

Tables

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TABLES

Table D-1. Life History Strategies of Dominant Woody Riparian Species Found in the Study Area.

ATTRIBUTE		SPECIES				
		Cottonwood		Willow	Alder	
		Fremont	Black		White	Mountain
Initiation¹						
Reproduction	Flowering Timing	Mar to June (Stella et al. 2006)	Apr to May (as cited in Braatne et al. 1996)	Apr to May; depends on location/ elevation and species (USDA-FS 2009; Zasada et al. 2009)	Mar (Harrington et al. 2009)	Early spring. Mar/ Apr (USDA-NRCS 2009; Uchytel 1989b)
	Seed Dispersal Timing	Seed Dispersal Timing is provided in Table C-2.				
	Seed Dispersal Agent ²	Hydrochoric and anemochoric				Hydrochoric and zoochoric
	Asexual Traits	Crown breakage and flood-related disturbance (e.g. tree fall) (Braatne et al. 1996)	Root suckering and crown breakage (Braatne et al. 1996)	Root sprouts and sprouting of broken stem and root pieces transported during high flows, and layering of stems (Zasada et al. 2009)	Root or trunk resprouting; layering (Uchytel 1989a)	Rhizomes and root sprouts (Uchytel 1989b)
Germination and Establishment³	Seed Viability (in natural conditions)	1 to 3 weeks (as cited in Braatne et al. 1996)	1 to 2 weeks (as cited in Braatne et al. 1996)	A few days to a week, no more than 3 weeks (Anderson 2006)	Not a limiting factor (e.g. many months) (Harrington et al. 2009)	
	Germination	24 hours in moist, bare soil (Braatne et al. 1996)	24 hours in moist, bare soil (Braatne et al. 1996)	12 to 24 hours (USDA-FS 2009; Karrenberg et al. 2002)	Can germinate immediately in favorable conditions (Uchytel 1989a and 1989b)	
	Seedling Root Growth Rate (and Recession Rate Associated with Establishment)	Seedling root growth rate: 4 to 12 mm/day (as cited in Braatne et al. 1996); can reach 40 cm length in 30 days (Braatne et al. 1996) Recession rate: 2.5 to 4 cm/day (up to 10 cm/day) (Mahoney and Rood 1998; Amlin and Rood 2002; Roberts et al. 2002; Stella et al. 2006)	Seedling root growth rate: 6 to 12 mm/day (as cited in Braatne et al. 1996; USDA-FS 2009); can reach 40 cm length in 30 days (Braatne et al. 1996)	Recession rate: 1 to 2.5 cm/day (Amlin and Rood 2002)	Rapid (similar to cottonwoods with water table declining rates of 1 to 3 cm/day); require continuously moist substrates to successfully establish (Uchytel 1989a and 1989b; USDA-NRCS 2009; as cited in Braatne et al. 1996)	

Table D-1. Life History Strategies of Dominant Woody Riparian Species Found in the Study Area (continued).

