

APPENDIX D

REGRESSION METHOD DEVELOPMENT

Table D-1. R-Square Values for Relationships Relating Total P Load (lbs) to Total Flow Volume (cf).

Station	Year(s) Included		Linear Storms	Log-Log Storms	Linear Base flow	Log-Log Base flow	Linear S & B	Log-Log S & B
Dry Creek	96	CT01	0.7730	0.7489	0.5997	0.7940	0.7881	0.8049
	97		0.4385	0.9068	0.5900	0.8085	0.5795	0.8607
	96 & 97		0.7252	0.6502	0.6009	0.7612	0.7431	0.7827
West Branch	96	CT02	0.9509	0.7210	0.1994	0.4999	0.9372	0.8409
	97		0.6557	0.8313	0.7796	0.8945	0.7550	0.8846
	96 & 97		0.9197	0.7269	0.3663	0.7588	0.8995	0.8519
Horsepen	96	CT31	0.5593	0.7348	0.0089	0.2416	0.6309	0.6700
	97		0.6536	0.7546	0.1630	0.5552	0.6889	0.8718
	96 & 97		0.4595	0.7264	0.0250	0.3737	0.5749	0.7387
Blackman	96	CT32	0.9381	0.7500	0.1442	0.2056	0.9196	0.7860
	97		0.7509	0.8611	0.6104	0.7853	0.7536	0.8714
	96 & 97		0.7803	0.7344	0.3791	0.5701	0.7934	0.8123
Otterdale	96	CT04	0.8632	0.4558	0.3243	0.5604	0.8653	0.6617
	97		0.7856	0.6276	0.7738	0.8573	0.7548	0.8562
	96 & 97		0.7296	0.4665	0.4503	0.6693	0.7538	0.7307
Swift	96	CT05	0.7345	0.6237	0.1149	0.3509	0.7514	0.6895
	97		0.6265	0.8082	0.5383	0.8647	0.7412	0.8729
	96 & 97		0.7194	0.6050	0.2133	0.6064	0.7420	0.7340
Tomahawk	96	CT06	0.5500	0.7039	0.3256	0.6286	0.6192	0.7376
	97		0.8507	0.9082	0.1365	0.6974	0.8489	0.8433
	96 & 97		0.5619	0.6941	0.1233	0.6336	0.6213	0.7564
Little Tomahawk	96	CT07	0.9082	0.7189	0.0282	0.1229	0.9125	0.7497
	97		0.8519	0.8003	0.5971	0.8921	0.8434	0.8494
	96 & 97		0.9118	0.7515	0.1904	0.6164	0.9127	0.7860
Ashbrook	96	CT08	0.6307	0.5432	0.1625	0.6615	0.6534	0.7453
	97		0.6552	0.7047	0.6005	0.8138	0.8232	0.8945
	96 & 97		0.6172	0.5530	0.2105	0.6781	0.6436	0.7768
Cub Run (1996)			0.9477	0.7230	0.2376	0.2489	0.9530	0.8530
Cub Run (1997)			0.9117	0.8181	0.7245	0.7049	0.9146	0.9178
Cub Run (1996+1997)							0.901	0.8716

