APPENDIX A
AMBIENT WATER QUALITY BACTERIA DATA – 1997 TO 2003

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620010010G	Canadian River	9/8/1997	200	FC	400
OK520620010010G	Canadian River	9/22/1997	1700	FC	400
OK520620010010G	Canadian River	10/6/1997	200	FC	SBCR
OK520620010010G	Canadian River	10/20/1997	200	FC	SBCR
OK520620010010G	Canadian River	11/3/1997	<200	FC	SBCR
OK520620010010G	Canadian River	11/17/1997	200	FC	SBCR
OK520620010010G	Canadian River	12/1/1997	200	FC	SBCR
OK520620010010G	Canadian River	12/15/1997	20	FC	SBCR
OK520620010010G	Canadian River	12/29/1997	80	FC	SBCR
OK520620010010G	Canadian River	1/12/1998	80	FC	SBCR
OK520620010010G	Canadian River	1/26/1998	80	FC	SBCR
OK520620010010G	Canadian River	2/9/1998	400	FC	SBCR
OK520620010010G	Canadian River	2/22/1998	80	FC	SBCR
OK520620010010G	Canadian River	3/9/1998	700	FC	SBCR
OK520620010010G	Canadian River	3/23/1998	200	FC	SBCR
OK520620010010G	Canadian River	4/6/1998	<200	FC	SBCR
OK520620010010G	Canadian River	4/20/1998	230	FC	SBCR
OK520620010010G	Canadian River	5/4/1998	80	FC	400
OK520620010010G	Canadian River	5/18/1998	1300	FC	400
OK520620010010G	Canadian River	6/1/1998	2300	FC	400
OK520620010010G	Canadian River	6/15/1998	5000	FC	400
OK520620010010G	Canadian River	6/29/1998	1300	FC	400
OK520620010010G	Canadian River	7/27/1998	700	FC	400
OK520620010010G	Canadian River	8/10/1998	<200	FC	400
OK520620010010K	Canadian River	9/8/1997	200	FC	400
OK520620010010K	Canadian River	9/22/1997	200	FC	400
OK520620010010K	Canadian River	10/6/1997	200	FC	SBCR
OK520620010010K	Canadian River	10/20/1997	<200	FC	SBCR
OK520620010010K	Canadian River	11/3/1997	400	FC	SBCR
OK520620010010K	Canadian River	11/17/1997	<200	FC	SBCR
OK520620010010K	Canadian River	12/1/1997	200	FC	SBCR
OK520620010010K	Canadian River	12/15/1997	110	FC	SBCR
OK520620010010K	Canadian River	12/29/1997	<200	FC	SBCR
OK520620010010K	Canadian River	1/12/1998	40	FC	SBCR
OK520620010010K	Canadian River	1/26/1998	170	FC	SBCR
OK520620010010K	Canadian River	2/9/1998	<200	FC	SBCR
OK520620010010K	Canadian River	2/22/1998	40	FC	SBCR
OK520620010010K	Canadian River	3/9/1998	800	FC	SBCR
OK520620010010K	Canadian River	3/23/1998	800	FC	SBCR
OK520620010010K	Canadian River	4/6/1998	200	FC	SBCR
OK520620010010K	Canadian River	4/20/1998	300	FC	SBCR
OK520620010010K	Canadian River	5/4/1998	220	FC	400
OK520620010010K	Canadian River	5/18/1998	1,300	FC	400
OK520620010010K	Canadian River	6/1/1998	200	FC	400

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620010010K	Canadian River	6/15/1998	3,000	FC	400
OK520620010010P	Canadian River	9/8/1997	400	FC	400
OK520620010010P	Canadian River	9/22/1997	3000	FC	400
OK520620010010P	Canadian River	10/6/1997	<200	FC	SBCR
OK520620010010P	Canadian River	10/20/1997	<200	FC	SBCR
OK520620010010P	Canadian River	11/3/1997	<200	FC	SBCR
OK520620010010P	Canadian River	11/17/1997	<200	FC	SBCR
OK520620010010P	Canadian River	12/1/1997	<200	FC	SBCR
OK520620010010P	Canadian River	12/15/1997	20	FC	SBCR
OK520620010010P	Canadian River	12/29/1997	80	FC	SBCR
OK520620010010P	Canadian River	1/12/1998	230	FC	SBCR
OK520620010010P	Canadian River	1/26/1998	<20	FC	SBCR
OK520620010010P	Canadian River	2/9/1998	<200	FC	SBCR
OK520620010010P	Canadian River	2/22/1998	300	FC	SBCR
OK520620010010P	Canadian River	3/9/1998	1300	FC	SBCR
OK520620010010P	Canadian River	3/23/1998	<200	FC	SBCR
OK520620010010P	Canadian River	4/6/1998	<200	FC	SBCR
OK520620010010P	Canadian River	4/20/1998	220	FC	SBCR
OK520620010010P	Canadian River	5/4/1998	90	FC	400
OK520620010010P	Canadian River	5/18/1998	170	FC	400
OK520620010010P	Canadian River	6/1/1998	<200	FC	400
OK520620010010P	Canadian River	6/15/1998	900	FC	400
OK520620010010S	Canadian River	9/8/1997	400	FC	400
OK520620010010S	Canadian River	9/22/1997	2300	FC	400
OK520620010010S	Canadian River	10/6/1997	<200	FC	SBCR
OK520620010010S	Canadian River	10/20/1997	<200	FC	SBCR
OK520620010010S	Canadian River	11/3/1997	400	FC	SBCR
OK520620010010S	Canadian River	11/17/1997	200	FC	SBCR
OK520620010010S	Canadian River	12/1/1997	200	FC	SBCR
OK520620010010S	Canadian River	12/15/1997	60	FC	SBCR
OK520620010010S	Canadian River	12/29/1997	<20	FC	SBCR
OK520620010010S	Canadian River	1/12/1998	70	FC	SBCR
OK520620010010S	Canadian River	1/26/1998	40	FC	SBCR
OK520620010010S	Canadian River	2/9/1998	<200	FC	SBCR
OK520620010010S	Canadian River	2/22/1998	80	FC	SBCR
OK520620010010S	Canadian River	3/9/1998	1300	FC	SBCR
OK520620010010S	Canadian River	3/23/1998	<200	FC	SBCR
OK520620010010S	Canadian River	4/6/1998	200	FC	SBCR
OK520620010010S	Canadian River	4/20/1998	40	FC	SBCR
OK520620010010S	Canadian River	5/4/1998	170	FC	400
OK520620010010S	Canadian River	5/18/1998	80	FC	400
OK520620010010S	Canadian River	6/1/1998	400	FC	400
OK520620010010S	Canadian River	6/15/1998	1300	FC	400
OK520620010010S	Canadian River	6/29/1998	220	FC	400
OK520620010010S	Canadian River	7/27/1998	700	FC	400

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620010010S	Canadian River	8/10/1998	<200	FC	400
OK520620010120G	Bear Creek	7/31/2000	226	EC	406
OK520620010120G	Bear Creek	9/5/2000	3,282	EC	406
OK520620010120G	Bear Creek	12/19/2000	134	EC	SBCR
OK520620010120G	Bear Creek	1/29/2001	426	EC	SBCR
OK520620010120G	Bear Creek	3/6/2001	727	EC	SBCR
OK520620010120G	Bear Creek	4/10/2001	3,654	EC	SBCR
OK520620010120G	Bear Creek	5/15/2001	354	EC	406
OK520620010120G	Bear Creek	6/19/2001	333	EC	406
OK520620010120G	Bear Creek	7/24/2001	420	EC	406
OK520620010120G	Bear Creek	8/28/2001	260	EC	406
OK520620010120G	Bear Creek	11/6/2001	50	EC	SBCR
OK520620010120G	Bear Creek	7/31/2000	1,700	ENT	108
OK520620010120G	Bear Creek	9/5/2000	10,000	ENT	108
OK520620010120G	Bear Creek	12/19/2000	500	ENT	SBCR
OK520620010120G	Bear Creek	1/29/2001	5,000	ENT	SBCR
OK520620010120G	Bear Creek	3/6/2001	1,000	ENT	SBCR
OK520620010120G	Bear Creek	4/10/2001	500	ENT	SBCR
OK520620010120G	Bear Creek	5/15/2001	1,100	ENT	108
OK520620010120G	Bear Creek	6/19/2001	800	ENT	108
OK520620010120G	Bear Creek	7/24/2001	380	ENT	108
OK520620010120G	Bear Creek	8/28/2001	390	ENT	108
OK520620010120G	Bear Creek	11/6/2001	5	ENT	SBCR
OK520620010120G	Bear Creek	5/22/2000	500	FC	400
OK520620010120G	Bear Creek	6/26/2000	1,000	FC	400
OK520620010120G	Bear Creek	7/31/2000	240	FC	400
OK520620010120G	Bear Creek	9/5/2000	41,000	FC	400
OK520620010120G	Bear Creek	12/19/2000	220	FC	SBCR
OK520620010120G	Bear Creek	1/29/2001	230	FC	SBCR
OK520620010120G	Bear Creek	3/6/2001	300	FC	SBCR
OK520620010120G	Bear Creek	4/10/2001	4,100	FC	SBCR
OK520620010120G	Bear Creek	5/15/2001	5,000	FC	400
OK520620010120G	Bear Creek	6/19/2001	1,700	FC	400
OK520620010120G	Bear Creek	8/28/2001	330	FC	400
OK520620010120G	Bear Creek	11/6/2001	150	FC	SBCR
OK520620020010_001AT	Canadian River	6/15/1999	185	EC	406
OK520620020010_001AT	Canadian River	7/13/1999	10	EC	406
OK520620020010_001AT	Canadian River	9/15/1999	5,172	EC	406
OK520620020010_001AT	Canadian River	5/9/2000	132	EC	406
OK520620020010_001AT	Canadian River	6/13/2000	86	EC	406
OK520620020010_001AT	Canadian River	7/19/2000	41	EC	406
OK520620020010_001AT	Canadian River	5/2/2001	143	EC	406
OK520620020010_001AT	Canadian River	6/19/2001	5	EC	406
OK520620020010_001AT	Canadian River	5/14/2002	20	EC	406
OK520620020010_001AT	Canadian River	6/12/2002	20	EC	406

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620020010_001AT	Canadian River	7/17/2002	10	EC	406
OK520620020010_001AT	Canadian River	8/14/2002	169	EC	406
OK520620020010_001AT	Canadian River	5/12/2003	20	EC	406
OK520620020010_001AT	Canadian River	5/27/2003	10HT	EC	406
OK520620020010_001AT	Canadian River	6/16/2003	253	EC	406
OK520620020010_001AT	Canadian River	6/30/2003	10HT	EC	406
OK520620020010_001AT	Canadian River	7/21/2003	31	EC	406
OK520620020010_001AT	Canadian River	9/8/2003	10	EC	406
OK520620020010_001AT	Canadian River	6/15/1999	10	ENT	108
OK520620020010_001AT	Canadian River	7/13/1999	5	ENT	108
OK520620020010_001AT	Canadian River	9/15/1999	2,300	ENT	108
OK520620020010_001AT	Canadian River	5/9/2000	30	ENT	108
OK520620020010_001AT	Canadian River	6/13/2000	160	ENT	108
OK520620020010_001AT	Canadian River	7/19/2000	40	ENT	108
OK520620020010_001AT	Canadian River	5/2/2001	1,000	ENT	108
OK520620020010_001AT	Canadian River	6/19/2001	40	ENT	108
OK520620020010_001AT	Canadian River	5/14/2002	60	ENT	108
OK520620020010_001AT	Canadian River	6/12/2002	80	ENT	108
OK520620020010_001AT	Canadian River	7/17/2002	50	ENT	108
OK520620020010_001AT	Canadian River	8/14/2002	500	ENT	108
OK520620020010_001AT	Canadian River	5/12/2003	50	ENT	108
OK520620020010_001AT	Canadian River	5/27/2003	200HT	ENT	108
OK520620020010_001AT	Canadian River	6/16/2003	3,000	ENT	108
OK520620020010_001AT	Canadian River	6/30/2003	10HT	ENT	108
OK520620020010_001AT	Canadian River	7/21/2003	600	ENT	108
OK520620020010_001AT	Canadian River	9/8/2003	600	ENT	108
OK520620020010_001AT	Canadian River	6/15/1999	100	FC	400
OK520620020010_001AT	Canadian River	7/13/1999	5	FC	400
OK520620020010_001AT	Canadian River	9/15/1999	2,400	FC	400
OK520620020010_001AT	Canadian River	5/9/2000	70	FC	400
OK520620020010_001AT	Canadian River	6/13/2000	150	FC	400
OK520620020010_001AT	Canadian River	7/19/2000	100	FC	400
OK520620020010_001AT	Canadian River	5/2/2001	2,000	FC	400
OK520620020010_001AT	Canadian River	6/19/2001	40	FC	400
OK520620020010_001AT	Canadian River	5/14/2002	10	FC	400
OK520620020010_001AT	Canadian River	6/12/2002	400	FC	400
OK520620020010_001AT	Canadian River	7/17/2002	10	FC	400
OK520620020010_001AT	Canadian River	8/14/2002	400	FC	400
OK520620020010_001AT	Canadian River	5/12/2003	10	FC	400
OK520620020010_001AT	Canadian River	5/27/2003	50HT	FC	400
OK520620020010_001AT	Canadian River	6/16/2003	600	FC	400
OK520620020010_001AT	Canadian River	6/30/2003	70HT	FC	400
OK520620020010_001AT	Canadian River	9/8/2003	10	FC	400
OK520620020090G	Trail Creek	7/31/2000	41	EC	406
OK520620020090G	Trail Creek	9/5/2000	416	EC	406

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620020090G	Trail Creek	11/14/2000	314	EC	SBCR
OK520620020090G	Trail Creek	12/19/2000	373	EC	SBCR
OK520620020090G	Trail Creek	1/30/2001	10	EC	SBCR
OK520620020090G	Trail Creek	3/6/2001	31	EC	SBCR
OK520620020090G	Trail Creek	4/10/2001	3,654	EC	SBCR
OK520620020090G	Trail Creek	6/19/2001	74	EC	406
OK520620020090G	Trail Creek	7/24/2001	195	EC	406
OK520620020090G	Trail Creek	8/27/2001	1,040	EC	406
OK520620020090G	Trail Creek	10/2/2001	230	EC	SBCR
OK520620020090G	Trail Creek	11/6/2001	30	EC	SBCR
OK520620020090G	Trail Creek	4/23/2002	350	EC	SBCR
OK520620020090G	Trail Creek	5/29/2002	350	EC	406
OK520620020090G	Trail Creek	7/9/2002	140	EC	406
OK520620020090G	Trail Creek	8/6/2002	610	EC	406
OK520620020090G	Trail Creek	9/10/2002	300	EC	406
OK520620020090G	Trail Creek	10/15/2002	20	EC	406
OK520620020090G	Trail Creek	4/8/2003	60	EC	SBCR
OK520620020090G	Trail Creek	5/13/2003	470	EC	406
OK520620020090G	Trail Creek	6/17/2003	190	EC	406
OK520620020090G	Trail Creek	7/31/2000	<10	ENT	108
OK520620020090G	Trail Creek	9/5/2000	1,100	ENT	108
OK520620020090G	Trail Creek	11/14/2000	900	ENT	SBCR
OK520620020090G	Trail Creek	12/19/2000	8,000	ENT	SBCR
OK520620020090G	Trail Creek	1/30/2001	400	ENT	SBCR
OK520620020090G	Trail Creek	3/6/2001	160	ENT	SBCR
OK520620020090G	Trail Creek	4/10/2001	500	ENT	SBCR
OK520620020090G	Trail Creek	6/19/2001	300	ENT	108
OK520620020090G	Trail Creek	7/24/2001	940	ENT	108
OK520620020090G	Trail Creek	8/27/2001	500	ENT	108
OK520620020090G	Trail Creek	10/2/2001	370	ENT	SBCR
OK520620020090G	Trail Creek	11/6/2001	100	ENT	SBCR
OK520620020090G	Trail Creek	4/23/2002	140	ENT	SBCR
OK520620020090G	Trail Creek	5/29/2002	140	ENT	108
OK520620020090G	Trail Creek	7/9/2002	130	ENT	108
OK520620020090G	Trail Creek	8/6/2002	610	ENT	108
OK520620020090G	Trail Creek	9/10/2002	220	ENT	108
OK520620020090G	Trail Creek	10/15/2002	220	ENT	SBCR
OK520620020090G	Trail Creek	4/8/2003	60	ENT	SBCR
OK520620020090G	Trail Creek	5/13/2003	130	ENT	108
OK520620020090G	Trail Creek	6/17/2003	130	ENT	108
OK520620020090G	Trail Creek	5/22/2000	100	FC	400
OK520620020090G	Trail Creek	6/26/2000	1,700	FC	400
OK520620020090G	Trail Creek	7/31/2000	70	FC	400
OK520620020090G	Trail Creek	9/5/2000	<10	FC	400
OK520620020090G	Trail Creek	11/14/2000	500	FC	SBCR

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620020090G	Trail Creek	12/19/2000	100	FC	SBCR
OK520620020090G	Trail Creek	1/30/2001	<10	FC	SBCR
OK520620020090G	Trail Creek	3/6/2001	40	FC	SBCR
OK520620020090G	Trail Creek	4/10/2001	16,000	FC	SBCR
OK520620020090G	Trail Creek	6/19/2001	200	FC	400
OK520620020090G	Trail Creek	7/24/2001	480	FC	400
OK520620020090G	Trail Creek	8/27/2001	1,630	FC	400
OK520620020090G	Trail Creek	10/2/2001	580	FC	SBCR
OK520620020090G	Trail Creek	11/6/2001	85	FC	SBCR
OK520620030020C	Lone Creek	8/14/2001	155	EC	406
OK520620030020C	Lone Creek	9/18/2001	71,600	EC	406
OK520620030020C	Lone Creek	10/23/2001	1,010	EC	SBCR
OK520620030020C	Lone Creek	4/23/2002	80	EC	SBCR
OK520620030020C	Lone Creek	5/29/2002	160	EC	406
OK520620030020C	Lone Creek	7/9/2002	280	EC	406
OK520620030020C	Lone Creek	8/6/2002	520	EC	406
OK520620030020C	Lone Creek	9/10/2002	180	EC	406
OK520620030020C	Lone Creek	10/15/2002	120	EC	SBCR
OK520620030020C	Lone Creek	4/8/2003	200	EC	SBCR
OK520620030020C	Lone Creek	5/13/2003	1,320	EC	406
OK520620030020C	Lone Creek	6/17/2003	100	EC	406
OK520620030020C	Lone Creek	8/14/2001	125	ENT	108
OK520620030020C	Lone Creek	9/18/2001	1,310	ENT	108
OK520620030020C	Lone Creek	10/23/2001	320	ENT	SBCR
OK520620030020C	Lone Creek	4/23/2002	260	ENT	SBCR
OK520620030020C	Lone Creek	5/29/2002	210	ENT	108
OK520620030020C	Lone Creek	7/9/2002	330	ENT	108
OK520620030020C	Lone Creek	8/6/2002	900	ENT	108
OK520620030020C	Lone Creek	9/10/2002	210	ENT	108
OK520620030020C	Lone Creek	10/15/2002	80	ENT	SBCR
OK520620030020C	Lone Creek	4/8/2003	30	ENT	SBCR
OK520620030020C	Lone Creek	5/13/2003	90	ENT	108
OK520620030020C	Lone Creek	6/17/2003	120	ENT	108
OK520620030020C	Lone Creek	9/18/2001	600	FC	400
OK520620030050G	Red Trail Creek	7/31/2000	74	EC	406
OK520620030050G	Red Trail Creek	11/14/2000	259	EC	SBCR
OK520620030050G	Red Trail Creek	12/19/2000	86	EC	SBCR
OK520620030050G	Red Trail Creek	1/30/2001	20	EC	SBCR
OK520620030050G	Red Trail Creek	3/6/2001	52	EC	SBCR
OK520620030050G	Red Trail Creek	4/10/2001	852	EC	SBCR
OK520620030050G	Red Trail Creek	5/14/2001	>520	EC	406
OK520620030050G	Red Trail Creek	6/19/2001	512	EC	406
OK520620030050G	Red Trail Creek	7/24/2001	305	EC	406
OK520620030050G	Red Trail Creek	8/28/2001	450	EC	406
OK520620030050G	Red Trail Creek	10/2/2001	1730	EC	SBCR

