

# Our Last Cast: The Future of Fly Fishing in the American West

William Griffiths

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Mentor – Mark Fiege

MSU Wallace Stegner Chair in Western American Studies



## The Problem

The Northern Rockies are home to rivers deeply rooted in American culture. These rivers have inspired popular literature like *A River Runs Through It*, helped create and support thousands of jobs, served as sources of incalculable natural values, and provided meaning and identity to generations of people. But a menace looms that threatens the pristine waters of the West—climate change. Therefore we need to insure that stakeholders understand the impacts we face and how to imagine a better world.

### 2016 Fish Kill: Yellowstone River

The Massive Yellowstone Fish Die-Off: A Glimpse Into Our Climate Future?

This unprecedented kill reveals why we need to keep rivers resilient

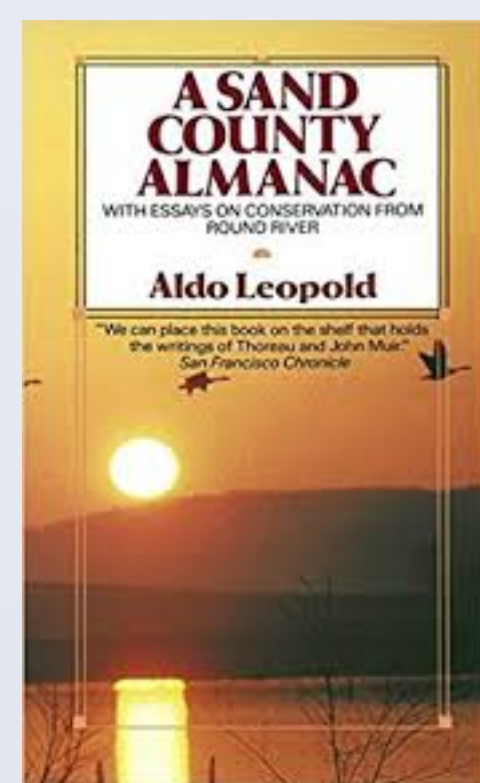
By Sarah Jane Heller  
MONTANADAILY CHRONICLE  
AUGUST 25, 2016



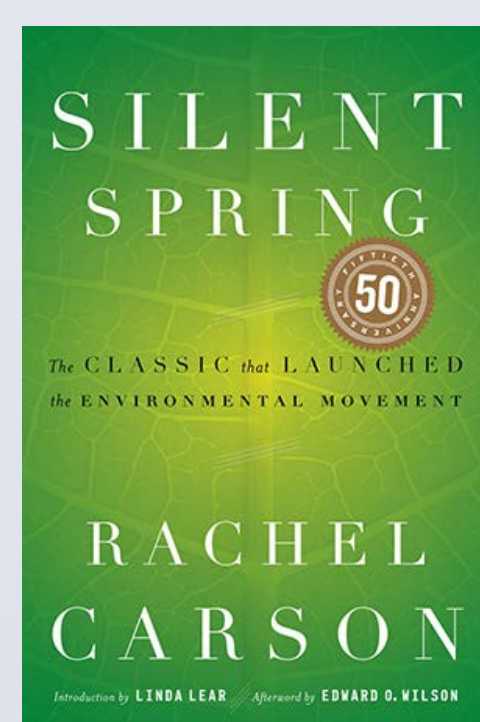
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- 183 miles of river was closed to any recreational water use on August 19<sup>th</sup> by Montana Fish and Wildlife Commission after thousands of dead whitefish began dying around Livingston, MT<sup>1</sup>
- Proliferative kidney disease (PKD) was the culprit, aided by unprecedented warm water<sup>1</sup>
- Caused over \$500,000 worth of economic loss in Park County, MT<sup>2</sup>

