Presentation from

2016 World Water Week in Stockholm

www.worldwaterweek.org

© The authors, all rights reserved

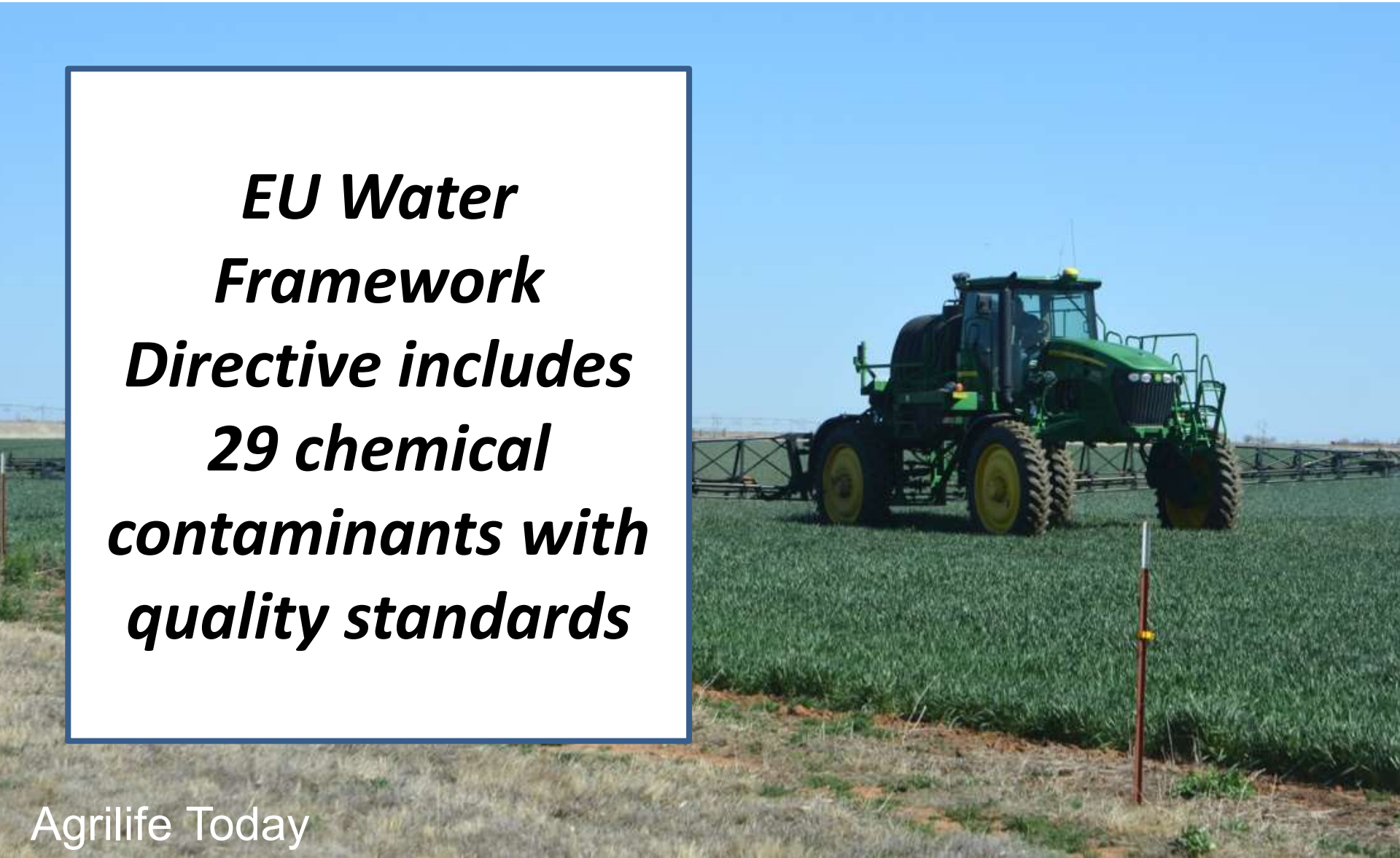
THE UNIVERSITY of York

Emerging Contaminants in the Environment: State of the Science

Alistair B A Boxall
Environment Department
Email: alistair.boxall@york.ac.uk
Twitter: @alistairboxall

