



GRAND COUNTY

LEARNING BY DOING

2020 Aquatic Resource Monitoring Report

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2020 Notable Events

The following summary of notable events in 2020 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 2020 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) is included in the 2020 Aquatic Resource Monitoring Report.

In 2020, LBD made significant strides in operations, monitoring, and stream restoration efforts. The following is not meant to be exclusive or comprehensive but to highlight some of the most notable events of 2020 that may impact water quality.

Climate, Hydrology, and Impacts

- Grand County experienced a slightly above average snowpack in 2020. The Colorado Basin River Forecast Center (CBRFC) April 1, 2020, Most Probable Runoff Forecast at Kremmling was 103 percent of average. Forecasts after April 1 and actual runoff volumes in the Upper Colorado River Basin were much reduced from April 1 forecasts, especially to the south, following a near-average snow accumulation season, due to warm and dry conditions in the late spring and early summer. The actual runoff at Kremmling was 91 percent of average. The highest sub-basin runoff forecast within the LBD CEA was in the Fraser River basin at 103 percent of average, and the lowest was in the Willow Creek basin at 96 percent of average. The April 1 Most Probable Runoff Forecast into Granby Reservoir was 100 percent of average.
- The Williams Fork Fire was reported on August 14, 2020, originating 15 miles southwest of Fraser in the Arapaho National Forest. The fire burned 14,833 acres of heavy dead and down beetle-killed lodgepole pine. The fire was declared contained on November 30, 2020.
- The East Troublesome Fire was reported on the afternoon of October 14, 2020, originating northeast of Kremmling in the Arapaho National Forest. The fire burned 192,457 acres. The fire was declared contained on November 30, 2020. The fire was fueled by wide-spread drought, numerous dead and down beetle-killed trees, red flag weather conditions created by high winds and dry conditions, and poor humidity recovery overnight. The combination of

these factors led to unprecedented, wind-driven, active fire behavior with rapid spread.

Coordination Calls

- 2020 was the sixth 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, allowing LBD partners to be responsive to low flow and high-water temperature conditions through coordination of environmental water releases, which foster communication, relationships, and trust among stakeholders.

Operations

- Denver Water Moffat Collection System spill bypasses in 2020 included approximately 21,000 acre-feet (af) during runoff season, maintenance bypasses totaling 1,600 af from the North Ranch Creek component of the Moffat Collection System, and maintenance bypasses totaling 259 af at the Fraser River and Jim Creek diversions.
- The Colorado River District, Denver Water, and Northern Water participated in Coordinated Reservoir Operations (CROS) to enhance peak runoff in the 15-mile reach to benefit the endangered fish utilizing reservoir releases.
- Release of 5,412 af from the Endangered Fish Pool in Granby Reservoir for the Upper Colorado River Endangered Fish Recovery Program (Recovery Program).
- Denver Water's Moffat Collection System began spill bypasses on May 17, starting with Cabin Creek, Hurd Creek, and Hamilton Creek diversions. Ranch Creek, St. Louis Creek, Vasquez Creek, and the Fraser River soon followed. Based on recommendations from LBD, Denver Water continued diverting water from the upper Williams Fork Basin (Jones Pass) until mid-June.

Restoration Projects

- In 2020, LBD developed a work plan for the Cabin Creek aquatic organism passage (AOP) culvert construction in 2021. The combined benefit of installing an AOP culvert and removing the flume will provide habitat connectivity, allowing fish to migrate upstream more easily. In addition, the new AOP culvert will be larger with a natural streambed, thereby better accommodating high flows (greater than the estimated 100-year flood), sediment transport, and aquatic passage.
- In 2020, LBD conducted a survey of willow counts and condition at the Fraser Flats River Habitat Project. In 2017, volunteers planted approximately 2,400 willows as part of the project. In 2020, roughly 1,207 willows were observed. Of these, approximately

50 percent were in good to fair condition. While the overall survivorship of willows is satisfactory, the revegetated area could be improved with supplemental plantings in future years. LBD plans to do supplemental willow plantings at the project reach in 2021.

- In 2020 CPW aquatics crews conducted electrofishing population surveys on five sites on the Fraser River and four sites on the Colorado River in the LBD cooperative effort area. In addition, CPW is an active partner to construct the Colorado River Connectivity Channel (CRCC), which will restore river connectivity around Windy Gap Reservoir when built. As part of this effort, in 2020, CPW added fish tagging to monitor fish movement utilizing a solar-powered antenna.

