



2022 Aquatic Resource Monitoring Report

For its tenth consecutive year, Learning By Doing (LBD) continued to monitor the health of aquatic resources within the Colorado, Fraser and Williams Fork River basins in 2022. A snapshot of the 2022 results can be found in each of the tabs below which include summaries of 2022 monitoring results as well as individual metric summaries. The monitoring consisted of macroinvertebrates, stream temperature, substrate, fish and flushing flows.

2022 Notable Events

The following summary of notable events in 2022 is provided to give context to the ongoing monitoring and cooperative Learning By Doing (LBD) effort in Grand County, Colorado. This summary is accompanied by a "Monitoring Year 2022 Snapshot," which summarizes monitoring results in the Fraser and Colorado River basins. Additional information on monitoring results for the entire LBD cooperative effort area (CEA), are included in the detailed monitoring reports which are linked above.

In 2022, LBD made significant strides in operations, monitoring, and stream restoration efforts, however, elevated stream temperature and sediments remain a challenge. The following is not meant to be exclusive or comprehensive, but to highlight some of the most notable events of 2022 that may have positively impacted on water quality.

Climate, Hydrology, and Impacts

- Grand County experienced below average snowpack in 2022. The Colorado Basin River Forecast Center (CBRFC) April 1, 2021, Most Probable Runoff Forecast at Kremmling was 84 percent of average. Forecasts after April 1 and actual runoff volumes in the Upper Colorado River Basin were slightly increased from April 1 forecasts due to above average precipitation in May and July. The actual runoff at Kremmling was 89 percent of average. The highest sub-basin runoff percent of average within the LBD CEA was in the Willow Creek basin at 134 percent of average, and the lowest was the Williams Fork Creek basin at 85 percent of average. The runoff into Granby Reservoir was 98 percent of average.
- No wildfires greater than 1000 acres occurred within the CEA in 2022.

Coordination Calls

- 2022 was the eighth consecutive year in which LBD conducted weekly water coordination calls from late May to mid-September. Calls provide a forum to discuss conditions and weekly projected operations, allow LBD partners to be responsive to low flow and high-water temperature conditions through coordination of environmental water releases, and foster communication, relationships, and trust amongst stakeholders.

Operations

- Denver Water's Moffat Collection System spill bypasses in 2022 totaled approximately 200 acre-feet (af) in August to mitigate high water temperatures.
- Northern Water's Municipal Subdistrict (Subdistrict) Windy Gap released 400 af in 2022 during the construction drawdown.
- River District's Wolford bypass and release from storage of approximately 500 af in 2022 to mitigate high water temperatures.
- Release of 5,412 af from the Endangered Fish Pool in Granby Reservoir for the Upper Colorado River Endangered Fish Recovery Program occurred in 2022.
- Grand County releases totaling approximately 1,300 af in August and September from Granby Reservoir delivered to the Grand Valley Irrigators.

