



# Evaluating planning successes for **the conservation of the Arctic grayling**



Review of how a candidate conservation agreement helped keep the species from needing listing under the Endangered Species Act



*“ We acknowledge the ranchers along the Big Hole River who came together with federal, state and local partners for a common good, investing in voluntary conservation that helps improve habitat and water quality while also supporting productive agriculture. By ensuring streams collect clean and abundant water, ranchers restored waterways crucial to the Arctic grayling. The grayling’s rebounding population underscores both the value of targeted, science-based conservation on private lands and that there is room for both successful agriculture and abundant wildlife on working lands.”*

— Jason Weller, Chief of the USDA’s Natural Resource Conservation Service

*“ FWP is proud of the work accomplished with our partners and private landowners under the CCAA. The Big Hole River partnership and CCAA have proven to be a highly-effective approach for conservation, and I’m confident that it will become the model for conservation on private lands in the West.”*

— Travis Horton, Region 3 Fisheries Manager Montana Fish, Wildlife & Parks



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### **About Sand County Foundation**

Sand County Foundation is a private, non-profit organization dedicated to working with private landowners across North America on voluntary, ethical and scientifically-sound land management practices that benefit the environment.

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## Introduction

The Arctic grayling was first proposed for listing under the Endangered Species Act (ESA) in 1992. Although as recently as 2010 the U.S. Fish and Wildlife Service (USFWS) believed the species warranted protection, in August 2014 the agency concluded it was not endangered or threatened. That outcome was made possible in large part by phenomenal conservation success on private lands in the upper Big Hole River in Montana.<sup>1</sup> The Big Hole River serves as the major source of drinking water for Butte — Montana's fifth biggest city. Hundreds of conservation strategies have been implemented on private ranches, especially over the last 5 years. This included removal of fish passage barriers, riparian restoration, and ranchers' willingness to return water to streams during low flow periods. These actions led to a 500 — 900 percent increase in the grayling population and a brighter future for the once-declining fish.

The Big Hole River is an important trout fishery, providing millions in local economic benefits. In 1995, private ranchers and agencies began the Big Hole Watershed Committee, taking actions in part supported by the Bradley Fund for the Environment and National Fish and Wildlife Foundation. As early as 2004, Natural Resource Conservation Service (NRCS) was funding hundreds of thousands of dollars-worth

of habitat restoration and payments to ranchers to keep water in streams. The early willingness of the NRCS to invest, encouraged a host of agencies to put their resources and personnel in place to try to create a successful outcome for ranchers and the grayling in the Big Hole. Today, 98 percent of the best habitat in the Big Hole is available for the grayling and, because landowners are contributing more water to streams during low-flow periods, instream flow targets are being met most of the year.

In part, conservation actions taken on these private lands were made possible by the development of an agreement called a Candidate Conservation Agreement with Assurances — or CCAA — between landowners, the State of Montana and USFWS. The agreement was important because it provided assurances to landowners that, if the species became listed under the Endangered Species Act (ESA), they would be protected from additional regulation. Shortly after it was established in 2006, the Big Hole Arctic grayling CCAA became the biggest one in the country for a time, with 140,000 acres enrolled. Montana Fish, Wildlife and Parks dedicated staff to the private lands program and led implementation and monitoring work.

This CCAA is one of approximately 30 similar candidate agreements that exist around the country and create potential for private landowners to partner with agencies and non-profit groups to restore a species and justifiably remove a species from the candidate list. However, the Big Hole Arctic Grayling CCAA is distinctive because

<sup>1</sup> Additional genetic information about the species showing that reestablished, genetically-diverse populations, especially in lakes, further reduced any risk of extinction also contributed to the need not to list the species.

of its use of sound conservation planning principles, including meaningful goals, outcome measures and specific indicators that clearly tie conservation actions to positive outcomes for the species. In other words, the agreement sets a clear bar that defines how much conservation is enough.

This brief review looks at the strategic planning-related strengths of the CCAA for the fluvial Arctic grayling in the Upper Big Hole River of Montana to describe why we believe the agreement was particularly successful in contributing to the effective conservation of the grayling.

