Bioengineering GROUP

Building Sustainable Communities
on an Ecological Foundation

Black's Nook Site Improvements

Fresh Pond Reservation

Cambridge, MA

Presentation to Black's Nook Stakeholders

Planting and Wildlife Subcommittee

13 January 2010

Building Sustainable Communities on an Ecological Foundation

Bioengineering GROUP

Agenda

- Introduction (Chip)
- Project Goals
- Restoration Strategies
- Restoration Design (Plan)
- Schedule
- Discussion

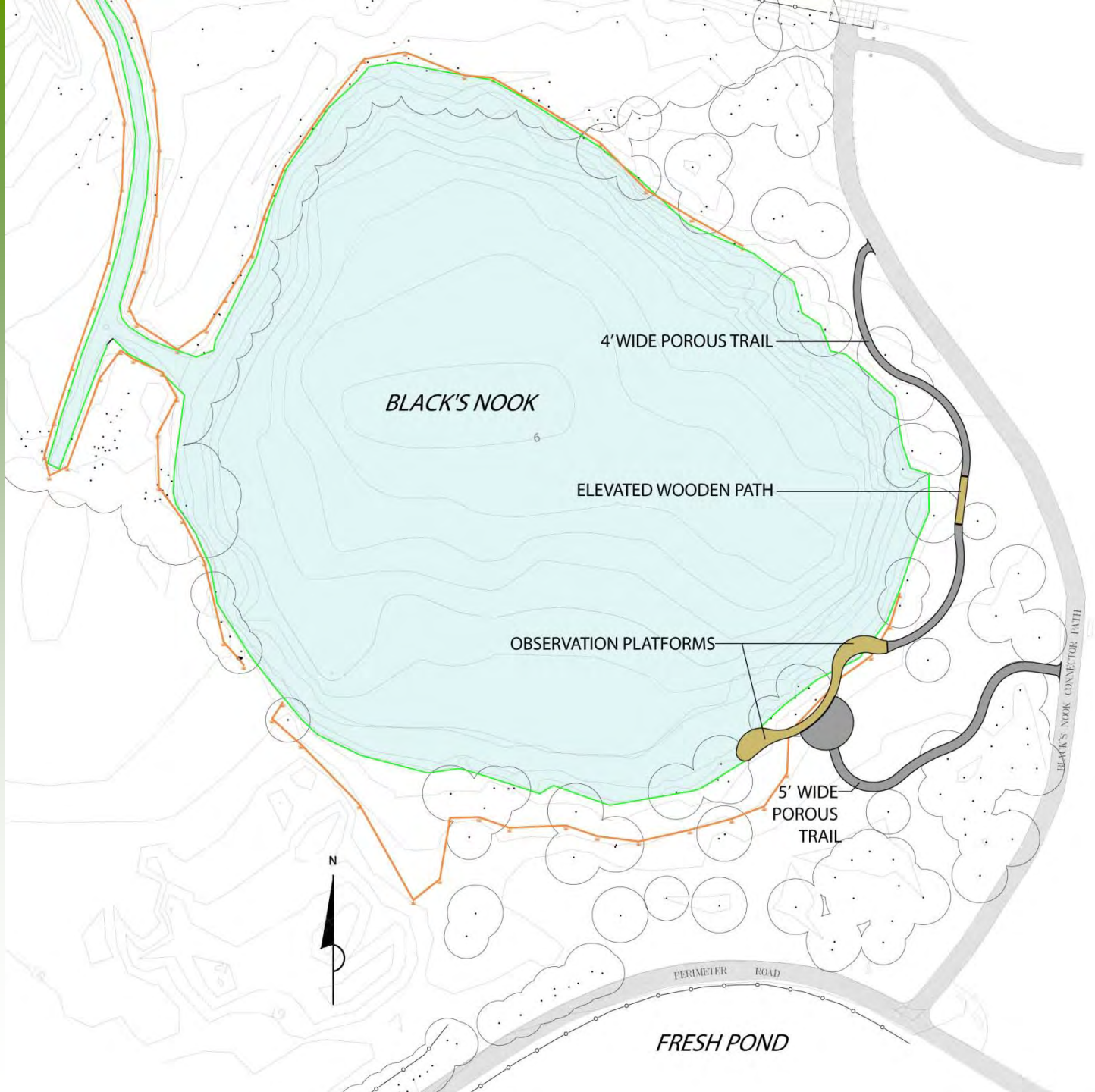
The Wild and the Beautiful, ca. 1874

Building Sustainable Communities on an Ecological Foundation
Bioengineering
GROUP