Restoration Projects

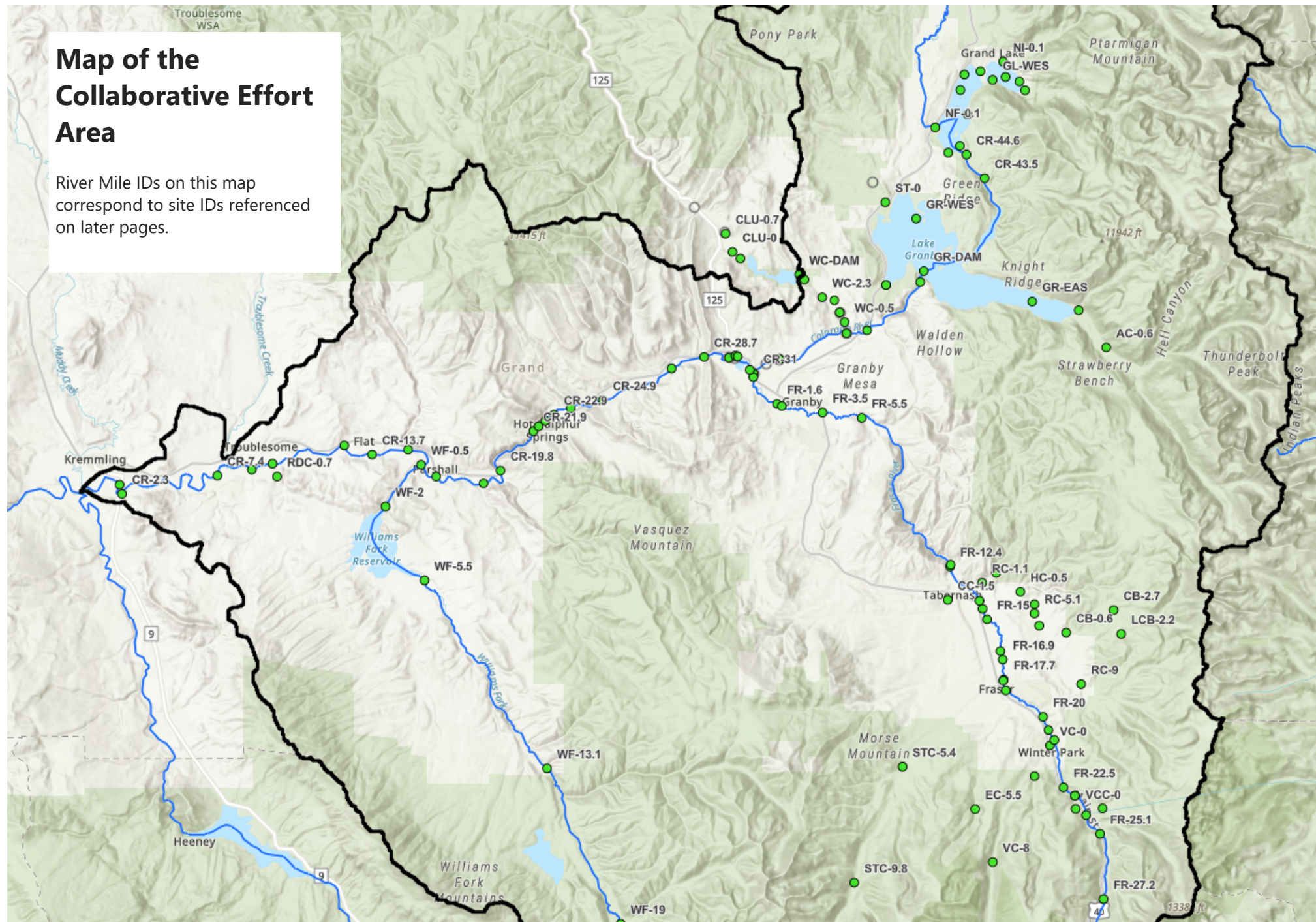
- Construction began in 2022 on the Kemp Breeze Wildlife Area. CPW contracted Stillwater Sciences to design a state-of-the-art habitat improvement project for the Colorado River to revitalize river functions that have been slowly lost or degraded over the past several decades.
- The Colorado River Connectivity Channel Project construction was started in 2022. The Colorado River Connectivity Channel Project is a [\\$30 million project](#), proposed by Trout Unlimited, Northern Colorado Water Conservancy District Municipal Subdistrict, Grand County, the Upper Colorado River Alliance, and supported by project partner Colorado Parks and Wildlife, will build a natural river channel around Windy Gap Reservoir to improve aquatic habitat in the Fraser and Colorado rivers.

Monitoring Programs and Results

- The Subcommittee developed and executed an extensive Aquatic Resource Monitoring Plan for 2022.
- In 2022, **stream temperature** monitoring continued for 67 sites within LBD's CEA. No new monitoring sites were added in 2022. Of the sites monitored where data was available, 9 sites in the Fraser River basin exceeded state thresholds, and 11 sites in the Colorado River basin respectively.
- In 2022, a total of 14 sites within the CEA were sampled utilizing the Modified Wolman Pebble Count Method. At each site, 400 measurements for the **pebble count** were conducted, utilizing the Modified Wolman Pebble Count Method. **Percent embeddedness** was also performed at each location with 45 to 50 measurements per site. There was an overall increase in substrate less than 64 mm among most sites and the proportion of fine sediments increased at many sites. However, 12 of 14 sites surveyed had percentages of fine sediment less than 29.3%, which is the threshold set in CDPHE Policy 98-1.
- In 2022, **macroinvertebrate** bioassessments were conducted in the Fall at 20 sites in the CEA including 12 LBD sites, 4 Denver Water sites, and 4 Northern Water sites. Although the number of sites remained the same from prior years, three new sites were evaluated in 2023 including two sites on Willow Creek used to assess reservoir operations and a recent habitat improvement project and one on the Colorado River at Sheriff Ranch. In the 20 sites, all but 2 sites on the Colorado River were in attainment with state aquatic life standards. In general, for sites on the Colorado River, macroinvertebrate populations appeared to be relatively healthy, but scores showed that most sites exhibited additional stress as compared to sampling events in previous years.
- In 2022 Colorado Parks and Wildlife (CPW) aquatics crews conducted standardized **fish population monitoring surveys**. Because of construction at Kemp Breeze State Wildlife Area, annual electrofishing surveys were not conducted in the Parshall reach. Surveys will resume in 2024 after construction is completed. Electrofishing surveys on sites downstream from Williams Fork Reservoir showed total trout biomass estimates of 263 and 155 lbs per acre and 101 and 45 trout > 14" per acre, respectively. These are excellent values and provide evidence that the habitat project was successful. Sculpin capture at the Safeway site rebounded to 199 from the record low of 56 captured in 2021. Trout populations also rebounded at the Fraser Flats site. The Kaibab Park site in Granby saw further decrease of trout population estimates, likely a reflection of the change of habitat, sculpin capture doubled in 2022, however, showing positive signs of recovery after the diversion structure project construction.

