

MASON COUNTY VSP
5-year REPORT
SUPPLEMENTAL ATTACHMENT

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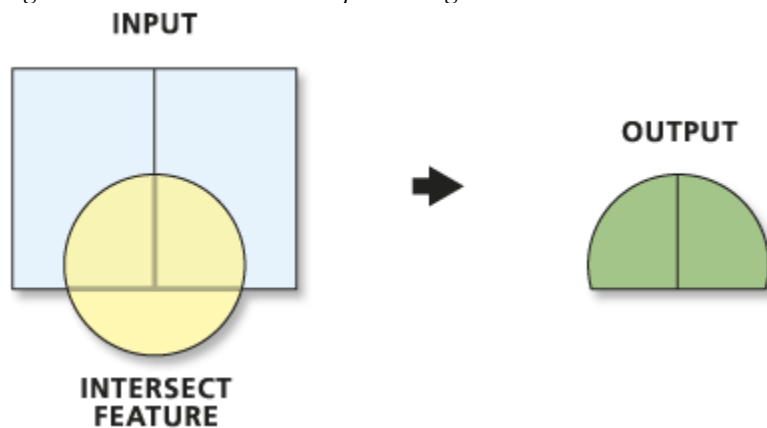
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Methods

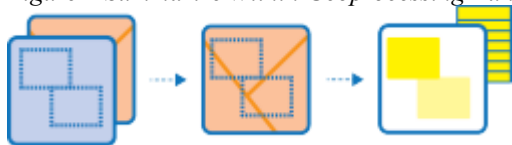
Geospatial analyses were conducted in ESRI ArcGIS Pro to quantify the spatial intersection of agricultural land use with regulated critical areas from a 2011 baseline through to current conditions. Agricultural parcels were overlaid with Critical Aquifer Recharge Areas (CARA); (2) Frequently Flooded Areas (FEMA flood-map zones); Geologically Hazardous Areas; Wetlands (via National Wetlands Inventory (NWI) co-witnessed with highly hydric soil layers from the USGS); and State Priority Habitat and Species (PHS) areas mapped by Washington Department of Fish and Wildlife (WDFW). Using the “Pairwise Intersect” tool, agriculture-critical area overlaps were extracted, and the “Summarize Within” procedure quantified acreage of intersection per Water Resource Inventory area (WRIA)

Figure 1 Pairwise Intersect Geoprocessing Function



Note: Computes a pairwise intersection of the input features. Features or portions of features that overlap between the input feature layers or feature classes will be written to the output feature class. Pairwise intersection refers to selecting one feature from the first input and intersecting it with the features in the second input that it overlaps. (*Pairwise Intersect (Analysis)—ArcGIS Pro | Documentation*)

Figure 2 Summarize Within Geoprocessing Function



Note: Overlays a polygon layer with another layer to summarize the number of points, length of the lines, or area of the polygons within each polygon, and calculate attribute field statistics about the features within the polygons. (*Summarize Within (Analysis)—ArcGIS Pro | Documentation*)

Agricultural Best Management Practices (BMPs) implemented on agricultural lands intersecting these critical areas were catalogued from implementation records, deduplicated, and summarized in reference to goals and benchmarks established in the Mason County Watershed Work Plan (2017). Analyses compared the 2011 baseline to two subsequent implementation windows (2016–2025; 2021–2025) data reporting period is from January of starting year until July 2025. In Microsoft Excel the metrics “acres of critical-area overlap” divided by “agricultural acres”

(and separately “critical-area acres / total watershed acres”) were computed to derive overlap rates. Rates of change were calculated according to $(\text{Final} - \text{Initial}) / \text{Initial} \times 100\%$.

Effectiveness monitoring of key critical-area functions and values included sampling for stream temperature, turbidity, fecal coliform (CFU/100 mL), and dissolved oxygen (DO). These were graphed by year and month and fitted with linear trendlines. Fecal coliform data were additionally \log_{10} -transformed and fitted with an exponential trendline to accommodate a wide dynamic range of values and reveal underlying linear relationships when plotted on a log scale. Trends in these water-quality parameters were interpreted in the context of agricultural influence and restoration practice implementation. Literature supports the use of temperature, DO and turbidity as reliable indicators of water quality and anthropogenic influence for critical area functions of wetlands, fish and wildlife habitat, and critical aquifer recharge areas.

Other authoritative direct sample data sets were examined for indicators of critical aquifer recharge area functions and values such as closure reports, Washington Department of Ecology well and drinking water contamination areas, and well head protection areas. However, no changes from baseline were identified.

US Department of Agriculture’s agricultural census was examined to note trends on economic changes. This information only references county wide changes; however, inferences could be made regarding percentage of County agricultural per WRIA.

For WRIA 14, a comparative LiDAR analysis (2007 vs. 2019) of 200-foot stream-buffer canopy height was performed to identify restorable acres (canopy < 5 ft). Ground-truth verification was undertaken using a handheld GNSS unit (Geode GPS) and ArcGIS Field Maps to confirm mapped acreages of sources such as HRCD (High Resolution Change Detection) data. In-office aerial imagery verification was performed using NAIP imagery (2010, 2018, 2023) and Google Earth historic imagery. Ground-truth data were used to challenge mapped agricultural extents but were not used to correct mapped wetland acreages due to high error rates in the NWI layer.

Quality assurance/quality control (QA/QC) procedures included deduplication of BMP records, cross-checking spatial layers for projection and unit consistency, checking time-series data for outliers, and verifying the log-transformation and exponential fit for coliform data to ensure statistical assumptions were met. All GIS analyses were performed in the Washington State Plane (NAD83) coordinate system unless otherwise noted.

Source Tables

Table 1 Agricultural Best Management Practices Installed

14 - Kennedy - Goldsborough																
Critical Area	Baseline Counts BMPs 2011				2015-2025 10 yr BMPs				2021-2025 5-year BMPs				10-yr Annual Average % Increase			
	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	BMP Counts	units installed	acres installed	feet installed
Critical Aquifer Recharge Areas	34	19	189.11	0	92	39	137.89	33909	52	23	133.87	26942	17.06	10.76	-2.71	0.00
Frequently Flooded Areas	28	0	64.85	13869.20	56	8	127.21	35227	32	5	124.85	28594	10.00	0.00	9.61	15.40
Erosion Hazard Areas	11	30	36.97	302.45	95	33	159.95	47260	58	23	154.83	29959	76.36	0.89	33.26	1552.54
Wetlands	34	5	19.70	13566.75	103	39	275.64	46570	67	29	272.74	29269	20.29	70.43	129.93	24.33
Fish and Wildlife Priority Habitat Area	9	35	16.97	13869.20	84	23	276.81	44105	61	17	273.42	28104	83.33	-3.34	153.10	21.80
Agriculture					85	20	134.16	3823	52	8	131.93	1655				
15 - Kitsap																
Critical Area	Baseline Counts BMPs 2011				2015-2025 10 yr BMPs				2021-2025 5-year BMPs				10-yr Annual Average % Increase			
	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	BMP Counts	units installed	acres installed	feet installed
Critical Aquifer Recharge Areas	21	1	13.12	0.00	36	11	76.73	18890	8	5	37	15945	7.14	74.39	48.49	0.00
Frequently Flooded Areas	7	0	4.50	962.17	22	5	43.83	19700	7	3	43.6	15945	21.43	0.00	87.42	194.75
Erosion Hazard Areas	0	2	2.56	20.98	44	15	107.53	19880	24	9	89.3	15945	0.00	61.35	409.22	9464.56
Wetlands	36	0	1.37	941.19	67	15	153.04	19880	41	9	130.34	15945	8.61	435.91	1109.86	201.22
Fish and Wildlife Priority Habitat Area	3	2	1.18	962.17	63	14	152.94	19800	41	9	130.34	15945	200.00	48.41	1288.99	195.79
Agriculture					40	4	89.27	945	18	0	49	0				
16 - Skokomish - Dosewallips																
Critical Area	Baseline Counts BMPs 2011				2015-2025 10 yr BMPs				2021-2025 5-year BMPs				10-yr Annual Average % Increase			
	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	BMP Counts	units installed	acres installed	feet installed
Critical Aquifer Recharge Areas	28	7	66.60	0	25	5	53.95	6414	13	3	53.35	5627	-1.07	-2.44	-1.90	0.00
Frequently Flooded Areas	26	0	22.84	4884.477	15	1	61.05	12274	10	1	60.95	9612	-4.23	0.00	16.73	15.13
Erosion Hazard Areas	0	11	13.02	106.5184	58	13	210.87	12304	49	11	210.27	9642	0.00	2.18	151.94	1145.11
Wetlands	46	2	6.94	4777.959	86	15	550.95	12304	76	13	549.75	9642	8.70	77.84	784.15	15.75
Fish and Wildlife Priority Habitat Area	12	12	5.98	4884.477	88	13	823.85	12304	75	11	549.75	9642	63.33	0.83	1368.37	15.19
Agriculture					46	2	607.58	3582	31	2	321.98	3145				
22 - Lower Chehalis																
Critical Area	Baseline Counts BMPs 2011				2015-2025 10 yr BMPs				2021-2025 5-year BMPs				10-yr Annual Average % Increase			
	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	Counts	UNITS	ACRES	FEET	BMP Counts	units installed	acres installed	feet installed
Critical Aquifer Recharge Areas	3	4	43.17	0.00	4	2	25.23	10540	1	1	4.5	2490	3.3	-5.3	-4.2	0.0
Frequently Flooded Areas	1	0	14.81	3166.16	3	2	25.23	10540	1	1	4.5	2490	20.0	0.0	7.0	23.3
Erosion Hazard Areas	0	7	8.44	69.05	3	2	25.23	10540	1	1	4.5	2490	0.0	-7.1	19.9	1516.5
Wetlands	7	1	4.50	3097.11	5	2	29.93	10540	2	1	9	2490	-2.9	8.1	56.6	24.0
Fish and Wildlife Priority Habitat Area	0	8	3.87	3166.16	5	2	29.93	10540	2	1	9	2490		-7.5	67.3	23.3
Agriculture					2	0	4.5	0	1	0	4.5	0				

Note: Summarized Practices Installed by WRIA, Critical Area, and Period. Counts installed sourced from 2020 5-year report and may not directly align with Watershed total installation goal units (page 167 of workplan) Critical Area Category referenced from Mason County workplan tables for best management practices (BMP) for functions and values (starting on page 93 of the workplan). Some BMP values will overlap, in such 1000ft of fence installed along an eroding riverine wetland buffer of known salmon habitat would be 1 BMP and 1000ft for Wetlands, Fish and Wildlife Habitat, AND Erosion Hazard Areas. Baseline counts from Appendix 6 of the Mason county workplan (Page 167)

