Environmental Science 102

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Good introduction

Vegetational Analysis of Harmon Pond

Introduction: The 1989 Wetlands Protection Act restricts the development or alteration of wetlands in an effort to control the huge losses of wetlands in the continental U.S., estimated at over 53% since the 1780's. (Berkshire Eagle, "Report maps region's shrinking wetlands." Dec. 12, 1990.) Although worded differently from the federal act, the Massachussetts state Wetlands Protection Act contains some of the same language, and illustrates the areas falling under protection by the act: "No person shall remove, fill, dredge or alter any bank, freshwater wetland, ... marsh, meadow or swamp bordering on ... any estuary, creek, river, stream, pond, or lake, or any land under said waters or any land subject to ... flooding ... without filing written notice...." (Chapter 130, 105) Some of the reasons cited for supporting wetland preservation include their natural buffer against water supply and ground water pollution and their habitats for wildlife.

While in legal language it is easy enough to reel off terms like "bank, freshwater wetland, ... marsh, meadow or swamp", actual field determinations of what constitutes each of these types of wetlands is not a clear-cut task. One of the more recent aids, although already outdated, is the 1989 Wetland Manual, whose guidelines we will follow in a field analysis of Williamstown's Harmon Pond. To determine what if any wetlands will be protected there, we look for the manual's criteria of: hydrology (inundation or saturation), hydrophyte vegetation (>50% = Obligate + Facultative Wetland + Facultative species), and hydric soils. Our analysis focuses on the vegetation, which we identified by the line-intercept method. Land protected includes, in addition to that covered by 50% indicator vegetation: banks, land under water bodies and waterways, and a 100 foot buffer zone extending from the outer limits of the 50% cover area.

Methods: To make a wetland vegetation map showing the limit of wetlands

according to the 1989 WPA, we identified species using the line-intercept method along nine transects of 100-170 feet in length. By this method one estimates the percent cover of all the species which hit a straight line through the plot. Our data were divided into three layers: herbaceous (<3 feet), shrubs (3-6 feet), and trees (>6 feet). These were then merged to identify areas meeting the 50% composition requirement, qualifying them for legal protection. The 100 foot buffer zone was drawn in, as were the characteristic demarcations of each region, e.g. tree swamp or shrub swamp. Our approach mirrors the sort of methods that might be employed to determine whether building a shopping center on the banks of Harmon Pond might hinder the natural functioning of the wetland.

Results: From each of the data reports generated from each transect, a diagrammatic representation was made for the herb, shrub, and tree layers. Appendix 1 shows the cover by OBL, FACW and FAC species (in purple), the presence or absence of hydric soil (in hot pink), the presence of standing water (in turquoise), the existence of Magee's wetland indicator species (in green), and the type of wetland according to the Massachussetts WPA's indicator species lists (in blue).

Next, a linear transect summary was made for the regions that met the wetlands definitions, or some of them. (See Appendix B) Regions abiding by the 50% cover law were classified for each of nine transects. From these results, wetland regions were sketched in on the map as best as possible given the limited number of transects. (See Map)

Discussion: Based on the methods proscribed by the Wetland Manual's definitions, only the narrow western end of Harmon Pond would fit the 50% cover definitions. To the north, south and east of the pond, the terrain slopes up to predominately hemlock-filled tree swamps (with scattered white pine and a few hardwoods). Eastern hemlock, although designated by the Massachussetts WPA to indicate a swamp, is considered by the U.S Fish and Wildlife Service to be a "facultative upland" species. These plots thus do

Probably not swamp because soil is dry

not meet the 50% cover qualifications for protection.

The wetlands to the west are flatter and more diverse of vegetation, including regions of wet meadow and marsh, emergent vegetation/ standing water, and shrub swamp (and a beaver dam!) Because the ground slopes so little here as compared with the other end, much of the area's soil is saturated or inundated with water. Well-adapted gramenoids (sedges, rushes) emerge from these wet soils, particularly wild rye, watercress, and willow herb. The shrubs, which are a little taller and have woody stems, are also highly tolerant of having roots covered by water and oxygen-deficient soils. Common among them are willow, spirea, and arrowwood. Arrowwood is among the few lone trees in the 50% cover wetlands.

