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Texas Watch Volunteer Water Quality Monitoring Program
2006 Brazos River – Salado Creek Data Summary

This data summary report includes general basin volunteer monitoring activity, general water quality descriptive statistics, tables and graphs, and comparisons to stream standards. In alignment with Texas Watch's core mission, monitors attempt to collect data that can be used in decision-making processes, to promote a healthier and safer environment for people and aquatic inhabitants. From "backyard" concerns to state or regional issues, it has become increasingly important for monitors to be accountable for their monitoring information and how it can be infused into the decision-making process,. To assist with this effort, Texas Watch is coordinating with monitoring groups and government agencies to propagate numerous data use options.

Among these options, volunteer monitors can directly participate by communicating their data to various stakeholders. Some options include: participating in the Clean Rivers Program (CRP) Steering Committee Process (see box insert on this page); providing information during "public comment" periods; attending city council and advisory panel meetings; developing relations with local Texas Commission on Environmental Quality (TCEQ) and river authority water specialists; if necessary, filing complaints with environmental agencies; contacting elected representatives and media; or starting organizing local efforts to address areas of concern.

The Texas Clean Rivers Act established a way for the citizens of Texas to participate in building the foundation for effective statewide watershed planning activities. Each CRP partner agency has established a steering committee to set priorities within its basin. These committees bring together the diverse interests in each basin and watershed. Steering committee participants include representatives from the public, government, industry, business, agriculture, and environmental groups. The steering committee is designed to allow local concerns to be addressed and regional solutions are recommended. For more information about participating in these steering committee meetings and to contribute your views about water quality, contact the appropriate CRP partner agency for your river basin at: http://www.tnrcc.state.tx.us/water/quality/data/wmt/contract.html.

Currently, Texas Watch is working with various public and private organizations to facilitate data and information sharing. One component of this process includes interacting with watershed stakeholders at CRP steering committee meetings. A major function of these meetings is to discuss water quality issues and to obtain input from the general public. While participation in this process may not bring about instantaneous results, it is a good place to begin making institutional connections and to learn how to "work" the assessment and protection system that Texas agencies use to keep water resources healthy and sustainable.

In general, Texas Watch efforts to use volunteer data may include the following:

1. Assist monitors with data analysis and interpretation
2. Analyze watershed-level or site-by-site data for monitors and partners
3. Screen all data annually for values outside expected ranges
4. Network with monitors and pertinent agencies to communicate data
5. Attend meetings and conferences to communicate data
6. Participate in CRP stakeholder meetings
7. Provide a data viewing forum via the Texas Watch Data Viewer
8. Participate in professional coordinated monitoring processes to raise awareness of areas of concern

Information collected by Texas Watch volunteers utilizes a TCEQ and EPA approved quality assurance project plan (QAPP) to ensure data are correct and accurately reflects the environmental conditions of the segment being monitored. All data are screened for completeness, precision and accuracy where applicable, and scrutinized with data quality objective and data validation screening techniques. Sample results are intended to be used for education and research, baseline, local decision making, problem identification, and others uses deemed appropriate by the data user. Graphs are compiled and situated to assist the data user in obtaining information from the collected data. Where applicable, "time" is located on the "x" or horizontal axis and is chronologically listed from oldest to most recent sampling (left to right respectively). The "y1" or "y2" axes contain the constituent(s) of interest and these scales may be different. Data collected by Texas Watch monitors include: pH, specific conductivity, water and air temperature, dissolved oxygen, flow severity, days since last precipitation, total depth, sample depth, Secchi depth, field observations, and others. Note: pH values were not transformed for graphing purposes or for developing mean statistics; data collection events may not be evenly distributed over time (through seasons and years); sampling events may occur at different times of the day; sample collection and results documentation may have been completed by different monitors over time at each site; data collected by school groups should undergo additional scrutiny before use; data summary information is subject to change.

When assessing any surface water quality data, it is important to clarify the segment's official "designated and aquatic life use" categories. The "aquatic life use" designation, which ranges from "exceptional and high to intermediate or limited," sets the standards for aquatic inhabitants of the water body. For instance, an "exceptional" aquatic life use designation for a stream segment establishes a dissolved oxygen standard of 6.0 mg/L. A "high" designation for dissolved oxygen is 5.0 mg/L. Similar standards are set for pH, chlorides, dissolved solids, bacteria, temperature, and so on. These standards are important when calculating point source effluent discharge permit limitations for nutrients and other key constituents that are released into surface waters.

Data summary reports are typically generated for sites with a minimum of 9 samples over the last five years. For more information about data summary reports please read the Texas Watch Summer 2005 issue and look for the article entitled, "Monitors often ask, 'How are you using my data?".

