RHODE ISLAND DIVISION OF PLANNING

Legislative Task Force

Meeting #3

Tuesday November 19, 2013
8:00 – 10:00 AM

Room 300, 3rd Floor
Department of Environmental Management
235 Promenade Street Providence, RI

Agenda

8:00 Welcome and Overview of Agenda – *Kevin Flynn, DOP*

8:05 Amendments to meeting notes for 10.24.13 - All

8:15 Subject Topics and Technical Presentations:

A. Wetland Functions and Values
   a. Christopher Mason, President, Mason and Associates, Inc.

B. Questions & Task Force Discussion – *All - moderated by Kevin Flynn, DOP*

9:50 Next Steps – *Nancy Hess, DOP*

10:00 Adjourn

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Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Vincent Murray (Municipal Representative – South Kingstown), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative-Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), Leslie Taito (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Carol Murphy, Ernie Panciera, Terry Gray, and Nicole Pollock. Nancy Hess and Paul Gonsalves were on hand from DOP.

Elected officials present include Rep. Teresa Tanzi, Rep. Donna Walsh, and Rep. Arthur Handy.

Introduction

Kevin Flynn began the meeting with an introduction of the meeting's guest speaker, Christopher Mason, Principal Scientist and President of Mason Associates. Mr. Mason provided for the task force a presentation on the functions and values of wetlands, a copy of which can be found here.

Wetlands Functions and Values

The presentation began with examining the multiple and varying functions of one particular wetland in Westerly, Rhode Island. Mr. Mason highlighted the multiple roles the wetlands plays, such as a drinking and agricultural water source, floodwater storage, pollution filtration, food chain support, wildlife habitat, nutrient filtration, recreation, and others. The example showed that a single wetland can provide multiple functions for the surrounding area.

There are many different types of wetlands, however swamps are the most common type of wetlands in the state, which can vary in inundation. Mr. Mason explained that a wetlands doesn't necessary mean the land is always submerged, but the water table may be within one foot of the surface. Other wetlands types include bogs, fens, marshes, wet meadows, rivers, (intermittent) streams, lakes, vernal (seasonal) pools, coastal features, and more. The wetlands are all hydrologically interconnected, and can support one another throughout the year as waters traverse the topography. Climate change, urban development, and other factors impact wetlands over time. These impact can be difficult to measure, as observations can provide a snapshot of the current state of a wetland but may not be apparent without data from a longer span of time. Wetlands most often occur on flat land. Topography and geology affect how water flows both above and underground. Often, where an area of land is below the local water table, wetlands will develop. However, wetlands can develop on slopes, hills, and other types of topography.

One of the most important functions wetlands provide is a source of drinking water and water for agricultural uses. Mr. Mason shared that, while industrial processes can use a large amount of water, that water often must be cleaner than drinking water, so it would require additional filtration.

Wetlands can store floodwaters after a storm, but one of the most important aspects of floodwater retention is the deceleration of waters as they are absorbed by the wetland. These waters are slowed as they spread across the wetlands, recharge the local water table, and are slowly released downstream.

Questions

Lorraine Joubert asked Mr. Mason about identifying floodplains for smaller wetlands. He said that it would need to be calculated, either by observation or by hiring an engineer to measure and model the area. Mr. Casali explained the process of how an engineer would measure a wetland for that purpose. Several members asked about variables for modeling a wetland for floodwater capacity. Mr. Mason explained that models are only as good as the data input to it, and seeking very minute measurements can easily become very expensive.

Functions and Values cont'd

The next portion of the presentation centered around nutrient and soil interactions with wetlands. Mr. Mason related the relationship between water velocity, the "solution", and nutrient particles. As water slows, microbes, metals, nutrients, and soils will separate from the water and settle in the wetland. This can have a big impact on the microbial food chain, as well as the levels of nitrogen in the wetland. Nutrients, as well as pollutants, may be trapped in the wetland depending on how fast or slow it's water moves. To demonstrate the collection of pollutants in wetlands, Mr. Mason detailed the wetland decontamination and construction project he was a part of at the University of Connecticut, as well as some examples of wildlife that use wetlands for habitat.

Questions

Ms. Joubert asked Mr. Mason to expand upon pathogen export from wetlands. He explained that many of the pathogens can be attributed to wildlife that uses the area, however studies can be performed to detect sources of viruses and pathogens, such as DNA testing.

Functions and Values cont'd

The next section of the presentation related to wildlife that interact with wetlands. Fish and shellfish an example of an obligate species, those that require the wetlands to survive. A wood duck, he explained, depends on the wetland to eat, hide from predators, breed, and would not be present in an area without the wetlands to support it. Facultative species are those that use the wetlands, but do not depend on it entirely.

Social and cultural values are those people use for enjoyment and recreation. Aesthetic value is an example of a social value. Waterviews and open space enhance property value because many people traditionally enjoy them. Many recreational purposes use wetlands, such as swimming, hiking, hunting, and many others. Mr. Mason closed his presentation with a restatement of the benefits that wetlands provide us. Viable drinking water sources are vitally important to us as a society. They add tremendous value to a local society, including economic value.

Questions

Members were invited to ask question of Mr. Mason after the conclusion of his presentation. Mr. Prive asked about the role of phosphorus in wetlands. Mr. Mason explained that phosphorus is often the limiting nutrient for plants, that their growth is stymied by the limited amount of phosphorus. Ms. Coit asked about the loss of wetlands since colonial times, and about wetlands construction. He answered that loss of wetlands over such a long period of time is difficult to measure due to the lack of measurement over time. Mr. Boyd shared that over a 200 year span, there exists about half the wetlands that there used to be, with the loss mostly due to development and land use over time. He stressed that this is an important reason to prevent unchecked development or overdevelopment. As for wetlands creation, Mr. Mason cited his University of Connecticut project. He explained that is very expensive, and can be quite complicated to engineer and monitor. Members discussed the loss of wetlands and its factors. Mr. Casali had a question about pathogen removal, and the conditions that would best remove them from a wetland. Shallow waters provide denitrification and serve this role well. Members then discussed trends in zoning setbacks from wetlands and local regulations with Mr. Mason.

Next Steps and Next Meeting

The next meeting is on December 19. Nancy Hess, DOP, shared that the materials from the presentation would be available on the Statewide Planning Program website, and that the topic of the next meeting would be the area immediately surrounding the wetlands and lands typically contained within the zoning setbacks.

Adjourn
10:00 AM

Why Protect Wetlands?

