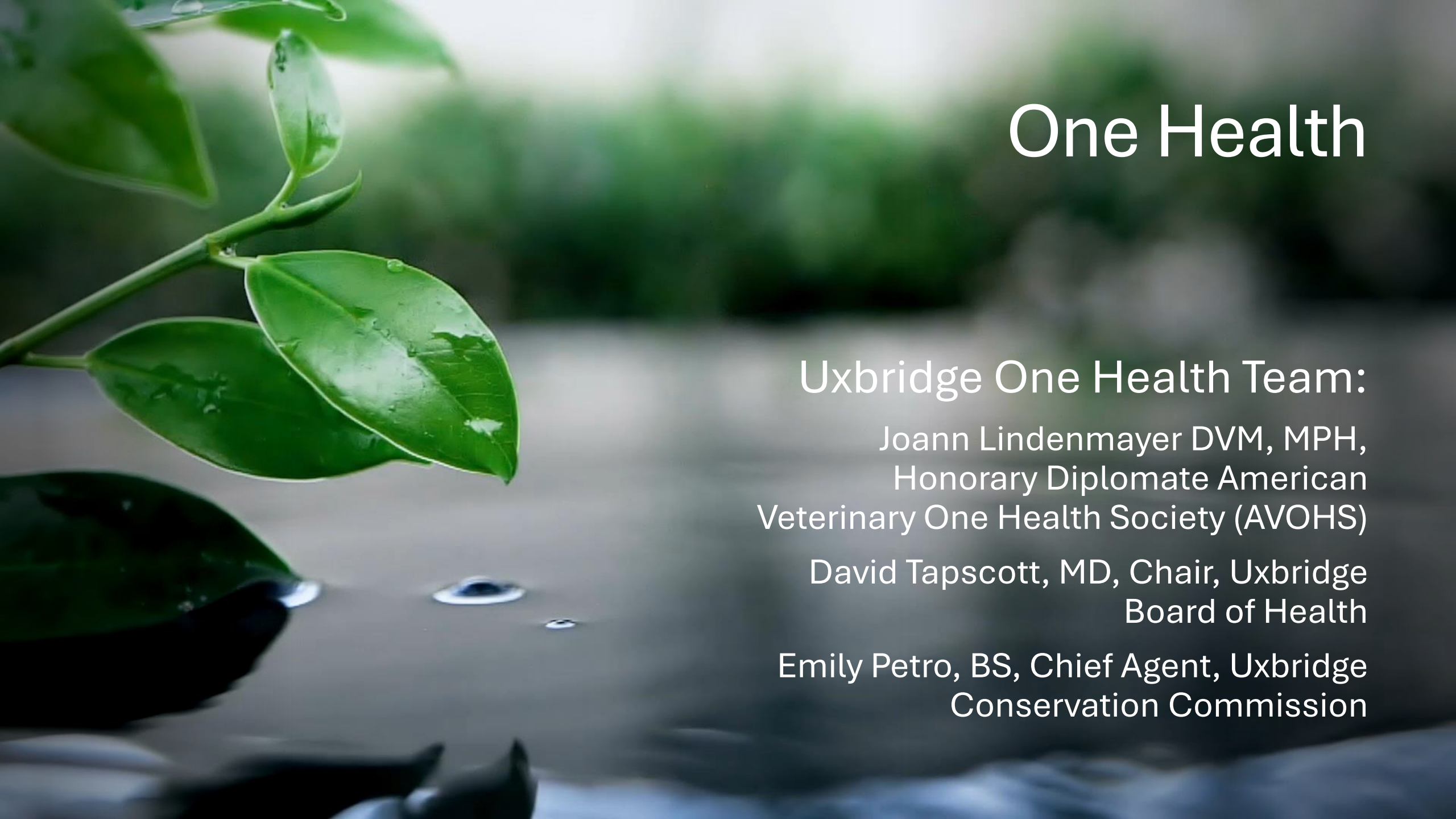


One Health

Uxbridge One Health Team:

Joann Lindenmayer DVM, MPH,
Honorary Diplomate American
Veterinary One Health Society (AVOHS)

David Tapscott, MD, Chair, Uxbridge
Board of Health

Emily Petro, BS, Chief Agent, Uxbridge
Conservation Commission

Learning Objectives: after the presentation, attendees will be able to

- Define One Health and describe a One Health challenge, approach, and policy or program at the local level
- Describe why it's important to consider the health of people, other animals, plants and nature when making decisions that could have impacts beyond the intended target populations of Boards of Health, Conservation Commissions, Planning Boards, and other departments, boards and commissions

Definition of Human Health

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

(World Health Organization Constitution, ratified 1948)

Definition of One Health (One Health High Level Expert Panel, 2021)

One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems.

It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.

The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development

One Health: core concepts

One Health recognizes the **interdependence** of health and well-being among people, other animals and nature

It incorporates **physical, mental, emotional and social well-being** for people, other animals and nature

It seeks to achieve **optimal health** simultaneously for people, other animals and nature, and **accepts tradeoffs** that may not privilege only people

It operates within **scientific uncertainty and limited understanding** of a complex and constantly changing world

One Health Approach Key Features

Multidisciplinary

- health experts (human, other animal, plant, environment, ecosystem)
- Affiliated disciplines: law, economics, sociology, anthropology, etc.

