Shoreland Habitat Restoration

Outline

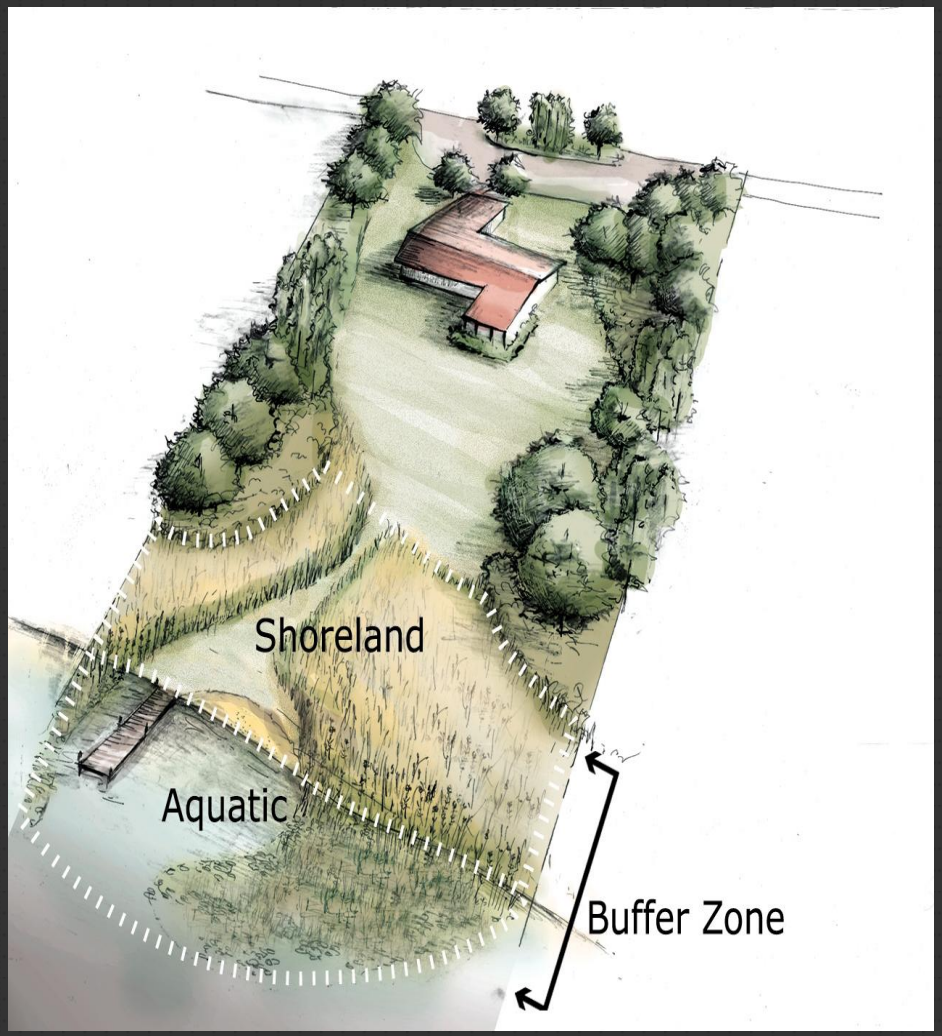
- Shoreland habitat
  - Definition
  - Function
  - Why restore?
- Types of restoration
- Site planning
  - Develop a site plan
  - Review erosion control needs & permit requirements
- Site preparation & planting techniques
- Native plants used in shoreland restoration
  - Aquatic plants
  - Species for shore: wet & dry sites

Shoreland Habitat

* Area adjacent to lakes
* Vegetated with a mix of native plants
* Corridor between upland & aquatic ecosystems
* Referred to as shoreline or riparian buffer
* Performs many functions

90% of all lake life is born, raised and fed in the area where land and water meet.

Functions:



* Water quality protection
  - Filters sediments
  - Increases infiltration
  - Reduces erosion/runoff
  - Takes up nutrients

* Provides essential habitat
  - Offers food & shelter
  - Keeps out invasives

* Preserves natural shoreline
* Provides privacy

Why restore with native plants?

* Adapted to soil & climate conditions
* Increased survival rates
* Minimized need for fertilizer, pesticides, water, & maintenance
* Provide the most benefits to wildlife & water quality protection

Restoration:

The act of restoring a specific plant community. Restoration is site specific and is composed of native trees, shrubs, and groundcovers. It is not meant to be a garden.

