Avian Influenza – A primer

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AIV Baby Basics

Waterfowl are considered natural reservoir of AIV

Historically, AIV rarely caused issues for wild birds.
LPAI vs HPAI

- Pathogenicity is defined by the impact on domestic poultry
- Low pathogenicity avian influenza
  - Doesn’t really cause disease in domestic birds
- HPAI – can kill >75% of infected domestic birds.
  - Only H5 and H7 are considered HPAI.
  - But, not all H5 or all H7 ARE HPAI.
- Flu viruses readily reassort/evolve, so a low-path H5 may easily become a high-path H5.
- Though human infections w/ HPAI are rare, when they do occur, mortality can be high.
  - E.g., H5N1 has ~50% mortality rate.

Image credit: Wisconsin Humane Society
Why do we care about HPAI so much?

- Agricultural impact(s)
  - >58 million domestic birds since 2022
- Also, AIV can infect humans
  - Zoonotic disease
- Recombination of bird IA-V with Human IV-A is of concern
  - 1918 Spanish Flu pandemic was an AIV (H1N1)
- Hence the interjurisdictional nature of HPAI response and management

Image credit: Ducks Unlimited
Current strain of H5N1

Ramey et al., 2021
**History of HPAI in the US**

- **1924**: H7 HPAI in East Coast live bird markets.
- **1984**: H5N2 in NE US domestics.
- **2004**: H5N2 in SE US domestics.
- **Dec 2014**: First detection in US in wild birds (ducks and falcon) in Washington (Whatcom Co).
- **2015**: Since late 2014, several ongoing HPAI incidents in the Pacific, Central, Mississippi Flyways in wild and domestic birds. (H5N2, H5N8, H5N1)
- **2022–2023**: Ongoing H5N1 outbreak in wild and domestic birds in US.
Historically, HPAI infections were associated with domestic birds!

Image credit: Science News
Is HPAI H5N1 an emerging disease threat for wild birds?

Ramey et al., 2021
H5N1 (EA 2.3.4.4b) in Washington

• 1 March 2022 – 1st case in WA
• Greater white fronted goose
• Walla Walla Co
Since then….

- Monitoring reports sick/dead wild birds
- Submit priority suspect cases for testing
- Working closely with wildlife rehabilitators
- Regular coordination calls with state and federal partners
HPAI sampling and confirmed cases in WA

- 206 cases submitted
  - Lots more recorded as “suspect”
- 112 confirmed H5N1
  - NVSL does confirmation testing
- Various birds and mammals tested
  - Only raccoons and bobcat positive (so far) in WA
Side note: H5N1 can infect and kill marine mammals
The impact in WA?

- Unfortunately, we don’t really know.
- Biased monitoring approach
- Limited resources ($, staff time)
- Some species impact may be rather large – e.g., Caspian terns

Globally, estimated >75,000 wild birds have died due to H5N1 2.3.4.4b. Most of these are colonially nesting marine birds.
Rat Island outbreak - ongoing

- First H5N1 event in marine environment (in WA)
- >1224 dead Caspian terns
- >158 dead Gulls
- Huge effort for carcass removal
  - >30 people days
- Long-term impacts?
When is such effort warranted?

- Setting – is it feasible?
- Benefit vs cost
- Scale of mortality
- Likelihood of exposure to other wild birds and mammals
- Access
- Disposal
- Public health reasons
- Adequate resources

Photo credit: Scott Pearson
H5N1 in Washington – next steps

- Continue surveillance
- Identify reservoir(s)
- Data-driven risk assessments
- Science-driven management recommendations

Pending resources.
Closing thoughts

- This highlights the importance of our interjurisdictional collaborations.
- HPAI overlaps many jurisdictions:
  - WDFW
  - DOH / Public Health
  - WS Dept of Ag
  - USDA APIHS
  - USFWS
  - NOAA
H5N1 is different

H5N1 may be “emerging” in wild birds

H5N1 in impacts in Washington have been HARD to quantify
This strain of HPAI (EA H5N1) is more deadly to wild birds
Questions?

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Image Credit: American Oceans