

Monitoring Report

System: Rockport Reservoir

Sampling Date(s): 4/19/2022

Target Species: Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch

Monitoring Objectives:

1. Provide data for assessment of trends in species occurrence, relative abundance, biomass, and size structure of forage and sport fish assemblages.
2. Evaluate population indices to improve the effectiveness of stocking efforts of Kokanee Salmon (hereafter Kokanee) and Rainbow Trout.
3. Establish a naturally reproducing population of Kokanee.
4. Use top-down control to regulate Utah Chub population size.

Sampling Design and Methods:

A new sampling design was implemented in 2021 to improve the effectiveness of sampling methods in reservoirs that contain Kokanee and in deep reservoirs where traditional, benthic gillnets do not effectively quantify species that occupy pelagic habitats. The new sampling design used experimental curtain gillnets suspended in the water column, thus giving managers the ability to sample benthic and littoral habitats simultaneously or sample stratified portions of the pelagic fish community. Sampling occurs in the spring. Three gillnets were suspended in the pelagic zone at 6-m depth intervals ranging from 0 to 18-m depth and an additional gillnet was set nearshore with 6 m of water to sample the benthic and littoral habitats. All gillnets were 45.7 m long by 6.1 m deep with six 7.6-m panels that had bar mesh sizes of 13, 19, 25, 38, 51, and 64 mm randomly positioned throughout the net. Nets were set overnight and retrieved at dawn. All fish caught were measured for total length (mm) and weight (g). Two replicate sampling events were completed in 2021 to train staff on gear deployment.

Prior to 2021, experimental benthic gillnets were used to conduct sampling. Benthic gillnets were 24.8 m long by 1.8 m deep with eight 3.1-m panels that had bar mesh sizes of 19, 25, 32, 38, 44, 51, 57, and 64 mm. Demographic data (*i.e.*, total length and weight) from benthic gillnets were used in this report for the size structure, weight-length, and relative weight analyses with the assumptions that catchability was constant between benthic and curtain gillnets and no size-based selectivity exists.

Summary:

The new sampling design appeared successful at sampling the littoral pelagic and benthic fish communities but was limited in deeper pelagic depth zones. Additional years of sampling data are required before inferences can be drawn regarding sampling efficiency. Fish catches were comprised of Brown Trout, Kokanee, Rainbow Trout, Smallmouth Bass, Utah Chub, Utah Sucker, and Yellow Perch (Table 2). Rainbow Trout were the most abundant sport fish species in 2022 (Mean = 26.0; SD = 30.2) and had the highest relative abundance in the 0 to 6-m depth zones of both benthic and pelagic habitats (Table 3; Figure 2). Brown Trout mean relative abundance was 2.2 fish/net-night (SD = 2.6) and evenly dispersed among sampled depth zones and habitats above 12 m (Table 3; Figures 1 & 2). Kokanee mean relative abundance was 1.0

fish/net-night ($SD = 1.4$) and sporadically found in all sampling depths and habitats. Yellow Perch mean relative abundances was 2.5 fish/net-night ($SD = 3.8$) and were segregated between littoral benthic and deep pelagic habitats. Temporal comparisons of relative abundance were precluded by changes in sampling gear. The size structure of Kokanee suggested a single, weak adult age class ($n = 4$) was present in 2022 (Table 2; Figures 3 & 4). The presence of only one Kokanee age class (out of two adult age classes stocked) in low abundance suggested survival to age-3, and subsequently survival to maturity, was low and warrants concern. Yellow Perch size structure suggested multiple age classes exist to support a valuable sport fishery (Figures 3 & 4). Relative weights of all target species except Brown Trout were acceptable (Figure 6). The population size of Utah Chub appeared to be under control. All other measurements and indices were within normal bounds.

Management Actions:

1. Continue to perform the new sampling design with curtain gillnets. After an additional two years of data collection, a power analysis will be conducted to determine the effectiveness of the new sampling design. Sampling effort may need to increase to provide accurate and reliable population estimates.
2. Continue stocking 20,000 Rainbow Trout to supplement the Rockport Reservoir fishery.
3. Evaluate the stocking program of Kokanee. Three years of stocking Kokanee were performed in an attempt to establish a naturally reproducing population. No stocking will be performed in 2023 because of a low number of broodstock spawning, limiting the number of offspring available to be stocked throughout the state. Additional years of catch data are required to determine if the current stocking program is effective.
4. Observe Utah Chub populations to ensure salmonids in Rockport Reservoir are at a high enough density to apply sufficient top-down control over this forage species. Utah Chub and salmonid species can negatively interact when forage densities are high and compete for limited food resources. Alternating the number of stocked Rainbow Trout would be recommended if Utah Chub abundances change. No changes are currently recommended.
5. Identify the mechanism driving the separation of two Yellow Perch assemblages. Possible explanations could be related to the availability of refuge habitat or variability in oxythermal habitat from reservoir draw downs.

