Middle Fork New River Restoration Prioritization Plan

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Partners

- High Country COG
- Blue Ridge Conservancy
- New River Conservancy
- Blue Ridge RC&D
- NC Division of Water Resources
- Jennings Environmental PLLC
- Zink Environmental PLLC
- Trillium Environmental LLC

Middle Fork Greenway
A Blue Ridge Conservancy Project

Blue Ridge Conservancy
Saving The Places You Love

New River Conservancy
Protecting the waters, woodlands and wildlife of the New River Watershed

Since 1974
NC High Country Council of Governments

Blue Ridge RC&D
Blue Ridge Resource Conservation & Development

Jennings Environmental

Middle Fork Greenway: *Blowing Rock to Boone*

- 6 miles of multi-use path following Middle Fork New River
- Transportation, recreation, education, resource protection
- Partnership led by Blue Ridge Conservancy: *Wendy Patoprsty*

Middle Fork Greenway
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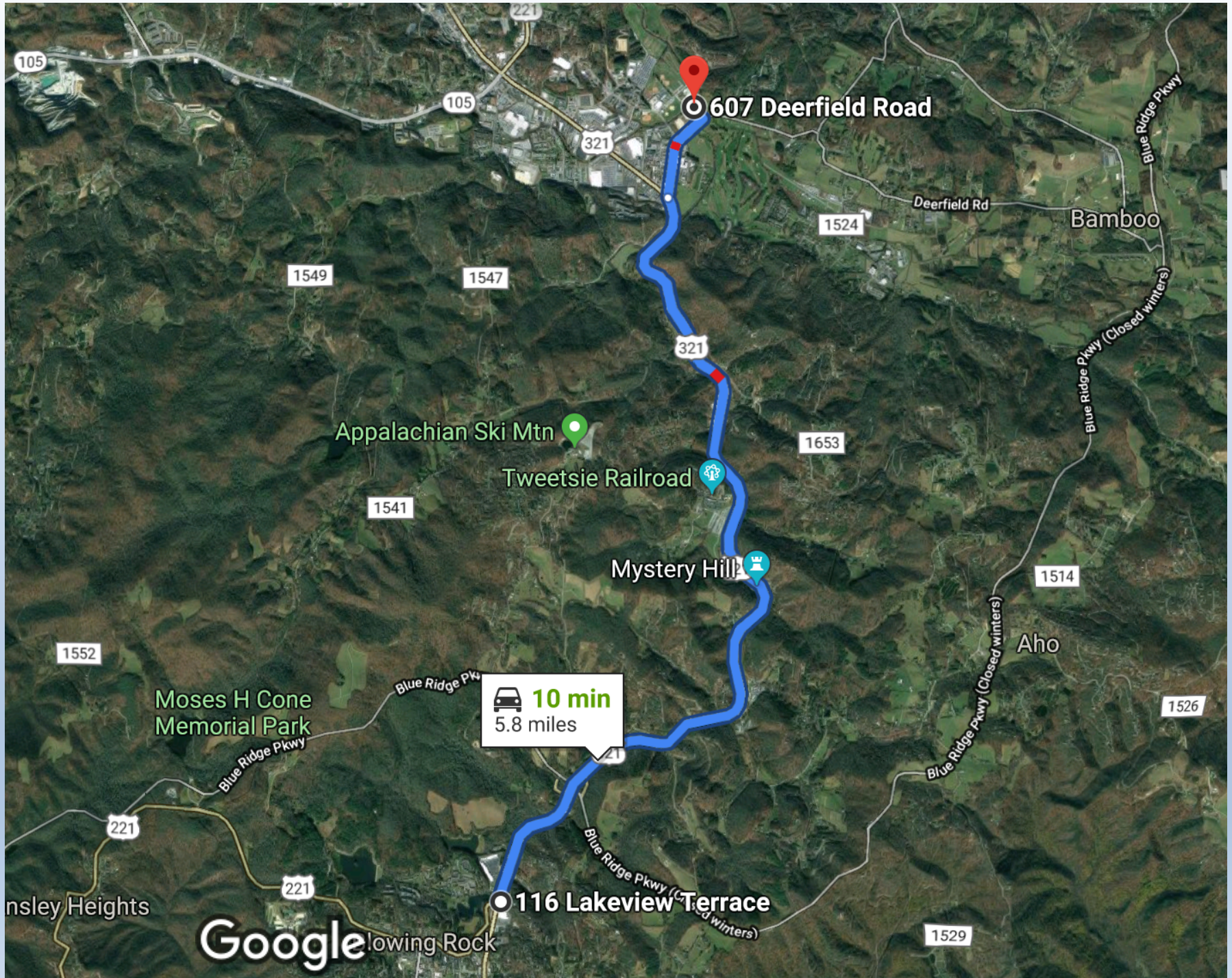
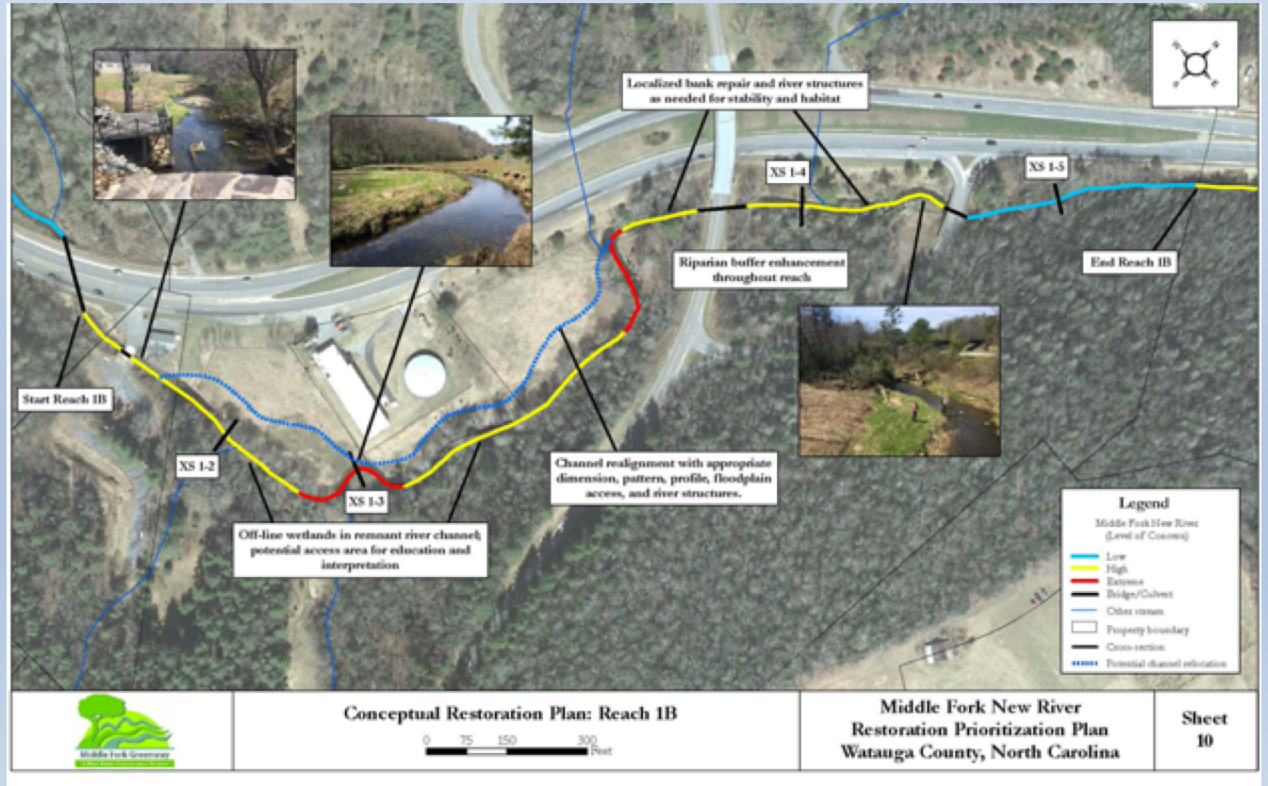
Blue Ridge Conservancy
Saving The Places You Love

