

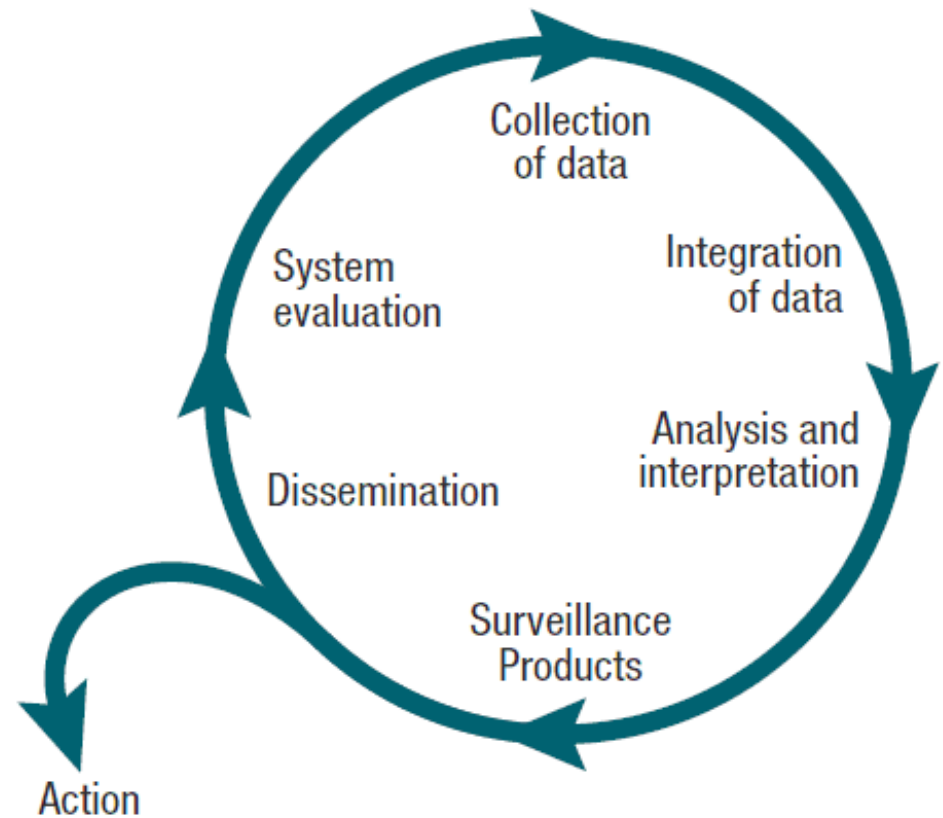
Surveillance planning in a wildlife health context

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What is the purpose of surveillance

- provide timely intelligence on the health of the population and inform effective responses to emerging and ongoing issues



Monitoring is the ongoing, continuous, routine observation to assess the status of a population. It is a part of surveillance

Most wildlife health surveillance is monitoring or a survey

Surveys because...

- Time limited, not continuous, not routine

Monitoring because...

- Not linked to action, not timely

Wildlife surveillance challenges

Biased population sampling

- **Detection biases**
 - affect species and diseases tracked
 - location by convenience
- **“Interest” biases**
 - exclude many important causes of death and disease and/or species from surveillance
- **Misclassification bias**
 - tests not validated, few case definitions

Hard to determine trends

- Non-representative, varying sampling effort
- Sparse denominator data
 - how to measure prevalence?
- Rarely see the same individual twice
 - how to measure incidence?

A photograph of two Canada warblers perched on a pine branch. The bird in the foreground is in sharp focus, showing its white face, dark eye, and greyish-brown wings. The second bird is slightly behind and to the left, also in focus. The pine needles are green and sharp. The background is a dark, out-of-focus forest. A semi-transparent grey circle is overlaid on the right side of the image, containing the text.