Tables:

Table 1: Number of samples collected by sampling gear type, prescribed number samples by sampling gear type, and any additional data collected from Rockport Reservoir in 2022.

Gear Type	# of Samples	# of Prescribed Samples	Additional Data Collected
Curtain Gillnets	4	4	–

Table 2: Species composition from curtain gillnets as catch (# of fish) and biomass (kg) estimates from Rockport Reservoir in 2022.

Target Species	Catch	Catch (% Total)	Biomass	Biomass (% Total)
Brown Trout	9	6.6	2.7	3.6
Kokanee	4	2.9	2.0	2.7
Rainbow Trout	104	75.9	59.7	80.3
Utah Chub	5	3.6	1.7	2.3
Yellow Perch	10	7.3	1.1	1.4
Smallmouth Bass	1	0.7	0.9	1.1
Utah Sucker	4	2.9	6.3	8.5

Table 3: Mean catch-per-unit-effort (CPUE; fish/net-night), mean total length (TL; mm), mean condition (Wr), and percentage of individuals within each traditional proportional size distribution (PSD) category for each target species from Rockport Reservoir in 2022. All values in parentheses indicate standard deviation.

Target Species	CPUE	Mean TL	Mean Wr	PSD-Quality	PSD-Preferred	PSD-Memorable	PSD-Trophy
Brown Trout	2.2 (2.6)	307 (52)	82 (4)	44	11	0	0
Kokanee	1.0 (1.4)	361 (17)	102 (7)	100	100	0	0
Rainbow Trout	26.0 (30.2)	367 (30)	96 (8)	9	0	0	0
Utah Chub	1.2 (2.5)	280 (45)	107 (9)	100	80	60	0
Yellow Perch	2.5 (3.8)	198 (44)	91 (7)	67	11	0	0

Figures:

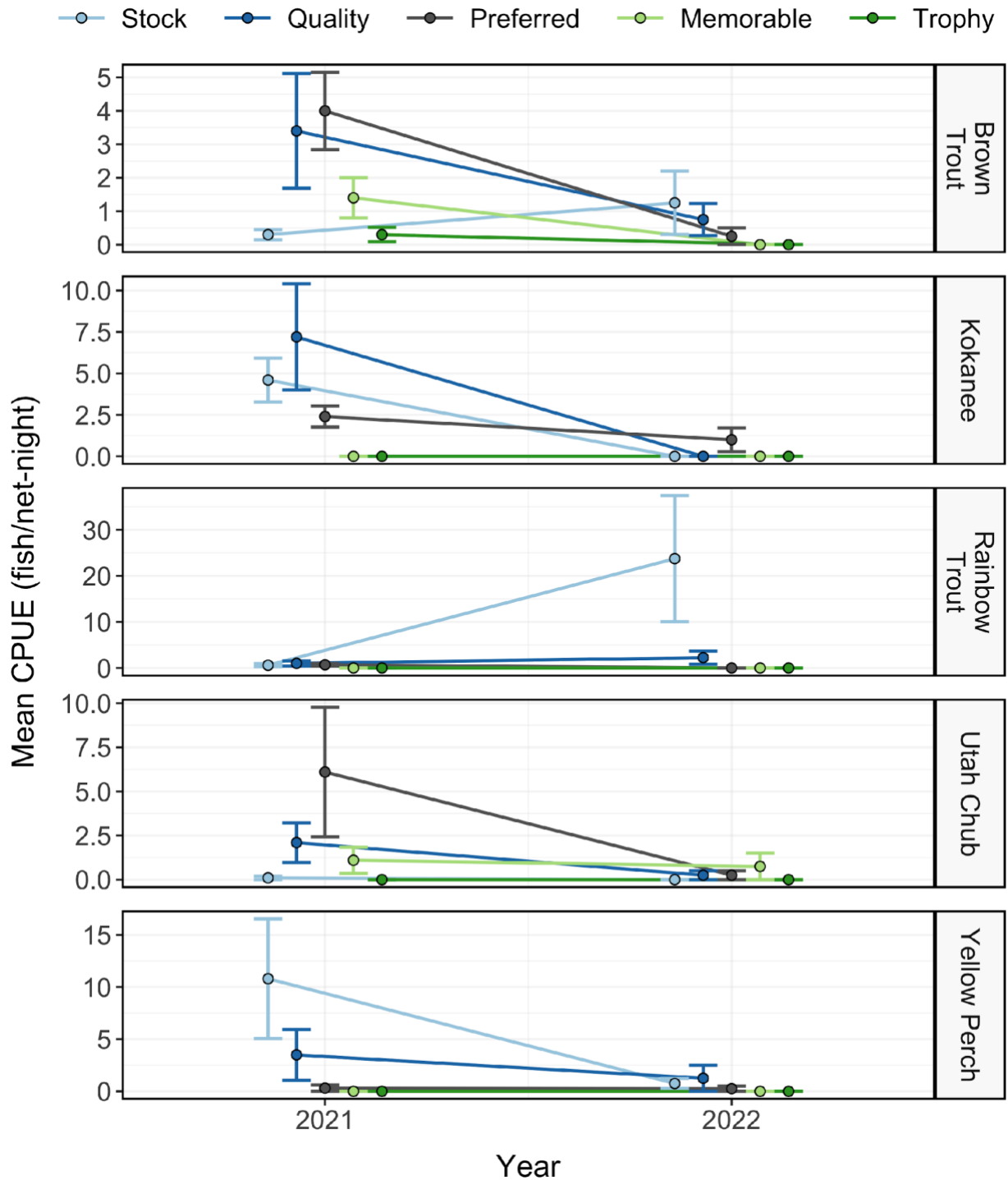


Figure 1: Mean catch-per-unit-effort (\pm standard error) of Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch within each Gablehouse length category from Rockport Reservoir in 2021-22 as an index of relative abundance. Points and lines are jittered to minimize overplotting.

