

Aquatic Fauna of the Cumberland



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<http://www.tnironfurnacetrail.org/Images/Introduction%20Page/Geological.jpg>

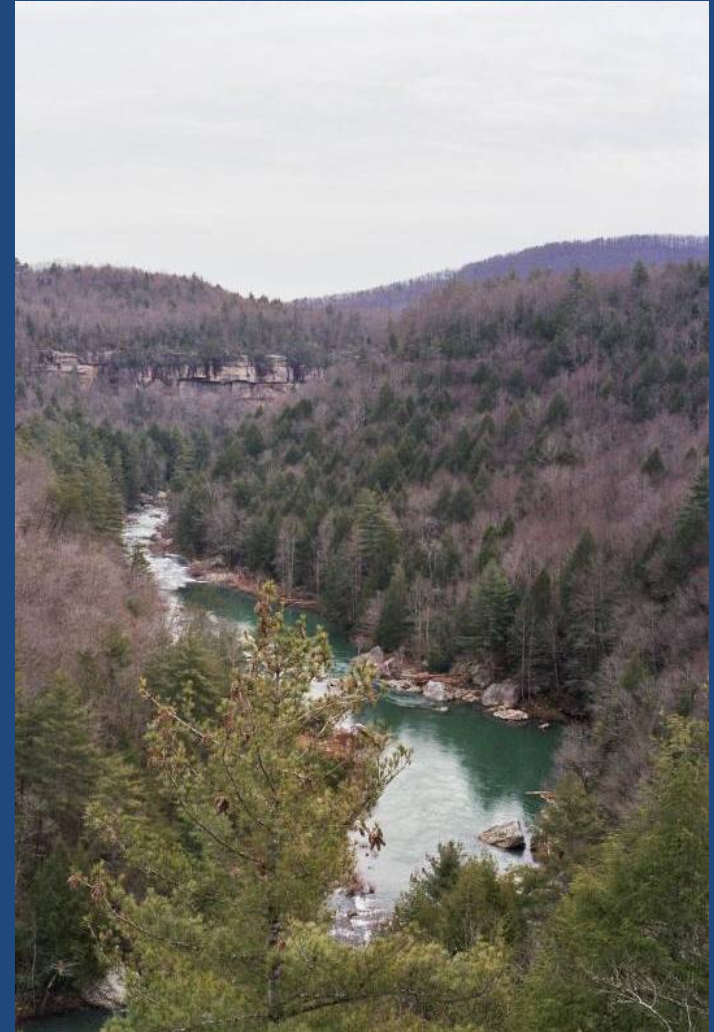


<http://tn.gov/environment/watersheds/guide/>

Important Physical Factors of Aquatic Environments

Current

Influences substrate size and type
Delivery/Removal of food/waste
Effect on species dispersal



