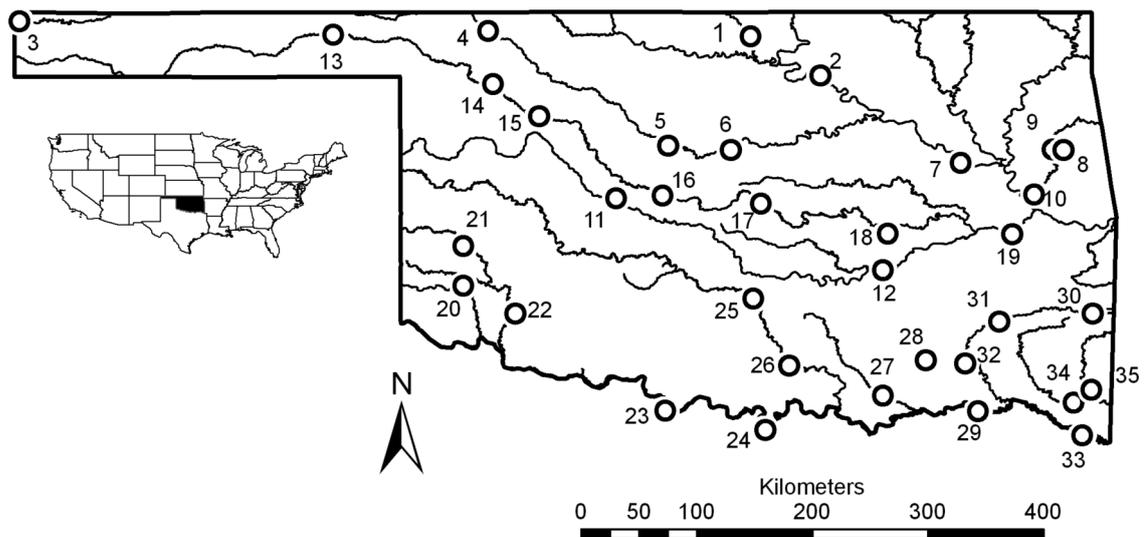


## Appendix A

Localities of 35 fish communities monitored between 1978 and 2008 to assess the relationship between community species richness and community biomass stability. Site identification numbers are presented in Appendix B.



## Appendix B

Collection site, United States Geological Survey (USGS) gauging station number, latitude and longitude (DD), sampling period, number of times sampled, number of years sampled, years of flow data, and stream size site scores from PC I summarized using principal components analysis (PCA) from the 35 sites in the central plains of North America.

Site ID	Location	USGS Number	Latitude (dd)	Longitude (dd)	Times sampled	Years sampled	Years of flow data	Stream hydrology PC I
1	Chikaskia River	07152000	36.81139	-97.27417	41	21	73	-0.23
2	Arkansas River	07152500	36.50417	-96.72806	56	23	84	1.30
3	Cimarron River	07154500	36.92667	-102.95861	38	20	59	-2.78
4	Cimarron River	07157950	36.85194	-99.31500	58	22	43	-1.28
5	Cimarron River	07159100	35.95167	-97.91417	42	22	36	0.01
6	Cimarron River	07160000	35.92056	-97.42556	50	23	66	0.20
7	Arkansas River	07165570	35.82083	-95.63861	53	23	37	2.05
8	Illinois River	07196500	35.92278	-94.92333	56	21	74	0.16
9	Baron Fork River	07197000	35.92111	-94.83833	25	15	61	-0.43
10	Illinois River	07198000	35.57306	-95.06861	57	22	72	0.91
11	Canadian River	07228500	35.54361	-98.31750	60	22	61	-0.44
12	Canadian River	07231500	34.97778	-96.24333	58	22	72	0.55
13	Beaver River	07234000	36.82222	-100.51889	31	19	72	-2.05
14	North Canadian R.	07237500	36.43667	-99.27806	52	21	73	-0.89
15	North Canadian R.	07238000	36.18333	-98.92083	27	16	63	-0.84
16	North Canadian R.	07239500	35.56306	-97.95722	56	20	78	-0.63
17	North Canadian R.	07241550	35.50028	-97.19361	59	23	41	0.00
18	North Canadian R.	07242000	35.26556	-96.20583	45	23	72	0.17
19	Canadian River	07245000	35.26222	-95.23694	38	21	71	1.74
20	Salt Fork Red River	07300500	34.85833	-99.50833	55	23	72	-1.75
21	North Fork Red River	07301500	35.16806	-99.50694	53	21	64	-1.49
22	North Fork Red River	07305000	34.63806	-99.10333	57	22	76	-0.61
23	Red River	07315500	33.87861	-97.93417	53	23	71	0.59
24	Red River	07316000	33.72778	-97.15972	45	20	73	0.78
25	Washita River	07328500	34.75472	-97.25111	38	22	72	0.20
26	Washita River	07331000	34.23333	-96.97556	48	23	81	0.57
27	Blue River	07332500	33.99694	-96.24083	32	20	73	-0.51
28	Muddy Boggy Creek	07334000	34.27139	-95.91194	31	12	72	0.03
29	Red River	07335500	33.87500	-95.50167	45	23	80	1.95
30	Kiamichi River	07335700	34.63833	-94.61250	56	22	44	-1.46
31	Kiamichi River	07335790	34.57472	-95.34056	38	20	29	0.27
32	Kiamichi River	07336200	34.24861	-95.60500	41	21	37	0.54
33	Red River	07336820	33.68389	-94.69417	57	21	38	2.06
34	Little River	07338500	33.94111	-94.75833	55	22	63	0.61
35	Mountain Fork	07339000	34.04167	-94.61972	37	20	82	0.71