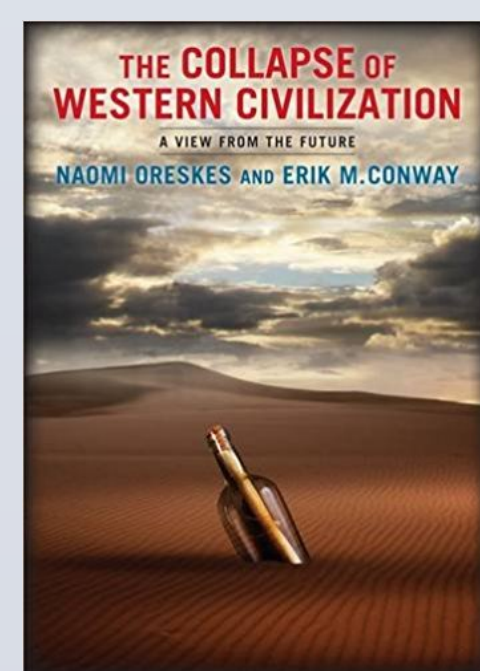
## Science Communication



- Aldo Leopold, the father of Game Management in the US, has shaped the thoughts of natural resource managers and everyday citizens alike since the late 1930s.
- In *A Sand County Almanac*, Leopold communicates to the reader the importance of ecological understanding.
- “The Land Ethic” in the final section of the book inspired my Salmonid Ethic and teaches us how to relate to the natural world responsibly and with integrity.



- Rachel Carson was a biologist who wrote about the uninhibited use of chemicals as a danger to people and ecosystems.
- Her powerful first chapter, “A Fable for Tomorrow,” which tells a story of a small town stricken by an unseen plague, has inspired my writing about climate change.
- Her ability to communicate science to the public about the dangers of pesticides, especially DDT, helped to ban the use of these harmful chemicals in the US.

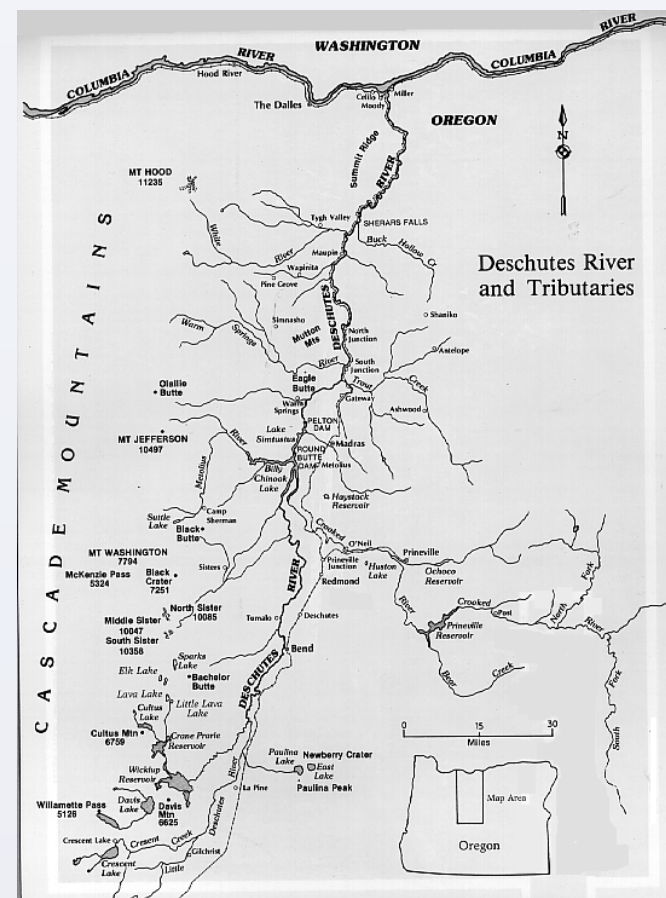


- Naomi Oreskes and Erik Conway are science historians who imagine a dystopian, but all too possible future where humans failed to respond to the warming climate and the civilizations we see today collapsed.
- This short book critiques the failures of “free market” capitalism along with how scientists fail to communicate their work and politicians fail to uphold the values of democracy.
- This book succinctly and effectively communicates the worst case scenario of not acting to stop anthropogenic climate change.

