



The Role of Disturbance in Shaping the Ecosystem and Species of the Blanco River Watershed

Fire suppression has changed the habitats of two endangered birds: The Black-capped Vireo (BCV, right) and the Golden Cheeked Warbler (GWC, left).



Photos courtesy of Pete Diaz

Black-Capped Vireo

Natural fires assure creation of appropriate habitat for BCV populations. Landscapes recovering from fire undergo a sequence of changes or stages of different vegetation types prior to the re-establishment old-growth forest. Appropriate BCV habitat is mid-successional scrubby oak vegetation in transition to domination by large trees. Areas of habitat therefore pass through periods of suitability and unsuitability. Especially true during breeding season, BCVs prefer shrubby growth of irregular height and distribution with small thickets and clumps with high density vegetative cover extending to ground level. The BCV is considered endangered as it has undergone substantial range reduction due mainly to man-made disturbance in the creation of pastureland suppression of natural fire regimes yielding mature woodlands and development. Introduction and the subsequent increase of fenced livestock into the Blanco watershed has also intensified existing threats of cowbird brood parasitism. Cowbirds were formerly associated with roaming buffalo and therefore historically had a much smaller impact on local bird populations.



Golden Cheeked Warbler

Until recently, appropriate GCW habitat was confined to steep canyon slopes because they provide greater protection against the effects of range fires.

Populations of GCW prefer mesic woodlands in limestone hills and canyons, composed of moderate to high density of old-growth and mature ash juniper and oak. The foliage at upper levels provide nesting habitat with greater insect availability and foliage at upper levels for nesting habitat. Clear-cutting or severe understory reduction by grazing or burning may reduce suitable habitat.

Floods and the drought-ephemeral nature of river

Consistent flow of the Blanco River is a major influence in aquatic species adaptation. As a consequence of long hot summers with high temperatures, annual evapotranspiration exceeds annual precipitation and produces intermittent flows. Precipitation tends to occur as localized thunderstorms which gives pulses of flow, from dry to flood conditions within hours. Seasonally high temperatures are accompanied by low levels of dissolved oxygen (DO) that add more stress to populations of aquatic species

Adaptation of invertebrates

- Body form hydrodynamic to resist high flow rates fast flowing water during flood events
- External gills for low flow, hot, low D.O. conditions during drought conditions
- Baetid larval mayflies have adapted by shortening “opportunistic” life spans (2 week larval stages) to take advantage of erratic periods water availability. Megalopteran *Corydalus* sa shortened egg to mature larval stages from 11-12 months to 6-7 months. Stoneflies of the genus *Perlesta* have evolved drought-resistant life stages to help them persist thru hard times.



Heptagenid mayfly - flat body design for fast currents



Isonychiidae family of mayflies- hydrodynamic body form



External gills for low dissolved oxygen conditions





External gills of Damselfly of the order Coenagrionidae



Mayfly larvae are able to withstand both conditions through body form for high flows and external gills for times of low DO.



Stoneflies of the genus Perlesta go through drought resistant stages of development