

**Part IV: Scoring Criteria for the Index of Biotic Integrity and the
Index of Well-Being to Monitor Fish Communities in Wadeable
Streams in the Coosa and Tennessee Drainage Basins of the Ridge
and Valley Ecoregion of Georgia**

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Introduction

The Ridge and Valley ecoregion is one of the six Level III ecoregions found in Georgia (Part 1, Figure 1). It is contained within two major drainage basins, the Coosa and the Tennessee, in the northwestern corner of Georgia. The Ridge and Valley ecoregion covers nearly 3,000 square miles (United States Census Bureau 2000) and includes all or portions of 10 counties (Fig. 1), bordering the Piedmont ecoregion to the south and the Blue Ridge ecoregion to the east. A small portion of the Southwestern Appalachians ecoregion is located in the upper northwestern corner of the Ridge and Valley ecoregion.

The biotic indices developed by the GAWRD are based on the Level III ecoregion delineations (Griffith et al 2001). The metrics and scoring criteria adapted to the Ridge and Valley ecoregion were developed from biomonitoring samples collected in the two major river basins that drain the Ridge and Valley ecoregion, the Coosa (ACT) and the Tennessee (TEN). A total of 169 biomonitoring samples have been collected by the GAWRD in the Ridge and Valley ecoregion since 2001.

A total of 57 native species were collected from samples in the Coosa drainage basin, while 52 native species were collected from samples in the Tennessee drainage basin. Six species on Georgia's list of protected animals of Georgia list were collected in the Ridge and Valley ecoregion. The state listed fish were ranked as endangered, threatened, or rare based on the Endangered Wildlife Act of 1973 (Georgia Department of Natural Resources, Nongame – Endangered Wildlife Program, 1999). The flame chub (*Hemitremia flammea*), ranked as endangered, was collected in the Tennessee drainage basin. Three species were ranked as threatened: the stargazing minnow (*Phenacobius uranops*) and the northern studfish (*Fundulus catenatus*), which were collected in the Tennessee drainage basin, and the trispot darter (*Etheostoma trisella*), which was found in the upper Coosa drainage basin. Three species ranked as rare were collected from the Tennessee drainage basin: the bigeye chub (*Hybopsis amblops*), the black darter (*Etheostoma duryi*), and the dusky darter (*Percina sciera*). Table 1 shows a complete list of state listed fish found in the Ridge and Valley ecoregion of Georgia.

IBI scores were generally higher in the Ridge and Valley ecoregion than in the Piedmont and Southeastern Plains ecoregions. Based on the IBI integrity classes (Part I, Table 2), 22 sites scored in the excellent class, 47 scored in the good class, 41 scored in the fair class, 29 scored in

the poor class, and 30 scored in the very poor class. IBI scores in the Ridge and Valley ecoregion ranged from a maximum of 58 to a minimum of 12. Unlike the Piedmont ecoregion, more sites scored in the excellent and good integrity classes ($[69/169] * 100 = 40.8$) than in the poor and very poor integrity classes ($[59/169] * 100 = 34.9$). Major impacts in the Ridge and Valley ecoregion include the effects of animal agriculture production and urban / suburban development.

Table 2 shows the scoring criteria for the IBI metrics in the Ridge and Valley ecoregion. The Maximum Species Richness (MSR) graphs for each basin group within the Ridge and Valley ecoregion are included in Appendix 1. Figures ACT1 - RGV through ACT6b - RGV depict the MSR graphs used to score the species richness metrics (metrics 1 – 6b) in the Coosa drainage basin. Figures TEN1 - RGV through TEN6b - RGV depict the MSR graphs used to score the species richness metrics in the Tennessee drainage basin. The fish list for the Ridge and Valley ecoregion showing the water quality tolerance rankings, feeding guilds, and species categories used in calculating the IBI is also included in Appendix 1.

Based on the modified Iwb integrity classes for the Ridge and Valley ecoregion (Table 3), 16 sites scored in the excellent class, 49 scored in the good class, 68 scored in the fair class, 14 scored in the poor class, and 22 scored in the very poor class. Modified Iwb scores in headwater streams ranged from a maximum score of 10.04 to a minimum of 0.89. At larger wadeable streams, modified Iwb scores ranged from a maximum of 10.24 to a minimum of 5.86. There was a significant relationship between the indices across the Ridge and Valley ecoregion ($r = 0.8379$, $p = 0.0000$, $N = 169$), although the relationship was stronger in larger wadeable streams ($r = 0.8838$, $p = 0.0000$, $N = 44$) than in headwater streams ($r = 0.8322$, $p = 0.0000$, $N = 169$).

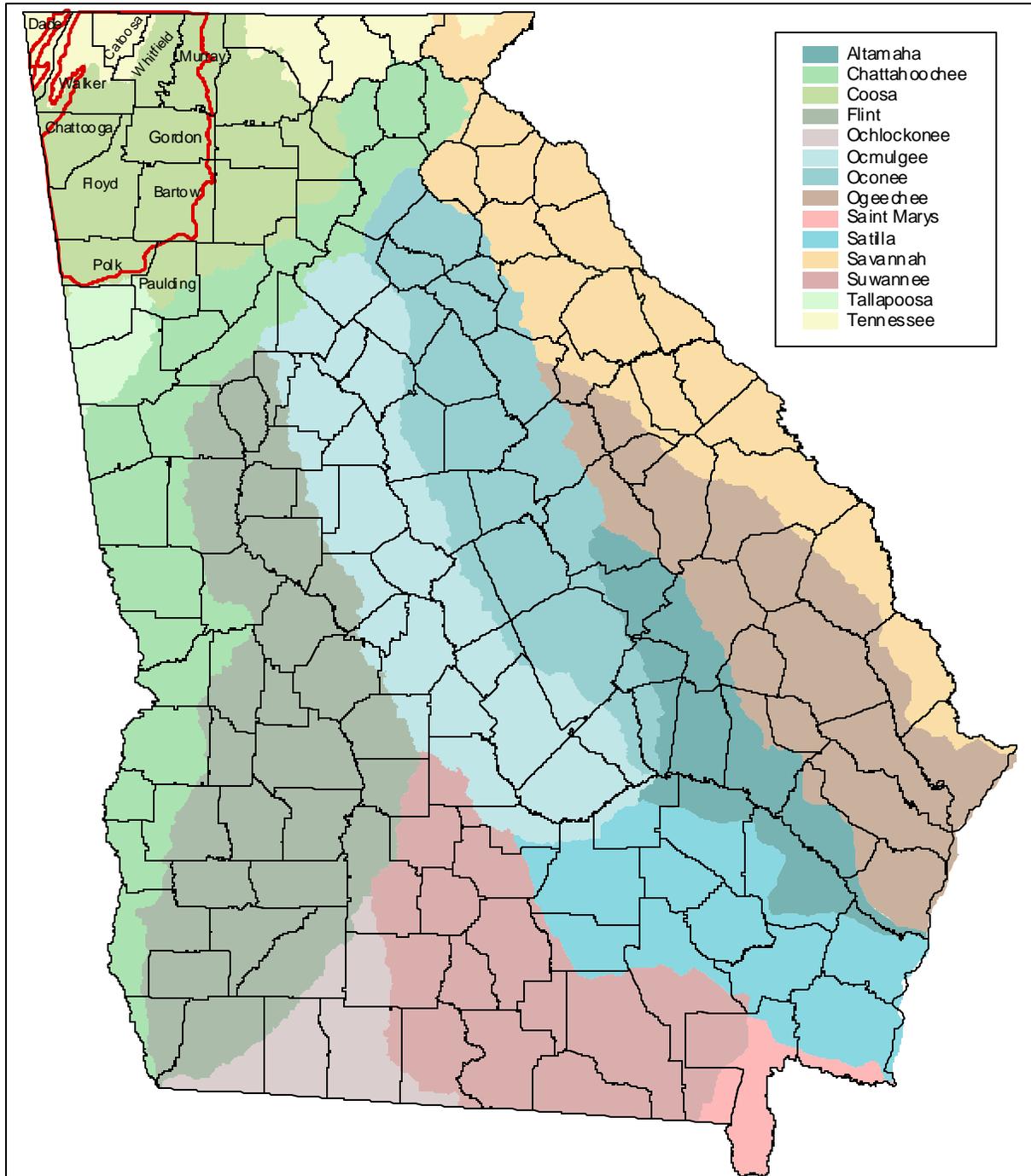


Figure 1. Level III Ridge and Valley ecoregion (outlined in bold red) in Georgia. Major drainage basins include the Coosa and the Tennessee.

Table 1. State listed fish found in the Ridge and Valley ecoregion of Georgia (Georgia Department of Natural Resources, Nongame – Endangered Wildlife Program, 1999).

Species	State Status	Federal Status	Basin
Blue Shiner (<i>Cyprinella caerulea</i>)	E	T	COO
Holiday Darter (<i>Etheostoma brevirostrum</i>)	T	None	COO
Coldwater Darter (<i>Etheostoma ditrema</i>)	T	None	COO
Black Darter (<i>Etheostoma duryi</i>)	R	None	TEN
Trispot Darter (<i>Etheostoma trisella</i>)	T	None	COO
Northern Studfish (<i>Fundulus catenatus</i>)	T	None	TEN
Flame Chub (<i>Hemitremia flammea</i>)	E	None	TEN
Bigeye Chub (<i>Hypopsis amblops</i>)	R	None	TEN
Ohio Lamprey (<i>Ichthyomyzon bdellium</i>)	R	None	TEN
River Redhorse (<i>Moxostoma carinatum</i>)	R	None	COO, TEN
Popeye Shiner (<i>Notropis ariommus</i>)	T	None	TEN
Mountain Madtom (<i>Noturus eleutherus</i>)	T	None	TEN
Frecklebelly Madtom (<i>Noturus munitus</i>)	E	None	COO
Amber Darter (<i>Percina antesella</i>)	E	E	COO
Goldline Darter (<i>Percina aurolineata</i>)	T	T	COO
Conasauga Logperch (<i>Percina jenkinsi</i>)	E	E	COO
Freckled Darter (<i>Percina lenticula</i>)	E	None	COO
Dusky Darter (<i>Percina sciera</i>)	R	None	TEN
River Darter (<i>Percina shumardi</i>)	E	None	COO, TEN
Upland Bridled Darter (<i>Percina</i> sp.)	R	None	COO
Snail Darter (<i>Percina tanasi</i>)	T	T	TEN
Stargazing Minnow (<i>Phenacobius uranops</i>)	T	None	TEN

Status: E = endangered; R = rare; T = threatened

Basin: COO = Coosa; TEN = Tennessee

Table 2. Index of Biotic Integrity metrics for wadeable streams in the Ridge and Valley ecoregion of Georgia.

