

Tualatin River Watershed

A Water Quality Database Project

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Outline of Project

- The Objective
- Data Collection
- Designing the Schema
- Building the Geodatabase
- Querying Data
- ArcCatalog / ArcMap

Objective

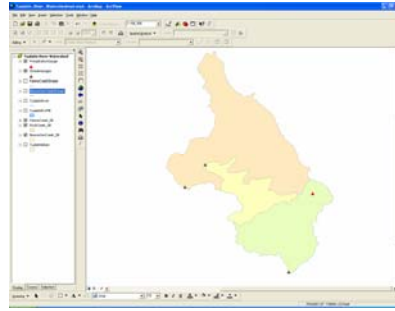
- The objective is to provide support to existing applications in water quality monitoring, watershed assessment, and municipal water management by bringing existing datasets together in a way that makes them easily combined and related for direct analysis.

Objective cont...

- We've combined precipitation monitoring data with water quality parameter monitoring data in a way that allows direct analysis of precipitation conditions for a given watershed and its immediate effects on water quality of the streams within that watershed.

Data Collection

- USGS water quality data was compiled for Beaverton Creek, Fanno Creek, and Rock Creek.
- Precipitation monitoring data was obtained from existing Hydranet monitoring stations.



Water Quality Data

- Water quality data was obtained using the USGS Data Grapher and Data Tabler.
<http://or.water.usgs.gov/grapher>
- Water quality data that was collected:
 - Dissolved Oxygen.
 - pH.
 - Temperature.

Water Quality Data cont...

USGS Data Tables - Microsoft Internet Explorer

Address: http://water.usgs.gov/cgi-bin/grapherTable.php?station_id=14206950

Step 2: Choose a site from the drop-down list.

14206950 - Forno Creek at Durham Road

Step 3: Select the parameters to include in the table.

Parameter	Begin Date	End Date	Date of Last Reading
<input type="checkbox"/> Discharge	Oct-01-2000 01:00	Sep-30-2004 24:00	Dec-03-2005 19:00
<input type="checkbox"/> Water Temperature	Sep-06-2002 16:00	Sep-30-2004 24:00	Dec-03-2005 23:00
<input type="checkbox"/> Dissolved Oxygen	Jan-10-2003 14:00	Sep-30-2004 24:00	Dec-03-2005 23:00
<input type="checkbox"/> Oxygen % Saturation	Jan-10-2003 14:00	Sep-30-2004 24:00	Dec-03-2005 23:00
<input type="checkbox"/> pH	Jan-10-2003 14:00	Sep-30-2004 24:00	Dec-03-2005 23:00
<input type="checkbox"/> Specific Conductance	Sep-06-2002 16:00	Sep-30-2004 24:00	Dec-03-2005 23:00
<input type="checkbox"/> Turbidity	Jan-10-2003 14:00	Sep-30-2004 24:00	Dec-03-2005 23:00

Measurements at this site are made every 60 minutes.

Step 4: Choose the type of data for the table.

Only Minutes

Do you wish to apply a running average to the data?
If so, check the box and select the length of the average:

☐ Apply a running average with a length of 1 days.

Step 5: Choose starting and ending dates for the table.

Begin Date: From 01/01/2004

End Date: To 02/28/2004

Step 6: Make the table, or reset the form and try again.

Make Table Reset Form

Construction of the table may take a minute or two.

Water Quality Data cont...

USGS Data Tables - Results - Microsoft Internet Explorer

Address: <http://water.usgs.gov/cgi-bin/grapherTable.php>

Date/Time	Water Temp. (deg. C)	Dissolved Oxygen (mg/L)	pH (std. unit)
09/30/2004 24:00	17.1	5.88	-1234567890
10/01/2004 01:00	17.1	5.81	6.66
10/01/2004 02:00	17.1	5.66	6.68
10/01/2004 03:00	17.0	5.55	6.68
10/01/2004 04:00	16.9	5.41	6.73
10/01/2004 05:00	16.7	5.36	6.74
10/01/2004 06:00	16.4	5.37	6.75
10/01/2004 07:00	16.2	5.37	6.74
10/01/2004 08:00	16.0	5.43	6.74
10/01/2004 09:00	15.8	5.68	6.71
10/01/2004 10:00	15.7	5.78	6.72
10/01/2004 11:00	15.6	5.91	6.71
10/01/2004 12:00	15.6	6.07	6.70
10/01/2004 13:00	15.6	6.23	6.70
10/01/2004 14:00	15.7	6.25	6.69
10/01/2004 15:00	15.7	6.40	6.67
10/01/2004 16:00	15.8	6.47	6.66
10/01/2004 17:00	15.9	6.55	6.66
10/01/2004 18:00	16.1	6.62	6.67
10/01/2004 19:00	16.4	6.71	6.67
10/01/2004 20:00	16.6	6.79	6.69
10/01/2004 21:00	16.6	6.77	6.74
10/01/2004 22:00	16.7	6.65	6.69
10/01/2004 23:00	16.7	6.58	6.68
10/01/2004 24:00	16.9	6.51	6.68
10/02/2004 01:00	16.8	6.42	6.68
10/02/2004 02:00	16.2	6.29	6.67
10/02/2004 03:00	16.7	6.22	6.66
10/02/2004 04:00	16.5	6.29	6.65
10/02/2004 05:00	16.4	6.26	6.64
10/02/2004 06:00	16.2	6.33	6.63
10/02/2004 07:00	16.0	6.39	6.63
10/02/2004 08:00	15.9	6.49	6.65
10/02/2004 09:00	15.5	6.62	6.65
10/02/2004 10:00	15.3	6.57	6.65
10/02/2004 11:00	15.2	6.68	6.67
10/02/2004 12:00	15.1	6.77	6.67

Water Quality Data cont...

