

## Appendix A - Long-term Trends in Water Quality Parameters

Appendix A - Section I. Blocked seasonal Kendall long-term trends in water quality for all tributaries and the Virginia Mainstem Chesapeake Bay (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids.

Segment	Season	Parameter	'93		'93		'13		'13		Trend Comparison	Trend	Combined	Combined
			Trend	'93	Trend	'93	Trend	'13	Trend	'13				
			P value	Slope	Direction	P value	Slope	Direction	P value	Comparison	Trend	P value	Direction	
APPTF	ANNUAL	STN	0.1637	-0.0113	No Trend	0.0075	-0.0061	Improving	0.0414	Same	0.0027	Improving		
APPTF	ANNUAL	BTN	0.3498	-0.0090	No Trend	0.0023	-0.0078	Improving	0.0108	Same	0.0014	Improving		
APPTF	ANNUAL	SDIN	0.1968	-0.0057	No Trend	0.1904	-0.0030	No Trend	0.3924	Same	0.1000	No Trend		
APPTF	ANNUAL	BDIN	0.1162	-0.0100	No Trend	0.2429	-0.0026	No Trend	0.5492	Same	0.1061	No Trend		
APPTF	ANNUAL	STP	0.7501	0.0000	No Trend	<0.001	-0.0017	Improving	<0.001	Different	<0.001	Improving 95		
APPTF	ANNUAL	BTP	0.0346	0.0025	No Trend	<0.001	-0.0014	Improving	<0.001	Different	0.0022	Improving 95		
APPTF	ANNUAL	SPO4F	0.0005	-0.0013	Improving	<0.001	-0.0006	Improving	<0.001	Different	0.0000	Improving*		
APPTF	ANNUAL	BPO4F	<0.001	-0.0017	Improving	<0.001	-0.0006	Improving	<0.001	Different	0.0000	Improving*		
JMSTF2	ANNUAL	STN	0.1188	-0.0225	No Trend	<0.001	-0.0101	Improving	0.0004	Different	<0.001	Improving 95		
JMSTF2	ANNUAL	BTN	0.1378	-0.0127	No Trend	<0.001	-0.0141	Improving	<0.001	Different	<0.001	Improving 95		
JMSTF2	ANNUAL	SDIN	0.0125	-0.0225	No Trend	0.0121	-0.0049	No Trend	0.1270	Same	0.0013	Improving		
JMSTF2	ANNUAL	BDIN	0.0031	-0.0228	Improving	0.0207	-0.0050	No Trend	0.2309	Same	0.0015	Improving		
JMSTF2	ANNUAL	STP	0.1733	0.0013	No Trend	<0.001	-0.0021	Improving	<0.001	Different	<0.001	Improving 95		
JMSTF2	ANNUAL	BTP	0.0008	0.0050	Degrading	<0.001	-0.0023	Improving	<0.001	Different	0.0027	D85 - I95		
JMSTF2	ANNUAL	SPO4F	<0.001	-0.0025	Improving	0.0000	-0.0008	Improving	<0.001	Different	0.0000	Improving*		
JMSTF2	ANNUAL	BPO4F	<0.001	-0.0017	Improving	0.0000	-0.0008	Improving	<0.001	Different	0.0000	Improving*		
JMSTF1	ANNUAL	STN	0.0002	-0.0250	Improving	0.0792	-0.0042	No Trend	0.6747	Same	0.0038	Improving		
JMSTF1	ANNUAL	BTN	<0.001	-0.0696	Improving	0.2053	-0.0036	No Trend	0.3113	Same	0.0007	Improving		
JMSTF1	ANNUAL	SDIN	0.0004	-0.0200	Improving	0.5963	-0.0013	No Trend	0.5187	Same	0.0991	No Trend		
JMSTF1	ANNUAL	BDIN	<0.001	-0.0563	Improving	0.6269	-0.0010	No Trend	0.1610	Same	0.0202	No Trend		
JMSTF1	ANNUAL	STP	<0.001	-0.0125	Improving	<0.001	-0.0023	Improving	<0.001	Different	0.0000	Improving*		
JMSTF1	ANNUAL	BTP	<0.001	-0.0188	Improving	<0.001	-0.0020	Improving	0.0002	Different	<0.001	Improving*		
JMSTF1	ANNUAL	SPO4F	<0.001	-0.0110	Improving	0.0000	-0.0016	Improving	<0.001	Different	0.0000	Improving*		
JMSTF1	ANNUAL	BPO4F	<0.001	-0.0150	Improving	0.0000	-0.0014	Improving	<0.001	Different	0.0000	Improving*		
CHKOH	ANNUAL	STN	0.0440	-0.0338	No Trend	0.1895	-0.0020	No Trend	0.3706	Same	0.0927	No Trend		
CHKOH	ANNUAL	BTN	0.2880	-0.0250	No Trend	0.0809	-0.0044	No Trend	0.1316	Same	0.0545	No Trend		
CHKOH	ANNUAL	SDIN	0.0520	0.0000	No Trend	0.0006	0.0016	Degrading	0.0002	Different	0.0020	Degrading 95		
CHKOH	ANNUAL	BDIN	0.0742	0.0000	No Trend	0.7486	0.0000	No Trend	0.5561	Same	0.9639	No Trend		
CHKOH	ANNUAL	STP	0.0311	0.0025	No Trend	0.0183	-0.0008	No Trend	0.0066	Different	0.0541	No Trend*		
CHKOH	ANNUAL	BTP	0.0315	0.0050	No Trend	0.0136	-0.0012	No Trend	0.0046	Different	0.0434	No Trend*		
CHKOH	ANNUAL	SPO4F	0.1546	0.0000	No Trend	0.0004	-0.0002	Improving	0.0008	Different	0.0002	Improving 95		
CHKOH	ANNUAL	BPO4F	0.0335	0.0000	No Trend	0.0021	-0.0001	Improving	0.0060	Different	0.0008	Improving 95		
JMSOH	ANNUAL	STN	0.1549	-0.0096	No Trend	0.2017	-0.0021	No Trend	0.4698	Same	0.0917	No Trend		
JMSOH	ANNUAL	BTN	0.0373	0.0200	No Trend	0.0305	-0.0065	No Trend	0.0061	Different	0.1804	No Trend*		
JMSOH	ANNUAL	SDIN	0.0008	-0.0104	Improving	0.7596	0.0005	No Trend	0.1503	Same	0.3881	No Trend		
JMSOH	ANNUAL	BDIN	0.0021	-0.0121	Improving	0.9619	<0.001	No Trend	0.2938	Same	0.3373	No Trend		
JMSOH	ANNUAL	STP	<0.001	0.0050	Degrading	0.0092	-0.0006	Improving	0.0001	Different	0.2727	D85 - I95		
JMSOH	ANNUAL	BTP	<0.001	0.0117	Degrading	0.0704	-0.0011	No Trend	0.0005	Different	0.9332	Degrading 85		
JMSOH	ANNUAL	SPO4F	0.1452	0.0000	No Trend	0.9399	0.0000	No Trend	0.5941	Same	0.6970	No Trend		
JMSOH	ANNUAL	BPO4F	0.4470	0.0000	No Trend	0.9390	0.0000	No Trend	0.8600	Same	0.7478	No Trend		
JMSMH	ANNUAL	STN	0.0211	0.0115	No Trend	0.5423	-0.0007	No Trend	0.1802	Same	0.8505	No Trend		
JMSMH	ANNUAL	BTN	0.0058	0.0183	Degrading	0.1378	-0.0025	No Trend	0.0205	Same	0.6250	No Trend		
JMSMH	ANNUAL	SDIN	0.9101	0.0000	No Trend	0.2429	-0.0013	No Trend	0.2468	Same	0.2862	No Trend		
JMSMH	ANNUAL	BDIN	1.0000	0.0000	No Trend	0.2759	-0.0007	No Trend	0.3056	Same	0.2947	No Trend		
JMSMH	ANNUAL	STP	<0.001	0.0036	Degrading	0.0631	-0.0003	No Trend	0.0010	Different	0.8106	Degrading 85		
JMSMH	ANNUAL	BTP	<0.001	0.0033	Degrading	0.0141	-0.0007	No Trend	0.0002	Different	0.3869	Degrading 85		
JMSMH	ANNUAL	SPO4F	0.0020	0.0013	Degrading	0.2532	<0.001	No Trend	0.0420	Same	0.8856	No Trend		
JMSMH	ANNUAL	BPO4F	0.0009	0.0006	Degrading	0.3141	<0.001	No Trend	0.0495	Same	0.9667	No Trend		
JMSPH	ANNUAL	STN	0.8096	0.0010	No Trend	0.0024	-0.0024	Improving	0.0030	Different	0.0052	Improving 95		
JMSPH	ANNUAL	BTN	0.3202	0.0049	No Trend	0.0294	-0.0020	No Trend	0.0168	Same	0.0830	No Trend		
JMSPH	ANNUAL	SDIN	0.9147	0.0000	No Trend	0.0128	-0.0007	No Trend	0.0150	Same	0.0185	No Trend		
JMSPH	ANNUAL	BDIN	0.1128	0.0000	No Trend	0.0119	-0.0007	No Trend	0.0045	Different	0.0417	No Trend*		
JMSPH	ANNUAL	STP	0.5062	0.0002	No Trend	<0.001	-0.0004	Improving	<0.001	Different	<0.001	Improving 95		
JMSPH	ANNUAL	BTP	0.4686	0.0005	No Trend	<0.001	-0.0007	Improving	<0.001	Different	<0.001	Improving 95		
JMSPH	ANNUAL	SPO4F	0.2019	0.0000	No Trend	0.0224	<0.001	No Trend	0.0729	Same	0.0102	No Trend		
JMSPH	ANNUAL	BPO4F	0.6865	0.0000	No Trend	0.0265	<0.001	No Trend	0.0456	Same	0.0244	No Trend		
ELIPH	ANNUAL	STN	0.3762	0.0048	No Trend	0.0094	-0.0042	Improving	0.0059	Different	0.0294	Improving 95		
ELIPH	ANNUAL	BTN	0.4951	0.0014	No Trend	0.0764	-0.0028	No Trend	0.0567	Same	0.1424	No Trend		
ELIPH	ANNUAL	SDIN	0.6306	<0.001	No Trend	0.3453	-0.0012	No Trend	0.2921	Same	0.4517	No Trend		
ELIPH	ANNUAL	BDIN	0.9368	0.0000	No Trend	0.0652	-0.0015	No Trend	0.0708	Same	0.0816	No Trend		
ELIPH	ANNUAL	STP	0.8184	0.0000	No Trend	0.0014	-0.0005	Improving	0.0018	Different	0.0030	Improving 95		
ELIPH	ANNUAL	BTP	0.1060	0.0013	No Trend	<0.001	-0.0007	Improving	<0.001	Different	0.0013	Improving 95		

Appendix A - Section I -Continued. Blocked seasonal Kendall long-term trends in water quality for all tributaries and the Virginia Mainstem Chesapeake Bay (1985-2012). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids.

