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Introduction

Blackside Dace is a cool fish, intolerant species, and is the food for many other creatures in the creeks it lives in. It is less than 8 cm long and has a distinct dark lateral stripe, a green-gold posterior with black flecks, and light or vivid red belly. The fins are frequently brilliant yellow, with metallic grey at the base of the pectoral and pelvic fins. This species' life cycle is not extensively described. It lays its eggs in nests that have been built or adopted between May and June. One nest was discovered in a small trench made of gravel, with fine pebbles for reproducing (Rakes et al., 2013). The blackside dace has been sighted feeding on rocks, and it is believed to feed on debris, algae, and occasionally bugs. The blackside dace favors riparian environments with destabilized river beds, giant boulders, and deep streams. The most abundant species are found in regions where banks are surrounded by luxuriant vegetation, and the canopy shelter surpasses 70%. Plantlife contributes to the retention of cool aquatic temperatures and sludge from regions downstream of the riffles. The river currents must be adequately strong to clear muck. Since this species was discovered so in recent times, its historical array is unknown. Nevertheless, it was eradicated from as many as fifty two streams in Tennessee and Kentucky before it was identified and documented. Trivial streams in the upper Cumberland River basin, particularly in Pulaski, Laurel, McCreary, above Cumberland Falls, Whitley, Harlan, Letcher Counties in Kentucky, Knox, Bell, and Scott, Campbell together with Claiborne Counties in Tennessee, are home to blackside dace (Scherer & Santangelo, 2014). Despite its seeming extensive distribution, it presently occupies approximately 14 miles (23 kilometres) of around 30 streams.

Problem Statement

The species has declined due to increased silt deposits into its home waters in the Cumberland River Drainage and strip mining around the area. The species is known as Threatened under the Endangered Species Act where it has several agencies in the Southeast trying to improve habitat and save the species from going extinct. This fish's siltation is produced by coal excavating, woodcutting, strip mining, acid mine drainage, farming, and road-building overflow. Many of the streams that still sustain black side dace are under threat from these practices. The southern redbelly dace is an imported dace that may have supplanted the black side dace in warmer waters within its habitat.

History of the Problem

On June 12, 1987, the federal government designated the blackside dace as an endangered species. The southern redbelly dace (*Phoxinus erythrogaster*) may be to blame for the demise of the black side dace. The southern redbelly dace has been spotted in numerous locations where the black side dace formerly lived. Because of the limited life span of the black side dace, any habitat disturbance substantially influences this fish. The most major driver in this species' decrease is habitat deterioration due to siltation. Logging, urbanization, periodic low streams, impoundments, water diversions, pollution, agricultural runoffs, chemical contamination, and water-poor water quality are challenges to this species.

Thesis

Blackside Dace has faced many issues over the last couple of decades due to human activities; it is up to humans to try to do good on our wrongdoings and get these fishes populations back up. This paper goes deep into examining the extent of the problem and stating the possible solutions to this issue.

Body Section 1

Extent of the Problem

The Blackside Dace's habitat has been reported to be disrupted by resource extraction operations such as forestry, coal mine, agriculture, gas/oil well drilling, human development, and poor sewage treatment. All of these operations have led to deterioration of streams within species' range. On the other hand, coal mining related activities may constitute most immediate as well as significant source of hazards towards the species since they can permanently affect in-stream water quality and create physical habitat damage.

Reasons We Should Be Concerned

Blackside dace are food for many other species, indicating good water quality; they are animals like us who need our help. Blackside dace are principal feeders, mostly eating algae. They provide nourishment for carnivores, notably bigger fishe. They might also be predators of aquatic insect larvae on occasion hence playing an essential role in the balance of the food chain.

Who or What Is Affected, Facts and How They Are Affected

Blackside dace populations. Hitt et al. (2016) discovered an undesirable relationship amongst the blackside dace population, largemouth bass and redbreast sunfish population, related to a predator-prey relationship. The US Fish and Wildlife Service designated the black side dace as an endangered species in 1987. Many factors other than surface coal mining siltation also combine to degrade the populations (SRBD, Water withdrawals, etc.). We all inhabit downstream from mountaintop revocation damaged streams, and the species is only one example of the trade-off that mountaintop removal represents for our natural areas. The Blackside Dace is on the verge of extinction, and rather than eradicating them, and we should behave as stewards of the environment.

Body Section 2

Cause/ Effect

Mountaintop removal is a risky business. As a result, local water supplies are regularly contaminated due to mountaintop removal activities. They emit hazardous chemicals, including selenium and heavy metals. Communities near mountaintop removal miners have higher rates of significant health issues, including cancer and birth abnormalities.

What Happened as a Result of the Problem

Because surface coal mining, siltation, and the southern red-bellied dace moved into Blackside dace territory, we started drastically losing Blackside dace populations. Also, River connectivity due to perched road culverts has made connectivity poor, keeping these populations in certain areas.

Repercussions of the Problem

The significant repercussion of this problem is that the species could face extinction if the restoration is not affected. If the issue is not solved and regular monitoring of the populations of Blackside dace is not done, then the species could be lost; we need to try to lower pollution as humans, especially around the Cumberland River system where these fish are endemic, make better connectivity for our black side dace to find more habitat an increase population

Body Section 3

Possible Solutions

Eliminating logging near rivers and streams. Floyd et al. (2013) argue that tree logging or cutting can result in a loss of canopy cover over streams. The canopy of the trees offers shade, which keeps rivers and streams cold. Another possible solution is implementing stringent mining measures in watershed areas containing blackside dace.

