Atlantic Salmon Autumn Pre-smolts in New Brunswick, Canada Rivers

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In some Atlantic salmon (*Salmo salar*) rivers, juvenile salmon begin their movements toward the sea in autumn of the year before they become smolts. These fish are termed "pre-smolts", and we know very little about their ecology, behavior, physiology, and the adaptive reasons for their movements, and to what degree changes in these could be contributing to depressed salmon returns. Two hypotheses have been proposed for the autumn movements. The first holds that the fish have outgrown the winter shelters available to them among the substrate interstitial spaces in their home tributaries, and they move to locate larger shelters in the river's main stem. The second hypothesis is that the fish are staging toward the estuary in order to be able to rapidly enter the sea during favorable conditions in the following spring. Work involving the New Brunswick Wildlife Trust Fund, Bowater, J.D. Irving Limited, the Miramichi Salmon Association, the Tobique Salmon Association, DFO, the Université de Québec at Rimouski, and the Atlantic Salmon Federation has begun to document autumn pre-smolt abundance and movements on selected New Brunswick rivers.

Rotary Screw fish traps were installed in the autumn in the Gulquac (Saint John system), Rocky Brook (Miramichi system) and Little Main Restigouche rivers to enumerate pre-smolts and document movement timing. In 2001, pre-smolt blood samples were obtained for hormonal assays (T3, T4, Cortisol), and a sample of fish from Rocky Brook had sonic tags (VEMCO) surgically implanted in their body cavities. VR2 receivers were deployed for a distance of about 40 km along the Miramichi main stem to record signals from the sonically tagged fish in order to document their movements in the autumn and winter.

Pre-smolts were found in all the rivers monitored, although the numbers caught varied among sites and years. Within a given year, pre-smolt movements in the different rivers were initiated and peaked on roughly the same dates. Water temperature appears to be an important cue. Hormonal assays are not yet completed. Sonic tracking of pre-smolts in 2001–2002 was hampered by drought conditions and a warm winter. The former reduced water depths, and may have blocked the transmission of some of our signals. The latter resulted in unsafe ice conditions during much of the winter that prevented us from accessing the receivers to download information. The few fish that we have successfully tracked moved short distances and seem to have taken shelter in the first patches of coarse substrate they encountered during their downstream migration. More information may become available when we can download presently inaccessible receivers in the river.

Present results suggest that pre-smolts move to find winter shelter rather than as a staging movement.

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