Map of the Collaborative Effort Area

River Mile IDs on this map correspond to site IDs referenced on later pages.

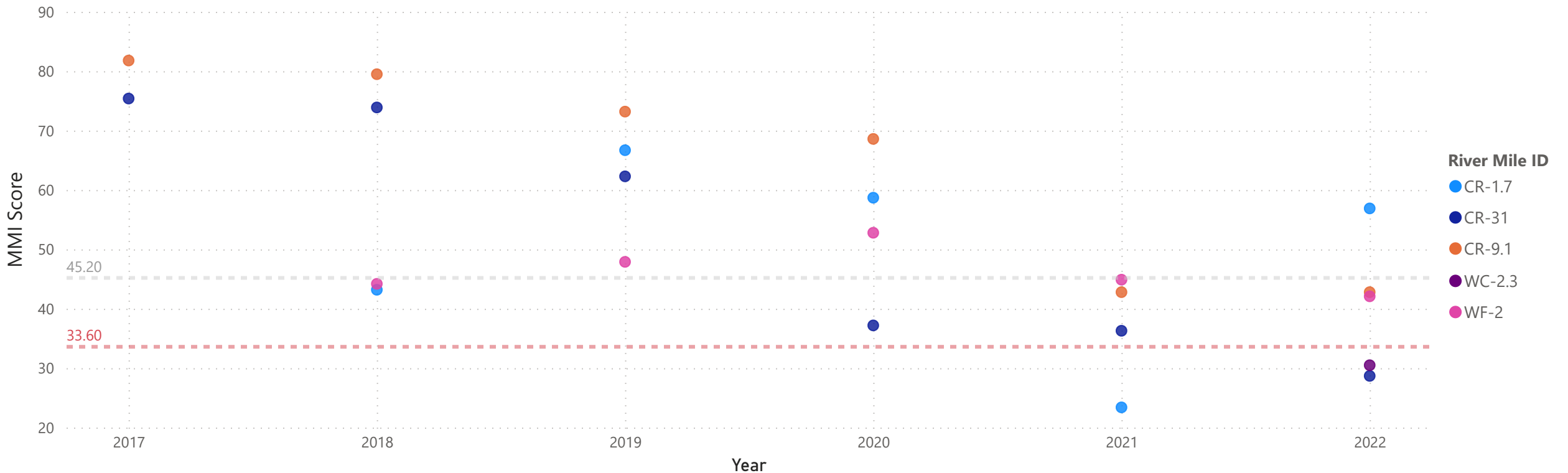


MACROINVERTEBRATES

In 2022, bioassessments were conducted at 20 sites in the CEA. Of the 20 sites, all but 2 sites received attainment for aquatic life use designation through their MMI score.

[Click here for 2022 Macro Data](#)