The screenshot shows a Microsoft Excel spreadsheet with the following structure:

- Columns:** Labeled A through Y. The first few columns (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y) contain numerical data.
- Rows:** Numbered 1 through 32. The first few rows (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32) contain numerical data.
- Content:** The data appears to be organized into groups, possibly representing different water quality parameters or locations over time. The values are mostly small numbers, some with decimal points.

Precipitation Data

- The HYDRA rainfall network is operated and maintained by the City of Portland Bureau of Environmental Services. Rainfall data are provided with their permission and cooperation.

- <http://or.water.usgs.gov/non-usgs/bes/sylvan.rain>

Precipitation Data cont...

- City of Portland HYDRA Rainfall Network - Clickable Station Map.



http://or.water.usgs.gov/non-usgs/bes/raingage_info/clickmap.html

Precipitation Data cont...

Sylvan School Raingage - 1849 SW. 58th Ave.

PROVISIONAL, UNCORRECTED RAW DATA FROM THE CITY OF PORTLAND HYDRA NETWORK.
Data are the number of tips of the rain gage bucket.
Each tip is 0.01 inches of rainfall.

[-, missing data]

Dates and times are PACIFIC STANDARD TIME.

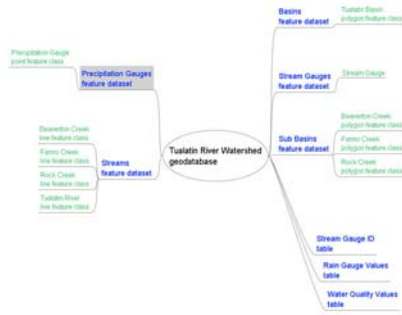
Date	Daily Hourly data -->																								
	Total	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04-DEC-2005	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03-DEC-2005	3	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
02-DEC-2005	64	1	1	4	1	2	1	0	0	5	9	2	1	6	1	2	2	8	4	5	0	0	7	2	0
01-DEC-2005	47	0	0	0	0	0	0	3	3	2	4	6	2	1	0	1	0	0	2	5	2	2	2	1	3
30-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-NOV-2005	17	1	0	0	0	0	0	0	0	0	2	6	0	0	2	5	0	0	0	0	0	0	0	0	1
28-NOV-2005	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	5	5	2	0	1	
27-NOV-2005	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
26-NOV-2005	4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
25-NOV-2005	63	1	4	8	2	5	13	4	5	4	5	3	1	0	0	0	0	1	5	1	0	1	0	0	0
24-NOV-2005	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	6	6	1	4	1	
23-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14-NOV-2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13-NOV-2005	12	4	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12-NOV-2005	31	0	0	0	4	1	1	0	0	0	0	0	0	0	0	0	4	5	6	3	1	0	0	3	

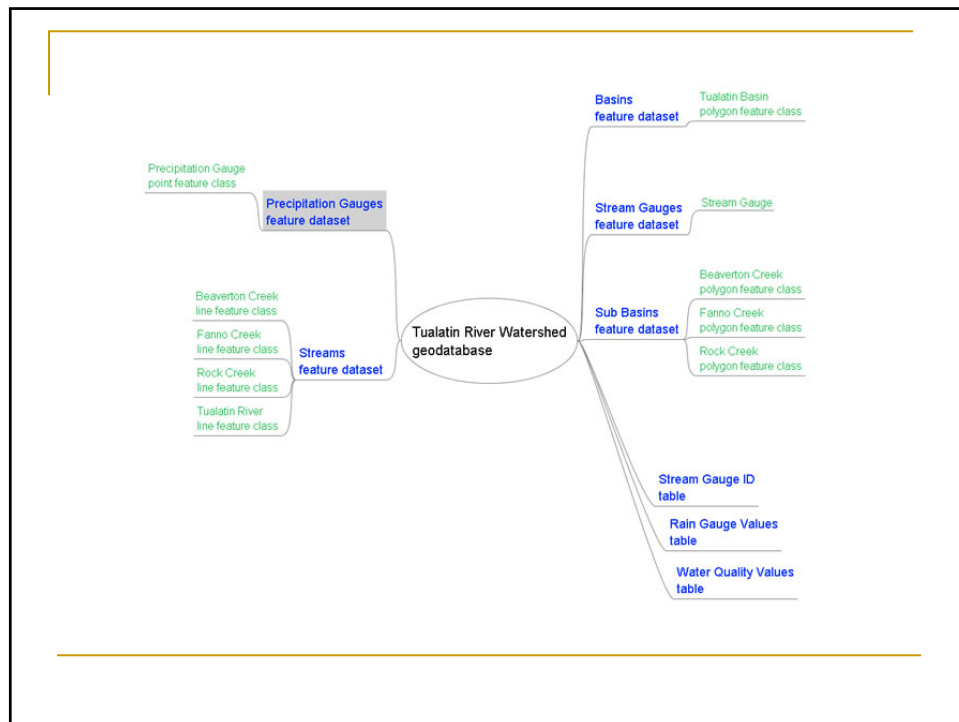
Precipitation Data cont...