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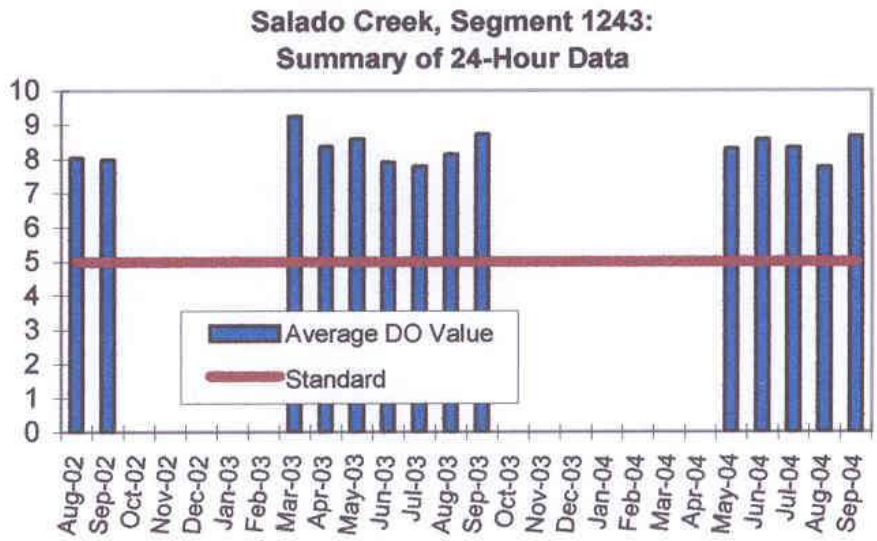
Each parameter will have series of corresponding graphs and charts. There are two sets of graphs. For all graphs, site name or sample date is located on the "x" or horizontal axis and is shown moving from upstream to downstream or is chronologically listed from oldest to most recent sampling. The "y1" or "y2" axes contain the constituent(s) of interest. Data collected by Texas Watch monitors include: pH, specific conductivity, water and air temperature, dissolved oxygen, flow severity, days since last precipitation, total depth, sample depth, field observations, and others.

Salado Creek map produced by TCEQ TMDL 2004

Salado Creek (segment 1243) is located in the Brazos River basin in south-central Texas. Salado Creek begins where North Salado and South Salado Creeks come together. From this confluence, Salado Creek flows twenty-seven miles until it joins the Lampasas River. The Salado Creek watershed is 170 square miles and is partially located on the Edwards Plateau physiographic province and Oak Woods and Prairies natural region. Land activities consist predominantly of rangeland and cropland uses with some urban areas and projected growth imminent.

According to the TCEQ, water quality information collected before 2002 indicated concerns for low dissolved oxygen levels, and segment 1243 was a candidate for a Total Maximum Daily Load project. Subsequent data collection activities from 2002 to 2004 show that oxygen levels are adequate enough for water managers to potentially de-list Salado Creek from the 303d report (TCEQ 2004 www.tceq.org/goto/tmdl/). Please see the graphs below to view summary graphs produced by TCEQ.



Salado Creek graph produced by TCEQ TMDL 2004

Volunteer Data

Six Salado Creek Preservation Committee (SCPC) volunteer water quality monitors collected samples from four sites located in the Salado Creek watershed. Training and quality control oversight has been managed by the Brazos River Authority.

Station ID	Site Name	Number of Sample Events
12049	Salado Creek at Chisholm Trail	9
12051	Salado Creek at Sirena Statue	9
12053	Salado Creek at Patterson's Crossing	9
13493	Salado Creek at Stagecoach Dam	17

The following narrative summarizes the SCPC water quality data. Summary and individual sample event graphs are included in this report.

Specific conductivity remained relatively steady at each site with the average values ranging from 468 µS/cm (Patterson's Crossing) to 515 µS/cm (Sirena Statue). There are no apparent specific conductivity trends at any of the monitoring locations.

Average pH values at each site ranged from 7.8 su (Chisholm Trail) to 8.0 su (Patterson's Crossing and Stagecoach Dam). There are no apparent pH trends at any of the monitoring locations.

Average dissolved oxygen values at each site range from 5.0 mg/l (Stagecoach Dam) to 7.3 mg/l (Patterson's Crossing). Unlike other water quality parameters on Salado Creek, dissolved oxygen values show decreasing trends from 2001 to 2004 at each monitoring location. Dissolved oxygen values range from 9.5 mg/l to 3.1 mg/l. This information seems to substantiate earlier professional data that showed depressed dissolved oxygen conditions on Salado Creek.

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Graphs and Tables

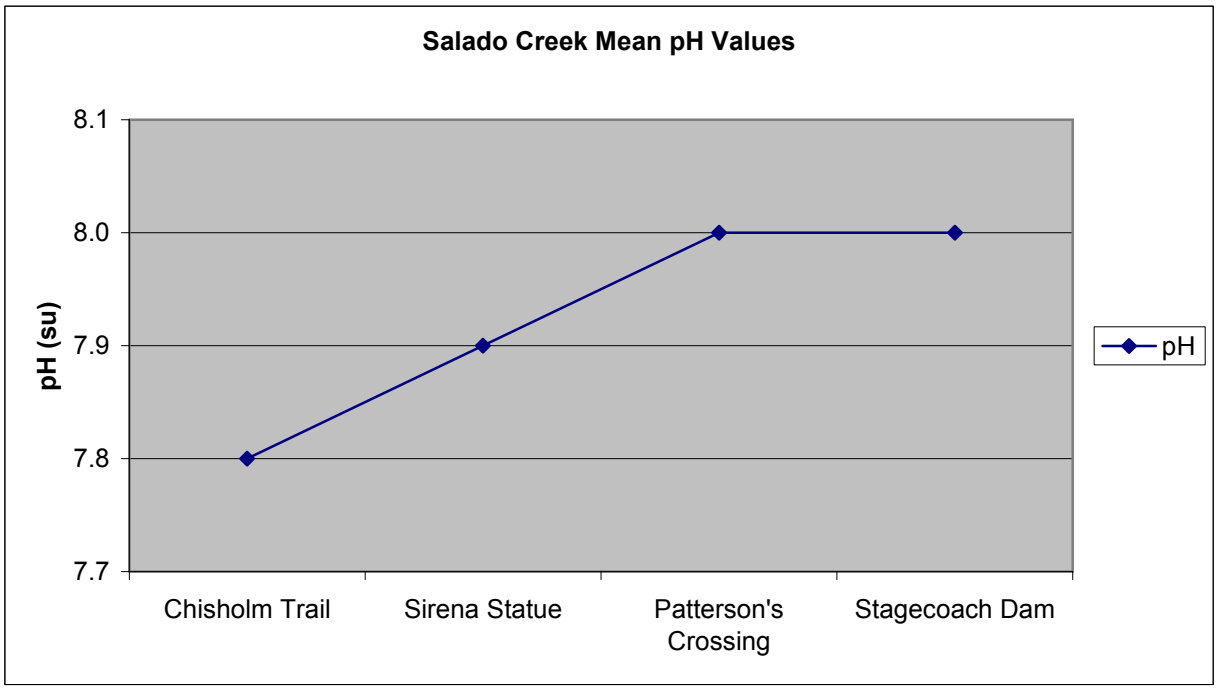
(Station ID# 12049) Salado Creek at Chisholm Trail	N	% Complete	MIN	MEAN	MAX
Sample TIME	9	100	8:00	8:23	9:30
Specific conductivity	9	100	390	507	558
Air T (C)	9	100	6	19	28
Water T (C)	9	100	8	18	24.45
Dissolved Oxygen (mg/L)	9	100	4.07	6.1	9.9
pH (su)	9	100	7.1	7.8	8.5
Total Depth (m)	9	100	0.2	0.3	0.44
DO exceedence [< 6.0 mg/L]		4 of 9	44%		

