Upper Colorado River Wild & Scenic Stakeholders Alternative Management Plan
Colorado Parks and Wildlife Fish Biosurvey Protocol

Background

The provisional Fishing ORV Indicators address trout abundance (i.e., quality trout), biomass, and fish species diversity. A Quality Trout is defined as trout over 14 inches. The provisional ORV Indicators are 24 Quality Trout per acre and 90 pounds of trout biomass per acre. The SG monitors these provisional ORV Indicators through CPW's fish population surveys (biosurveys), which they use to evaluate trout abundance, biomass, and species presence/absence.

CPW Fish Biosurveys Protocol

CPW conducts annual biosurveys at four sites within W&S Segments 5 and 6. The provisional Recreational Fishing ORV Indicator applies to three of the four sites (see Table 1). CPW biosurveys for these reaches are accomplished using two rafts equipped with electrofishing gear. There is a generator and control box behind the rower, and a livewell in front of the rower. A fiberglass boom extending from the bow holds an electrode in the water. Two netters stationed at the bow capture stunned fish and place them in the livewell. Fish are weighed, measured, marked, and released. The rafts work downriver in tandem, each covering half of the river divided longitudinally.

Table 1: CPW fish biosurvey locations & sampling schedule

Location	Location Information	# of biosurveys by end of provisional period	CPW's intended schedule
Radium (Segment 5)	Two river miles immediately upstream of CR-11 bridge at Radium	7	odd number years
State Bridge (Segment 6)	Two river miles immediately downstream of State Bridge	6	2019 and even number years after
Catamount (Segment 6)	Two river miles immediately downstream of the Catamount boat ramp	6	2019, 2020, and odd number years after

Population estimates are derived using standard mark-recapture methodology, requiring two separate passes on each survey reach – a Mark pass and a Recapture pass. The first pass is the Mark pass, during which captured fish are measured in length, those greater than 150 mm are marked on the tail with a hole punch, and then all fish are returned to the river. The Recapture pass is conducted with at least one full day separating it from the Mark pass to allow for fish to redistribute in the survey reach. During the Recapture pass, fish are again measured, a subset of fish is weighed, and marked fish are documented as "Recaps"[1]. Data entry and analysis is performed using CPW's Aquatic Data Management System (ADAMAS), deriving estimates for abundance and biomass using the modified Lincoln-Peterson estimator. Fish biosurveys may not be possible in all years or data from fish biosurveys may not be useable in all years if trout capture probability is below 0.10 (see footnote).

Figure 1 indicates the reaches where CPW biosurveys are performed near Radium, State Bridge, Catamount, and Lyons Gulch. These survey reaches are identified in relation to W&S Segments 4, 5, 6, and 7. Biosurvey data from these reaches characterize the fishery resource that is the foundation of the Recreational Fishing ORV.

CPW biosurveys are typically conducted in late April or early May to take advantage of lower flows, cooler waters, and fewer river users – thus, increasing capture efficiency, decreasing stress on fish, and limiting impacts to other users. CPW's first surveys in the W&S Segments were conducted in August 2008 and were subjected to warmer river temperatures, elevated river flows from reservoir releases, and abundant float boaters and anglers. Consequently, CPW's 2008 biosurvey results are not directly comparable to subsequent years when surveys were performed in the Spring.

CPW biosurveys indicate that trout populations throughout W&S Segments 5 and 6 vary considerably from year to year. This can be attributed to the variability within the river environment and associated variations in seasonal and annual climate. For example, mild winters provide increased opportunities for trout to forage and grow during what is typically a cold, low productivity time of year. The formation of anchor ice is also limited during mild winters, which can otherwise negatively impact fish and macroinvertebrate habitat. Stochastic rain events can send large amounts of sediment into the river causing stress and mortality in fish and negatively impacting substrate conditions. Variations in winter snowpack, spring runoff, and summer water availability can influence channel formation, fish distribution, and fish recruitment.

[1] Recapture Rates directly correlate to the confidence intervals that surround the provisional Fishing ORV Indicators (biomass estimate (lbs/ac) and 'quality fish' metric). CPW generally uses a qualifier of a 10% Recapture Rate as a value that creates acceptable confidence intervals for population estimates, and is indicative of high-quality data. The Fishing Ad Hoc Committee has recommended ONLY using data for ORV Indicators when recapture rates exceed 10%.

