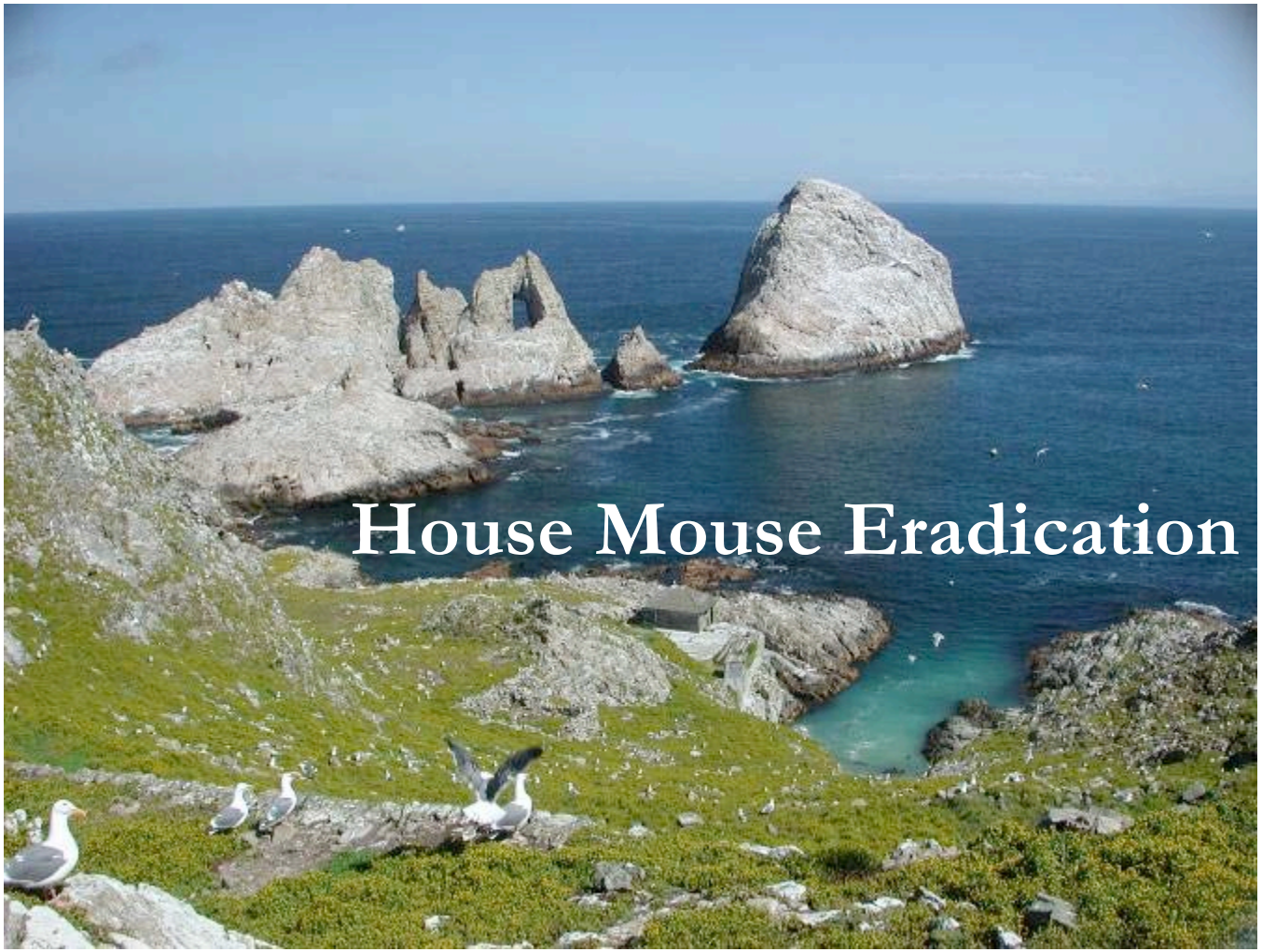
Ecosystem Restoration on the South Farallon Islands