Transdisciplinary

- Community voices engaged from problem identification to evaluation/modification
- Includes voices for the all living (biotic) and non-living (abiotic) elements in a defined area

One Health as a Movement: Intersection with other "healths"

Ecosystem Health

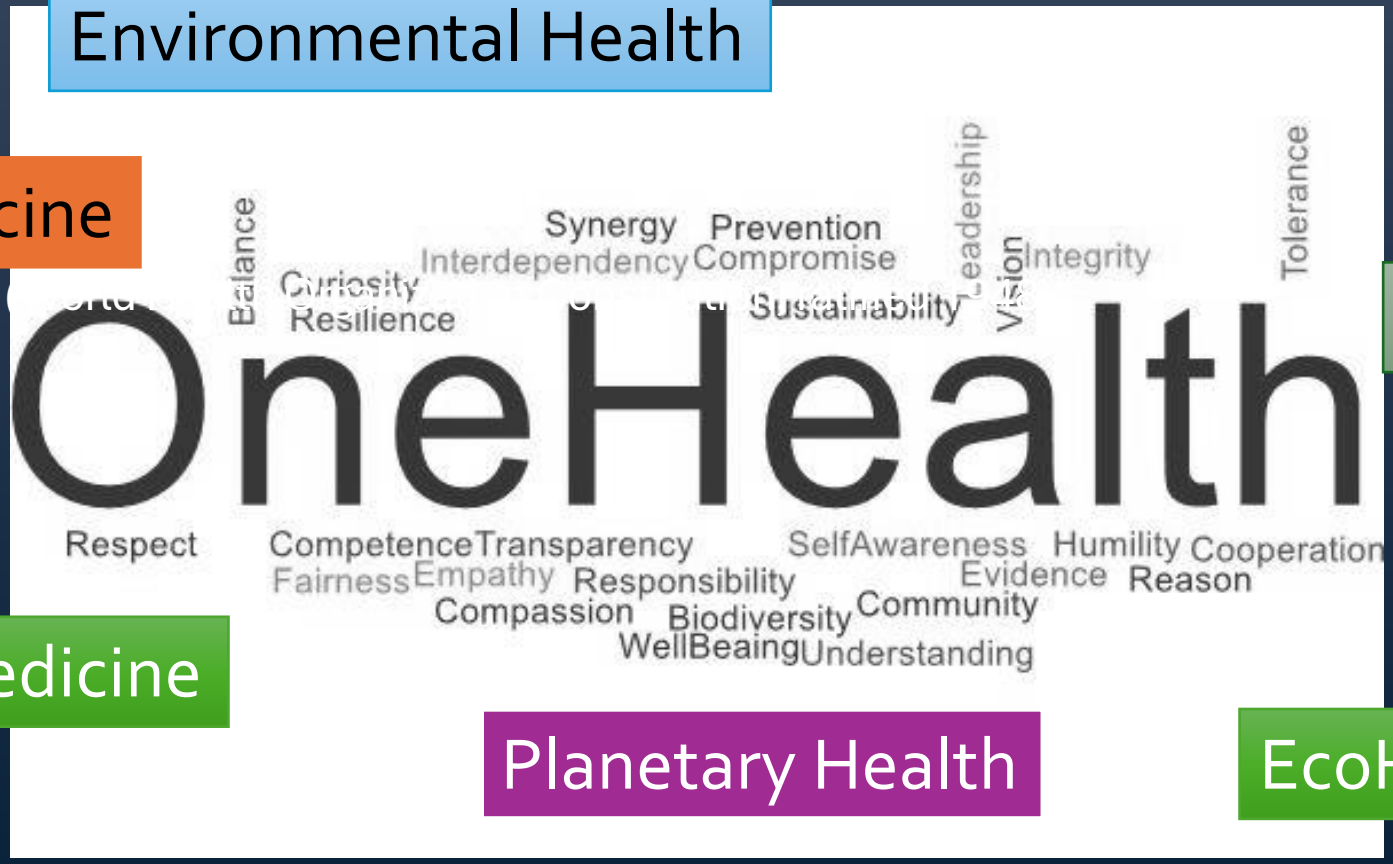
Public Health

CDC

Environmental Health

WHO

Preventive Medicine



Global Health

WOAH

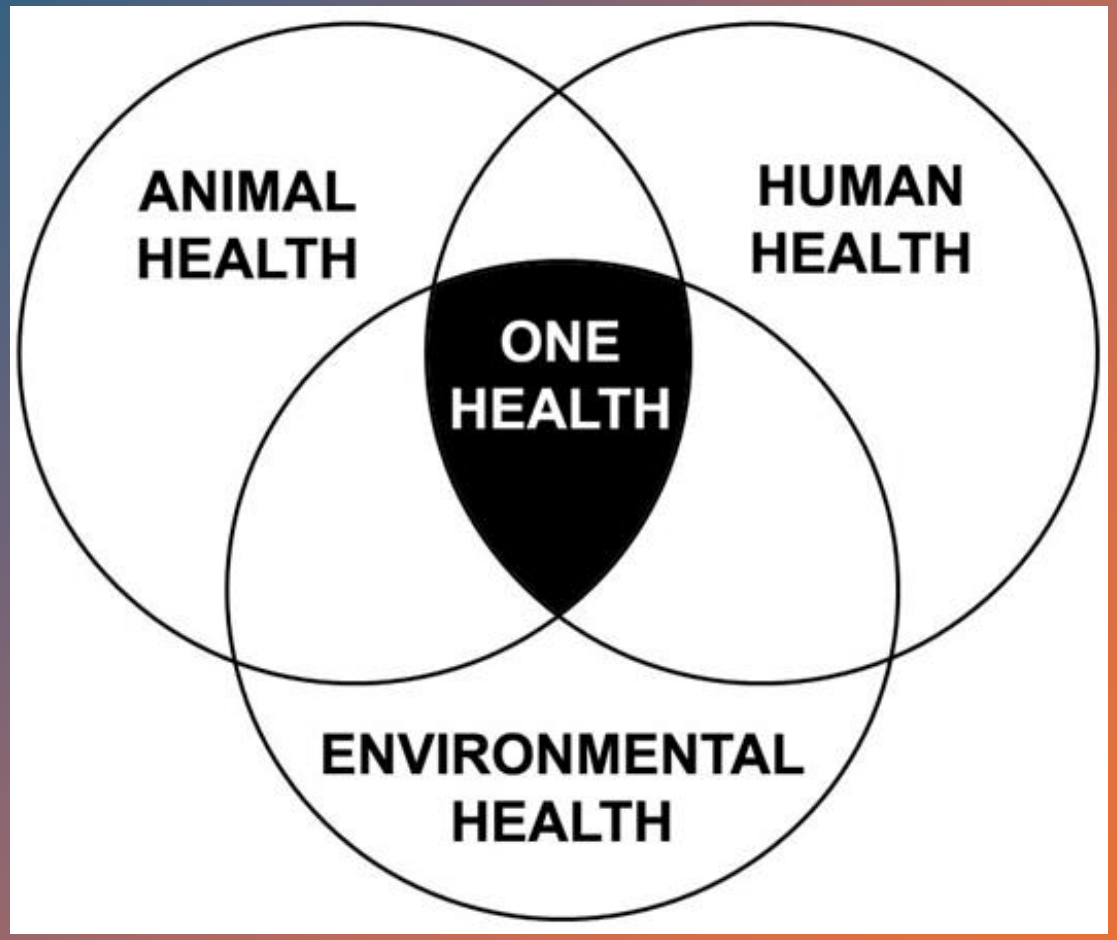
FAO

Conservation Medicine

Planetary Health

EcoHealth

Global Health



One Health, Illustrated

- Limitations:
  - Separates humans from other animals
  - Implies that humans and other animals exist apart from the environment
  - Gives equal weight to all three domains
  - Assumes that disciplinary expertise is sufficient to achieve One Health

A better illustration of One Health

Levels of One Health

International: Quadripartite

National

State

Local

International: Quadripartite One Health Plan of Action, 2022-2026

https://www.who.int/publications/i/item/9789240059139

Action tracks

The OH JPA is structured around six action tracks (areas of action) for addressing key health challenges at the human–animal–plant–environment interface that require a One Health approach. The action tracks are interdependent. They also capture a systems approach required to reduce health threats shared by humans, animals, plants and the environment and contribute to achieving sustainable health and food systems, as well as improved ecosystem management.

FIGURE 3: THE SIX OH JPA ACTION TRACKS

National: U.S. Federal Interagency Coordination:

enhancing collaboration that benefits human, animal, plants and environment health through activities such as promoting health, enhancing health-sustaining resources, emergency preparedness, and the prevention, detection, and response to zoonotic diseases

