

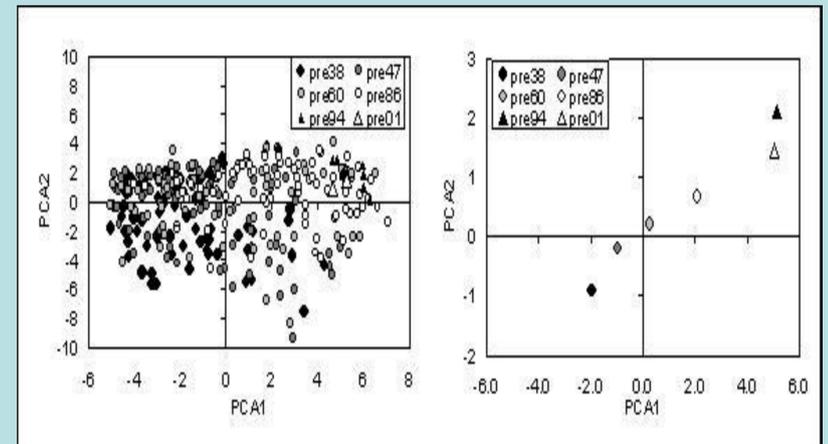


# Dune slack wetlands of Cape Cod National Seashore

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Locations and size of dune slack wetlands (polygons) within the dune landscape of Provincetown and Truro. There are more than 350 wetlands, covering an area of approximately 135 acres, fostering over 100 different wetland plant species.



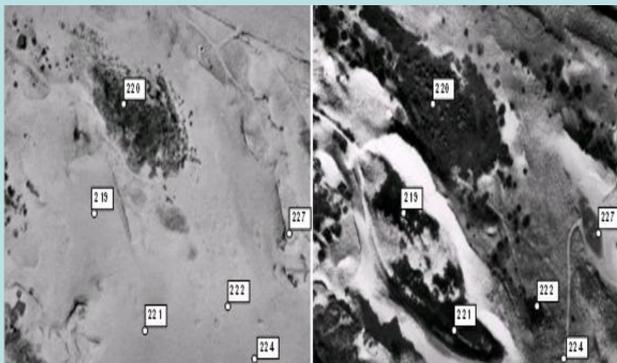
Principle Components Analysis of dune slack wetland species composition, separated by age class. The graph on the right shows the centroids of each age group cluster.

Interdunal seasonal wetlands, also known as dune slack wetlands, were mapped and their vegetation surveyed across a large region of dunes within the Cape Cod National Seashore. Wetland sizes and ages were estimated from digitized, georeferenced aerial photographs taken in 1938, 1947, 1960, 1986, 1994, and 2001, and from LIDAR elevation data.

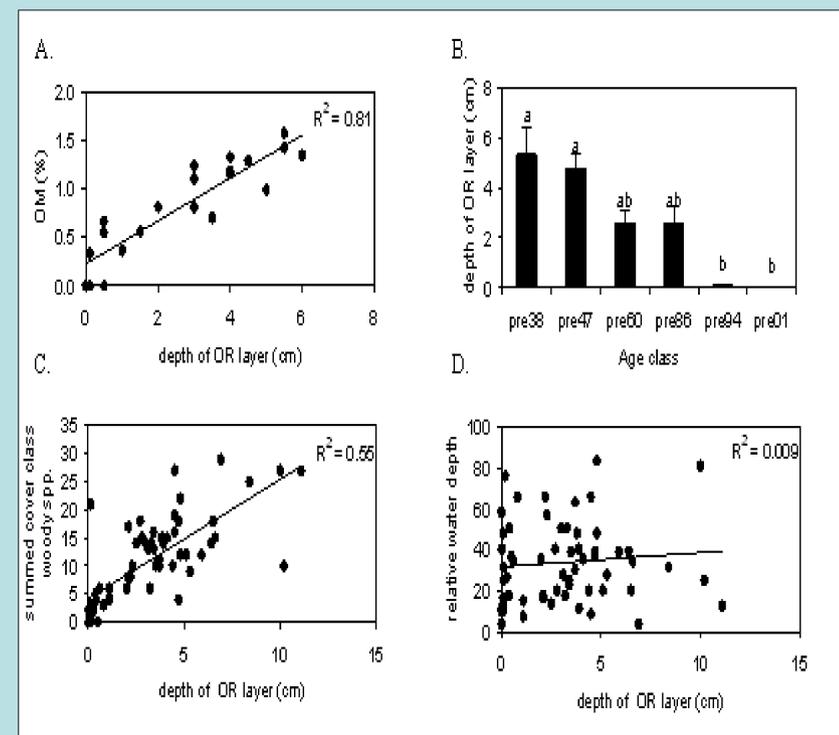
Vegetation structure and composition exhibited a distinct pattern of development with age, followed a pattern of succession from herbaceous, graminoid-dominated communities to shrub and/or tree-dominated communities. Soil organic matter accumulated throughout this sequence of change. The close correlation of these vegetation and soil variables with age suggests that vegetation dynamics are primarily driven by internal processes and that environmental factors explain only a minor fraction of physiognomic variability among existing wetlands. Notwithstanding, any changes in the environment that alter the process of succession will collectively influence the character of these wetlands. In addition, stabilization of the dunes resulting in a reduction in the formation of new wetlands, may translate into permanent loss of early and mid-successional dune slack communities. Maintenance of these communities will depend on succession being periodically reset by disturbance.



