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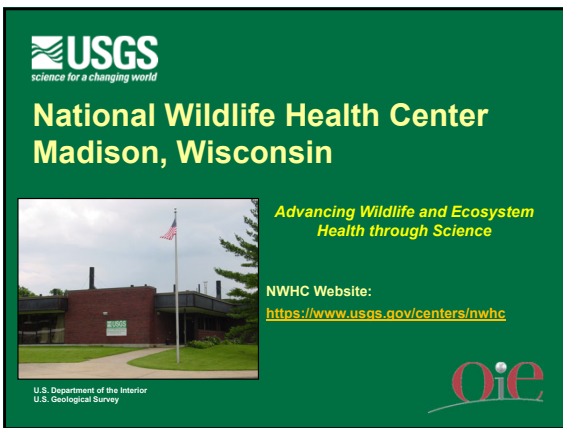
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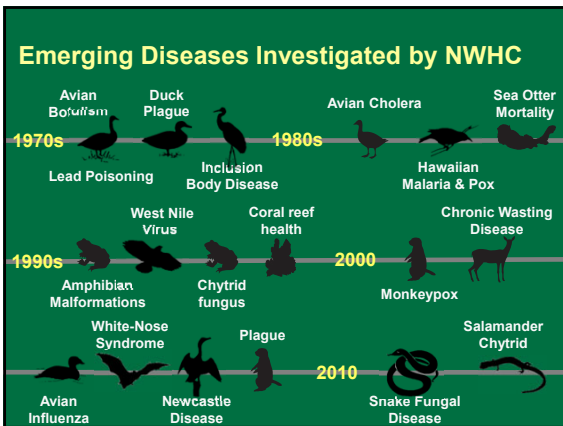
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**Most emerging and resurging infectious diseases of humans are of animal origin and the majority have wildlife roots.**

Morens, Folkers and Fauci. 2004. Nature

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**An approach to ~~Wildlife~~ Disease Management**

- **Prevention, prevention, prevention**
- **Minimize the potential for disease spread**
- **Monitor for new outbreaks**
  - when discovered in a new area determine magnitude and extent of outbreak
- **Manage infection rates within affected areas**
- **Support research**
- **Provide timely, complete and accurate information to all stakeholders**

2004 Multi-state CWD Guidelines

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**USGS**  
science for a changing world

**FOREST AND WILDLIFE ECOLOGY**  
COLLEGE OF AGRICULTURAL & LIFE SCIENCES

**Chronic Wasting Disease**  
- 24 March 2021

Bryan Richards  
National Wildlife Health Center

U.S. Department of the Interior  
U.S. Geological Survey

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### Observations

- **Characteristics of CWD**
  - Geographic spread
  - Increasing prevalence (locally)
  - Kills deer
  - Predisposes affected cervids to all other sources of mortality
- **Consequences (longer-term)**
  - Demonstrated population impacts
    - Declining herd performance -> population decline
  - Herd structure (demographic) shifts
  - Hunter behavior, participation changes
  - Fiscal impacts to natural resource agencies

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### CWD Characteristics

- TSE (prion disease) of North American deer, elk, & moose (cervids)
- Progressive neurological degeneration
- Uniformly fatal upon clinical presentation, predisposes infected cervids to other sources of mortality
- Infection via ingestion/inhalation of infectious agent (prions)
- Infected animals shed prions in bodily fluids (saliva, feces, urine, etc.)
- Contagious (only CWD & Scrapie)
  - Transmissible via contact (direct transmission)
  - Transmission via contaminated environment (indirect transmission)
  - Vertical (in-utero) transmission
- Long incubation period (18-24 months on average)
- Brief clinical disease phase
- Animals are infectious (shed prions) before onset of clinical disease
- Prions persist in the environment for years, perhaps decades
- Sex and age patterns of infection (male > female; older > younger)
- Tests are post-mortem \*
- No vaccination, therapeutic, or remediation tools available
- No evidence of widespread genetic resistance
- **Effective management in free-ranging herds - extremely difficult**

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### CWD – preclinical appearance