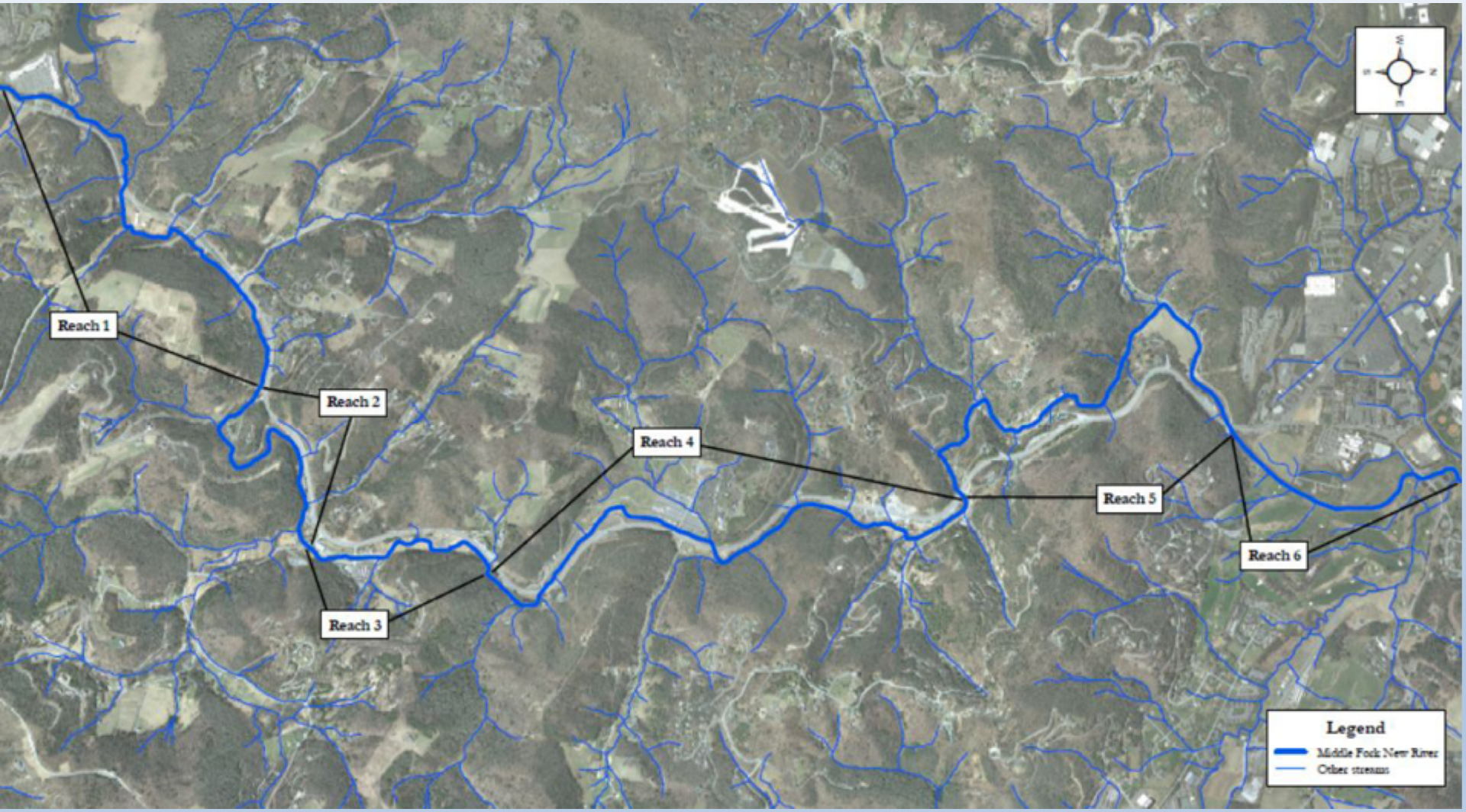

607 Deerfield Road
116 Lakeview Terrace
10 min
5.8 miles
Deerfield Rd
Bamboo
Appalachian Ski Mtn
Tweetsie Railroad
Mystery Hill
Aho
Moses H Cone
Memorial Park
Blue Ridge Pkwy
Blue Ridge Pkwy (Closed winters)
105
221
321
1524
1549
1547
1653
1541
1514
1552
1526
1529
Google

Middle Fork New River
Restoration Prioritization Plan: *2018*

- Master Plan for river restoration and protection
- 6 river reaches along 6 miles of Middle Fork New River
- Assessment of current river conditions
- Restoration opportunities with estimated costs



Middle Fork New River: *6 Reaches for Assessment*



Current River Conditions: *2018*

¼ Excellent condition requiring protection
½ Fair condition requiring enhancement + protection
¼ Poor condition requiring restoration + protection

Excellent Condition: *Protection*

Fair Condition: *Erosion requiring enhancement*

Poor Condition: *Erosion requiring restoration*

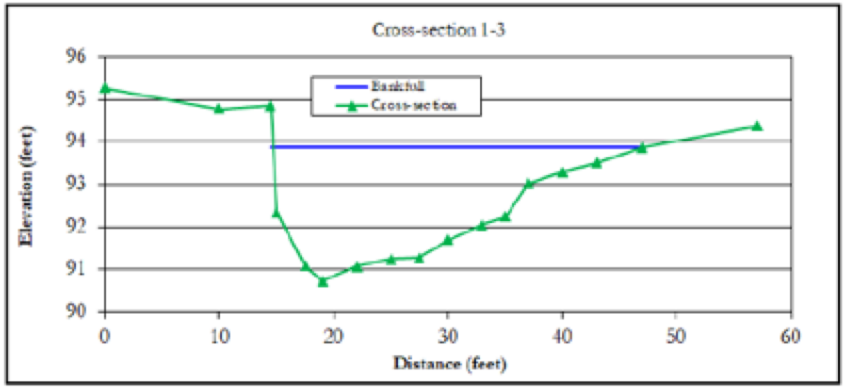
Morphology Cross-sections

Dimensions plotted on hydraulic geometry relationships

Cross-section 1-3
Middle Fork New River

Latitude: 36.145324
Longitude: -81.662814
Drainage area: 3.86 square miles
Median particle size: gravel

