

# Missouri's Aquatic Mollusks



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# Missouri's Aquatic Mollusks

## Native freshwater mussels

Also known as bivalves, unionoids, naiads, or clams



## Native freshwater gastropods

Also known as snails



## Native fingernail clams

Also known as pea clams



## Invasive Species:

Zebra Mussels



Asiatic Clam



Chinese Mysterysnail



# Importance of Mollusks









- Food & medicinal uses
- Buttons, cultured pearls & other jewelry
- Water purification, contaminant sequestration, algal control
- Nutrient cycling & storage
- Denitrification
- Habitat provisioning & food web support
- Heritage & sense of place
- Education & research

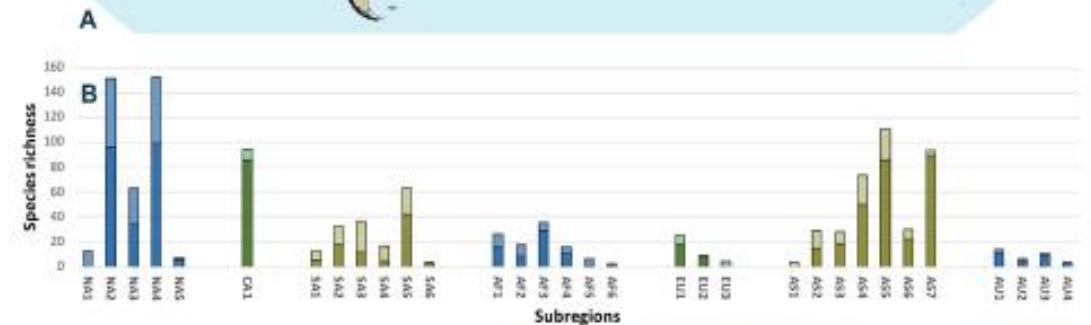
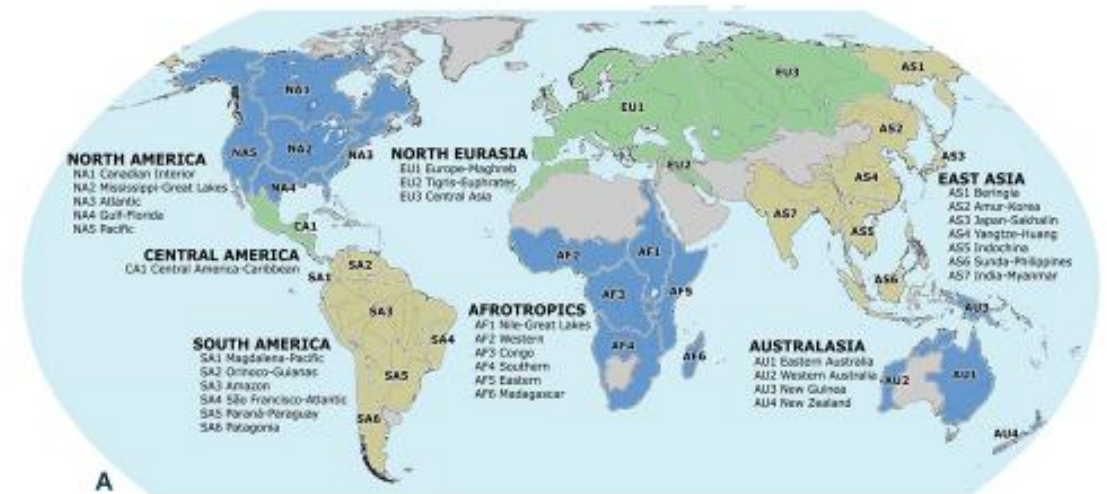


Atkinson *et al.* (2023)



# Diversity of Freshwater Mollusks

Area	Mussels	Gastropods
North America	300	729
	66	31
	69	51
	85	42
	89	37
	100	84
	104	66
	155	91
	170	204



*J Molluscan Stud*, Volume 87, Issue 1, March 2021, eyaa034, <https://doi.org/10.1093/mollus/eyaa034>









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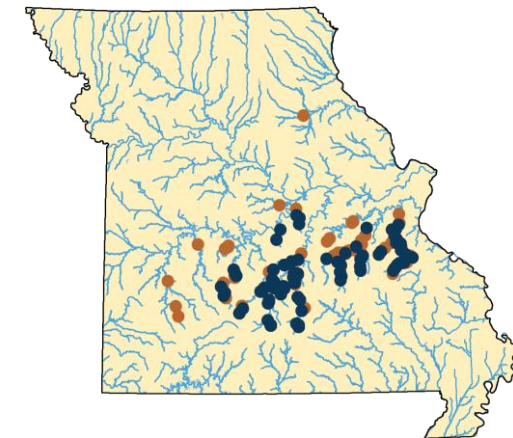
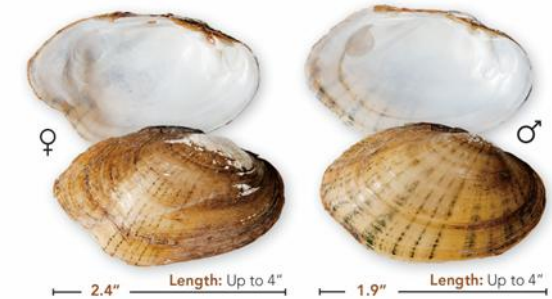


# Diversity of Freshwater Mollusks









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Northern brokenray

*Lampsilis brittsi* (Simpson, 1900)



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# Diversity of Freshwater Mollusks

## Washboard

*Megaloniaias nervosa* (Rafinesque, 1820)



4.6" Length: Up to 8"

## Purple lilliput

*Toxolasma lividum* (Rafinesque, 1831)



