

Buncombe County Stream Monitoring



Ann Marie Traylor, Environmental Quality Institute

July 15, 2022

Picture: French Broad River at Ledges Park

The Environmental Quality Institute

Volunteer Water Information Network (VWIN)

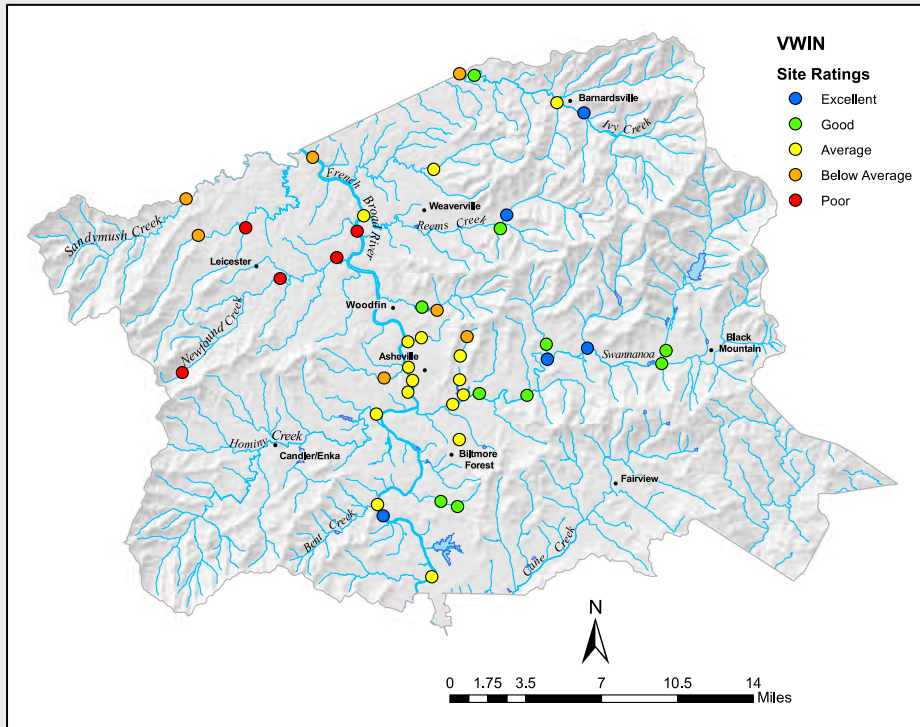
Chemical stream monitoring since 1990



Picture: EQI Laboratory, Black Mountain

Monthly VWIN Water Monitoring Locations

VWIN Sites in the County



Currently 50 sites in Buncombe Co.
Residential and urban streams
Rural and forested watersheds
Mainstem rivers



Water Monitoring Partners – Buncombe Co.

- Metropolitan Sewerage District
- Buncombe County SWCD
- City of Asheville SW Serv. Division
- RiverLink
- New Belgium
- MountainTrue
- Biltmore Lake Association
- Lake View Park Commission (Beaver Lake)
- Ivy River Partners

Data Uses

- Red flags for sudden water quality changes
- Supporting grant funding for restoration and conservation
- Identifying septic and sewer failures
- Allocating resources for erosion controls and stormwater runoff
- Outreach and education
- Community stewardship
- Increasingly used by NC DEQ and US EPA

NC Impaired Waterways - 303(d) listings

Assessments conducted every two years by NC DEQ Division of Water Resources.

Quarterly sampling of 300 sites in all of NC for turbidity, fecal coliform bacteria, and benthic invertebrates.

2022 Impaired Waterways in Buncombe County

- Cane Creek *
- South Hominy Creek
- Hominy Creek *
- Ross Creek
- Swannanoa River *
- Town Branch *
- Bacoate Branch *
- Smith Mill Creek
- Newfound Creek
- Big Ivy River
- French Broad River *

* = added or expanded in since 2020 list

The only delisting in the FBR Basin was Fines Creek in Haywood County



Raw VWIN Data – shared monthly

32 years of lab results and volunteer observations

Buncombe County VWIN Data to share

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B16204 Beaverdam Creek at Elk Mountain Scenic Highway