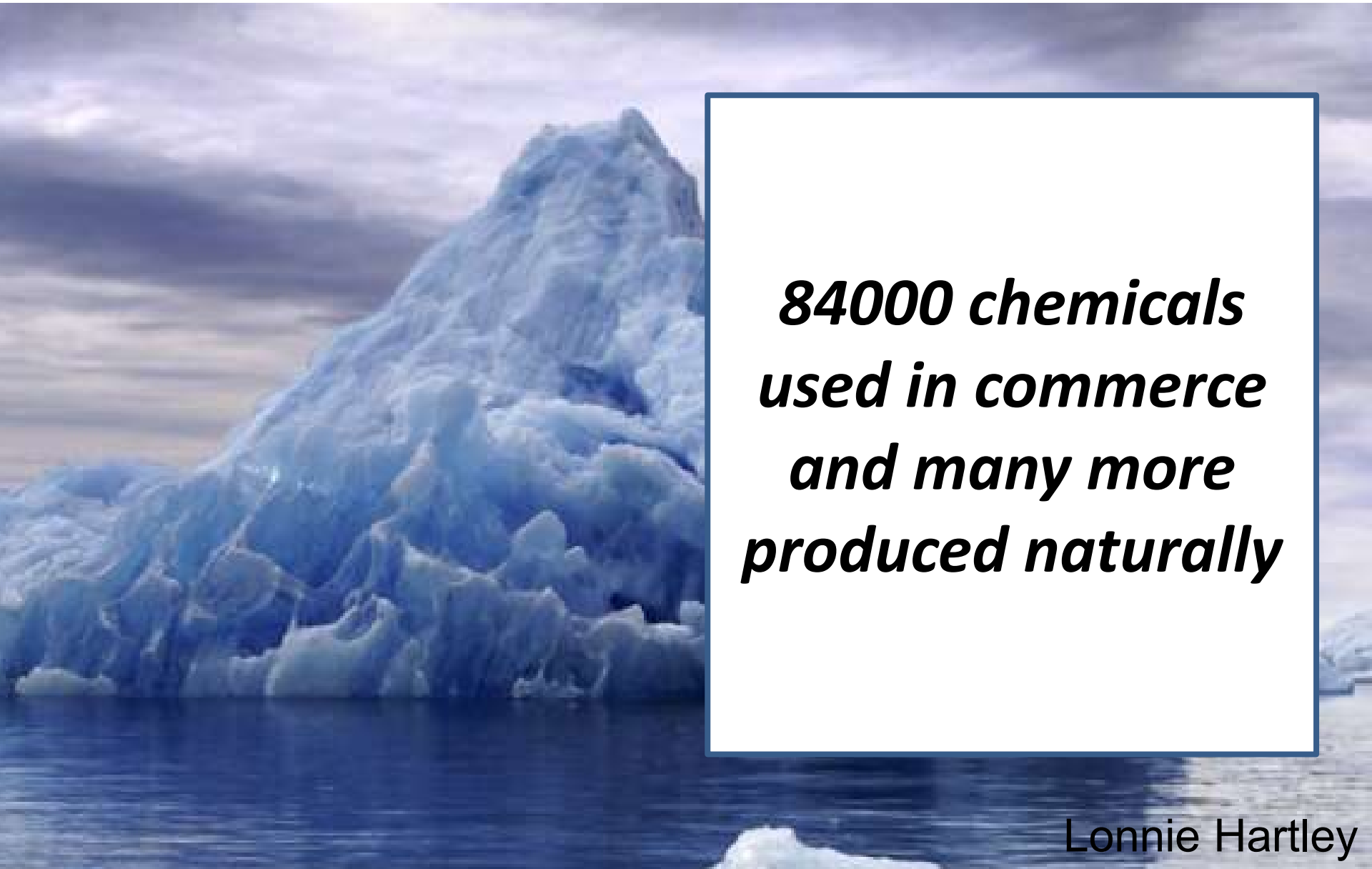
Current Regulatory Monitoring

EU Water Framework Directive includes 29 chemical contaminants with quality standards



