Understanding the carp virome:
What it could mean for the control of invasive carp

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Driven to Discover℠

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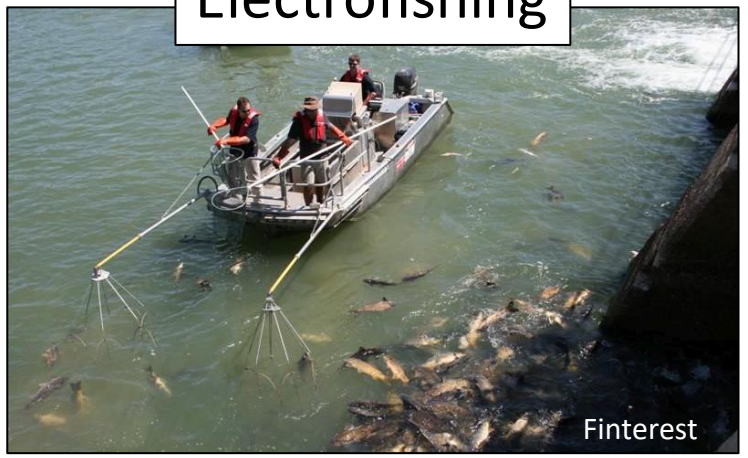
Current options for common carp control

Seining

Biocontrol

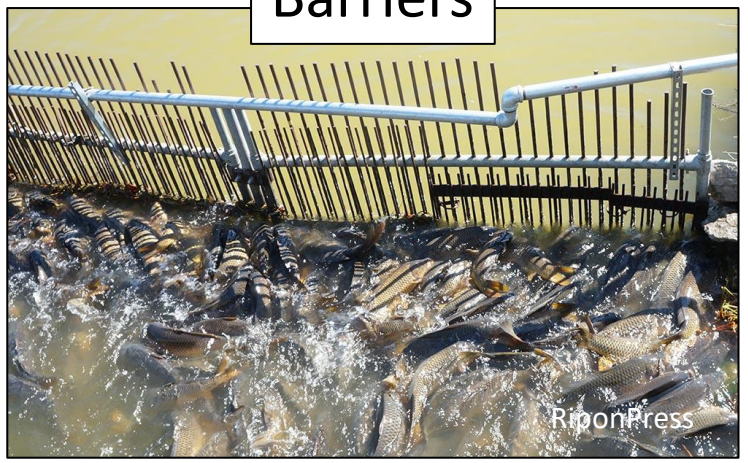
Electrofishing



Poison

Deterants

Barriers



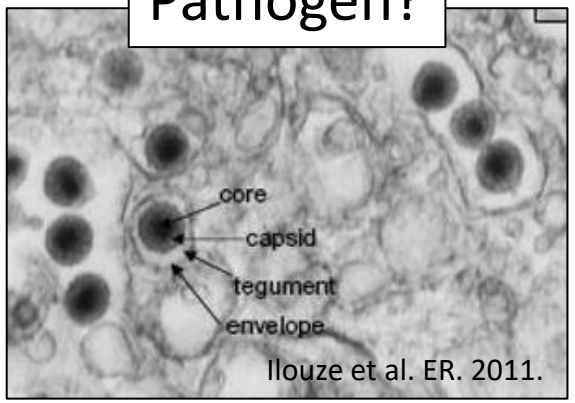
Could there be a ‘silver bullet’?

Chemical control?

Selective removal?

Gene editing?

Pathogen?



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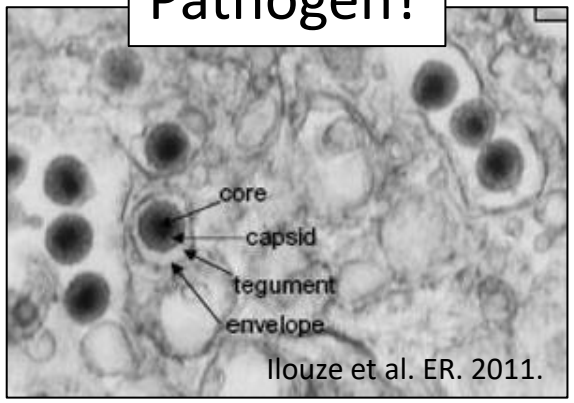
Could there be a better tool box??