Macroinvertebrate MMI Scores



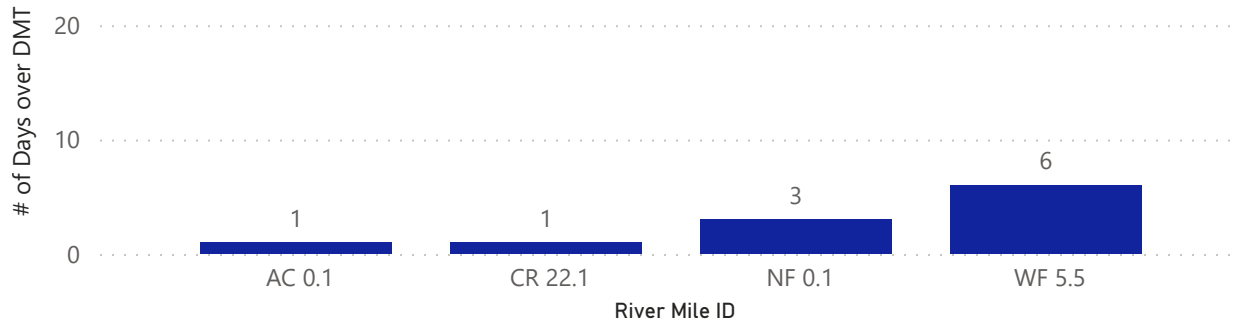
The sites shown above received either non-attainment or an M&E listing in either 2021 or 2022. In 2022 the only sites that did not receive attainment were CR-31: Colorado River upstream Windy Gap Reservoir and WC-2.3: Willow Creek upstream Bunte Highline Ditch (New site in 2022). CR 1.7 which did not receive attainment in 2021 gained over 30 points in its MMI score, achieving attainment in 2022. All other sites monitored achieved attainment both in 2021 and 2022.

STREAM TEMPERATURE

[Click here for full report](#)