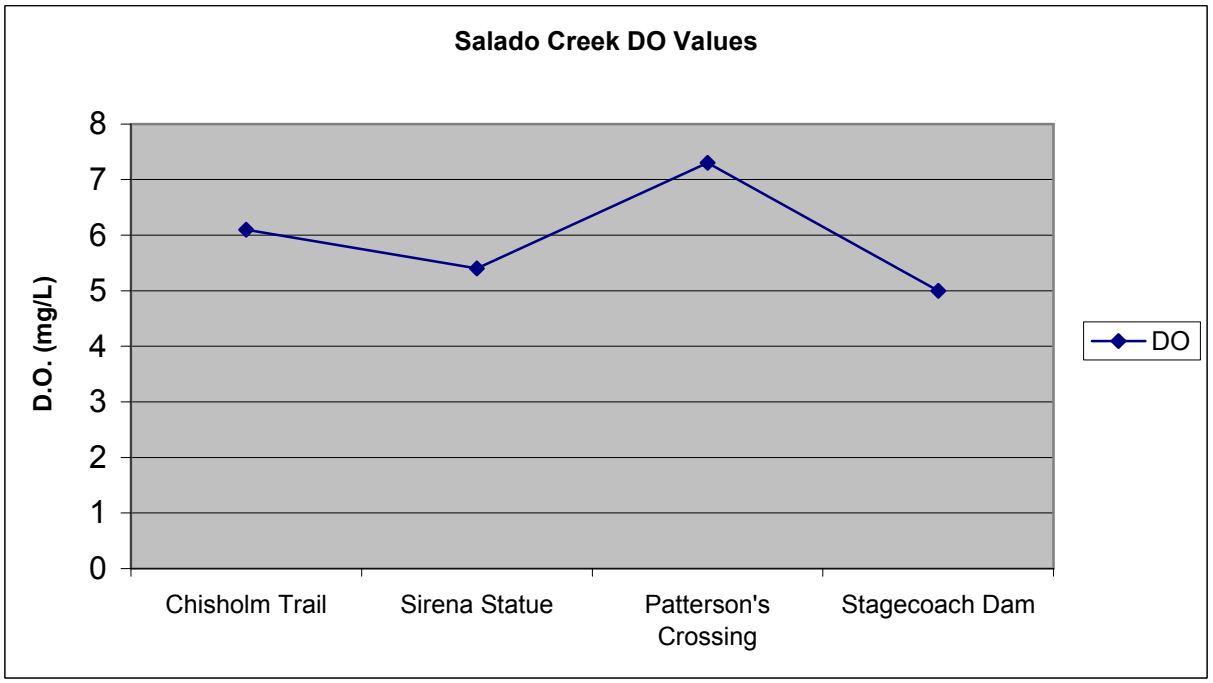
(Station ID# 12051) Salado Creek at Sirena Statue	N	% Complete	MIN	MEAN	MAX
Sample TIME	9	100	8:21	8:39	9:05
Specific conductivity	9	100	380	515	558
Air T (C)	9	99	8	18	30
Water T (C)	9	100	13.82	19	23.52
Dissolved Oxygen (mg/L)	9	100	2.87	5.4	9.45
pH (su)	9	100	6.8	7.9	8.6
Total Depth (m)	9	100	0.167	0.3	0.61
DO exceedence [< 6.0 mg/L]		5 of 9	56%		