Metric	Basin Group	Scoring Criteria		
1. Number of native species	COO / TEN			
2. Number of benthic invertivore species	COO / TEN			
3a. Number of native sunfish species ^a	COO / TEN			
3b. Number of native centrarchid species ^b	COO / TEN			
4. Number of native insectivorous cyprinid species	COO / TEN			
5. Number of native round-bodied sucker species	COO / TEN			
6a. Number of sensitive species ^a	COO / TEN			
6b. Number of intolerant species ^b	COO / TEN			
		<u>5</u>	<u>3</u>	<u>1</u>
7. Evenness	COO	≥ 77	77 - ≥ 69	< 69
	TEN	≥ 73	73 - ≥ 65	< 65
8. % of individuals as <i>Lepomis</i> species	COO	≤ 30	30 - ≤ 54	> 54
	TEN	≤ 28	28 - ≤ 53	> 53
9. % of individuals as insectivorous cyprinids	COO	≥ 28	28 - ≥ 14	< 14
	TEN	≥ 34	34 - ≥ 17	< 17

		<u>5</u>	<u>3</u>	<u>1</u>
10a. % of individuals as generalist feeders and herbivores	COO	≤ 25	$25 - \leq 44$	> 44
	TEN	≤ 21	$21 - \leq 40$	> 40
10b. % of individuals as top carnivores ^b	COO	$\geq 3.5 - \leq 8.75$	$\geq 1.75 - 3.5$ or $8.75 - \leq 10.5$	< 1.75 or > 10.5
	TEN	$\geq 3.8 - \leq 9.5$	$\geq 1.9 - 3.8$ or $9.5 - \leq 11.4$	< 1.9 or > 11.4
11. % of individuals as benthic fluvial specialist	COO	≥ 27	$27 - \geq 15$	< 15
	TEN	≥ 26	$26 - \geq 13$	< 13
12. Number of individuals per 200 meters	COO	≥ 720	$720 - \geq 360$	< 360
	TEN	≥ 800	$800 - \geq 400$	< 400
13. % of individuals with external anomalies	COO / TEN	> 1.2 – subtract 4 points from total score		

^a used at sites with an upstream drainage basin area < 15 square miles

^b used at sites with an upstream drainage basin area ≥ 15 square miles

Table 3. Index of well-being scoring criteria and integrity classes for wadeable streams in the Ridge and Valley ecoregion of Georgia.

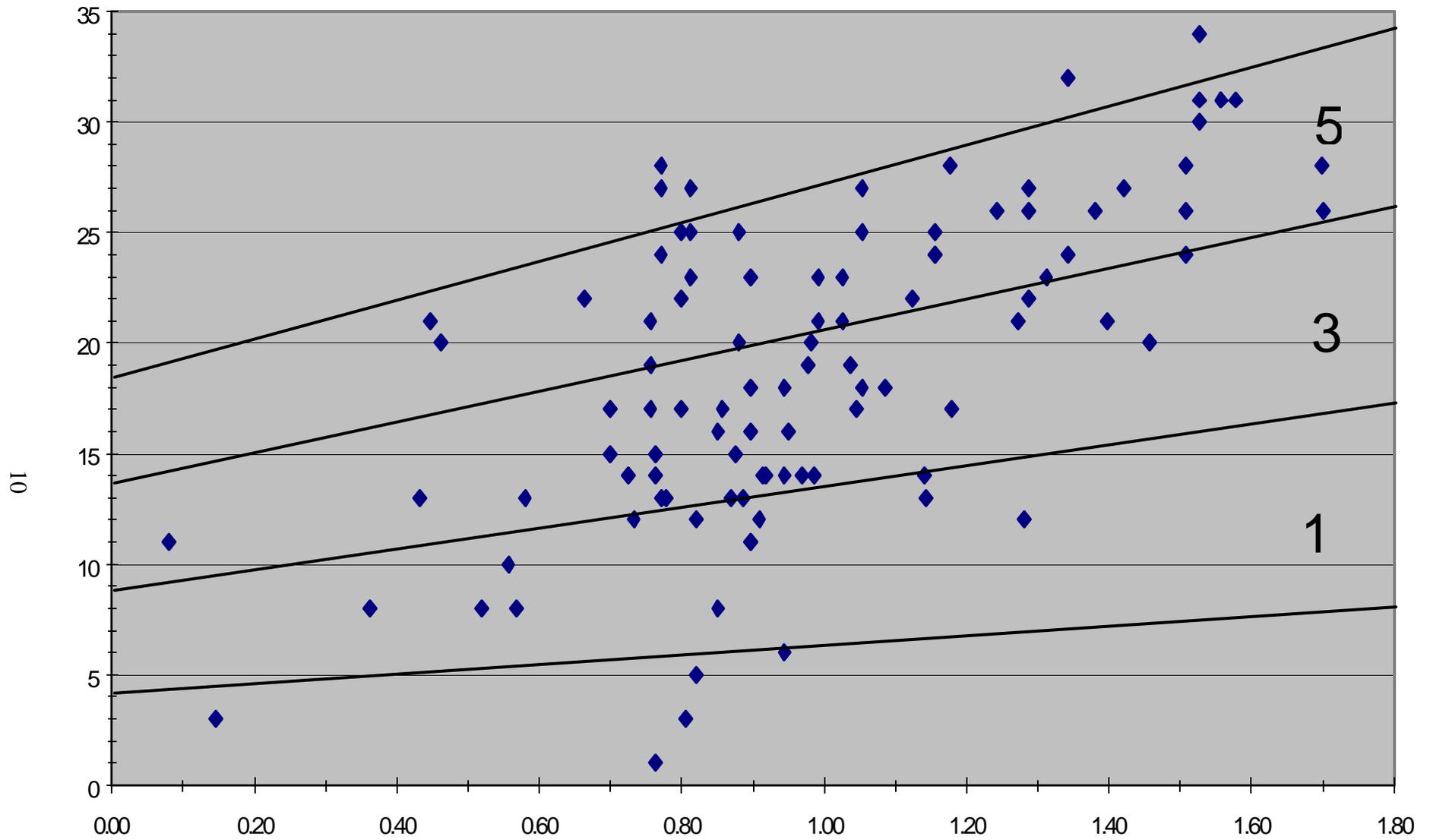
Iwb Score	DBA (Sq. miles)	Integrity Class	Attributes
≥ 9.5	< 15	Excellent	Comparable to the best regional reference conditions; all regionally expected species for the habitat and stream size, including the most intolerant species, are present with a full array of size classes; healthy species diversity within the fish community, indicated by elevated evenness scores; number of individuals abundant; total biomass is high, with each level of the food web represented, indicating a balanced trophic structure.
≥ 9.85	≥ 15		
$9.5 - \geq 8.6$	< 15	Good	Species richness somewhat below expectation; evenness scores decrease as species diversity falls, especially due to the loss of the most intolerant forms; good number of individuals in the sample, with several species of benthic fluvial specialist and insectivorous cyprinids present; some decreases in total biomass as trophic structure shows some signs of stress.
$9.85 - \geq 9.25$	≥ 15		
$8.6 - \geq 6.8$	< 15	Fair	Species richness and diversity decline as some expected species are absent; abundance of individuals declines; total biomass continues to decline as some levels of the food web in low abundance or missing; trophic structure skewed toward generalist feeders and/or <i>Lepomis</i> species as the abundance of insectivorous cyprinid and benthic fluvial specialist species decreases.
$9.25 - \geq 8.05$	≥ 15		
$6.8 - \geq 5.9$	< 15	Poor	Number of individuals is low; species richness and diversity are very low, with benthic fluvial specialist and insectivorous cyprinid species in low abundance or absent; sample dominated by generalist feeders, herbivores, and <i>Lepomis</i> species; increase in the proportions of non-native species and hybrids; growth rates depressed as sample is heavily skewed to the smaller size classes; total biomass low.
$8.05 - \geq 7.45$	≥ 15		
< 5.9	< 15	Very Poor	Sample represented by few individuals, mainly generalist feeders and <i>Lepomis</i> species; some sites dominated by non-native species; total biomass very low.
< 7.45	≥ 15		

References

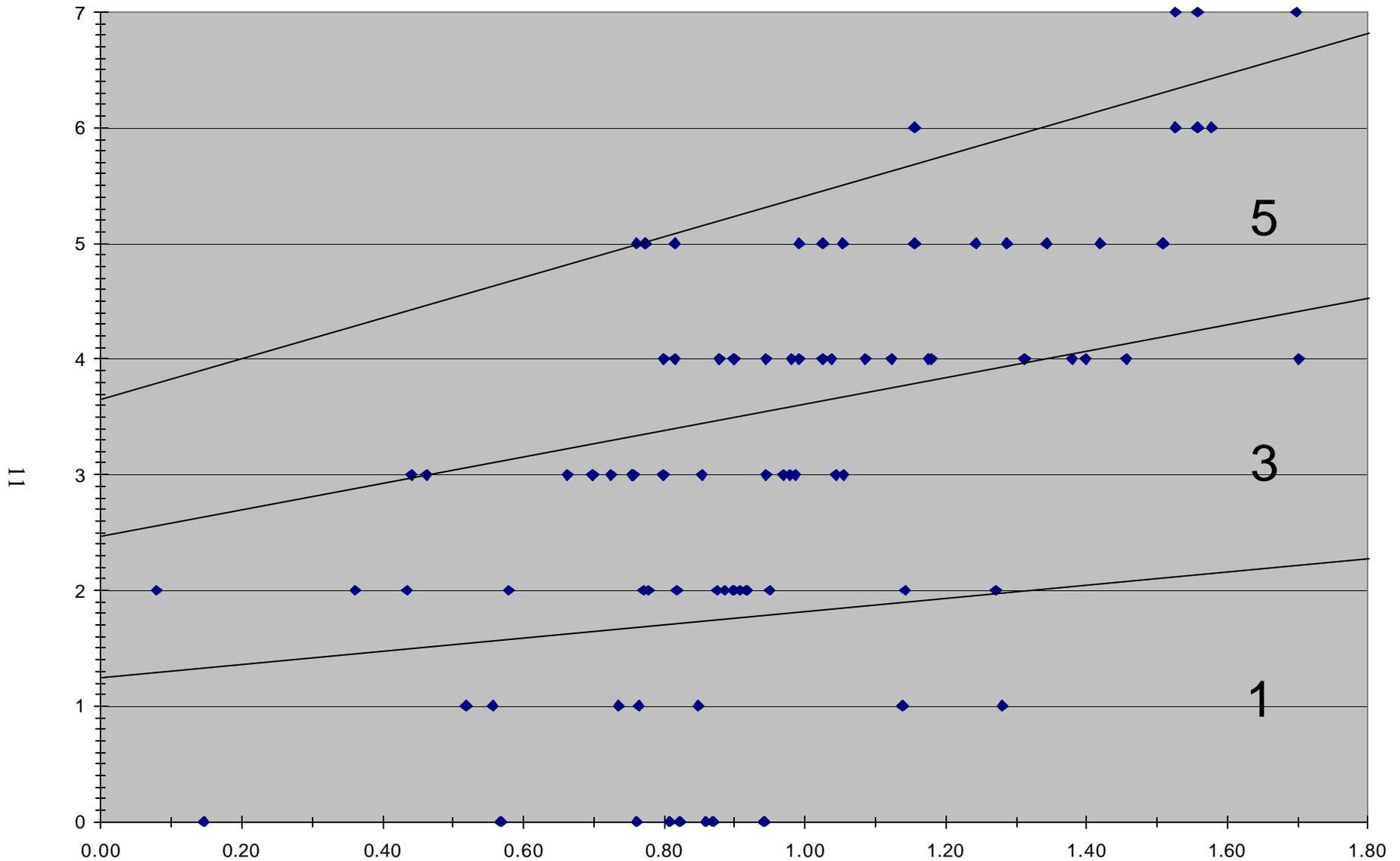
- Georgia Department of Natural Resources, Wildlife Resources Division. 1999. Protected Animals of Georgia. Nongame Wildlife – Natural Heritage Section, Forsyth, Georgia.
- Griffith, G.E., J.M. Omernik, J.A. Comstock, S. Lawrence, and T. Foster. 2001. Level III and IV Ecoregions of Georgia, (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia, U.S. Geological Survey.
- United States Census Bureau. 2000. 2000 Census of Population and Housing. United States Census Bureau, Washington, D.C.