Microsoft Excel - rate.apex.xls																	File Edit Format Tools Window Help										C:\Program Files\Microsoft Office\Office\Excel.exe										Worksheet: Sheet1										Date: 11/11/2000										Time: 11:11:11 AM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Date	Daily Total	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9	Hour 10	Hour 11	Hour 12	Hour 13	Hour 14	Hour 15	Hour 16	Hour 17	Hour 18	Hour 19	Hour 20	Hour 21	Hour 22	Hour 23	Hour 24	Hour 25	Hour 26	Hour 27	Hour 28	Hour 29	Hour 30	Hour 31	Hour 32	Hour 33	Hour 34	Hour 35	Hour 36	Hour 37	Hour 38	Hour 39	Hour 40	Hour 41	Hour 42	Hour 43	Hour 44	Hour 45	Hour 46	Hour 47	Hour 48	Hour 49	Hour 50	Hour 51	Hour 52	Hour 53	Hour 54	Hour 55	Hour 56	Hour 57	Hour 58	Hour 59	Hour 60	Hour 61	Hour 62	Hour 63	Hour 64	Hour 65	Hour 66	Hour 67	Hour 68	Hour 69	Hour 70	Hour 71	Hour 72	Hour 73	Hour 74	Hour 75	Hour 76	Hour 77	Hour 78	Hour 79	Hour 80	Hour 81	Hour 82	Hour 83	Hour 84	Hour 85	Hour 86	Hour 87	Hour 88	Hour 89	Hour 90	Hour 91	Hour 92	Hour 93	Hour 94	Hour 95	Hour 96	Hour 97	Hour 98	Hour 99	Hour 100	Hour 101	Hour 102	Hour 103	Hour 104	Hour 105	Hour 106	Hour 107	Hour 108	Hour 109	Hour 110	Hour 111	Hour 112	Hour 113	Hour 114	Hour 115	Hour 116	Hour 117	Hour 118	Hour 119	Hour 120	Hour 121	Hour 122	Hour 123	Hour 124	Hour 125	Hour 126	Hour 127	Hour 128	Hour 129	Hour 130	Hour 131	Hour 132	Hour 133	Hour 134	Hour 135	Hour 136	Hour 137	Hour 138	Hour 139	Hour 140	Hour 141	Hour 142	Hour 143	Hour 144	Hour 145	Hour 146	Hour 147	Hour 148	Hour 149	Hour 150	Hour 151	Hour 152	Hour 153	Hour 154	Hour 155	Hour 156	Hour 157	Hour 158	Hour 159	Hour 160	Hour 161	Hour 162	Hour 163	Hour 164	Hour 165	Hour 166	Hour 167	Hour 168	Hour 169	Hour 170	Hour 171	Hour 172	Hour 173	Hour 174	Hour 175	Hour 176	Hour 177	Hour 178	Hour 179	Hour 180	Hour 181	Hour 182	Hour 183	Hour 184	Hour 185	Hour 186	Hour 187	Hour 188	Hour 189	Hour 190	Hour 191	Hour 192	Hour 193	Hour 194	Hour 195	Hour 196	Hour 197	Hour 198	Hour 199	Hour 200	Hour 201	Hour 202	Hour 203	Hour 204	Hour 205	Hour 206	Hour 207	Hour 208	Hour 209	Hour 210	Hour 211	Hour 212	Hour 213	Hour 214	Hour 215	Hour 216	Hour 217	Hour 218	Hour 219	Hour 220	Hour 221	Hour 222	Hour 223	Hour 224	Hour 225	Hour 226	Hour 227	Hour 228	Hour 229	Hour 230	Hour 231	Hour 232	Hour 233	Hour 234	Hour 235	Hour 236	Hour 237	Hour 238	Hour 239	Hour 240	Hour 241	Hour 242	Hour 243	Hour 244	Hour 245	Hour 246	Hour 247	Hour 248	Hour 249	Hour 250	Hour 251	Hour 252	Hour 253	Hour 254	Hour 255	Hour 256	Hour 257	Hour 258	Hour 259	Hour 260	Hour 261	Hour 262	Hour 263	Hour 264	Hour 265	Hour 266	Hour 267	Hour 268	Hour 269	Hour 270	Hour 271	Hour 272	Hour 273	Hour 274	Hour 275	Hour 276	Hour 277	Hour 278	Hour 279	Hour 280	Hour 281	Hour 282	Hour 283	Hour 284	Hour 285	Hour 286	Hour 287	Hour 288	Hour 289	Hour 290	Hour 291	Hour 292	Hour 293	Hour 294	Hour 295	Hour 296	Hour 297	Hour 298	Hour 299	Hour 300	Hour 301	Hour 302	Hour 303	Hour 304	Hour 305	Hour 306	Hour 307	Hour 308	Hour 309	Hour 310	Hour 311	Hour 312	Hour 313	Hour 314	Hour 315	Hour 316	Hour 317	Hour 318	Hour 319	Hour 320	Hour 321	Hour 322	Hour 323	Hour 324	Hour 325	Hour 326	Hour 327	Hour 328	Hour 329	Hour 330	Hour 331	Hour 332	Hour 333	Hour 334	Hour 335	Hour 336	Hour 337	Hour 338	Hour 339	Hour 340	Hour 341	Hour 342	Hour 343	Hour 344	Hour 345	Hour 346	Hour 347	Hour 348	Hour 349	Hour 350	Hour 351	Hour 352	Hour 353	Hour 354	Hour 355	Hour 356	Hour 357	Hour 358	Hour 359	Hour 360	Hour 361	Hour 362	Hour 363	Hour 364	Hour 365	Hour 366	Hour 367	Hour 368	Hour 369	Hour 370	Hour 371	Hour 372	Hour 373	Hour 374	Hour 375	Hour 376	Hour 377	Hour 378	Hour 379	Hour 380	Hour 381	Hour 382	Hour 383	Hour 384	Hour 385	Hour 386	Hour 387	Hour 388	Hour 389	Hour 390	Hour 391	