## Fishing in the Anthropocene

The Anthropocene is the geologic epoch in which we are now living. In this period, human activities shape every corner of the world. Land use practices, dams, and the introduction of invasive species in the rivers of the American West are all examples of the broad scale environmental and ecological changes humans have caused. As anglers, we need to be aware of the anthropogenic changes in our rivers and streams. I will use four rivers as case studies for the Anthropocene.

### Deschutes River: Central Oregon



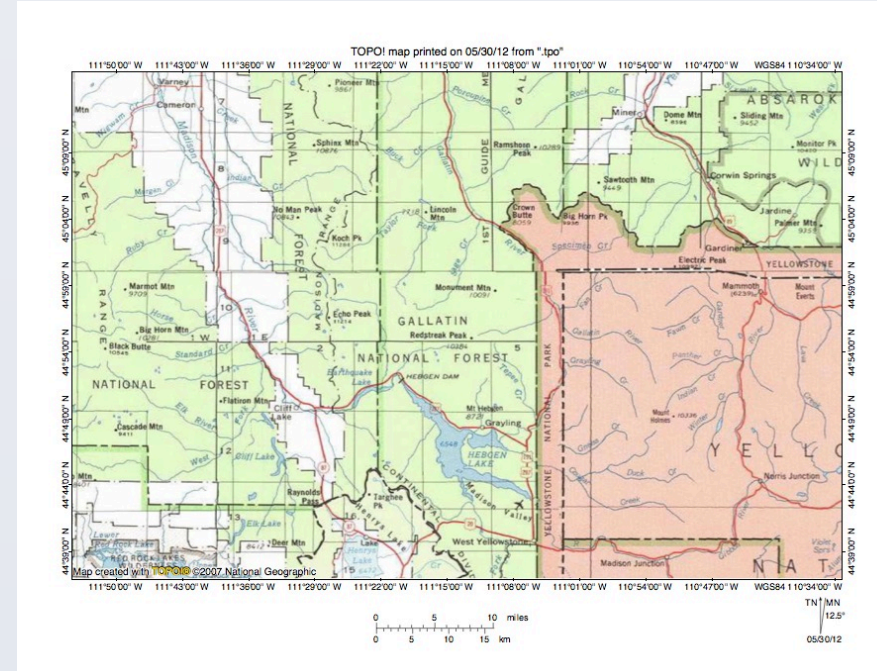
Retrieved from: <http://www.flyfishingsciencecenter.com/flyfishusa/about-our-waters/deschutes-river/basic-map/desmap.html>

- Returning the Upper Deschutes to its historic stream flows below Wickiup Reservoir has been hastened by the listing of the Oregon Spotted Frog as an Endangered Species
- Tens of millions of dollars have been spent to regain steelhead and salmon passage to the Upper Deschutes, bypassing three major dams
- The geology of the Deschutes Basin makes it one of the most climate resilient rivers in the West

### The Greater Yellowstone Ecosystem

The Greater Yellowstone Ecosystem is the starting point for three of the largest river systems in the West: the Yellowstone, Missouri, and Snake Rivers. The Madison and the Yellowstone are two of the most famous trout fisheries in the world, but their cold water is in grave danger from reduced snowpack caused by climate change.

