Jackson Tailwater Benthic Study

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Gathright Stakeholders Meeting

June 5, 2019

VIRGINIA DGIF

CONSERVE. CONNECT. PROTECT.

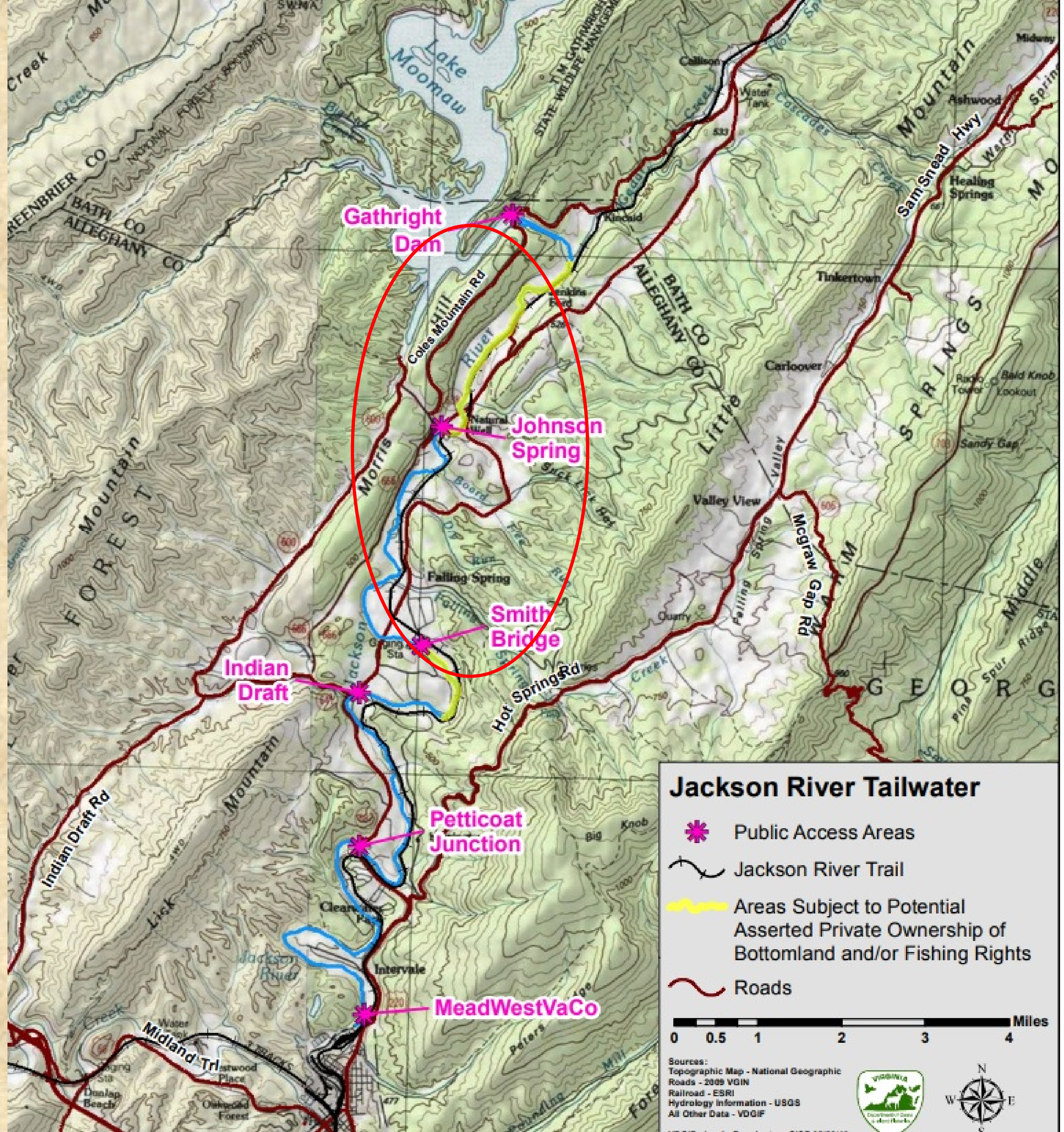
DGIF-Partners Macroinvertebrate Sampling History - Jackson River Tailwater

