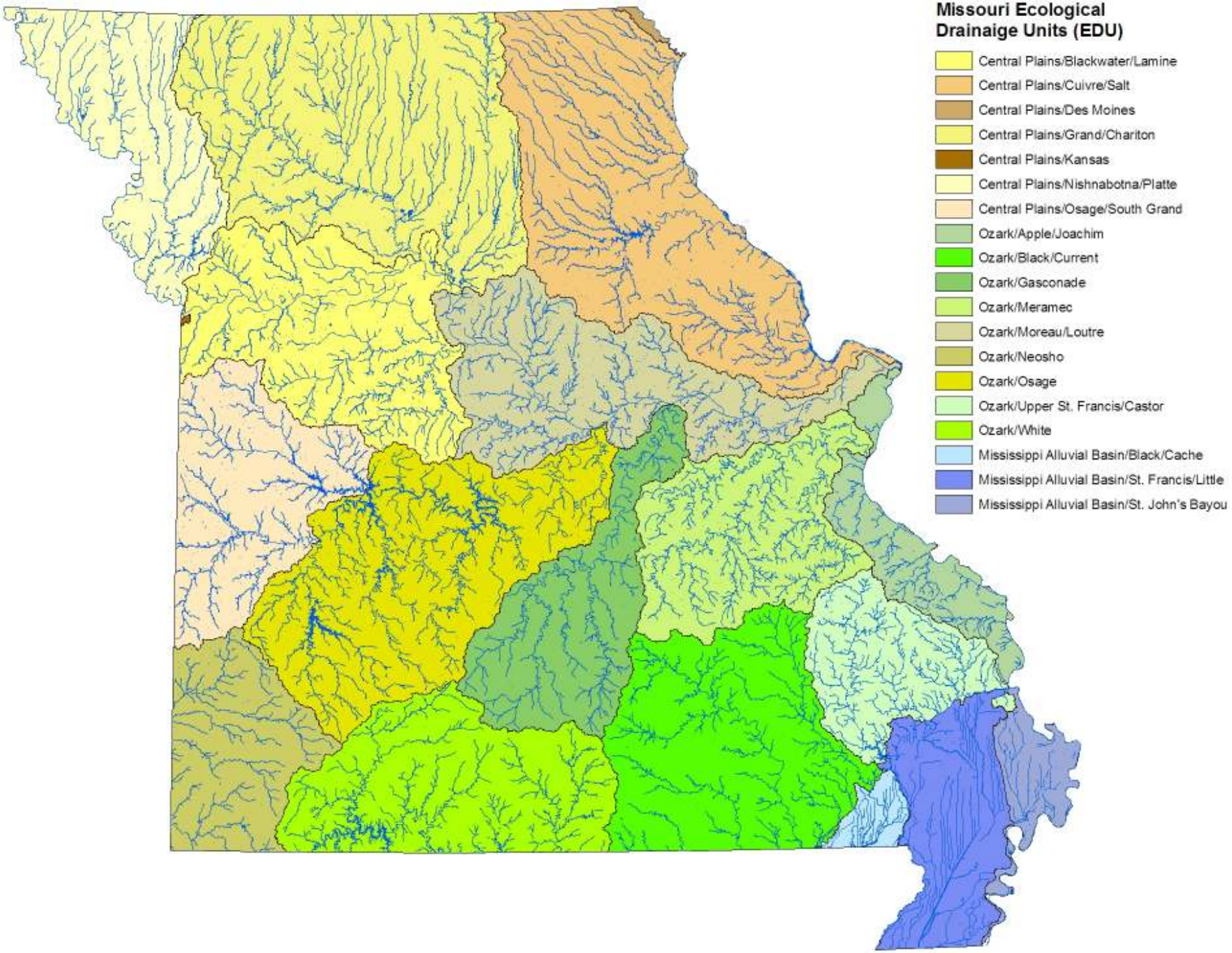
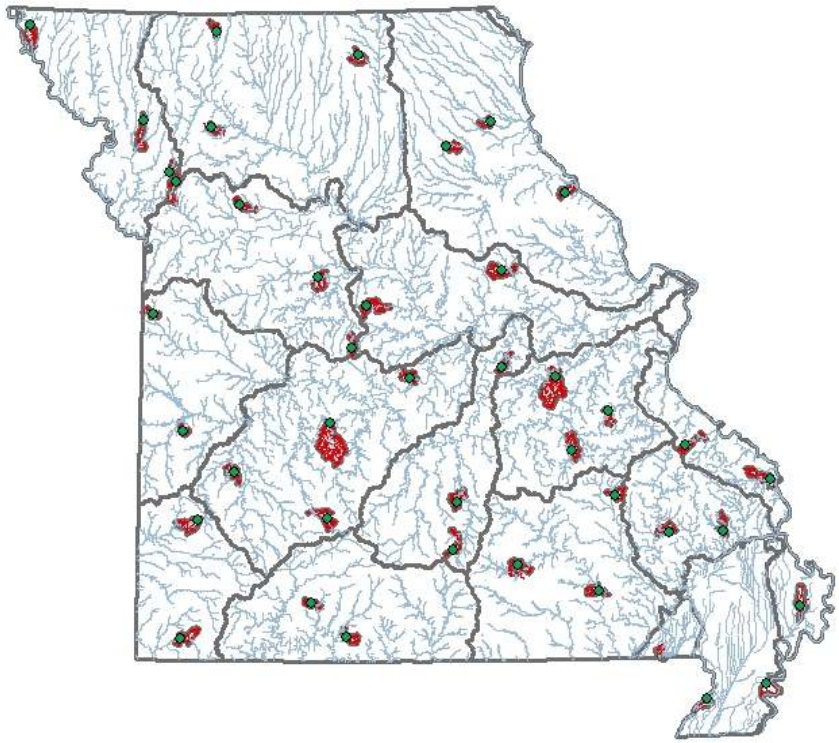
Headwater Stream Aquatic Life Assessment of Aquatic Conservation Opportunity Areas.

