



United States Department of Agriculture

# Genetic Engineering in the World of Environmental Conservation

John Eisemann  
USDA National Wildlife Research Center

FLC FW/MC Regional Meeting  
Livermore, CA  
November 5, 2019

- Gene Editing
- Gene Drive
- Gene Silencing





United States Department of Agriculture

A collage of five agricultural images: almonds in a bowl, a red tractor with a tillage implement, a man in a plaid shirt and hat, a flock of white chickens, and a woman in a white shirt working in a greenhouse.

# **FINAL PART OF COMMERCIAL RAT CONTROL SERIES :** **RAT CONTROL PRACTICES IN AGRICULTURE**

Effective control

Cost Effective

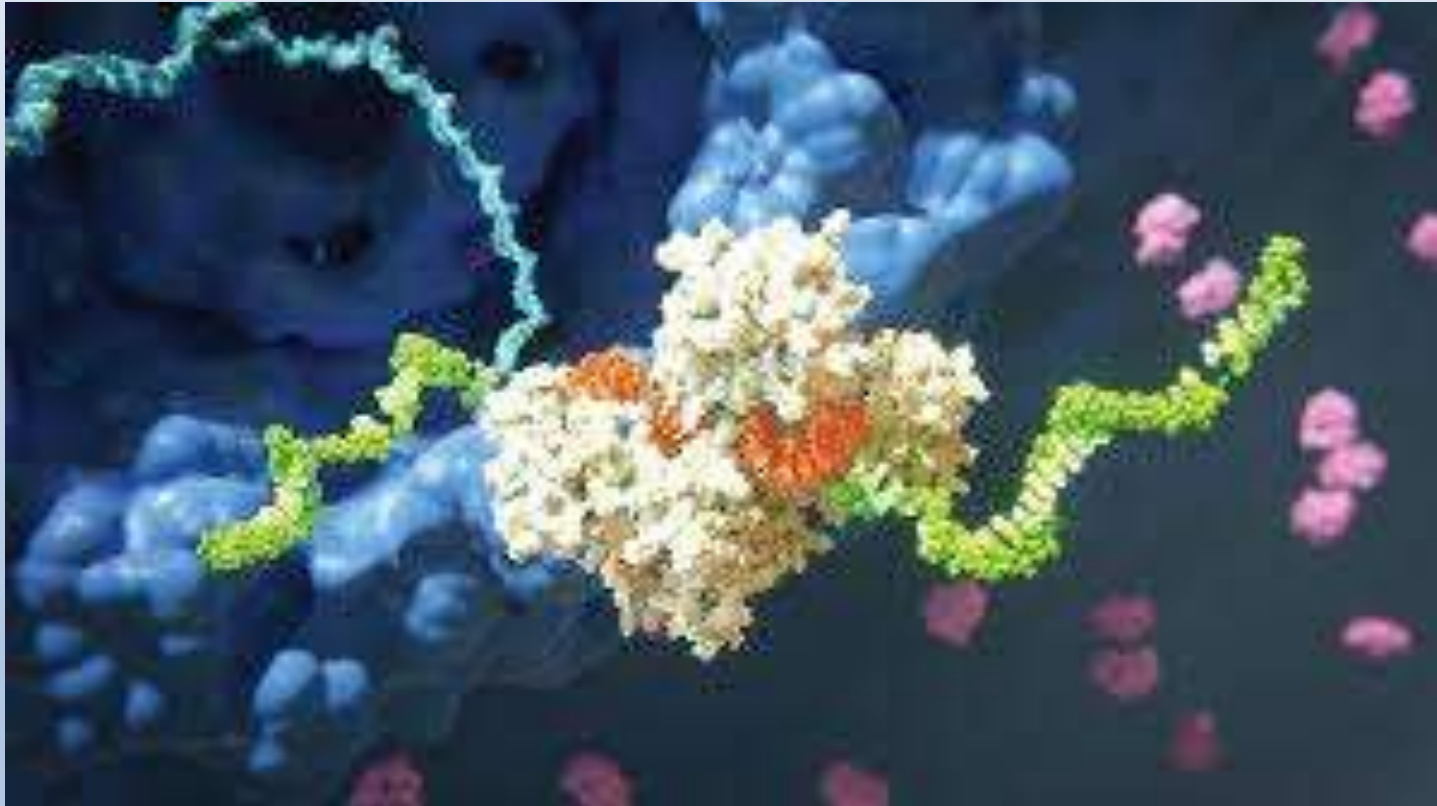
Regulatory Clarity

Humane

Species Specific

Low environmental burden

# Interfering RNA



# ISLANDS REPRESENT



**5.3%**

Of the Earth's landmass