One Health Issues, CDC

Antimicrobial-resistant germs can quickly spread through communities, the food supply, healthcare facilities, and the environment (soil, water), making it harder to treat certain infections in animals and people.

Vector-borne diseases are on the rise with warmer temperatures and expanded mosquito and tick habitats.

Diseases in food animals can threaten supplies, livelihoods, and economies.

The human-animal bond can help improve mental well-being.

Contamination of water used for drinking, recreation, and more can make people and animals sick.

https://www.cdc.gov/one-health/about/index.html#cdc_generic_section_2-what-are-common-one-health-issues

State: New Jersey One Health Task Force

- Purpose: "*promote the health and wellness of New Jersey's resident, animals, including pets, livestock, and wildlife, and natural resources*"
- The One Health initiative framework recognizes "*the strong connections and interdependency of human health, animal health and ecosystem health*."
- "*Awareness and collaboration among disciplines will help protect the environment, the health of all species, save lives in present and future generations, and increase qualify of life, physical and mental health, and productivity*."
- Members: representatives of the Depts. of Agriculture, Environmental Protection, Health, medical community (1), veterinary medical community (2), medical research (1), zoonotic disease (1), epidemiology/biomedical sciences (2), academics in public health, ecology, natural resources, environmental and biological sciences (3)

- https://pub.njleg.gov/bills/2020/A2000/1992_I1.HTM

Local: Overview of Local Public Health in Massachusetts

Protection of the food supply through inspections of restaurants and other food establishments; inspections and permitting of septic systems, landfills, and other solid waste facilities