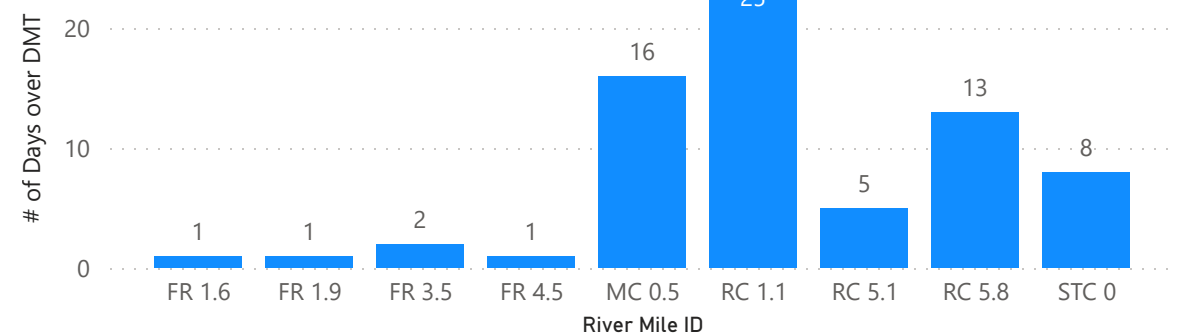
Colorado River Basin

Acute Temperature Exceedances - Days above DMT



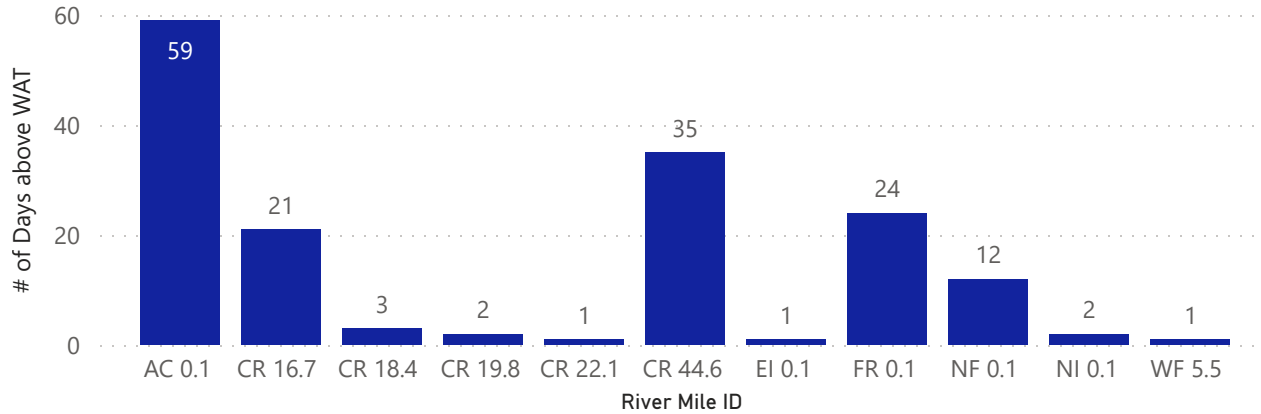
Fraser River Basin

Acute Temperature Exceedances - Days above DMT

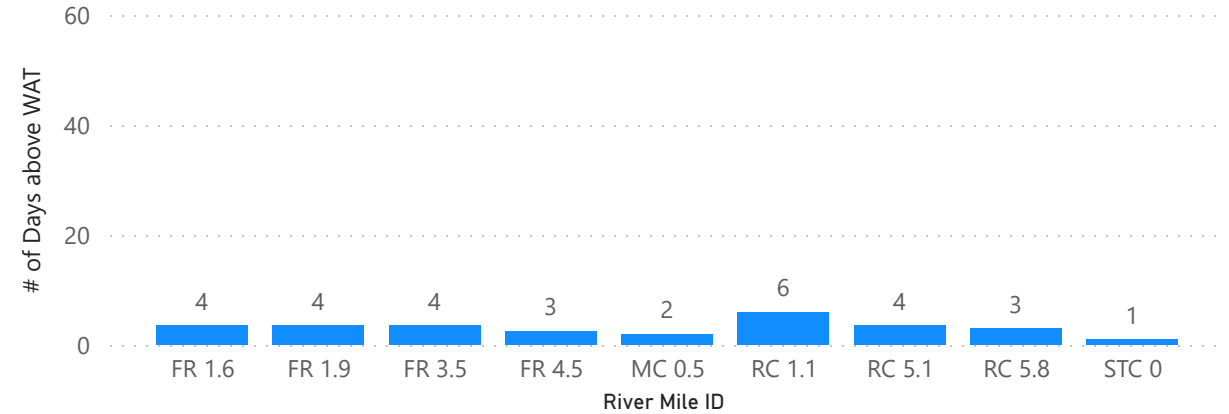


Of the 67 sites monitored where data was available, **9 sites in the Fraser River basin and 4 sites in the Colorado River basin exceeded the Acute Temperature Standards.** This is an increase in exceedances in the Colorado River Basin from 2021 when only 1 site experienced acute exceedance and a decrease in the Fraser River basin from 2021 when 10 sites experienced acute exceedance.

Chronic Temperature Exceedances - Days above WAT



Chronic Temperature Exceedances - Days above WAT



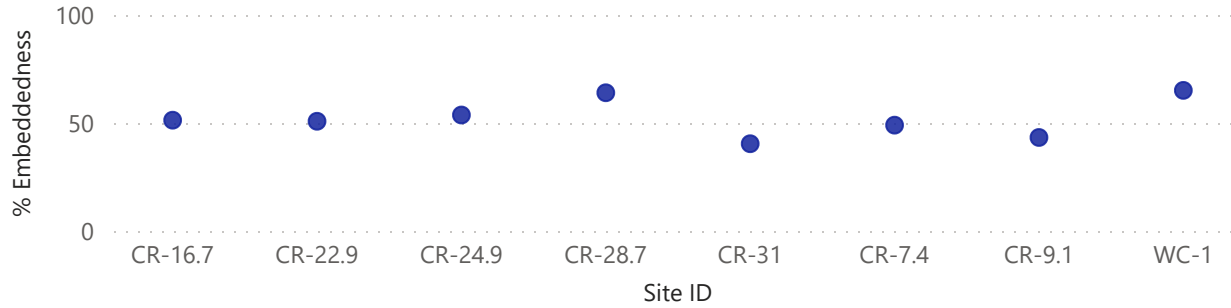
Of the 67 sites monitored where data was available, **9 sites in the Fraser River basin and 11 sites in the Colorado River basin exceeded the Chronic Temperature Standards.** This is an increase in exceedances in the Colorado River Basin from 2021 when only 4 sites experienced chronic exceedance and an increase in the Fraser River basin from 2021 when 7 sites experienced chronic exceedance.

SUBSTRATE

[Click Here for Full Report](#)

Colorado River Basin

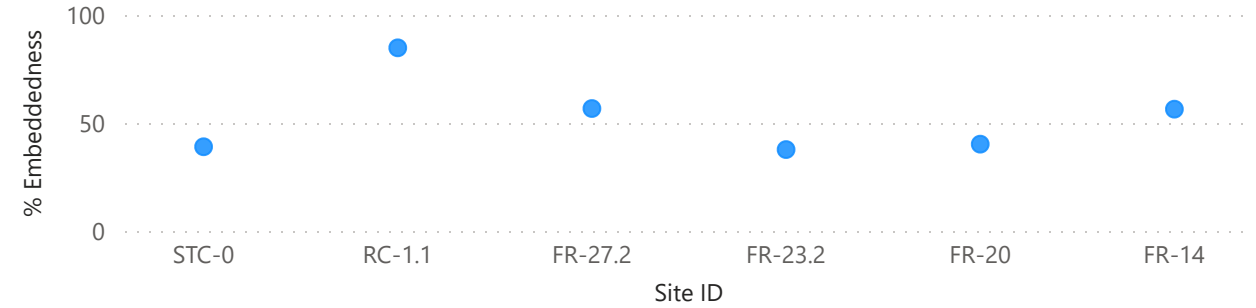
Percent Embeddedness



Embeddedness values on the Colorado River were notably greater at CR-28.7 - likely influenced by proximity to Windy Gap Reservoir and CR-6.1: Colorado River downstream of ILVK - likely influenced by substrate from tributaries.