Segment	Season	Parameter	'93		Trend	'93		Trend	'13		Trend	Comparison	Trend		Comparison	Combined		Combined
			P value	Slope		P value	Slope		P value	Slope			P value	Direction		P value	Direction	
ELIPH	ANNUAL	SPO4F	0.5337	0.0000	No Trend	0.1004	<0.001	No Trend	0.0780	0.1657	No Trend	0.0936	Same	0.2868	No Trend	0.4422	No Trend	
ELIPH	ANNUAL	BPO4F	0.3081	0.0000	No Trend	0.1520	<0.001	No Trend	0.0936	0.2868	No Trend	0.4812	Same	0.0072	Improving	0.7206	No Trend	
PMKTF	ANNUAL	STN	0.9501	0.0006	No Trend	0.4334	0.0012	No Trend	0.0217	0.0072	Improving	0.9914	Same	0.1618	No Trend	0.1949	No Trend	
PMKTF	ANNUAL	BTN	0.5995	-0.0050	No Trend	0.0078	-0.0060	Improving	0.0217	0.0072	Improving	0.9914	Same	0.1618	No Trend	0.1949	No Trend	
PMKTF	ANNUAL	SDIN	0.6333	-0.0020	No Trend	0.8446	-0.0003	No Trend	0.2954	0.1618	No Trend	0.3056	Same	0.8402	Degrading	85		
PMKTF	ANNUAL	BDIN	0.6427	0.0000	No Trend	0.1909	-0.0018	No Trend	0.2954	0.1618	No Trend	0.3056	Same	0.8402	Degrading	85		
PMKTF	ANNUAL	STP	0.0005	0.0025	Degrading	0.8856	<0.001	No Trend	0.3056	0.1949	No Trend	0.0033	Different	0.0000	Improving	95		
PMKTF	ANNUAL	BTP	<0.001	0.0043	Degrading	0.1453	-0.0005	No Trend	0.0033	0.8402	Degrading	85	Different	0.0000	Improving	95		
PMKTF	ANNUAL	SPO4F	0.0042	0.0000	High BDLS	0.0000	-0.0007	Improving	<0.001	0.0000	Improving	95	Different	0.0000	Improving	95		
PMKTF	ANNUAL	BPO4F	0.0041	0.0000	High BDLS	<0.001	-0.0007	Improving	<0.001	0.0000	Improving	95	Different	0.0000	Improving	95		
PMKOH	ANNUAL	STN	0.0002	0.0300	Degrading	0.4044	-0.0015	No Trend	0.0338	0.5698	No Trend	0.5815	Same	0.0552	No Trend	0.4985	No Trend	
PMKOH	ANNUAL	BTN	0.0005	0.0508	Degrading	0.4661	0.0029	No Trend	0.5815	0.0552	No Trend	0.7635	Same	0.7796	No Trend	0.5283	No Trend	
PMKOH	ANNUAL	SDIN	0.5889	0.0000	No Trend	0.6053	-0.0006	No Trend	0.7635	0.4985	No Trend	0.6178	Same	0.7796	No Trend	0.5283	No Trend	
PMKOH	ANNUAL	BDIN	0.7455	0.0000	No Trend	0.6831	-0.0005	No Trend	0.6178	0.7796	No Trend	0.0585	Same	0.5283	No Trend	0.0398	No Trend	
PMKOH	ANNUAL	STP	0.0005	0.0063	Degrading	0.4997	-0.0003	No Trend	0.0585	0.5283	No Trend	0.6506	Same	0.0398	No Trend	<0.001	Degrading	
PMKOH	ANNUAL	BTP	0.0003	0.0175	Degrading	0.3938	0.0011	No Trend	0.6506	0.0398	No Trend	0.0209	Same	<0.001	Degrading	95		
PMKOH	ANNUAL	SPO4F	0.0116	0.0000	No Trend	0.0010	0.0003	Degrading	0.0209	<0.001	Degrading	95	Different	0.0001	Degrading	95		
PMKOH	ANNUAL	BPO4F	0.1884	0.0000	No Trend	0.0004	0.0004	Degrading	0.0028	0.0001	Degrading	95	Different	0.0001	Degrading	95		
MPNTF	ANNUAL	STN	0.9251	0.0004	No Trend	0.1289	0.0030	No Trend	0.1655	0.1411	No Trend	0.5193	Same	0.3519	No Trend	0.0083	Degrading	
MPNTF	ANNUAL	BTN	0.0293	-0.0108	No Trend	0.8782	-0.0003	No Trend	0.5193	0.3519	No Trend	0.0550	Same	0.0083	Degrading	0.0111	No Trend	
MPNTF	ANNUAL	SDIN	0.2760	0.0013	No Trend	0.0161	0.0026	No Trend	0.0550	0.0083	Degrading	0.0395	Same	0.0111	No Trend	0.1534	No Trend	
MPNTF	ANNUAL	BDIN	0.5042	0.0000	No Trend	0.0145	0.0024	No Trend	0.0395	0.0111	No Trend	0.3308	Same	0.1534	No Trend	0.9534	No Trend	
MPNTF	ANNUAL	STP	0.0002	0.0017	Degrading	0.8101	<0.001	No Trend	0.3308	0.1534	No Trend	0.0950	Same	0.9534	No Trend	<0.001	Improving	95
MPNTF	ANNUAL	BTP	0.0211	0.0013	No Trend	0.3574	-0.0002	No Trend	0.0950	<0.001	Improving	95	Different	<0.001	Improving	95		
MPNTF	ANNUAL	SPO4F	1.0000	0.0000	No Trend	<0.001	-0.0006	Improving	<0.001	<0.001	Improving	95	Different	<0.001	Improving	95		
MPNTF	ANNUAL	BPO4F	0.0287	0.0000	No Trend	<0.001	-0.0007	Improving	<0.001	<0.001	Improving	95	Different	<0.001	Improving	95		
MPNOH	ANNUAL	STN	<0.001	0.0259	Degrading	0.4715	-0.0010	No Trend	0.0248	0.3728	No Trend	0.0024	Same	0.1880	No Trend*	0.7965	No Trend	
MPNOH	ANNUAL	BTN	0.0145	0.0232	No Trend	0.0201	-0.0060	No Trend	0.0024	0.1880	No Trend*	0.6297	Different	0.7965	No Trend	0.2819	No Trend	
MPNOH	ANNUAL	SDIN	0.2419	0.0011	No Trend	0.9062	-0.0001	No Trend	0.6297	0.7965	No Trend	0.6737	Same	0.2819	No Trend	0.1908	No Trend	
MPNOH	ANNUAL	BDIN	0.2875	0.0020	No Trend	0.4331	0.0009	No Trend	0.6737	0.2819	No Trend	0.0967	Same	0.1908	No Trend	0.3646	No Trend	
MPNOH	ANNUAL	STP	<0.001	0.0058	Degrading	0.8518	-0.0001	No Trend	0.0967	0.1908	No Trend	0.1904	Same	0.3646	No Trend	0.4936	No Trend	
MPNOH	ANNUAL	BTP	0.0012	0.0061	Degrading	0.8304	-0.0001	No Trend	0.1904	0.3646	No Trend	0.6631	Same	0.4936	No Trend	0.6736	No Trend	
MPNOH	ANNUAL	SPO4F	0.0603	0.0000	No Trend	0.8964	0.0000	No Trend	0.6631	0.4936	No Trend	0.5348	Same	0.6736	No Trend	0.4592	No Trend	
MPNOH	ANNUAL	BPO4F	0.0943	0.0000	No Trend	0.9166	0.0000	No Trend	0.5348	0.6736	No Trend	0.0627	Same	0.4592	No Trend	0.4134	No Trend	
YRKMH	ANNUAL	STN	0.0003	0.0225	Degrading	0.5481	-0.0010	No Trend	0.0627	0.4592	No Trend	0.0309	Same	0.4134	No Trend	0.4764	No Trend	
YRKMH	ANNUAL	BTN	<0.001	0.0296	Degrading	0.4761	-0.0018	No Trend	0.0309	0.4134	No Trend	0.3527	Same	0.4764	No Trend	0.7411	No Trend	
YRKMH	ANNUAL	SDIN	0.7671	0.0000	No Trend	0.3853	-0.0006	No Trend	0.3527	0.4764	No Trend	0.2983	Same	0.7411	No Trend	0.0090	Degrading	
YRKMH	ANNUAL	BDIN	0.2243	0.0000	No Trend	0.4751	-0.0008	No Trend	0.2983	0.7411	No Trend	0.1192	Same	0.0090	Degrading	0.0156	No Trend	
YRKMH	ANNUAL	STP	<0.001	0.0050	Degrading	0.5744	0.0001	No Trend	0.1192	0.0156	No Trend	0.4508	Same	0.0156	No Trend	<0.001	Degrading	
YRKMH	ANNUAL	BTP	<0.001	0.0075	Degrading	0.3775	0.0006	No Trend	0.4508	0.0156	No Trend	0.1592	Same	<0.001	Degrading	<0.001	Degrading*	
YRKMH	ANNUAL	SPO4F	<0.001	0.0008	Degrading	0.0038	0.0003	Degrading	0.1592	<0.001	Degrading*	0.0062	Different	0.1008	No Trend	0.7433	Degrading	85
YRKMH	ANNUAL	BPO4F	<0.001	0.0010	Degrading	<0.001	0.0003	Degrading	0.0062	0.1008	No Trend	0.7461	Same	0.1008	No Trend	0.2194	No Trend	
YRKPH	ANNUAL	STN	0.0061	0.0135	Degrading	0.4812	0.0006	No Trend	0.7461	0.1008	No Trend	0.2833	Same	0.2194	No Trend	0.1255	No Trend*	
YRKPH	ANNUAL	BTN	<0.001	0.0279	Degrading	0.1665	-0.0017	No Trend	0.0035	0.7433	Degrading	85	Different	0.7433	Degrading	85		
YRKPH	ANNUAL	SDIN	0.7844	0.0000	No Trend	0.2364	-0.0003	No Trend	0.2833	0.2194	No Trend	0.0088	Same	0.1255	No Trend*	0.1431	No Trend	
YRKPH	ANNUAL	BDIN	0.0124	0.0000	No Trend	0.0337	-0.0010	No Trend	0.0088	0.1255	No Trend*	0.0217	Different	0.1255	No Trend*	0.1049	No Trend	
YRKPH	ANNUAL	STP	<0.001	0.0029	Degrading	0.6585	<0.001	No Trend	0.0217	0.1431	No Trend	0.0217	Same	0.1049	No Trend	0.0208	No Trend	
YRKPH	ANNUAL	BTP	<0.001	0.0036	Degrading	0.7204	-0.0001	No Trend	0.0217	0.1049	No Trend	0.5324	Same	0.0208	No Trend	0.0482	No Trend	
YRKPH	ANNUAL	SPO4F	0.0037	0.0000	High BDLS	0.1255	0.0001	No Trend	0.5324	0.0208	No Trend	0.5983	Same	0.0482	No Trend	0.0445	D85 - I95	
YRKPH	ANNUAL	BPO4F	0.0104	0.0000	No Trend	0.1927	<0.001	No Trend	0.5983	0.0482	No Trend	<0.001	Different	<0.001	Improving	95		
MOBPH	ANNUAL	STSS	0.0010	0.5000	Degrading	0.0000	-0.1600	Improving	<0.001	0.0445	D85 - I95	<0.001	Different	<0.001	Improving	95		
MOBPH	ANNUAL	BTSS	0.0384	0.4286	No Trend	0.0000	-0.4061	Improving	<0.001	<0.001	Improving	95	Different	<0.001	Improving	95		
RPPTF	ANNUAL	STN	0.4714	-0.0077	No Trend	0.0003	-0.0067	Improving	0.0015	0.0003	Improving	95	Different	0.0003	Improving	95		
RPPTF	ANNUAL	BTN	0.0202	-0.0213	No Trend	0.0003	-0.0080	Improving	0.0072	<0.001	Improving	95	Different	<0.001	Improving	95		
RPPTF	ANNUAL	SDIN	0.2397	0.0067	No Trend	0.3326	-0.0021	No Trend	0.1931	0.5912	No Trend	0.1231	Same	0.6714	No Trend	0.0069	Improving	95
RPPTF	ANNUAL	BDIN	0.0783	0.0100	No Trend	0.3009	-0.0021	No Trend	0.1231	0.6714	No Trend	0.0002	Same	0.6714	No Trend	0.0538	No Trend	
RPPTF	ANNUAL	STP	0.1001	0.0009	No Trend	0.0006	-0.0008	Improving	0.0002	0.0538	No Trend	0.0110	Different	0.0069	Improving	95		
RPPTF	ANNUAL	BTP	0.3526	0.0007	No Trend	0.0182	-0.0006	No Trend	0.0110	0.0538	No Trend		Same	0.0538	No Trend			

