

# Phragmites Invasion Impacts

September 4, 2024



Massive Habitat Alteration by Monocultures

84% of new individuals  
from seed (Albert et al.  
2015, *J Ecology*)

High genetic diversity

Clones then spread  
vegetatively



Competitive Advantage

Thrive on high N  
inputs



Competitive Advantage



Impact Perhaps Greatest in Freshwater Tidal Marsh

## Association

### *Impatiens capensis* - *Peltandra virginica* - *Polygonum arifolium* - *Bolboschoenus fluviatilis* - *Typha angustifolia* Tidal Marsh

**Translated Name:** Orange Jewelweed - Green Arrow-arum - Halberd-leaf Tearthumb - River Bulrush - Narrowleaf Cattail Tidal Marsh

**Common Name:** Freshwater Tidal Mixed High Marsh



**NatureServe Element Code:** C EGL006325

#### Summary:

This association occupies the higher elevation zone of freshwater to slightly oligohaline marshes along the Atlantic coast from Maine to Virginia. In the southern part of the range (northern Virginia, Maryland, and Delaware), this is the principal mixed freshwater tidal marsh community, forming extensive patches. The vegetation is typically mixed and dense, with highly variable species composition and patch dominance. *Impatiens capensis*, *Peltandra virginica*, *Polygonum* spp. (*Polygonum arifolium*, *Polygonum sagittatum*, *Polygonum punctatum*, *Polygonum hydropiperoides*), *Bolboschoenus fluviatilis*, and *Typha angustifolia* are characteristic and often abundant. Other species that may be abundant in a given stand include *Leersia oryzoides*, *Hibiscus moscheutos*, *Mikania scandens*, *Sagittaria latifolia*, *Amaranthus cannabinus*, *Zizania aquatica*, *Bidens laevis*, *Bidens coronata*, *Pontederia cordata*, *Typha latifolia*, *Onoclea sensibilis*, and *Carex comosa*. Additional associates include *Boehmeria cylindrica*, *Acorus calamus*, *Cicuta maculata* var. *maculata*, *Cuscuta gronovii* var. *gronovii*, *Apios americana*, *Schoenoplectus tabernaemontani*, *Bolboschoenus novae-angliae*, *Echinochloa walteri*, *Lycopus americanus*, *Pilea fontana*, *Eleocharis palustris*, *Iris versicolor*, and *Sium suave*. In the northern portion of the range, *Carex stricta* is also common. On the Connecticut River, *Impatiens capensis* is less important, and a levee is often present in the high marsh supporting such species as *Carex lacustris*, *Ambrosia trifida*, and *Eupatorium perfoliatum*.

DE Estuary has < 5% of historic freshwater tidal marsh



High marsh: Habitat for Declining Species



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High marsh: Black Rail and other declining species





Mesohaline marsh: regionwide decline of *Schoenoplectus*

# Biodiversity Value is Context-Dependent



## Invited Review

### SPECIAL ISSUE: *Phragmites australis* in North America and Europe

## Ecosystem services of *Phragmites* in North America with emphasis on habitat functions

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**Abstract.** *Phragmites australis* (common reed) is widespread in North America, with native and non-native haplotypes. Many ecologists and wetland managers have considered *P. australis* a weed with little value to the native biota or human society. I document important ecosystem services of *Phragmites* including support for many common and rare species of plants and animals. This paper is based on an extensive review of the ecology and natural history literature, discussions with field workers, and observations in 13 US states and one Canadian province during the past 40 years. *Phragmites* sequesters nutrients, heavy metals and carbon, builds and stabilizes soils, and creates self-maintaining vegetation in urban and industrial areas where many plants do not thrive. These non-habitat ecosystem services are proportional to biomass and productivity. *Phragmites* was widely used by Native Americans for many purposes; the most important current direct use is for the treatment of wastes. Most of the knowledge of non-habitat ecosystem services is based on studies of *P. australis* haplotype M (an Old World haplotype). *Phragmites* also has habitat functions for many organisms. These functions depend on the characteristics of the landscape, habitat, *Phragmites* stand, species using *Phragmites* and life history element. The functions that *Phragmites* provides for many species are optimal at lower levels of *Phragmites* biomass and extent of stands. Old World *Phragmites*, contrary to many published statements, as well as North American native *Phragmites*, provide valuable ecosystem services including products for human use and habitat functions for other organisms. *Phragmites* stands may need management (e.g. thinning, fragmentation, containment or removal) to create or maintain suitable habitat for desired species of animals and plants.

**Keywords:** Bio-energy; ecosystem services; habitat functions; invasive plants; management; methodology; non-native species; *Phragmites*.

## Taxon Impacts: Birds

Nesting Passerines: Common Yellowthroat,  
Least Bittern (only on edges)

Roosting Passerines: swallows

Foraging Passerines: Bobolink?