Moving downstream →

		Gathright Dam	Sycamore Bend	Camp Appalachia	Johnson Springs	Jacks Island	Smith Bridge	Indian Draft	Petticoat J.	Intervale
Virginia Tech	1973							X		
VCU	1990		X	X				X		X
Virginia Tech	1991		Xx					Xx		Xx
Virginia Tech	1992	Xx				x	x	Xx	x	Xx
Virginia Tech	1993	Xx				x	x	Xx	x	Xx
Virginia Tech	1994	Xx				x	x	Xx	x	Xx
USFS	1997	X								
REIC	2007	Xx				x	x	Xx	x	Xx
REIC	2008	Xx					x	Xx	x	Xx
REIC	2009	Xx				x	x	Xx	x	Xx
REIC	2016		Xx		Xx		Xx			
REIC	2017		Xx		Xx		Xx			
Kirk Environmental	2018		Xx		Xx		Xx			

X = PIBS or Carle (Kirber) Sampler

x = D-frame net


Lake Moomaw
Gathright Dam
Johnson Spring
Smith Bridge
Indian Draft
Petticoat Junction
MeadWestVaCo
Coles Mountain Rd
Hot Springs Rd
Indian Draft Rd
Sam Snead Hwy
Mcgraw Gap Rd
Midland Trl
Falling Spring
Valley View
Tinkertown
Carloover
Healing Springs
Ashwood
Intervale
BATH CO
ALLEGHANY CO
Jackson River Tailwater
Public Access Areas
Jackson River Trail
Areas Subject to Potential Asserted Private Ownership of Bottomland and/or Fishing Rights
Roads
Miles
0 0.5 1 2 3 4
Sources:
Topographic Map - National Geographic
Roads - 2009 VGIN
Railroad - ESRI
Hydrology Information - USGS
All Other Data - VDGIF

Design

Purpose – Obtain fresh macroinvertebrate data on upper Jackson Tailwater and compare to pre-pulse samples

Time Frame – late summer 2016, 2017, 2018

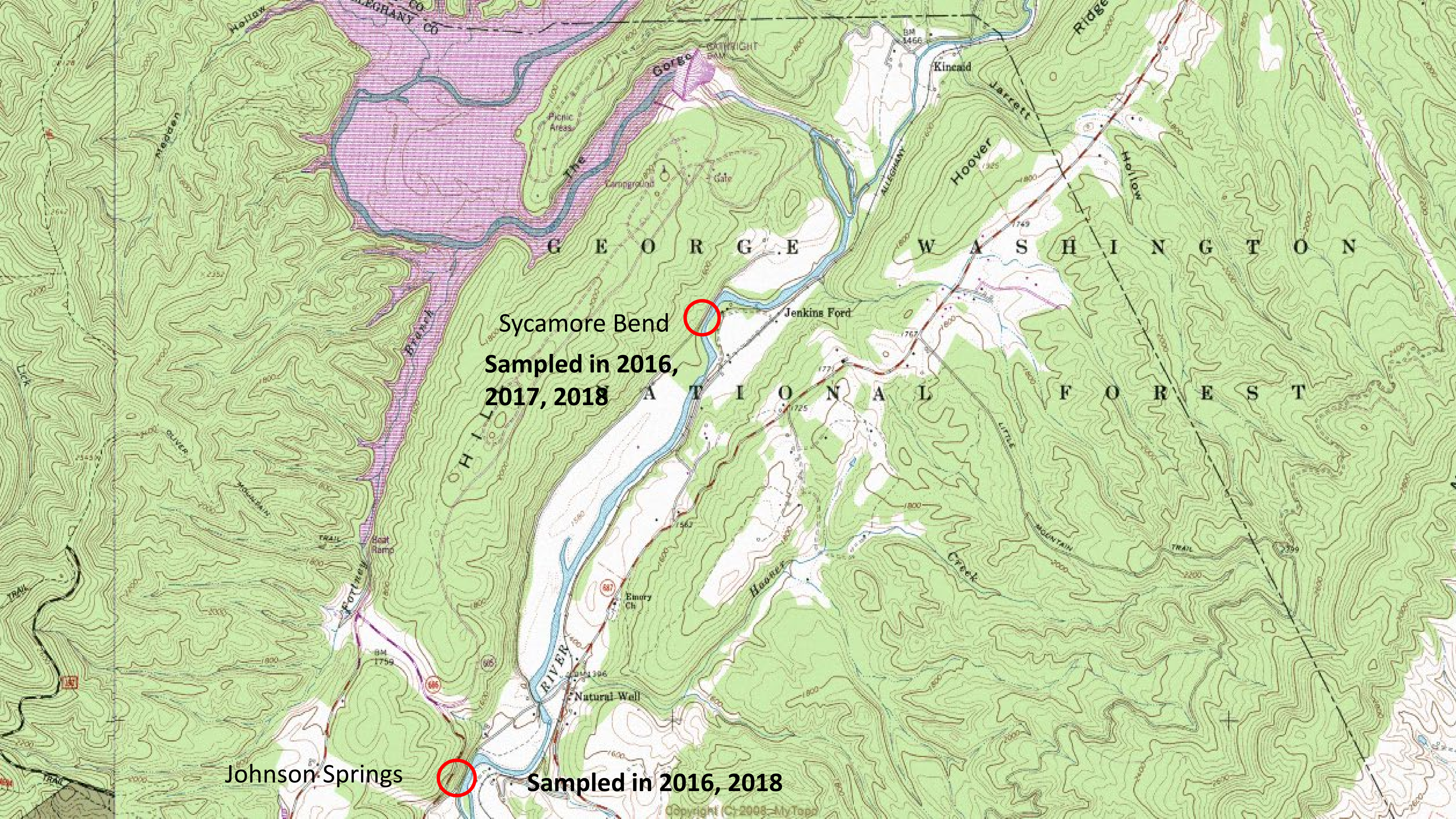
Locations – Sycamore Bend, Johnson Springs, Smith Bridge

