

## Talking points: Arguments against effluent discharges in the Hill Country

### **Why discharges degrade downstream water quality**

High permitted levels for contaminants in wastewater are allowed by TCEQ because nutrients (nitrogen and phosphorus) and other contaminants are expected to be absorbed in the channel. Outside the Hill Country many streambeds contain vegetation and soils which absorb nutrients and other effluent pollutants. Additionally, such streams have flat slopes which reduce stream velocity which provides time for pollutants to be absorbed before reaching downstream critical areas. Finally, any pollutants recharging aquifers move very slowly and are absorbed by the soils in aquifers outside the Hill Country.

However, Hill country streams contain minimal if any soils and vegetation to absorb nutrients. Additionally, Hill country streams are steep which causes rapid movement of effluent to downstream surface water supplies and wells. The Hill Country is comprised of streams that lie over the Trinity and Edwards aquifers--most of the streams lose most or all base flow to the aquifers thus exposing effluent to wells. Additionally water movement in both aquifers is extremely rapid compared to other aquifers thus exposing many wells to effluent.

Spills, overflows and intentional releases of improperly treated sewage causes a greater threat than effluent meeting criteria.

### **Threat of stream eutrophication and algae**

In order to prevent eutrophication, EPA recommendations for nutrient criteria for EcoRegion IV are 0.56 mg/l for total nitrogen and 0.023 mg/l for total phosphorus

<https://www.epa.gov/nutrient-policy-data/ecoregional-nutrient-criteria-rivers-streams>.

Additionally, a study conducted by the Texas Institute for Applied Environmental Research shows that phosphorus levels as low as 0.05 mg/l have produced as much as one-half of the average algal biomass in the streams studies (Kiesling and others, 2001, p. 34, fig. 12, <http://tiaer.tarleton.edu/pdf/TR0107.pdf>).

Therefore, the permitted effluent level for ammonia nitrogen is almost double the EPA value to prevent eutrophication and 20 times the Texas based value to prevent eutrophication. Additionally, the permitted level of phosphorus is 43 times higher than the value to prevent eutrophication.

### **USGS and TCEQ study of water quality for streams receiving effluent discharges**

More than 15 years ago, it was known that wastewater discharges had adversely impacted Hill Country streams. In 2005-06, the US Geological Survey, in cooperation with the TCEQ, evaluated nutrient and biological conditions in 15 small streams in the Hill Country. Streams that did not receive wastewater effluent had relatively low nutrient concentrations. Streams receiving wastewater effluent had relatively high nutrient concentrations and were classified as eutrophic.

The results from this study are published in a report entitled "Nutrient and Biological Conditions of Selected Small Streams in the Edwards Plateau, Central Texas, 2005-06,

and Implications for Development of Nutrient Criteria”—the report is available on the Internet at <https://pubs.er.usgs.gov/publication/sir20075195>

### Water quality values from above study

Based on 16 samples for nutrients (6 from basins with wastewater discharges and 10 from basins without wastewater discharges), figure 4 of the report presents the following:

**Total N values for streams with wastewater 5 times greater than streams without wastewater**

**Total P in streams with wastewater 183 times greater than streams without wastewater**

Median total nitrogen value for samples from non wastewater basins = 0.3 mg/L

Median total nitrogen value for samples from wastewater basins = 1.6 mg/L

Median total phosphorus value for samples from non wastewater basins = 0.006 mg/L

Median total phosphorus value for samples from wastewater basins = 1.1 mg/L

The values of total nitrogen and total phosphorus from the basins with wastewater discharges are greater than threshold values that could produce eutrophication (see slides 10 and 11). Additionally, for the samples, the median value for nitrite and nitrate nitrogen is 0.94 mg/L, a value that is comparable to the EPA maximum limit of 1 mg/L of nitrite nitrogen allowed for a public water supply (slides 10 and 11).