Table 2 Acreage by WRIA of Critical Area and Agriculture

Critical Area	WRIA	2011 Acres	2025 Result Acres	Acres Difference	Acres % Change	Watershed Baseline 2011	Watershed 2025	Watershed Acres Difference	2011 Baseline % intersect	2025 % intersect	Intersect rate of change	2011 Watershed % Critical area	2025 Watershed % Critical Area	Watershed Critical Area Rate of Change	2011 % Watershed Critical Area is Agriculture	2025 % Watershed Critical Area is Agriculture	Watershed Is Agriculture Rate of Change
Agriculture	14 - Kennedy - Goldsborough	4,840.40	4,407.62	-432.78	-8.94%	181,277.52	181,277.52				-8.94%				2.67%	2.43%	-8.94%
Agriculture	15 - Kitsap	335.80	626.56	290.76	86.59%	119,489.03	119,489.03				86.59%				0.28%	0.52%	86.59%
Agriculture	16 - Skokomish - Dosewallips	1,704.70	2,069.64	364.94	21.41%	230,590.68	230,590.68				21.41%				0.74%	0.90%	21.41%
Agriculture	22 - Lower Chehalis	1,105.00	1,081.24	-23.76	-2.15%	132,382.67	132,382.67				-2.15%				0.83%	0.82%	-2.15%
Critical Aquifer Recharge	14 - Kennedy - Goldsborough	1,164.70	1,944.93	780.23	66.99%	36,586.40	36,117.55	-468.85	24.06%	44.13%	83.39%	20.18%	19.92%	-1.28%	3.18%	5.38%	69.16%
Critical Aquifer Recharge	15 - Kitsap	143.20	218.34	75.14	52.47%	4,004.60	3,969.01	-35.59	42.64%	34.85%	-18.28%	3.35%	3.32%	-0.89%	3.58%	5.50%	53.84%
Critical Aquifer Recharge	16 - Skokomish - Dosewallips	1,505.60	1,852.79	347.19	23.06%	11,255.40	11,513.86	258.46	88.32%	89.52%	1.36%	4.88%	4.99%	2.30%	13.38%	16.09%	20.30%
Critical Aquifer Recharge	22 - Lower Chehalis	995.30	932.78	-62.52	-6.28%	69,126.00	69,318.35	192.35	90.07%	86.27%	-4.22%	52.22%	52.36%	0.28%	1.44%	1.35%	-6.54%
Erosion Hazard Area	14 - Kennedy - Goldsborough	76.30	44.74	-31.56	-41.36%	8,176.40	8,051.90	-124.50	1.58%	1.02%	-35.61%	4.51%	4.44%	-1.52%	0.93%	0.56%	-40.46%
Erosion Hazard Area	15 - Kitsap	7.00	11.90	4.90	69.94%	7,059.00	7,215.03	156.03	2.08%	1.90%	-8.92%	5.91%	6.04%	2.21%	0.10%	0.16%	66.27%
Erosion Hazard Area	16 - Skokomish - Dosewallips	39.10	100.16	61.06	156.17%	1,559.30	1,520.41	-38.89	2.29%	4.84%	111.00%	0.68%	0.66%	-2.49%	2.51%	6.59%	162.72%
Erosion Hazard Area	22 - Lower Chehalis	0.40	0.84	0.44	109.30%	68.70	68.74	0.04	0.04%	0.08%	113.90%	0.05%	0.05%	0.06%	0.58%	1.22%	109.17%
Frequently Flooded	14 - Kennedy - Goldsborough	1,164.70	837.67	-327.03	-28.08%	8,387.70	11,510.11	3,122.41	24.06%	19.00%	-21.02%	4.63%	6.35%	37.23%	13.89%	7.28%	-47.59%
Frequently Flooded	15 - Kitsap	143.20	158.04	14.84	10.36%	29,308.80	29,777.28	468.48	42.64%	25.22%	-40.85%	24.53%	24.92%	1.60%	0.49%	0.53%	8.62%
Frequently Flooded	16 - Skokomish - Dosewallips	1,324.30	1,457.54	133.24	10.06%	16,672.20	13,375.68	-3,296.52	77.69%	70.42%	-9.35%	7.23%	5.80%	-19.77%	7.94%	10.90%	37.19%
Frequently Flooded	22 - Lower Chehalis	330.40	368.68	38.28	11.58%	7,092.80	7,131.79	38.99	29.90%	34.10%	14.04%	5.36%	5.39%	0.55%	4.66%	5.17%	10.97%
Wetlands	14 - Kennedy - Goldsborough	826.00	416.74	-409.26	-49.55%	28,376.50	13,806.71	-14,569.79	17.06%	9.45%	-44.59%	15.65%	7.62%	-51.34%	2.91%	3.02%	3.69%
Wetlands	15 - Kitsap	93.70	112.78	19.08	20.36%	7,582.40	5,423.56	-2,158.84	27.90%	18.00%	-35.49%	6.35%	4.54%	-28.47%	1.24%	2.08%	68.27%
Wetlands	16 - Skokomish - Dosewallips	377.40	249.94	-127.46	-33.77%	14,538.10	12,309.32	-2,228.78	22.14%	12.08%	-45.45%	6.30%	5.34%	-15.33%	2.60%	2.03%	-21.78%
Wetlands	22 - Lower Chehalis	173.20	57.99	-115.21	-66.52%	7,844.00	8,201.87	357.87	15.67%	5.36%	-65.78%	5.93%	6.20%	4.56%	2.21%	0.71%	-67.98%
Fish and Wildlife Critical Habitat	14 - Kennedy - Goldsborough	895.10	442.31	-452.79	-50.59%	3,908.70	1,811.11	-2,097.59	18.49%	10.04%	-45.73%	2.16%	1.00%	-53.66%	22.90%	24.42%	6.65%
Fish and Wildlife Critical Habitat	15 - Kitsap	22.90	8.62	-14.28	-62.36%	2,506.20	11,917.52	9,411.32	6.82%	1.38%	-79.83%	2.10%	9.97%	375.52%	0.91%	0.07%	-92.08%
Fish and Wildlife Critical Habitat	16 - Skokomish - Dosewallips	481.00	791.87	310.87	64.63%	21,391.10	19,092.02	-2,299.08	28.22%	38.26%	35.60%	9.28%	8.28%	-10.75%	2.25%	4.15%	84.46%
Fish and Wildlife Critical Habitat	22 - Lower Chehalis	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Note: Acreage counts from work plan and summarized from ArcGIS differences calculated by (ACRE Final – ACRE Initial). Proportion of (Agriculture, WRIA Acreage) calculated by (ACRE A / ACRE B) and represented as a percentage. Percent change calculated as ((ACRE Final – ACRE Initial) / ACRE Initial) represented as a percent. Percent Change of proportion calculated as ((PERCENT Final – PERCENT Initial)/PERCENT Initial) represented as a percent.

Table 3 Source Acreage Summaries

		WRIA																			
		On AG										Total									
Feature	Unit	Kennedy - Goldsborough		Kitsap		Lower Chehalis		Skokomish - Dosewallips		Kennedy - Goldsborough		Kitsap	Lower Chehalis	Skokomish - Dosewallips							
		Baseline Acres	2024 Acres	Baseline AG	24 Ag	Baseline AG	24 Ag	Baseline AG	24 Ag	Baseline AG	24 Ag										
ALLAG	Acres	4407.617		626.56		1081.241		2069.638		181277.5223	2.43%	119489.032	0.52%	132382.6709	0.82%	230590.6832	0.90%				
Baseline AG	Acres	4,840.40		335.8		1,105		1,704.70		181277.5223	2.67%	119489.032	0.28%	132382.6709	0.83%	230590.6832	0.74%				
WSDA10	Acres	1242.555856		14.21084509		101.8581957		855.5491994		1242.555856	100.00%	14.2108451	100.00%	101.8581957	100.00%	855.5491994	100.00%				
WSDA16	Acres	1884.224407		13.18677242		117.0151714		1069.289696		1884.224407	100.00%	13.1867724	100.00%	117.0151714	100.00%	1069.289696	100.00%				
WSDA19	Acres	3221.420503		220.5784892		963.1306592		1488.512999		3221.420503	100.00%	220.578489	100.00%	963.1306592	100.00%	1488.512999	100.00%				
WSDA20	Acres	3189.630726		220.5784892		963.1307578		1538.816734		3189.630726	100.00%	220.578489	100.00%	963.1307578	100.00%	1538.816734	100.00%				
WSDA24	Acres	3298.796765		221.2989871		978.8373864		1560.070864		3298.796765	100.00%	221.298987	100.00%	978.8373864	100.00%	1560.070864	100.00%				
303d16	Miles	1.621567393	0.03%	0.04%	0.945668734	0.28%	0.15%	0.06494604	0.01%	0.01%	2.390259169	0.14%	0.12%	57.4500218	2.82%	52.4266964	1.80%	9.510201395	0.68%	24.05000439	9.94%
303d18	Miles	5.154796413	0.11%	0.12%	1.837933532	0.55%	0.29%	0.095649633	0.01%	0.01%	2.675454778	0.16%	0.13%	55.86632447	9.23%	72.5937578	2.53%	10.77231433	0.89%	23.13565793	11.56%
303d22	Miles	5.457438482	0.11%	0.12%	1.875833226	0.56%	0.30%	0.095651018	0.01%	0.01%	2.713584465	0.16%	0.13%	55.85663907	9.77%	72.5274661	2.59%	10.77233661	0.89%	23.11476698	11.74%
CARA	Acres	1944.927	40.18%	44.13%	218.343	65.02%	34.85%	932.78	84.41%	86.27%	1852.79	108.69%	89.52%	36117.54707	5.38%	3969.0079	5.50%	69318.35401	1.35%	11513.86436	16.09%
Baseline CARA	Acres	1,164.70	24.06%	26.42%	143.2	42.64%	22.85%	995.3	90.07%	92.05%	1,505.60	88.32%	72.75%	36,586.40	3.18%	4,004.60	3.58%	69,126	1.44%	11,255.40	13.38%
EHA	Acres	44.739	0.92%	1.02%	11.896	3.54%	1.90%	0.8372	0.08%	0.08%	100.161	5.88%	4.84%	8051.93264	0.56%	7215.03221	0.16%	68.74336969	1.22%	1520.411673	6.59%
Baseline EHA	Acres	76.3	1.58%	1.73%	7	2.08%	1.12%	0.4	0.04%	0.04%	39.1	2.29%	1.89%	8,176.40	0.93%	7,059	0.10%	68.7	0.58%	1,559.30	2.51%
FEMA14	Acres	837.667	17.31%	19.00%	158.037	47.06%	25.22%	368.675	33.36%	34.10%	1457.539	85.50%	70.42%	11906.13959	7.04%	29794.6385	0.53%	7089.206214	5.20%	13692.23507	10.65%
FEMA19	Acres	836.532	17.28%	18.98%	163.18	48.59%	26.04%	368.671	33.36%	34.10%	1502.38	88.13%	72.59%	11605.74173	7.21%	29834.922	0.55%	7084.588937	5.20%	13482.43357	11.14%
FEMA24	Acres	836.53	17.28%	18.98%	158.41	47.17%	25.28%	368.67	33.36%	34.10%	1461.7	85.75%	70.63%	11510.10807	7.27%	29777.2838	0.53%	7131.790124	5.17%	13375.68288	10.93%
Baseline FFA	Acres	1164.7	24.06%	26.42%	143.2	42.64%	22.85%	330.4	29.90%	30.56%	1324.3	77.69%	63.99%	29,308.80	3.97%	8,387.70	1.71%	7,092.80	4.66%	16,672.20	7.94%
HRCD	Acres	110.48	2.28%	2.51%	47.002	14.00%	7.50%	12.028	1.09%	1.11%	16.503	0.97%	0.80%	24050.44097	0.46%	9442.84559	0.50%	10978.32499	0.11%	14049.79874	0.12%
LCH07	Acres	469.77	9.71%	10.66%	NA			NA			NA			6673.456236	7.04%	NA	#VALUE!	NA	#VALUE!	NA	#VALUE!
LCH19	Acres	303.66	6.27%	6.89%	NA			NA			NA			1517.039968	20.02%	NA	#VALUE!	NA	#VALUE!	NA	#VALUE!
LHA	Acres	309.0548017	6.38%	7.01%	140.6864663	41.90%	22.45%	25.13412843	2.27%	2.32%	103.3403935	6.06%	4.99%	24440.63027	1.26%	18238.4819	0.77%	18615.213	0.14%	23421.10347	0.44%
SHA	Acres	4032.495307	83.31%	91.49%	598.1303668	178.12%	95.46%	983.557151	89.01%	90.97%	1988.093638	116.62%	96.06%	167958.7264	2.40%	69578.7552	0.86%	89226.77028	1.10%	82421.00426	2.41%
EWL11	Acres	562.795	11.63%	12.77%	87.7	26.12%	14.00%	157.616	14.26%	14.58%	348.21	20.43%	16.82%	8265.063378	6.81%	3589.06012	2.44%	7206.506319	2.19%	5367.831683	6.49%
EWL16	Acres	563.644	11.64%	12.79%	88.79	26.44%	14.17%	157.617	14.26%	14.58%	388.236	22.77%	18.76%	8813.45263	6.40%	11842.2112	0.75%	7256.93522	2.17%	6174.78313	6.29%
EWL24	Acres	416.737	8.61%	9.45%	112.78	33.59%	18.00%	57.99	5.25%	5.36%	249.944	14.66%	12.08%	13806.71	3.02%	5423.56	2.08%	8201.87	0.71%	12309.32	2.03%
Baseline Wetland	Acres	826	17.06%	18.74%	93.7	27.90%	14.95%	173.2	15.67%	16.02%	377.4	22.14%	18.24%	28,376.50	2.91%	7,582.40	1.24%	7,844	2.21%	14,538.10	2.60%
SWFD07	Miles	36.86364292	0.76%	0.84%	8.426179251	2.51%	1.34%	12.41313823	1.12%	1.15%	54.57487532	3.20%	2.64%	409.8699731	8.99%	312.608883	2.70%	338.2488026	3.67%	590.4495684	9.24%
SWFD24	Miles	36.00354112	0.74%	0.82%	13.48807867	4.02%	2.15%	19.86625854	1.80%	1.84%	49.18627102	2.89%	2.38%	759.4995473	4.74%	530.757633	2.54%	766.0402536	2.59%	1095.343302	4.49%
FWPHS24	Miles	442.31	9.14%	10.04%	8.619	2.57%	1.38%	0	0.00%	0.00%	791.874	46.45%	38.26%	1811.11497	24.42%	11917.5243	0.07%	0	0.00%	19092.01946	4.15%
Baseline FWPCA	Acres	895.1	18.49%	20.31%	22.9	6.82%	3.65%	0	0.00%	0.00%	481	28.22%	23.24%	3,908.70	22.90%	2,506.20	0.91%	0	0.00%	21,391.10	2.25%