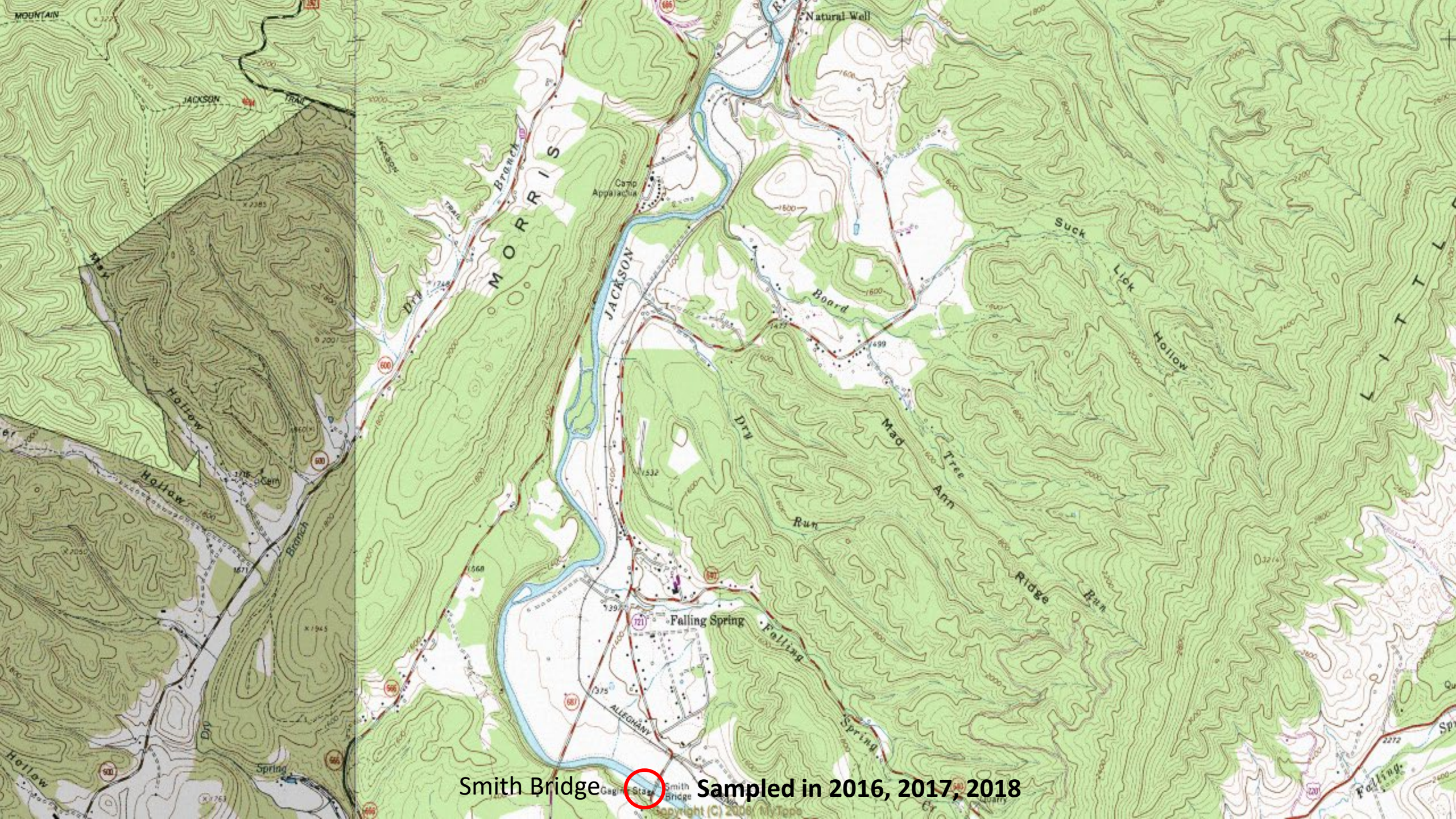
Equipment – Carle Sampler (0.26 cubic meter), D-frame net