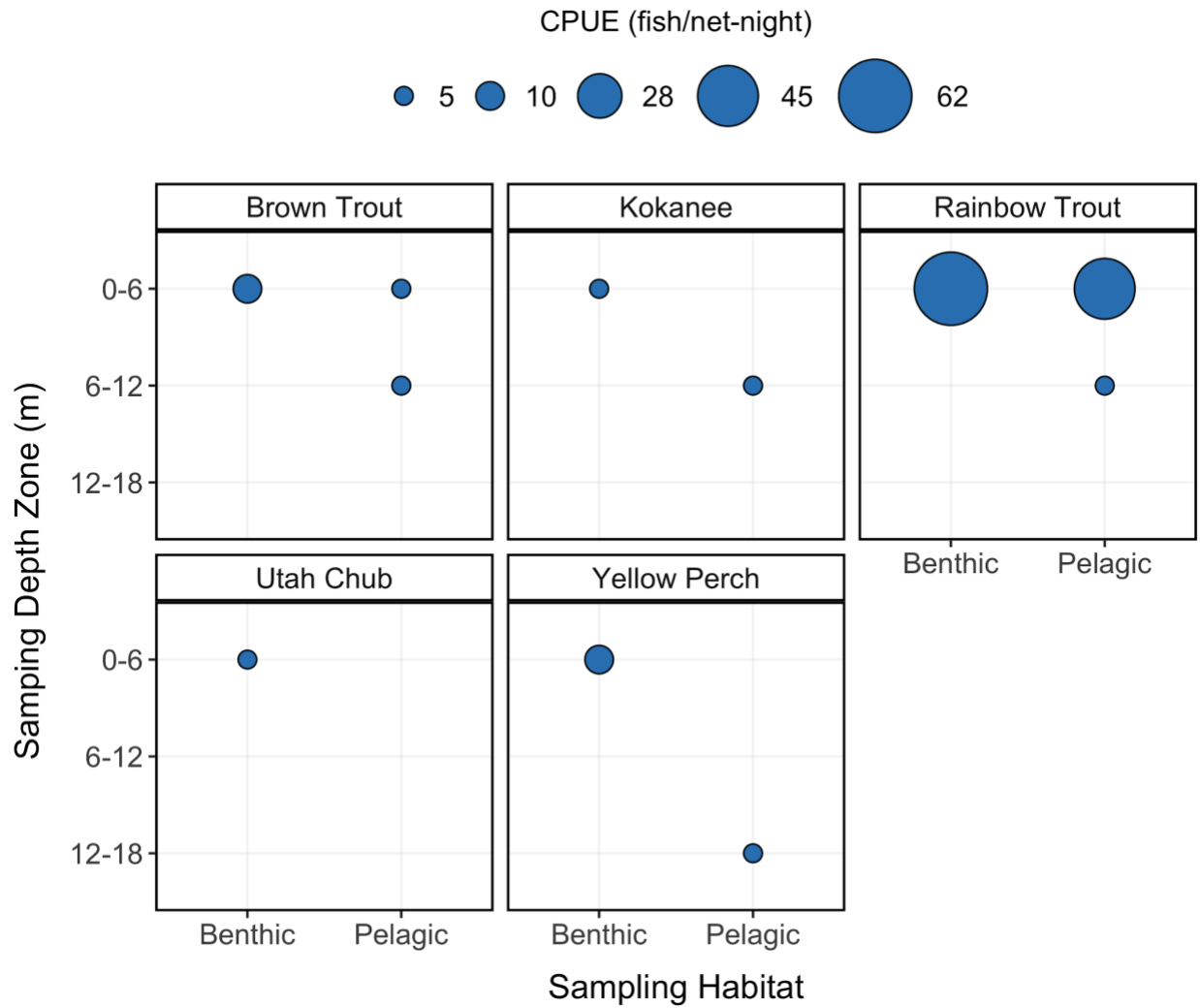


Figure 2: Catch-per-unit-effort (CPUE) of Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch from each sampling location in Rockport Reservoir from 2022. CPUE is depicted with varying point size and the diameter of the point is directly proportional to CPUE. No sampling was conducted in the 6-12 and 12-18 m depth zones for benthic habitat.

