Lake Trout Population Monitoring

RAPID ASSESSMENT OF LAKE TROUT POPULATION SIZE IN LAKES AND RESERVOIRS

## How are lake trout populations monitored?

Lake trout are top predators, reproduce naturally, and are important sport and food fish for anglers in Colorado's lakes and reservoirs. Keeping close tabs on their abundance and size structure is necessary for assessing the appropriateness of harvest regulations, ensuring lake trout remain in balance with prey fish populations, and determining whether management goals are achieved. However, estimating the abundance of lake trout in our large coldwater reservoirs at the frequency needed to inform management using conventional methods such as mark-recapture is impractical. Thus, CPW researchers and biologists evaluated the utility of "Summer Profundal Index Netting" (SPIN) for application to lake trout in Colorado beginning in 2011. Developed by the Ontario Ministry of Natural Resources, SPIN is a standardized gill netting method for estimating the density of lake trout ≥12 inches over a 1-2 week period. Colorado has since adopted SPIN for monitoring lake trout populations in Blue Mesa Reservoir, Grand Lake, Lake Granby, and Taylor Park Reservoir.

Survey design, implementation, and results:

Standard gill nets specific to this protocol are set for two hours during daylight along the bottom in random orientation when surface temperatures exceed 64°F. You may see these nets being set or pulled at these lakes by CPW personnel during the summer months. The number of sets depends on the surface area of the lake or reservoir. Set locations cover depth intervals of 6-32 ft, 32-64 ft, 64-96 ft, 96-128 ft, 128-192 ft, 192-256 ft, and >256 ft. Sampling is also conducted in different portions of the lake or reservoir if necessary to account for differences in lake trout habitat. Catch rates of lake trout in the gill nets set in Colorado systems are compared to catch rates of lake trout in the same type of gill nets in other water bodies where estimates of lake trout density were available. The advantage of this method is the use of data from numerous other systems as a calibration tool to quantify lake trout densities and abundances in Colorado. Please see Lepak (2011) and Hansen (2018) for additional information.

Management implications:

Results from each SPIN survey conducted to date shows that lake trout density varies 7-fold across study systems. This indicates that processes governing the productivity of lake trout vary or operate differently in each lake or reservoir. Thus, management plans and corresponding harvest regulations must be tailored to each individual lake trout population in order to achieve desired goals for the fishery.

References:
Hansen, A.G. 2018. Summer profundal index netting for tracking trends in the abundance of lake trout in coldwater lakes and reservoirs of Colorado: results from 2018. Internal CPW report. 6 pages.
Lepak, J.M. 2011. Evaluating summer profundal index netting (SPIN) as a standardized quantitative method for assessing lake trout populations. Internal CPW report. 10 pages.

Map of Blue Mesa Reservoir showing gill net set locations ($N = 83$ dots) and the associated depth interval sampled (colors) during the 2016 SPIN survey:
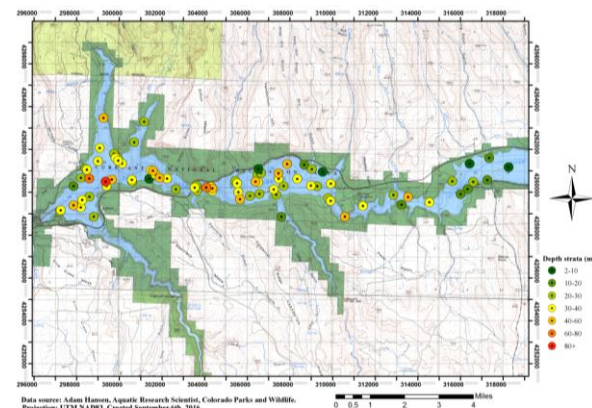
Summary data from each SPIN survey conducted to date. Asterisks indicate the presence of *Mysis* shrimp in the body of water.

Survey year	Lake or reservoir	Number of gill net sets	Number of lake trout caught	Mean length (inches)	Density (fish/acre)	Total area surveyed (ha)	Abundance estimate
2011							
	Blue Mesa	81	129	17.2	4.51	7,559	34,071
2013							
	Grand Lake*	36	87	16.5	5.14	477	2,452
	Taylor Park*	36	271	16.4	7.94	1,507	11,950
2014							
	Blue Mesa	81	211	16.7	3.18	8,424	26,753
	Lake Granby*	71	501	16.4	23.17	6,870	159,193
2016							
	Blue Mesa	83	180	17.2	2.89	8,424	24,368
	Grand Lake*	36	109	17.2	6.56	477	3,131
2018							
	Blue Mesa	95	313	16.3	4.60	6,496	29,857