Note: S & B = Sampled Storm and Base Flows included

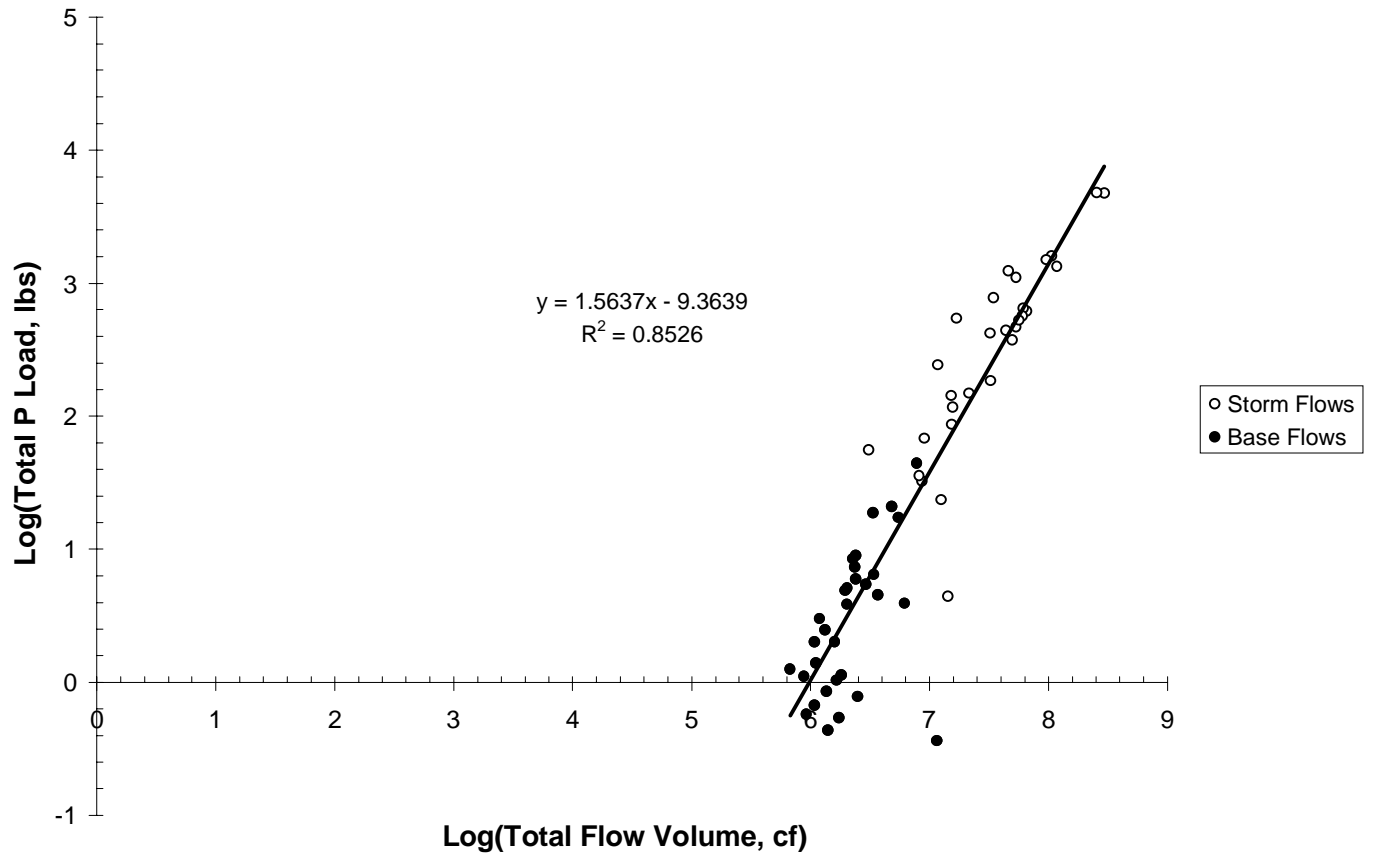
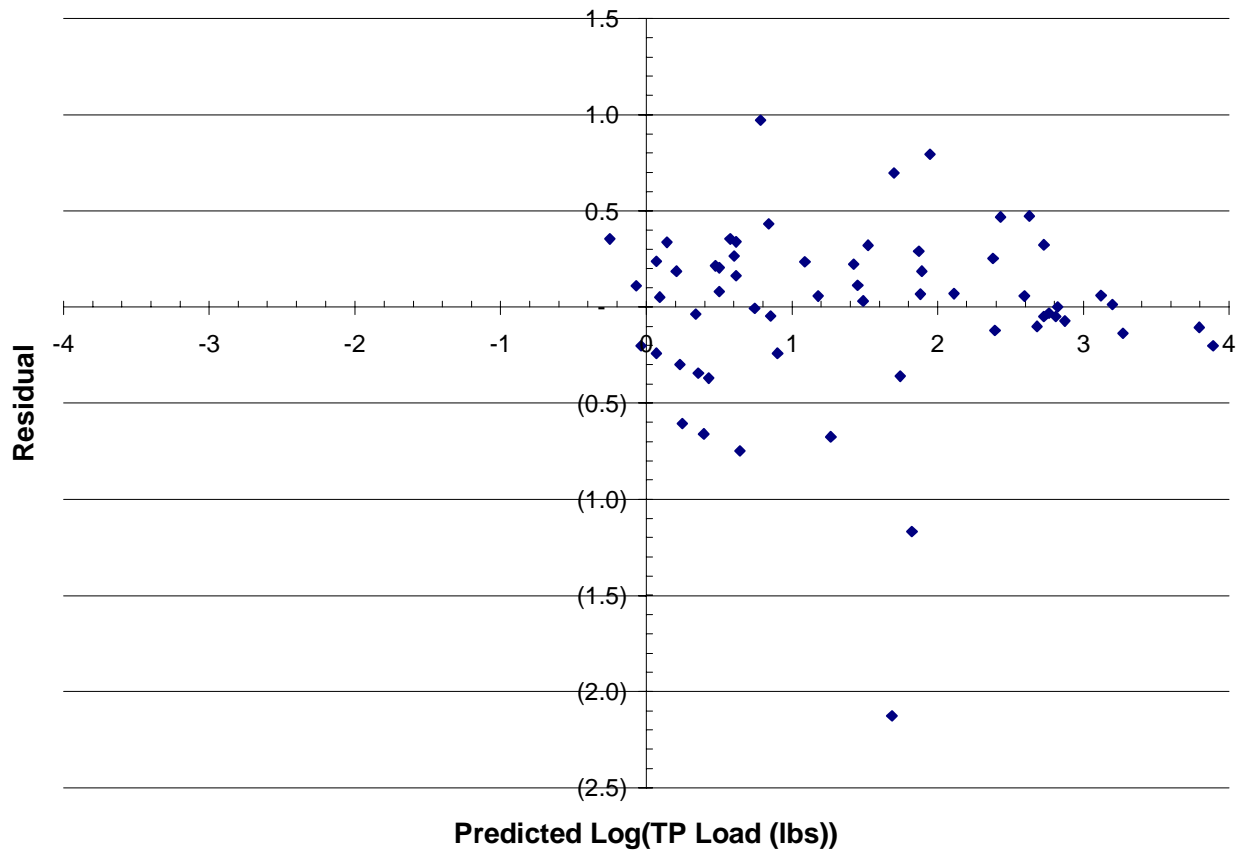


