Reintroduction of Rio Grande Cutthroat Trout: A Plan to Engage Communities in New Mexico and Colorado

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Abstract:

In 2008, the habitat of the Rio Grande Cutthroat trout was 11 percent of its original habitat (Cherry, 2014). In 2014, Rio Grande Cutthroat trout were removed from consideration for the endangered species list (Cherry, 2014) thanks to conservation and reintroduction efforts. Reintroduction efforts are ongoing but face an uphill battle in many areas along the Rio Grande and its tributaries. This Community Engagement Lab aims to address community fears regarding reintroduction projects as well as engage communities in the actual reintroduction process.

Through this Community Engagement Lab, I hope to provide a sense of pride in the native fish species found in New Mexico and southern Colorado. By conserving a species native to the area, I hope residents will feel a closer connection to the environment and gain a better understanding of the need for biodiversity. I also hope this community lab will encourage people to use science-based evidence when it comes to wildlife management decision making. By relying on science, communities will be able to make better decisions on wildlife management practices which will benefit the entire ecosystem - whether in the case of the reintroduction of the Rio Grande Cutthroat trout or other wildlife management issues.

Introduction:

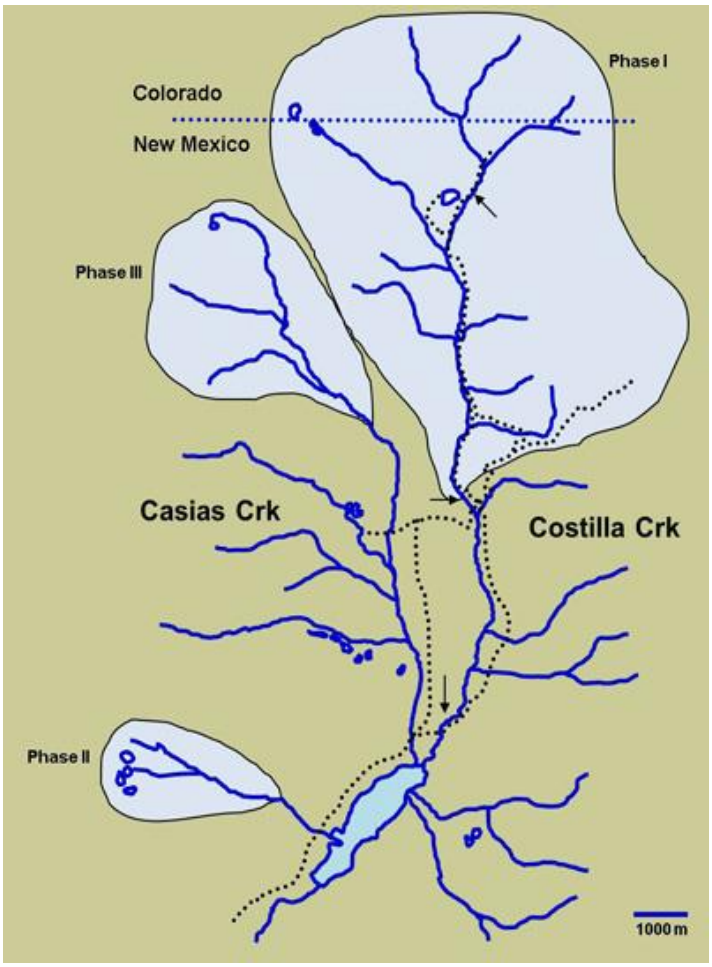
Rio Grande Cutthroat trout have typically been found in high elevation streams in southern Colorado and New Mexico, and are a subspecies of cutthroat trout (Newswire, 2008). To thrive, Rio Grande Cutthroat trout require clear and cold water that is high in oxygen, as well as various water bodies, and ample food (USFWS, 2014). With their need for cold water, Rio Grande Cutthroat trout are especially susceptible to climate change, and global warming was listed as

one of the main reasons for its decline, along with habitat fragmentation, disease, and nonnative trout (Newswire, 2008).