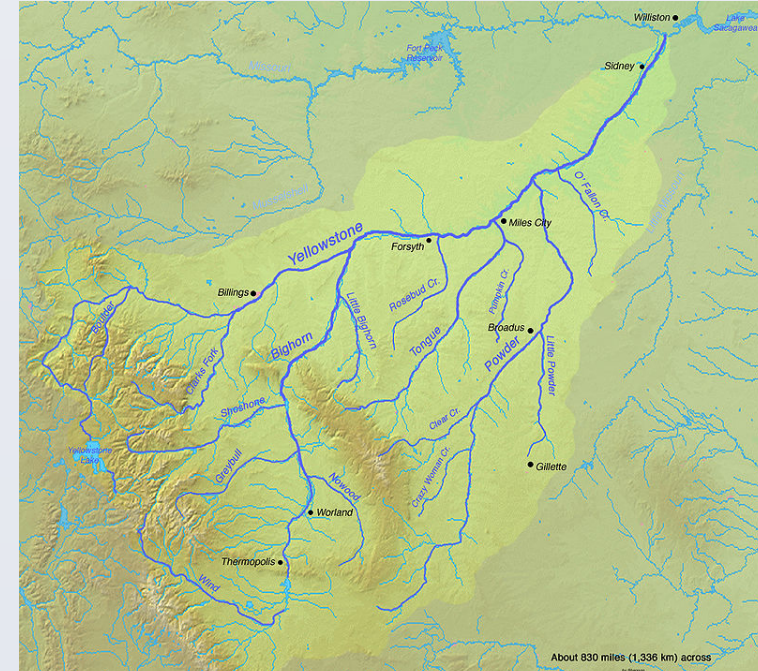
#### Madison River



Retrieved from: “Madison River-Gallatin River drainage divide area landform origins in northwest Yellowstone National Park region, Montana and Wyoming, USA”

- The Madison is one of the most heavily fished rivers in the U.S seeing well over 150,000 angler days per year<sup>3</sup>
- The Lower Madison, below the Madison Dam, is on the brink of complete die-offs of trout due to thermal extremes—according the river’s head biologist.

#### Yellowstone River



Retrieved from Wikipedia: [https://en.wikipedia.org/wiki/Yellowstone\\_River](https://en.wikipedia.org/wiki/Yellowstone_River)

- The Yellowstone is the longest river in the U.S without a major dam
- Smallmouth bass, a warm water species, are being found higher up in the river system than ever before.
- The upper sections of the river are home to the Yellowstone Cutthroat, an ESA listed threatened species.

### Salmon River: Central Idaho



Retrieved from: [https://en.wikipedia.org/wiki/Salmon\\_River\\_\(Idaho\)](https://en.wikipedia.org/wiki/Salmon_River_(Idaho))



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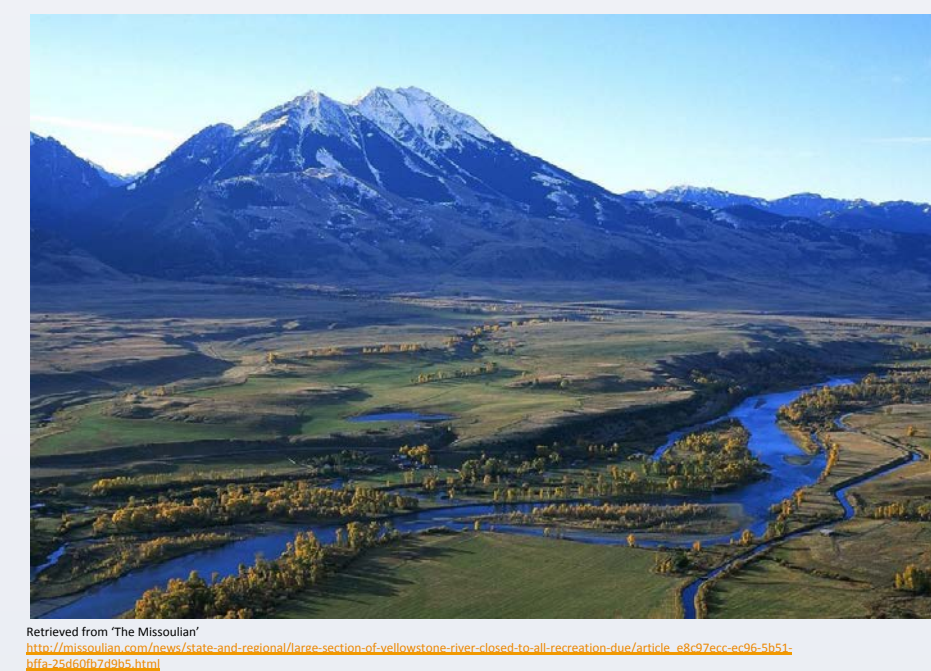
- The Wild and Scenic Salmon River, a tributary of the Snake, is a remote undammed river in the heart of Idaho. It remains as the longest salmon and steelhead migration in the world, over 850 miles from the ocean.
- Hatchery salmon and steelhead are still released into the river though scientifically proven to hurt wild fish.
- The pristine habitat is a reminder of what has been lost in the Pacific Northwest and testifies to the enduring capabilities of wild, native anadromous fish.