site #	site name	month	day	year	NHS-N	NDS-N	P04	Turb	TSS	Cond	Alk	pH	volunteer comments	present weather	condition	amt rain last 3 days	flow/water level	water clarity	water color	water surface	water odor	trash
58	Reems Creek at Or Creek	5	7	2022	0.06	0.2	0.02	2.3	4.8	37.2	32.0	7.4	new subdivision being built on Reems Creek Rd near Hwy 108	intermittent rain	medium	low	clear/translucent	no color	clear	natural/none	none	
64	French Broad River at Leigens Park	5	7	2022	0.31	0.4	0.13	27.8	22.8	93.7	38.0	7.3		overcast	medium		clear/translucent	no color	clear	natural/none	trash on shore	
56	Reems Creek at US 25/70 (near French Broad River)	5	7	2022	0.06	0.3	0.04	2.6	4.0	75.5	28.0	7.6	lots of bank disturbance	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash on shore	
7A	Reed Creek at UNCA Botanical Gardens	5	7	2022	0.07	0.9	0.11	6.8	3.4	312.9	35.0	7.4	a few sticks in stream	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
7B	Glenn Creek at Reed Creek confluence	5	7	2022	0.05	1.5	0.08	0.4	3.4	306.1	34.0	7.1	tree branch in stream	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
8	Beaverdam Creek at Beaver Lake	5	7	2022	0.06	0.3	0.09	1.2	6.8	90.6	24.0	7.0	stick dam	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
34	Bee Tree Creek upstream from Owen Lake	5	9	2022	0.03	0.1	0.03	0.2	0.4	33.8	32.0	7.2		overcast	light	normal	clear/translucent	no color	clear	natural/none	none	
10	Bull Creek at Swannanoa River	5	7	2022	0.05	0.2	0.06	3.0	3.0	42.5	14.0	7.3	tire in stream	intermittent rain	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream	
12A	Bent Creek at SR 331 (at French Broad River)	5	7	2022	0.05	0.1	0.04	1.8	4.4	23.8	7.0	7.2		clear/sunny	heavy	normal	clear/translucent	no color	clear	natural/none	none	
12B	French Broad River at Bent Creek	5	7	2022	0.34	0.2	0.07	16.0	22.4	28.3	9.0	7.3		clear/sunny	heavy	normal	cloudy/somewhat turbid	brown/muddy	clear	natural/none	none	
13	French Broad River at Corcoran Park	5	7	2022	0.16	0.2	0.05	33.0	25.8	28.0	9.0	7.0		clear/sunny	heavy	high	opaque/turbid	tannic/tea colored	chly sheen	natural/none	none	
15A	Care Creek at Hwy 76	5	9	2022	0.07	0.2	0.05	5.9	13.0	38.2	13.0	7.2		overcast	light	normal	cloudy/somewhat turbid	brown/muddy	clear	natural/none	trash in stream and	
15B	Ashworth Creek at Care Creek	5	9	2022	0.07	0.5	0.11	3.8	6.4	64.0	25.0	7.2		overcast	light	normal	cloudy/somewhat turbid	brown/muddy	clear	natural/none	trash in stream and	
17A	Swannanoa River below South Tunnel Road	5	9	2022	0.07	0.2	0.04	3.6	5.6	55.8	14.0	7.2		overcast	light	normal	cloudy/somewhat turbid	tannic/tea colored	clear	natural/none	trash in stream and	
17B	Haw Creek at Swannanoa River	5	9	2022	0.07	0.4	0.20	2.0	38.4	129.6	27.0	7.4		intermittent rain	heavy	normal	clear/translucent	no color	clear	natural/none	none	
20	Ivy Creek at Buckner Branch Road	5	7	2022	0.03	0.2	0.03	2.6	3.4	29.1	10.0	7.2		intermittent rain	heavy	normal	clear/translucent	no color	clear	natural/none	none	
21	Rain Fork at Ivy Creek confluence in Barnwellsville	5	7	2022	0.08	0.1	0.05	7.9	12.4	28.7	15.0	7.2		intermittent rain	heavy	normal	clear/translucent	no color	clear	natural/none	none	
22	Ivy Creek at Dillingham Road	5	7	2022	0.03	0.2	0.02	0.8	3.2	30.1	7.0	7.2		intermittent rain	heavy	normal	clear/translucent	no color	clear	natural/none	none	
23	French Broad River at Jean Webb Park	5	9	2022	0.10	0.2	0.05	5.2	8.4	43.9	12.0	7.3		overcast	light	normal	cloudy/somewhat turbid	tannic/tea colored	foam	natural/none	trash in stream and	
24	Swannanoa River at confluence with North Fork	5	7	2022	0.11	0.2	0.03	6.5	6.6	34.8	10.0	7.0	0.57" of rain over 24 hours	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
25	South Turkey Creek	5	8	2022	0.07	0.2	0.06	8.0	12.6	35.7	13.0	7.3	new home construction across road; slight foam on water	intermittent rain	heavy	normal	cloudy/somewhat turbid	no color	foam	natural/none	none	
26	North Turkey Creek at North Turkey Creek Road	5	7	2022	0.05	0.3	0.08	6.7	4.0	63.7	24.0	7.6		overcast	heavy	normal	clear/translucent	no color	clear	natural/none	trash on shore	