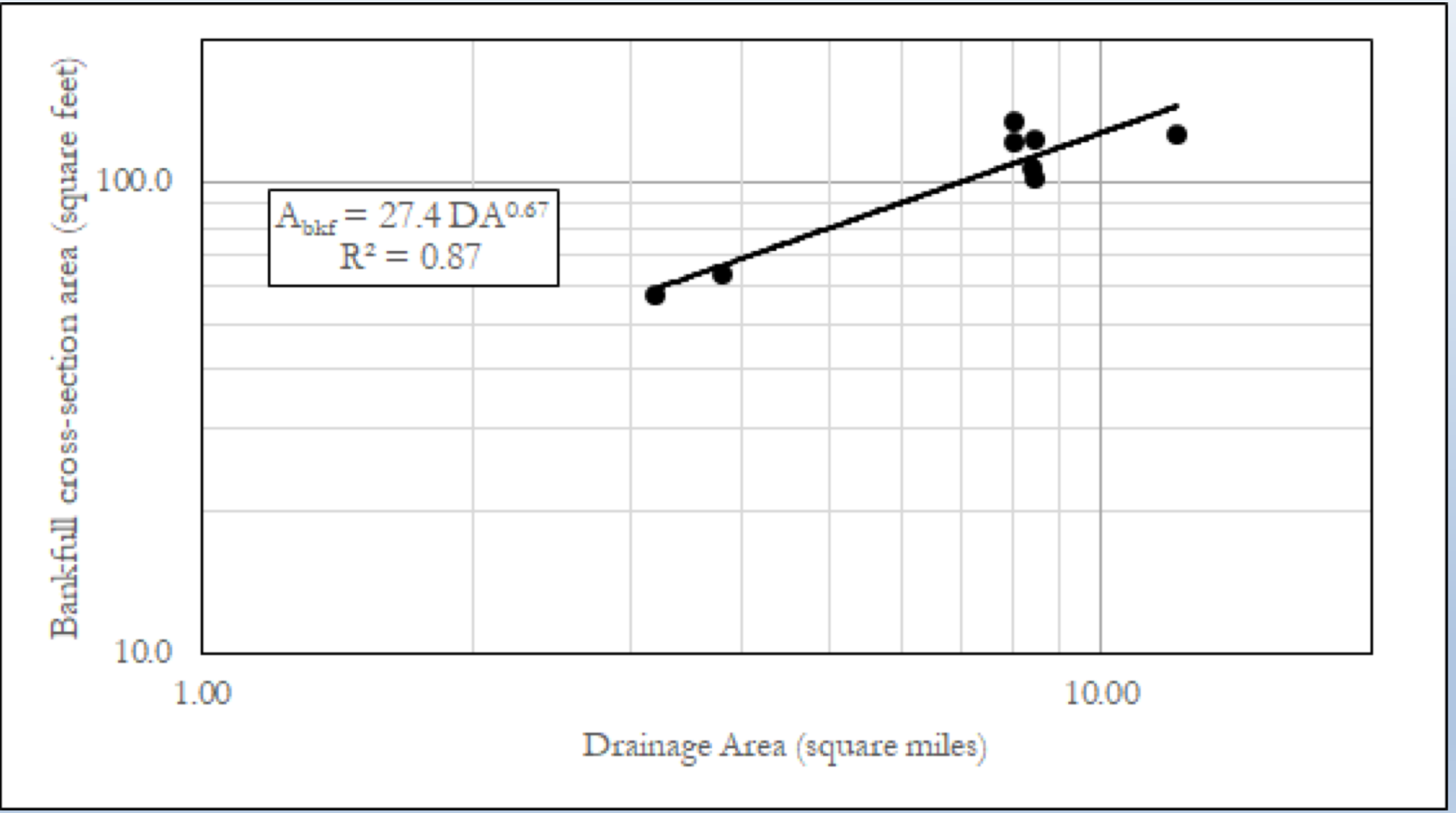
	1-3
Area (square feet) =	56.1
Width (feet) =	32.3
Mean depth =	1.7
Max depth =	3.2



Stream Morphology

Site	Drainage area (mile²)	Cross-section area (ft²)	Bankfull width (ft)	Bankfull mean depth (ft)	Width/ depth ratio	Entrenchment ratio	Median particle size	Stream
1-1	3.19	57.6	27.6	2.1	13.3	3.3	gravel	C4
1-2	3.80	63.4	27.6	2.3	12.0	3.4	cobble	E3
1-3*	3.86	56.1	32.3	1.7	-	-	gravel	-
1-4	4.04	62.6	37.2	1.7	22.1	3.0	gravel	C4
1-5	4.07	73.3	36.4	2.0	18.1	2.0	gravel	B4c
1-6	4.89	69.1	37.2	1.9	20.0	2.4	gravel	C4
2-1	5.56	83.7	32.1	2.6	12.3	2.2	cobble	C3
2-2	5.57	73.7	30.1	2.4	12.3	2.5	cobble	C3
3-1	8.01	120.9	53.4	2.3	23.5	2.9	gravel	C4
4-1	8.01	133.8	56.0	2.4	23.5	1.3	gravel	B4c
4-2	8.40	106.8	29.9	3.6	8.4	2.6	cobble	E3
4-3	8.47	102.4	29.8	3.4	8.6	4.5	cobble	E3
4-4	8.47	123.2	41.6	3.0	14.0	3.1	cobble	C3
4-5	10.20	130.5	42.6	3.1	13.9	2.6	cobble	C3
6-1	12.20	126.1	37.1	3.4	10.9	4.6	gravel	E4

Morphology Hydraulic Geometry Relationships



Streambank Erosion: *How much?*

Bank Erodibility Hazard Index (BEHI)

