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Contemporary Technologies in Blakiston's Fish Owl Research

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Abstract: Blakiston's fish owl *Ketupa blakistoni* is a threatened species distributed across Northeast Asia. This species is difficult to study due to its scarcity and sporadic distribution, and biological features, such as nocturnal life and dependence on hard-to-reach old growth riparian forest. Scientists practice a wide range of technical research methods in ornithology to overcome the difficulties in studying certain aspects of bird life. The tools range from traditional to high-tech equipment, such as various tracker systems or drones. Here we analyze some original applications of widespread technical tools for studying the ecology of the fish owl based on our experience with a continental population.

Automatic photo and video recording. Many years of using camera traps proved their low effectiveness for studying the phenology of breeding in fish owls (the beginning of egg-laying and the duration of incubation), nesting behavior, forage ratio, etc. On the contrary, around the clock video recording, including infrared shooting and sometimes controlled by an operator, on nests or hunting places proved to be highly effective. Low night temperatures (up to -25C) at the beginning of nesting, high nest position (up to 18 m from the ground), night shooting conditions – these factors require special refinement of standard video equipment.

Remote weighting. The problem of assessing the physiological conditions of females before the start of egg-laying is an important task of monitoring the population. We have worked out a method for remote, in vivo weighing of birds, which does not require their capture. This simple device is a combination of mechanical scales, camouflaged as a perch placed near the nest or at the place of hunting, and a video camera or a camera trap capturing the weight of a bird when it sits on it. The method allows multiple weighings. Identification of individuals in a pair requires color banding.

Drone surveys. Blakiston's fish owl population counts is a difficult task, involving several stages: 1) desk research identification of potential nesting sites (analysis of winter satellite images for ice-free areas of rivers and presence of old-growth forests near them), 2) field verification of the previous stage (mapping of actual ice-free areas), 3) assessment of presence / absence of birds on a potential site (call counts and search for signs of presence, such as footprints and molded feathers) 4) locating the nesting tree (if present) and evaluating the contents of the nest.

Drone surveys proved to be extremely useful for points 2 and 4. Mapping open water with a drone is much more efficient than a ground survey in rough terrain and high snow. A drone can also be helpful in checking potential or existing nests, since it eliminates the laborious and dangerous need to climb up each potential nesting tree.

To summarize, the methods described above proved very useful in both searching for potential suitable habitats and in monitoring the situation in known nesting sites. We have conducted several surveys to test these methods in the Land of the Leopard national park and in the North-East of Primorsky krai.