

Caldera Assessment /Frequently Asked Questions

Introduction

Spatial scale:

The Caldera Assessment/Frequently Asked Questions (FAQs) includes that part of the Henrys Fork within the geologic feature of the Island Park Caldera, with the primary focus being on the wild rainbow trout fishery of the Henrys Fork from Island Park Dam downstream to Riverside Campground.

Objectives:

The objectives of this document for the Henrys Fork within the above-described area:

- Summarize the scientific knowledge base; the questions within are intended to provide an expansive and thorough coverage of the fishery, aquatic ecology, water management, etc. Therefore the primary issues, concerns, and questions will be addressed in a single summary document that is accessible to a broad audience.
- Provide the foundational information for a summary brochure that will be produced and distributed to anglers, businesses, etc. during 2008. The brochure is intended to provide outreach and education, links to this scientific summary document and references cited, and other sources of information about the river to interested parties.
- Assess the current state of scientific understanding and knowledge, as well as opportunities for future aquatic research and restoration.

Framework :

The focus of this document is on the wild rainbow trout fishery, but also includes all those features of the watershed that support the fishery, i.e., water flows, habitat, aquatic insects, etc. The substantive resource issues of concern of the Caldera Assessment/FAQs are categorized by those similar to the overall HFF Research and Restoration program:

- 1) **water quantity** (including hydrology and geomorphology);
- 2) **water and habitat quality** (including invertebrate ecology);
- 3) **fisheries biology and management** (includes creel and economic surveys); and
- 4) **watershed, riparian, and other aquatic ecology** (includes land use).

All of the FAQs are placed under the above categories dependent upon the primary subject matter. However, there are considerable interrelations among many of these categories, as is to be expected of a complex aquatic ecosystem. Questions are further grouped together within categories by topic in a logical sequencing.

FAQs

1) Water quantity (including hydrology and geomorphology):

What is the history of water management below Island Park Dam? What, if anything, changed in 1972 (with the MOU between irrigation interests and power production)? Did water management change in 1994 with the addition of the hydroelectric project on Island Park Dam? What changed in 2003 with the advent of the Henrys Fork Drought Management Plan? Isn't there a minimum flow requirement for the Henrys Fork?

What about flows at times of year apart from the winter – have they changed over the years (volume/timing)? What effects might this have had on the hydrology and geomorphology on the Harriman State Park section of the Henrys Fork, a.k.a, the Ranch? Are there other “tailwater effects” of Island Park Dam; in terms of water, geomorphology, and hydrology?

Outside of the current Drought Management Planning process, are there any other water management options, within the bounds of Idaho water law, to obtain improved water flows to support the wild rainbow trout population?

What do we know about when sediment mobilizes in the reservoir and through Island Park Dam? What was the amount of sediment released from Island Park Dam in 1992? What is the nature/composition of that sediment, is there anything chemically harmful in the sediment? Where did the sediment go then, where does it go now? Are water flows or channel characteristics affected by sediment deposition in the Henrys Fork?

Would it be possible to increase high flow releases from Island Park Dam to mobilize and remove sediment from the Ranch, what are the benefits and drawbacks of such water management? Is dredging, specifically on the Ranch, a viable option for achieving long-term channel benefits?

2) Water and habitat quality (including invertebrate ecology):

What is overwintering habitat for rainbow trout, and why is it available in some places and not in others? Where is the existing overwintering habitat? How does it change in relation to flow volumes, time of year, and other factors? What is the efficiency and effectiveness of increasing overwintering habitat, i.e, “blocks of habitat” argument?

Could overwintering habitat be provided in off-mainstem areas, i.e., tributaries, springs, etc, that? Where? Can we make a reasonable estimate of true potential of these places (individually and collectively) to have a population-level impact on the Ranch fishery, and if so, what would be required?

Is there any fish habitat benefit to the Last Chance Canal? Do fish move back to the river and/or how many are “lost” to the canal? Could fish habitat in the canal be improved?

What kind of overwintering fish habitat is found downriver of Pinehaven, downriver to Riverside, and below Riverside to Sheep Falls (upstream barrier to fish passage?)?

How does icing: shelf, frazil, or anchor, effect overwintering habitat for rainbow trout?

Has there been any attempt to improve or enhance overwinter habitat “directly” with structures, etc? How successful were these attempts? What is there relative cost vs. benefit compared to water management?

What is the benefit to improved fish passage at the Buffalo River Hydroelectric Project? Can this project, and the fish passage improvements made, increase the number of rainbow trout in the Henrys Fork? Will improved fish passage benefit the fish and fishing in the Buffalo River?

What is the current condition of fish habitat in the Buffalo River, specifically for rainbow trout? Could habitat improvement projects in the Buffalo River drainage, including tributaries, improve rainbow trout overwintering capability?

Is there enough rainbow trout spawning habitat in the river or tributaries? Would improvements or increases in spawning habitat increase the number of fish in the population?

Did aquatic macroinvertebrates decline after the sediment release in 1992? Is there any data available prior to that event to compare to after? Ultimately, does or has this sediment made a difference, and is that a positive or a negative difference? Would sediment dredging improve habitat for any of these aquatic species? Are there any proven examples of such modifications?

