CHAPTER 7

APPLICATION OF SELECTED HYDROLOGIC MODEL

Development of a Model for the Fishing Creek/Cedar Run Watershed

1. The Combined Watershed was divided into sub-areas to analyze flows and flow relationships. The sub-areas were delineated based on the location of stream confluence points and surveyed hydraulic (in-stream) obstructions using information provided by the Lead Agency. Data concerning land use, curve number, impervious fraction, overland slope, overland flow length, and Manning's roughness coefficient (n) were compiled for each sub-area. This information was compiled using data input into the IDRISI-GIS supplied to the original Consultant by the Lead Agency and USGS Quadrangle mapping.
2. The hydrologic connectivity of each of the individual sub-areas and major drainage elements located within the study area was established.
3. The 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour design rainfall depths were determined based on the Pennsylvania Department of Transportation Intensity-Duration-Frequency curves for Region 3 (Aron, et al., 1986). Design hydrographs were generated for use in the hydrologic model. Storm events of various durations were computed for TR-20 test runs. The peak flows at various points of interest in the test runs were compared to flows based on peak flow computational methods (PSU IV, USGS Regional Flood Frequency Estimates, and FEMA FIS).
4. Channel travel times and bank-full discharge capacities were computed for the major drainage elements connecting each sub-area in the Combined Watershed. Cross-section and longitudinal slope information provided by field survey and topographic mapping were used to determine these values.

The sequence of hydrologic operations in TR-20 for the Combined Watershed is basic to any watershed rainfall-runoff simulation, and is described below:

1. Surface runoff was computed by the SCS unit hydrograph method for each sub-area to produce a sub-area outflow hydrograph. The SCS curve number was applied to the design storm rainfall to produce rainfall excess.
2. Each sub-area hydrograph was routed along the main channel of each stream length to the next sub-area inflow point using the Modified Attenuated Kinematic (Modified Att-Kin) Procedure. This procedure results in no attenuation of the peak for channel reaches

with short hydraulic travel times (amounts of time it takes sub-area runoff to reach a downstream point-of-interest) relative to the overall modeling time step.

3. Sub-area hydrographs and routed hydrographs from upstream sub-areas were hydrologically combined at selected points of interest along the main channel to produce watershed peak flows.

4. Due to the significant presence of karst features within the Combined Watershed, a runoff curve number (CN) reduction technique was employed to calibrate the runoff model to various peak flow methodologies. The CN reduction technique used was developed for and utilized in the Hogestown Run/Trindle Spring Run Act 167 Stormwater Management Plan in Cumberland County prepared by Hartman & Associates, Inc., and provided by the Pennsylvania Department of Environmental Protection for use in this Plan. Table 7-1 lists the reduced runoff curve numbers.

Table 7-1
Curve Number (CN) Reduction Relationship
(Hogestown Run/Trindle Spring Run Act 167 Stormwater Management Plan in Cumberland County)

SCS Curve Number	Adjusted Curve Number
100	100
90	84
80	68
70	52
60	36
50	20

The data collection within the Combined Watershed included land use, soils, and geology. The use of these three parameters resulted in the land use being categorized by SCS hydrologic soil group (A - D) and either karst or non-karst geology. The procedure outlined above was used to reduce the CN based on karst geology while the CN in non-karst regions remained unchanged.

The SCS Curve Number weighting procedure that was used in the Combined Watershed is outlined below:

1) Analyze each sub-area based on land use, SCS soil type, and karst or non-karst geology.
2) Assign SCS CN's to soil type/land use category for non-karst regions based on Table 2-2 of the USDA SCS Technical Release 55.
3) Assign the same SCS CN's to soil type/land use categories for karst regions (with no reduction factors).
4) To establish a baseline comparison for the peak flows within the Combined Watershed, PSU IV (Aron, Kibler, and White 1981) and USGS-IND were used to estimate peak flows at various places within the Combined Watershed. The Federal Emergency Management Agency (FEMA) predicted peak flows within the limits of their detailed study area in the Flood Insurance Study (FIS). All three of these peak flow generators were used in comparison with the TR20 computed peak flows for the Combined Watershed.
5) TR-20 test runs were made for comparison with the peak flow methods above. Test runs were developed varying from no karst area CN reduction to a maximum reduction (indicator = 20). Four rainfall duration events were considered for the model test run comparison (6 hr, 8 hr, 12 hr, & 24 hour storm events). However, due to the size of the Combined Watershed (181 sq mi), only the 12 hour and 24 hour duration events were considered for use. Table 7-2 presents a comparison of flows using various indicators and peak flow methods.

Table 7-2
12 Hour Duration 100-Year Storm Event Peak Flow Comparison
Fishing Creek/Cedar Run Watershed
Crop/Pasture CN = Pasture CN

Sub-Area No.	Drainage Area (sq mi)	Adjusted CN (cfs)	Unadjusted CN (cfs)	USGS-IND (cfs)	PSU IV (cfs)	F.I.S. (cfs)	PA Bull 13 (cfs)
FC19	28.9	5947	7758	4890			
FC27	42.7	7585	9262	6617			
FC29	47.2	7772	9891	7151			
FC40	10.8	4622	4422	2280			
FC43	74.8	12165	14837	10218			
FC55	15.2	4118	5064	2972			
FC64	25.5	4759	6047	4438			
FC74	14.7	4677	4784	2896			
FC75	15.3	4677	4809	2987			
FC77	118.2	18611	22901	14567			
FC83	129.5	19013	23514	15635			
FC88	138.8	19803	25164	16498			
FC100	15.1	4102	8590	2957	2762		4854
FC108	11.4	6123	6272	2518			
FC112	7.7	4159	6036	1754			
FC115	23.1	9498	11835	4110	4402	3820	6939
FC118	181.8	27156	34735	20337	19610	22300	32600

Based on the flow comparison in Table 7-2, it appeared that TR-20 would produce results closest to peak flow values if a CN reduction based on an indicator value of 20 was used. However, to verify that using such a reduction would not skew the model, we compared hydrograph timing relationships and percentage of contribution to peak flows were compared for the 100-year storm event using four comparison test models:

24 Hour Duration - AB indicator = 40

12 Hour Duration - AB indicator = 40

24 Hour Duration - AB indicator = 20

12 Hour Duration - AB indicator = 20

The results of these model runs showed that the AB indicator and shortened duration event did not affect the timing relationship of the hydrologic models, while the peaks were reduced to values more in line with the various peak flow methods - especially the lower frequency storm events. Table 7-3 presents a comparison of the TR20 flows for all computed storm events versus the USGS-IND peak flows.

Table 7-3
24 Hour Storm Flow Peak Comparison Between TR20 and USGS-IND Values
Fishing Creek/Cedar Run Watershed
(Curve Numbers are based on Crop/Pasture CN = Pasture CN)
(AB Indicator = 20 for all Data - Existing Conditions)

Peak Flow Values for TR20 and USGS												
Design Storm	Flow Source	Sub-area Number/Drainage Area (sq mi)										
		19	27	29	40	43	55	64	83	88	108	118
		28.85	42.71	47.23	10.77	74.84	15.18	25.52	129.46	138.75	11.37	181.76
1-YR	TR20	181	183	175	156	257	103	115	499	505	203	589
1-YR	USGS	717	972	1051	334	1501	436	652	2296	2422	349	2986
2-YR	TR20	533	519	520	430	729	280	308	1424	1475	531	1814
2-YR	USGS	1178	1597	1726	549	2467	716	1071	3772	3980	573	4906
5-YR	TR20	1059	988	1010	810	1513	579	631	2830	2895	1018	3571
5-YR	USGS	1878	2545	2752	875	3932	1142	1708	6012	6344	913	7820