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620030050G	Red Trail Creek	11/6/2001	1630	EC	SBCR
OK520620030050G	Red Trail Creek	7/31/2000	260	ENT	108
OK520620030050G	Red Trail Creek	11/14/2000	9000	ENT	SBCR
OK520620030050G	Red Trail Creek	12/19/2000	6000	ENT	SBCR
OK520620030050G	Red Trail Creek	1/30/2001	7000	ENT	SBCR
OK520620030050G	Red Trail Creek	3/6/2001	500	ENT	SBCR
OK520620030050G	Red Trail Creek	4/10/2001	1100	ENT	SBCR
OK520620030050G	Red Trail Creek	5/14/2001	4,000	ENT	108
OK520620030050G	Red Trail Creek	6/19/2001	4,000	ENT	108
OK520620030050G	Red Trail Creek	7/24/2001	590	ENT	108
OK520620030050G	Red Trail Creek	8/28/2001	190	ENT	108
OK520620030050G	Red Trail Creek	10/2/2001	530	ENT	SBCR
OK520620030050G	Red Trail Creek	11/6/2001	100	ENT	SBCR
OK520620030050G	Red Trail Creek	5/22/2000	1,100	FC	400
OK520620030050G	Red Trail Creek	6/26/2000	1,400	FC	400
OK520620030050G	Red Trail Creek	7/31/2000	200	FC	400
OK520620030050G	Red Trail Creek	11/14/2000	160	FC	SBCR
OK520620030050G	Red Trail Creek	12/19/2000	90	FC	SBCR
OK520620030050G	Red Trail Creek	1/30/2001	50	FC	SBCR
OK520620030050G	Red Trail Creek	3/6/2001	30	FC	SBCR
OK520620030050G	Red Trail Creek	4/10/2001	1100	FC	SBCR
OK520620030050G	Red Trail Creek	5/14/2001	500	FC	400
OK520620030050G	Red Trail Creek	6/19/2001	500	FC	400
OK520620030050G	Red Trail Creek	8/28/2001	660	FC	400
OK520620030050G	Red Trail Creek	10/2/2001	1880	FC	SBCR
OK520620030050G	Red Trail Creek	11/6/2001	1680	FC	SBCR
OK520620030110G	Red Creek	9/5/2000	10	EC	406
OK520620030110G	Red Creek	10/9/2000	546	EC	SBCR
OK520620030110G	Red Creek	11/14/2000	20	EC	SBCR
OK520620030110G	Red Creek	12/19/2000	10	EC	SBCR
OK520620030110G	Red Creek	1/30/2001	31	EC	SBCR
OK520620030110G	Red Creek	3/6/2001	<10	EC	SBCR
OK520620030110G	Red Creek	4/10/2001	364	EC	SBCR
OK520620030110G	Red Creek	5/14/2001	122	EC	406
OK520620030110G	Red Creek	6/19/2001	52	EC	406
OK520620030110G	Red Creek	7/24/2001	145	EC	406
OK520620030110G	Red Creek	8/28/2001	450	EC	406
OK520620030110G	Red Creek	10/2/2001	200	EC	SBCR
OK520620030110G	Red Creek	11/6/2001	140	EC	SBCR
OK520620030110G	Red Creek	9/5/2000	50	ENT	108
OK520620030110G	Red Creek	10/9/2000	1500	ENT	SBCR
OK520620030110G	Red Creek	11/14/2000	120	ENT	SBCR
OK520620030110G	Red Creek	12/19/2000	60	ENT	SBCR
OK520620030110G	Red Creek	1/30/2001	300	ENT	SBCR
OK520620030110G	Red Creek	3/6/2001	30	ENT	SBCR

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620030110G	Red Creek	4/10/2001	400	ENT	SBCR
OK520620030110G	Red Creek	5/14/2001	500	ENT	108
OK520620030110G	Red Creek	6/19/2001	500	ENT	108
OK520620030110G	Red Creek	7/24/2001	60	ENT	108
OK520620030110G	Red Creek	8/28/2001	330	ENT	108
OK520620030110G	Red Creek	10/2/2001	410	ENT	SBCR
OK520620030110G	Red Creek	11/6/2001	210	ENT	SBCR
OK520620030110G	Red Creek	5/22/2000	400	FC	400
OK520620030110G	Red Creek	6/26/2000	800	FC	400
OK520620030110G	Red Creek	9/5/2000	3300	FC	400
OK520620030110G	Red Creek	10/9/2000	400	FC	SBCR
OK520620030110G	Red Creek	11/14/2000	50	FC	SBCR
OK520620030110G	Red Creek	12/19/2000	20	FC	SBCR
OK520620030110G	Red Creek	1/30/2001	10	FC	SBCR
OK520620030110G	Red Creek	3/6/2001	10	FC	SBCR
OK520620030110G	Red Creek	4/10/2001	700	FC	SBCR
OK520620030110G	Red Creek	5/14/2001	200	FC	400
OK520620030110G	Red Creek	6/19/2001	190	FC	400
OK520620030110G	Red Creek	7/24/2001	270	FC	400
OK520620030110G	Red Creek	8/28/2001	600	FC	400
OK520620030110G	Red Creek	10/2/2001	120	FC	SBCR
OK520620030110G	Red Creek	11/6/2001	270	FC	SBCR
OK520620040050D	Hackberry Creek	8/14/2001	105	EC	406
OK520620040050D	Hackberry Creek	9/18/2001	1,120	EC	406
OK520620040050D	Hackberry Creek	10/23/2001	100	EC	SBCR
OK520620040050D	Hackberry Creek	4/23/2002	320	EC	SBCR
OK520620040050D	Hackberry Creek	5/29/2002	950	EC	406
OK520620040050D	Hackberry Creek	7/9/2002	440	EC	406
OK520620040050D	Hackberry Creek	10/15/2002	160	EC	SBCR
OK520620040050D	Hackberry Creek	4/8/2003	30	EC	SBCR
OK520620040050D	Hackberry Creek	5/13/2003	100	EC	406
OK520620040050D	Hackberry Creek	6/17/2003	500	EC	406
OK520620040050D	Hackberry Creek	8/14/2001	435	ENT	108
OK520620040050D	Hackberry Creek	9/18/2001	520	ENT	108
OK520620040050D	Hackberry Creek	10/23/2001	120	ENT	SBCR
OK520620040050D	Hackberry Creek	4/23/2002	250	ENT	SBCR
OK520620040050D	Hackberry Creek	5/29/2002	140	ENT	108
OK520620040050D	Hackberry Creek	7/9/2002	310	ENT	108
OK520620040050D	Hackberry Creek	10/15/2002	100	ENT	SBCR
OK520620040050D	Hackberry Creek	4/8/2003	30	ENT	SBCR
OK520620040050D	Hackberry Creek	5/13/2003	50	ENT	108
OK520620040050D	Hackberry Creek	6/17/2003	580	ENT	108
OK520620040050D	Hackberry Creek	9/18/2001	1,340	FC	400
OK520620050160C	Commission Creek	8/14/2001	40	EC	406
OK520620050160C	Commission Creek	9/18/2001	620	EC	406

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620050160C	Commission Creek	10/23/2001	140	EC	SBCR
OK520620050160C	Commission Creek	4/23/2002	10	EC	SBCR
OK520620050160C	Commission Creek	5/29/2002	270	EC	406
OK520620050160C	Commission Creek	7/9/2002	280	EC	406
OK520620050160C	Commission Creek	8/6/2002	180	EC	406
OK520620050160C	Commission Creek	9/10/2002	70	EC	406
OK520620050160C	Commission Creek	10/15/2002	20	EC	SBCR
OK520620050160C	Commission Creek	4/8/2003	15	EC	SBCR
OK520620050160C	Commission Creek	5/13/2003	120	EC	406
OK520620050160C	Commission Creek	6/17/2003	140	EC	406
OK520620050160C	Commission Creek	8/14/2001	150	ENT	108
OK520620050160C	Commission Creek	9/18/2001	580	ENT	108
OK520620050160C	Commission Creek	10/23/2001	120	ENT	SBCR
OK520620050160C	Commission Creek	4/23/2002	80	ENT	SBCR
OK520620050160C	Commission Creek	5/29/2002	130	ENT	108
OK520620050160C	Commission Creek	7/9/2002	90	ENT	108
OK520620050160C	Commission Creek	8/6/2002	200	ENT	108
OK520620050160C	Commission Creek	9/10/2002	200	ENT	108
OK520620050160C	Commission Creek	10/15/2002	200	ENT	SBCR
OK520620050160C	Commission Creek	4/8/2003	15	ENT	SBCR
OK520620050160C	Commission Creek	5/13/2003	20	ENT	108
OK520620050160C	Commission Creek	6/17/2003	200	ENT	108
OK520620050160C	Commission Creek	9/18/2001	930	FC	400
OK520620060010F	Deer Creek	8/14/2001	55	EC	406
OK520620060010F	Deer Creek	9/18/2001	7800	EC	406
OK520620060010F	Deer Creek	10/23/2001	50	EC	SBCR
OK520620060010F	Deer Creek	4/22/2002	10	EC	SBCR
OK520620060010F	Deer Creek	5/28/2002	540	EC	406
OK520620060010F	Deer Creek	7/9/2002	650	EC	406
OK520620060010F	Deer Creek	8/6/2002	80	EC	406
OK520620060010F	Deer Creek	9/9/2002	<10	EC	406
OK520620060010F	Deer Creek	10/14/2002	20	EC	SBCR
OK520620060010F	Deer Creek	4/7/2003	<10	EC	SBCR
OK520620060010F	Deer Creek	5/12/2003	20	EC	406
OK520620060010F	Deer Creek	6/16/2003	1620	EC	406
OK520620060010F	Deer Creek	8/14/2001	55	ENT	108
OK520620060010F	Deer Creek	9/18/2001	610	ENT	108
OK520620060010F	Deer Creek	10/23/2001	20	ENT	SBCR
OK520620060010F	Deer Creek	4/22/2002	10	ENT	SBCR
OK520620060010F	Deer Creek	5/28/2002	40	ENT	108
OK520620060010F	Deer Creek	7/9/2002	70	ENT	108
OK520620060010F	Deer Creek	8/6/2002	120	ENT	108
OK520620060010F	Deer Creek	9/9/2002	140	ENT	108
OK520620060010F	Deer Creek	10/14/2002	<20	ENT	SBCR
OK520620060010F	Deer Creek	4/7/2003	<10	ENT	SBCR

WQM Station	Water Body Name	Date	Bacteria Concentration (#/100ml)	Bacteria Indicator	Criteria (#/100ml)
OK520620060010F	Deer Creek	5/12/2003	<10	ENT	108
OK520620060010F	Deer Creek	6/16/2003	540	ENT	108
OK520620060010F	Deer Creek	9/18/2001	10	FC	400

EC = E. coli; ENT = enterococci; FC = fecal coliform

SBCR indicates secondary body contact recreation, applicable from October 1 to April 30, for which numeric criteria are not specified

APPENDIX B
NPDES PERMIT DISCHARGE MONITORING REPORT DATA – 1997 TO 2005

Appendix B

NPDES Permit Discharge Monitoring Report Data 1997-2005

Permit	Monthly Average Concentration (cfu/100ml)	Daily Maximum Concentration (cfu/100ml)	Outfall	Report Date	Parameter Code	Parameter	Monthly Average Flow (MGD)	Monthly Maximum Flow (MGD)	Parameter Code	Parameter
OK0021563	50	64	1	5/31/1999	74055	FC	0.893	1.089	50050	Flow
OK0021563	63.6	122	1	6/30/1999	74055	FC	0.92	1.212	50050	Flow
OK0021563	66.5	88	1	7/31/1999	74055	FC	0.94	1.225	50050	Flow
OK0021563	92	136	1	8/31/1999	74055	FC	0.957	1.087	50050	Flow
OK0021563	41.2	76	1	9/30/1999	74055	FC	0.924	1.119	50050	Flow
OK0021563	70.6	155	1	5/31/2000	74055	FC	0.76	0.977	50050	Flow
OK0021563	34.5	52	1	6/30/2000	74055	FC	0.866	1.266	50050	Flow
OK0021563	60	132	1	7/31/2000	74055	FC	0.929	1.216	50050	Flow
OK0021563	51	82	1	8/31/2000	74055	FC	0.926	1.165	50050	Flow
OK0021563	43.5	74	1	9/30/2000	74055	FC	0.915	1.038	50050	Flow
OK0021563	50	84	1	5/31/2001	74055	FC	0.995	1.263	50050	Flow
OK0021563	46.75	68	1	6/30/2001	74055	FC	0.9906	1.182	50050	Flow
OK0021563	66	106	1	7/31/2001	74055	FC	1.051	1.294	50050	Flow
OK0021563	53.6	72	1	8/31/2001	74055	FC	0.938	1.302	50050	Flow
OK0021563	50	104	1	9/30/2001	74055	FC	0.877	1.079	50050	Flow
OK0021563	46.4	68	1	5/31/2002	74055	FC	0.85	1.054	50050	Flow
OK0021563	106.5	224	1	6/30/2002	74055	FC	0.888	1.04	50050	Flow
OK0021563	38.8	64	1	7/31/2002	74055	FC	1.118	1.141	50050	Flow
OK0021563	31.5	70	1	8/31/2002	74055	FC	0.903	1.103	50050	Flow
OK0021563	23	44	1	9/30/2002	74055	FC	0.757	1.023	50050	Flow
OK0021563	32	36	1	5/31/2003	74055	FC	0.7869	0.925	50050	Flow
OK0021563	75	128	1	6/30/2003	74055	FC	0.8468	1.054	50050	Flow
OK0021563	65	106	1	7/31/2003	74055	FC	0.764	0.994	50050	Flow
OK0021563	30	32	1	8/31/2003	74055	FC	0.874	1.047	50050	Flow
OK0021563	43	54	1	9/30/2003	74055	FC	0.952	1.081	50050	Flow
OK0021563	54	84	1	5/31/2004	74055	FC	0.783	0.916	50050	Flow
OK0021563	49	62	1	6/30/2004	74055	FC	0.8645	1.063	50050	Flow
OK0021563	31	36	1	7/31/2004	74055	FC	0.8176	1.083	50050	Flow
OK0021563	40	46	1	8/31/2004	74055	FC	0.923	1.14	50050	Flow
OK0021563	25	32	1	9/30/2004	74055	FC	0.8669	1.035	50050	Flow
OK0028185			1	5/31/1998	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/1998	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/1998	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/1998	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/1998	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/1999	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/1999	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/1999	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/1999	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/1999	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/2000	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/2000	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/2000	74055	FC	0	0	50050	Flow

Permit	Monthly Average Concentration (cfu/100ml)	Daily Maximum Concentration (cfu/100ml)	Outfall	Report Date	Parameter Code	Parameter	Monthly Average Flow (MGD)	Monthly Maximum Flow (MGD)	Parameter Code	Parameter
OK0028185			1	8/31/2000	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/2000	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/2001	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/2001	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/2001	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/2001	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/2001	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/2002	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/2002	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/2002	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/2002	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/2002	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/2003	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/2003	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/2003	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/2003	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/2003	74055	FC	0	0	50050	Flow
OK0028185			1	5/31/2004	74055	FC	0	0	50050	Flow
OK0028185			1	6/30/2004	74055	FC	0	0	50050	Flow
OK0028185			1	7/31/2004	74055	FC	0	0	50050	Flow
OK0028185			1	8/31/2004	74055	FC	0	0	50050	Flow
OK0028185			1	9/30/2004	74055	FC	0	0	50050	Flow
OK0028185	1175	1320	1	5/31/2005	74055	FC	0	0	50050	Flow
OK0028185	1380	2380	1	6/30/2005	74055	FC	0	0	50050	Flow
OK0028185	340	360	1	7/31/2005	74055	FC	0	0	50050	Flow
OK0028185	1470	2620	1	8/31/2005	74055	FC	0	0	50050	Flow
OK0028185	1290	1740	1	9/30/2005	74055	FC	0	0	50050	Flow

APPENDIX C
ESTIMATED FLOW EXCEEDANCE PERCENTILES

Appendix C

Estimated Flow Exceedance Percentiles by WQM Station (cfs)