WETLAND FUNCTIONS & VALUES

Presentation to the

RI Legislative Task Force

November 19, 2013

By Christopher Mason, PWS

President, Mason & Associates, Inc.

WHY PROTECT WETLANDS?

WETLAND FUNCTIONS AND VALUES:

- Water Supply
- Flood Control / Storm Damage Prevention
- Pollution Filtration / Transformation
- Productivity – Food Chain Support
- Protection of Fisheries / Shellfish
- Wildlife Habitat & Biodiversity
- Open Space / Recreation / Education

Wetland Functions & Values

Function: Action that a wetland performs

- ***Example:*** Storage of surface water runoff after a storm

Value: Benefit of that function to society

- ***Example:*** Prevention of flood damage to property.

Overview:

- What are wetlands? (Examples)
- What functions do wetlands perform?
- Why do we care?

What Are Wetlands?

Various definitions by science and regulation.

For this presentation, "wetlands" include:

- Swamps, Marshes, Bogs, Fens, Wet Meadows
- Lakes, Ponds, Pools (standing water)
- Rivers, Streams, Channels (flowing water)
- Areas that Flood

Federal Definition
U.S. Fish & Wildlife Service

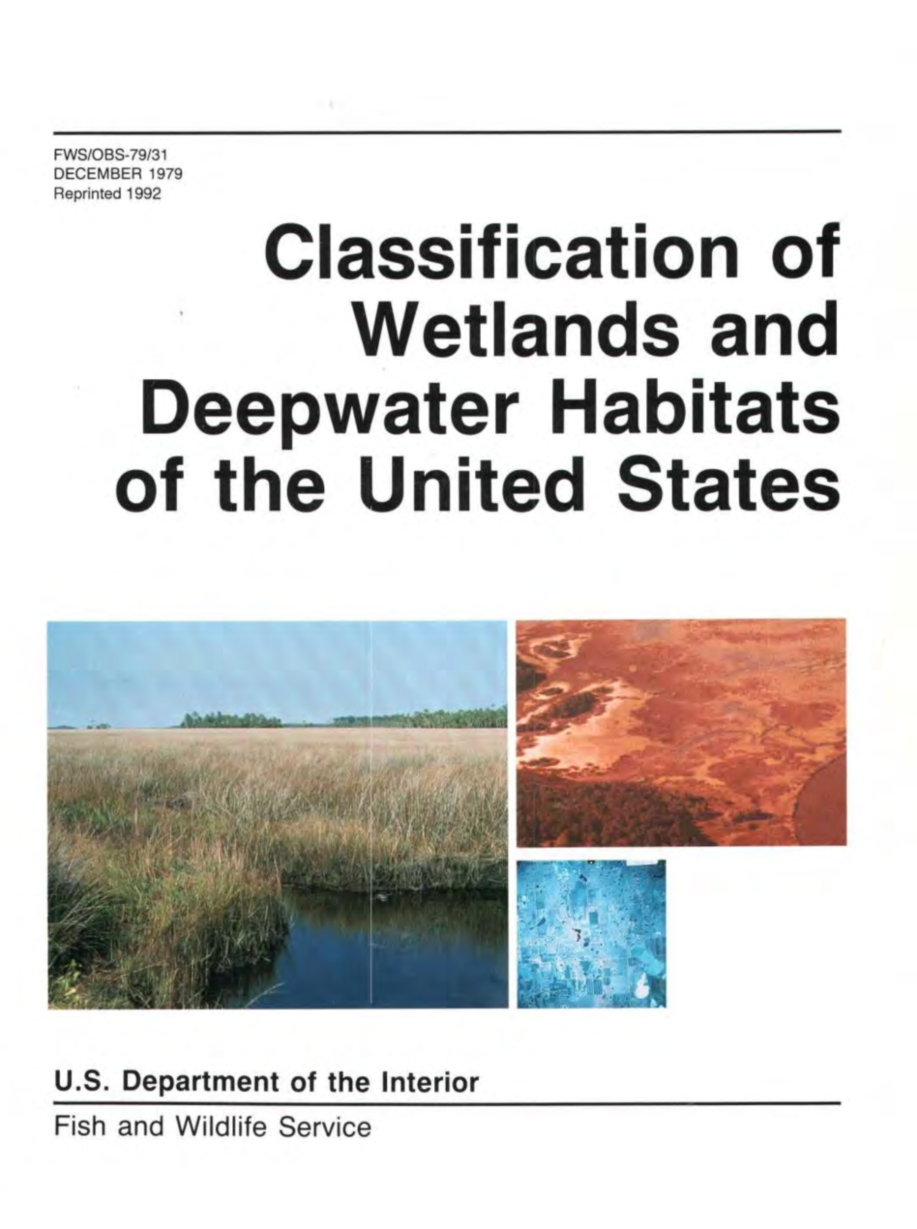
WETLANDS are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

USFWS manages wetlands on USFWS Preserves, sponsors wetland research, maps different wetland types (National Wetlands Inventory), and is a partner in federal wetland policymaking

U.S. Fish & Wildlife Service – National Wetlands Inventory

Federal Classification:

- Provided common language for describing wetlands nationwide
- Allowed mapping of wetlands across the U.S. (National Wetlands Inventory)
- Allows tracking of wetland losses (and gains) nationwide
- Can be used at different scales
- Required of all federal projects