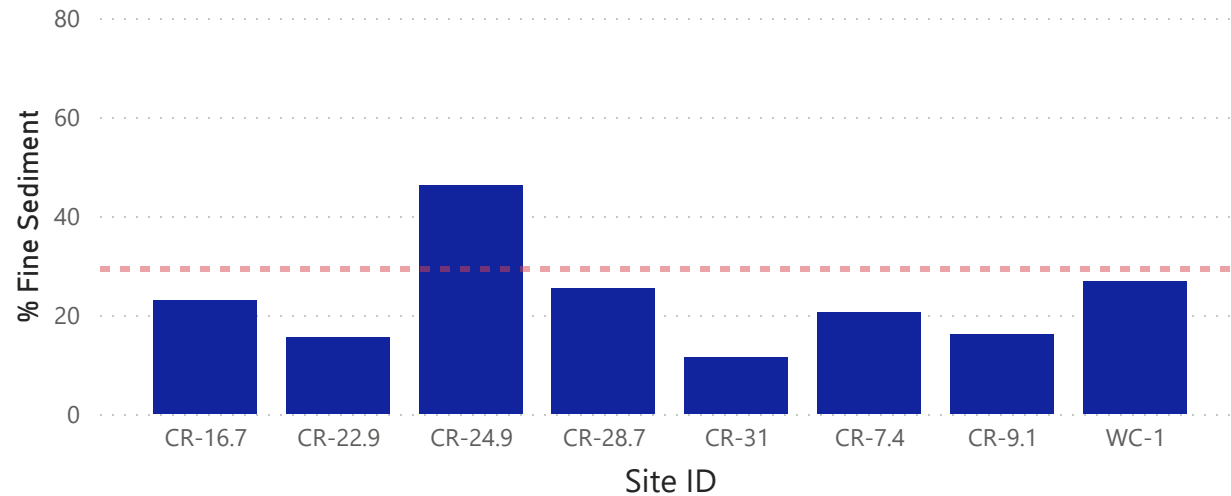
Fraser River Basin

Percent Embeddedness



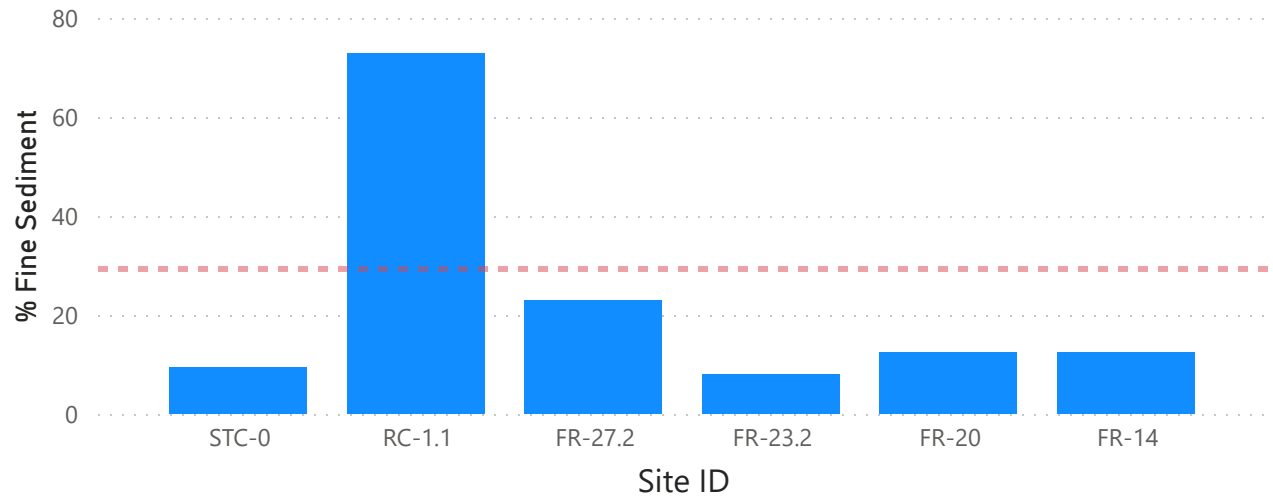
Embeddedness increased in a downstream direction from FR-23.2 to FR-14 instead of decreasing like in 2021. Increased spring runoff in 2022 may have caused transport of sediment.