Flows projected from USGS gage stations

	OK520620020010-001AT	OK520620010010G	OK520620010010K	OK520620010010P	OK520620010010S	OK520620010120G	OK520620020090G	OK520620030020C	OK520620030050G	OK520620030110G	OK520620040050D	OK520620050160C	OK520620060010F
USGS Gage Reference	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	7228400
Watershed Area (sq. mile)	23,978	24,892	24,444	24,310	24,281	20.6	45.1	29.2	4.2	10.7	107.4	56.1	310.5
NRCS Curve Number	64	65	65	64	64	75	67	63	64	71	55	59	76
Average Annual Rainfall (inch)	18.3	18.7	18.5	18.4	18.4	30.4	28.8	27.8	26.4	26.4	25.2	23.8	30.1
Percentile	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**
0	19224	42100	29001	25499	24857	69	92	55	6.3	26	69	41	5560
1	1872	4770	3479	3093	3018	7.9	10.4	6.3	0.7	3.0	7.8	4.7	864
2	1059	2480	1728	1562	1524	3.9	5.1	3.1	0.4	1.5	3.8	2.3	352
3	766	1700	1154	1061	1045	2.6	3.4	2	0.2	1	2.5	1.5	196
4	622	1280	941	862	847	2.1	2.7	1.6	0.2	0.8	2	1.2	145
5	525	1070	806	748	736	1.7	2.3	1.4	0.2	0.7	1.7	1	111
6	471	950	701	635	622	1.6	2.1	1.3	0.1	0.6	1.6	0.9	81
7	436	822	625	573	562	1.4	1.8	1.1	0.1	0.5	1.4	0.8	71
8	403	769	578	525	514	1.3	1.7	1	0.1	0.5	1.3	0.8	64
9	373	700	537	490	481	1.2	1.5	0.9	0.1	0.4	1.2	0.7	59
10	351	629	493	453	444	1.1	1.4	0.9	0.1	0.4	1.1	0.6	55
11	332	580	456	421	413	1	1.3	0.8	0.1	0.4	1	0.6	51
12	316	533	428	393	386	0.9	1.2	0.7	0.1	0.4	0.9	0.5	49
13	301	500	407	370	363	0.9	1.1	0.7	0.1	0.3	0.9	0.5	46
14	289	475	378	350	344	0.8	1.1	0.7	0.1	0.3	0.8	0.5	45
15	276	450	363	334	329	0.8	1	0.6	0.1	0.3	0.8	0.5	44
16	264	420	348	320	315	0.7	1	0.6	0.1	0.3	0.7	0.4	43
17	256	400	334	308	302	0.7	1	0.6	0.1	0.3	0.7	0.4	42
18	247	380	318	292	288	0.7	0.9	0.5	0.1	0.3	0.7	0.4	41
19	239	357	305	282	277	0.7	0.9	0.5	0.1	0.2	0.6	0.4	40
20	232	343	291	270	265	0.6	0.8	0.5	0.1	0.2	0.6	0.4	40
21	226	330	280	260	255	0.6	0.8	0.5	0.1	0.2	0.6	0.3	39
22	220	316	268	247	243	0.6	0.8	0.5	0.1	0.2	0.6	0.3	38
23	214	302	257	237	233	0.6	0.7	0.4	0.1	0.2	0.5	0.3	37
24	210	290	248	230	226	0.5	0.7	0.4	0	0.2	0.5	0.3	36
25	204	279	240	221	218	0.5	0.7	0.4	0	0.2	0.5	0.3	36
26	199	268	232	214	211	0.5	0.7	0.4	0	0.2	0.5	0.3	35
27	194	256	224	207	204	0.5	0.6	0.4	0	0.2	0.5	0.3	35
28	191	249	215	199	196	0.5	0.6	0.4	0	0.2	0.5	0.3	34
29	185	236	207	190	188	0.4	0.6	0.4	0	0.2	0.4	0.3	33
30	181	226	199	184	181	0.4	0.6	0.3	0	0.2	0.4	0.3	33
31	177	217	193	179	176	0.4	0.5	0.3	0	0.2	0.4	0.2	32
32	172	209	186	172	169	0.4	0.5	0.3	0	0.1	0.4	0.2	32
33	167	200	178	165	164	0.4	0.5	0.3	0	0.1	0.4	0.2	31
34	162	192	172	159	157	0.4	0.5	0.3	0	0.1	0.4	0.2	31
35	158	185	165	154	152	0.3	0.5	0.3	0	0.1	0.3	0.2	30
36	154	178	159	148	146	0.3	0.4	0.3	0	0.1	0.3	0.2	30
37	151	172	153	142	140	0.3	0.4	0.3	0	0.1	0.3	0.2	29
38	147	165	148	138	136	0.3	0.4	0.2	0	0.1	0.3	0.2	29
39	143	159	144	134	132	0.3	0.4	0.2	0	0.1	0.3	0.2	29
40	139	152	139	130	129	0.3	0.4	0.2	0	0.1	0.3	0.2	28
41	136	147	135	126	124	0.3	0.4	0.2	0	0.1	0.3	0.2	28
42	133	140	130	121	119	0.3	0.4	0.2	0	0.1	0.3	0.2	28
43	129	133	124	115	114	0.3	0.3	0.2	0	0.1	0.3	0.2	28
44	126	129	119	110	109	0.2	0.3	0.2	0	0.1	0.2	0.1	27
45	124	123	114	106	104	0.2	0.3	0.2	0	0.1	0.2	0.1	27
46	121	115	110	102	100	0.2	0.3	0.2	0	0.1	0.2	0.1	27
47	117	109	106	99	97	0.2	0.3	0.2	0	0.1	0.2	0.1	26
48	115	102	102	94	93	0.2	0.3	0.2	0	0.1	0.2	0.1	26
49	112	97	97	91	89	0.2	0.3	0.2	0	0.1	0.2	0.1	26
50	109	90	92	86	85	0.2	0.2	0.1	0	0.1	0.2	0.1	26
51	106	85	87	81	80	0.2	0.2	0.1	0	0.1	0.2	0.1	25
52	103	80	82	76	75	0.2	0.2	0.1	0	0.1	0.2	0.1	25
53	100	76	77	72	71	0.2	0.2	0.1	0	0.1	0.2	0.1	25
54	97	72	73	69	68	0.1	0.2	0.1	0	0.1	0.1	0.1	25
55	94	68	68	64	64	0.1	0.2	0.1	0	0.1	0.1	0.1	25
56	91	64	65	61	60	0.1	0.2	0.1	0	0.1	0.1	0.1	24
57	89	60	61	58	57	0.1	0.2	0.1	0	0	0.1	0.1	24
58	86	58	58	55	54	0.1	0.2	0.1	0	0	0.1	0.1	24
59	84	54	55	52	52	0.1	0.1	0.1	0	0	0.1	0.1	23
60	81	51	52	50	49	0.1	0.1	0.1	0	0	0.1	0.1	23
61	78	48	49	46	46	0.1	0.1	0.1	0	0	0.1	0.1	23
62	75	46	47	44	43	0.1	0.1	0.1	0	0	0.1	0.1	23
63	72	43	44	42	42	0.1	0.1	0.1	0	0	0.1	0.1	22
64	70	40	41	39	39	0.1	0.1	0.1	0	0	0.1	0	22
65	67	38	38	36	36	0.1	0.1	0.1	0	0	0.1	0	22
66	65	35	35	34	33	0.1	0.1	0.1	0	0	0.1	0	22
67	62	33	33	31	31	0.1	0.1	0.1	0	0	0.1	0	22
68	60	31	31	29	29	0.1	0.1	0	0	0	0.1	0	21
69	57	29	29	27	27	0.1	0.1	0	0	0	0.1	0	21
70	55	28	27	26	26	0.1	0.1	0	0	0	0.1	0	20
71	52	26	25	24	24	0	0.1	0	0	0	0	0	20
72	49	25	23	22	22	0	0.1	0	0	0	0	0	20

	OK520620020010-001AT	OK520620010010G	OK520620010010K	OK520620010010P	OK520620010010S	OK520620010120G	OK520620020090G	OK520620030020C	OK520620030050G	OK520620030110G	OK520620040050D	OK520620050160C	OK520620060010F
USGS Gage Reference	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	07228500	7228400
Watershed Area (sq. mile)	23,978	24,892	24,444	24,310	24,281	20.6	45.1	29.2	4.2	10.7	107.4	56.1	310.5
NRCS Curve Number	64	65	65	64	64	75	67	63	64	71	55	59	76
Average Annual Rainfall (inch)	18.3	18.7	18.5	18.4	18.4	30.4	28.8	27.8	26.4	26.4	25.2	23.8	30.1
Percentile	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**
73	47	23	21	20	20	0	0.1	0	0	0	0	0	20
74	43	22	20	18.9	18.8	0	0.1	0	0	0	0	0	19
75	40	20	19	17.9	17.6	0	0.1	0	0	0	0	0	19
76	36	19	17.6	16.7	16.3	0	0	0	0	0	0	0	18
77	33	18	16.2	15.1	15.1	0	0	0	0	0	0	0	18
78	32	16	15.2	14.4	14.2	0	0	0	0	0	0	0	18
79	29	16	14.3	13.6	13.3	0	0	0	0	0	0	0	17
80	26	15	13.3	12.4	12.2	0	0	0	0	0	0	0	17
81	25	14	12.4	11.8	11.7	0	0	0	0	0	0	0	16
82	23	13	11.4	11.3	11.2	0	0	0	0	0	0	0	16
83	22	13	10.7	10.4	10.4	0	0	0	0	0	0	0	15
84	20	12	10.1	9.4	9.4	0	0	0	0	0	0	0	14
85	18	11	9.5	8.7	8.5	0	0	0	0	0	0	0	14
86	17	10	8.6	8.3	8.2	0	0	0	0	0	0	0	13
87	15	9.7	8.1	7.5	7.5	0	0	0	0	0	0	0	12
88	14	9	7.4	6.8	6.7	0	0	0	0	0	0	0	12
89	13	8.2	6.7	6.2	6.1	0	0	0	0	0	0	0	11
90	12	7.4	5.7	5.6	5.5	0	0	0	0	0	0	0	11
91	10	6.5	4.7	4.2	4.1	0	0	0	0	0	0	0	10
92	9.3	5.6	3.8	3.6	3.5	0	0	0	0	0	0	0	9.6
93	8.4	5	2.7	2.4	2.3	0	0	0	0	0	0	0	9
94	7.2	4.3	1.9	1.8	1.7	0	0	0	0	0	0	0	8.7
95	5.8	3.6	0	0	0	0	0	0	0	0	0	0	8.4
96	4.8	2.7	0	0	0	0	0	0	0	0	0	0	7.8
97	3.6	1.4	0	0	0	0	0	0	0	0	0	0	7.4
98	2.2	0	0	0	0	0	0	0	0	0	0	0	6.9
99	0.9	0	0	0	0	0	0	0	0	0	0	0	6.4
100	0	0	0	0	0	0	0	0	0	0	0	0	5.8

Appendix C
General Methodology for Estimating Flow at WQM Stations

A flow duration curve will be developed using existing USGS measured flow where the data exist at the same location as the Oklahoma WQM station, or by estimating flow for WQM stations with no corresponding flow record. Flow data to support flow duration curves and load duration curves will be derived for each Oklahoma WQM station in the following priority:

v) In cases where a USGS flow gage coincides with, or occurs within one-half mile upstream or downstream of the Oklahoma WQM station.

a. If simultaneous daily flow data matching the water quality sample date are available, these flow measurements will be used.

b. If flow measurements at the coincident gage are missing for some dates on which water quality samples were collected, the gaps in the flow record will be filled, or the record will be extended, by estimating flow based on measured streamflows at a nearby gage. First, the most appropriate nearby stream gage is identified. All flow data are first log-transformed to linearize the data because flow data are highly skewed. Linear regressions are then developed between 1) daily streamflow at the gage to be filled/extended, and 2) streamflow at all gages within 95 miles that have at least 300 daily flow measurements on matching dates. The station with the best flow relationship, as indicated by the highest r-squared value, is selected as the index gage. R-squared indicates the fraction of the variance in flow explained by the regression. The regression is then used to estimate flow at the gage to be filled/extended from flow at the index station. Flows will not be estimated based on regressions with r-squared values less than 0.25, even if that is the best regression. In some cases, it will be necessary to fill/extend flow records from two or more index gages. The flow record will be filled/extended to the extent possible based on the best index gage (highest r-squared value), and remaining gaps will be filled from the next best index gage (second highest r-squared value), and so forth.

vi) In the case no coincident flow data are available for a WQM station, but flow gage(s) are present upstream and/or downstream, flows will be estimated for the WQM station from an upstream or downstream gage using a watershed area ratio method derived by delineating subwatersheds, and relying on the National Resources Conservation Service (NRCS) runoff curve numbers and antecedent rainfall condition. Drainage subbasins will first be delineated for all impaired 303(d)-listed WQM stations, along with all USGS flow stations located in the 8-digit HUCs with impaired streams. Parsons will then identify all the USGS gage stations upstream and downstream of the subwatersheds with 303(d) listed WQM stations.

a. Watershed delineations are performed using ESRI Arc Hydro with a 30 m resolution National Elevation Dataset (NED) digital elevation model, and National Hydrography Dataset (NHD) streams. The area of each watershed will be calculated following watershed delineation.

b. The watershed average curve number is calculated from soil properties and land cover as described in the U.S. Department of Agriculture (USDA) Publication

TR-55: Urban Hydrology for Small Watersheds. The soil hydrologic group is extracted from NRCS STATSGO soil data, and land use category from the National Land Cover Dataset (NLCD). Based on land use and the hydrologic soil group, SCS curve numbers are estimated at the 30-meter resolution of the NLCD grid as shown in Table 7. The average curve number is then calculated from all the grid cells within the delineated watershed.

c. The average rainfall is calculated for each watershed from gridded average annual precipitation datasets for the period 1971-2000 (Spatial Climate Analysis Service, Oregon State University, http://www.ocs.oregonstate.edu/prism/, created 20 Feb 2004).

Table C-1 Runoff Curve Numbers for Various Land Use Categories and Hydrologic Soil Groups

NLCD Land Use Category	Curve number for hydrologic soil group			
	A	B	C	D
0 in case of zero	100	100	100	100
11 Open Water	100	100	100	100
12 Perennial Ice/Snow	100	100	100	100
21 Low Intensity Residential	54	70	80	85
22 High Intensity Residential	77	85	90	92
23 Commercial/Industrial/Transportation	89	92	94	95
31 Bare Rock/Sand/Clay	25	25	25	25
32 Quarries/Strip Mines/Gravel Pits	0	0	0	0
33 Transitional	75	80	85	90
41 Deciduous Forest	37	48	57	63
42 Evergreen Forest	45	48	73	80
43 Mixed Forest	43	65	76	82
51 Shrubland	40	51	63	70
61 Orchards/Vineyards/Other	55	69	78	83
71 Grasslands/Herbaceous	40	51	63	70
81 Pasture/Hay	35	56	70	77
82 Row Crops	64	75	82	85
83 Small Grains	64	75	82	85
84 Fallow	40	51	63	70
85 Urban/Recreational Grasses	49	69	79	84
91 Woody Wetlands	100	100	100	100
92 Emergent Herbaceous Wetlands	100	100	100	100

d. Flow at the ungaged site is calculated from the gaged site. The NRCS runoff curve number equation is:

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad (1)$$

where:

Q = runoff (inches)

P = rainfall (inches)

S = potential maximum retention after runoff begins (inches)

I_a = initial abstraction (inches)

If P < 0.2, Q = 0. Initial abstraction has been found to be empirically related to S by the equation

$$I_a = 0.2*S \qquad (2)$$

Thus, the runoff curve number equation can be rewritten:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S} \qquad (3)$$

S is related to the curve number (CN) by:

$$S = \frac{1000}{CN} - 10 \qquad (4)$$

e. First, S is calculated from the average curve number for the gaged watershed. Next, the daily historic flows at the gage are converted to depth basis (as used in equations 1 and 3) by dividing by its drainage area, then converted to inches. Equation 3 is then solved for daily precipitation depth of the gaged site, P_{gaged}. The daily precipitation depth for the ungaged site is then calculated as the precipitation depth of the gaged site multiplied by the ratio of the long-term average precipitation in the watersheds of the ungaged and gaged sites:

$$P_{ungaged} = P_{gaged}\left(\frac{M_{ungaged}}{M_{gaged}}\right) \qquad (5)$$

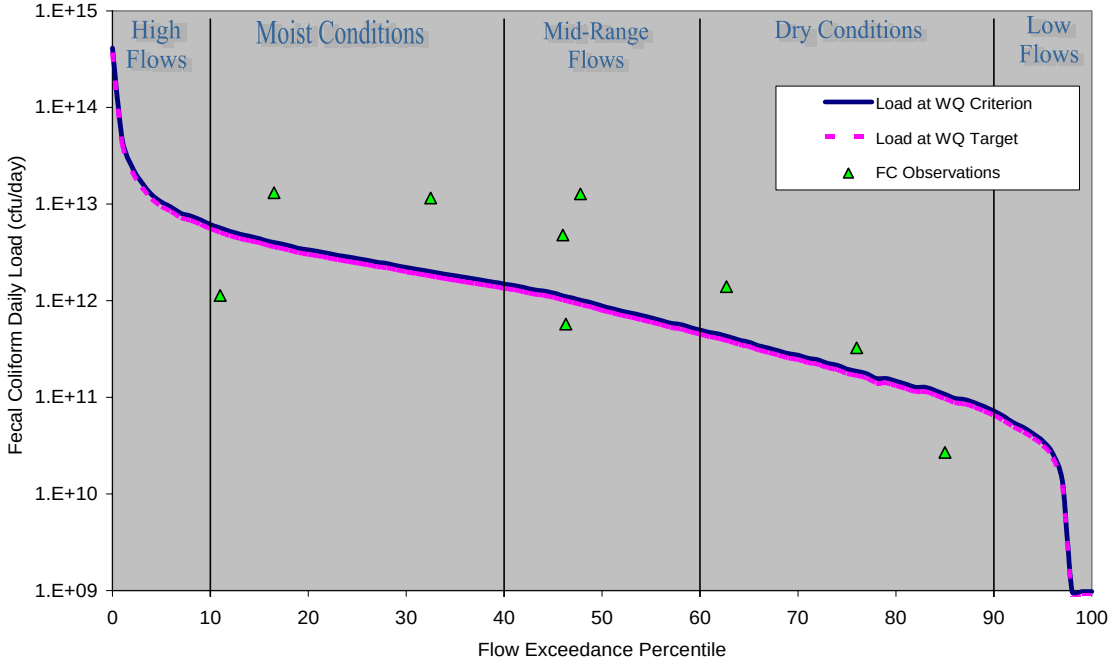
where M is the mean annual precipitation of the watershed in inches. The daily precipitation depth for the ungaged watershed, along with the average curve number of the ungaged watershed, are then used to calculate the depth equivalent daily flow Q of the ungaged site. Finally, the volumetric flow rate at

the ungaged site is calculated by multiplying by the area of the watershed of the ungaged site and converted to cubic feet.

vii) In the rare case where no coincident flow data are available for a WQM station and no gages are present upstream or downstream, flows will be estimated for the WQM station from a gage on an adjacent watershed of similar size and properties, via the same procedure described above for upstream or downstream gages.