FWS/OBS-79/31
DECEMBER 1979
Reprinted 1992

Classification of Wetlands and Deepwater Habitats of the United States

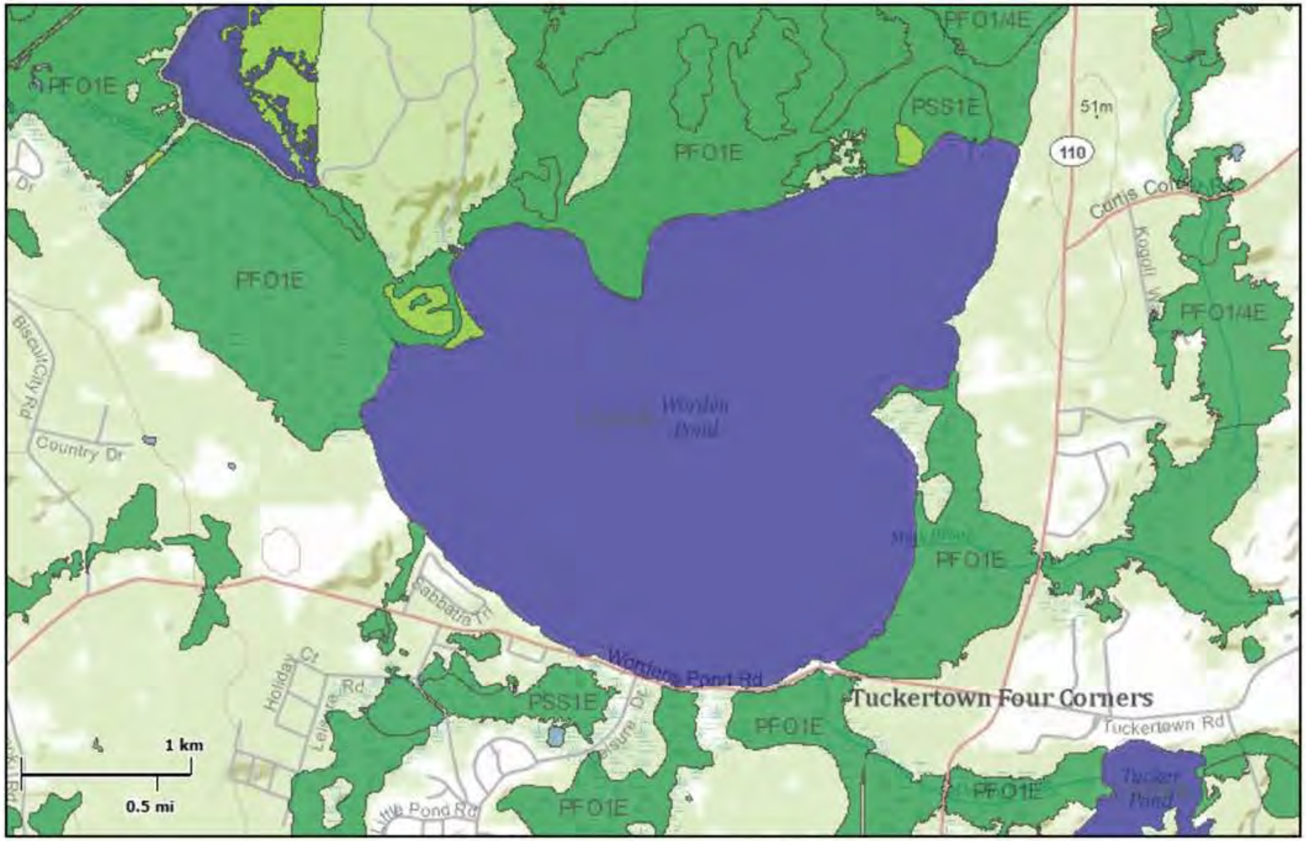
U.S. Department of the Interior
Fish and Wildlife Service

U.S. Fish and Wildlife Service

National Wetlands Inventory

Worden Pond

Aug 27, 2010



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deetwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

NWI on Shaded Relief Topo

Federal Definition
Army Corps of Engineers

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The federal Clean Water Act Section 404 protects “waters of the United States”, including wetlands

The Corps Leads Federal Wetland Regulation – and More

Wetland Definition – The Three Parameters

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetland Identification & Delineation: Three Parameter Approach

Wetland Hydrology –
Flooded to Seasonally Saturated

Wetland Vegetation – "Hydrophytes"
Occur in Wetlands 50% or More

Wetland Soils – "Hydric Soils"
Features Present Year-Round

"THREE PARAMETER APPROACH"

Wetland Hydrology –

Flooded to Seasonally Saturated

“THREE PARAMETER APPROACH”

Wetland <u>Vegetation</u>

“Hydrophytes” -
Species Occurs in Wetlands 50% or More Often

Official List Under Revision

"THREE PARAMETER APPROACH"

"Hydric Soils"

Redoximorphic Features

Features Present Year-Round

Wetland Types – Swamps

Atlantic White Cedar
Often Flooded

Red Maple
Flooded to Seasonally Wet

Wetland Types – Bogs / Fens

Low Nutrients: Stunted Growth, Carnivorous Plants, Peat

Wetland Types – <u>Marshes</u>

Mostly Herbaceous

Pools, Shallow Flooding

Wetland Types – Wet Meadows

Mostly Herbaceous

Seasonally Wet Pastures

Also “Wetlands”

Rivers

Streams

Also "Wetlands"

Floodplains

Intermittent Streams

Also “Wetlands”

Lakes

Ponds

Also "Wetlands"

Tidal Marshes & Creeks

Beaches & Shallow Waters

Wetland Functions

- Water Supply
- Flood Control / Storm Damage Prevention
- Pollution Filtration / Transformation
- Productivity – Food Chain Support
- Protection of Fisheries / Shellfish
- Wildlife Habitat & Biodiversity
- Open Space / Recreation / Education

Water Supply

- Landscape Position, Topography, & Geology Are Key to Water Supply Functions of Wetlands
- Surface Water Recharge / Discharge
- Ground Water Recharge / Discharge

RED MAPLE SWAMPS 15

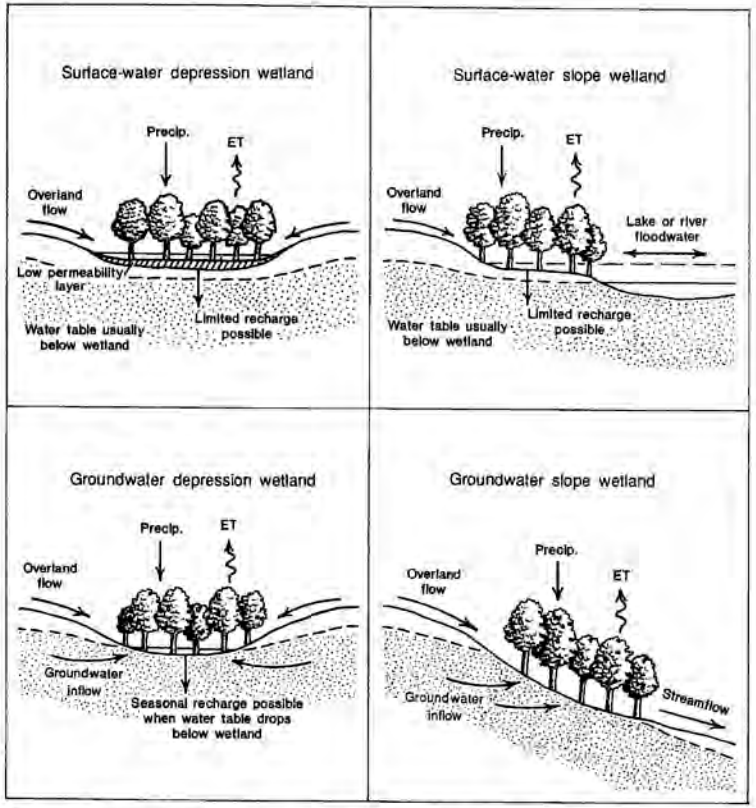


Fig. 2.2 Inland wetland hydrologic classes (based on Novitzki 1979a, 1982). The *shaded area* is the groundwater zone; its upper surface is the water table.