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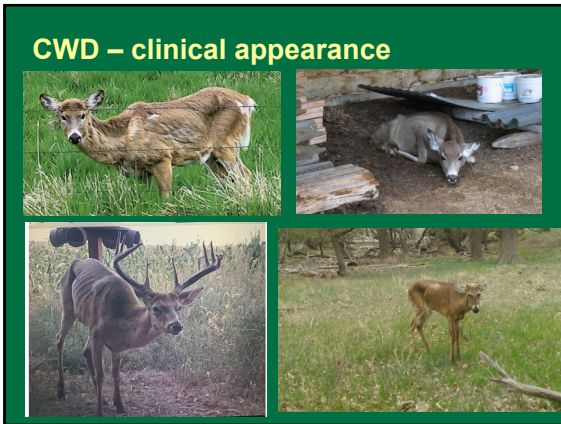
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### CWD – outcome (individual deer)

- CWD is a fatal disease with a lengthy incubation period (~2 years on average)
- CWD results in progressive neurological degeneration
- CWD+ deer have increased susceptibility to ALL other sources of mortality
- Few CWD+ deer, in clinical phase, are observed.
- The majority of CWD+ deer die from other causes, earlier than they otherwise would have

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### Why care about CWD?

- Data from several sources suggest that heavily-infected cervid populations will not thrive in the long-term.
- Data on CWD prions and experience with other animal prion diseases suggest minimizing human exposure to these agents is prudent.

