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WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD
(2003)

Scientific Name: *Phragmites australis* (Non-native Genotype)
Plant Synonyms:
Phragmites australis (Cav.) Trin. ex Steud. var. *berlandieri* (Fourn.) C.F. Reed
Phragmites communis Trin.
Phragmites communis Trin. ssp. *berlandieri* (Fourn.) A.& D. Löve
Phragmites communis Trin. var. *berlandieri* (Fourn.) Fern.
Phragmites phragmites (L.) Karst.

Common Name: Common Reed, Phragmites

Family: Poaceae

Legal Status: The **Non-native** Genotype of *Phragmites australis* was changed to a Class B Noxious Weed in 2008, after being added as a Class C in 2004.

Description and Variation: *Non-native genotype of Phragmites* is a large perennial, grass or reed with creeping rhizomes, and often also with stolons. The woody hollow culms (stems) can grow to 12 feet tall. Leaves are lanceolate, ranging from 8-16 inches long and .5- 1.5 inches wide. The sheath of the leaf blade is glabrous (smooth, no hairs or glands), and it is loose, allowing it to twist in the wind, so the blades turn to one side. Dense silky flowers develop in mid July through October. The densely flowered panicle (floral spikelets) is feathery, tawny or purplish, 6–16 inches long, with the branches ascending. When in flower, the glumes (the lower bracts at the base of the flowering spikelet) are glabrous. The glumes are smaller than the lemmas (the bracts at the base of the individual flowers in a grass spikelet).

Distinguishing Characteristics	Native Genotype	Non-Native Genotype
Observed stand Density	*Less dense*	*More Dense*
Stem thickness	*Thin, Approximately the size of a pencil. Stems appear "crooked" from blowing over in the wind.*	*Thicker, Approximately the size of a finger.*
Stem	*Smooth and shiny, appearing polished.* *Green in the summer, changing to brown or gray in the winter*	*Rough and Ribbed, dull Tan coloration*
Ligule Color	*Reddish-Purple in Spring.* *Fading to chesnut brown*	*Green to yellow-green*
Flower	*Less dense, possibly appearing earlier in the season. Senescing earlier.*	*More dense, "clusters" larger. Thought to senesce later (variable due to environmental factors)*

Economic Importance:

Detrimental: Non-native genotype of Phragmites is frequently regarded as an aggressive, unwanted invader. It displaces native species that provide valuable forage for wildlife, (Hauber et al 1991). The non-native genotype of Phragmites is a problem when and where stands appear to be spreading while other species typical of the community are diminishing(Marks et al, 1994). Disturbances or stresses such as pollution, alteration of the natural hydrologic regime, dredging, and increased sedimentation favor invasion and spread of Phragmites (Roman et al. 1984). Non-native genotype of Phragmites invasions may increase the frequency of marsh fires during the winter when the above ground portions of the plant die (Reimer 1973). In addition, Phragmites invasions can also have adverse aesthetic impacts.

Beneficial: *Phragmites australis* is historically a useful plant with a long association with humans. Ethnobotanical sources reveal that *Phragmites* species have used as food, sweeteners, decoration, weapons, weaving material for various purposes, and for making musical instruments. Phragmites has been used throughout the world for Boats, sleeping mats, baskets, harpoons, arrow shafts, and construction of houses. Native Americans have used this plant for treatment of digestive ailments and headaches. Various Western Native American groups have used the reed as a fiber plant, pipestems and arrow shafts, and basketry materials (Ebeling 1986; Laforet 1990; Tanner 1990). Several groups of Western Native Americans also collected insect honeydew from the stems to eat like sugar (Ebeling 1986; Timbrook 1990). It was also used as a source of salt and smoking tobacco (Ebeling 1986). Common reed was used for thatching Native American houses and in the construction of items such as clothing, nets, snares, sleeping mats, wooden frames for drying berries, and sandals (Cain 1967; Mathias 1978; Ebeling 1986). Moerman (1998) has listed several medicinal uses by Western Native Americans.

Phragmites is the sole known hostplant for the Yuma Skipper butterfly(Ochlodes yuma) (Larsen et al. 1995). The Yuma skipper is a rare Washington butterfly and a state candidate for listing under Washington's endangered, threatened, and sensitive wildlife species classification (WAC 232-12-297). This skipper is the largest most conspicuous of the tawny,

grass–feeding Hesperiine skipers. The skipper is distributed in the Great Basin area ranging from Arizona to south-central Washington. Washington skipper populations have been located in Sun Lakes - Dry Falls State Park in Grant County. The Columbia Basin area is thought to be potential range for the Washington Yuma skipper, though surveys have yet to be done(Ann Potter, pers comm). Precautions should be taken to avoid control of native Phragmites populations that are occupied by the Yuma skipper.

