Yang Liu, Penghao Wang, Melissa L.Thomas, Dan Zheng & Simon J. McKirdy, 2021, Cost effective surveillance of invasive species using info-gap theory, *Scientific Reports*, (2021) 11:22828.

Abstract Invasive species can lead to community-level damage to the invaded ecosystem and extinction of native species. Most surveillance systems for the detection of invasive species are developed based on expert assessment, inherently coming with a level of uncertainty. In this research, info-gap decision theory (IGDT) is applied to model and manage such uncertainty. Surveillance of the Asian House Gecko, Hemidactylus frenatus Duméril and Bibron, 1836 on Barrow Island, is used as a case study. Our research provides a novel method for applying IGDT to determine the population threshold (K) so that the decision can be robust to the deep uncertainty present in model parameters. We further robust-optimize surveillance costs rather than minimize surveillance costs. We demonstrate that increasing the population threshold for detection increases both robustness to the errors in the model parameter estimates, and opportuneness to lower surveillance costs than the accepted maximum budget. This paper provides guidance for decision makers to balance robustness and required surveillance expenditure. IGDT ofers a novel method to model and manage the uncertainty prevalent in biodiversity conservation practices and modelling. The method outlined here can be used to design robust surveillance systems for invasive species in a wider context, and to better tackle uncertainty in protection of biodiversity and native species in a cost-efective manner.