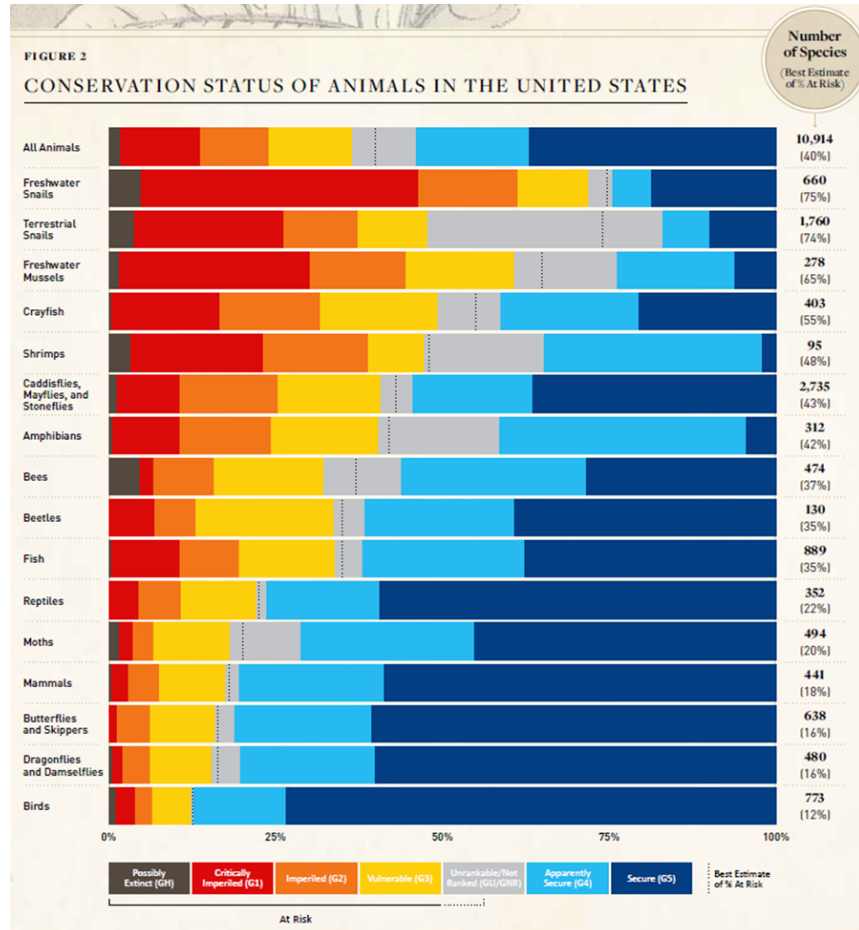
1.0" Length: Up to 2"







# Freshwater Mollusk Status

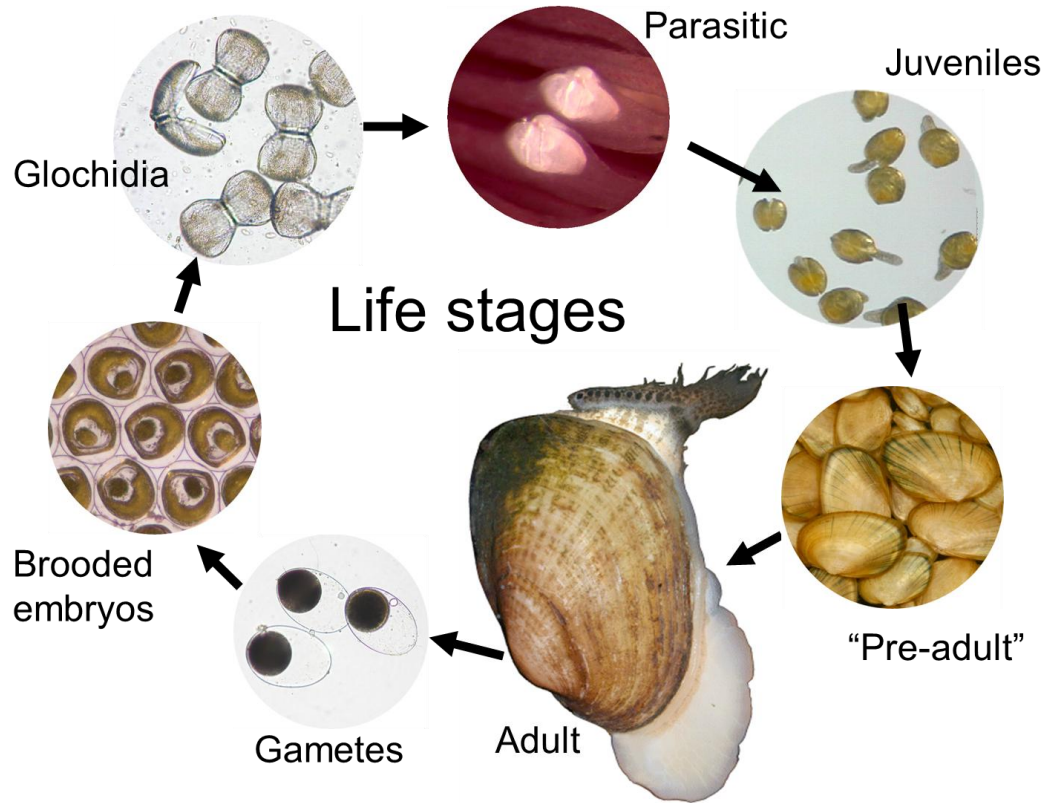


From The Nature Conservancy (2023) "Biodiversity in Focus: United States Edition"