Chemical control?

Selective removal?

Gene editing?

Pathogen?



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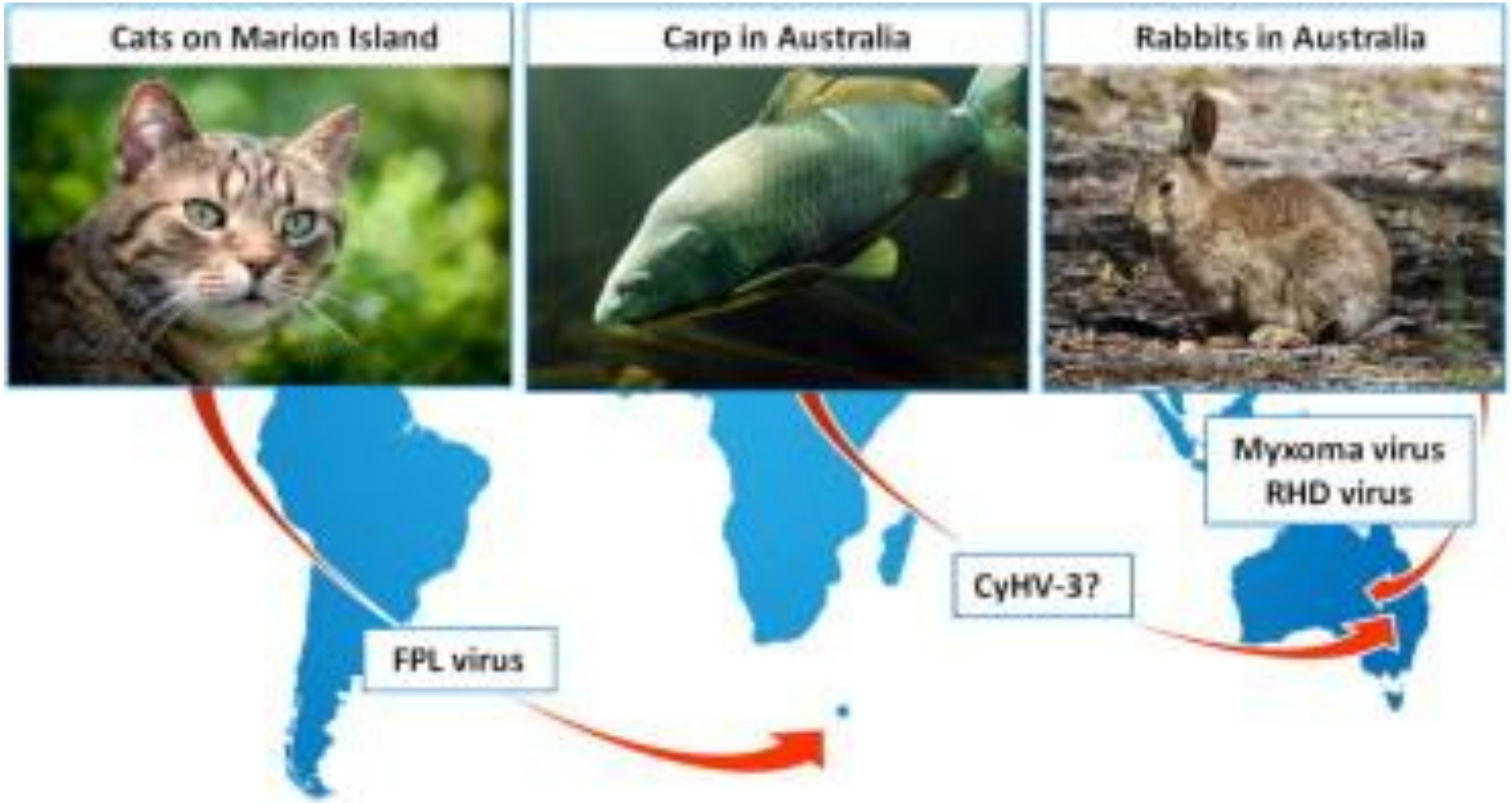
Pathogens for biocontrol



McColl et al. 2014. Biological Control.

