DELTA WATERFOWL

RESEARCH

Testing Drone-Mounted Thermal-Imaging Cameras for Wildlife Applications:

Dabblers and Diving Ducks, Pheasants, Songbirds and Endangered Plovers and Grouse

Delta is testing drone-mounted thermal-imaging cameras to conduct bird surveys. Finding nests to monitor is essential to evaluate management for increasing production. However, finding nests is so difficult that it often stifles management. Fortunately, birds have high body temperatures (104 degrees Fahrenheit), so they have even greater potential than mammals for being detected with sensitive thermal imaging systems.

Pilot Work in 2016

Delta's pilot work in 2016 produced promising findings. We mounted a thermal infrared camera on a drone and attempted to locate nests of dabbling ducks. We flew the drone over nine nests and got obvious thermal images at each nest. After this initial testing, we flew the drone over the field and located six additional duck nests not previously detected by traditional nest searching.

When we flew the drone at a low altitude (50 feet), the infrared camera detected the heat signatures of mice. We also picked-up a heat signal that proved to be a vespers sparrow on a nest, which is very promising for songbird research.

Based on the pilot work in 2016, we are moving full speed ahead on two drone projects in 2017.

Testing Efficiency of a Thermal Camera and Drone for Detecting Nests of Dabbling Ducks, Sage Grouse, Ring-Necked Pheasants, Piping Plovers and Grassland Songbirds.

Roald Stander, M.S. student,
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For upland ducks, the pilot work in 2016 showed that a drone with thermal imaging can detect nests, so our testing in 2017 with dabbling ducks is about efficiency. Can the drone system find nests faster and more efficiently than traditional searching using a chain drag?

Ring-necked pheasant and sage grouse nest detection will be evaluated because these birds have proven exceptionally difficult to study. Pheasants and grouse females secretly slip off their nest when they are disturbed, so finding nests means just that – we have to actually find the unattended nest. We will collaborate with researchers in South Dakota for pheasants and Montana for sage grouse so we have access to nests found in traditional ways. This allows us to test whether the drone detects known nests, just as we did with dabblers in our pilot work. If this test is positive, then we will contrast the efficiency of drone nest searching versus traditional nest searching.

The songbird and piping plover work follows the same protocol as with the pheasants and grouse. We are collaborating with researchers from North Dakota State University that are working in North Dakota on grassland songbirds such as bobolinks, savannah, grasshopper, vespers sparrows and others. The piping plover work will occur in Alberta as a collaboration with researchers from the Alberta Conservation Association. The Alberta work will also involve testing of the drone and thermal camera for detecting broods of sharp-tailed grouse and grey partridge.

Drone and Thermal Technology Focused on Diving Ducks and Predator Management: Detecting Nests, Predator Abundance and Broods

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We believe the drone and thermal camera have great utility for work on diving ducks. Finding nests of canvasbacks and other divers is incredibly labor-intense and time-consuming because hens slip off of the nest when they are disturbed. Field crews walk in waders to search the stands of cattail and bulrush for nests. It is brutal work, and takes a small fortune to hire a crew to find reasonable numbers of nests. We currently have a major project examining Predator Management for canvasbacks and other divers, so it only makes sense to have a student doing dedicated drone work in association with the canvasback project.

This project has three important goals:

1) Testing the drone/thermal camera to find over-water nests. As with other tests, our initial efforts will evaluate the efficacy of finding known nests of canvasbacks or other over-water nesting ducks based on the heat signatures detected by the drone-mounted thermal camera. Follow-up work will test efficiency and efficacy of our nest search crews. If the drone detects nests the field team in waders failed to find, it will be valuable information to inform our estimates of nest density.

2) Predator surveys will be undertaken with the drone. Assuming it works, we will get estimates of mammalian population sizes on the trapped and non-trapped blocks during the course of the season. This will certainly guide our trapping effort by informing us about population changes on the trapped blocks.

3) Brood surveys with the drone will be undertaken in late July when predator surveys and nest searching work is completed. Again, the goal is to test efficiency and efficacy of thermal drones for finding hens with broods. The drone might increase the accuracy of our brood surveys, or our confidence in our visual brood survey work.