Health care and disease control, including timely reporting and response to communicable diseases, occupational health and safety violations, food poisoning, and rabies

Inspections of pools, beaches, camps, hotels, and mobile home parks

Enforcement of state lead poisoning regulations and sanitary code in housing

Enforcing no-smoking laws

Developing, testing, and building awareness of emergency preparedness plans for a wide range of hazards

A wide array of other responsibilities, including issuing burial permits, regulating pesticides, inspecting bodywork and tattoo parlors, and issuing health reports

https://www.mass.gov/info-details/overview-of-local-public-health-in-massachusetts#:~:text=Massachusetts%20local%20boards%20of%20health,%2C%20housing%2C%20and%20health%20codes.

Local Public Health Responsibilities that involve other animals and the environment

Protection of the food supply through inspections of restaurants and other food establishments; **inspections and permitting of septic systems, landfills, and other solid waste facilities**

Health care and disease control, including timely reporting and response to communicable diseases, occupational health and safety violations, food poisoning, and **rabies**

Inspections of pools, **beaches,** camps, hotels, and mobile home parks

Enforcement of state lead poisoning regulations and sanitary code in housing

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One Health Approach for Prevention and Control of Zoonoses

Preventing spillover: healthy animals, healthy environment

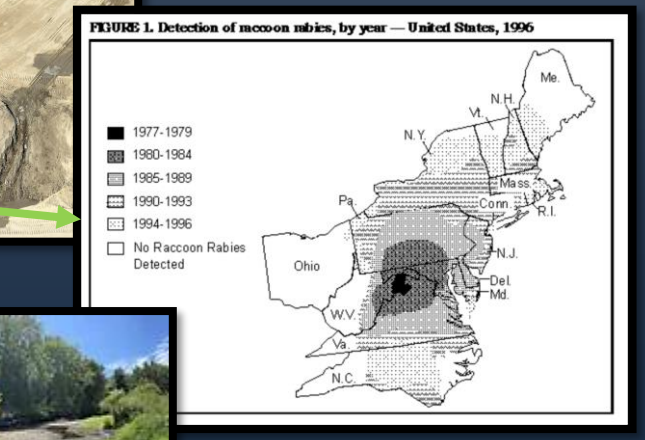
Preventing disease: vaccines, masks, distancing

Preventing morbidity and mortality: treatment, hospitalization

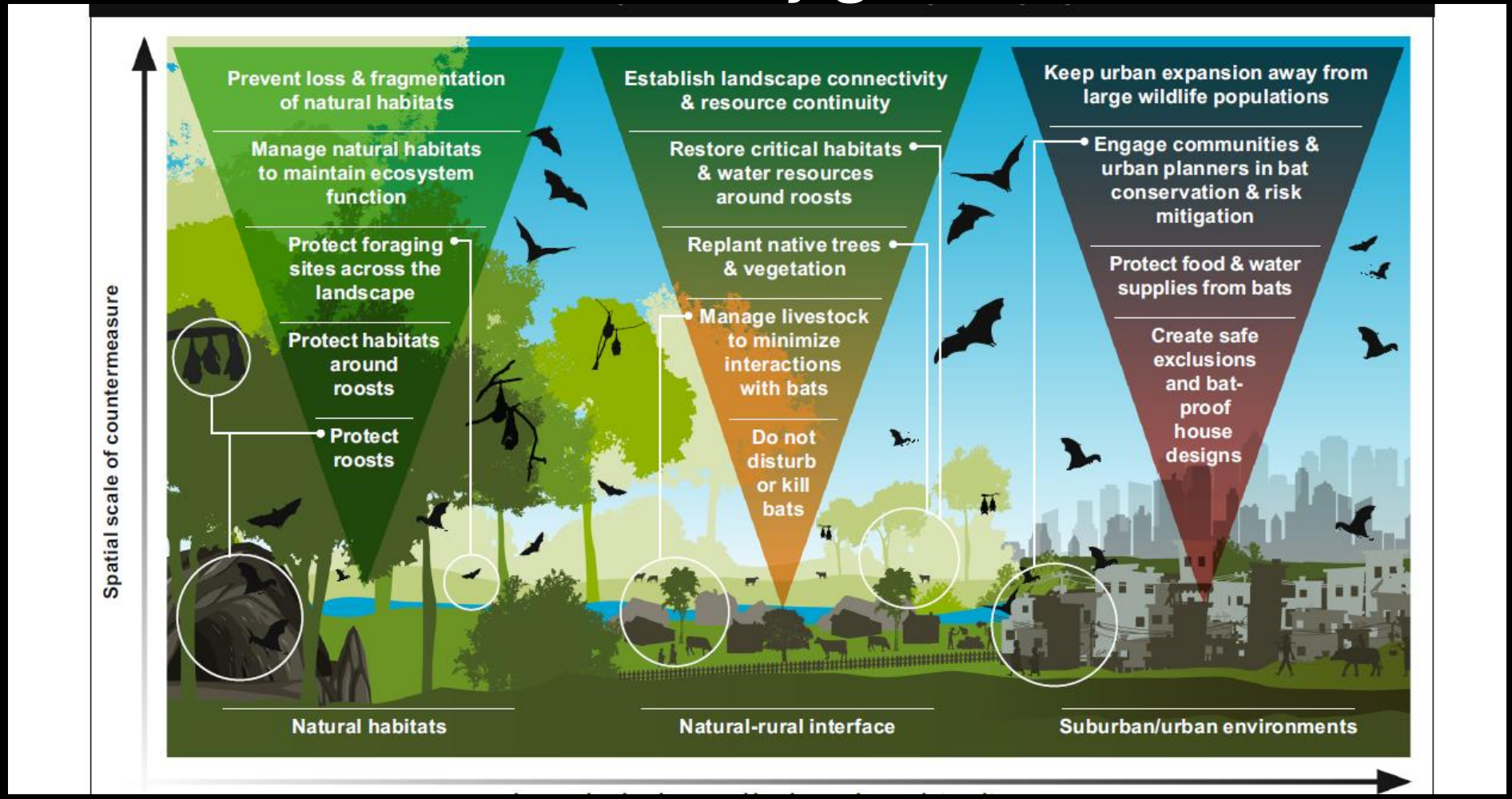
https://bccdcfoundation.org/decoding-public-health-infographics-and-downloads/