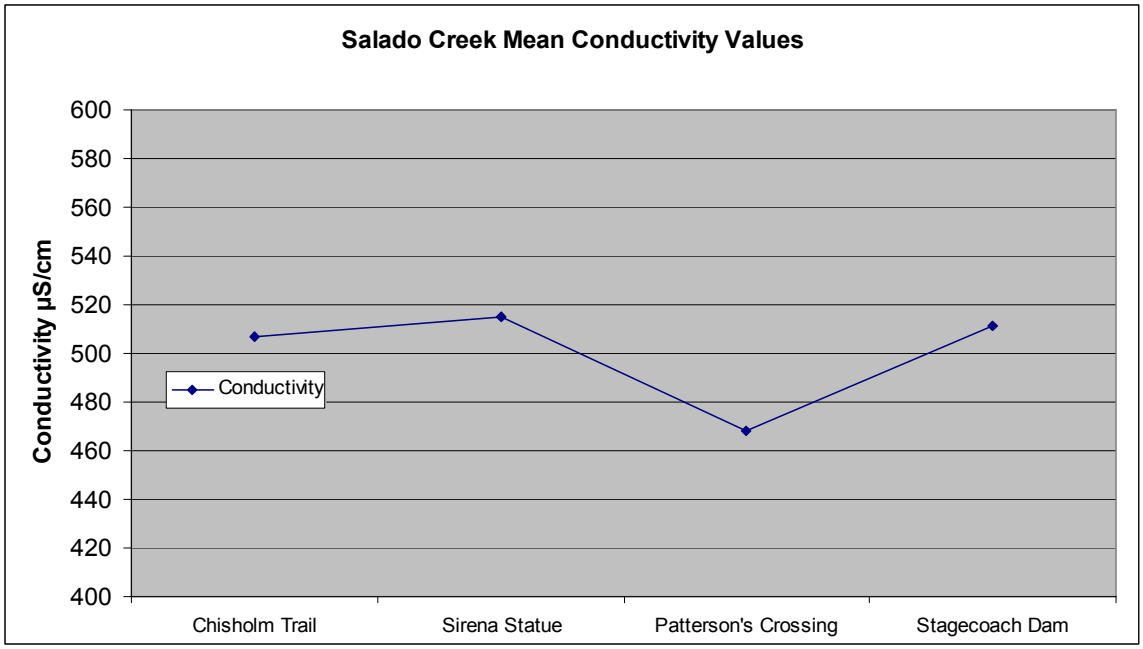
(Station ID# 12053) Salado Creek at Patterson's Crossing	N	% Complete	MIN	MEAN	MAX
Sample TIME	9	100	7:00	8:46	9:50
Specific conductivity	9	100	340	468	546
Air T (C)	9	100	10	21	28
Water T (C)	9	100	12	19	26.5
Dissolved Oxygen (mg/L)	9	100	2.69	7.3	9.95
pH (su)	9	100	7.4	8.0	8.3
Total Depth (m)	9	100	0.2	0.2	0.25
DO exceedence [< 6.0 mg/L]		2 of 9	22%		

(Station ID# 13493) Salado Creek at Stagecoach Dam	N	% Complete	MIN	MEAN	MAX
Sample TIME	17	100	8:00	8:58	9:36
Specific conductivity	17	100	392	511	553
Air T (C)	17	100	8	21	30
Water T (C)	17	100	13.19	19	23.98
Dissolved Oxygen (mg/L)	17	100	2.76	5.0	8.7
pH (su)	17	100	6.6	8.0	8.5
Total Depth (m)	17	100	0.3	1.0	3.5
DO exceedence [< 6.0 mg/L]		10 of 17	59%		

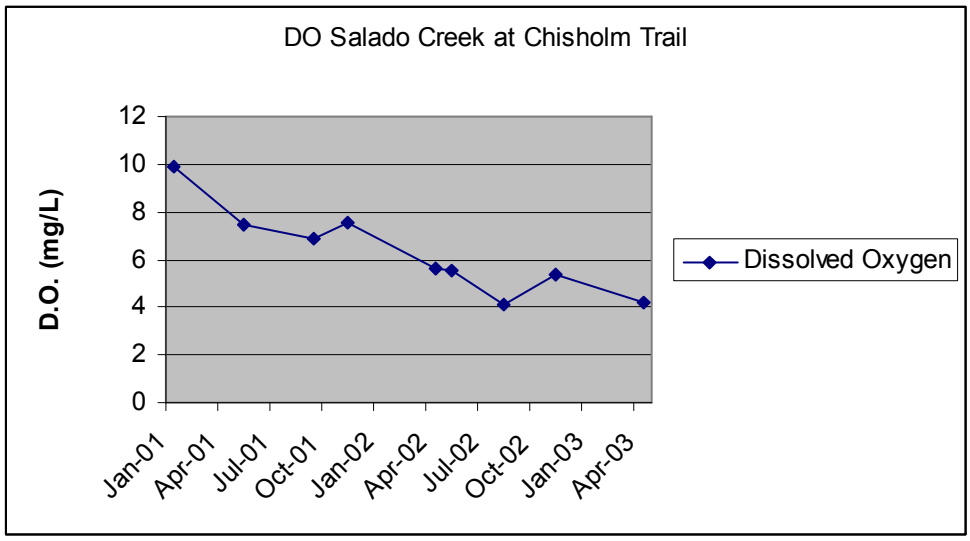
The following four graphs show mean values at each site.