Figure D-1. Cub Run Relationship Between Log(Total P Load) vs. Log(Total Flow Volume) for Sampled Base and Storm Flows in 1996.



Note: Residual = observed - predicted

Figure D-2. Residual Plot for Cub Run 1996 Log-Log Relationship with Sampled Storm and Base Flows.

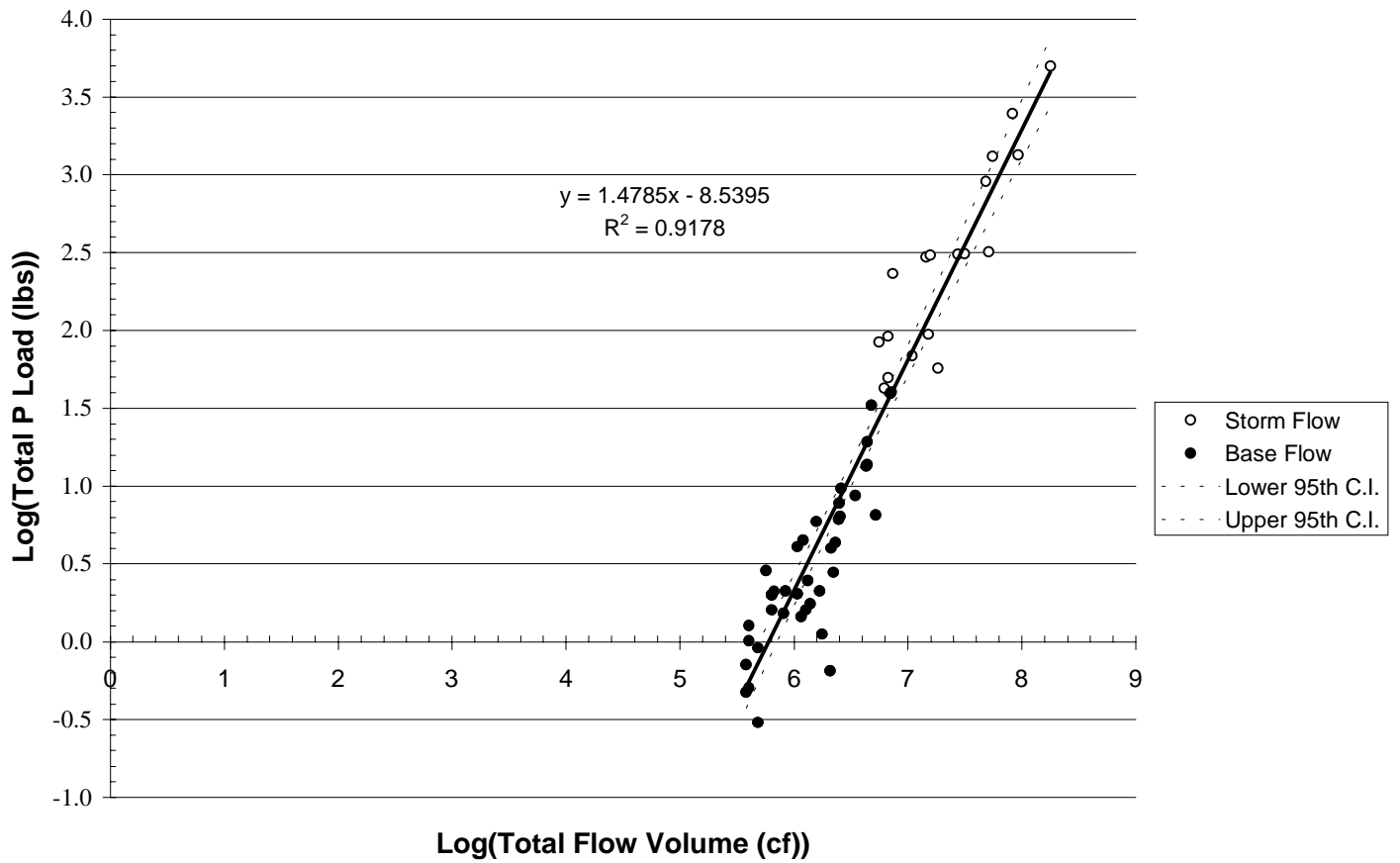


Figure D-3. Cub Run Relationship Between Log(Total P Load) vs. Log(Total Flow Volume) for Sampled Storm and Base Flows in 1997.