Emergence and exposure

- Encroachment
- Exploitation
- Translocation
- Climate variability
- Vector density and distribution
- Ecological Pressure



Proposed ecological countermeasures over different scales and land-use intensity gradients*



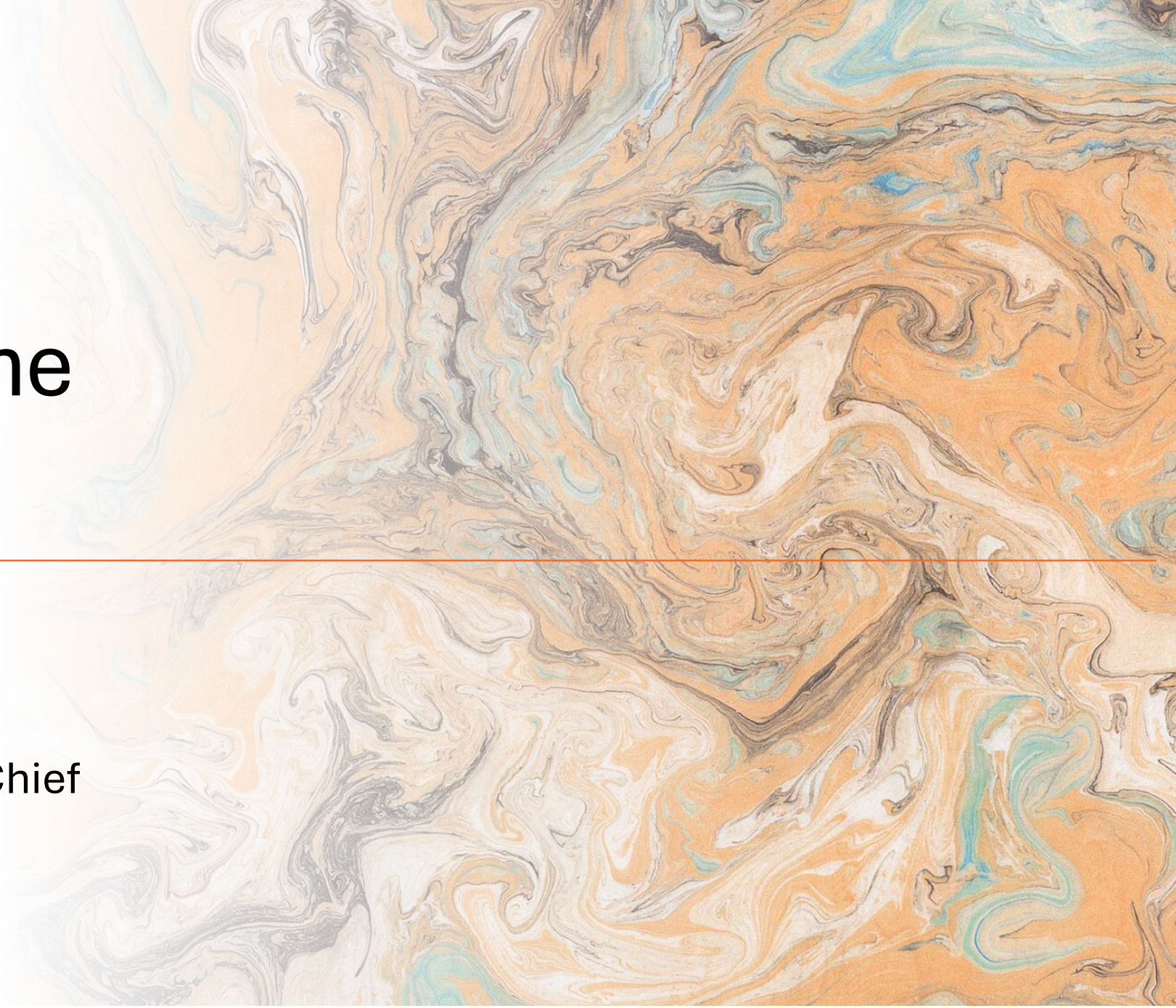
Plowright, R. K., Ahmed, A. N., Coulson, T., Crowther, T. W., Ejotre, I., Faust, C. L., ... & Keeley, A. T. (2024). Ecological countermeasures to prevent pathogen spillover and subsequent pandemics. *Nature Communications*, *15*(1), 2577.owright, R. K., Ahmed, A. N., Coulson, T., Crowther, T. W., Ejotre, I., Faust, C. L., ... & Keeley, A. T. (2024). Ecological countermeasures to prevent pathogen spillover and subsequent pandemics. *Nature Communications*, *15*(1), 2577.

