THE ECOLOGY OF AN UNWELCOME EXOTIC, *PHRAGMITES AUSTRALIS*

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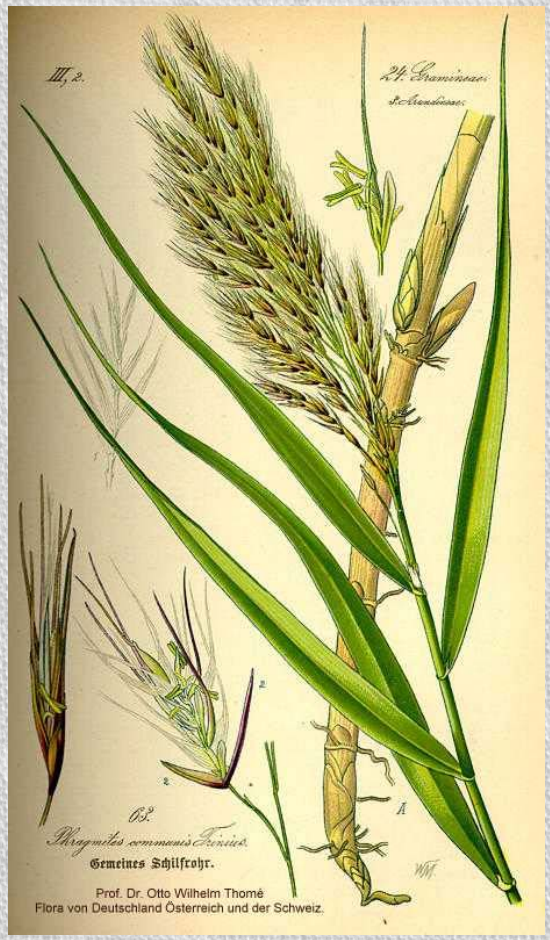
What is common reed? (formally)

- *Phragmites australis* (Cavanilles) Trinius ex Steudel)
- Member of Poaceae; subfamily Panicoideae
- AKA (formerly) *Phragmites communis*
- Common names: common reed; giant reed, giant reedgrass, cane, roseau cane, yellow cane

What does common reed look like?

- Robust, rhizomatous, perennial, warm season grass
  - Reaches 10-12 feet in 5-8 years
  - Clonal
- Stout, hollow, erect, leafy unbranched stem
- Leaves flat, deciduous, 10-60 cm long, 1-6 cm wide
- Flowers in dense, plumose, purple panicles 15-50 cm long
  - Lower florets, staminate or sterile
  - Upper florets, pistillate or perfect

http://www.biolib.de/

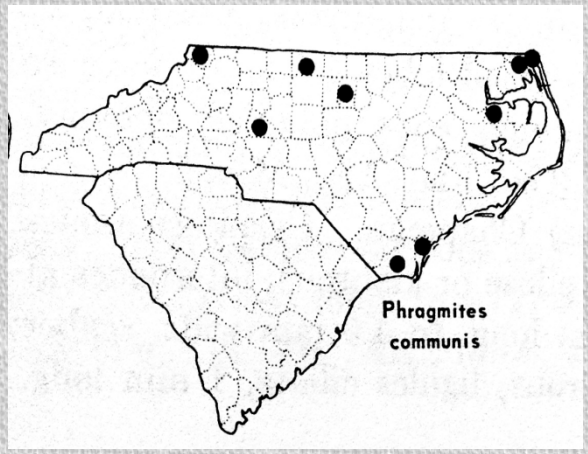


http://wisplants.uwsp.edu/scripts/bigphoto.asp?bigphoto=PHRAUS_KSOL.jpg&taxon=Phragmites%20australis%20(Cav.)%20Trin.%20ex%20Steud.&phog=Kurt%20St%FCber&spcode=PHRAUS

Where did common reed originate; how has it spread?