Some early decisions
in the design process

Decision 1

Do you want monitoring or surveillance

Monitoring

- **GOAL = characterize a status**
 - Population disease, risky situation, hazard
- **TRADE OFF = timelines for accuracy**
- **NEEDS = able to accurately track the populations, hazards and conditions of interest**
 - See previous list of challenges

Surveillance

- **GOAL = see a signal of change to provoke investigation or action**
- **TRADE OFF = accuracy for timeliness**
- **NEEDS = options, thresholds, links to resources and authority to act**
 - often resource poor and involves multiple authorities
 - values and uncertainties limit agreement of action thresholds

Decision 2

*Do you want
health, risk or
disease
surveillance?*

Wildlife health operational model

- Absence of disease
 - Hazards surveillance predominate
 - infectious/parasitic mainly
 - contaminants re-emerging

Risk surveillance limited

- Rarely characterizing exposure potential
 - Risk= hazards + exposure +uncertainty

Health as a capacity to cope

- 'Never' done in wildlife health surveillance
 - Relevant data in population management units

Decision 3

What form of surveillance do you want?

Will you make a surveillance system or a time-limited project?

- Affects ability to reliably see trends

Will you examine a specific population or issue or will you scan for a suite of signals?

- Affects ability to see the unexpected

Will you look for health outcomes or signals of threat and hazards

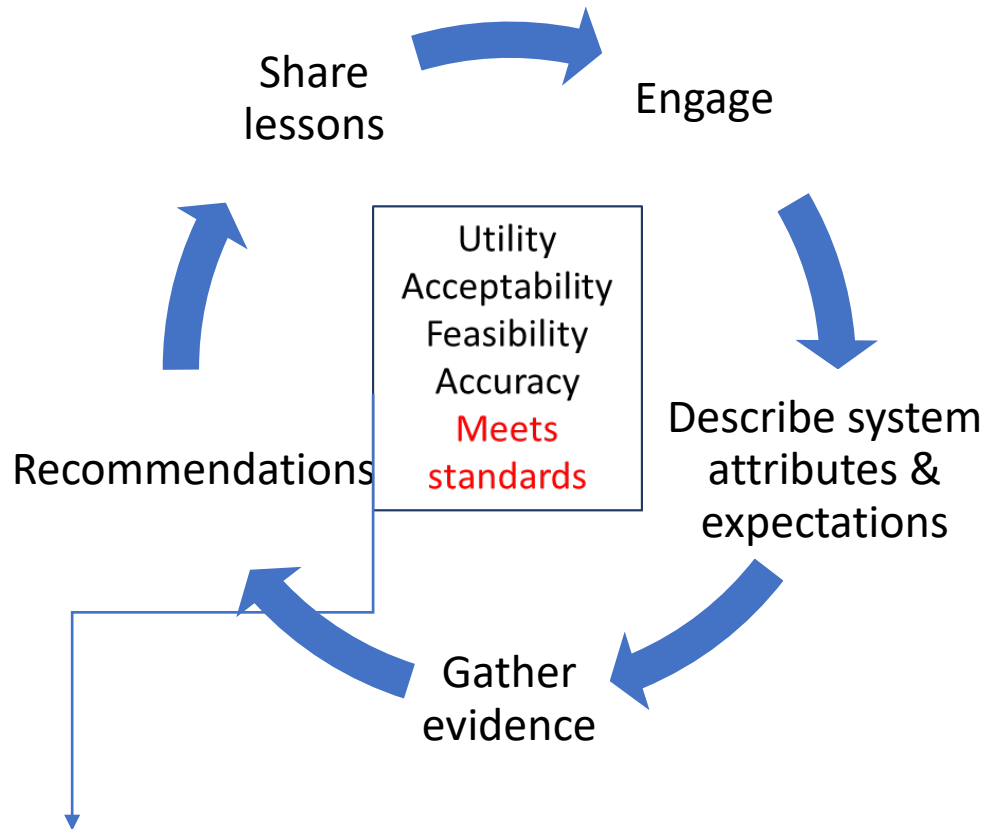
- Affects who can use the information