Table 7-3 (cont.)
24 Hour Storm Flow Peak Comparison Between TR20 and USGS-IND Values
Fishing Creek/Cedar Run Watershed
(Curve Numbers are based on Crop/Pasture CN = Pasture CN)
(AB Indicator = 20 for all Data - Existing Conditions)

Peak Flow Values for TR20 and USGS												
Design Storm	Flow Source	Sub-area Number/Drainage Area (sq mi)										
		19	27	29	40	43	55	64	83	88	108	118
		28.85	42.71	47.23	10.77	74.84	15.18	25.52	129.46	138.75	11.37	181.76
10-YR	TR20	1746	1690	1730	1360	2857	1057	1157	5103	5177	1801	6352
10-YR	USGS	2476	3356	3628	1154	5183	1505	2251	7925	8362	1203	10309
25-YR	TR20	3067	3073	3144	2329	5424	1980	2223	9622	9655	3248	11801
25-YR	USGS	3356	4549	4917	1564	7025	2040	3052	10743	11336	1631	13974
50-YR	TR20	3921	3983	4074	3018	7209	2605	2954	12758	12750	4181	15386
50-YR	USGS	4090	5544	5993	1906	8562	2487	3719	13093	13815	1988	17031
100-YR	TR20	5759	5923	6033	4569	10680	3944	4505	18655	18587	5977	22173
100-YR	USGS	4890	6617	7151	2280	10218	2972	4438	15635	16494	2373	20337

Table 7-4 presents a percentage comparison between the TR20 peak flows and the USGS-IND peak flows. Of note in Table 7-4 is that the peak flows in general show a high correlation in the lower frequency events such as the 50-year and 100-year storms. This would be expected in a karst region where large flows exceed the capacity of karst features. In the higher frequency events, the TR20 peak flows are significantly lower than the USGS-IND. Again, this is to be expected since the USGS-IND peak generation does not account for karst geology, which can significantly reduce higher frequency storm peaks.

Table 7-4
Percentage Comparison of TR20/USGS Peak Flows
Fishing Creek/Cedar Run Watershed
(Curve Numbers are based on Crop/Pasture CN = Pasture CN)
(AB = 20 for all Data - Existing Conditions)

Percentage Comparison of Flow Values by Storm Event and Sub-area											
Storm	Sub-Area Number										
Event	19	27	29	40	43	55	64	83	88	108	118
1-YR	25%	19%	17%	47%	17%	24%	18%	22%	21%	58%	20%
2-YR	45%	33%	30%	78%	30%	39%	29%	38%	37%	93%	37%
5-YR	56%	39%	37%	93%	38%	51%	37%	47%	46%	112%	46%
10-YR	71%	50%	48%	118%	55%	70%	51%	64%	62%	150%	62%
25-YR	91%	68%	64%	149%	77%	97%	73%	90%	85%	199%	84%
50-YR	96%	72%	68%	158%	84%	105%	79%	97%	92%	210%	90%
100-YR	118%	90%	84%	200%	105%	133%	102%	119%	113%	252%	109%

Based on the results of the analysis, the SCS Curve Numbers were reduced using an AB Indicator value of 20. The Curve Numbers for the hydrologic models are presented in Table A-1.

Table 7-5 presents the existing conditions sub-area and sub-watershed peak discharges where the sub-area flows represent the peak runoff from the individual sub-area at the sub-area outlet, and the sub-watershed flows represent the portion of the total watershed above the sub-area outlet.