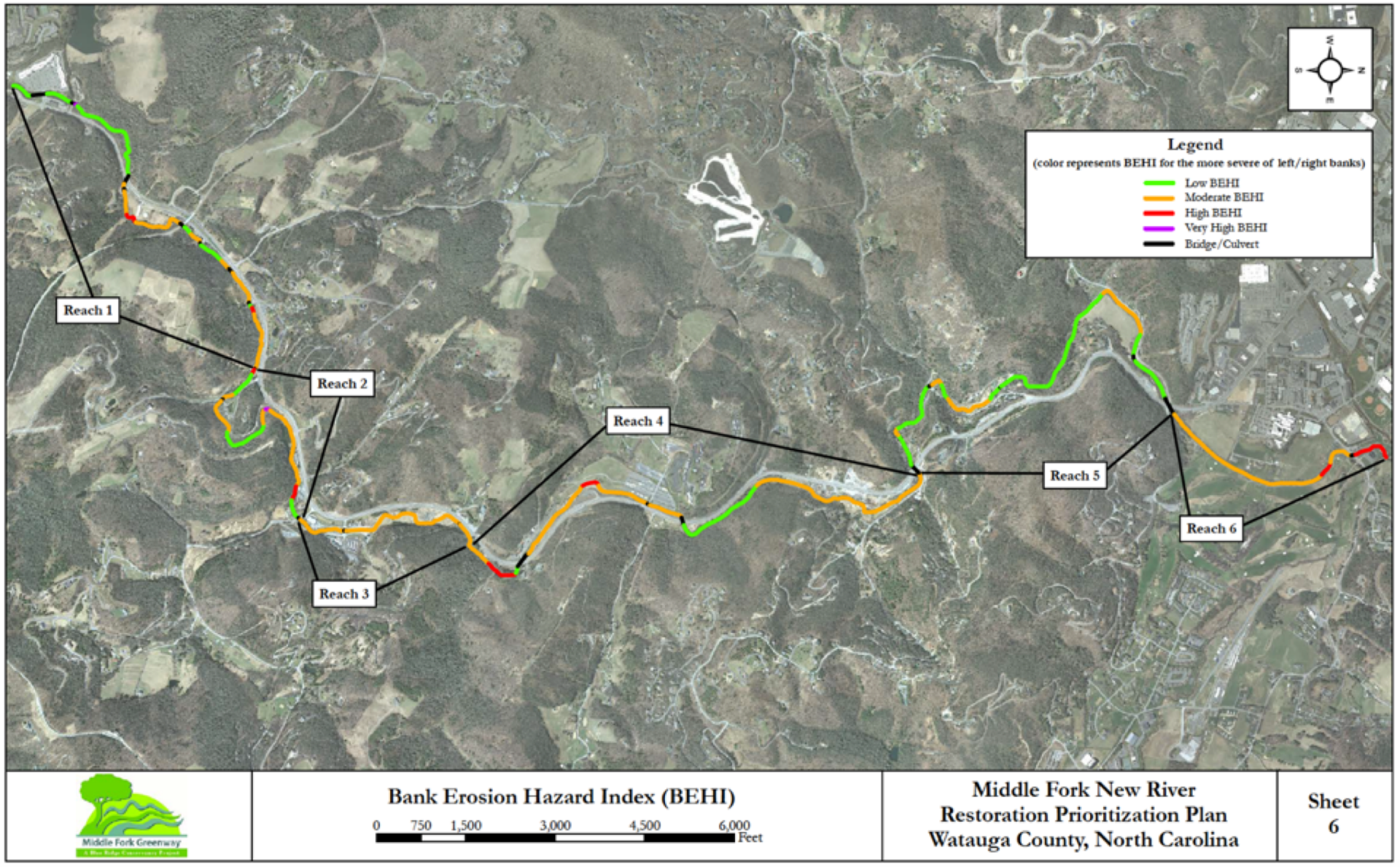
Near Bank Stress (NBS)

Estimated erosion rates for each reach

BEHI and NBS Observations

Reach	Bank Length	Left BEHI	Left NBS	Right BEHI	Right NBS	Left Bank Erosion Rate	Right Bank Erosion Rate	Erosion Rate
	(feet)					(feet/year)	(feet/year)	(cu feet/year)
1A	386	Low	Low	Low	Low	0.02	0.02	39
1A	246	None	None	None	None	0	0	0
1A	456	Low	Low	Low	Low	0.02	0.02	46
1A	55	None	None	None	None	0	0	0
1A	54	Very High	Moderate	Low	Low	0.75	0.02	205
1A	712	Low	Low	Low	Low	0.02	0.02	85
1A	639	Low	Moderate	Low	Low	0.05	0.02	89
1A	387	Low	Low	Low	Low	0.02	0.02	31
1A	148	None	None	None	None	0	0	0
1B	99	Low	Low	Moderate	Moderate	0.02	0.05	14
1B	22	None	None	None	None	0	0	0
1B	129	Moderate	Low	Moderate	Low	0.02	0.02	13
1B	277	Moderate	Low	Low	Low	0.02	0.02	28
1B	98	Moderate	Low	High	High	0.02	0.2	82
1B	135	High	High	Low	Very Low	0.2	0.008	110
1B	510	Moderate	Low	Low	Low	0.02	0.02	61
1B	153	Moderate	Moderate	Moderate	Moderate	0.05	0.05	46
1B	68	Moderate	Very High	Moderate	Moderate	0.28	0.05	84
1B	146	Moderate	Low	Moderate	Low	0.02	0.02	18
1B	92	None	None	None	None	0	0	0
1B	162	Low	Low	Low	Low	0.02	0.02	13
1B	219	Moderate	Moderate	Low	Low	0.05	0.02	31
1B	46	None	None	None	None	0	0	0
1B	436	Low	Low	Very Low	Low	0.02	0.02	35
1C	177	Moderate	Low	Very Low	Low	0.02	0.02	14
1C	81	None	None	None	None	0	0	0
1C	182	Moderate	Low	Low	Low	0.02	0.02	15
1C	427	Moderate	Moderate	Low	Low	0.05	0.02	81
1C	46	None	None	None	None	0	0	0
1C	53	Low	Low	Low	Low	0.02	0.02	4
1C	112	High	High	Moderate	Low	0.2	0.02	71
1C	614	Moderate	Moderate	Low	Low	0.05	0.02	107
1C	364	Moderate	Moderate	Low	Low	0.05	0.02	64
2A	18	None	None	None	None	0	0	0
2A	95	High	Low	High	Low	0.1	0.1	57
2A	474	Low	Low	Low	Low	0.02	0.02	47
2A	178	Moderate	Low	Low	Low	0.02	0.02	18
2A	45	None	None	None	None	0	0	0