Appendix A - Section I -Continued. Blocked seasonal Kendall long-term trends in water quality for all tributaries and the Virginia Mainstem Chesapeake Bay (1985-2013).Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids.

Segment	Season	Parameter	'93			'93			'13			'13			Trend		Combined		Combined	
			Trend	P value	Slope	Trend	P value	Slope	Trend	P value	Slope	Trend	P value	Slope	Comparison	P value	Trend	P value	Trend	Direction
RPPTF	ANNUAL	SPO4F	0.6996	0.0000	No Trend	<0.001	-0.0003	Improving	<0.001	<0.001	-0.0003	Improving	<0.001	<0.001	Different	<0.001	Improving	<0.001	Improving	95
RPPTF	ANNUAL	BPO4F	0.6793	0.0000	No Trend	<0.001	-0.0003	Improving	<0.001	<0.001	-0.0003	Improving	<0.001	<0.001	Different	<0.001	Improving	<0.001	Improving	95
RPPMH	ANNUAL	STN	0.0018	0.0133	Degrading	0.1106	-0.0018	No Trend	0.0119	0.0119	-0.0018	No Trend	0.0119	0.0119	Same	0.6097	No Trend	0.6097	No Trend	
RPPMH	ANNUAL	SDIN	0.3587	0.0000	No Trend	0.1256	-0.0002	No Trend	0.2133	0.2133	-0.0002	No Trend	0.2133	0.2133	Same	0.0850	No Trend	0.0850	No Trend	
RPPMH	ANNUAL	BDIN	0.9137	0.0000	No Trend	0.2197	-0.0006	No Trend	0.2536	0.2536	-0.0006	No Trend	0.2536	0.2536	Same	0.2223	No Trend	0.2223	No Trend	
RPPMH	ANNUAL	STP	<0.001	0.0020	Degrading	0.0199	-0.0003	No Trend	0.0002	0.0002	-0.0003	No Trend	0.0002	0.0002	Different	0.4927	Degrading	0.4927	Degrading	85
RPPMH	ANNUAL	BTP	0.0034	0.0017	Degrading	0.0005	-0.0007	Improving	<0.001	<0.001	-0.0007	Improving	<0.001	<0.001	Different	0.0163	D85 - I95	0.0163	D85 - I95	
RPPMH	ANNUAL	SPO4F	0.8505	0.0000	No Trend	0.0048	<0.001	Improving	0.0061	0.0061	<0.001	Improving	0.0061	0.0061	Different	0.0048	Improving	0.0048	Improving	95
RPPMH	ANNUAL	BPO4F	0.1772	0.0000	No Trend	0.0197	<0.001	No Trend	0.0109	0.0109	<0.001	No Trend	0.0109	0.0109	Same	0.0412	No Trend	0.0412	No Trend	
RPOH	ANNUAL	STN	0.1402	0.0100	No Trend	0.7167	0.0007	No Trend	0.8763	0.8763	0.0007	No Trend	0.8763	0.8763	Same	0.4005	No Trend	0.4005	No Trend	
RPOH	ANNUAL	BTN	0.0018	0.0268	Degrading	0.9370	0.0003	No Trend	0.3370	0.3370	0.0003	No Trend	0.3370	0.3370	Same	0.2672	No Trend	0.2672	No Trend	
RPOH	ANNUAL	SDIN	0.1570	0.0000	No Trend	0.5648	0.0000	No Trend	0.9289	0.9289	0.0000	No Trend	0.9289	0.9289	Same	0.3156	No Trend	0.3156	No Trend	
RPOH	ANNUAL	BDIN	0.0650	0.0000	No Trend	0.6828	0.0000	No Trend	0.8460	0.8460	0.0000	No Trend	0.8460	0.8460	Same	0.3314	No Trend	0.3314	No Trend	
RPOH	ANNUAL	STP	<0.001	0.0050	Degrading	0.7829	<0.001	No Trend	0.1093	0.1093	<0.001	No Trend	0.1093	0.1093	Same	0.2795	No Trend	0.2795	No Trend	
RPOH	ANNUAL	BTP	<0.001	0.0070	Degrading	0.8173	<0.001	No Trend	0.1850	0.1850	<0.001	No Trend	0.1850	0.1850	Same	0.0784	No Trend	0.0784	No Trend	
RPOH	ANNUAL	SPO4F	0.4570	0.0000	No Trend	0.0012	-0.0002	Improving	0.0026	0.0026	-0.0002	Improving	0.0026	0.0026	Different	0.0009	Improving	0.0009	Improving	95
RPOH	ANNUAL	BPO4F	0.1177	0.0000	No Trend	0.0001	-0.0002	Improving	0.0008	0.0008	-0.0002	Improving	0.0008	0.0008	Different	<0.001	Improving	<0.001	Improving	95
CRRMH	ANNUAL	STN	0.1829	0.0020	No Trend	0.1104	-0.0017	No Trend	0.0494	0.0494	-0.0017	No Trend	0.0494	0.0494	Same	0.2999	No Trend	0.2999	No Trend	
CRRMH	ANNUAL	BTN	0.0345	0.0180	No Trend	<0.001	-0.0078	Improving	<0.001	<0.001	-0.0078	Improving	<0.001	<0.001	Different	<0.001	Improving	<0.001	Improving	95
CRRMH	ANNUAL	SDIN	0.1653	0.0000	No Trend	0.0031	-0.0001	Improving	0.0015	0.0015	-0.0001	Improving	0.0015	0.0015	Different	0.0077	Improving	0.0077	Improving	95
CRRMH	ANNUAL	BDIN	0.5659	0.0000	No Trend	0.0996	-0.0001	No Trend	0.0831	0.0831	-0.0001	No Trend	0.0831	0.0831	Same	0.1299	No Trend	0.1299	No Trend	
CRRMH	ANNUAL	STP	<0.001	0.0013	Degrading	0.0799	-0.0002	No Trend	0.0014	0.0014	-0.0002	No Trend	0.0014	0.0014	Different	0.9211	Degrading	0.9211	Degrading	85
CRRMH	ANNUAL	BTP	<0.001	0.0017	Degrading	<0.001	-0.0009	Improving	<0.001	<0.001	-0.0009	Improving	<0.001	<0.001	Different	<0.001	D85 - I95	<0.001	D85 - I95	
CRRMH	ANNUAL	SPO4F	0.6865	0.0000	No Trend	0.0024	0.0000	High BDLS	0.0021	0.0021	0.0000	High BDLS	0.0021	0.0021	Different	0.0036	No Trend*	0.0036	No Trend*	
CRRMH	ANNUAL	BPO4F	0.2846	0.0000	No Trend	<0.001	-0.0001	Improving	0.0001	0.0001	-0.0001	Improving	0.0001	0.0001	Different	<0.001	Improving	<0.001	Improving	95
PIAMH	ANNUAL	STSS	0.0010	0.3750	Degrading	0.0002	-0.1000	Improving	<0.001	<0.001	-0.1000	Improving	<0.001	<0.001	Different	0.0865	D85 - I95	0.0865	D85 - I95	
PIAMH	ANNUAL	BTSS	0.8028	0.0000	No Trend	<0.001	-0.2736	Improving	<0.001	<0.001	-0.2736	Improving	<0.001	<0.001	Different	<0.001	Improving	<0.001	Improving	95
POCMH	ANNUAL	STSS	<0.001	1.3452	Degrading	<0.001	-0.4217	Improving	<0.001	<0.001	-0.4217	Improving	<0.001	<0.001	Different	0.2301	D85 - I95	0.2301	D85 - I95	
POCMH	ANNUAL	BTSS	<0.001	1.1156	Degrading	<0.001	-0.6749	Improving	<0.001	<0.001	-0.6749	Improving	<0.001	<0.001	Different	0.0406	D85 - I95	0.0406	D85 - I95	
CB5MH	ANNUAL	STSS	0.0253	0.1950	No Trend	0.0000	-0.1229	Improving	<0.001	<0.001	-0.1229	Improving	<0.001	<0.001	Different	0.0006	Improving	0.0006	Improving	95
CB5MH	ANNUAL	BTSS	0.0011	0.6250	Degrading	0.0000	-0.4383	Improving	<0.001	<0.001	-0.4383	Improving	<0.001	<0.001	Different	<0.001	D85 - I95	<0.001	D85 - I95	
CB6PH	ANNUAL	STSS	0.0308	0.2500	No Trend	0.0000	-0.1640	Improving	<0.001	<0.001	-0.1640	Improving	<0.001	<0.001	Different	0.0001	Improving	0.0001	Improving	95
CB6PH	ANNUAL	BTSS	0.1155	0.3000	No Trend	0.0000	-0.5285	Improving	<0.001	<0.001	-0.5285	Improving	<0.001	<0.001	Different	<0.001	Improving	<0.001	Improving	95
CB7PH	ANNUAL	STSS	0.0000	0.3700	Degrading	0.0025	-0.0700	Improving	<0.001	<0.001	-0.0700	Improving	<0.001	<0.001	Different	0.4181	D85 - I95	0.4181	D85 - I95	
CB7PH	ANNUAL	BTSS	0.0009	0.7850	Degrading	0.0000	-0.4133	Improving	<0.001	<0.001	-0.4133	Improving	<0.001	<0.001	Different	0.0001	D85 - I95	0.0001	D85 - I95	