Appendix 1

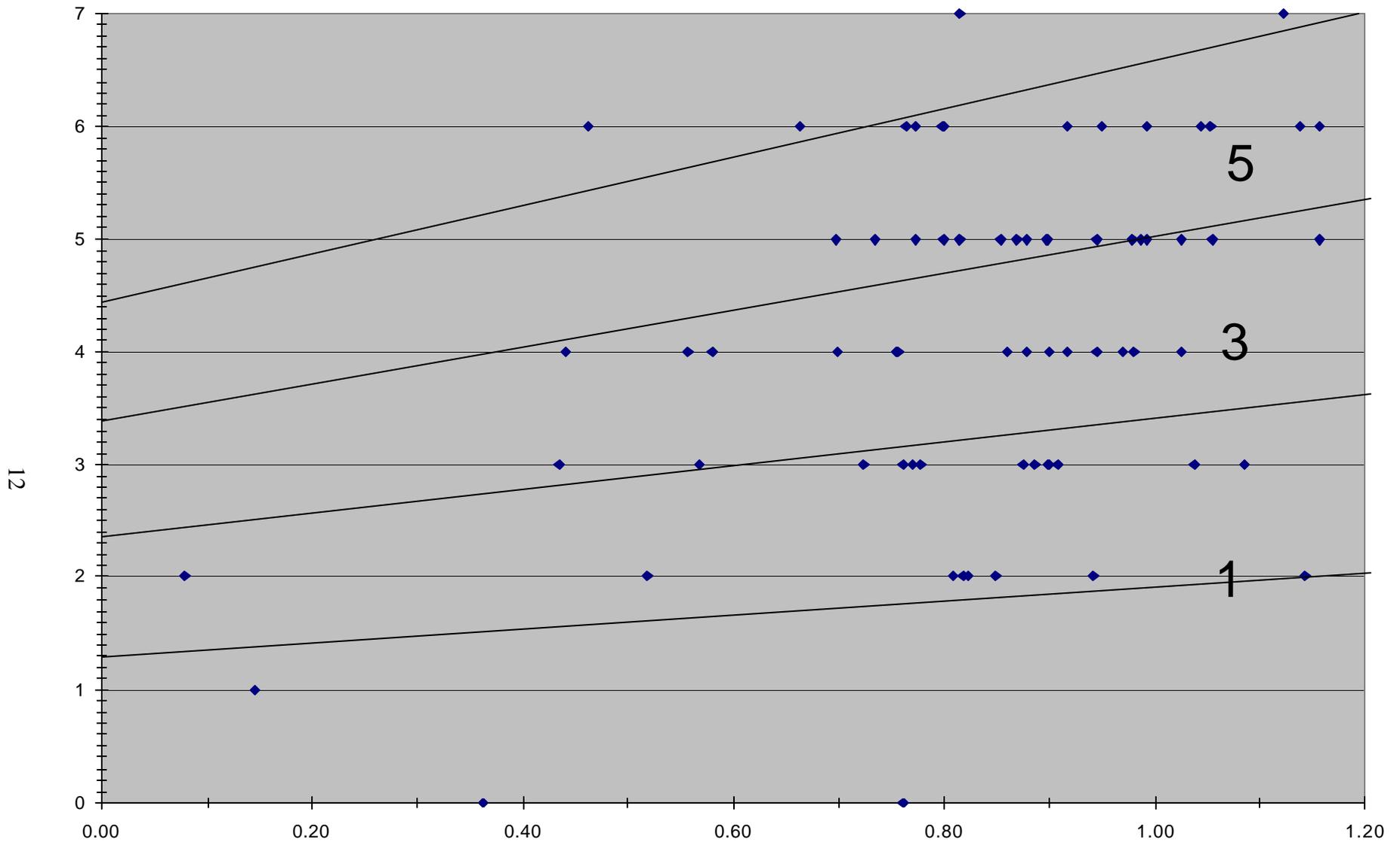
Coosa Basin Group (ACT) MSR Graphs.....	Pg. 10
Tennessee Basin Group (TEN) MSR Graphs.....	Pg. 18
Ridge and Valley Ecoregion Fish List.....	Pg. 26



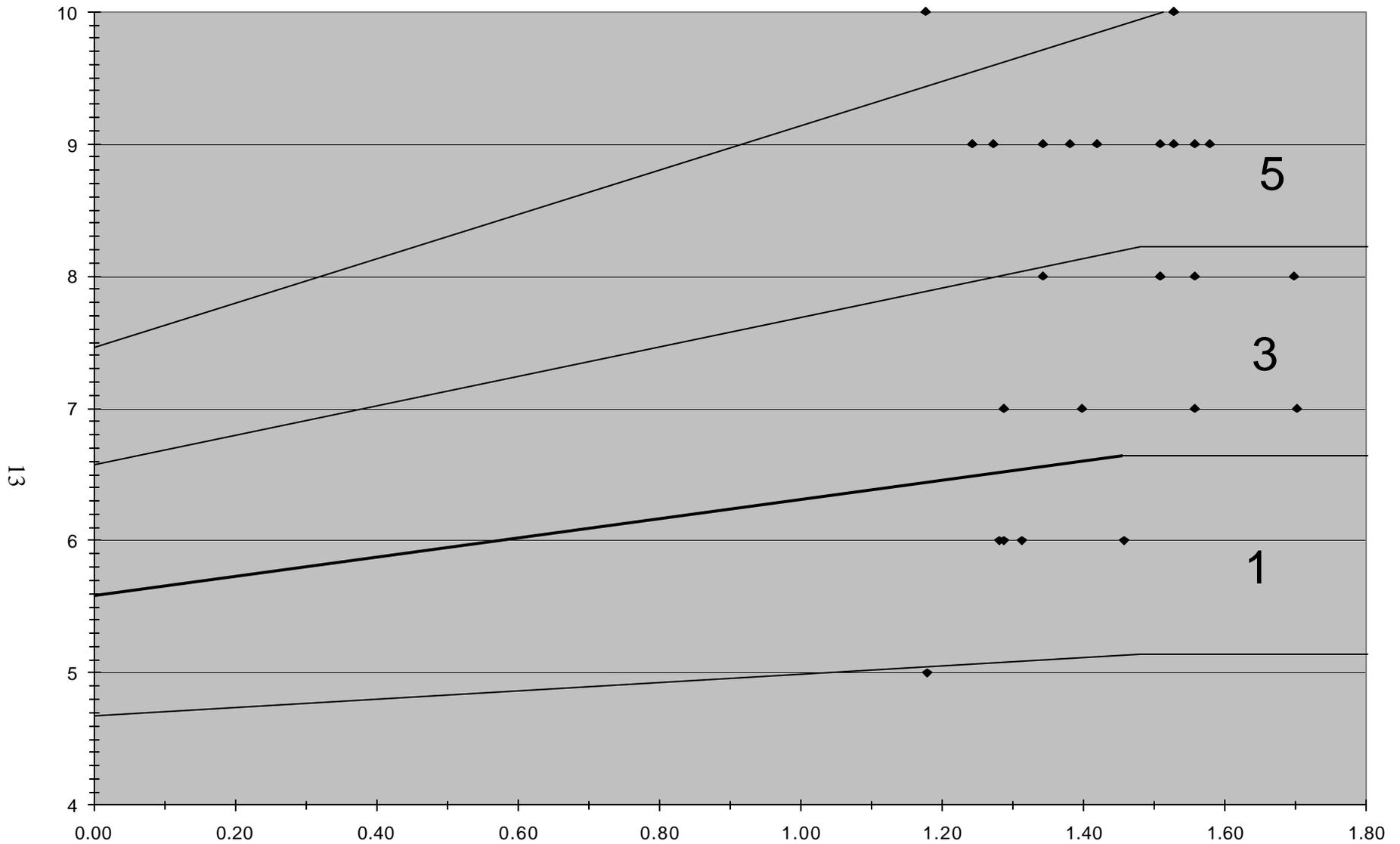
ACT1 - RGV. Total number of species in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 102.



