Extraordinary Results of Innovative Stocking of Brook Trout *(Salvelinus fontinalis)*

Norm Quinn[1] and Chris Wilson[2]

[1] Park Biologist, Algonquin Provincial Park, OMNR Algonquin Park
P.O. Box 219, Whitney, ON, K0J 2M0
norm.quinn@mnr.gov.on.ca
(613) 637-2780 ext. 315

[2] Ontario Ministry of Natural Resources, Aquatic Research and Development Section
Trent University, Peterborough, ON, K9J 8N8
chris.wilson@mnr.gov.on.ca
(705) 755-2261

Domestic hatchery-reared brook trout (*Salvelinus fontinalis*) rarely establish wild (self sustaining) populations when stocked in lakes. The reasons for this are unclear but must be related to both deficiencies of habitat in recipient lakes or the fish themselves; generations of rearing in the hatchery seems to reduce the fitness of brook trout (eg., Vincent 1960). We stocked three lakes in the western uplands of Algonquin Park in 1991 with spring fingerlings spawned from wild adults and observed both reproduction and evidence of extraordinarily high survival. The recipient lakes were Thunder, Whitespruce and Eu (the latter two are connected and effectively form one lake). All three lakes are small (<18 ha) with depauperate fish communities and maximum depths >10 m (details are available from NWSQ). None of the lakes had brook trout prior to stocking. Spawn were collected in November 1990 from three Park lakes: Scott, Charles, and Salvelinus, incubated over winter in a private hatchery, and stocked by helicopter in May 11. Thunder Lake received 950 fish from Salvelinus and Charles lakes, and Eu-Whitspruce received a total of 2250 fish from all three donor lakes.

In November of 1999, the Thunder Lake population was sampled via two overnight gill net sets of two panels each. Fifteen brook trout with a mean length of 42.38 cm (38.0-49.5 cm) were caught, clearly comprising one cohort of F_1 (stocked) fish. Eu and Whitespruce lakes were sampled in September of 2000, using four overnight gill nets of two panels each. Forty-six fish were caught, of which 36 were greater than 30 cm (maximum 45 cm), 9 were 20-30 cm, and one 10 cm. Based on length-at-age data for brook trout from the Park (Quinn *et al*. 1994) , the smallest fish was certainly produced from reproduction of the original planted fish, which seems probable for most or all of the 20-30 cm fish as well. Juvenile brook trout were observed in the shallows of Eu-Whitespruce in the spring of 2001, confirming wild reproduction in at least one of these lakes. Wild brook trout in Algonquin Park rarely live past 5 years of age (Quinn *et al*. 1994) and survival of stocked brook trout is poor (e.g., Fraser 1972). Results of our netting are therefore suggestive of exceptional survivorship.

Brook trout from the three source populations were readily distinguishable based on genetic variation at six isozyme loci. Assignment tests based on multilocus genotypes of individual fish correctly identified the population of origin for 94% of brook trout from the three source lakes. Assignment tests were similarly successful in resolving the ancestry of brook trout in the stocked lakes. All but one of the captured Thunder Lake brook trout originated from Salvelinus Lake. Similarly, Salvelinus Lake brook trout showed the greatest contribution (67%) to the Eu-Whitespruce populations, although Charles Lake brook trout made up 22% of the sample collection. The genotypes of several fish indicated their mixed ancestry, primarily between Salvelinus and Charles Lake brook trout. The contribution of success of

brook trout from the three source populations varied in proportion to the extent of introgressed hatchery ancestry (Ihseen *et al*. unpublished data). The combined survivorship and genetic data indicate that wild stocking and maintaining the genetic integrity of wild source populations may result in enhanced survivorship and reproductive success of stocked fish.

References

Fraser, J. 1972. Recovery of planted brook trout (*Salvelinus fontinalis*), splake, and rainbow trout *(Salmo gairdneri*) from selected Ontario Lakes, *Journal of the Fishery Resource Board of Canada*, 29: 129-142.

Quinn, N.W.S., R.M. Korver, F.J. Hicks, B.P. Monroe, and R.R. Hawkins. 1994. An empirical model of lentic brook trout (*Salvelinus fontinalis*). *North American Journal of Fisheries Management*, 14: 692-709.

Vincent, R.E. 1960. Some influences of domestication upon three stocks of brook trout (*Salvelinus fontinalis*) *Transactions of the American Fisheries Society*, 89: 35-52.