27	Flat Creek at US 19/23	5	7	2022	0.07	0.3	0.05	23.0	4.0	77.4	23.0	7.5		overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash on shore	
31	Swannanoa River at Grossy Branch confluence	5	7	2022	0.20	0.2	0.04	14.0	15.2	46.6	12.0	7.3		intermittent rain	medium	high	cloudy/somewhat turbid	opaque/turbid	clear	natural/none	none	
32	French Broad River at Walnut Island Park	5	7	2022	0.30	0.4	0.15	28.0	30.0	48.3	13.0	7.3	park near stream	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
33	North Fork of the Swannanoa River at Gravestone Quarry	5	7	2022	0.09	0.1	0.05	5.8	7.2	32.4	6.0	7.3	0.5" of rain in 24 hours	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
34	Lower Horny Creek at SR 191	5	8	2022	0.06	0.4	0.04	4.1	6.4	58.7	18.0	7.2		overcast	light	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
35	Smith Mill Creek at Louissans Blvd	5	8	2022	0.08	1.2	0.05	3.1	4.4	90.4	18.0	7.2		overcast	light	normal	brown/muddy	no color	clear	natural/none	trash in stream and	
36	Newfound Creek at Dark Cove Road	5	8	2022	0.13	0.3	0.14	22.0	27.4	58.5	18.0	7.3	construction and fresh tire tracks	overcast	medium	low	cloudy/somewhat turbid	tannic/tea colored	clear	natural/none	trash on shore	
37	Newfound Creek at Leckert Hwy	5	8	2022	0.06	0.6	0.12	6.9	10.0	84.6	28.0	7.4	construction; bank disturbance	overcast	medium	low	cloudy/somewhat turbid	tannic/tea colored	clear	natural/none	trash on shore	
38	Swannanoa River at Bull Creek	5	7	2022	0.10	0.2	0.04	33.0	13.2	44.8	14.0	7.4	2 geese in stream directly above site	intermittent rain	medium	normal	cloudy/somewhat turbid	tannic/tea colored	clear	natural/none	none	
39	South Creek at Beaver Lake	5	7	2022	0.19	1.0	0.04	3.9	4.0	170.0	23.0	7.3	a little debris	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
40	Ross Creek at Lower Churn's Cove Rd bridge	5	8	2022	0.10	0.3	0.08	0.3	14.4	102.2	27.0	7.4	road construction above sample area; cans and bottles	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
41	Ross Creek at Tunnel Road	5	6	2022	0.07	0.4	0.05	3.8	4.4	176.6	35.0	7.3	trash in creek from Tunnel Rd; bank disturbance from road	overcast	medium	normal	cloudy/somewhat turbid	tannic/tea colored	foam	present	trash in stream and	
42	Ross Creek at Upper Churn's Cove	5	6	2022	0.08	0.3	0.05	34.0	19.6	78.5	26.0	7.3	road construction in watershed	overcast	medium	normal	clear/translucent	no color	clear	natural/none	none	
43	Ross Creek at Swannanoa River	5	9	2022	0.11	0.3	0.06	2.3	3.0	164.2	13.0	7.4		overcast	light	normal	cloudy/somewhat turbid	brown/muddy	foam	natural/none	trash in stream and	
49	Single Creek at Ramble Way	5	7	2022	0.06	0.4	0.06	1.6	3.4	88.5	18.0	7.3		clear/sunny	heavy	normal	clear/translucent	no color	clear	natural/none	none	
50	Single Creek at Overlook Rd	5	7	2022	0.07	0.6	0.09	1.8	6.4	133.2	26.0	7.3	6 sleeping ducks on shore	clear/sunny	heavy	normal	clear/translucent	no color	clear	natural/none	none	
54	Town (Nashly) Branch	5	8	2022	0.09	1.2	0.48	2.2	443.8	300.2	52.0	7.5	urban	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
60	Perland Creek (upper)	5	7	2022	0.07	1.3	0.38	1.3	4.4	176.1	39.0	7.4	condo construction adjacent to stream	overcast	light	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
61	Perland Creek (lower)	5	7	2022	0.08	0.8	0.13	2.2	3.4	308.2	58.0	7.3	condo construction adjacent to 980	overcast	light	normal	clear/translucent	no color	clear	natural/none	none	
63	Bacoate Branch	5	8	2022	0.07	1.9	0.18	1.2	0.8	270.4	45.0	7.3	urban	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
64	Health Branch (All Tech)	5	8	2022	0.06	1.7	0.14	3.6	333.8	135.3	25.0	7.3	urban	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
65	Nesbitt Discovery Academy stream	5	9	2022	0.03	1.8	0.25	0.4	0.3	362.3	17.0	7.5		overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream and	
66	Beaverdam Creek at Elk Mountain Scenic Highway	5	7	2022	0.10	0.3	0.09	1.6	6.4	75.4	20.0	7.5	development in watershed: house, road, golf course, lot	overcast	medium	normal	clear/translucent	no color	clear	natural/none	trash in stream	