Objective

- To provide a spatial and temporal snapshot of macroinvertebrate communities in high quality, unclassified streams of Missouri


Missouri Ecological
Drainaige Units (EDU)
Central Plains/Blackwater/Lamine
Central Plains/Cuivre/Salt
Central Plains/Des Moines
Central Plains/Grand/Chariton
Central Plains/Kansas
Central Plains/Nishnabotna/Platte
Central Plains/Osage/South Grand
Ozark/Apple/Joachim
Ozark/Black/Current
Ozark/Gasconade
Ozark/Meramec
Ozark/Moreau/Loutre
Ozark/Neosho
Ozark/Osage
Ozark/Upper St. Francis/Castor
Ozark/White
Mississippi Alluvial Basin/Black/Cache
Mississippi Alluvial Basin/St. Francis/Little
Mississippi Alluvial Basin/St. John's Bayou

Headwater Stream Aquatic Life Assessment
Aquatic Conservation Opportunity Areas - 2007



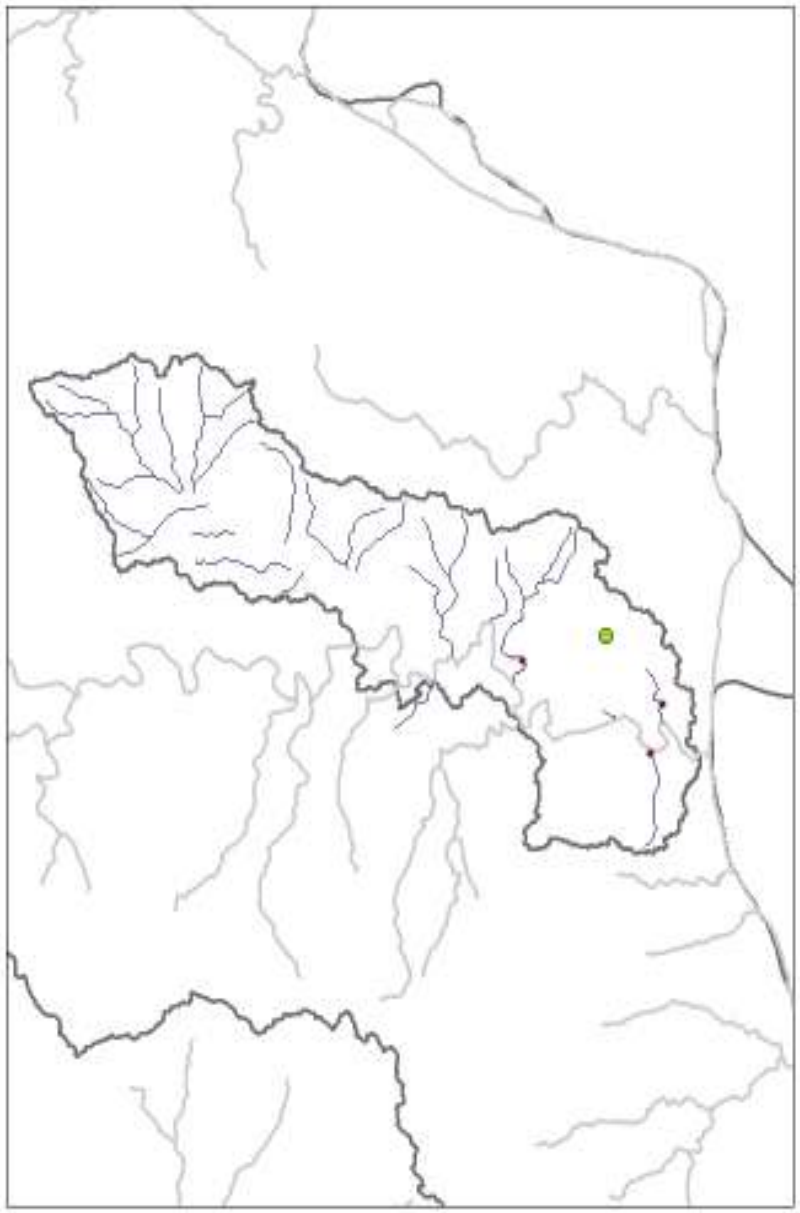
Stream Selection

- 158 Aquatic Conservation Opportunity Areas
- Subset of 42 selected for project
- 34 - unclassified
- 7 - classified (4 Class C & 3 Class P)
- 1 unsampled (Big Cane Creek not sampled due to water depth)
- Subset - good statewide distribution & association with Biological Criteria Wadeable/Perennial Reference Streams when possible
- All sites classified as headwater streams in MoRAP stream classification system (except Taum Sauk - sampled at wrong location)

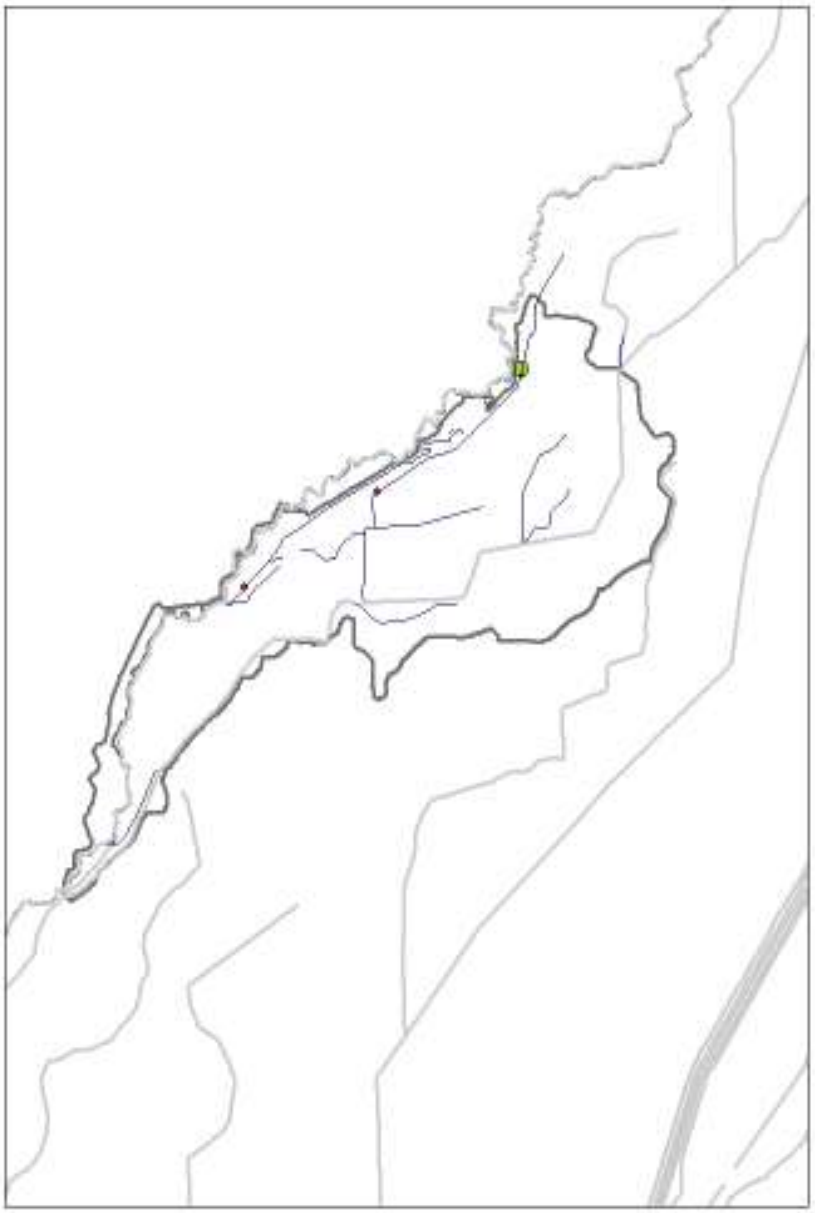
Aquatic Conservation Opportunity Areas Human Impact Selection Criteria