Table 7-5
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC1	1.26	1.26	49	49	111	111	211	211	402	402	527	527	776	776
FC2	0.31	1.57	70	73	117	136	183	251	293	471	359	611	484	889
FC3	1.30	1.30	79	79	155	155	271	271	484	484	618	618	882	882
FC4	1.63	1.63	104	104	210	210	377	377	681	681	874	874	1252	1252
FC5	0.88	0.88	49	49	99	99	176	176	318	318	408	408	585	585
FC6	1.29	6.67	101	334	198	687	344	1244	609	2268	776	2923	1099	4217
FC7	0.92	0.92	99	99	185	185	313	313	542	542	683	683	955	955
FC8	1.38	2.29	70	142	144	286	260	510	475	914	614	1172	886	1677
FC9	1.57	1.57	115	115	242	242	442	442	809	809	1041	1041	1496	1496
FC10	2.40	12.94	76	501	185	1054	371	1931	734	3507	977	4520	1461	6531
FC11	1.51	1.51	68	68	153	153	292	292	555	555	726	726	1066	1066
FC12	3.28	17.73	18	423	60	856	157	1463	380	2632	541	3432	882	5114
FC13	1.72	1.72	98	98	188	188	323	323	570	570	726	726	1030	1030
FC14	2.89	22.34	8	474	31	961	141	1615	475	2906	737	3734	1320	5492
FC15	0.60	22.94	1	464	5	932	21	1556	73	2751	116	3545	211	5238
FC16	1.13	1.13	8	8	35	35	101	101	255	255	365	365	596	596
FC17	0.94	0.94	45	45	86	86	148	148	262	262	334	334	476	476
FC18	1.53	2.47	292	295	493	503	775	794	1250	1291	1536	1593	2079	2171
FC19	2.31	28.85	6	533	23	1059	94	1746	315	3067	489	3921	876	5759
FC20	0.56	0.56	55	55	107	107	186	186	326	326	413	413	582	582

Table 7-5 (cont.)
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC21	2.51	31.92	10	531	33	1039	87	1736	214	3107	306	3989	504	5899
FC22	1.52	33.43	6	467	20	892	61	1535	164	2795	241	3631	407	5429
FC23	2.09	2.09	101	101	232	232	450	450	861	861	1128	1128	1657	1657
FC24	1.64	3.73	11	83	42	215	119	450	297	936	425	1277	698	1924
FC25	0.91	0.91	53	53	122	122	235	235	446	446	582	582	850	850
FC26	1.53	1.53	90	90	169	169	288	288	503	503	639	639	903	903
FC27	3.11	42.71	26	519	82	988	196	1690	446	3073	622	3983	992	5923
FC28	0.96	0.96	81	81	154	154	262	262	455	455	577	577	813	813
FC29	3.56	47.23	21	520	77	1010	215	1730	541	3144	777	4074	1280	6033
FC30	3.14	3.14	122	122	268	268	505	505	956	956	1251	1251	1838	1838
FC31	2.83	53.20	9	530	35	1051	119	1811	352	3289	530	4257	920	6281
FC32	1.32	1.32	55	55	149	149	309	309	632	632	841	841	1256	1256
FC33	1.08	55.59	21	528	73	1054	171	1833	375	3347	514	4329	797	6369
FC34	2.54	58.13	199	533	386	1084	669	1884	1179	3434	1500	4435	2128	6507
FC35	1.28	1.28	35	35	92	92	193	193	394	394	528	528	801	801
FC36	2.27	2.27	246	246	456	456	765	765	1308	1308	1645	1645	2300	2300
FC37	1.91	4.18	139	341	277	652	487	1085	870	1924	1115	2452	1588	2485
FC38	1.67	5.85	146	389	292	714	517	1202	922	2163	1177	2787	1671	4021
FC39	3.14	8.99	168	425	335	811	593	1379	1069	2376	1372	3082	1967	4663
FC40	1.78	10.77	120	430	243	810	432	1360	780	2328	1003	3018	1435	4569