+ Information (please read) Buncombe County VWIN data

VWIN Parameters and Grading Rubric



pH

- A: never < 6.0
- B: < 6.0 in < 10% of samples, never < 5.0
- C: never < 5.0
- D: at least one sample was < 5.0

Alkalinity: *Note: Grades of "C" and "D" are typical of natural alkalinity levels in western NC.

- A: median > 30 mg/L (indicates little vulnerability to acidic inputs)
- B: median 21-30 mg/L (indicates moderate vulnerability to acidic inputs)
- C: median \leq 20 mg/L (considered to be vulnerable to acidic inputs)
- D: median \leq 15 mg/L (very vulnerable to acidic inputs)

Turbidity

- A: median < 5 NTU and values are > 10 NTU trout water standard in < 10% of samples, but never > 50 NTU
- B: median < 7.5 NTU and never > 50 NTU aquatic life standard
- C: median < 10 NTU and values are > 50 NTU in < 10% of samples
- D: median \geq 10 NTU or values are > 50 NTU in > 10% of samples

Total Suspended Solids (TSS)

- A: median < 5 mg/L and maximum < 100 mg/L
- B: median < 7.5 mg/L and values are > 100 mg/L in < 10% of samples
- C: median < 10 mg/L and values are > 100 mg/L in < 10% of samples
- D: median \geq 10 mg/L or values are > 100 mg/L in \geq 10% of samples

Conductivity

- A: median < 30 μ hos/cm and never > 100 μ hos/cm
- B: median < 50 μ hos/cm and values are > 100 μ hos/cm in < 10% of samples
- C: median \geq 50 μ hos/cm and values are > 100 μ hos/cm in < 10% of samples
- D: values are > 100 μ hos/cm in > 10% of samples

Orthophosphate (as PO_4^{3-})

- A: median \leq 0.05 mg/L
- B: median 0.06 – 0.10 mg/L
- C: median 0.11 – 0.20 mg/L
- D: median \geq 0.20 mg/L

Ammonia-Nitrogen

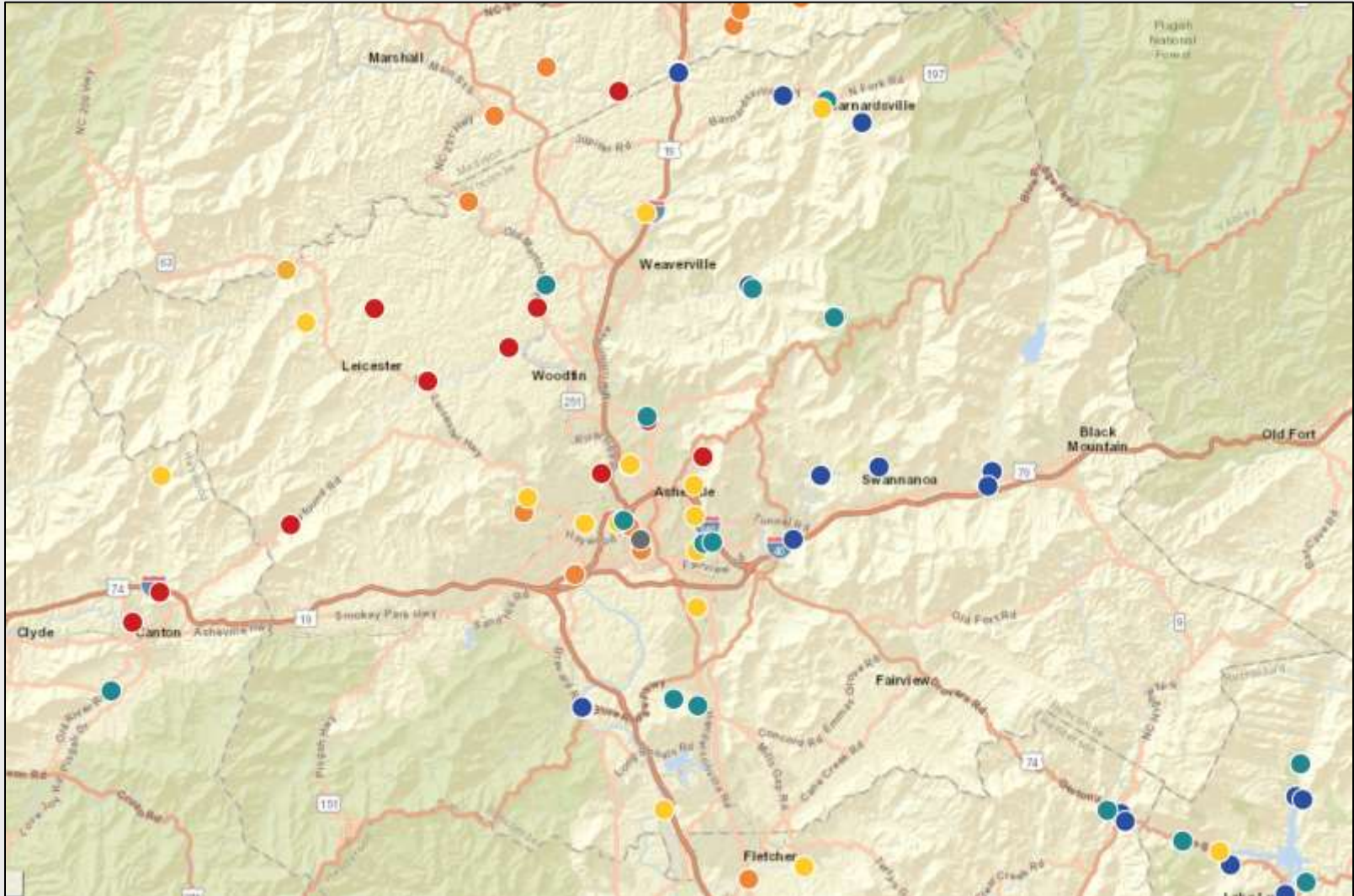
- A: never > 0.50 mg/L
- B: never > 1.0 mg/L (proposed summer standard for trout waters)
- C: > 1 mg/L in < 10% of samples but never > 2 mg/L
- D: > 1 mg/L in > 10% of samples or at least one sample > 2.0 mg/L (proposed winter standard for trout waters)