What is the current status of aquatic macroinvertebrates in the Henrys Fork? Have bug numbers declined recently? Are aquatic insects affected by the current water management? How does the Buffalo River affect aquatic macroinvertebrates in the Henrys Fork relative to the flow releases from Island Park Reservoir? Are New Zealand mud snails present in the Caldera, if so, how do they affect other macroinvertebrates and fish?

How did the 1992 sediment releases affect the aquatic macrophytes? If there were any negative changes to aquatic macrophytes how would this affect macroinvertebrates? What is the current status of macrophytes? How do swans affect macrophytes and then how may this affect rainbow trout?

Would “flushing flows” improve aquatic habitat for fish (spawning, overwintering, etc), macroinvertebrates, or macrophytes on the Ranch? Would other changes in water

management (timing, frequency, duration, rates of changes, and magnitude) improve habitat for any of these aquatic organisms?

3) **Fisheries biology and management (includes creel and economic surveys)**

What is the history of the introduction of rainbow trout to the Henrys Fork? Is there a genetically distinct or distinguishable “Henrys Fork rainbow trout”? How many different hatchery strains have been stocked in the Caldera? Can the current rainbow trout in the Henrys Fork be traced back to the famous McCloud River strain? Are there genetically unique rainbow trout in Silver Lake?

How did the fish removal projects (Rotenone, etc) for Island Park Reservoir and below affect the rainbow trout and other fishes?

How well do rainbow trout grow in the caldera? How long do they live? What are the mortality rates between year classes? How do these figures translate to fish/mile?

Are adult rainbow trout negatively affected by low winter flows, in terms of mortality, feeding, etc.?

Does water management (Island Park Reservoir storage and delivery) affect the wild rainbow trout population in the caldera, how and how not? What is the relationship between winter flows and wild trout numbers? Is it more important to have more water in the early part of the winter or the later part of winter? How does winter air temperature effect water temperature, fish movement, and survival in the caldera? If early winter flows and air temperatures are low, then should flows be increased sooner?

Are there other effects of water management (all seasons) that affect the number of fish? How does water/hydropower production management affect rainbow trout spawning?

Are fish (which species?) moving from Island Park Reservoir to the river below, and if so, how, when, and how many? Does Reservoir management affect the number of fish moving from to the river below? How does the current fish movement from the Reservoir compare to that prior to the Island Park Hydroelectric Project? What would happen if the screen to the hydroelectric power plant intake were removed? Are rainbow trout that move through Island Park Dam to the river below more likely to reside in the Box Canyon or below? What are the benefits and drawbacks from reservoir “by-stocking” of fish?

Is whirling disease present in the Henrys Fork within the caldera? If so, does whirling disease affect the rainbow trout population? If not, what are the risks of whirling disease being spread to the Caldera and how might it affect the rainbow trout population?

Do rainbow trout prefer the Box Canyon to other parts of the Henrys Fork? Do we know how or when fish habitat in Box Canyon might become “saturated”, causing fish to move

out of the Box Canyon seeking other habitat? What is the relationship between rainbow trout numbers in the Box Canyon and those on the Ranch or other parts of the Henrys Fork?

When did stocking end in the caldera? What are the differences in fish numbers before and after stocking in the Caldera? Could stocking of juvenile rainbows, 1-year-old and older, increase the numbers of fish? Has this been documented to work on other western rivers, e.g., the Green River, et. al?

When did fishing regulations change from a catch-and-keep fishery to catch-and-release? Did rainbow trout numbers increase as a result of the change?

When was the last time a “creel survey” was conducted for the Henrys Fork within the caldera? What was angler effort, catch, satisfaction, for the different stretches of the river?

What is the economic contribution of the Henrys Forks in the caldera? Is it possible to break this down by different sections of the river, e.g., Box Canyon, the Ranch, etc.?

When were Yellowstone cutthroat trout displaced/replaced by rainbow trout in this part of the Henrys Fork?

What is the status and trend of whitefish in the Caldera? How are whitefish affected by water management? Have whitefish numbers declined in recent years? Have whitefish benefited from improved fish passage at the Buffalo River Hydroelectric Project?

What is the affect of brook trout on rainbow trout in the Buffalo River, especially in regards to overwintering habitat, competition, predation, and increased upstream fish passage at the Buffalo River Hydroelectric Project.?

How might climate change affect the Henrys Fork and its fishery?

4) Watershed, riparian, and other aquatic ecology

What is the history of riparian vegetation before and after cattle grazing was begun on the Ranch and adjacent areas? Were willows, shrubs, or trees commonly found along the Henrys Fork within the Ranch prior to cattle grazing and management? Did cattle grazing harm the streambanks and affect the river and fish? How does water management affect current riparian vegetation?

What is the history of the riparian fencing within and adjacent to the Ranch? Has fencing improved riparian vegetation, bank habitat, erosion? Does fencing assist with improving macroinvertebrate or fish habitat? What is the current status of fencing and streambank conditions?

Would it be beneficial to plant willows, conifers, or other vegetation along the Henrys Fork? Would this improve habitat for fish, aquatic plants, or insects?

Are there any aquatic nuisance species, i.e., plants, macroinvertebrates, etc. that have a high potential for invasion and/or a high potential for affecting the river or fishery?

Does residential or commercial development affect the Henrys Fork, the Buffalo River, or the fishery in the caldera?