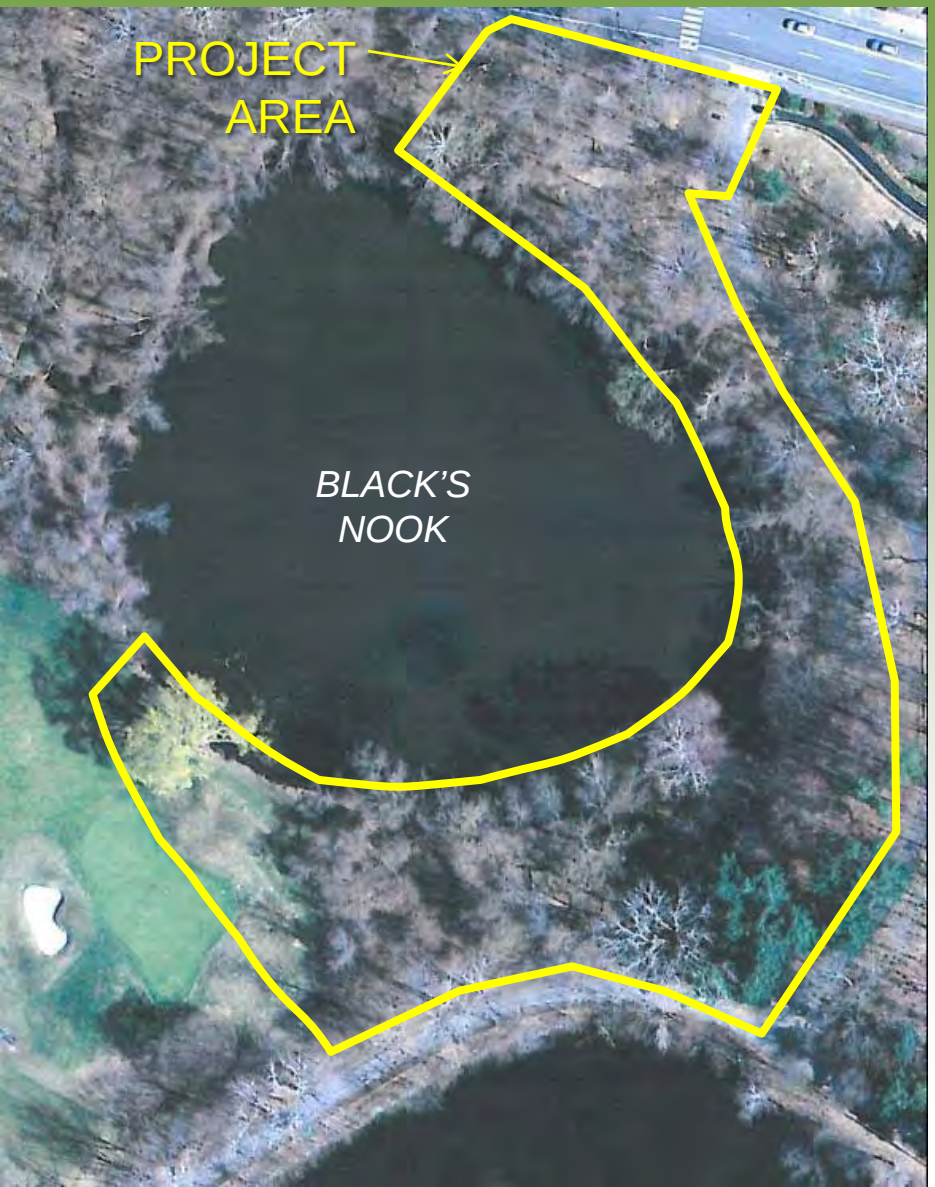
Project Goals

- Improve/maximize wildlife habitat
- Restore by natural plant communities
- Enhance water quality
- Provide accessible route
- “Soften” Concord Avenue entrance
- Enhance educational opportunities