APPENDIX D
LDCS FOR ADDITIONAL SITES AND INDICATOR BACTERIA

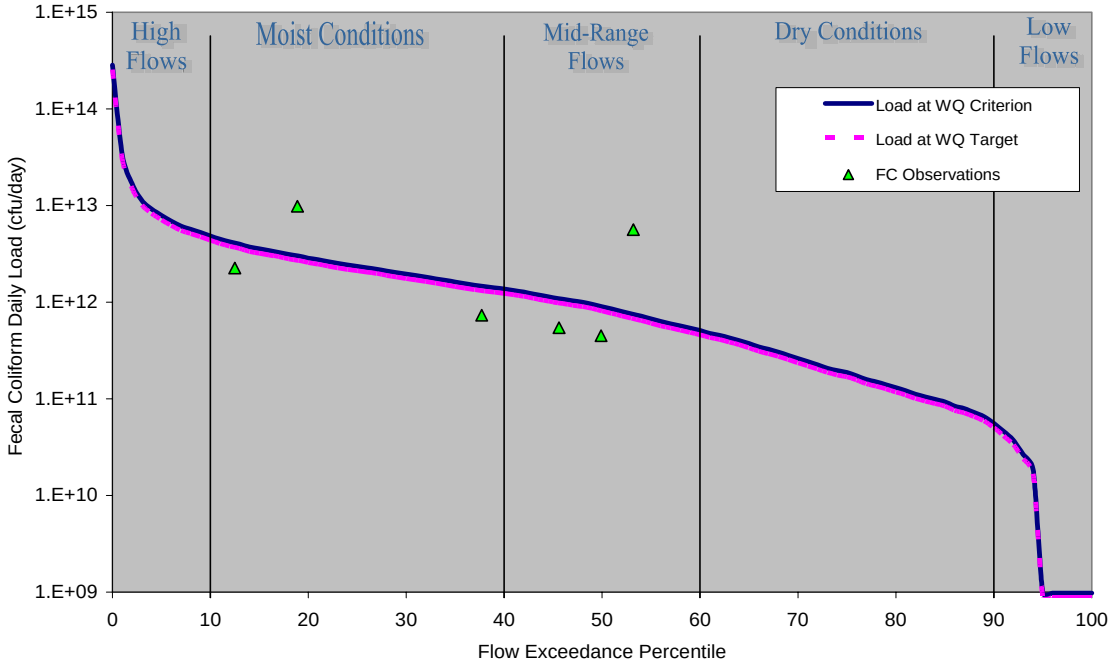
Load Duration Curve for Fecal Coliform in the Canadian River at Station OK520620010010G



Load Duration Curve Data for Fecal Coliform in the Canadian River at Station OK520620010010G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010010G	9/8/1997	5.73E+11	46.30	200	117
OK520620010010G	9/22/1997	4.78E+12	46.00	1700	115
OK520620010010G	5/4/1998	1.14E+12	11.00	80	580
OK520620010010G	5/18/1998	1.31E+13	16.50	1300	412
OK520620010010G	6/1/1998	1.15E+13	32.50	2300	205
OK520620010010G	6/15/1998	1.27E+13	47.80	5000	104
OK520620010010G	6/29/1998	1.40E+12	62.70	1300	44
OK520620010010G	7/27/1998	3.25E+11	76.00	700	19
OK520620010010G	8/10/1998	2.69E+10	85.00	100	11

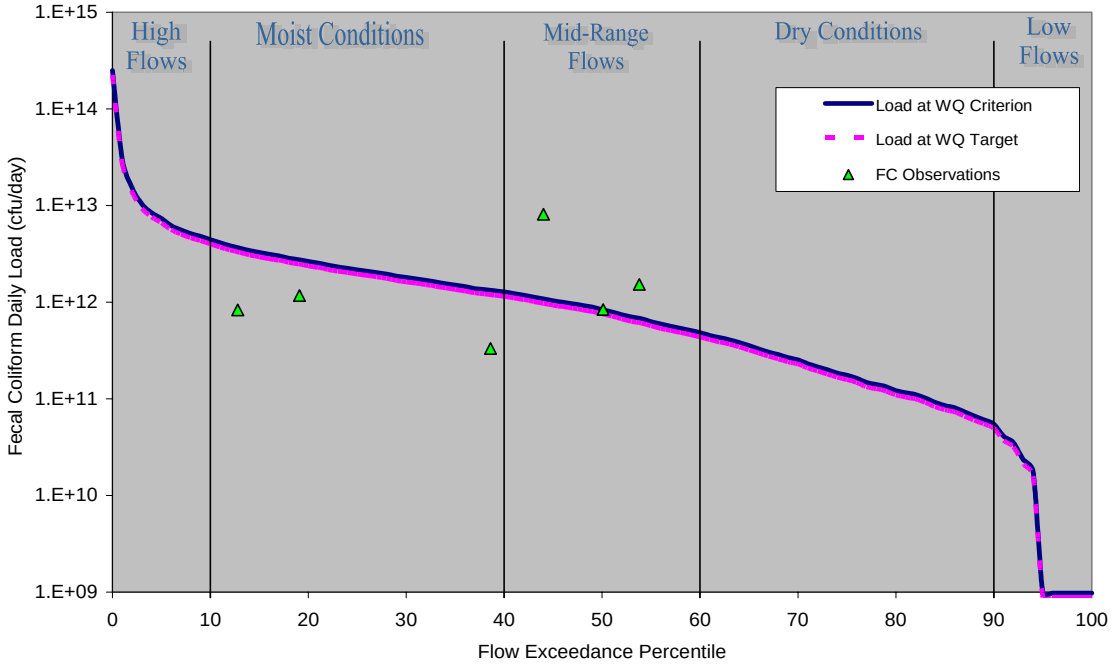
Load Duration Curve for Fecal Coliform in the Canadian River at Station OK520620010010K



Load Duration Curve Data for Fecal Coliform in the Canadian River at Station OK520620010010K

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010010K	9/8/1997	4.51E+11	49.9	200	92
OK520620010010K	9/22/1997	5.46E+11	45.6	200	112
OK520620010010K	5/4/1998	2.25E+12	12.5	220	418
OK520620010010K	5/18/1998	9.80E+12	18.9	1,300	308
OK520620010010K	6/1/1998	7.34E+11	37.7	200	150
OK520620010010K	6/15/1998	5.62E+12	53.2	3,000	77

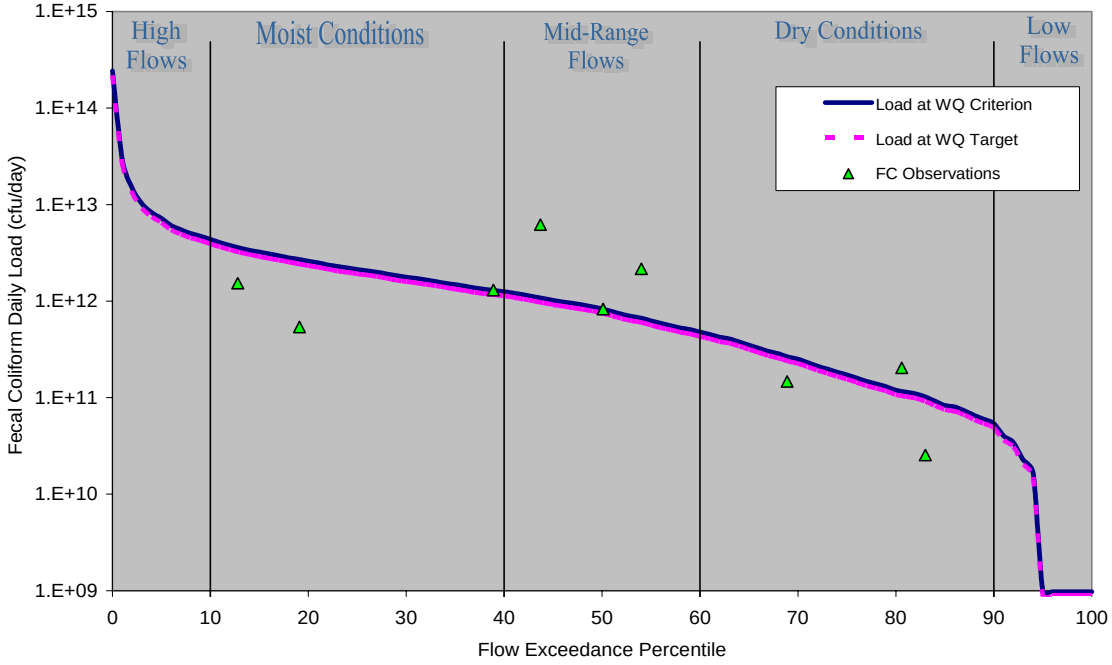
Load Duration Curve for Fecal Coliform in the Canadian River at Station OK520620010010P



Load Duration Curve Data for Fecal Coliform in the Canadian River at Station OK520620010010P

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010010P	9/8/1997	8.37E+11	5.01E+01	400	85.5
OK520620010010P	9/22/1997	8.12E+12	4.40E+01	3000	110.6
OK520620010010P	5/4/1998	8.29E+11	1.28E+01	90	376.7
OK520620010010P	5/18/1998	1.17E+12	1.91E+01	170	281.3
OK520620010010P	6/1/1998	3.32E+11	3.86E+01	100	135.5
OK520620010010P	6/15/1998	1.53E+12	5.38E+01	900	69.4

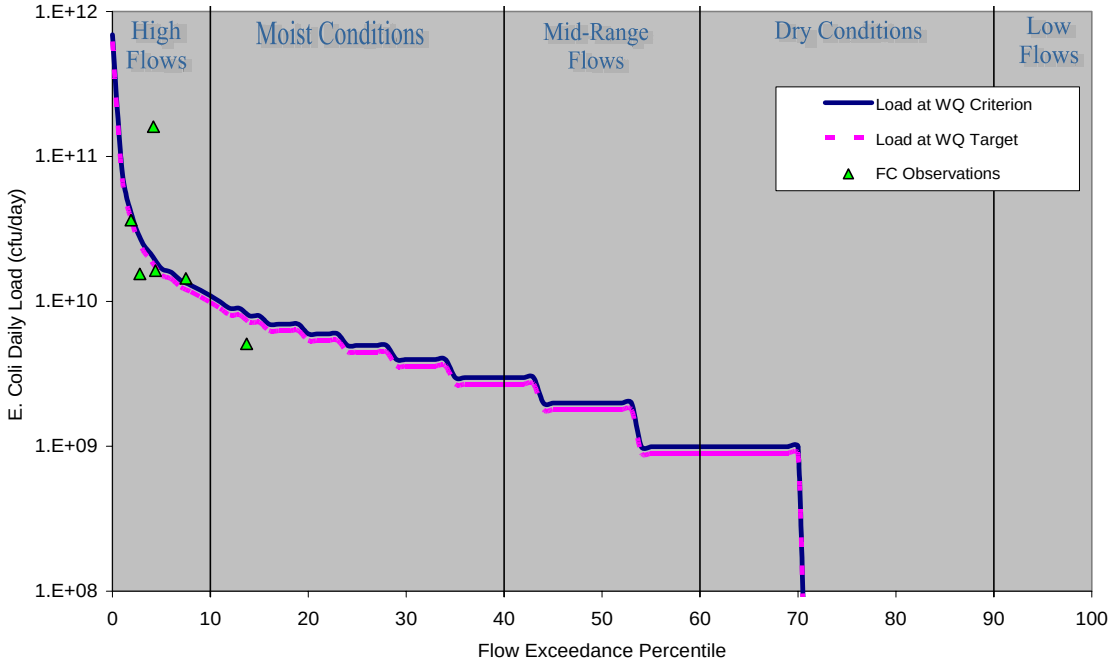
Load Duration Curve for Fecal Coliform in the Canadian River at Station OK520620010010S



Load Duration Curve Data for Fecal Coliform in the Canadian River at Station OK520620010010S

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010010S	9/8/1997	8.25E+11	5.01E+01	400	84.3
OK520620010010S	9/22/1997	6.21E+12	4.37E+01	2300	110.4
OK520620010010S	5/4/1998	1.53E+12	1.28E+01	170	369
OK520620010010S	5/18/1998	5.40E+11	1.91E+01	80	276
OK520620010010S	6/1/1998	1.30E+12	3.89E+01	400	133
OK520620010010S	6/15/1998	2.17E+12	5.40E+01	1300	68.1
OK520620010010S	6/29/1998	1.47E+11	6.89E+01	220	27.3
OK520620010010S	7/27/1998	2.04E+11	8.06E+01	700	11.9
OK520620010010S	8/10/1998	2.54E+10	8.30E+01	100	10.4

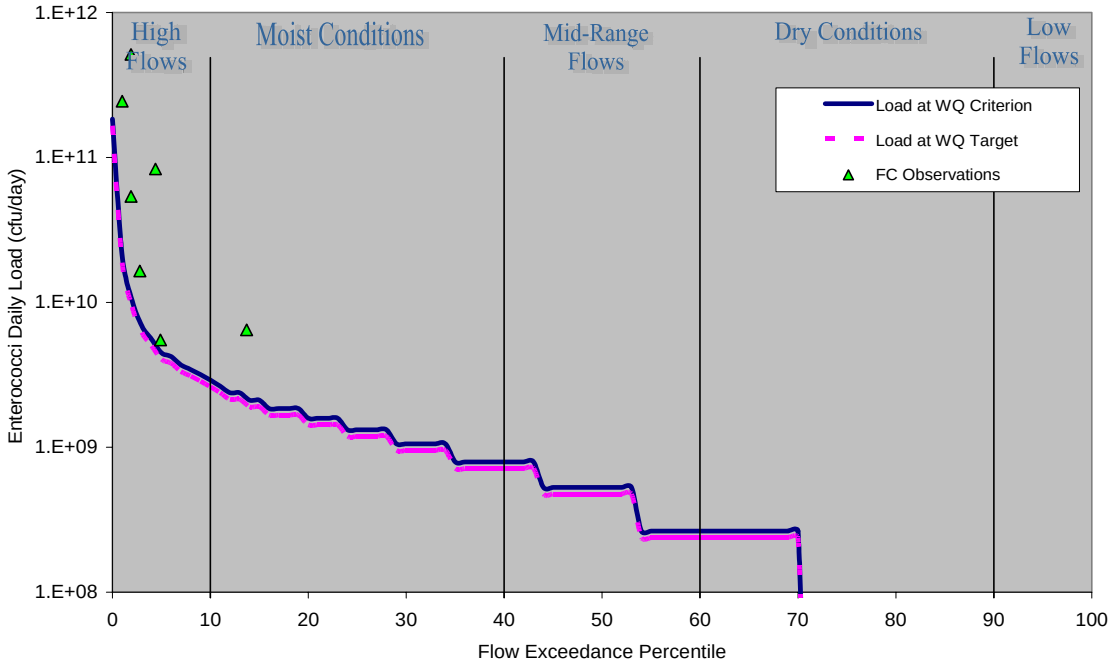
Load Duration Curve for *E. coli* in Bear Creek at Station OK520620010120G



Load Duration Curve Data for *E. coli* in Bear Creek at Station OK520620010120G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010120G	7/31/2000	1.55E+10	2.80E+00	226	3
OK520620010120G	9/5/2000	1.61E+11	4.20E+00	3,282	2
OK520620010120G	5/15/2001	3.64E+10	1.90E+00	354	4
OK520620010120G	6/19/2001	1.63E+10	4.40E+00	333	2
OK520620010120G	7/24/2001	1.44E+10	7.50E+00	420	1
OK520620010120G	8/28/2001	5.09E+09	1.37E+01	260	1

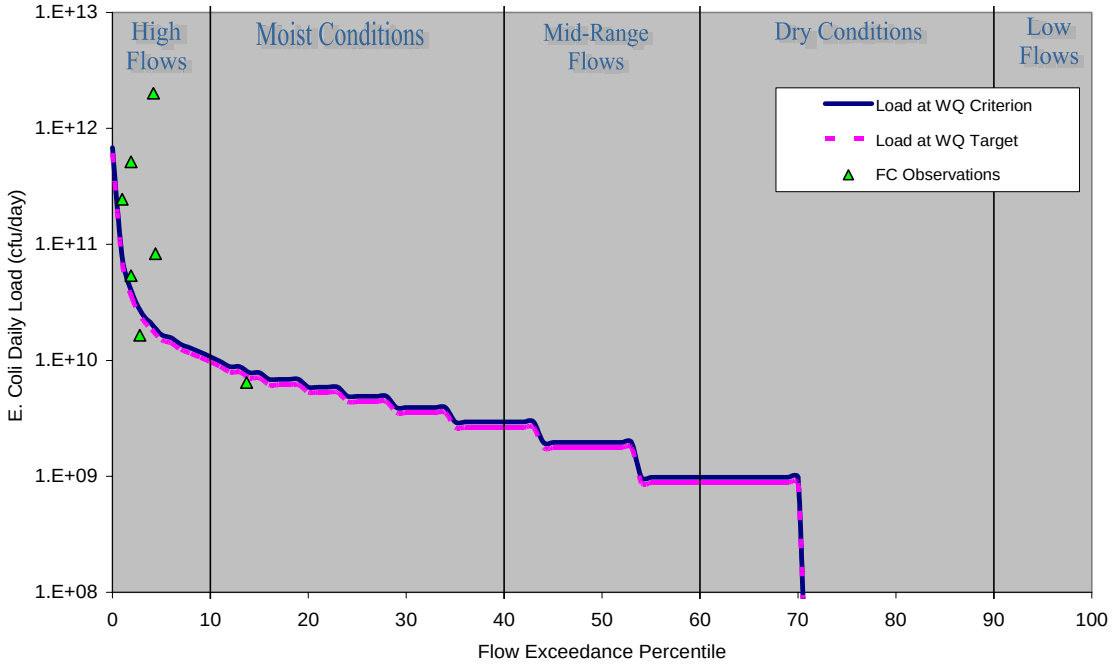
Load Duration Curve for *Enterococci* in Bear Creek at Station OK520620010120G



Load Duration Curve Data for *Enterococci* in Bear Creek at Station OK520620010120G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010120G	5/22/2000	5.38E+10	1.90E+00	500	4
OK520620010120G	6/26/2000	2.45E+11	1.00E+00	1,000	10
OK520620010120G	7/31/2000	1.64E+10	2.80E+00	240	3
OK520620010120G	9/5/2000	2.01E+12	4.20E+00	41,000	2
OK520620010120G	5/15/2001	5.14E+11	1.90E+00	5,000	4
OK520620010120G	6/19/2001	8.32E+10	4.40E+00	1,700	2
OK520620010120G	8/28/2001	6.46E+09	1.37E+01	330	1
OK520620010120G	11/6/2001	5.50E+09	4.90E+00	150	2