Preventing emergence and exposure

- Consider primordial prevention
- Build a One Health team
- Take a long retrospective view of primary risk factors and a long-term perspective to outcomes
- Focus on human behavior
- Make short-term tradeoffs between conservation and property taxes, town revenue

Land Use & One Health

Emily Petro, Conservation Chief



Blackstone River Valley

~14,000 Residents

146 Corridor – 16 miles southeast of Worcester, 20 miles northwest of Providence

"Cradle of the Industrial Revolution" "Heart of The Blackstone Valley" "A Crossroads Village"

Uxbridge listed 15th in the state for the most forest land lost to development from 1985 to 1999

736 acres of land were consumed from 1991 to 1999 by 127 new housing units on 7.74-acre lots

Most recent data collected between 2012-1017 saw Uxbridge losing land at a rate of 11.3 square miles/day

Land Use decisions can affect...

- Flood attenuation
- Water quality
- Air quality
- Habitat for native flora and fauna

Land Conversion for Renewable Energy…

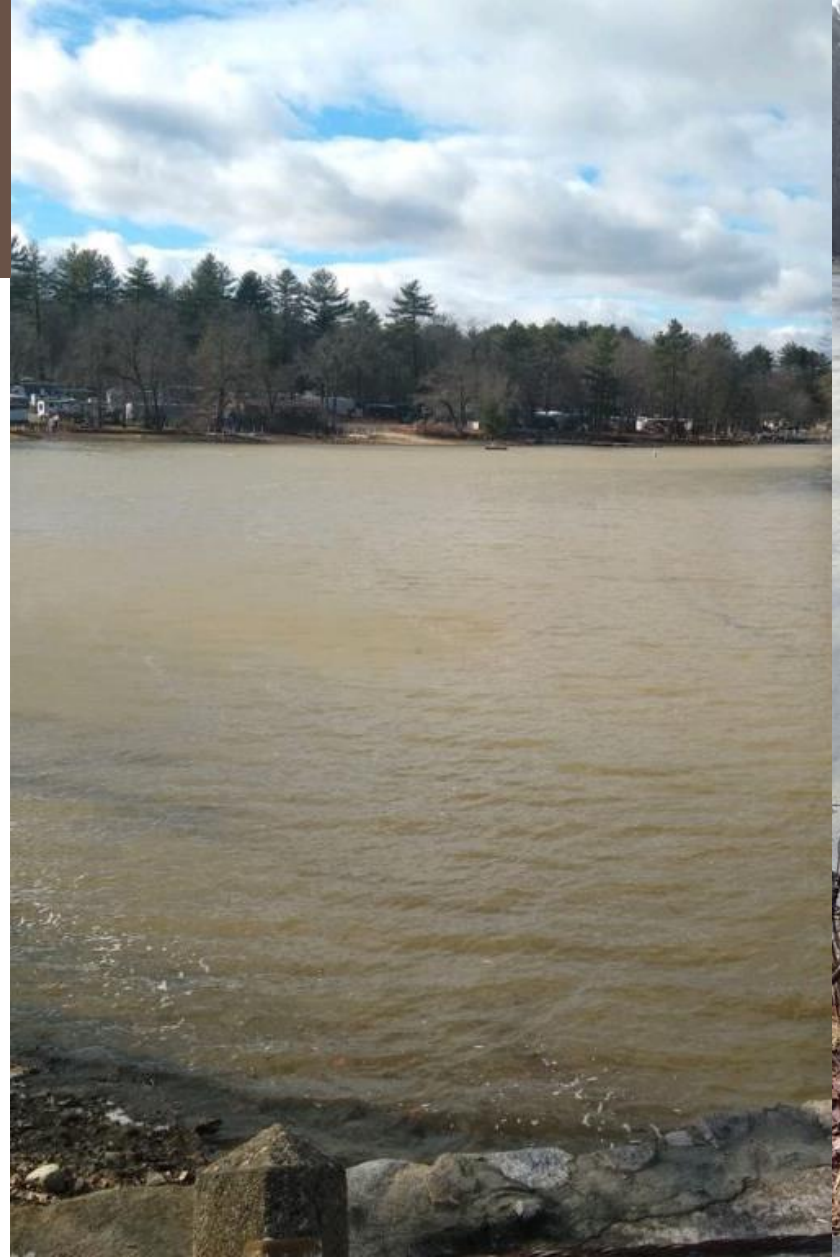
- MA estimated that ground-based solar represents roughly 6,000 acres of land conversion between 2012 and 2017
- 47% of electrical demand could supported by solar capacity on existing rooftops