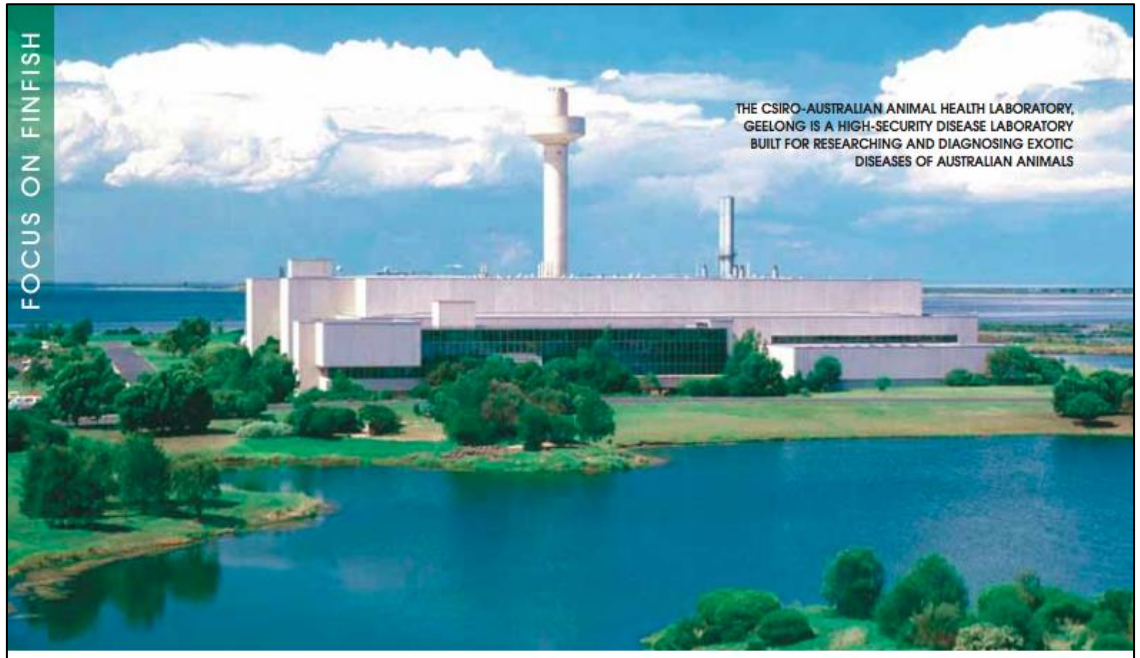
Pathogens for biocontrol: Koi Herpes Virus

National Carp Control Plan: Community consultation on virus begins

NATALIE KOTSIOS, The Weekly Times
October 11, 2017 8:00am

> “Carp herpesvirus has the potential to substantially reduce Australian carp numbers”

PestSmart 2017



KOI HERPES VIRUS: DREADED PATHOGEN OR WHITE KNIGHT?

DRS KENNETH A MCCOLL, AGUS SUNARTO, LYNETTE M WILLIAMS AND MARK ST J CRANE
(CSIRO-AAHL FISH DISEASES LABORATORY, GEELONG, AUSTRALIA)

