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Management of urban woodlands
– effects on bird communities and recreational values

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Abstract
The ongoing urbanisation increases the pressure on urban nature. Urban woodlands are receiving growing attention as they provide valuable ecosystem services to urban citizens, mainly by providing areas for recreation but also through improving air quality and reducing noise. There is an increasing demand for knowledge of how urban woodlands should be managed to combine several functions, such as recreational values and biodiversity conservation. There are, however, few field experiments that evaluate the effects of forest management.
The work in this thesis is based on the results of large-scale, replicated field experiments in urban woodlands in southern Sweden. Management by clearance of woody understory (bushes and small trees) was conducted at five sites in oak-dominated forest stands on the fringe of three midsize cities. Two different types of clearance were applied: 90% removal of understory and 50% removal in regular 50x50 meter patches. Control plots of equal size were left unmanaged. Bird communities were surveyed before and after management, and the impact of bird predation on arthropods in bush and tree canopies were evaluated with exclosure experiments. Bird communities were affected by understory clearance and a decrease in bird abundance was observed in the stands with 90% removal of understory. Patchy clearance had no negative effects on bird abundance. Bird predation had strong effects on arthropods in the understory, which suggests that an important food resource for birds is removed when the understory is cleared. Arthropods were affected by bird predation in the tree canopies too, but the effects of bird predation were weaker in the managed areas, which further stresses the negative impact on birds by extensive clearance of understory.
The recreational values in relation to understory density were evaluated in a photo survey where pictures from the managed areas were shown to panels of students. Open forests were considered most attractive for recreation but 75% of the respondents claimed that they preferred a mix of open and closed forest. In a field study, the participants used cameras to take photos of liked and disliked places along a forest trail in an urban forest. The analysis of photo contents showed that both open and dense forest landscapes were appreciated while visible human impact was usually perceived negatively. Implications for management are that clearance of understory can enhance recreational values but should be conducted in a small scale pattern to promote visual variation and minimise the negative effects on birds. Visible impact from recreational facilities and forest management should be minimised as far as possible. Openness is often affected by management and was found to be useful as a key-variable to analyse management trade-offs between social and ecological values.

Keywords: arthropods, biodiversity, bird communities, clearance, ecosystem services, forest management, multiple-use, preference, recreation, suburban, understory, urban woodlands, visitor employed photography