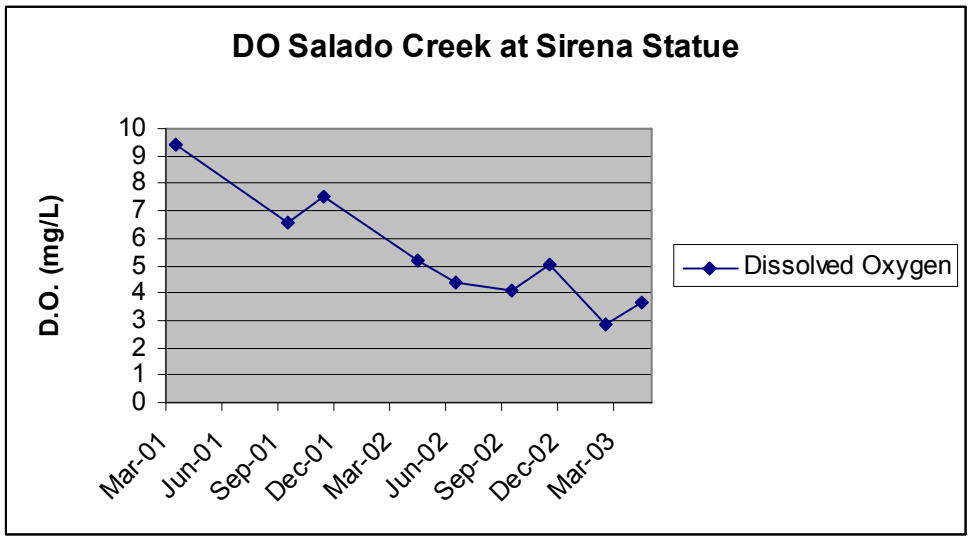


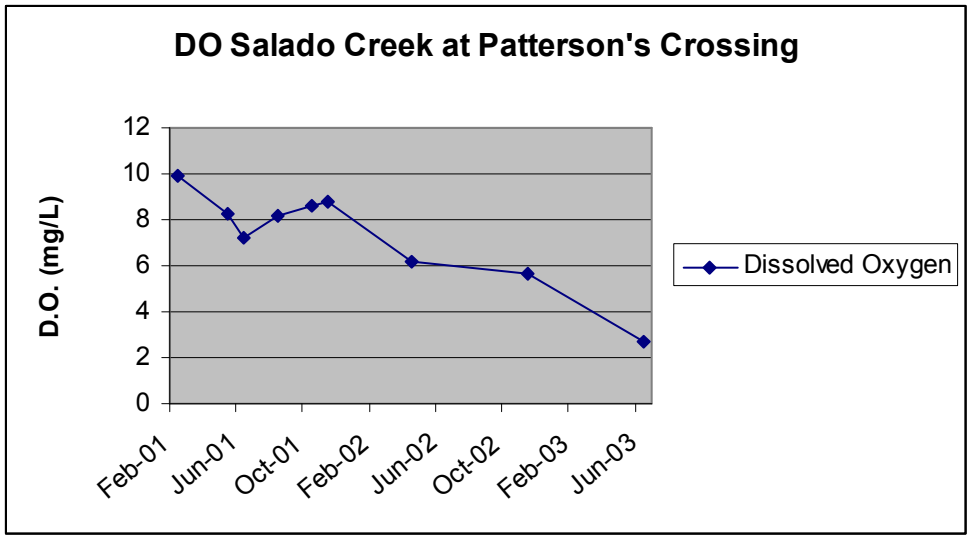


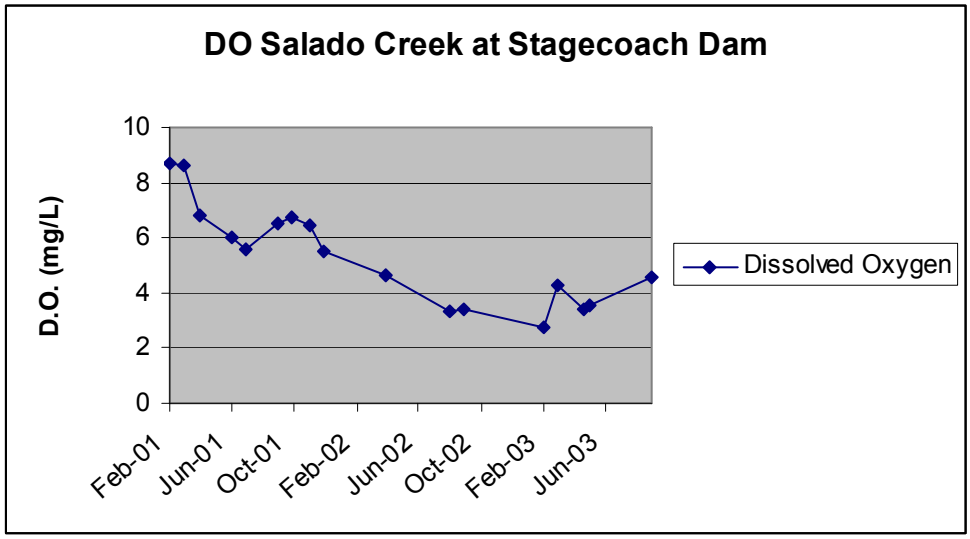

Salado Creek Mean Conductivity Values
Conductivity µS/cm
600
580
560
540
520
500
480
460
440
420
400
Conductivity
Chisholm Trail
Sirena Statue
Patterson's Crossing
Stagecoach Dam

The following graphs show each individual dissolved oxygen sampling event (by site over time)