Types of Restoration

Protection

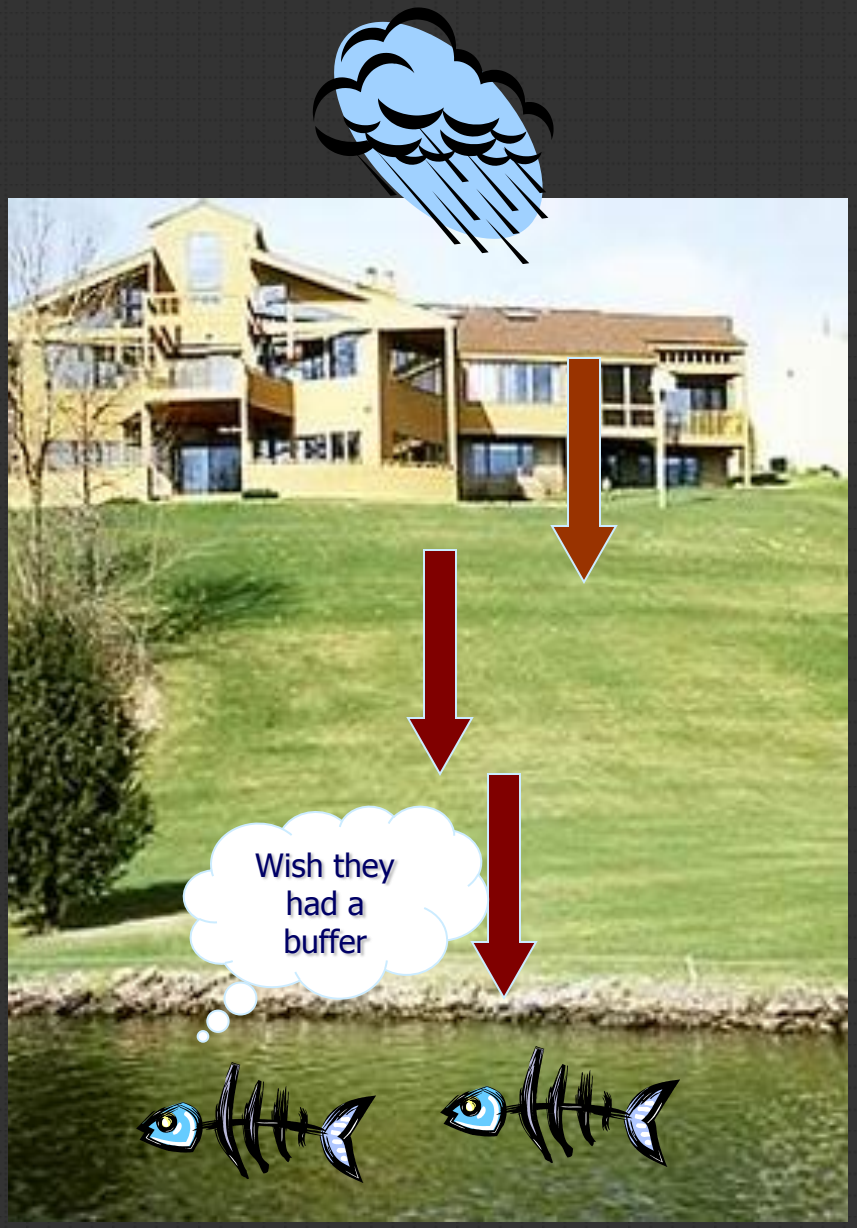
* No serious erosion
* Native vegetation present
* Diversity of structure
* Buffer width met

Natural Recovery

* Along wet lake margin
* Turf not well established
* Native species present
* Adopt “No Mow” zone

Accelerated Recovery

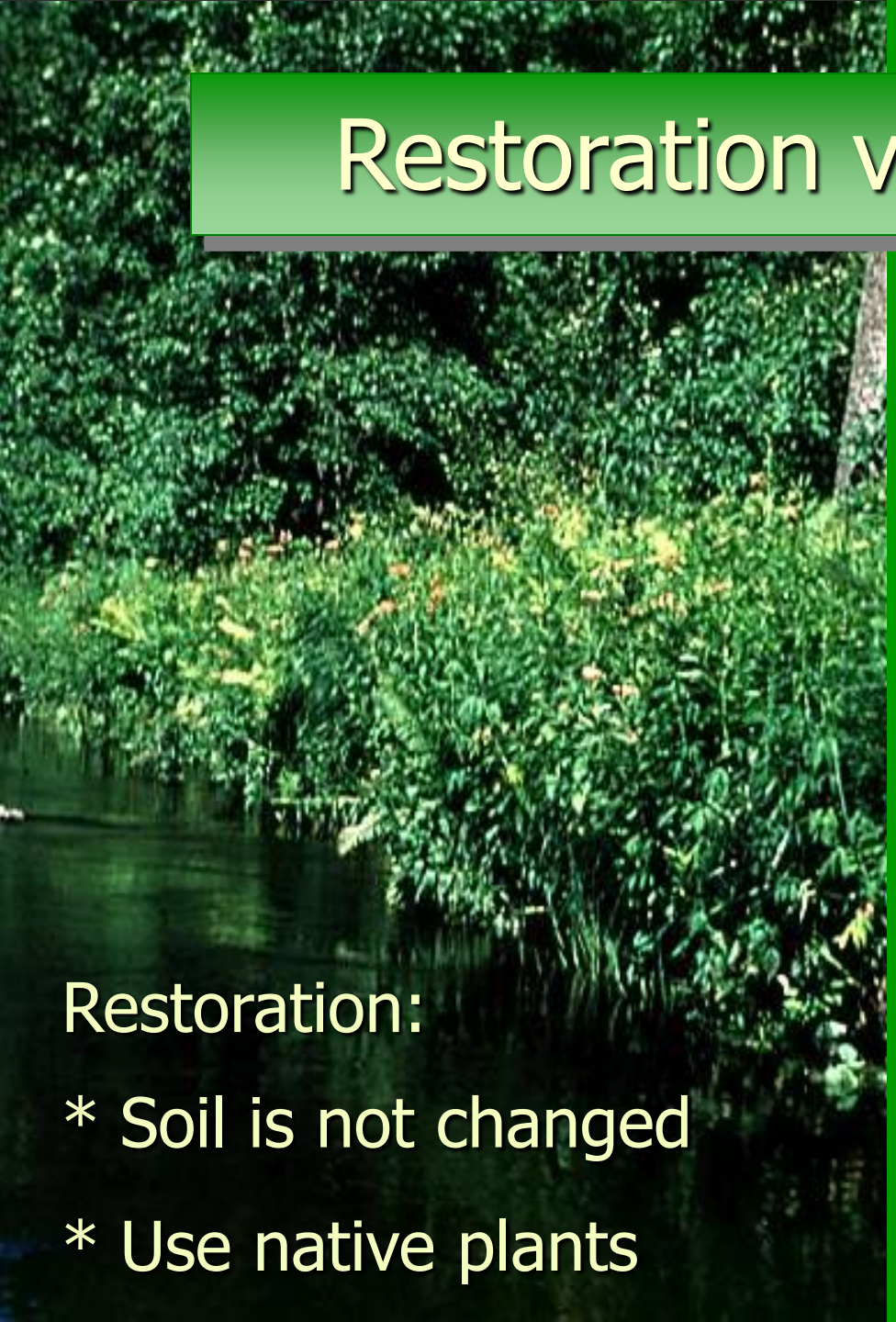
* Turf grass well established
* No buffer vegetation
* Exposed soil
* Quick results wanted



A natural shoreline?