Replicates – Three reps per riffle with the Carle, numerous swipes with the D-frame

Samples – Samples were individually bagged labeled and preserved in alcohol

Analysis – REIC labs in Beaverton, WV (Ed Kirk)


Sycamore Bend
Sampled in 2016, 2017, 2018
Johnson Springs
Sampled in 2016, 2018
GEORGE WASHINGTON
NATIONAL FOREST
Jenkins Ford
Kincaid
Natural Well
Emory Ch
RIVER
Boat Ramp
Campground
Picnic Areas
The Gorge
Hoover
Jarrett
Hollow
Ridge
Creek
ALLEGHANY CO
Copyright (C) 2008, MyTopo


Smith Bridge
Sampled in 2016, 2017, 2018

Virginia Stream Condition Index

Year	Sycamore	Johnson	Smith
2016	73.70	74.82	76.31
2017	70.90		74.74
2018	73.50	77.00	70.70
	72.70	**75.91**	**73.92**

A score over 61 is the acceptable biocriteria threshold

EPT Group

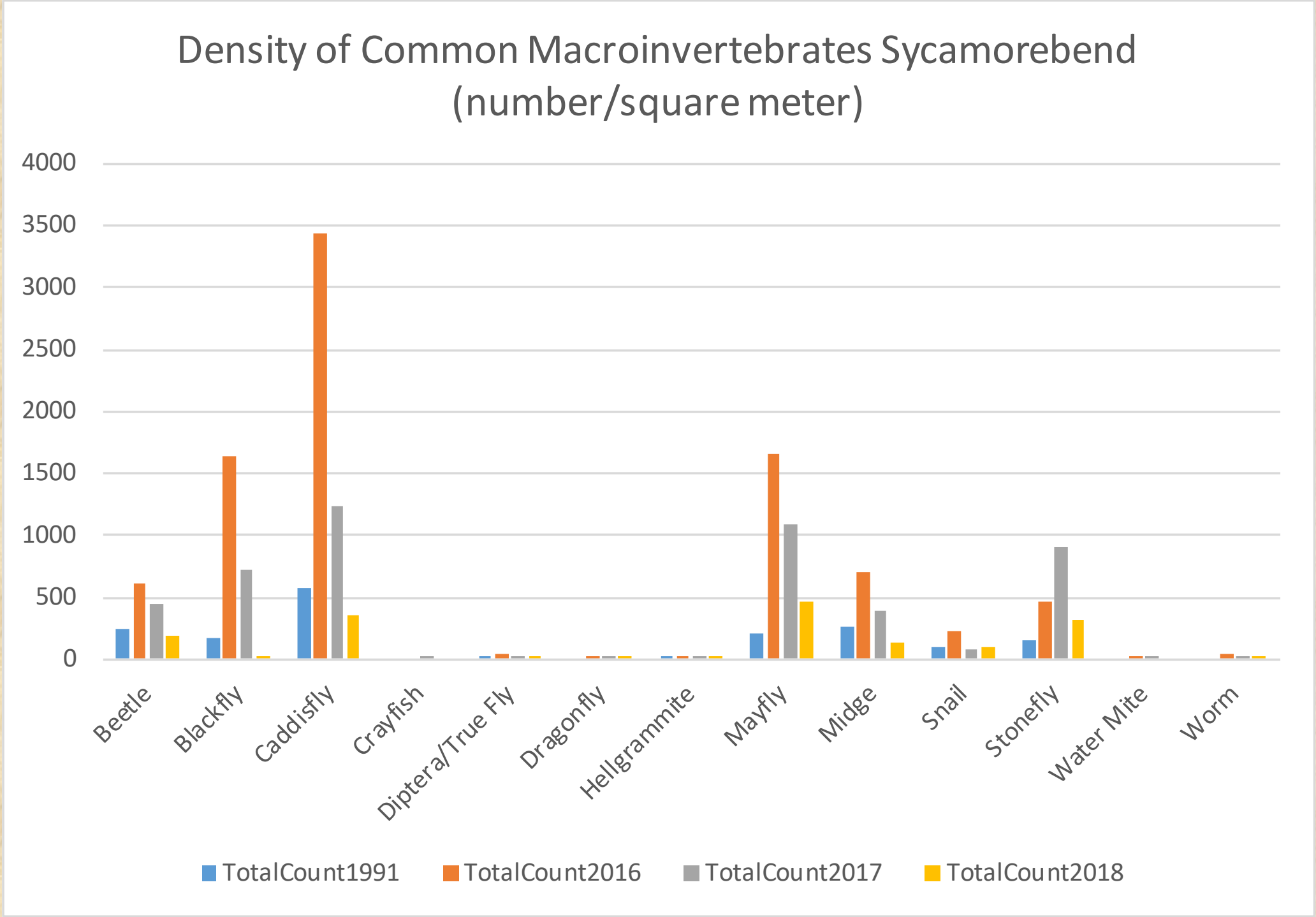
(Number per sq meter, Carle Sampler)		Sycamore Bend			Johnson Springs			Smith Bridge		
		2016	2017	2018	2016	2017	2018	2016	2017	2018
Ephemeroptera (Mayflies)						no sample				
Baetidae										
Acentrella	Tiny Blue-winged	523	572	113	212		15	31	68	1
Baetis	Blue winged olive	915	236	260	12		12	8	23	8
Heterocloeon	Tiny blue wings			1						
Caniidae										
Caenis	Small squaregills	15	71	6	19		1	15	45	10
Ephemerellidae	Spiny crawlers	8	1		4					
Ephemerella	Sulphurs		3	1						
Serratella	Little Sooty Olive	8								
Heptageniidae				10			17		15	
Epeorus	Quill gordon	65	29	19	63		54	15	27	15
Maccaffertium	March brown	69	67	22	15		8	65	18	35
Stenacron	Light cahill	4	19	15	19		8	12	14	3
Heptagenia	Golden Dun	12								
Isonychiidae										
Isonychia	Mahogany dun	23	72		4		1	12	14	8
Leptophebiidae										
Leptophlebia	Black quill	15	99	15	23		6	31	49	13