Agrilife Today

Chemical Use Today



84000 chemicals used in commerce and many more produced naturally

Lonnie Hartley

My view of an Emerging Contaminant

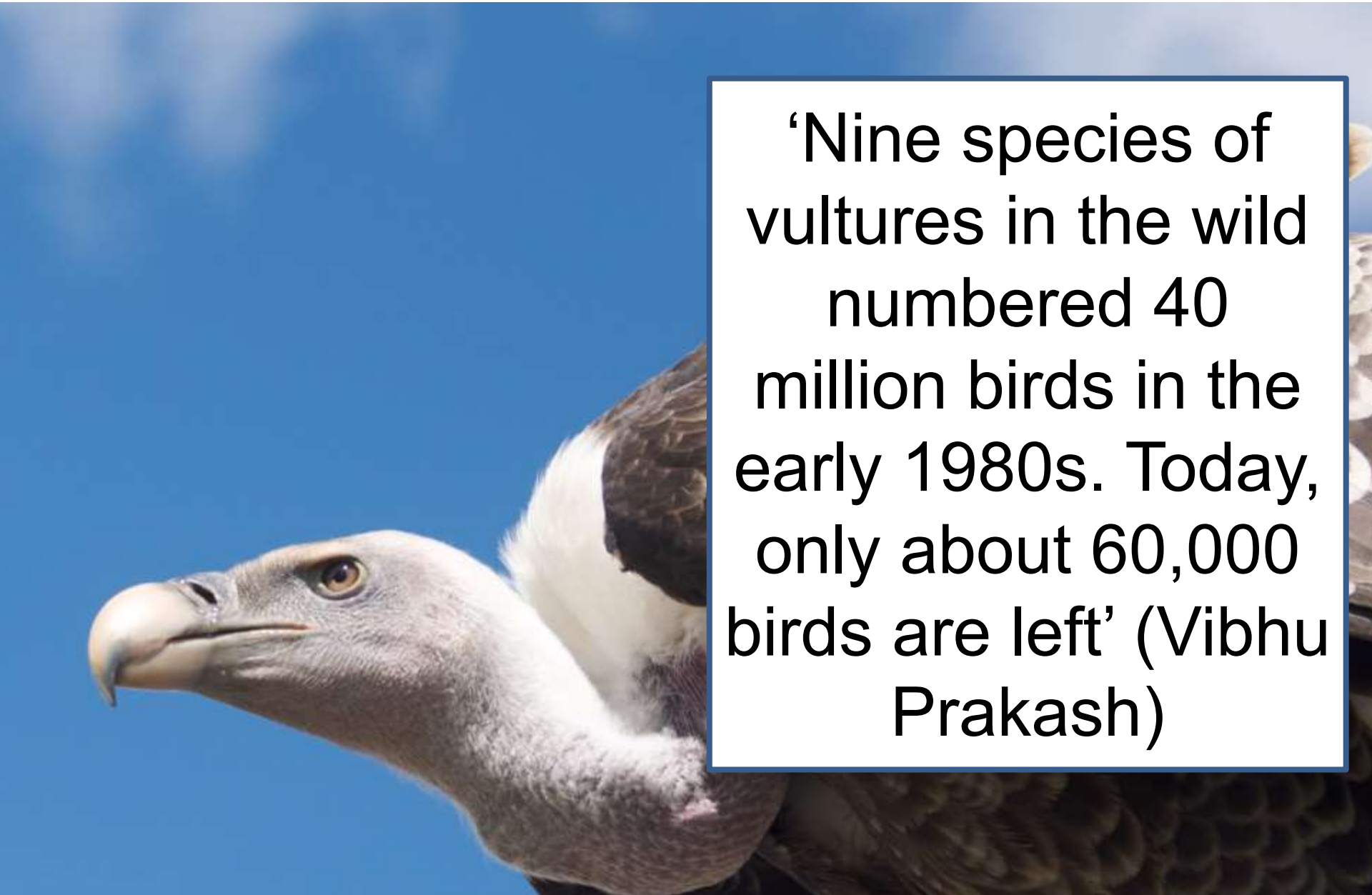
A contaminant from a chemical class that so far has not been studied extensively, where there is either a concern from stakeholders (scientists, regulators, NGOs etc.), that the contaminant class may be having an impact on environmental or human health; or where there is a concern that existing environmental assessment paradigms are not appropriate for the contaminant class