Important Physical Factors of Aquatic Environments

Substrate

Provide microhabitat variation

Important to life history of species



Important Physical Factors of Aquatic Environments

Temperature

Variable; Importance in extremes not the average

Timing of life cycle events

Influence development and growth rates



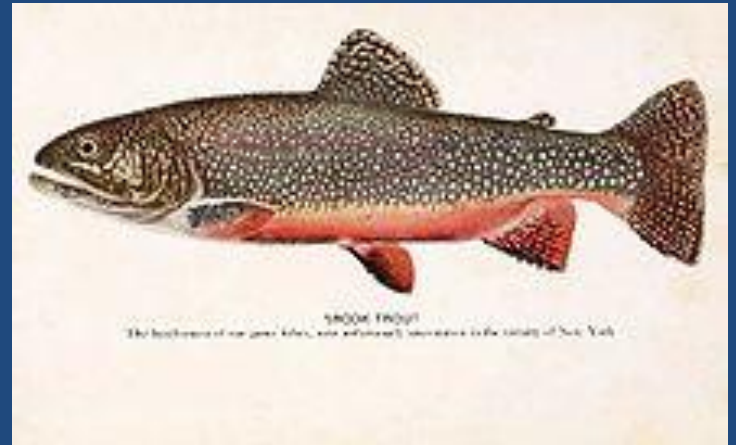
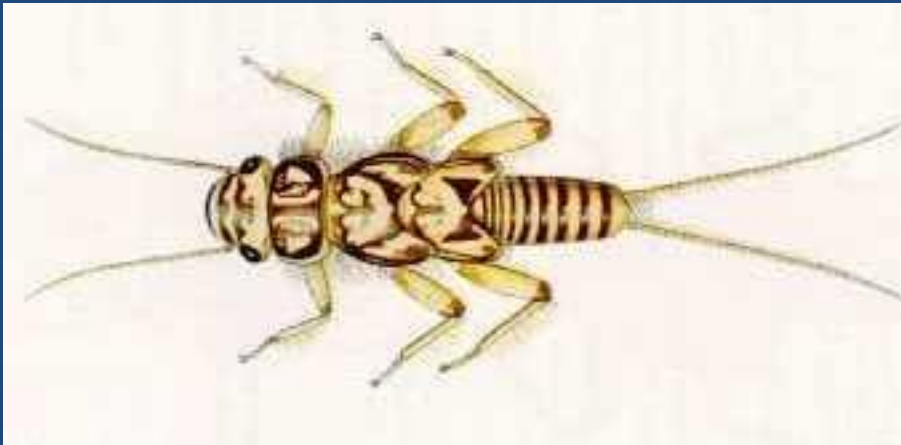
Important Physical Factors of Aquatic Environments

Oxygen

Requirement for Respiration

Usually near saturation in lotic systems

Related to other three factors



Etheostoma lemniscatum

DRAWING REMOVED PRIOR TO PUBLICATION DUE TO COPYRIGHT ISSUES

Previously *Etheostoma percnurum*

Endemic to Big South Fork River, Inhabits
pools

Benthic fish, male builds nest under large flat
rocks

Insectivore; Ephemeroptera, Chironomidae



Photo by Rebecca Johansen

Etheostoma susanae



Photo by Matt Thomas

Benthic Fish, inhabiting sandy substrates

Deposit eggs in clearing beneath a submerged object

Insectvore; Chironomidae, Ephemeroptera, Trichoptera

Erimonax monachus

Inhabit large/moderate streams with swift current

Breed using crevices in substrate in shallow runs with moderate flow

Juveniles inhabit smaller silt free streams

Sight feeding Aquatic Insectivore

May interact negatively with *Cyprinella galactura*



Chrosomus cumberlandensis

Inhabits pools of cool, small, upland streams

Grazes on algae and diatoms

Use the nests of other species (i.e. *Semotilus*, *Campostoma*) for spawning, but not obligate