Nonnative species pose a threat to biodiversity around the globe. The United States spends billions of dollars each year to fight invasive species because they are impacting agricultural and forest ecosystems, and could be threatening endangered species (Messing, 2006). While their role in causing extinctions is only beginning to be documented (Messing, 2006) they have been called the second most significant threat to biodiversity by the World Conservation Union (Environment and Climate Change Canada, 2013). As invasive species often are not introduced to their new environment along with their predators (Messing, 2006) they often get out of control quickly.

In the case of the Rio Grande Cutthroat trout, non-native fish species negatively impact their numbers through hybridization of the species and through predation (Pritchard et al, 2006).

Efforts to restore Rio Grande Cutthroat trout began before their candidacy for listing on the Endangered Species List in 2008. According to the USDA Forest Service, restoration efforts began in the Upper Rio Costilla watershed in 2001. In 2007, the Forest Service intensified efforts after the completion of an environmental assessment in the area.



Reintroducing a native species to the river involves a lot more than simply releasing fish into waterways. The process in the Upper Rio Costilla area involved fish barriers, fish removal, stream diversions, road diversions, and finally, diversion and fish barrier removals and site restoration (USDA, Forest Service, 2015). Removal of nonnative trout includes the use of netting, angling, electrofishing, and piscicide - a type of poison (New Mexico Department of Game and Fish). When introducing Rio Grande Cutthroat trout - or other native fish species - back into their native habitat, there is understandably some push back from the community about the impact piscicide and other water treatments that are necessary during the process could have on the environment and human health.

Rotenone, a commonly used piscicide, has been proven to have no long or short-term effect on human health (Arizona Department of Game and Fish, 2012). Rotenone is not a carcinogen, mutagen, and does not negatively impact reproductive health (ADGF, 2012). To make sure the public is not exposed to Rotenone where the chemical is being implemented, areas are closed to the public and these areas are not reopened until levels have fallen to below 90 parts per billion.

It is estimated someone weighing 160 pounds would need to drink 23,000 gallons of water treated with Rotenone at a concentration of 250 ppb for the dose to be lethal (ADGF, 2012).

However, myths persist about piscicides including claims that exposure to the chemical may cause Parkinson's Disease (Moss, 2016). In March 2016, the issue of using piscicides in New Mexico made the papers again, and multiple media outlets, including the Santa Fe New Mexican and the Albuquerque Journal, incorrectly conflated the use of rotonene as a pesticide which is an illegal way to use the chemical. US Fish and Wildlife and the New Mexico Department of Game and Fish both stress that rotonene is safe when used properly (Moss, 2016).

While it is understandable for the public to be wary of state agencies putting poisons in their water, the research shows that commonly used piscicides do not pose a major threat to human health. Because of misinformation about reintroduction projects, communities are often opposed to these projects despite their environmental benefits. This is why community engagement when it comes to the reintroduction of Rio Grande Cutthroat is crucial and is the focus of this project.

Methods:

The first phase of this community engagement lab will be surveying communities where reintroduction of Rio Grande Cutthroat trout will be taking place. Survey answers will be compiled online or in person through a paper survey.

Online survey available here: http://goo.gl/forms/GhTlT02hCi

The questions include:

- Do you know the current threats facing Rio Grande Cutthroat trout?

- Do you know about the plan to reintroduce Rio Grande Cutthroat trout in your area?
- Are you in favor of the plan?
- If yes why? If no why?
- Would you be interested in learning more about the plan?

The answers collected through this survey will provide valuable information about what educational programs need to be created and provided.

The next step in this campaign involves hosting meetings in the area. The New Mexico Wildlife Federation currently hosts monthly meetings with sportsmen and women in New Mexico, and these meetings will be a great opportunity to begin educating the public. It is important for members of the community to understand what happens every step of the way in the reintroduction campaign. Issues addressed will include: impact on the environment, the community, and the future health of the area.

Fish reintroduction campaigns take years to complete - breaking down the project by segments will be a helpful step during the education process.