Decision 4

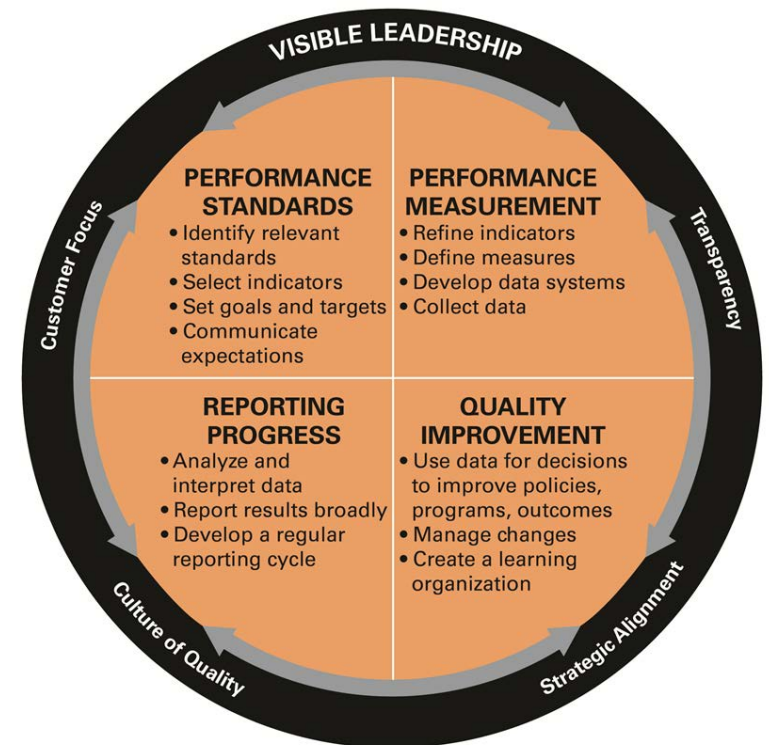
*Who is going
to do it?*

- Wildlife surveillance systems are **interconnected and interdependent intergovernmental enterprise** done in the public good
 - Who has legal authority?
 - Who has stakeholders, rights holder and community trust?
 - Who has the expertise and resources to operate and sustain the activities?
 - Who has the contextual understanding to assess and communicate the findings?

Decision 5 – *How will you determine it is working?*



PUBLIC HEALTH PERFORMANCE MANAGEMENT SYSTEM



Recent literature review found no systematic evaluations of wildlife surveillance systems (Stephen et al. *can Vet J* 60.8 (2019): 841)



How to increase the
likelihood of being
helpful

Elements for Surveillance Success

Human dimensions

- commitment among the partners to work together in an organized manner for the collective benefit
- respects jurisdictional roles and responsibilities
- do not depend on individual people to function, but emphasizes the linkages among organizations

Design

- purposeful
- acquires and shares appropriate data to support that purpose
- accessible to decisions makers, partners and stakeholders
- combines epidemiological and laboratory sciences
- strategically links people, processes, and technologies

Clarity of goals, roles and activities

Agreed purposes of surveillance

Agreement of what you need to look at to meet the purpose

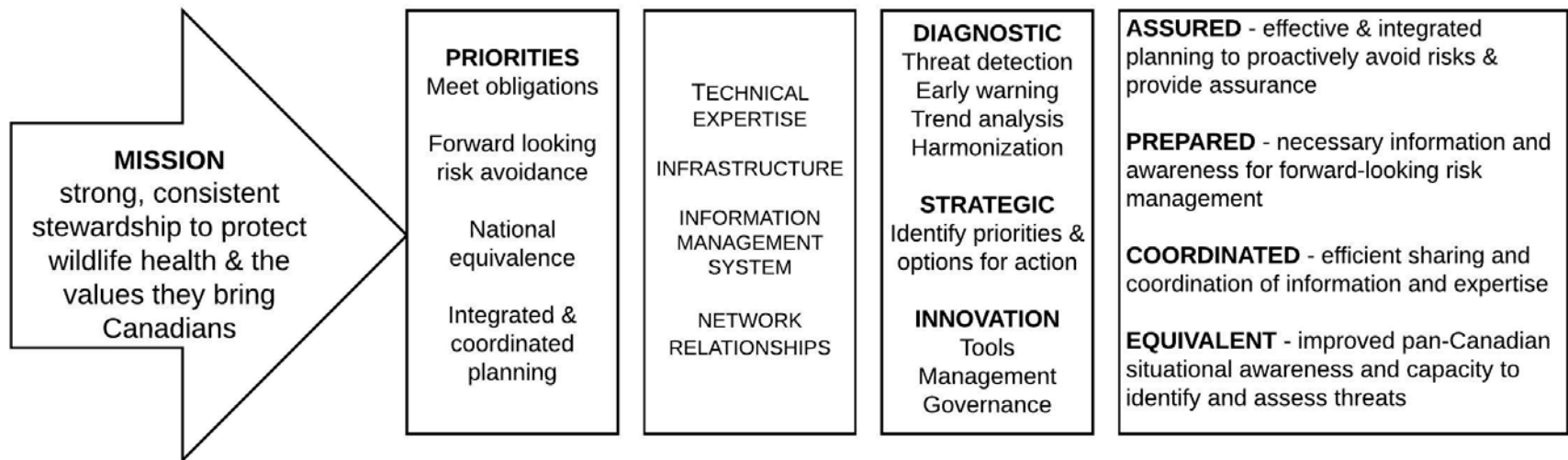
- scope of information
- what conditions, diseases, risk factors, determinants, and/or protective factors