Loafing Non-passerines: wading birds (egrets,  
herons, esp. night-herons)



Phragmites as Habitat

## Taxon Impacts: Birds

Tidal Marsh Obligates: Saltmarsh  
and Seaside Sparrows, Willet,  
Clapper Rail



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Marsh-nesting Raptors: Northern Harrier

Migratory Shorebirds





## Taxon Impacts: Insects

Broad-winged Skipper (*Poanes viator* ssp. *zizaniae*)









*Journal of the Lepidopterists' Society*  
47(2), 1993, 125-133

BIOLOGY OF THE RARE SKIPPER, *PROBLEMA BULENTA*  
(HESPERIIDAE), IN SOUTHERN NEW JERSEY

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**ABSTRACT.** The rare skipper, *Problema bulenta* (Boisduval & Leconte), was first recognized as occurring in southern New Jersey in 1989, although the first specimen was collected in 1983. Through the summer of 1992, it has been found in five counties along the Delaware bayshore and the Atlantic coast, with Burlington Co. the northern limit. We collected two larvae in the field on *Spartina cynosuroides* (L.) Roth (Poaceae), and reared one to maturity on the same host. Adults occur in tidal marshes containing *S. cynosuroides*, but have been observed only in the vicinity of nectar plants, not in patches of the larval host. Adults may become highly concentrated on nectar plants at some sites; we have counted as many as 121 individuals on flowers in ten minutes at one locality. It is not yet possible to say whether the New Jersey populations are secure.



Taxon Impacts: Insects

## Taxon Impacts: Marsh Macroinvertebrates

Some reduction in abundance and species richness (Angradi et al. 2001)

Impacts are greater post-control compared to invaded or uninvaded sites

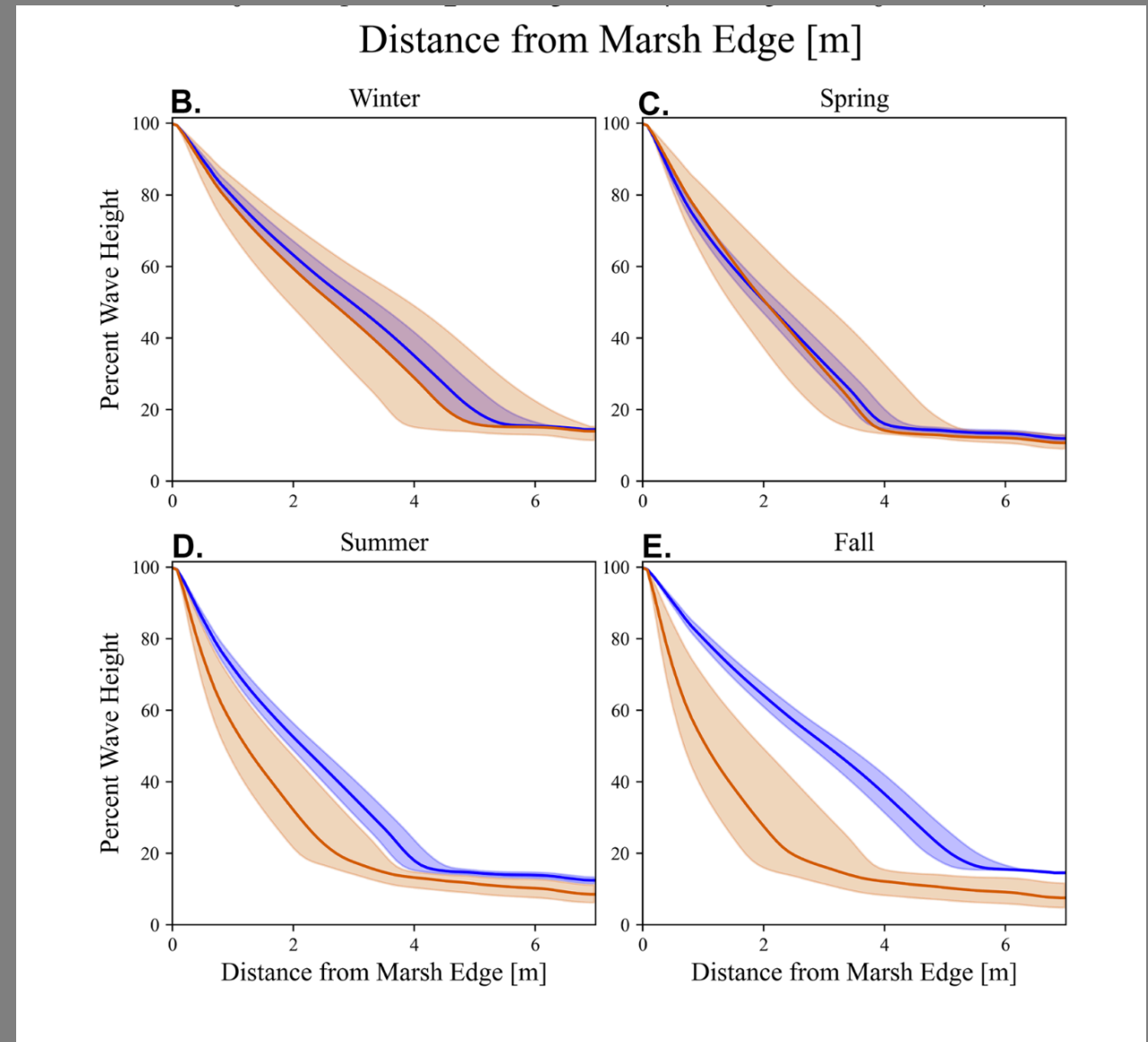


## Taxon Impacts: Fish

Loss of standing water on marsh platform

Small fish impacted – mummichog and spotfin killifish (Able et al. 2003, Hagan et al. 2007)