	Mussels	Snails
No. Species	69	51
S1	13	5
S2	7	1
S3	8	
SE	16	1
FE	10	1
FT	2	1

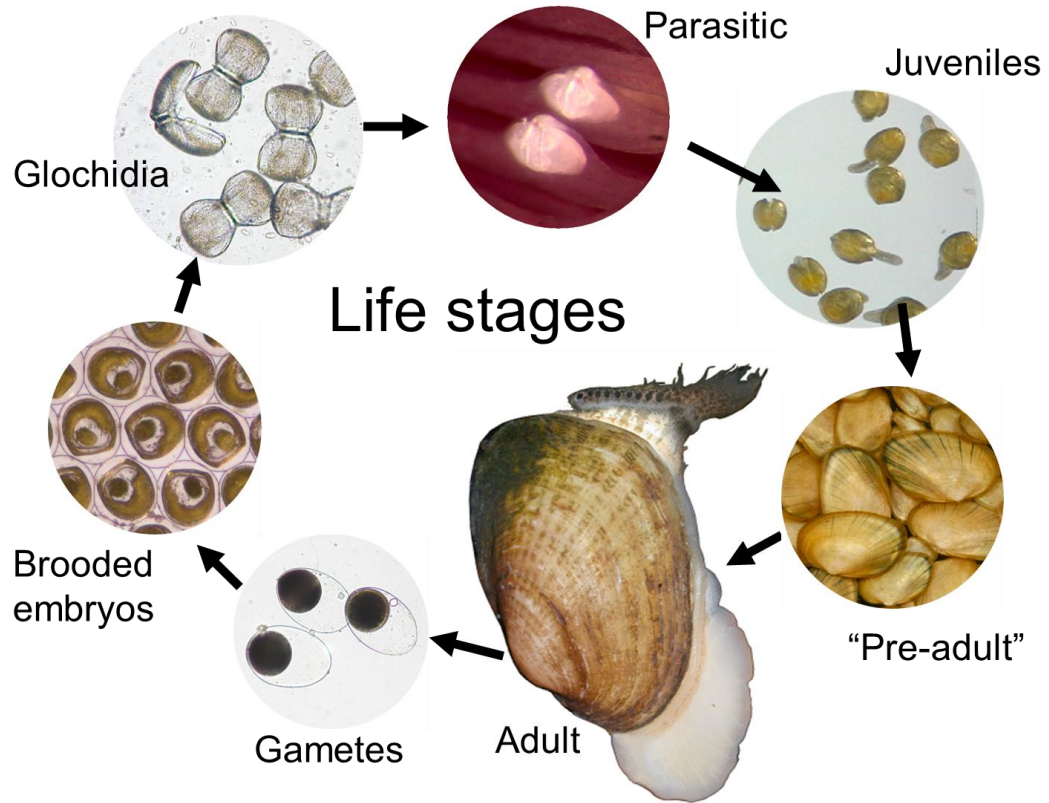


# Freshwater Mussel Life Cycle

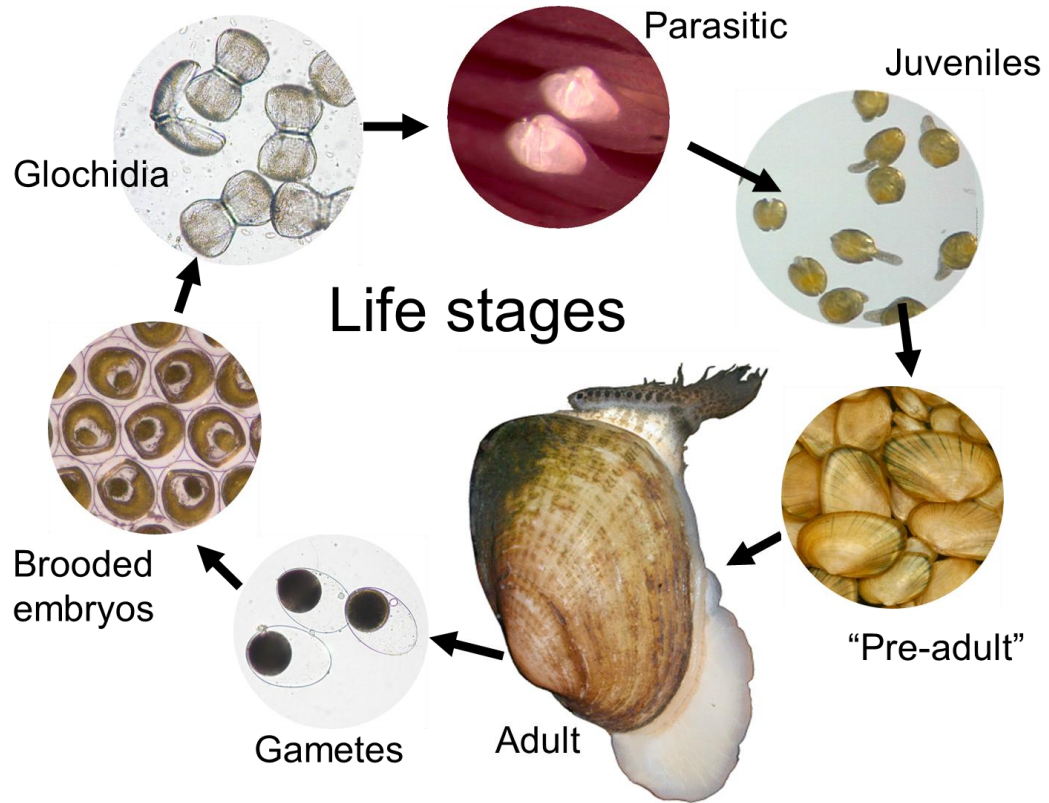




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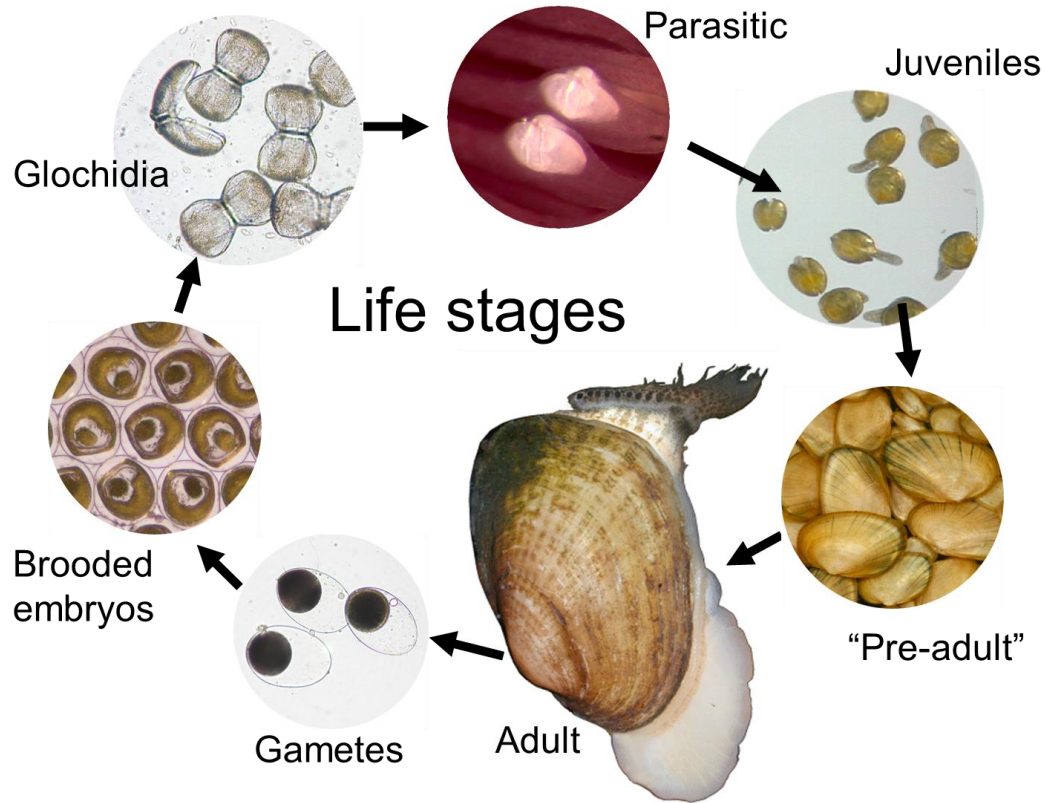