Nitrate-Nitrite Nitrogen

- A: median \leq 0.3 mg/L and no sample > 1.0 mg/L
- B: < 10% of samples > 1.0 mg/L and no sample > 5 mg/L
- C: no sample > 5 mg/L
- D: at least one sample > 5 mg/L

2021 Buncombe County Monitoring Sites

<http://www.eqilab.org/map.php>

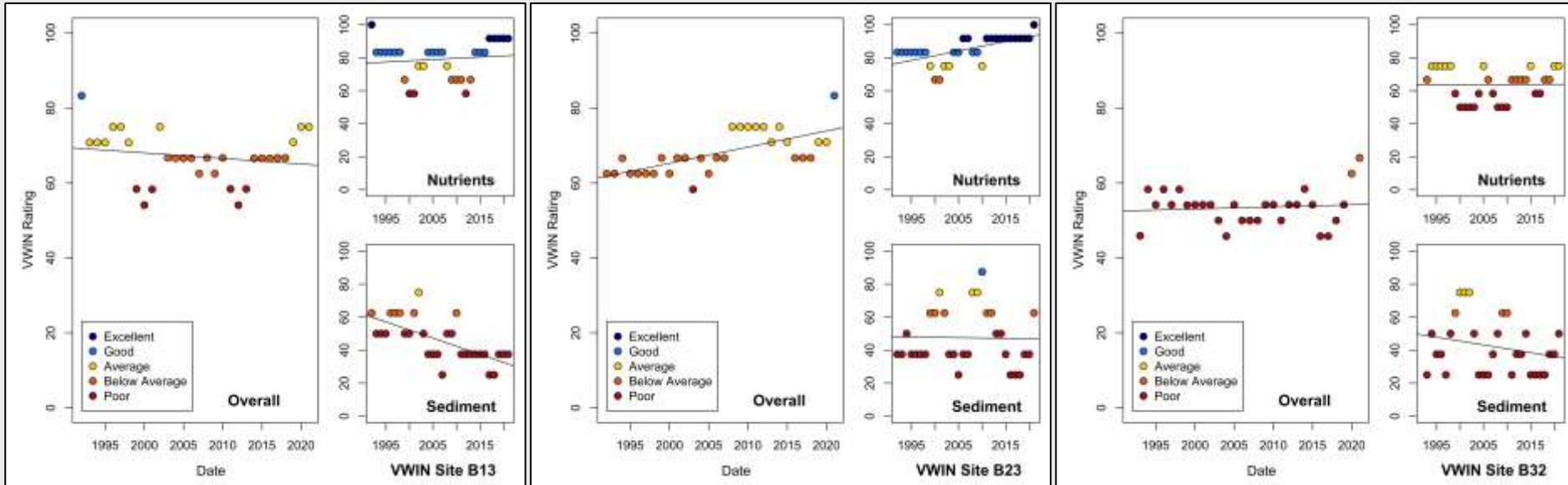


Water Quality Trends - French Broad River