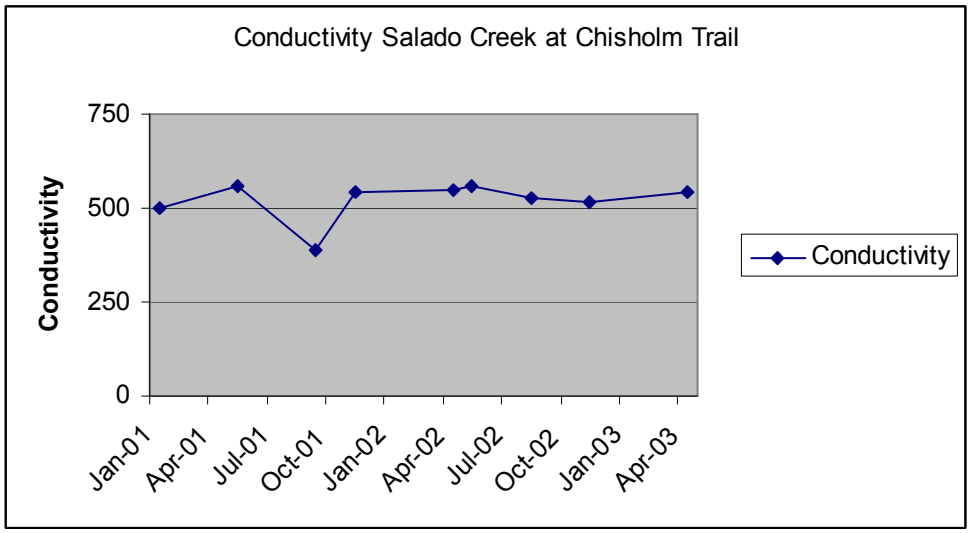


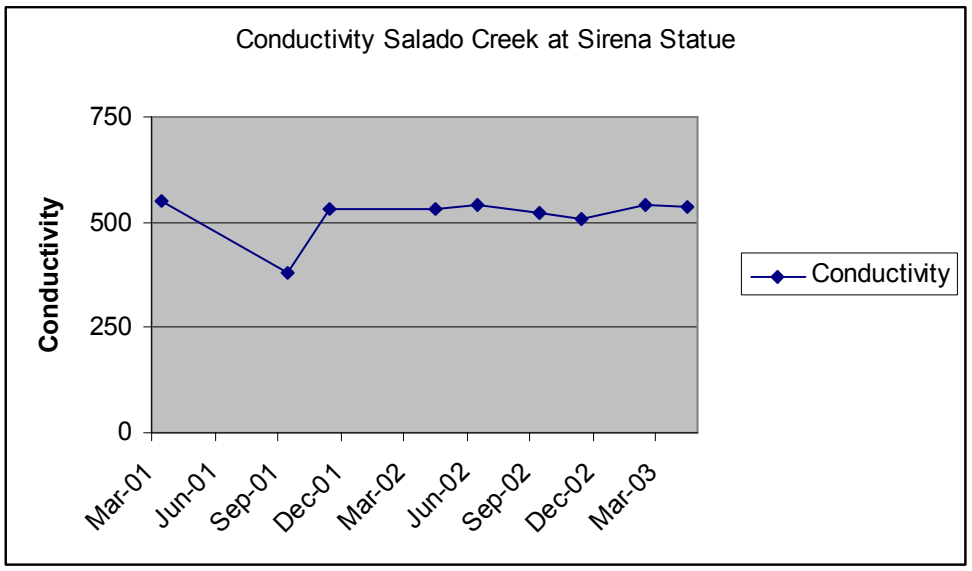


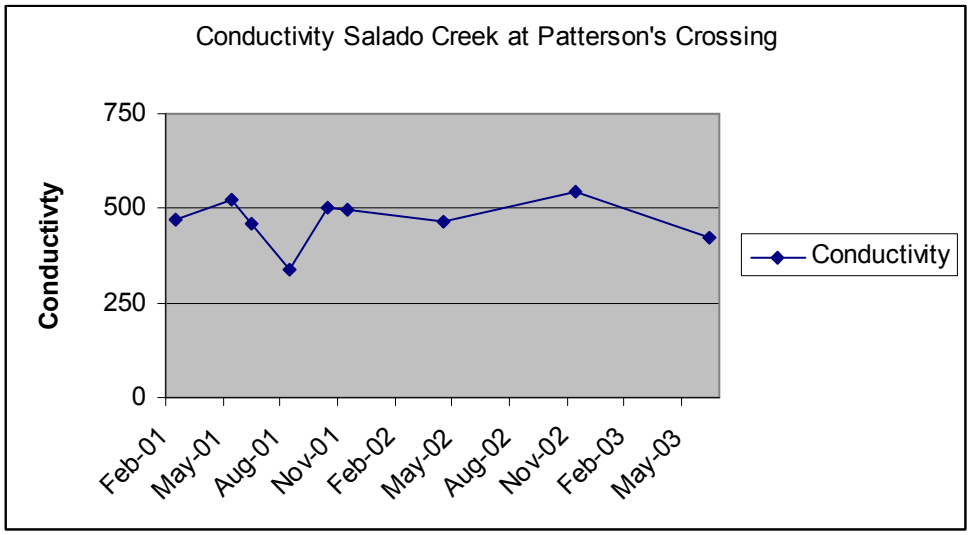

DO Salado Creek at Patterson's Crossing
D.O. (mg/L)
12
10
8
6
4
2
0
Feb-01
Jun-01
Oct-01
Feb-02
Jun-02
Oct-02
Feb-03
Jun-03
Dissolved Oxygen

