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Comparison of Catch and Lake Trout Bycatch in Commercial Trap Nets and Gill Nets Targeting Lake Whitefish in Northern Lake Huron

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Abstract.–We compared seasonal lake whitefish catch rates, lake trout bycatch, and gear-induced lake trout mortality between commercial trap nets and gill nets in north-central Lake Huron. Onboard monitors recorded catches from 260 gill net and 96 trap net lifts from October 1998 through December 1999. Catch rates for lake whitefish were highest in fall for both gear types, reflecting proximity of spawning sites to the study area. Lake whitefish catch rates were also relatively high in spring but low in both gear types in summer. Lake trout were the principal bycatch species in both gears. The lake trout bycatch was lowest in both gear types in fall, highest in gill nets in spring, and highest in trap nets in summer. The ratio of lake trout to legal whitefish (the target species) was highest in summer and lowest in fall in both gear types. The high lake trout ratio in summer was due principally to low catch rates of lake whitefish. All but 3 of 186 live lake trout removed from trap net pots survived for at least two days of observation in laboratory tanks. Therefore, we estimated that post-release survival of trap netted lake trout that had not been entangled in the mesh was 98.4%. In addition, we accounted for stress-induced mortality for lake trout that were live at capture but entangled in the mesh of either gear type. Resulting estimates of lake trout survival were higher in trap nets (87.8%) than in gill nets (39.6%). The number of lake trout killed per lift was highest during summer in trap nets and

during spring in gill nets. In trap nets, 85% of dead lake trout were observed to be entangled in the mesh of the pot or tunnels. Survival rates of lake trout in gill nets were higher in our study than reported by others, probably because our nets were hand lifted in a small boat. Our trap net-induced mortality estimates on lake trout were higher than those reported by others because we adjusted our estimates to account for post-release mortality caused by handling and injury. Studies such as ours should prove useful to managers developing harvest allocation options that are consistent with the need to protect nontarget populations. For example, applying our seasonal lake trout-whitefish catch ratios to a hypothetical small-boat gill net fishery, the lake trout bycatch from harvest of 100,000 kg of whitefish would equal the estimated lake trout production available for harvest in the study area for year 2002. The two trap net fisheries may have incidentally killed half this number of lake trout annually from 1995-99. Bycatch estimates are also important inputs to catch-at-age decision models used in developing rehabilitation and harvest strategies for target and bycatch species.