Sensitive to changes in conductivity, temperature





Cambarus pristinus



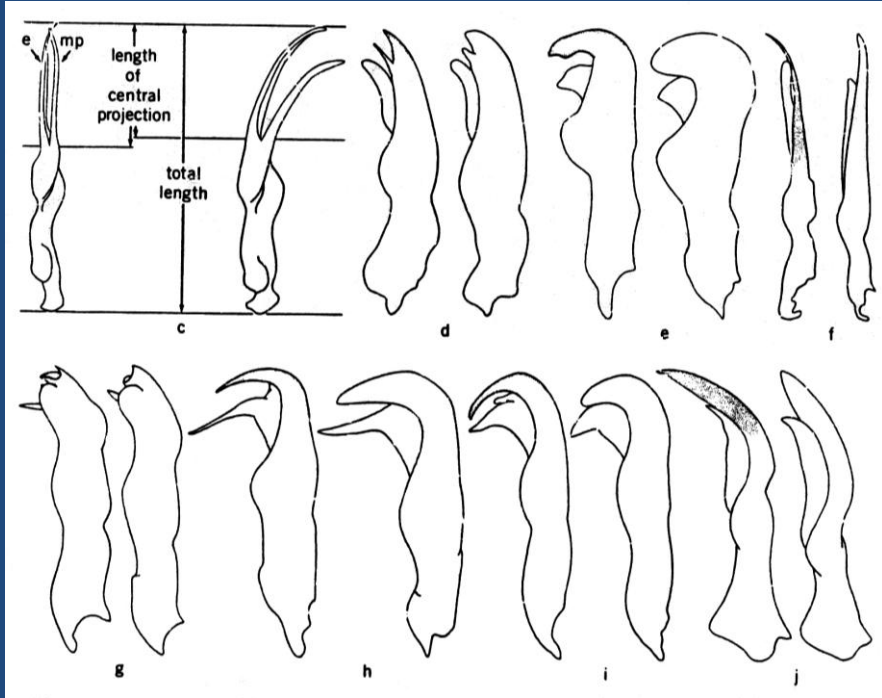
Cambarus obeyensis



Cambarus bouchardi



Cambarus sp.

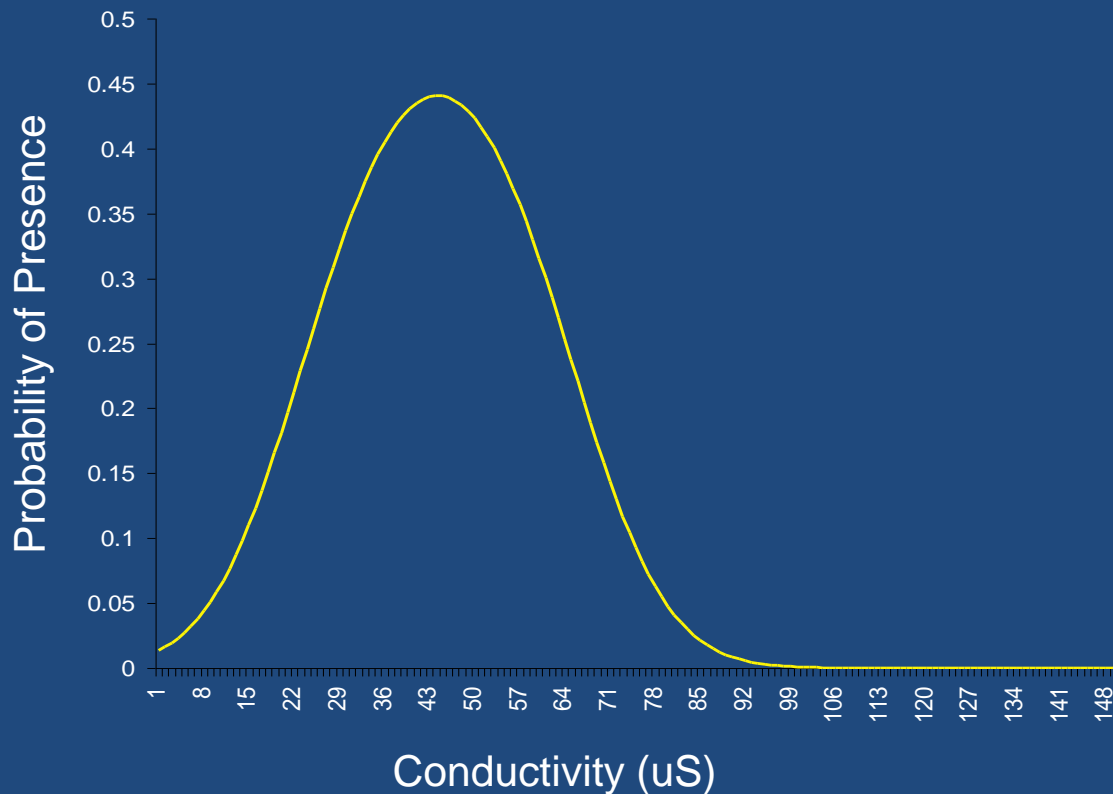




Logistic Regression Model to describe probability of Pristine Crayfish presence as a function of water conductivity (μS):

$$P(1 | x) = e^f (e^f + 1)^{-1}$$

$$f = -4.4699 + (0.1912)(\text{conductivity}) - (0.00216)(\text{conductivity}^2)$$