# Freshwater Mussel Life Cycle

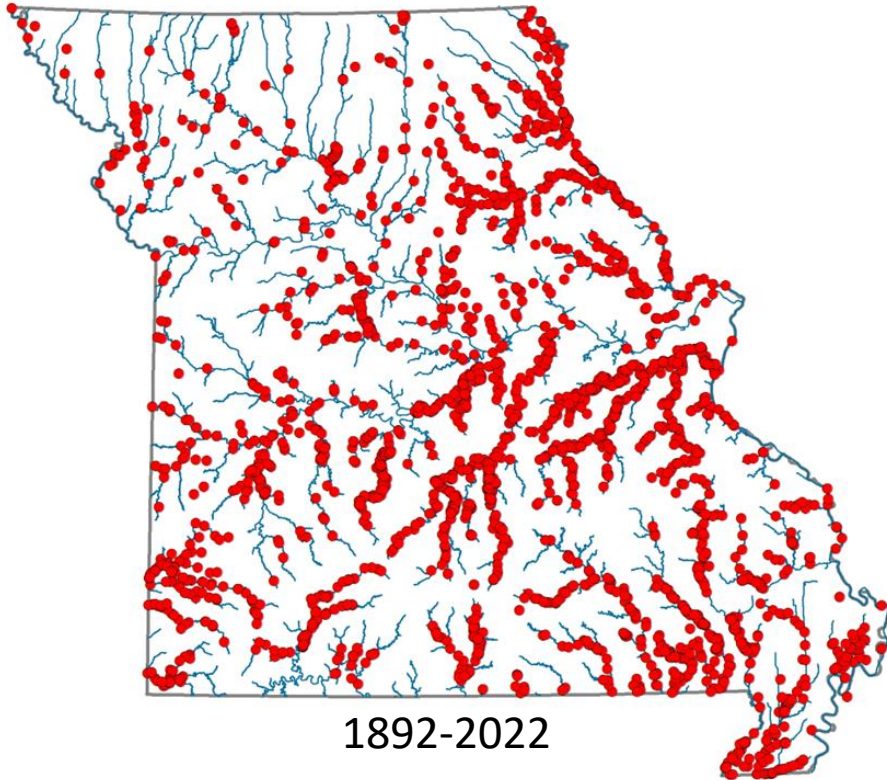




# Freshwater Mussel Life Cycle



# Freshwater Mussel Distributions



Water Chemistry (Temperature, pH, O<sub>2</sub>)

Substrate Type

- Most prefer stable coarse sand or gravel-sand mixtures

Water Velocities

- Low enough for substrate stability, but high enough to keep clean

Water Depth

- Large variation; shallow water (few mm) up to 40 m (or more)