Proposed Circulation

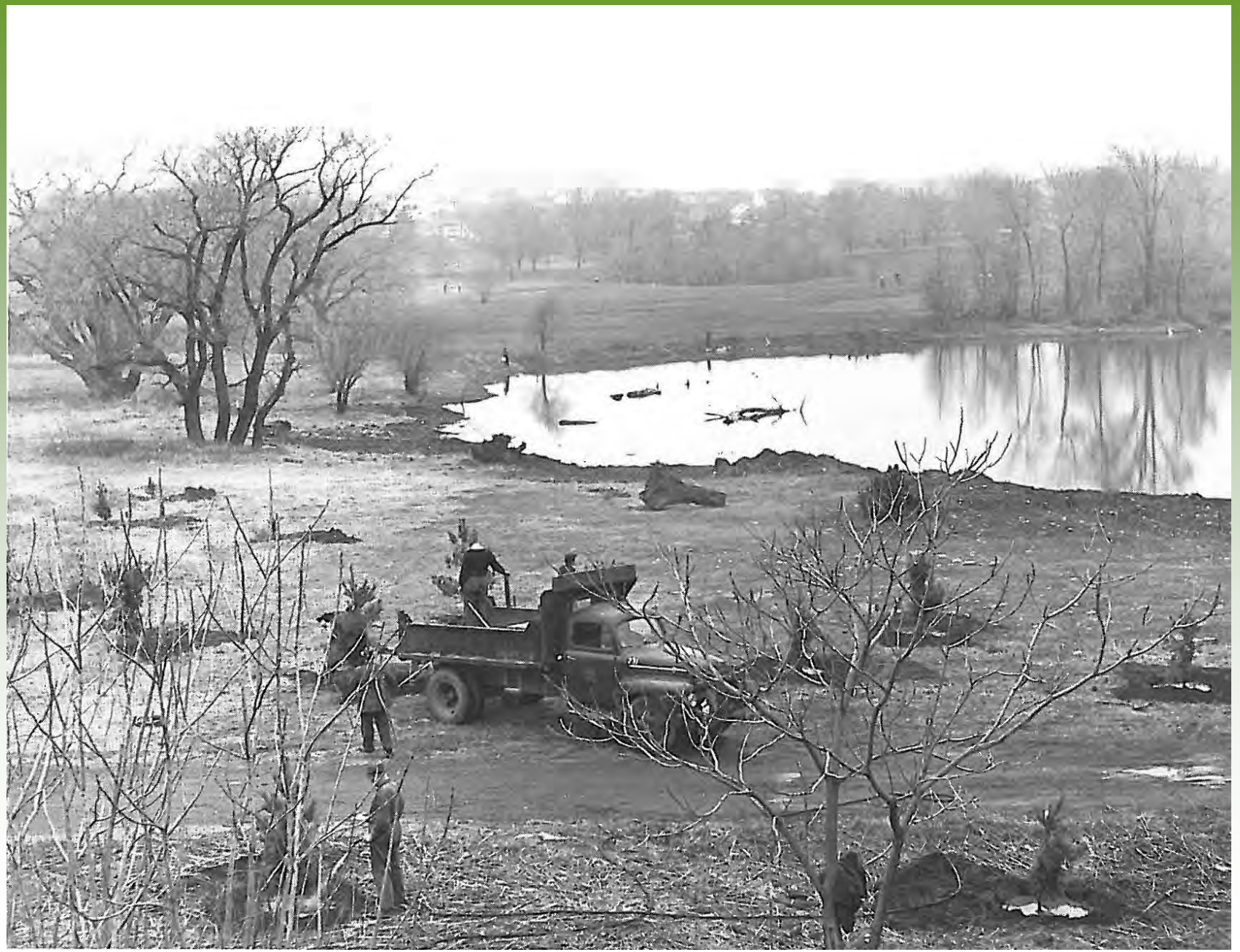


2005 Aerial Photo



Black's Nook, Circa 1920

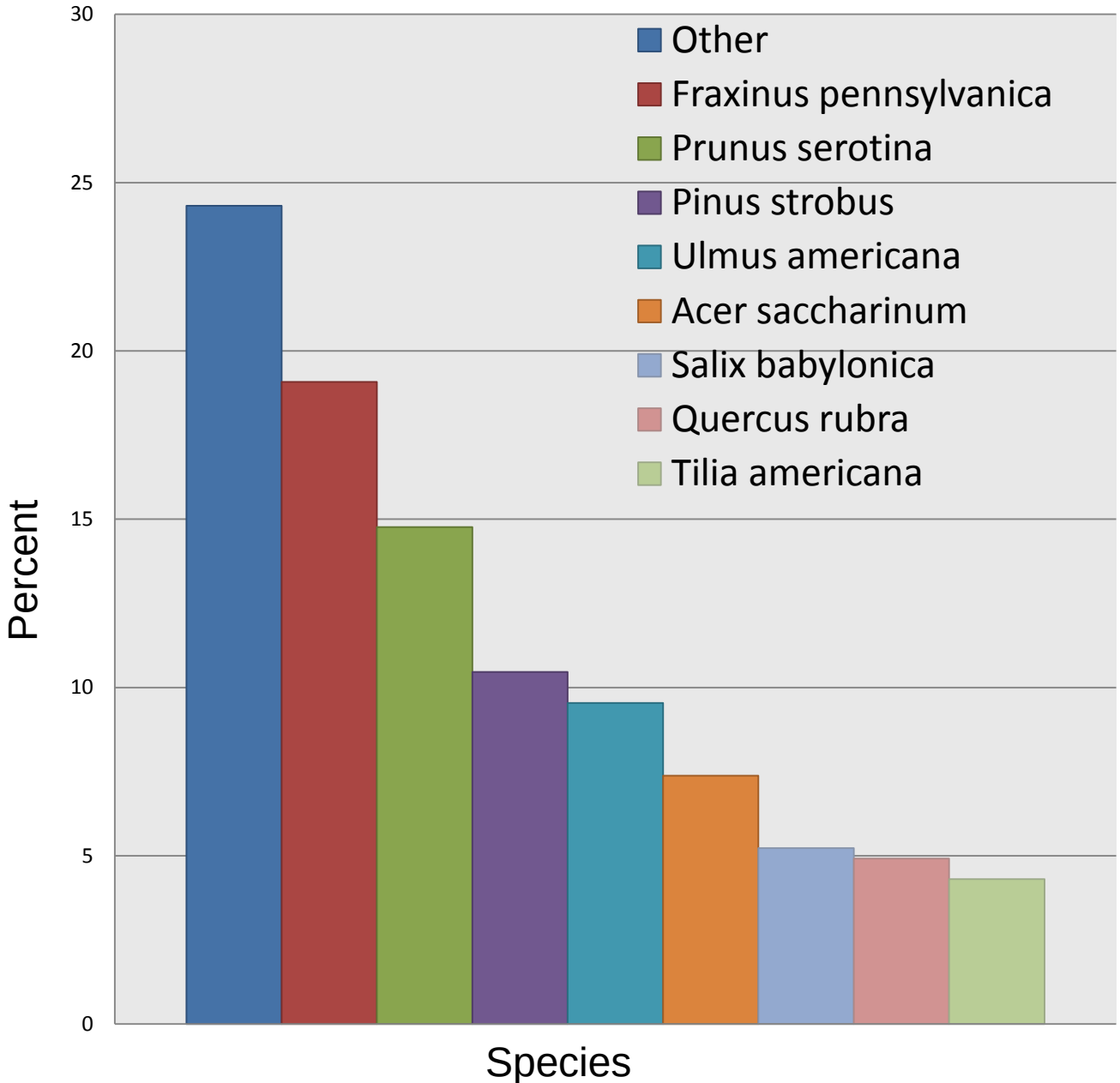
Black's Nook Restoration – 1960's



Black's Nook Restoration – 1960's

Plant and Garden Club Members

Existing Trees (>6” dia)



Other includes:

-Acer platanoides
-Acer rubrum
-Acer pseudoplatanus
-Betula papayrifera
-Crataegus sp.
-Fagus sp.
-Juglans nigra
-Malus sp.
-Morus sp.
-Platanus occidentalis