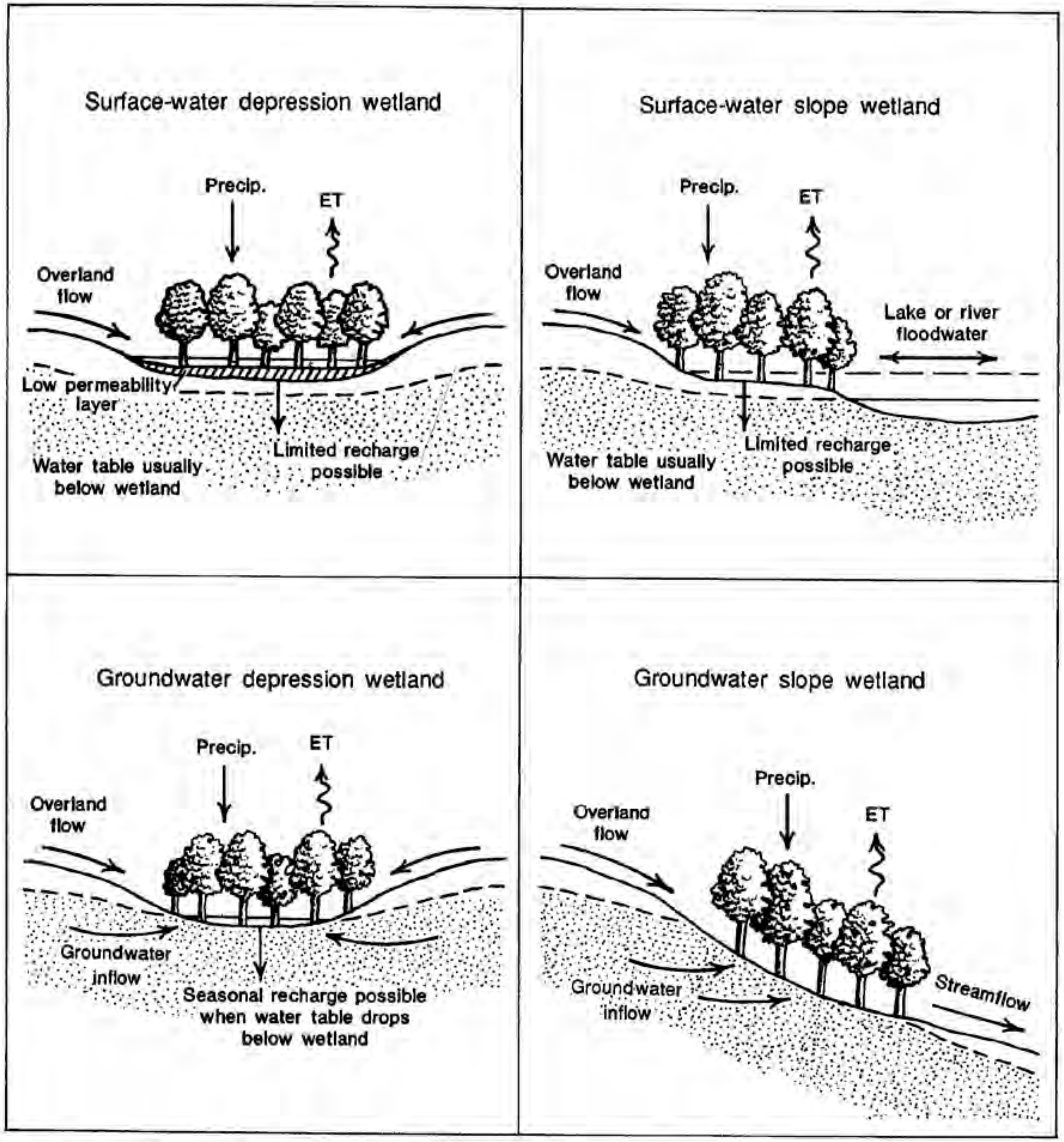


Fig. 2.2. Inland wetland hydrologic classes (based on Novitzki 1979a, 1982). The *shaded area* is the groundwater zone; its upper surface is the water table.

