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## Swimming In

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## 24TH ANNUAL SOUTH PLATTE FORUM: THE INS AND OUTS OF THE SOUTH PLATTE BASIN

Longmont, Colorado    October 23-24, 2013

### SWIMMING IN

As part of its twenty-fourth annual proceedings, the South Platte Forum hosted a discussion on fish in the South Platte Basin. Titled "Swimming In," the three-part discussion focused on the heritage of Colorado's state fish, fish management by flow management, and improvement of urban streams for native warmwater fishes.

Dr. Kevin Rogers, a fisheries scientist and member of the Aquatic Research Group for Colorado Parks and Wildlife ("CPW"), spoke about the greenback cutthroat trout (the "greenback"), Colorado's state fish since 1994. Often referred to as the "blackspotted trout" and once believed to be extinct, in 1973 the government designated the greenback as one of the first species listed as endangered under the Endangered Species Act ("ESA"). Downlisted from endangered to threatened in 1978 and currently poised for delisting entirely, Dr. Rogers noted the greenback is one of the "shining stars" of the ESA due to the success of multiple conservation efforts.

Dr. Rogers described recent historical research and scientific analyses of the greenback's DNA that revealed much about the greenback's lineage. For example, in the mid-1850s, William A. Hammond, a Civil War surgeon and eventual Surgeon General of the United States Army, served as medical officer on an expedition from Fort Riley, Kansas that attempted to find a pass to the Oregon Trail. Dr. Rogers obtained copies of notes Hammond made and sent to the National Archives at Philadelphia after his expedition. In these notes, Hammond mentioned the blackspotted trout. Dr. Rogers plotted Hammond's notes on a timeline and determined that Hammond made his notes regarding the blackspotted trout in what is now Colorado. Hammond also managed to collect and send trout specimens to the National Archives. Dr. Rogers reported that scientists analyzed DNA taken from these preserved specimens and confirmed that the fish that eventually became Colorado's state fish derived from around sixty populations of Colorado River cutthroat trout on the Western Slope.

Dr. Rogers stated that Colorado has been home to six distinct lineages of greenbacks, but a fire near Pagosa Springs in the summer of 2013 wiped out one of these populations. Another of these six lineages, which Dr. Rogers considers "the true greenback cutthroat trout" due to its lack of hybridization, is native to the South Platte Basin on Bear Creek near Colorado Springs. In mid-September 2013, historic rains increased the flow on this creek from a normal flow rate of five cubic feet per second ("cfs") to an estimated 169 cfs. According to Dr. Rogers, the September 2013 flood might actually improve these fishes' habitat on Bear Creek, "assuming they are still there."

In a discussion entitled "Managing Fish by Managing Flows: A Wild Rainbow Story in Elevenmile Canyon," Ken Kehmeier, Senior Aquatic Biologist in the Platte Basin for CPW, discussed recent successes in wild rainbow trout

(“rainbow”) management. Elevenmile Canyon lies southwest of Lake George in Park County, Colorado. CPW manages the upper section of the canyon as a self-sustaining wild rainbow trout fishery, which means no stocking is required.

Since 2003, the rainbow population in this area has consistently declined. In light of this realization, Mr. Kehmeier and his associates began studying the factors that might have contributed to the decline. According to Mr. Kehmeier, rainbows in this area tend to spawn in mid- to late-April depending on the temperature of the water, which warm-water releases from the Elevenmile Canyon Dam can alter. After studying years of data, Mr. Kehmeier’s team determined that in years with sustained populations of rainbows, flow rates downstream of Elevenmile reservoir and Spinney Mountain reservoir remained stable. However, in recent years with demonstrated low population growth, overlapping data suggested that flows created by “untimely” releases from these reservoirs were responsible for the rainbow population decline. Mr. Kehmeier said releases from the reservoir in April and June simply “washed out” trout eggs and fry, thus depleting the populations.