## Appendix C

Hydrologic parameter, parameter description, parameter transformation, and the first principal components analysis (PCA) axis loading (percent of variation explained by each axis) of flow variation parameters quantified from USGS gauging stations at 35 stream sites in the central plains of North America.

Hydrologic parameter	Parameter description	Transformation	PC I (50.6%)	PC II (13.9%)	PC III (10.7%)
Mean annual flow	mean annual discharge ( $\text{m}^3 \text{s}^{-1}$ )	$\log_{10}(X + 1)$	0.93	0.04	0.24
Number of zero days	median number of zero flow days per year	$\log_{10}(X + 1)$	-0.82	0.20	0.20
Annual C.V.	coefficient of variation in annual discharge	$\log_{10}(X + 1)$	-0.89	0.24	-0.14
Flow predictability	flow predictability	$\arcsine(\sqrt{X})$	-0.43	0.40	0.48
Constancy/predictability	flow constancy/flow predictability	$\arcsine(\sqrt{X})$	0.18	0.93	-0.17
Percent of floods in 60 day period	percentage of floods that occur during a given 60 day period in all years	$\arcsine(\sqrt{X})$	-0.10	0.34	0.51
Base flow index	ratio of base flow to total flow	$\arcsine(\sqrt{X})$	0.72	0.49	-0.16
Date of minimum flow	julian date of minimum flow	$\log_{10}(X + 1)$	0.92	-0.20	-0.04
Date of maximum flow	julian date of maximum flow	$\log_{10}(X + 1)$	-0.45	-0.21	0.67
Rise rate	median of all positive differences between consecutive daily values	$\log_{10}(X + 1)$	0.90	-0.12	0.31
Fall rate	median of all negative differences between consecutive daily values	$\log_{10}(X^* - 1 + 1)$	0.91	0.06	0.28
Number of reversals	number of hydrologic reversals	$\log_{10}(X + 1)$	0.57	0.31	0.03

## Appendix D

Small-bodied fishes included in analyses to assess the influence of species diversity on temporal community and population stability of 35 long-term stream sites in the central plains of North America, from 1978–2008. Species that comprised at least 20% of the biomass collected from each site and year are indicated with (\*).

