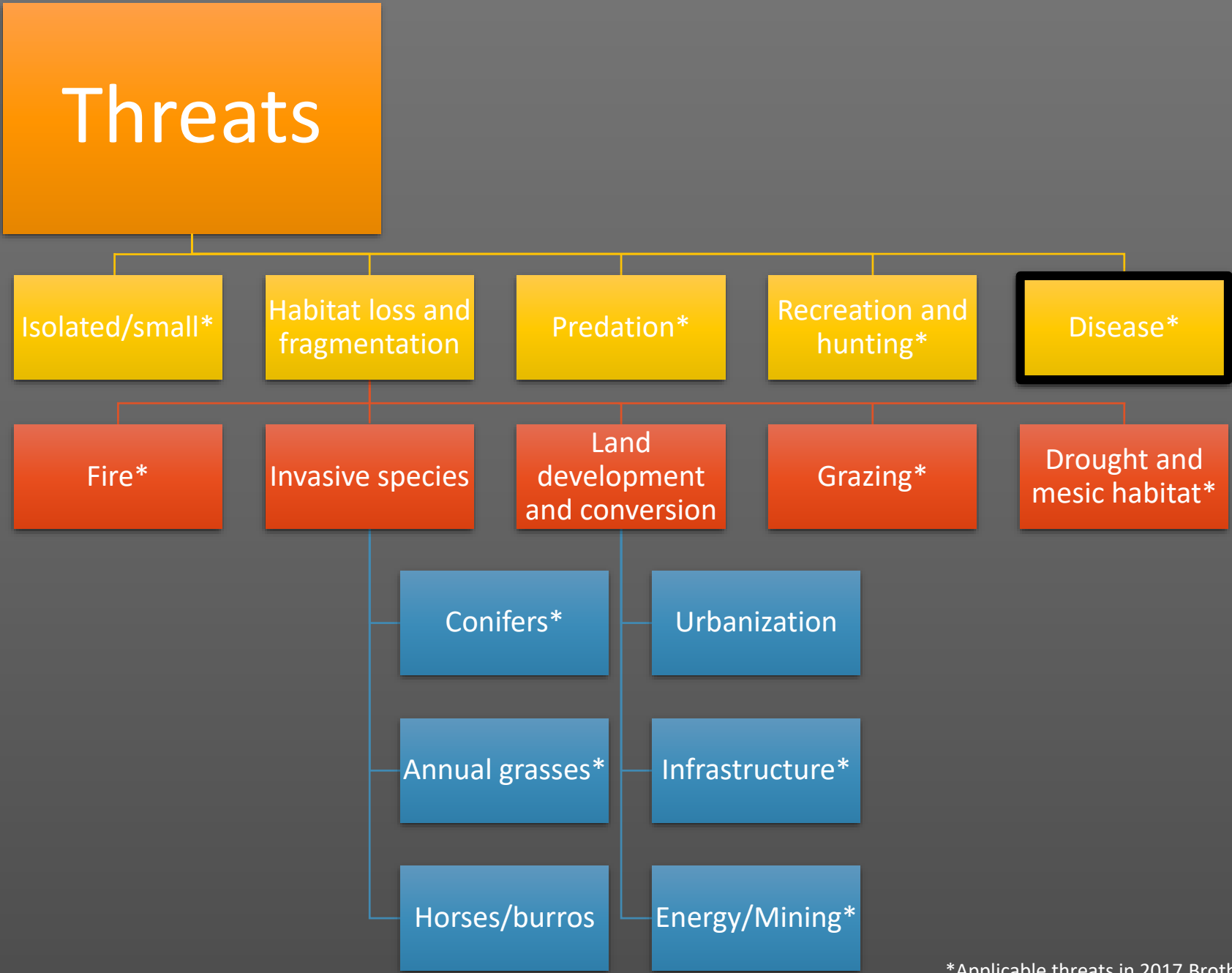


**Sage-grouse and West Nile virus
Prineville LIT
May 20, 2020**

Emily Weidner – Fish & Wildlife Biologist