Pathogens for biocontrol in Minnesota

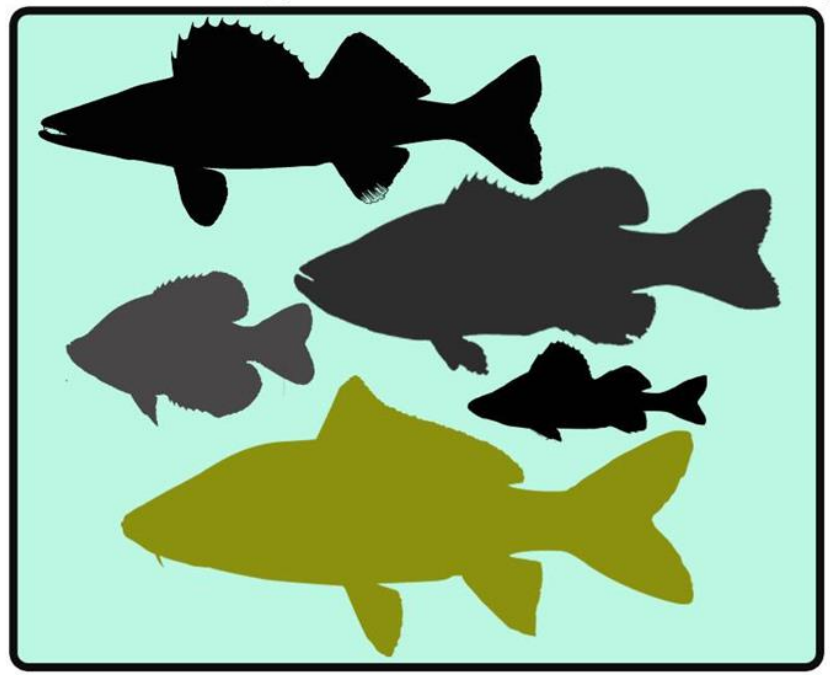
Where do we begin??

- Candidate pathogens would be:
  - Species specific
  - Easily transmissible and highly virulent
  - Slow mutation rate
- Candidate carp populations would be:
  - Dense (at least seasonally)
  - Naïve
  - Susceptible
- VERY conservative approach to this project…
  - “Use something that is already here”

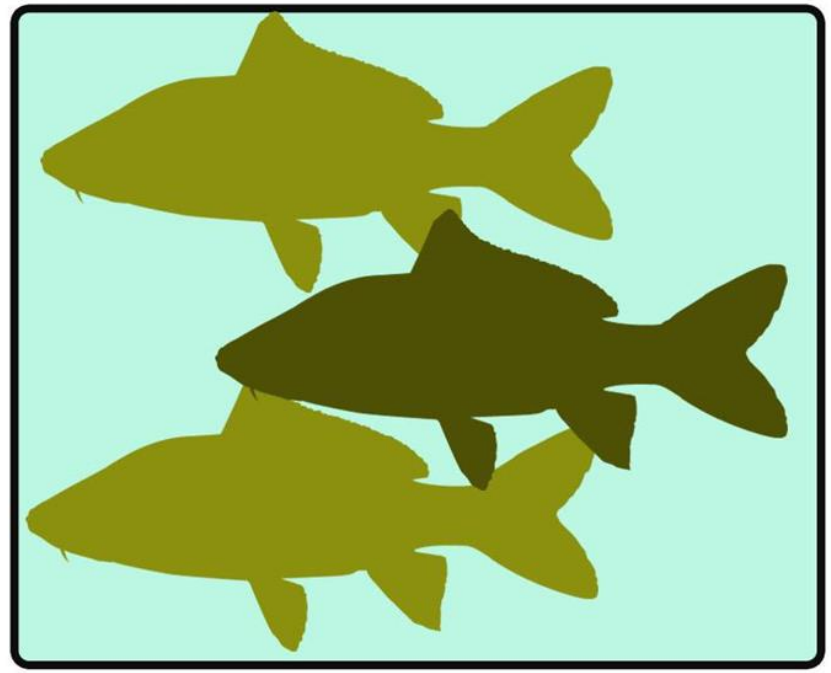
Approach:

1. Sampling

A. From fish kills of native species and carp



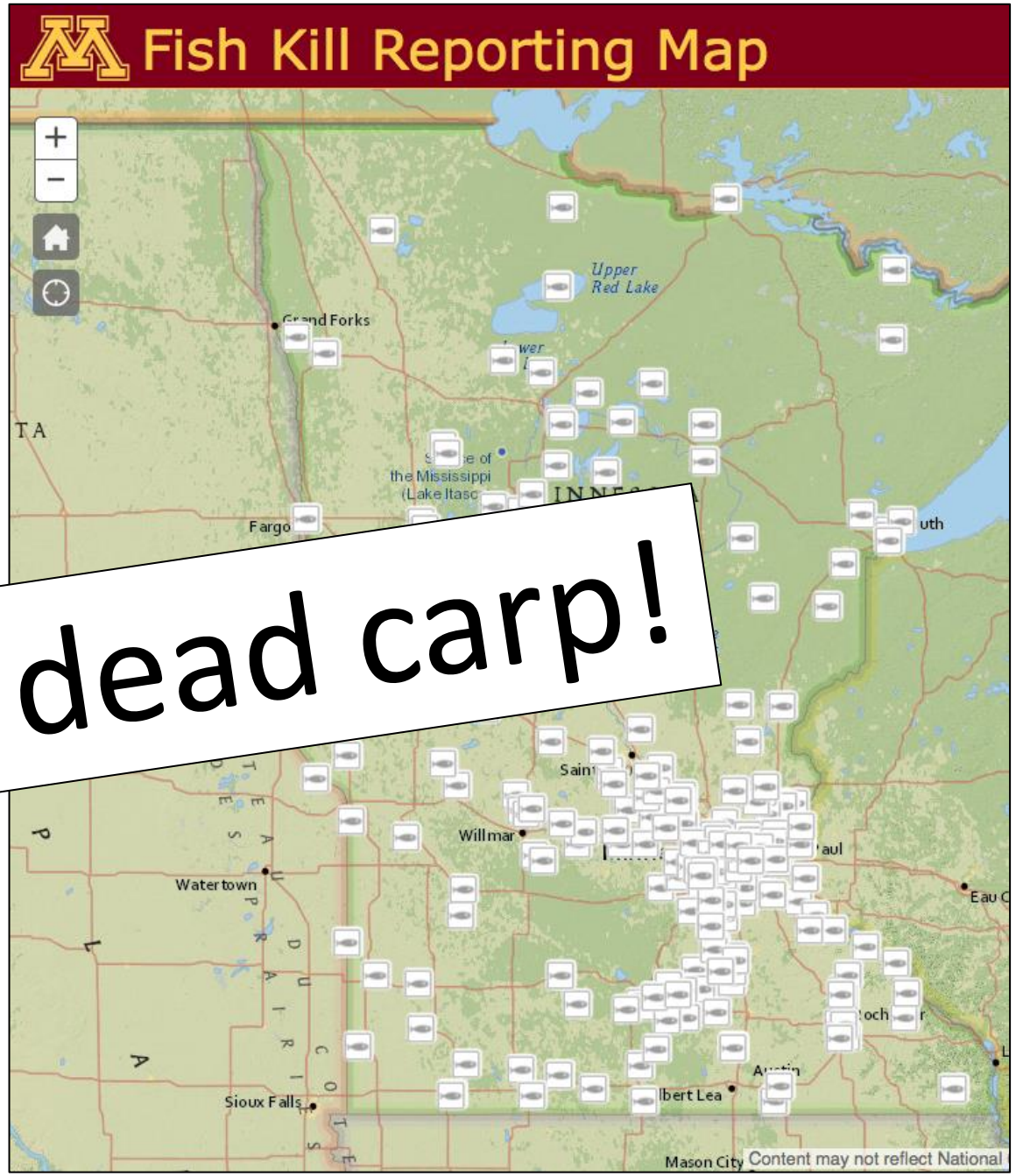
B. From healthy populations of carp



Approach:

- Improve fish kill reporting

www.z.umn.edu/fishkill



Send me your dead carp!

Approach:

2. Identification of candidate Pathogens

Pathogen 1-3: found in sick natives and carp X

Pathogen 4-5: found in many healthy carp X

Pathogen 6-8: found in sick carp only √

Results: 2015-2017 sampling

Healthy Common Carp (n= 15 lakes):

- ~~Astrovirus, picornavirus, calicivirus, hepevirus, nodavirus, reovirus~~
- All samples negative for KHV, CEV, SVCV