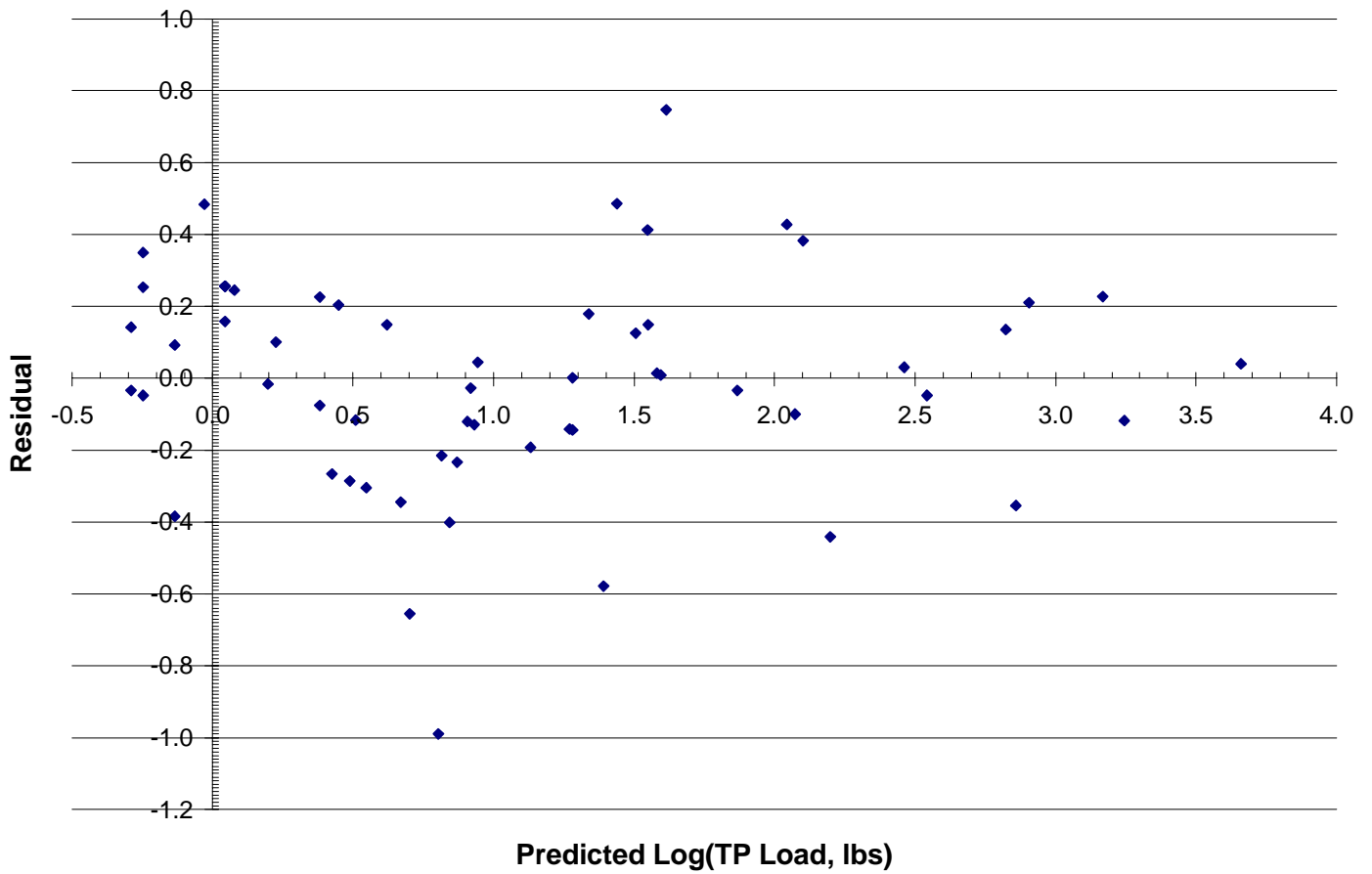


Figure D-4. Residual Plot for Cub Run 1997 Log-Log Relationship with Sampled Storm and Base Flows.