Step 1	• Isolate waters for reintroduction • Set up permanent and temporary barriers • Establish access in restoration area - horseback and foot traffic are allowed, no new roads are permitted
Step 2	• Removal of nonnative fish species, protection of native fish species • This includes permitting angling, netting, and electrofishing where appropriate in waterways • As many native fish as possible are removed from the area and transported and held temporarily
Step 3	• Application of piscicide for remaining nonnative trout • Piscicide is chosen and applied carefully depending on water levels, temperature, pH, turbidity, and additional factors • Application would be done in stages

Step 4	• Reintroduction of native trout after the eradication of nonnative trout • Monitoring of reintroduced population to check disease and population health

Educating the community during Steps 1 -3 is crucial as this is the most controversial part of the plan. Meetings will include fact sheets about rotonene, benefits of preserving biodiversity in New Mexico and Colorado, talks from biology and ecology experts, and updates from the New Mexico Department of Game and Fish as well as nonprofits involved in the process.

Step 4 holds the most potential for hands on engagement with the community. Prior to the reintroduction of the Rio Grande Cutthroat trout, students and children in the community can conduct water tests with Fish and Wildlife. This will not only lead to a greater understanding of this project, but will also help the children in the community feel more connected to their waterways overall. Students can conduct simple water tests for pH, turbidity, dissolved oxygen, and temperature to see if the conditions are right for the fish to be reintroduced.

Student groups and families can also take part in the reintroduction of the Rio Grande Cutthroat trout to the river. By seeing the fish swimming in their natural habitat, children and their families will feel more connected to the project and hopefully feel more connected to the nature in their own backyard.

Student groups can continue to be involved in the monitoring process by learning how to tag the reintroduced fish and recording progress or setbacks. This will teach children how to record data, conduct scientific experiments, and keep them engaged on a long term environmental project in their community. By engaging with these citizen scientists, agencies conducting the reintroduction project will have a great ally to help collect data throughout the monitoring process.

Results:

As this project is still in the early stages of development and will most likely occur through the New Mexico Wildlife Federation and with the cooperation of the New Mexico Department of Game and Fish and with the agreement of local communities, the survey was the only piece implemented at this time. The survey was shared online with students and parents of students at the Santa Fe Indian School, which is a school that works with multiple tribal communities in New Mexico.

While I did not get the amount of responses I would have liked (the amount I would've liked being more than 2), I believe as this project develops outside of class, this survey will help assess the needs of the community when it comes to educating the public about this project.

Data:

B	C	D	E	F	G
Do you know the current threats facing Rio Grande Cutthroat trout?	Do you know about the plan to reintroduce Rio Grande Cutthroat trout in your area?	If you answered yes, please give us a brief description of your understanding of the project:	Are you in favor of the plan?	Explain your support or opposition to the plan:	Would you be interested in learning more about the plan?
Yes	No		Not sure		Yes
Yes	Yes	I think it involves removing other species, then introducing the RG Cutthroat	Not sure	I don't know enough about the other species who will be sacrificed (I assume this includes other natives	Yes

Discussion:

Obviously, getting only two responses is not enough to make definitive conclusions. I did not anticipate the length of time it would take for people to respond to the survey or the length of time it takes to gain trust within communities in the area. As someone who is new to New Mexico, I believe it will take much longer and more effort by me to be able to make connections with the communities who will be most impacted by this project.

However, progress is being made. The New Mexico Wildlife Federation is increasingly getting invited to tribal events and will hopefully make headway in making connections throughout diverse communities which will help make this program a success.

Despite the small sample size, I was interested to learn that people are open to learning more and admitting they don't have all the information to make a definitive decision. I've learned that many in the tribal community are not as worried about the impacts of the chemicals being released into the water, as they are to the perceived unnecessary killing of animals (conversation with colleague who is Iroquoian and has a PhD in Native American studies). This is helpful information to have, despite the fact that it could be an insurmountable obstacle to get over.

Next Steps/Reflections:

I am disappointed in the lack of responses I got to my survey and going forward I will make more of an effort to communicate with people in a variety of ways. I am still new to the area, and people communicate much differently here than what I am used to. In person meetings are essential, as is putting in time to show you are serious about your work and that you want to actually hear from the community.