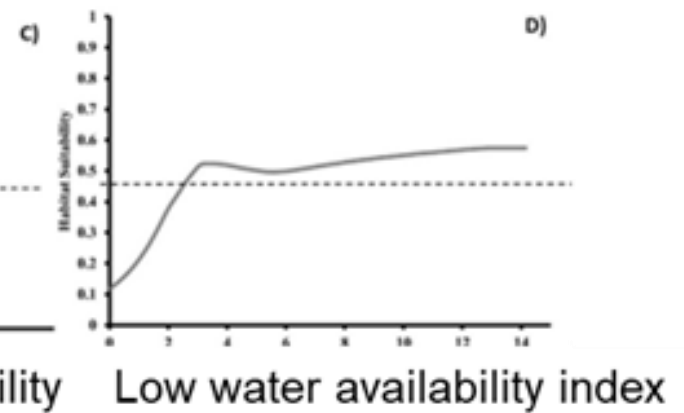
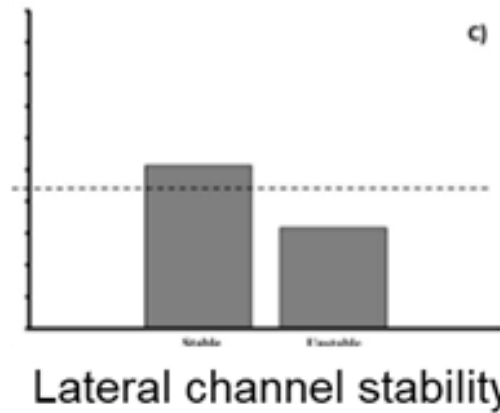
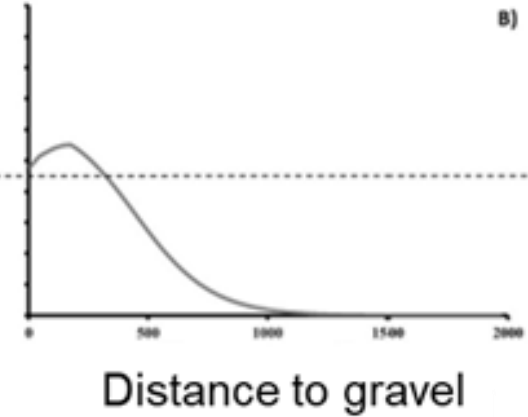
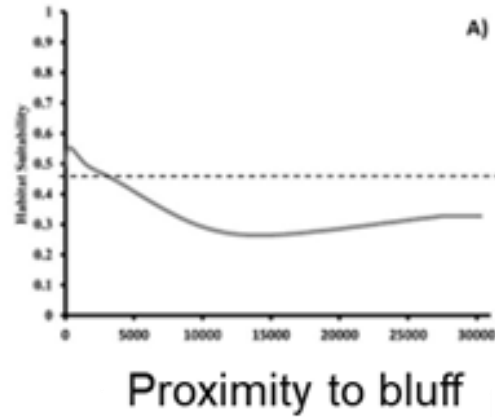
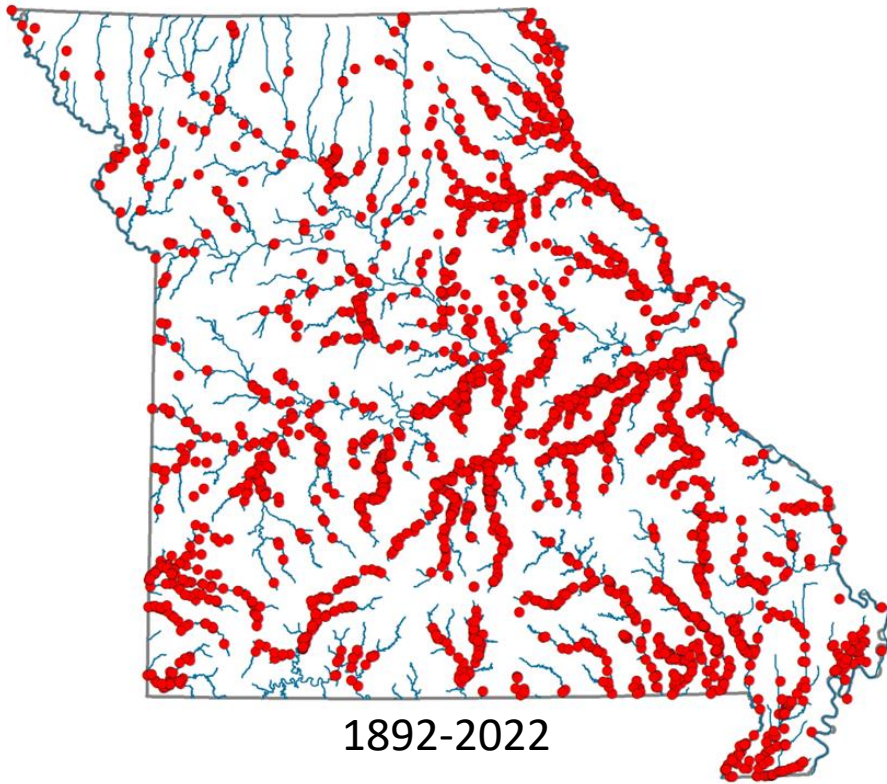
Host distribution

- Only method for dispersal

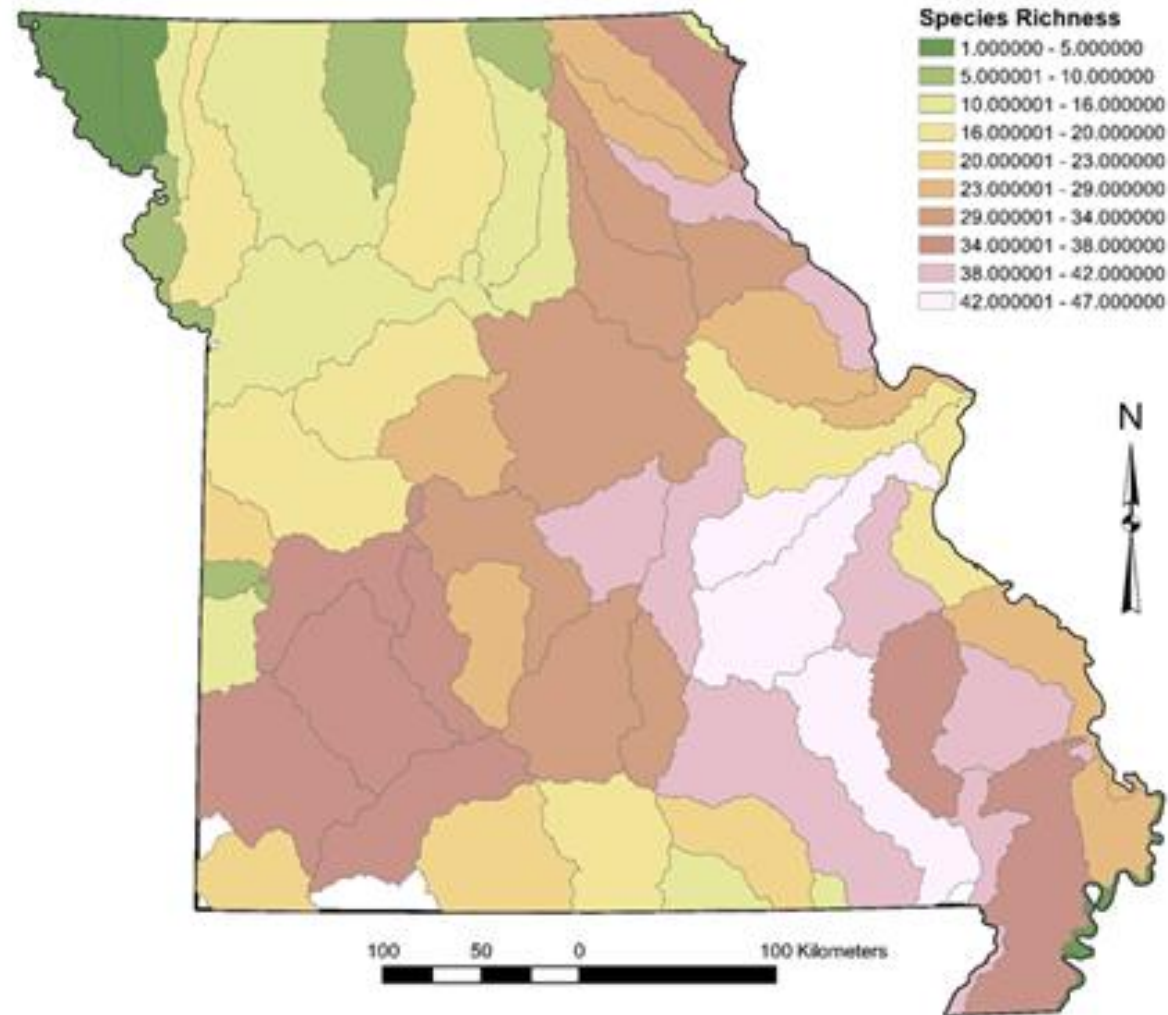
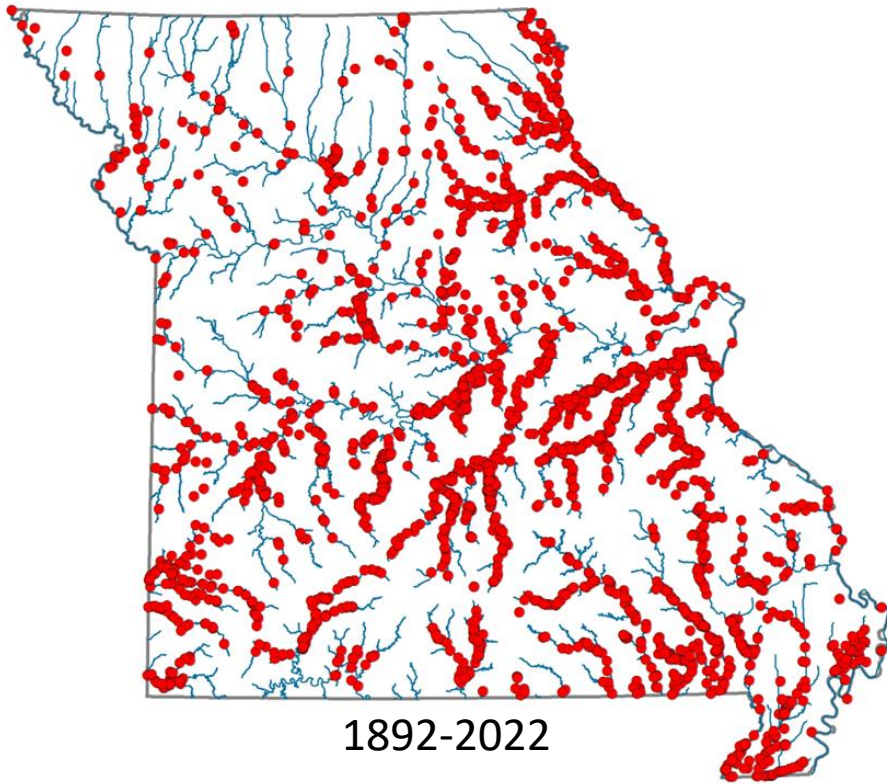