US Fish and Wildlife Service

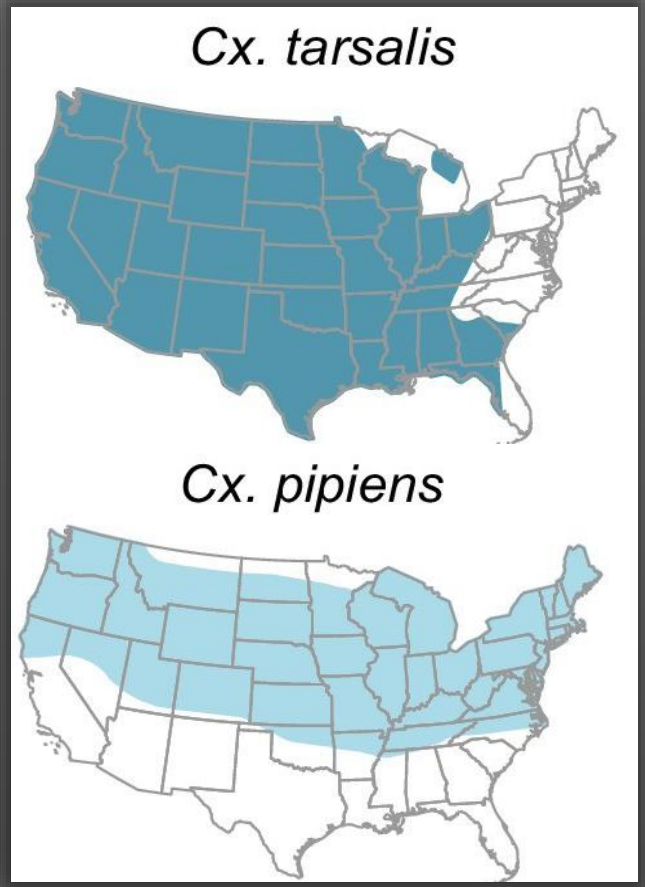
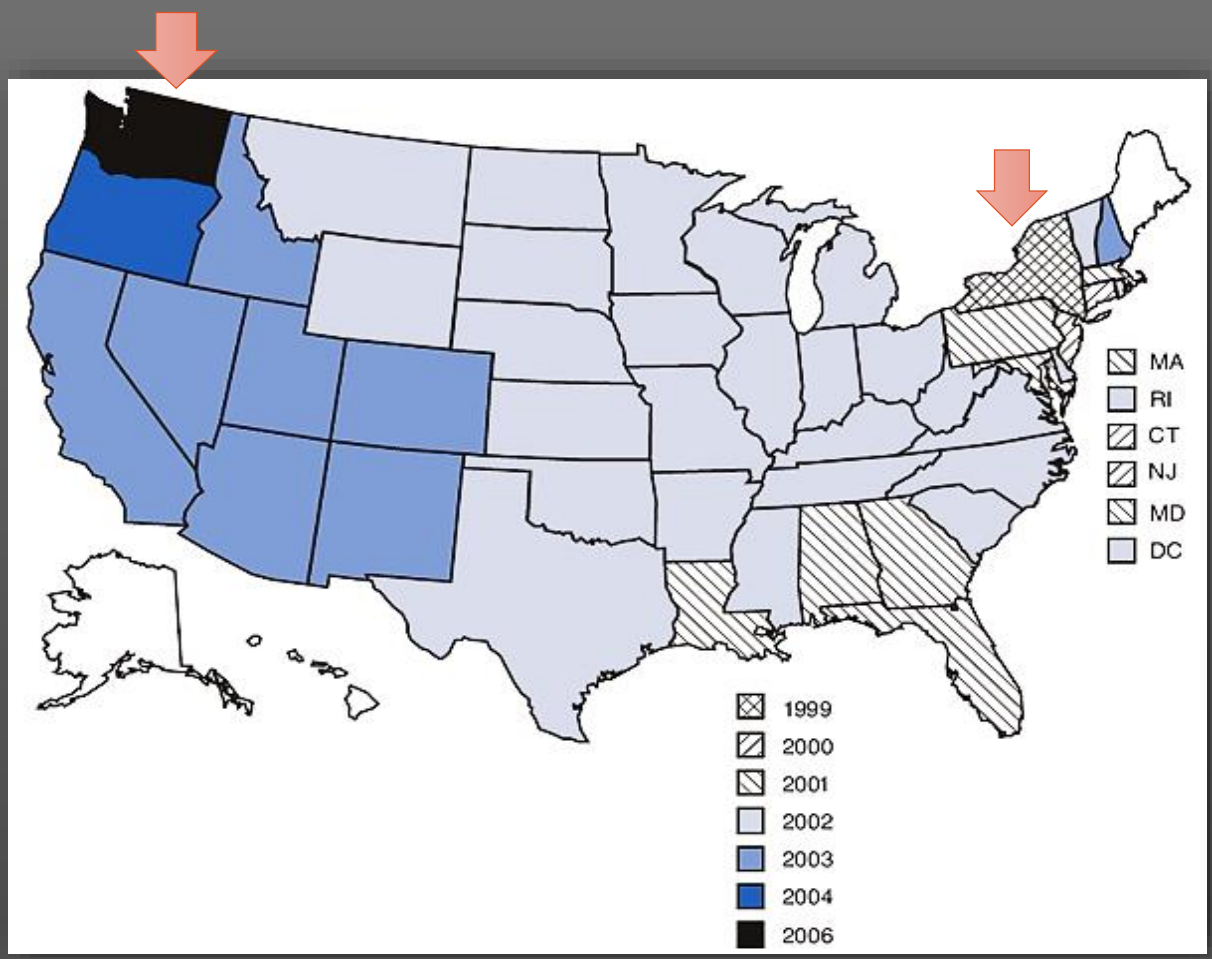


*Applicable threats in 2017 Brothers CFA

West Nile virus (WNV)