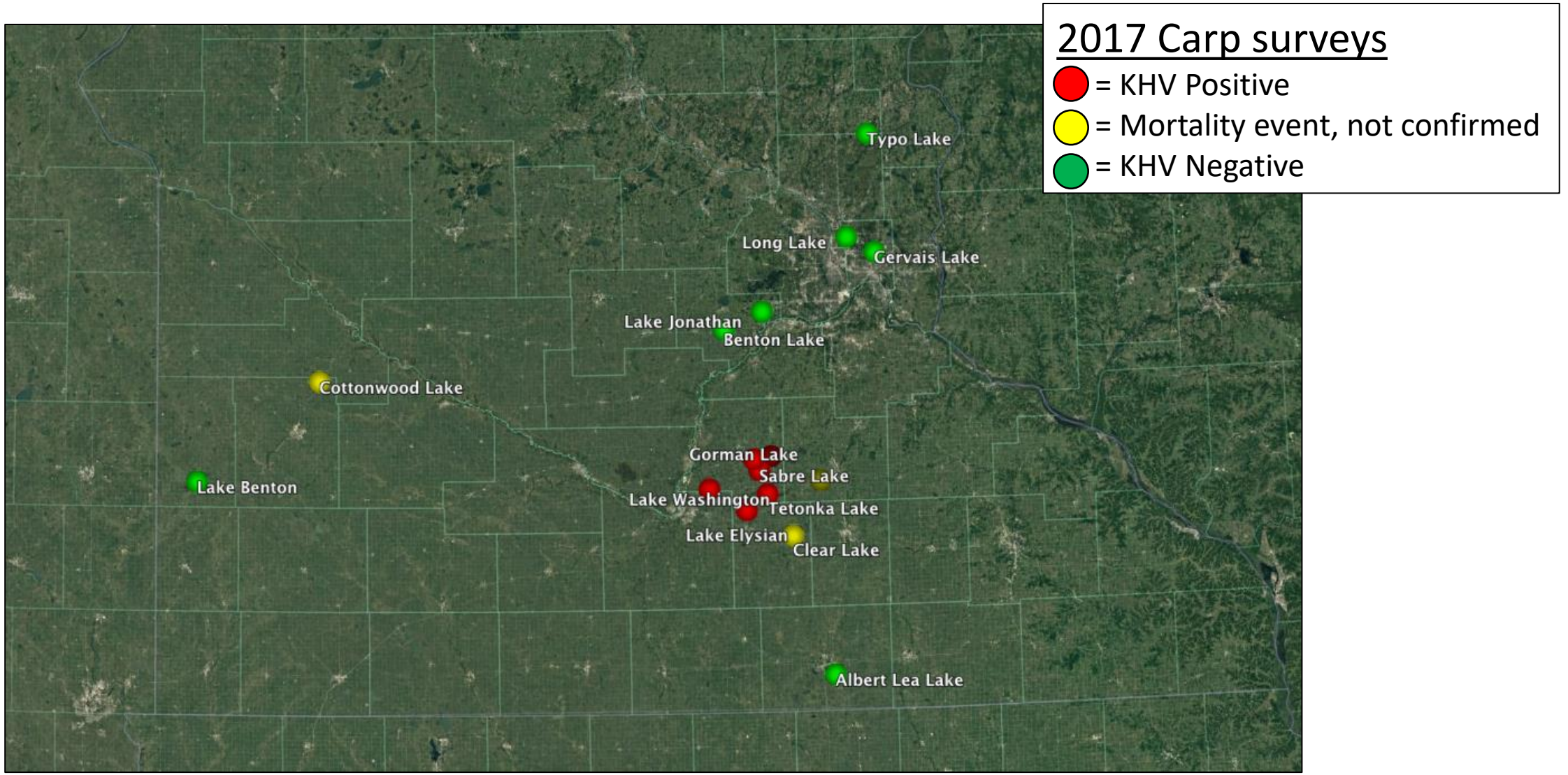
Mortality events that included native fish (n=13 events):

- ~~Bluegill picornavirus, calicivirus~~

Mortality events with *only* common carp (n=14 events):

- ~~Picornavirus, paramyxovirus, Grass carp reovirus,~~ koi herpes virus

Results: Koi Herpes Virus



Word of caution…

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correspondence

Safe and effective … carp

…BRUARY 2017 | VOLUME: 1 | ARTICLE NUMBER: 0087

correspondence

Biocont… … in Australia poses risks to biosecurity

Next steps

- Continued surveys
  - Particular focus on region with KHV outbreak
  - Population impact estimates
- Infection trials with candidate pathogens
  - MANY questions!

- Risk assessments
- Release strategies
- Regulatory and public consultation (ongoing)
- Etc!

Questions?

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