Tualatin Soil and Water
CONSERVATION DISTRICT
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Critical Questions for Ensuring Riparian Forest Function post EAB

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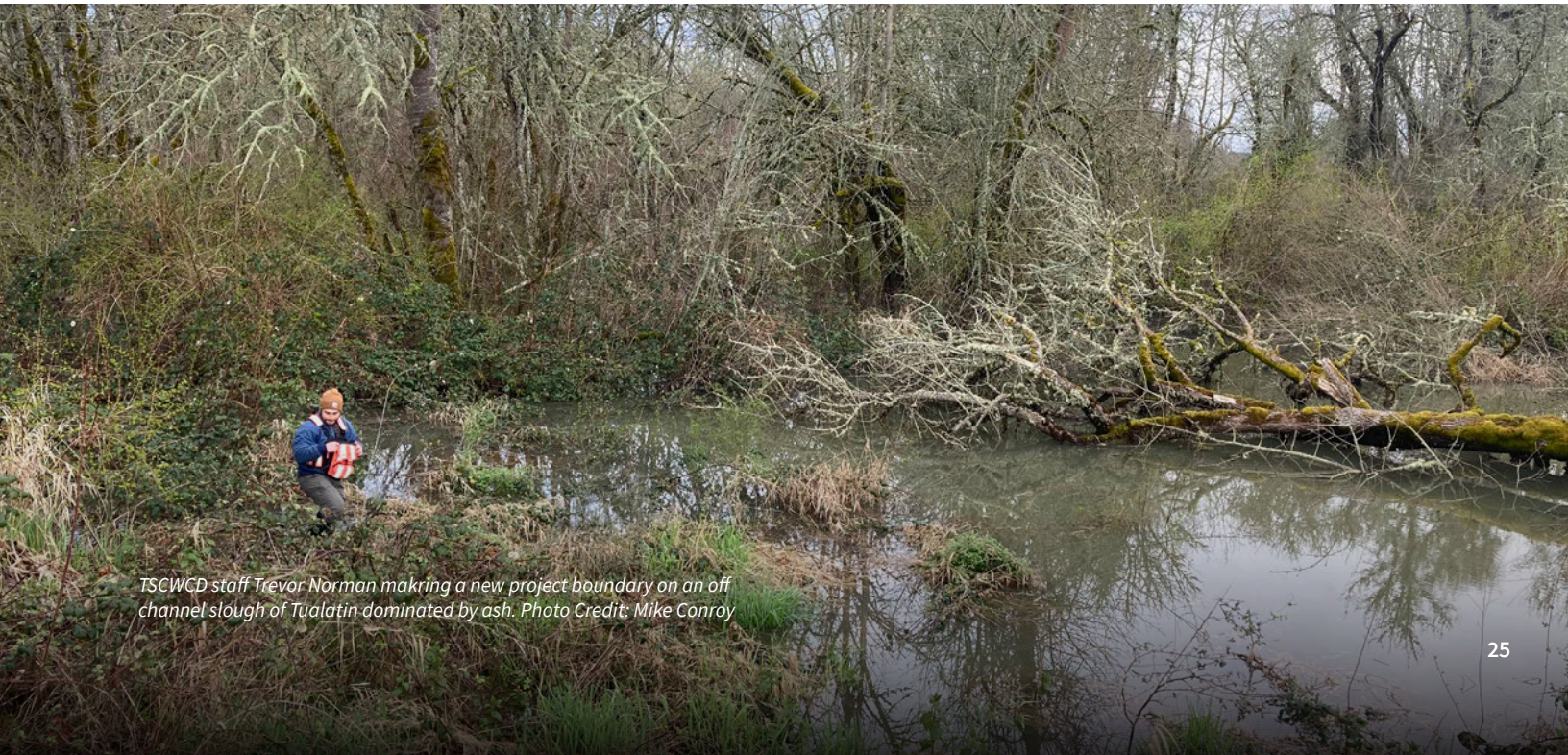
Emerald Ash Borer will have wide ranging impacts on forest cover throughout the lower elevations of the Tualatin Valley and the entire range of Oregon ash. Greater than 95% mortality of mature Oregon ash is anticipated, with a less certain but still bleak future for seedling ash. Oregon ash is the most dominant overstory component along perennial streams in the Tualatin River valley and negative impacts on water quality temperature from loss of shade are anticipated. While impacts on ash forested wetlands will likely lead to a future altered successional state or reversion to historical savannah like conditions, the impacts to riparian forests will have a greater impact on water quality as riparian forests are more commonly found along perennial streams and provide shade during the summer months. Fortunately, most riparian forests can support a wider diversity of native species than forested wetlands, and may be more responsive to managed adaptation to this rapid change.