- Incorporated MoRAP human stressor index
- Individual stressors
- Riparian corridor
- Percentage of land in public ownership
- Natural land cover

Apple Creek COA

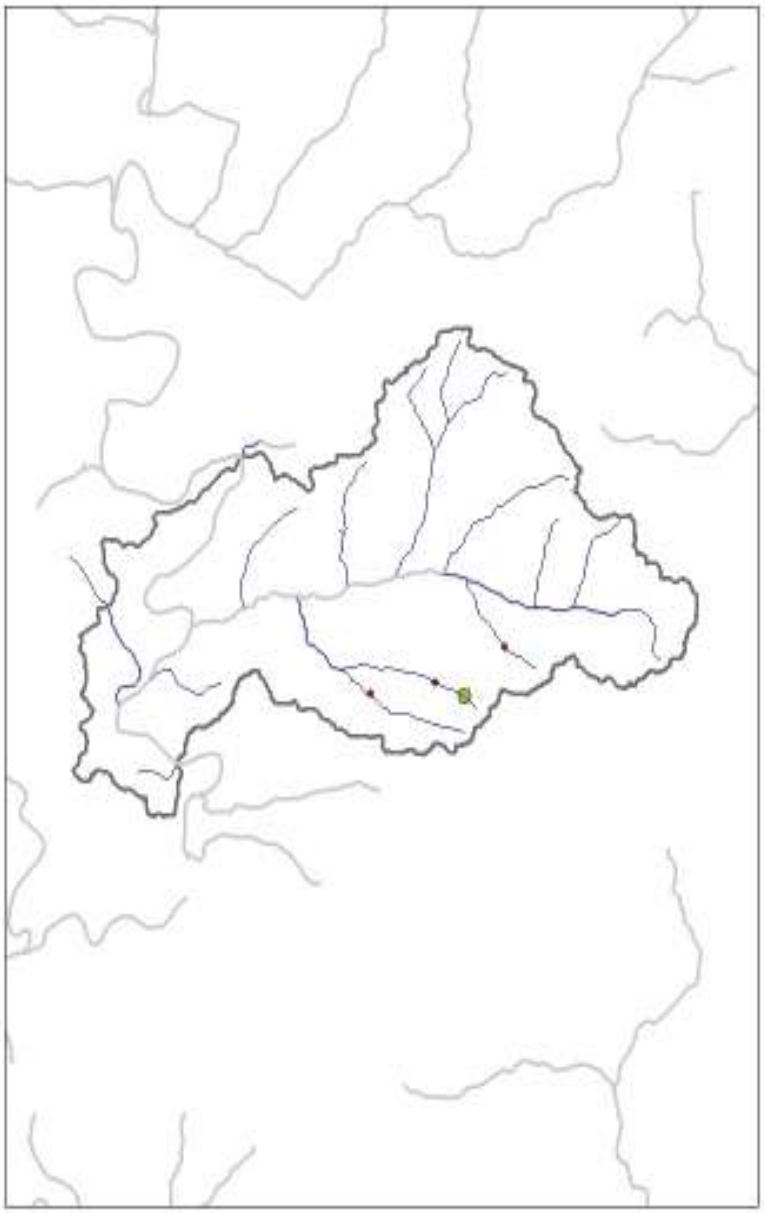


Ben Cash COA



Big Sugar Creek COA

Coldwater Creek COA



East Prairie COA

Taum Sauk Creek COA

Field Methods

- MDNR Semi-quantitative Macroinvertebrate Stream Bioassessment
- Project Procedure
- U.S. EPA EMAP Physical/Habitat Procedure
- May 2007 sampling
- Field work performed by contractors (MEC Water Resources, Barr Eng., and BWR)