## Our Last Cast

While fishing the beautiful rivers of the West, anglers don’t want the day to end and “one more cast” is a often heard on the water. But we have entered an era where one day we may literally have a last cast on the rivers we love. The Yellowstone River closure in 2016 was a portent of this dreaded potential future. Our last cast on the rivers of the West will be caused by an anthropogenic climate change.

### The River Regime of the West

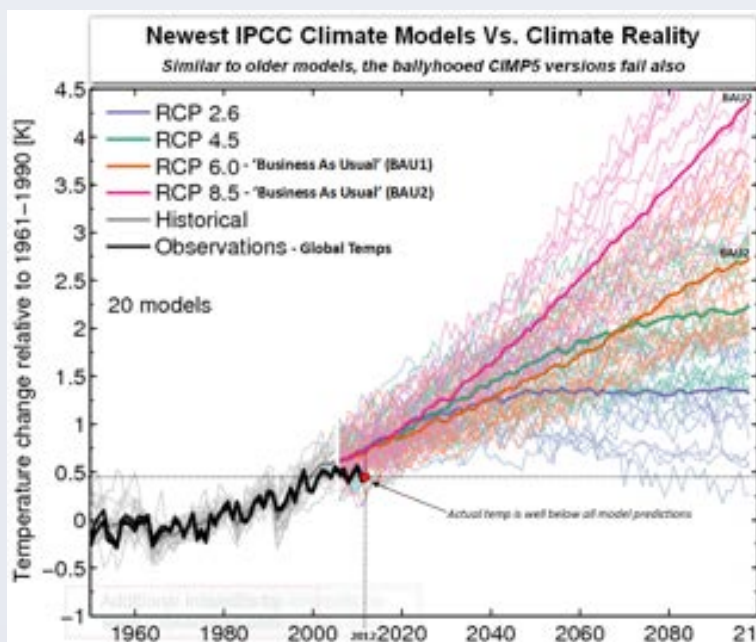
Find mountains and rivers will follow. Snowpack in high montane regions historically melted slowly, feeding rivers through the late summer and dry periods. But we are now seeing snow packs melting more rapidly and earlier in the season—altering water regimes that have been relatively stable for thousands of years.



Retrieved from: <https://www.fishbase.org/species/osa/atlantic>

- ~ 2 weeks earlier snowmelt in Montana.
- Water rights for irrigation are in danger.
- Less water in late summer leads to increased water temperature.

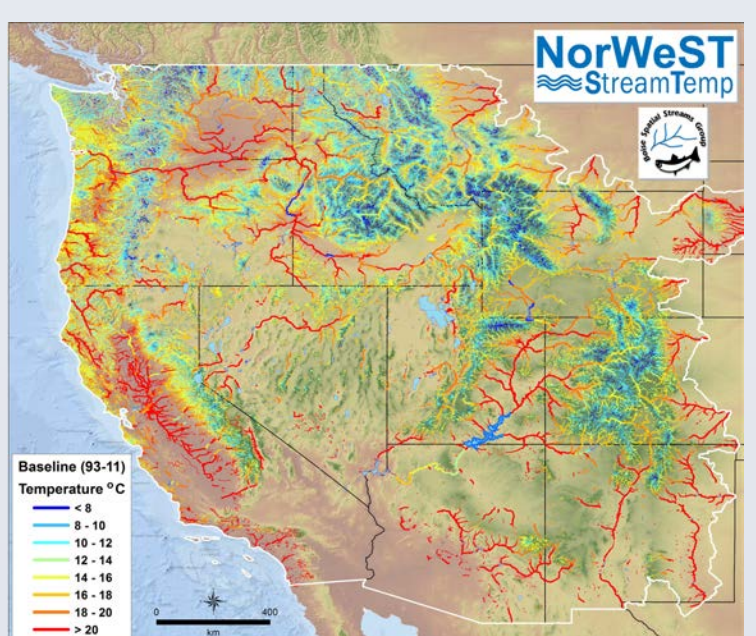
### Intergovernmental Panel on Climate Change