45 Oak Street, Douglas, BlueWave Solar, Lake Manchaug Foundation, https://www.manchaugpond.org/events-info/bluewave-solar-runoff/Accessed November 5, 2024

45 Oak Street, Douglas, BlueWave Solar, Lake Manchaug Foundation, https://www.manchaugpond.org/events-info/bluewave-solar-runoff/ Accessed November 5, 2024

Sediment Impact to Lake Manchaug

- Sediment pollution can contain nutrients, heavy metals, organic chemicals, bacteria and other pathogens
- Sediment considered one of the largest pollutants by volume of surface water in the nation



45 Oak Street, Douglas, BlueWave Solar, Lake Manchaug Foundation, https://www.manchaugpond.org/events-info/bluewave-solar-runoff/Accessed November 5, 2024

Regulated disturbance to wetlands and waterways

- MA Wetlands Protection Act
- Wetland replication required by WPA – MASSDEP study found that 26.8% of replication projects met success criteria (built, wetland hydrology, sized, regulatory compliance)
- “The state’s goal of no net loss of wetlands cannot be met unless the regulatory program succeeds in compensating for all authorized wetland impacts.”

Land Conservation is Pandemic Prevention

- Extensive changes in land use impact human/wildlife interactions
- Fragmented and degraded habitat increases risk of pathogen spill over

