Plant establishment and community succession in relation to geomorphic change on rivers with multiple channels

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Flood plain ecosystems are considered to be critical centers of biological activity for diverse animal assemblages due to high habitat heterogeneity and diversity. Fluvial processes periodically cut and fill alluvial deposits to maintain a mosaic of vegetation patches in various stages of regeneration and maturity that uniquely function as habitat for wildlife. To understand wildlife habitat creation and maintenance on floodplains, patterns of plant recruitment and community succession must be better understood as they relate to seasonal flow dynamics and consequent geomorphic changes. Anastamosed river reaches of large glacial and snowmelt rivers were examined in summer 2004 to investigate patterns in plant disseminule establishment and plant community succession as they relate to geomorphic change. Evidence of geomorphic change was observed on lateral dimension in the form of cutbank erosion and lateral bar accretion. On the longitudinal dimension change was in the form of deposition on midchannel bars influenced by large wood at channel bifurcations and the formation of backwaters at confluences. Vegetation chronosequences were observed in lateral and longitudinal arrays produced by ongoing deposition. Interruptions within these chronosequences associated with channel avulsions were also observed. Dendrochronologic analysis of vegetative chronosequences indicated that seedling establishment and the dispersal of vegetative propogules was episodic, indicating that establishment is the result of interactions between life history traits and strategies, and flow pulses. Analysis of community composition and species-specific patterns of establishment indicated that this interaction is quite complex. Species composition was strongly independent of site age, relative elevation, and substratum characteristics leading to the logical deduction that patterns in the recruitment of pioneer floodplain plants was strongly dependent upon the timing and magnitude of seasonal flow pulses. Patterns of recruitment and establishment indicate the magnitude must reach the threshold of bankfull in order for the successful recruitment of new seedlings and the flow pulse must coincide with the reproductive cycle and strategy of species dispersing their seed. Variability in the timing and magnitude of seasonal flow pulses therefore controls which species will successfully be recruited and the magnitude of that pulse controls the spatial extent of recruitment. Patterns of establishment are the result of large-scale and infrequent hydrologic events that can result in the establishment of disseminules on floodplain surfaces well above bankfull stage, and smaller-scale events at or near bankfull discharge resulting in the recruitment of seedlings on the fringes of lateral and midchannel bars or locally associated with wood debris.

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