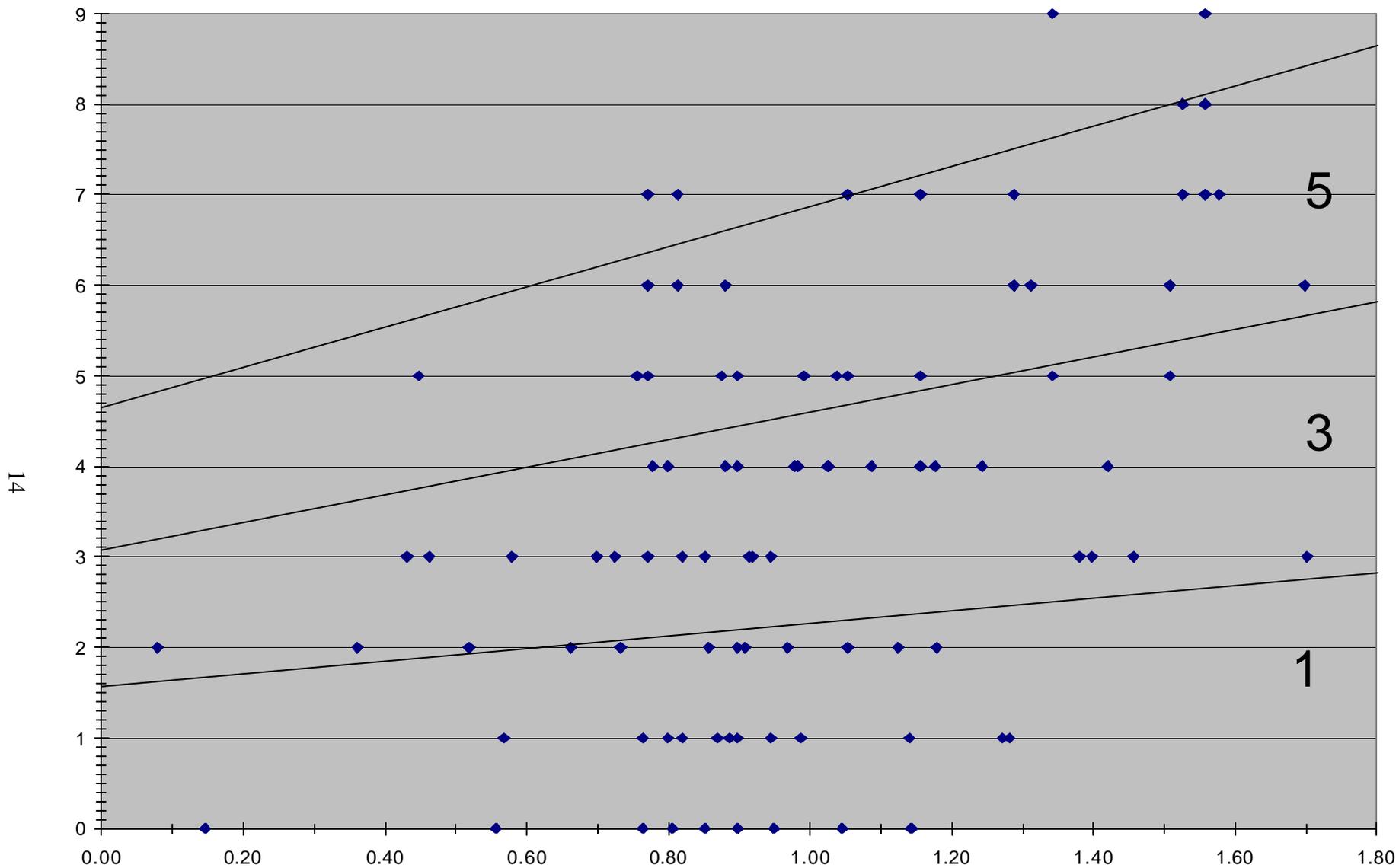
ACT2 - RGV. Number of benthic invertivore species in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 102.



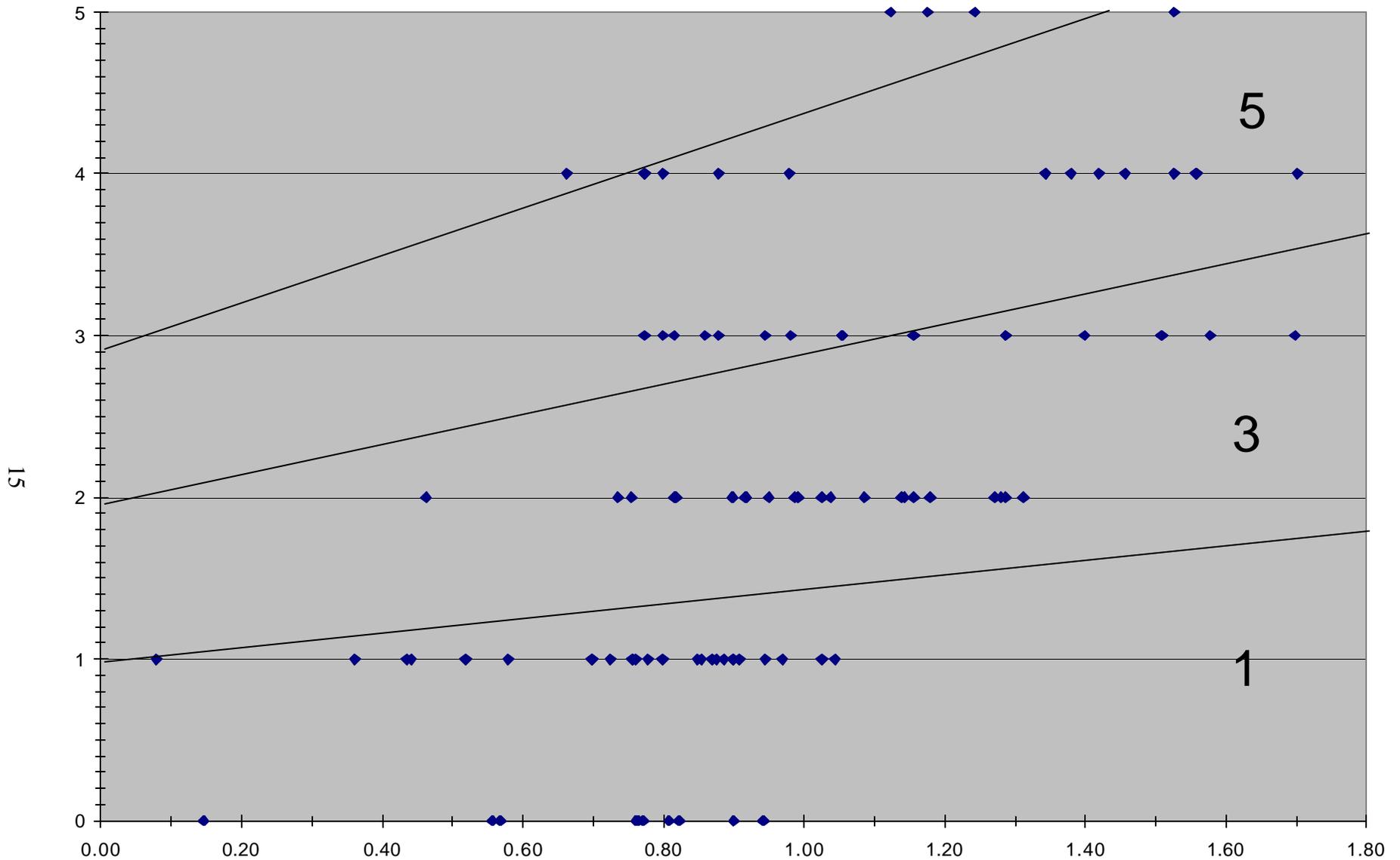
ACT3a - RGV. Number of native sunfish species in headwater streams (<15 square miles drainage basin area) in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 75.



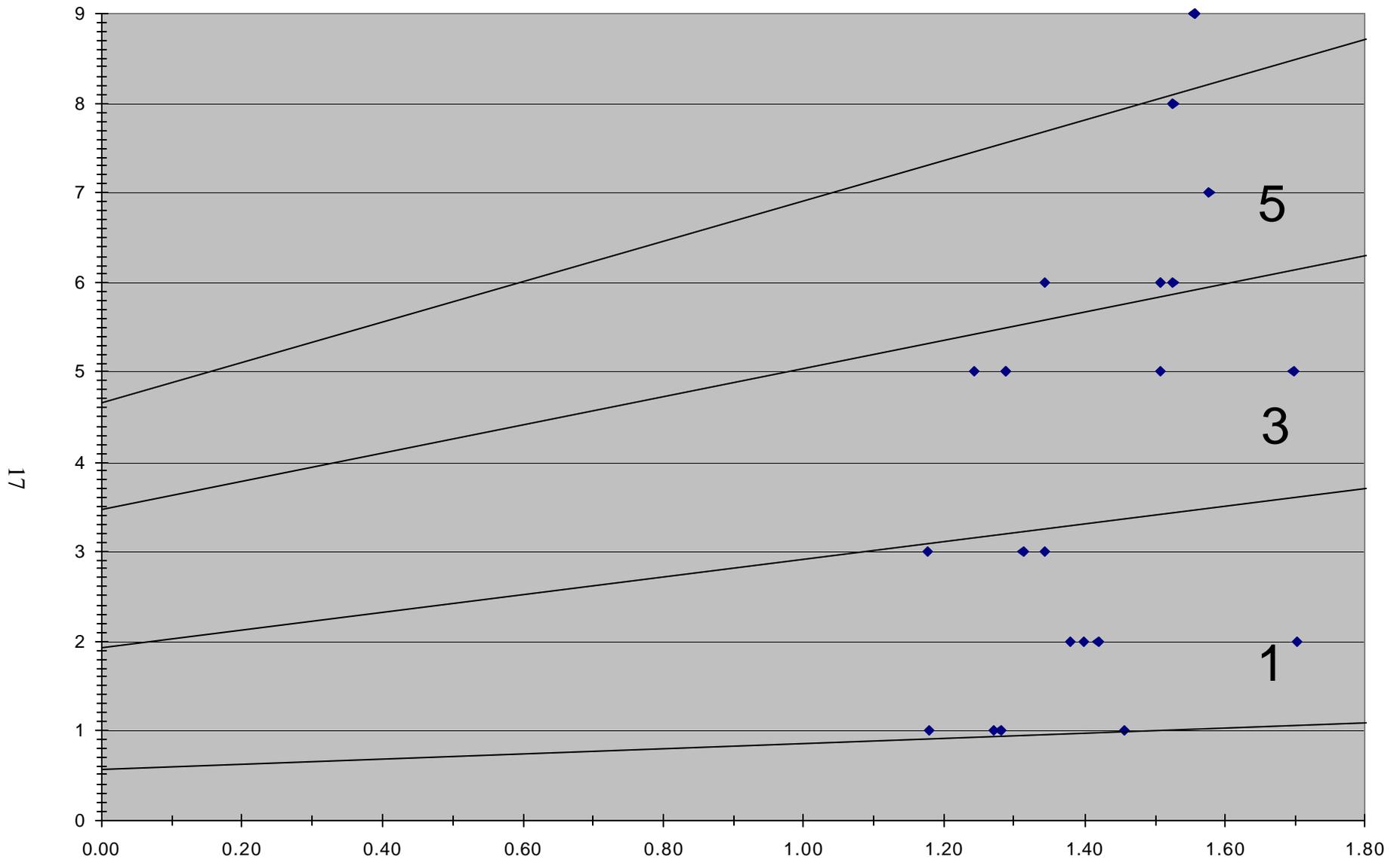
ACT3b - RGV. Number of native centrarchid species in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Flatlines at 30 square miles. Total samples equal 27.