- Origins in the Middle East
- Cosmopolitan
- Three species (Weakley)
  - *americanus* (native)
  - *karka* (native)
  - *australis* (non-native, invasive)
- *P. australis* first reported in NC around 1950
- RAB cites it in 9 counties
- 1970 occurs in 48 states; Canada

http://www.nae.usace.army.mil/reg/InvasiveSpecies/PhragmitesNewIntroduced.pdf



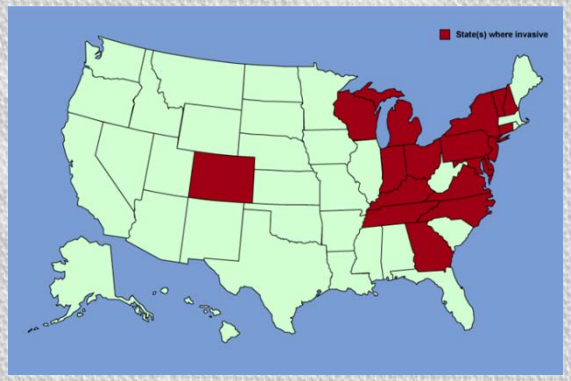
What habitats does common reed occupy?

- Wetlands
  - Palustrine persistent emergent
  - Estuarine intertidal
- Habitat conditions
  - Prolonged flooding, seasonal drought, fluctuating water
  - Anaerobic and aerobic; peat to clay; fine to coarse sediment
  - Acidic, basic, nutrient rich, nutrient poor
  - Fresh and low salinity, best at 0-5 ppt; survives to 18 ppt

http://www.fs.fed.us/database/feis/plants/graminoid/phraus/all.html

Where did we get this invasive haplotype of common reed?

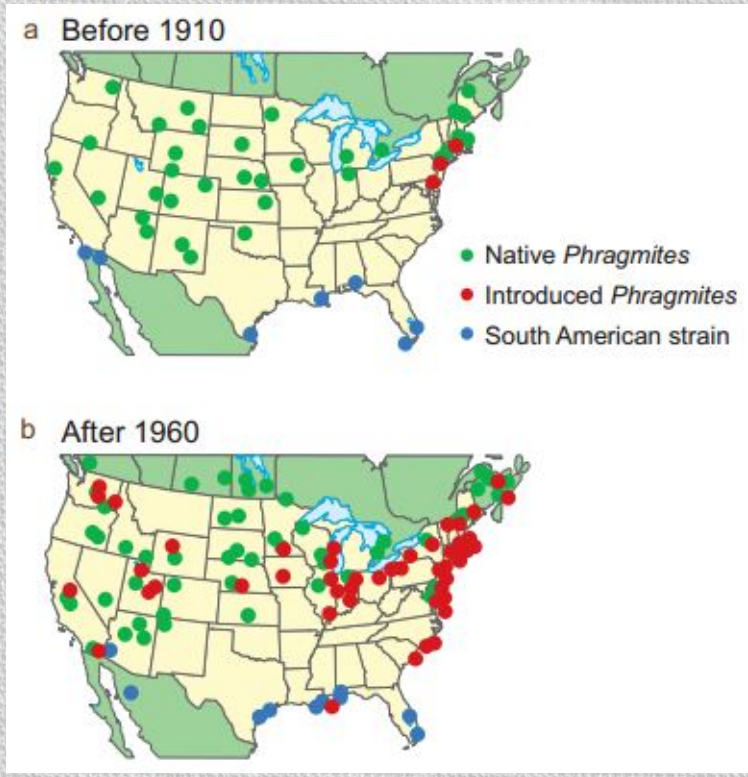
- Distribution of *Phragmites australis*
  - Increased in 20th century from rare to common
  - Spread westward in US geographically
- Non-native haplotype
  - European origin
  - Migrated to US in 18th & 19th century through ports
  - Replacing native *Phragmites* species in US
  - Not invasive in native habitats



http://www.nps.gov/plants/alien/map/phau2.htm

Where did we get this invasive haplotype of common reed?

