

I.B.2.N.D. TEMPORARILY FLOODED COLD-DECIDUOUS FOREST

I.B.2.N.d.38. POPULUS FREMONTII TEMPORARILY FLOODED FOREST ALLIANCE
Fremont Cottonwood Temporarily Flooded Forest Alliance

ALLIANCE CONCEPT

Summary: This forest alliance occurs in riparian areas in the southwestern United States. Stands have been described from floodplains along the valley floors of large rivers in New Mexico and Arizona. Although periodic drought can result in the rivers becoming dry, water tables are generally high throughout the year, with surface flooding during the spring months. Soils are alluvial, deposited in stratified layers of clays, sands, silts and gravels. Forests included in this alliance are characterized in mature stands by a dense overstory canopy 20-25 m tall of *Populus fremontii*. Canopy cover is variable, depending upon the age of the stand, but averages well over 60%. In the subcanopy, *Salix gooddingii*, a small tree (to 15 m tall), is usually present with low cover. Scattered shrubs are found in the understory, but total cover of this layer is typically less than 10%. Shrub species may include *Amorpha fruticosa*, *Baccharis salicifolia*, and *Salix exigua*. The herbaceous layer is sparse. Associated species include *Anemopsis californica*, *Distichlis spicata*, and *Juncus balticus*. Tree litter covers much of the ground surface. Diagnostic of this alliance is the dominance of *Populus fremontii* in the relatively dense tree canopy of forests that are briefly flooded during the growing season and have relatively high water tables.

ENVIRONMENTAL DESCRIPTION

USFWS WETLAND SYSTEM: PALUSTRINE

Ouray National Wildlife Refuge Environment: The Fremont Cottonwood Temporarily Flooded Forest occupies second and third terraces and large islands within the Green River Floodplain. These stands have become established on sediments deposited in and along the river. More mature trees are typically located further from the flowing water, and younger trees are established nearer the river. Individual trees are occasionally uprooted by river flows and some stands are affected by beaver foraging activity. This extremely important habitat is used by nearly all species (except strict aquatic and wetland species) of wildlife present in the Refuge to some degree.

Global Environment (Alliance): Vegetation types within this alliance occur mainly in dry, hot areas of the southwestern United States. The climate of this region is typically hot and arid. There is great fluctuation in precipitation between wet and dry years, but the annual average is 19.8 cm. Periodic droughts can result in the rivers becoming dry, while spring flooding results in very high water tables and much deposition of silt and sands. Stands of this alliance occur primarily along the valley floors of large rivers in central and southern New Mexico, from 1500 to near 2100 m elevation. They are also reported from relatively flat floodplains along low-gradient rivers in Arizona. The deposition of alluvial materials by tributaries is the primary formative agent for these floodplains. On the Rio Grande, from the vicinity of Albuquerque south, the river drops an average of 1.5 m per 0.6 km.

These vegetation types are found on the most mesic or hydric of floodplain sites along these rivers. Soils are somewhat alkaline, and derived from alluvial materials, deposited in stratified layers of clays, sands, silts and gravels. Soil textures are variable, but clays are reported to be the most common. Water tables are high throughout the year, with surface flooding during the spring months.

VEGETATION DESCRIPTION

Ouray National Wildlife Refuge Vegetation: *Populus fremontii* Temporarily Flooded Forest stands are littered by downed trunks, branches, and leaves so that little if any bare ground is visible. This litter overlies fine, silty clay soil deposited by flood flows and occasional cobbles. A few stands have an emergent canopy of *Populus fremontii* that were estimated at 25% foliar cover and stood between 30-35 m tall. One emergent tree was measured at 92" dbh, but most mature trees measure from 45-65" dbh. Most stands have an even canopy layer of predominantly *Populus fremontii*, which provides 60-80% foliar cover. These trees measure from 20-40" dbh and stand approximately 30m tall. In the subcanopy, *Elaeagnus angustifolia* trees are becoming established with sapling *Populus fremontii* and an occasional *Salix amygdaloides* tree. The subcanopy foliar cover rarely exceeds 20% for any stand and the trees reach heights averaging 5-10 m tall. In one island stand north of the Fish Hatchery, however, *Elaeagnus angustifolia* in the subcanopy was recorded at approximately 70% foliar cover and approximately 40% foliar cover in the tall shrub vegetation layer. The tall shrub zone is dominated by *Tamarix ramosissima* in most stands although *Rhus trilobata*, *Populus fremontii*, and *Elaeagnus angustifolia* are sometimes recorded. Tall shrub foliar cover is usually close to 5%, but may range to 20% when *Rhus trilobata* is present and the shrubs usually are in the 5-10 m height range. The short shrub class is also dominated by *Rhus trilobata* and *Tamarix ramosissima*, but the roles are reversed and more skunkbrush is usually present; foliar cover values range from 1-10%. Forest stands rarely have herbaceous vegetation

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foliar cover over 5%, and this is typically provided by *Phalaris arundinacea*, *Lepidium latifolium*, *Apocynum cannabinum*, and *Iva axillaris*.

