Chapter One: Introduction 0.3

Effective wildlife conservation requires an understanding of diet and its consequences for population demographics. Generalist predators are less sensitive to fluctuations in prey abundance than specialists, as their broad diet reduces the likelihood that prey species will fluctuate synchronously. Their ability to switch between alternate prey species when one becomes rare increases population stability and decreases the risk of population decline. Despite this flexibility, a single key prey species or limited suite of species may still have a major influence on productivity, site occupancy, and other demographic drivers.

The northern goshawk (*Accipiter gentilis*) is a forest-dwelling raptor with a wide distribution and generalist diet. However, the number and identity of key prey species varies across its range, with consequences for demographic parameters. In the Yukon, goshawks dependend on snowshoe hare (*Lepus americanus*) and show strong variation in productivity, mortality, and space use in response to cyclical changes in hare abundance (Doyle and Smith 1994). Goshawks in Scandinavia likewise rely heavily on a single narrow prey group, grouse (subfamily Tetraoninae), and show changes in productivity and occupancy based on grouse abundance (Tornberg et al. 2005). In contrast, goshawks in the American Southwest have a wide prey base, regularly taking some fourteen different species. Population fluctuations are small and driven by total prey abundance, though the most influential single species is red squirrel (*Tamiasciurus hudsonicus*) (Salafsky et al. 2007). For such an adaptable predator, the identity and influence of key prey species on population demographics may be specific to each population.

Like many raptors, goshawks in both Europe and North America appear to be limited primarily by nest site availability and food availability (Reynolds, Wiens, and Salafsky 2006; Rutz et al. 2006). For this reason, longstanding guidelines in the American Southwest suggest managing forests for both goshawks and goshawk prey (Reynolds et al. 1992). Under this plan, the majority of managed forest is recommended to remain in the older age classes preferred by goshawks for nesting and foraging. However, a portion should be managed as a mosaic of differently-aged stands and small gaps for the benefit of goshawk prey species. This approach remains controversial (Greenwald et al. 2005), but by manipulating the amount and character of forest habitat managers seek to affect occupancy and productivity, two key drivers of breeding density.

In British Columbia, the coastal population of northern goshawks is the object of federal and provincial management that focuses on the protection of nesting habitat. This strategy is due, in part, to a lack of knowledge regarding goshawk foraging behavior and foraging habitat requirements. Goshawks in this region are known to consume a diverse range of birds and small mammals, but their diet has never been quantified. There is also little known about variation in diet in response to landscape characteristics. The consequences of such habitat-driven variation in diet may have significant–-or negligible-–effects on goshawk productivity and site occupancy. Here we describe goshawk diet at the nest during the breeding season. We evaluate whether landscape characteristics are correlated with variation in breeding season diet across this ecologically diverse region. Finally, we explore whether occupancy and reproductive success vary with diet and landscape characteristics. Addressing these fundamental knowledge gaps will assist in improving existing forest management strategies.

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