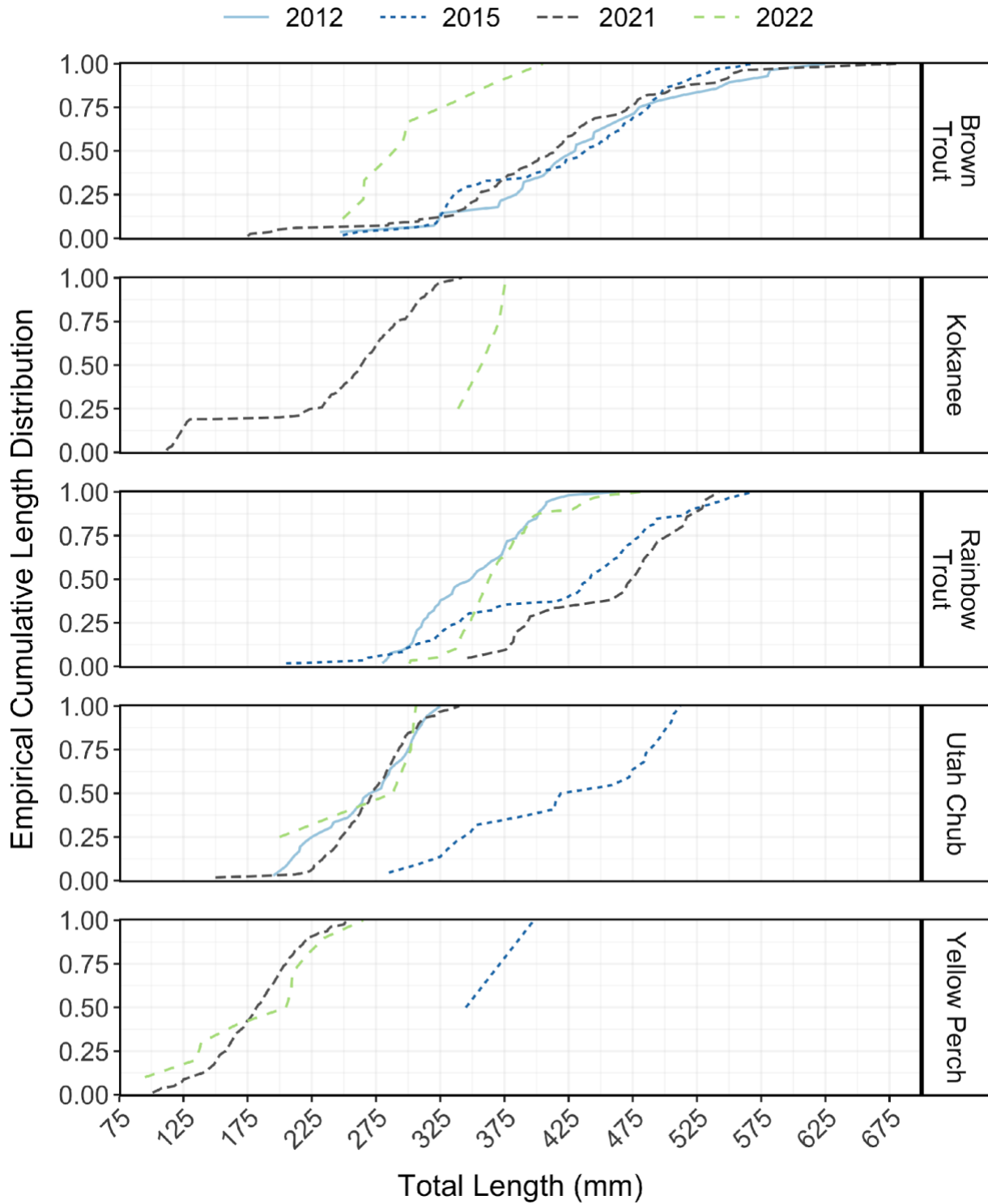


Figure 3: Empirical cumulative total length (mm) distribution of Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch from Rockport Reservoir in 2012, 2015, and 2020-21. Data prior to 2021 was collected from benthic gillnets and no sampling was conducted in 2013-14 and 2016-20.