-Populus deltoides
-Populus tremuloides
-Quercus palustris
-Quercus prinus
-Rhamnus cathartica
-Robinia pseudoacacia

Restoration Strategies

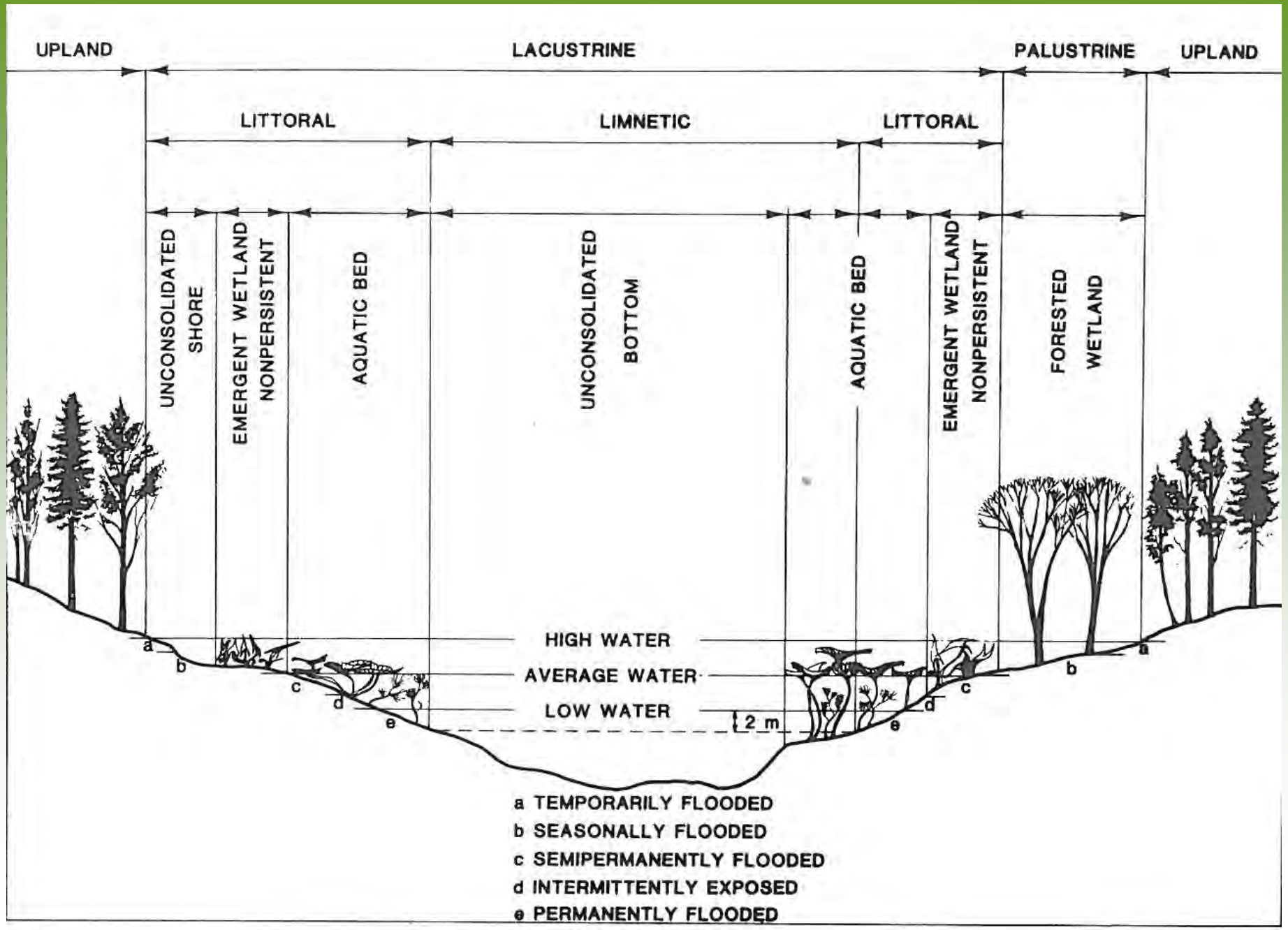
- Build on existing natural characteristics
  - Restore riparian and wetland zone by community type
    - Natural soil chemistry characteristics
    - Eliminate non-native, improve site conditions for natives
    - Add community components
  - Sculpt pond edge and littoral zone