This site would be a good candidate for a restoration project.

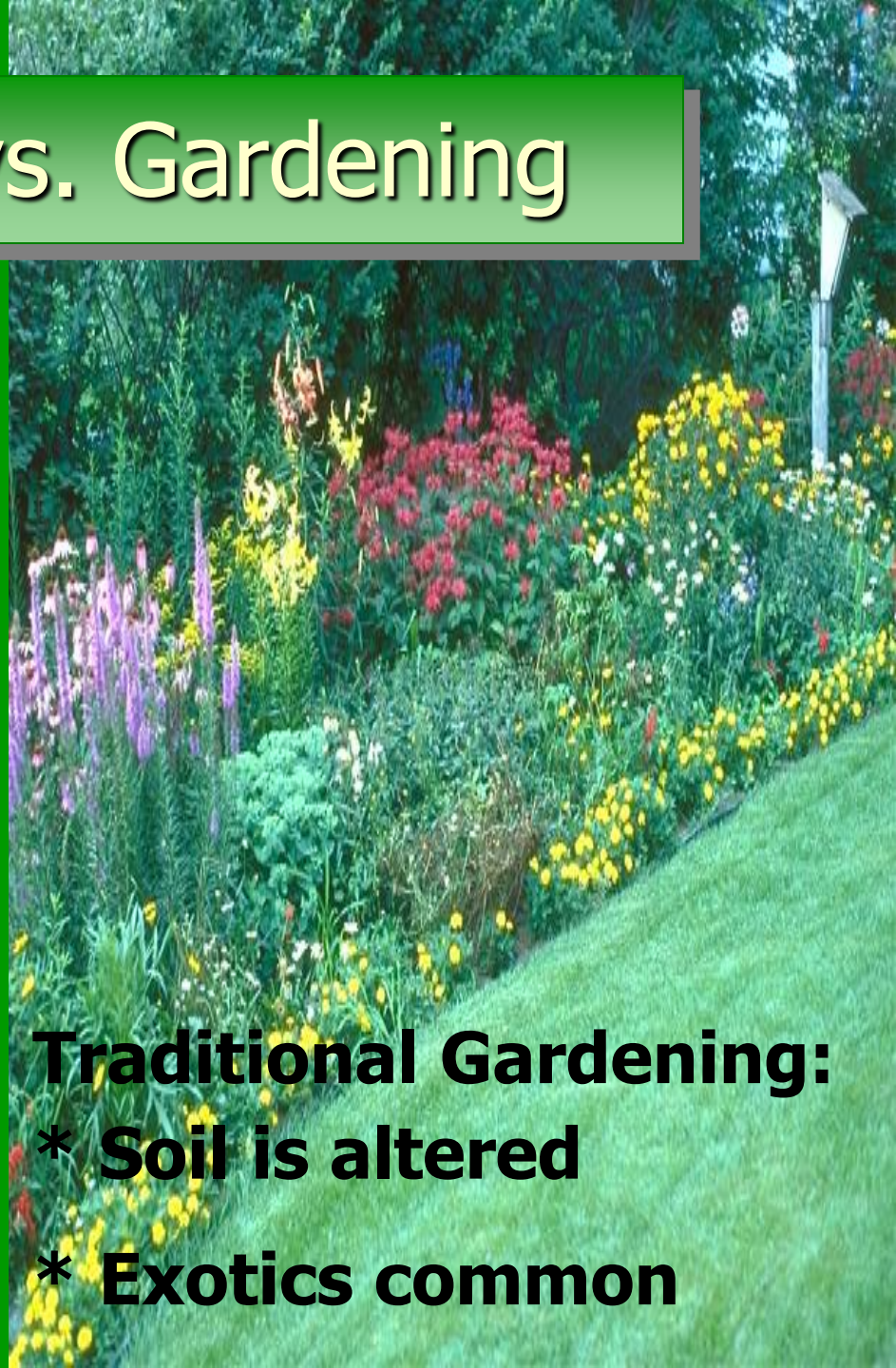
Restoration vs. Gardening



Restoration:

* Soil is not changed

* Use native plants



Traditional Gardening:

*** Soil is altered**

*** Exotics common**

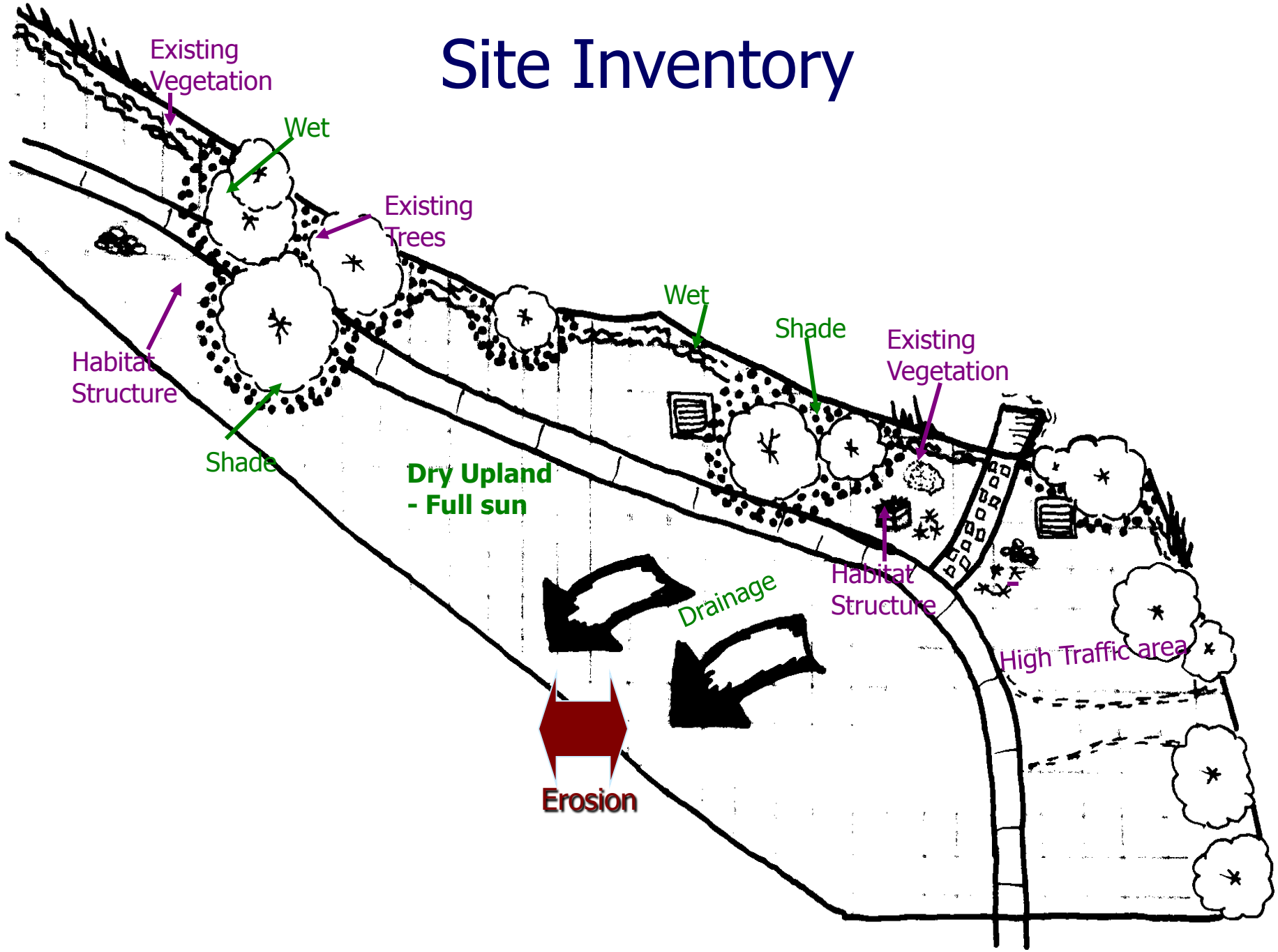
Site Plan Design

The first step in designing a site plan is to inventory and map the existing:

* Trees & shrubs
* Runoff & impervious areas
* Recreation areas
* Native plants

* Structures
* Drainage
* Any slopes
* Erosion
* Sun & shade areas
* Soil & moisture

Site Inventory



Homeowner questions

* Why restore
* How much privacy do you want
* What is the drainage pattern
* Where are the areas of heaviest use
    * **Recreation**
    * **Pets & children**
* Where is the viewing corridor
* Structures near the water

Tell your neighbors about the project

* Talk to your neighbors
* Put up a sign

* Use flags
* Use plant stakes

Find a reference site

* It is important to keep plants and seed local to the site.
* Look at a vegetated site adjacent to, or close to your property with similar site conditions (slope, sunlight, soil).
* Note species, densities, and growth characteristics.
* Use this information on your site.

Things to remember

* Keep it SIMPLE. Less = easier to maintain and gives room for growth.
* Divide large projects into stages (Year 1,etc)
* Practice conservation: reduce runoff & stabilize slopes
* Identify non-native, invasive plants & undesirable plants to be removed

Purple Loosestrife

Poison Ivy

Eurasian Water Milfoil

Bad guys to note

Parrot feather

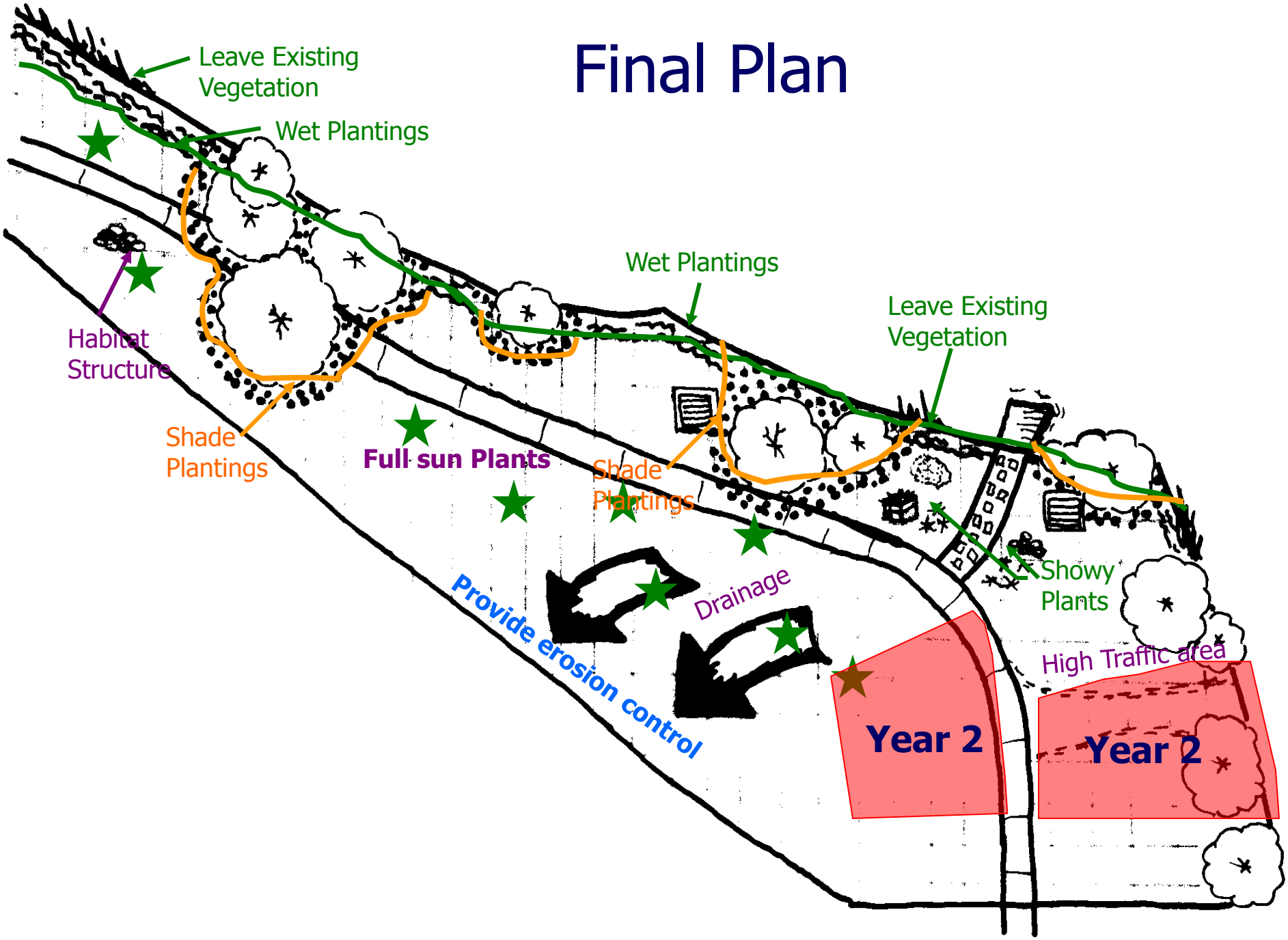
The following plants should NOT be used in gardening:

- Flowering rush *(Butomus umbellatus)*
- Frog-bit *(Hydrocharis morsusranae)*
- Giant water fern *(Salvinia molesta)*
- Hydrilla *(Hydrilla verticillata)*
- Mosquito fern *(Azolla pinnata)*
- Parrot feather *(Myriophyllum aquaticum)*
- Water hyacinth *(Eichorina crassipes)*
- Water lettuce *(Pistia stratiotes)*

Hydrilla

If you have questions about whether a specific plant is native, consult the Wisconsin State Herbarium web: www.botany.wisc.edu/wisflora/

Final Plan


Leave Existing Vegetation
Wet Plantings
Habitat Structure
Shade Plantings
Full sun Plants
Wet Plantings
Shade Plantings
Leave Existing Vegetation
Showy Plants
Drainage
Provide erosion control
High Traffic area
Year 2
Year 2

Shoreland erosion control

* Control runoff
* Bioengineering:
  - Revegetation
  - Biologs
  - Fabric
* Rock riprap


Duckbill


Stakes


Sedge Plugs


Will you need a permit?

Ordinary High Water Mark (OHWM)

The point on the bank or shore where water created a distinct mark.

Site Preparation, Planting, Maintenance

* Vegetation Removal
  - -Black plastic
  - -Herbicide
  - -Tilling
* Planting
* Mulch
  - -Synthetic
  - -Organic
* Maintenance

Vegetation Removal

* Black Plastic
* Herbicides
* Soil tilling

Black Plastic

* Prepare the site
* Lay plastic & anchor
* Leave alone 4-6 weeks
* Remove plastic
* Plant directly into dead vegetation

Pros

* Inexpensive
* Low chance of erosion

Cons

* Some feel unsightly
* Takes a long time

Herbicide

* Apply in growing season
* Shield native plants
* Never allow drift into water
* Wait 7 to 10 days
* Second application if necessary
* Leave dead plant material

Pros

* Relatively fast
* Low chance of erosion

Cons

* Using poison near water
* Non-selective

Tilling

Pros

* Effective if done correctly

Cons

* High chance of erosion
* Repeat to be effective
* Will stir up weed seeds
* Can destroy soil structure

Planting

* Seeds
* Live plants
  - plants
  - rootstock

Seeding

* Remove competing vegetation
* Mix seed with moist sand & distribute
* Tamp
* Mulch
* Water
* WEED

Plug Plants

* Space plants 1½’ apart
* 25-75 plants/ 100’ sq.

* Plant in cool hours
* Mulch
* Water
* WEED

Potted Trees or Shrubs

* Group plantings are more natural and pleasing to the eye.
* Small shrubs 4-6’ spacing.
* Large shrubs & trees 6-9’ spacing.
* 1-4 shrubs/ 100’ sq.
* .5-2 trees/ 100’ sq.
* Plant scattered for natural look.

Bareroot

* Dig holes large enough
* Plant to the depth of old soil line or swelling on stem
* Pack soil firmly, but gently

* Water well
* Mulch
* Delay in planting; keep roots moist & in shade

Mulches

* Synthetic
  - Plastic
  - Landscape Fabric
* Organic
  - Leaves
  - Straw
  - Wood chips
  - Paper Mulch



* Mulch should be free of weed seeds
* Organic mulch should be 3-4 inches deep
* Use mulch to define your planting area. It serves as a break between planting and other areas. Maintain this area to keep lawn out.

Challenges

* Early Maintenance/Watering
* Unrealistic homeowner expectations
* Patience
* Lack of good reference sites/lists
* Site variability
* Technical Skills
* Undesirable species
* Browse
* Maintenance

Monitoring Plan

* Maintenance required until established
* Once established; minimum maintenance
* Continue to monitor in future years for exotic, invasive species & weeds

Native plants:

For the water and the shore

Plants for the water & water gardens

** Aquatic plantings in a lake REQUIRES A DNR PERMIT!

There are many plants that are native or not invasive that would make great addition to gardens. For a water garden try:

Pickerelweed

Submerged or floating plants:

- Water lilies *(Nuphar* or *Nymphaea species)*
- Coontail *(Ceratophyllum demersum)*
- Native pondweeds *(Potamogeton* species*)*
- Water celery *(Vallisneria americana)*

White water lily

Emergent or wetland/ shoreline plants:

- Pickerelweed *(Pontederia cordata)*
- Native sedges *(Carex* species*)*
- Native Bulrushes *(Scirpus* species*)*

Wisconsin State Herbarium website: www.botany.wisc.edu/wisflora/

Shore Plants

Moist-Wet Sites

Tree layer

Balsam fir (*Abies balsamea*)

