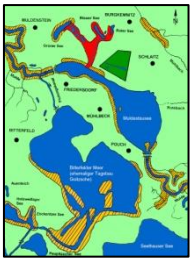
KARL-ANDREAS NITSCHE & GÜNTHER RÖBER, Dessau

Inventory of beaver (*Castor fiber albicus*) activities by a camera drone in the nature protection areas of the former opencast-mining landscape near Bitterfeld, Saxony-Anhalt, Germany

Introduction

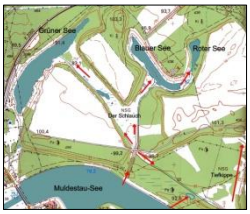
Especially in wide and inaccessible areas, the recording of beaver activities by aircrafts can be helpful. The first operations were started in North America (BRYANT, 1957) and in the Soviet Union (SHARKOV, 1963). Now we have some further and cheaper methods with the development of camera-drones for the recording of beaver activities across smaller investigation areas. In the former opencast mining areas, beavers spread and colonise more and more new areas after the re-naturation of the nature. Because for some of these zones, there is a ban on public access, it is difficult to register respective beaver activities or to perform territory classifications. Therefore, the authors have selected two Nature Protection Areas (NPAs) in the former opencast mining area near Bitterfeld for a first trial for recording beaver activities by a camera-drone.

Investigation area (red point) Punkt) in Saxony-Anhalt (grey))



Onvestigation areas (red and green) yellow hatched beaver territories

Drone-Typ: Yuneec-Typhoon H



Migration routes (red arrows) in the investigation areas

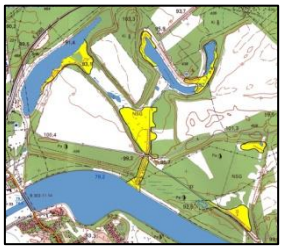
Draw off in Nature Protection Area (NPA) Schlauch Burgkemnitz

Methods

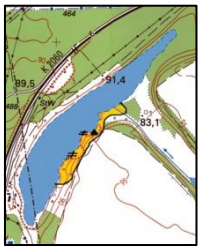
Two NPAs “Schlauch Burgkemnitz” and “Tiefkippe Schlaitz” in the district of Anhalt-Bitterfeld were selected for this investigation. Both areas were nominated for NPAs in 1995. Keep-off-zones and other inaccessible parts were overflown by a camera-drone (Type: Yuneec-Typhoon H, remote control ST 16/ camera: Yuneec Type Cgo3, with a maximum resolution of 3000x4000 pixels and with a video resolution of max. 4 K ultra HD, software version for camera 3.2.26 / single representation 72 dpi, colours spectrum S RGB, colour intensity 24 bit, automatic white equalizer, post adaption: Adobe Lightroom 5.7. 64 bit and PhotoStudio 5.5). The optimum height for flying over was proven to be between 30 and 50 m. The distance between the single photos was 50 m for reaching an overlapping effect. The route was marked with screenshots for all flights. Investigation time: from September 2016 to February 2017.

Results

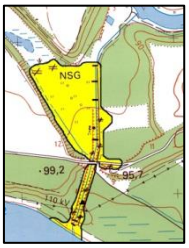
We located 7 winter territories of the beavers inside the investigation area. In total, only few activities were registered on all the beaver sites. Although, there is an optimal food resource during the vegetation period, there is a clear shortage of woods for food in the winter months. Beavers mainly use the bank lines, which are covered by soft woods. In total, seven photo-flights were performed by a camera-drone. 898 aerial photos were evaluated. The activities of beavers were presented on section maps. The number of beavers in the investigation area was estimated with 20 animals as a maximum.



Recorded winter territories



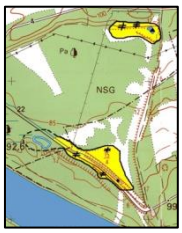
Grüner See (Green Lake), winter territory



NPA Schlauch Burgkemnitz
2 winter territories and draw off

Black line border of territory, ● beaver tube, ▲ Lodge, ⬋ food-, cuttingplace, △ lodge leaved , ? lodge unknow , ---- Beaver dam

Blauer See und Roter See (Blue and Red Lake), winter



NPA Tiefkippe Schlaitz,
northern and southern part

Spots for coordination of mapping
Blauer See (Blue Lake) and draw off

NPA Der Schlauch, draw off

NPA Der Schlauch, southern part.
Flightroutes (red line), 21. 12. 2016

NPA Der Schlauch – draw off. 21. 12. 2016,
red line – border of territory, 1-4 beaverdams

NPA Tiefkippe Schlaitz, northern part, 21. 12. 2016,
red line – border of territory,arrow: beaver lodge

Western part Blauer See (Blue lake), red line winter territory

NSPA Tiefkippe Schlaitz, southern part, 16. 02. 2017
Beaver trails and cuttingplace, 21. 12. 2016

Discussion

In North America, beaver-sites were investigated by aircraft and aerial photos from the highest distances were taken by different methods – the results were made possible by long beaver-dams and big lodges in lakes and ponds (see enclosed references to this poster). In our investigation area, it was difficult to operate the camera-drone and the interpretation of aerial photos was also not easy. Free-standing lodges in open water were not present, tubes along the bank-lines are only visible when covered by wood and tube-constructions are not visible at all. Only, when ice-free water-spots with gnawed wood-stems on the banklines can be seen, an inhabited beaver-lodge with a tube-construction is to be assumed. However, due to the little beaver activities (cuttings and used tracks), we could trace back the winter territories. There are disadvantages for the application of a camera-drone, such as limited capacity of batteries, low flight distances (max. 300 m); and, therefore, only short flight times; the application is highly-dependent on the weather (calm, no minus degrees, which lead to icing of propellers); The tree-vegetation in a height of over 15 m has a negative impact, because radio-waves are cancelled. A view contact to the camera- drone is required for all flights In our opinion, the operation of a camera-drone is suitable for the recording of beaver-activities in small and inaccessible areas. The using of camera-drones for the recording of beaver-damages in beaver-management measures should be investigated in further projects.

Acknowledgements

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Summary

By means of a camera-drone (unmanned aerial vehicle), the winter territories and the activities of beavers were recorded in two Nature Protection Areas in the former opencast-mining landscape. The surface area of both investigation areas is 124.26 ha. As a result of the inaccessibility and the ban on entering the investigation area in many parts, the home range of beaver sites could thus be determined. The camera drone was able to show the distribution of beaver-sites only with restrictions. The beaver population in the study area is estimated with 15 to 20 animals as a maximum. Due to the limited winter food resources in the form of small stripes of softwood-trees at the edge of the banks, the beaver population will be hardly significant in the future. The use of camera-drones for the detection of beaver-damages on surfaces should be tested by further investigations.

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