Hour 392	Hour 393	Hour 394	Hour 395	Hour 396	Hour 397	Hour 398	Hour 399	Hour 400	Hour 401	Hour 402	Hour 403	Hour 404	Hour 405	Hour 406	Hour 407	Hour 408	Hour 409	Hour 410	Hour 411	Hour 412	Hour 413	Hour 414	Hour 415	Hour 416	Hour 417	Hour 418	Hour 419	Hour 420	Hour 421	Hour 422	Hour 423	Hour 424	Hour 425	Hour 426	Hour 427	Hour 428	Hour 429	Hour 430	Hour 431	Hour 432	Hour 433	Hour 434	Hour 435	Hour 436	Hour 437	Hour 438	Hour 439	Hour 440	Hour 441	Hour 442	Hour 443	Hour 444	Hour 445	Hour 446	Hour 447	Hour 448	Hour 449	Hour 450	Hour 451	Hour 452	Hour 453	Hour 454	Hour 455	Hour 456	Hour 457	Hour 458	Hour 459	Hour 460	Hour 461	Hour 462	Hour 463	Hour 464	Hour 465	Hour 466	Hour 467	Hour 468	Hour 469	Hour 470	Hour 471	Hour 472	Hour 473	Hour 474	Hour 475	Hour 476	Hour 477	Hour 478	Hour 479	Hour 480	Hour 481	Hour 482	Hour 483	Hour 484	Hour 485	Hour 486	Hour 487	Hour 488	Hour 489	Hour 490	Hour 491	Hour 492	Hour 493	Hour 494	Hour 495	Hour 496	Hour 497	Hour 498	Hour 499	Hour 500	Hour 501	Hour 502	Hour 503	Hour 504	Hour 505	Hour 506	Hour 507	Hour 508	Hour 509	Hour 510	Hour 511	Hour 512	Hour 513	Hour 514	Hour 515	Hour 516	Hour 517	Hour 518	Hour 519	Hour 520	Hour 521	Hour 522	Hour 523	Hour 524	Hour 525	Hour 526	Hour 527	Hour 528	Hour 529	Hour 530	Hour 531	Hour 532	Hour 533	Hour 534	Hour 535	Hour 536	Hour 537	Hour 538	Hour 539	Hour 540	Hour 541	Hour 542	Hour 543	Hour 544	Hour 545	Hour 546	Hour 547	Hour 548	Hour 549	Hour 550	Hour 551	Hour 552	Hour 553	Hour 554	Hour 555	Hour 556	Hour 557	Hour 558	Hour 559	Hour 560	Hour 561	Hour 562	Hour 563	Hour 564	Hour 565	Hour 566	Hour 567	Hour 568	Hour 569	Hour 570	Hour 571	Hour 572	Hour 573	Hour 574	Hour 575	Hour 576	Hour 577	Hour 578	Hour 579	Hour 580	Hour 581	Hour 582	Hour 583	Hour 584	Hour 585	Hour 586	Hour 587	Hour 588	Hour 589	Hour 590	Hour 591	Hour 592	Hour 593	Hour 594	Hour 595	Hour 596	Hour 597	Hour 598	Hour 599	Hour 600	Hour 601	Hour 602	Hour 603	Hour 604	Hour 605	Hour 606	Hour 607	Hour 608	Hour 609	Hour 610	Hour 611	Hour 612	Hour 613	Hour 614	Hour 615	Hour 616	Hour 617	Hour 618	Hour 619	Hour 620	Hour 621	Hour 622	Hour 623	Hour 624	Hour 625	Hour 626	Hour 627	Hour 628	Hour 629	Hour 630	Hour 631	Hour 632	Hour 633	Hour 634	Hour 635	Hour 636	Hour 637	Hour 638	Hour 639	Hour 640	Hour 641	Hour 642	Hour 643	Hour 644	Hour 645	Hour 646	Hour 647	Hour 648	Hour 649	Hour 650	Hour 651	Hour 652	Hour 653	Hour 654	Hour 655	Hour 656	Hour 657	Hour 658	Hour 659	Hour 660	Hour 661	Hour 662	Hour 663	Hour 664	Hour 665	Hour 666	Hour 667	Hour 668	Hour 669	Hour 670	Hour 671	Hour 672	Hour 673	Hour 674	Hour 675	Hour 676	Hour 677	Hour 678	Hour 679	Hour 680	Hour 681	Hour 682	Hour 683	Hour 684	Hour 685	Hour 686	Hour 687	Hour 688	Hour 689	Hour 690	Hour 691	Hour 692	Hour 693	Hour 694	Hour 695	Hour 696	Hour 697	Hour 698	Hour 699	Hour 700	Hour 701	Hour 702	Hour 703	Hour 704	Hour 705	Hour 706	Hour 707	Hour 708	Hour 709	Hour 710	Hour 711	Hour 712	Hour 713	Hour 714	Hour 715	Hour 716	Hour 717	Hour 718	Hour 719	Hour 720	Hour 721	Hour 722	Hour 723	Hour 724	Hour 725	Hour 726	Hour 727	Hour 728	Hour 729	Hour 730	Hour 731	Hour 732	Hour 733	Hour 734	Hour 735	Hour 736	Hour 737	Hour 738	Hour 739	Hour 740	Hour 741	Hour 742	Hour 743	Hour 744	Hour 745	Hour 746	Hour 747	Hour 748	Hour 749	Hour 750	Hour 751	Hour 752	Hour 753	Hour 754	Hour 755	Hour 756	Hour 757	Hour 758	Hour 759	Hour 760	Hour 761	Hour 762	Hour 763	Hour 764	Hour 765	Hour 766	Hour 767	Hour 768	Hour 769	Hour 770	Hour 771	Hour 772	Hour 773	Hour 774	Hour 775	Hour 776	Hour 777	Hour 778	Hour 779	Hour 780	Hour 781	Hour 782	Hour 783	Hour 784	Hour 785	Hour 786	Hour 787	Hour 788	Hour 789	Hour 790	Hour 791	Hour 792	Hour 793	Hour 794	Hour 795	Hour 796	Hour 797	Hour 798	Hour 799	Hour 800	Hour 801	Hour 