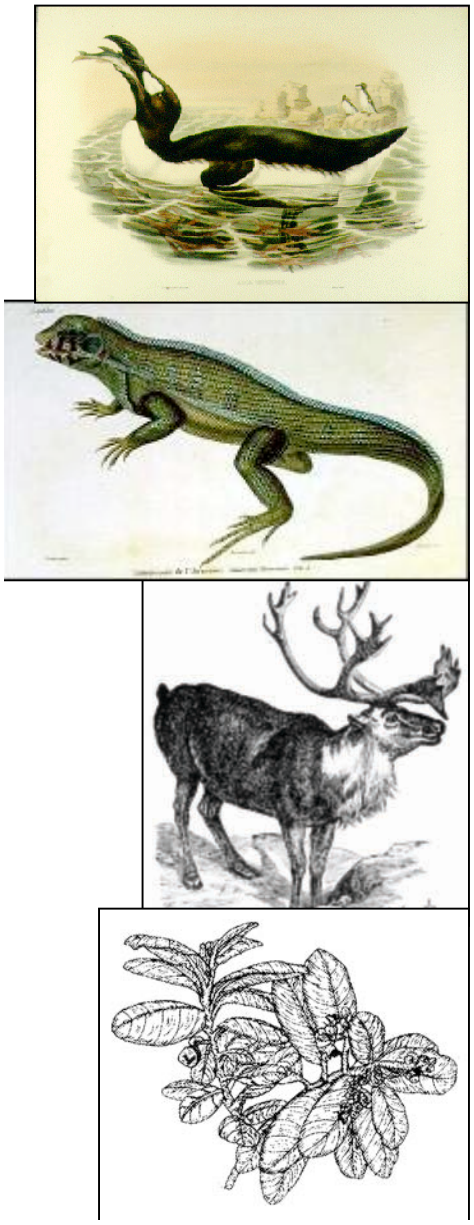
Importance of islands

Farallon arboreal salamander

Harbor seals

- Endemic species
- 3% of earth's surface, but **15-20%** of birds, reptiles and plants
- Critical habitat