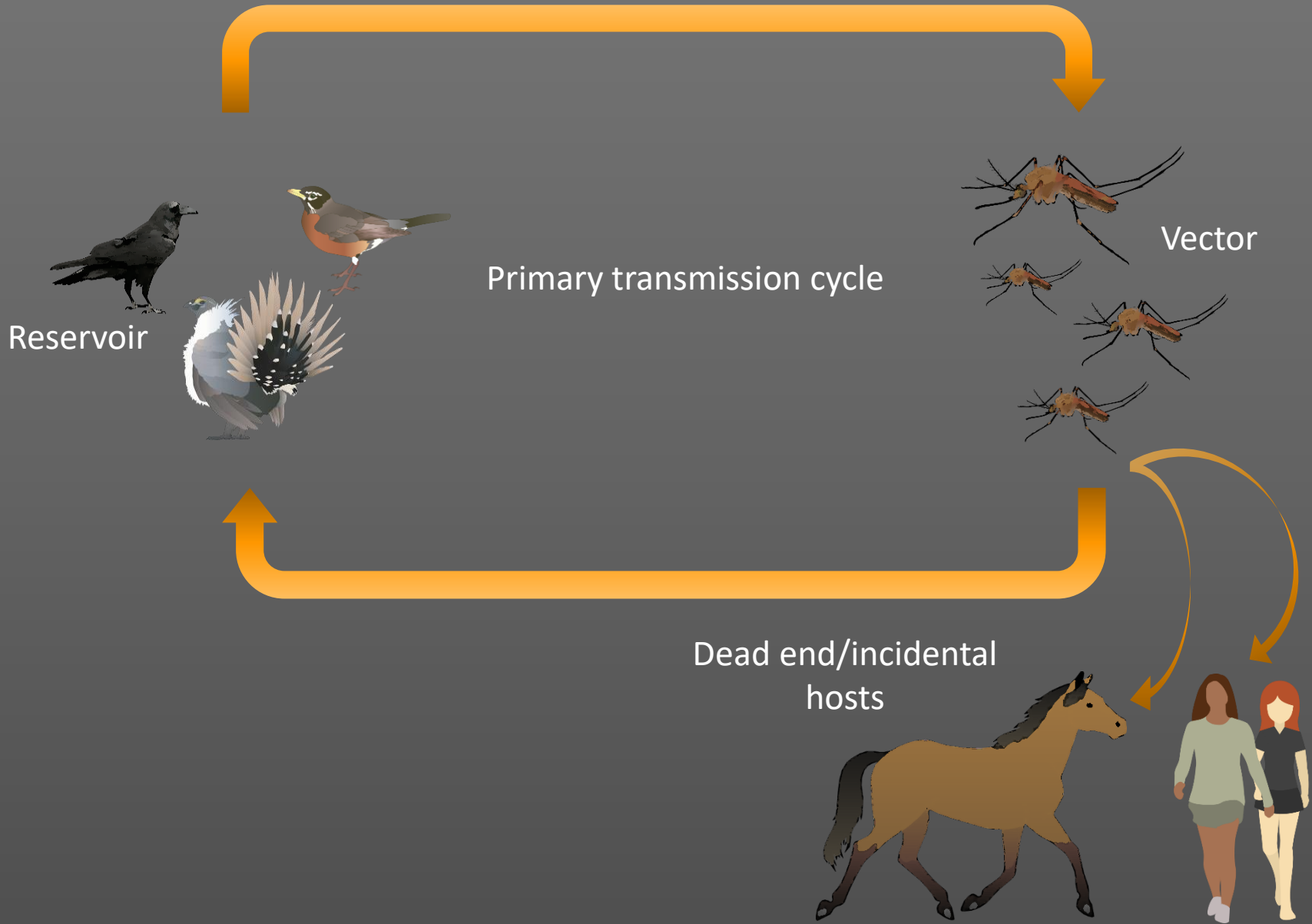
- Reemerging pathogen
- Same genus as dengue, yellow fever, and zika
- Arbovirus (ARthropod-BORne virus)
 - *Culex* spp. primary vectors
- Birds serve as primary reservoir
 - American robin likely responsible for maintenance and transmission across the landscape
- Causative agent of West Nile fever in humans

West Nile virus (WNV)