*A Candidate Conservation Agreement with Assurances (CCAA) is an agreement between the U.S. Fish and Wildlife Service (USFWS) and any non-Federal entity whereby non-Federal property owners who voluntarily agree to manage their lands or waters to remove threats to species at risk of becoming threatened or endangered receive assurances against additional regulatory requirements should that species be subsequently listed under the Endangered Species Act (ESA).*



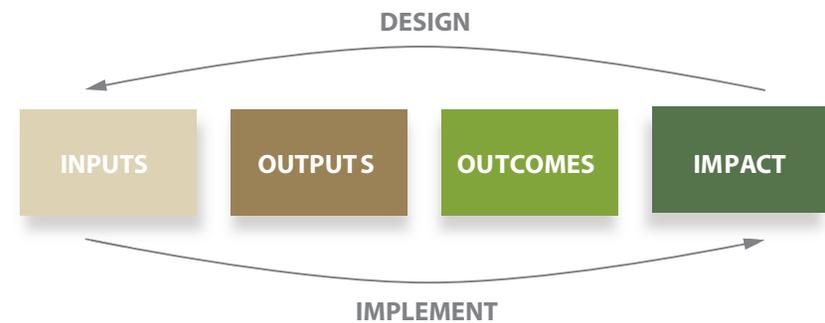
## Fundamentals of Conservation Planning

The conservation community has developed a variety of adaptive management frameworks and best practices for strategic planning. These planning practices allow evaluation of whether interventions will achieve their desired impact. The Open Standards for the Practice of Conservation<sup>2</sup> is one such framework that has been used by several natural resource agencies and conservation organizations. Although the specific terminology may differ, the frameworks all share a common focus on developing clear management goals that can be monitored to show their impact on threats, habitats and species (Figure 1).

In order to achieve success, a strong CCAA should follow these basic principles of conservation planning. This includes identifying and prioritizing critical threats, developing strategies that will reduce those threats, developing management goals and objectives for the species, and monitoring results and effectiveness. Meaningful goals must be linked to the target species, and be results-oriented, measurable, time-limited, specific and practical. A CCAA should describe goals that are tied to beneficial outcomes for the species

<sup>2</sup> See [www.conservationmeasures.org](http://www.conservationmeasures.org) for the latest version of the Standards released by the Conservation Measures Partnership

and its habitat rather than simply tracking conservation actions taken. Without clear goals and indicators, the USFWS would be hard-pressed to explain a decision to not list a candidate species.



**Figure 1.** At their simplest, a good conservation strategy has a clear articulation of the goal intended for the species, and the outcomes and outputs that would indicate progress toward that goal. When implemented, the plan of action (inputs) includes monitoring of outputs and outcomes that show whether actions are working or need to be changed. The Arctic grayling CCAA and state and federal monitoring strategies have all of these elements.





Poorly executed CCAAs try to take a short cut and often fail to include explicit goals and indicators needed to prove that the conservation actions taken are making a measurable difference to the species status.

**Figure 2. A strong CCAA and its connection to conserving species and keeping them off the Endangered and Threatened species list.**

## The CCAA for the Upper Big Hole River

The Arctic grayling (*Thymallus arcticus*) is a river-dwelling freshwater fish with a distinctive large, sail-like dorsal fin. Based on the best available science, the agencies and other partners had identified small dams and other fish passage barriers, habitat fragmentation, stream dewatering, thermal stress, entrainment, riparian habitat loss, and effects from climate change as the critical threats to the grayling. A CCAA should logically outline how its conservation actions or measures<sup>3</sup> will help ameliorate the threats to the grayling and its riparian habitat.

In 2006, the Big Hole Arctic Grayling Candidate Conservation Agreement with Assurances was developed to enhance the Arctic grayling in Montana's Big Hole River. It describes the following four types of conservation measures:

- Removing barriers to migration
- Improving instream flows
- Identifying and reducing or eliminating entrainment<sup>4</sup> threats
- Improving and protecting the function of riparian habitats

The CCAA outlines corresponding conservation projects and the expected benefits of implementing them (see Figure 3). Using the best available science, the CCAA sets targets for each goal based on historical data, projected results and the requirements for suitable habitat.<sup>5</sup>

<sup>3</sup> For CCAAs, agencies used the term conservation measures to refer to conservation projects and actions. Other practitioners, including those using The Open Standards for Conservation Planning, use the term measures in relation to evaluating the effectiveness of and efficiency of conservation projects.

<sup>4</sup> Entrainment occurs when fish become trapped in a portion of aquatic habitat that is harmful to them.