Young *Populus fremontii* stands of the same species composition described above also occur in the Refuge. They are described here in more detail, but may comprise a separate classification unit and map unit. Typically, Fremont cottonwood trees (sometimes in association with peachleaf willow trees) in young stands contribute approximately 30% foliar cover, are approximately 10-15 m tall, and have dbh measurements in the 10-15 cm range. Salt-cedar dominates the tall shrub layer, contributing approximately 20% foliar cover and standing 2-5 m tall. Understory herbaceous species include *Pascopyrum smithii*, *Phalaris arundinacea*, and *Eleocharis palustris*.

Global Vegetation (Alliance): These riparian cottonwood forests are characterized in mature stands by a dense canopy of the broad-leaved deciduous tree *Populus fremontii*, with heights of 20-25 m. Cover is variable, depending upon the age of the stand, but averages well over 60% and occasionally is over 90%. A smaller (to 15 m tall), broad-leaved deciduous tree, *Salix gooddingii*, is usually present with low cover (averaging <15%). Broad-leaved deciduous shrubs are found scattered in the understory, but total cover of this layer is typically less than 10%. *Amorpha fruticosa* is the only shrub found under the dense tree canopy, while *Baccharis salicifolia* and *Salix exigua* are more commonly found near the riverbanks or under less dense canopies. The herbaceous layer is sparse; in the spring the perennial forb *Anemopsis californica* is the dominant species. The perennial graminoids *Distichlis spicata* and *Juncus balticus* are usually present, but not abundant. Litter layers on the ground surface are thick, ranging from 2-15 cm deep.

Dynamics (Alliance): *Populus fremontii* requires particular flood regime characteristics for germination and establishment (Stromberg et al. 1991, Stromberg 1993a). Stands dominated by this species can occur on relatively flat floodplains along low-gradient rivers.

MOST ABUNDANT SPECIES

Ouray National Wildlife Refuge

Stratum	Species
TREE EMERGENT	<i>Populus fremontii</i>
TREE CANOPY	<i>Populus fremontii</i> , <i>Elaeagnus angustifolia</i>
TREE SUBCANOPY	<i>Populus fremontii</i> , <i>Elaeagnus angustifolia</i> , <i>Salix amygdaloides</i>
SHRUB TALL	<i>Rhus trilobata</i> , <i>Tamarix ramosissima</i>
SHORT SHRUB	<i>Salix exigua</i> , <i>Apocynum cannabinum</i>
HERBACEOUS	<i>Sporobolus airoides</i> , <i>Phalaris arundinacea</i> , <i>Eleocharis palustris</i> , <i>Lepidium latifolium</i> , <i>Iva axillaris</i>

Global

Stratum	Species
TREE CANOPY	<i>Populus fremontii</i>

CHARACTERISTIC SPECIES

Ouray National Wildlife Refuge

Species
Populus fremontii, *Salix amygdaloides*, *Elaeagnus angustifolia*, *Rhus trilobata*, *Tamarix ramosissima*, *Apocynum cannabinum*, *Phalaris arundinacea*

Global

Species
Populus fremontii

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OTHER NOTEWORTHY SPECIES

Ouray National Wildlife Refuge
Stratum **Species**
N/A

Global
Stratum **Species**
TALL SHRUB *Elaeagnus angustifolia*
TALL SHRUB *Tamarix* spp.
FORB *Melilotus officinalis*

GLOBAL SIMILAR ASSOCIATIONS: N/A

SYNONYMY: N/A

CLASSIFICATION COMMENTS

Ouray National Wildlife Refuge: It is notable that almost no lianas were observed in the Fremont cottonwood forest stands; the few present were *Clematis ligusticifolia*.

Global Comments (Alliance): Further inventory and classification work are needed for all *Populus fremontii* communities. This is hindered by the alteration of species structure and composition that has occurred in most remaining stands because of hydrologic alterations, exotic species invasions, grazing, and other human impacts.

ELEMENT DISTRIBUTION

Ouray National Wildlife Refuge Range: The Fremont Cottonwood Temporarily Flooded Forest type lines the Green River banks, point bars, side channels, and grows on islands within the river. It is the most common forest type within the Refuge.

Global Range (Alliance): Communities within this alliance are described for central New Mexico, mainly along the Rio Grande River corridor, and southern and central Arizona. The alliance likely also occurs in California, Colorado, Nevada, and Utah, and possibly in northern Mexico.

Nations: MX? US

States/Provinces: AZ CA? CO? NM NV?

TNC Ecoregions: 10:C, 11:C, 18:C, 19:C, 20:C, 21:C, 22:C, 24:C

USFS Ecoregions: 313A:CC, 321A:CC, 322A:CC, 341C:CC, M313A:CC, M313B:C?, M331F:??, M341C:CC

Federal Lands: USFWS (Ouray)

ALLIANCE SOURCES

Identifier: A.313 **Confidence:** N/A **Conservation Rank:** N/A

REFERENCES: Brown 1982, Campbell and Dick-Peddie 1964, Eyre 1980, Henry 1981, Muldavin et al. 1993a, Muldavin et al. 1993b, Reid et al. 1994, Stromberg 1993a, Stromberg et al. 1991, Szaro 1989, Von Loh et al. 1999, Von Loh 2000, Watson 1912.