Oblique aerial photo showing the dune landscape interspersed with dune slack wetlands



Creation of dune slack wetlands by dune movement. On the left is a photo from 1960. On the right is the same parcel of land in 1987. Present-day wetlands are labeled numerically.



Relationships between the depth of the organic layer in dune slack wetland soil cores and % organic matter, age class, cover of woody species, and relative water depth.



*Calapogon tuberosus* *Kalmia angustifolia* *Xyris difformis*



Field crew surveying a dune slack wetland in the Province Lands

| COVER | OBL     | FACW  | FAC    | Trees  | Shrubs | Shrubs* | Sub-shrubs | Gram-inoids | Forbs | Vines | Ferns | Moss  | Woody spp. | Woody spp.* |
|-------|---------|-------|--------|--------|--------|---------|------------|-------------|-------|-------|-------|-------|------------|-------------|
| pre38 | 13.1 a  | 8.0 a | 8.3 a  | 0.9 a  | 11.9 a | 10.1 a  | 4.8 a      | 6.3 a       | 3.4 a | 0.7 a | 1.4 a | 0.3 a | 27.7 a     | 15.8 a      |
| pre47 | 10.7 b  | 5.2 b | 7.8 a  | 0.5 ab | 10.4 a | 7.6 b   | 4.9 a      | 5.2 a       | 2.4 a | 0.4 a | 0.5 a | 0.3 a | 23.4 a     | 13.0 a      |
| pre60 | 10.2 b  | 3.9 b | 10.2 b | 0.2 b  | 9.8 a  | 6.2 bc  | 4.6 a      | 6.6 ab      | 2.9 a | 0.1 a | 0.0 a | 0.4 a | 20.8 a     | 11.0 b      |
| pre86 | 11.6 ab | 4.7 b | 11.6 b | 0.2 b  | 9.1 b  | 4.6 c   | 4.6 a      | 10.5 b      | 3.9 a | 0.1 a | 0.2 a | 0.9 a | 18.5 a     | 9.4 b       |
| pre94 | 6.9 c   | 3.0 b | 9.3 a  | 0.0 b  | 3.6 c  | 0.1 d   | 2.1 b      | 12.4 bc     | 4.2 a | 0.0 a | 0.0 a | 0.0 a | 5.8 b      | 2.2 c       |
| pre01 | 1.7 d   | 2.0 b | 5.3 a  | 0.0 b  | 1.7 c  | 0.0 d   | 0.0 b      | 9.3 b       | 0.3 a | 0.0 a | 0.0 a | 0.0 a | 1.7 c      | 0.0 d       |

Mean of summed cover class values for species belonging to various wetland indicator categories and growth forms, separated by age class (statistically similar values share a common letter).