



Improving Water Quality in the Arroyo Colorado A Project to Reduce Legacy Pollutants

The state of Texas requires that water quality in the Arroyo Colorado be suitable for swimming, fishing, and a healthy aquatic ecosystem. However, water quality and fish tissue analyses conducted between 1980-1998 identified several legacy pollutants (chlordane, DDE, DDT, dieldrin, endrin, hexachlorobenzene, heptachlor, heptachlor epoxide, lindane, PCBs, and toxaphene) in fish tissue at concentrations warranting a fish consumption advisory upstream from the Port of Harlingen (Segments 2202 and 2202A). Legacy pollutants are chemicals whose use has been banned or severely restricted, but which persist in the environment. In response, TCEQ conducted a total maximum daily load (TMDL) project to address these pollutants. The ultimate goal of these TMDLs was the reduction of fish tissue contaminant concentrations to levels that constitute an acceptable risk to consumers.

The Arroyo Colorado Watershed

The Arroyo Colorado, an ancient distributary channel of the Rio Grande, extends about 90 miles from Mission, Texas, to the Laguna Madre in the Rio Grande Valley. Flow in the Arroyo Colorado is sustained by wastewater discharges, agricultural irrigation return flows, urban runoff, and base flows from shallow groundwater. Although an integral part of a major floodwater system, water is only diverted from the Rio Grande into the Arroyo Colorado during major flood events. The Arroyo is also the major source of fresh water to the lower Laguna Madre, an economically and ecologically important resource to the region.

The Arroyo Colorado watershed (1,828 square kilometers) is a flat coastal plain that slopes gently toward the Gulf of Mexico. The fertile farmland, long growing season, and access to water for irrigation from the Rio Grande make this region one of the most productive agricultural areas in the U.S. The Laguna Atascosa National Wildlife Refuge and several county and city parks are located within the Arroyo watershed. The mild climate, semi-tropical plants and animals, and many recreational opportunities draw large numbers of people to the Arroyo Colorado watershed. One-third of the stream is used for shipping from the Gulf Intracoastal Waterway to the Port of Harlingen.



TMDLs for Legacy Pollutants

Widespread use of the chemicals addressed in these TMDLs has been either banned or restricted for at many years. Sediment and fish tissue samples collected in some of these water bodies suggest that legacy pollutant levels are diminishing. The maximum allowable daily load is, in effect, zero, since no additional loading should occur beyond current background levels. The concept of establishing a “no permittable load” allocation is not entirely new and has been applied in other parts of the country where legacy pollutants have been addressed.

Because no additional loading of legacy pollutants is allowed, these TMDLs do not attempt to quantify allowable loads for these contaminants into the subject water bodies. The targets established in the TMDLs represent the fish tissue contaminant concentrations that are within the acceptable risk levels established by the Texas Department of State Health Services (DSHS).

Public Participation

Two committees were formed to provide guidance and local input for the TMDL project. The Watershed Steering Committee was formed to ensure local involvement. The Science and Technical Advisory Committee was formed to provide technical guidance.

For More Information

Send an email to tmdl@tceq.texas.gov, or call us at 512-239-6682. Or visit the project website at:

www.tceq.texas.gov/waterquality/tmdl/07-arroyoleg.html.

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Table 1. Description of Pollutants

Chemical	Description
Chlordane	Organochlorine pesticide
DDD	Dichlorodiphenyldichloroethane (Organochlorine pesticide, a degradation product of DDT)
DDE	Dichlorodiphenyldichloroethylene (Organochlorine pesticide, a degradation product of DDD and DDT)
DDT	Dichlorodiphenyltrichloroethane
Dieldrin	Organochlorine pesticide
Endrin	Organochlorine pesticide
Hexachlorobenzene	Organochlorine pesticide
Heptachlor	Organochlorine pesticide
Heptachlor epoxide	Organochlorine pesticide
Lindane	Organochlorine pesticide
Mercury	Metal
PCBs	Polychlorinated Biphenyls (group of synthetic organic chemicals widely used as coolants and lubricants)
Toxaphene	Organochlorine pesticide