Appendix A - Section IIa. Seasonal Kendall Long-term trends in water quality for the James River (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, SCHLA=Surface chlorophyll *a*, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids, SEECCHI=Secchi depth, BDO=Bottom dissolved oxygen, SSALIN=Surface salinity, BSALIN=Bottom salinity, SWTEMP=Surface water temperature, BWTEMP=Bottom water temperature.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
APPTF	Annual	SCHLA	2.76	0.0299	-0.08	30.94	-2.12	-6.84	No Trend	0.6175
APPTF	Annual	STSS	0.00	0.0026	-0.20	19.50	-5.00	-25.64	Improving	0.9107
APPTF	Annual	BTSS	0.00	0.0224	-0.25	27.25	-6.25	-22.94	No Trend	0.8827
APPTF	Annual	SECCHI	0.00	0.0205	0.00	0.50	0.00	0.00	No Trend	0.2443
APPTF	Annual	SSALINITY	0.00	0.2654	0.00	0.01	0.00	0.00	No Trend	0.9053
APPTF	Annual	BSALINITY	0.00	0.1755	0.00	0.01	0.00	0.00	No Trend	0.9420
APPTF	Annual	SWTEMP	0.00	0.0046	0.04	19.68	1.24	6.30	Increasing	0.5045
APPTF	Annual	BWTEMP	0.00	0.0106	0.05	19.00	1.30	6.82	No Trend	0.4431
JMSTF1	Annual	SCHLA	4.25	0.0000	-0.06	3.80	-1.68	-44.27	Improving	0.0276
JMSTF1	Annual	STSS	1.78	0.0100	-0.07	9.00	-1.67	-18.52	Improving	0.8359
JMSTF1	Annual	BTSS	0.61	0.5361	-0.03	16.25	-0.68	-4.16	No Trend	0.2649
JMSTF1	Annual	SECCHI	0.00	0.8290	0.00	1.00	0.00	0.00	No Trend	0.4794
JMSTF1	Annual	SSALINITY	0.00	0.0719	0.00	0.01	0.00	0.00	No Trend	0.7988
JMSTF1	Annual	BSALINITY	0.00	0.0736	0.00	0.01	0.00	0.00	No Trend	0.9830
JMSTF1	Annual	SWTEMP	0.00	0.3921	0.01	18.78	0.40	2.13	No Trend	0.5849
JMSTF1	Annual	BWTEMP	0.00	0.0658	0.03	19.00	0.92	4.84	No Trend	0.2864
JMSTF2	Annual	SCHLA	0.88	0.3152	-0.05	16.56	-1.51	-9.14	No Trend	0.4699
JMSTF2	Annual	STSS	0.02	0.1516	-0.08	19.75	-2.03	-10.27	No Trend	0.3878
JMSTF2	Annual	BTSS	0.04	0.1858	0.27	172.00	7.64	4.44	No Trend	0.9668
JMSTF2	Annual	SECCHI	0.00	0.0000	0.00	0.60	-0.09	-14.58	Degrading	0.1460
JMSTF2	Annual	SSALINITY	0.00	0.0000	0.00	0.01	0.00	0.00	Unchanged	0.6616
JMSTF2	Annual	BSALINITY	0.00	0.0001	0.00	0.01	0.00	0.00	Unchanged	0.8817
JMSTF2	Annual	SWTEMP	0.00	0.0534	0.03	18.50	0.79	4.29	No Trend	0.4893
JMSTF2	Annual	BWTEMP	0.00	0.0807	0.02	18.35	0.70	3.81	No Trend	0.5661
CHKOH	Annual	SCHLA	1.19	0.0000	-0.31	22.35	-7.75	-34.68	Improving	0.0856
CHKOH	Annual	STSS	0.00	0.5075	0.03	17.50	0.63	3.57	No Trend	0.7035
CHKOH	Annual	BTSS	0.00	0.0220	0.33	27.00	8.33	30.86	No Trend	0.9349
CHKOH	Annual	SECCHI	0.00	0.0000	-0.01	0.60	-0.18	-29.76	Degrading	0.1561
CHKOH	Annual	SSALINITY	0.00	0.0000	0.00	0.01	0.00	0.00	Unchanged	0.9705
CHKOH	Annual	BSALINITY	0.00	0.0000	0.00	0.01	0.00	0.00	Unchanged	0.9584
CHKOH	Annual	SWTEMP	0.00	0.1637	0.02	16.00	0.62	3.91	No Trend	0.0896
CHKOH	Annual	BWTEMP	0.00	0.1317	0.03	15.60	0.63	4.01	No Trend	0.0812
JMSOH	Annual	SCHLA	0.84	0.0146	-0.07	7.22	-1.96	-27.17	No Trend	0.3839
JMSOH	Annual	STSS	0.08	0.0964	-0.17	662.00	-4.67	-0.70	No Trend	0.6862
JMSOH	Annual	BTSS	0.00	0.2803	-0.32	290.00	-8.83	-3.04	No Trend	0.7290
JMSOH	Annual	SECCHI	0.00	0.4222	0.00	0.53	0.00	0.00	No Trend	0.5673
JMSOH	Annual	SSALINITY	0.00	0.0004	0.03	2.72	0.90	33.03	Increasing	0.9838
JMSOH	Annual	BSALINITY	0.00	0.0001	0.06	3.47	1.62	46.73	Increasing	0.9876
JMSOH	Annual	SWTEMP	0.00	0.2286	0.02	18.30	0.51	2.80	No Trend	0.5530
JMSOH	Annual	BWTEMP	0.00	0.2103	0.02	18.48	0.51	2.74	No Trend	0.5452
JMSMH	Annual	SCHLA	1.08	0.1767	0.03	4.47	0.73	16.42	No Trend	0.0019
JMSMH	Annual	STSS	0.26	0.4529	-0.03	15.00	-0.82	-5.49	No Trend	0.7475
JMSMH	Annual	BTSS	0.13	0.0144	0.23	142.00	6.36	4.48	No Trend	0.8712
JMSMH	Annual	SECCHI	0.00	0.3635	0.00	0.95	0.00	0.00	No Trend	0.1203
JMSMH	Annual	SSALINITY	0.00	0.2614	0.03	14.96	0.92	6.15	No Trend	0.9660
JMSMH	Annual	BSALINITY	0.00	0.9709	0.00	18.35	0.00	0.00	No Trend	0.9906
JMSMH	Annual	SWTEMP	0.00	0.4404	0.01	20.13	0.22	1.08	No Trend	0.6994
JMSMH	Annual	BWTEMP	0.00	0.4242	0.01	19.90	0.28	1.41	No Trend	0.8953
JMSPH	Annual	SCHLA	0.36	0.0003	0.09	8.19	2.46	29.99	Degrading	0.0000
JMSPH	Annual	STSS	0.19	0.9636	0.00	8.25	0.00	0.00	No Trend	0.8591
JMSPH	Annual	BTSS	0.04	0.0000	-0.27	18.45	-7.48	-40.52	Improving	0.0427
JMSPH	Annual	SECCHI	0.00	0.0000	-0.01	1.30	-0.28	-21.54	Degrading	0.0541
JMSPH	Annual	SSALINITY	0.00	0.0575	-0.04	21.56	-1.05	-4.86	No Trend	0.9956
JMSPH	Annual	BSALINITY	0.00	0.0000	-0.14	24.83	-3.88	-15.62	Decreasing	0.5881
JMSPH	Annual	SWTEMP	0.00	0.0849	0.02	17.40	0.43	2.49	No Trend	0.6530
JMSPH	Annual	BWTEMP	0.00	0.0000	0.05	16.95	1.36	8.00	Increasing	0.0597