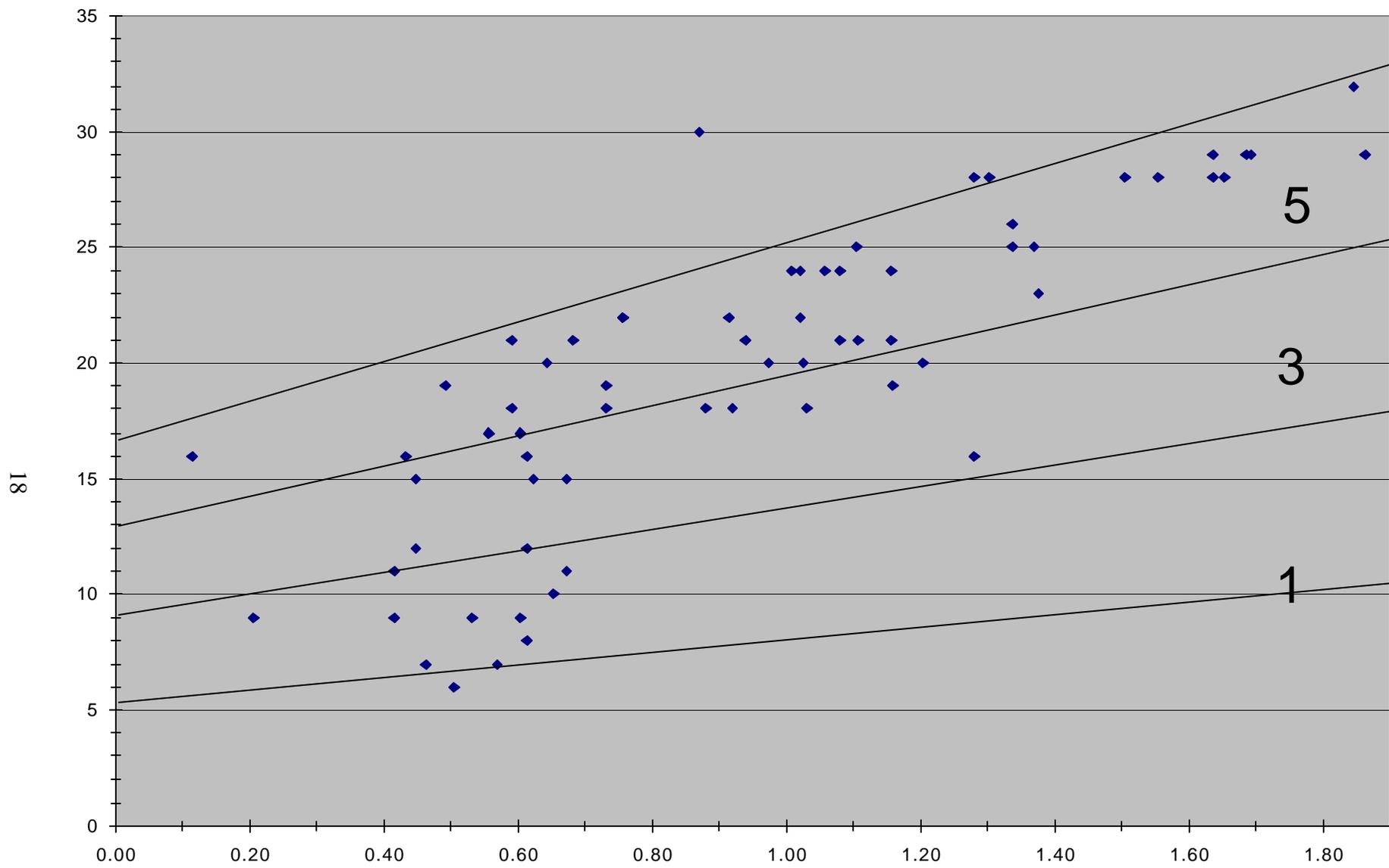
ACT4 - RGV. Number of native insectivorous cyprinid species in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 102.



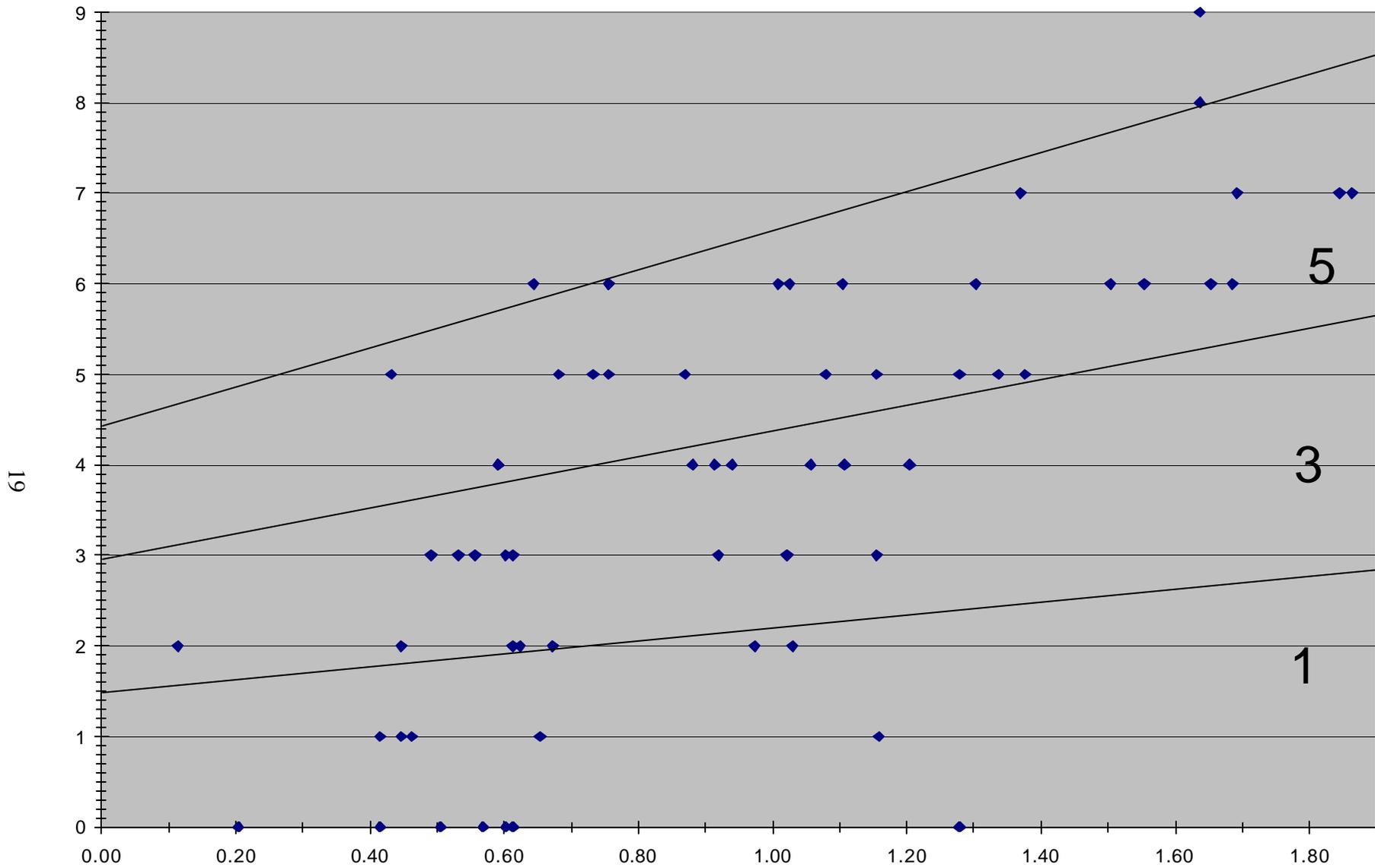
ACT5 - RGV. Number of native round-bodied sucker species in the Ridge and Valley ecoregion of the Coosa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 102.



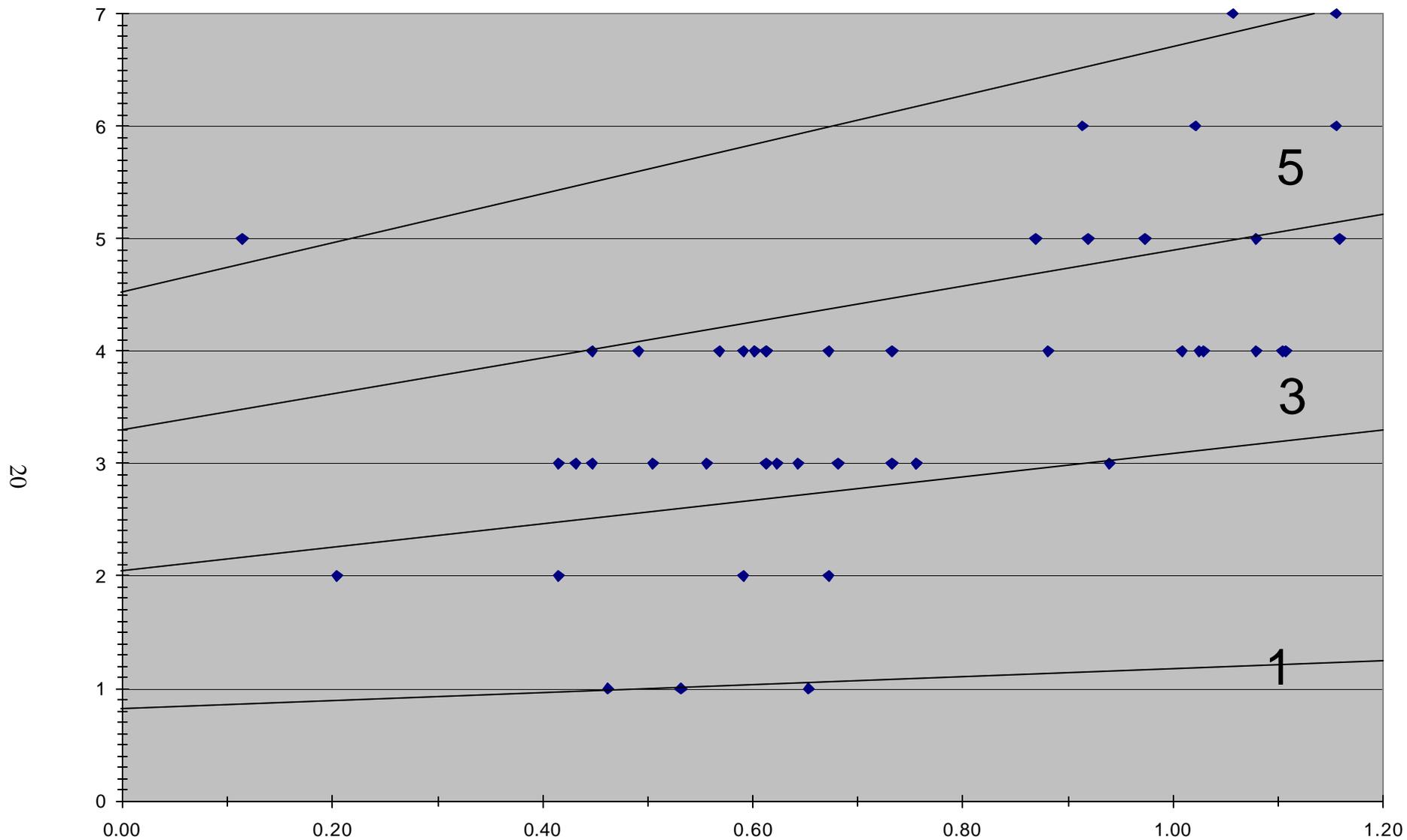
ACT6b - RGV. Number of species ranked as intolerant in the Ridge and Valley ecoregion of the Coosaa drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 27.



