Drone herbicide applications prove effective for common reed control

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On the left, the brown vegetation is a patch of Phragmites australis where herbicide was applied with a drone the previous fall. On the right is a control patch that was not treated with herbicide and remains green. The high precision application with a drone reduced the extent of non-target effects to neighboring vegetation. Credit: Adrian Rivard

New research from the University of Waterloo shows that a single, targeted herbicide application from a Remotely Piloted Aircraft System

(RPAS) can suppress common reed invasions with more than 99% effectiveness. This result is among many research findings recently published online in *Invasive Plant Science and Management*.

"The 99% reduction in live common reed stems observed with RPAS-based herbicide application demonstrates its capacity to suppress invasive common reed effectively," says Rebecca Rooney, Ph.D., an associate biology professor at the University of Waterloo, Waterloo, Canada, and the study's lead author. "This method matched or exceeded the efficacy of conventional helicopter and backpack applications."

Managing the invasive common reed with herbicides in wetlands can pose significant challenges for land managers, often due to either limited or difficult access to the weeds via foot or with ground spray equipment. Using ground access with heavy equipment can potentially trample wildlife and desirable vegetation. RPAS technology provides more convenient access to spraying the weeds than with ground-control methods, with less risk of trampling or disturbance.

RPAS application also allows smaller spray widths and lower flight heights compared to helicopters, with reduced off-target impacts and lower risk of drift. "It's important to avoid the potential for herbicide drift and any collateral damage to native vegetation, which is especially valuable in ecologically sensitive wetlands," says Rooney.

"The precision of RPAS applications may help land managers to minimize off-target herbicide exposure, reducing impacts to surrounding vegetation and improving conditions for native plant recovery."

While the study's researchers observed short-term declines in plant diversity from the RPAS applications, they also noted that early evidence suggests some native species recolonized in treated areas within a year.

"These findings indicate that RPAS technologies can offer a safe and scalable alternative for invasive species control," says Rooney.

"This approach also holds promise for accelerating ecological recovery in wetland habitats. Future research should focus on long-term native vegetation recovery and quantify the accuracy of RPAS-based herbicide applications to minimize off-target damage to native vegetation in wetlands."

More information: Grace K. Lew-Kowal et al, Suppression efficacy of remotely piloted aircraft systems–based herbicide application on invasive Phragmites australis in wetlands, *Invasive Plant Science and Management* (2025). DOI: 10.1017/inp.2025.8

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