Restoration Strategies

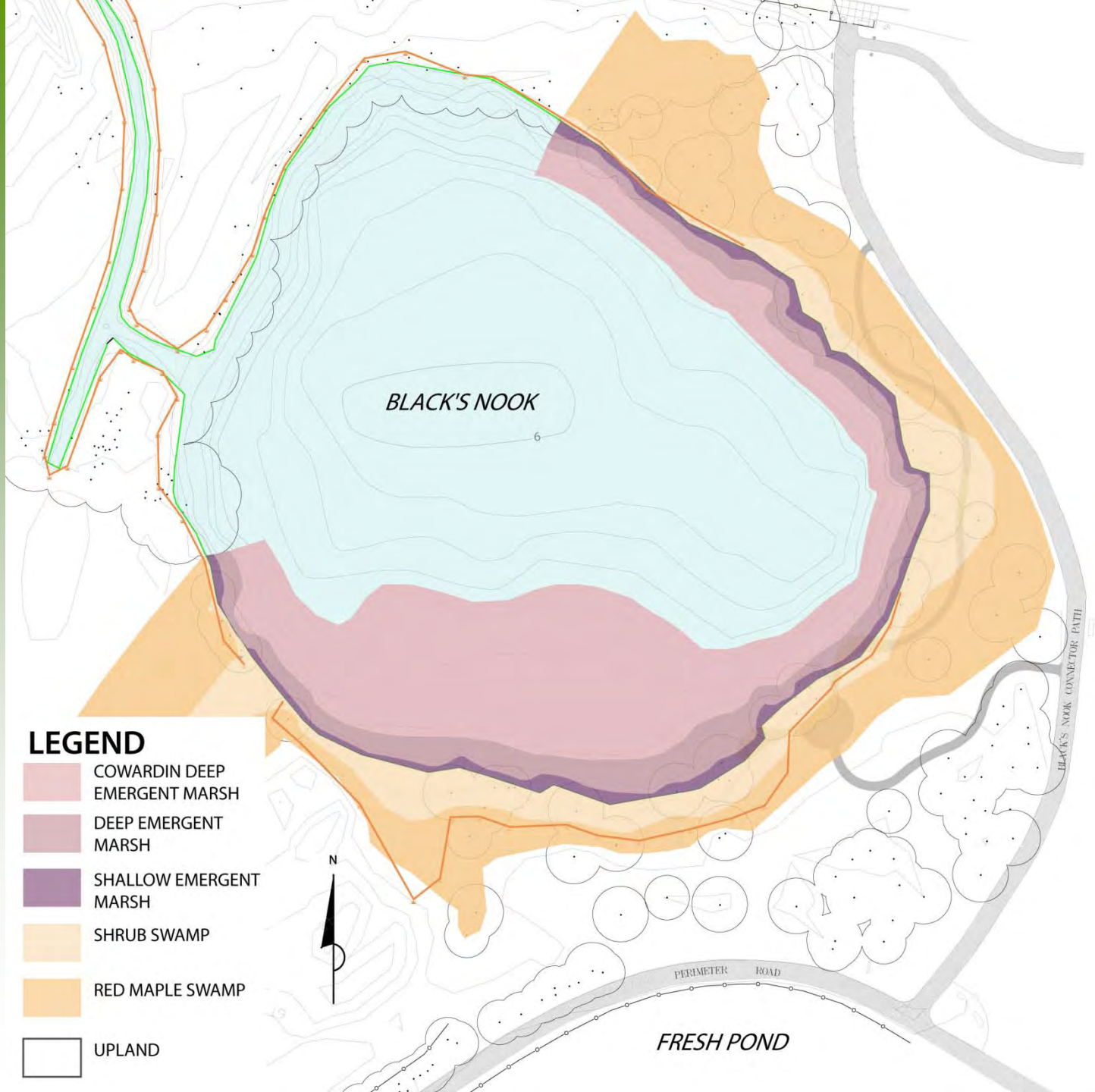
Plant Communities based on:

- Classification of Natural Communities of Massachusetts – Natural Heritage & Invasive Species Program, Division of Fisheries & Wildlife
- US Fish and Wildlife Services Classification of Wetlands and Deepwater Habitats in the US