Most extinctions are on islands



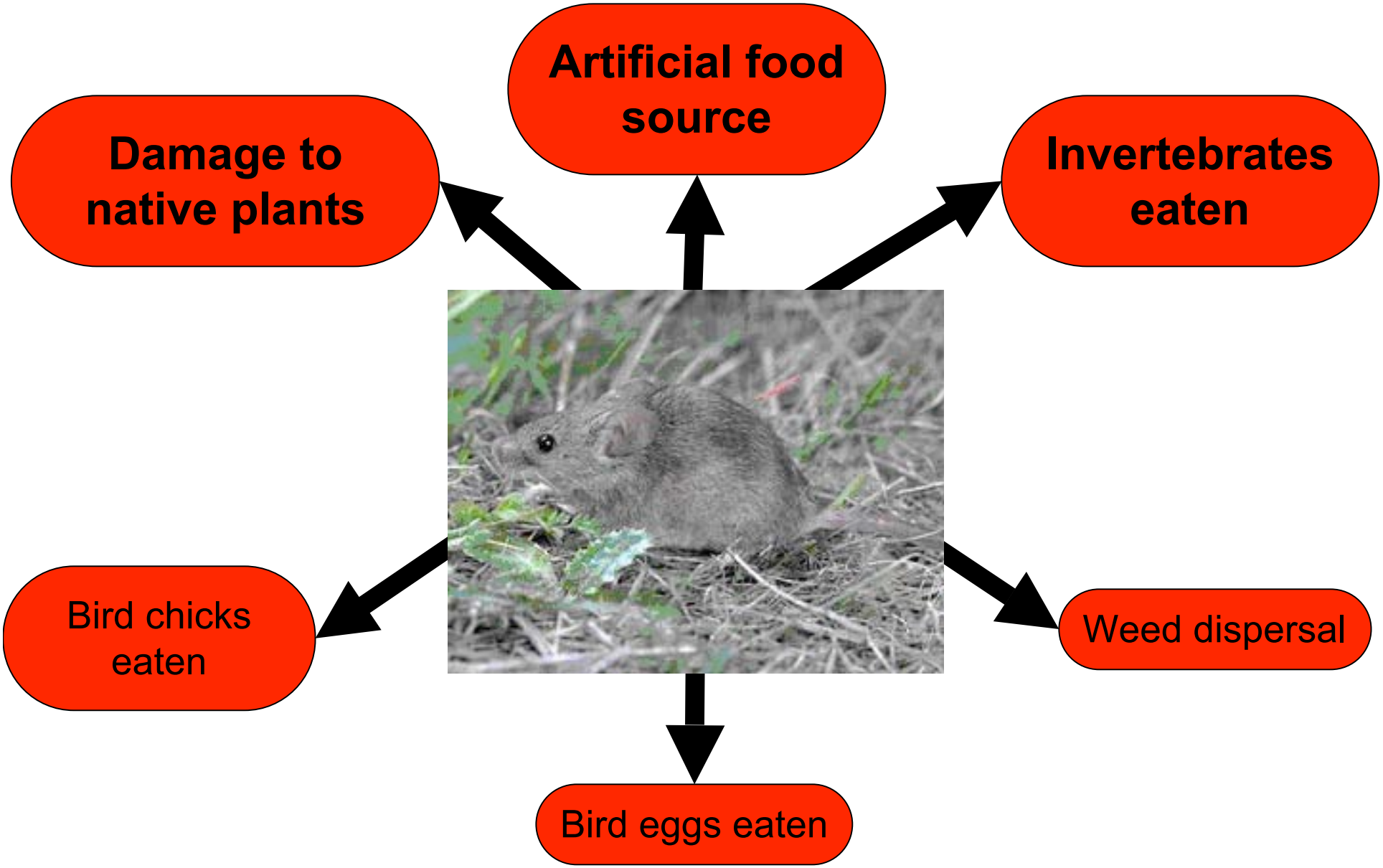
Extinctions since 1600

- **94%** of extinct birds
- **90%** of extinct reptiles
- **65%** of extinct mammals
- **68%** of extinct plants

Cause of island animal extinctions:

Invasive species (55-67%)

House mice on islands




arallon Islands

Ashy storm-petrels:

Limited and rare

- Limited breeding grounds
  1. Farallon Is.: **50% of population**
  2. Channel Is. (Southern CA)

- Rare (5,000-10,000 birds)

Ashy storm-petrels:

Characteristics of a vulnerable species

- Long-lived
- Slow reproduction
- Months of care

Ashy storm-petrels in decline

- **42% Farallons population decline** (breeding birds)
- **Identified as a species at risk**
  - IUCN
  - Audubon