Note: Values sourced from Mason County Workplan for baseline and ArcGIS Pro Analysis Results

Table 4 WRIA 14 - Kennedy - Goldsborough All practices Installed 2000-2025

2000-2010			2011-2021			2016-2025					
14 Kennedy - Goldsborough						14 Kennedy - Goldsborough					
BMP	Amount	Unit	BMP	Amount	Unit	Practice	Acres	Feet	Square Feet	Tons/acre /year	Number Installed
Access Control	269.45	Acres	Access Control	11.5	Acres	Access Road		810			2
Composting Facility	1	Number	Access Road	1,700	Feet	Composting Facility					1
Conservation Cover	0.88	Acres	Animal Trails/Walkways	54	Feet	Constructed Wetland	0.54				1
Critical Area Planting	1.83	Acres	Aquatic Organism Passage	0.35	Miles	Cover Crop	0.5				3
Diversion	467	Feet	Brush Management	0.2	Acres	Critical Area Planting	5.55				4
Fence	26,601	Feet	Composting Facility	2	Number	Fence	205.48	26893			22
Fish Raceway or Tank	8,900	Feet	Constructed Wetland	0.54	Acres	Heavy Use Area Protection	2.19				20
Forage and Biomass Planting	40.41	Acres	Critical Area Planting	0.71	Acres	Hedgerow Planting		1606			3
Heavy Use Area Protection	55,086	Sq. Feet	Fence	30,141	Feet	Herbaceous Weed Control	162.53				23
Mulching	2.41	Acres	Forage and Biomass Planting	12	Acres	Herbaceous Weed Treatment	0.8				1
Nutrient Management	41	Acres	Grassed Waterway	0.007	Acres	High Tunnel System			3002		3
Prescribed Grazing	63.36	Acres	Heavy Use Area Protection	89,440	Sq. Feet	Livestock Pipeline		867			3
Riparian Forest Buffer	4.774	Acres	Hedgerow Planting	1,420	Feet	LWD Structure					1
Riparian Herbaceous Cover	0.1	Acres	Herbaceous Weed Control	5.3	Acres	Mulching	2				4
Roof Runoff Structure	15	Number	Livestock Pipeline	1,466	Feet	Multi-Story Cropping					2
Stormwater Runoff Control	0.01	Acres	Mulching	11.2	Acres	Nutrient Management					4
Stream Habitat Improvement and Management	3.2	Acres	Multi-Story Cropping	2	Acres	Pasture and Hay Planting	4.5			1	3
Streambank and Shoreline Protection	25	Feet	Nutrient Management	60	Acres	Riparian Forest Buffer	26.52	715			5
Subsurface Drain	918	Feet	Obstruction Removal	1.01	Acres	Roof Runoff Structure		200			11
Subsurface Drainage, Field Ditch	2	Feet	Restoration and Management of Rare and Declining Habitats	0.5	Acres	Roofs and Covers			11200		4
Surface Drainage, Main or Lateral	40	Feet	Riparian Forest Buffer	15.58	Acres	Stream Crossing					1
Tree/Shrub Establishment	12,214.04	Acres	Riparian Herbaceous Cover	0.27	Acres	Structures for Wildlife					3
Tree/Shrub Site Preparation	7.344	Acres	Roof Runoff Structure	9	Number	Subsurface Drain	0.13	400			7
Underground Outlet	310	Feet	Silvopasture Establishment	7	Acres	Surface Drainage, Field Ditch		1000			2
Waste Recycling	41	Acres	Stormwater Runoff Control	0.02	Acres	Trails and Walkways		0.54			1
Waste Storage Facility	5	Number	Stream Crossing	3	Number	Tree/Shrub Establishment	8.32				3
Watering Facility	2	Number	Subsurface Drain	1,667	Feet	Tree/Shrub Site Preparation	24.12				5
Wetland Wildlife Habitat Management	3.304	Acres	Subsurface Drainage, Field Ditch	1,600	Feet	Underground Outlet		1880			3
			Tree/Shrub Establishment	24.16	Acres	Waste Storage Facility					9
			Tree/Shrub Site Preparation	2.8	Acres	Waste Treatment					1
			Waste Storage Facility	1	Number	Watering Facility					13
			Waste Treatment	1	Number						
			Watering Facility	13	Number						

Note: Data Summarized from workplan adaptive management tables (2022), CPDS, NRCS, Mason Conservation District Internal tracking, and partner organizations. Duplicates removed.

Table 5 WRIA 15 - Kitsap All practices Installed 2000-2025

2000-2010			2011-2021		
15 Kitsap					
BMP	Amount	Unit	BMP	Amount	Unit
Access Control	11	Acres	Conservation Cover	0.2	Acres
Fence	720	Feet	Fence	1,600	Feet
Hedgerow Planting	164	Feet	Forage and Biomass Planting	0.5	Acres
Mulching	11.2	Acres	Heavy Use Area Protection	1,500	Sq. Feet
Multi-Story Cropping	2	Acres	Livestock Pipeline	100	Feet
Nutrient Management	60	Acres	Obstruction Removal	0.07	Acres
Obstruction Removal	0.11	Acres	Riparian Forest Buffer	21.08	Acres
Prescribed Grazing	21	Acres	Streambank and Shoreline Protection	30	Feet
Roof Runoff Structure	1	Number	Waste Storage Facility	2	Number
Tree/Shrub Establishment	0.42	Acres	Watering Facility	1	Number
Tree/Shrub Site Preparation	0.34	Acres	Wetland Restoration	2.9	Acres
2016-2025					
15 Kitsap					
Practice	Acres	Feet	Square Feet	Tons/acre /year	Number Installed
Brush Management	7.6				1
Conservation Easement	8.7				1
Critical Area Planting	1				2
Fence		2990			2
Heavy Use Area Protection	0.13		720		3
Herbaceous Weed Control	44.08				16
High Tunnel System			830.3		1
Irrigation System, Microirrigation	0.1				1
Livestock Pipeline		865			2
Mulching	1.5			0.1	1
Nutrient Management	21.5				4
Pasture and Hay Planting	18				2
Restoration of Rare or Declining Natural Communities	3.1				3
Riparian Forest Buffer	12.1	595			3
Roof Runoff Structure					1
Structures for Wildlife					1
Tree/Shrub Establishment	22.6				4
Tree/Shrub Site Preparation	41.8				11
Underground Outlet		80			1
Waste Storage Facility					2
Watering Facility					2

Note: Data Summarized from workplan adaptive management tables (2022), CPDS, NRCS, Mason Conservation District Internal tracking, and partner organizations. Duplicates removed.

Table 6 WRIA 16 - Skokomish - Dosewallips All practices Installed 2000-2025

2000-2010			2011-2021		
16 Skokomish - Dosewallips					
BMP	Amount	Unit	BMP	Amount	Unit
Conservation Cover	0.5	Acres	Cover Crop	43	Acres
Cover Crop	16,515	Acres	Fence	16,813	Feet
Critical Area Planting	0.5	Acres	Forage and Biomass Planting	20	Acres
Fence	7,862	Feet	Heavy Use Area Protection	6,892	Sq. Feet
Fish Raceway or Tank	300	Feet	Livestock Pipeline	30	Feet
Heavy Use Area Protection	43,550	Sq. Feet	Nutrient Management	40	Acres
Mulching	1.2	Acres	Riparian Forest Buffer	50.43	Acres
Nutrient Management	30.8	Acres	Waste Storage Facility	1	Number
Pest Management Conservation	33	Acres	Watering Facility	1	Number
Riparian Forest Buffer	70.23	Acres			
Streambank and Shoreline Protection	100	Feet			
Structure for Water Control	1	Number			
Tree/Shrub Establishment	1.64	Acres			
Tree/Shrub Site Preparation	1.14	Acres			
Waste Transfer	1	Number			
Wetland Restoration	0.02	Acres			
2016-2025					
16 Skokomish - Dosewallips					
Practice	Acres	Feet	Square Feet	Tons/acre /year	Number Installed
Brush Management	7.6				1
Habitat for pollinators	0.5				1
Conservation Easement	42.3				4
Dike	0	1000			1
Fence	4	7431			4
Harvest hay in a manner that allows wildlife to flush and escape	272				3
Heavy Use Area Protection	0.1				1
Herbaceous Weed Control	327.43				22
Herbaceous Weed Treatment	1				1
High Tunnel System			14576		7
Livestock Pipeline		3395			3
Access Control		187			1
Restoration of Rare or Declining Natural Communities	20.7				5
Riparian Forest Buffer	7.05	245			1
Seasonal High Tunnel System for Crops			4080		2
Transition to Organic Cropping Systems	284				3
Tree/Shrub Establishment	87.34				10
Tree/Shrub Site Preparation	140.19				29
Upland Wildlife Habitat Management	5				1
Waste Transfer					1
Watering Facility					3

Note: Data Summarized from workplan adaptive management tables (2022), CPDS, NRCS, Mason Conservation District Internal tracking, and partner organizations. Duplicates removed.