With the arrival of Emerald Ash Borer, we find ourselves in a highly industrialized and environmentally regulated Tualatin basin dependent on a sliver of a remnant riparian forest to maintain shade over perennial waters, comply with regulatory benchmarks, and provide rudimentary ecological function in a rapidly warming climate. The conditions that led us here are complex and the degree to which ash provides shade in riparian zones is currently outsized. Fortunately, most of the riparian zone of the Tualatin basin can support a wide diversity of species, and reliance on ash isn't a necessity, but will require active management to convert these forests to more diverse and resilient floodplain communities. Many near channel riparian stands are lacking in non-ash tree diversity and the likelihood of passive conversion to a diverse and adapted forest overstory is unlikely. Many stands lack a local source of viable non-ash tree replacements due to the dominance of ash, and high cover of competitive native and non-native shrubs and herbaceous species means natural regeneration of non-ash trees is unlikely for many stands. The scope of the threat in the Tualatin valley is daunting, but by focusing efforts to convert ash dominated riparian forest stands I believe we can best address the anticipated impacts to water quality in the Tualatin valley and through most of Oregon ash's range.



TSCWCD staff Trevor Norman makring a new project boundary on an off channel slough of Tualatin dominated by ash. Photo Credit: Mike Conroy

There are many potential effects from the spread of EAB in Oregon ash's range, and there are several uncertainties as to how quickly it will spread. While these uncertainties exist, based on experiences in more than 30 states it is important for individual land managers to start preparing forest stands to be resilient to a likely catastrophic outcome for mature ash over the next ten years. Given the proximity and urgency of EAB to the Tualatin valley there is a need to rapidly strengthen the toolbox for natural resource managers to begin conversion of ash dominated riparian forests. Many natural resource managers in the Tualatin valley have over a decade of experience in large scale riparian forest establishment and management, including access to a high diversity and quantity of planting stock and budgets that allow for management beyond initial establishment. While there is much to build upon there is a need to learn and adopt new best management practices quickly.

Table 1. Uncertainties Regarding EAB Invasion

Is the current extent of EAB really confined to Forest Grove?
How fast will EAB spread throughout Oregon ash's range?
If an approach to slow the spread of EAB (SLAM) is attempted, how might this impact the rate of spread?
Since biological control is being introduced comparatively early in the establishment of EAB will this greatly affect dynamics of invasion?
Oregon ash can produce seed in less than 20 years, how might this early maturation time facilitate selection over time?
How much ash is there in the Willamette Valley and how will its distribution along riparian corridors affect invasion dynamics?
Of the ash in the Willamette Valley how much is growing on sites suitable for replacement species?

Strategies to inform ash stand management post EAB

REFINING METHODS TO IDENTIFY AN ENVIRONMENTAL GRADIENT FOCUSED ON REPLACEMENT SPECIES FOR ASH

When planning out restoration projects natural resource managers utilize multiple sources of information to inform their thinking, including soil maps and observations of onsite vegetation. Plants are often the best indicator of environmental gradients because they are generally readily identified year-round in the mild climate of the PNW. To identify suitability more precisely on a narrow environmental gradient where less than 1 foot in elevation change can mean a site is suitable for non-ash tree species it is important to identify the indicators more precisely for these thresholds. Efforts should be focused on identifying common indicator species that are easily identifiable year-round and help delineate the narrow band in floodplain and riparian communities where replacement species are being considered. Paring these on site observations with the diagram of species moisture and soil type tolerances detailed in "**Alternatives to Ash in Western Oregon**" will allow managers and planting crews to make informed decisions that yield better outcomes.