FBR @ Corcoran Pk

FBR @ Jean Webb Pk

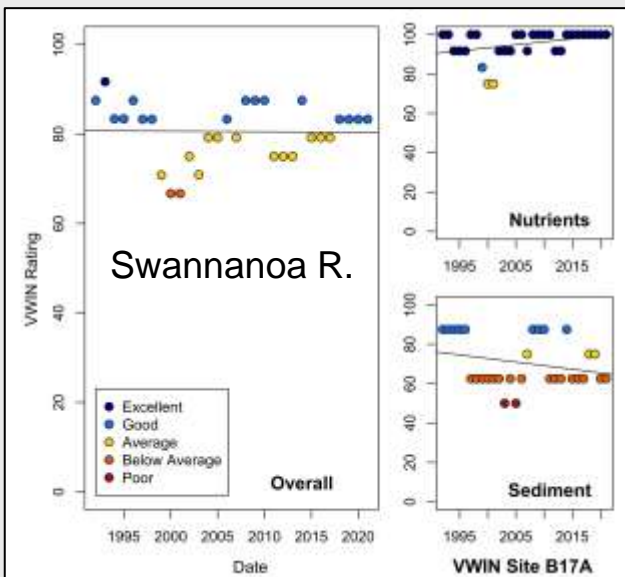
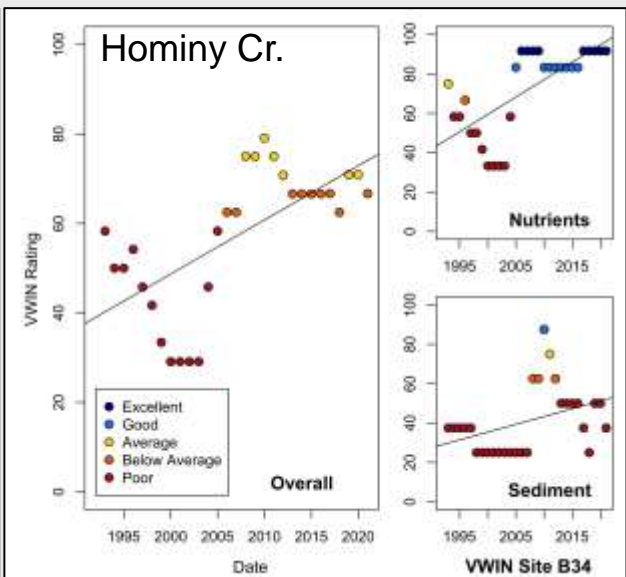
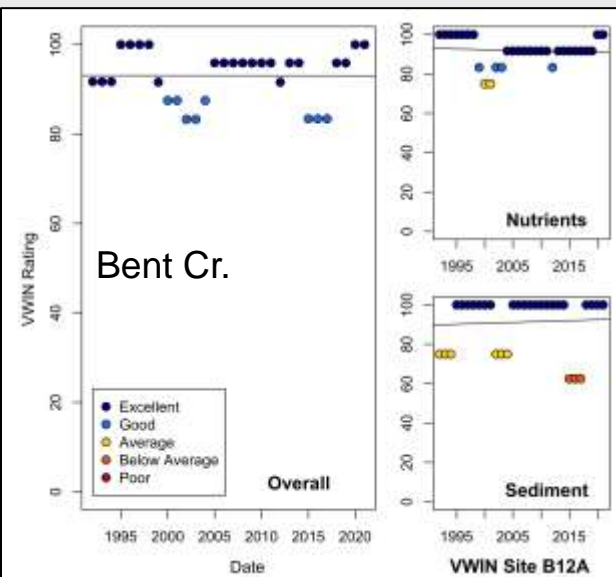
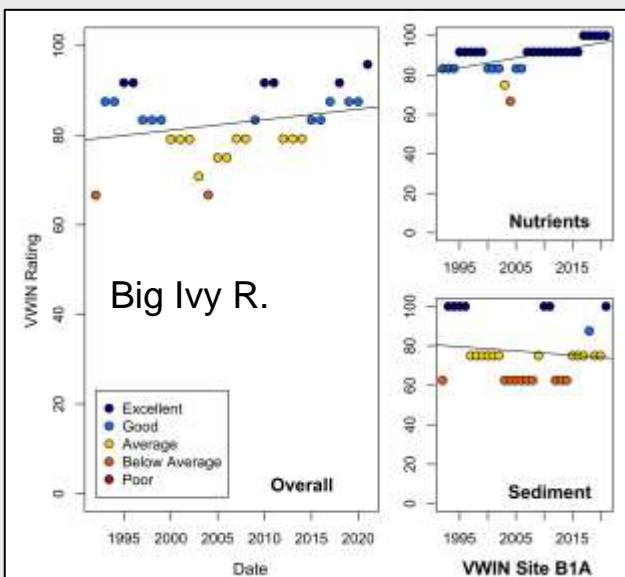
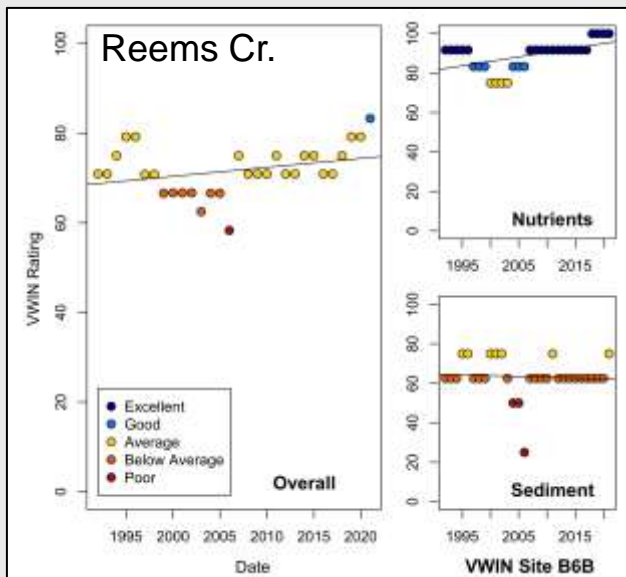
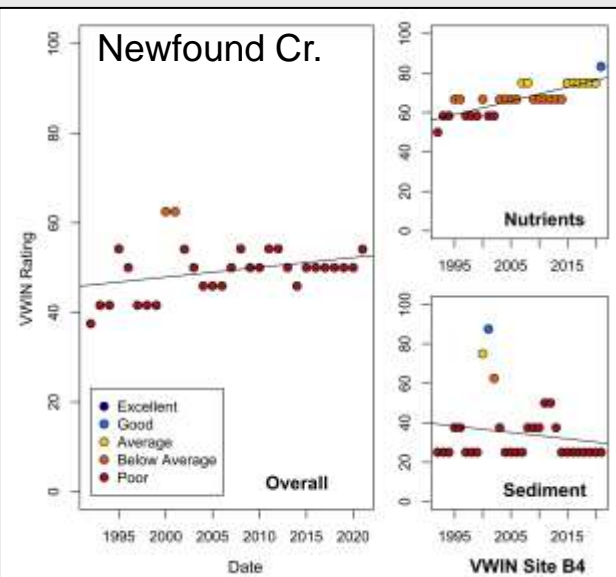
FBR @ Walnut Island Pk