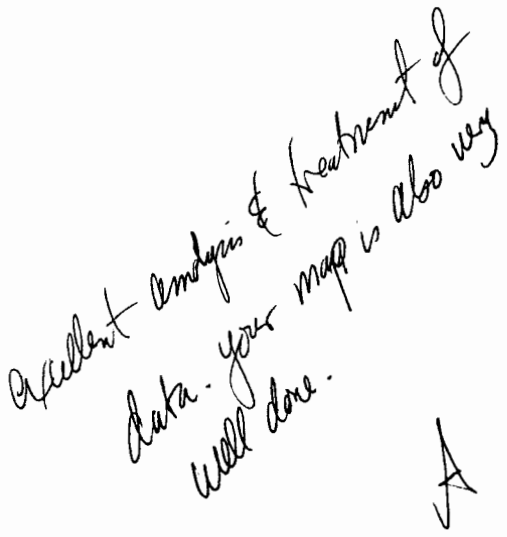
Part of the rationale behild the linear diagrams in Appendices 1 and 2 is to simultaneously display Harmon Pond's cmpliance with measures of determining wetlands provided by the USF&WS, the Massachussetts WPA, and an independent naturalist with no hidden agenda, D.W.Magee. (Freshwater Uplands, 1981, UMASS.) What these comparisons point out is the variability of wetlands. A section can have 90% cover by OBL + FACW + FAC species and overwhelmingly (90%) contain Magee's indicator species, yet because it lacks in hydric soils, it is not by law a wetland. (This example refers to transect G, 104-118 feet) For all intents and purposes, is such an area a part of the wetlands? Should it, too, be protected by law? For one thing, the wetlands is not 100% uniforn - and it is reasonable and generally accepted that the law must be laid down at some specified point. Secondly, it may be that the region of wetlands in question may be in some kind of transition, not currently fulfilling its role of water purifier. However, the fact that it is not presently covered by water does not mean that it won't be at the high end of the 1-year flood cycle, nor that it doesn't provide wildlife habitat.

In a similar plot of wetland vegetation that lacks in hydric soil, it is possible that the samplers neglected to notice that the soil was getting wetter as they went farther from the pond. In transect D, one would expect the soil to be wet from 42 to 102 feet due to overwhelming USF&WS

designation, Magee indicators, and Massachussetts WPA indicators. Whether sampling error or, as already pondered, a genuine vagrancy of nature, such indefinite data makes it hard to plot a decisive map.

Also hindering our map-making is the limited number of transects at the western edge of the pond. It was difficult to estimate the extent of the wetlands outside of the limits of the transects, and the line designating 50% cover is thus very imprecise.

Just what has this excercise taught us about the relative merits of the 1989 and 1992 means of wetland identification under the law? Simply this: neither version of the act effectively stands behind the promise, "No Net Loss of Wetlands." (George Bush, 1988) In fact, both versions make the loss of wetlands a continuing story, with a less than all-inclusive definition of what constitutes a wetlands, and what seems like a rubber-stamp yes on every appeal to develop any wet areas.



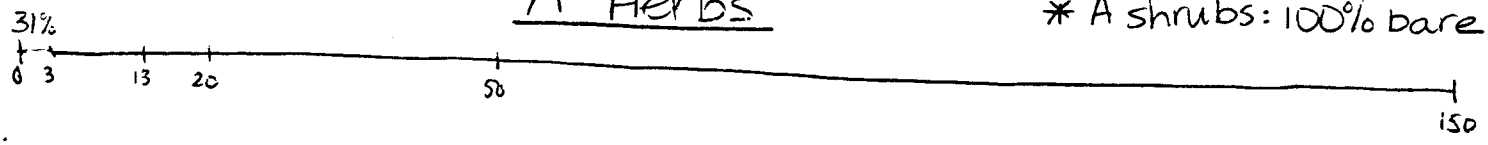
HARMON POND: LINEAR TRANSECTS

Key

- ☐ >50% Composition = OBL + FACW + FAC (1989 Wetland Manual, USF&WS)
- ☐ Massachussetts WPA Indicator Species
- ☐ [illegible]
- ☐ Hydric Soil (Wet)