Table 7-5 (cont.)
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC41	2.59	72.78	173	699	370	1460	678	2769	1253	5283	1618	7036	2334	10423
FC42	1.27	1.27	150	150	274	274	457	457	780	780	989	979	1359	1359
FC43	0.79	74.84	5	729	21	1513	62	2857	158	5424	228	7209	375	10680
FC44	2.14	2.14	81	81	184	184	351	351	672	672	882	882	1299	1299
FC45	2.12	4.26	12	66	42	175	116	382	290	820	416	1124	685	1748
FC46	1.73	5.98	12	72	62	188	193	408	521	877	751	1206	1231	1877
FC47	0.97	0.97	131	131	228	228	368	368	608	608	754	754	1033	1033
FC48	0.66	1.63	32	141	68	262	124	444	229	769	297	973	430	1367
FC49	1.70	1.70	0	0	3	3	11	11	52	52	96	96	207	207
FC50	0.59	9.91	89	182	162	390	270	744	456	1481	569	1997	786	3056
FC51	1.13	11.04	146	233	269	477	448	887	759	1682	950	2221	1317	3345
FC52	0.41	11.46	96	264	164	521	265	944	429	1743	528	2285	716	3423
FC53	1.28	1.28	0	0	0	0	4	4	23	23	50	50	135	135
FC54	0.87	13.61	32	276	80	548	165	998	328	1859	436	2445	651	3695
FC55	1.57	15.18	10	280	36	579	104	1057	263	1980	379	2605	624	3944
FC56	1.22	16.40	76	306	160	616	292	1100	537	2039	693	2682	1000	4055
FC57	1.63	1.63	9	9	41	41	131	131	348	348	505	505	844	844
FC58	0.86	18.88	119	336	216	672	357	1194	601	2210	751	2905	1037	4395
FC59	1.41	20.29	1	311	1	622	1	1130	1	2143	1	2837	1	4322
FC60	1.15	21.44	0	306	0	615	0	1120	7	2137	15	2835	52	4318

Table 7-5 (cont.)
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC61	1.60	23.03	3	306	11	624	41	1142	143	2186	226	2901	417	4417
FC62	0.75	23.79	5	308	18	628	50	1150	125	2203	179	2924	294	4454
FC63	0.80	24.58	3	309	14	631	46	1157	132	2218	195	2943	334	4483
FC64	0.94	25.52	0	308	0	631	0	1157	6	2223	13	2954	54	4505
FC65	0.82	26.34	0	307	0	629	1	1154	6	2223	14	2956	55	4512
FC66	2.08	2.08	112	112	258	258	493	493	942	942	1229	1229	1798	1798
FC67	1.66	3.74	131	191	252	421	434	724	761	1356	966	1736	1363	2443
FC68	1.53	5.26	125	233	243	483	421	768	743	1499	945	1948	1336	2741
FC69	2.11	7.37	166	291	319	571	550	881	963	1752	1223	2290	1725	3270
FC70	1.16	1.16	46	46	107	107	206	206	398	398	523	523	772	772
FC71	1.51	2.68	147	159	287	322	500	576	879	1051	1115	1348	1572	1925
FC72	1.59	11.64	71	413	139	789	242	1285	432	2498	554	3271	792	4746
FC73	0.46	0.46	9	9	31	31	75	75	167	167	232	232	362	362
FC74	2.58	14.68	31	406	107	768	261	1253	595	2432	825	3193	1305	4691
FC75	0.63	15.31	0	403	2	763	6	1251	41	2426	78	3187	172	4689
FC76	0.69	42.34	0	637	0	1234	3	2169	13	4032	28	5377	72	7995
FC77	1.02	118.2	2	1352	7	2698	31	4878	114	9297	182	12440	337	18321
FC78	2.87	121.1	33	1362	98	2727	224	4940	491	9372	676	12475	1060	18285
FC79	1.97	123.0	54	1374	145	2752	306	4983	629	9441	844	12555	1279	18391
FC80	0.76	123.8	33	1383	70	2768	130	5009	241	9486	313	12611	456	18467