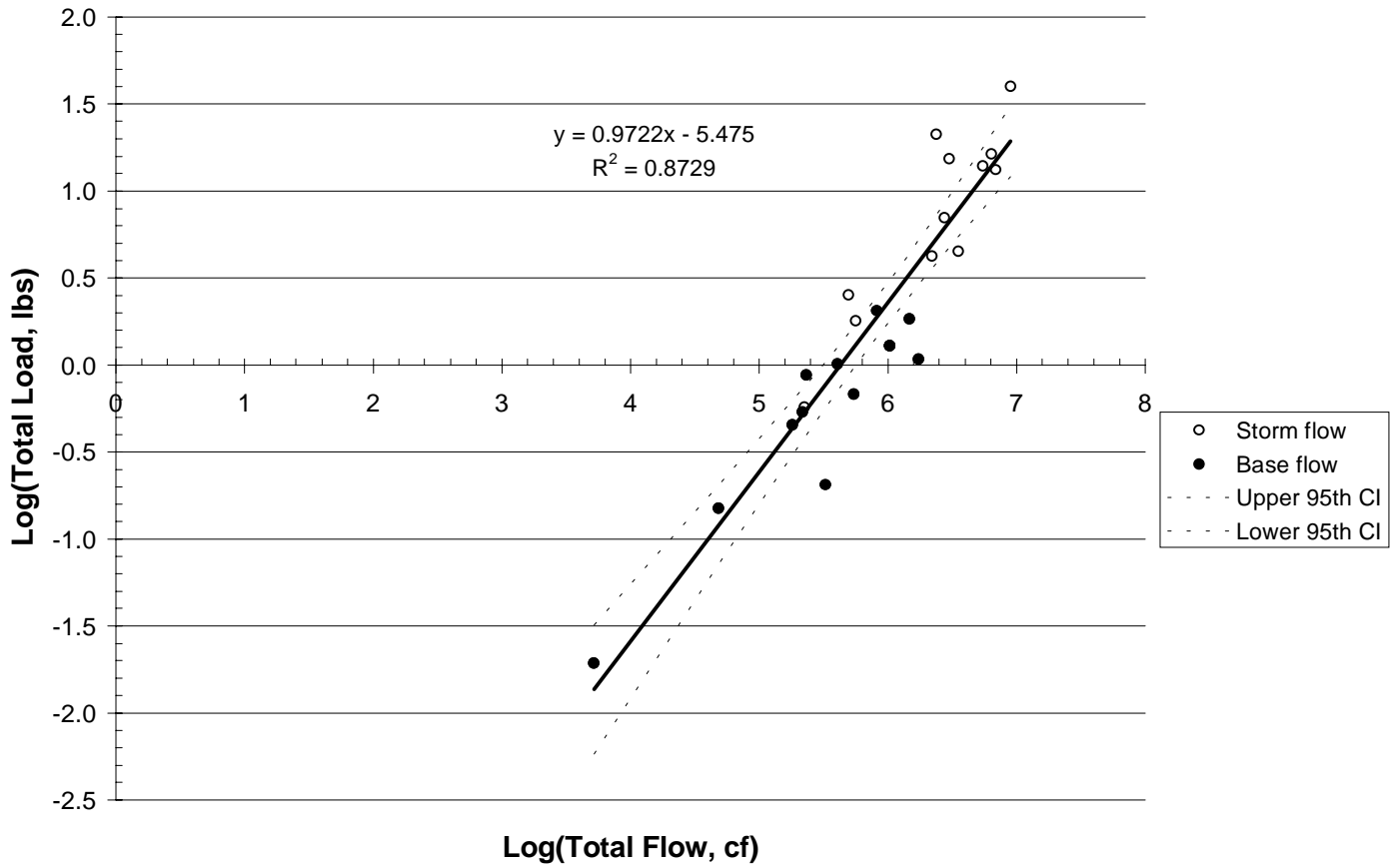


Figure D-5. Example Plot of Log(Total Phosphorus Load) vs. Log(Total Flow) with Sampled Base and Storm Flows for One of Swift Creek Reservoir's Tributaries (1997, CT05 Swift Creek).

