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Flooding Hazard Identification, Mapping, and Vulnerability Assessment in Newfoundland, Canada

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Most flood events in Newfoundland involve combinations of natural causes and anthropogenic factors. Hurricanes, autumn and winter storms, spring rain-on-snow events, and ice jams are consequences of the natural environment. Tsunami events have also been recorded.

Flooding would be influenced by changes in the magnitude, number, and timing of hurricane events. Overall precipitation has increased, in accordance with predictions from climate change models. An increase in precipitation, coupled with marginal decreases or no change in winter temperatures, would make rain-on-snow events more likely. Under the predicted climate change that will influence Newfoundland in coming decades, the styles of flooding due to natural causes will not differ in the future.

Flooding events are not statistically associated with overall wet years, and total annual precipitation increases do not directly imply increased flood risk. Anomalously dry years are not necessarily associated with reduced risk of flooding, and flood events are not directly associated with heavy precipitation following dry conditions. Precipitation records show annual variation in excess of 100% for some stations. The available data does not indicate a definitive link between overall regional climate variation and flood frequency.

Drainage infrastructure that is unable to evacuate water rapidly, buildings erected in vulnerable locations, and diversions or modifications of natural drainage are common

factors. Construction in upslope positions increases flood risk in lower areas. Municipal planning is critical to avoid, mitigate, or resolve anthropogenic factors contributing to flooding. Maintenance of infrastructure is a major factor in limiting damage from successive rainfall events.

Identification of floods and other natural hazards, assessment of their impacts, and suggestions for adaptation have proceeded in a somewhat piecemeal fashion. Fragmentation of databases; loss of records, institutional, community, and individual memories; limited financial and personnel resources; and difficulties with effective dissemination of the available information have all hampered efforts. Although the impacts of different natural hazards are frequently linked, accentuating risk, increasing vulnerability, and augmenting damage and human cost, comprehensive mapping and assessment of all natural hazards is not available for any community in Newfoundland. An integrated approach, encompassing mapping, analysis, socio-economic research, and risk and vulnerability assessment, is a vital aspect of reducing risk and effective emergency planning under both current and future climate conditions. Although some flooding is inevitable and unavoidable, human choices can be made on the basis of hazard identification, mapping, and vulnerability assessment that minimize community and individual vulnerability.