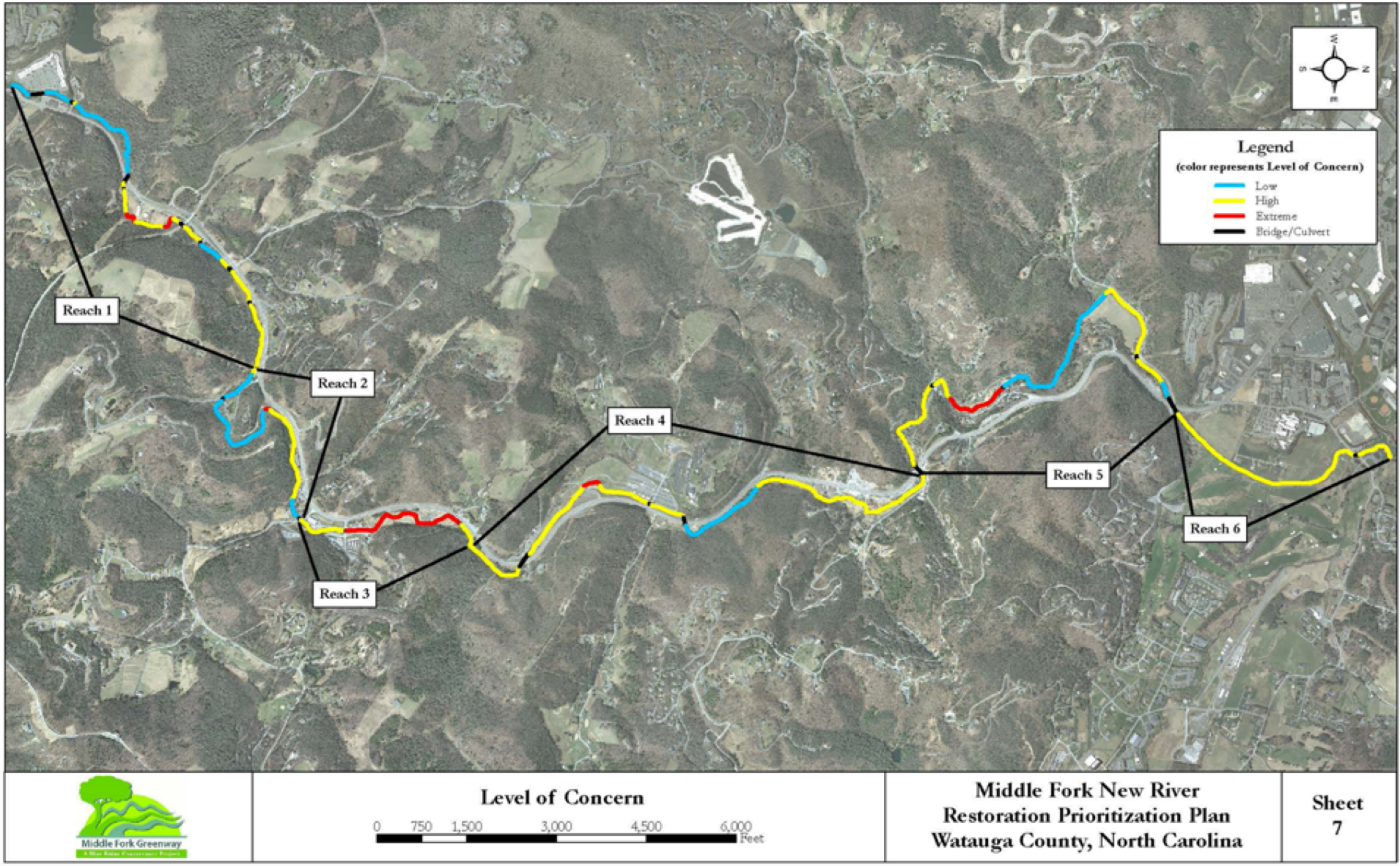
Streambank Erosion: *How much?*



Streambank Erosion: *How much?*

Reach	Streambank Erosion Rates (tons/year)	Average Erosion per Linear Foot (tons/year/ foot)
1	67	0.008
2	69	0.014
3	47	0.013
4	124	0.013
5	95	0.010
6	104	0.024
Total	505	0.013