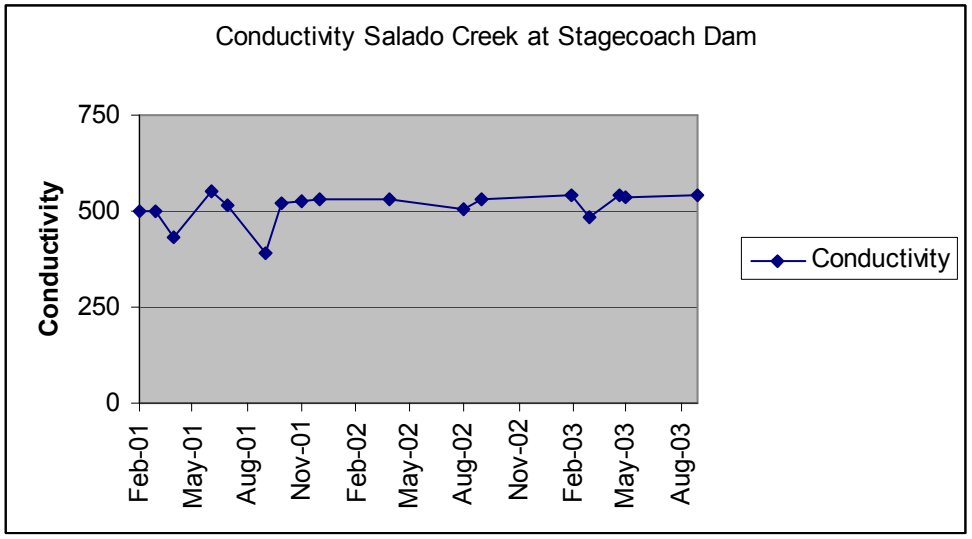

DO Salado Creek at Stagecoach Dam
D.O. (mg/L)
10
8
6
4
2
0
Feb-01
Jun-01
Oct-01
Feb-02
Jun-02
Oct-02
Feb-03
Jun-03
Dissolved Oxygen

The following graphs show each individual specific conductance (µS/cm) sampling event (by site over time)