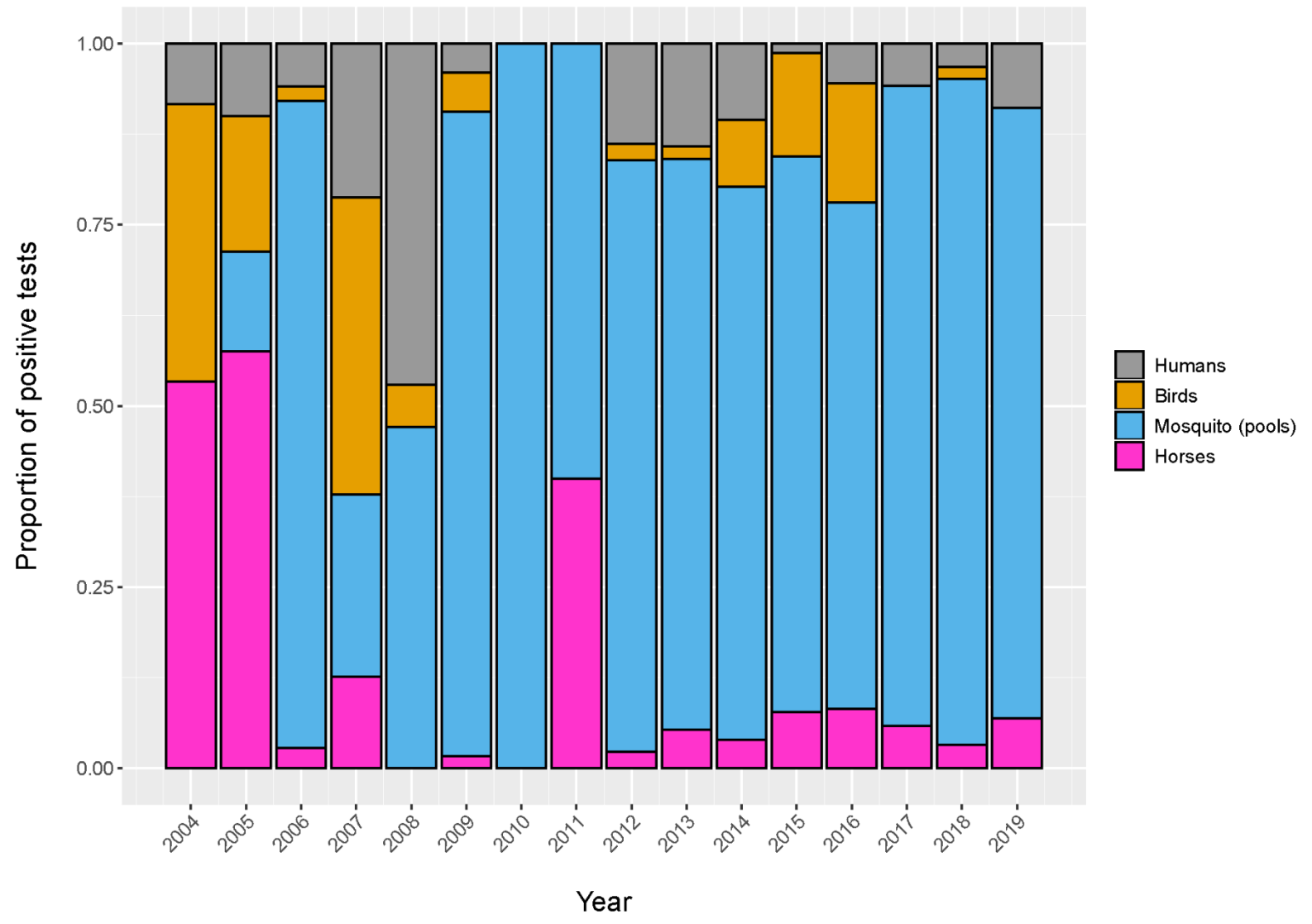
WNV in sage-grouse

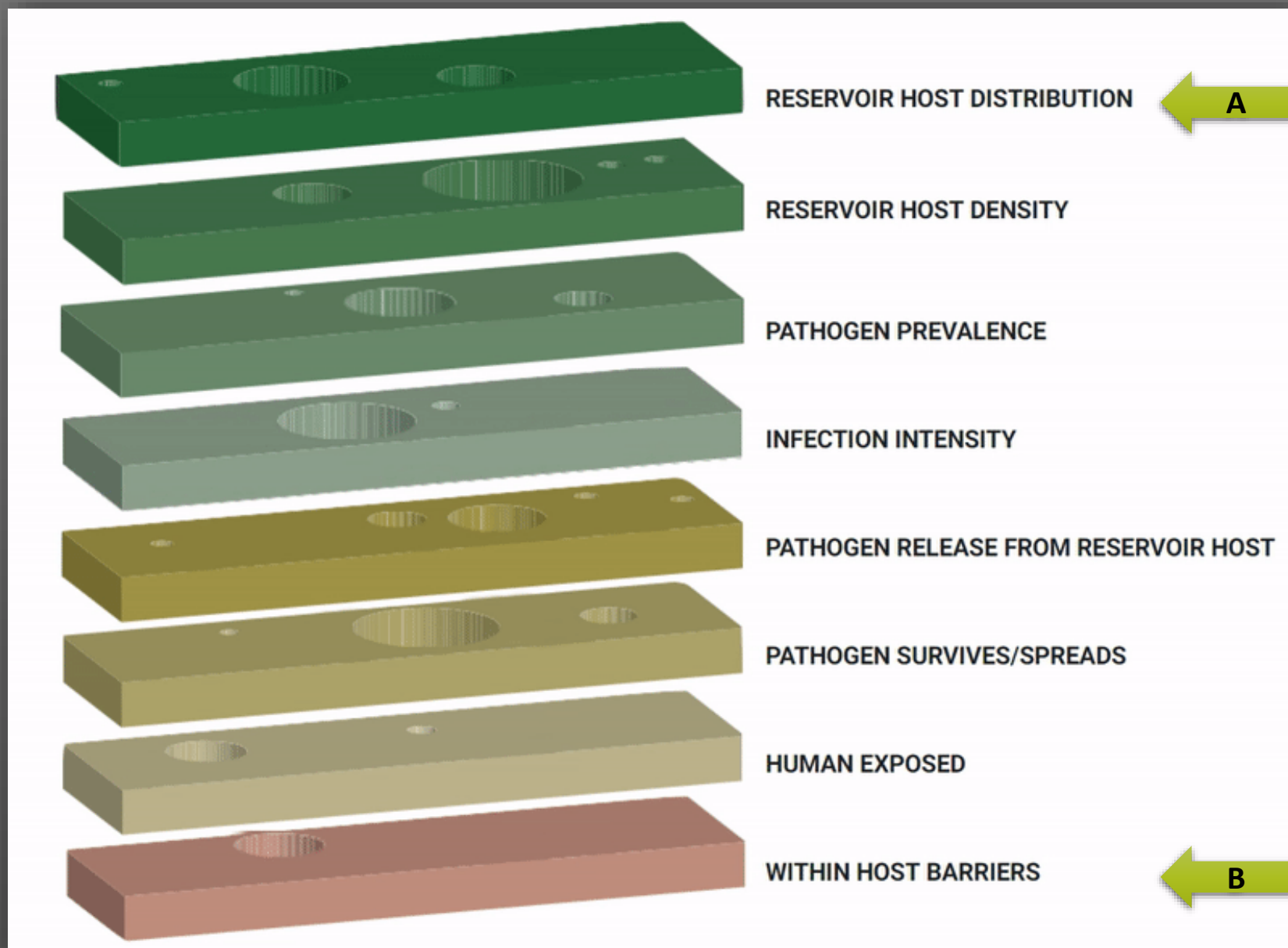
- 2003, first documented WNV mortalities
 - Alberta, Montana, Wyoming
- 2006, Malheur County, Oregon
- Variable mortality and low resistance to infection
- Affects all age classes and both sexes
- Mortalities typically occur July through September
- Considered an endemic stressor



West Nile virus monitoring (2004 – 2019)