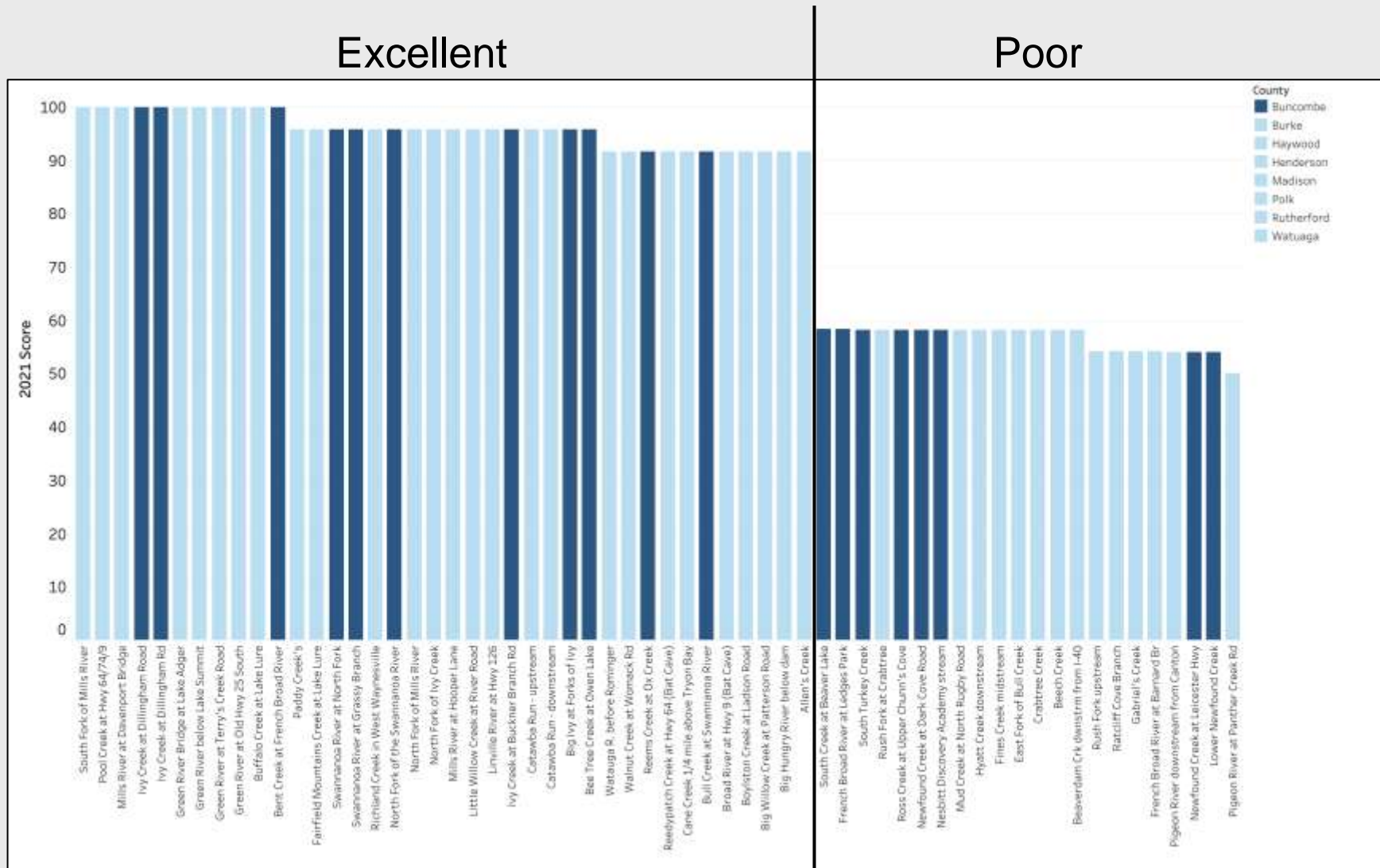
Sediment is generally worsening but has been stable in the AVL area. Nutrients are improving but have been stable downstream of MSD.

Variation between years often due to precipitation. Potential improvements overall in past decade.