Appendix A - Section IIb. Seasonal Kendall Long-term trends in water quality for the Elizabeth River (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, SCHLA=Surface chlorophyll *a*, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids, SEECCHI=Secchi depth, BDO=Bottom dissolved oxygen, SSALIN=Surface salinity, BSALIN=Bottom salinity, SWTEMP=Surface water temperature, BWTEMP=Bottom water temperature.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute		% Change	Direction	Homogeneity test
						Baseline	Change			P value
EBEMH	Annual	STN	0.00	0.0000	-0.0125	1.0400	-0.3011	-28.95	Improving	0.2417
EBEMH	Annual	BTN	0.00	0.0000	-0.0111	0.8550	-0.2673	-31.26	Improving	0.4462
EBEMH	Annual	SDIN	0.00	0.0000	-0.0080	0.5069	-0.1914	-37.76	Improving	0.9363
EBEMH	Annual	BDIN	0.00	0.0000	-0.0073	0.4902	-0.1758	-35.85	Improving	0.9235
EBEMH	Annual	STP	0.00	0.0000	-0.0009	0.0745	-0.0216	-28.99	Improving	0.1649
EBEMH	Annual	BTP	0.00	0.0000	-0.0012	0.0740	-0.0276	-37.30	Improving	0.9086
EBEMH	Annual	SPO4F	12.83	0.0011	-0.0001	0.0435	-0.0034	-7.80	Improving	0.2171
EBEMH	Annual	BPO4F	13.16	0.0000	-0.0002	0.0455	-0.0040	-8.79	Improving	0.3386
EBEMH	Annual	SCHLA	17.36	0.3455	0.00	6.60			No Trend	0.0710
EBEMH	Annual	STSS	0.38	0.0000	-0.20	9.95	-4.80	-48.24	Improving	0.8940
EBEMH	Annual	BTSS	0.38	0.0000	-0.38	12.15	-9.15	-75.33	Improving	0.9981
EBEMH	Annual	SECCHI	0.00	0.0024	0.01	1.00	0.16	16.00	Improving	0.2002
EBEMH	Annual	SSALINITY	0.00	0.0231	0.06	16.85	1.34	7.94	No Trend	0.3900
EBEMH	Annual	BSALINITY	0.00	0.5505	0.02	18.40	0.37	2.01	No Trend	0.8696
EBEMH	Annual	SWTEMP	0.00	0.0065	0.04	17.00	1.03	6.05	Increasing	0.6265
EBEMH	Annual	BWTEMP	0.00	0.0009	0.06	15.90	1.37	8.60	Increasing	0.6509
WBEMH	Annual	STN	0.00	0.0000	-0.0064	0.8000	-0.1528	-19.10	Improving	0.1542
WBEMH	Annual	BTN	0.00	0.0000	-0.0069	0.7910	-0.1652	-20.88	Improving	0.1308
WBEMH	Annual	SDIN	2.30	0.1753	-0.0005	0.1980	-0.0118	-5.95	No Trend	0.3779
WBEMH	Annual	BDIN	1.53	0.0550	-0.0016	0.2569	-0.0386	-15.01	No Trend	0.4351
WBEMH	Annual	STP	0.00	0.0000	-0.0010	0.0830	-0.0240	-28.92	Improving	0.3197
WBEMH	Annual	BTP	0.00	0.0000	-0.0010	0.0795	-0.0240	-30.19	Improving	0.6264
WBEMH	Annual	SPO4F	21.19	0.0014	-0.0001	0.0345			Improving	0.0653
WBEMH	Annual	BPO4F	18.89	0.0001	-0.0001	0.0330			Improving	0.1272
WBEMH	Annual	SCHLA	4.14	0.0008	-0.19	23.00	-4.61	-20.05	Improving	0.6062
WBEMH	Annual	STSS	0.00	0.0000	-0.29	20.60	-7.03	-34.11	Improving	0.9276
WBEMH	Annual	BTSS	0.00	0.0000	-0.51	20.50	-12.14	-59.24	Improving	0.7680
WBEMH	Annual	SECCHI	0.00	0.0445	0.00	0.60	0.00	0.00	No Trend	0.8708
WBEMH	Annual	SSALINITY	0.00	0.0510	0.05	15.90	1.27	8.01	No Trend	0.7000
WBEMH	Annual	BSALINITY	0.00	0.1051	0.04	16.70	0.99	5.93	No Trend	0.6213
WBEMH	Annual	SWTEMP	0.00	0.0547	0.03	17.00	0.69	4.07	No Trend	0.5644
WBEMH	Annual	BWTEMP	0.00	0.0066	0.04	16.15	0.99	6.12	Increasing	0.6381
SBEMH	Annual	STN	0.00	0.0000	-0.0214	1.3330	-0.5145	-38.60	Improving	0.3627
SBEMH	Annual	BTN	0.00	0.0000	-0.0134	1.0700	-0.3216	-30.06	Improving	0.5678
SBEMH	Annual	SDIN	0.00	0.0000	-0.0165	0.7376	-0.3951	-53.56	Improving	0.6085
SBEMH	Annual	BDIN	0.00	0.0000	-0.0093	0.5855	-0.2241	-38.27	Improving	0.3955
SBEMH	Annual	STP	0.00	0.0000	-0.0008	0.0735	-0.0202	-27.52	Improving	0.0489
SBEMH	Annual	BTP	0.00	0.0000	-0.0012	0.0788	-0.0279	-35.48	Improving	0.8500
SBEMH	Annual	SPO4F	5.19	0.0052	-0.0003	0.0478	-0.0060	-12.57	Improving	0.7088
SBEMH	Annual	BPO4F	7.61	0.0000	-0.0004	0.0478	-0.0096	-20.10	Improving	0.8641
SBEMH	Annual	SCHLA	27.20	0.3658	0.00	4.05			No Trend	0.3189
SBEMH	Annual	STSS	1.31	0.0000	-0.18	8.58	-4.27	-49.82	Improving	0.7507
SBEMH	Annual	BTSS	0.19	0.0000	-0.39	13.08	-9.46	-72.32	Improving	0.9396
SBEMH	Annual	SECCHI	0.00	0.0021	0.01	0.75	0.18	24.31	Improving	0.7801
SBEMH	Annual	SSALINITY	0.00	0.0039	0.08	14.75	1.91	12.97	Increasing	0.7277
SBEMH	Annual	BSALINITY	0.00	0.8550	0.00	18.45	-0.12	-0.65	No Trend	0.8725
SBEMH	Annual	SWTEMP	0.00	0.0161	0.04	18.20	1.03	5.65	No Trend	0.6061
SBEMH	Annual	BWTEMP	0.00	0.0000	0.09	17.10	2.16	12.61	Increasing	0.7150
ELIPH	Annual	SCHLA	0.61	0.3880	0.02	8.63	0.59	6.82	No Trend	0.0001
ELIPH	Annual	STSS	0.29	0.0037	-0.11	8.00	-3.08	-38.50	Improving	0.7924
ELIPH	Annual	BTSS	0.03	0.0343	-0.17	16.00	-4.67	-29.17	No Trend	0.1092
ELIPH	Annual	SECCHI	0.00	0.0011	0.00	1.10	-0.13	-11.57	Degrading	0.4494
ELIPH	Annual	SSALINITY	0.00	0.0475	-0.04	21.01	-1.19	-5.66	No Trend	0.9770
ELIPH	Annual	BSALINITY	0.00	0.0068	-0.05	24.39	-1.39	-5.68	Decreasing	0.9755
ELIPH	Annual	SWTEMP	0.00	0.0744	0.02	20.00	0.49	2.43	No Trend	0.7264
ELIPH	Annual	BWTEMP	0.00	0.3636	0.01	17.90	0.36	2.02	No Trend	0.9042

