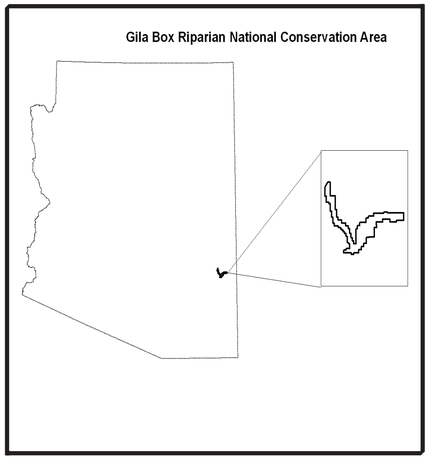
Monitoring changes in the Gila Box Riparian National Conservation Area



The Gila Box Riparian National Conservation Area ("Gila Box"). It was established as a result of the "Arizona Desert Wilderness Act of 1990." The United States Department of the Interior (USDI), Bureau of Land Management (BLM) Safford Field Office is tasked with management responsibilities. The objective is to conserve, protect, and enhance its riparian areas and associated resources and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, recreational, educational, scenic, and other resources and values of such areas.

The purpose of this study was to investigate temporal changes that occurred in the stream channel of the Gila River that flows through the Gila Box.

To accomplish this purpose, eight channel cross-sections measured in 1994, 2001, and 2008 were compared; while aerial photographs from 1935 and 2007 were used to measure sinuosity. Results indicate changes have occurred in stream channel geometry. Sinuosity was slightly different between 1935 (1.48) and 2007 (1.41), while thalweg depths were significantly deeper in 1994 than in 2001 and 2008. Climate patterns and particularly precipitation that causes major floods appear to be the major influence on stream channel dimension. Still, management that can lead to increased vegetation in the riparian areas (e.g. exclosure of livestock, all terrain vehicles) can mitigate flood impacts. In this study the stream channel appears more resilient to the 2005 flood when vegetation was better established than in 1993 when past management impacts were still lingering.

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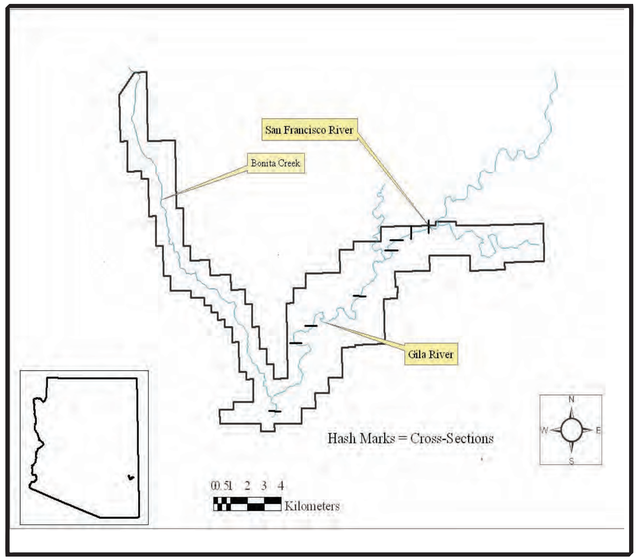

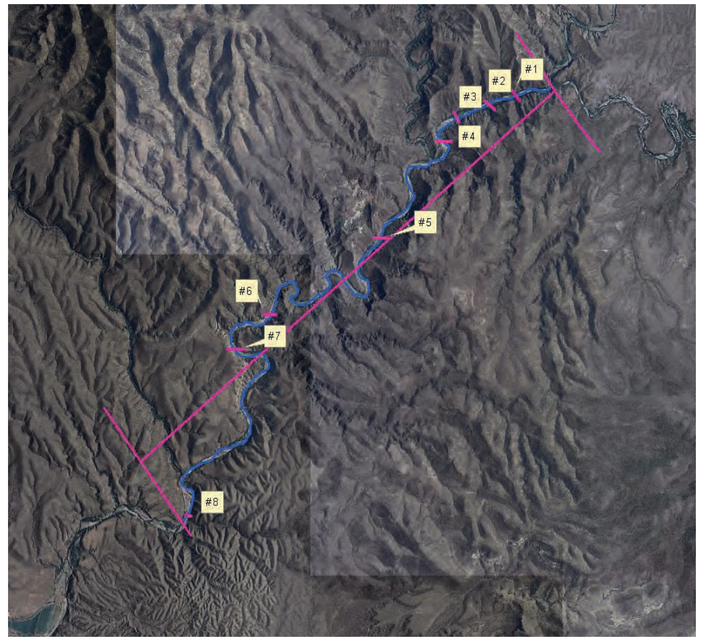

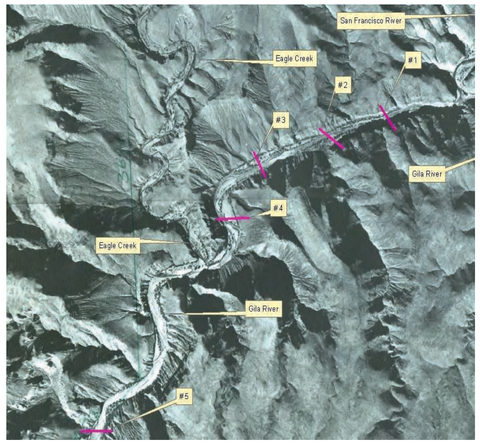

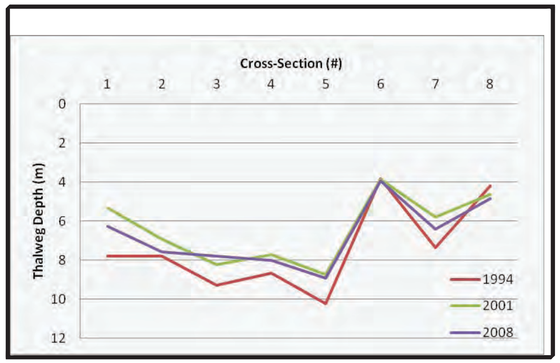

Table 1. Thalweg depth (meters) of individual cross-sections between years.

Cross-Section	Thalweg		
	1994	**2001**	**2008**
1	7.81	5.31	6.25
2	7.78	6.91	7.57
3	9.27	8.22	7.79
4	8.68	7.72	8.00
5	10.23	8.75	8.91
6	3.85	3.86	3.93
7	7.35	5.80	6.41
8	4.2 [1]	4.64	4.84

[1] Estimated from chart (missing data sheet)

Table 2. Differences in thalweg mean depths (meters) between years.

	1994	2001	2008
Thalweg	7.80[a]	6.40[b]	6.98[c]

[a,b] differ P < .01 Paired Students t-Test, P < .03125 Wilcoxon Matched-Pairs Signed-Ranks Test

[b,c] differ P < .076 Paired Students t-Test, P < .07812 Wilcoxon Matched-Pairs Signed-Ranks Test

[a,c] differ P < .01 Paired Students t-Test, P < .03125 Wilcoxon Matched-Pairs Signed-Ranks Test

Table 3. Regression coefficient of thalweg between years.

	1994 vs 2001	1994 vs 2008	2001 vs 2008
Regression Coefficient	0.947	0.968	0.949

Sinuosity

Sinuosity (Fig.6) changed little between 1935 (1.48) and 2007 (1.41). This in agreement with Graf (1981) who reported sinuosity remained constant over long periods of time.