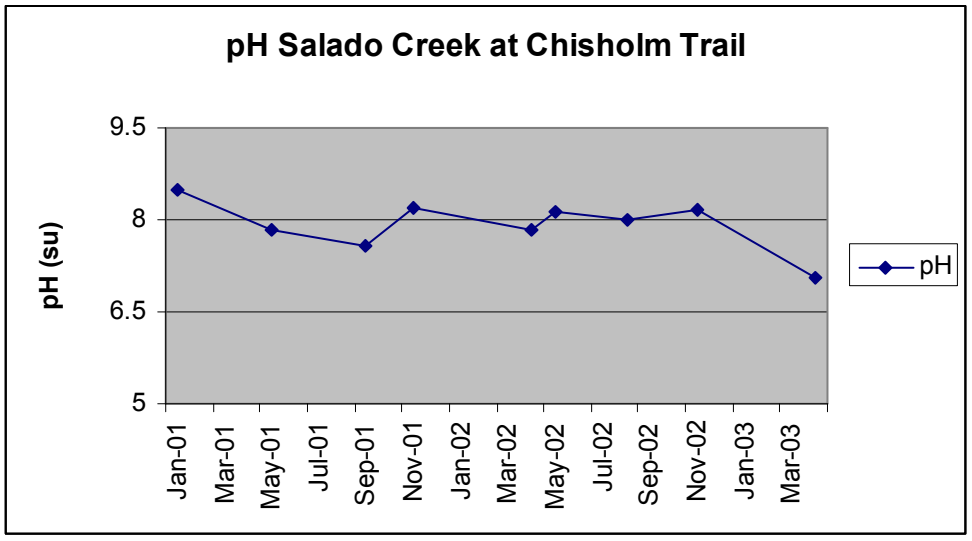


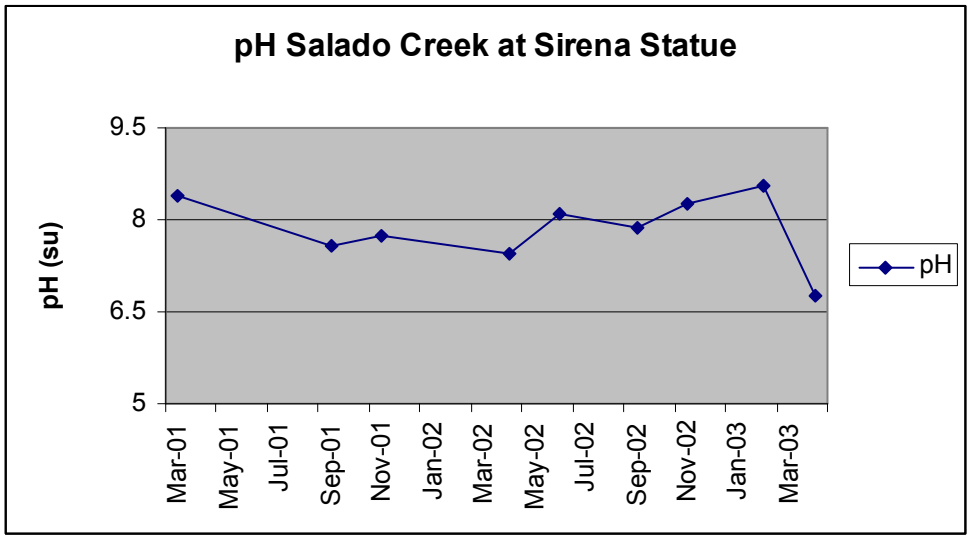


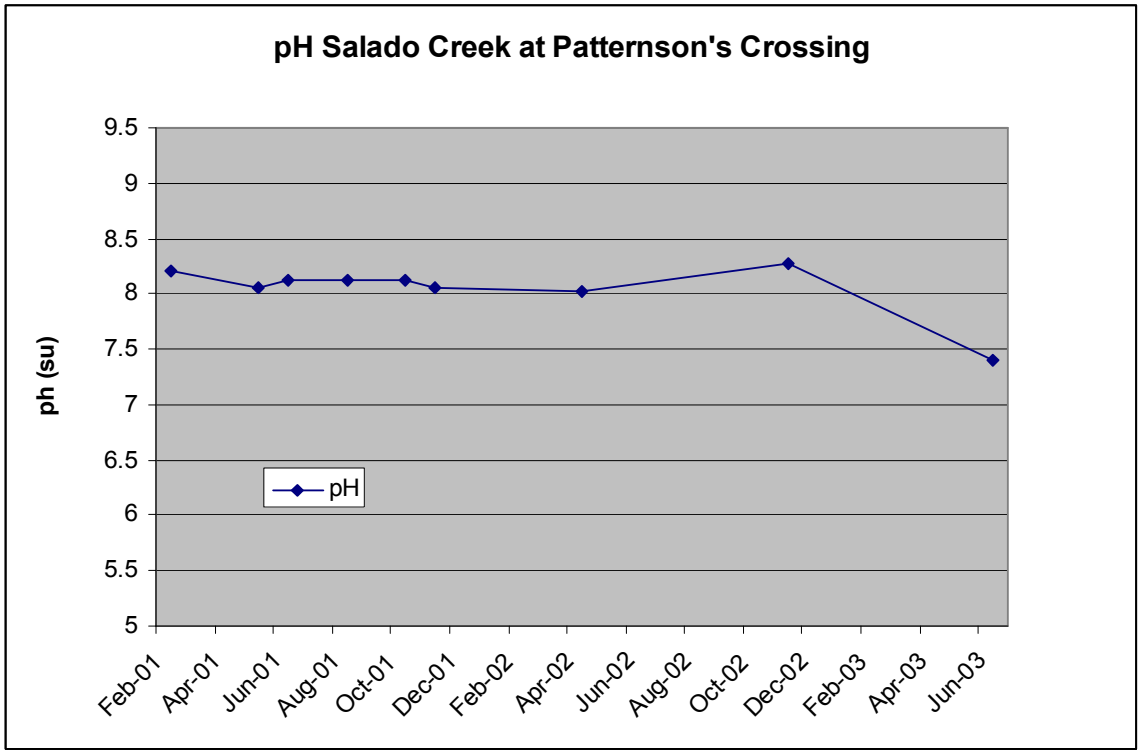

Conductivity Salado Creek at Patterson's Crossing
Conductivty
750
500
250
0
Feb-01
May-01
Aug-01
Nov-01
Feb-02
May-02
Aug-02
Nov-02
Feb-03
May-03
Conductivity

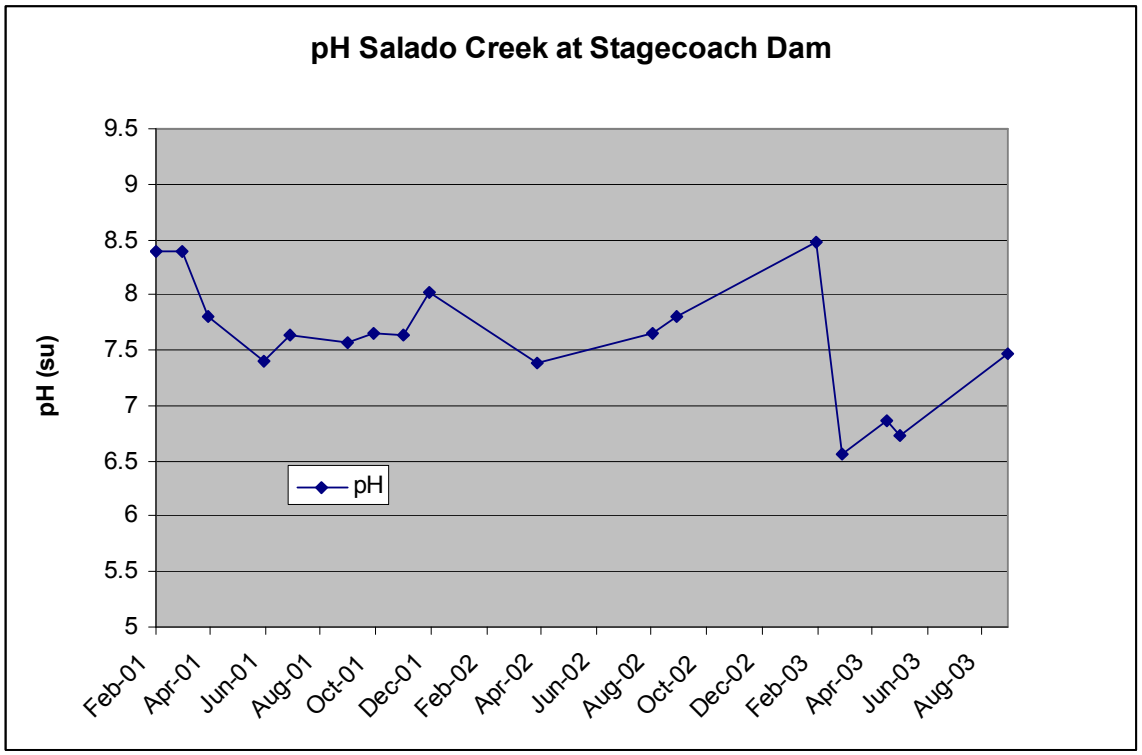

Conductivity Salado Creek at Stagecoach Dam
Conductivity
750
500
250
0
Feb-01
May-01
Aug-01
Nov-01
Feb-02
May-02
Aug-02
Nov-02
Feb-03
May-03
Aug-03
Conductivity

The following graphs show each individual pH sampling event (by site over time)






pH Salado Creek at Patternson's Crossing
ph (su)
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
pH
Feb-01
Apr-01
Jun-01
Aug-01
Oct-01
Dec-01
Feb-02
Apr-02
Jun-02
Aug-02
Oct-02
Dec-02
Feb-03
Apr-03
Jun-03


pH Salado Creek at Stagecoach Dam
pH (su)
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
pH
Feb-01
Apr-01
Jun-01
Aug-01
Oct-01
Dec-01
Feb-02
Apr-02
Jun-02
Aug-02
Oct-02
Dec-02
Feb-03
Apr-03
Jun-03
Aug-03