 Miller & Fischer, 2016

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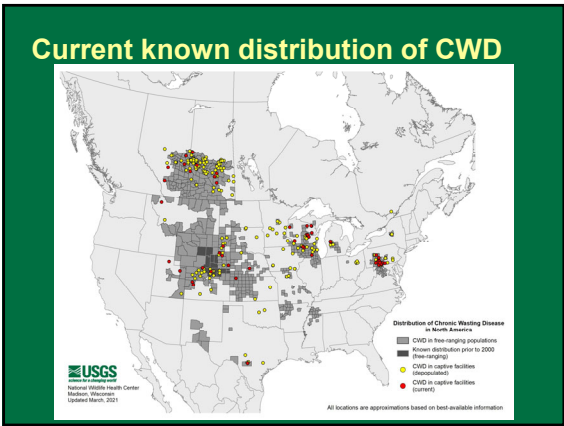
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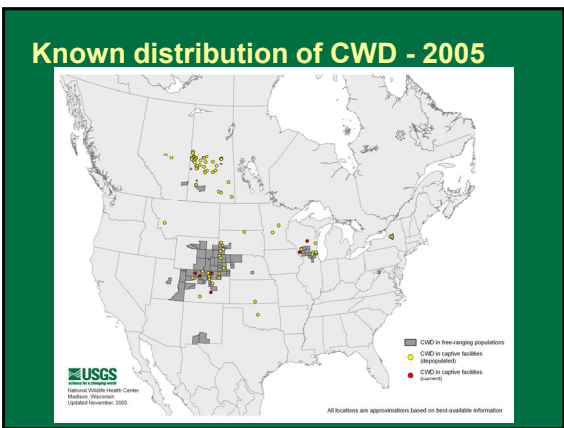
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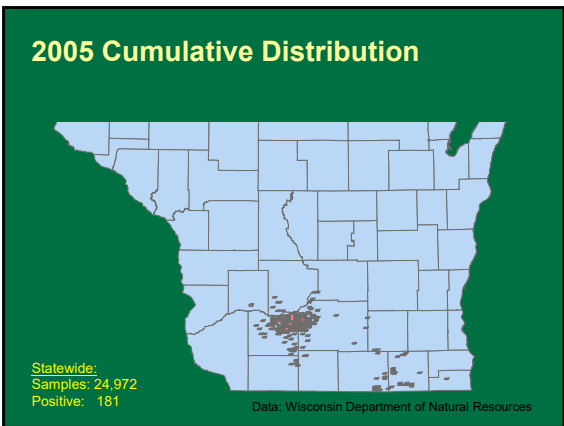
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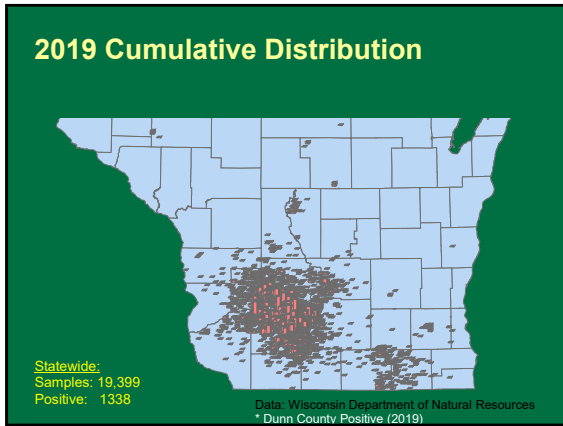
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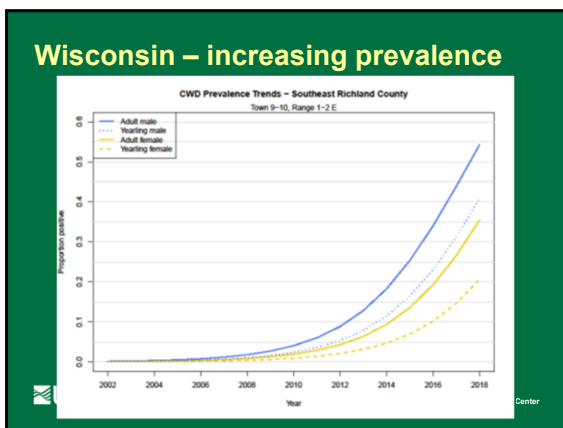
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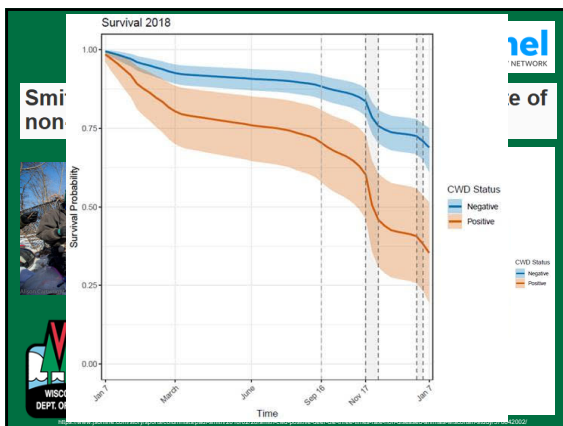
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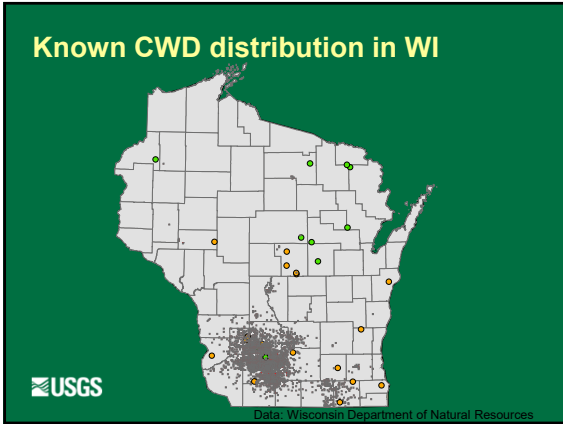
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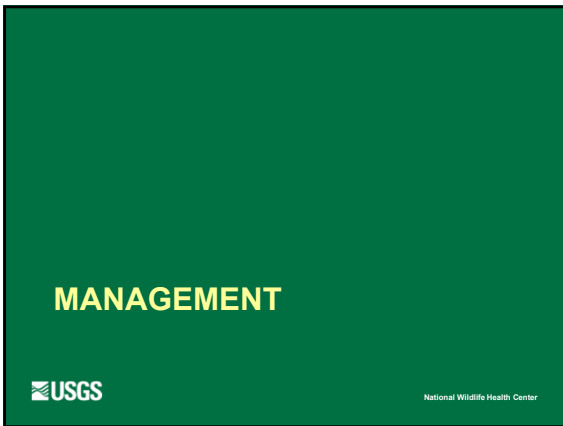
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**CWD management opportunities**

- **Do everything you can to keep from getting it**
  - Identify potentially infectious/contaminated materials
  - Identify and address anthropogenic risks
    - Both exposure and amplification
  - Implement both regulatory and I&E mechanisms to address risk
- **If that fails, manage it**
  - Goal: Alter outcomes (measurable)

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### CWD management tools – future?

