

# Increasing Snake River Cutthroat Spawning Habitat Through Restoration and Effective Monitoring

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## Introduction

The headwaters of the Snake River in western Wyoming supports native Snake River Fine-spotted Cutthroat trout (*Oncorhynchus clarkii*). These fluvial fish rely heavily on spring creek tributaries for spawning and early rearing. Historically, many of these spring creeks had seasonal connectivity with the Snake River during spring run-off. In the 1950's and 1960's, a 42-mile levee system was constructed on the Snake River by the Army Corps of Engineers to reduce the risk of flooding. This action degraded both instream and riparian habitat for the river and its tributaries. The reduction of floodplain connectivity altered the hydrologic and sediment regime in crucial spawning tributaries. The natural source for replenishing channel substrates suitable for salmonid redd formation was removed from the system. In many tributaries, repeated spawning activity has displaced gravels from riffle and glide locations and reduced spawning habitat quality and quantity.

This restoration project occurred on two spring creeks approximately two miles South of Wilson, Wyoming located within the historic Snake River floodplain. Both creeks are utilized by Snake River Fine-spotted Cutthroat trout.

## Objective

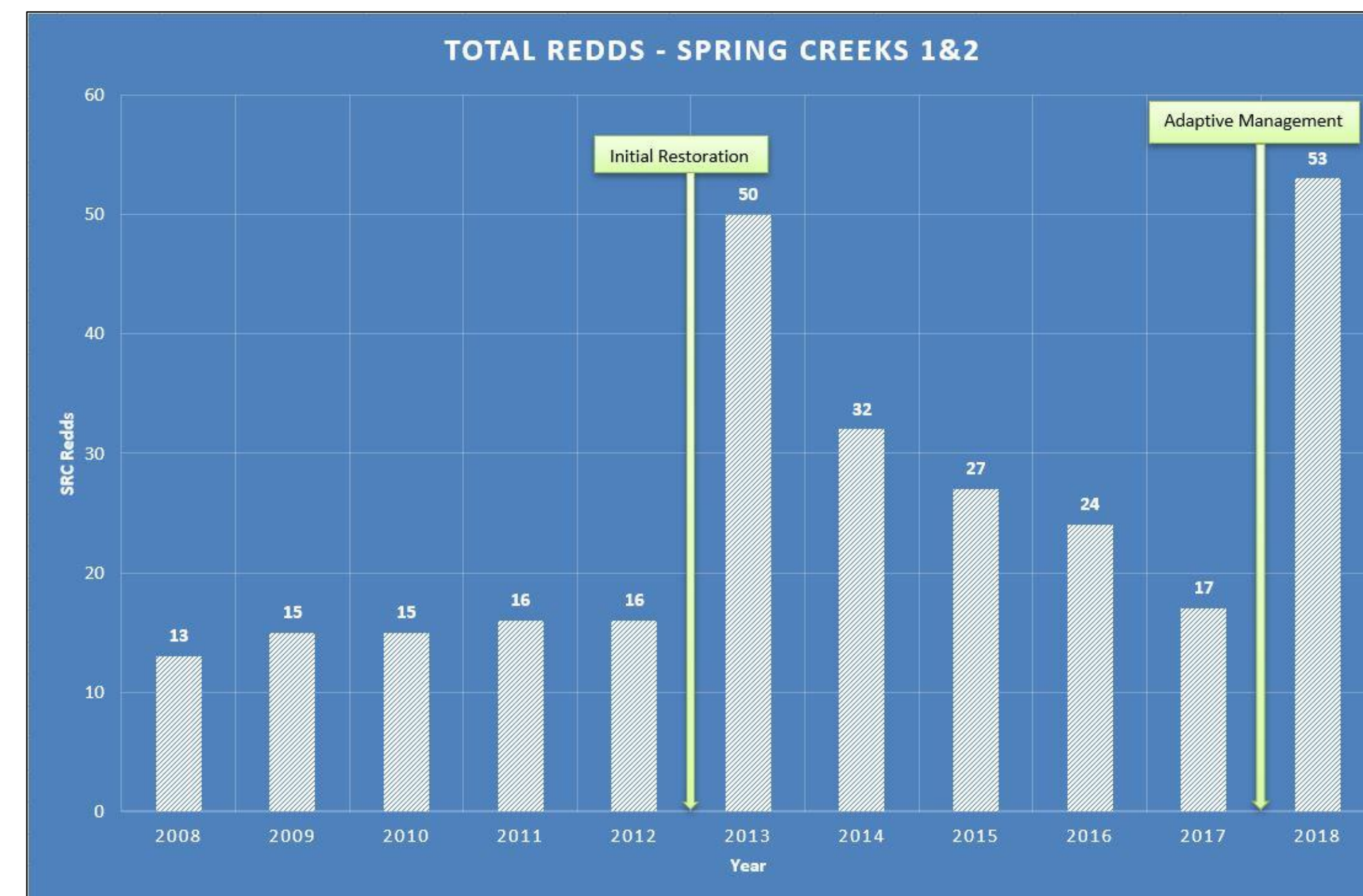
Increase Snake River Cutthroat spawning in two spring creeks by improving riffle and glide habitat.