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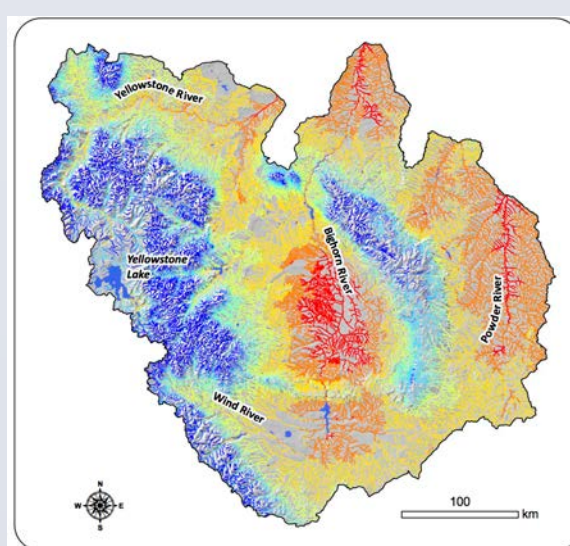
- We know that human actions are causing the climate to change substantially.
- Our future depends on our greenhouse gas emissions, which is where the unpredictability lies.
- One of the unknowns is how the ecosystems on which we rely will respond.

### Climate Modeling: NorWest

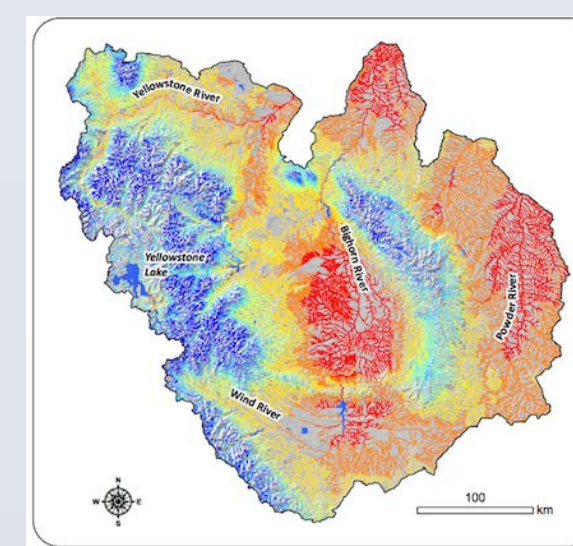


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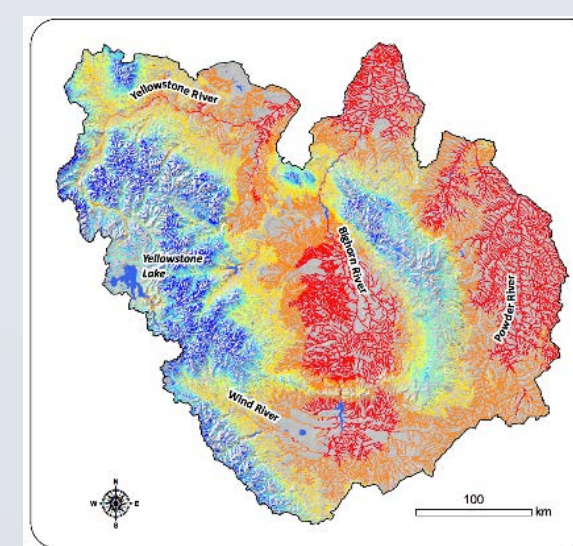
- The Rocky Mountain Research Station Team in Boise, Idaho has gathered all the water temperature data from the Western US and created models to show average water temperatures.
- This information can be used a powerful management and education tool.