- 27 haplotypes identified worldwide from 283 modern and 62 herbarium specimens
- 11 considered native to N.A. (green)
- Haplotype I is southern native (blue)
- Haplotype M is introduced (red)
- Research conducted by Saltonstall (2002)



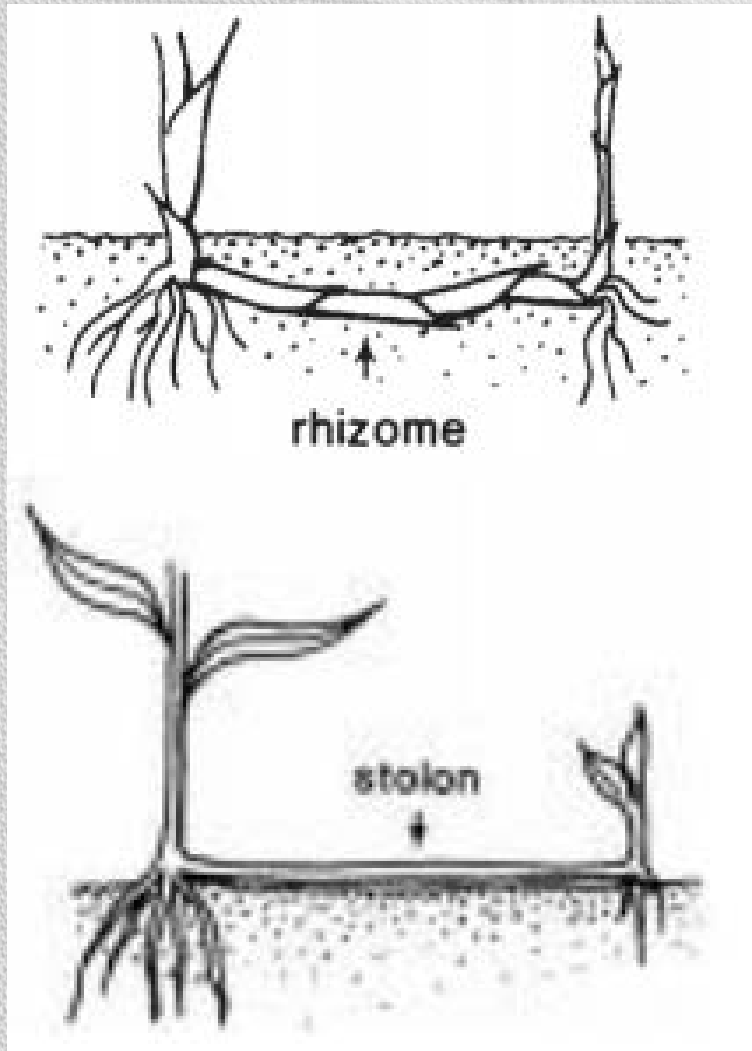
http://www.nae.usace.army.mil/reg/InvasiveSpecies/PhragmitesNewIntroduced.pdf

How does common reed reproduce?

- Seeds
  - Mode of long distance dispersal; up to 2,000 seeds per plant
  - Seed production variable
  - Seed viability low
  - Seed dispersal: wind and water

How does common reed reproduce?

- Stolons
  - Capable of rapid growth
- Rhizomes
  - Capable of rapid growth; up to 6 feet/yr



http://www.fws.gov/gomcp/pdfs/phragmitesQA_factsheet.pdf

What are the germination and early growth requirements of common reed?

- Emerge from less than 2 inches of soil; spring
- Best germination below 5 ppt salinity
- Seedling survival less than 1%
- Seedlings cannot tolerate flooding
- Spreading allows survival in 20-30 ppt salinity

http://www.oardc.ohio-state.edu/weedguide/singlerecord.asp?id=110

Why is common reed considered an "*ecosystem engineer*?"

Common reed alters:

- Plant diversity
- Elevation
- Sedimentation rate
- Bird/fish habitat
- Food web
- Peat accumulation
- Organic matter
- Bulk density
- Salinity
- Depth to water table

Does common reed have wildlife value?