# Freshwater Mussel Distributions



# Freshwater Mussel Distributions





# Freshwater Mussel Distributions

Most species require clean, flowing water



Larger streams will have more taxa



Relative few can survive in lakes, reservoirs, ponds, or oxbows



Small streams can have some

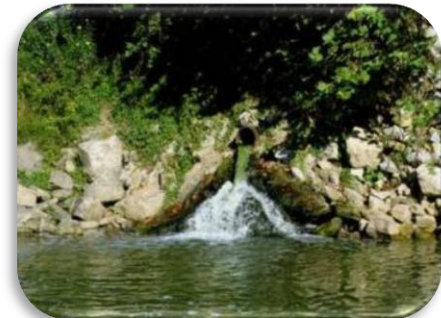


Even ditches



# Threats to Mollusks

- Impoundments
- Channel alteration
- Sedimentation
- Poor water quality
- Mining
- Modified Hydrology
- Overharvest
- Invasive species






# Missouri Mussel Conservation and Management Plan


April 2008

## Missouri Mussel Conservation and Management Plan



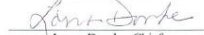
Approved By:

  
Ron Dent, Chief  
Resource Science Division

  
Chris Vitello, Acting Chief  
Fisheries Division

  
Dennis Steward, Chief  
Protection Division

  
DeeCee Darrow, Chief  
Wildlife Division

  
Lorna Domke, Chief  
Outreach and Education Division

  
Bill McGuire, Chief  
Private Land Services Division



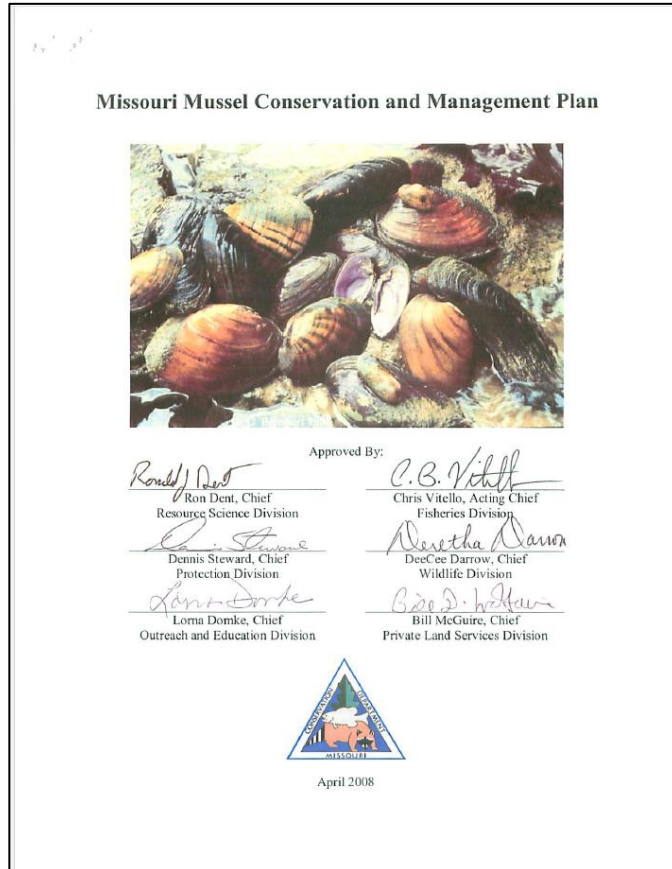
April 2008

1. Implement the conservation and management actions necessary to restore, protect, and use Missouri's mussel fauna
2. Evaluate conservation actions through integrated monitoring of the status, distribution, diversity, and fitness of Missouri's mussels, and relevant aspects of habitat and water quality
3. Increase awareness of conservation needs for Missouri's mussel fauna
4. Advance our knowledge of mussel biology and ecology through research



