Trees and shrubs

Salt cedar seedlings grow in exactly the same places as cottonwoods or willows—wet, sunny soil, often along riverbanks and on sandbars and islands. The other trees are more likely to sprout in the shelter of other plants, a little ways away from the stream itself, and they do not require full sunlight or completely saturated soil. As with any invasive plant, they are likely to sprout in places where existing plants have been disturbed by something. All these trees will sprout back very vigorously from cut stumps and roots left in the soil.

Salt cedar [6.a]
Tamarix spp.

Russian olive [6.b]
Eleagnus angustifolia

You already recognize these familiar banes of the bosque, right? Here are what the seedlings and sprouts look like so you can manage them before they get out of hand.

Siberian elm [6.c]
Ulmus pumila

Siberian elm spreads prolifically from seed and sprouts from its roots. The seeds are even edible, if you gather them in the spring when they are green and tender.

Tree of heaven [6.d]
Alianthus altissima

Don't overlook these invaders. In New Mexico, they are not as common as salt cedar, Russian olive or Siberian elm, but they can spread very rapidly.

Herbaceous plants

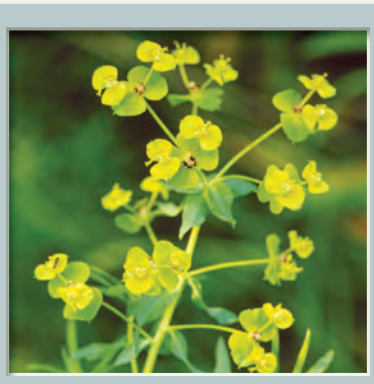
Purple loosestrife is a true wetland-obligate plant that is spreading in New Mexico in the same places as, and even among, cattails. It requires very wet soil and can tolerate some permanent standing water. In these conditions it can spread explosively.

Purple loosestrife [6.e]
Lythrum salicaria

Blue verbena [6.f]
Verbena hastata

Be sure not to confuse it with blue (swamp) verbena (Verbena hastata), a most desirable native wetland plant.

Leafy spurge, perennial pepperweed, thistles, and toadflaxes are all plants that require the moisture of riparian areas but do not need completely saturated soil, and grow in slightly drier places than purple loosestrife. As with all invasive plants, they are especially likely to sprout where existing plants have been disturbed.



Leafy spurge [6.g]
Euphorbia esula

Don't handle this plant without skin and eye protection! It is best not to pull this plant at all, because it has an extensive root system and will just re-sprout.

Perennial pepperweed (or Whitetop) [6.h]
Lepidium latifolium

Root segments as small as one inch are capable of producing new shoots.

Herbaceous plants (cont.)

Canada thistle [6.i]
Cirsium arvense

Musk thistle [6.j]
Carduus nutans

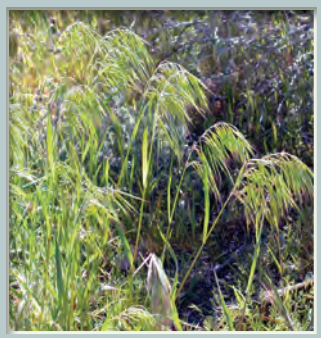
Canada thistle [6.k]
(sprout)

Bull thistle [6.l]
Cirsium vulgare

Dalmatian toadflax [6.m]
Linaria dalmatica

Yellow toadflax [6.n]
Linaria vulgaris

Cheatgrass, along with the knapweeds and starthistles, require the least water of any of the invasive plants shown here, and may occur farther from streams and open water. In fact, they are often found in rangelands far from anything riparian. Nonetheless, they thrive in moist riparian areas and are a rapidly increasing threat there.



Cheatgrass [6.o]
Bromus tectorum

This annual grass mainly reproduces by seed and can be controlled by mowing before seed production.

Russian knapweed is one of the most difficult invasives to control. Pulling and cutting alone are ineffective, because its main mode of reproduction is sprouting from buds on its creeping root system, which will seek moisture as deep as 75 feet. Seek professional help to control this increasingly common invasive weed.