In Great Britain, the common reed is an important economic plant. It has even figured in heraldry and is featured on the crest of Middlemore, and described by Kenk (1963) as "a moor cock amidst grass and reeds proper; Sykes' shield: gules, three tufts of reeds vert." Many of the picturesque and familiar traditional thatched roofs of England are made of common reed (Norfolk Reed Growers' Association 1972) and a well-constructed roof of good "Norfolk reed" has a life expectancy of 60 to 70 years and is impenetrable to insects, birds, and vermin (McGhee 1998). *Phragmites* has also been used to make pen points for calligraphy pens (Brown 1979, p. 134).

Phragmites is currently used for Swedish bagpipes horticultural peat and pulp for paper-making in Italy and Romania (Isenberg 1956; Rudescu 1976; Cruz 1978) and in other regions such as Russia (Brown 1979). Today, sustainable reed harvesting is a concern in Europe and efforts are being made to save the species (Nevel 1996).

Habitat: *Phragmites australis* is found in disturbed and non-disturbed (pristine) sites that hold water, including roadside ditches and depressions. It is typically found in or near wetlands including marshes, swamps, fens, prairie potholes, and marsh upland areas. Phragmites has been known to inhabit areas near freshwater, brackish(slightly saline) and alkaline wetlands in the temperate zones world wide (Haslam 1972, Roman et al. 1984). *Phragmites* will inhabit any slight depression that has the ability to hold water. It has become increasingly common along railroad tracks, roadsides, and dredge spoils (Ricciuti 1983).

Geographic Distribution: *Phragmites australis* is found on every continent except Antarctica and is thought to have the widest distribution of any flowering plant (Tucker 1990). *Phragmites australis***,** is possibly the most widely distributed flowering plant, ranging across Europe, Asia, Africa, North and South America and Australia, however, the origin of the species is unclear.

Until recently the status of the plant as native to North America or introduced has been in dispute but new work has demonstrated the existence of native and introduced genotypes of *P. australis*. Current research is being conducted in the United States, to determine the distributions of the native genotypes vs. the non-native genotypes.

> For more information follow this link: www.invasiveplants.net and follow the links to Phragmites Diagnostic Service.

History: *Phragmites australis***,** is possibly the most widely distributed flowering plant in the world. Paleoecology studies of peat samples show that *P. australis* has grown in New England tidal wetlands for at least the last 3,000 years (Orson 1987). Many researchers (Blossey 2002a; Norris et al. 2002; Rice et al. 2000) note that during the 1900s in parts of North America, *P. australis* rapidly expanded its range and successfully invaded fresh and brackish wetlands, altering the landscape of the marsh-estuary system (Lathrop et al. 2002). Marks et

al. (1994) and Roman et al. (1984) indicate that this population expansion may be partially driven by human activities that have led to habitat destruction, sedimentation, eutrophication, and decreased oxygen levels in water and sediments in marsh areas. There has been discussion that the invasiveness of *P. australis* in North America over the last century may be attributable to the introduction of more aggressive European genotypes (Blossey 2002b; NJMSC 2002). Questions over this issue prompted genomic research to determine whether there were differences in genotype among stands of North American *P. australis*. Saltonstall (2002) recently reported the present-day existence of native North American haplotypes (lineages) and of introduced European haplotypes in North American stands of *P. australis*. A total of 27 haplotypes were identified of which 11 (A-H, S, Z, AA) are native to North America (Saltonstall 2001). Within the North American populations, a continuum of geographic substructuring exists for the native haplotypes. Types AA, F, Z and S are known historically from the Northeast; types E, G, and H are found throughout the Midwest and types A-D are found in the South and Intermountain West only. Two haplotypes show worldwide distribution with M as the most common type in North America, Europe and Asia. Type I is found along the Gulf Coast and also occurs in South America and Asia (for more details see Saltonstall 2001). Comparing the genetic structuring of present-day populations with those available in herbarium specimens collected prior to 1910 reveals significant changes in haplotype frequencies in North America. While the herbarium samples show a widespread distribution of native haplotypes across North America, modern populations show a striking range expansion of the M haplotype (for more details see Saltonstall 2001b). Type M (which is most closely related to other European types) has spread to the West and is also becoming prevalent in the Midwest. It is likely that the introduction of type M material has occurred sometime in the early part of the 19th century, probably at several Atlantic coast ports. Over the last 150 years, among-population variation in North America has declined significantly and today the genetic structure of North American populations resembles that of Europe.

> Currently research is being conducted throughout the US to determine the population levels of native vs. non-native genotypes. For more information follow this link: www.invasiveplants.net and follow the links to Phragmites Diagnostic Service.

Growth and Development: *Phragmites* seeds are shed from November through January. When seeds germinate and become established the young plants will usually persist for at least two years in a small, inconspicuous stage where they resemble many other grass species. *Phragmites*' primary mode of reproduction is vegetative, through its extensive rhizomitous network. Individual rhizomes live for 3 to 6 years developing buds at the base of the vertical rhizomes in late summer each year. The buds grow horizontally approximately 1 meter before going dormant until spring. In Wisconsin, annual rhizome lateral spread averaged 16 inches per year (Curtis 1959). In Europe, lateral rhizome spread has been as great as 3.3 to 6.6 feet per year (Looman 1982). Stolons, which may grow up to 4.25 inches per day, are produced in young stands or over open water and further aid in rapid stand expansion (Cross and Fleming 1989, Shay and Shay 1986).