- Yellowstone Basin Baseline Model Map 1993 - 2003



- Yellowstone Basin Model 2040s - 2060s



- Yellowstone Basin Model 2060s - 2080s

These models use the A1B scenario from the Intergovernmental Panel on Climate Change (IPCC), which assumes a rapid increase of technology and energy use through the 21<sup>st</sup> century with a balanced energy system. Using this relatively conservative model, by the time my generation retires there will be ~50% loss of cold water habitat in the West. If we reach this level of degradation, there will be nothing left of wild native Salmonids for the generations of children after 2100.<sup>4</sup>

### How to Proceed?

I am a sixth generation Oregonian and I am deeply disturbed that our actions as Americans are helping to ensure that the tenth generation of my family won’t be able to connect with Salmonid species. We can take action to prevent this unacceptable outcome.<sup>5</sup>

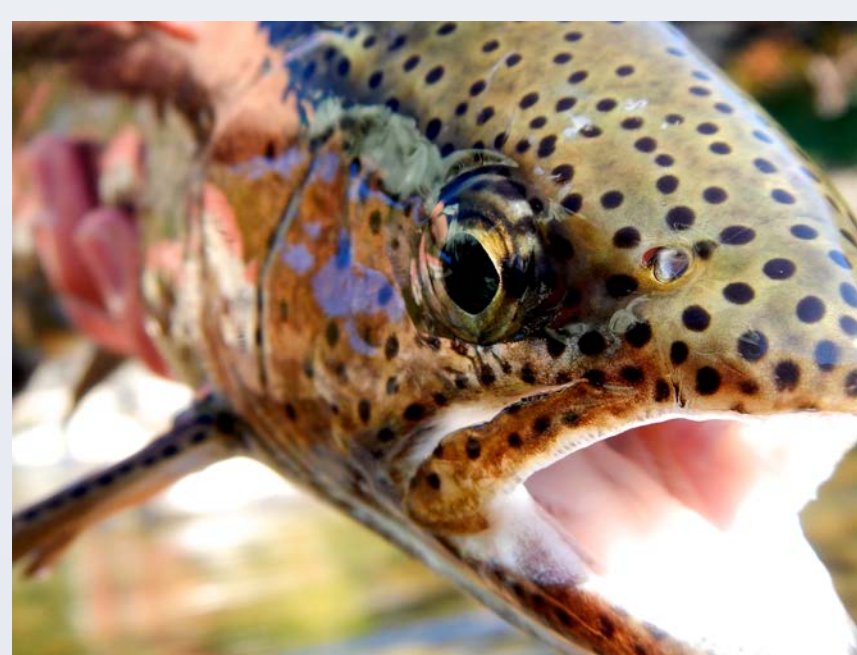
## The Salmonid Ethic

When confronted with the severity and stark reality of the challenges we face as a culture and society, hopelessness can lead to the stagnation of action. But there is way through this dark time. Many people have imagined a path towards a better future, including Aldo Leopold and, in the present, Pope Francis. They call for a new understanding of the world around us, of an integral ecology. I offer a way forward for those who find harmony on cold water rivers in the West: an ethic that may be able to guide us through the 21<sup>st</sup> century as anglers and citizens of the Earth.



“Nothing so important as an ethic is ever written... It evolves in the minds of the thinking community.” – Aldo Leopold

The Salmonid Ethic is an extension of Leopold’s Land Ethic but in the context of the 21<sup>st</sup> century, anthropogenic climate change, and rivers. There are many aspects of the Salmonid Ethic, but it emanates from every part of our lived experience, our interpretations of history, our understanding of science, and our actions.