Analyses Methods

- Macroinvertebrates identified to family level (or higher taxonomic level) by contractors
- MDC performing calculation of physical/habitat metrics

Table 1 – ACOA Information

Aquatic Conservation Opportunity Area Name	SITE_ID	EDU	Strahler Order	UTM_X	UTM_Y	Watershed Area (sq. kilometers)	Collection Date	COA ID
Chilton Creek	COA052	Ozark/Black/Current	1	4088761	682648	3.6477	5/7/2007	52
Leatherwood Creek	COA054	Ozark/Black/Current	3	4106403	625307	19.4418	5/7/2007	54
Taum Sauk Creek	COA062	Ozark/Black/Current	2	4155626	693790	33.4512	5/6/2007	62
Little Third Creek	COA076	Ozark/Gasconade	2	4244507	613377	19.7307	4/29/2007	76
Apple Creek	COA084	Ozark/Apple/Joachim	1	4166815	803672	0.6578	5/5/2007	84
Pickle Creek	COA089	Ozark/Apple/Joachim	2	4190675	743548	16.9684	5/5/2007	89
Huzzah Creek	COA094	Ozark/Meramec	3	4186601	663405	24.8651	5/1/2007	94
Lower Bourbeuse	COA096	Ozark/Meramec	2	4237764	651775	20.6362	4/30/2007	96
Mineral Fork	COA100	Ozark/Meramec	1	4213849	688985	1.8984	5/1/2007	100
Coldwater	COA128	Ozark/Upper St. Francis/Castor	1	4129332	731856	0.3535	5/6/2007	128
Hurricane Creek	COA131	Ozark/Upper St. Francis/Castor	2	4130252	769980	5.0911	5/6/2007	131
Ben Cash	COA144	MAB/St. Francis/Little	1	4013437	758607	4.5579	5/3/2007	144
East Prairie	COA153	MAB/St. Johns Bayou	2	4078000	824179	46.6869	5/2/2007	153
Wolf Bayou	COA156	MAB/St. Johns Bayou	2	4023262	800562	5.3787	5/2/2007	156
Big Sugar Creek	MDNR_BSC01	Ozark/Neosho	2	4055036	386808	12.4191	5/14/2007	64
Cane Creek	MDNR_CANE02	Ozark/White	1	4056516	503620	5.2353	5/15/2007	138
Cedar Creek	MDNR_CEDAR01	Ozark/Osage	2	4171571	424961	10.6758	5/14/2007	117
Coon Creek	MDNR_COON04	Ozark/Neosho	2	4137955	399459	4.2723	5/14/2007	67
Hamilton Creek	MDNR_HAMILTON01	Ozark/Gasconade	2	4117344	578827	15.5277	5/8/2007	75
Hightower Creek	MDNR_HIGH02	Central Plains/Osage/South Grand	1	4199794	388701	4.2300	5/15/2007	36
Little Niangua River	MDNR_LNIANGUA04	Ozark/Osage	1	4205279	492600	3.2274	5/10/2007	119
Massey Creek	MDNR_MAS04	Central Plains/Osage/South Grand	2	4281769	367489	8.2251	5/15/2007	38
Paddy Creek	MDNR_PADDY01	Ozark/Gasconade	2	4150379	582426	10.6344	5/7/2007	80
Pomme De Terre River	MDNR_PDT01	Ozark/Osage	2	4138838	490719	12.5544	5/9/2007	121
Richland Creek	MDNR_RICH02	Central Plains/Blackwater/Lamine	1	4258461	507810	9.0414	5/8/2007	10
Saline Creek	MDNR_SAL01	Ozark/Osage	2	4237619	548983	9.7389	5/10/2007	122
Woods Fork	MDNR_WFC02	Ozark/White	2	4079777	479615	4.2363	5/16/2007	143
Clear Creek	MDOC04-2007	Central Plains/Blackwater/Lamine	2	4373996	384050	3.6288	5/12/2007	4
Heaths Creek	MDOC09-2007	Central Plains/Blackwater/Lamine	1	4307361	484223	2.3724	5/10/2007	9
Moniteau Creek	MDOC108-2007	Ozark/Moreau/Loutre	3	4287414	518712	38.7279	5/10/2007	108
Whetstone Creek	MDOC110-2007	Ozark/Moreau/Loutre	1	4312072	613139	1.8765	5/4/2007	110
West Fork Wakenda Creek	MDOC13-2007	Central Plains/Blackwater/Lamine	3	4358335	428732	6.0093	5/11/2007	13
Dog Creek	MDOC16-2007	Central Plains/Grand/Chariton	1	4412154	408494	4.0500	5/17/2007	16
Union Ridge	MDOC23-2007	Central Plains/Grand/Chariton	1	4463238	512561	0.8848	5/15/2007	23
West Fork Big Creek	MDOC25-2007	Central Plains/Grand/Chariton	2	4479096	412230	6.0917	5/15/2007	25
Little Platte River	MDOC28-2007	Central Plains/Nishnabotna/Platte	1	4381297	379421	15.2928	5/12/2007	28
Muddy Creek	MDOC32-2007	Central Plains/Nishnabotna/Platte	2	4417100	360971	12.3272	5/16/2007	32
Rock Creek	MDOC34-2007	Central Plains/Nishnabotna/Platte	1	4483661	280895	2.2518	5/16/2007	34
Grassy Creek	MDOC42-2007	Central Plains/Cuivre/Salt	2	4367145	657948	10.9818	5/2/2007	42
North Fork Salt River	MDOC44-2007	Central Plains/Cuivre/Salt	2	4399080	574717	8.5077	5/14/2007	44
South Fabius River	MDOC46-2007	Central Plains/Cuivre/Salt	1	4416183	605693	5.6277	5/3/2007	46