802	Hour 803	Hour 804	Hour 805	Hour 806	Hour 807	Hour 808	Hour 809	Hour 810	Hour 811	Hour 812	Hour 813	Hour 814	Hour 815	Hour 816	Hour 817	Hour 818	Hour 819	Hour 820	Hour 821	Hour 822	Hour 823	Hour 824	Hour 825	Hour 826	Hour 827	Hour 828	Hour 829	Hour 830	Hour 831	Hour 832	Hour 833	Hour 834	Hour 835	Hour 836	Hour 837	Hour 838	Hour 839	Hour 840	Hour 841	Hour 842	Hour 843	Hour 844	Hour 845	Hour 846	Hour 847	Hour 848	Hour 849	Hour 850	Hour 851	Hour 852	Hour 853	Hour 854	Hour 855	Hour 856	Hour 857	Hour 858	Hour 859	Hour 860	Hour 861	Hour 862	Hour 863	Hour 864	Hour 865	Hour 866	Hour 867	Hour 868	Hour 869	Hour 870	Hour 871	Hour 872	Hour 873	Hour 874	Hour 875	Hour 876	Hour 877	Hour 878	Hour 879	Hour 880	Hour 881	Hour 882	Hour 883	Hour 884	Hour 885	Hour 886	Hour 887	Hour 888	Hour 889	Hour 890	Hour 891	Hour 892	Hour 893	Hour 894	Hour 895	Hour 896	Hour 897	Hour 898	Hour 899	Hour 900	Hour 901	Hour 902	Hour 903	Hour 904	Hour 905	Hour 906	Hour 907	Hour 908	Hour 909	Hour 910	Hour 911	Hour 912	Hour 913	Hour 914	Hour 915	Hour 916	Hour 917	Hour 918	Hour 919	Hour 920	Hour 921	Hour 922	Hour 923	Hour 924	Hour 925	Hour 926	Hour 927	Hour 928	Hour 929	Hour 930	Hour 931	Hour 932	Hour 933	Hour 934	Hour 935	Hour 936	Hour 937	Hour 938	Hour 939	Hour 940	Hour 941	Hour 942	Hour 943	Hour 944	Hour 945	Hour 946	Hour 947	Hour 948	Hour 949	Hour 950	Hour 951	Hour 952	Hour 953	Hour 954	Hour 955	Hour 956	Hour 957	Hour 958	Hour 959	Hour 960	Hour 961	Hour 962	Hour 963	Hour 964	Hour 965	Hour 966	Hour 967	Hour 968	Hour 969	Hour 970	Hour 971	Hour 972	Hour 973	Hour 974	Hour 975	Hour 976	Hour 977	Hour 978	Hour 979	Hour 980	Hour 981	Hour 982	Hour 983	Hour 984	Hour 985	Hour 986	Hour 987	Hour 988	Hour 989	Hour 990	Hour 991	Hour 992	Hour 993	Hour 994	Hour 995	Hour 996	Hour 997	Hour 998	Hour 999	Hour 1000	Hour 1001	Hour 1002	Hour 1003	Hour 1004	Hour 1005	Hour 1006	Hour 1007	Hour 1008	Hour 1009	Hour 1010	Hour 1011	Hour 1012	Hour 1013	Hour 1014	Hour 1015	Hour 1016	Hour 1017	Hour 1018	Hour 1019	Hour 1020	Hour 1021	Hour 1022	Hour 1023	Hour 1024	Hour 1025	Hour 1026	Hour 1027	Hour 1028	Hour 1029	Hour 1030	Hour 1031	Hour 1032	Hour 1033	Hour 1034	Hour 1035	Hour 1036	Hour 1037	Hour 1038	Hour 1039	Hour 1040	Hour 1041	Hour 1042	Hour 1043	Hour 1044	Hour 1045	Hour 1046	Hour 1047	Hour 1048	Hour 1049	Hour 1050	Hour 1051	Hour 1052	Hour 1053	Hour 1054	Hour 1055	Hour 1056	Hour 1057	Hour 1058	Hour 1059	Hour 1060	Hour 1061	Hour 1062	Hour 1063	Hour 1064	Hour 1065	Hour 1066	Hour 1067	Hour 1068	Hour 1069	Hour 1070	Hour 1071	Hour 1072	Hour 1073	Hour 1074	Hour 1075	Hour 1076	Hour 1077	Hour 1078	Hour 1079	Hour 1080	Hour 1081	Hour 1082	Hour 1083	Hour 1084	Hour 1085	Hour 1086	Hour 1087	Hour 1088	Hour 1089	Hour 1090	Hour 1091	Hour 1092	Hour 1093	Hour 1094	Hour 1095	Hour 1096	Hour 1097	Hour 1098	Hour 1099	Hour 1100	Hour 1101	Hour 1102	Hour 1103	Hour 1104	Hour 1105	Hour 1106	Hour 1107	Hour 1108	Hour 1109	Hour 1110	Hour 1111	Hour 1112	Hour 1113	Hour 1114	Hour 1115	Hour 1116	Hour 1117	Hour 1118	Hour 1119	Hour 1120	Hour 1121	Hour 1122	Hour 1123	Hour 1124	Hour 1125	Hour 1126	Hour 1127	Hour 1128	Hour 1129	Hour 1130	Hour 1131	Hour 1132	Hour 1133	Hour 1134	Hour 1135	Hour 1136	Hour 1137	Hour 1138	Hour 1139	Hour 1140	Hour 1141	Hour 1142	Hour 1143	Hour 1144	Hour 1145	Hour 1146	Hour 1147	Hour 1148	Hour 1149	Hour 1150	Hour 1151	Hour 1152	Hour 1153	Hour 1154	Hour 1155	Hour 1156	Hour 1157	Hour 1158	Hour 1159	Hour 1160	Hour 1161	Hour 1162	Hour 1163	Hour 1164	Hour 1165	Hour 1166	Hour 1167	Hour 1168	Hour 1169	Hour 1170	Hour 1171	Hour 1172	Hour 1173	Hour 1174	Hour 1175	Hour 1176	Hour 1177	Hour 1178	Hour 1179	Hour 1180	Hour 1181	Hour 1182	Hour 1183	Hour 1184	Hour 1185	Hour 1186	Hour 1187	Hour 1188	Hour 1189	Hour 1190	Hour 1191