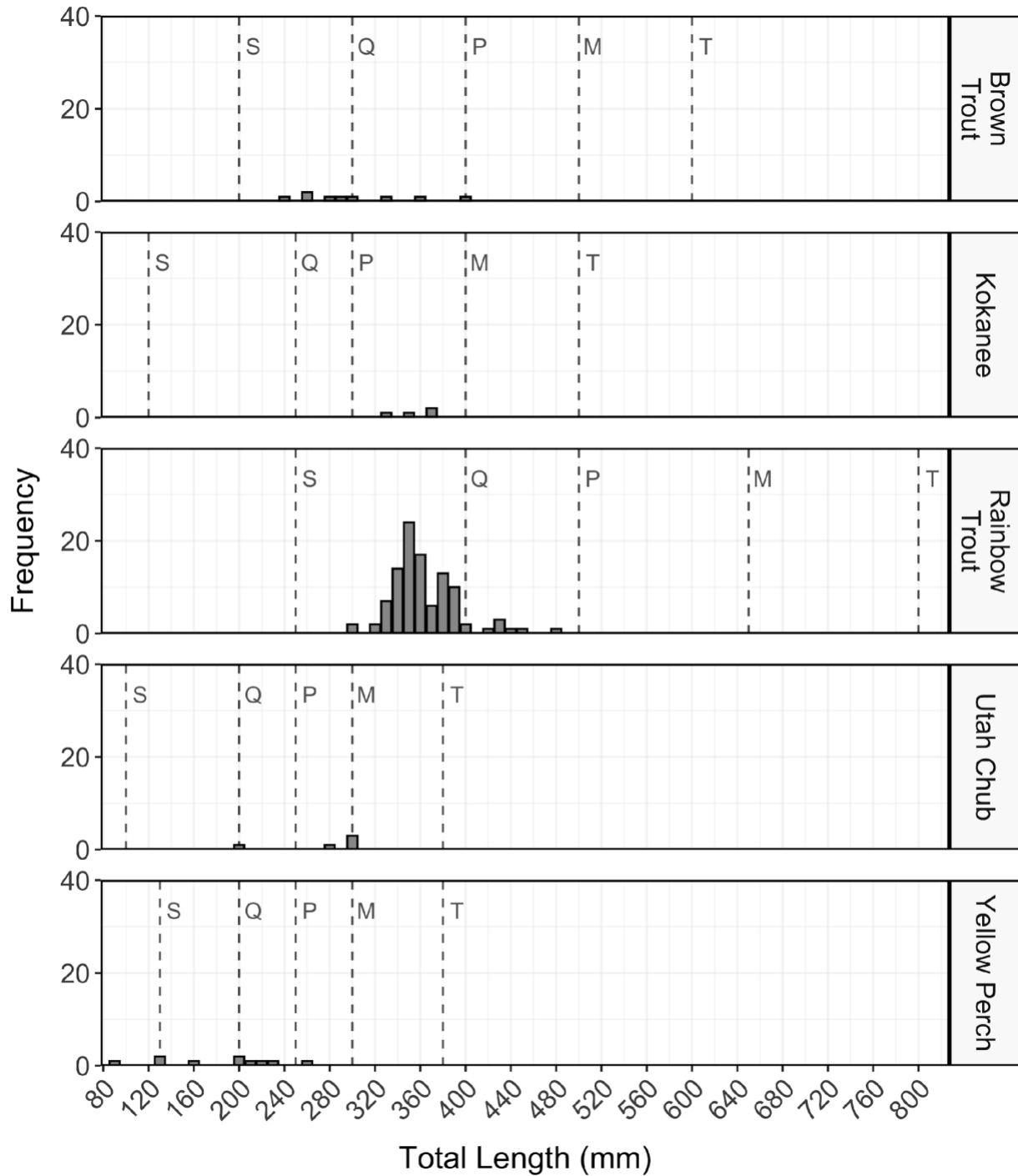


Figure 4: Total length (mm) frequency of Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch from Rockport Reservoir in 2022. The length intervals are left-inclusive and right-exclusive, and the x-axis labels represent the start of the length interval (i.e., left side). The start of each Gablehouse length category is identified by the vertical dashed lines and the category name (i.e., stock, quality, preferred, memorable, and trophy) is indicated by the first letter of each category on the right side of the dashed line.

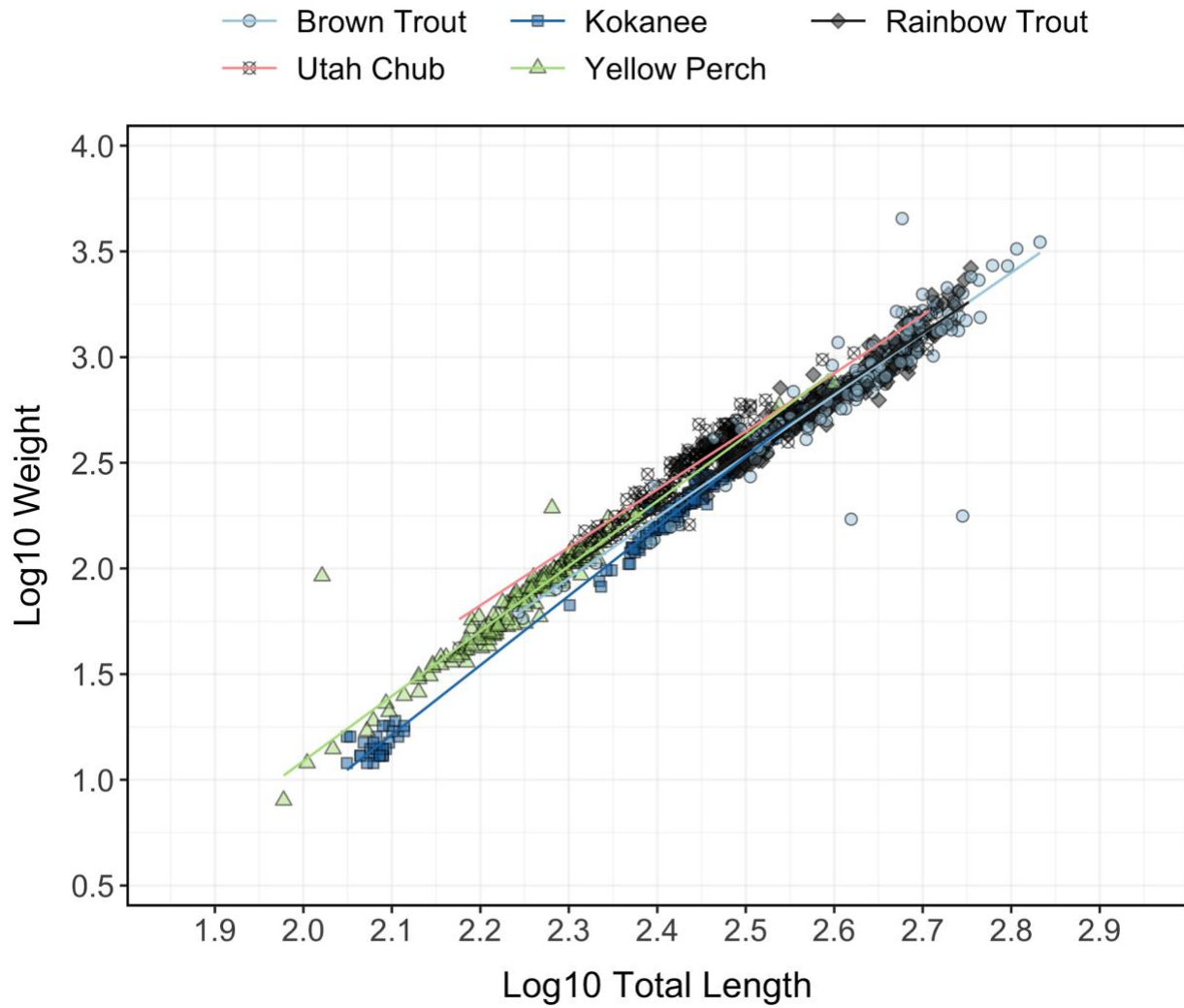


Figure 5: Fitted line plot for the regression of log10 weight on log10 total length for Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch from Rockport Reservoir in 2012, 2015, and 2021-22. Data prior to 2021 was collected from benthic gillnets and no sampling was conducted in 2013-14 and 2016-20.