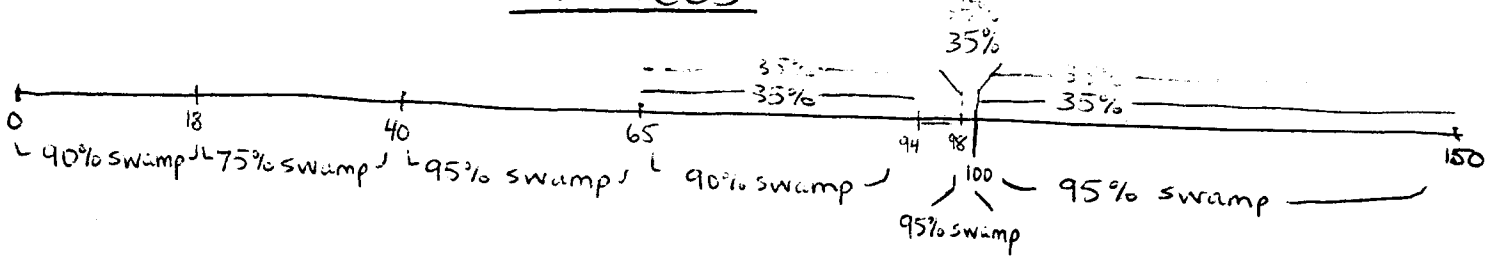
SCALE: 5 ft. 10 ft. — All Measurements in Feet