Lacustrine System - USFWS Zones



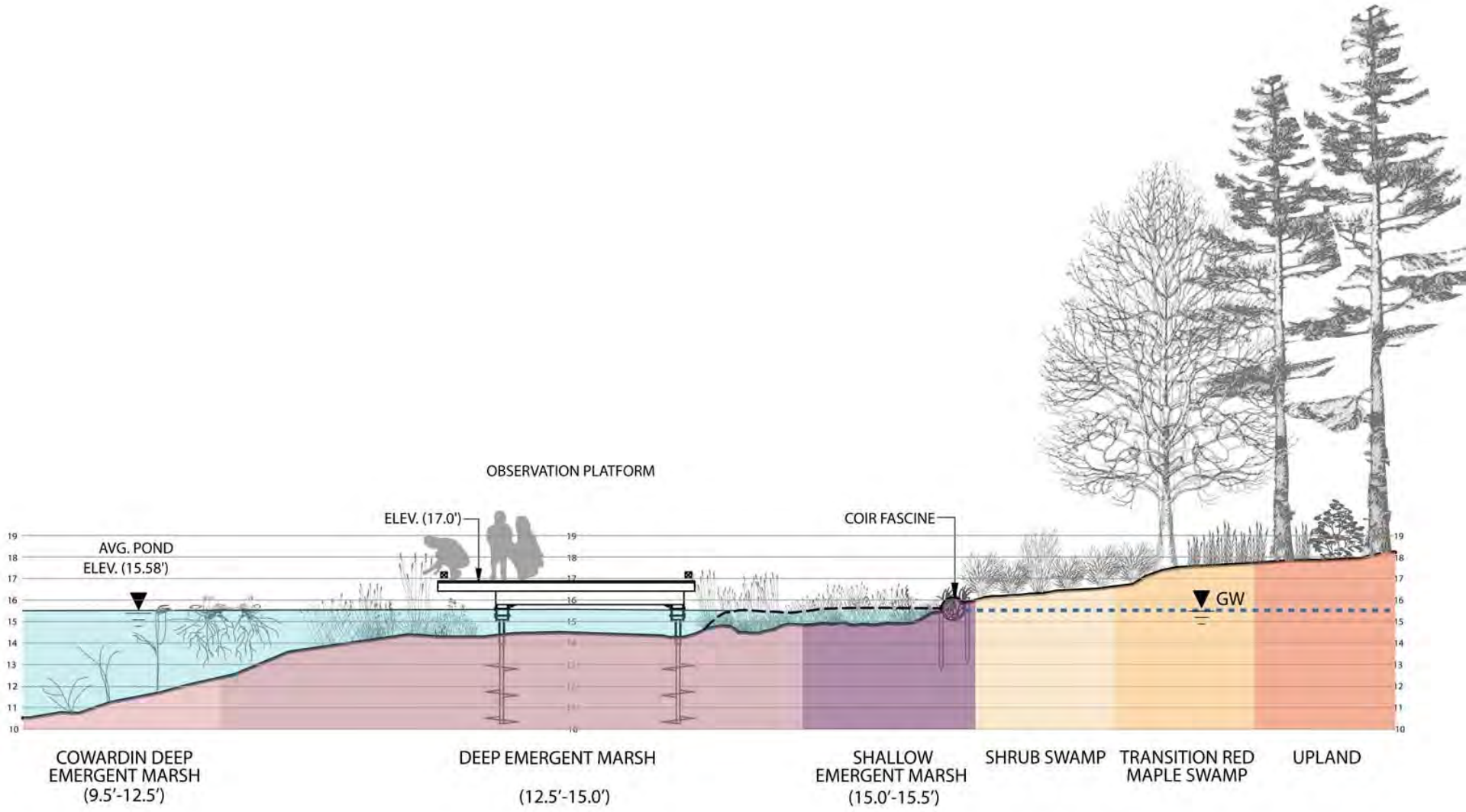
Existing Hydrologic Zones



Design Strategy: Identify Appropriate Plant Communities

- Upland
  - Red Oak – Sugar Maple Transition Forest
  - Oak-Hemlock-White Pine
- Riparian
  - Red Maple Swamp
  - Scrub/Shrub Swamp
- Littoral
  - Shallow Emergent Marsh
  - Deep Emergent Marsh
  - Cowardin Deep Marsh

Proposed Section - Restoration Zones



Upland Forest Plant Communities

- 17.5 MSL and above
  - Red Oak – Sugar Maple Transition Forest
    - Uplands south-southwest and north-northeast of the pond
  - Oak-Hemlock-White Pine Forest
    - Uplands in the vicinity of existing pine grove

Red Oak – Sugar Maple Transition Forest

- Moderate nutrient availability
- Typical tree species:
  - Northern Red Oak, Sugar Maple, Beech, Black Birch, White Pine, Hemlock
- Typical shrub/groundcover species: Viburnums, lowbush blueberry, laurel, ferns, wood asters, woodland wildflowers, grasses
- Maximize value-native forest species
  - Manage forest for native bird species (breeding, feeding and resting)
  - Locate random forest openings, snags