Equal attention to finding and testing as on assessing and sharing

- plan for collecting and distributing the information to be shared and management of that information/data
- agreement on how to interpretation surveillance outputs and how and when to use them

Develop a logic framework

INPUTS → OUTPUTS → OUTCOMES





LOGIC MODEL - CORE PROGRAMS

MISSION: Timely awareness of the national wildlife health situation to identify priorities and actions

GOAL: Geographically representative detection, assessment and communication of information on a diversity of wild terrestrial and aquatic species

RATIONALES

Limited options for treatment and recovery necessitate early detection and rapid response

Limited resources requires evidence-based strategies for action & resource allocation

Multi-jurisdictional management for wildlife benefits from a centralized view of risks & opportunities

ASSUMPTIONS

Core support is sustained at a sufficient level to meet goals

A national wildlife health program is valued and required

Inputs to the core program (submissions, samples, information, resources) support the mission and goal

ACTIVITIES

Scanning surveillance to document trends in endemic threats & detect new disease situations

Health Intelligence to assess, interpret and report trends and emerging events

Data management and storage to support claims on wildlife disease status

Reporting & communicating findings to stakeholders and decision makers

Knowledge-to-action by working with partners to mobilize outputs

Coordination of targeted surveillance activities

OUTPUTS

Morbidity & mortality reports on individual and incidents of wildlife disease

Timely reports of disease incidence for targeted surveillance

Periodic summaries of trends

Notifications of emerging & introduced diseases

Expert interpretation of social and ecological implications of findings

Recommendations on priorities & actions

National archive of wildlife disease reports

LONG TERM OUTCOMES

Confidence in statements of assurance of presence/absence of hazards

Strategic policy priorities identified & supported

Value of wildlife health programs for society documented and sustained.

MEDIUM TERM OUTCOMES

Trends detected and relevance communicated

Regional & national networks for information sharing

Priorities for additional investigation, targeted surveillance and/or capacity development identified

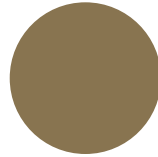
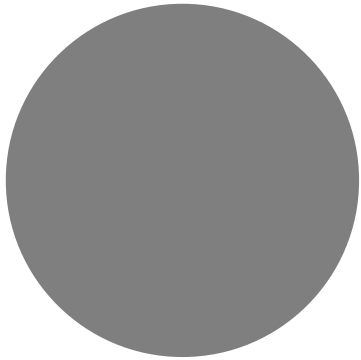
SHORT TERM OUTCOMES