A Herbs

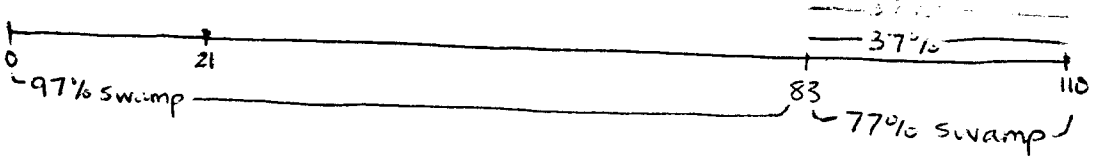


* A shrubs: 100% bare

A Trees

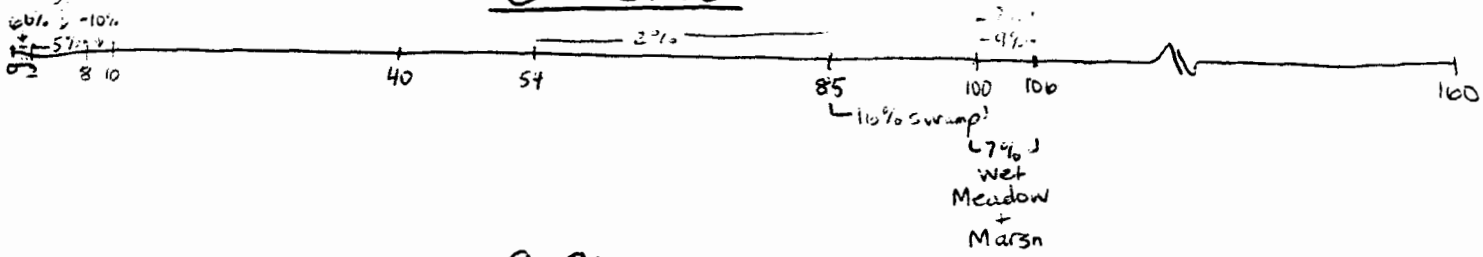


B Trees

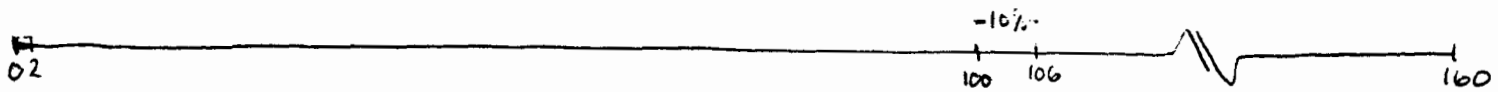


* B herbs & shrubs: no wetland species

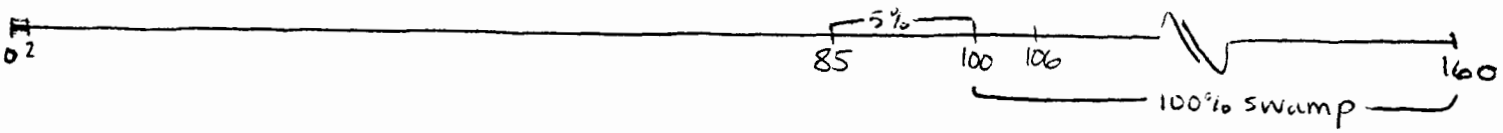
C Herbs



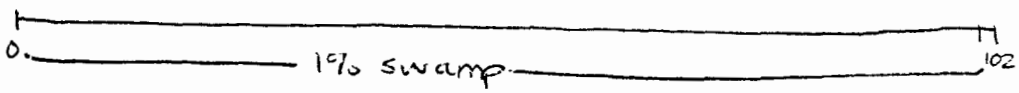
C Shrubs



C Trees

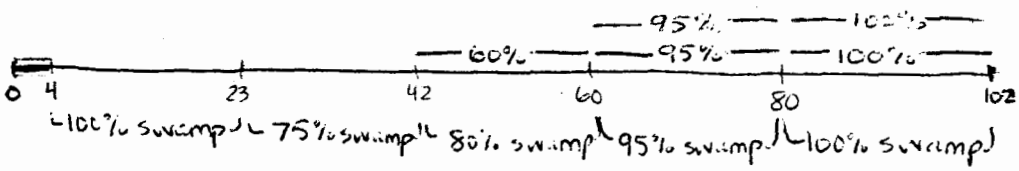


D Herbs

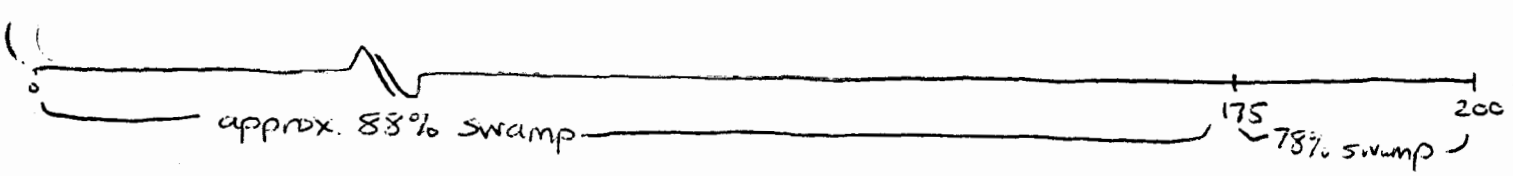


* D Shrubs: 100% Bare

D Trees

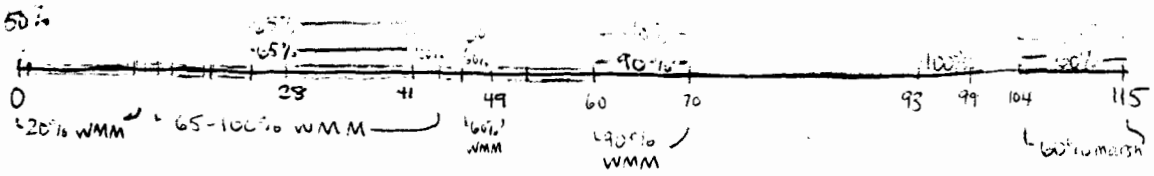


E Trees