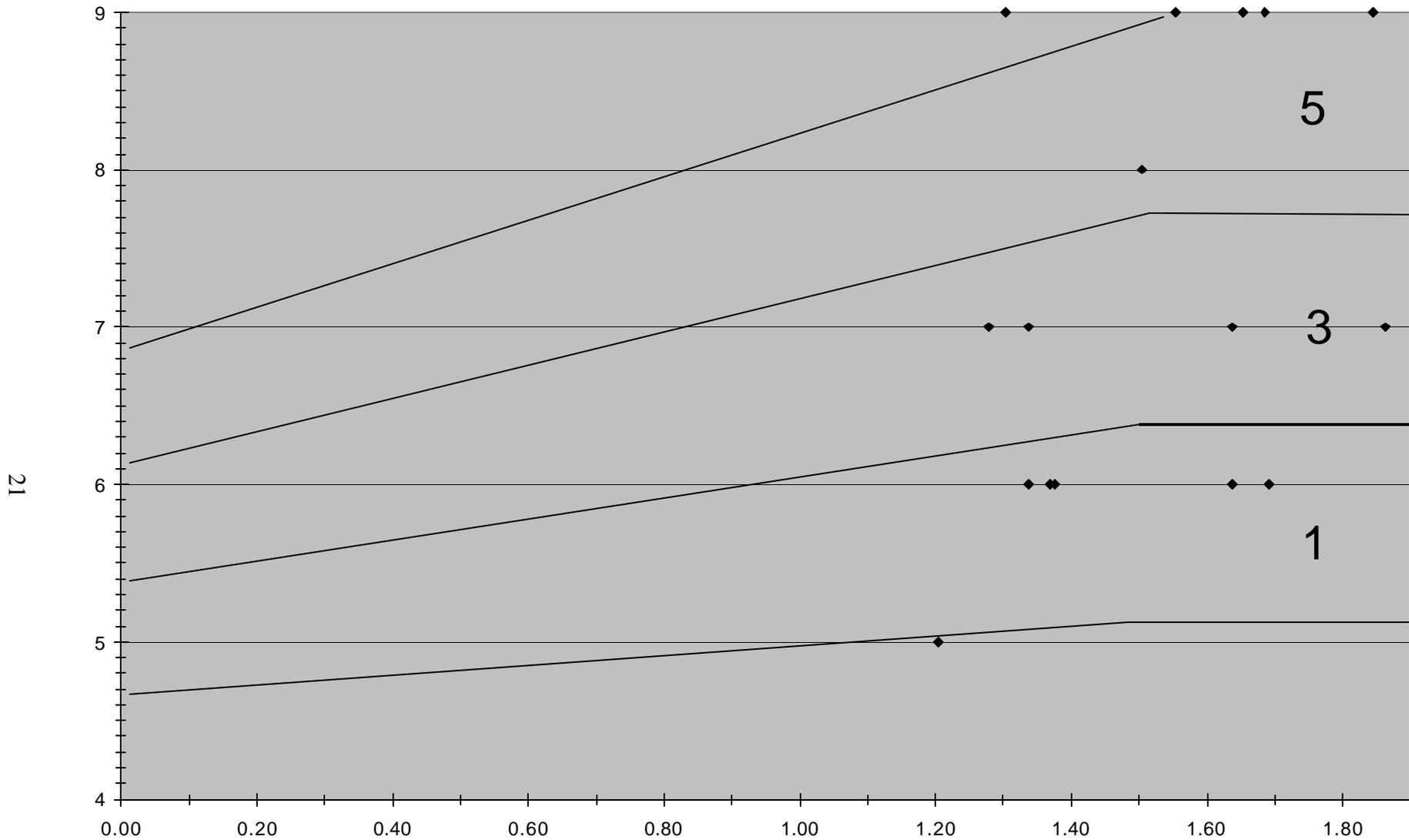
TEN1 - RGV. Total number of native species in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 67.



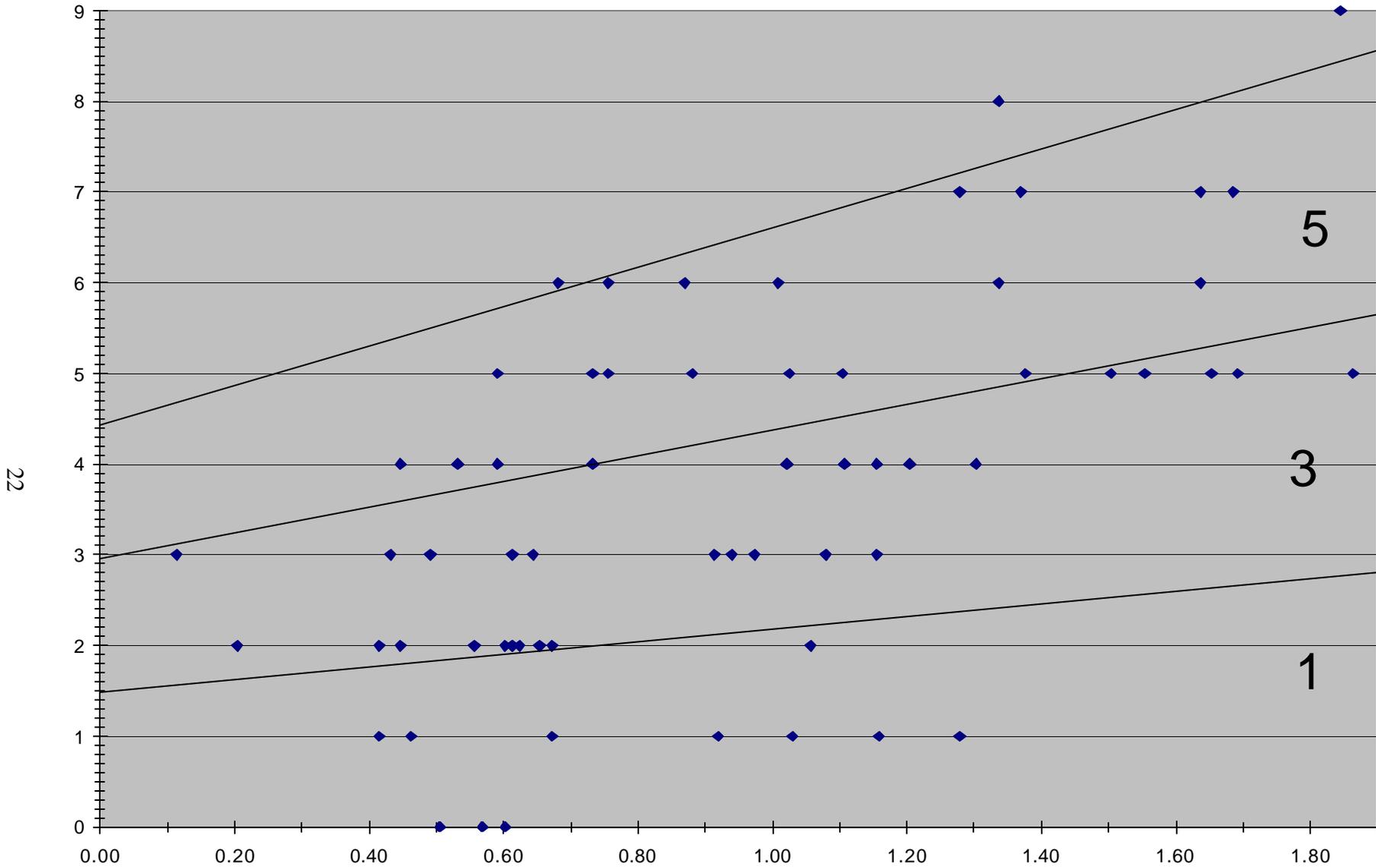
TEN2 - RGV. Number of benthic invertivore species in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 67.



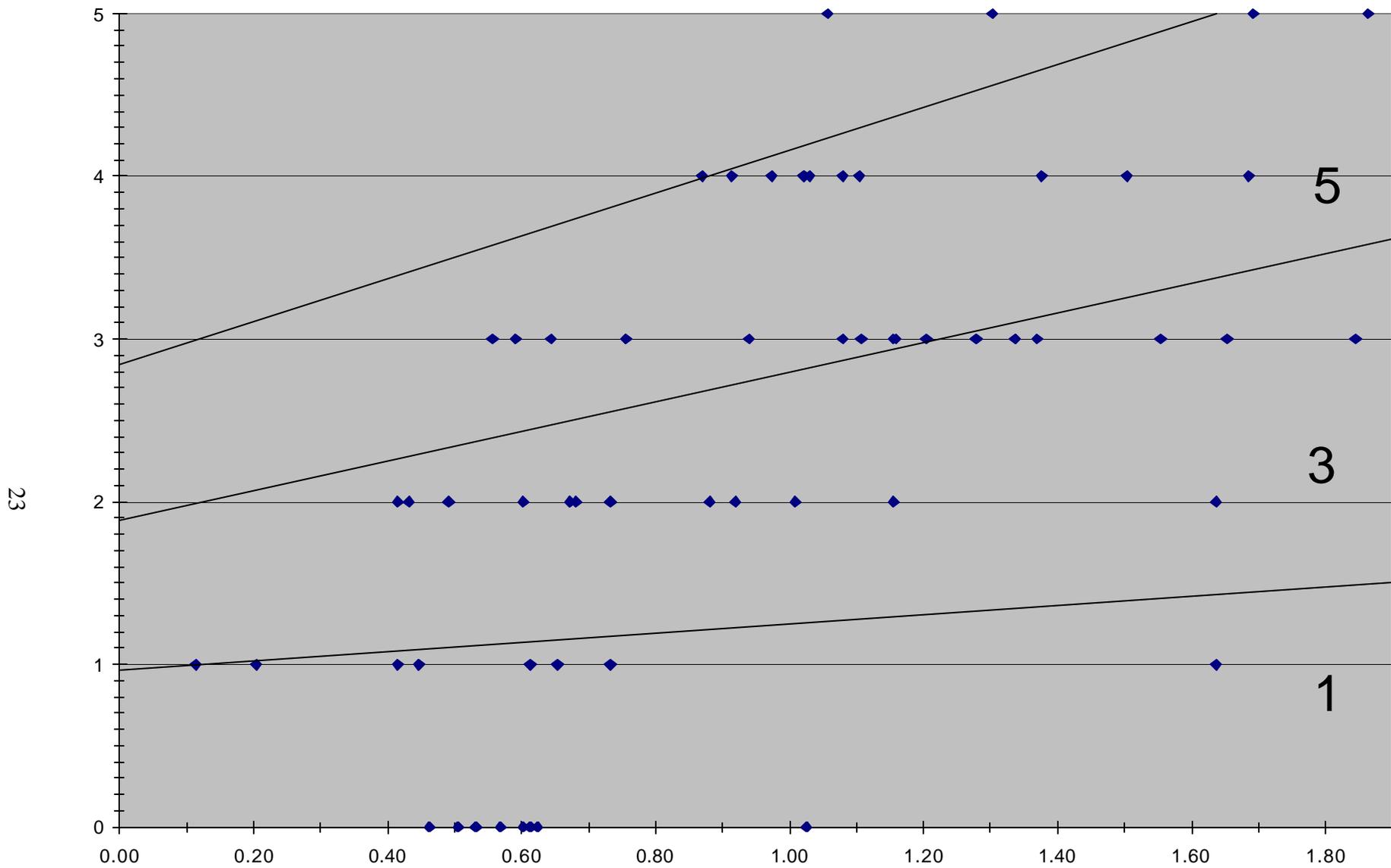
TEN3a - RGV. Number of native sunfish species in headwater streams (<15 square miles drainage basin area) in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 50.



