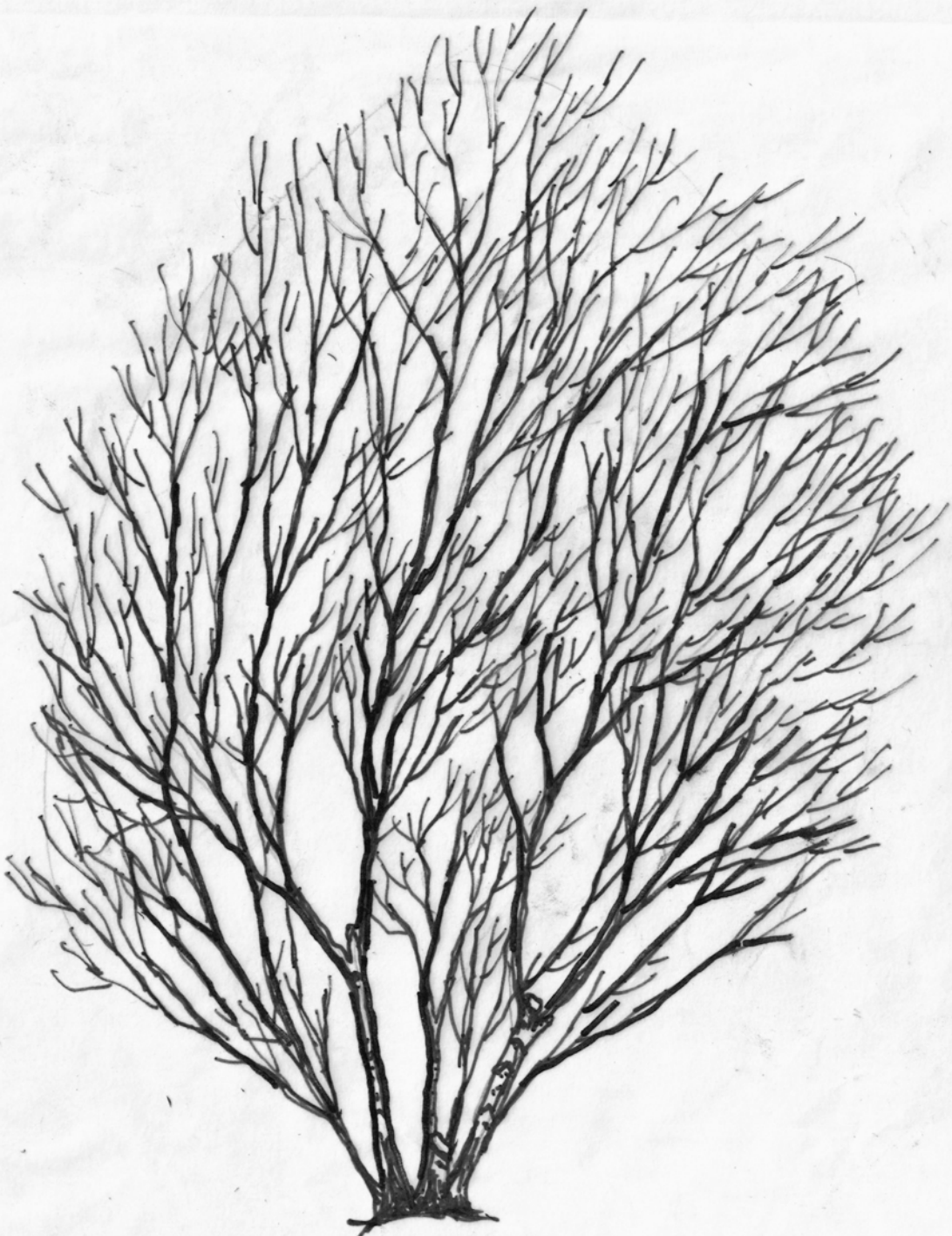
Coppiced Grey Birch

- *Remove main leaders to ground or to lower branches*
- *Root system remains vigorous*
- *Quick re-sprouting*



Maturing - Coppiced Grey Birch

- *Top-growth resumes*
- *Vigorous basal shoot sprouts*
- *Prune for desired form/number of stems*



Second-generation Mature Grey Birch

- *Dense branching*
- *Root system remains vigorous*
- *Prune for desired form*
- *Repeat coppicing as needed every 10 years +-*
- *“short-lived” species can be coppiced for decades*



Staghorn Sumac

Rhus typhina

- *Successional species*
- *Outstanding fall color*
- *Foliage texture interest*
- *Spreads horizontally via rhizomes*
- *With sun/space forms large "domes"*
- *Fruit Wildlife value*
- *NOT poisonous*
(Toxicodendron vernix, swamps)
- *Undesirable weed?*
....or vigorous successional species?