Table 2 – ACOA Metrics

Aquatic Conservation Opportunity Area Name	Habitats Sampled	Number of Habitats Sampled	Stream type	Total Macroinvertebrate Count	Taxa Richness	EPT Taxa	Dominant Taxon	Dominant Taxon %
Chilton Creek	CS, NF, RM	3	RP	752	32	15	Chironomidae	**16%**
Leatherwood Creek	CS	1	RP	184	27	11	Chironomidae	58%
Taum Sauk Creek*	CS, NF	2	RP	147	23	10	Perlodidae	20%
Little Third Creek	CS, NF	2	RP	943	28	13	Chironomidae	28%
Apple Creek	CS, NF, RM	3	RP	589	18	7	Gammaridae	81%
Pickle Creek*	CS	1	RP	173	27	18	Heptageniidae	36%
Huzzah Creek*	CS, NF	2	RP	877	**38**	**19**	Chironomidae	18%
Lower Bourbeuse*	CS, NF	2	RP	918	33	14	Glossosomatidae	24%
Mineral Fork	CS, NF	2	RP	745	32	15	Chironomidae	23%
Coldwater	CS, NF	2	RP	**23**	14	5	Oligochaeta	17%
Hurricane Creek	CS, NF	2	RP	**1317**	**38**	15	Chironomidae	38%
Ben Cash	SG, NF	2	GP	641	18	**0**	Gammaridae	41%
East Prairie*	SG, NF	2	GP	737	28	7	Chironomidae	72%
Wolf Bayou	SG, NF	2	GP	587	12	1	Asellidae	47%
Big Sugar Creek	CS, NF, RM	3	RP	1031	19	4	Chironomidae	**95%**
Cane Creek	CS, NF	2	RP	114	13	4	Chironomidae	26%
Cedar Creek	CS, NF, RM	3	RP	1201	19	4	Physidae	52%
Coon Creek	CS, NF	2	RP	820	12	1	Asellidae	50%
Hamilton Creek	CS, NF	2	RP	888	14	7	Asellidae	61%
Hightower Creek	CS, NF	2	RP	878	11	1	Oligochaeta	39%
Little Niangua River	CS, NF, RM	3	RP	1134	35	11	Chironomidae	35%
Massey Creek	CS, NF	2	RP	845	21	6	Chironomidae	42%
Paddy Creek	CS, NF	2	RP	769	**38**	14	Chironomidae	**16%**
Pomme De Terre River	CS, NF	2	RP	255	20	7	Chironomidae	31%
Richland Creek	CS, NF, RM	3	RP	1184	27	8	Physidae	45%
Saline Creek	CS, NF	2	RP	816	21	8	Planariidae	54%
Woods Fork	CS, NF, RM	3	RP	108	**8**	1	Asellidae	69%
Clear Creek	CS, NF, RM	3	RP	283	25	7	Chironomidae	30%
Heaths Creek	CS, NF, RM	3	RP	909	14	5	Asellidae	76%
Moniteau Creek*	CS, NF, RM	3	RP	346	19	5	Elmidae	32%
Whetstone Creek	CS, NF, RM	3	RP	891	14	6	Asellidae	66%
West Fork Wakenda Creek	CS, NF, SG	3	?	386	20	4	Heptageniidae	45%
Dog Creek	CS, NF, SG	3	?	696	23	3	Simuliidae	52%
Union Ridge	CS, NF, RM	3	RP	1007	18	3	Simuliidae	58%
West Fork Big Creek	CS, NF, RM	3	RP	264	20	5	Simuliidae	69%
Little Platte River	CS, NF, RM	3	RP	460	21	6	Elmidae	35%
Muddy Creek	CS, NF, RM	3	RP	747	13	1	Simuliidae	44%
Rock Creek*	CS, NF, RM	3	RP	901	17	1	Simuliidae	51%
Grassy Creek	CS, NF, RM	3	RP	1243	23	10	Crangonyctidae	34%
North Fork Salt River	CS, NF, RM	3	RP	1032	19	6	Chironomidae	42%
South Fabius River	CS, NF, RM	3	RP	394	27	5	Chironomidae	70%