# Missouri Mussel Conservation and Management Plan

April 2008

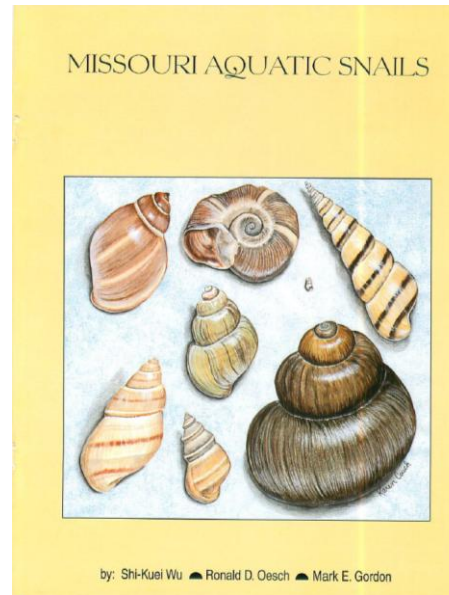
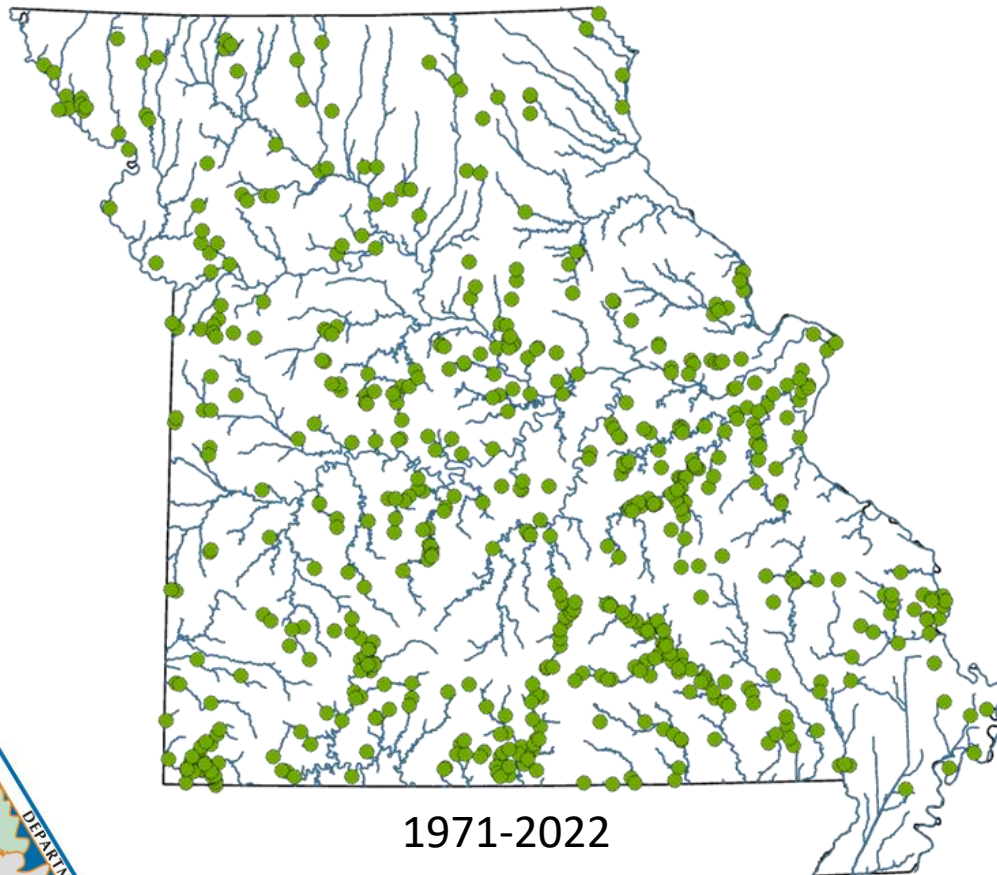


- Statewide & species-specific surveys
- Evaluation of factors influencing capture probability, community and population metrics of freshwater mussels in Missouri
- Publication of “A Guide to Missouri’s Freshwater Mussels”
- Propagation & augmentation research
- Determination of population genetic and ecological variation in the Scaleshell (*Leptodea leptodon*) and Pink Mucket (*Lampsilis abrupta*)
- Assessment of mussel communities and habitat in the lower Osage River
- Mussel & heavy metals assessment in the Big River
- Private landowner cooperative efforts
- Toxicology research
- Population genetic and population viability analyses on *Cumberlandia monodonta*
- Population genomics of the Neosho Mucket