Table 7 WRIA 22 - Lower Chehalis All Practices Installed 2000-2025

2000-2010			2011-2021		
22 Lower Chehalis					
BMP	Amount	Unit	BMP	Amount	Unit
Access Control	2.56	Acres	Fence	6,350	Feet
Fence	6,434	Feet	Grade Stabilization Structure	1	Number
Forage and Biomass Planting	13	Acres	Mulching	20	Acres
Nutrient Management	13	Acres	Riparian Forest Buffer	11.18	Acres
Riparian Forest Buffer	0.03	Acres	Waste Storage Facility	1	Number
Tree/Shrub Establishment	0.11	Acres	Waste Transfer	1	Number
Tree/Shrub Site Preparation	0.03	Acres	Watering Facility	5	Number
Underground Outlet	250	Feet	Wetland Restoration	10	Acres

2016-2025					
22 Lower Chehalis					
Practice	Acres	Feet	Square Feet	Tons/acre /year	Number Installed
Fence		10800			1
Herbaceous Weed Control	4.5				1
High Tunnel System			2160		1
Restoration of Rare or Declining Natural Communities	0.2				1
Riparian Forest Buffer	39.05	670			2

Note: Data Summarized from workplan adaptive management tables (2022), CPDS, NRCS, Mason Conservation District Internal tracking, and partner organizations. Duplicates removed.

Table 8 Watershed Counts of BMP's, ISP, and ISP Surveys

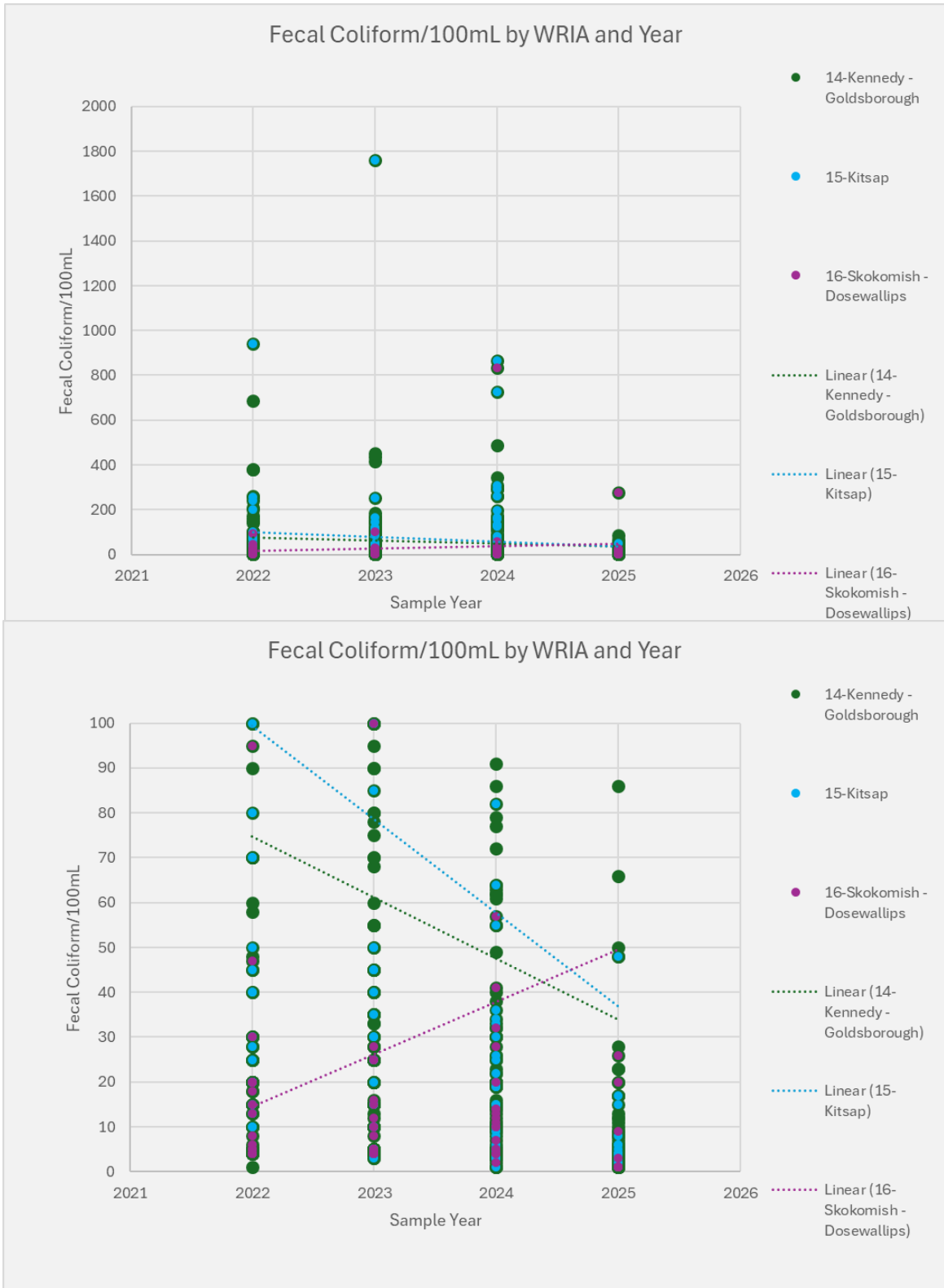
BMP Counts by Watershed							
WRIA	2000-2010 Baseline BMP Counts	2000-2010 Baseline Annual Average	2015-2025 BMP Counts	2015-2025 BMP Annual Average	2021-2025 BMP counts	2021-2025 Annual Average	Percent Change From Baseline
14 - Kennedy - Goldsborough	180	18	147	14.7	100	20	11%
15 - Kitsap	18	1.8	74	7.4	42	8.4	367%
16 - Skokomish - Dosewallips	58	5.8	103	10.3	81	16.2	179%
22 - Lower Chehalis	30	3	6	0.6	2	0.4	-87%

Individual Stewardship Plan / NRCS Farm Plan							
WRIA	2000-2010 Baseline ISP	2000-2010 Baseline Annual Average	2015-2025 ISP Counts	2015-2025 ISP Annual Average	2021-2025 ISP counts	2021-2025 Annual Average	Percent Change From Baseline
14 - Kennedy - Goldsborough	143	14.3	143	14.3	64	12.8	0%
15 - Kitsap	22	2.2	38	3.8	20	4	73%
16 - Skokomish - Dosewallips	28	2.8	43	4.3	38	7.6	54%
22 - Lower Chehalis	15	1.5	10	1	1	0.2	-33%

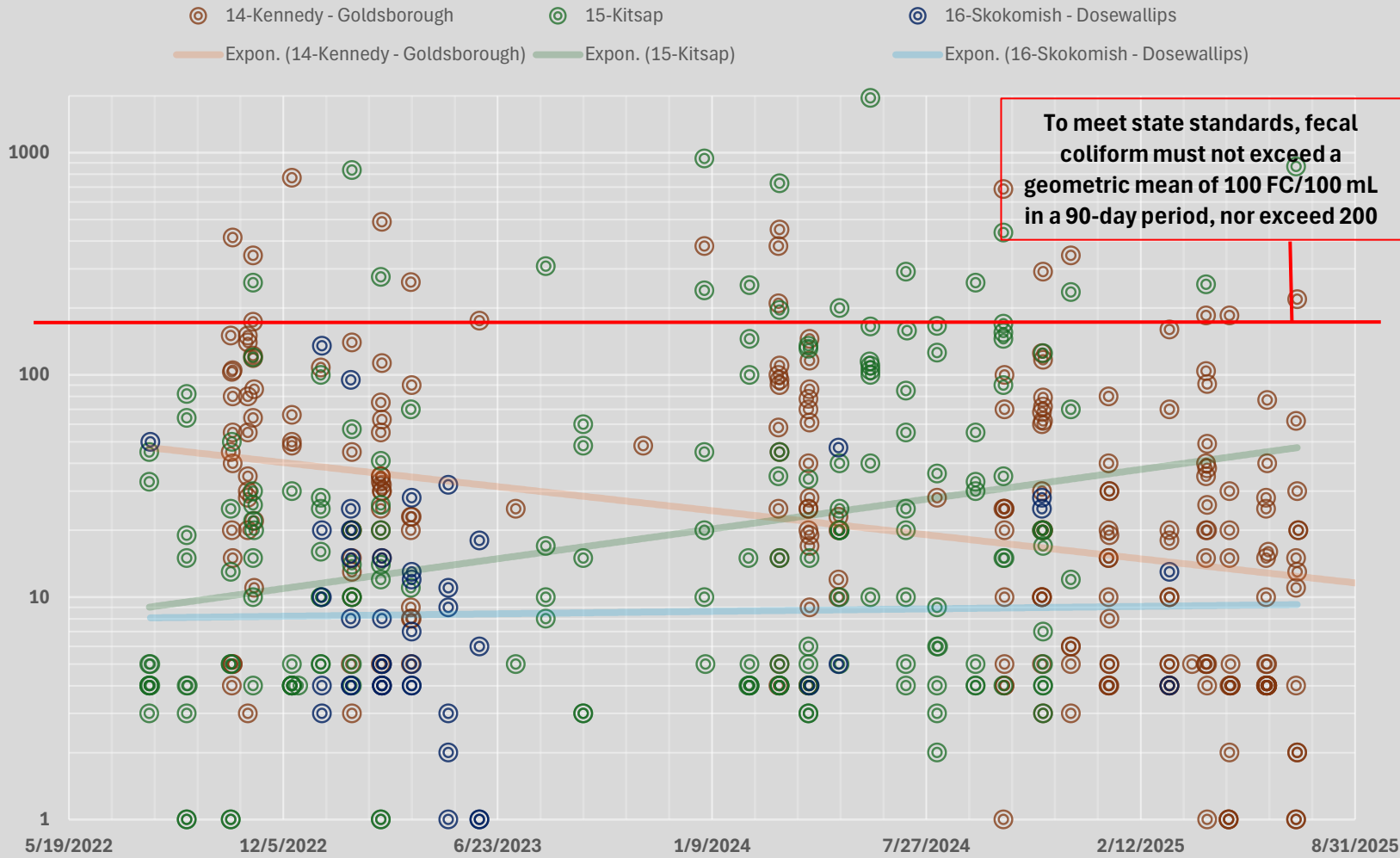
Individual stewardship survey / checklist							
WRIA	2000-2010 Baseline ISP Survey	2000-2010 Baseline Annual Average	2015-2025 ISP Survey Counts	2015-2025 ISP Survey Annual Average	2021-2025 ISP Survey counts	2021-2025 Annual Average	Percent Change From Baseline
14 - Kennedy - Goldsborough	143	14.3	176	17.6	93	18.6	23%
15 - Kitsap	22	2.2	46	4.6	25	5	109%
16 - Skokomish - Dosewallips	28	2.8	55	5.5	47	9.4	96%
22 - Lower Chehalis	15	1.5	25	2.5	11	2.2	67%