Cause of death and illness for individual cases/incidents determined

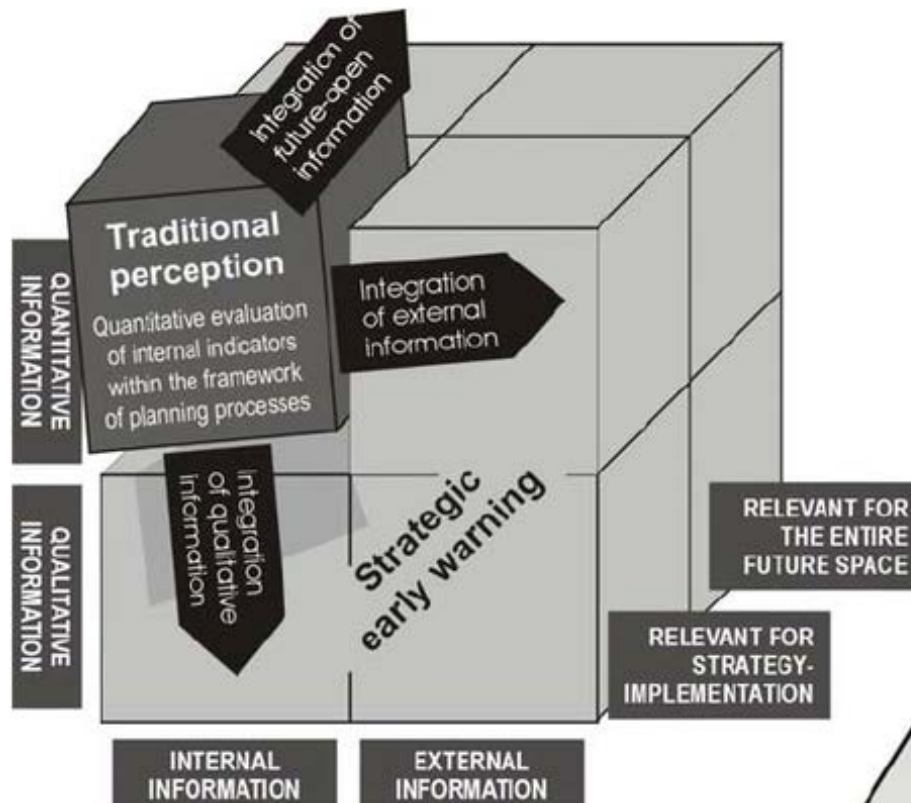
Local response to cases/incidents supported