Water Quality Trends – Some FBR Tributaries



Best and Worst Sites – WNC 2021



Best: Big Ivy Watershed in Barnardsville, Bent Cr, Upper Swannanoa River Watershed
 Worst: Newfound Cr, South Turkey Cr, urban AVL sites

Examples of Water Quality Problems

Widespread erosion



Point source pollution



Excessive road salt; urban stormwater

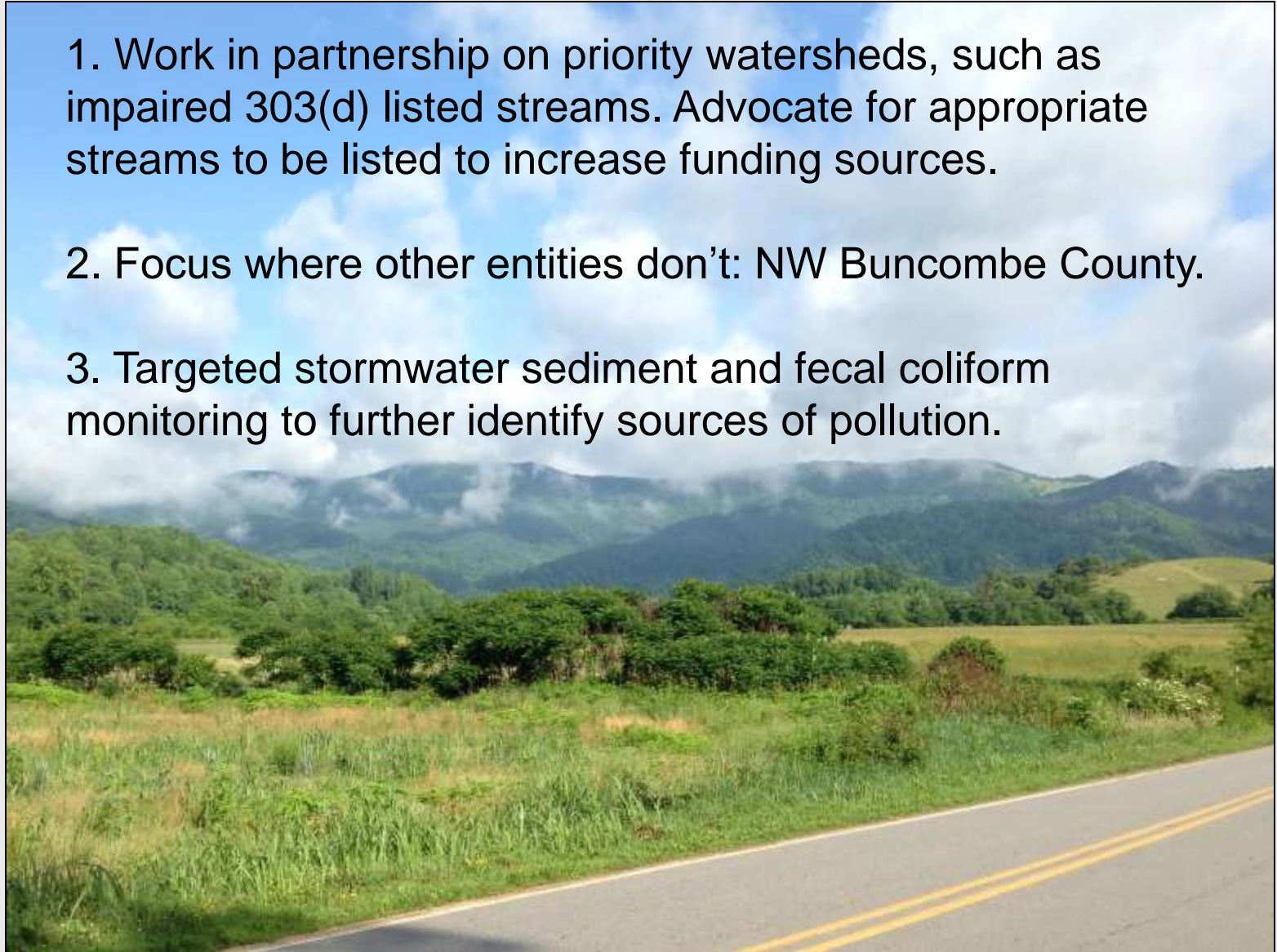


Septic, sewage, livestock waste pollution



Goals

1. Work in partnership on priority watersheds, such as impaired 303(d) listed streams. Advocate for appropriate streams to be listed to increase funding sources.
2. Focus where other entities don't: NW Buncombe County.
3. Targeted stormwater sediment and fecal coliform monitoring to further identify sources of pollution.



Picture: Sandymush at Willow Creek Rd.

Additional Monitoring: Stream Invertebrates

What can live in the streams?

Helps evaluate toxicity, habitat disturbance, and chronic stressors.



(Program funded by the Pigeon River Fund of CFWNC)

THANK YOU for Buncombe County's continued leadership in watershed management!