Level of Concern



Poor Condition: *Erosion, Buffer Encroachment*

Poor Condition: *Erosion, Buffer Encroachment*

Poor Condition: *Buffer Encroachment*

Poor Condition: *Buffer Encroachment, Utilities*

Poor Condition: *Buffer Encroachment, Utilities*

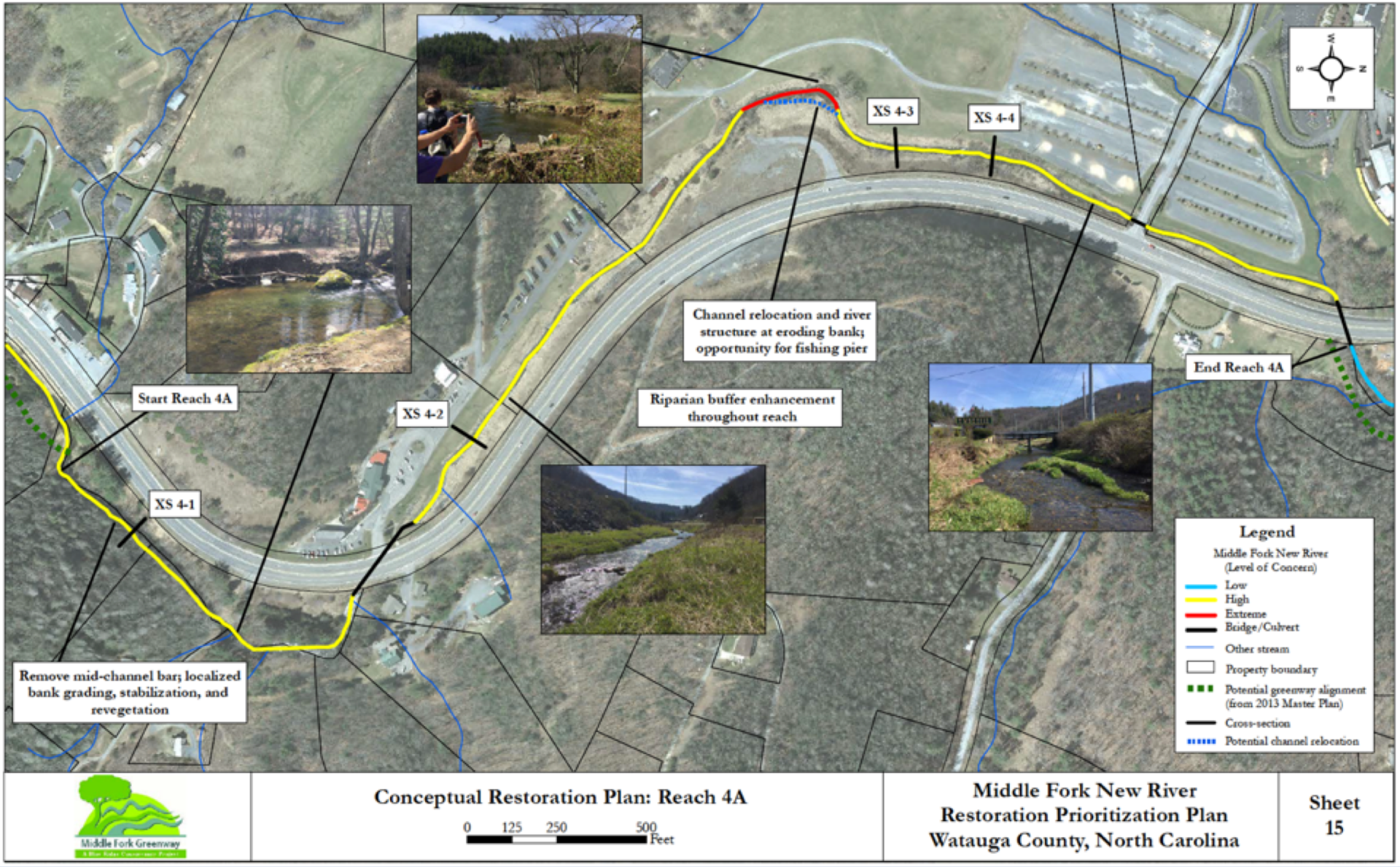
Poor Condition: *Buffer Encroachment, Stormwater*