Fecal Coliform

Figure 3 Fecal Coliform by WRIA and Year



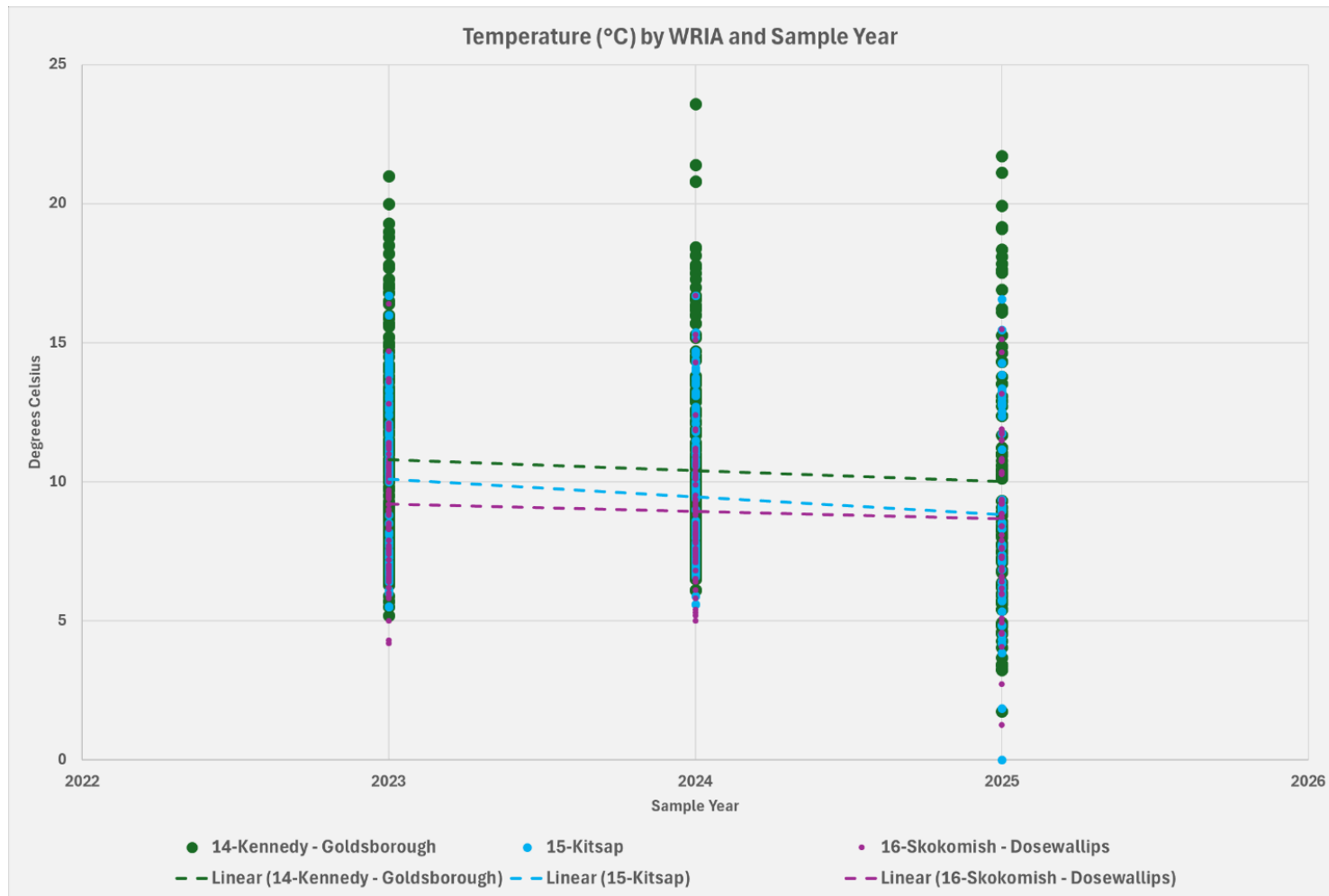
Log 10 : Fecal Coliform/100 ml



Note: linear trends in the untransformed data could be skewed by high samples in 2022 and 2023 for Kitsap and Kennedy Goldsborough. Log transformed data shows a different relationship using exponential trendline on the log transformed data. Plotted points above the 100 FC/100mL threshold support relationships. Inconclusive regarding practice implementation and timescale. More data needed, and recommendations of smaller scale

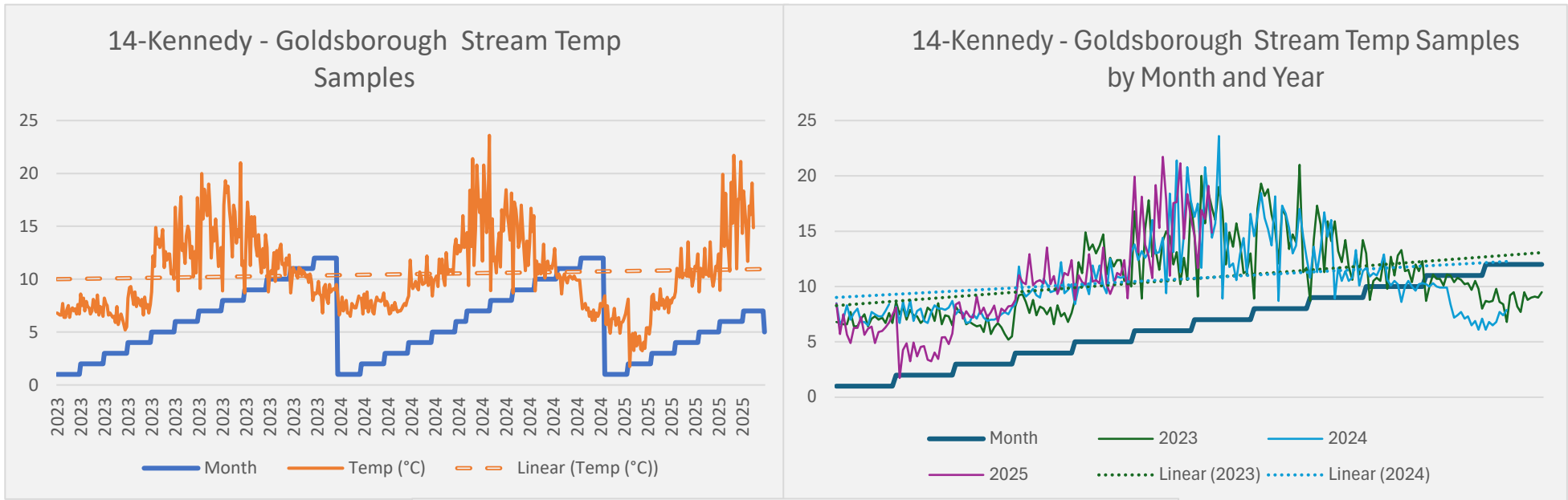
Stream Temperature

Figure 4 Stream Temperature



Note: Clustered Shows slight Trend towards cooling over time. Inconclusive regarding practice implementation and timescale. More data needed, and recommendations of smaller scale

Figure 5 WRIA 14 - Kennedy - Goldsborough Stream Temperature



Note: On a month scale from 2023-2025 slight trend toward heating over time. On the 12- and 7-months scales trend will go up but note the annual trendlines of starting and ending temperatures.

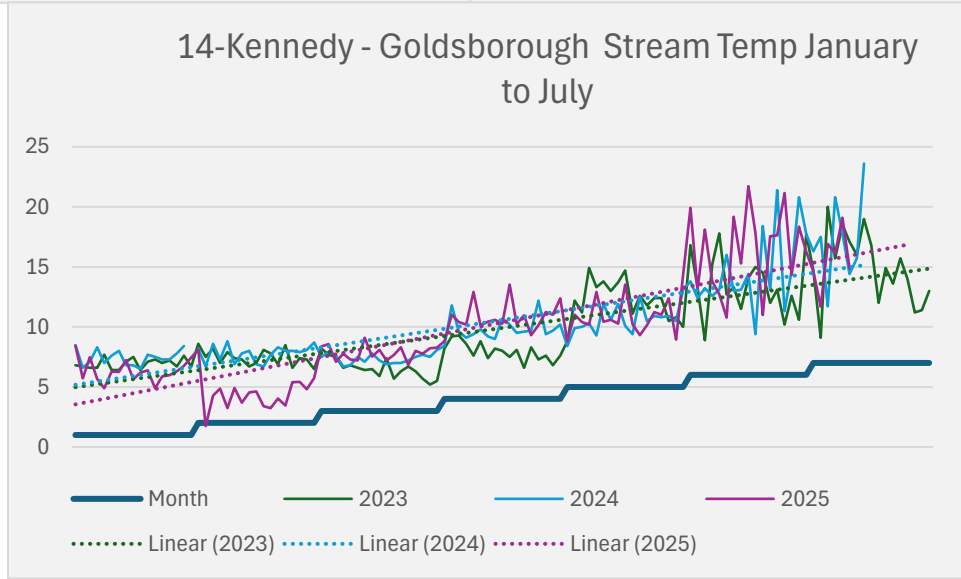
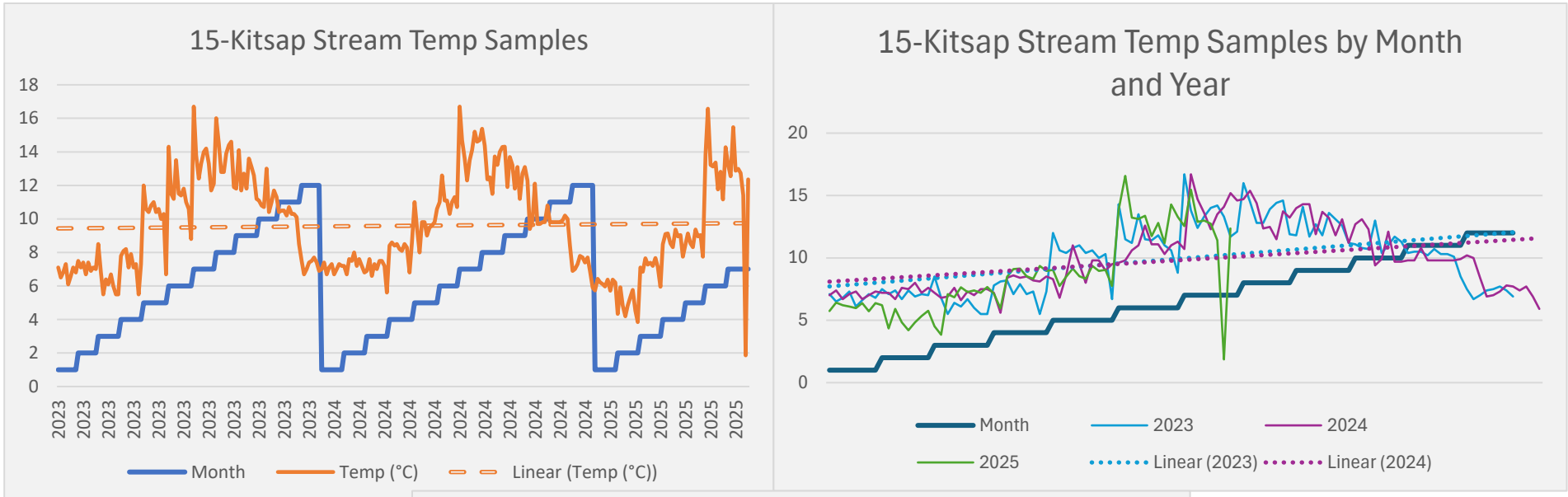


Figure 6 WRIA 15 - Kitsap Stream Temperature



Note: On a month scale from 2023-2025 slight trend toward heating over time. On the 12- and 7-months scales trend will go up but note the annual trendlines of starting and ending temperatures.