## Methods

- 2008 - An extensive fish habitat assessment and monitoring program was established on both creeks.
  - As part of the monitoring program, annual cutthroat trout redd surveys were performed to assess spawning utilization. Redd counts along with data pertaining to water depth, location, temperature, discharge, particle size, and overhanging cover were collected.
- 2012 - Monitoring data were used to inform a restoration design focused on improving instream habitat to increase cutthroat trout spawning production.
  - The primary restoration tool was to augment spawning riffles by importing and re-distributing clean gravels.
  - Initial project implementation was accomplished by traditional means using heavy equipment.
- 2017 - Monitoring data identified adaptive management needs.
  - Redd counts had declined to pre-project levels.
- 2017 - Adaptive management occurred.
  - Spawning gravels were redistributed and supplemented by hand.

## Results

- Initial restoration efforts resulted in an immediate 3-fold increase in redd formation.
- Post-project monitoring showed redd production decreased to pre-project levels over the subsequent 4 years.
- Inexpensive, manual adaptive management was able to restore post implementation redd numbers.
- Pre and Post-project monitoring were essential to maintain objective and minimize costs.



This is what project success looks like!

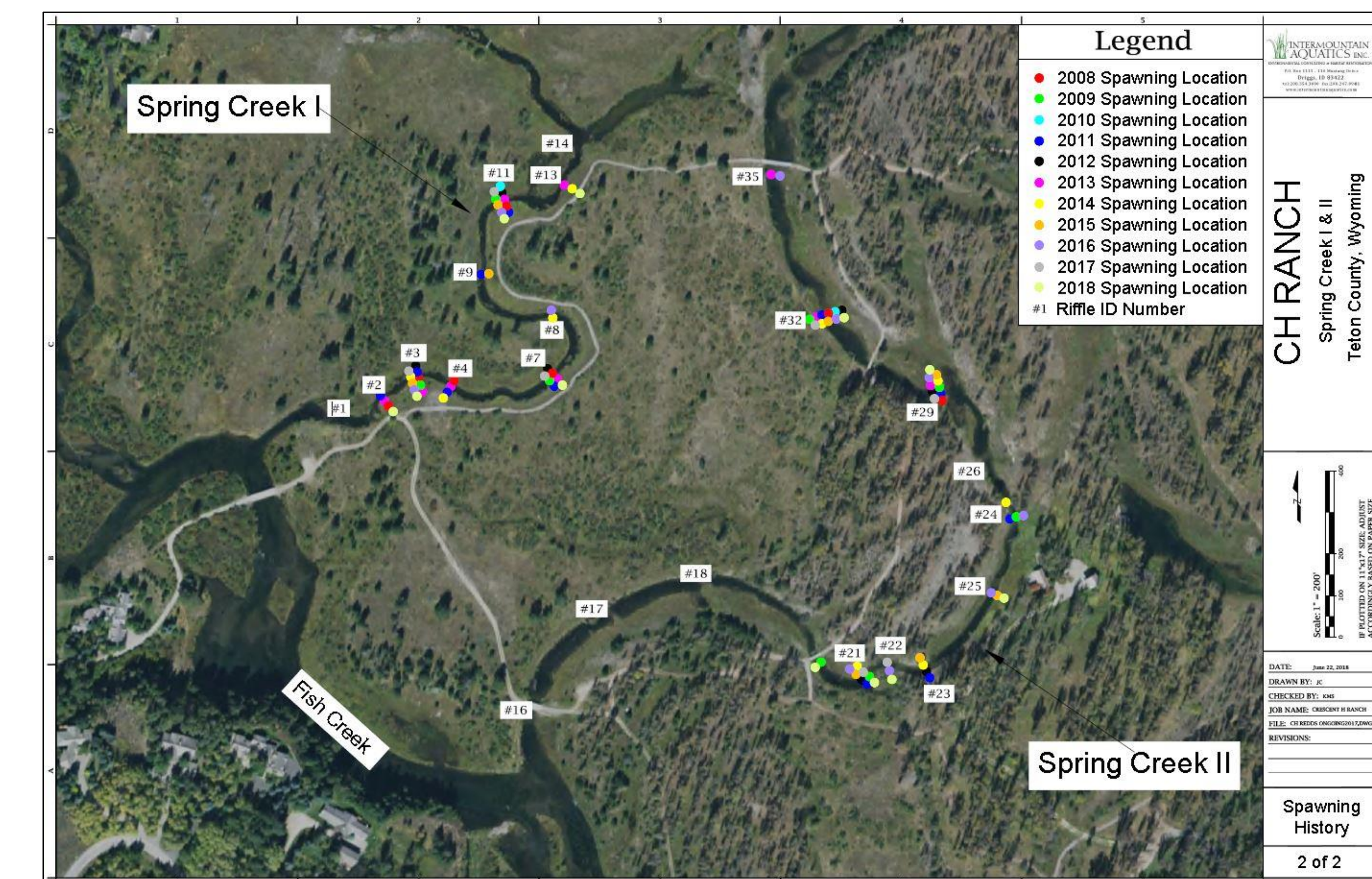
## Conclusions

- Riffle augmentation is an effective strategy for increasing Snake River Cutthroat trout spawning.
- Periodic riffle maintenance is necessary to sustain spawning production in spring creek tributaries artificially disconnected from the Snake River.
- Monitoring has allowed this project to be more functional and cost efficient by influencing design parameters and identifying both the necessity and the timing of adaptive management.
- This project illustrates the importance of project monitoring and adaptive management to achieve and maintain project objectives.

