Supplementary materials for Journal of Wildlife Diseases DOI: 10.7589/JWD-D-20-00082: Michelle Coombe, Stefan Iwasawa, Kaylee A. Byers, Natalie Prystajecky, William Hsiao, David M. Patrick, Chelsea G. Himsworth. A SYSTEMATIC REVIEW AND NARRATIVE SYNTHESIS OF THE USE OF ENVIRONMENTAL SAMPLES FOR THE SURVEILLANCE OF AVIAN INFLUENZA VIRUSES IN WILD WATERBIRDS.

SUPPLEMENTARY TABLE 1. Search strings entered into databases to search for peer-reviewed literature relevant to the detection of avian influenza virus in environmental samples from wild waterfowl habitats.

Group	Search strings
Animal	Duck*, geese, gull*, migratory, shorebird, swan, tern, water bird, waterfowl, wild bird, aquatic bird, migratory bird
Diagnostic	Diagnostic, PCR, genom*, AGID, isolates, recovered, swab, viable, detect, presen* sample
Disease	Avian influenza, bird flu, fowl plague, LPAI, low pathogenic avian influenza, HPAI, highly pathogenic avian influenza, orthomyxovirus A, influenza
Environment	Air, aquatic, environment, faeces, feather, feces, foliage, grass, ice, mud, secretion*, soil, terrestrial, water, nasal, detritus, fecal, marsh, swam, saliva, sediment, wetland, persist
Surveillance	Surveillance, screen*, submit*, monitor*, survey*, track*, observe*, testing, detect*, program

Supplementary Table 2. Inclusion and exclusion criteria for evaluation of relevance of peer-reviewed literature to detection of avian influenza viruses in environmental samples from wild waterfowl habitats.

Inclusion criteria for peer-reviewed literature
2005 to Jan 30, 2019
Databases searched include PubMed, Science Direct, EBSCO Host, and Ovid (Embase/Medline/Biological abstracts)
Title and abstract in English
Must involve avian influenza
Must involve wild birds or wild bird habitat
Describes or discusses methods for collecting environmental samples
Describes or discusses qualities of different sample types (e.g., sediment, surface swabs, feces, water, shed feathers)
Describes or evaluates the state of knowledge with regards to environmental samples for avian influenza surveillance
Describes or discusses the efficacy and efficiency of one or more techniques to identify avian influenza viruses in environmental samples
Describes or discusses techniques for identifying avian influenza viruses in environmental samples (e.g., virus isolation, PCR, whole genome sequencing)

Exclusion criteria for peer-reviewed literature
Describes or discusses methods for sample collection from live birds exclusively (e.g., cloacal swabs, plucked feathers)

Describes or discusses methods for sample collection from livestock buildings or domesticated birds exclusively

Experimental or observational studies on avian influenza in fleas, bivalves, other aquatic animals or flora exclusively

Experimental studies of avian influenza persistence in soil samples (observational studies were included) exclusively

Modeling studies of shedding patterns, environmental persistence, risk factors, prevalence patterns, transmission dynamics, or predictive risk mapping exclusively

Studies that focused on the inactivation of avian influenza viruses exclusively (e.g., chlorination, UV radiation, anaerobic digestion)

SUPPLEMENTARY TABLE 3. Procedures for selecting, grouping, and screening peer-reviewed and grey literature related to the detection of avian influenza viruses in environmental samples from wild waterfowl habitats.

Peer-reviewed literature

Step	Procedure
1	Databases searched using search strings provided in Table S1 The first search took place between Jan 1 to Jan 25, 2016 and an updated search took place between Oct 31, 2018 and Jan 30, 2019
2	Articles grouped by database and search string combinations
3	Within each group, the first 100 articles screening using inclusion/exclusion criteria in Table S2 and relevant articles retained
4	Within each group, remaining articles screened using inclusion/exclusion criteria in Table S2 in groups of 30 until no relevant articles were found or until 200 articles were screened, whichever came first, and relevant articles retained
5	Relevant articles were sorted into categories of three-stars (most relevant) to one-star (least relevant), based on a qualitative assessment of relevance to the search question and inclusion/exclusion criteria
6	All three-star publications were used for performing forward searches (finding other articles that cited the selected publication through the "web of science" database) and backwards searches (reviewing the selected publication's cited references) to find other relevant articles, based on inclusion/exclusion criteria in Table S2

Grey literature

Step	Procedure

1 Three internet search engines (Google, Bing, and Yahoo) were searched using strings provided in Table S1

2 Results were limited to recent news (i.e., within the last two years of search date)

3 Within each search engine, results were sorted by date and degree of relevance, and the first 40 were considered for inclusion based on inclusion and exclusion criteria provided in Table S2

4 Within each search engine, an additional 40 results being considered if at least 10 relevant results were found in the initial group