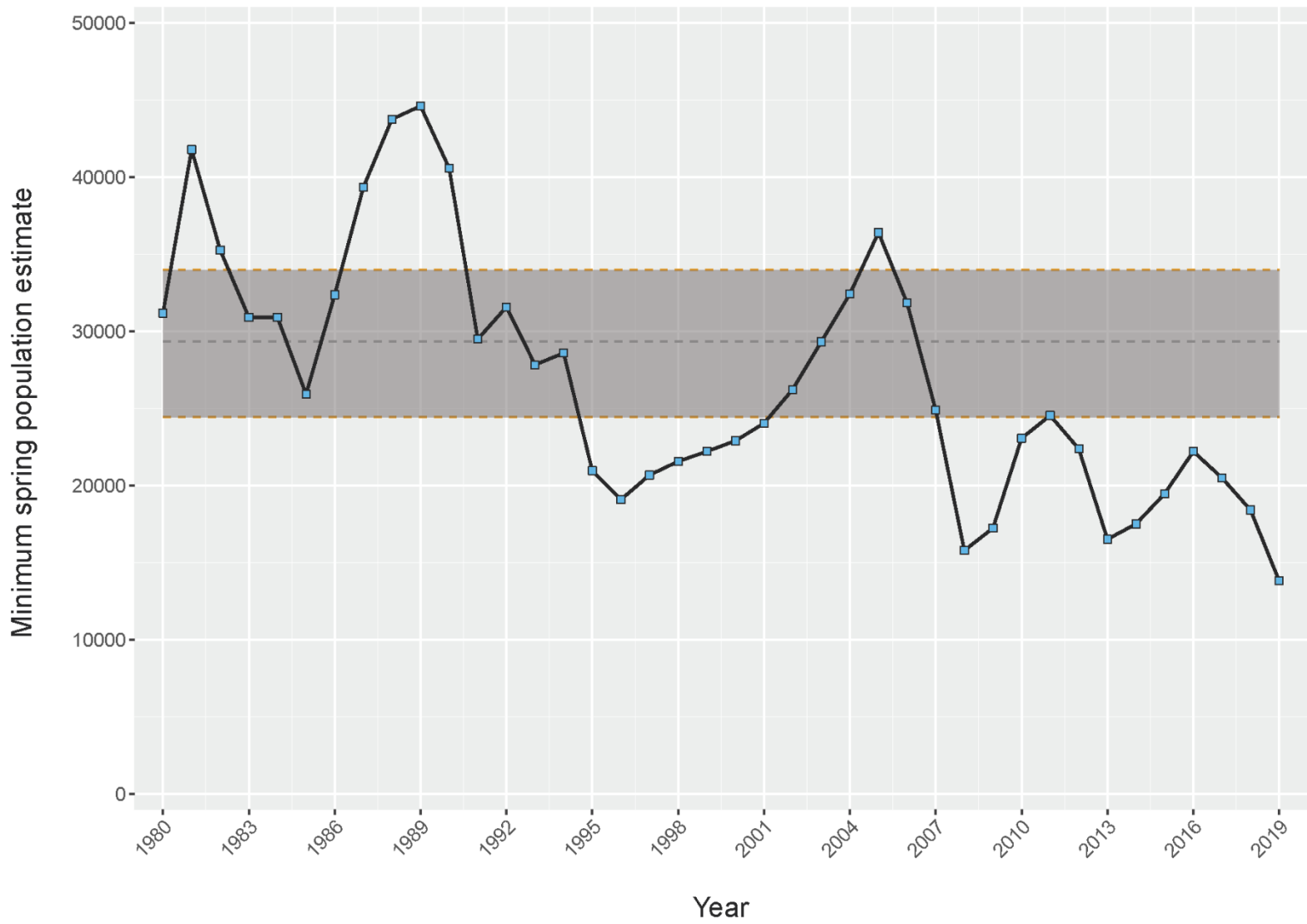
Oregon Health Authority





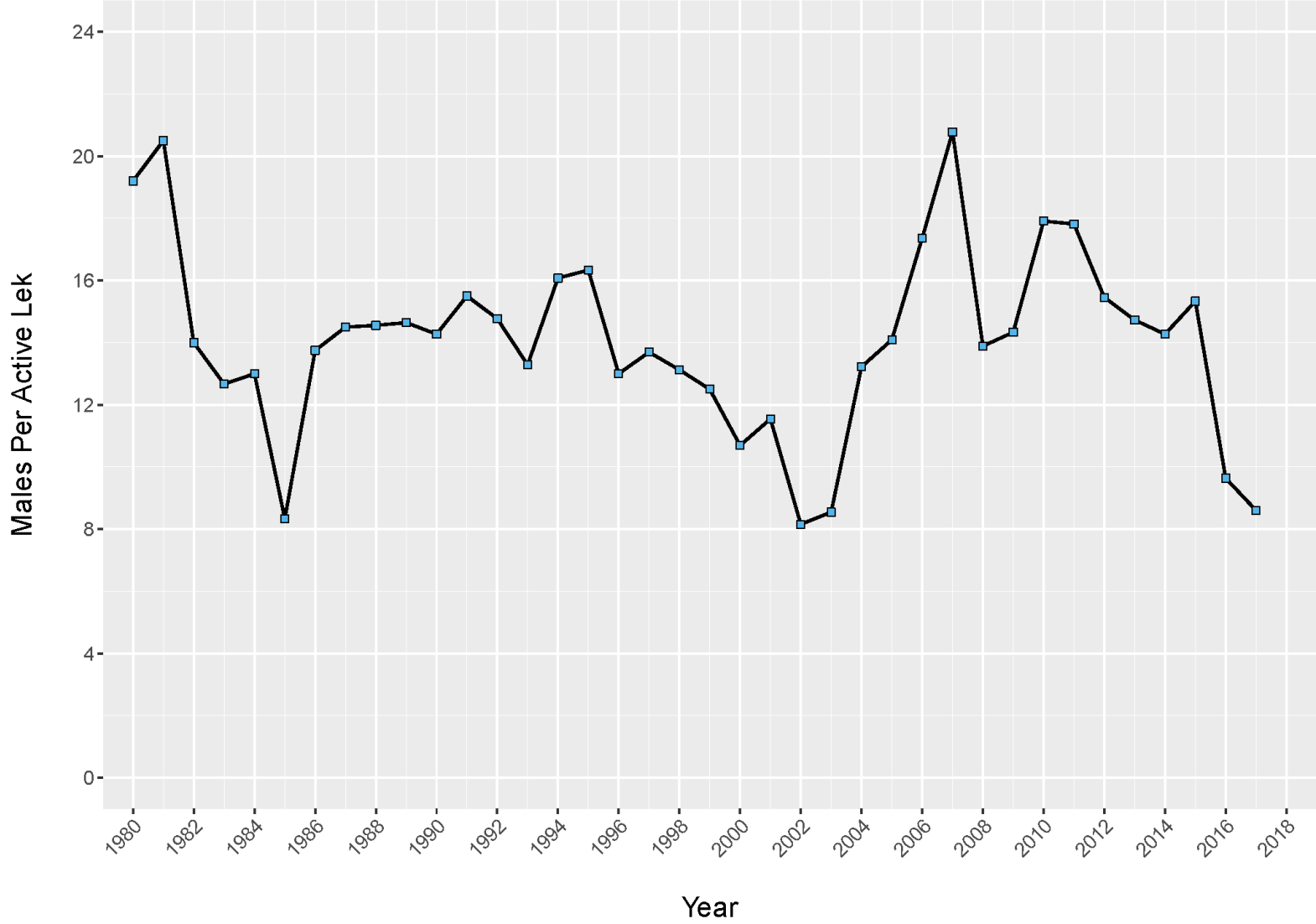
Estimated Minimum Spring Breeding Population (1980 – 2019)