Table 7-5 (cont.)
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC81	2.13	125.9	87	1404	217	2804	438	5069	870	9586	1151	12733	1712	18634
FC82	2.23	2.23	140	140	327	327	329	329	1207	1207	1575	1575	2300	2300
FC83	1.31	129.5	17	1424	60	2830	146	5103	331	9622	459	12758	724	18655
FC84	1.64	1.64	29	29	84	84	185	185	396	396	539	539	834	834
FC85	3.26	3.26	361	361	677	677	1152	1152	1982	1982	2496	2496	3484	3484
FC86	1.68	4.95	5	303	16	576	48	1005	137	1822	204	2340	353	3356
FC87	1.11	6.06	34	312	91	616	190	1090	387	1982	517	2554	778	3692
FC88	1.59	138.8	111	1475	227	2895	406	5177	733	9655	941	12750	1436	18587
FC89	0.77	0.77	3	3	13	13	54	54	165	165	254	254	441	441
FC90	1.42	2.20	0	3	0	13	0	54	8	165	17	254	61	454
FC91	0.99	3.18	9	10	32	38	80	108	188	288	263	421	421	715
FC92	1.07	1.07	0	0	0	0	3	3	14	14	33	33	104	104
FC93	1.22	5.47	5	14	19	49	73	133	219	361	328	551	568/	1018
FC94	1.49	6.96	31	31	91	105	201	269	426	657	579	952	893	1662
FC95	1.85	1.85	9	9	9	9	9	9	9	9	9	9	9	9
FC96	0.64	0.64	6	8	24	24	64	64	155	155	219	219	353	353
FC97	0.73	3.22	9	17	30	45	72	121	164	294	227	418	360	680
FC98	1.78	11.96	36	60	117	192	270	477	591	1157	807	1672	1248	2800
FC99	0.81	12.77	34	74	87	229	180	554	357	1312	473	1914	705	3249
FC100	2.33	15.10	27	90	91	263	220	645	500	1556	694	2266	1100	3893

Table 7-5 (cont.)
Existing Conditions Sub-Area and Sub-Watershed Peak Discharges (cfs)
Fishing Creek/Cedar Run Watershed

Sub-Area No.	Drainage Area		2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed	Sub-Area	Sub-Shed
FC101	0.91	0.91	71	71	127	127	209	209	352	352	441	441	612	612
FC102	1.13	2.04	87	112	107	217	298	277	531	667	667	854	960	1214
FC103	0.87	2.91	76	164	154	323	275	608	491	1085	627	1387	891	1977
FC104	2.12	5.04	178	256	346	522	502	995	1060	1833	1347	2368	1903	3421
FC105	0.80	0.80	37	37	86	86	165	165	317	317	415	415	609	609
FC106	1.27	1.27	98	98	202	202	361	361	655	655	840	840	1200	1200
FC107	1.06	1.06	184	184	336	336	555	555	951	951	1187	1187	1638	1638
FC108	3.20	11.37	232	531	410	1020	670	1801	1129	3248	1415	4181	1963	5977
FC109	1.38	1.38	125	125	256	256	460	460	841	841	1078	1078	1538	1538
FC110	2.21	3.60	42	153	132	367	300	724	652	1411	890	1863	1377	2764
FC111	2.18	2.18	7	7	27	27	87	87	249	249	371	371	639	639
FC112	1.93	7.70	78	174	184	413	359	891	694	1850	915	2508	1353	3889
FC113	1.51	20.59	7	664	28	1365	97	2549	275	4768	407	6236	693	9140
FC114	1.36	21.95	2	656	3	1357	34	2548	133	4798	215	6284	403	9254
FC115	1.15	23.10	3	649	13	1353	48	2545	149	4769	226	6232	397	9157
FC116	0.90	0.90	14	14	45	45	105	105	233	233	321	321	505	505
FC117	1.07	1.07	84	84	168	168	297	297	531	531	679	679	966	966
FC118	2.84	181.8	144	1814	284	3571	497	6352	891	11801	1142	15386	1633	22173