As a result of his team’s findings, CPW met with officials from Denver Water and Aurora Water in March 2011 and February 2012 to discuss possible changes to releases and flow rates downstream of Elevenmile Canyon to attempt to increase the wild rainbow trout population. According to Mr. Kehmeier, the existing population of rainbows in the upper section of the canyon increased by only seventy fry in 2010. As the result of collaboration with the pertinent water authorities, the existing population in the upper canyon section grew by a total of 672 fry in 2011 and 2012. In 2013, demands on Denver Water prevented it from instituting the improvements from the previous two years. As a result, the population of trout fry declined once again, thus proving the relationship between flow rates and wild rainbow trout populations in the upper section of Elevenmile Canyon and the need for continued collaboration between water managers and fisheries managers. Mr. Kehmeier stated that even with losses in 2013, “if the wild rainbow trout population can increase two to three years out of every five, the overall population will tend to improve.”

With respect to the September 2013 flood, Mr. Kehmeier said river fish populations experienced virtually no changes. In fact, from a fisheries standpoint, Mr. Kehmeier said the flood was “almost an ecological reset on a lot of our rivers,” essentially a cleaning of the rivers. Mr. Kehmeier acknowledged that the September flood was devastating, but he noted “the fish survived the flood way better than we as people did.”

In the final discussion of “Swimming In,” Ashley Ficke discussed how to improve urban streams for native warmwater fishes. Ms. Ficke, a doctoral candidate in fisheries biology at the University of Colorado at Boulder, described the South Platte as an “urban stream,” a transition zone between the mountains and the plains. According to Ficke, “transition zone streams” in Colorado are highly modified because of their spatial relation to urban areas, differing greatly from mountain and plains streams in terms of geomorphology, physicochemical characteristics, and hydrology.

Ms. Ficke described urban streams as home to a unique combination of species that tend to have a large diversity of body size, lifespan, and reproductive strategy. Accordingly, urban stream species have “impressive physiological tolerances” to large temperature ranges, dissolved oxygen levels, and salinity levels. As illustrations of their ability to adapt to changing needs, urban species tend to be omnivorous and can make wide changes in habitats if compelled to do so by flooding or seasonal changes.

Despite a high tolerance to urban environments, Ms. Ficke stated that assemblages of fishes in urban streams are declining. These declines are due to “extensive human modifications” in and around the streams such as alterations of flow rates, sedimentation, changes to water quality, fragmentation, channelization, and introduction of nonnative species. According to Ms. Ficke, dams and diversions cause changes in flow patterns that can adversely affect opportunities for foraging, spawning and refuge. Changes in sediment regimes can suffocate incubating eggs and increase competition for food and predation amongst existing populations. “More water is not always beneficial,” according to Ms. Ficke: higher flow rates can lead to limited refuge during spates and floods and limited habitats for spawning and rearing. Hence, urban fish have “nowhere to hide” in channelized systems. Ms. Ficke concluded by stating that the persistent introduction and growth of nonnative species in urban streams will continue to pose significant challenges to existing and future populations of urban fish species as fish fight for habitat and food.

“Swimming In” proved to be a useful mix of history, biology and the current reality. From tracing the roots of Colorado’s state fish, to fisheries scientists collaborating with water managers to spur trout populations while maintaining domestic needs, to the challenges faced by fish that prefer the city to the country, these speakers fascinated and educated the attendees of the twenty-fourth annual proceedings of the South Platte Forum.

*J. Keith Tart*

## DIGGING IN

As part of its two-day conference, the South Platte Forum hosted a panel that discussed Colorado agriculture and the effects of the September 2013 floods on livestock and crops in the South Platte Basin.

The first speaker, David Petrocco, a local vegetable farmer in Adams and Weld Counties, discussed the basics of local agriculture, including methods of applying water to crops, water conservation, and the beneficial uses of water. As Petrocco explained, timely irrigation is every farmer’s main concern. A lack of adequate water stresses certain crops and affects their marketable quality. Irrigation wells were useful resources for timely irrigation prior to 2006. However, due to severe drought in 2006 the State of Colorado shut down many irrigation wells, which impacted the production of crops.

Most importantly, Petrocco discussed the challenges of water conservation. Noting the significance of agriculture, Petrocco suggested that, along with improving irrigation efficiency, water conservation efforts should focus on cities and municipalities decreasing the watering of golf courses, parks, and road frontages in order to provide more water to agriculture. Petrocco also dis-