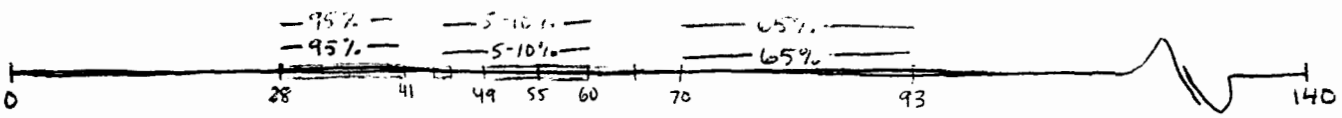


* E herbs and shrubs: 100% bare

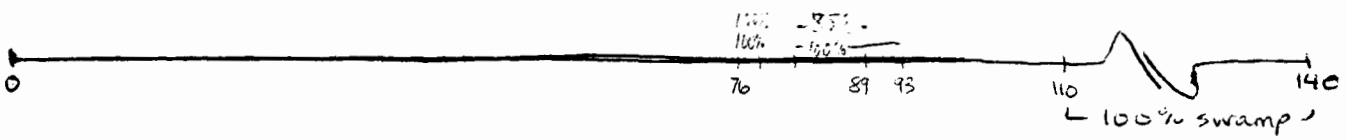
F Herbs



F Shrubs

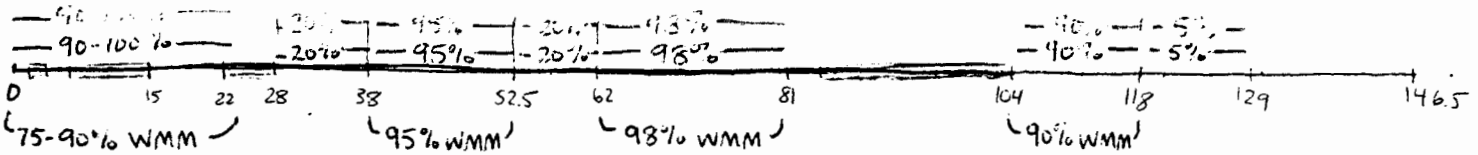


F Trees

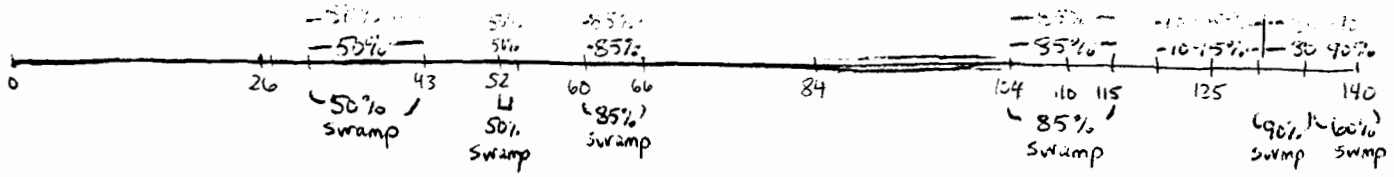


G Herbs

* G Trees: 100% Bare



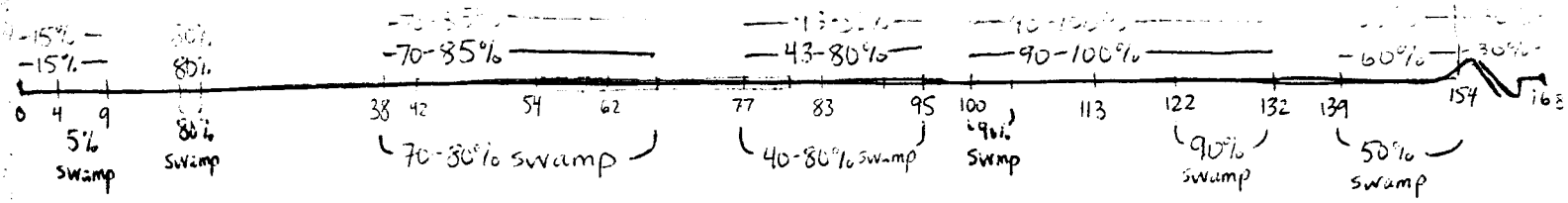
G Shrubs



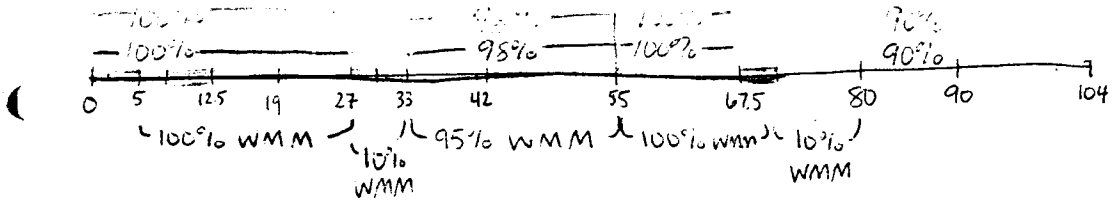
Beaver Dam: Herbs

* No wetland trees

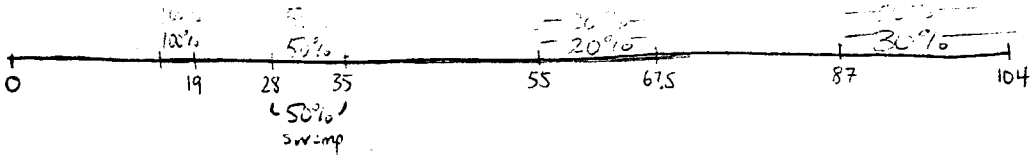
Beaver Dam: Shrubs



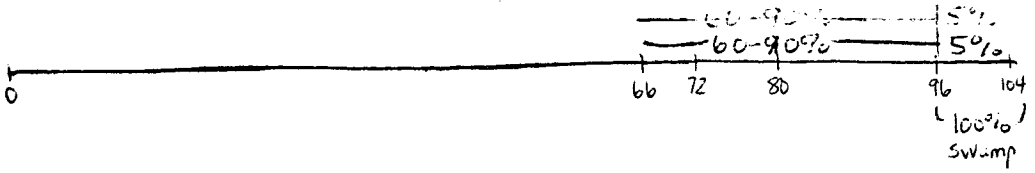
XY: Herbs