Appendix A - Section IIc. Seasonal Kendall Long-term trends in water quality for the York River (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, SCHLA=Surface chlorophyll *a*, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids, SEECCHI=Secchi depth, BDO=Bottom dissolved oxygen, SSALIN=Surface salinity, BSALIN=Bottom salinity, SWTEMP=Surface water temperature, BWTEMP=Bottom water temperature.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute		% Change	Direction	Homogeneity test
						Baseline	Change			P value
PMKTF	Annual	SCHLA	8.04	0.0225	-0.02	3.10	-0.52	-16.64	No Trend	0.3501
PMKTF	Annual	STSS	0.29	0.0000	0.33	14.00	8.33	59.52	Degrading	0.7974
PMKTF	Annual	BTSS	0.21	0.2521	0.13	20.50	3.13	15.24	No Trend	0.4767
PMKTF	Annual	SECCHI	0.00	0.0000	-0.01	0.70	-0.20	-28.57	Degrading	0.1485
PMKTF	Annual	SSALINITY	0.00	0.0000	0.00	0.01	0.00	0.00	Unchanged	0.4526
PMKTF	Annual	BSALINITY	0.00	0.0000	0.00	0.01	0.00	0.00	Unchanged	0.4251
PMKTF	Annual	SWTEMP	0.00	0.0287	0.04	18.00	1.03	5.73	No Trend	0.7772
PMKTF	Annual	BWTEMP	0.00	0.0187	0.04	19.10	1.18	6.17	No Trend	0.8690
PMKOH	Annual	SCHLA	2.95	0.2065	0.02	6.38	0.66	10.37	No Trend	0.6445
PMKOH	Annual	STSS	0.09	0.0100	-0.50	48.00	-14.00	-29.17	Improving	0.7277
PMKOH	Annual	BTSS	0.11	0.2373	-0.82	102.00	-20.39	-19.99	No Trend	0.5164
PMKOH	Annual	SECCHI	0.00	0.0009	0.00	0.30	0.00	0.00	Unchanged	0.8771
PMKOH	Annual	SSALINITY	0.00	0.0013	0.04	3.49	1.17	33.62	Increasing	0.9972
PMKOH	Annual	BSALINITY	0.00	0.0018	0.05	4.31	1.30	30.24	Increasing	0.9914
PMKOH	Annual	SWTEMP	0.00	0.2287	0.01	20.55	0.40	1.95	No Trend	0.8549
PMKOH	Annual	BWTEMP	0.00	0.1286	0.02	20.70	0.54	2.59	No Trend	0.7545
MPNTF	Annual	SCHLA	11.29	0.0000	-0.05	3.10	-1.40	-45.16	Improving	0.3996
MPNTF	Annual	STSS	3.11	0.3655	0.00	6.50	0.00	0.00	No Trend	0.0027
MPNTF	Annual	BTSS	1.83	0.9022	0.00	8.25	0.00	0.00	No Trend	0.0051
MPNTF	Annual	SECCHI	0.00	0.0002	-0.01	1.00	-0.22	-21.54	Degrading	0.0515
MPNTF	Annual	SSALINITY	0.00	0.0124	0.00	0.01	0.00	0.00	No Trend	0.9535
MPNTF	Annual	BSALINITY	0.00	0.0231	0.00	0.01	0.00	0.00	No Trend	0.9661
MPNTF	Annual	SWTEMP	0.00	0.0010	0.06	17.50	1.60	9.13	Increasing	0.9398
MPNTF	Annual	BWTEMP	0.00	0.0067	0.05	18.58	1.40	7.54	Increasing	0.8753
MPNOH	Annual	SCHLA	4.55	0.9065	0.00	4.25	0.00	0.00	No Trend	0.3705
MPNOH	Annual	STSS	0.17	0.1697	0.15	26.00	4.20	16.15	No Trend	0.1400
MPNOH	Annual	BTSS	0.11	0.0763	0.50	44.00	14.00	31.82	No Trend	0.4533
MPNOH	Annual	SECCHI	0.00	0.5961	0.00	0.48	0.00	0.00	No Trend	0.1172
MPNOH	Annual	SSALINITY	0.00	0.0000	0.09	3.38	2.53	74.75	Increasing	0.9671
MPNOH	Annual	BSALINITY	0.00	0.0000	0.10	4.31	2.74	63.52	Increasing	0.9873
MPNOH	Annual	SWTEMP	0.00	0.0155	0.03	20.50	0.88	4.31	No Trend	0.9519
MPNOH	Annual	BWTEMP	0.00	0.0282	0.03	20.33	0.83	4.09	No Trend	0.9820
YRKMH	Annual	SCHLA	0.47	0.0051	0.11	9.59	3.03	31.60	Degrading	0.3638
YRKMH	Annual	STSS	0.00	0.3166	-0.10	27.00	-2.50	-9.26	No Trend	0.8030
YRKMH	Annual	BTSS	0.08	0.0116	0.56	39.00	13.89	35.61	No Trend	0.7101
YRKMH	Annual	SECCHI	0.00	0.3546	0.00	0.60	0.00	0.00	No Trend	0.2249
YRKMH	Annual	SSALINITY	0.00	0.9506	0.00	12.43	0.05	0.41	No Trend	0.9984
YRKMH	Annual	BSALINITY	0.00	0.4877	-0.02	13.58	-0.44	-3.27	No Trend	0.9651
YRKMH	Annual	SWTEMP	0.00	0.2266	0.02	20.05	0.44	2.22	No Trend	0.9255
YRKMH	Annual	BWTEMP	0.00	0.0405	0.03	19.90	0.82	4.10	No Trend	0.8765
YRKPH	Annual	SCHLA	0.43	0.0440	0.05	8.00	1.36	17.01	No Trend	0.0144
YRKPH	Annual	STSS	0.80	0.0063	0.11	6.00	3.11	51.85	Degrading	0.4214
YRKPH	Annual	BTSS	0.18	0.0005	0.38	17.75	9.38	52.82	Degrading	0.8182
YRKPH	Annual	SECCHI	0.00	0.0001	-0.01	1.20	-0.22	-17.95	Degrading	0.3945
YRKPH	Annual	SSALINITY	0.00	0.0014	-0.06	20.65	-1.72	-8.35	Decreasing	0.9937
YRKPH	Annual	BSALINITY	0.00	0.0003	-0.07	21.84	-1.84	-8.42	Decreasing	0.7971
YRKPH	Annual	SWTEMP	0.00	0.3419	0.02	19.03	0.43	2.26	No Trend	0.9770
YRKPH	Annual	BWTEMP	0.00	0.2356	0.02	18.73	0.53	2.85	No Trend	0.8574

Appendix A - Section IIc. Seasonal Kendall Long-term trends in water quality for the York River (1985-2013). Continued.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
MOBPH	Annual	STN	0.00	0.0000	-0.0038	0.4853	-0.0958	-19.75	Improving	0.9993
MOBPH	Annual	BTN	0.00	0.0000	-0.0045	0.4728	-0.1132	-23.95	Improving	0.9012
MOBPH	Annual	SDIN	42.49	0.0005	0.0000	0.0297			Unchanged	0.7187
MOBPH	Annual	BDIN	34.40	0.0000	-0.0002	0.0326			Improving	0.6932
MOBPH	Annual	STP	0.41	0.0000	-0.0003	0.0270	-0.0065	-24.02	Improving	0.4680
MOBPH	Annual	BTP	0.41	0.0000	-0.0003	0.0275	-0.0085	-30.84	Improving	0.9267
MOBPH	Annual	SPO4F	63.21	0.0000	-0.0001	0.0029			HIGH BDLS	0.0023
MOBPH	Annual	BPO4F	55.65	0.0000	-0.0001	0.0030			HIGH BDLS	0.0074
MOBPH	Annual	SCHLA	0.65	0.0825	0.03	5.62	0.94	16.81	No Trend	0.2594
MOBPH	Annual	SECCHI	0.00	0.0000	-0.01	1.45	-0.36	-24.58	Degrading	0.7448
MOBPH	Annual	SSALINITY	0.00	0.0032	-0.05	22.22	-1.33	-5.97	Decreasing	0.9995
MOBPH	Annual	BSALINITY	0.00	0.0001	-0.06	22.89	-1.54	-6.73	Decreasing	0.9878
MOBPH	Annual	SWTEMP	0.00	0.0034	0.03	18.45	0.97	5.28	Increasing	0.4361
MOBPH	Annual	BWTEMP	0.00	0.0009	0.04	17.63	1.06	6.02	Increasing	0.2687



Appendix A - Section IId. Seasonal Kendall Long-term trends in water quality for the Rappahannock River (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, SCHLA=Surface chlorophyll *a*, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids, SEECHI=Secchi depth, BDO=Bottom dissolved oxygen, SSALIN=Surface salinity, BSALIN=Bottom salinity, SWTEMP=Surface water temperature, BWTEMP=Bottom water temperature.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
RPPTF	Annual	SCHLA	1.84	0.4015	-0.02	12.39	-0.69	-5.55	No Trend	0.5512
RPPTF	Annual	STSS	0.07	0.0022	-0.19	24.75	-4.69	-18.94	Improving	0.1286
RPPTF	Annual	BTSS	0.06	0.0584	-0.25	36.75	-6.25	-17.01	No Trend	0.5799
RPPTF	Annual	SECCHI	0.00	0.8513	0.00	0.50	0.00	0.00	No Trend	0.8016
RPPTF	Annual	SSALINITY	0.00	0.0000	0.00	0.01	0.03	280.00	Increasing	0.9015
RPPTF	Annual	BSALINITY	0.00	0.0000	0.00	0.01	0.03	280.00	Increasing	0.7223
RPPTF	Annual	SWTEMP	0.00	0.0314	0.03	16.33	0.87	5.31	No Trend	0.6296
RPPTF	Annual	BWTEMP	0.00	0.0182	0.03	17.75	0.90	5.05	No Trend	0.7088
RPPOH	Annual	SCHLA	2.22	0.0000	0.18	5.04	4.91	97.61	Degrading	0.5171
RPPOH	Annual	STSS	0.00	0.6937	0.00	31.50	0.00	0.00	No Trend	0.7089
RPPOH	Annual	BTSS	0.11	0.0689	0.36	38.00	9.09	23.92	No Trend	0.2484
RPPOH	Annual	SECCHI	0.00	0.0007	0.00	0.40	0.00	0.00	Unchanged	0.0083
RPPOH	Annual	SSALINITY	0.00	0.8174	0.00	2.17	0.00	0.00	No Trend	0.9924
RPPOH	Annual	BSALINITY	0.00	0.7076	0.00	2.59	0.00	0.00	No Trend	0.9918
RPPOH	Annual	SWTEMP	0.00	0.0012	0.05	16.00	1.34	8.35	Increasing	0.5050
RPPOH	Annual	BWTEMP	0.00	0.0102	0.04	16.40	1.05	6.38	No Trend	0.6744
RPPMH	Annual	SCHLA	0.16	0.0002	0.08	8.33	2.27	27.27	Degrading	0.2767
RPPMH	Annual	STSS	0.38	0.3895	-0.02	6.75	-0.53	-7.84	No Trend	0.3905
RPPMH	Annual	BTSS	0.12	0.4596	0.04	10.75	1.17	10.85	No Trend	0.2666
RPPMH	Annual	SECCHI	0.00	0.0018	-0.01	1.28	-0.19	-14.97	Degrading	0.0367
RPPMH	Annual	SSALINITY	0.00	0.0001	-0.08	15.30	-2.32	-15.19	Decreasing	0.9998
RPPMH	Annual	BSALINITY	0.00	0.0002	-0.07	17.02	-1.86	-10.90	Decreasing	0.9779
RPPMH	Annual	SWTEMP	0.00	0.0040	0.03	17.90	0.89	4.99	Increasing	0.5000
RPPMH	Annual	BWTEMP	0.00	0.0158	0.03	16.43	0.78	4.74	No Trend	0.9181
CRRMH	Annual	SCHLA	1.45	0.2637	0.03	7.33	0.83	11.32	No Trend	0.6830
CRRMH	Annual	STSS	7.56	0.1098	0.00	5.00	0.00	0.00	No Trend	0.7530
CRRMH	Annual	BTSS	4.65	0.4372	0.00	13.50	0.00	0.00	No Trend	0.6053
CRRMH	Annual	SECCHI	0.00	0.0000	-0.02	1.95	-0.43	-22.09	Degrading	0.0969
CRRMH	Annual	SSALINITY	0.00	0.0000	-0.09	16.51	-2.47	-14.96	Decreasing	1.0000
CRRMH	Annual	BSALINITY	0.00	0.0001	-0.07	16.84	-2.02	-12.01	Decreasing	0.9989
CRRMH	Annual	SWTEMP	0.00	0.0019	0.04	18.50	1.05	5.68	Increasing	0.5478
CRRMH	Annual	BWTEMP	0.00	0.0633	0.02	17.83	0.62	3.47	No Trend	0.5860