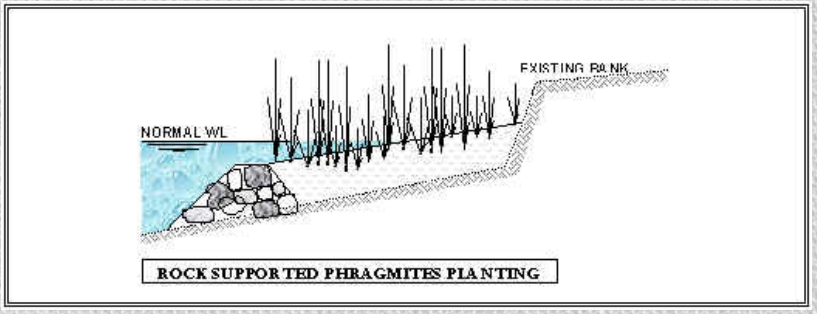
- Cover for deer and rabbits
- Rest and roost for yellowthroat, marsh wren, least bittern
- Nesting site for red wing blackbirds
- Rhizomes are food for muskrats and nutria
- Some scientists indicate that common reed wildlife value is overrated

http://www.clevescene.com/scene-and-heard/archives/2011/03/04

Does common reed like humans?

- Grows best on disturbed sites
  - Areas drained, dredged, excavated, filled
  - Constructed wetlands
  - Fire adapted

http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/washington/breaching-the-dike-at-port-susan-bay.xml



http://www.tweed.nsw.gov.au/Waterways/bankmanagementplan/tweed.htm

http://mnfi.anr.msu.edu/phragmites/vectors.cfm

How do human use common reed?

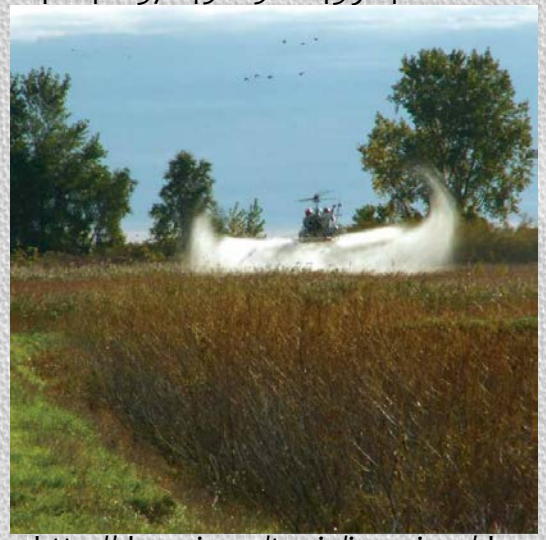
- Food source
  - Shoots are great, raw or cooked
  - Rhizomes used to make flour
  - Seeds ground into high fiber meal
- Medicine
  - Stomach- and tooth- ache
- Reeds have multiple uses
  - Baskets, mats, insulation, fuel, fertilizer, mulch, thatch, possibly arrow shafts

http://fwcb.cfans.umn.edu/courses/nresexotics3002/GradPages/Phragmites/economic.html

Is there such a thing as management of common reed?

- Herbicides
  - Most effective method
  - Glyphosate-based
  - Best used early in infestation
  - Apply late summer and early fall
  - Must be repeated for several years

http://www.voicenews.com/articles/2009/10/14/news/doc4ad4dd37d4506562243964.txt



http://dnr.wi.gov/topic/invasives/documents/phragmite_control_management.pdf

Is there such a thing as management of common reed?

- Fire
  - Burn after flowering is complete
  - Combine with herbicide use
  - DO NOT burn before it flowers
- Mechanical
  - Least effective method
  - Mowing slows spread
  - Disking leaves rhizomes
- Biological Control
  - None currently

http://blog.uwgb.edu/biodiversity/2012/08/point-au-sable-phragmites-burn/

http://dnr.wi.gov/topic/invasives/documents/phragmite_control_management.pdf

Summary

- Invasive form of common reed overtaking native form
- Multiple reproductive methods assure rapid spread
- “Ecosystem engineering” changes by common reed mostly negative
- Human development practices encourage common reed
- Common reed management requires strategy, money, manpower and persistence

References

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