- Vaccines
- Complete genetic resistance
- Disinfectants
- Tools to better identify CWD+ animals (quick, remote, so they can be selectively removed)
- Tools to detect prion contamination in the environment (early detection)



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### Management tools – today

- Removing deer (gun)\*
  - Must be aggressive
  - Must be sustained
  - Selectively target positives
  - Remove impediments to removing deer
  - Create incentives to remove deer



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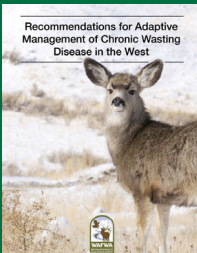

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### Resources

- AFWA Best Management Practices (BMPs)
- WAFWA Adaptive Management Guidelines



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### AFWA BMPs - Management

- Target the portion of the population most likely to have CWD.
- Target animals in known CWD hotspots.
- Adjust timing to most effectively remove infected animals.
- Reduce cervid density in CWD-positive areas.
- Eliminate practices that promote artificial cervid concentrations.

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### Why are we failing?

- Wildlife management
  - Habitat management
  - Population management
  - **People management**
- “The real problem of wildlife management is not how we shall handle the animals... the real problem is one of human management.”--Aldo Leopold



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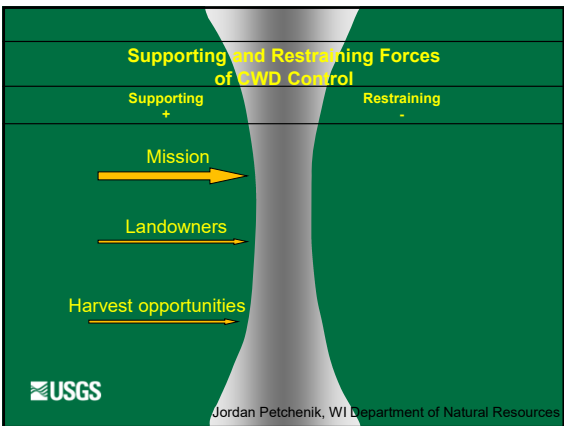
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*If convinced efforts will make a positive difference!*



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**CWD**

- Issues:
  - Protecting currently disease-free areas
  - Managing CWD in the free-ranging population
  - Managing CWD within the captive industry
  - Identifying/managing risk
  - Misinformation
  - Stakeholder support



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### Components for success?

- Precautionary measures
- Early detection
- Active, aggressive intervention
  - Hotspot culling
  - Population reduction
  - Male-focused strategies
- Intensive monitoring
- Open, honest, continuous dialog with stakeholders
- Stakeholder support

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### Summary

- CWD is significant wildlife health issue
- Zoonotic potential cannot be ruled out
- Management efforts, to date, have been largely unsuccessful
- There is a need for more effective disease management tools
- Stakeholder support for management is challenging to obtain/retain
  - Human Dimensions “Change Management” necessary

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### CWD – What you can do

- Learn about CWD and talk to others
- Hunt
  - Follow regulations
  - Never use lures or bait
  - Shoot as many deer as you can
    - Use non-toxic ammunition
  - Don't pass on yearling males
  - Practice safe carcass disposal
  - Test your deer
- Promote hunting, access
- Advocate for change



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### CWD Stories

- “in 2014, my group of hunting buddies leased 280 acres between Dodgeville and Spring Green on Lower Wyoming Valley Rd. The heart of CWD. We leased the ground for 4 seasons. In that time frame, EVERY SINGLE BUCK we killed was CWD positive. ... In four years, I believe we killed about 12+ CWD positive deer. ... It became so bad, that we gave up the lease and checked out. We couldn't stand shooting the deer and not being able to eat them ...”

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Iowa County hunter testimonial

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### QUESTIONS?

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