Ash stand in riparian area off Tualatin flooded mid April due to heavy rains. Photo Credit: Mike Conroy

IMPLEMENTING MANAGEMENT TRIALS TO CONVERT ASH DOMINATED RIPARIAN FORESTS COST EFFECTIVELY

The impact of EAB on the PNW will be different than the majority of North America, especially the mid-latitude eastern deciduous forests which possess a greater diversity of non-ash tree species capable of filling in the vacancy left by ash. However, the black ash (Fraxinus nigra) forested wetlands of the northern latitudes may provide the best analog to conditions in the PNW. In these forests, black ash provides most of the cover and site conditions preclude the colonization of other species adapted to the adjacent upland forest. Several field trials have been conducted to evaluate silvicultural and replanting management options in black ash stands, notably the work from Upper Midwest discussed in several articles stands out as a potential template to adapt for PNW ash dominated riparian forests (Palik et al 2021, Looney et al 2015, D'Amato et al 2018). These trials evaluate multiple replacement species and silvicultural strategies for 1-2- and 8-year success, and the environmental impacts from different methods. Adapting these or similar methods with local practitioner knowledge of species tolerances shown below in figure 1 seems an essential step. Of special interest is evaluating more closely the ability of planted species to tolerate shade given that the arrival of EAB to a given site is unknown. By evaluating species in or ex situ for shade tolerance it would inform land managers of varying degrees of proximity to the current known infestation.

Trees/Arboles		Shade Tolerance Tolerencia de Sombra			Hydrology Hidrologia			Soils Suelo			Palatability Palatabilidad		Height (feet) Altura (pies)
Name / Nombre	Scientific Name / Nombre cientifico	*Shade / Sombra*	*Partial Shade / Sombre Parcial*	*Sun / Sol*	*Dry / Seco*	*Moist / Humedo*	*Wet / Mojado*	*Coarse / Aspero*	*Mixed / Veriado*	*Fine / Fino*	*Deer / Venado*	*Beaver / Castor*	*At 20 Years / En 20 Anos*
Bigleaf maple	Acer macrophyllum		x	x	x	x		x	x		H	H	50
Black cottonwood	Populus trichocarpa			x		x	x	x	x	x	H	H	80
Black hawthorn	Crataegus douglasii		x	x	x	x			x	x	M	L	20
Cascara	Rhamnus purshiana	x	x	x	x	x		x	x	x	M	L	20
Douglas fir	Pseudotsuga menziesii			x	x	x		x	x		L	L	40
Grand fir	Abies grandis		x	x	x	x			x	x	L	L	40
Oregon ash	Fraxinus latifolia		x	x		x	x		x	x	H	M	35
Oregon white oak	Quercus garryana			x	x	x		x	x	x	M	M	25
Pacific willow	Salix lasiandra			x			x		x	x	M	H	50
Red alder	Alnus rubra			x	x	x	x	x	x	x	M	M	50
Scouler willow	Salix scouleriana			x	x	x			x	x	H	H	30
Valley ponderosa pine	Pinus ponderosa (W.v.)			x	x	x		x	x	x	L	L	35
Vine maple	Acer circinatum	x	x		x	x		x	x		H	M	15
Western crabapple	Malus fusca		x	x		x	x	x	x	x	H	M	20
Western red cedar	Thuja plicata	x	x		x	x	x	x	x		L	M	30
White Alder	Alnus rhombifolia	x	x			x		x	x	x	M	M	50

Figure 1. Pocket reference for tree tolerances for species present in Tualatin riparian zones.