

# Nogales Wash and International Outfall Interceptor Fact Sheet

## **General Background:**

The Nogales Wash is the main surface water drainage for the Ambos [both] Nogales watershed. Nogales Wash runs perennially from Sonora to Arizona with a base flow of 2-3 cubic feet per second, much of which is supplemented by potable- and wastewater-infrastructure leaks in Sonora.

The International Outfall Interceptor (IOI) is the infrastructure that conveys wastewater from Sonora and Arizona to the Nogales International Wastewater Treatment Plant (NIWTP.) The IOI covers a distance of approximately 8.5 miles from the border to the NIWTP. The treated effluent is discharged into the Santa Cruz River, where it provides a perennial surface water source to recharge groundwater levels and sustain riparian habitat.

The U.S. International Boundary and Water Commission (IBWC) and the City of Nogales are co-owners of the Nogales International Wastewater Treatment Plant (NIWTP), which is located in Rio Rico, Arizona, and provides treatment of sewage for both Nogales, Arizona, and Nogales, Sonora.

The NIWTP is designed to treat 14.74 million gallons of wastewater per day (mgd). 9.9 mgd is allocated to Nogales, Sonora under IBWC minute 276. The remaining capacity (4.84 million gallons per day) is allocated to Nogales and Rio Rico, Arizona. The plant does have the ability to handle wastewater flows in excess of 14.74 mgd for limited periods of time.

## **Nogales Wash Background:**

The Nogales Wash Channel was constructed by the U.S. International Boundary and Water Commission (USIBWC) in the early 1930s. It drains a 94.2 square mile (244 square kilometer) watershed centered over the US/Mexico border at Ambos Nogales. Given Mexico's higher elevation, the Nogales Wash flows northward through Nogales, Sonora into Nogales, Arizona.

The Nogales Wash is a covered concrete channel for its first 0.80 miles as it enters Arizona. The wash daylights just south of the Morley Avenue Bridge in downtown Nogales. The concrete channel continues for another 0.60 miles where it runs under the Patagonia overpass. The wash becomes an unlined channel approximately 2.10 miles north of the border just south of the City of Nogales Public Works Building and North Detention Road.

A 2008 inspection of the Nogales Wash covered channel by the Army Corp of Engineers concluded: "The walls and roof deck of the covered channel are in good condition, but due to the severe scouring and rebar exposure in the invert, the overall structural stability of the box section has been compromised and its performance under current imposed loads is very unpredictable and a hazardous condition."

Wastewater contamination of the Nogales Wash attributable to Mexico as it enters Arizona has been an ongoing issue for over two decades. The wash has at least three flow components: near surface groundwater/spring flow, leakage from the potable water system, and wastewater. The wastewater component contains microbiological and industrial contaminants.

Accidental discharges to the Nogales Wash come from poorly constructed Mexican wastewater collectors and conveyance pipelines. Intentional discharges occur when there are direct discharges from residences and businesses that are not connected to sewers and from maintenance and construction practices associated with the wastewater system.

Wastewater sourced to Sonora contains significant levels of regulated metals such as cadmium, lead, copper and zinc. Fugitive wastewater flows impacting surface water in the Nogales Wash may be contaminated with metals and other pollutants associated with industrial activities in Nogales, Sonora. In addition to impairing surface water quality, fugitive flows have the potential of impacting groundwater resources.

IBWC provides chlorine to the Nogales Sonora Public Works Utility and the City of Nogales, Arizona for disinfection of fugitive flows impacting the wash. Currently, there is no standard operating procedure for chlorinating the wash. The Arizona Division of Environmental Quality (ADEQ) is concerned about the formation of disinfection byproducts which may contaminate groundwater in Arizona.

Encroachment of population and transportation routes on the floodplains and drainages of Nogales Wash and its tributaries channelizes flows during periods of heavy monsoonal precipitation. These flows erode alluvial sediments along the banks of washes, which in turn scour the concrete channel of the Nogales Wash. A section of the Nogales Wash surveyed by the Army Corp of Engineers in 2007 indicated the concrete bottom had lost half of its thickness.

#### **IOI Background:**

The Nogales International Outfall Interceptor (IOI) is the gravity wastewater pipeline that begins at the border and flows 8.5 miles north to the Nogales International Wastewater Treatment Plant (NIWTP). The international outfall is the point where all Nogales, Sonora wastewater concentrates into a 24 inch pipe.

The reach of the IOI from the international border to City Public Works building was constructed during the 1950s. It consists of 24 & 30 inch concrete reinforced pipe. This entire stretch of pipe is located within and/or below the concrete lined channel of the Nogales Wash. The IOI runs approximately 3 feet below the concrete bottom of the Nogales Wash from just south of the Morley Avenue bridge (manhole 16) to just south of where the wash becomes an unlined channel near the City of Nogales Public Works Building and North Detention Road (manhole 32), a distance of approximately 5000 feet.

The reach from the City Public Works building to the current site of the Nogales International Wastewater Treatment Plant (NIWTP) was constructed in 1971 by the USIBWC for the City of Nogales. It consists of pipe diameters of 30, 36 and 42 inch concrete reinforced pipe, gradually becoming larger as it nears the NIWTP. The majority of this stretch of pipe is NOT located within the Nogales Wash except for a limited number of perpendicular crossings.

The pipeline, which was placed into operation in 1972, has been eroded and developed many cracks. Excessive amounts of groundwater infiltrate the pipe through these cracks, significantly increasing the volume in the wastewater system. This increased volume results in higher than normal operations and maintenance costs for treatment of the wastewater at the NIWTP.

Since the wastewater collection system in Sonora acts as a combined sanitary-storm water conveyance, inflow and infiltration of storm water in Sonora scours the IOI in Arizona. This scouring has resulted in failure of the IOI at the border as recently as October, 2010. The integrity of the IOI further north may also likely be compromised due to scouring.

Repeated failure of the IOI may result in contamination of Arizona groundwater resources as a result of industrial and sanitary wastewater infiltrating into the aquifer. Failure may result from years of scouring, or from the bottom panels of the Nogales Wash impacting the alignment of the IOI.

The Arizona Department of Environmental Quality (ADEQ) reports that the wastewater influent rate at the border averages 11-12 million gallons per day (MGD). Peak flows reach 2 to 3 times this amount. The international treaty allocation is 9.9 MGD. The USIBWC is the federal agency responsible for the treaty. The City of Nogales, Arizona discharges its wastewater into the IOI, commingling with Mexican wastewater, at a rate of 2-4 MGD. The capacity of the NIWTP is about 15 MGD.

Given age and disrepair, the Nogales Wash and IOI are chronically impacted by relatively small flood events. These conditions expose downstream populations to extraordinary public health risk.