**With a small amount of data, a little bit of money was able to maintain project effectiveness 6 years post implementation!**

## Acknowledgments

This project was sponsored by the Crescent H Ranch Stream and Trail Committee in Wilson, Wyoming.



11 years of monitoring data has maximized project effectiveness and reduced project costs



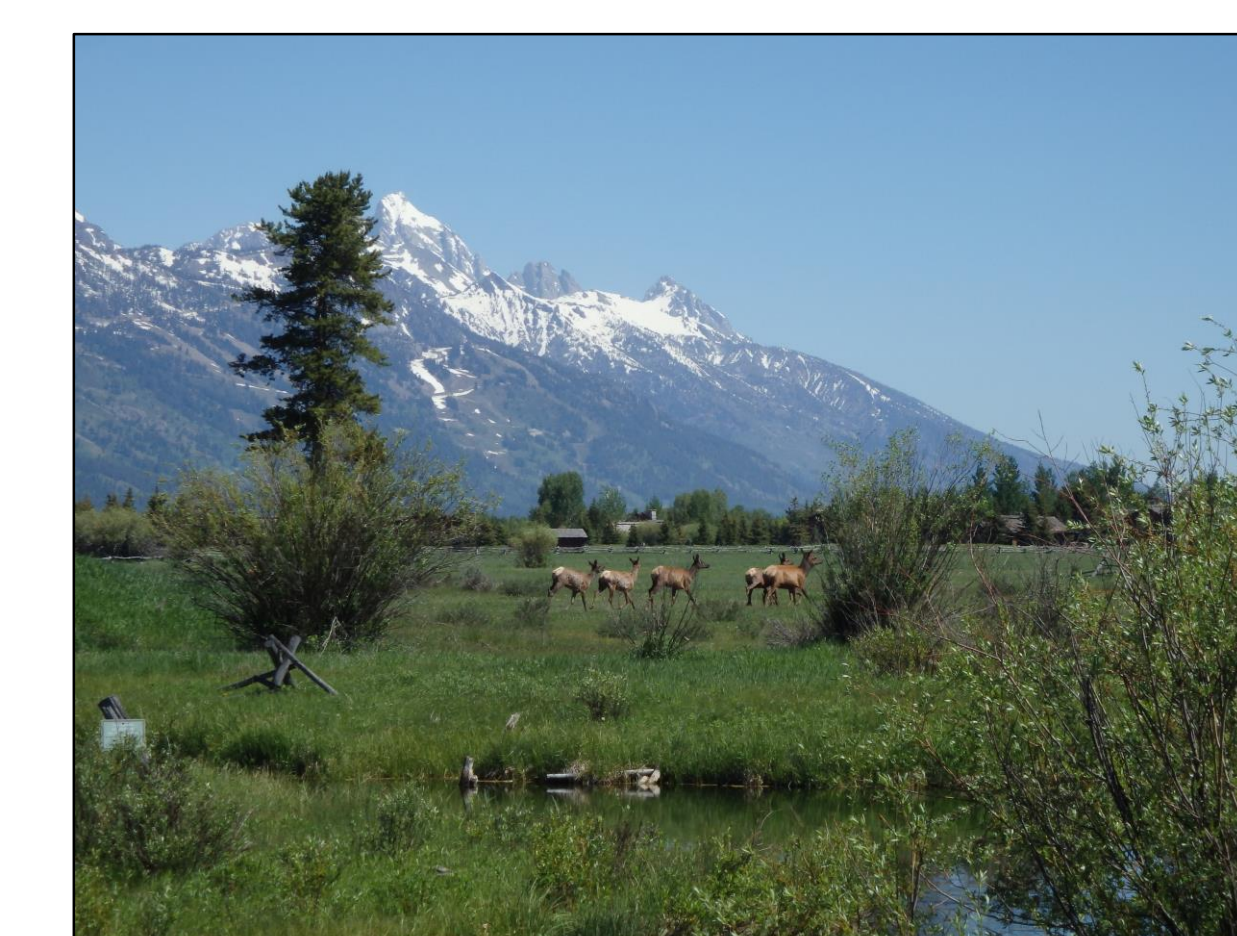
Typical spawning riffle – Spring Creek I



Initial construction occurred using heavy equipment



Adaptive maintenance performed with manual labor



The Crescent H Ranch is located at the base of the Teton mountain range