BEST PRACTICE GUIDANCE - MANAGING LAND AS A FORAGING RESOURCE FOR BADGERS

INTRODUCTION

Badgers are omnivorous, feeding on a wide variety of food from invertebrates, small mammals and birds to plant foods such as fruit, nuts and crops. The distribution and abundance of these food resources can have a profound influence on badger ecology. For example, the size of a badger social group territory is dependent upon the distribution of key food resources such as earthworms. The density of these key food resources within the territory determines the number of animals within each social group.[1] The sensitive management of these key resources can therefore be a useful tool in mitigating the adverse effects of development.

GENERAL PRINCIPLES

In a development context the management of land as a foraging resource for badgers should embody the following three basic principles:

- Key foraging habitat should be identified at an early stage in the evolution of development proposals and retained wherever possible by preferentially locating built environments on less preferred badger foraging habitat. However, it is important to bare in mind that these less preferred habitats may have other inherent natural heritage value and these should be taken into account.

- Where there is a loss of key foraging habitat to development every effort should be made to enhance the capacity of those habitats which remain within and adjacent to the built environment to support foraging by badgers.

- Where on-site habitat retention or enhancement is not possible compensatory habitat creation should be undertaken offsite.

WHAT CONSTITUTES KEY BADGER FORAGING HABITAT?

Within the Inverness area earthworms are likely to figure prominently in badger diet. Accordingly, the protection, enhancement or creation of those habitats which support good earthworm populations will be pivotal to a successful badger mitigation plan. Some habitats are better than others in this respect – these are illustrated in the following Table:

Habitat	Worm Biomass (kg/ha)
Beechwood	123[2]
Coniferous plantation	175[3]

[1] H. Kruuk (1989). *The Social Badger*. Oxford University Press, Oxford.
[2] Cuendet, G. (1984). *A comparative study of the earthworm population of four different woodland types in Wytham Woods, Oxford.* Pedobiologia, 26, 421-439.

Habitat	Worm Biomass (kg/ha)
Rough grassland	230[3]
Mixed plantation	278[3]
Cereal fields	482[4]
Deciduous woodland	837[3]
Improved pasture	971[4]

While all the habitats shown in the above Table are likely to be used by foraging badgers those that support the highest earthworm biomass are preferentially exploited. Improved grasslands and deciduous woodlands are therefore favoured by badgers, the former habitat being of particular importance, especially when grazed by livestock or mown for amenity purposes. In the latter context sports fields and golf courses can provide a rich source of earthworms, but only in the absence of the use of vermicides (chemicals which kill worms). Grazing or mowing produces a short sward from which earthworms can easily be predated. Longer swards, such as those associated with rough un-grazed grasslands are of relatively less value: worm biomass is reduced and the worms are more difficult to predate.

Although worm-rich grazed or mown grasslands are a primary foraging resource for badgers, other habitats are also of importance. These alternative or "secondary" habitats may be crucial under certain weather conditions such as drought and frost when earthworms may be difficult to obtain. At such times arable crops such as grains and root crops, and woodlands, scrub and rough ungrazed grassland will be readily exploited by badgers.

BADGER FORAGING HABITAT AUDIT

Before any development proposals are considered, it is important to assess the existing habitat value for badgers. This should consist of an audit of the areas of habitat of primary and secondary importance using published data on worm densities for the different habitats present. Please see Table below.

Primary foraging habitat	• Short grazed or mown grassland i.e. improved grassland.
	• Golf Course
	• Broadleaved woodland
Secondary foraging habitat	• Arable
	• Rough grassland (not grazed by domestic stock)
	• Scrub

[3] Hofer, H. (1988). *Variation in resource presence, utilisation and reproductive success within a population of European Badgers Meles meles.* Mammal Review 18, No.1, 25-36.
[4] Kruuk, H. (1978). *Foraging and social organisation of the European badger Meles meles.* Journal of Zoology, 184, 1-19.

	• Mixed woodland
Other	• Coniferous woodland etc.

The audit should be repeated based on the areas of anticipated post-development habitats and a balance sheet prepared showing gains and losses. This balance sheet will provide an indicative assessment of the shortfall in primary and secondary badger foraging habitat that needs to be created elsewhere in the territory by either habitat creation or enhancement.

MEASURES FOR RETAINING, CREATING & ENHANCING BADGER FORAGING HABITAT

In attempting to mitigate the loss of badger foraging habitat the following measures should be considered:

- Avoid locating built environments on primary badger foraging habitat.
- If topsoil is to be removed from primary or secondary badger foraging habitats it should be stripped and piled during dry conditions to avoid compaction. It should also be handled with care and not mixed with subsoil and loose tipped (i.e. not run over by machines as they tip). Piles of soil should be a maximum height of 2m. It should then be seeded within 10 days with a leguminous seed mix and thereafter care should be taken not to contaminate it with chemicals or waste.
- Subject to the value of other natural heritage interests on site, consider the conversion of some areas of "secondary" or "other" habitat to primary badger foraging habitat, e.g. introduce grazing or mowing to rough grassland; convert arable or coniferous plantation to broadleaved woodland.
- Avoid the use of vermicides (chemicals which kill worms) on areas of amenity grassland and golf courses.
- Ensure that habitats of importance for foraging badgers are not fragmented or isolated by development, such that badgers can move freely between them and their setts. Maximum landscape connectivity should be developed by retention of known badger pathways and the retention/development of a network of hedgerows and tree lines that incorporate native species with a high proportion of fruit-bearing species such as Rowan and Elder. Where possible wildlife corridor networks should link with Greenspace (ex/ Inverness's "Green Wedges") and with any badger tunnels or passes installed to prevent road mortality.