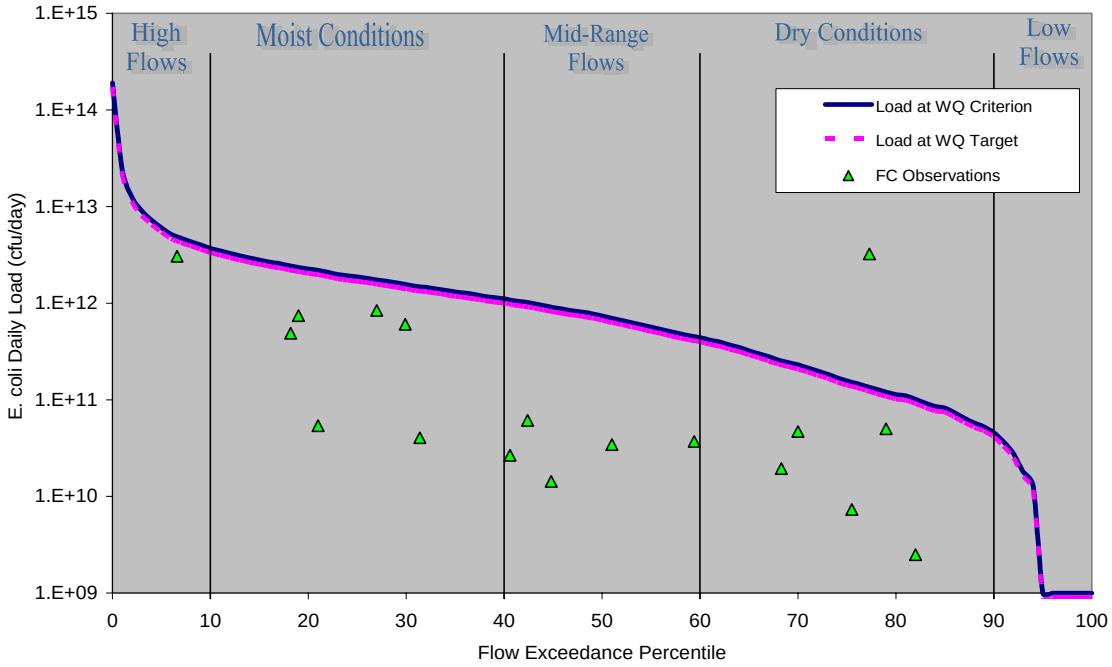
Load Duration Curve for Fecal Coliform in Bear Creek at Station OK520620010120G



Load Duration Curve Data for Fecal Coliform in Bear Creek at Station OK520620010120G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620010120G	5/22/2000	5.38E+10	1.90	500	4
OK520620010120G	6/26/2000	2.45E+11	1.00	1,000	10
OK520620010120G	7/31/2000	1.64E+10	2.80	240	3
OK520620010120G	9/5/2000	2.01E+12	4.20	41,000	2
OK520620010120G	5/15/2001	5.14E+11	1.90	5,000	4
OK520620010120G	6/19/2001	8.32E+10	4.40	1,700	2
OK520620010120G	8/28/2001	6.46E+09	13.70	330	1

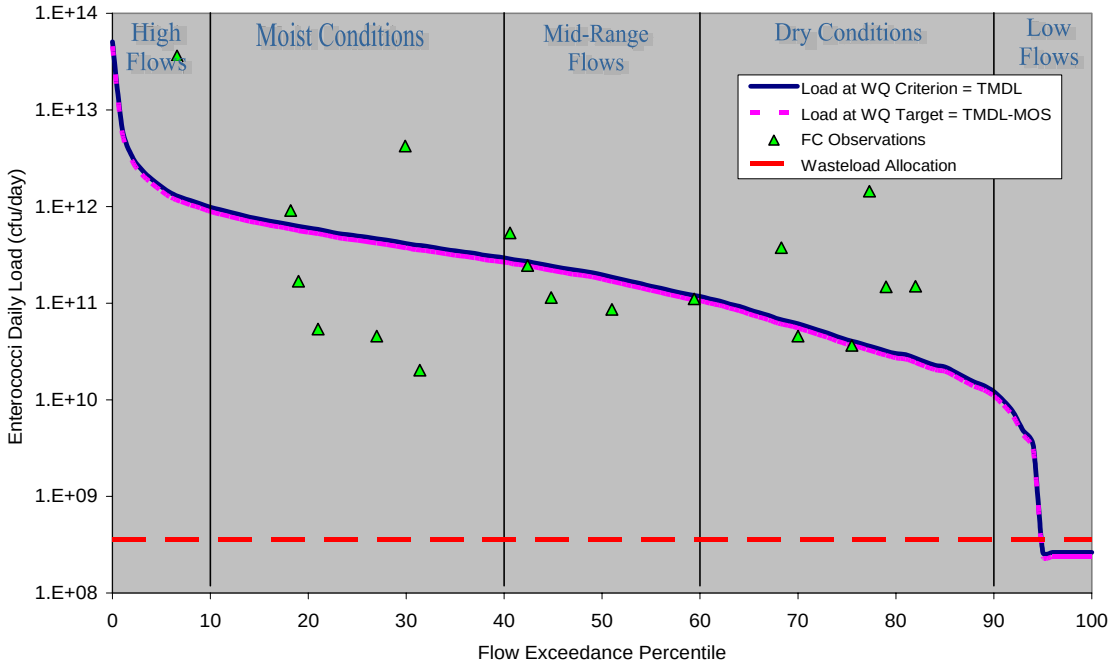
Load Duration Curve for *E. coli* in the Canadian River at Station OK520620020010_001AT



Load Duration Curve Data for *E. coli* in the Canadian River at Station OK520620020010_001AT

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020010_001AT	6/15/1999	8.43E+11	2.70E+01	185	186
OK520620020010_001AT	7/13/1999	4.05E+10	3.14E+01	10	166
OK520620020010_001AT	9/15/1999	3.24E+12	7.73E+01	5,172	26
OK520620020010_001AT	5/9/2000	7.43E+11	1.90E+01	132	230
OK520620020010_001AT	6/13/2000	4.90E+11	1.82E+01	86	233
OK520620020010_001AT	7/19/2000	4.68E+10	7.00E+01	41	47
OK520620020010_001AT	5/2/2001	6.05E+11	2.99E+01	143	173
OK520620020010_001AT	6/19/2001	1.43E+10	4.48E+01	5	117
OK520620020010_001AT	5/14/2002	3.70E+10	5.94E+01	20	76
OK520620020010_001AT	6/12/2002	6.12E+10	4.24E+01	20	125
OK520620020010_001AT	7/17/2002	7.32E+09	7.55E+01	10	30
OK520620020010_001AT	8/14/2002	5.00E+10	7.90E+01	169	12
OK520620020010_001AT	5/12/2003	3.44E+10	5.10E+01	20	70
OK520620020010_001AT	5/27/2003	2.67E+10	4.06E+01	10	109
OK520620020010_001AT	6/16/2003	3.06E+12	6.60E+00	253	495
OK520620020010_001AT	6/30/2003	5.38E+10	2.10E+01	10	220
OK520620020010_001AT	7/21/2003	1.94E+10	6.83E+01	31	26
OK520620020010_001AT	9/8/2003	2.50E+09	8.20E+01	10	10

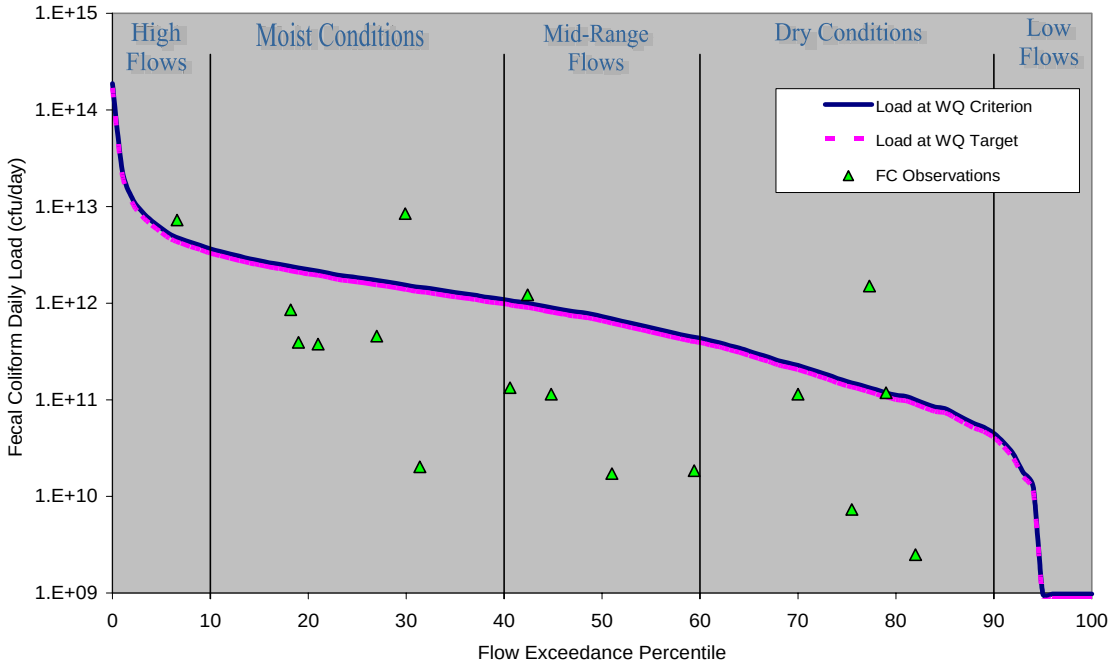
Load Duration Curve for *Enterococci* in the Canadian River at Station OK520620020010_001AT



Load Duration Curve Data for *Enterococci* in the Canadian River at Station OK520620020010_001AT

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020010_001AT	6/15/1999	4.56E+10	2.70E+01	10	186
OK520620020010_001AT	7/13/1999	2.02E+10	3.14E+01	5	166
OK520620020010_001AT	9/15/1999	1.44E+12	7.73E+01	2,300	26
OK520620020010_001AT	5/9/2000	1.69E+11	1.90E+01	30	230
OK520620020010_001AT	6/13/2000	9.12E+11	1.82E+01	160	233
OK520620020010_001AT	7/19/2000	4.57E+10	7.00E+01	40	47
OK520620020010_001AT	5/2/2001	4.23E+12	2.99E+01	1,000	173
OK520620020010_001AT	6/19/2001	1.15E+11	4.48E+01	40	117
OK520620020010_001AT	5/14/2002	1.11E+11	5.94E+01	60	76
OK520620020010_001AT	6/12/2002	2.45E+11	4.24E+01	80	125
OK520620020010_001AT	7/17/2002	3.66E+10	7.55E+01	50	30
OK520620020010_001AT	8/14/2002	1.48E+11	7.90E+01	500	12
OK520620020010_001AT	5/12/2003	8.61E+10	5.10E+01	50	70
OK520620020010_001AT	5/27/2003	5.33E+11	4.06E+01	200	109
OK520620020010_001AT	6/16/2003	3.63E+13	6.60E+00	3,000	495
OK520620020010_001AT	6/30/2003	5.38E+10	2.10E+01	10	220
OK520620020010_001AT	7/21/2003	3.76E+11	6.83E+01	600	26
OK520620020010_001AT	9/8/2003	1.50E+11	8.20E+01	600	10

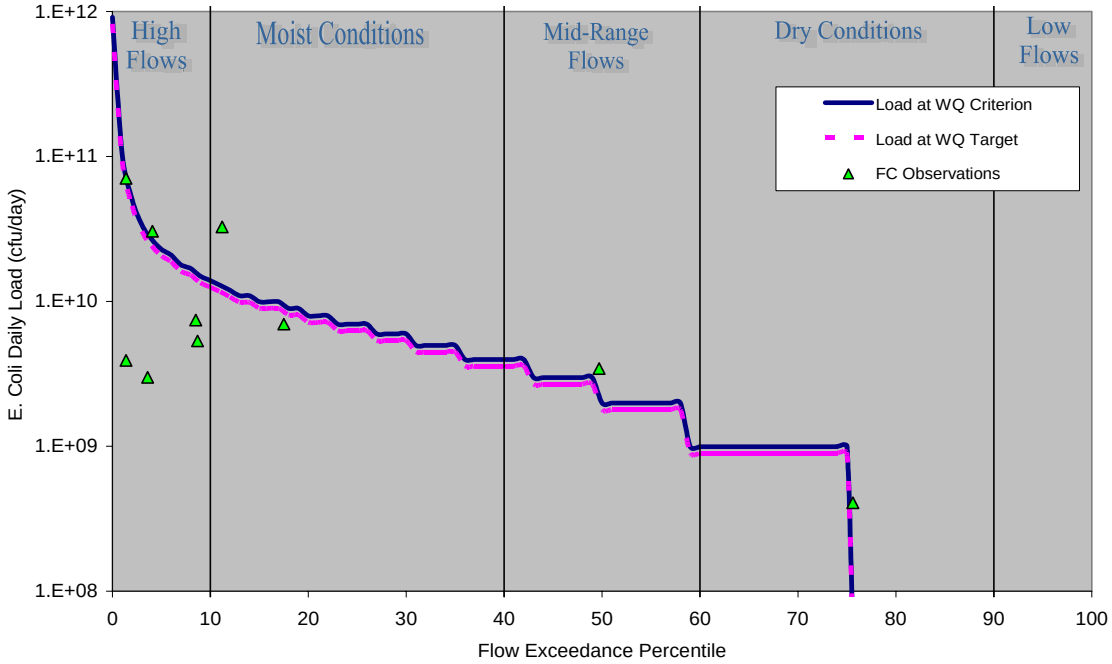
Load Duration Curve for Fecal Coliform in the Canadian River at Station OK520620020010_001AT



Load Duration Curve Data for Fecal Coliform in the Canadian River at Station OK520620020010_001AT

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020010_001AT	6/15/1999	4.56E+11	2.70E+01	100	186
OK520620020010_001AT	7/13/1999	2.02E+10	3.14E+01	5	166
OK520620020010_001AT	9/15/1999	1.50E+12	7.73E+01	2,400	26
OK520620020010_001AT	5/9/2000	3.94E+11	1.90E+01	70	230
OK520620020010_001AT	6/13/2000	8.55E+11	1.82E+01	150	233
OK520620020010_001AT	7/19/2000	1.14E+11	7.00E+01	100	47
OK520620020010_001AT	5/2/2001	8.47E+12	2.99E+01	2,000	173
OK520620020010_001AT	6/19/2001	1.15E+11	4.48E+01	40	117
OK520620020010_001AT	5/14/2002	1.85E+10	5.94E+01	10	76
OK520620020010_001AT	6/12/2002	1.22E+12	4.24E+01	400	125
OK520620020010_001AT	7/17/2002	7.32E+09	7.55E+01	10	30
OK520620020010_001AT	8/14/2002	1.18E+11	7.90E+01	400	12
OK520620020010_001AT	5/12/2003	1.72E+10	5.10E+01	10	70
OK520620020010_001AT	5/27/2003	1.33E+11	4.06E+01	50	109
OK520620020010_001AT	6/16/2003	7.27E+12	6.60E+00	600	495
OK520620020010_001AT	6/30/2003	3.77E+11	2.10E+01	70	220
OK520620020010_001AT	9/8/2003	2.50E+09	8.20E+01	10	10

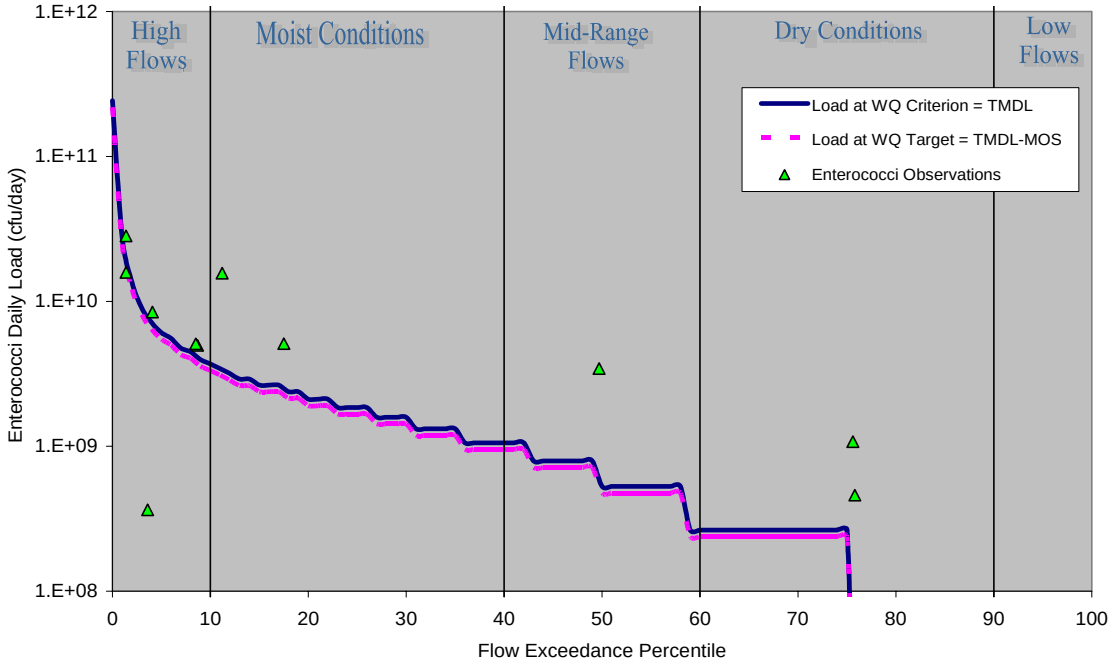
Load Duration Curve for *E. coli* in Trail Creek at Station OK520620020090G



Load Duration Curve Data for *E. coli* in Trail Creek at Station OK520620020090G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020090G	7/31/2000	2.99E+09	3.60E+00	41	3
OK520620020090G	9/5/2000	4.07E+08	7.56E+01	416	0
OK520620020090G	6/19/2001	3.91E+09	1.40E+00	74	2
OK520620020090G	7/24/2001	9.54E+07	7.58E+01	195	0
OK520620020090G	8/27/2001	3.26E+10	1.12E+01	1,040	1
OK520620020090G	5/29/2002	7.07E+10	1.40E+00	350	8
OK520620020090G	7/9/2002	5.34E+09	8.70E+00	140	2
OK520620020090G	8/6/2002	3.43E+09	4.97E+01	610	0
OK520620020090G	9/10/2002	6.97E+09	1.75E+01	300	1
OK520620020090G	5/13/2003	3.05E+10	4.10E+00	470	3
OK520620020090G	6/17/2003	7.44E+09	8.50E+00	190	2