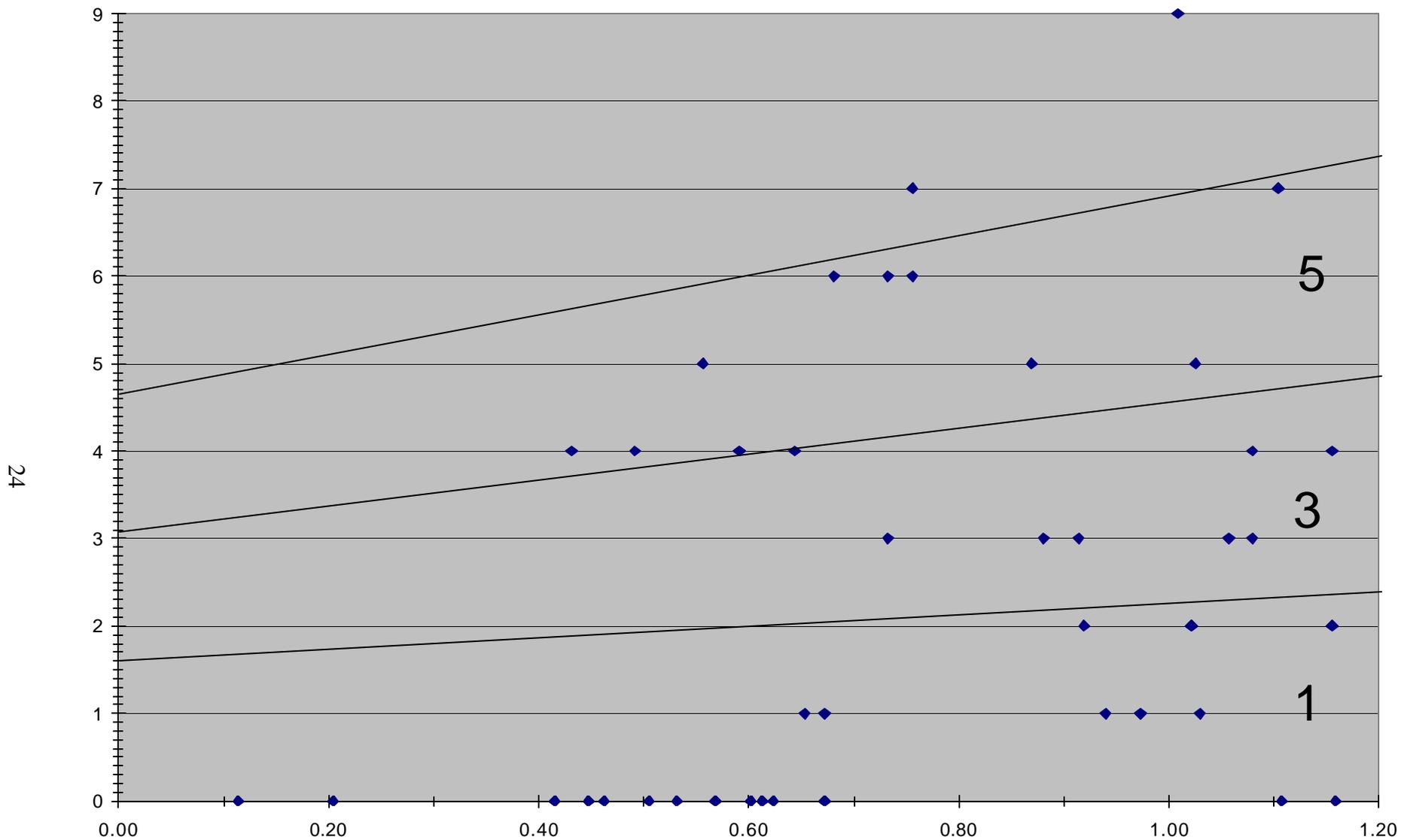
TEN3b - RGV. Number of native centrarchid species in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Flatlines at 30 square miles. Total samples equal 17.



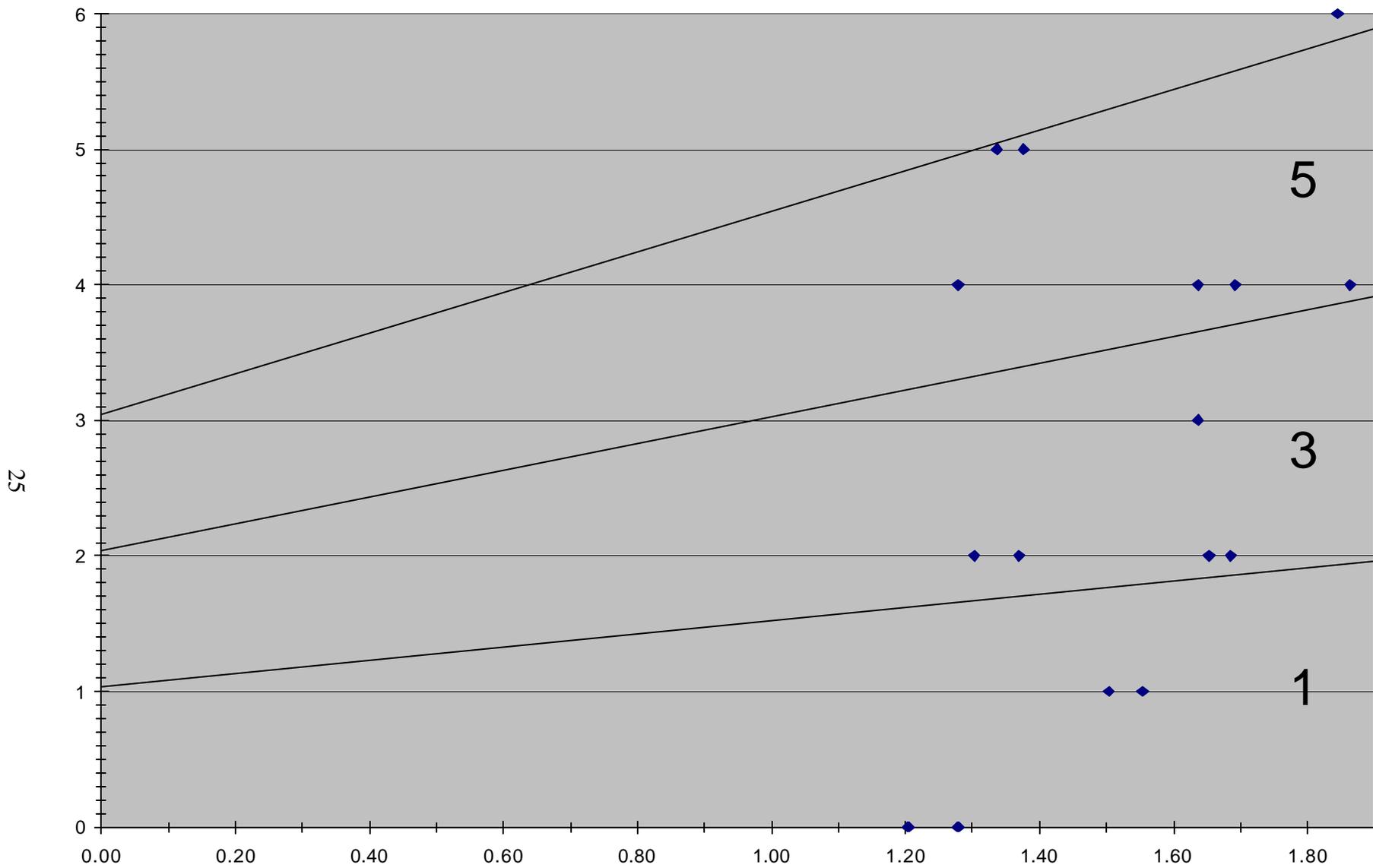
TEN4 - RGV. Number of native insectivorous cyprinid species in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 67.



TEN5 - RGV. Number of native round-bodied sucker species in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 67.



TEN6a - RGV. Total number of species ranked as sensitive at headwater sites (<15 square miles drainage basin area) in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 50.



TEN6b - RGV. Number of species ranked as intolerant in the Ridge and Valley ecoregion of the Tennessee drainage basin plotted against the log (base 10) transformed value of the drainage basin area (square miles). Total samples equal 17.

Fish List for the Ridge and Valley Ecoregion of Georgia. (Updated May 11, 2005)

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Petromyzontidae				
Ohio Lamprey <i>Ichthyomyzon bdellium</i>		PR		TEN
Chestnut Lamprey <i>Ichthyomyzon castaneus</i>		PR		COO, TEN
Southern Brook Lamprey <i>Ichthyomyzon gagei</i>		HB		COO
Mountain Brook Lamprey <i>Ichthyomyzon greeleyi</i>		HB		TEN
Least Brook Lamprey <i>Lampetra aepyptera</i>		HB		COO
American Brook Lamprey <i>Lampetra appendix</i>	HWI	HB		TEN
Acipenseridae				
Lake Sturgeon <i>Acipenser fulvescens</i>		IN		COO
Lepisosteidae				
Spotted Gar <i>Lepisosteus oculatus</i>		CR		COO, TEN
Longnose Gar <i>Lepisosteus osseus</i>		CR		COO, TEN
Hiodontidae				
Mooneye <i>Hiodon tergisus</i>		IN		COO
Clupeidae				
Skipjack Herring <i>Alosa chrysochloris</i>		CR		TEN
Gizzard Shad <i>Dorosoma cepedianum</i>		GE		COO, TEN
Threadfin Shad <i>Dorosoma petenense</i>		HB		COO, TEN
Cyprinidae				
Largescale Stoneroller <i>Campostoma oligolepis</i>		HB		COO, TEN
Goldfish <i>Carassius auratus</i>		GE		EXOTIC

Fish List for the Ridge and Valley Ecoregion of Georgia.