70023Venus2009


Ilmicofono Oggiono

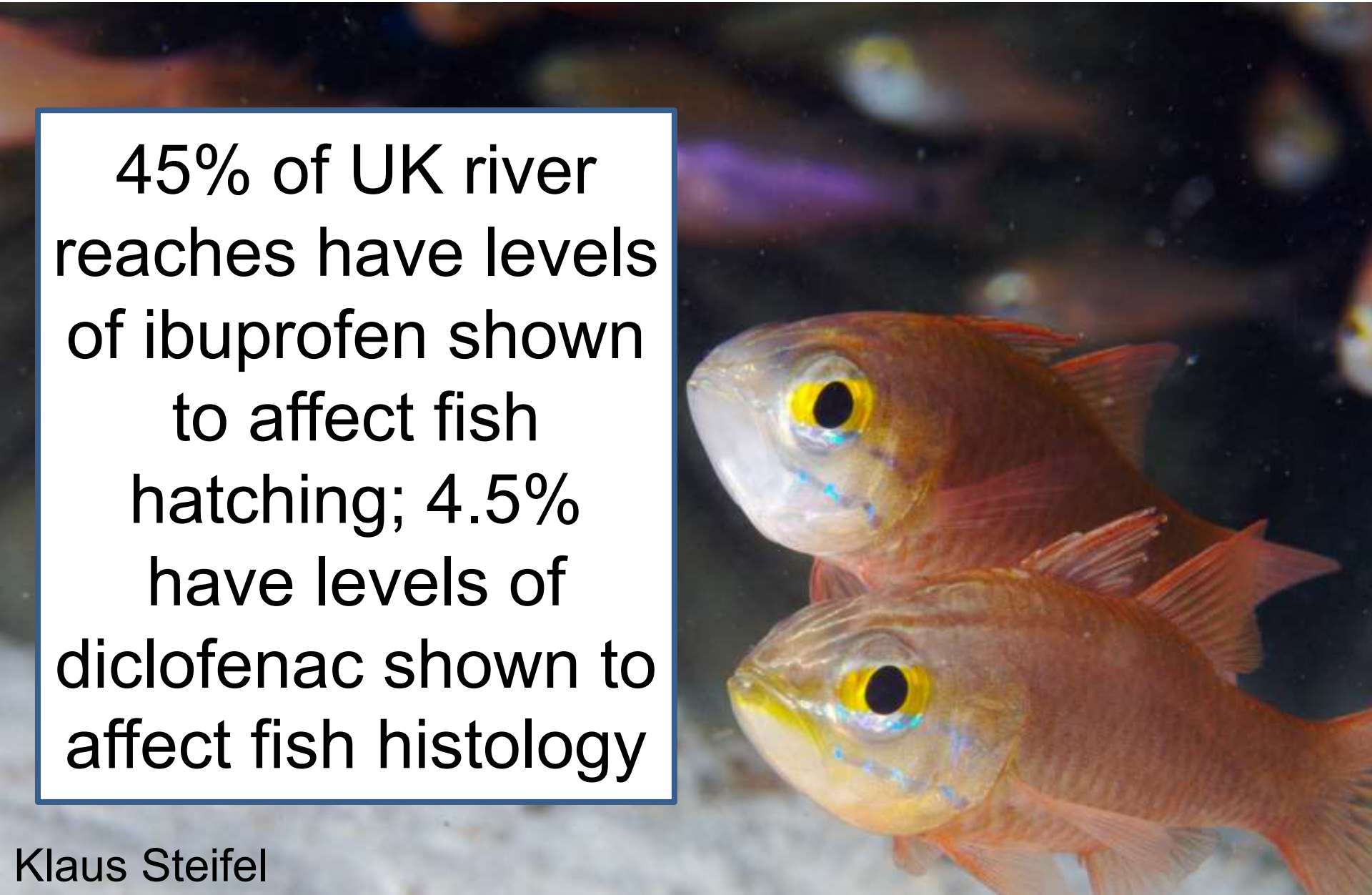

NOAA

Diclofenac and Vultures



‘Nine species of vultures in the wild numbered 40 million birds in the early 1980s. Today, only about 60,000 birds are left’ (Vibhu Prakash)

Effects on Fish



45% of UK river reaches have levels of ibuprofen shown to affect fish hatching; 4.5% have levels of diclofenac shown to affect fish histology

