



Threats to Watershed Biodiversity



The Blanco River watershed is an extremely biodiverse landscape. Sensitive vegetation and wildlife habitats are threatened by:

1. Changes in vegetation;
2. Altered natural flow patterns;
3. Toxic or excessive materials;
4. Invasive and exotic species; and
5. Commercial and industrial development.

1. Changes in vegetation:



Eliminating natural riparian vegetation reduces available food and shelter for native birds and mammals and alters the hydrology of streams and rivers.



Riparian vegetation along the streamside is a sensitive area with a diverse under-story of native grasses, herbs and shrubs and an over-story of larger trees. This vegetation increases available food and shelter and promotes successful fish spawning. Increased vegetation acts as a buffer, protecting from activities of the surrounding catchment area, protects against erosion, and acts as a sink for pulses of nutrients. Excessive grazing along river banks can strip vegetation, disturb the soil and banks, and slow regeneration.

Upland vegetation management:



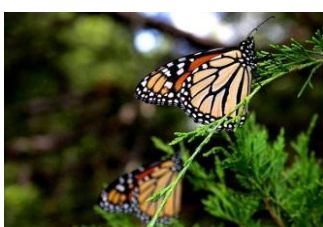
Large-scale removal of brush and juniper results in fragmented habitat and changes in species composition, distribution, and numbers.

Unsustainable livestock grazing practices- Overstocked properties are neither productive nor biodiverse.



Fire suppression- Occasional disturbance from fire is obligatory to maintain quality habitat for the endangered black-capped vireo.

Mechanical clearing of forest understory -Stripping out midstory shrubs, trees and vines of riparian forests to create European park-like areas with sparse habitat and biodiversity.





Excessive wildlife herbivory:



Over-abundance of White-tailed deer- Surveys by TPWD indicate densities in Blanco and Hays County of 250% of recommended levels (Armstrong and Young 2002).

Introduced species- axis deer (*Cervus axis*), and feral hogs (*Sus scrofa*). Damage can be significant for plant species in sensitive areas such as springs.

2. Changes to natural flow patterns



The Blanco River is defined by its natural flow pattern of floods punctuated by periods of exceptionally low summer flows as a result of drought. Unnatural flow patterns disturb habitat and remove flow triggers for migration or spawning.

Dams and impoundments change hydrology and sediment loading.

Excessive sedimentation destroys fish and macro-invertebrate habitat, and kills fauna by smothering.

Heavy metals and contaminants are concentrated in front of dams, and released *en masse* during catastrophic flood events.

Localized eutrophication by concentrating fertilizers and excrements.

As settling ponds, dams prevent the movement of organic material.

Instream barriers are structures built for water management (dams, reservoirs and weirs) and for crossings (bridges and culverts)

Passage of migratory fish is seriously impacted and threatens the survival and distribution of many species.

Disruption of migrations and recolonizations can eliminate complete populations and affect the whole balance of aquatic ecosystems.

Increased Impervious Cover



Hard surfaces of asphalt and concrete used for roads, parking lots, driveways, and sidewalks.

Alter the velocity, amount, and pulse of rainwater returning into the ground or to streams and rivers.

Gathers oil, grease, and other contaminants, depositing them into waterways.

Removal of Woody Debris - Creates diversity of flows in stream.



Fish require woody debris for;

- Sites to spawn and rear juveniles;
- Protection from strong currents and sunlight;
- Shelter from predators
- Vantage points to help capture prey

Woody debris protruding from rivers and streams provides **valuable habitat** for birds, reptiles, mammals, amphibians and insects. It is an important link in food chains. Removing the woody debris results in a loss of organic matter and energy from the Blanco River ecosystem. Without riparian vegetation, there can be no input of new woody debris.

- **Organic matter** such as leaves is trapped by the debris.
- **Algae, fungi, and bacteria** grow on wood surfaces
- **Invertebrates** graze on wood surfaces of high nutritional value.
- These are eaten by **fish and waterbirds**,
- Which in turn provide food to **top predators** such as snakes, hawks, and some mammals.

3. Toxic or excessive materials

Until recently, rivers and streams have been regarded as exploitable resource and used as convenient channels for disposal of wastes.

Toxic materials enter rivers and streams via surface runoff and have significant effects on living organisms.

Agricultural runoff is a source of excess nutrients and pesticides.

Toxicants include:

- herbicides
- insecticides
- Metals like;
- mercury,
- cadmium,
- zinc;
- Petroleum by-products like oil and petrol



The effect of toxicants is increased by their ability to stay in the environment for a long time.

Polychlorinated biphenyls (PCBs) are resistant to degradation and remain in aquatic systems for many years.

Affects individuals differently depending on age, sex and size. Developmental or larval stages more sensitive than adults.

The effects of toxicants on plants and animals can extend way beyond the immediate river and stream community.

Sedimentation of rivers and streams excessive sediment input over natural levels is probably the most serious and widespread issue for all rivers and streams

Human activity significantly increases sediment loads into streams, having significant effects on



Grazing by livestock causes erosion. River banks are stripped of vegetation, banks are eroded, and regeneration of vegetation is slowed.

Unsustainable Fertilizer, Pesticide, Herbicide Use Aquatic systems are threatened by overuse of fertilizers and pesticides.

Fertilizers increase nitrogen levels in water contributing to unnatural growth of aquatic plants.

Pesticides and herbicides may directly kill aquatic organisms, or may stress biota by changing water chemistry or even body chemistry within individuals.

The main **source of fertilizer and chemical runoff** is likely suburban and urban properties. Fertilizer, pesticide and herbicide run-off from homes and schools has been shown to be higher per acre than from many farms.

4. Invasive and exotic species



The most controversial invasive plant here is a native: **Ashe juniper** has expanded its range and now dominates landscapes due to fire suppression, heavy grazing, and a period of increased rainfall. It is controversial since, while necessary habitat for endangered Golden-cheeked Warblers, Ashe juniper has also been blamed for depleting groundwater stores at a watershed scale (Texas Water Development Board 2002).



Problematic exotic grasses, such as King Ranch bluestem, have proven difficult to eradicate. Other species are bermudagrass (*Cynodon dactylon*), Kleberg bluestem (*Dichanthium annulatum*) and silky bluestem (*Dichanthium sericeum*). Exotic shrub and tree species include giant reed (*Arundo donax*), castor bean (*Ricinus communis*), chinaberry (*Melia azedarach*), and chinese tallow (*Sapium sebiferum*).



5. Commercial and Industrial Development

The ecological concerns of development can be ameliorated by improvements in design and scale of development. Construction away from environmentally sensitive areas, building structures and parking areas that minimize habitat loss and reduce impervious cover mitigate many concerns. Industries which require discharge into river bodies could have deleterious effects on aquatic species and water quality. Commercial and industrial growth should strive to maintain the character, culture, and the quality of life valued by local residents ([BMPs pdf](#)).