Designing the Schema

- FreeMind was used to layout the ‘thought pattern’ of the schema





Building the Geodatabase

- ArcCatalog was used to build a geodatabase, along with the feature datasets and feature classes.
- Microsoft Access was used to:
 - Import data from Excel for table creation.
 - Define additional fields and data types.
 - Establish relationships.
 - Query data.

Querying Data

The screenshot shows the Microsoft Access interface. A query named 'PrecipitationDailyTotal' is displayed in Design View. The diagram shows a relationship between the 'PrecipitationDaily' table and the 'PrecipitationDailyTotal' query. The data grid below shows the results of the query, with columns for Date, Longitude, Latitude, PrecipitationDailyTotal, and PrecipitationDailyTotal.

Date	Longitude	Latitude	PrecipitationDailyTotal	PrecipitationDailyTotal
10/15/2004	8.08	6.89	10.53	0.11
10/16/2004	8.07	6.87	10.26	0.34
10/17/2004	8.06	6.93	10.77	0.73
10/18/2004	8.04	6.74	14.07	0.08
10/19/2004	8.06	6.99	14.26	0.01
10/20/2004	8.08	7.19	15.26	0.07
10/21/2004	8.09	7.01	14.47	0.05
10/22/2004	8.12	6.92	13.26	0.22
10/23/2004	7.95	6.92	13	0.10
10/24/2004	8.04	6.96	13.36	0.06
10/25/2004	8.08	6.99	13.37	0.07
10/26/2004	8.05	7.16	13.22	0.03
10/27/2004	7.98	7.26	11.91	0.11
10/28/2004	7.43	7.31	10.66	0.39
10/29/2004	7.07	7.19	10.86	0.36
10/30/2004	7.27	7.4	11.16	0.04
10/31/2004	7.06	7.62	11.62	0.01
10/01/2004	7.17	7.42	11.9	0.26
10/02/2004	8.06	7.25	10.82	0.07
10/03/2004	7.8926	7.5429	14.33	0.11
10/04/2004	7.6716866667	7.3683333333	15.95	0.34
10/05/2004	7.59	7.27	15.61	0.72
10/06/2004	6.1333333333	7.4043333333	19.09	0.08
10/07/2004	7.14375	7.4033333333	14.13	0.01
10/08/2004	6.8754166667	7.78375	14.7	0.07
10/09/2004	7.0484166667	7.2283333333	14.6	0.05
10/10/2004	7.5104166667	7.5641666667	13.89	0.22
10/11/2004	7.84	7.6416666667	12.97	0.19
10/12/2004	8.04	7.645	13.06	0.06
10/13/2004	8.015	7.76	12.75	0.07
10/14/2004	7.4133333333	7.86	12.27	0.03
10/15/2004	7.8020333333	7.8625	11.84	0.11
10/16/2004	8.2016666667	7.8641666667	10.33	0.39
10/17/2004	8.3104166667	7.6983333333	10.67	0.36
10/18/2004	8.6833333333	7.6029166667	10.46	0.04
10/19/2004	8.0541666667	7.7325	11.15	0.01
10/20/2004	8.0541666667	7.72	11.22	0.26
10/21/2004	8.66375	7.6775	10.76	0.07
10/22/2004	7.3686666667	7.2483333333	14.8975	0.11
10/23/2004	7.89	7.07	10.4541666667	0.34
10/24/2004	6.6120333333	7.0066666667	15.5166666667	0.72
10/25/2004	6.9629166667	6.9766666667	14.875	0.08
10/26/2004	6.2863333333	6.9596333333	14.3033333333	0.01
10/27/2004	6.6279166667	7.1303333333	14.9	0.07
10/28/2004	7.4220333333	7.6229166667	14.5416666667	0.15
10/29/2004	6.38075	6.9683333333	11.4483333333	0.22
10/30/2004	8.22125	6.9620333333	12.8625	0.19
10/31/2004	6.2875	6.9775	11.94	0.14

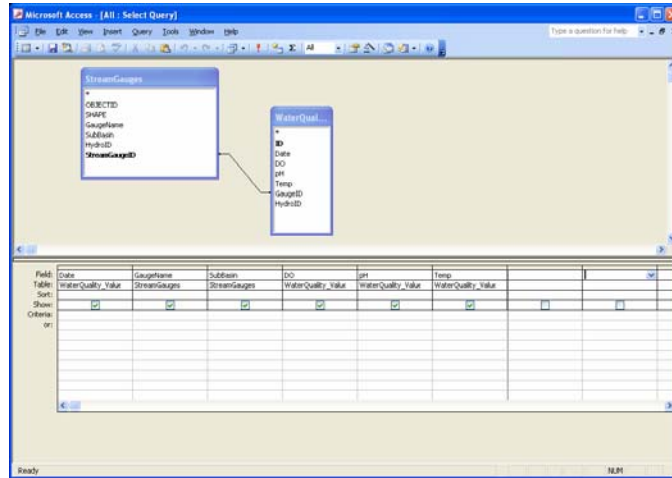
Querying Data cont...

The screenshot shows the Microsoft Access interface. A query named 'PrecipitationDailyTotal' is displayed in Design View. The diagram shows a relationship between the 'PrecipitationDaily' table and the 'PrecipitationDailyTotal' query. The data grid below shows the results of the query, with columns for Date, Longitude, Latitude, PrecipitationDailyTotal, and PrecipitationDailyTotal.