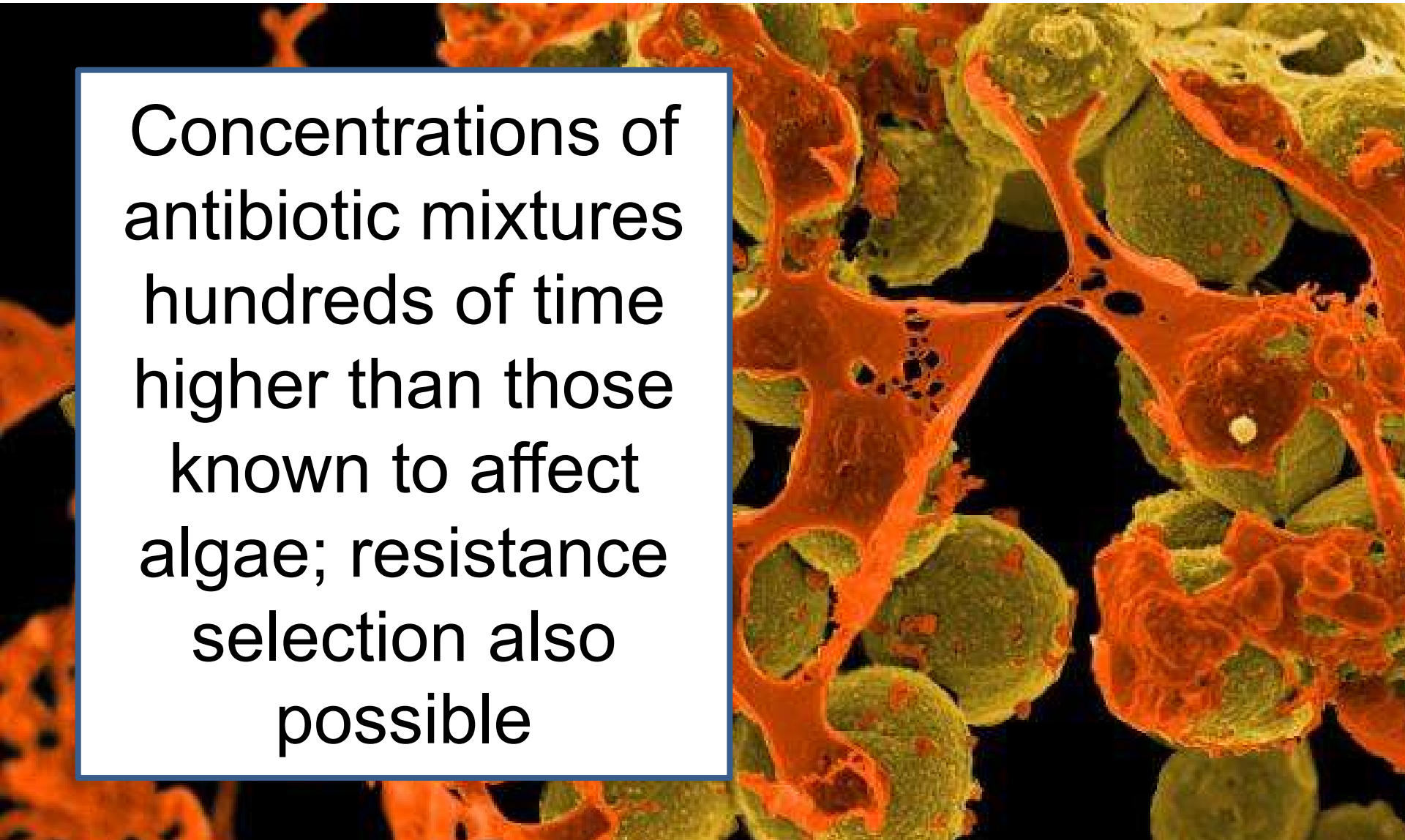
Klaus Steifel

Starlings on Prozac

Exposure of starlings to antidepressants in sewage works could be affecting bird feeding behaviour