Oregon Department of Fish and Wildlife



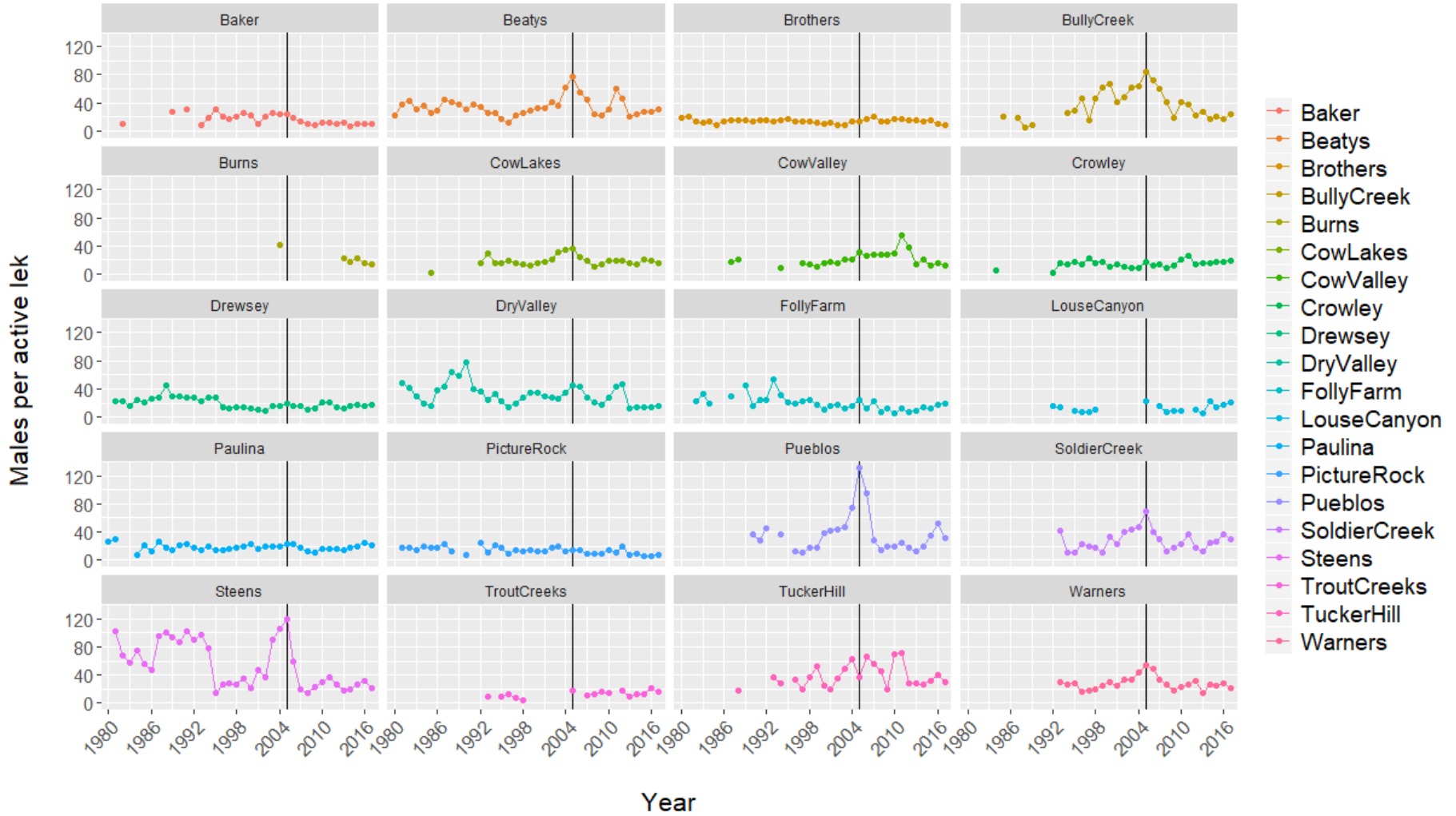
Brothers/N. Wagontire PAC (1980 - 2017)

Oregon Department of Fish and Wildlife



Oregon Department of Fish and Wildlife

Sage-grouse lek trends in selected PACs (1980 - 2017)



Difficult to assess...