XY: Shrubs



XY: Trees



APPENDIX 2

SUMMARY OF LINEAR TRANSECTS

☐ Qualifies as wetlands by 1989 Wetland Manual:
>50% composition = OBL + FACW + FAC

☐ Type of wetlands, if >50%

☐ [illegible] ☐ hydric (wet) soil

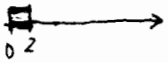
A

no wetlands

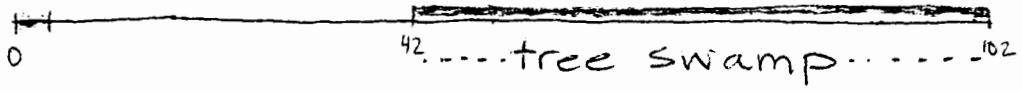
B

no wetlands

C



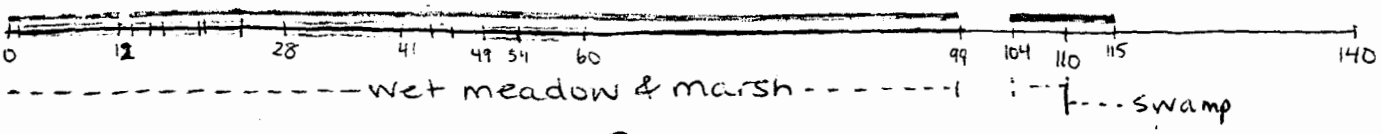
D



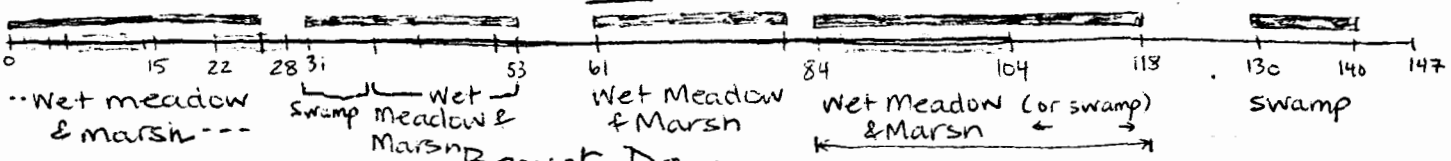
E

no wetlands

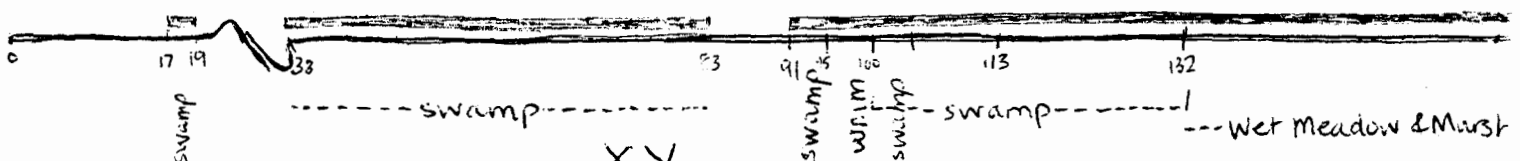
F



G



Beaver Dam



XY