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Promoting strategic Nature-based Solutions (NBS) by understanding ecosystem services as a driving factor for urban growth

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Nature-based solutions (NBS) can be used in improving and protecting ecosystem services (ES), in order to address urban challenges. However, current urban planning approaches have not efficiently integrated NBS into planning to better manage urban land use. This paper examines the interactions between human and natural systems resulting in urban ES and land use and cover change (LUCC) and presents a social-ecological model for LUCC and ES that can help introduce NBS in urban planning. In the model, spatial variations in ES are treated as both drivers and consequences of human decision-making in commercial and residential location choices that drive LUCC. Stockholm County, Sweden, is used as a case study, with a social-ecological LUCC model on 30x30m grid. The results show that ES accessibility drives urban residential and commercial development, with the presence of non-linearity. Areas around existing urban centers show high ES accessibility and high development probabilities, while smaller population centers in large areas enjoy high ES accessibility and low urban development probabilities. Based on the model results, we propose place-specific NBS strategies to deal with the heterogeneous spatial relationship between ES and urban development probabilities.