ATTRIBUTE		SPECIES				
		Cottonwood		Willow	Alder	
		Fremont	Black		White	Mountain
Dormant Season	Rooting Depth of Sapling, first growing season	75 to 150 cm (Braatne et al. 1996)		40 to 60 cm (Karrenberg et al. 2002)	Root growth rates similar to cottonwoods	
Maturation⁴						
	Age at Reproductive Maturity	5 to 10 years (as cited in Braatne et al. 1996)	8 to 10 years (as cited in Braatne et al. 1996)	5 to 10 years (Zasada et al. 2009)	10 years, can be earlier (Harrington et al. 2009)	3 to 4 years
	Rooting Depth of Mature Stands/ Depth to Groundwater	3 to 5+ m (as cited in Braatne et al. 1996)	3 to 5+ m (Braatne et al. 1996)	Less than 3 m	1 m (Uchytel 1989b)	
	Lifespan	130+ years (as cited in Braatne et al. 1996)	100 to 200 years (as cited in Braatne et al. 1996)	Varies depending on species. Stems survive 10 to 20 years (USDA-FS 2009)	100 years	60 to 100 years
	Tree Height (mature tree)	12 to 35 m (USDA-NRCS 2008)	8 to 13.5 m (as cited in Braatne et al. 1996)	Variable, depends on species	15 to 24 m (Uchytel 1989a)	1 to 9 m (Harrington et al. 2009)
	Diameter at Breast Height (mature tree)	30 to 150 cm USDA-NRCS 2008)	8 to 11.7 cm (as cited in Braatne et al. 1996)	Variable, depends on species	28 to 60 cm (Uchytel 1989a)	Typically 10 to 20 cm (Uchytel 1989b)
Germination/Recruitment Microsite Characteristics						
	Depth to Water Table or Elevation above Baseflow	Elevation above baseflow: 1 to 3 m (Mahoney and Rood 1998; Roberts et al. 2002)	Elevation above water table: 0.7 to 3 m (Law et al. 2000; Jamison and Braatne 2001)	Elevation above baseflow: 0.6 to 3 m (Mahoney and Rood 1998; Jamison and Braatne 2001)	Elevation above baseflow: 0.4 m above baseflow (Lisle 1989)	Depth to water table: 1 m (Uchytel 1989b)
	Substrate	Bare, moist sandy, humous, or gravelly soils -with silts and clays.	Bare, moist sandy, humous, or gravelly soils - with silts and clays.	Bare, moist sandy, humous, or gravelly soils -with silts and clays.	Sunny, wet mineral sites exposed from receding flood waters; cobbles, gravels and sands (Uchytel 1989a and 1989b)	
	Location on Floodplain	Point bars, cut off channels, lower terraces	Gravel bars, floodplains, and terraces	Point bars and cut off channels; water's edge	Sandbars or other fresh alluvium exposed by receding flood waters (Uchytel 1989a and 1989b)	

¹ Initiation refers to seed dispersal, germination, and initial seedling growth.

² Hydrochroic: water-dispersed; Anemochoric: wind-dispersed; Zoochoric: animal-dispersed.

³ Establishment refers to the continued survival and growth of seedlings and saplings over several years until the tree reaches maturity.

⁴ Maturity (sexual) occurs once a tree begins to flower and produce seed.

Table D-2. Timing of Seed Dispersal for Common Woody Riparian Species in the Study Area.

Seed Dispersal ¹	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
COTTONWOODS												
Fremont Cottonwood (<i>Populus fremontii</i>)												
Sacramento												
Sacramento River												
San Joaquin and Tuolumne Rivers												
Trinity River												
Black Cottonwood (<i>Populus balsamifera</i>)												
Trinity River												
ALDERS												
White Alder (<i>Alnus rhombifolia</i>)												
San Joaquin and Tuolumne Rivers												
Trinity River												
Mountain Alder (<i>Alnus incana</i> ssp. <i>tenuifolia</i>)												
WILLOWS												
Arroyo Willow (<i>Salix lasiolepis</i>)												
San Joaquin and Tuolumne Rivers												
Trinity River												
Gooding's Willow (<i>Salix gooddingii</i>)												
San Joaquin and Tuolumne Rivers												
San Joaquin and Tuolumne Rivers												
Shining Willow (<i>Salix lucida</i>)												
Trinity River												
Narrowleaf Willow (<i>Salix exigua</i>)												
Trinity River												
San Joaquin and Tuolumne Rivers												
San Joaquin and Tuolumne Rivers												

¹References and elevation data for the different studies are:
 San Joaquin River and Tuolumne River (< 650 feet elevation) (Stella et al 2006)
 Sacramento River (< 300 feet elevation) (CALFED 1999)
 San Joaquin River (< 600 feet elevation) (as reported in McBain and Trush 2002)
 Sacramento River (< 300 feet elevation) (Roberts et al 2002 (TNC))
 Trinity River (< ~1500 feet elevation) (McBain and Trush 1997)
 General Source (Uchytel 1989b and as cited in Braatne et al 1996 for POBA)