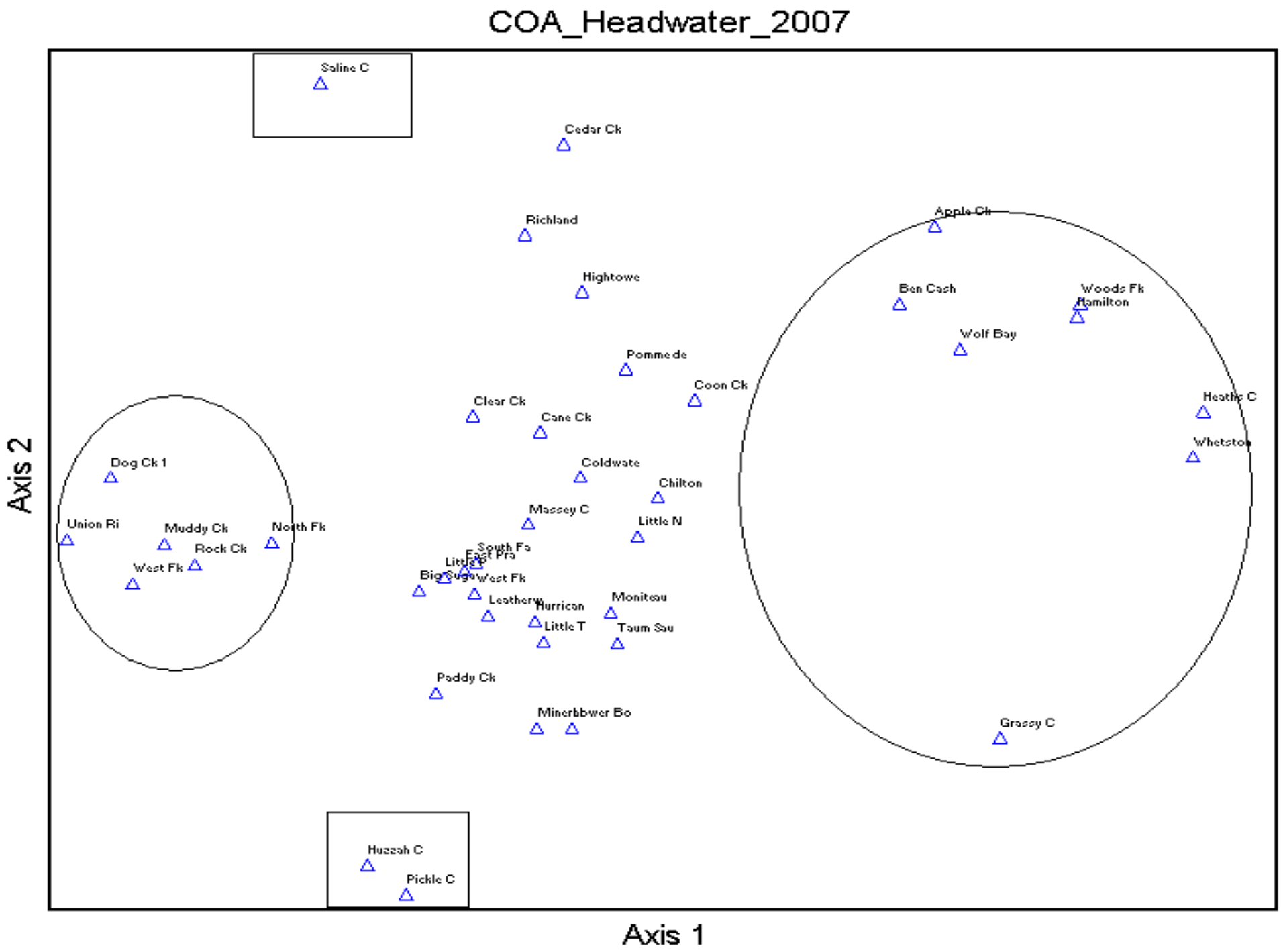
*Classified streams

Metric Results for All Streams

- Count range = 23 -1317
- Taxa Richness = 8-38
- EPT Taxa = 0-19
- Percent Dominant Taxon = 16-95

Average Metric Results

Average Taxa Richness of unclassified streams	21
Average Taxa Richness of classified streams	26
Average EPT of unclassified streams	6
Average EPT of classified streams	10
Average % DT of unclassified streams	47
Average % DT of classified streams	36
Average unclassified stream size	7.3 square kilometers
Average classified stream size	26 square kilometers


COA_Headwater_2007
Axis 2
Axis 1
Saline C
Cedar Ck
Richland
Hightowe
Pomme de
Coon Ck
Clear Ck
Cane Ck
Coldwate
Chilton
Massey C
Little N
South Fa
East Pra
Little P
Big Sugar
West Fk
Leatherw
Hurrican
Moniteau
Little T
Taum Sau
Paddy Ck
Minerhbwer Bo
Apple Ck
Ben Cash
Woods Fk
Hamilton
Wolf Bay
Heaths C
Whetston
Grassy C
Dog Ck 1
Union Ri
Muddy Ck
North Fk
Rock Ck
West Fk
Huzzah C
Pickle C

Discussion

- Headwater Streams in Aquatic Conservation Opportunity Areas have a significant and important biological community
- Supported by:
  - Ohio EPA biological criteria for streams with watersheds less than 20 square miles
  - Contribution to stream network (Myers et al. 2007)
  - MDC is sampling fish communities

Big Sugar Creek-ACOA

Coon Creek - ACOA

Cane Creek - ACOA

Woods Fork - ACOA

Chilton Creek - ACOA

Leatherwood Creek - ACOA

Taum Sauk Creek - ACOA

Hurricane Creek - ACOA

Coldwater Creek - ACOA

Big Cane - ACOA

Ben Cash _ ACOA

East Prairie - ACOA

Wolf Bayou - ACOA

Apple Creek - ACOA

Pickle Creek - ACOA

Huzzah Creek - ACOA

Lower Bourbeuse River - ACOA

Mineral Fork - ACOA

Little Third Creek - ACOA

Paddy Creek - ACOA

Hamilton Creek - ACOA

Saline Creek - ACOA

Little Niangua River - ACOA

Pomme De Terre - ACOA

Cedar Creek - ACOA

Moniteau Creek - ACOA

Whetstone Creek - ACOA

Hightower Creek - ACOA

Massey Creek - ACOA

Heaths Creek - ACOA

Clear Creek - ACOA

Richland Creek - ACOA

West Fork Wakenda Creek - ACOA

Little Platte River - ACOA

Rock Creek - ACOA

Muddy Creek - ACOA

Dog Creek - ACOA

West Fork Big Creek - ACOA

Union Ridge - QCOA

Grassy Creek - QCOA

North Fork Salt River - ACOA

South Fabius River - ACOA