- Wildlife move on large scales and are cryptic
- Field work requires substantial time, labor, and a uniform effort
- Must have diseased bird in-hand or birds must survive in order for WNV to be detected
- **Potentially biased population metrics**
- **Transmission and outbreaks are temporally and spatially patchy on the landscape**
- **Low occurrence and equivocal results in serosurveys**

Counting sage-grouse

- Lek count data: only long-term, range-wide dataset available for evaluating trends in sage-grouse population
- Imperfect detection (sightability & lek attendance)
- Counts may inaccurately reflect changes in population abundance when detection of individuals is not constant for surveys either within or among years

Landscape

- Spatial and temporal variation in WNV transmission moderates WNV impacts on species
- **Spatial** - range of habitats, and WNV transmission is lower in one of these habitats, then this area may serve as a refuge from infection
- **Temporal** - intensity of WNV transmission may temper impacts and allow recovery in low transmission years

Low occurrence & equivocal results

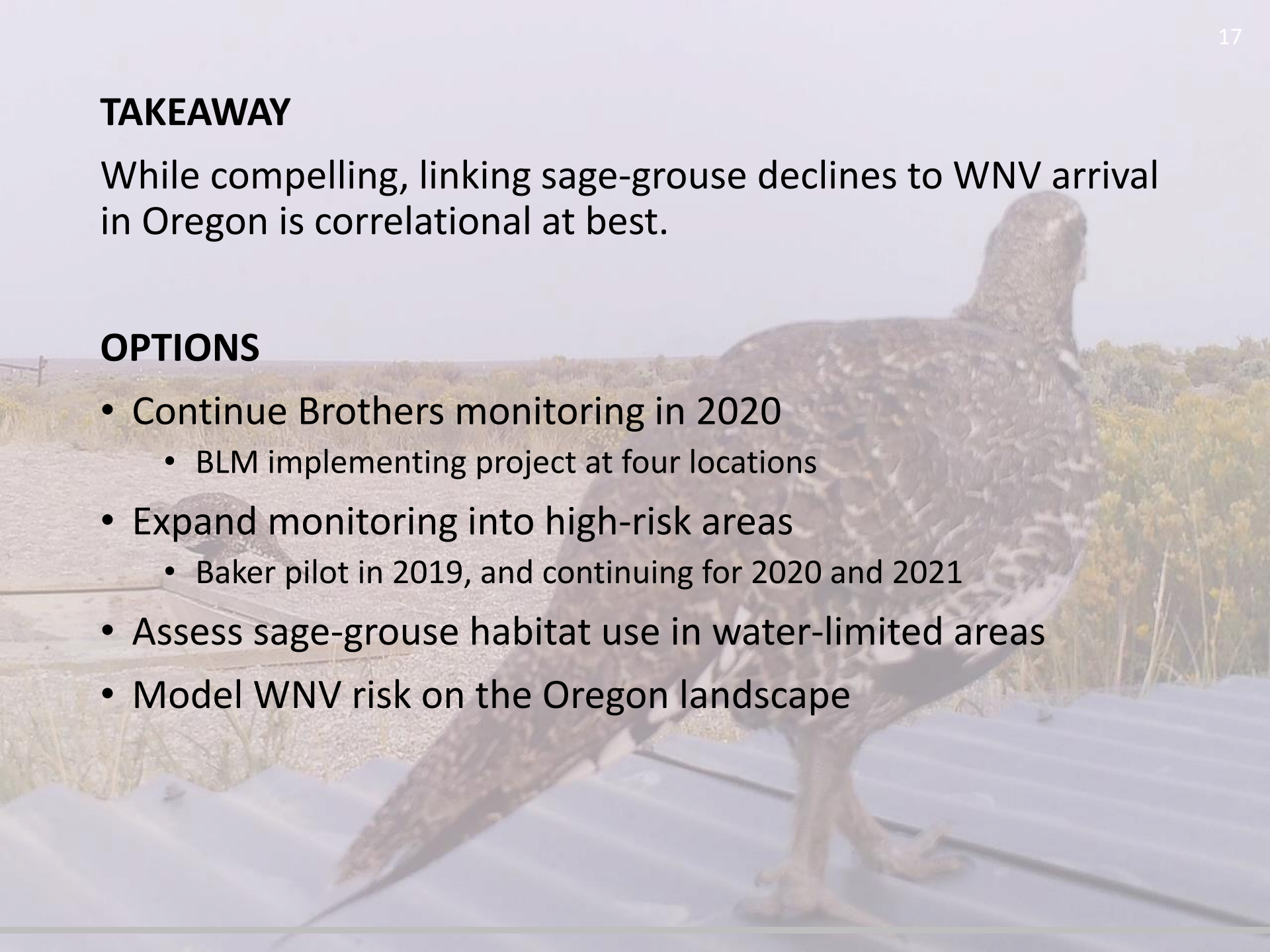
These two aspects suggest:

1. Sage-grouse have not been exposed to WNV and haven't had an opportunity to develop antibodies
2. WNV is lethal for the majority but a limited number of birds survive infection and develop antibodies
3. Sage-grouse mount an immune response other than producing WNV-specific antibodies, thus making detection difficult

TAKEAWAY

While compelling, linking sage-grouse declines to WNV arrival in Oregon is correlational at best.

OPTIONS

- Continue Brothers monitoring in 2020
 - BLM implementing project at four locations
 - Expand monitoring into high-risk areas
 - Baker pilot in 2019, and continuing for 2020 and 2021
 - Assess sage-grouse habitat use in water-limited areas
 - Model WNV risk on the Oregon landscape
- 



Questions?