Oak-Hemlock-White Pine Forest

- Shallow soils, nutrient-poor soils
- Typical tree species:
  - Oaks, black birch, black cherry, red maple, hemlock, white pine
- Typical shrub species
  - Blueberries, laurels, winterberry, pipsissewa, native orchids, Canada mayflower, starflower, ferns
- Ideal vernal pool location
  - Migratory birds, small mammals, amphibians

Riparian Plant Communities

- Red Maple Swamp
  - 15.5 – 17.5 MSL
- Shrub Swamp
  - 15.5 – 16.5 MSL

Red Maple Swamp

- Shallow to thick organic layer
- Typical plant species:
  - Trees: Red maple dominate; yellow birch; black gum; green ash; white pine; American elm; hemlock; pin oak; and swamp white oak
  - Shrubs: sweet pepperbush and swamp azaleas dominate; highbush blueberry; winterberry; spicebush; speckled/smooth alder
  - Herbaceous: skunk cabbage, cinnamon fern, royal fern
- Dense and well-developed shrub layer provides valuable habitat for wildlife (food, nesting, resting, hiding)

Shrub Swamp

- Transition between emergent marshes and swamp forests

- Typical shrubs:
  - Speckled alder; smooth alder; highbush blueberry; meadowsweet; sweet gale; swamp azalea; silky dogwood; redosier dogwood; northern arrow-wood; buttonbush; winterberry; maleberry

Littoral Zone - Shallow Emergent Marsh

- 15.0-16.0 MSL – 0”- 6” water depth
- Hummocky, undulating surface
- Typical plant species:
  - Tussock-sedge; blue flag, Canada blue-joint; bur-reeds; sedges; rice-cut grass; water-lilies; pondweeds
- Excellent habitat for wetland/upland mammals; shorebirds; important habitat for amphibians/reptiles

Building Sustainable Communities on an Ecological Foundation
Bioengineering GROUP

Deep Emergent Marsh

- 6-inch to 3-foot water depth
- Typical plant species:
  - Monocots: cattail; woolgrass, common threesquare; Canada bluejoint, rice-cut grass, and tussock-sedge, pickerelweed, arrow arum
  - Dicots: Arrow-leaf hearthumb; bulbet water-hemlock; swamp candles; beggar-ticks; bedstraw; common arrowhead slender-leaved goldenrod; and marsh-fern
- Excellent waterfowl habitat, important reptiles, amphibians, marsh/wading birds and ducks

Cowardin Deep Emergent Marsh

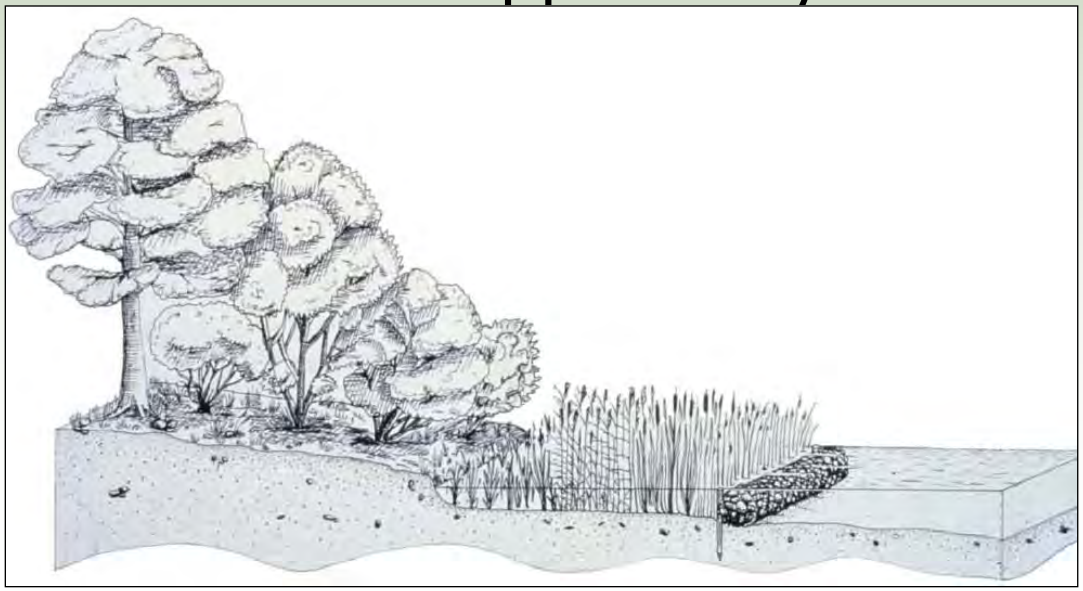
- Named according to Cowardin classification (USFWS – Classification of Wetlands and Deepwater Habitats in the United States)
- 3-foot to 6-foot water depth
- Aquatic plants: floating leaved, rooted submergent, unrooted submergent
  - White pond lily, Spadderdock, *Potomogeton*