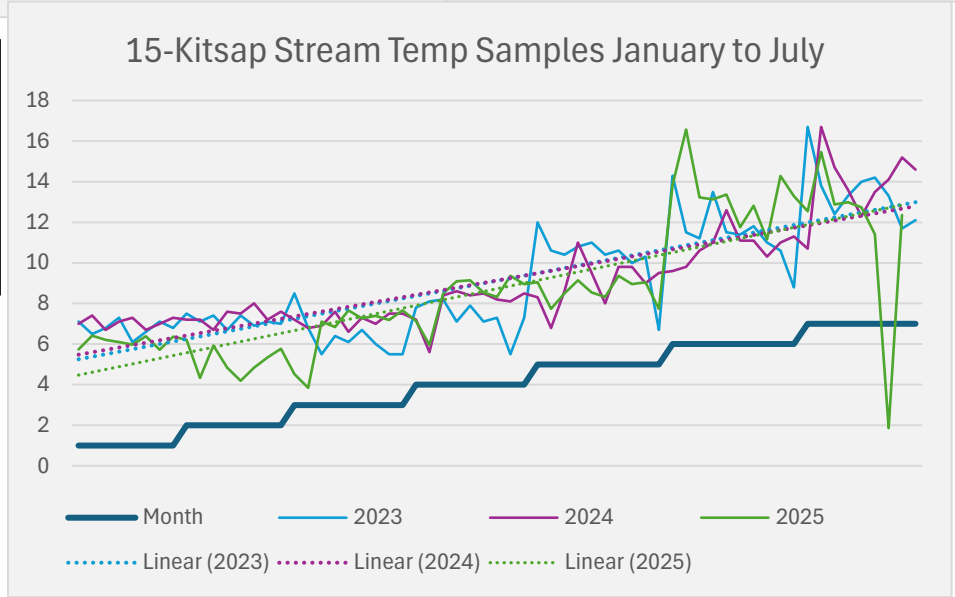
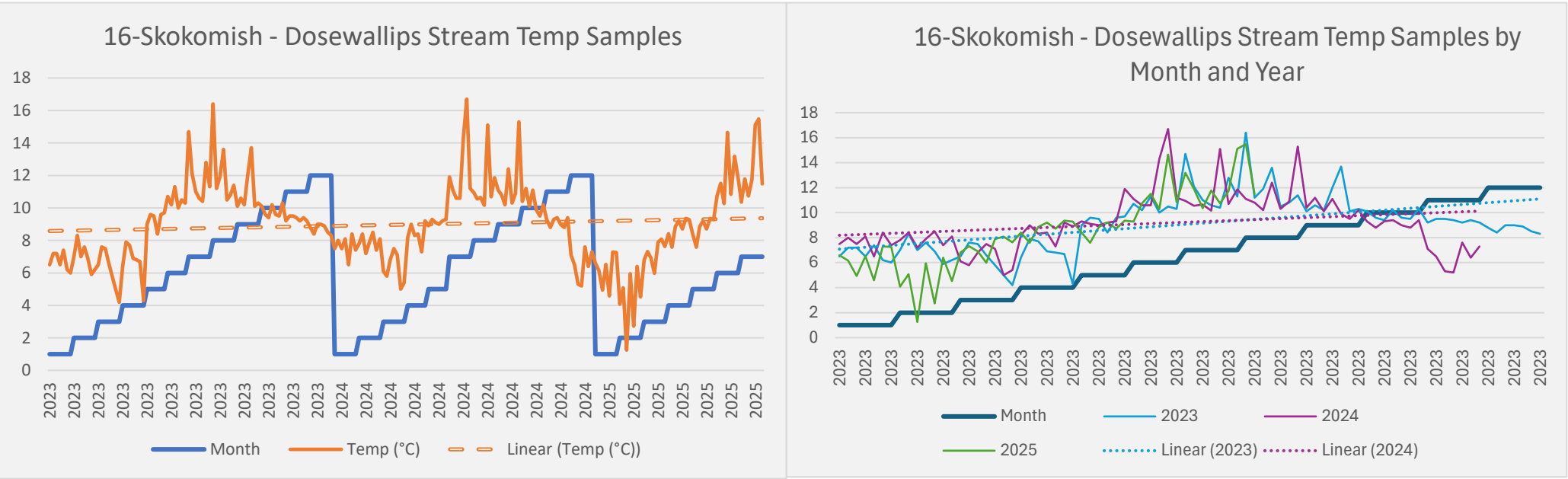


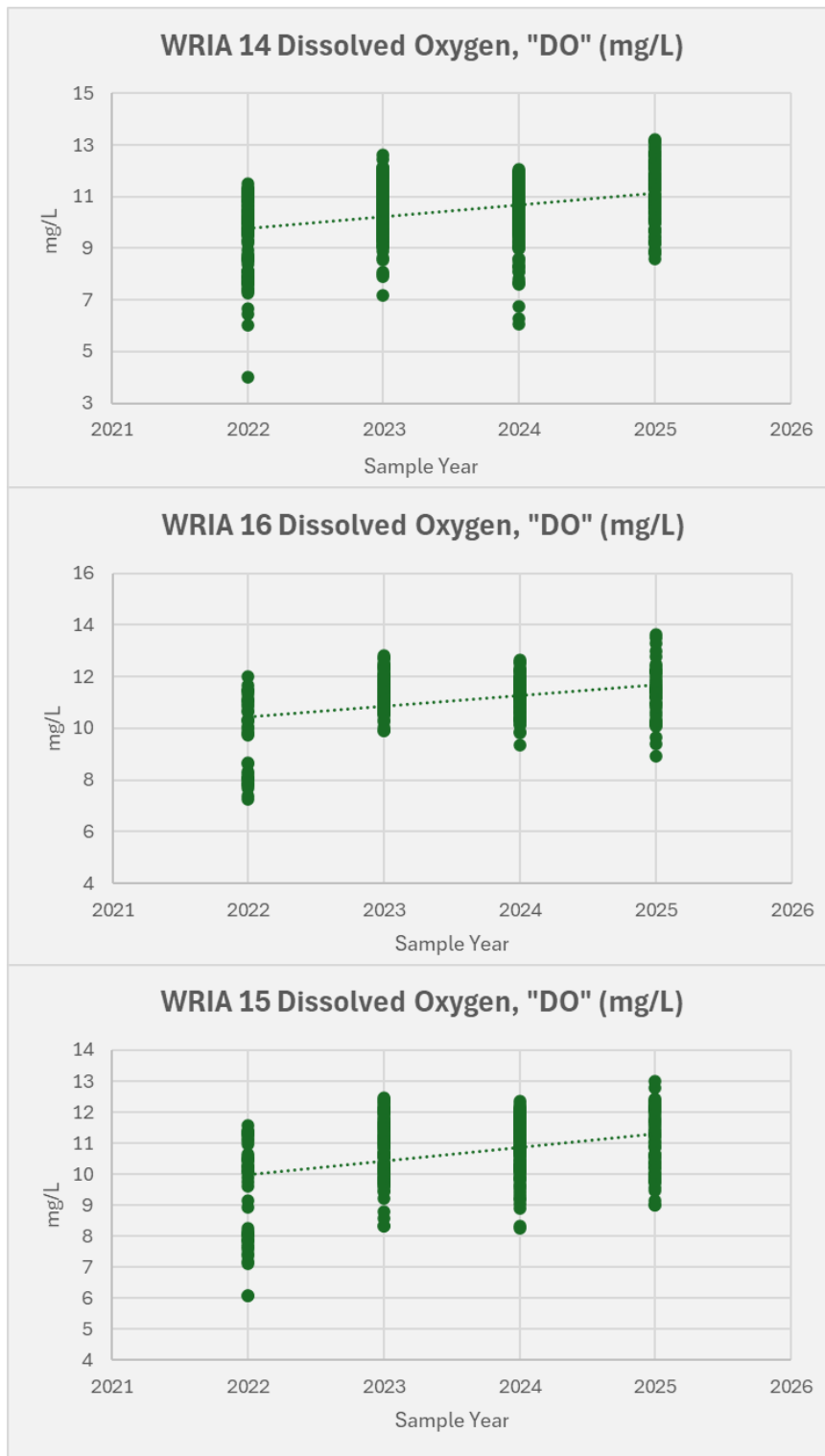
Figure 7 WRIA 16 - Skokomish - Dosewallips Stream Temperature



Note: On a month scale from 2023-2025 there is a slight trend toward heating over time. On the 12- and 7-months scales trend will go up but note the annual trendlines of starting and ending temperatures.

Dissolved Oxygen

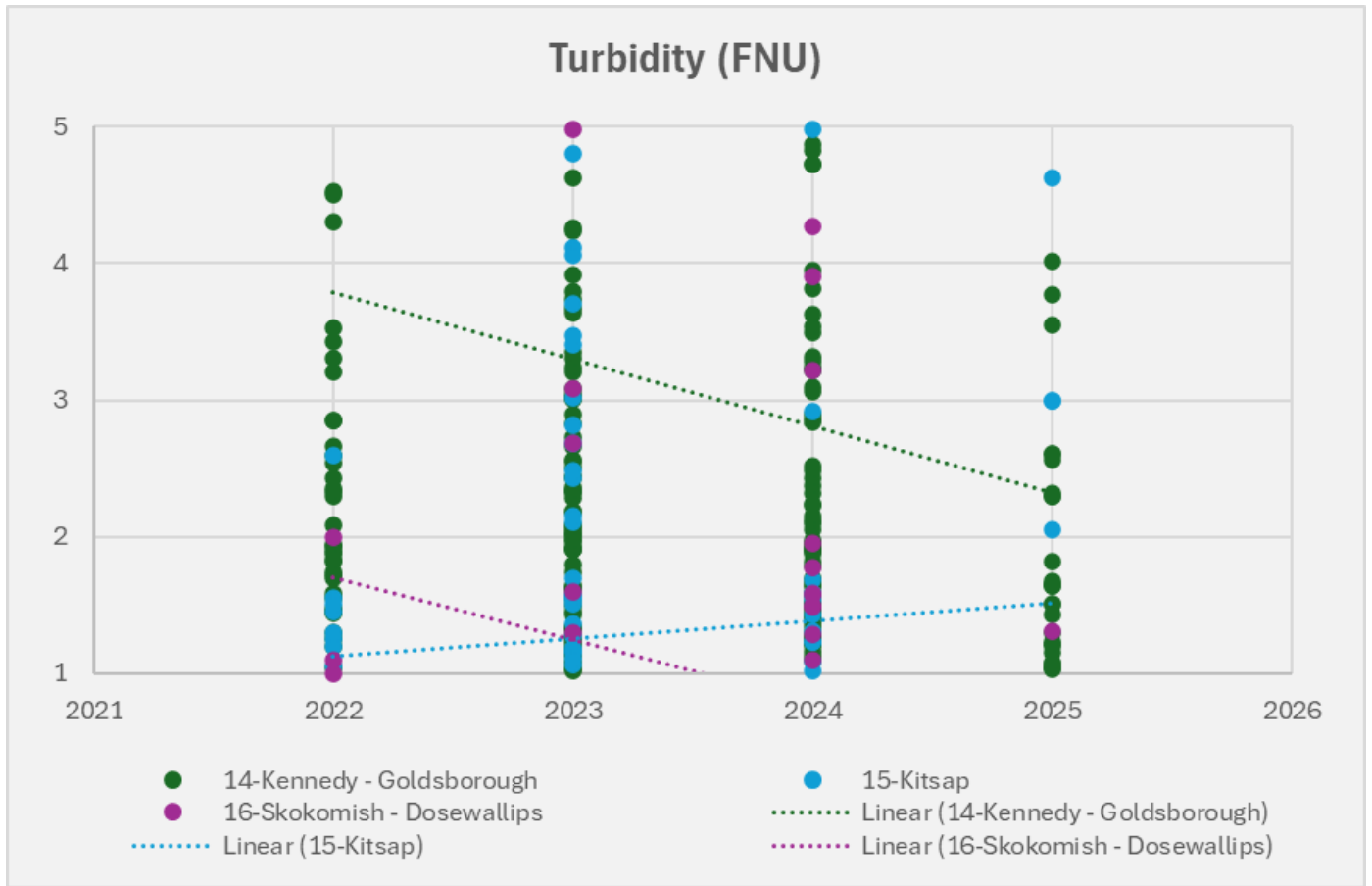
Figure 8 Dissolved Oxygen (mg/L) By WRIA and Sample Year