Water Supply: Surface Water Reservoirs

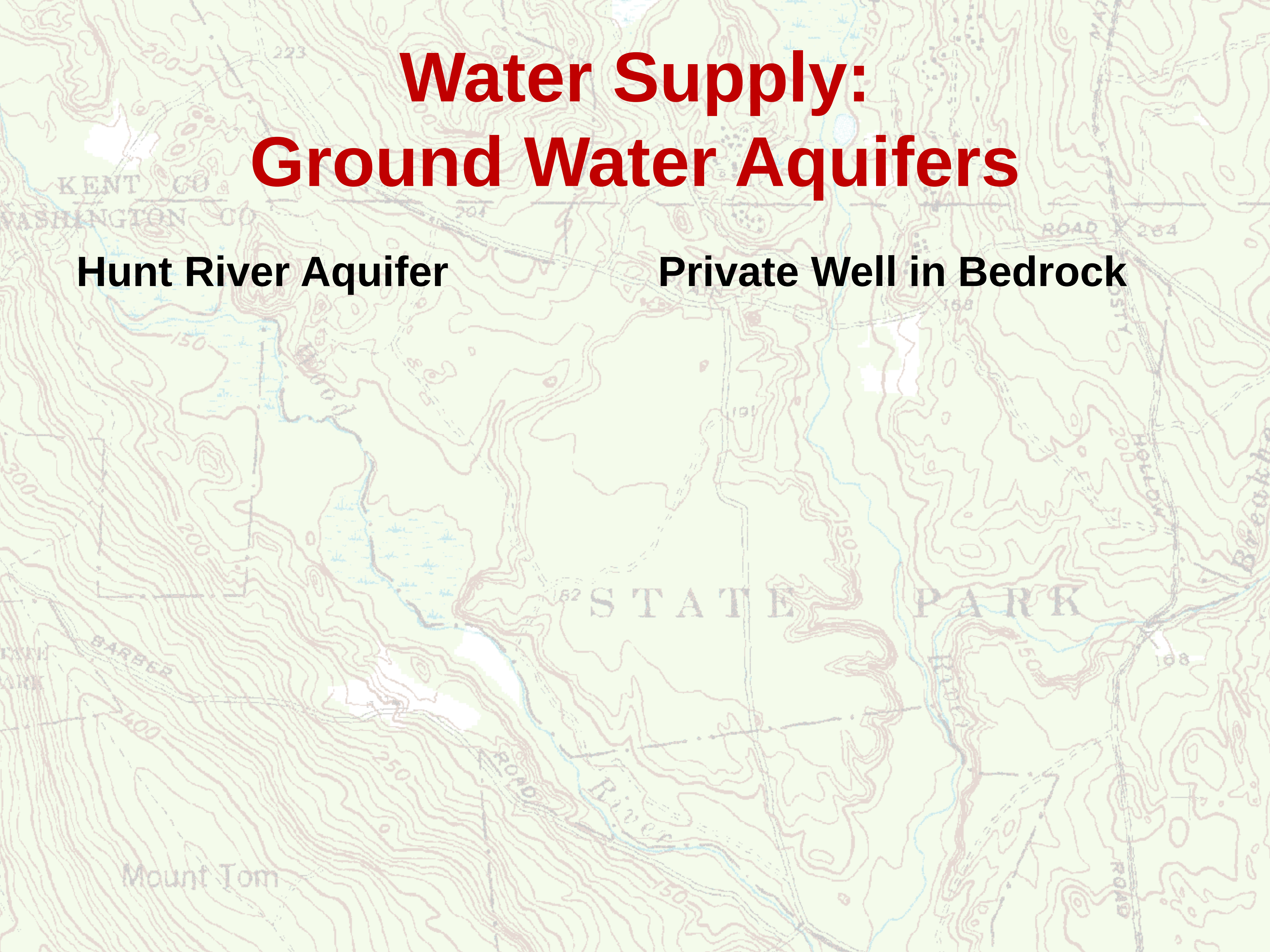
Scituate Reservoir

Easton Pond

Water Supply:
Ground Water Aquifers

Hunt River Aquifer

Private Well in Bedrock



Water Supply: Agriculture

Water Supply: Industry

Flood Control / Storm Damage Prevention

- Wetlands Store Precipitation, Stormwater Runoff, Floodwaters
- Wetland Topography and Vegetation Slow Flood Velocity
- Wetland Vegetation Anchors Shorelines, Reducing Erosion

Flood Control / Storm Damage Prevention

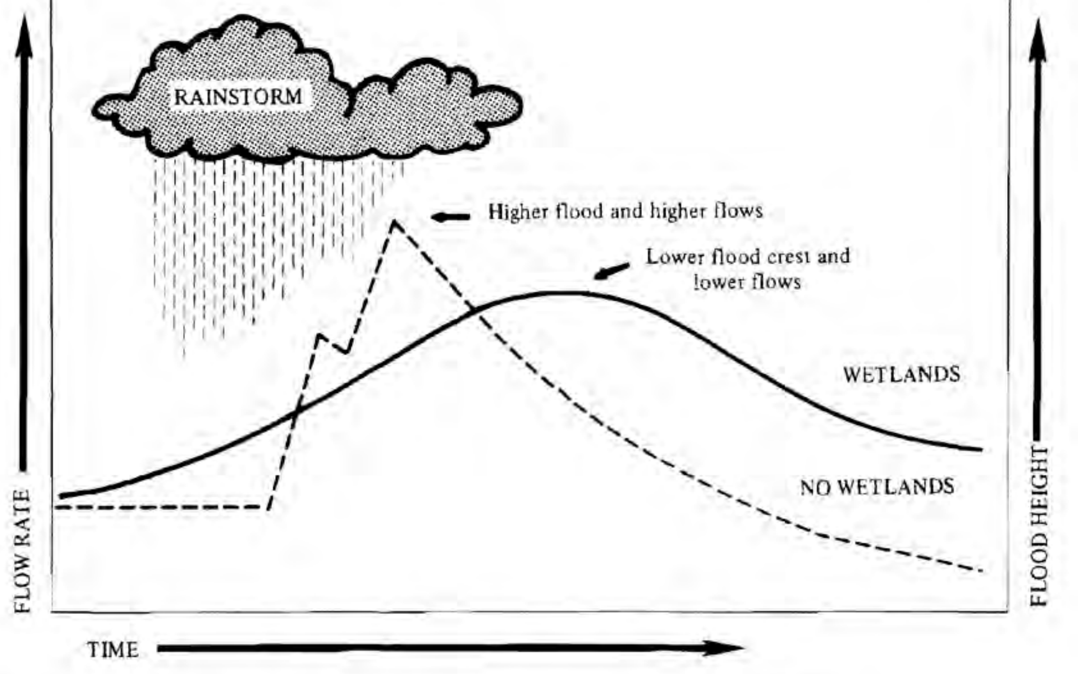


Figure 27. Wetlands help reduce flood crests and slow flow rates after rainstorms (adapted from Kusler 1983).