Staghorn Sumac

Rhus typhina

- Clones start in open fields
- Spread via rhizomes



Staghorn Sumac “Dome”

Rhus typhina

- Mature plants spread horizontally – form “dome”
- Takes over, or becomes leggy



Examples of Ecological-designed Landscapes on the Cape and Islands

- Beach House
- Edgartown Great Pond Residence
- West Tisbury Library
- International Fund for Animal Welfare
- Association for the Preservation of Cape Cod
- Mashpee Residence
- Mytoi Gardens



Beach House

Cape Cod Bay
Studio 2112

LEGEND

- 1 PARKING
- 2 COURTYARD
- 3 BOARDWALK
- 4 DECK
- 5 BRACKISH RAIN GARDEN
- 6 GRASSLAND MEADOW
- 7 BIOSWALE
- 8 ENHANCED BUFFER ZONE
- 9 RESTORED DUNE
- 10 TIDAL FLUX ZONE













Edgartown Great Pond Residence

The Nature Conservancy and Private Owner















West Tisbury Free Library
Martha's Vineyard





Engineered Bioswales

Plants Protect our Water

Rainwater falling on the parking lot can carry hydrocarbons (gas and oil) from car tires and exhaust into the adjacent Mill Brook Watershed. To keep pollutants from contaminating these waters, the parking lot has been designed as an environmental filtering system. The stone pavers collect and move rainfall into the bordering planting beds ("bioswales"), where plants capture the water, reduce its temperature, and bind and collect pollutants in their root systems. In this way over 90 percent of the hydrocarbons evaporate or are broken down by bacteria within the plants' root-zone.

For more information on the plants and this specialized planting, a brochure is available inside the library.

Little Bluestem
*Schizachyrium
scoparium*

Turf grass

Plant roots
pull water deep
into soil











A modern building with a glass and metal facade is visible in the background, partially obscured by a field of tall, golden-brown grass in the foreground. The sky is clear and blue.

International Fund for Animal Welfare

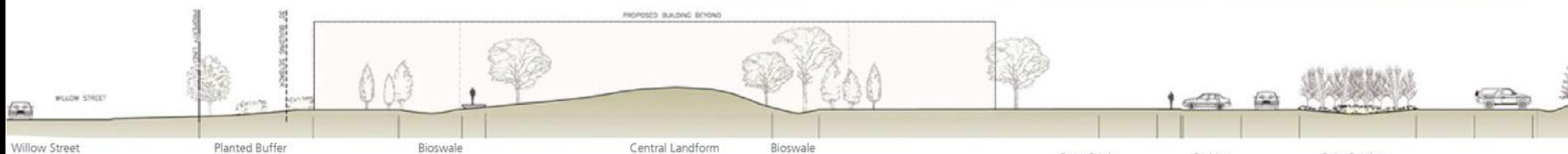
Yarmouth
Stimson Associates

IFAW

International Fund for Animal Welfare



- 1 Open space
- 2 Exterior deck
- 3 Landform
- 4 Infiltration basin
- 5 Rain garden
- 6 Bioswale
- 7 Hedgerow
- 8 Cape terrace
- 9 Entry court
- 10 Service



200

400

800

1,600 FEET











APCC Demonstration Landscape
Kristin Andres, APCC
Blue Sage Design

Photo: Gerald Beetham



We've been a-BUZZ
with bees because of our new

Cape Cod Meadow Garden

Look for:

Partridge Pea - *Chamaecrista fasciculata*

Anise-scented Goldenrod - *Solidago odora*

Black-eyed Susan - *Rudbeckia hirta*

Whorled Milkweed - *Asclepias verticillata*

Butterfly Milkweed - *Asclepias tuberosa*

Swamp Milkweed - *Asclepias incarnata*

Switchgrass - *Panicum virgatum*

Hyssop-leaved Boneset - *Eupatorium hyssopifolium*

Heath Aster - *Symphyotrichum ericoides*

Purple Coneflower - *Echinacea purpurea*

Spotted Bee Balm - *Monarda punctata*

Little Bluestem - *Schizachyrium scoparium*

Hyssop - *Agastache*



First year planting by seed and plugs.

SPECIAL THANKS to BlueFlax Design
for the
generous donation of professional services, seed and plants.