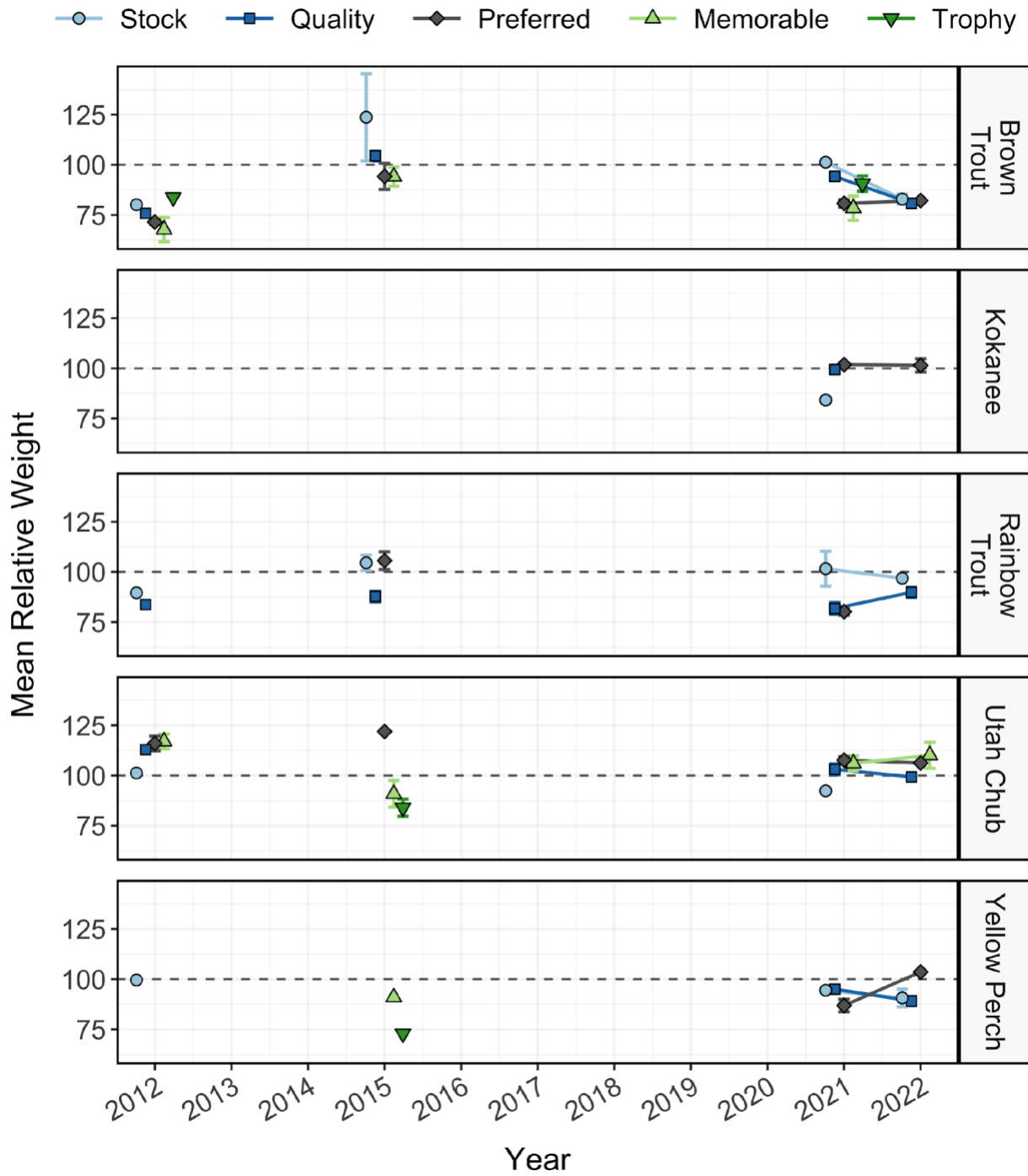


Figure 6: Relative weight (\pm standard error) of Brown Trout, Kokanee Salmon, Rainbow Trout, Utah Chub, and Yellow Perch within each Gablehouse length category from Rockport Reservoir in 2012, 2015, and 2021-22 as an index of condition. The horizontal dashed line indicates a 1:1 relationship between standard weight and relative weight. Points and lines are jittered to minimize overplotting. Data prior to 2021 was collected from benthic gillnets and no sampling was conducted in 2013-14 and 2016-20.