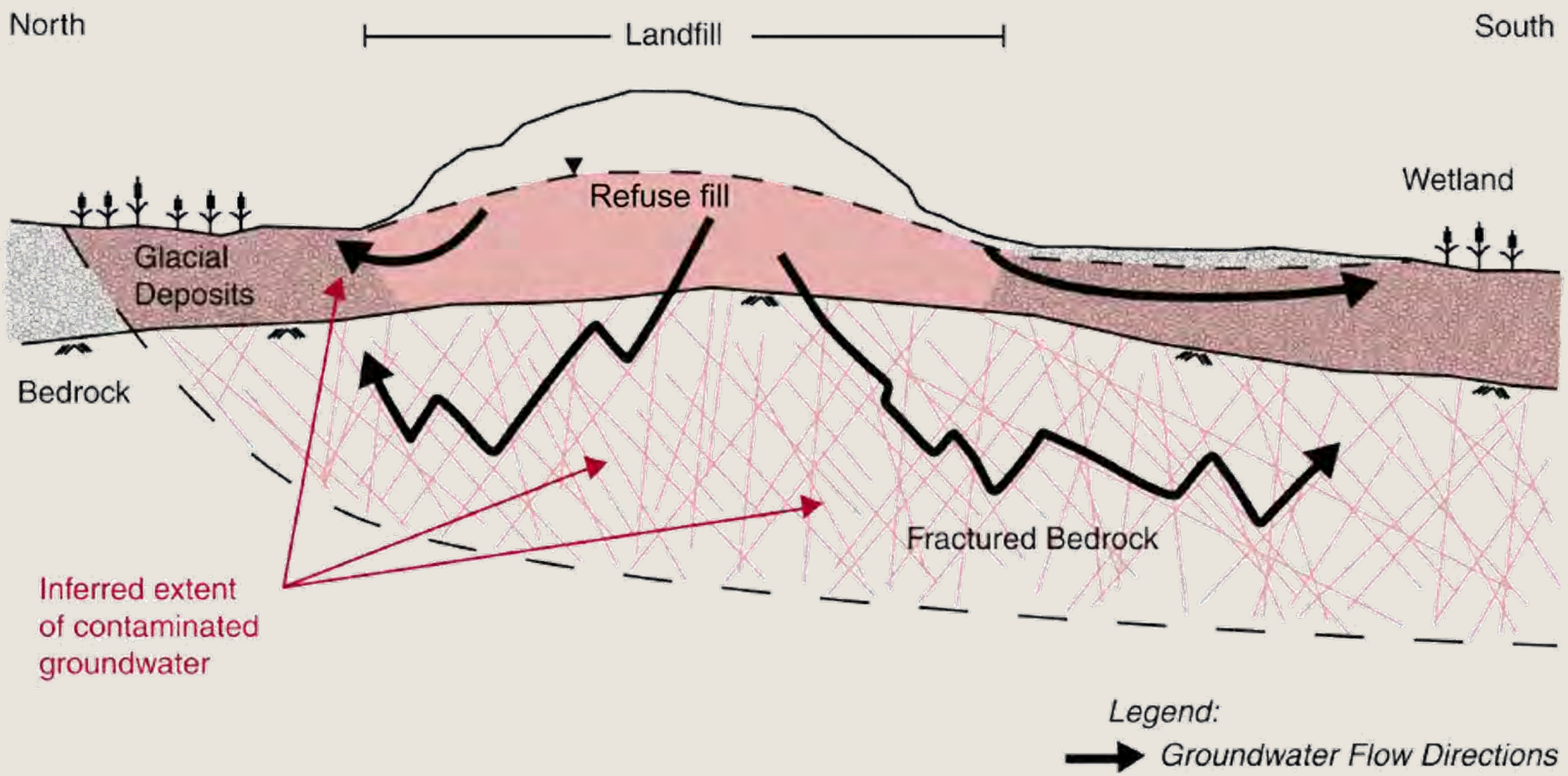
Coastal Storm Damage

- Hurricane Sandy

Pollution Filtration & Transformation

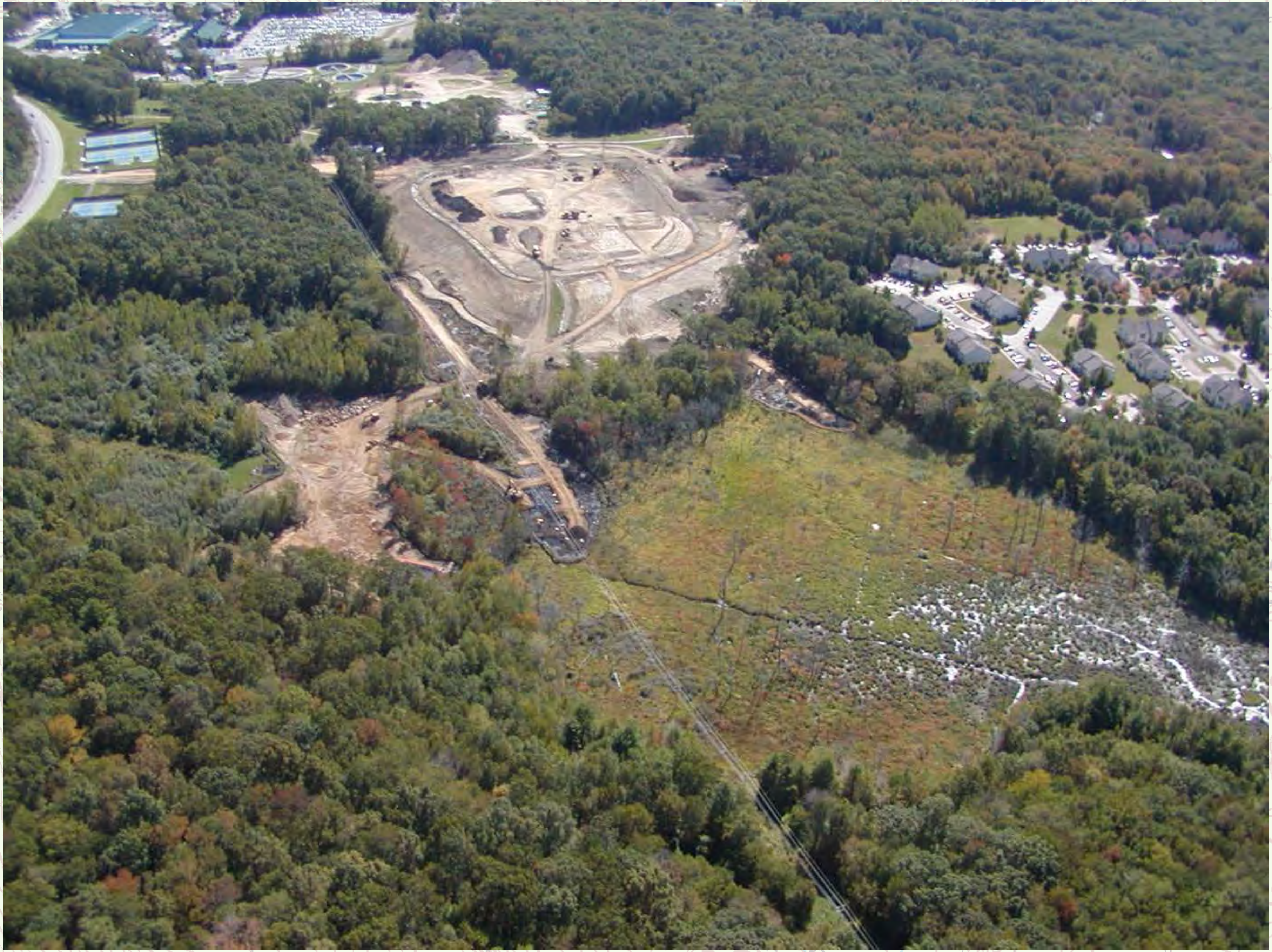
- Sediment Trapping – basin topography, vegetation, decreased flow velocity
- Nutrient Uptake / Transformation – plant growth, microbial denitrification, chemical interactions
- Heavy Metal Trapping – chemical interactions, some plant uptake
- Volatile, Semi-Volatile, Other Toxic Compounds – chemical interactions, photodegradation, microbial degradation