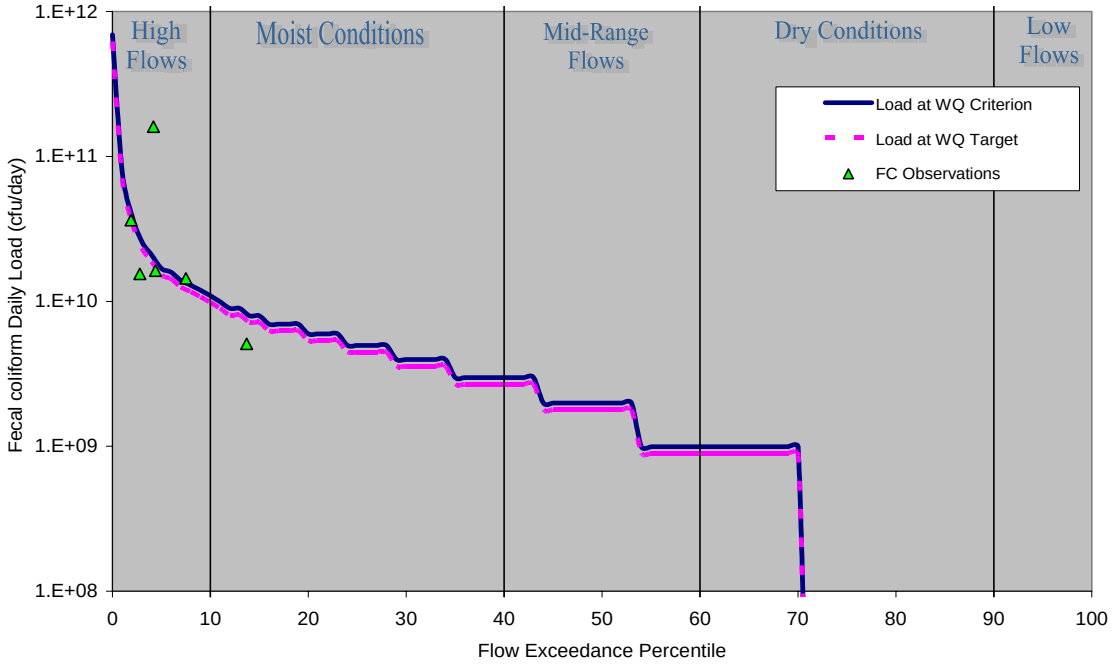
Load Duration Curve for *Enterococci* in Trail Creek at Station OK520620020090G



Load Duration Curve Data for *Enterococci* in Trail Creek at Station OK520620020090G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020090G	7/31/2000	3.65E+08	3.60E+00	5	3
OK520620020090G	9/5/2000	1.08E+09	7.56E+01	1,100	0
OK520620020090G	6/19/2001	1.59E+10	1.40E+00	300	2
OK520620020090G	7/24/2001	4.60E+08	7.58E+01	940	0
OK520620020090G	8/27/2001	1.57E+10	1.12E+01	500	1
OK520620020090G	5/29/2002	2.83E+10	1.40E+00	140	8
OK520620020090G	7/9/2002	4.96E+09	8.70E+00	130	2
OK520620020090G	8/6/2002	3.43E+09	4.97E+01	610	0
OK520620020090G	9/10/2002	5.11E+09	1.75E+01	220	1
OK520620020090G	5/13/2003	8.43E+09	4.10E+00	130	3
OK520620020090G	6/17/2003	5.09E+09	8.50E+00	130	2

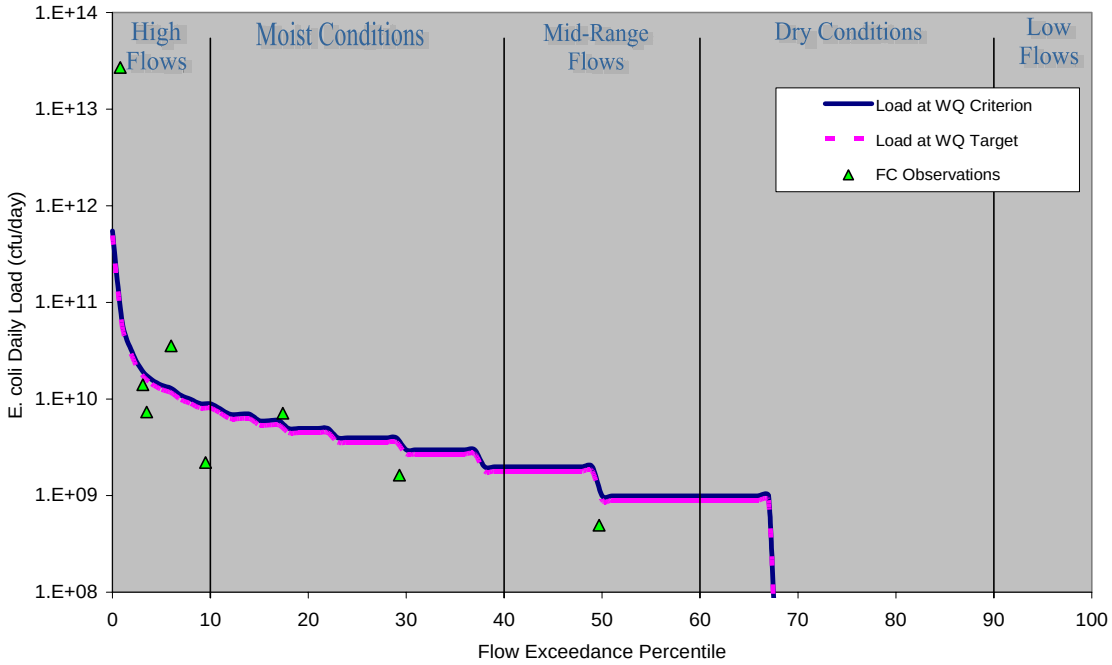
Load Duration Curve for Fecal Coliform in Trail Creek at Station OK520620020090G



Load Duration Curve Data for Fecal Coliform in Trail Creek at Station OK520620020090G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620020090G	7/31/2000	1.55E+10	2.80E+00	226	3
OK520620020090G	9/5/2000	1.61E+11	4.20E+00	3,282	2
OK520620020090G	5/15/2001	3.64E+10	1.90E+00	354	4
OK520620020090G	6/19/2001	1.63E+10	4.40E+00	333	2
OK520620020090G	7/24/2001	1.44E+10	7.50E+00	420	1
OK520620020090G	8/28/2001	5.09E+09	1.37E+01	260	1

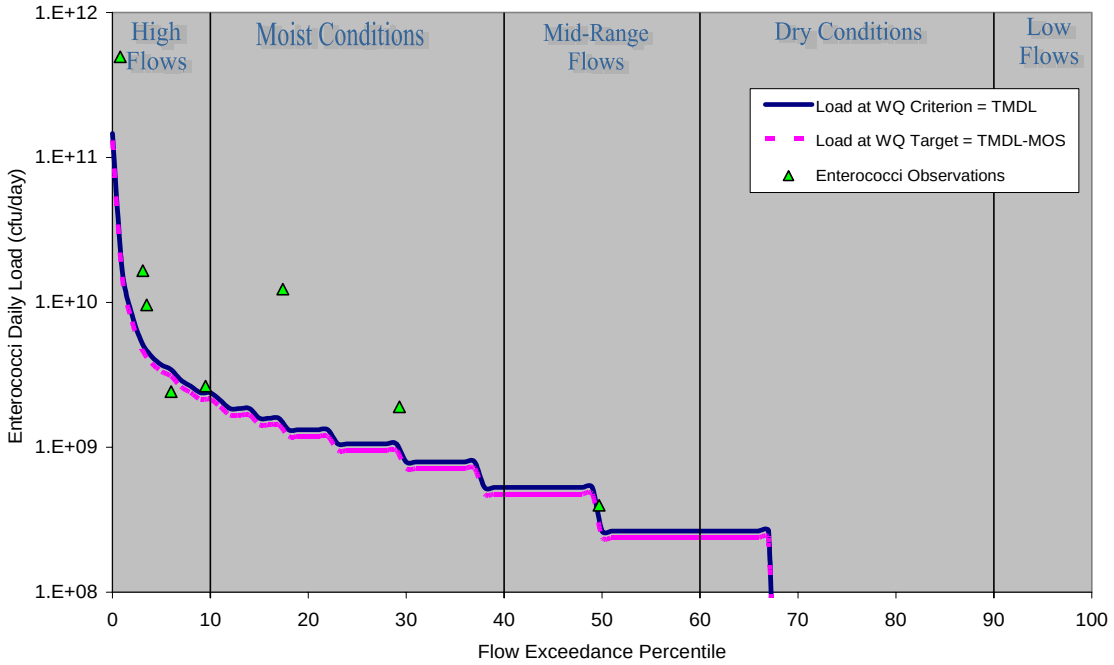
Load Duration Curve for *E. coli* in Lone Creek at Station OK520620030020C



Load Duration Curve Data for *E. coli* in Lone Creek at Station OK520620030020C

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030020C	8/14/2001	4.93E+08	4.97E+01	155	0
OK520620030020C	9/18/2001	2.71E+13	8.00E-01	71,600	15
OK520620030020C	5/29/2002	7.32E+09	3.50E+00	160	2
OK520620030020C	7/9/2002	1.40E+10	3.10E+00	280	2
OK520620030020C	8/6/2002	7.12E+09	1.74E+01	520	1
OK520620030020C	9/10/2002	1.63E+09	2.93E+01	180	0
OK520620030020C	5/13/2003	3.55E+10	6.00E+00	1,320	1
OK520620030020C	6/17/2003	2.20E+09	9.50E+00	100	1

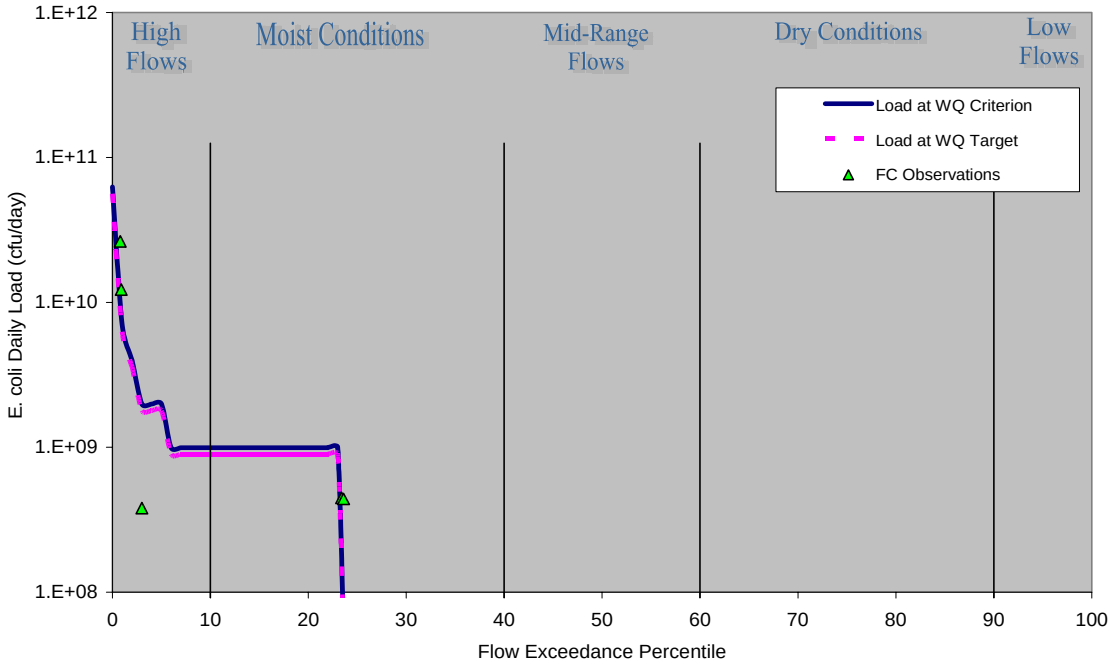
Load Duration Curve for *Enterococci* in Lone Creek at Station OK520620030020C



Load Duration Curve Data for *Enterococci* in Lone Creek at Station OK520620030020C

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030020C	8/14/2001	3.98E+08	4.97E+01	125	0
OK520620030020C	9/18/2001	4.95E+11	8.00E-01	1,310	15
OK520620030020C	5/29/2002	9.61E+09	3.50E+00	210	2
OK520620030020C	7/9/2002	1.66E+10	3.10E+00	330	2
OK520620030020C	8/6/2002	1.23E+10	1.74E+01	900	1
OK520620030020C	9/10/2002	1.90E+09	2.93E+01	210	0
OK520620030020C	5/13/2003	2.42E+09	6.00E+00	90	1.1
OK520620030020C	6/17/2003	2.64E+09	9.50E+00	120	0.9

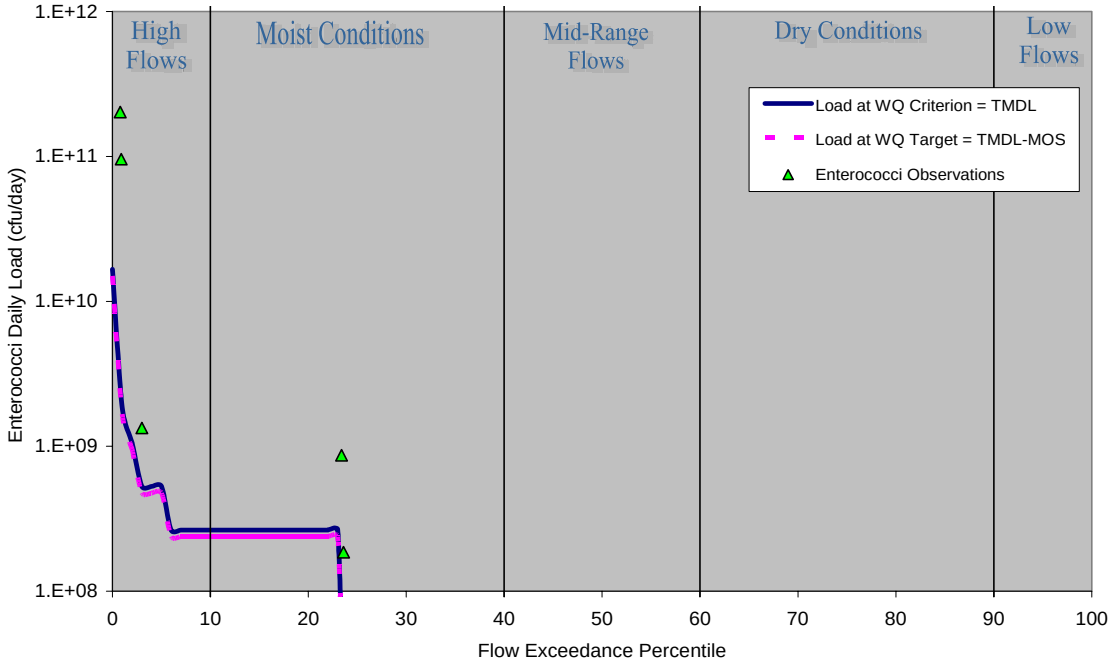
Load Duration Curve for *E. coli* in Red Trail Creek at Station OK520620030050G



Load Duration Curve Data for *E. coli* in Red Trail Creek at Station OK520620030050G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030050G	7/31/2000	3.80E+08	3.00E+00	74	0
OK520620030050G	5/14/2001	2.63E+10	8.00E-01	520	2
OK520620030050G	6/19/2001	1.23E+10	9.00E-01	512	1
OK520620030050G	7/24/2001	4.48E+08	2.34E+01	305	0
OK520620030050G	8/28/2001	4.40E+08	2.36E+01	450	0

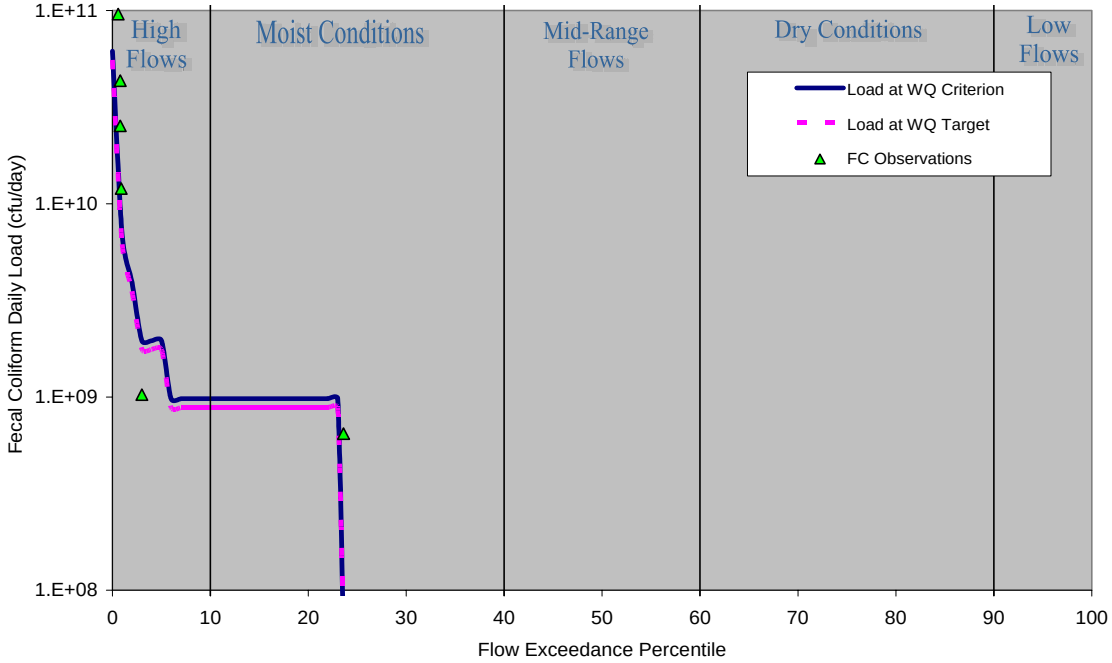
Load Duration Curve for *Enterococci* in Red Trail Creek at Station OK520620030050G



Load Duration Curve Data for *Enterococci* in Red Trail Creek at Station OK520620030050G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030050G	7/31/2000	1.34E+09	3.00E+00	260	0
OK520620030050G	5/14/2001	2.03E+11	8.00E-01	4,000	2
OK520620030050G	6/19/2001	9.59E+10	9.00E-01	4,000	1
OK520620030050G	7/24/2001	8.66E+08	2.34E+01	590	0
OK520620030050G	8/28/2001	1.86E+08	2.36E+01	190	0