Note: All showing slight trend toward increasing, this is inconclusive to connect to practice implementation over the reported sample period. Results do not correlate with expected inverse relationships with fecal coliform.

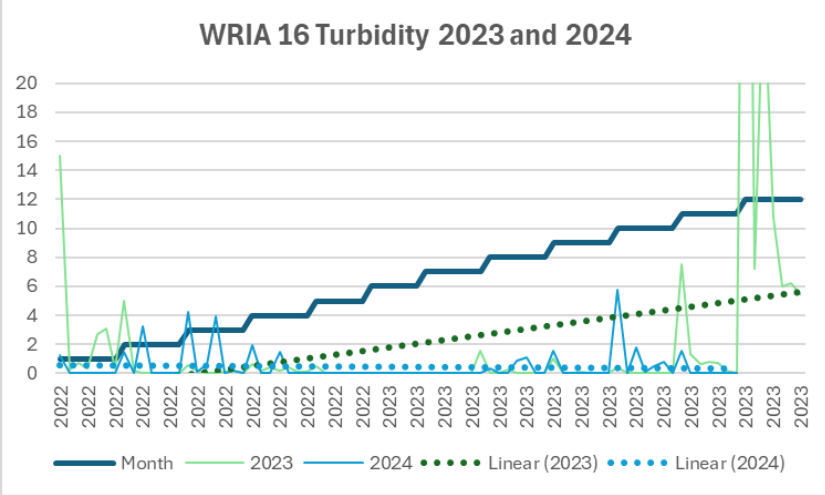
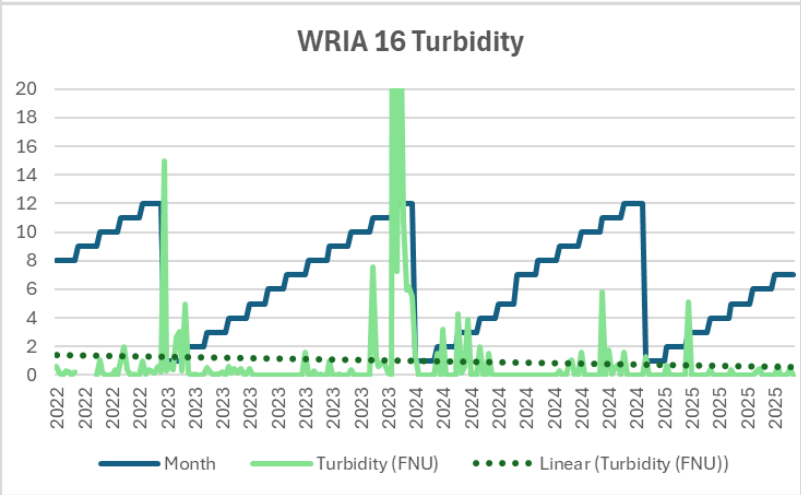
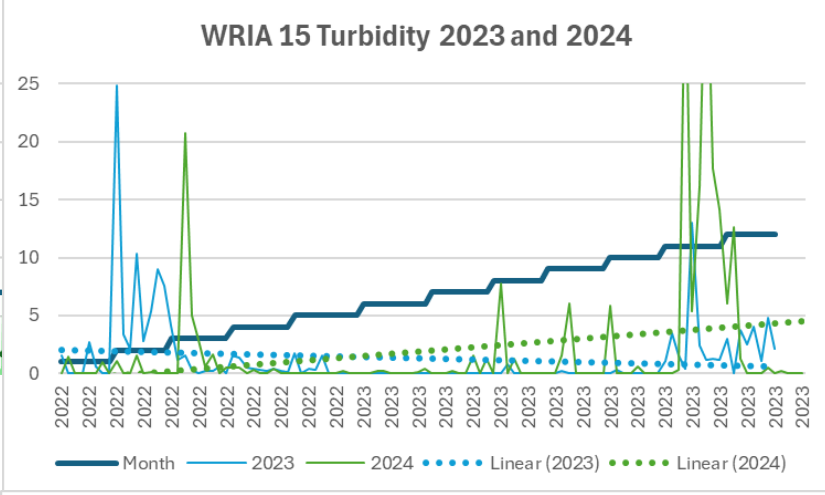
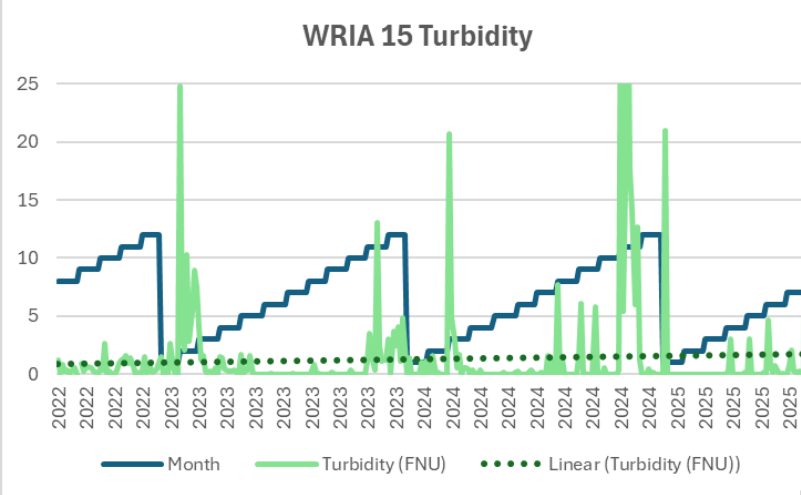
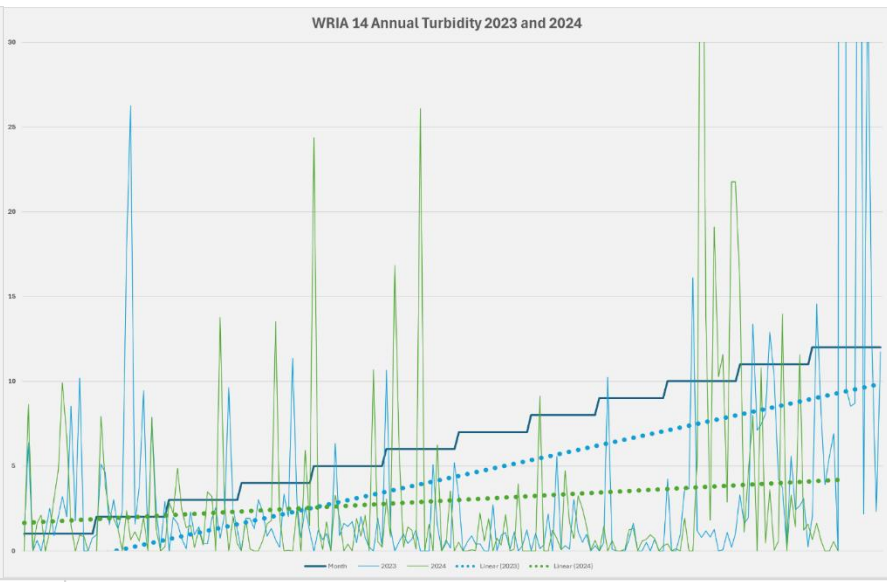
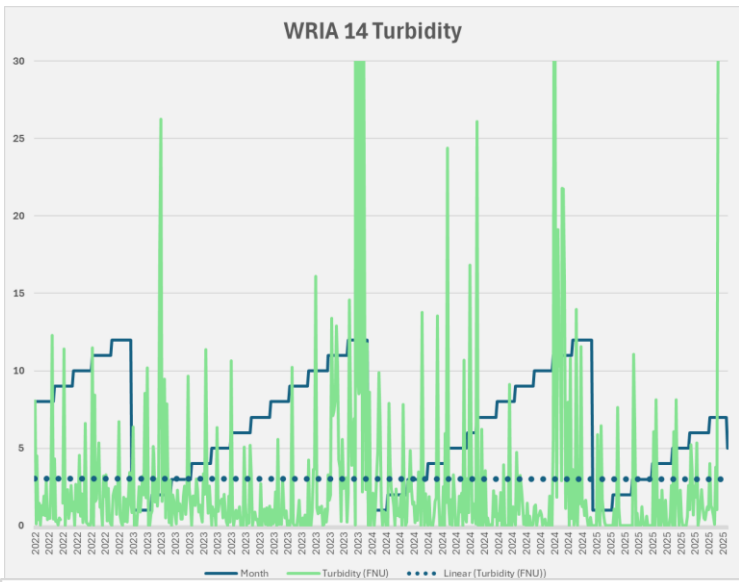
Turbidity