Date	Longitude	Latitude	PrecipitationDailyTotal	PrecipitationDailyTotal
10/15/2004	8.08	6.89	10.53	0.11
10/16/2004	8.07	6.87	10.26	0.34
10/17/2004	8.06	6.93	10.77	0.73
10/18/2004	8.04	6.74	14.07	0.08
10/19/2004	8.06	6.99	14.26	0.01
10/20/2004	8.08	7.19	15.26	0.07
10/21/2004	8.09	7.01	14.47	0.05
10/22/2004	8.12	6.92	13.26	0.22
10/23/2004	7.95	6.92	13	0.10
10/24/2004	8.04	6.96	13.36	0.06
10/25/2004	8.08	6.99	13.37	0.07
10/26/2004	8.05	7.16	13.22	0.03
10/27/2004	7.98	7.26	11.91	0.11
10/28/2004	7.43	7.31	10.66	0.39
10/29/2004	7.07	7.19	10.86	0.36
10/30/2004	7.27	7.4	11.16	0.04
10/31/2004	7.06	7.62	11.62	0.01
10/01/2004	7.17	7.42	11.9	0.26
10/02/2004	8.06	7.25	10.82	0.07
10/03/2004	7.8926	7.5429	14.33	0.11
10/04/2004	7.6716866667	7.3683333333	15.95	0.34
10/05/2004	7.59	7.27	15.61	0.72
10/06/2004	6.1333333333	7.4043333333	19.09	0.08
10/07/2004	7.14375	7.4033333333	14.13	0.01
10/08/2004	6.8754166667	7.78375	14.7	0.07
10/09/2004	7.0484166667	7.2283333333	14.6	0.05
10/10/2004	7.5104166667	7.5641666667	13.89	0.22
10/11/2004	7.84	7.6416666667	12.97	0.19
10/12/2004	8.04	7.645	13.06	0.06
10/13/2004	8.015	7.76	12.75	0.07
10/14/2004	7.4133333333	7.86	12.27	0.03
10/15/2004	7.8020333333	7.8625	11.84	0.11
10/16/2004	8.2016666667	7.8641666667	10.33	0.39
10/17/2004	8.3104166667	7.6983333333	10.67	0.36
10/18/2004	8.6833333333	7.6029166667	10.46	0.04
10/19/2004	8.0541666667	7.7325	11.15	0.01
10/20/2004	8.0541666667	7.72	11.22	0.26
10/21/2004	8.66375	7.6775	10.76	0.07
10/22/2004	7.3686666667	7.2483333333	14.8975	0.11
10/23/2004	7.89	7.07	10.4541666667	0.34
10/24/2004	6.6120333333	7.0066666667	15.5166666667	0.72
10/25/2004	6.9629166667	6.9766666667	14.875	0.08
10/26/2004	6.2863333333	6.9596333333	14.3033333333	0.01
10/27/2004	6.6279166667	7.1303333333	14.9	0.07
10/28/2004	7.4220333333	7.6229166667	14.5416666667	0.15
10/29/2004	6.38075	6.9683333333	11.4483333333	0.22
10/30/2004	8.22125	6.9620333333	12.8625	0.19
10/31/2004	6.2875	6.9775	11.94	0.14

The results.

Querying Data cont...

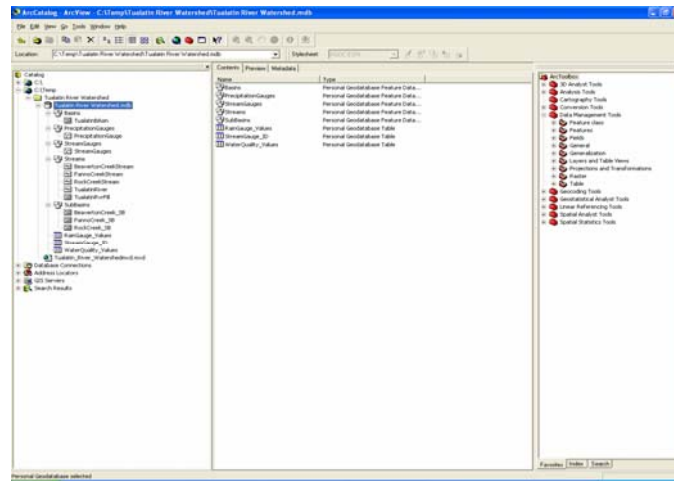


Querying Data cont...