What Will Work

Monitor populations, pollution, and areas in need of better connectivity. For instance, Kentucky and Tennessee make it illegal to fish blackside dace for any reason. Some protection strategies are relocating wild people, limiting wood collecting, pesticide and herbicide usage, managing toxic waste and road repairs techniques, decreasing river bank alteration, and restoring captive-bred species to appropriate habitats. The US Fish and Wildlife Service expects that each stream that provides habitation for the blackside dace will be protected by governmental agencies or private conservation organizations.

What Will Not Work

Stopping mining activities entirely will not work because it is an economic activity that people depend on. Similarly, placing stringent measures upstream might not always work because effluent will always find its way in streams mainly through herbicides and pesticides, even without the knowledge of individuals.

Possible Oppositions

Local landowners support where these creeks run that they live. Mineral mining is economically disadvantaged since mining firms are prohibited from disturbing streams containing black side dace, designated as Outstanding Resource Waters.

Conclusion

Blackside dace is a cool animal that needs our help to get back to normal populations. This species' life cycle is not extensively described. It lays its eggs in nests that have been built or adopted between May and June. One nest was discovered in a small trench made of grit, with fine pebbles for reproducing. The blackside dace grazes on rocks and it is believed to feed on algae, debris, and occasionally insects. However, in susceptibility and scenario studies, mining effects, like increased stream conductivity, came out as most relevant variables influencing

expected local Blackside Dace population resilience. Most findings show mining impacts as legitimate target area for study as well as recovery measures for species, however the model should be reviewed and revised further.

The United States Fish and Wildlife Service saw it wise to designate blackside dace as Endangered, and it is protected under the Endangered Species Act. Nonetheless, the primary reason for the fall in black side dace populations appears to be habitat degradation induced by strip mining and logging activities (Hayden, 2013). Blackside dace is found in southern Kentucky's coalfields and occupies headwater streams where these practices influence. The majority of the US Fish and Wildlife Service's Blackside Dace recovery activities have concentrated on protecting existing populations, identifying undiscovered people, and distinguishing appropriate unoccupied habitats. A large-scale habitat enhancement initiative for the species has been a missing component of its recovery campaign.

State and federal governments ban or strictly control mining activities in watersheds harboring black side dace through the pre-mine licensing procedure. Overall, our work improves the present together with future capability for clear restoration management of Blackside Dace species. Blackside Dace has faced many issues over the last couple of decades due to human activities; it is up to humans to try to do well on our wrongdoings and get these fishes populations back up. Thus, the paper’s emphasis has been on the extent of the problem and stating the possible solutions.

References

Floyd, M. A., Harrel, S. L., Parola, A. C., Hansen, C., Harrel, J. B., & Merrill, D. K. (2013). Restoration of Stream Habitat for Blackside Dace, Chrosomus cumberlandensis, in Mill Branch, Knox County, Kentucky. *Southeastern Naturalist*, *12*(4), 129–142. https://doi.org/10.1656/058.012.s408

https://www-jstor-org.utk.idm.oclc.org/stable/42003909?seq=1#metadata_info_tab_contents

Hayden T. Mattingly. (2013). Ecology and Conservation of the Threatened Blackside Dace, Chrosomus cumberlandensis. *Southeastern Naturalist*, *12*(sp4), i–i. https://doi.org/10.1656/058.012.s415

https://bioone-org.utk.idm.oclc.org/journals/southeastern-naturalist/volume-12/issue-sp4/058.012.s415/Ecology%20and%20Conservation%20of%20the%20Threatened%20Blackside%20Dace,%20Chrosomus%20cumberlandensis/10.1656/058.012.s415.full

Hitt, N. P., Floyd, M., Compton, M., & McDonald, K. (2016). Threshold Responses of Blackside Dace (Chrosomus cumberlandensis) and Kentucky Arrow Darter (Etheostoma spilotum) to Stream Conductivity. *Southeastern Naturalist*, *15*(1), 41–60. https://doi.org/10.1656/058.015.0104

https://www-jstor-org.utk.idm.oclc.org/stable/26454647?seq=1#metadata_info_tab_contents

Rakes, P. L., Petty, M. A., Shute, J. ., Ruble, C. L., & Mattingly, H. T. (2013). Spawning and Captive Propagation of Blackside Dace, Chrosomus cumberlandensis. *Southeastern Naturalist*, *12*(4), 162–170. https://doi.org/10.1656/058.012.s409

https://www-jstor-org.utk.idm.oclc.org/stable/42003911?seq=1#metadata_info_tab_contents

SCHERER, A. E., & SANTANGELO, N. (2014). Assessment of reproductive requirements in habitat conservation efforts: a case study on blackside dace (Chrosomus cumberlandensis), a federally listed threatened species. *Canadian Journal of Fisheries and Aquatic Sciences*, *71*(3), 408–415. https://doi.org/10.1139/cjfas-2013-0404 https://go-gale com.utk.idm.oclc.org/ps/i.do?p=AONE&u=tel_a_utl&id=GALE%7CA365689972&v=2.1&it=r

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