<sup>5</sup> The general timeline for implementation and threat reduction are summarized in Table 5 in the CCAA. The Big Hole Arctic Grayling Strategic Habitat Conservation Plan (SHCP) explains how to prioritize projects to best allocate Agency resources.

Ultimately the goal of any CCAA is to remove enough of the threats to a candidate species to eliminate the need for protection under the ESA. Only by monitoring the actual outcomes (i.e., the biological response of the species and its habitat) of the conservation measures can a CCAA demonstrate its success. It is then up to the FWS to determine whether the accomplishments of the CCAA are sufficient to remove a species from the candidate list.

## Measurable Results

In its decision, the FWS provides all of the analysis showing the results of the conservation projects, results and the response of the Arctic grayling since the CCAA's implementation in 2006. The following are some of the results that have been tracked under the CCAA:



Outcomes from CCAAs Conservation Actions	
<b>Biological Response Monitoring</b>	
Population	<ul style="list-style-type: none"> <li>• Breeding adults: increase from 100 to 500-900</li> <li>• Abundance: increased catch per unit effort 0.2 to 1.4 fish/mile in river mainstem; increased 2.9 to 7.4 in tributaries</li> <li>• Distribution: increased by 4 miles in Rock Creek and 2 miles in Big Lake Creek</li> </ul>
Entrainment	<ul style="list-style-type: none"> <li>• Only one entrainment documented since 2010 and now being addressed</li> <li>• Low rate of entrainment in unscreened ditches</li> </ul>
<b>Habitat Response Monitoring</b>	
Streamflow Monitoring Riparian Assessment Channel Morphology Stream Water Temperature	<ul style="list-style-type: none"> <li>• Achievement of instream flow goals increased from 50% to 78% (target was 75%)</li> <li>• 65% of riparian habitat in enrolled lands improving</li> <li>• Percent of stream miles accessible to grayling increased significantly for Tier I, II and III habitat types</li> <li>• Landowner contributions to streamflow increasing as more site-specific plans implemented</li> <li>• Temperature reductions in tributaries after restoration</li> </ul>
<i>See Table 4 of the FWS decision in the Federal Register for the full details.</i>	

