

PROGRAMME - ABSTRACTS
Canadian Conference for
Fisheries Research
January 2-4, 1998

PROGRAMME - RÉSUMÉS
Conférence canadienne de la
recherche sur les pêches
les 2-4 janvier 1998

Queen's University
Kingston

clearcut). A pre-treatment survey of aquatic fauna was conducted during July and August 1995. Benthic insects emerging from littoral and profundal zones were sampled with conical floating traps (basal diameter = 0.3 m²). Ninety-eight percent (1,054 of 1,076) of the total emergent macroinvertebrates were chironomids (Diptera: Nematocera). From 28 May to 6 August 1997 (first year post-treatment), a total of 1,989 chironomid imagoes were collected. Midges will be identified to genus and the resulting assemblages will be analyzed as an indicator of aquatic environmental stresses associated with catchment deforestation.

TEMPORAL CHANGES IN GENETIC VARIATION IN ATLANTIC SALMON POPULATIONS IN THE INNER BAY OF FUNDY

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Atlantic salmon populations in the Inner Bay of Fundy have been declining since the late 1980s. To examine the degree to which these population declines have been associated with changes in genetic variability, we analyzed microsatellite DNA from historical and contemporary samples obtained from one reintroduced population (Point Wolfe River) and from several natural populations (Big Salmon, Upper Salmon, Stewiacke, Petitcodiac Rivers). Temporal stability of genetic variation within and among populations is used to assess the genetic distinctiveness of salmon in separate rivers and the utility of reintroduction efforts.

PHYLOGENETIC RELATIONSHIPS OF THE BROOK STICKLEBACK, *CULAEA INCONSTANS* (TELEOSTEI, GASTEROSTEIDAE)

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The phylogenetic relationships of the brook stickleback, *Culaea inconstans*, are uncertain; some workers consider the ninespine sticklebacks, *Pungitius* spp., the threespine sticklebacks, *Gasterosteus* spp., or the fiftenspine stickleback, *Spinachia spinachia*, as its closest sister group. We examined representatives of the gasterosteid species, *Spinachia spinachia*, *Apeltes quadracus*, *Gasterosteus aculeatus*, *P. pungitius*, *P. platygaster*, and *P. hellenicus* as the ingroup and *Aulorhynchus flavidus* as the outgroup to determine their phylogenetic relationships in an osteological study. Behavioral characters also were used from the literature. The results of this study suggest that the Greek ninespine stickleback, *P. hellenicus*, may be the sister group of the brook stickleback.

AQUATIC-TERRESTRIAL TOPOGRAPHIC AND CLIMATE LINKAGES AT THE COLDWATER LAKES EXPERIMENTAL WATERSHEDS

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The study of both aquatic and terrestrial ecosystems at the Coldwater Lakes site has required the use of innovative technology and sampling protocols to generate seamless models describing topographic and climate linkages between the two systems. Specifically, a common digital elevation model of landform and forest canopy was created by merging points from Ontario Base Maps, air photogrammetry, SPOT imagery, and GPS-generated bathymetry and terrestrial feature identification. Underwater and terrestrial climates were similarly linked by both upland and lake-center meteorological stations, nearshore water temperature and wind fields measurements, and temperature and light monitoring in riparian forest, shoreline buffer strips, and clearcuts.

SIZE-DEPENDENT GROWTH AND MORTALITY IN AGE-0 RAINBOW TROUT AMONG LAKES DIFFERING IN INTENSITY OF SIZE-DEPENDENT INTERACTIONS

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I examined the direct and indirect effects of size-dependent interactions within lentic rainbow trout (*Oncorhynchus mykiss*) populations. I tested two specific hypotheses: (1) growth of age-0 rainbow trout is indirectly controlled by the presence of older conspecifics; and (2) mortality of age-0 rainbow trout is size-dependent and directly controlled by the presence of older conspecifics. I measured short-term behaviours such as use of resources like space and food. Growth rates of age-0 rainbow trout populations in the experimental lakes could not be explained simply by prey availability. The intensity of interactions with older and larger conspecifics may have indirectly affected growth of age-0 rainbow trout by altering the spatial and temporal use of resources and/or directly by imposing an energetic cost. Mortality rates of age-0 rainbow trout varied directly with the presumed intensity of interactions with