Throughout the semester in Issues in Biodiversity we have struggled with issues related to invasives, native animals, and what is natural. Extensive time, money, and changes to the environment are needed to successfully introduce the Rio Grande Cutthroat trout. At this point, are the nonnative trout more "natural" than the historically present Rio Grande Cutthroat trout?

It's true that as of this moment, there is no scientific evidence to suggest that the chemicals used to eradicate nonnative trout are harmful to humans or have long-lasting effects on the

environment, but this is still changing the landscape. Is it more natural for humans to construct barriers, alter streams, and kill fish that are thriving in a waterway for the sake of one native species?

It is possible that without human intervention the nonnative trout currently present in the Rio Grande and its tributaries could cause more harm on the environment and result in additional problems down the road. By working to restore streams and pools to their native origins through the reintroduction of native species we are potentially preventing even worse problems in the future. As we've observed all semester, it is impossible to know how these projects will turn out until many years later. Further, it is impossible to know the outcome of the road not taken - would environments ultimately be fine with nonnative fish?

In addition to the invasive species question, the Rio Grande Cutthroat trout also face an ongoing issue thanks to climate change. It's possible that eradicating nonnative trout will not be enough to allow the Rio Grande Cutthroat trout to thrive given that they are uniquely susceptible to climate change. Could everything in the reintroduction process go perfectly only to have the native trout perish anyway due to global warming?

I believe attempting to eradicate nonnative species is a worthwhile endeavor and giving native species the opportunity to thrive is an important one. However, I believe it is important to consider these questions as additional reintroduction projects inevitably move forward.

Works Cited:

Arizona Department of Game and Fish. (2012). *Rotenone FAQ Committee Final Report.*

Cherry, L. (2014, October 1). *Rio Grande cutthroat trout no longer an endangered species candidate*. Retrieved from New Mexico Department of Game and Fish: http://www.wildlife.state.nm.us/rio-grande-cutthroat-trout-no-longer-an-endangered-species-candidate/

ENS Newsire. (2008, May 14). *Rio Grande Cutthroat Trout Now Endangered Species Candidate*. Retrieved from ens-newswire: http://www.ens-newswire.com/ens/may2008/2008-05-14-091.html

Environment and Climate Change Canada. (2013, July 19). *Why Are Invasive Alien Species a Problem?* Retrieved from Government of Canada: https://www.ec.gc.ca/eee-ias/default.asp?lang=En&n=4612AC81-1

Messing, R. H. & Wright, M.G. (2006) Biological control of invasive species: solution or pollution? *Frontiers in Ecology and the Environment*

Moss, R. (2016). *Worries linger over pesticide to be used in Gila trout reintroduction.* Retrieved from The Santa Fe New Mexican: http://m.santafenewmexican.com/news/local_news/worries-linger-over-pesticide-to-be-used-in-gila-trout/article_eb72211b-cd0c-5a4a-b70a-5c867d7ea78a.html?mode=jqm&_dc=918988995684.4584

New Mexico Department of Game and Fish. (n.d.). *Restoration of Rio Grande Cutthroat Trout and the Native Fish Community to the Upper Rio Costilla Watershed.* Retrieved from wildlife.state: http://www.wildlife.state.nm.us/download/fishing/costilla/Final-Enviromental-Assessment-Native-Fish-Restoration-Rio-Costilla-Watershed.pdf

USDA Forest Service. (2015, December 10). *Preliminary Environmental Assessment for the Rio Costilla Terminal Fish Barrier Project Carson National Forest, Taos County, New Mexico.* Retrieved from http://www.wildlife.state.nm.us/download/fishing/costilla/Rio-Costilla-Terminal-Fish-Barrier-Project-Environmental-Analysis-12_10_2015.pdf

US Fish and Wildlife. (2014, August). *Species Assessment Report for the Rio Grande Cutthroat Trout.* Retrieved from fws: https://www.fws.gov/southwest/es/NewMexico/documents/RGCT_SSA_Report_2014_Final.pdf