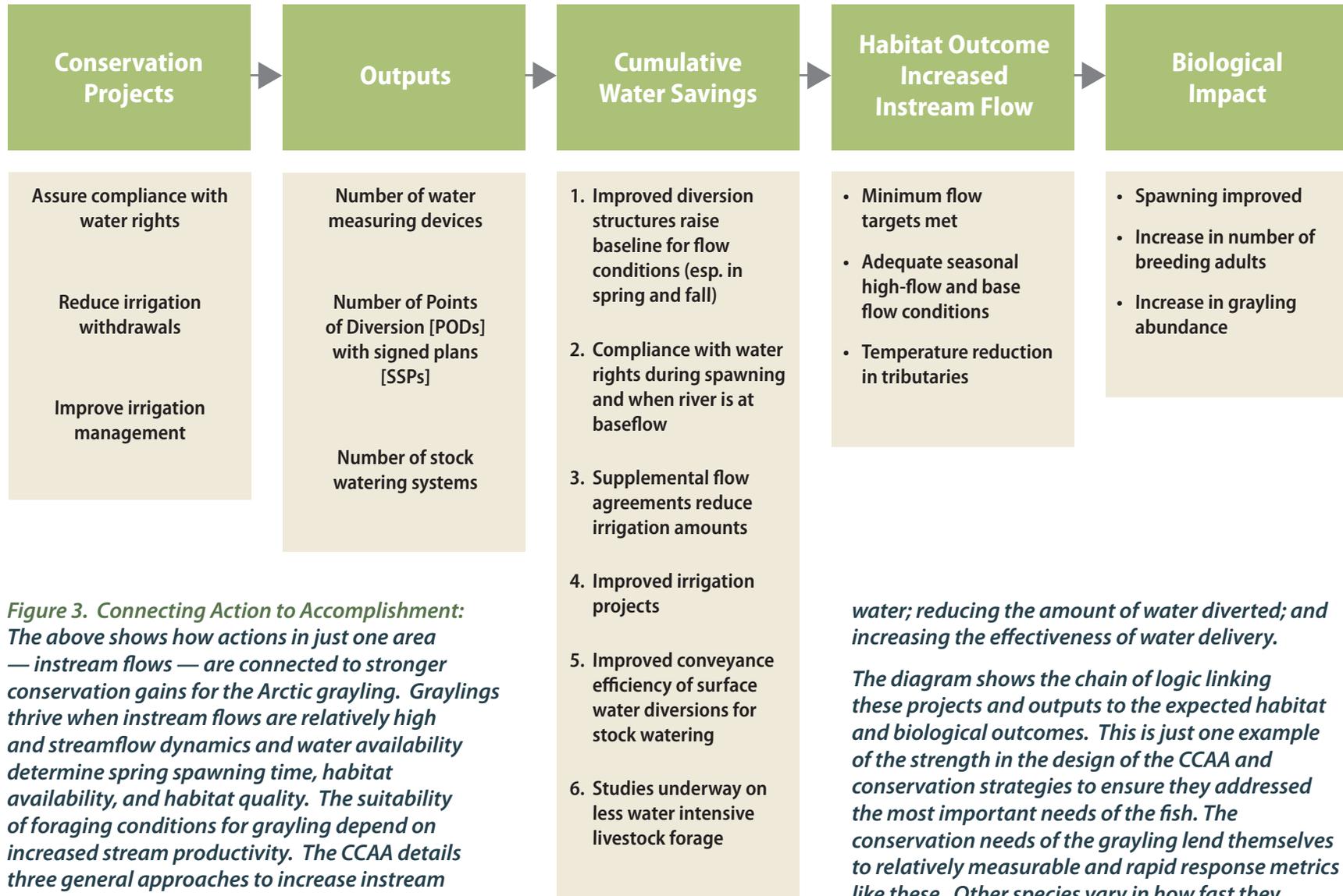
## Going Beyond Outputs

Like many CCAAs and conservation plans, the Big Hole Arctic grayling CCAA includes output measures to monitor implementation. Basic measures include the types and numbers of projects implemented (e.g., 41 fish ladders, 26 stream restoration miles, 33 landowners and 165,000 acres enrolled in CCAAs. These are 'weak' output measures since many assumptions must be made to directly connect or correlate these changes to a change in the status of the fish. The CCAA also includes many strong outcomes — changes

that are associated with the physical or biological environment but have much stronger linkages to the biology and demographic health of the species. For example, the effectiveness of fish exclusion and fish passage devices and changes in water temperature directly affect fish mortality. Even if mortality isn't measured, it is clear from zero entrainment and the absence of fish die offs that these threats have been reduced. In addition, participating landowners are monitored for their compliance with water withdrawals, contact with Agency personnel and adherence to site-specific plans.



## Conservation Measure: Increased Instream Flow



*Figure 3. Connecting Action to Accomplishment: The above shows how actions in just one area — instream flows — are connected to stronger conservation gains for the Arctic grayling. Graylings thrive when instream flows are relatively high and streamflow dynamics and water availability determine spring spawning time, habitat availability, and habitat quality. The suitability of foraging conditions for grayling depend on increased stream productivity. The CCAA details three general approaches to increase instream flow: improving participating landowner control over diversion, delivery, and measurement of*

*water; reducing the amount of water diverted; and increasing the effectiveness of water delivery.*

*The diagram shows the chain of logic linking these projects and outputs to the expected habitat and biological outcomes. This is just one example of the strength in the design of the CCAA and conservation strategies to ensure they addressed the most important needs of the fish. The conservation needs of the grayling lend themselves to relatively measurable and rapid response metrics like these. Other species vary in how fast they respond to conservation.*

Too often, managers point to the number of actions taken under a CCAA in terms of the actions taken without reference to any measurable outcomes — in other words, they stop at measuring outputs or project implementation metrics like the ones described above. However, weak and strong outputs are not proof of a CCAA's success. Managers should ideally be able to show that the CCAA has made (and will continue to make) a significant contribution associated with reduced threats and improved status for the species. As described above, the Big Hole CCAA stands out in its emphasis on important outcome measures related to the response of the species and its habitat to the conservation measures. The CCAA and other monitoring efforts documented the positive changes in the grayling's population size, reduction in entrainment and lethal water temperatures (mortality), and miles of stream occupied by the fish. Together, this mix of outputs and outcomes — all measured and reported on by landowners and agencies strengthened the likelihood of success of the CCAA. In addition, had the agreement not worked as intended, the agreement's well-designed monitoring system which is closely linked to threats to the species would have helped pinpoint what was going wrong and possibly how to fix it. A hallmark of any good conservation strategy is the availability of a feedback loop and opportunity for adaptive management that allows improvement over time — the Big Hole Arctic grayling CCAA had that too.