Percentage of Fine Sediment



Between 2019 and 2022 there was an increase in fine substrate (>2mm) at almost all sites. CR-7.4 located within the ILVK restoration reach was the only site with a decrease in the % fine substrate.

Percentage of Fine Sediment



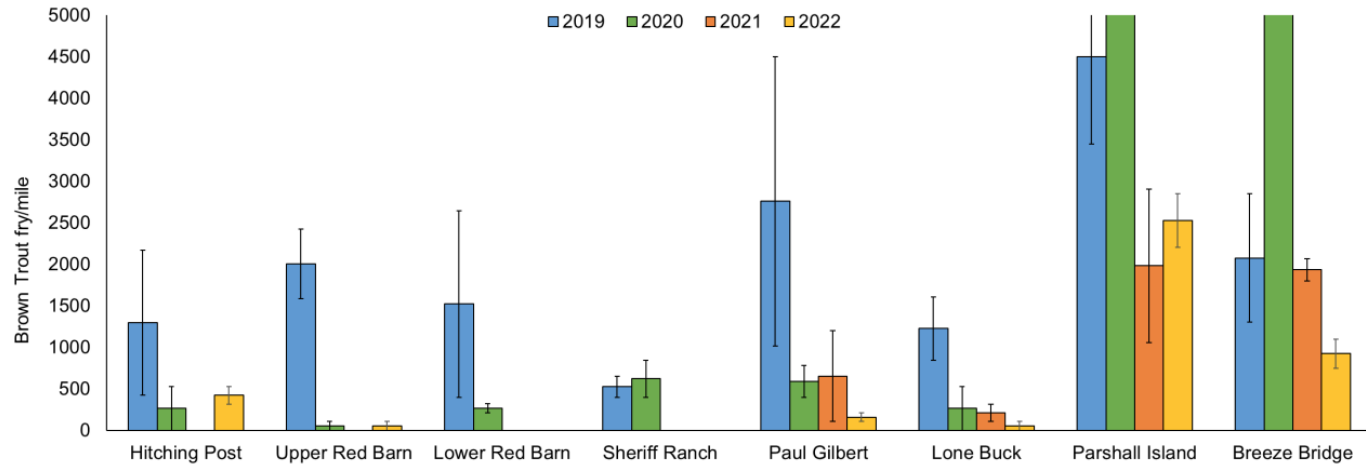
Between 2019 and 2022 the largest increases in fine substrate (>2mm) were at FR-14 and RC-1.1. These changes could be due to inundation from beaver ponds which have the capacity to store sand and silt. FR-23.2 and FR-20 also saw increases in gravel substrate (2-8mm - not shown).

FISH

[Click here to access Fish Survey Summaries](#)

