5   Conclusions

A wide variety of models has been developed to try and predict the distribution of twite across Britain. The models all perform reasonably well, generally achieving area under the ROC curve values in excess of 0.8-0.9. In all cases the models predict absence of twite far better than presence. In itself this could be useful in assessing the potential impact of changing land use on this endangered species. If the values of certain parameters were adjusted to simulate possible changes in agricultural practices, e.g. over grazing and the loss of heather moorland, or an increase in permanent pasture, the model might be expected to respond with increased areas with no twite, i.e. a continuing decline. Similarly, it might be possible to test options that might increase the number of twite tetrads.

However, caution must be applied to such applications because the models clearly did not perform well in all locations, better in some and worse in others. Consideration needs to be given to devising ways to improve the models to better reflect the localised variation in terrain, habitat and land cover, land use and perhaps even climate, if a more reliable model is to be found. Thus, the use of these models should be restricted to broad considerations of the general pattern of distribution as opposed to the detailed distribution and the local level.

Irrespective of the potential uses and value of the models themselves, this project demonstrates the manner by which GIS can contribute to modelling species distributions. The combination of traditional statistical analysis, such as logistic regression, to examine relationships between parameters, and more spatial approaches offers considerable scope to improve the understanding of dynamic and variable interactions between species and their environment. GIS can play a valuable role in developing the understanding of habitat preferences for nesting and foraging twite. However, the nature of the breeding ecology of this increasingly threatened bird species is complex and dependent upon factors that vary at a very local scale. The availability of data of sufficient quality and quantity to develop and utilise complex habitat suitability models is unlikely to be readily available for most areas. The deficiencies in the data that were used for this project show how difficult it would be to develop a model for the whole country that addresses these critical local scale interactions.

Thus, for genuine benefit to be achieved in terms of emerging strategies and policies for the conservation of twite, it is essential that any GIS-based model is as uncomplicated as

possible and capable of being used without the need for intensive local scale survey programmes, or is developed specifically for a number of discrete areas where genuine threats can be mitigated against. Such a model would perhaps be unlikely to produce the best predictive results for the whole country, but could produce a useful compromise between efficacy and viability and focus attention of the critical sites where twite are declining.