Monitoring Programs

- The LBD Monitoring Subcommittee (Subcommittee) re-evaluated objectives for sediment monitoring. The Subcommittee issued an RFP for sediment monitoring and selected GEI as the consultant to conduct sediment surveys in 2020. The monitoring plan included a change to the methodology for conducting pebble counts. The new methodology is more robust and adheres to Colorado Division of Water Quality guidelines for collecting sediment data to assess aquatic health.
- The Subcommittee developed and executed an extensive 2020 Aquatic Resource Monitoring Plan and 2020 Aquatic Resource Monitoring Report.

LEARNING BY DOING – MONITORING YEAR 2020 SNAPSHOT

For its eighth consecutive year, Learning By Doing (LBD) continued to monitor the health of aquatic resources within the Colorado, Fraser, and Williams Fork River basins in 2020. A snapshot of the 2020 results is below, followed by individual metric summaries.

Results	Observations	Colorado River Basin, including Williams Fork	Fraser River Basin, including Ranch Creek
Stream Temperature	<p>In 2020 there were 67 sites monitored within LBD’s Cooperative Effort Area (CEA). This area includes sites on the Colorado and Fraser rivers and 19 tributaries. Two new sites were added on Ranch Creek in 2020. Temperature data were compared to Colorado temperature standards at the monitoring sites. Of the sites monitored where data was available, 6 sites exceeded the state temperature thresholds in the Fraser River basin, but there were no exceedances in the Colorado River basin for the available data in 2020. Exceedances generally occurred in late July or early August during the hottest months of the year, or in October and May when the Cold Stream Tier 1 (CSI) standards change from winter to summer.</p> <p>Click here for temperature assessment.</p>	<p>Of the 28 sites where data was collected, there were 20 sites where the data was compared to temperature standards. At this time, data for 8 sites above Granby Reservoir is not available due to database upgrades that are currently in progress. The 2020 results for these 8 sites will be presented in LBD’s 2021 Monitoring Year Snapshot. For the 20 sites with available data, all were in attainment with state temperature standards.</p>	<p>Of the 34 sites where data were compared to temperature standards, 28 sites were in attainment with state temperature standards.</p> <p>Six sites exceeded the state temperature threshold for acute (1-day) exposure:</p> <ul style="list-style-type: none"> • Ranch Creek below CR 8315 (RC-4.7) • Ranch Creek below Meadow Creek (RC-1.1) • Ranch Creek above Quad Ranch (RC-8.5) • Meadow Creek at CR 84 (MC-0.5) • St. Louis Creek (STC-0) • Hurd Creek on County Road 843 (HC-0.5) <p>Three sites exceeded the state temperature threshold for chronic (7-day) exposure:</p> <ul style="list-style-type: none"> • Ranch Creek below CR 8315 (RC-4.7) • Ranch Creek above Quad Ranch (RC-8.5) • St. Louis Creek (STC-0)
Macro-invertebrates	<p>In 2020, bioassessments were conducted at 18 sites in the CEA. Of the 18 sites, all but 1 site received an attainment for aquatic life use designation through their MMI (v4) scores.²</p> <p>Click here for full report.</p>	<p>Of the 13 sites monitored in the Colorado River basin, all but 1 site was in attainment with state standards in 2020. The 12 attaining sites appear to support healthy macroinvertebrate populations. The MMI (v4) score for site CR-WGU located on the Colorado River upstream of Windy Gap Reservoir indicated impairment due to a > 22 point drop in score. Overall, benthic macroinvertebrate communities appeared to be relatively healthy in the Colorado River. However, most MMI (v4) scores exhibited additional stress compared to sampling events in prior years. Although no sites in the Williams Fork River basin were considered impaired, there was evidence of increased stress downstream from the Williams Fork Reservoir. Site WF-0.5 below Williams Fork Dam near the confluence with the Colorado River showed improvements in macroinvertebrate communities following the stream restoration work completed in this reach of the Kemp Breeze State Wildlife Area in 2019.</p>	<p>Of the 8 sites monitored in the Fraser basin, all were in attainment with state standards in 2020 and appear to support healthy macroinvertebrate populations.</p> <p>Two sites on the Fraser River supported exceptional densities of macroinvertebrates at the time of the sampling in September 2020. These sites include FR-15, upstream of the Fraser Flats River Habitat Project, and FR-12.4, upstream of the Fraser canyon.</p>
Fish	<p>CPW conducted electrofishing surveys again in 2020 to estimate trout populations in the Colorado and Fraser River basins. Data for 7 sites along the Fraser River one site on the Colorado River is summarized here. A summary of available data for these sites from survey years 2019 and 2020 is presented here.</p> <p>Click here for full report – Colorado River.</p> <p>Click here for Fraser River report through 2019. CPW will update this report to include 2020 and 2021 data in early 2022.</p>	<p>In 2019 and 2020 CPW collected trout population data on the two-mile reach of the Colorado River beginning just upstream of the Parshall Hole and extending downstream through the Kemp-Breeze State Wildlife Area to the irrigation diversion on the Bureau of Land Management Sunset property. Population estimates are obtained by raft electrofishing using standard mark-recapture methodology. Survey data from 2019 was not reported in the 2019 Monitoring Snapshot, so it is presented below along with 2020 survey data.</p> <p>From 2011 through 2019, the trout biomass estimate steadily increased in this reach. The 2020 survey produced a minor decline in this estimate, however in all years that this reach has been surveyed this estimate has generously exceeded the minimum Gold Medal criteria of at least 60 lbs/surface acre. Since 2009, the biomass estimate for all trout has averaged 145 lbs/surface acre. The second biological criteria for Gold Medal designation is a minimum of 12 trout per surface acre 14” or larger. The average estimate from 2009-2020 is 33 trout per acre greater than 14”.</p>	<p>Robbers Roost was a new site for 2019 and CPW stocked 10,000 native Colorado River Cutthroat Trout in this stretch above the sedimentation pond. Preliminary data for 2020 show an increase in trout biomass and number of trout per surface acre as compared to 2019 at this location. Preliminary data collected in 2020 at the Safeway site show that this site continues to sustain a productive fishery. Preliminary data collected in 2020 for the Confluence Park site show a continued decline in trout biomass in recent years since 2014.</p> <p>Preliminary 2020 data for LBD’s Fraser Flats River Habitat Project showed a third year of decline in trout biomass estimations since the peak in 2017 (post restoration). Preliminary 2020 data show for the first year since the project was completed that trout biomass estimates post-project are less than pre-project trout biomass estimates from 2007. The instream habitat, thalweg, and riffle- to-pool ratio has been improved; however, the willow plantings remain immature and have yet to increase canopy cover and improved ecological function. Sculpin numbers also show a decline, but sampling efforts each year will help further the analysis of this trend. It is believed that the extreme drought conditions of fall 2020 likely contributed to the poor estimates this survey yielded.</p>

