Title: Using gene drive technology to control invasive species in Australia: are we ready for a CRISPR step?

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In Australia, invasive species have been linked to the extinctions of native wildlife, and also to significant financial impacts to agricultural industries. While current management is ongoing to control invasive species, these efforts are self-limiting: they require ongoing management and cost over large landscapes, and often result in the short-term suppression of local populations. New and innovative approaches are warranted. Recently, the gene editing system CRISPR/Cas9 has been proposed as a potential genetic tool that, among other applications, could be used to bias sex-determining genes in a target species to produce males and reduce the numbers of individuals over generations. This technology has the potential to be used by wildlife managers as a non-lethal alternative to control invasive species. While regulatory control and social acceptance are components that must be addressed, there is also a need to identify knowledge and research gaps based on the currently available information for each invasive species. Here we apply a conceptual framework based to an ecological risk model within the gene drive context to identify key requirements for undertaking work on seven exemplar invasive species in Australia: red fox, feral cat, house mouse, black rat, starling, cane toad, rabbit. Our findings provide the opportunity to address knowledge gaps in preparation for a more formal evaluation of the potential for gene drives to provide an effective and sustainable strategy for the control of specific invasive species. This will go hand-in-hand with preparations for managers to engage with policy makers and the public for the social licence to proceed with this innovative technology.