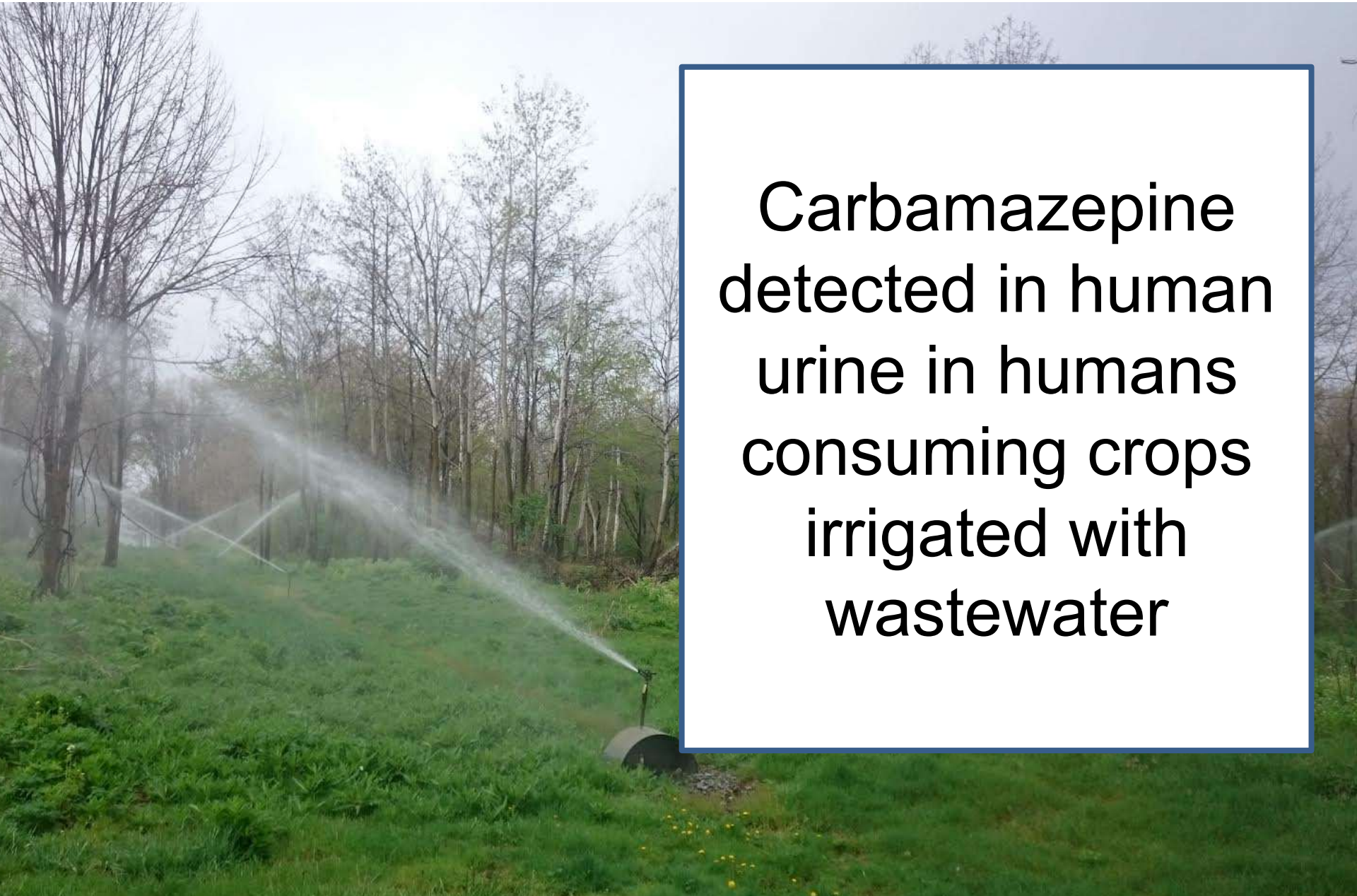
Margaret Walsh

Antibiotics, Primary Production and Resistance



Concentrations of antibiotic mixtures hundreds of time higher than those known to affect algae; resistance selection also possible

Risks to Human Health



Carbamazepine detected in human urine in humans consuming crops irrigated with wastewater

Limitations in our current Understanding

- We still only investigate a handful of substances
- European and N. American focus
- Observations generally based on laboratory studies and models
- Implications of long-term, low level exposure not really understood
- Many models and paradigms we use for assessing impacts may not be appropriate

Need for a paradigm shift

- Understanding of exposure and effects in all regions of the World
- Battery of approaches to identify problem substances – prioritisation; effects directed analysis; novel analytical approaches; eco-epidemiology; web-agents; molecular modelling
- Better use of the wealth of data already available e.g. for model development and validation