Table 2. Water Bodies and Pollutants Addressed

Segment Number	Segment Name (portion covered by TMDL)	Fish Tissue Contaminant(s) covered by TMDL	DSHS Advisory/ Ban Issued	DSHS Advisory/Ban Modifications (during TMDL implementation)
2202	<u>Arroyo Colorado Above Tidal</u> (upstream of the Port of Harlingen, including Llano Grande Lake and the main floodway)	Chlordane, toxaphene, DDE, DDT, DDD, dieldrin, endrine, hexachlorobenzene, heptachlor, heptachlor epoxide, and lindane	June 1993 and November 1993 - Consumption Advisory	June 2001 – Advisory modified to smallmouth buffalo January 2008 – Advisory modified to longnose gar due to DDE, mercury and PCBs; and to smallmouth buffalo due to DDE and PCBs December 2015 – Advisory modified to longnose gar due to mercury and PCBs; and to smallmouth buffalo due to PCBs
2202A	<u>Donna Reservoir and Canal</u> (entire reservoir and canal)	PCBs	April 1994 - Consumption Ban	August 2007 – Ban retained November 2010 – Ban retained

TMDL Highlights

- In January 2001, the commission adopted *Four Total Maximum Daily Loads for Legacy Pollutants in the Arroyo Colorado Above Tidal and the Donna Reservoir and Canal System*. EPA approved the TMDLs in June 2001.
- In June 2001, after intensive sampling in 1999 and 2000, DSHS modified the existing consumption advisory on the Arroyo Colorado. All fish consumption restrictions were lifted on the Arroyo Colorado except for one species, smallmouth buffalo.
- In August 2003, the Commission adopted revisions adding eight TMDLs that incorporated additional legacy pesticides, which were found to contribute slightly to the risk of consuming smallmouth buffalo from the Arroyo Colorado. The EPA approved the TMDLs in May 2004.
- In December 2006, TCEQ’s Office of the Chief Engineer formally referred the Donna Canal and Reservoir System to TCEQ’s Office of Permitting, Remediation, and Registration for inclusion into its Superfund Program.
- In December 2005 and January 2006, DSHS collected fish tissue samples from the Arroyo Colorado and Donna Reservoir and Canal to reassess the risk associated with consuming fish from those areas.
- In August 2007, DSHS released the fish consumption risk study that maintained the ban on fish from the Donna Reservoir and canal.

Implementation Highlights

- In September 2001, the commission approved the Implementation Plan for Legacy Pollutants in the Arroyo Colorado Above Tidal and the Donna Reservoir and Canal System.
- In January 2008, DSHS modified the Arroyo Colorado advisory to limit consumption of longnose gar (due to DDE, mercury and PCBs) and smallmouth buffalo (due to DDE and PCBs).
- In March 2008, the Donna Canal and Reservoir system was added to the EPA Superfund Program's National Priorities List (NPL).
- In May 2008, the EPA began an investigation into the source of the PCBs in the canal and reservoir system, also conducting fish removal actions in August 2008, February 2009, August 2009, October 2012, and June 2017.
- In December 2015 DSHS modified the Arroyo Colorado advisory to limit consumption of longnose gar due to mercury and PCBs; and to smallmouth buffalo due to PCBs.
- In October 2018, the EPA issued its Record of Decision (ROD) regarding the Donna Canal and Reservoir system. The remedy specified in the ROD calls for removing contaminated sediment and fish and building new infrastructure at the source of the contamination, among other measures. These actions will address risks to people's health associated with eating fish from the reservoir and canal system.
- Check EPA's progress on remediating pollution in the watershed on EPA's webpage [Superfund Site: Donna Reservoir and Canal System](#)¹.

¹ <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.schedule&id=0605363>