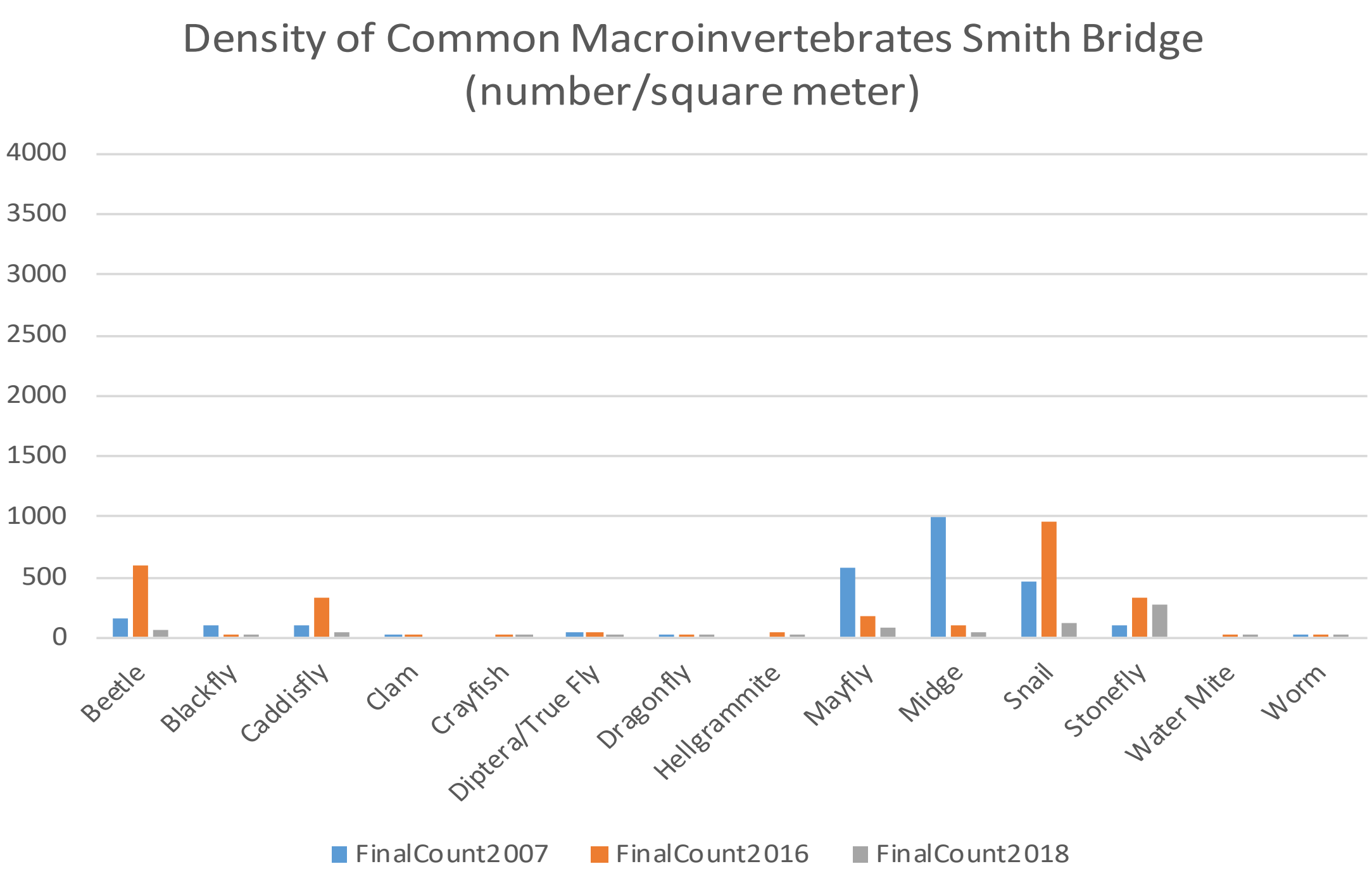
		2016	2017	2018	2016	2017	2018	2016	2017	2018
Plecoptera (Stoneflies)										
Chloroperlidae	Green Stonefly		1							
Leuctridae	Rolled Winged	446	906	340	515		410	331	214	281
Perlidae	Common Stonefly	12	3	1	4		3			
Tricoptera (Caddisflies)										
Goeridae	Little Gray Sedge						1	4		
Hydropsychidae										
Ceratopsyche	Spotted Sedge	607	446	64	308		19	38	12	6
Cheumatopsyche	Little Sister Sedge	2023	369	195	269		76	200	100	28
Hydropsyche	Common Netspinners	538	278	33	223		27	35	9	4
Brachycentridae	Humpless Casemaker		6		19		3	23	3	
Glossosomatidae	Little Black Caddis		10						3	
Lepidostomatidae	Little Brown Sedge				4					1
Philopotamiidae	Fingernet Caddis		3							1
Leptoceridae	Longhorned Caddis									
Polycentropodidae	Trumpetnet Caddis	15	10		8				1	
Psychomyiidae	Net Tube Caddis	4	5							
Rhyacophilidae	Free Living Caddis	238	79	58	73		14	23	1	4

