

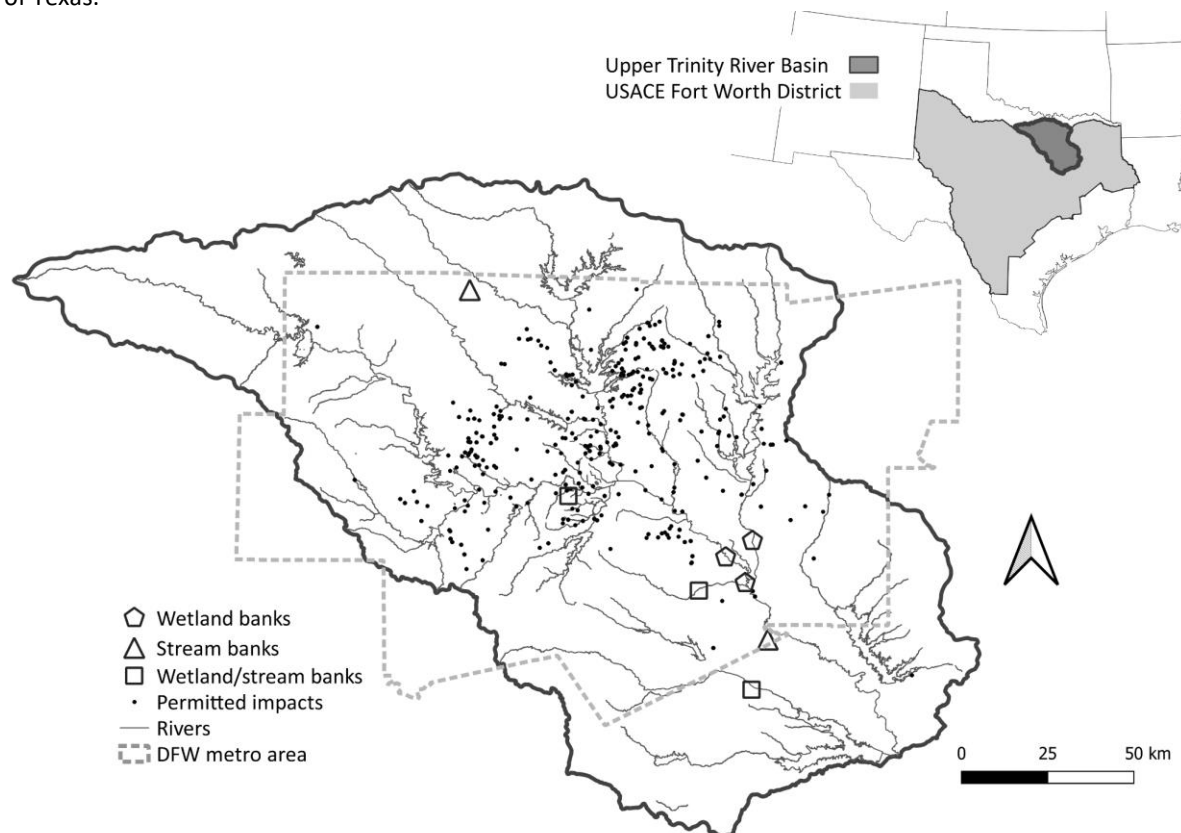
Matthew Ungaro — Master's Thesis Summary

Prioritizing streams: the impacts of in-kind mitigation rules on an ecosystem offset market¹

Extensive regulations have aimed to protect streams and wetlands threatened by development activities in the United States. However, failures to offset ecosystem damage with restoration of similar ecosystems (i.e., “in-kind mitigation”) have impeded ecological success of these policies. How do policies enforcing in-kind mitigation requirements -- e.g., prioritizing stream mitigation for stream impacts -- alter the structure of mitigation markets? What impacts do they have on the broader market for stream and wetland mitigation? I studied the mitigation market of Texas’s Upper Trinity River Basin (USA; Figure 1), where, in 2013, regulators implemented the Stream Mitigation Method (SMM), a set of novel, in-kind stream mitigation requirements (USACE SWF 2013). Drawing on impact (ORM 2) and mitigation data (RIBITS) from 2007-2019, as well as interviews with key USACE personnel, I statistically examined the long-term effects of this policy on the Basin’s stream and wetland mitigation markets, including demand and supply of mitigation bank credits.

I found the SMM altered the local mitigation market in three meaningful ways (Table 1 and Figure 2): 1) stream impacts declined over time, as a result of increased costs; 2) stream mitigation credit inventories increased markedly; and 3) wetland credit inventories declined gradually.

Figure 1. Map of Upper Trinity River Basin study area, as well as wetland and stream impacts (n=311) and mitigation banks (n=8). Inset map shows Basin and USACE Fort Worth District (SWF) situated within the U.S. State of Texas.



¹ Full manuscript available upon request.