### Effluent permitted water quality values

In a few days, effluent can move downstream many miles and enter the aquifer and nearby wells. However, permit levels for the Edwards aquifer contributing zone address only **30-day mean values for maximum pollutant levels**. No limit exists for average contaminant levels for periods less than 30 days. In other words nitrogen or phosphorus levels can be much higher than permitted for a few days or a week or longer, as long as the 30-day mean value is less than the permitted level. However, during those few days or a week or longer, the contaminated can threaten downstream streams and wells. Wastewater contaminant levels should be but are not established for grab samples (instantaneous value at time of sample), and 7-day man values as required for the remainder of the State.

### Effluent toxics not addressed by TCEQ permits

Many pharmaceuticals, personal care products, surfactants, various industrial additives and numerous organic chemicals are identified as Endocrine Disrupting Chemicals (EDCs). Based on USGS studies that sampled at and downstream from 10 wastewater treatment plants, 78 EDCs were detected. One USGS study, Glassmeyer and others (2005, table 5) presents a list of 37 EDCs most often detected in wastewater. At least one-half of these 37 EDCs were detected at all sites and 11 of the EDCs were detected at every wastewater site. The same USGS study included sampling at many sites upstream from the wastewater sites. Detections of and concentrations of EDCs at the upstream sites were substantially less than found at wastewater sites, proving wastewater to be the major source for EDCs.

Studies suggest that the effect of EDCs exposure on human health includes a decrease in male sperm count, an increase in testicular, prostate, ovarian and breast cancer and reproductive malfunctions. The significant concern is toward fetuses and newborn babies since they are the most vulnerable (Bologna and others, 2009, p. 234).

Some EDCs detected in wastewater represent estrogenic pesticides and pharmaceuticals , which operate through estrogen receptors in their target cells--their effects are additive. This means that there is no minimally safe exposure because any dose adds to natural estrogens already present (Norris and Vajda, 2007). Wastewater contaminated water supplies will produce continued exposure and cumulative levels of estrogenic hormonal chemicals in humans.

### **Effluent Plant discharge violations in the Hill Country**

- 48 municipal wastewater discharge facilities with 147 outfalls in the Hill Country
- The permitted discharge for the facilities totals about 303 million gallons per day, which is about 9 times greater than the mean flow from Barton Springs.
- Three of the facilities (in Kerrville, Pflugerville, and Sabinas) were non compliant in meeting the permit specifications during 11 of the 12 quarters during the past 3 years.
- 31 of the 48 facilities were non compliant as of September 22, 2018.
- During the past 3 years, the facilities in Kyle and Uvalde had the most quarters with significant violations--7 and 6 respectively.
- During the past 3 years, the three facilities in New Braunfels, and the facility in Kyle and Pflugerville had the most number of effluent violations with 129, 50 and 36 respectively.
- About 1/3 of the facilities (15 Of 48) had only one on-site inspection during the past 5 years.
- During the past 3 years, the 48 facilities had 411 violations, an average of 8.6 violations per facility.
- Despite 411 violations in the past 3 years, only 38 formal enforcement actions were issued during the past 5 years.

### **Wastewater discharges Texas versus remainder of United States**

- Based on the database, **Texas has the most 1812 and major such facilities with 489. PA is second with 291.** 4420 such facilities exist Nationwide thus Tx has 11% of those in the Nation. Scroll down the link and click on the box "Majors with limits" to view this database.
- **Tx also has the most minor facilities with at least 1323--**the database description warns that not all minor facilities are included in this database.
- Additionally, the database shows that only 7% of Tx major facilities have imposed nitrogen (N) or phosphorus (P) limits--this compares with 34% for the entire U.S.
- Finally monitoring requirements for N or P are required for only 4% of major TX facilities--compared with 63% Nationwide.
- Tx has the most total such facilities and is at the bottom or near the bottom of the list for percent of facilities with N or P limits and for N or P monitoring.