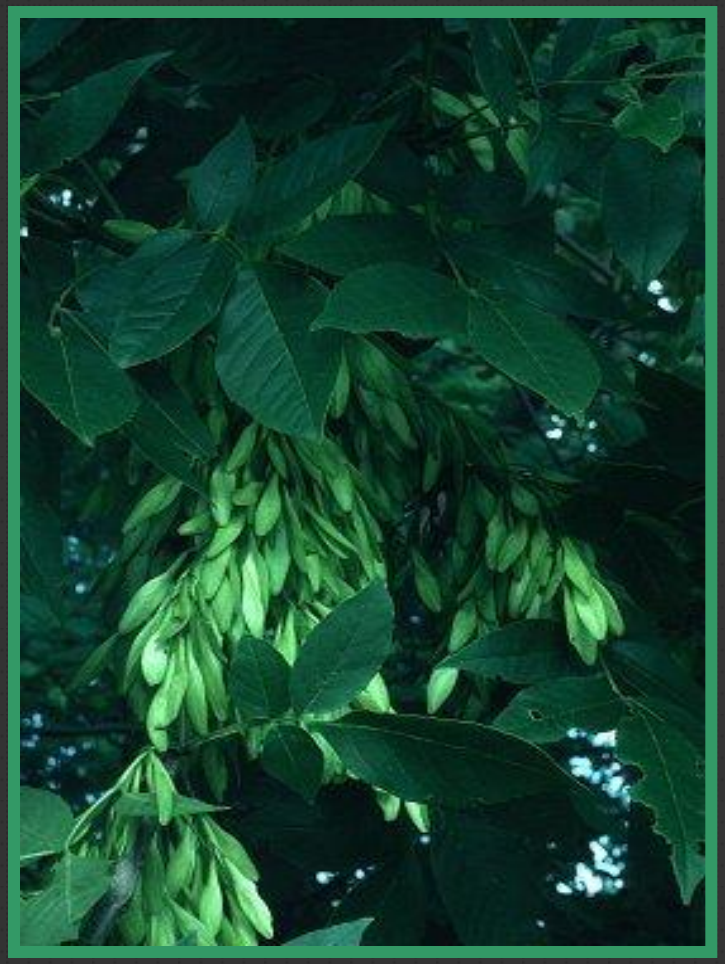
* Up to 80’
* Full sun-part shade
* Prefers cool, moist, or shaded sites
* Deer leave it alone

Yellow birch (*Betula alleghaniensis*)

* Up to 60-75’
* Full sun-part shade
* Moist, cool site
* Gold peeling bark
* Easy to grow & long-lived

Green ash (*Fraxinus pensylvanica*)

* 50-60’
* Full- part sun
* Moist site
* Easy to grow
* Provides shade



Tamarack (*Larix laricina*)

* 40-65’
* Full sun-part shade
* Wet site
* Needles turn gold in fall
* Intolerant to heat & extremely dry soils

White spruce (*Picea glauca*)

* 50-75’
* Full sun-part shade
* Moist, cool site
* Low, damp woods
* Good for restoration & landscaping

Basswood (*Tilia americana*)

* 60-80’
* Full sun-part shade
* Well-drained soil
* Stump sprouts

Moist-Wet Sites

Shrubs

Sweet gale (*Myrica gale*)

* 3′
* Full sun-part shade
* Common lake edge plant
* Attractive foliage

Hazelnut *(Corylus americanus)*

* 6-8′
* Full sun-part shade
* Tolerates wet-dry soils & shade-sun
* Fast growing
* Attractive foliage & fall color

Meadowsweet *(Spirea alba)*

* 3-4’
* Full-part sun
* Sand-peat; wet-moderately dry soils
* Fast growing for restoration
* Attracts butterflies

Steeplebush *(Spiraea tomentosa)*

* 2.5-3.5’
* Full-part sun
* Sand-peat soils
* Tall, pink, spiked flowers
* Attracts butterflies

Winterberry holly *(Ilex verticillata)*

* To 6’
* Full sun-part shade
* Great for lake edges; tolerates upland soil
* Beautiful in winter
* Female has red berries; plant 4 to ensure reproduction

Red osier dogwood (*Cornus stolonifera*)

* To 6’
* Full sun-part shade
* Heavy, moist-wet soil
* Red, winter stems

Elderberry (*Sambucus canadensis*)

* 6-12‘
* Full-part sun; moist-wet soils
* Fast growing
* White flowers; purple edible berries

Moist-Wet Sites

Wildflowers, Grasses, & Sedges

Swamp milkweed (*Asclepias incarnata*)

* Marsh milkweed
* 1-4.5’
* Full sun-part shade
* Pink, showy flowers
* Lake or wet edges
* Great for restoration
* Attracts butterflies & hummingbirds

Northern blue-flag iris (*Iris versicolor*)

* 2-3′
* Full-part sun
* Purple flowers
* Showy & attractive
* Grows in clumps

Fringed sedge (*Carex crinita*)

* 3.5-4.5′
* Full sun-part shade
* Forms clumps
* Caterpillar-like spikes
* Erosion control

Tussock sedge (*Carex stricta*)

* 2-3’
* Full sun-part shade
* Forms dense clumps
* Common to wetlands & lake edges
* Good for restoration & water gardens

Turtlehead (*Chelone glabra*)

* 2-3′
* Full sun-part shade
* White, turtle-shaped flowers
* Wet soils

Boneset (*Eupatorium perfoliatum*)

* 2-3.5′
* Full sun-part shade
* Clustered, white flowers
* Common along lake edges

Joe-pye weed (*Eupatorium maculatum*)

* 2-3’
* Part sun-shade
* Clustered, purple flowers
* Damp meadow, marshes, shores
* Leaves whorled
* Attracts butterflies

Soft rush (*Juncus effusus*)

* 2-4′
* Full sun-part shade
* Evergreen
* Forms clumps along lake edges & wetlands

Blue vervain (*Verbena hastata*)

* 3-4′
* Full sun-part shade
* Tall, purple flowers
* Attracts butterflies

Dry Sites

Tree layer

Red maple (*Acer rubrum*)

* 40-65’
* Full sun-part shade
* Dry to moist soils
* Nice fall color
* Shade-tolerant tree
* Great for wildlife