### Planning and Implementation both required

This paper describes how and why the Arctic grayling CCAA is an excellent plan. Even if that plan were barely funded, funds that were provided would likely be used efficiently to achieve important conservation progress per dollar spent. But it would never have precluded the need to list the species. "In reality, USDA spent \$1.5

million since 2004, while \$4.5 million has come from Montana State Wildlife Grants, \$0.5 million from National Fish and Wildlife Foundation, and approximately \$0.5 million from USFWS Partners for Fish and Wildlife Program, as well as BLM, Future Fisheries, Big Hole Watershed Committee, Big Hole River Foundation, TNC, and the Bradley Fund for the Environment. These investments in a great plan were needed to achieve the conservation goals for the species. In contrast, too many CCAAs and other agreements have both weak conservation strategies and get little money, leaving little to show for those investments. New commitments to Sage Grouse and the USDA Working Lands for Wildlife Program are examples of how significant funds can be put into on-the-ground implementation for at risk wildlife. However, without plans in place where everyone understands the logical connection between actions on the ground and outcomes for species, large amounts of funding can also be wasted.

	<b>Poorly designed conservation strategy, unclear connections between actions and any change in condition for species</b>	<b>Well-designed plan, strong connection between actions, outcomes and goals</b>
<b>Inadequate resources available for implementation</b>	Little conservation progress and funding poorly spent	Efficient progress for every dollar invested
<b>Significant resources available for implementation</b>	Resources likely to be wasted and low probability of achieving species conservation goals or eliminating necessity of listing	Efficient progress that is likely to achieve conservation goals and has the highest chance to preclude the need for listing

## A Reasonable Conclusion

The decision to remove the Arctic grayling from the candidate list was a sound one. The FWS found that the threats to the grayling have been sufficiently ameliorated and that 19 of 20 grayling populations are either stable or increasing. In the most important natural river population that remains, careful monitoring of the CCAA has demonstrated that actions taken under the agreement have changed the status and trajectory of grayling that depend upon this landscape of private ranches. In addition, the FWS determined that existing Federal and State regulations will continue to protect the species on government lands which support many of the lake-based populations.

CCAs cannot obviate the need to list a candidate species unless they can demonstrate meaningful results. If clear goals, indicators and monitoring plans were not in the grayling CCAA, then there would be no concrete justification for the decision not to list the Arctic grayling. Simple tracking of implementation is not enough because measuring actions taken in the hopes of improving the status of the fish does not say anything about outcomes that matter to the fish. A risk of having such clear outcome commitments in a CCAA is that if managers are unsuccessful in achieving outcomes, that failure would suggest that listing would have been needed. In other words, there was less agency discretion available because of the clear bars for performance in this plan.



The success of the Arctic grayling conservation strategy and CCAA have many lessons for other efforts to reverse declining trends for at risk species and to ensure they don't become listed as threatened or endangered.

**1. Use a CCAA or other agreement to communicate clearly the outcomes that are needed to define success (and eliminate the need for ESA listing). Without such clarity, participants will not know whether their efforts are enough. Predictability is key.**