Salinity and depth to the water table are among the factors which control the distribution and performance of Phragmites. Maximum salinity tolerances vary from population to population (Hocking et al. 1983). Phragmites has a low tolerance for wave and current action which can

break its culms (vertical stems) and impede bud formation in the rhizomes (Haslam 1970). It can thrive in stagnant waters where sediments are poorly aerated (Haslam 1970).

Reproduction: *Phragmites australis* is a clonal grass species that reproduces both vegetative and by seed dispersal. Common reed is wind-pollinated but is self-incompatible. Plants flower and set seed between July and October, the viability of the seed produced varies greatly between plants (Haslam 1970). The seeds are dispersed by wind, water and animals. Germination occurs in spring on exposed moist soils. Seeds that do germinate often do not grow vigorously for 2-4 years, hiding the initial population (Haslam 1970). High mortality due to flooding, frost, salt, and competition is also common in juvenile plants (Haslam 1970). Low seed viability and high seedling mortality result in low reproductive rates. However, the low rate of reproduction is thought to be sufficient because once established, Phragmites populations can live for long periods of time and spread by rhizome extension (Haslam 1972).

Response to Herbicide:
RodeoTM, a water solution of the isopropylamine salt of glyphosate is commonly used for Phragmites control. This herbicide is not, however, selective and will kill grasses and broadleaved plants alike. Toxicity tests indicate that it is virtually non-toxic to all aquatic animals tested. It should be noted that many of these tests were performed by or for Monsanto, the company which manufactures Rodeo. Bioconcentration values for glyphosate in fish tissues were insignificant. Glyphosate biodegrades quickly and completely in the environment into natural products including carbon dioxide, nitrogen, phosphate and water. Finally, since glyphosate does not volatilize, it will not vaporize from a treated site and move to a non-target area (Monsanto 1985). Instructions for application, amounts needed per acre, the approved surfactants and ratios for mixing, are on the Rodeo label. Application rates and effectiveness may vary. Areas must be treated and maintained for several years.

Response to Cultural Methods:
Beall (1984) discourages mowing and disking. Mowing only affects the above ground portion of the plant, so mowing would have to occur annually. To remove the rhizome, disking could be employed. However, disking could potentially result in an increase of Phragmites since pieces of the rhizome can produce new plants. Cross and Fleming (1989) describe successful mowing regimes of several year duration during the summer (August and September) and disking in summer or fall.

BURNING: Prescribed burning does not reduce the growing ability of Phragmites unless root burn occurs. Root burn seldom occurs, however, because the rhizomes are usually covered by a layer of soil, mud and/or water. Fires in Phragmites stands are dangerous because this species can cause spot-fires over 100 feet away (Beall 1984). Burning does remove accumulated Phragmites leaf litter, giving the seeds of other species area to germinate. Prescribed burning has been used with success after chemical treatment for this purpose at The Brigantine National Wildlife Refuge, NJ (Beall 1984). Occasional burning has been used in Delaware in conjunction with intensive spraying and water level management. This helps remove old canes and allows other vegetation to grow.

Dredging, and draining are methods that have often been used to reduce stand vigor (Howard, Rhodes and Simmers 1978). However, draining and dredging are not appropriate for use on most preserves (Osterbrock, 1984).

Response to Mechanical Methods:
Cutting has been used successfully to control Phragmites. Since it is a grass, cutting several times during a season, at the wrong times, may increase stand density (Osterbrock 1984). However, if cut just before the end of July, most of the food reserves produced that season are removed with the aerial portion of the plant, reducing the plant's vigor. This regime may eliminate a colony if carried out annually for several years. Care must be taken to remove cut shoots to prevent their sprouting and forming stolons (Osterbrock 1984).

Biocontrol Potentials:
Grazing may trample the rhizomes and reduce vigor but the results are limited (Cross and Fleming 1989). Van Deursen and Drost (1990) found that cattle consumed 67-98% of above-ground biomass; in a four year study, they found that reed populations may reach new equilibrium under grazing regimes.

Rationale for Listing: The Non-native genotype of *Phragmites australis* will colonize, and displace the other plants in a wetland community, often forming, dense monospecific stands. Wildlife is displaced when wetland hydrology, structure and function are altered. Water quality deteriorates when water flow or circulation is adversely affected by this species. In Washington, Phragmites is rapidly invading the riparian zone of the Snake River displacing native wetland vegetation. In the Winchester waste way, it is noted to aggressively invade areas following the eradication of purple loosestrife. There are also noted problems on our wildlife refuges in eastern Washington.

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