Red pine (*Pinus resinosa*)

* Norway pine
* To 100+
* Full sun-part shade
* Prefers well-drained, sandy soil
* Cover for lots of wildlife

Northern red oak (*Quercus rubra*)

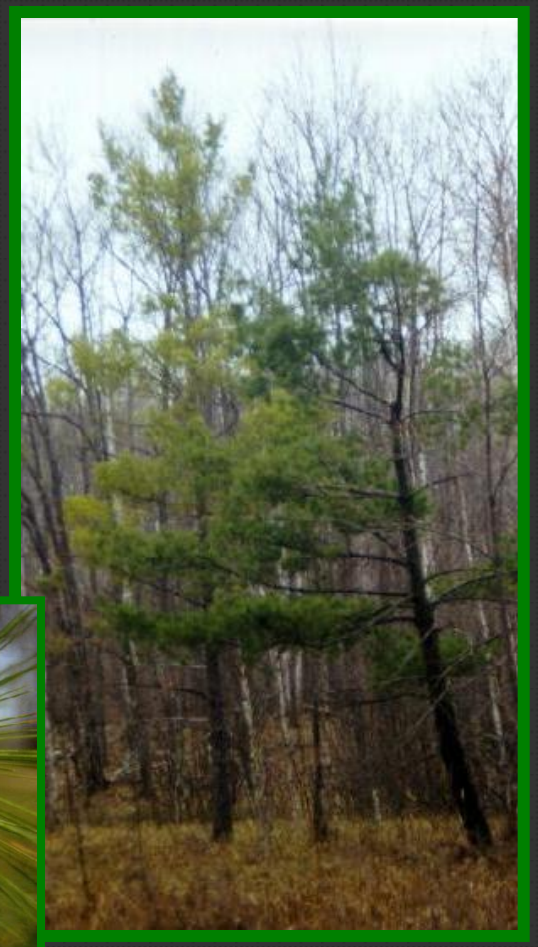
* To 80’
* Full sun-part shade
* Well-drained to moist soils
* Fast-grower
* Red-brown fall color

Paper birch (*Betula papyrifera*)

* To 80’
* Full sun-part shade
* White peeling bark
* Dry-wet soils

White pine *(Pinus strobus)*

* 100-150’
* Full sun-part shade
* Tolerates wet-dry soil
* Fast growing
* Used for building



Pin cherry

(Prunus pennsylvanica)

* 5-30’
* Full sun-shade
* Wide range of soils & sunlight
* Red fruit for jam
* Attracts wildlife

Dry Sites

Shrubs

Black chokeberry (*Aronia melanocarpa*)

* To 6’
* Full-part sun
* Clustered white flowers
* Excellent for lake edge plantings
* Deep red, fall foliage

Sweet-fern (*Comptonia peregrina*)

* 1-2’
* Full sun-part shade
* Slow-growing, low shrub
* Serrated elongate leaves
* Fragrant foliage

Bush honeysuckle (*Diervilla lonicera*)

* 2-3’
* Full sun-shade
* Trumpet-shaped yellow flowers
* Dry-moist soils
* Great low shrubs

Ninebark (*Physocarpus opulifolius*)

* 8-10’
* Full-part sun
* Moist-dry soils
* Fast-growing, hardy, good windbreak
* Deer leave it alone

Nannyberry *(Viburnum lentago)*

* 10-15’
* Full sun-part shade
* Purple foliage
* Excellent berries for jam
* Shade-tolerant
* Very hardy

Downy arrow-wood (*Viburnum rafinesquianum*)

* 3-6′
* Full sun-part shade
* Clustered white flowers
* Prefers dry, rocky soils
* Good fall color
* Shade-tolerant

Gray dogwood *(Cornus racemosa)*

* 6-8′
* Full sun-part shade
* Shade tolerant
* Dry-moist soils
* Good fall color
* Excellent production of berries

Dry Sites

Wildflowers, Grasses, & Sedges

Pearly everlasting (*Anaphalis margaritacea*)

* 1.5-2’
* Full sun-part shade
* Papery white strawflowers
* Nice dried flower
* Host for painted lady

Columbine (*Aquilegia canadensis*)

* 2-3’
* Full sun-shade
* Dry sandy soils
* Woodland perennial
* Attracts hummingbirds

Black eyed Susan *(Rudbeckia hirta)*

* 2-3’
* Full-part sun
* Common short-lived perennial
* Wide range of habitats

Large-leaved aster (*Aster macrophyllus*)

* .5-1.5’
* Full sun-shade
* Heart-shaped leaves
* Common forest groundcover
* Fast-growing
* Shade-tolerant

Rough blazing star *(Liatris aspera)*

* 1.5-3′
* Full-part sun
* Beautiful purple spikes
* Attracts butterflies

Harebell *(Campanula rotundifolia)*

* 1-2′
* Full sun-part shade
* Bell-shaped blue flowers
* Dry habitats
* Shade tolerant

Flat-top aster (*Aster umbellatus*)

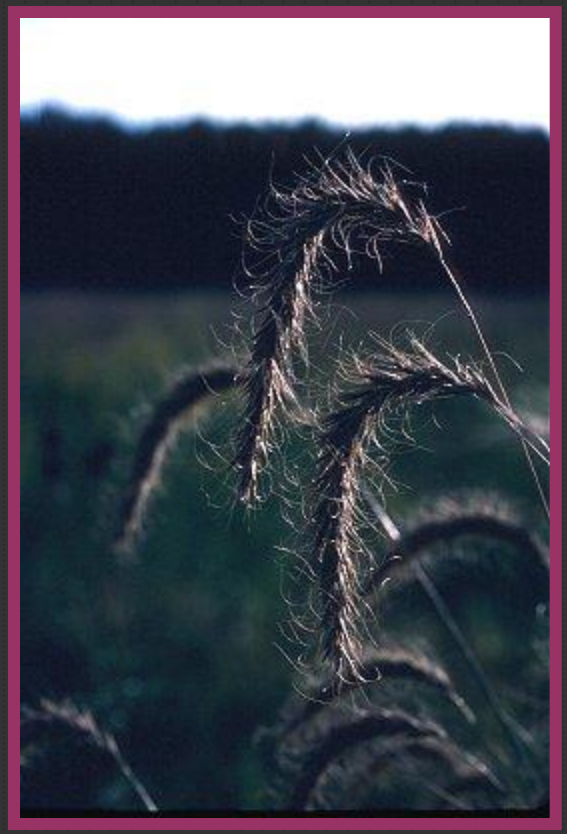
* 2.5-3.5’
* Full sun-full shade
* Clustered white flowers
* Moist-wet lakes edges & forests
* Good cut flower
* Attract butterflies