Landfill Conceptual Model



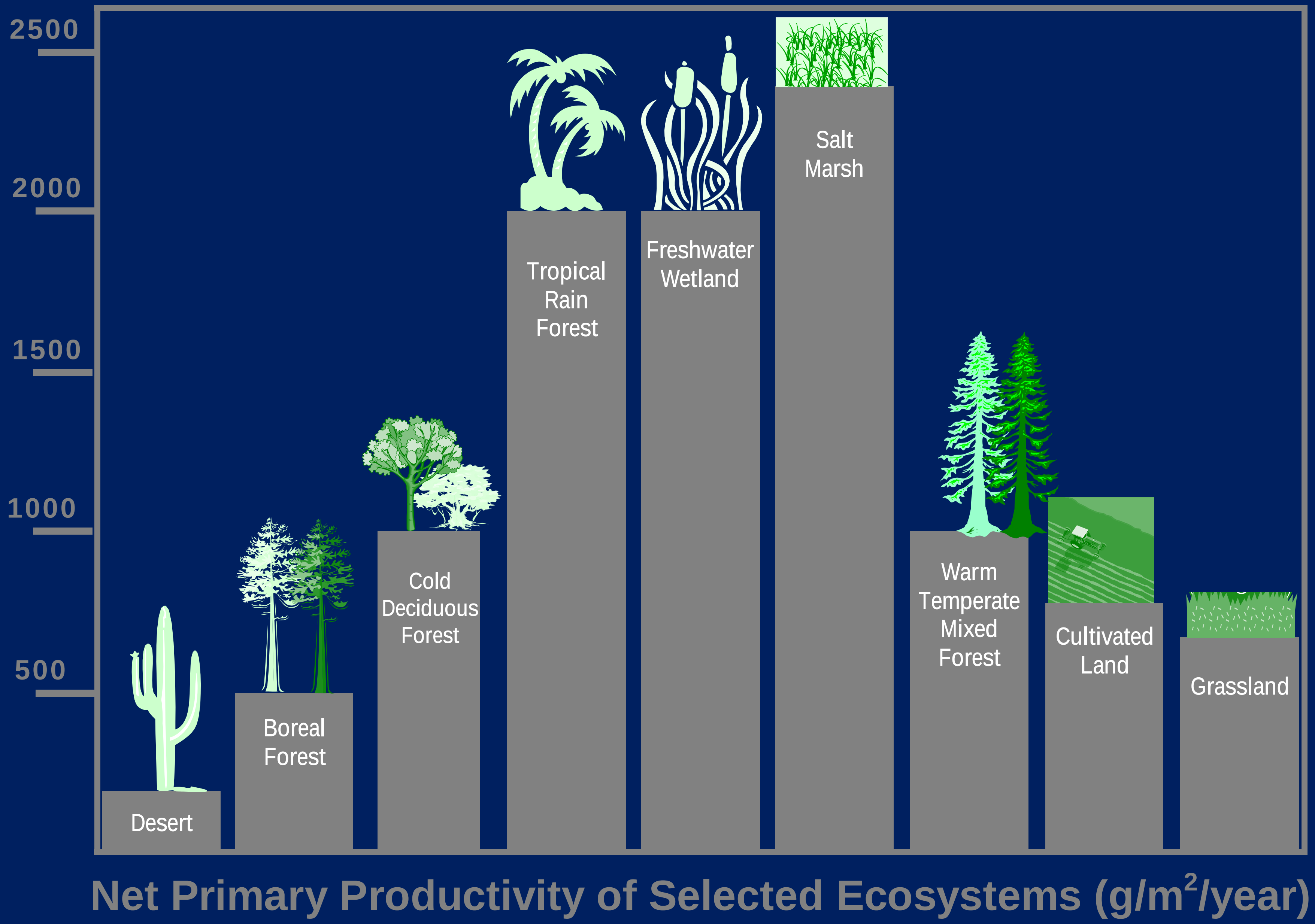
- Landfill is uncapped, unlined
- Infiltration generates leachate
- Leachate discharges to surface waters
- Metals precipitate on wetland sediments