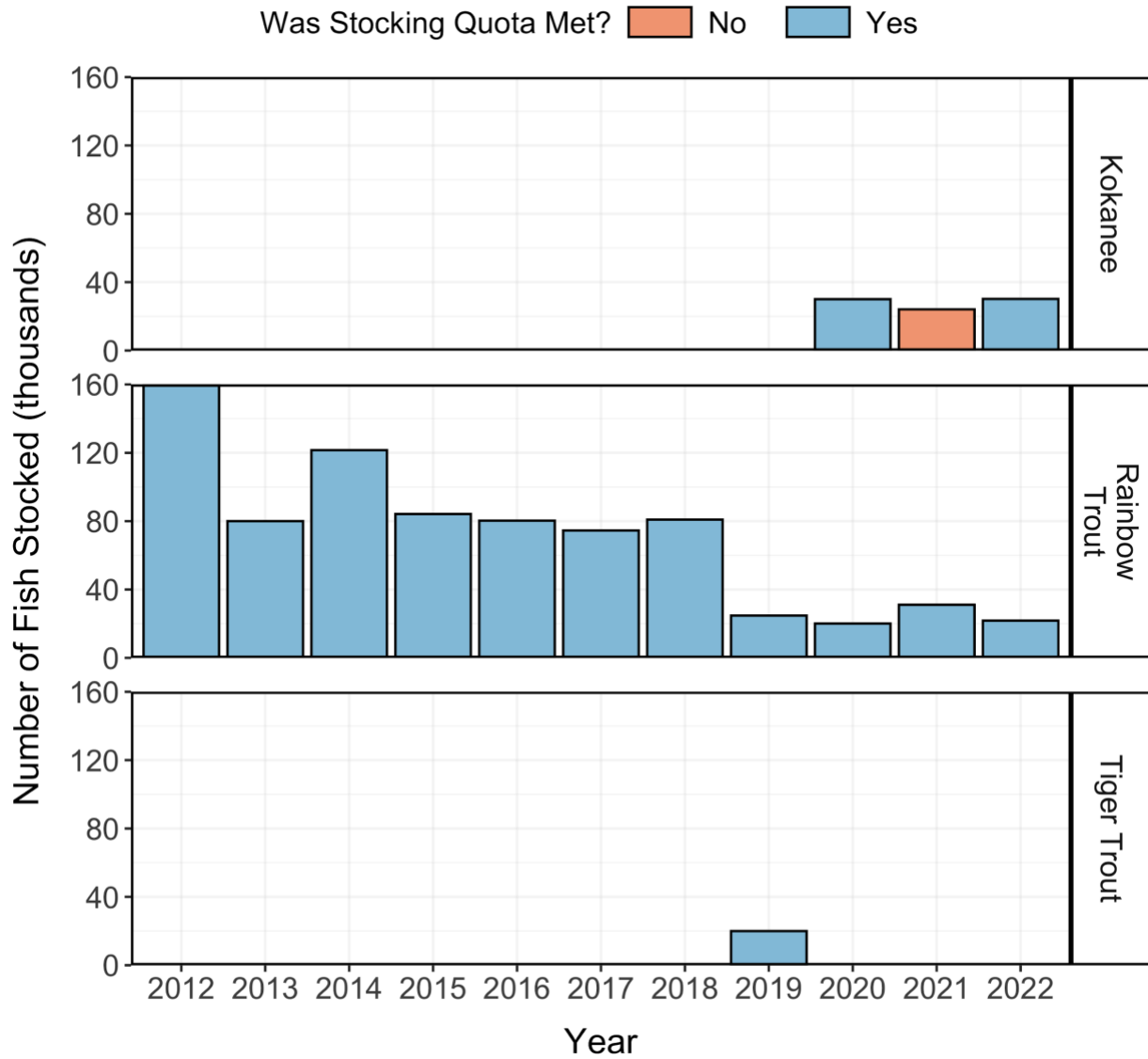


Figure 7: Number of individuals stocked in Rockport Reservoir from 2012-2022. Length-at-stocking and stocking quota varies among years. A stocking quota was determined to be met if the number of stocked individuals was at least 90% of the stocking quota.