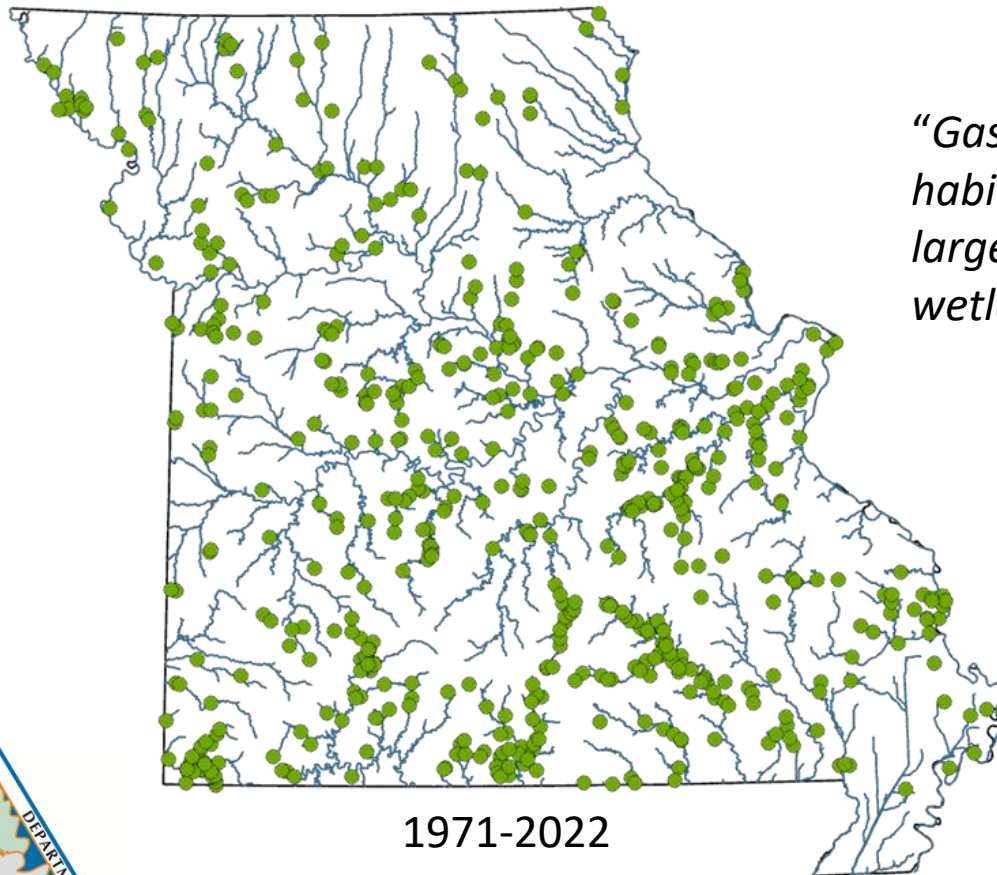




# Freshwater Gastropod Distribution & Habitats



# Freshwater Gastropod Distribution & Habitats



*“Gastropods have diversified into every conceivable aquatic habitat, including hypogean aquifers, springs, small streams, large rivers, ponds, lakes, and ephemeral to permanent wetlands” (Johnson et al. 2013)*





# Show-Me Snails

## Show-Me Snails!

We need your help collecting snails to update MDC's snail distributional map and to protect aquatic habitats. MDC staff and staff volunteers are asked to opportunistically collect snails from streams while doing planned field work. This is not mandatory, but we would greatly appreciate your snails.



### Why?

These specimens will be used to update our snail distribution database and prepare MDC for proposed changes to the Missouri's Water Quality Standards. Potential changes in standards would allow elevated ammonia levels in waters where snails are absent. Ammonia is toxic to aquatic organisms at very low levels, with gilled snails being the most sensitive organisms. Increased snail distribution data from this project will allow better protection of streams where they are found.

### How?

**Search** for and collect snails from the stream at your field site. Look in different habitats, such as pools, riffles, logs, rootmats, and vegetation. Snails can be found in the sediment, on large rocks, submerged trash, on mudflats, and on undercut banks.

**Preserve** specimens in any leak-proof container filled with 70% ethanol or 91% isopropanol (rubbing alcohol).

**Label** containers in pencil with:

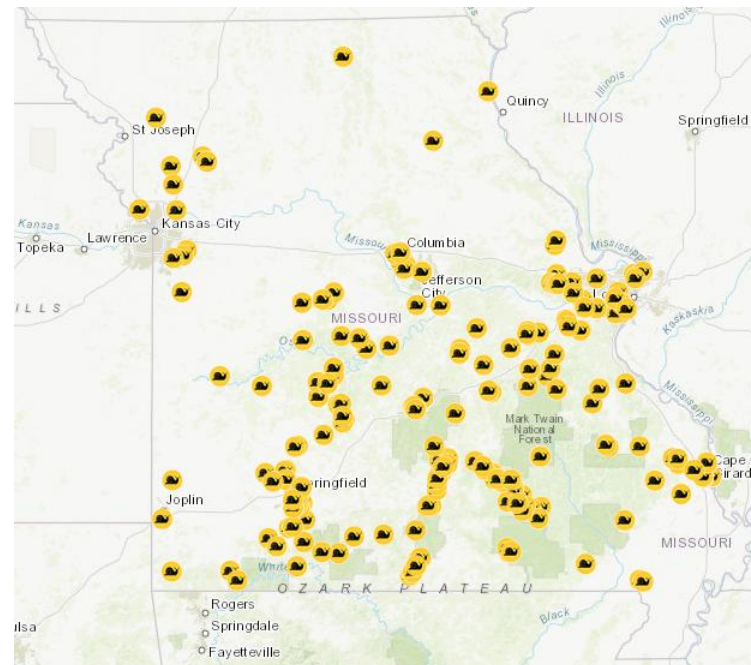
- Collector's name
- Stream name
- GPS location (from cell phone)
- Date of collection
- Preservative used (ethanol or isopropanol)

Send samples to Steve McMurray at Central Regional Office.

FOR QUESTIONS ON THIS PROJECT, CONTACT STEVE AT  
[STEPHEN.McMURRAY@MDC.MO.GOV](mailto:STEPHEN.McMURRAY@MDC.MO.GOV) OR EXTENSION 2925.

VIALS AND LABELS AVAILABLE BY REQUEST TO [APRIL.SEVY@MDC.MO.GOV](mailto:APRIL.SEVY@MDC.MO.GOV).

Show-Me Snails project is a collaborative project with MDC Science Branch and Missouri Stream Team.



Year	#
2020	121
2021	159
2022	189
2023	86



# Questions?

[Stephen.McMurray@mdc.mo.gov](mailto:Stephen.McMurray@mdc.mo.gov)

Central Regional Office and Conservation Research Center  
(573) 815-7900 ext. 2925

Show-Me Snails Map:

<https://experience.arcgis.com/experience/ffacfa441aec4a9ca783c0a2b5691d93/?draft=true>



Photo/Video Credits: Chris Barnhart, Chris Lukhaup, Missouri Department of Conservation, U.S. Geological Survey