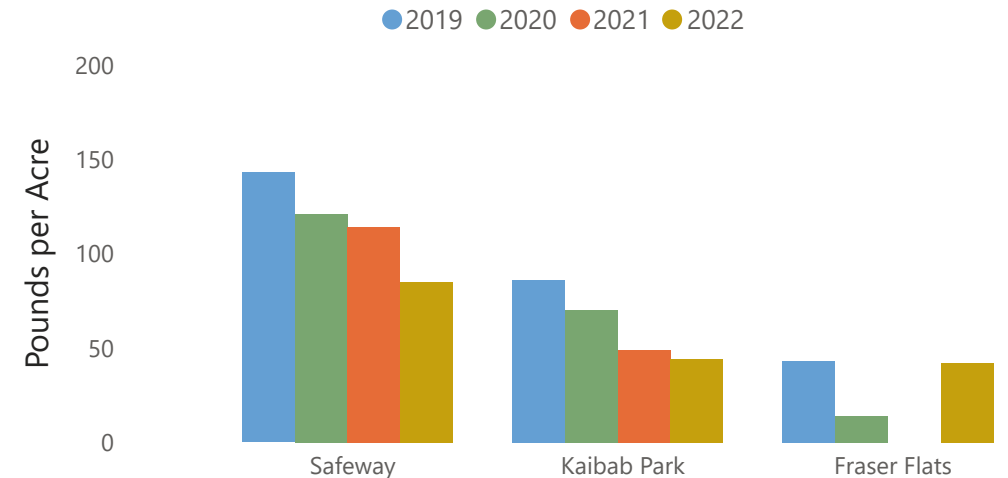
Colorado River Basin

Brown Trout fry per Mile



Fraser River Basin

Brown Trout Pounds per Acre



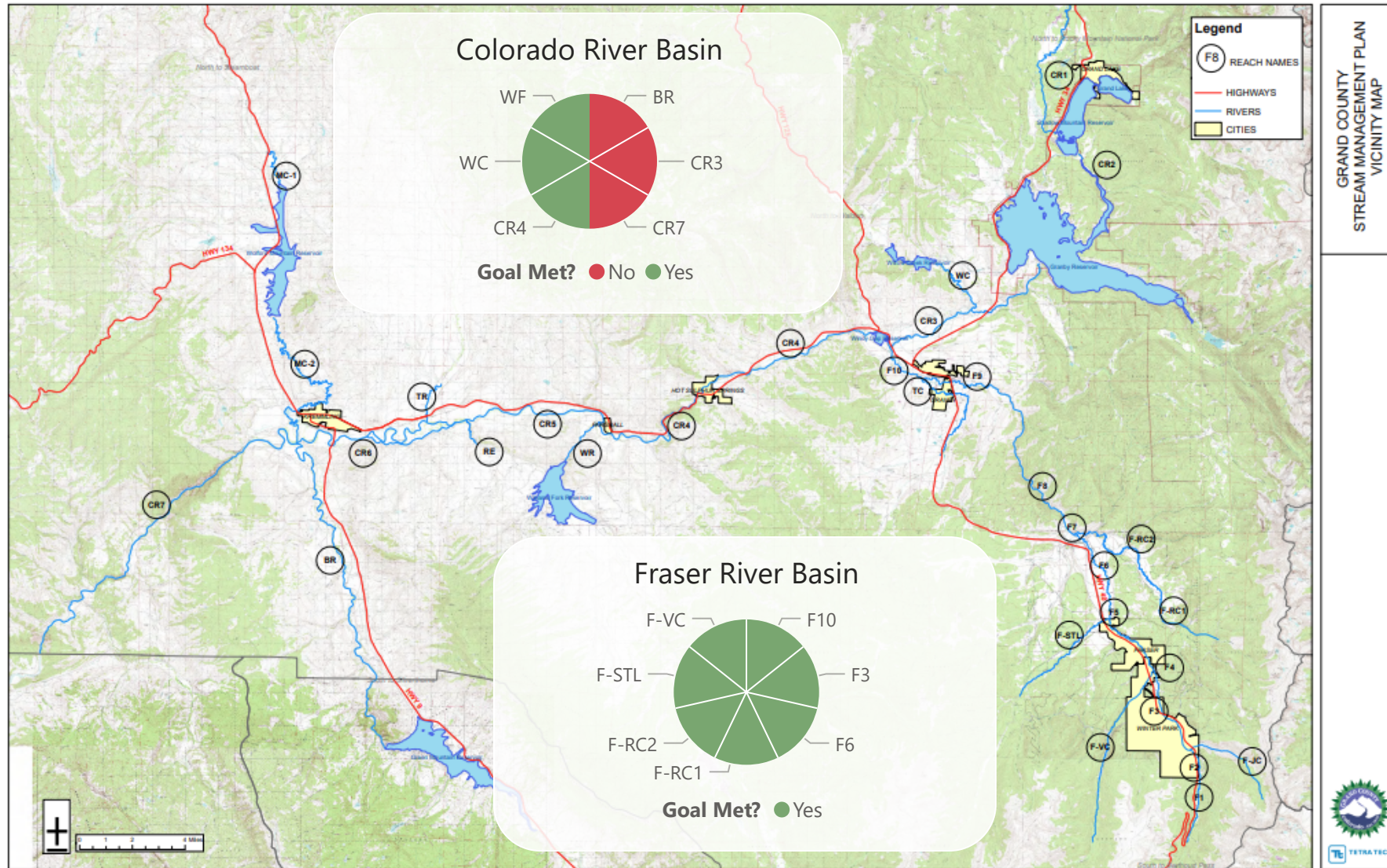
In 2022 CPW collected trout population data on the Colorado River and Fraser River. While direct data was not able to be summarized for this report, the data displayed below is adapted from a presentation given by CPW in January 2023 about the 2022 data collection.

Note the difference in units in the Colorado River and Fraser River Basins (Brown Trout fry/mile versus Brown Trout Pounds per Acre)

Reporting will resume in early 2024.

FLUSHING FLOWS

[Click Here for GCSMP2010](#)



Spring runoff met Grand County's recommended flushing flows at 10 of the 13 sites that were evaluated in the CEA for the 2022 runoff season.