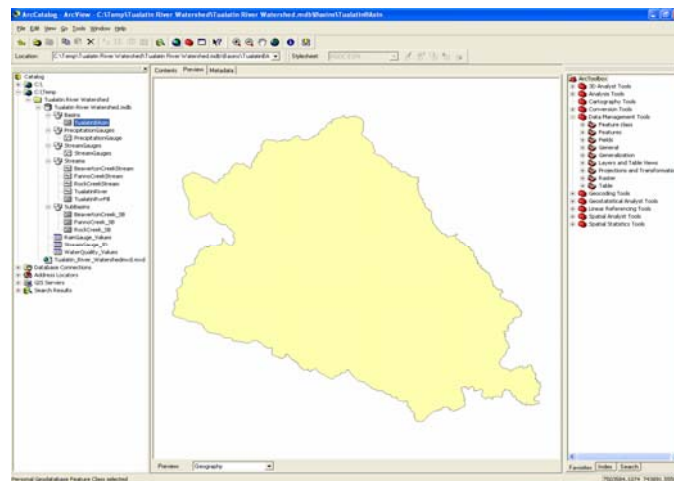
Date	GaugeName	Subbasin	DO	pH	Temp	WaterQuality_Value
10/17/2004	Des Moines Creek	Des Moines Creek	6.08	6.88	16.27	
10/22/2004	Des Moines Creek	Des Moines Creek	6.96	6.88	15.86	
10/25/2004	Des Moines Creek	Des Moines Creek	6.46	6.67	15.7	
10/4/2004	Des Moines Creek	Des Moines Creek	6.88	6.78	16.96	
10/6/2004	Des Moines Creek	Des Moines Creek	6.88	6.87	15.13	
10/6/2004	Des Moines Creek	Des Moines Creek	5.7	6.67	16.36	
10/7/2004	Des Moines Creek	Des Moines Creek	5.23	6.66	15.62	
10/8/2004	Des Moines Creek	Des Moines Creek	6.06	6.93	15.77	
10/9/2004	Des Moines Creek	Des Moines Creek	4.84	6.74	14.87	
10/10/2004	Des Moines Creek	Des Moines Creek	5.86	6.86	14.36	
10/11/2004	Des Moines Creek	Des Moines Creek	6	7.09	13.87	
10/12/2004	Des Moines Creek	Des Moines Creek	6.02	7.19	14.62	
10/13/2004	Des Moines Creek	Des Moines Creek	6.08	7.24	15.24	
10/14/2004	Des Moines Creek	Des Moines Creek	5.79	7.26	15.63	
10/15/2004	Des Moines Creek	Des Moines Creek	5.28	7.2	15.47	
10/16/2004	Des Moines Creek	Des Moines Creek	5.08	7.19	15.26	
10/17/2004	Des Moines Creek	Des Moines Creek	5.9	7.01	14.07	
10/18/2004	Des Moines Creek	Des Moines Creek	6.12	6.92	13.26	
10/19/2004	Des Moines Creek	Des Moines Creek	7.06	6.92	13	
10/20/2004	Des Moines Creek	Des Moines Creek	6.94	6.96	13.96	
10/21/2004	Des Moines Creek	Des Moines Creek	6.89	6.98	13.37	
10/22/2004	Des Moines Creek	Des Moines Creek	6.76	7.16	13.12	
10/23/2004	Des Moines Creek	Des Moines Creek	7.08	7.26	11.91	
10/24/2004	Des Moines Creek	Des Moines Creek	7.18	7.21	11.17	
10/25/2004	Des Moines Creek	Des Moines Creek	7.43	7.31	10.86	
10/26/2004	Des Moines Creek	Des Moines Creek	7.07	7.19	10.86	
10/27/2004	Des Moines Creek	Des Moines Creek	7.17	7.25	11.24	
10/28/2004	Des Moines Creek	Des Moines Creek	7.22	7.4	11.16	
10/29/2004	Des Moines Creek	Des Moines Creek	7.06	7.62	11.62	
10/30/2004	Des Moines Creek	Des Moines Creek	7.17	7.43	11.6	
10/31/2004	Des Moines Creek	Des Moines Creek	6.94	7.25	10.82	
10/1/2004	Rock Creek	Rock Creek	7.461666667	7.6725	15.37	
10/2/2004	Rock Creek	Rock Creek	7.79125	7.510833333	14.61	
10/3/2004	Rock Creek	Rock Creek	7.862083333	7.622916667	14.44	
10/4/2004	Rock Creek	Rock Creek	7.862916667	7.537083333	14.15	
10/5/2004	Rock Creek	Rock Creek	7.89125	7.542916667	14.33	
10/6/2004	Rock Creek	Rock Creek	7.616666667	7.605833333	15.46	
10/7/2004	Rock Creek	Rock Creek	7.403083333	7.15375	15.99	
10/8/2004	Rock Creek	Rock Creek	7.39	7.27	15.81	
10/9/2004	Rock Creek	Rock Creek	6.703333333	7.264583333	15.29	
10/10/2004	Rock Creek	Rock Creek	7.14375	7.489333333	14.36	
10/11/2004	Rock Creek	Rock Creek	7.42625	7.6775	13.98	
10/12/2004	Rock Creek	Rock Creek	7.946666667	7.626	13.75	
10/13/2004	Rock Creek	Rock Creek	7.213333333	7.674166667	14.17	
10/14/2004	Rock Creek	Rock Creek	6.906666667	7.707083333	14.07	
10/15/2004	Rock Creek	Rock Creek	6.708333333	7.796666667	14.15	
10/16/2004	Rock Creek	Rock Creek	6.875416667	7.770833333	14.7	
10/17/2004	Rock Creek	Rock Creek	7.664166667	7.719166667	14.15	

The results.

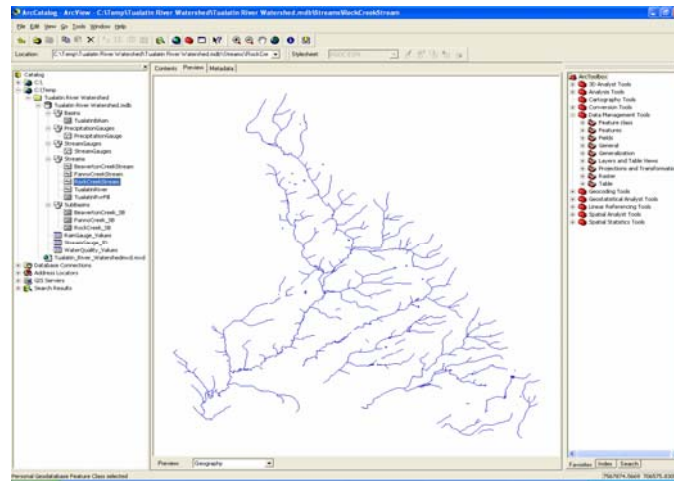
ArcCatalog



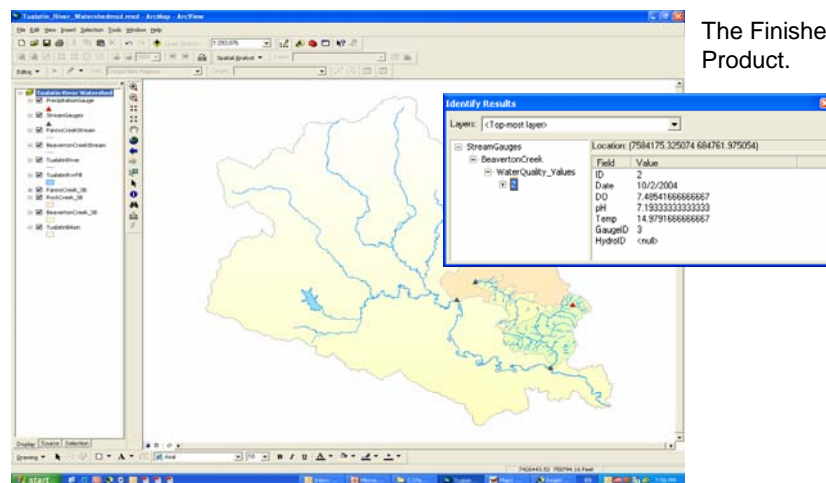
ArcCatalog



ArcCatalog



ArcMap



Questions?