Emerging issues or introduced diseases detected & reported

Annual priorities identified

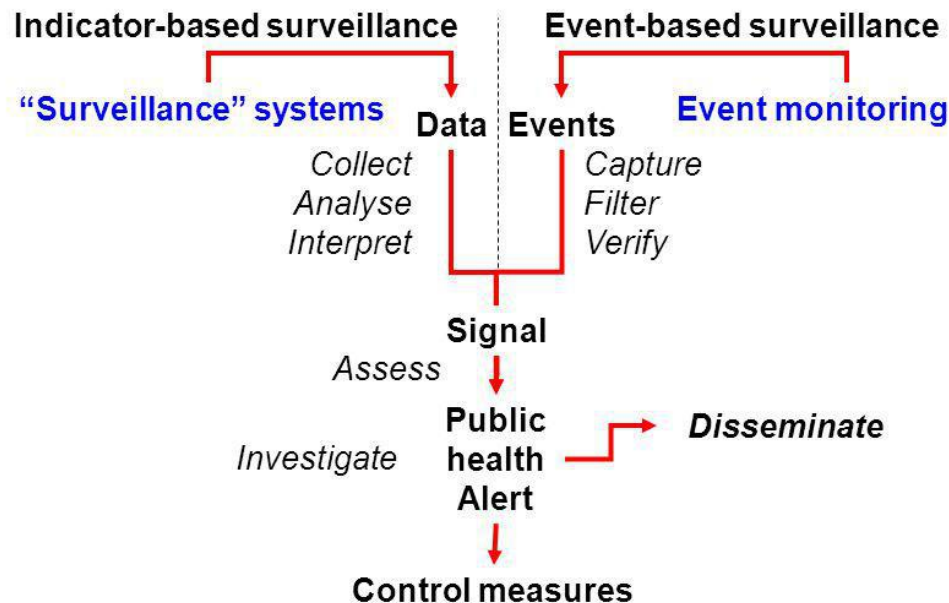


Special considerations for
threat detection surveillance



Epidemic intelligence – Context matters

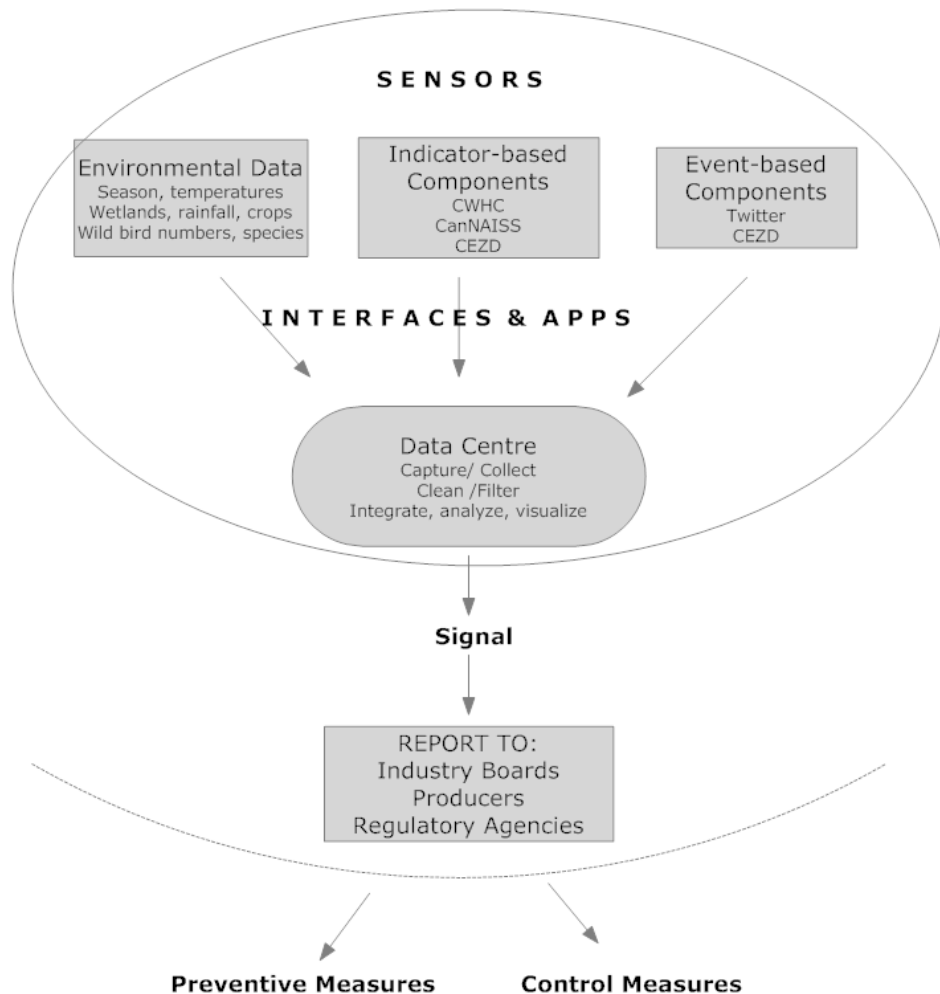
Epidemic Intelligence



The holders of this context are not traditional wildlife health actors

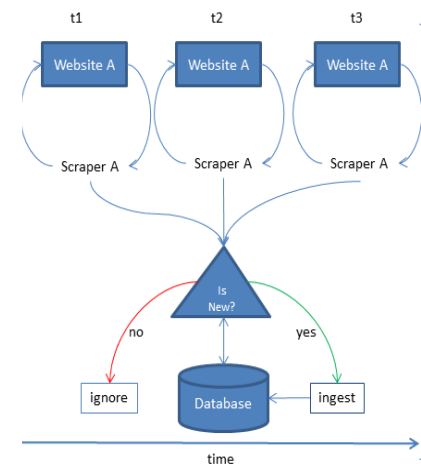
- Community
- Landscape managers
- Meteorologists
- Resource managers

