

Ecological Restoration Brief

Reprinted from TXSER Quarterly Newsletter

ERB No. 24

March 2016

Coyotes as Super Seed Dispersers are Keystone Species in the Fragmented Habitat of the Lower Rio Grande Valley

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Land use change and heavy fragmentation of remaining natural habitat are currently the main threats to biodiversity in the lower Rio Grande Valley (LRGV). These threats also represent formidable obstacles to full restoration at the landscape level. At the fragment level, attempts to rehabilitate patches of historic habitat such as Tamaulipan thorn forest and coastal prairie are hindered by the harsh climatic conditions and three hyper competitive invasive species of African grasses (guinea grass, buffel grass and Kleberg bluestem grass). In addition, natural propagation of native foundation species is very limited due to fragmentation.

Current and planned restoration efforts in this region focus on existing protected patches of natural habitat, and on abandoned fields set aside for conservation and to enhance connectivity among patches. A principal component of these efforts is revegetation/reforestation through planting of nursery produced seedlings. This procedure is expensive and time consuming; most thorn forest seedlings are grown in containers for about two years before transplantation into the field.



**A Coyote in the mixed palm forest near Brownsville, TX.
Photo credit: Game Camera**

We have been exploring a set of plant-animal interactions involving seeds of various species from the thorn forest and the mixed palm forest (i.e. thorn forest with sabal palm as one dominant species). We have found that seeds from sabal palm and from woody species are

heavily and rapidly predated. For example, palm seeds have a 100% predation rate within less than two weeks on the soil unless they are ingested by coyotes. Seed predators include rodents, raccoons and seed beetles, and replace each other depending on how far from the forest edge (both ways) the seeds fell to the ground.



**Coyote scat loaded with seeds.
Photo credit: Guillermo Aguilar**

As opportunistic feeders, coyotes consume fruits of several plant species and thus ingest their seeds. We investigated how well coyotes disperse seed and found, what we term "coyote benefits," including that a coyote is: 1) a legitimate disperser - seed in scats are viable (same germination percentage as clean seeds); 2) an effective disperser - the germination process is improved (faster and more synchronized germination); 3) an efficient disperser - the seeds are deposited far from the mother plant where seedlings have a higher chance to develop; 4) a seed protector - seeds are protected from

predators for a few weeks (based on a predator preference experiment, seeds in scats are avoided by beetles and mammals); and 5) a promoter of seedling recruitment and competitiveness - seeds in scats have congregated germination which represent an advantage for seedlings to resist competition by invasive grasses.

We sustain that the coyote is a keystone species in the LRGV because it is an extraordinary disperser/protector of native species' seeds. We have found seeds of native species (13 species in total so far) in every scat we have examined (~200 scats), and the "coyote benefits" are certainly applicable to all of these species. Finally and very importantly, coyotes have large home ranges traveling up to 30 km in a single day. They have adapted well to human modified landscapes, crossing almost any sort of land use when travelling from patch to patch of natural habitat. Their role as propagators of thorn forest species is unmatched in a fragmented landscape.



**Congregated germination and seedling recruitment is one of the "coyote benefits." A group of 6-8 sabal palm seedlings growing in the location of a coyote scat containing palm seeds.
Photo credit: Alejandro Fierro**

The Society for Ecological Restoration, Texas Chapter promotes ecological restoration as a means of sustaining the diversity of life on Earth and re-establishing an ecologically healthy relationship between nature and culture.

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