Utilisation of wildlife rescue hills by Eurasian beaver (*Castor fiber*) with regard to its management in floodplains

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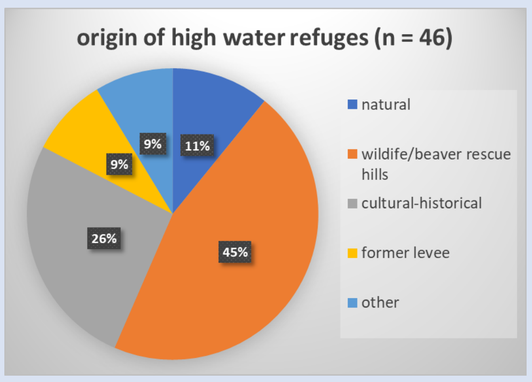
Introduction

Human river regulation measures e.g. on the Elbe, have led to higher water levels during floods and thus to flooding of naturally dry areas in the floodplain. The construction of beaver rescue hills began at the end of the 19th/ start of the 20th century as a protective measure for the then very small relict population of the Elbe beaver (*Castor fiber albicus*). Today, it is also considered a supportive management tool for avoiding conflicts between flood protection and beaver activites.

This study focuses on I) the use of high water refuges by beavers, II) the interaction between beavers and other wildlife species that use these high water refuges, and III) derivation of additional information for the construction of wildlife rescue hills.

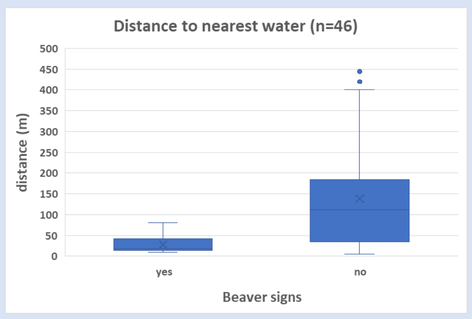
Results

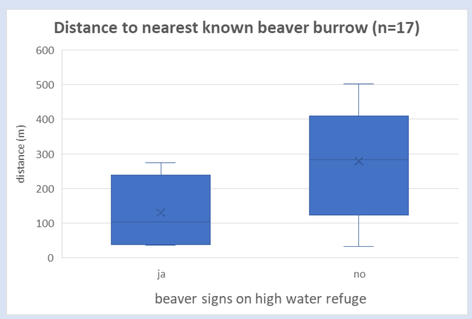
- 21 of the 46 high water refuges were constructed as wildlife or beaver rescue hills, while 24 are of other origins.



Remains of a former bridge that have been converted into a beaver rescue hill

- 13 (28%) of the high water refuges were used by beaver (9 with lairs/burrows, 4 only as feeding sites).
- High water refuges used by beaver (average distance 27,69 m) were closer to nearest permanent waterbody than those without beaver signs (average distance 138,45 m).
- The average distance to the nearest beaver burrow in use (130,67 m) was shorter for high water refuges used by beavers than for those without (278,82 m).





- There was no significant difference between utilised and unutilised sites in terms of the average degree of vegetation cover of the herb (84%), shrub (34%) and tree (44%) layers with a wide range of values.
- 17 lairs were build as small hollows in the ground, mainly under shrubs and dead wood, only 2 were without cover. 4 lairs were created in the root area of older trees on hills with little or no shrub cover.
- During the floods the following mammal species were recorded with wildlife cameras on high water refuges: beaver, red fox (*Vulpes vulpes*), European badger (*Meles meles*), marten (*Martes spec*.), Eurasian otter (*Lutra lutra*), roe deer (*Capreolus capreolus)*, wild boar (*Sus scrofa*), raccoon (*Procyon lotor*), nutria (*Myocastor coypus*) and small rodents.
- Used badger dens were found on 8 high water refuges, used fox dens on 3, resting places of wild boar on 4. But only in one case were an active badger den and two beaver lairs found on the same wildlife rescue hill.
- No interactions between beavers and other mammals were recorded. Hills with activity of beaver and other species have a size at the base of 20-35 m x 10-22 m.

Methods

46 potential high water refuges in the floodplains near the town of Dessau-Roßlau (Germany, Saxony-Anhalt) were monitored after the flood events in December 2023/January and February 2024 and September 2024 on the Elbe and Mulde rivers.

Signs of use by beavers and other wildlife species, characteristics of the high water refuges as well as their location and vegetation characteristics were recorded.

Location of the high water refuges, beaver signs on these sites and at nearby waters were recorded with GPS. The location of the hills was verified using a digital terrain model. Distance to nearest permanent water body and nearest known beaver burrow in use was measured in Q-GIS.

During the flood in winter 2023/ 2024 wildlife cameras were set up on 2 high water refuges. During the flood in September 2024 wildlife cameras were set up on 3 high water refuges.

Discussion

Most important factors for beavers' use of high water refuges were a short distance to the nearest permanent water body and a short distance to the nearest known beaver burrow in use.

The general vegetation cover was not important for the use of high water refuges by beaver. However, the beavers preferred to build their lairs in places with dense vegetation (under shrubs and/or dead wood).

Interactions between beaver and other animals were not recorded. Perhaps the rescue hills studied are large enough to prevent conflicts between beaver and other species. A resting roe deer could be observed on an old, smaller hill, but it was not disturbed. This mound is approximately the size that is considered to be the minimum (15 x 5 m at the base).

Beavers at a rescue hill with lair (on the right).

A resting roe on an old, small rescue hill .

One problem is that many of the old wildlife rescue hills are now too low, as the levees were restored and raised after the extreme floods on the Elbe and Mulde rivers in 2002 and 2013.

Construction of beaver and wildlife rescue hills

In addition to published information on beaver and wildlife rescue hills, the following guidance can be derived for the construction of high water refuges:

Beaver rescue hill at the food of a levee.

- sufficient height of high water refuges is essential (1m above height of levee), older mounds have to be raised
- short distance to water
- short distance to beaver burrow in use
- creation of places with cover for lairs (shrubs, dead wood) at least in one place towards the nearest water body

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