LEARNING BY DOING – MONITORING YEAR 2020 SNAPSHOT

Results	Observations	Colorado River Basin, including Williams Fork	Fraser River Basin, including Ranch Creek
Pebble Counts	A total of 13 sites within the CEA were sampled in 2020. Each location received 400 measurements for the pebble count, utilizing the Modified Wolman Pebble Count Method. Percent embeddedness was also performed at each location with 40 to 50 measurements per site. All sites surveyed had percentages of fine sediment less than 29.3%, which is the threshold set in CDPHE Policy 98-1. Click here for full report.	Six sites were assessed along the Colorado River, with one site assessed qualitatively. Sites further upstream have lower percentages of fine sediment and lower percentages embeddedness. Downstream sites showed higher values of embeddedness as well as higher percentages of fine sediment. The percentage of substrate sizes observed on the Colorado River varied between sites. Sites CR-9.1 and CR-7.4 had noticeably greater percentages of smaller substrate than all the other Colorado River sites sampled. Substantial additions of new substrate material into the Colorado River likely do not occur until the river reaches Byers Canyon. Overall, the percentages of substrate sizes did not change considerably between 2019 and 2020.	Six sites on the Fraser River and 1 site on Ranch Creek were assessed in this basin. Percent embeddedness was mostly consistent throughout the Fraser River. The notable exception was Ranch Creek, which showed 45.4% embeddedness. Substrate composition varied less between the Fraser River sites, with the exception of Site FR-25.1 which is the most upstream site on the Fraser River. This site had a strikingly greater percentage of larger substrate due to surrounding human-made alterations to the riverbanks, portions of the river, and nearby roadways. Overall, the percentages of substrate sizes did not change considerably between 2019 and 2020.
Flushing Flows¹	Spring runoff met Grand County’s recommended flushing flows at all 13 sites that were evaluated in the CEA for the 2020 runoff season.	All three sites on the Colorado River (CR3, CR4, CR7) met recommended flushing flows. Individual sites on the Williams Fork, Blue River and Willow Creek also met their recommended flushing flows. ¹	Of the seven sites monitored for flushing flows in the Fraser Basin, three sites are on the Fraser River (F3, F6, F10) and four sites on tributaries to the Fraser (F-VC, F-RC1, F-RC2, F-STL). All seven sites either met or exceeded the flushing flows described in the Grand County Stream Management Plan. ¹

Notes and Citations:

¹Recommended in the Grand County Stream Management Plan (2010)

²Colorado’s Multi-Metric Index (MMI) version 4.0



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