# ESTABLISHMENT OF WETLAND VEGETATION OF EAST TEXAS MINE SPOIL

Author: Steven Keith McKnight

Methods of establishing wetland vegetation on lignite mine spoil were studied at Big Brown Mine in northeast Texas from March 1989 to November 1990. Barnyard grass (*Echinochloa crusgalli* var. *crusgalli*), Japanese millet (*Echinochloa crusgalli* var. *frumentaceae*), and smartweed (*Polygonum punctatum*) seeds, and chufa (*Cyperus esculentus*) and arrowhead (*Sagittaria latifolia*) tubers were subjected to 4 water regimes (spring drawdown, spring flooding, fall drawdown, fall flooding). Spring drawdown was the only water regime to which all species responded. Barnyard grass produced the most ($P<0.05$) above-ground biomass, while Japanese millet produced the most ($P<0.05$) seed biomass in this water regime. Arrowhead grew under all water regimes except fall drawdown. In the remaining 3 water regimes, total tuber biomass did not differ ($P>0.05$), while tuber number was greatest ($P<0.05$) in spring drawdown. Chufa produced no seed biomass and little above-ground biomass.

Seed bank samples were collected from a shallow, reclaimed, 13-yr old, sedimentation pond (source pond), in November 1989 and subjected to 4 water regimes (unflooded, April drawdown, June drawdown, August drawdown). Nineteen species were common to both source pond point-intercept transects (24 species) and seed bank plots (41 species). April drawdown produced the greatest species richness, stem density ($P<0.05$), and above-ground biomass ($P<0.05$). June and August drawdowns produced the lowest species richness and above-ground biomass ($P<0.05$), while June drawdown produced the lowest ($P<0.05$) stem density. Mean soil moisture (percent of dry weight), differed ($P<0.05$) in all water regimes. Mean soil moisture/stem density relationships were found in only 15 of 39 taxa ($r^2 = 0.08$-$0.36$). Muskgrass (*Chara sp.*), pondweed (*Potamogeton pusillus*), and southern naiad (*Najas guadalupensis*) grew in June and August drawdown plots prior to drawdown, with total submergent biomass greatest ($P<0.05$) in August drawdown plots. Disturbed source pond strips had 66.0% ground cover 6 months after disturbance (seed bank soil collection) compared to 96.3% in undisturbed areas.

Results of this study suggest that a combination of transplanted wetland soil and artificial planting in spring would satisfy reclamation regulations and provide a diverse wetland plant community capable of supporting waterfowl and other wildlife.

*Master's Thesis*
*Department of Wildlife and Fisheries Sciences*
*Texas A&M University*
*College Station, Texas 77843*