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Grass Carp <i>Ctenopharyngodon idella</i>		HB		EXOTIC
Blue Shiner <i>Cyprinella caerulea</i>		IC	SMM	COO
Alabama Shiner <i>Cyprinella callistia</i>	INT	IC	SMM	COO
Whitetail Shiner <i>Cyprinella galactura</i>	INT	IC	SMM	TEN
Red Shiner <i>Cyprinella lutrensis</i>		GE		EXOTIC
Spotfin Shiner <i>Cyprinella spiloptera</i>		IC		TEN
Tricolor Shiner <i>Cyprinella trichroistia</i>	INT	IC		COO
Blacktail Shiner <i>Cyprinella venusta</i>		IC		COO
Common Carp <i>Cyprinus carpio</i>		GE		EXOTIC
Flame Chub <i>Hemitremia flammea</i>		IC		TEN
Bigeye Chub <i>Hybopsis amblops</i>		IC	SMM	TEN
Lined Chub <i>Hybopsis lineapunctata</i>		IC	SMM	COO
Striped Shiner <i>Luxilus chrysocephalus</i>		IC		COO, TEN
Warpaint Shiner <i>Luxilus coccogenis</i>		IC		TEN
Bandfin Shiner <i>Luxilus zonistius</i>		IC		COO**
Rosefin Shiner <i>Lythrurus fasciolaris</i>	HWI	IC		TEN
Mountain Shiner <i>Lythrurus lirus</i>	INT	IC		COO, TEN

Fish List for the Ridge and Valley Ecoregion of Georgia.

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Speckled Chub <i>Macrhybopsis aestivalis</i>		IC	SMM	COO
Silver Chub <i>Macrhybopsis storeriana</i>		IC	SMM	COO
River Chub <i>Nocomis micropogon</i>		IC	SMM	COO**, TEN
Golden Shiner <i>Notemigonus crysoleucas</i>		GE		COO, TEN
Popeye Shiner <i>Notropis ariommus</i>		IC		TEN
Burrhead Shiner <i>Notropis asperifrons</i>	INT	IC	SMM	COO
Emerald Shiner <i>Notropis atherinoides</i>		IC		TEN
Rainbow Shiner <i>Notropis chrosomus</i>	HWI	IC		COO
Tennessee Shiner <i>Notropis leuciodus</i>		IC		TEN
Silver Shiner <i>Notropis photogenis</i>		IC		TEN
Silverstripe Shiner <i>Notropis stilbius</i>	INT	IC		COO
Telescope Shiner <i>Notropis telescopus</i>	INT	IC		TEN
Mimic Shiner <i>Notropis volucellus</i>	INT	IC	SMM	COO, TEN
Coosa Shiner <i>Notropis xaenocephalus</i>		IC		COO
Rifle Minnow <i>Phenacobius catostomus</i>		IC	SMM	COO
Stargazing Minnow <i>Phenacobius uranops</i>	INT	IC	SMM	TEN
Tennessee Dace <i>Phoxinus tennesseensis</i>		HB		TEN

Fish List for the Ridge and Valley Ecoregion of Georgia.

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Bluntnose Minnow <i>Pimephales notatus</i>		GE		TEN
Fathead Minnow <i>Pimephales promelas</i>		GE		EXOTIC
Bullhead Minnow <i>Pimephales vigilax</i>		GE		COO, TEN
Blacknose Dace <i>Rhinichthys atratulus</i>		IC	SMM	COO, TEN
Creek Chub <i>Semotilus atromaculatus</i>		GE		COO, TEN
Catostomidae River Carpsucker <i>Carpionodes carpio</i>		GE		TEN
Quillback <i>Carpionodes cyprinus</i>		GE		TEN
White Sucker <i>Catostomus commersoni</i>		IN	RBS	TEN
Alabama Hogsucker <i>Hypentelium etowanum</i>		IN	RBS	COO
Northern Hogsucker <i>Hypentelium nigricans</i>		IN	RBS	TEN
Smallmouth Buffalo <i>Ictiobus bubalus</i>		GE		COO, TEN
Spotted Sucker <i>Minytrema melanops</i>		IN	RBS	COO, TEN
Silver Redhorse <i>Moxostoma anisurum</i>		IN	RBS	TEN
River Redhorse <i>Moxostoma carinatum</i>		IN	RBS	COO, TEN
Black Redhorse <i>Moxostoma duquesnei</i>		IN	RBS	COO, TEN
Golden Redhorse <i>Moxostoma erythrurum</i>		IN	RBS	COO, TEN
Blacktail Redhorse <i>Moxostoma poecilurum</i>		IN	RBS	COO

Fish List for the Ridge and Valley Ecoregion of Georgia.

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Ictaluridae				
Snail Bullhead <i>Ameiurus brunneus</i>		GE		COO, TEN**
Black Bullhead <i>Ameiurus melas</i>		GE		COO, TEN
Yellow Bullhead <i>Ameiurus natalis</i>		GE		COO, TEN
Brown Bullhead <i>Ameiurus nebulosus</i>		GE		COO, TEN
Blue Catfish <i>Ictalurus furcatus</i>		CR		COO, TEN
Channel Catfish <i>Ictalurus punctatus</i>		GE		COO, TEN
Speckled Madtom <i>Noturus leptacanthus</i>	HWI	IN	BI	COO
Mountain Madtom <i>Noturus eleutherus</i>		IN	BI	TEN
Yellowfin Madtom <i>Noturus flavipinnis</i>		IN	BI	TEN
Frecklebelly Madtom <i>Noturus munitus</i>		IN	BI	COO
Flathead Catfish <i>Pylodictis olivaris</i>		CR		COO, TEN
Esocidae				
Redfin Pickerel <i>Esox americanus</i>		CR		COO
Chain Pickerel <i>Esox niger</i>		CR		COO
Salmonidae				
Rainbow Trout <i>Oncorhynchus mykiss</i>		CR		EXOTIC
Brown Trout <i>Salmo trutta</i>		CR		EXOTIC
Brook Trout <i>Salvelinus fontinalis</i>		CR		COO**, TEN

Fish List for the Ridge and Valley Ecoregion of Georgia.

Species	Tolerance Ranking	Feeding Guild	Species Category	Drainage Basin
Fundulidae				
Northern Studfish <i>Fundulus catenatus</i>	INT	IN		TEN
Blackspotted Topminnow <i>Fundulus olivaceus</i>		IN		COO, TEN
Southern Studfish <i>Fundulus stellifer</i>	HWI	IN		COO
Poeciliidae				
Mosquitofish <i>Gambusia</i> sp.		GE		COO, TEN
Atherinidae				
Brook Silversides <i>Labidesthes sicculus</i>		IN		TEN
Cottidae				
Mottled Sculpin <i>Cottus bairdi</i>		IN	BI	COO, TEN
Banded Sculpin <i>Cottus carolinae</i>		IN	BI	COO, TEN
Percichthyidae				
White Bass <i>Morone chrysops</i>		CR		COO**, TEN
Yellow Bass <i>Morone mississippiensis</i>		CR		TEN
Striped Bass <i>Morone saxatilis</i>		CR		COO
Centrarchidae				
Shadow Bass <i>Ambloplites ariommus</i>	INT	CR	SF	COO
Rock Bass <i>Ambloplites rupestris</i>	HWI	CR	SF	TEN
Redbreast Sunfish <i>Lepomis auritus</i>		IN	SF	COO**, TEN**
Green Sunfish <i>Lepomis cyanellus</i>		IN	SF	COO, TEN
Warmouth <i>Lepomis gulosus</i>		CR	SF	COO, TEN

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Bluegill <i>Lepomis macrochirus</i>		IN	SF	COO, TEN
Longear Sunfish <i>Lepomis megalotis</i>		IN	SF	COO, TEN
Redear Sunfish <i>Lepomis microlophus</i>		IN	SF	COO, TEN
Spotted Sunfish <i>Lepomis punctatus</i>		IN	SF	COO, TAL
Redeye Bass <i>Micropterus coosae</i>	HWI	CR	CENT	COO, TEN**
Smallmouth Bass <i>Micropterus dolomieu</i>	INT	CR	CENT	TEN
Spotted Bass <i>Micropterus punctulatus</i>		CR	CENT	COO, TEN
Largemouth Bass <i>Micropterus salmoides</i>		CR	CENT	COO, TEN
White Crappie <i>Pomoxis annularis</i>		CR	CENT	COO, TEN
Black Crappie <i>Pomoxis nigromaculatus</i>		CR	CENT	COO, TEN
Percidae				
Greenside Darter <i>Etheostoma blennioides</i>	HWI	IN	BI	TEN
Holiday Darter <i>Etheostoma brevirostrum</i>		IN	BI	COO
Rainbow Darter <i>Etheostoma caeruleum</i>	HWI	IN	BI	TEN
Coosa Darter <i>Etheostoma coosae</i>		IN	BI	COO
Coldwater Darter <i>Etheostoma ditrema</i>		IN	BI	COO
Black Darter <i>Etheostoma duryi</i>		IN	BI	TEN
Blueside Darter <i>Etheostoma jessiae</i>	INT	IN	BI	TEN

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Greenbreast Darter <i>Etheostoma jordani</i>	INT	IN	BI	COO
Stripetail Darter <i>Etheostoma kennicotti</i>		IN	BI	TEN
Redline Darter <i>Etheostoma rufilineatum</i>		IN	BI	TEN
Rock Darter <i>Etheostoma rupestre</i>		IN	BI	COO
Tennessee Snubnose Darter <i>Etheostoma simoterum</i>		IN	BI	TEN
Speckled Darter <i>Etheostoma stigmaeum</i>	INT	IN	BI	COO
Trispot Darter <i>Etheostoma trisella</i>		IN	BI	COO
Banded Darter <i>Etheostoma zonale</i>	INT	IN	BI	TEN
Amber Darter <i>Percina antesella</i>		IN	BI	COO
Goldline Darter <i>Percina aurolineata</i>		IN	BI	COO
Logperch <i>Percina caprodes</i>	INT	IN	BI	TEN
Conasauga Logperch <i>Percina jenkinsi</i>		IN	BI	COO
Freckled Darter <i>Percina lenticula</i>		IN	BI	COO
Mobile Logperch <i>Percina kathae</i>	INT	IN	BI	TAL
Dusky Darter <i>Percina sciera</i>		IN	BI	TEN
River Darter <i>Percina shumardi</i>		IN	BI	COO, TEN
Blackbanded Darter <i>Percina nigrofasciata</i>		IN	BI	COO

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Bronze Darter <i>Percina palmaris</i>	HWI	IN	BI	COO
Snail Darter <i>Percina tanasi</i>		IN	BI	TEN
Upland Bridled Darter <i>Percina</i> sp.		IN	BI	COO
Yellow perch <i>Perca flavescens</i>		CR		EXOTIC
Sauger <i>Stizostedion canadense</i>		CR		TEN
Walleye <i>Stizostedion vitreum</i>		CR		COO, TEN
Sciaenidae Freshwater Drum <i>Aplodinotus grunniens</i>		CR		COO, TEN

Water Quality Tolerance: **HWI** = headwater intolerant; **INT** = intolerant

Feeding Guild: **CR** = top carnivore; **GE** = generalist; **HB** = herbivore; **IC** = insectivorous cyprinid; **IN** = insectivore/invertivore; **PR** = parasitic

Species Category: **BI** = benthic insectivore species; **CENT** = centrarchid species; **RBS** = round-bodied sucker species; **SF** = sunfish species; **SMM** = subterminal mouth minnow species;

Drainage Basin: **COO** = Coosa; **TEN** = Tennessee

EXOTIC = species introduced to Georgia

** = species introduced to that drainage basin