Appendix A - Section IIe. Seasonal Kendall Long-term trends in water quality for the Virginia Chesapeake Bay Mainstem (1985-2013). Parameters are as follows: STN=Surface total nitrogen, BTN=Bottom total nitrogen, SDIN=Surface dissolved inorganic nitrogen, BDIN=Bottom dissolved inorganic nitrogen, STP=Surface total phosphorus, BTP=Bottom total phosphorus, SPO4F=Surface dissolved inorganic phosphorus, BPO4F=Bottom dissolved inorganic phosphorus, SCHLA=Surface chlorophyll *a*, STSS=Surface total suspended solids, BTSS=Bottom total suspended solids, SEECHL=Secchi depth, BDO=Bottom dissolved oxygen, SSALIN=Surface salinity, BSALIN=Bottom salinity, SWTEMP=Surface water temperature, BWTEMP=Bottom water temperature.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
PIAMH	Annual	STN	0.00	0.0000	-0.0041	0.5460	-0.1031	-18.89	Improving	0.8468
PIAMH	Annual	BTN	0.00	0.0000	-0.0039	0.5615	-0.0979	-17.43	Improving	0.5048
PIAMH	Annual	SDIN	46.24	0.0468	0.0000	0.0303			HIGH BDLS	0.9809
PIAMH	Annual	BDIN	31.20	0.0239	-0.0001	0.0389			No Trend	0.9694
PIAMH	Annual	STP	2.79	0.0000	-0.0002	0.0233	-0.0055	-23.55	Improving	0.3716
PIAMH	Annual	BTP	1.39	0.0000	-0.0003	0.0240	-0.0065	-26.95	Improving	0.9519
PIAMH	Annual	SPO4F	79.67	0.0000	-0.0001	0.0022			HIGH BDLS	0.5416
PIAMH	Annual	BPO4F	76.32	0.0000	-0.0001	0.0026			HIGH BDLS	0.0739
PIAMH	Annual	SCHLA	2.24	0.3756	0.03	7.69	0.79	10.25	No Trend	0.5405
PIAMH	Annual	SECCHI	0.00	0.0000	-0.02	1.80	-0.50	-28.00	Degrading	0.4631
PIAMH	Annual	SSALINITY	0.00	0.0055	-0.05	18.17	-1.48	-8.13	Decreasing	0.9986
PIAMH	Annual	BSALINITY	0.00	0.0010	-0.06	18.92	-1.68	-8.88	Decreasing	0.9846
PIAMH	Annual	SWTEMP	0.00	0.0137	0.03	17.65	0.90	5.10	No Trend	0.1767
PIAMH	Annual	BWTEMP	0.00	0.0315	0.03	16.88	0.77	4.56	No Trend	0.2870
POCMH	Annual	STN	0.00	0.0000	-0.0062	0.6490	-0.1548	-23.84	Improving	0.9182
POCMH	Annual	BTN	0.00	0.0000	-0.0064	0.6305	-0.1601	-25.40	Improving	0.7553
POCMH	Annual	SDIN	39.39	0.0008	0.0000	0.0357			Improving	0.8175
POCMH	Annual	BDIN	34.74	0.0009	-0.0002	0.0431			Improving	0.8555
POCMH	Annual	STP	0.00	0.0000	-0.0003	0.0290	-0.0086	-29.78	Improving	0.7241
POCMH	Annual	BTP	0.00	0.0000	-0.0003	0.0263	-0.0081	-30.95	Improving	0.8708
POCMH	Annual	SPO4F	75.23	0.0000	-0.0001	0.0023			HIGH BDLS	0.9626
POCMH	Annual	BPO4F	77.95	0.0000	-0.0001	0.0020			HIGH BDLS	0.9166
POCMH	Annual	SCHLA	1.01	0.5987	-0.02	10.40	-0.45	-4.36	No Trend	0.7054
POCMH	Annual	SECCHI	0.00	0.0000	-0.01	1.10	-0.20	-18.18	Degrading	0.0586
POCMH	Annual	SSALINITY	0.00	0.0005	-0.06	19.02	-1.70	-8.95	Decreasing	0.9807
POCMH	Annual	BSALINITY	0.00	0.0002	-0.06	18.98	-1.62	-8.55	Decreasing	0.9480
POCMH	Annual	SWTEMP	0.00	0.0711	0.02	19.25	0.68	3.52	No Trend	0.4027
POCMH	Annual	BWTEMP	0.00	0.1364	0.02	19.00	0.52	2.71	No Trend	0.2912
CB5MH	Annual	STN	0.00	0.0000	-0.0055	0.6019	-0.1367	-22.71	Improving	0.7767
CB5MH	Annual	BTN	0.00	0.0000	-0.0061	0.5431	-0.1525	-28.08	Improving	0.5057
CB5MH	Annual	SDIN	27.93	0.1458	0.0000	0.0759			No Trend	0.8440
CB5MH	Annual	BDIN	12.16	0.0492	-0.0009	0.0802	-0.0219	-27.27	No Trend	0.7471
CB5MH	Annual	STP	2.20	0.0000	-0.0002	0.0243	-0.0062	-25.47	Improving	0.9097
CB5MH	Annual	BTP	0.58	0.0001	-0.0002	0.0265	-0.0057	-21.42	Improving	0.8635
CB5MH	Annual	SPO4F	74.62	0.0000	-0.0001	0.0028			HIGH BDLS	0.0215
CB5MH	Annual	BPO4F	49.66	0.0000	-0.0001	0.0030			Improving	0.0001
CB5MH	Annual	SCHLA	0.41	0.7742	-0.01	7.04	-0.21	-3.04	No Trend	0.4722
CB5MH	Annual	SECCHI	0.00	0.0003	-0.01	2.15	-0.31	-14.47	Degrading	0.4507
CB5MH	Annual	SSALINITY	0.00	0.0037	-0.05	17.21	-1.49	-8.64	Decreasing	0.9469
CB5MH	Annual	BSALINITY	0.00	0.2460	-0.02	20.97	-0.44	-2.10	No Trend	0.5928
CB5MH	Annual	SWTEMP	0.00	0.5165	0.01	17.03	0.23	1.37	No Trend	0.3565
CB5MH	Annual	BWTEMP	0.00	0.3243	0.01	16.30	0.35	2.15	No Trend	0.6193

Appendix A - Section IIe. Seasonal Kendall Long-term trends in water quality for the Virginia Chesapeake Bay Mainstem (1985-2013). - Continued.

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
CB6PH	Annual	STN	0.00	0.0000	-0.0042	0.5245	-0.1053	-20.07	Improving	0.8351
CB6PH	Annual	BTN	0.00	0.0000	-0.0046	0.4701	-0.1159	-24.66	Improving	0.9239
CB6PH	Annual	SDIN	33.30	0.0311	0.0000	0.0444			No Trend	0.7191
CB6PH	Annual	BDIN	10.03	0.0020	-0.0008	0.0647	-0.0203	-31.42	Improving	0.7025
CB6PH	Annual	STP	1.68	0.0000	-0.0003	0.0255	-0.0069	-27.16	Improving	0.9493
CB6PH	Annual	BTP	0.14	0.0000	-0.0003	0.0344	-0.0082	-23.85	Improving	0.7914
CB6PH	Annual	SPO4F	61.13	0.0000	-0.0001	0.0030			HIGH BDLS	0.0658
CB6PH	Annual	BPO4F	35.47	0.0000	-0.0001	0.0041			Improving	0.0005
CB6PH	Annual	SCHLA	0.28	0.2099	0.03	6.84	0.75	11.03	No Trend	0.6024
CB6PH	Annual	SECCHI	0.00	0.0000	-0.02	2.00	-0.49	-24.71	Degrading	0.2272
CB6PH	Annual	SSALINITY	0.00	0.0022	-0.05	19.77	-1.40	-7.08	Decreasing	0.9789
CB6PH	Annual	BSALINITY	0.00	0.0002	-0.05	23.41	-1.29	-5.51	Decreasing	0.9473
CB6PH	Annual	SWTEMP	0.00	0.1134	0.02	17.20	0.50	2.89	No Trend	0.0731
CB6PH	Annual	BWTEMP	0.00	0.3037	0.01	16.50	0.35	2.09	No Trend	0.3434
CB7PH	Annual	STN	0.00	0.0000	-0.0042	0.4698	-0.1047	-22.29	Improving	0.7311
CB7PH	Annual	BTN	0.00	0.0000	-0.0044	0.4458	-0.1102	-24.72	Improving	0.7412
CB7PH	Annual	SDIN	38.89	0.0539	0.0000	0.0256			HIGH BDLS	0.8931
CB7PH	Annual	BDIN	16.62	0.0027	-0.0006	0.0484			Improving	0.8095
CB7PH	Annual	STP	1.67	0.0000	-0.0003	0.0244	-0.0072	-29.60	Improving	0.9842
CB7PH	Annual	BTP	0.19	0.0000	-0.0004	0.0338	-0.0088	-26.03	Improving	0.7200
CB7PH	Annual	SPO4F	55.42	0.0000	-0.0001	0.0030			HIGH BDLS	0.0334
CB7PH	Annual	BPO4F	31.49	0.0000	-0.0001	0.0059			Improving	0.0205
CB7PH	Annual	SCHLA	0.39	0.0178	0.04	5.10	1.11	21.75	No Trend	0.2552
CB7PH	Annual	SECCHI	0.00	0.0000	-0.02	2.10	-0.56	-26.67	Degrading	0.1114
CB7PH	Annual	SSALINITY	0.00	0.0070	-0.05	20.82	-1.33	-6.39	Decreasing	0.9755
CB7PH	Annual	BSALINITY	0.00	0.0985	-0.02	24.35	-0.63	-2.58	No Trend	0.8315
CB7PH	Annual	SWTEMP	0.00	0.0098	0.03	16.33	0.70	4.29	Increasing	0.2818
CB7PH	Annual	BWTEMP	0.00	0.1314	0.02	16.00	0.47	2.92	No Trend	0.4673
CB8PH	Annual	STN	0.00	0.4904	-0.0004	0.3326	-0.0101	-3.05	No Trend	0.8499
CB8PH	Annual	BTN	0.00	0.4306	-0.0002	0.2480	-0.0062	-2.51	No Trend	0.3738
CB8PH	Annual	SDIN	12.03	0.0376	0.0000	0.0275	-0.0011	-3.90	No Trend	0.9185
CB8PH	Annual	BDIN	6.35	0.1696	-0.0001	0.0259	-0.0028	-10.79	No Trend	0.9724
CB8PH	Annual	STP	0.00	0.0000	-0.0004	0.0260	-0.0100	-38.42	Improving	0.0648
CB8PH	Annual	BTP	0.00	0.0000	-0.0005	0.0323	-0.0132	-41.00	Improving	0.5896
CB8PH	Annual	SPO4F	25.72	0.0000	-0.0002	0.0098			Improving	0.0264
CB8PH	Annual	BPO4F	9.72	0.0000	-0.0002	0.0135	-0.0060	-44.10	Improving	0.9775
CB8PH	Annual	SCHLA	0.67	0.0210	0.04	4.48	1.20	26.89	No Trend	0.0018
CB8PH	Annual	STSS	0.04	0.8770	0.00	6.53	-0.09	-1.38	No Trend	0.4128
CB8PH	Annual	BTSS	0.01	0.0000	-0.16	11.73	-4.38	-37.31	Improving	0.9626
CB8PH	Annual	SECCHI	0.00	0.0000	-0.02	2.03	-0.56	-27.65	Degrading	0.1722
CB8PH	Annual	SSALINITY	0.00	0.0001	-0.06	25.50	-1.82	-7.14	Decreasing	0.9949
CB8PH	Annual	BSALINITY	0.00	0.0017	-0.03	30.00	-0.92	-3.07	Decreasing	0.7449
CB8PH	Annual	SWTEMP	0.00	0.0254	0.02	15.75	0.70	4.44	No Trend	0.3808
CB8PH	Annual	BWTEMP	0.00	0.2780	0.01	15.15	0.39	2.54	No Trend	0.5110