Design Strategy: Vernal Pool Habitat

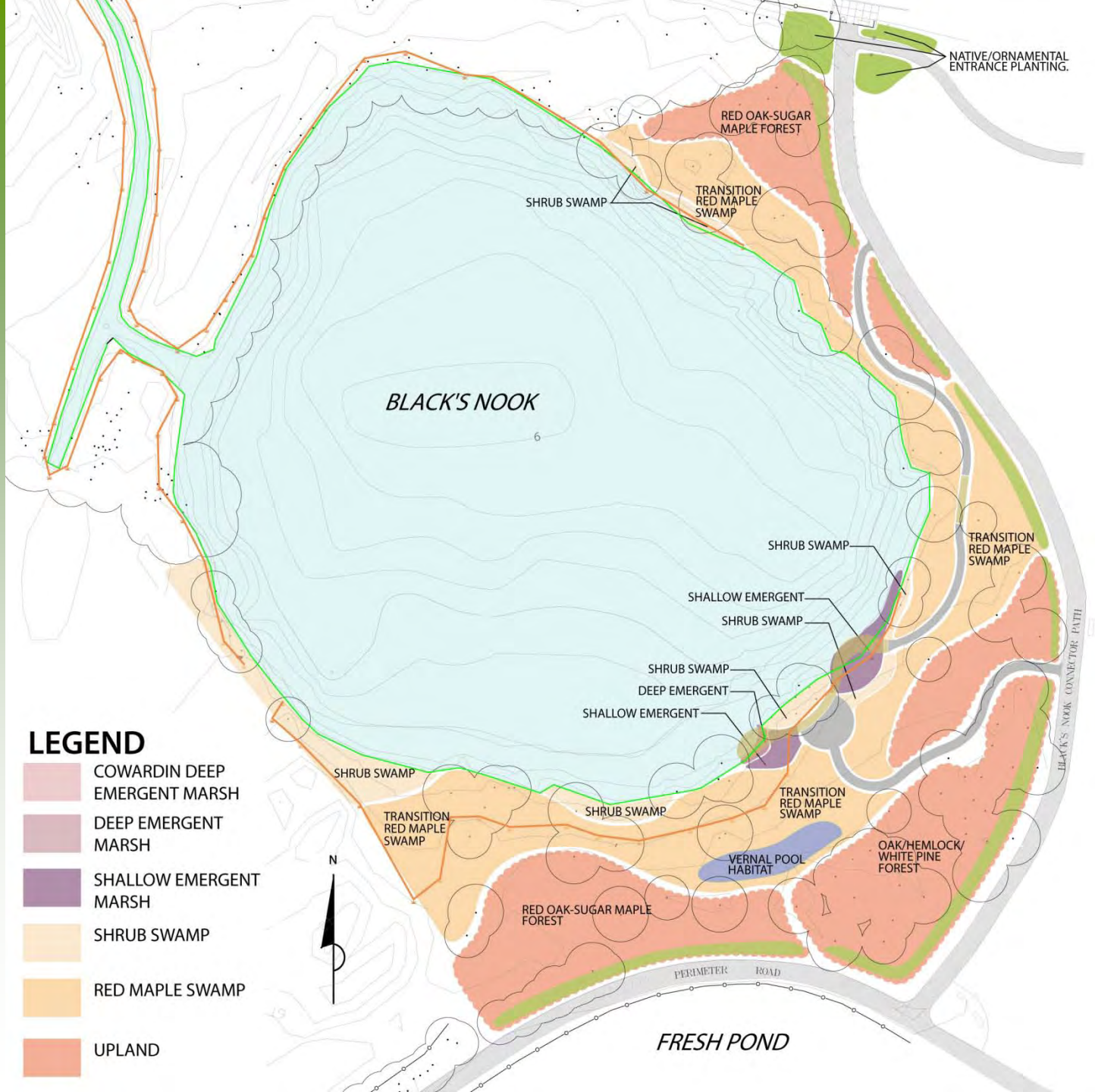
- Temporary body of water with little or no vegetation, ringed by upland trees or shrubs
- Important breeding habitat for amphibians
- Educational opportunity
- Create by excavating shallow basin and let nature take its course

Design Strategy: Constructed Shallows

- Pre-vegetated coir fascines, herbaceous plant plugs, & erosion control matting
- Uptakes soluble nutrients
- Provides habitat
- Protects shoreline
- Aesthetically pleasing
- Educational opportunity



Proposed Plant Communities



Plant Material

- Plants native to the area (no use of ornamental, hybrid native plants)
- Contract-grown plants from the area, if possible
  - Guarantee specific plants not typically cultivated and in the quantities specified
  - Locally harvested and grown
  - Improved hardiness
  - Improved quality control

Next Steps

- Informational presentation to Conservation Commission, January 25 2010
- Notice of Intent Hearing, Cambridge Conservation Commission, March 8 2010
- Invasive tree and vine removal (ongoing)
- Invasive plant monitoring, Spring/Summer 2010
- Trail, platform, and Concord Ave. improvements, Summer/Fall 2010
- Restoration plantings – Spring 2011 (includes dormant plantings)

Building Sustainable Communities on an Ecological Foundation
Bioengineering
GROUP