Example: Avian influenza observatory proof of concept

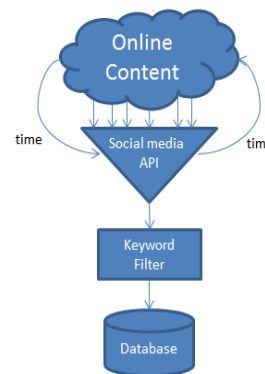


WHIP

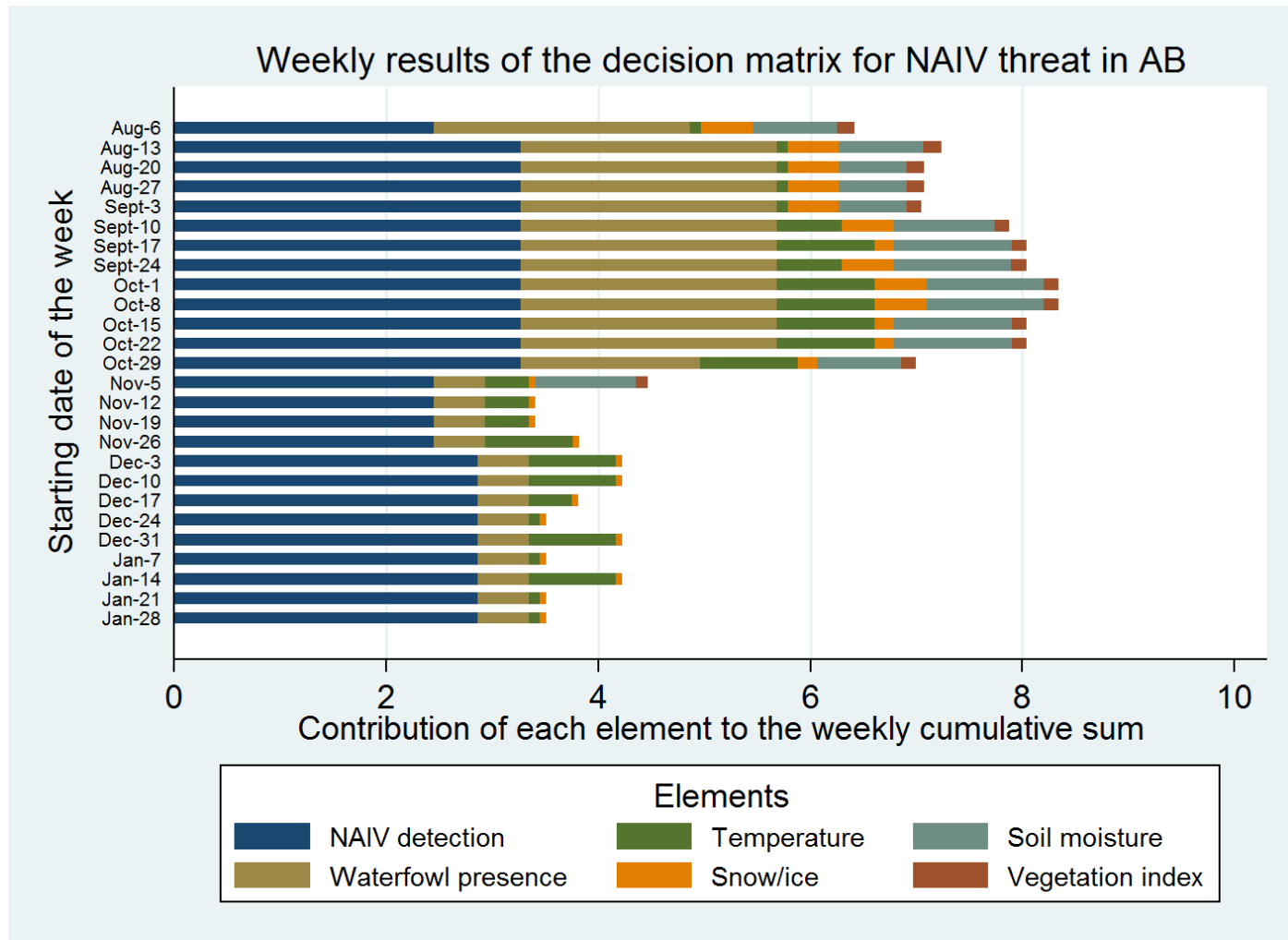
a) Web scraping surveillance



b) Social media surveillance



Intelligence over time in a location



Summary points

Wildlife surveillance is more than sampling and testing

Wildlife surveillance is biased but can be useful when integrated into situational context

Hazard surveillance is necessary but insufficient to characterize changing risk situations

Clarity on objectives and thresholds for action are essential at the outset of designing a program

A scenic landscape photograph of a lake with forested islands and mountains in the background. The foreground shows a dense forest of evergreen trees, with a misty or foggy atmosphere at the bottom. The middle ground features a calm body of water with several small, forested islands. The background consists of a range of mountains, some with patches of snow or light-colored rock, under a clear sky.

Travel for this meeting has
been offset by a donation to
preserve the headwaters of
Morrison Creek

Thank you

Questions?

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