Appendix A - Section II. Seasonal Kendall Long-term trends in Summer dissolved oxygen for all tributaries and the Virginia Chesapeake Bay Mainstem (1985-2013).

Segment	Season	Parameter	% BDL	P value	Slope	Absolute			Homogeneity test	
						Baseline	Change	% Change	Direction	P value
APPTF	Summer1	BDO	0.00	0.0215	0.03	8.20	0.70	8.54	No Trend	0.4542
JMSTF1	Summer1	BDO	0.00	0.2666	-0.02	6.20	-0.43	-6.87	No Trend	0.4246
JMSTF2	Summer1	BDO	0.00	0.0823	0.02	6.40	0.50	7.83	No Trend	0.9160
CHKOH	Summer1	BDO	0.00	0.2755	0.01	5.75	0.31	5.43	No Trend	0.2991
JMSOH	Summer1	BDO	0.00	0.0010	-0.02	6.88	-0.64	-9.34	Degrading	0.5407
JMSMH	Summer1	BDO	0.00	0.3021	-0.01	6.35	-0.18	-2.83	No Trend	0.0396
JMSPH	Summer1	BDO	0.00	0.0000	0.03	5.95	0.96	16.08	Improving	0.3775
EBEMH	Summer1	BDO	0.00	0.2753	0.02	3.25	0.39	12.13	No Trend	0.6896
WBEMH	Summer1	BDO	0.00	0.5610	0.01	4.40	0.34	7.69	No Trend	0.3764
SBEMH	Summer1	BDO	0.00	0.0661	0.04	2.65	0.89	33.44	No Trend	0.8096
ELIPH	Summer1	BDO	0.00	0.7820	0.00	5.30	-0.06	-1.17	No Trend	0.2113
PMKTF	Summer1	BDO	0.00	0.0001	0.03	5.35	0.93	17.45	Improving	0.9807
PMKOH	Summer1	BDO	0.00	0.1852	-0.01	4.88	-0.35	-7.18	No Trend	0.7775
MPNTF	Summer1	BDO	0.00	0.1331	0.01	5.85	0.29	4.91	No Trend	0.3759
MPNOH	Summer1	BDO	0.00	0.4798	-0.01	5.05	-0.16	-3.07	No Trend	0.6854
YRKMH	Summer1	BDO	0.00	0.8221	0.00	5.08	0.02	0.31	No Trend	0.2954
YRKPH	Summer1	BDO	0.00	0.1608	0.02	4.75	0.54	11.46	No Trend	0.3385
MOBPH	Summer1	BDO	0.00	0.0005	0.03	5.95	0.79	13.23	Improving	0.1975
RPPTF	Summer1	BDO	0.00	0.0004	-0.03	7.38	-0.96	-13.08	Degrading	0.6814
RPPOH	Summer1	BDO	0.00	0.0886	0.01	6.25	0.42	6.72	No Trend	0.7237
RPPMH	Summer1	BDO	0.00	0.3478	-0.01	5.38	-0.39	-7.18	No Trend	0.5434
CRRMH	Summer1	BDO	0.00	0.1024	-0.03	4.95	-0.91	-18.38	No Trend	0.4501
PIAMH	Summer1	BDO	0.00	0.0003	0.06	6.45	1.58	24.42	Improving	0.0431
POCMH	Summer1	BDO	0.00	0.0011	0.02	6.60	0.63	9.60	Improving	0.3324
CB5MH	Summer1	BDO	0.00	0.5616	-0.01	4.51	-0.28	-6.19	No Trend	0.0123
CB6PH	Summer1	BDO	0.00	0.2206	0.01	4.68	0.36	7.78	No Trend	0.0389
CB7PH	Summer1	BDO	0.00	0.2515	0.01	5.80	0.25	4.34	No Trend	0.2048
CB8PH	Summer1	BDO	0.00	0.0006	0.02	6.35	0.60	9.52	Improving	0.2506
APPTF	Summer2	BDO	0.00	0.0176	0.03	6.70	0.84	12.54	No Trend	0.3650
JMSTF1	Summer2	BDO	0.00	0.0887	-0.02	6.20	-0.67	-10.84	No Trend	0.9395
JMSTF2	Summer2	BDO	0.00	0.2137	0.01	6.40	0.35	5.47	No Trend	0.9044
CHKOH	Summer2	BDO	0.00	0.2385	0.01	5.75	0.34	5.90	No Trend	0.1769
JMSOH	Summer2	BDO	0.00	0.0078	-0.02	6.98	-0.56	-8.03	Degrading	0.3718
JMSMH	Summer2	BDO	0.00	0.8663	0.00	6.15	0.04	0.61	No Trend	0.1571
JMSPH	Summer2	BDO	0.00	0.0000	0.04	5.90	1.15	19.50	Improving	0.5989
EBEMH	Summer2	BDO	0.00	0.2006	0.03	3.00	0.63	20.95	No Trend	0.5726
WBEMH	Summer2	BDO	0.00	0.3214	0.02	4.40	0.48	10.91	No Trend	0.3202
SBEMH	Summer2	BDO	0.00	0.1086	0.04	2.55	0.87	34.31	No Trend	0.6171
ELIPH	Summer2	BDO	0.00	0.8194	0.00	4.88	0.07	1.48	No Trend	0.1623
PMKTF	Summer2	BDO	0.00	0.0003	0.04	5.08	1.00	19.70	Improving	0.9527
PMKOH	Summer2	BDO	0.00	0.0932	-0.02	4.85	-0.44	-9.15	No Trend	0.9759
MPNTF	Summer2	BDO	0.00	0.0455	0.02	5.45	0.53	9.66	No Trend	0.5166
MPNOH	Summer2	BDO	0.00	0.2572	-0.01	5.05	-0.27	-5.41	No Trend	0.7420
YRKMH	Summer2	BDO	0.00	0.8810	0.00	5.10	-0.01	-0.25	No Trend	0.2020
YRKPH	Summer2	BDO	0.00	0.1551	0.02	4.90	0.60	12.28	No Trend	0.1981
MOBPH	Summer2	BDO	0.00	0.0024	0.03	5.48	0.93	17.05	Improving	0.0970
RPPTF	Summer2	BDO	0.00	0.0003	-0.04	6.98	-1.18	-16.88	Degrading	0.8685
RPPOH	Summer2	BDO	0.00	0.2890	0.01	6.13	0.33	5.37	No Trend	0.7787
RPPMH	Summer2	BDO	0.00	0.6237	-0.01	5.38	-0.23	-4.25	No Trend	0.4218
CRRMH	Summer2	BDO	0.00	0.1601	-0.03	4.50	-0.86	-19.06	No Trend	0.2670
PIAMH	Summer2	BDO	0.00	0.0003	0.06	5.93	1.79	30.13	Improving	0.0270
POCMH	Summer2	BDO	0.00	0.0015	0.03	6.45	0.80	12.48	Improving	0.2470
CB5MH	Summer2	BDO	0.00	0.6931	-0.01	4.78	-0.28	-5.86	No Trend	0.0044
CB6PH	Summer2	BDO	0.00	0.0358	0.03	4.18	0.79	18.86	No Trend	0.1311
CB7PH	Summer2	BDO	0.00	0.0470	0.02	5.80	0.53	9.13	No Trend	0.7257
CB8PH	Summer2	BDO	0.00	0.0009	0.02	6.15	0.67	10.93	Improving	0.1646