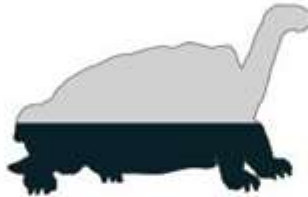
UNEP-WCMC 2015



**75%**

Of bird, amphibian, mammal, and  
reptile extinctions

Tersty et al. 2015



**41%**

Of all CR and EN  
terrestrial vertebrates

Spatz et al. 2017



**19%**

Of avian biodiversity

Tersty et al. 2015

## INVASIVE ALIEN SPECIES



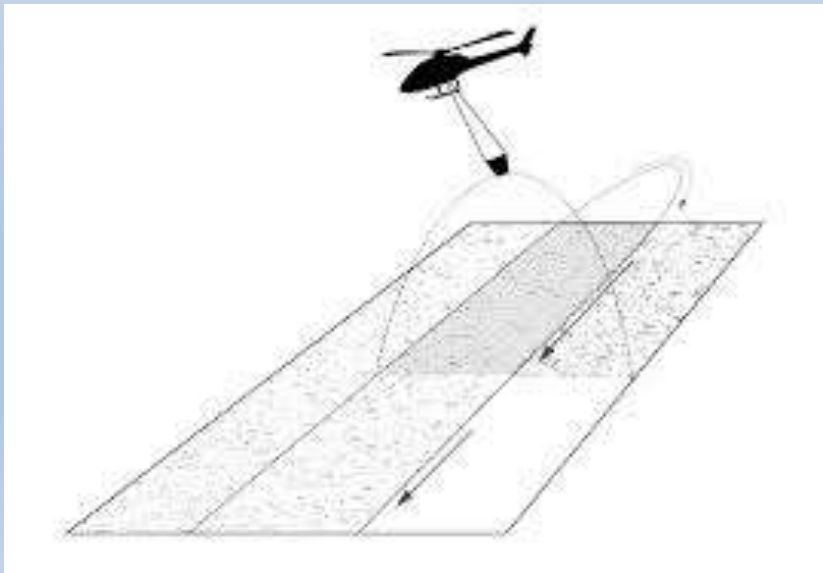
**86%**

Of recorded extinctions linked to  
invasives occurred on islands

Bellard et al. 2015

© Island Conservation 2017





Peter Dunlevy / USDA



United States Department of Agriculture



*Pisonia* patch 2011



*Pisonia* patch 2012



*Pisonia* patch 2014

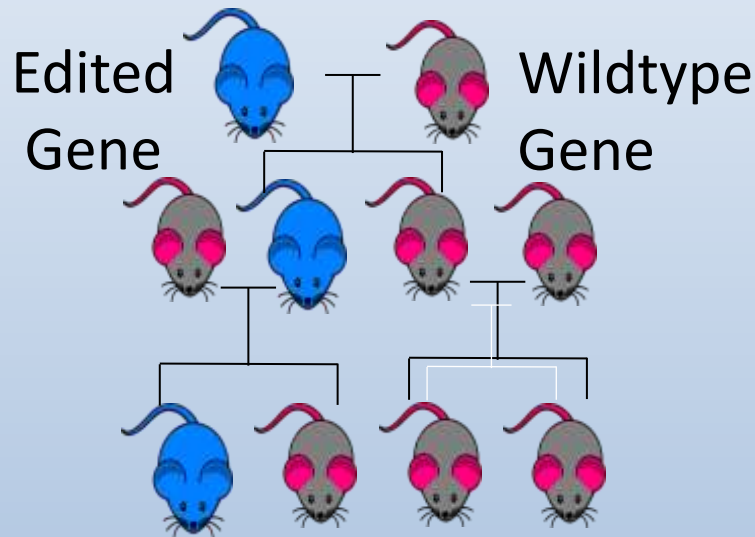


United States Department of Agriculture

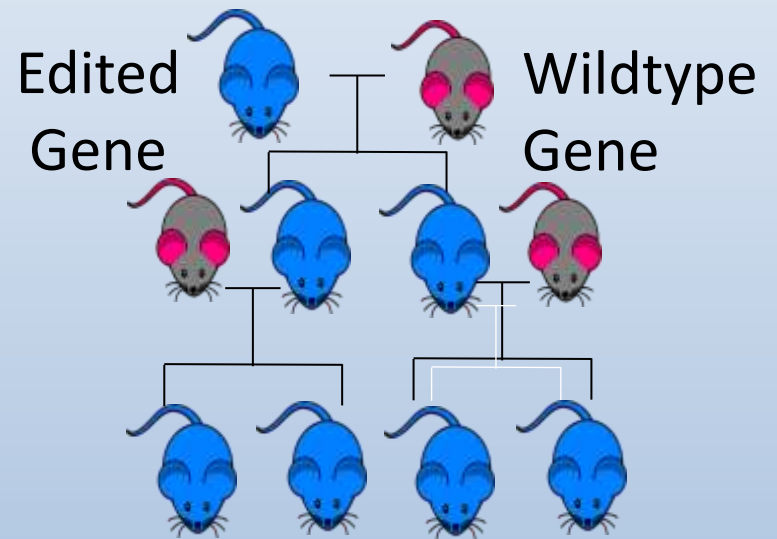




# Mendelian Genetics



# Gene Drive



# GBIRd

## Genetic Biocontrol of Invasive Rodents