Leachate Discharge to Surface Waters



Productivity – Food Chain Support

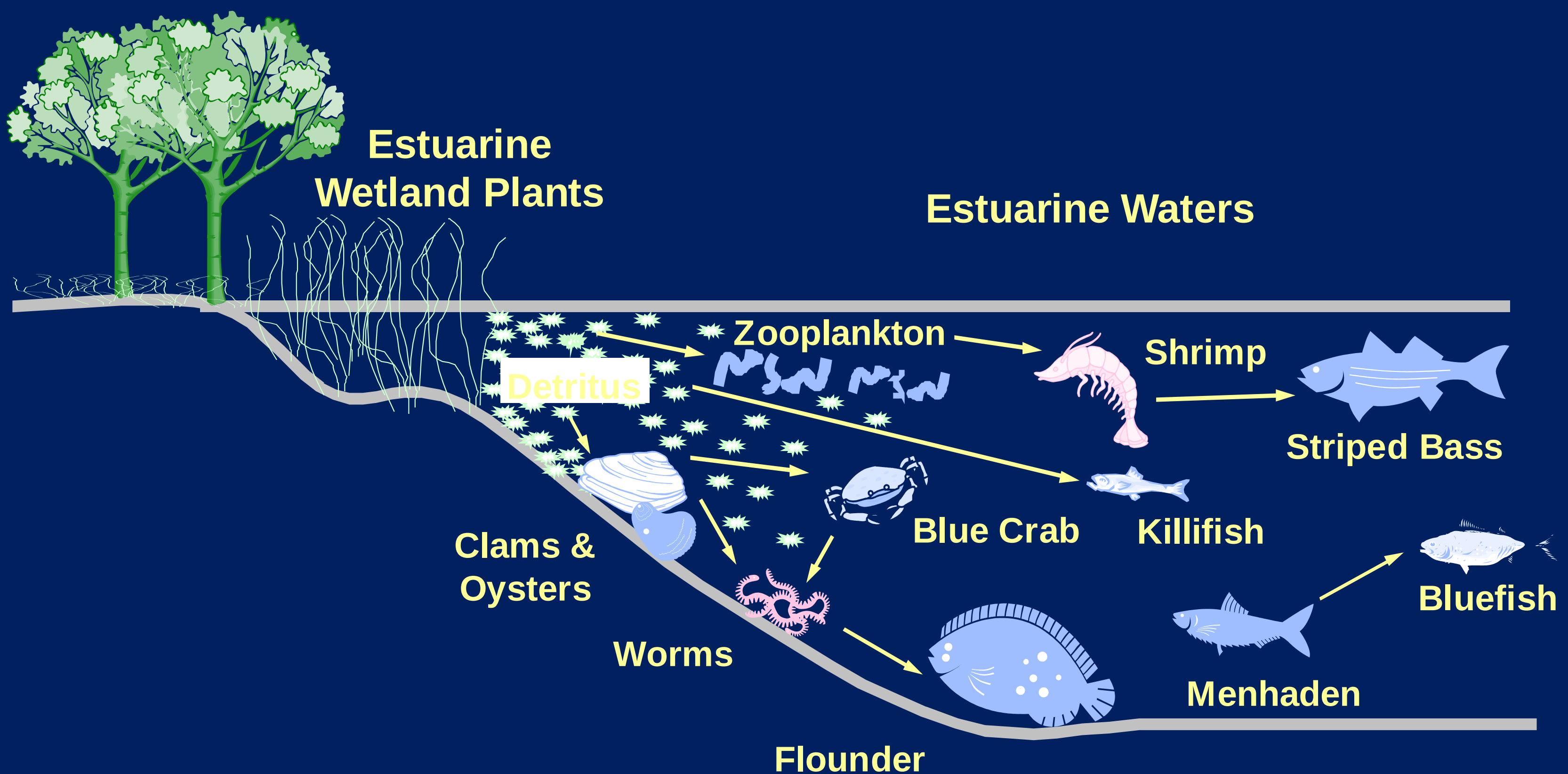
- Wetlands are highly productive compared to other habitats
- Productivity measured different ways:
  - Biomass (organic matter)
  - Crop / Timber Harvest
  - Trap Yield (pelts)
  - Fish Catch


2500
2000
1500
1000
500
Desert
Boreal Forest
Cold Deciduous Forest
Tropical Rain Forest
Freshwater Wetland
Salt Marsh
Warm Temperate Mixed Forest
Cultivated Land
Grassland
Net Primary Productivity of Selected Ecosystems (g/m2/year)

Production Export

- Salt Marsh Draining After Moon High Tide

Estuarine Food Chain Support



Benefits of High Productivity

Wetland Crops

- Fish and Shellfish
- Furbearing Animals
- Wood Products
- Forage Crops
- Wild Rice
- Peat Moss

Recreation

- Duck Hunting
- Fishing
- Birdwatching

Protection of Shellfish & Fisheries

Wetlands Are:

- Required Habitat of Freshwater Fish
- Required Habitat for Anadromous Fish
- Required Habitat for Many Saltwater Fish

Wetlands Provide:

- Food
- Cover
- Spawning Area
- Clean Water

Freshwater Fish - Lakes

Artificial Impoundment

Glacier Formed Lake

Freshwater Fish – Rivers & Streams

Lower Perennial River

Seasonal Headwater Stream

Fish & Shellfish – Coastal Wetlands

Salt Marsh & Tidal Creek

Salt Ponds, Marshes, Flats

Fish & Shellfish of Coastal Wetlands

- Menhaden
- Flounder
- Weakfish
- Bluefish
- Striped Bass
- Blue Crabs
- Shrimp
- Soft Clams

Wildlife Habitat & Biodiversity

- Many Wildlife Species Require Wetlands to Survive
- Other Species Use Wetlands Sometimes
- Source of Food & Water
- Shelter (Cover)
- Reproduction

Wildlife of Wetlands

- "Obligate" Species
  - Water-dependent Species
  - Require wetlands for survival

Wood Duck

Wildlife of Wetlands

- "Facultative" Species
  - Found in wetlands and uplands
  - Do not require wetlands for survival

Moose

Examples of Obligate Wildlife

Reptiles & Amphibians

- Green Frog
- Wood Frog
- Spotted Salamander
- Northern Water Snake
- Painted Turtle
- Snapping Turtle
- Diamondback Terrapin

Examples of Obligate Wildlife

Birds

- Swamp Sparrow
- Marsh Wren
- Great Blue Heron
- Osprey
- Bald Eagle
- Black Duck
- Canada Goose

Examples of Obligate Wildlife

Mammals

- Water Shrew
- Mink
- Fisher
- Otter
- Muskrat
- Beaver

Examples of Facultative Wildlife

Birds

- Ovenbird
- Wood Thrush
- Song Sparrow
- Gray Catbird
- Great Horned Owl
- Black-capped Chickadee
- Blue Jay

Examples of Facultative Wildlife

Mammals

- Opossum
- Raccoon
- White-tailed Deer
- Black Bear
- Eastern Cottontail
- Gray Squirrel
- White-footed Mouse

Examples of Facultative Wildlife

Red Maple Swamps:

59 Species of Facultative Birds
44 Species of Facultative Mammals

U.S. Threatened & Endangered Species

- 50% of animals are wetland-dependent
- 28% of plants are wetland-dependent
- Surface area of wetlands & deep waters = 9% of U.S.

Swamp-Pink or Dragon Mouth

Sociocultural Values

- Recreation
- Scenic or Aesthetic Value
- Education & Research
- Open Space

Recreation

- Swimming
- Fishing
- Shellfishing
- Canoeing
- Hiking
- Hunting
- Birdwatching
- Photography
- Skating / Skiing

Scenic / Aesthetic Value

- Water Views
- Natural Landscapes
- Undeveloped
- Variety & Interest
- Private

Education & Research

Open Space

Wetland Functions & Values – Why Do We Care?

- Functions Performed Represent Huge Economic Value to Public
- Value of Clean Water Alone is Priceless
- Floodwater Damage Costly - Ruinous
- Key Element of Recreation Based Tourism
- Value Added to Property
- Quality of Life – Recreation, Open Space