**2. Make sure that actions address each of the most important threats that need to be addressed for a species.**

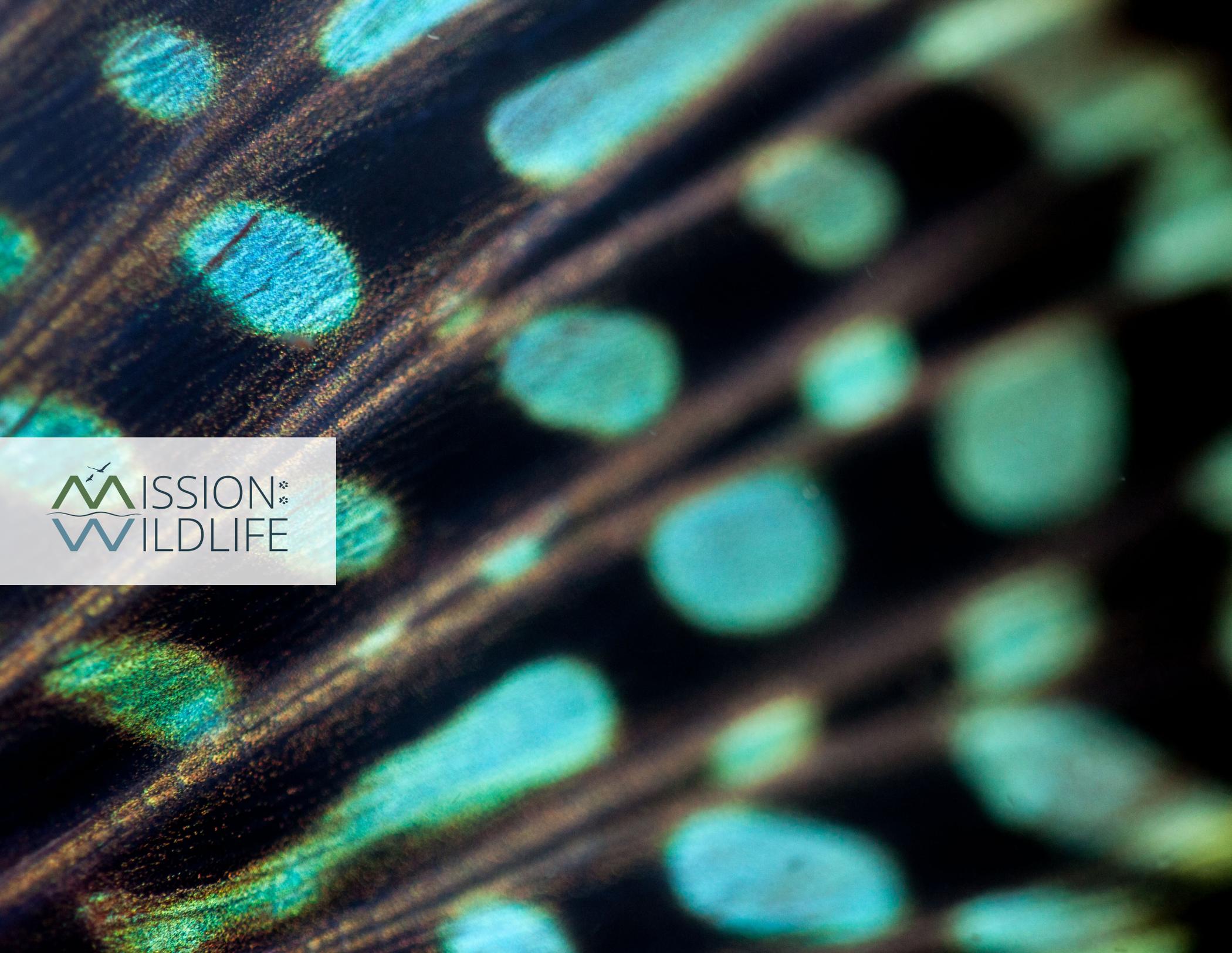
**3. Make sure that actions connect directly to outcomes or if intermediate outputs are needed, that those outputs are connected directly to outcomes. If a non-technical person cannot follow the logic, then the logic may be faulty.**

There are approximately 30 CCAA agreements now in operation and many more similar agreements among Federal agencies. Already, more than a dozen species have been kept off the endangered species list because of the conservation successes created by these frameworks. The Big Hole Arctic Grayling CCAA is a particularly strong example that shows how a careful strategy, implemented completely and quickly, can turn around once-declining species.

**Photo Credits:**

**Cover Photo:** Fluvial arctic grayling, Mark Conlin, U.S. Fish and Wildlife Service (USFWS), **Inside Front Cover:** Big Hole River, Tim Gage (link), **Page 2:** 2014 Montana Grayling Tour, Montana Arctic Grayling Recovery Program, **Page 3:** Big Hole River, Montana Arctic Grayling Recovery Program, **Page 5:** Fish screen, Montana Fish Wildlife and Parks, **Page 6:** Fish trap, Red Rock Lakes National Wildlife Refuge, USFWS, **Page 9:** Swimming arctic grayling, Curtis Fry, **Page 10:** Montana Arctic Grayling Recovery Program, **Back cover:** Arctic grayling dorsal fin underwater, Wyoming, June 2014, Charles J Reinertsen





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