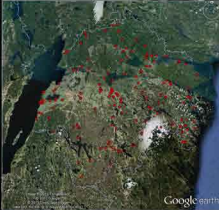


Influence of landscape scale and habitat distribution on individual bat species and bat species richness

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Background

Bats occupy a variety of habitats and are dependent on areas with a high production of insects. Their habitats are known to display a high biodiversity and they are also sensitive to landscape changes which make them excellent indicator species. The aim for this project was to identify how bat diversity and individual bat species respond to habitat amount at different spatial scales.



156 sites included in this study.

Method

A total of 156 sites over Östergötland were surveyed between 1994 and 2012. This resulted in over 700 observations of 10 species out of 12 possible (see species list). To be able to analyze the bat species response to the landscape, twenty different spatial scales were selected between 400 m up to 12000 m. The amount of each habitat variable for each spatial scale was then analyzed against species richness.

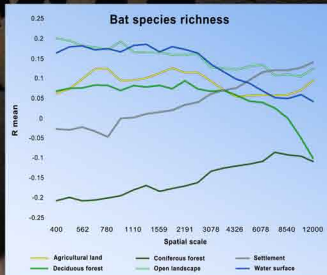
Results

The species richness of bats showed a negative response to amount of coniferous forest at all scales and also to human settlements in the local scales. Amount of water and open landscape showed the highest positive response for the majority of the scales.

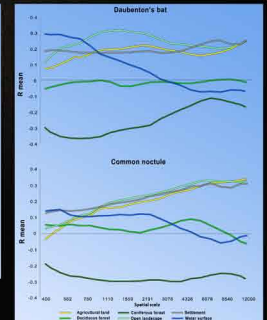
Each bat species responded differently to the landscape composition and at different scales. This is best shown by looking at Daubenton's bat (*Myotis daubentonii*) and the common noctule (*Nyctalus noctula*). Daubenton's bat hunts mainly over water surface and show a high response to increasing amount of water in the local scale and on open landscape on the regional scale, while the common noctule, which hunt over treetops mostly show a smaller response to amount of water on the local scale but respond to amount of agriculture, settlements and open landscapes at increasingly regional scales.

Conclusion

- Increasing amount of coniferous forest is negative for a species rich bat landscape.
- A model based on amount of settlement, open landscape and water was shown to best explain the species richness of bats in a landscape
- Each bat species respond very differently to different habitats at different spatial scales probably due to their hunting niche.



Bat species richness response to habitat amount at different spatial scales.



Daubenton's bat response to habitat amount at different spatial scales compare to the common noctule response.

English Name	Scientific Name	Status	Amount of sites observed in
Daubenton's bat*	<i>Myotis daubentonii</i>	Common	145
pond Bat	<i>Myotis dasycneme</i>	Very rare	0
Brandt's bat*	<i>Myotis brandtii</i>	Relatively common	104**
whiskered bats*	<i>Myotis myotis myotis</i>	Relatively common	104**
Natterer's bat*	<i>Myotis nattereri</i>	Relatively common	13
common noctule*	<i>Nyctalus noctula</i>	Relatively common	123
nocturnal bat*	<i>Eptesicus serotinus</i>	Common	145
particoloured Bat*	<i>Felispartus leucopus</i>	Common	37
vesperugo Pipistrelle*	<i>Pipistrellus pipistrellus</i>	Common	120
Nathusius's Pipistrelle*	<i>Pipistrellus nathusii</i>	Rare	6
brown Long-eared Bat*	<i>Plecotus auritus</i>	Common	65
barbastrelle	<i>Borhyctes barbastellus</i>	Rare	0

*Species list and occurrences at the 156 surveyed sites for the species known to occur in Östergötland.



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