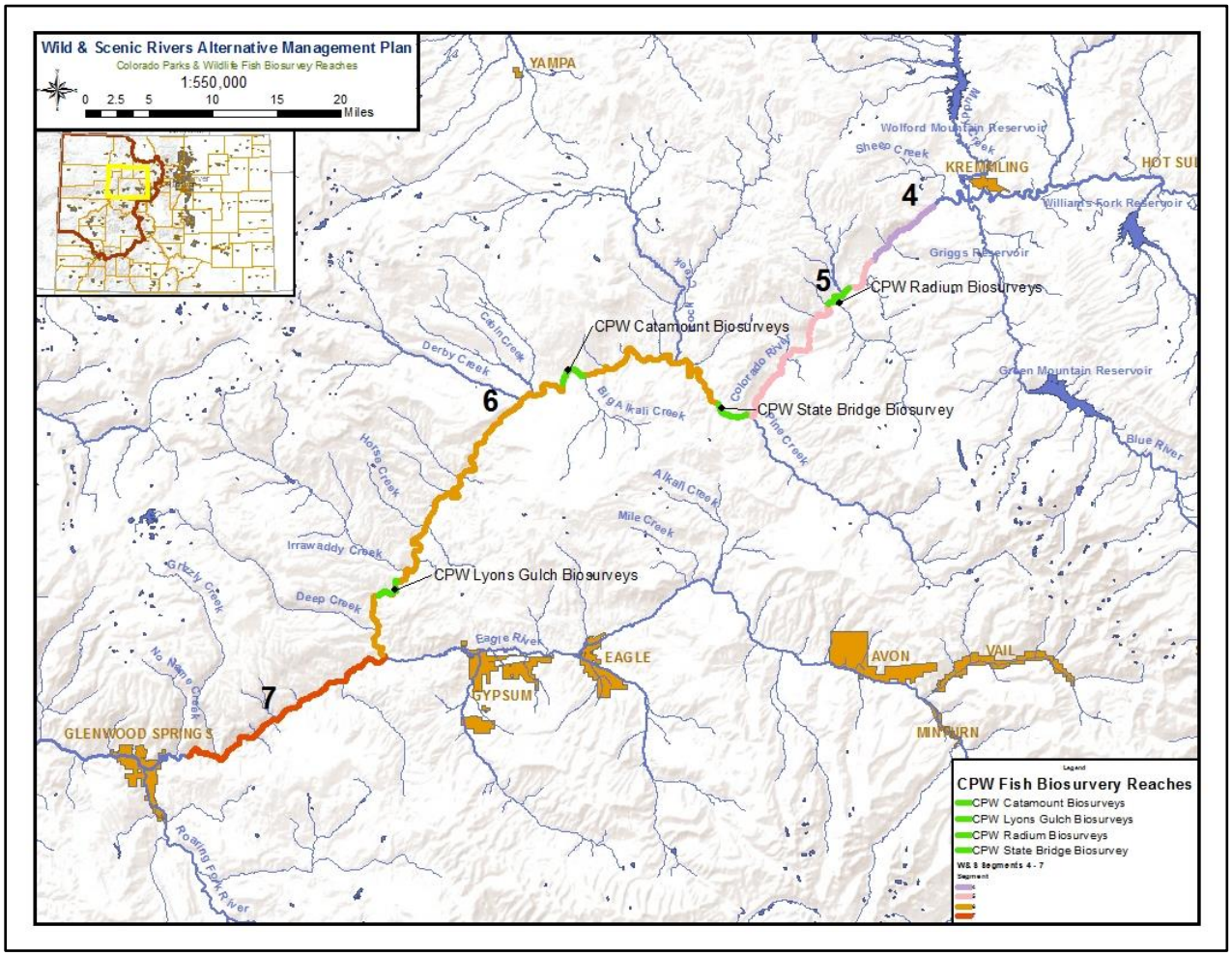

Figure 1: CPW Fish Biosurvey Locations