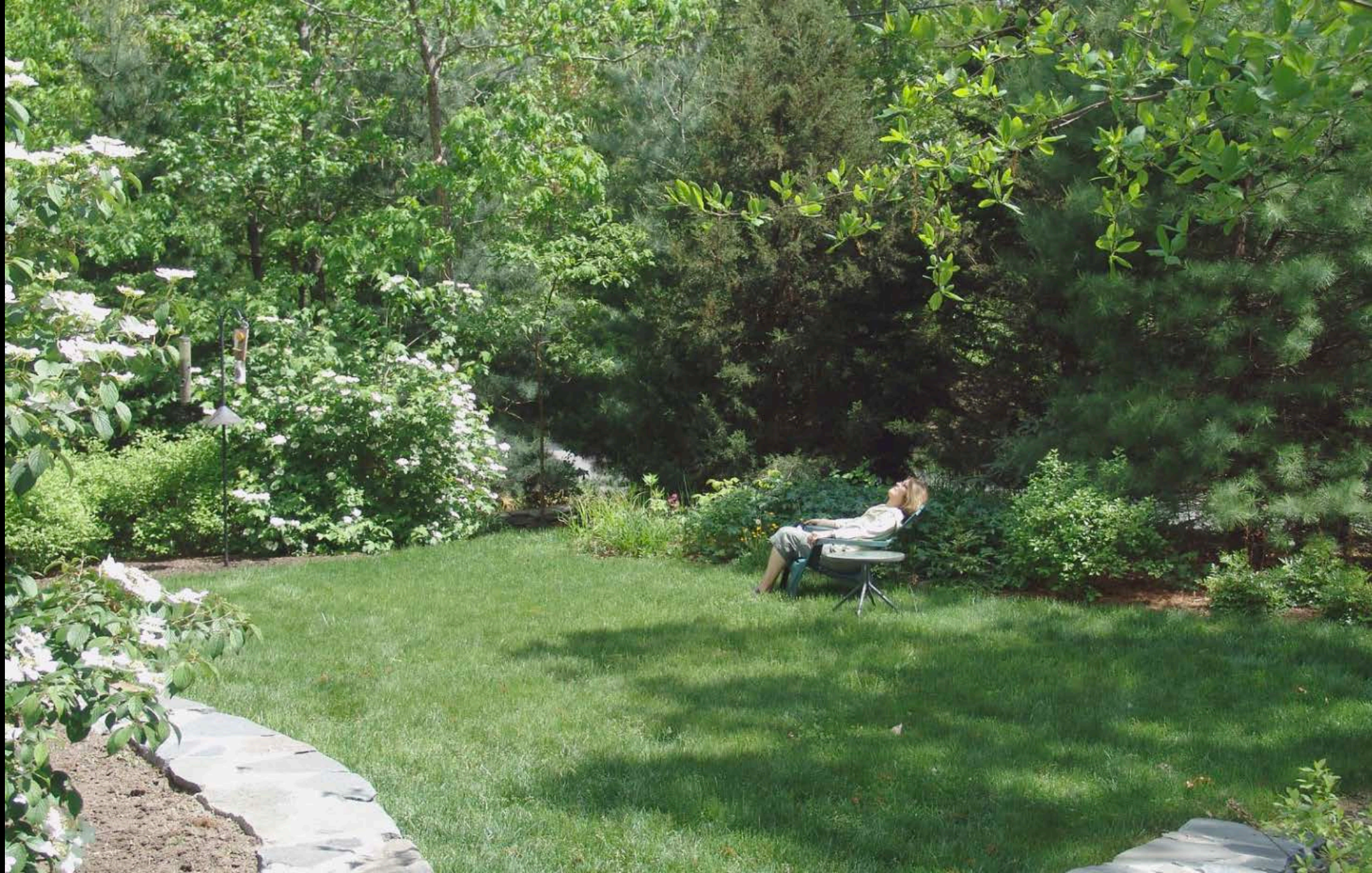




Mashpee Residence
Talbot Ecological Land Care











Mytoi Gardens
Chappaquiddick Island







Conclusions

- Issues with Conventional Landscape Design

Conclusions

- Issues with Conventional Landscape Design
- Benefits of Ecological Landscape Design

Conclusions

- Issues with Conventional Landscape Design
- Benefits of Ecological Landscape Design
- Native and Designed Plant Communities

Conclusions

- Issues with Conventional Landscape Design
- Benefits of Ecological Landscape Design
- Native and Designed Plant Communities
- Ecological Landscape Design Toolkit

Conclusions

- Issues with Conventional Landscape Design
- Benefits of Ecological Landscape Design
- Native and Designed Plant Communities
- Ecological Landscape Design Toolkit

Conclusions

- Issues with Conventional Landscape Design
- Benefits of Ecological Landscape Design
- Native and Designed Plant Communities
- Ecological Landscape Design Toolkit
- Questions/Comments ?
- Thank You! Jack Ahern jfa@umass.edu



Stiff aster, little bluestem, switchgrass. W. Tisbury Library



Gate. Switchgrass









Butterfly Weed

