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Tijuana River Valley Historical Ecology Investigation

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INTRODUCTION

The lower Tijuana River valley, straddling the border between southern California and northern Baja California, is a dichotomous landscape. In Mexico, the Tijuana River – confined to a concrete flood channel – is embedded within a highly modified urban area. As the river crosses the border into the United States, the high-rises and freeways give way to farms and fields, and a dense riparian forest marks the course of the river as it flows towards its outlet at the Pacific Ocean. Despite these differences, the valley on both sides of the border has been dramatically altered over the past centuries, albeit in different ways. Understanding what this landscape looked like in the past, and how it has changed over the time, is key to effectively managing it in the future.

In the relatively recent past (within the last 165 years), the valley supported a remarkable diversity of plants and animals adapted to a wide range of habitat types. Some, like coastal California gnatcatcher and San Diego pocket mouse, thrived in the dry scrublands on the edges of the valley. Others, like sandhill crane and wandering skipper, flourished in the extensive wetlands on the valley floor. Still others, like the California black rail, made their home in the tidal sloughs and marshes of the Tijuana Estuary. The river valley was truly a dynamic landscape: tides pumped water in and out of the estuary twice daily, while massive floods periodically swept through, scouring away vegetation and reshaping the valley floor.

Over the past several centuries, development and other land uses have resulted in dramatic physical and ecological changes in the valley. In the U.S., the extent of every major mapped historical habitat type (occupying >60 ha in the mid-19th century) has decreased by ~40–80%, while in Mexico the loss has exceeded 90%. Some habitat types, such as Vernal Pools, have completely vanished from the valley. In addition to this overall loss, habitat conversion has altered the structure of the estuary and the riparian corridor, further contributing to the transformation of the valley. Nevertheless, native plants and animals still survive and flourish in many areas. The nationally significant Tijuana Estuary continues to be an immensely productive ecosystem that supports a diverse array of birds, fish, and invertebrates. Upstream of the estuary, the Tijuana River supports an extensive riparian forest, one of the largest in coastal southern California, that provides habitat for a wide range of wildlife, including the federally endangered Least Bell's Vireo and Southwestern Willow Flycatcher. Though regulated by dams and partially channelized, the river continues to be a dynamic force capable of re-configuring the landscape.

With its binational jurisdiction and complex mosaic of urban and suburban development, agriculture, and open space, the Tijuana River valley is a challenging environment for land managers and conservation practitioners. In addition to habitat loss and conversion, key management challenges include the presence

of threatened and endangered species, invasion of non-native species, changes in streamflow and sediment dynamics, loss of tidal prism, and water quality degradation. The landscape also has unique restoration opportunities – for example, much of the lower river valley is relatively undeveloped and publicly owned – though determining appropriate restoration goals is itself a challenge. What types of habitats should be restored, and where? What physical processes are needed to maintain those habitats? How can critical disturbance events such as flooding and channel movement be accommodated?

The goal of this project is to help guide thinking around these and other questions by exploring the historical ecological and physical characteristics of the Tijuana River valley. While a historical perspective does not prescribe specific restoration goals or strategies, it can provide insights that help us to understand how the system functions today and to identify appropriate restoration targets. The absence of historical information limits our ability to see the future potential of the landscape. Conversely, an understanding of the valley's historical trajectory – of the drivers of change as well as the fundamental characteristics and processes that have remained unchanged – helps us to envision and create a landscape that supports the needs of its human residents while also optimizing biodiversity and ecological resilience.

Full Text
http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/967_TijuanaRiverValleyHistoricalEcologyInvestigation.pdf