Figure 2. Monthly (A) total stream impacts, (B) total wetland impacts, (C) stream mitigation credit sales, (D) wetland mitigation credit sales, (E) stream mitigation credit supply, and (F) wetland mitigation credit supply, before and after implementation of the SMM (indicated by dotted vertical lines; Oct. 2013)

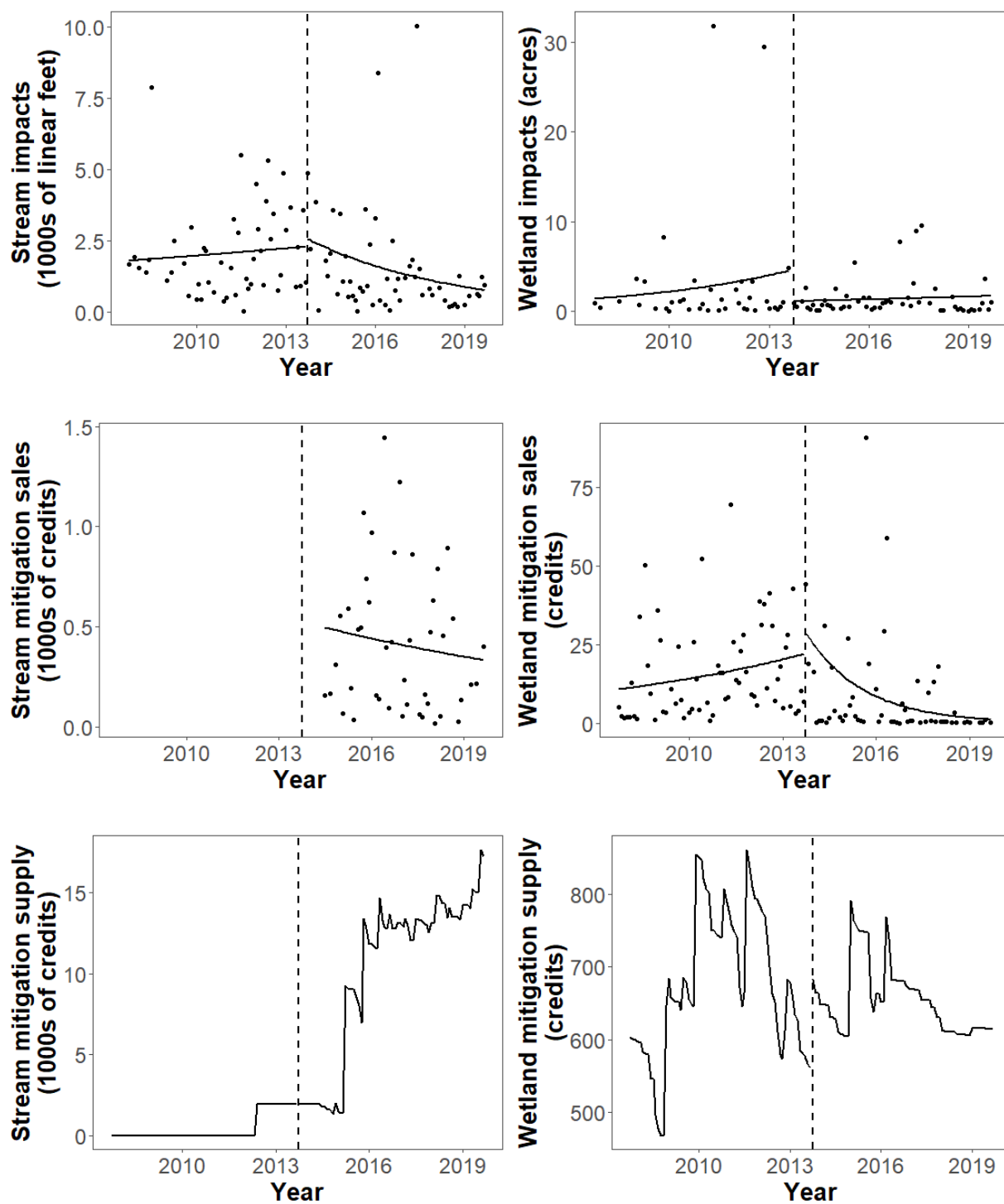


Table 1. Average monthly stream and wetland impacts, mitigation credit sales, and mitigation credit supplies before and after SMM implementation (October 2013).

Variable	Pre-SMM mean (95% CI)	Post-SMM mean (95% CI)
Stream impacts (ft)	1436.72 (1055.1; 1818.35)	1158.72 (746.13; 1571.31)
Wetland impacts (ac)	1.56 (0.35; 2.77)	1.05 (0.61; 1.5)
Stream mitigation sales (credits)	0 (NA; NA)	251.57 (170.87; 332.27)
Wetland mitigation sales (credits)	14.08 (10.57; 17.58)	6.60 (3.14; 10.06)
Wetland credit supply (credits)	675.83 (652.29; 699.37)	654.74 (643.3; 666.17)
Stream credit supply (credits)	431.26 (240.34; 622.18)	10128.59 (8911.71; 11345.46)

References

USACE SWF (2013) Public notice: Fort Worth district stream mitigation method (CESWF-13-MIT-1). US Army Corp of Engineers Fort Worth District, Fort Worth, Texas.