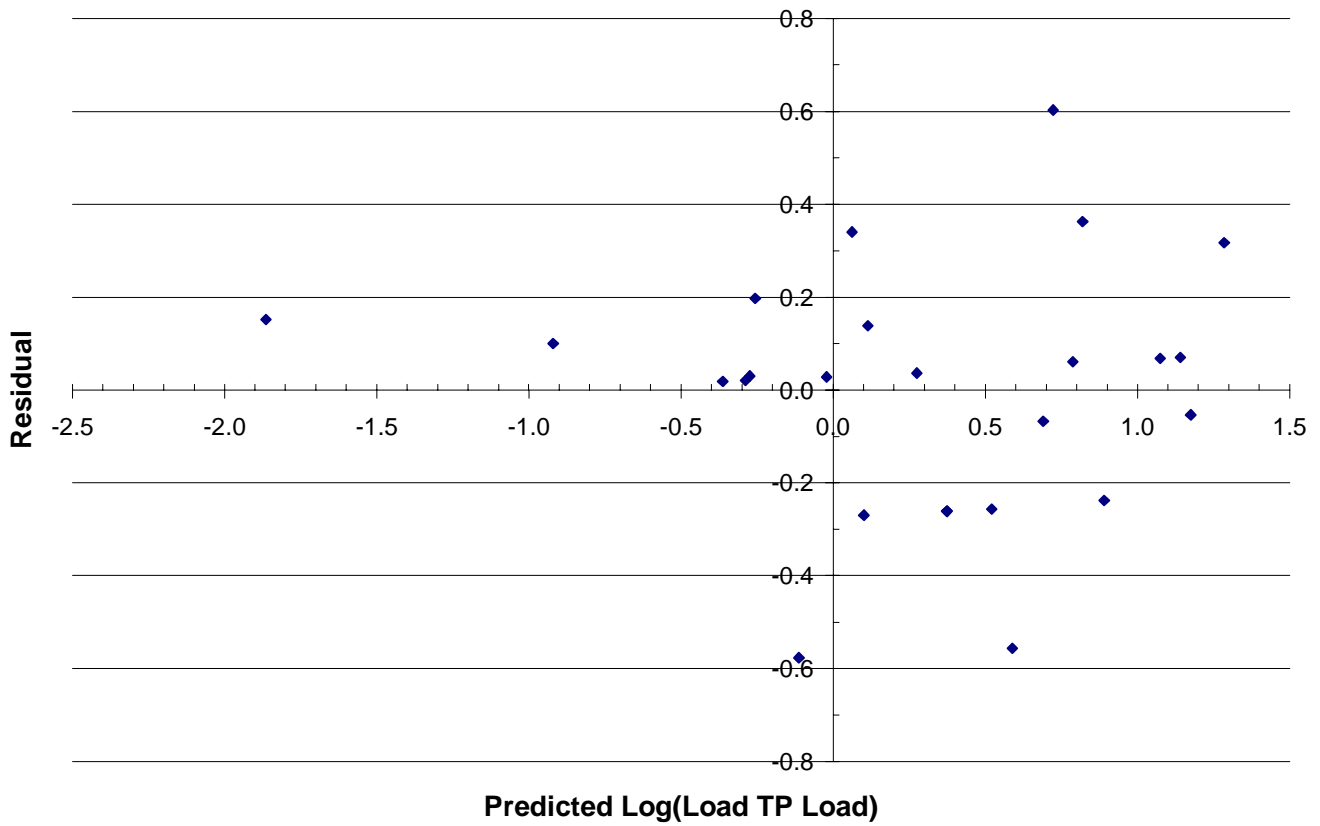


Figure D-6. Example Residual Plot for Log(TP Load) vs. Log(Total Flow Volume) Relationship for One of Swift Creek Reservoir's Tributaries (1997, CT05 Swift Creek).

Unsamped Storm Flow Volume Estimation Approach Summary

Table D-2. Comparison of Unsamped Storm Load Estimates in 1996 in lbs of P when the 85th Percentile Baseflow Separation Point was Used.

Station	Unsamped Storm Flow Load Using Mean Daily Flows	Unsamped Storm Flow Load Using USGS 5-minute record	Percent Difference
CT05	231.9	246.7	6.0%
CT31	51.0	51.5	1.0%

Table D-3. Comparison of Gaged Load Estimates in 1996 in lbs of P when the 85th Percentile Baseflow Separation Point was Used.

Station	Total Gaged Load When USF Volume was Found Using Mean Daily Flows	Total Gaged Load When USF Volume was Found Using USGS 5-minute Record	Percent Difference
CT05	983.8	998.5	1.5%
CT31	217.3	217.9	0.2%

Two different methods for calculating the total unsampled storm flow volume were used. The first method found the flow from the mean daily flows. Adjacent days with USF had their flow volumes added before the regression equation was applied. The second method was very time consuming and used the USGS 5-minute interval instantaneous flow records. The beginning and end of the storm was based on when the specified 85th percentile of the mean daily flow was exceeded. The flow volumes for adjacent days were added and the regression equation was applied. The base flow before and after the storm was also calculated and included in the USF load estimates in Table D2. 1996 was chosen because it was a wet year and two of the larger tributaries were investigated.

The use of the mean daily flows for the estimation of the unsampled storm flow volume changed each tributary's gaged load estimate less than 2%, so this method was adopted because of its simplicity.