Wave Attenuation: Phragmites Underperforms  
(Coleman et al. 2023, *Estuaries and Coasts*)





Shoreline Erosion: Dune is Immobilized and Slowly Eroded vs. natural overwash processes

The functions that Phragmites provides for many species are optimal at lower levels of Phragmites biomass and extent of stands. (Kiviat 2013)



Functional Eradication (Brooks et al. 2024, *Wetlands Ecol Manage*)



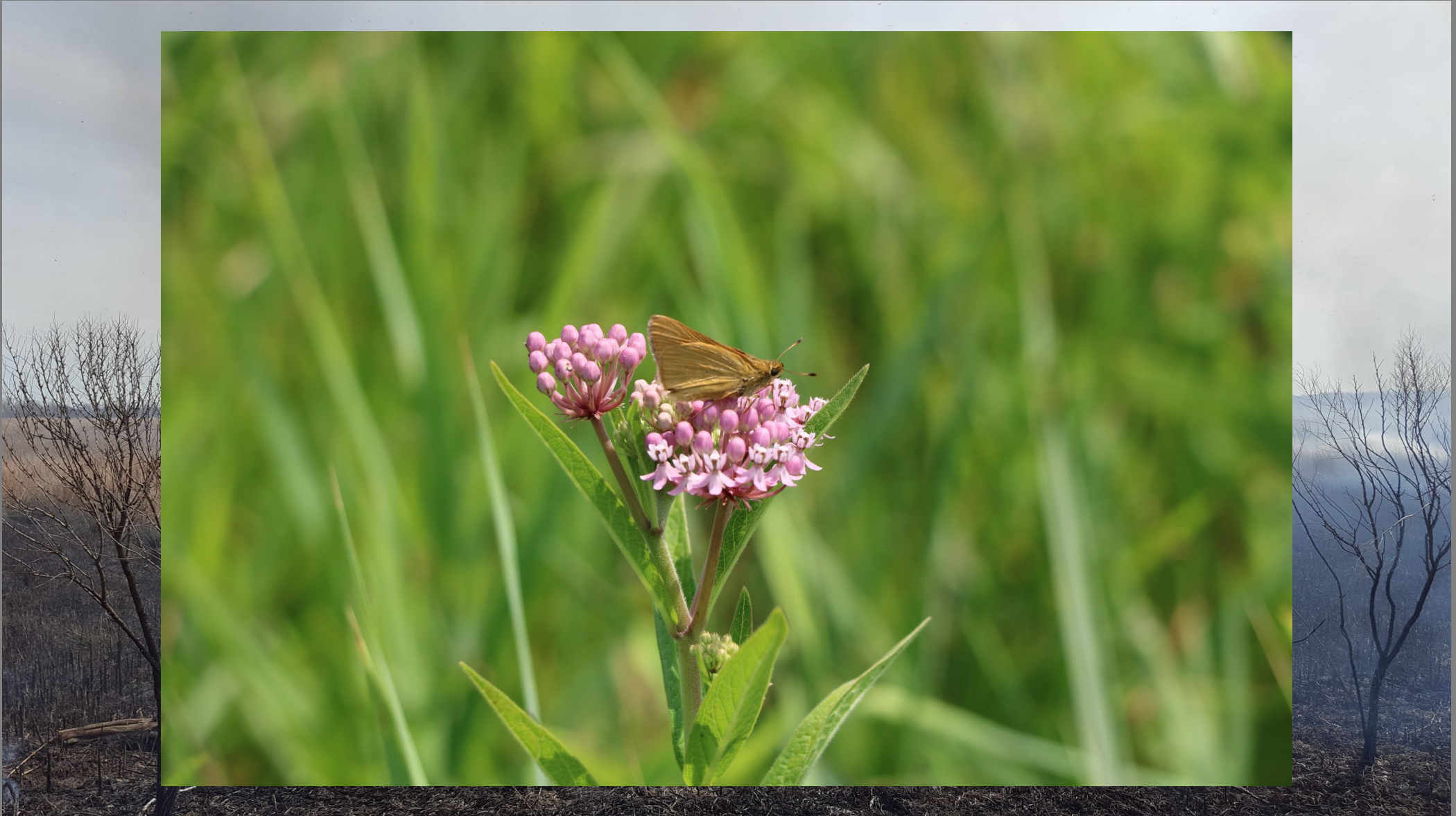
Perils of Under-management: Marsh Ecotone Loss



Perils of Over-management: Non-target Spray Effects



Perils of Rx Fire: Rare Skipper



Perils of Rx Fire: Rare Skipper