Poor Condition: *Buffer Encroachment, Stormwater*

Poor Condition: *Tributary Manipulation*

Poor Condition: *Impoundment*

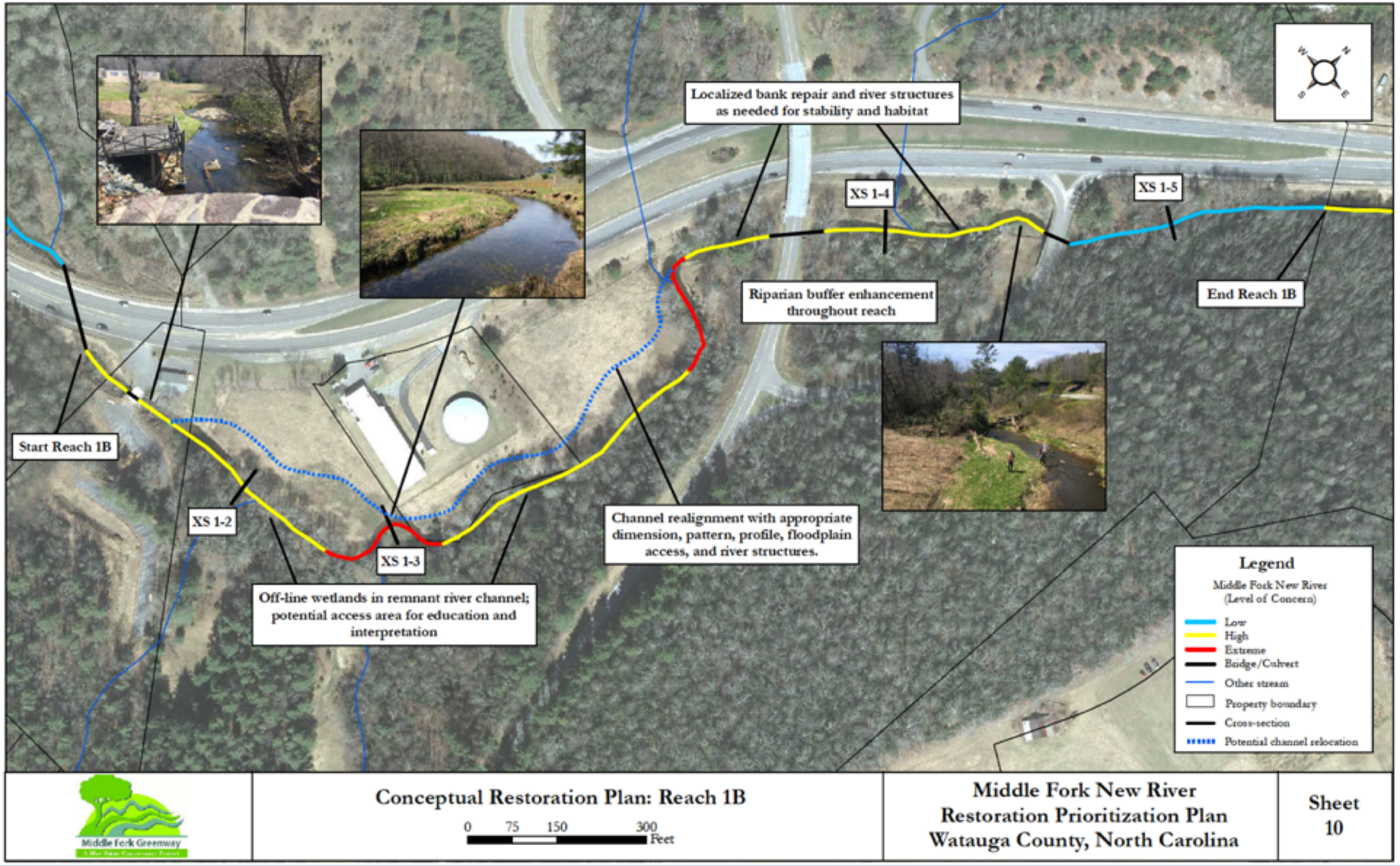
Reach 4A


XS 4-3
XS 4-4
Channel relocation and river structure at eroding bank; opportunity for fishing pier
End Reach 4A
Start Reach 4A
XS 4-2
Riparian buffer enhancement throughout reach
XS 4-1
Remove mid-channel bar; localized bank grading, stabilization, and revegetation
Legend
Middle Fork New River (Level of Concern)
Low
High
Extreme
Bridge/Culvert
Other stream
Property boundary
Potential greenway alignment (from 2013 Master Plan)
Cross-section
Potential channel relocation
Middle Fork Greenway
Conceptual Restoration Plan: Reach 4A
0 125 250 500 Feet
Middle Fork New River
Restoration Prioritization Plan
Watauga County, North Carolina
Sheet 15

Fair Condition: *Erosion requiring enhancement*

Poor Condition: *Erosion requiring restoration*

Reach 1B


Localized bank repair and river structures as needed for stability and habitat
XS 1-4
XS 1-5
Riparian buffer enhancement throughout reach
End Reach 1B
Start Reach 1B
XS 1-2
XS 1-3
Channel realignment with appropriate dimension, pattern, profile, floodplain access, and river structures.
Off-line wetlands in remnant river channel; potential access area for education and interpretation
Legend
Middle Fork New River (Level of Concern)
Low
High
Extreme
Bridge/Culvert
Other stream
Property boundary
Cross-section
Potential channel relocation
Middle Fork Greenway
Conceptual Restoration Plan: Reach 1B
0 75 150 300 Feet
Middle Fork New River Restoration Prioritization Plan Watauga County, North Carolina
Sheet 10

Poor Condition: *Erosion requiring restoration*

Cost Estimates for Restoration & Enhancement

Reach	Appendix Sheet Number	Relative Priority	Estimated Cost Range ($)
1a	9	Low	$ 10,000 to 20,000
1b	10	High	$ 250,000 to 500,000
1c	11	Moderate	$ 100,000 to 200,000
2a	12	Moderate	$ 80,000 to 150,000
2b	13	Moderate	$ 80,000 to 150,000
3	14	Moderate	$ 250,000 to 500,000
4a	15	High	$ 150,000 to 300,000
4b	16	High	$ 80,000 to 150,000
4c	17	High	$ 120,000 to 200,000
5a	18	Moderate	$ 150,000 to 300,000
5b	19	Moderate	$ 300,000 to 600,000
5c	20	Low	$ 80,000 to 150,000
6	21	Moderate	$ 200,000 to 400,000

Middle Fork New River Restoration Prioritization Plan

Jennings Environmental

- Awareness and understanding of river problems and opportunities
- Planning for grant applications and funding allocations

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Thank you!

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