Figure 9 Turbidity By WRIA and Year



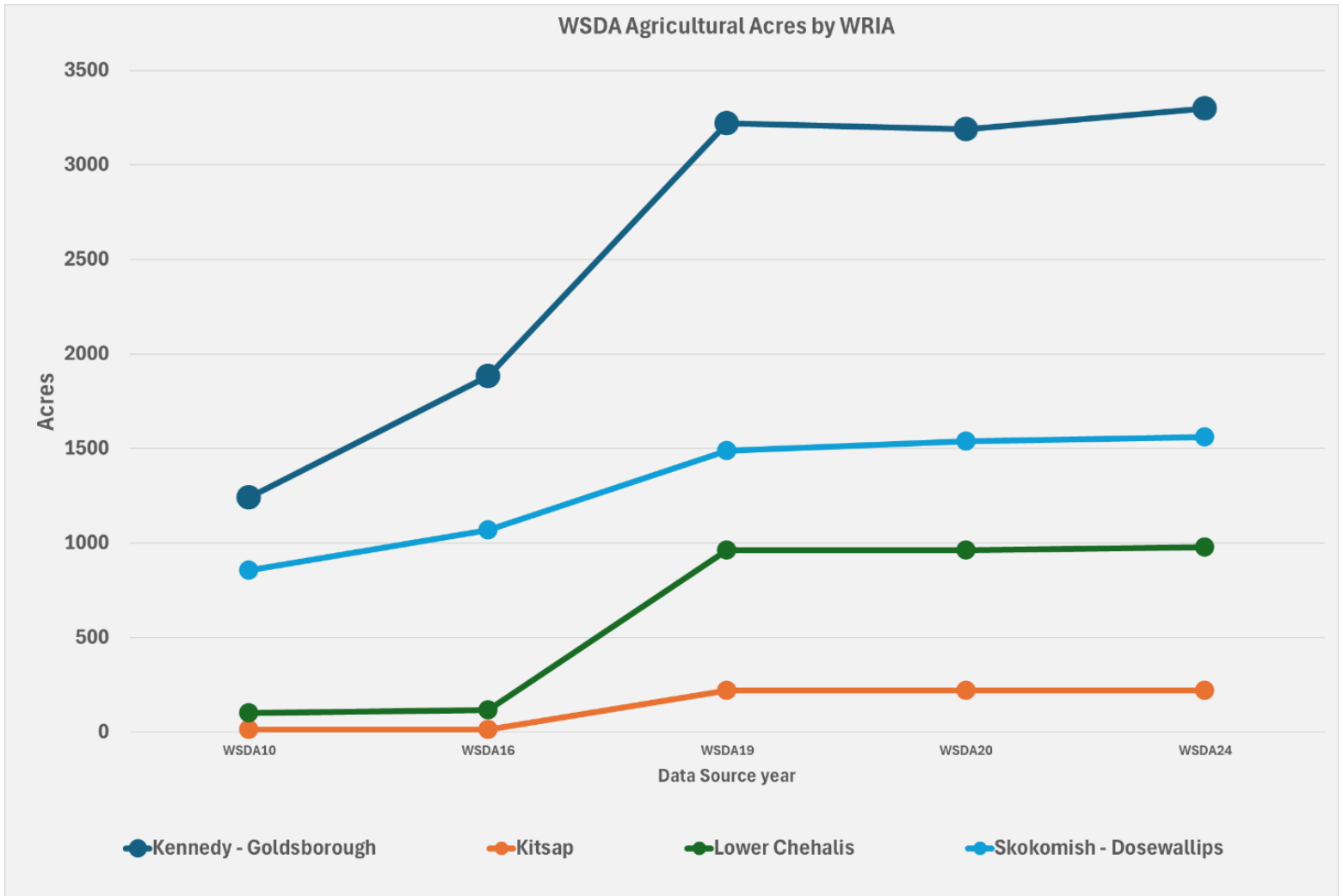
Note: Linear Relationships clustered match by month below for each watershed. A decrease in 14 and 16 and increase in 15.

Note: On a month's scale note the annual trendlines of starting and ending samples.



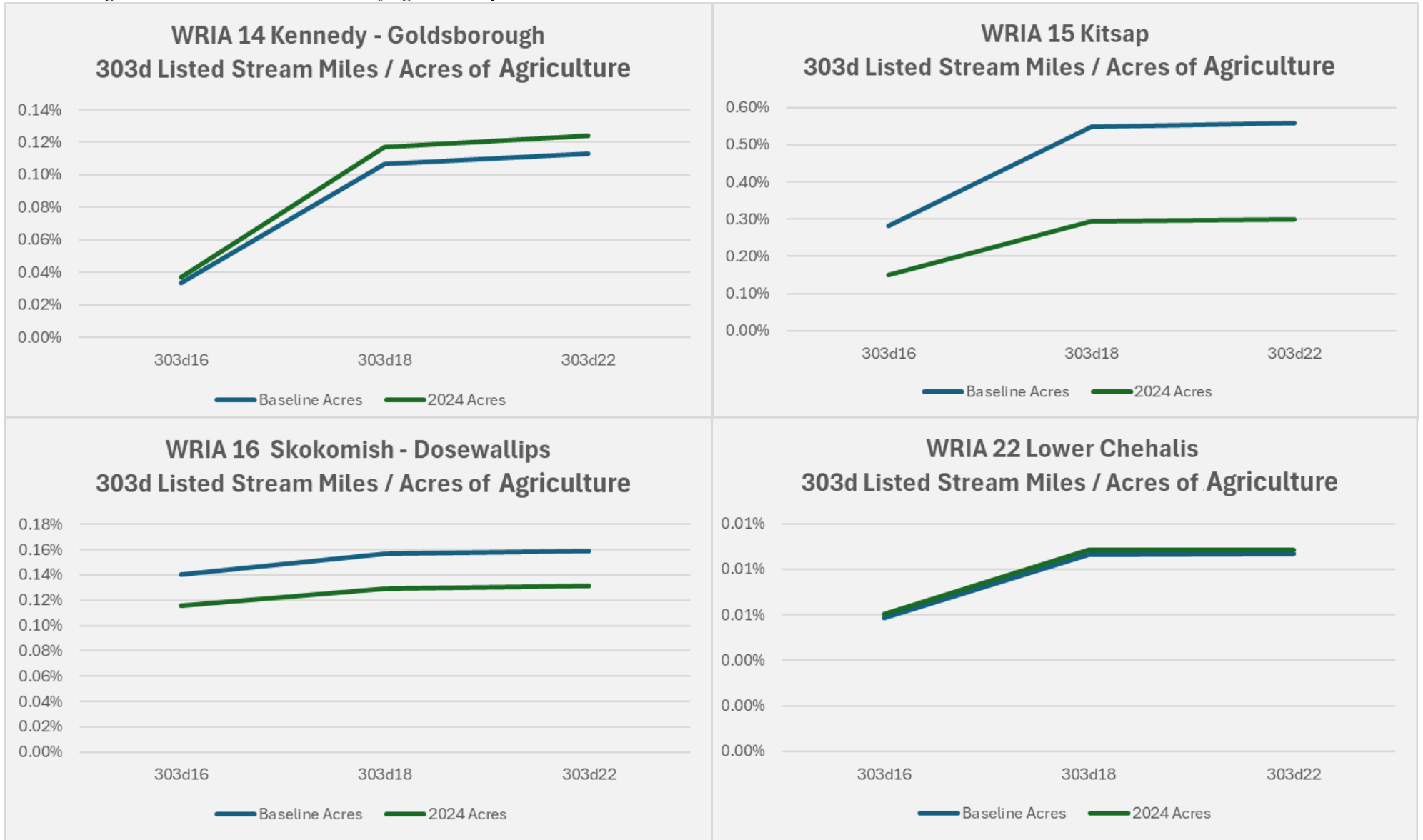
Acres Changes

Figure 10 WSDA Agriculture Reported Acres over time



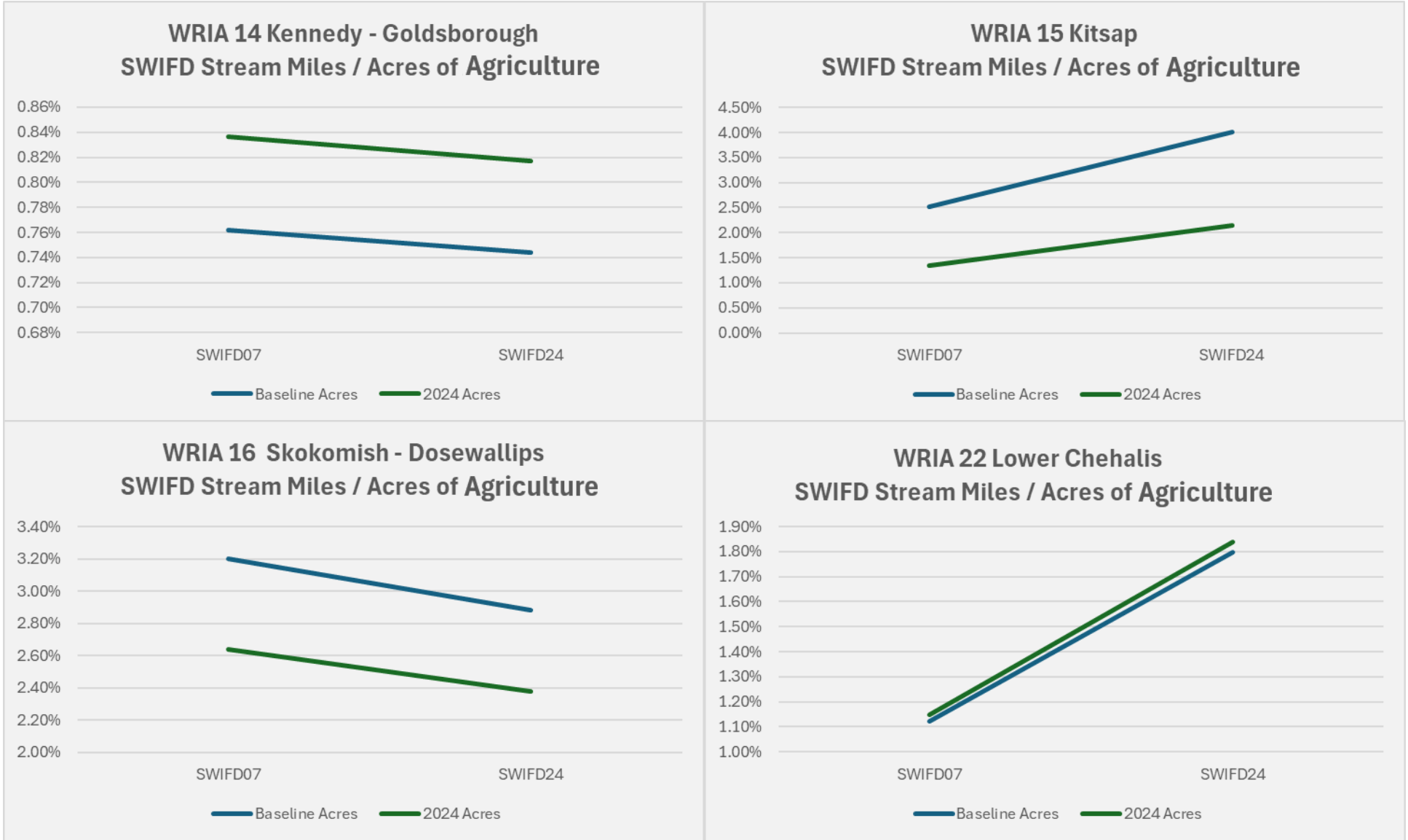
Note: Steady Increase over time.

Figure 11 303d Stream Miles / Acres of Agriculture by watershed



Note: WRIA 14 has a higher proportion of overlap from the 2011 baseline, WRIA 22 did not change, and WRIA's 15 and 16 both have a lower proportion of overlap.

Figure 12 SWIFD Stream Miles / Acres Agriculture by WRIA



Note: WRIA 14 has a higher proportion of overlap from the 2011 baseline, WRIA 22 did not change, and WRIA's 15 and 16 both have a lower proportion of overlap.

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