Pennsylvania sedge (*Carex pensylvanica*)

* 6-8”
* Full sun-full shade
* Forms low-growing clumps
* Common woodland sedge

Canada wild-rye (*Elymus canadensis*)

* 3-4’
* Full sun-part shade
* Tolerates wet-dry soil
* Fast growing; excellent cover plant



Bergamont (*Monarda fistulosa*)

* 3-4’
* Full sun-part shade
* Lavender flowers
* Moist-dry soils
* Common & widespread native flower

Little bluestem (*Schizachyrium scoparium*)

* 1.5-3’
* Prefers full sun
* Ornamental, amber foliage thru winter
* Forms clumps
* Dry, sandy-moist wooded habitats

Zig-zag goldenrod (*Solidago flexicaulis*)

* 2’
* Part-full shade
* Scattered yellow heads
* Common woodland species
* Medium textured, moist soils

Fireweed (*Epilobium angustifolium*)

* 3-4’
* Full-part sun
* Showy purple flowers
* Wet-dry open soils
* Common roadside plant
* Attracts butterflies

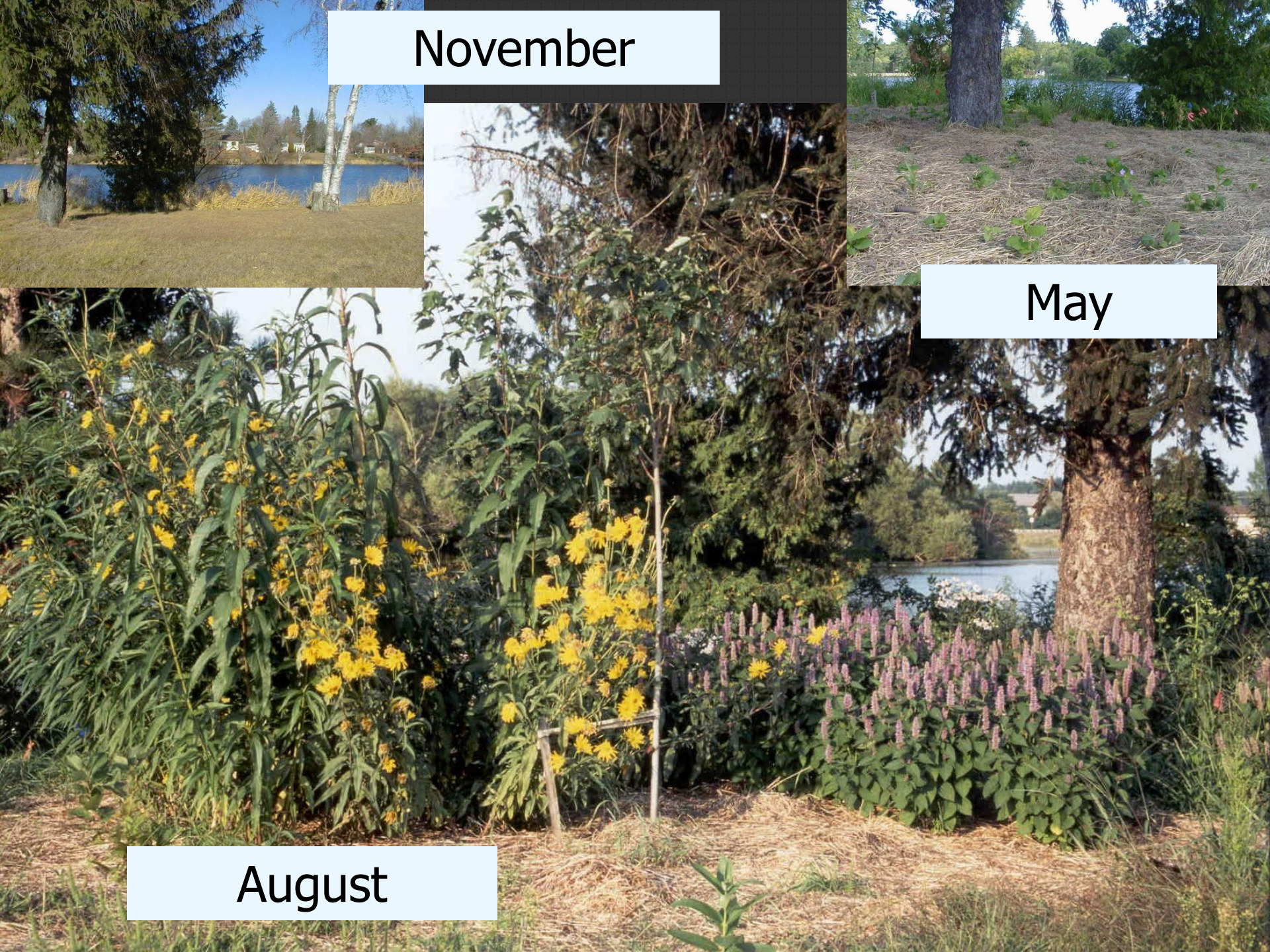
Yellow coneflower *(Ratibida pinnata)*

* 3-6’
* Full-part sun
* Tolerates drought-extreme cold
* Thrives on sand-clay
* Common to prairies
* Hardy
* Attracts butterflies

Look what a growing season can offer:

May 2007

July 2008


November
May
August