Family	Species	Family	Species
Petromyzontidae	<i>Ichthyomyzon castaneus</i>	Cyprinidae	<i>Notropis perpallidus</i>
Clupeidae	<i>Dorosoma petenense*</i>		<i>Notropis potteri</i>
Cyprinidae	<i>Campostoma anomalum*</i>		<i>Notropis percobromis*</i>
	<i>Campostoma oligolopis*</i>		<i>Notropis shumardi*</i>
	<i>Cyprinella camura</i>		<i>Notropis stramineus*</i>
	<i>Cyprinella lutrensis*</i>		<i>Notropis suttkusi</i>
	<i>Cyprinella venusta*</i>		<i>Notropis volucellus</i>
	<i>Cyprinella whipplei*</i>		<i>Opsopoeodus emiliae</i>
	<i>Dionda nubila*</i>		<i>Phenacobius mirabilis*</i>
	<i>Erimystax X-punctata</i>		<i>Phoxinus erythrogaster</i>
	<i>Hybognathus bayi</i>		<i>Pimephales notatus*</i>
	<i>Hybognathus nuchalis</i>		<i>Pimephales promelas*</i>
	<i>Hybognathus placitus*</i>		<i>Pimephales tenellus</i>
	<i>Hybopsis amblops</i>	Aphredoderidae	<i>Pimephales vigilax*</i>
	<i>Hybopsis amnis</i>		<i>Aphredoderus sayanus</i>
	<i>Luxilus cardinalis*</i>	Cyprinodontidae	<i>Cyprinodon rubrofluvialis*</i>
	<i>Luxilus chrysocephalus*</i>		
	<i>Luxilus cornutus</i>	Fundulidae	<i>Fundulus blairae</i>
	<i>Luxilus pilsbryi*</i>		<i>Fundulus notatus*</i>
	<i>Lythrurus fumeus</i>		<i>Fundulus olivaceus*</i>
	<i>Lythrurus snelsoni</i>		<i>Fundulus sciadicus</i>
	<i>Lythrurus umbratilis*</i>		<i>Fundulus zebrinus*</i>
	<i>Macrhybopsis aestivalis*</i>	Poeciliidae	<i>Gambusia affinis*</i>
	<i>Macrhybopsis australis</i>		
	<i>Macrhybopsis hyostoma</i>	Atherinopsidae	<i>Labidesthes sicculus*</i>
	<i>Notemigonus crysoleucas*</i>		<i>Menidia beryllina*</i>
	<i>Notropis atherinoids*</i>		
	<i>Notropis atrocaudalis</i>	Cottidae	<i>Cottus carolinae</i>
	<i>Notropis bairdi*</i>		
	<i>Notropis blennioides*</i>	Centrarchidae	<i>Centrarchus macropterus</i>
	<i>Notropis boops*</i>		<i>Lepomis auritus</i>
	<i>Notropis buechanani*</i>		<i>Lepomis humilis*</i>
	<i>Notropis emiliae</i>		<i>Lepomis marginatus*</i>
	<i>Notropis girardi*</i>		<i>Lepomis megalotis*</i>
	<i>Notropis greenei*</i>		<i>Lepomis punctatus*</i>
	<i>Notropis hubbsi</i>		<i>Lepomis symmetricus</i>
	<i>Notropis ortenburgeri</i>		
Percidae	<i>Ammocrypta clara</i>		
	<i>Ammocrypta vivax</i>		
	<i>Crystallaria asprella</i>		

*Etheostoma asprigene*  
*Etheostoma blenniodes*  
*Etheostoma chlorosomum*  
*Etheostoma collettei*  
*Etheostoma cragini*  
*Etheostoma flabellare*  
*Etheostoma gracile*  
*Etheostoma histrio*  
*Etheostoma microperca*  
*Etheostoma nigrum*  
*Etheostoma proeliare*  
*Etheostoma punctulatum*  
*Etheostoma radiosum\**  
*Etheostoma spectabile\**  
*Etheostoma stigmaeum*  
*Etheostoma whipplei*  
*Etheostoma zonale*  
*Percina caprodes\**  
*Percina copelandi*  
*Percina macrolepida*  
*Percina maculata*  
*Percina pantherina*  
*Percina phoxocephala*  
*Percina sciera*  
*Percina shumardi*

Elassomatidae

*Elassoma zonatum*

---

# Appendix E

Principal components analysis (PCA) axis I loadings summarizing stream size across the study area. Positive PC I scores associated with mean annual flow, date of minimum flow, rise and fall rates; negative PC I scores associated with coefficient of variation in annual flow, and median number of days with no flow.