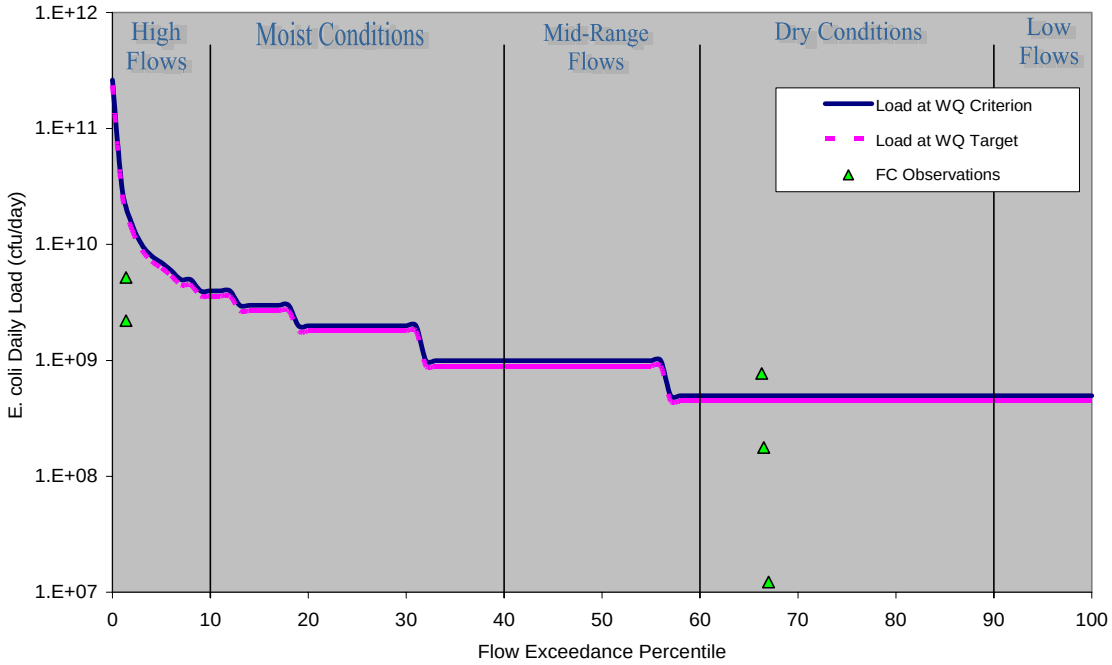
Load Duration Curve for Fecal Coliform in Red Trail Creek at Station OK520620030050G



Load Duration Curve Data for Fecal Coliform in Red Trail Creek at Station OK520620030050G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030050G	5/22/2000	4.33E+10	8.00E-01	1,100	2
OK520620030050G	6/26/2000	9.59E+10	6.00E-01	1,400	3
OK520620030050G	7/31/2000	1.03E+09	3.00E+00	200	0
OK520620030050G	5/14/2001	2.53E+10	8.00E-01	500	2
OK520620030050G	6/19/2001	1.20E+10	9.00E-01	500	1
OK520620030050G	8/28/2001	6.46E+08	2.36E+01	660	0

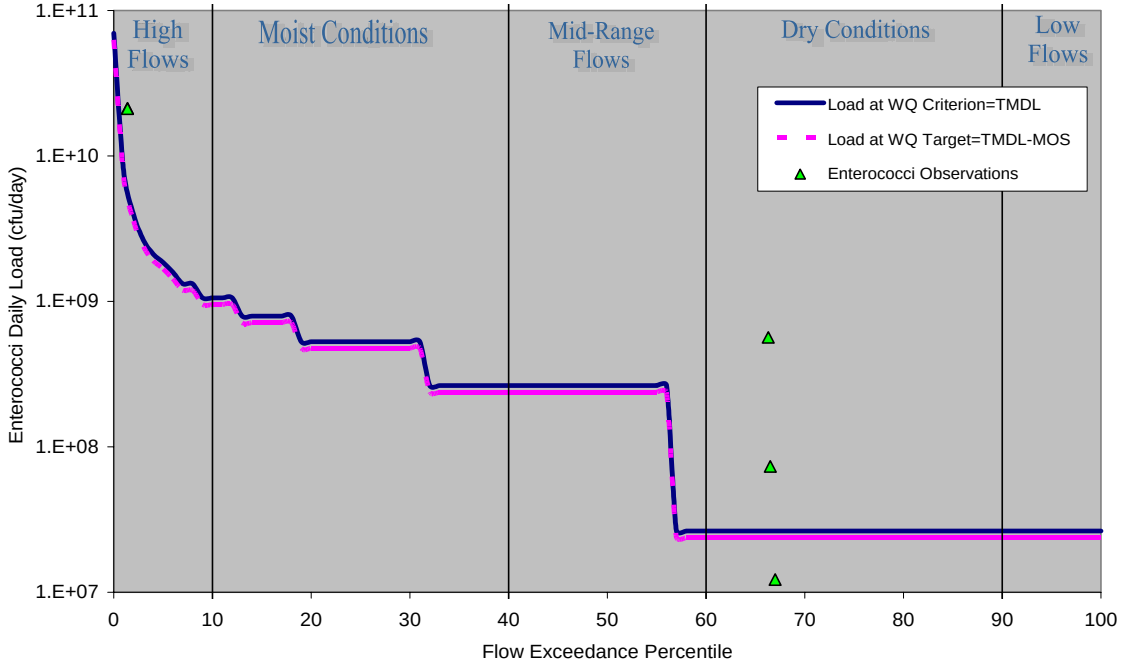
Load Duration Curve for *E. coli* in Red Creek at Station OK520620030110G



Load Duration Curve Data for *E. coli* in Red Creek at Station OK520620030110G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030110G	9/5/2000	1.22E+07	6.70E+01	10	0
OK520620030110G	5/14/2001	5.19E+09	1.40E+00	122	2
OK520620030110G	6/19/2001	2.20E+09	1.40E+00	52	2
OK520620030110G	7/24/2001	1.77E+08	6.65E+01	145	0
OK520620030110G	8/28/2001	7.71E+08	6.63E+01	450	0

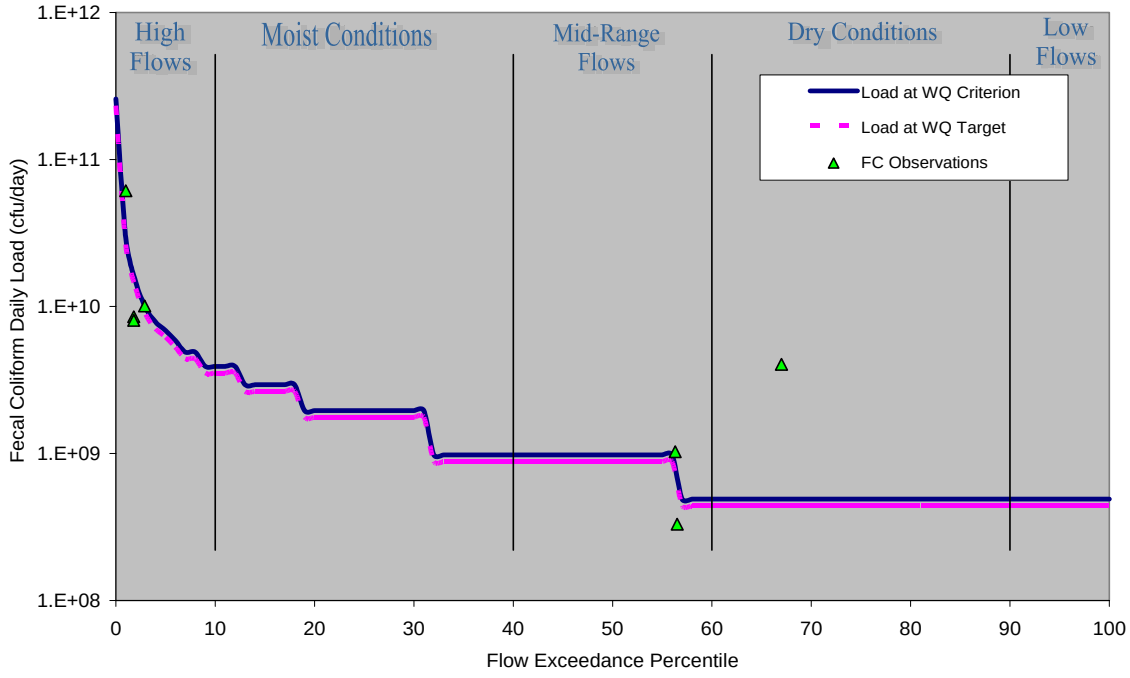
Load Duration Curve for *Enterococci* in Red Creek at Station OK520620030110G



Load Duration Curve Data for *Enterococci* in Red Creek at Station OK520620030110G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030110G	9/5/2000	1.22E+07	6.70E+01	50	0
OK520620030110G	5/14/2001	2.13E+10	1.40E+00	500	2
OK520620030110G	6/19/2001	2.12E+10	1.40E+00	500	2
OK520620030110G	7/24/2001	7.34E+07	6.65E+01	60	0
OK520620030110G	8/28/2001	5.65E+08	6.63E+01	330	0

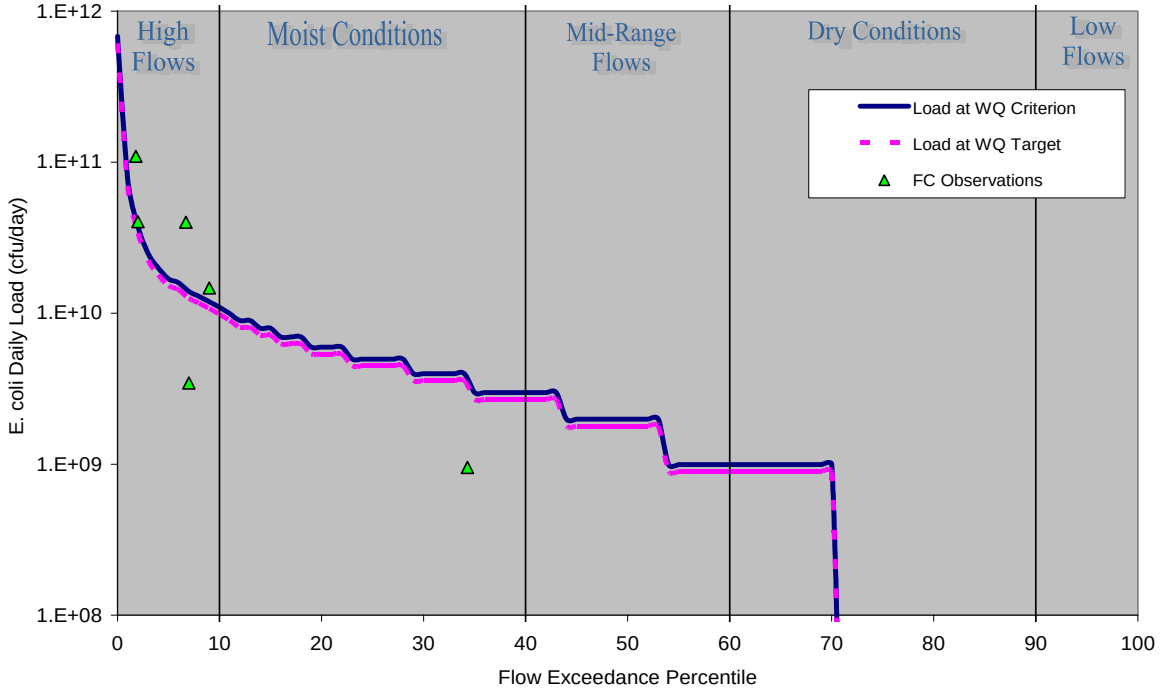
Load Duration Curve for Fecal Coliform in Red Creek at Station OK520620030110G



Load Duration Curve Data for Fecal Coliform in Red Creek at Station OK520620030110G

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620030110G	5/22/2000	1.01E+10	2.90E+00	400	1
OK520620030110G	6/26/2000	6.13E+10	1.00E+00	800	3
OK520620030110G	9/5/2000	4.04E+09	6.70E+01	3300	0
OK520620030110G	5/14/2001	8.51E+09	1.80E+00	200	2
OK520620030110G	6/19/2001	8.04E+09	1.80E+00	190	2
OK520620030110G	7/24/2001	3.30E+08	5.65E+01	270	0
OK520620030110G	8/28/2001	1.03E+09	5.63E+01	600	0

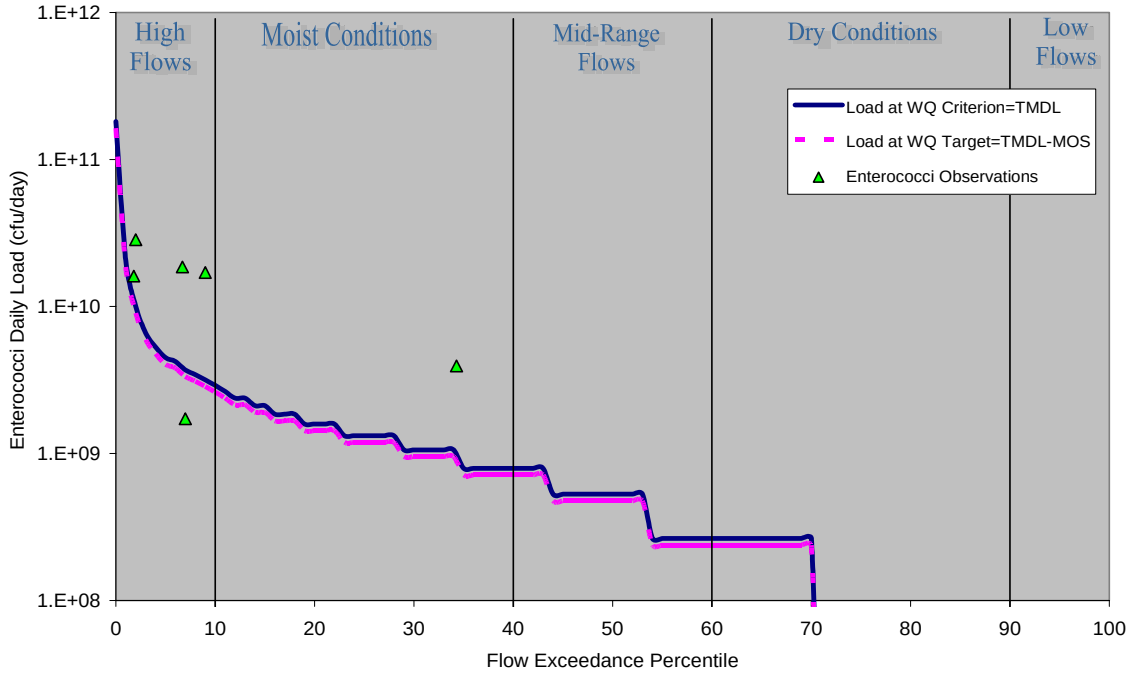
Load Duration Curve for *E. coli* in Hackberry Creek at Station OK520620040050D



Load Duration Curve Data for *E. coli* in Hackberry Creek at Station OK520620040050D

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620040050D	8/14/2001	9.50E+08	3.43E+01	105	0
OK520620040050D	9/18/2001	4.00E+10	6.70E+00	1,120	1
OK520620040050D	5/29/2002	1.09E+11	1.80E+00	950	4.7
OK520620040050D	7/9/2002	4.04E+10	2.00E+00	440	3.75
OK520620040050D	5/13/2003	3.45E+09	7.00E+00	100	1.41
OK520620040050D	6/17/2003	1.47E+10	9.00E+00	500	1.2

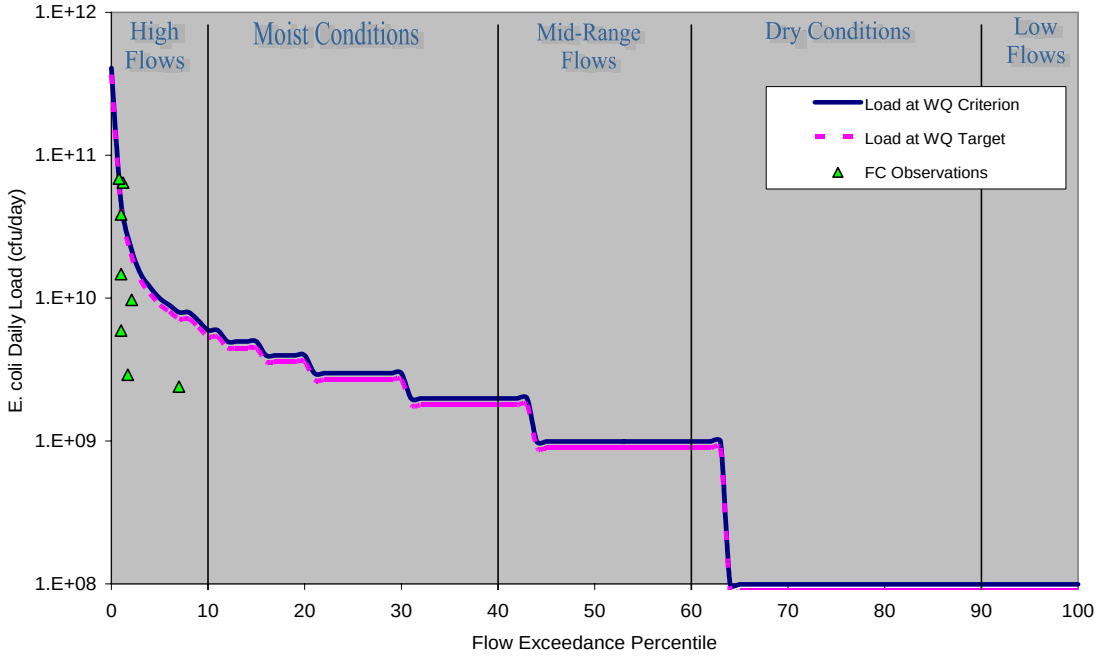
Load Duration Curve for *Enterococci* in Hackberry Creek at Station OK520620040050D



Load Duration Curve Data for *Enterococci* in Hackberry Creek at Station OK520620040050D

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620040050D	8/14/2001	3.94E+09	3.43E+01	435	0
OK520620040050D	9/18/2001	1.86E+10	6.70E+00	520	1
OK520620040050D	5/29/2002	1.61E+10	1.80E+00	140	4.7
OK520620040050D	7/9/2002	2.84E+10	2.00E+00	310	3.75
OK520620040050D	5/13/2003	1.72E+09	7.00E+00	50	1.41
OK520620040050D	6/17/2003	1.70E+10	9.00E+00	580	1.2