Russian knapweed [6.p]
Acroptilon repens

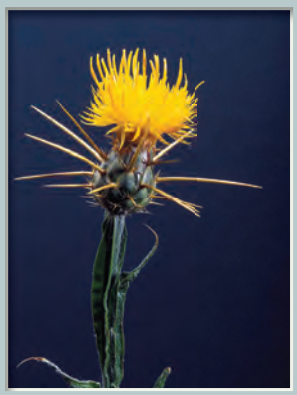
Russian knapweed [6.q]
Acroptilon repens

Spotted knapweed [6.r]
Centaurea stoebe

Purple starthistle [6.s]
Centaurea calcitrapa

Spotted knapweed [6.t]
Centaurea stoebe

Yellow starthistle [6.u]
Centaurea solstitialis



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References and Resources

Baker, M.B., P.F. Ffolliott, L.F. DeBano, and D.G. Neary 2004, *Riparian Areas of the Southwestern United States: Hydrology, Ecology, and Management*, CRC Press LLC, 408 p.

Briggs, M.K. 1996, *Riparian Ecosystem Recovery in Arid Lands: Strategies and References*, University of Arizona Press, Tucson, Arizona, 153 pp.

Chambers, J.C. and J.R. Miller 2004 *Great Basin Riparian Ecosystems: Ecology, Management, and Restoration*, Society for Ecological Restoration, Island Press, Covelo, California, 320 p.

Collins, J.N., E. Stein, & M. Sutula 2003, *California Rapid Assessment Method for Wetlands*, vol. 3.0., San Francisco Estuary Institute, Oakland, California and the Southern California Coastal Water Research Project, Westminster, California, 141 pp.

Fleming, W. & D. Henkel 2001, *Community-Based Ecological Monitoring: A Rapid Appraisal Approach*, Journal of the American Planning Association, Vol 67, No. 4, pp. 456-466.

Fullerton, W. and D. Batts 2003, *Hope for a Living River, A Framework for a Restoration Vision for the Rio Grande*, The Alliance for Rio Grande Heritage, World Wildlife Fund, Albuquerque, New Mexico, 131 pp.

Hauer, F. R., C. N. Dahm, G. A. Lamberti, & J. A. Stanford 2003, *Landscapes and Ecological Variability of Rivers in North America: Factors Affecting Restoration Strategies*, The American Fisheries Society, pp. 81-105.

Leopold, L.B. 1997, *Water, Rivers and Creeks*, Harvard University Press, Cambridge Massachusetts.

Los Lunas Plant Materials Center n.d., *Deep Planting of Longstem Transplants for Riparian Restoration in the Southwest*, USDA Natural Resources Conservation Service, Los Lunas, New Mexico.

McKinstry, M.C., W.A. Hubert and S.H. Anderson 2004, *Wetland and Riparian Areas of the Intermountain West: Ecology and Management*, University of Texas Press, Austin, Texas. 335 p.

Mouw, J.E.B & W.M. Dixson 2008, *Watersheds in Layers: Landform Influences on Tree Growth and Understory Species Richness*, Journal of Vegetation Science, Opulus Press, Issue 19. 6 Dec 2008, pp 885-892.

Muldavin, E.M, P. Durkin, M. Bradley, M. Stuver, & P. Melhop 2000, *Handbook of Wetland Vegetation Communities in New Mexico*, vol. 1, Univ. of New Mexico, Natural Heritage New Mexico, Albuquerque, New Mexico,

Muldavin E., et al. (In Progress) *New Mexico Rapid Assessment for Wetlands Method –Upper Rio Grande Watershed*, New Mexico Environment Department, Surface Water Quality Bureau Wetlands Program. Santa Fe, New Mexico.

Naiman, R.J., H. Decamps, & M.E. McClain 2005, *A River Runs Through It - Riparia:* Ecology, Conservation, and Management of Streamside Communities, Elsevier Academic Press, San Diego, California, 430 pp.

Rosgen, D. 1996, *Applied River Morphology*, Second Edition, Wildland Hydrology, Pagosa Springs, Colorado.

U.S. Department of Agriculture 2007, *A Guide for Planning Riparian Treatments in New Mexico*, New Mexico Natural Resources Conservation Service, New Mexico Association of Conservation Districts, NRCS Los Lunas Plant Materials Center, Albuquerque, New Mexico, 44 p.

Zeedyk, W. D. & V. Clothier 2009, *Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels*, The Quivira Coalition, Santa Fe, New Mexico, 239 p.

Zeedyk, W.D 2006, *An Introduction to Induced Meandering: A Method for Restoring Stability to Incised Stream Channels*, . ird Edition April 2006, Jointly published by Earth Works Institute and The Quivira Coalition, Santa Fe, New Mexico, 18 p.