

Succession Debt: Long-term Consequences of Clearcut Logging for Wolf-Deer Predator-Prey Dynamics in Southeast Alaska

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Industrial-scale clearcut logging in the temperate rainforest Southeast Alaska initiates a pattern of forest succession that has long-term consequences for wolves (*Canis lupus*) and their principal prey, Sitka black-tailed deer (*Odocoileus hemionus sitkensis*). Once initiated, the patterns of change are inexorable and adjustments to future forest management will do little to mitigate the consequences. We call this set of circumstances “succession debt.” Twenty-five to forty years after clearcutting, regenerating stands of even-aged conifers grow into a “stem exclusion” stage characterized by a dense overstory canopy and depauperate understory vegetation. Carrying capacity for deer is substantially reduced and roads constructed during logging facilitate access to wolf and deer habitat by people. The long-term effects of these factors include declines in populations of deer and wolves, greater vulnerability of deer to severe winter weather, greater probability that wolves will suppress deer numbers at low levels, increasing risk of unsustainable exploitation of deer and wolves, and increased likelihood of conflicts between hunters and wolves for deer. Resource managers need to consider long-term consequences of forest management on predator-prey systems and recognize that mitigation of those consequences may not be possible.



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