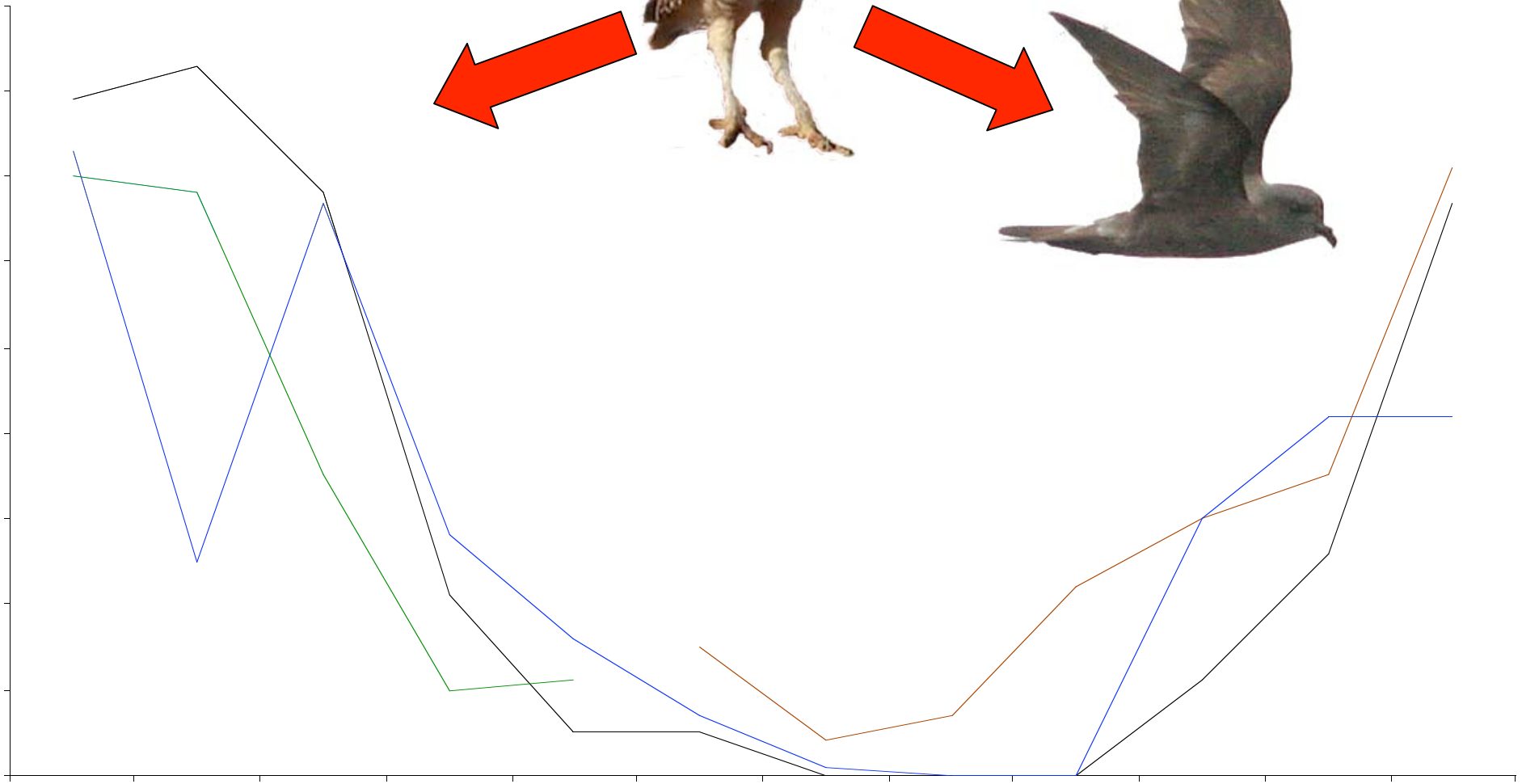
Ashy storm-petrels:
Predators

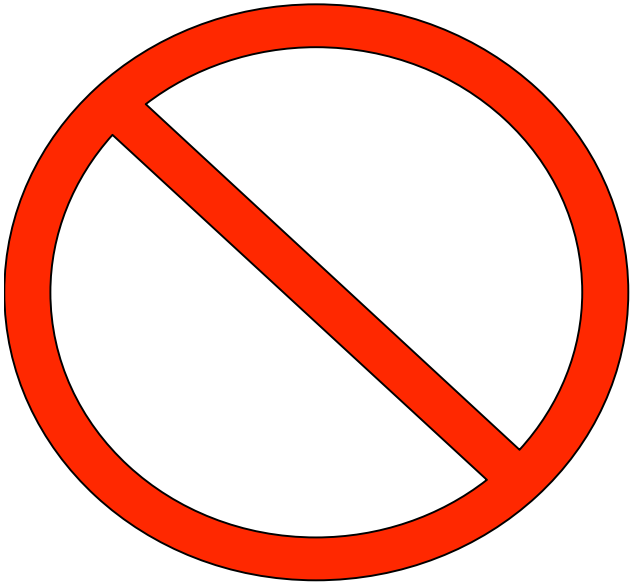
- Gulls (natural predator)
- Burrowing owls (artificially supported by mice)
- House mice (rarely documented)

Mice & ashy storm-petrels:

The hyperpredation link

Hyperpredation





No mice

Fall

Winter

Spring

Why remove mice?

- Ashy storm-petrels (burrowing owls leave)
- Other seabirds (disturbance)
- Native insects
- Native plants

Mouse eradication:

100% removal

- *Introduced predators*
- *Trapping*
- *Virus*
- **Rodenticide bait**

Bait delivery options

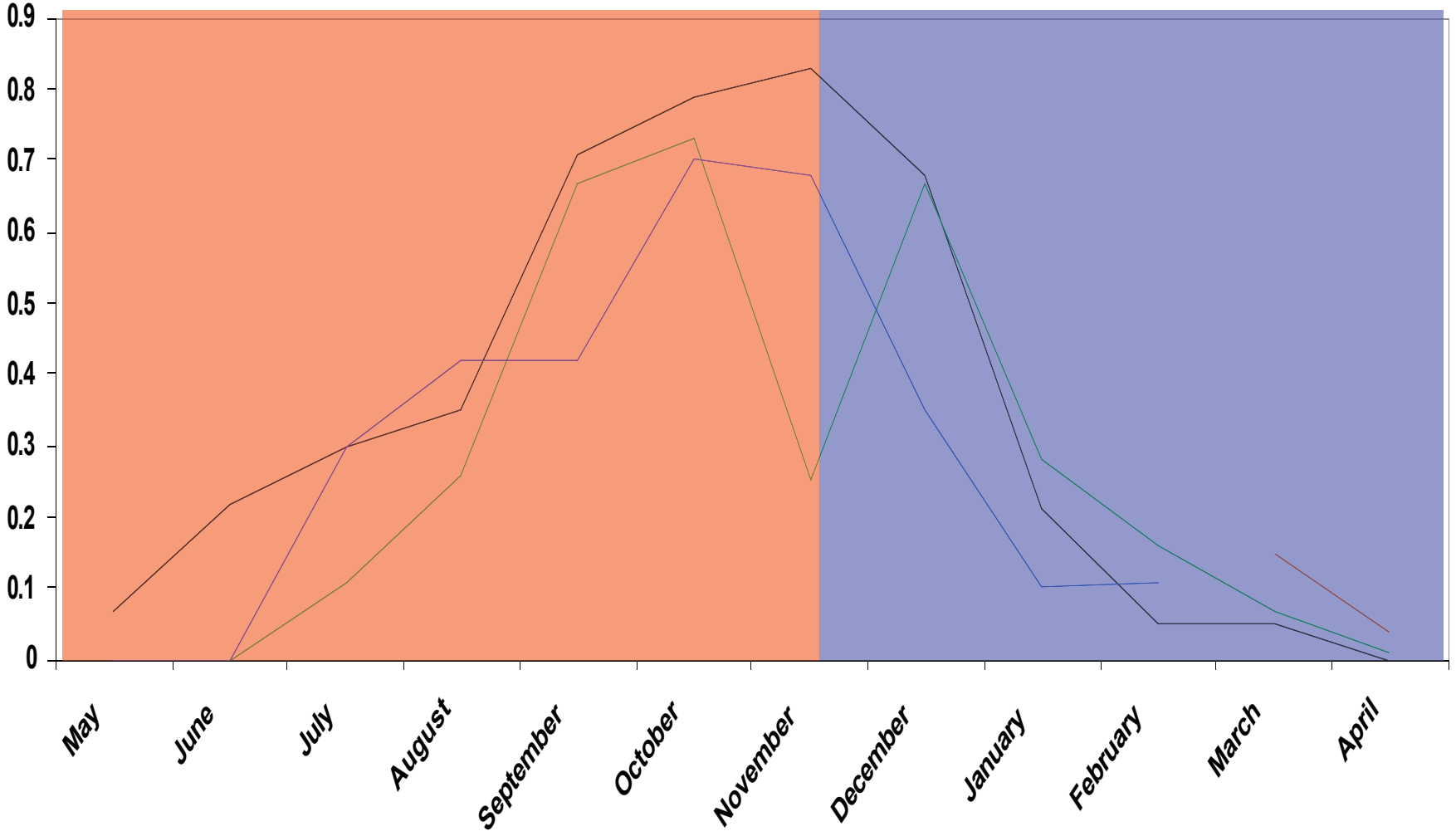
Bait stations

- Get every mouse
- Minimize disturbance
- Ecosystem benefits must outweigh risks

Aerial broadcast

Timing

Farallon mouse population cycle (mouse trap success by month)



Best time for eradication

Not ideal for eradication

Issues to consider

- Ecosystem disturbance?
- Effects of rodenticide?

Rodenticide use

HAZARD =

1) Toxicity + 2) Exposure

Rodenticides for conservation:

Toxicity risk

- Not affected:
  - Invertebrates
  - Plants
- Affected:
  - Vertebrates (e.g. mice)

Rodenticides for conservation:

Minimizing exposure risk

- Bait presentation
  - *Bait stations* inaccessible by most birds
  - *Grain-based pellet* unattractive to pinnipeds, nearly all seabirds, insect-eating songbirds, most fish
  - *Green coloration* unattractive to many grain-eating songbirds

- Dosage (body size)
  - No risk to pinnipeds (or humans)

Rodenticides:

Minimizing exposure risk

- Seasonal timing

- Non-target capture/hold

Rodenticides:

Aerial broadcast considerations

- Precision application
- Bait pellets disintegrate quickly
- Rodenticide doesn’t dissolve into water
- Low rodenticide concentration

Compliance

- National Environmental Policy Act (NEPA)
- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Endangered Species Act (ESA)
- National Historic Preservation Act (NHPA)
- Wilderness Act (WA)
- Marine Mammal Protection Act (MMPA)
- Migratory Bird Treaty Act (MBTA)
- National Marine Sanctuaries Act (NMSA)
- Coastal Zone Management Act (CZMA)
- Federal Insecticide Fungicide and Rodenticide Act (FIFRA)

Partners

Farallon National Wildlife Refuge (USFWS)

Island Conservation

PRBO Conservation Science

National Fish & Wildlife Foundation

S.S. Luckenbach Trustee Council

We want your input!

Jesse Irwin / Joelle Buffa
SF Bay National Wildlife Refuge Complex
PO Box 524, Newark CA 94560
(510) 792-0222
sfbaynwrc@fws.gov
(510) 792-5828 fax