Sycamore Bend

(Number per sq meter, Carle Sampler)		Pre-Pulse		Post-Pulse		
		1990	1991	2016	2017	2018
Ephemeroptera (Mayflies)						
Baetidae		23	80			
Acentrella	Tiny Blue-winged			523	572	113
Baetis	Blue winged olive			915	236	260
Heterocloeon	Tiny blue wings	17				1
Caniidae			50			
Caenis	Small squaregills			15	71	6
Ephemerellidae	Spiny crawlers		3	8	1	
Ephemerella	Sulphurs	4			3	1
Serratella	Little Sooty Olive		33	8		
Drunnela		12				
Heptageniidae						10
Epeorus	Quill gordon	5	20	65	29	19
Maccaffertium	March brown		13	69	67	22
Stenacron	Light cahill			4	19	15
Heptagenia	Golden dun			12		
Isonychiidae			3			
Isonychia	Mahogany dun			23	72	
Leptophebiidae						
Leptophlebia	Black quill			15	99	15

Plecoptera (Stoneflies)		1990	1991	2016	2017	2018
Chloroperlidae	Green Stonefly				1	
Leuctridae	Rolled Winged		150	446	906	340
Perlidae	Common Stonefly		10	12	3	1
Tricoptera (Caddisflies)						
Hydropsychidae						
Ceratopsyche	Spotted Sedge			607	446	64
Cheumatopsyche	Little Sister Sedge	28	13	2023	369	195
Hydropsyche	Common Netspinners	125	547	538	278	33
Brachycentridae	Humpless Casemaker				6	
Glossosomatidae	Little Black Caddis				10	
Lepidostomatidae	Little Brown Sedge		3			
Philopotamiidae	Fingernet Caddis				3	
Hydroptilidae	Micro Caddis	5				
Polycentropodidae	Trumpetnet Caddis	3		15	10	
Psychomyiidae	Net Tube Caddis			4	5	
Rhyacophilidae	Free Living Caddis		17	238	79	58


Density of Common Macroinvertebrates Sycamorebend (number/square meter)
4000
3500
3000
2500
2000
1500
1000
500
0
Beetle
Blackfly
Caddisfly
Crayfish
Diptera/True Fly
Dragonfly
Hellgrammite
Mayfly
Midge
Snail
Stonefly
Water Mite
Worm
TotalCount1991
TotalCount2016
TotalCount2017
TotalCount2018


Density of Common Macroinvertebrates Smith Bridge (number/square meter)
4000
3500
3000
2500
2000
1500
1000
500
0
Beetle
Blackfly
Caddisfly
Clam
Crayfish
Diptera/True Fly
Dragonfly
Hellgrammite
Mayfly
Midge
Snail
Stonefly
Water Mite
Worm
FinalCount2007
FinalCount2016
FinalCount2018