- Trout, salmon, and steelhead are collectively known as the salmonid species.
- Seeing A River Whole: Understanding the intrinsic value of river ecosystems and being able to read its health. They have value in themselves and they are right in themselves apart from whatever people think or do.

The idea of *reciprocity* needs to become a guiding principle of the angling community—we cannot just take; we also must give back to the places we love. This idea should extend beyond our treatment of our environment and extend to our fellow citizens and the fellow creatures with whom we share the Earth.

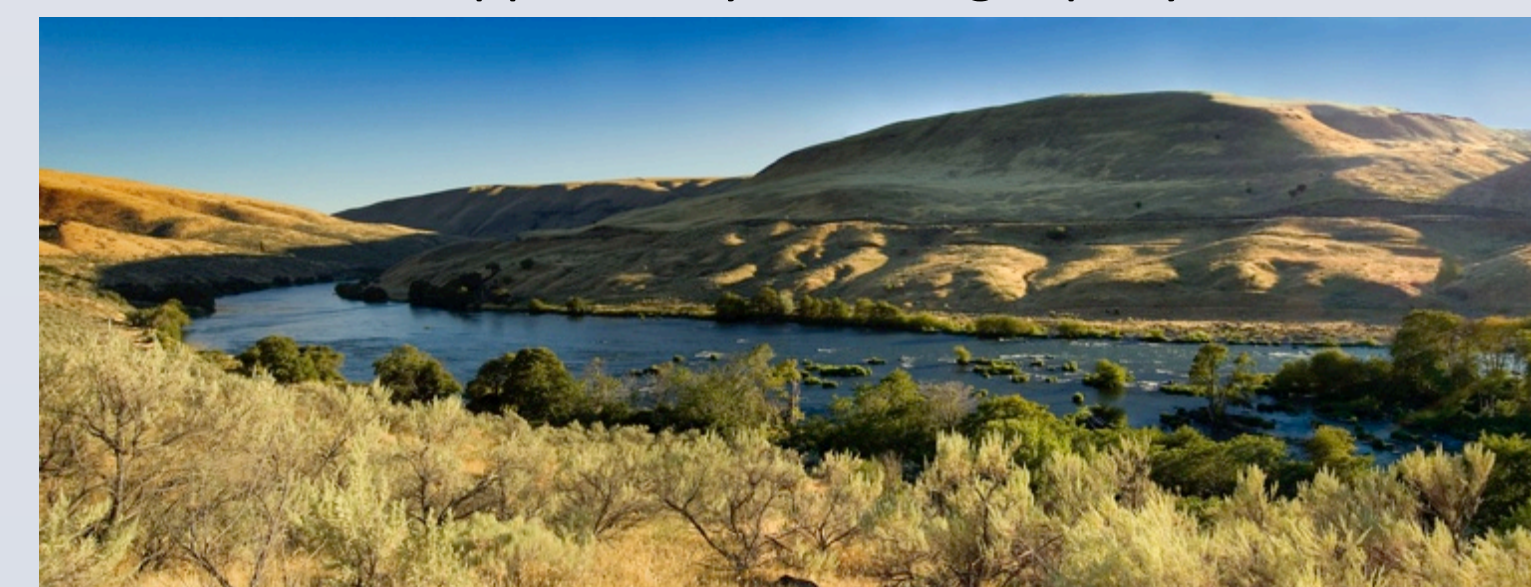


Retrieved from: <https://www.fishbase.org/species/osa/atlantic>

- We cannot own a river in the same way that we cannot own the water that passes through our bodies. We are tasked with stewardship, a more difficult duty than simple “ownership.”

### Potential Solutions?

The first step to any healing process is recognizing the problem. For our society there are many sources of the problem, including excessive fossil fuel consumption and the disconnection between humans and nature. We currently have all the tools to mitigate and adapt to climate change, but we need the political and societal will to do so. Our window of opportunity is closing rapidly.



Retrieved from: <https://www.fishbase.org/species/osa/atlantic>

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