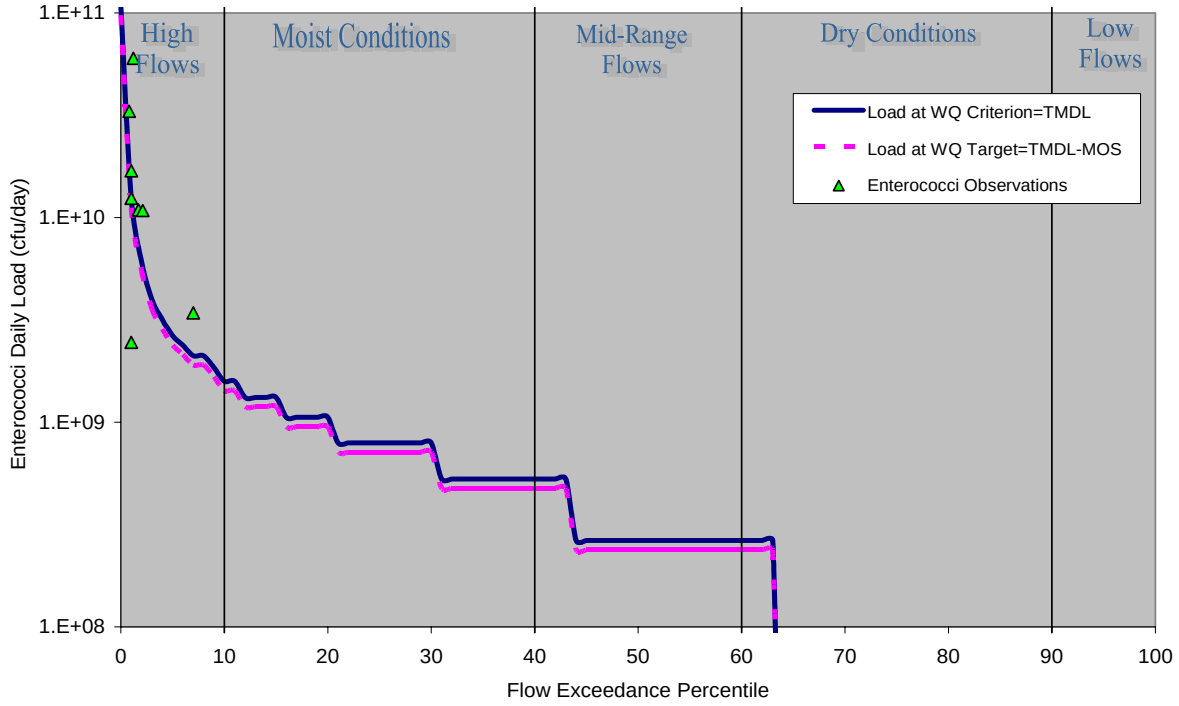
Load Duration Curve for *E. coli* in Commission Creek at Station OK520620050160C



Load Duration Curve Data for *E. coli* in Commission Creek at Station OK520620050160C

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620050160C	8/14/2001	2.91E+09	1.70E+00	40	3
OK520620050160C	9/18/2001	6.42E+10	1.20E+00	620	4
OK520620050160C	5/29/2002	6.86E+10	8.00E-01	270	10.38
OK520620050160C	7/9/2002	3.86E+10	1.00E+00	280	5.63
OK520620050160C	8/6/2002	9.73E+09	2.10E+00	180	2.21
OK520620050160C	9/10/2002	5.93E+09	1.00E+00	70	3.46
OK520620050160C	5/13/2003	1.47E+10	1.00E+00	120	5.02
OK520620050160C	6/17/2003	2.40E+09	7.00E+00	140	0.7

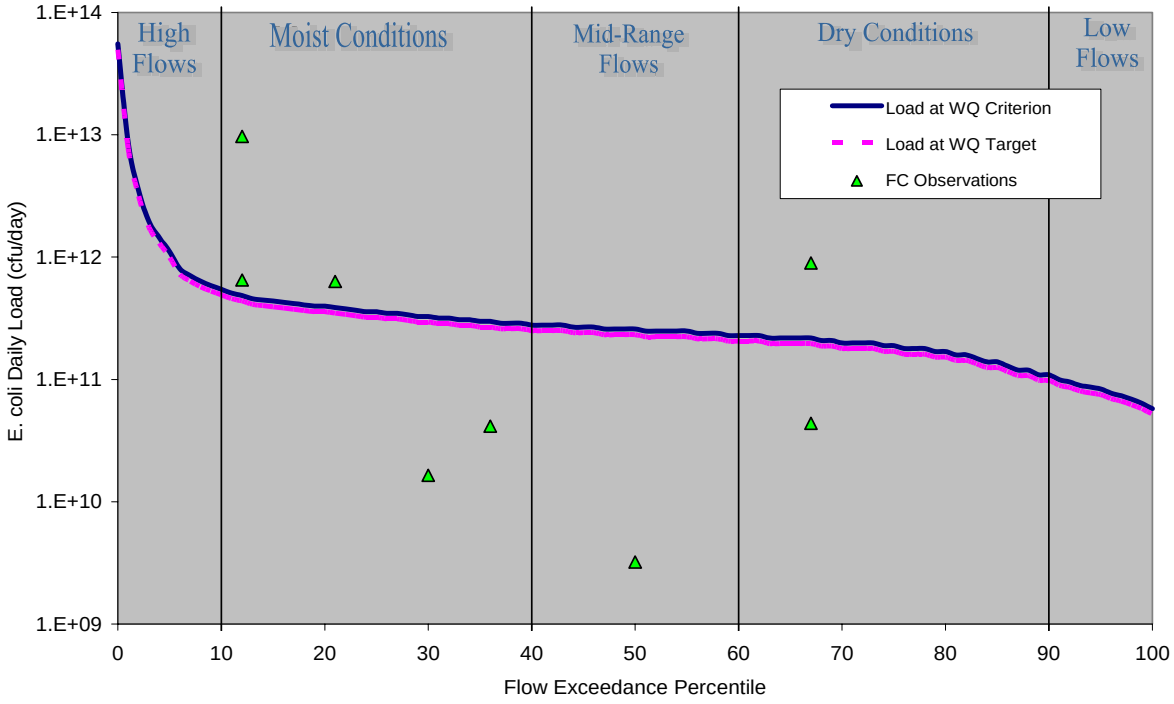
Load Duration Curve for *Enterococci* in Commission Creek at Station OK520620050160C



Load Duration Curve Data for *Enterococci* in Commission Creek at Station OK520620050160C

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620050160C	8/14/2001	1.09E+10	1.70E+00	150	2.97
OK520620050160C	9/18/2001	6.00E+10	1.20E+00	580	4.23
OK520620050160C	5/29/2002	3.30E+10	8.00E-01	130	10.38
OK520620050160C	7/9/2002	1.24E+10	1.00E+00	90	5.63
OK520620050160C	8/6/2002	1.08E+10	2.10E+00	200	2.21
OK520620050160C	9/10/2002	1.69E+10	1.00E+00	200	3.46
OK520620050160C	5/13/2003	2.46E+09	1.00E+00	20	5.02
OK520620050160C	6/17/2003	3.43E+09	7.00E+00	200	0.7

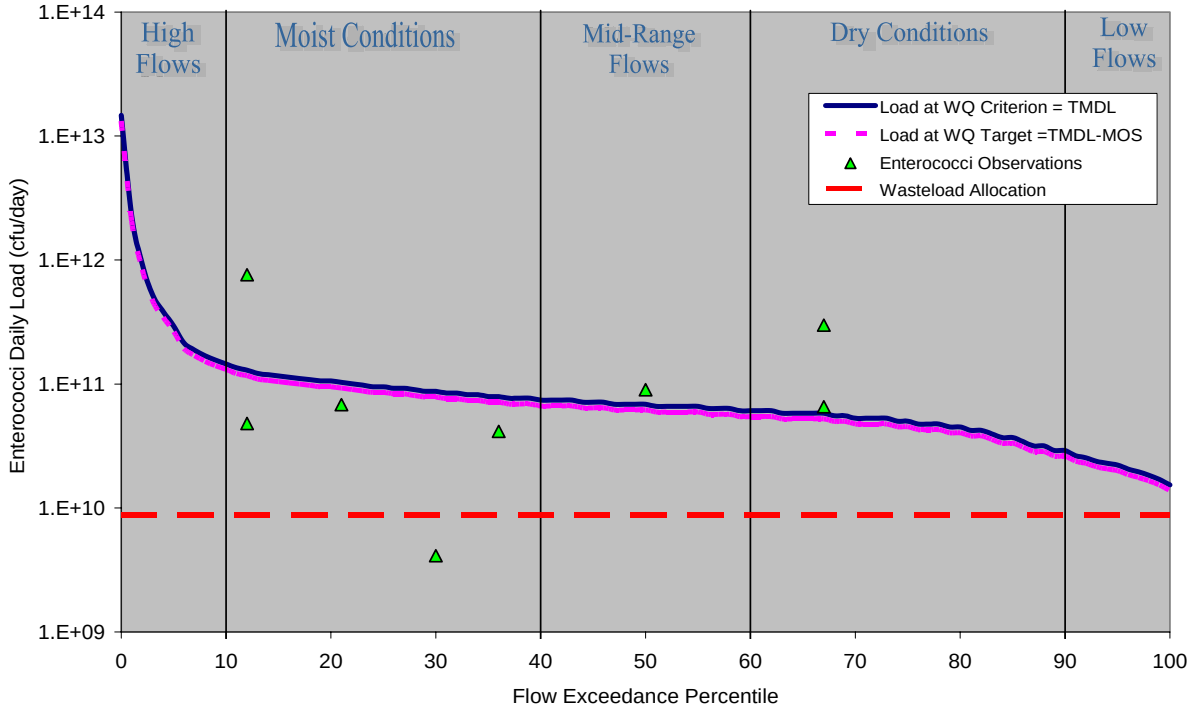
Load Duration Curve for *E. coli* in Deer Creek at Station OK520620060010F



Load Duration Curve Data for *E. coli* in Deer Creek at Station OK520620060010F

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620060010F	8/14/2001	4.15E+10	36.00	55	30.86
OK520620060010F	9/18/2001	9.72E+12	12.00	7800	50.93
OK520620060010F	5/28/2002	6.49E+11	12.00	540	49.15
OK520620060010F	7/9/2002	6.32E+11	21.00	650	39.71
OK520620060010F	8/6/2002	4.37E+10	67.00	80	22.35
OK520620060010F	9/9/2002	3.21E+09	50.00	10	26.25
OK520620060010F	5/12/2003	1.65E+10	30.00	20	33.65
OK520620060010F	6/16/2003	8.96E+11	67.00	1620	22.6

Load Duration Curve for *Enterococci* in Deer Creek at Station OK520620060010F



Load Duration Curve Data for *Enterococci* in Deer Creek at Station OK520620060010F

Station ID	Start Date	Load	Qfrequency	Result Value	Flow
OK520620060010F	8/14/2001	4.15E+10	36.00	55	30.86
OK520620060010F	9/18/2001	7.60E+11	12.00	610	50.93
OK520620060010F	5/28/2002	4.81E+10	12.00	40	49.15
OK520620060010F	7/9/2002	6.80E+10	21.00	70	39.71
OK520620060010F	8/6/2002	6.56E+10	67.00	120	22.35
OK520620060010F	9/9/2002	8.99E+10	50.00	140	26.25
OK520620060010F	5/12/2003	4.12E+09	30.00	10	33.65
OK520620060010F	6/16/2003	2.99E+11	67.00	540	22.6

APPENDIX E
STATE OF OKLAHOMA ANTIDEGRADATION POLICY

Appendix E
State of Oklahoma Antidegradation Policy

785:45-3-1. Purpose; Antidegradation policy statement

(a) Waters of the state constitute a valuable resource and shall be protected, maintained and improved for the benefit of all the citizens.

(b) It is the policy of the State of Oklahoma to protect all waters of the state from degradation of water quality, as provided in OAC 785:45-3-2 and Subchapter 13 of OAC 785:46.

785:45-3-2. Applications of antidegradation policy

(a) Application to outstanding resource waters (ORW). Certain waters of the state constitute an outstanding resource or have exceptional recreational and/or ecological significance. These waters include streams designated "Scenic River" or "ORW" in Appendix A of this Chapter, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)(2)(A) and 785:46-13-6(c). No degradation of water quality shall be allowed in these waters.

(b) Application to high quality waters (HQW). It is recognized that certain waters of the state possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected.

(c) Application to beneficial uses. No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed.

(d) Application to improved waters. As the quality of any waters of the state improve, no degradation of such improved waters shall be allowed.

785:46-13-1. Applicability and scope

(a) The rules in this Subchapter provide a framework for implementing the antidegradation policy stated in OAC 785:45-3-2 for all waters of the state. This policy and framework includes three tiers, or levels, of protection.

(b) The three tiers of protection are as follows:

(1) Tier 1. Attainment or maintenance of an existing or designated beneficial use.

(2) Tier 2. Maintenance or protection of High Quality Waters and Sensitive Public and Private Water Supply waters.

(3) Tier 3. No degradation of water quality allowed in Outstanding Resource Waters.

(c) In addition to the three tiers of protection, this Subchapter provides rules to implement the protection of waters in areas listed in Appendix B of OAC 785:45. Although Appendix B areas are not mentioned in OAC 785:45-3-2, the framework for protection of Appendix B areas is similar to the implementation framework for the antidegradation policy.

(d) In circumstances where more than one beneficial use limitation exists for a waterbody, the most protective limitation shall apply. For example, all antidegradation policy implementation rules applicable to Tier 1 waterbodies shall be applicable also to Tier 2 and Tier 3 waterbodies or areas, and implementation rules applicable to Tier 2 waterbodies shall be applicable also to Tier 3 waterbodies.

(e) Publicly owned treatment works may use design flow, mass loadings or concentration, as appropriate, to calculate compliance with the increased loading requirements of this section if those flows, loadings or concentrations were approved by the Oklahoma Department of Environmental Quality as a portion of Oklahoma's Water Quality Management Plan prior to the application of the ORW, HQW or SWS limitation.

785:46-13-2. Definitions

The following words and terms, when used in this Subchapter, shall have the following meaning, unless the context clearly indicates otherwise:

"Specified pollutants" means

(A) Oxygen demanding substances, measured as Carbonaceous Biochemical Oxygen Demand (CBOD) and/or Biochemical Oxygen Demand (BOD);

(B) Ammonia Nitrogen and/or Total Organic Nitrogen;

(C) Phosphorus;

(D) Total Suspended Solids (TSS); and

(E) Such other substances as may be determined by the Oklahoma Water Resources Board or the permitting authority.

785:46-13-3. Tier 1 protection; attainment or maintenance of an existing or designated beneficial use

(a) General.

(1) Beneficial uses which are existing or designated shall be maintained and protected.

(2) The process of issuing permits for discharges to waters of the state is one of several means employed by governmental agencies and affected persons which are designed to attain or maintain beneficial uses which have been designated for those waters. For example, Subchapters 3, 5, 7, 9 and 11 of this Chapter are rules for the permitting process. As such, the latter Subchapters not only implement numerical and narrative criteria, but also implement Tier 1 of the antidegradation policy.

(b) Thermal pollution. Thermal pollution shall be prohibited in all waters of the state. Temperatures greater than 52 degrees Centigrade shall constitute thermal pollution and shall be prohibited in all waters of the state.

(c) Prohibition against degradation of improved waters. As the quality of any waters of the state improves, no degradation of such improved waters shall be allowed.

785:46-13-4. Tier 2 protection; maintenance and protection of High Quality Waters and Sensitive Water Supplies

(a) General rules for High Quality Waters. New point source discharges of any pollutant after June 11, 1989, and increased load or concentration of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "HQW". Any discharge of any pollutant to a waterbody designated "HQW" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load or concentration of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load or concentration would result in maintaining or improving the level of water quality which exceeds that necessary to support recreation and propagation of fishes, shellfishes, and wildlife in the receiving water.

(b) General rules for Sensitive Public and Private Water Supplies. New point source discharges of any pollutant after June 11, 1989, and increased load of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "SWS". Any discharge of any pollutant to a waterbody designated "SWS" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load will result in maintaining or improving the water quality in both the direct receiving water, if designated SWS, and any downstream waterbodies designated SWS.

(c) Stormwater discharges. Regardless of subsections (a) and (b) of this Section, point source discharges of stormwater to waterbodies and watersheds designated "HQW" and "SWS" may be approved by the permitting authority.

(d) Nonpoint source discharges or runoff. Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds of waterbodies designated "HQW" or "SWS" in Appendix A of OAC 785:45.

785:46-13-5. Tier 3 protection; prohibition against degradation of water quality in outstanding resource waters

(a) General. New point source discharges of any pollutant after June 11, 1989, and increased load of any pollutant from any point source discharge existing as of June 11,

1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "ORW" and/or "Scenic River", and in any waterbody located within the watershed of any waterbody designated with the limitation "Scenic River". Any discharge of any pollutant to a waterbody designated "ORW" or "Scenic River" which would, if it occurred, lower existing water quality shall be prohibited.

(b) Stormwater discharges. Regardless of 785:46-13-5(a), point source discharges of stormwater from temporary construction activities to waterbodies and watersheds designated "ORW" and/or "Scenic River" may be permitted by the permitting authority. Regardless of 785:46-13-5(a), discharges of stormwater to waterbodies and watersheds designated "ORW" and/or "Scenic River" from point sources existing as of June 25, 1992, whether or not such stormwater discharges were permitted as point sources prior to June 25, 1992, may be permitted by the permitting authority; provided, however, increased load of any pollutant from such stormwater discharge shall be prohibited.

(c) Nonpoint source discharges or runoff. Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds of waterbodies designated "ORW" in Appendix A of OAC 785:45, provided, however, that development of conservation plans shall be required in sub-watersheds where discharges or runoff from nonpoint sources are identified as causing or significantly contributing to degradation in a waterbody designated "ORW".

(d) LMFO's. No licensed managed feeding operation (LMFO) established after June 10, 1998 which applies for a new or expanding license from the State Department of Agriculture after March 9, 1998 shall be located...[w]ithin three (3) miles of any designated scenic river area as specified by the Scenic Rivers Act in 82 O.S. Section 1451 and following, or [w]ithin one (1) mile of a waterbody [2:9-210.3(D)] designated in Appendix A of OAC 785:45 as "ORW".

785:46-13-6. Protection for Appendix B areas

(a) General. Appendix B of OAC 785:45 identifies areas in Oklahoma with waters of recreational and/or ecological significance. These areas are divided into Table 1, which includes national and state parks, national forests, wildlife areas, wildlife management areas and wildlife refuges; and Table 2, which includes areas which contain threatened or endangered species listed as such by the federal government pursuant to the federal Endangered Species Act as amended.

(b) Protection for Table 1 areas. New discharges of pollutants after June 11, 1989, or increased loading of pollutants from discharges existing as of June 11, 1989, to waters within the boundaries of areas listed in Table 1 of Appendix B of OAC 785:45 may be approved by the permitting authority under such conditions as ensure that the recreational and ecological significance of these waters will be maintained.

(c) Protection for Table 2 areas. Discharges or other activities associated with those waters within the boundaries listed in Table 2 of Appendix B of OAC 785:45 may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Service. Discharges or other activities in such areas shall not

substantially disrupt the threatened or endangered species inhabiting the receiving water.

(d) Nonpoint source discharges or runoff. Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds located within areas listed in Appendix B of OAC 785:45.