Multi-variate analysis of ecological communities

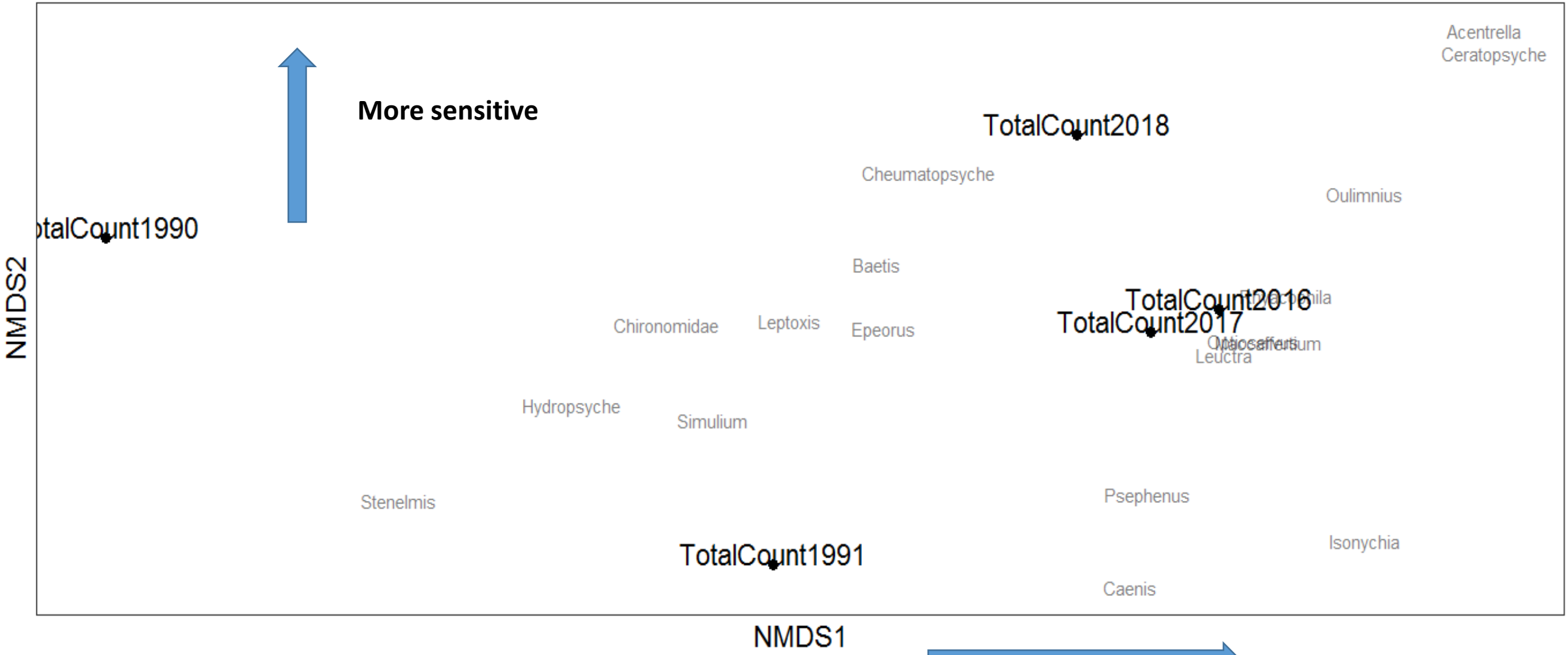
Sycamore Bend - rare taxa removed

Closer to Zero = More similar

1990 & 1991 = Pre-pulse data

Comparison	Sorensen	Chao
1990 - 1991	0.47	0.11
1990 - 2016	0.87	0.17
1990 - 2017	0.78	0.38
1990 - 2018	0.75	0.34
1991 - 2016	0.71	0.07
1991 - 2017	0.61	0.12
1991 - 2018	0.59	0.06
2016 - 2017	0.38	0
2016 - 2018	0.7	0.001
2017 - 2018	0.53	0.01

Sycamore Bend
Rare taxa removed



Taxa were removed if they made up less than 0.5% of total individuals throughout all years

Conclusions

- The three-year macroinvertebrate investigation on the upper Jackson River Tailwater was completed as agreed upon
- VSCI scores were high for all 3 sites, in 75th percentile
- Robust populations of mayfly, stonefly, and caddisfly were present at all 3 sites, particularly Sycamore Bend
- Post-pulse populations of EPT families at all 3 sites do not appear to have been affected by six release events per summer/fall
- Spiny crawler mayfly family was collected in low numbers; this group was much more robust in 1973 before Gathright Project
- Pulses do not appear to be affecting benthics in upper Jackson Tail.