Villosa perpurpurea



Photo by Ronald Cicerello, KSNPC

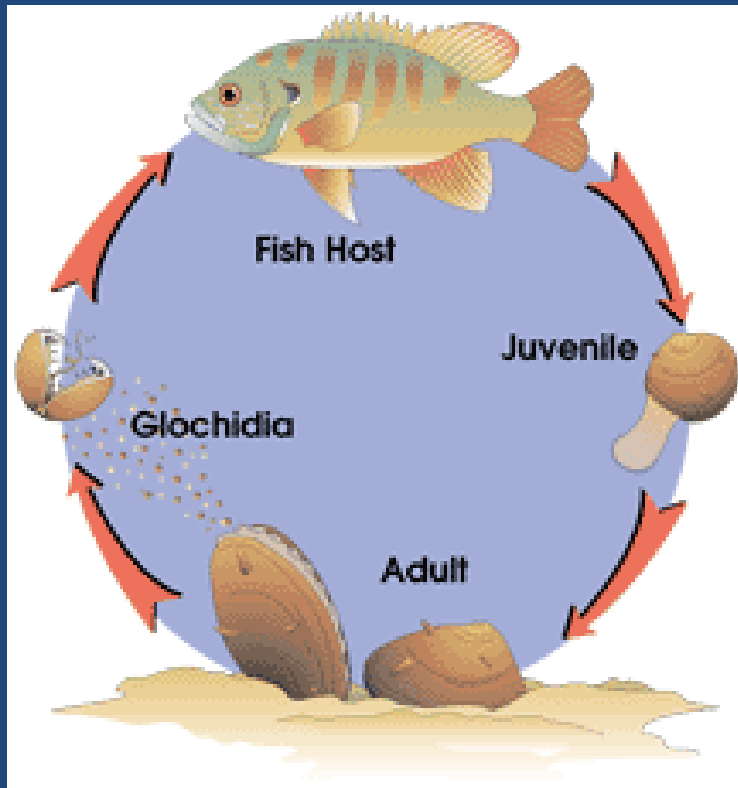
Alasmodonta atropurpurea



Lamsilis virescens



Villosa trabalis





<http://www.youtube.com/watch?v=w04wvaXtTdI>

http://www.youtube.com/watch?v=VDEOOWi5wcc&feature=player_embedded#



Photo by Ronald Cicerello, KSNPC



	Mammals	Birds	Reptiles	Amphibians	Fishes	Crayfish	Unionid Mussels
GX (Extinct)	1	20	0	3	18	1	12
GH (Possibly Extinct)	0	2	0	1	1	2	17
G1 (Critically Imperiled)	8	25	6	23	78	62	88
G2 (Imperiled)	23	9	10	17	72	49	49
G3 (Rare)	19	23	25	26	110	84	35
G4/G5 (Abundant)	330	628	251	153	549	106	73
Not Ranked	62	55	9	3	245	9	26
Total	443	762	301	226	852	313	300
Percent Imperiled	13	11	14	28	34	65	73

81% of imperiled North American fauna associated with
freshwater

Impoundments

Inundation of upstream habitats

Loss of shallow water habitats

Altered flow regime

Increased settling of suspended solids
upstream

Decreased food resources downstream

Scouring and erosion downstream may result

Altered temperature regime

Reduced variability

Biological barrier

Agriculture and Urbanization

Sedimentation

Clogging of benthic habitats

Reduced visibility

Altered Flow Regime

Increased flood/drought

Pollution/Increased nutrients

Potential increases in conductivity



Riparian Forest Buffers

Natural Filter: removes 26% of nitrates, 50% suspended solids
(Stroud Water Research Center, 2010)

Minimize erosion

Shade stream maintaining cooler temperatures and higher oxygen levels

Terrestrial input of food and substrate: leaf and woody debris

Mining Activities

Alter the Chemical Makeup of the water
Increased conductivities, decreased pH

Increased sedimentation

Water removal during fracking procedure
Additionally, polluted water may re-enter system

Devastation of terrestrial systems buffering/feeding streams



Invasive Species



Unforeseen Catastrophes