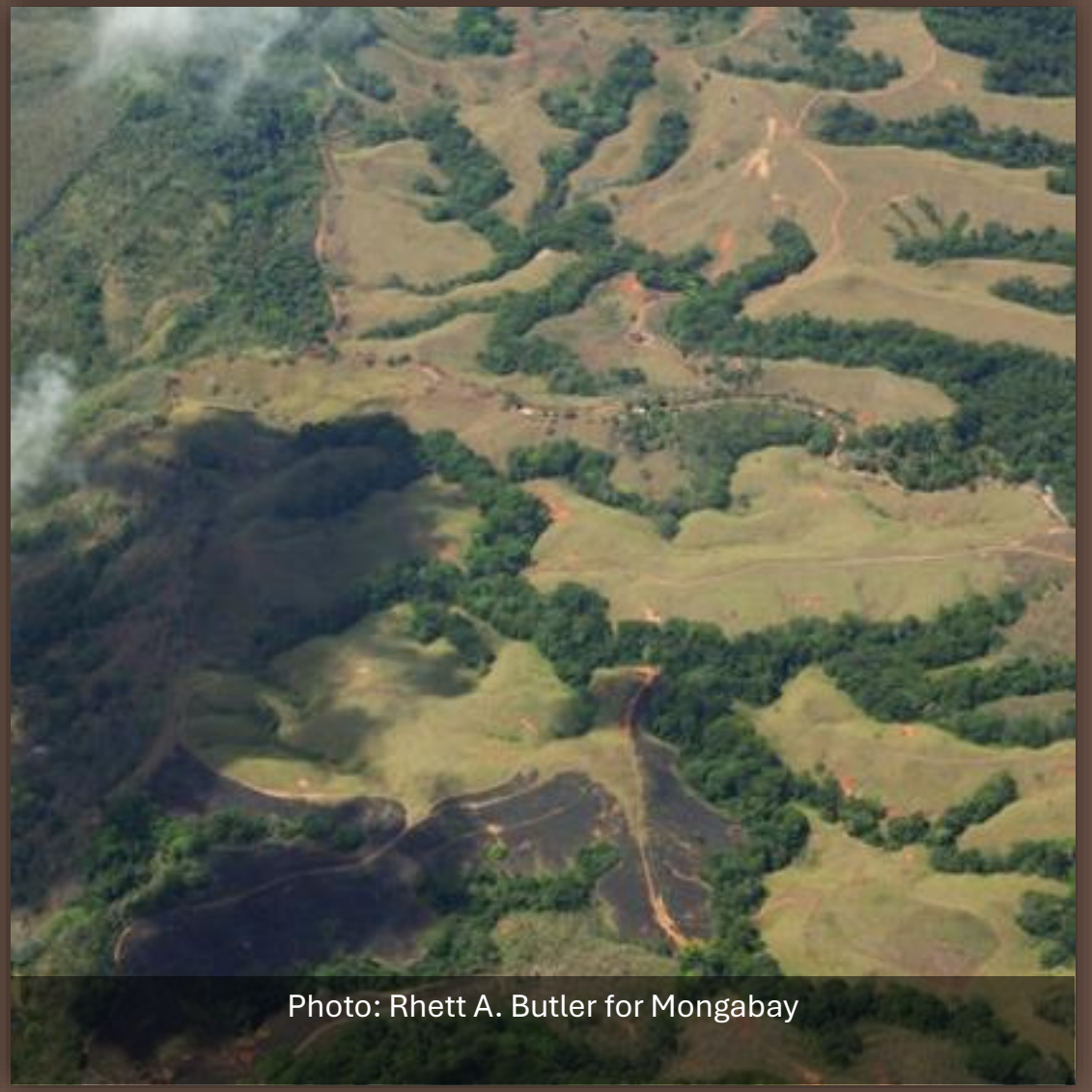


Photo: Rhett A. Butler for Mongabay

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- https://www.milforddailynews.com/story/news/2003/11/16/open-land-drying-up-in/41278808007/
- Wetland Replacement in Massachusetts, Scott Jackson et al. 2018
- https://extension.psu.edu/what-is-sediment-and-why-is-it-a-stormwater-pollutant
- https://www.climatehubs.usda.gov/approach/reduce-soil-erosion-and-sediment-deposition-0#:~:text=Approach,wetland%20ecosystems%20into%20the%20future
- https://cfpub.epa.gov/npstbx/files/ksmo_sediment.pdf
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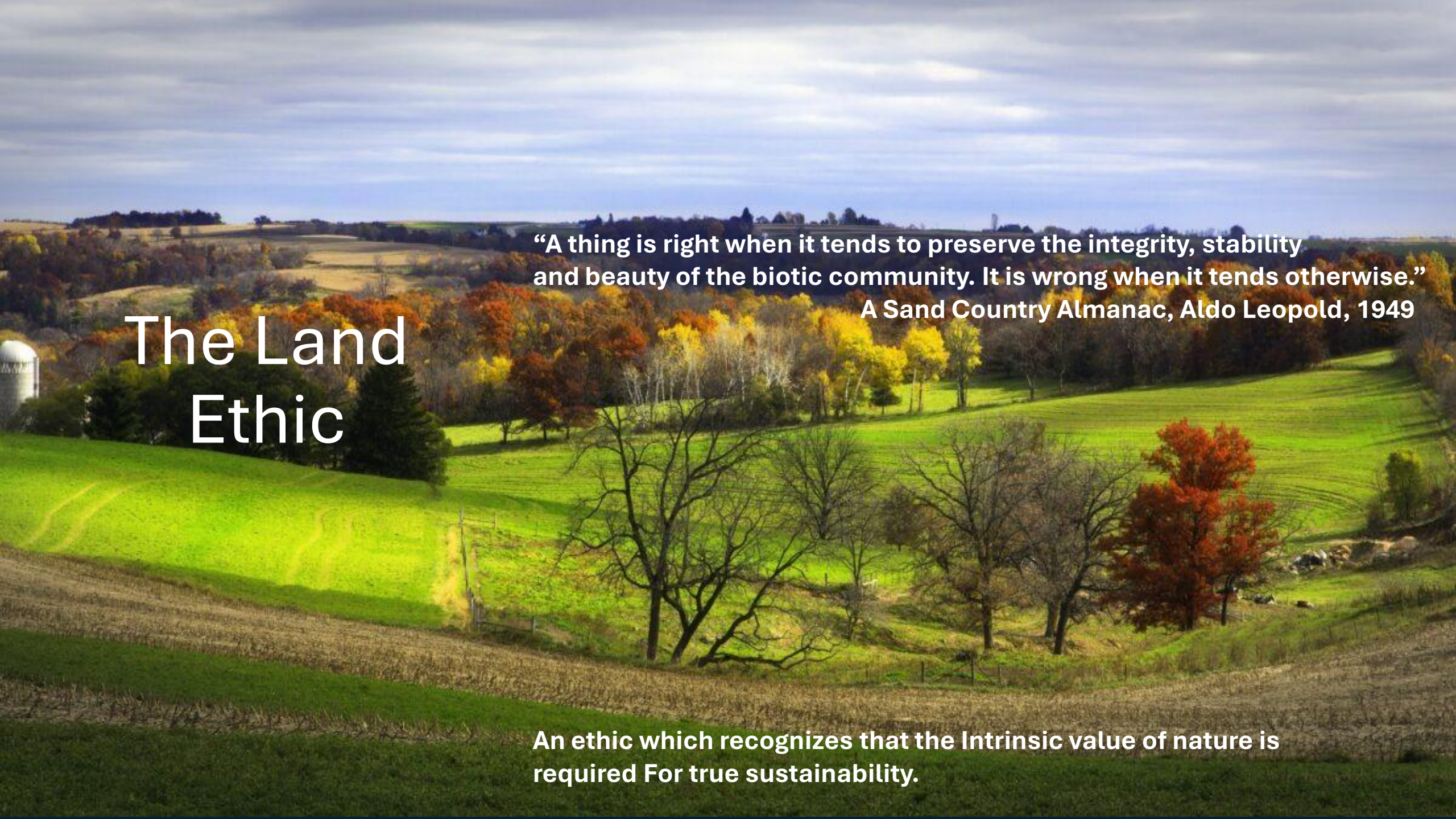
- Plowright, R.K., Ahmed, A.N., Coulson, T. *et al.* Ecological countermeasures to prevent pathogen spillover and subsequent pandemics. *Nat Commun* **15**, 2577 (2024). https://doi.org/10.1038/s41467-024-46151-9

ONE HEALTH...

Goes Local

David Tapscott, M.D.



The Land Ethic

“A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.”
A Sand Country Almanac, Aldo Leopold, 1949

An ethic which recognizes that the Intrinsic value of nature is required For true sustainability.

The Wide Lens of One Health

Why Does One Health Work?

- Complex biologic systems are inherently more stable and resilient in the in the face of constantly shifting conditions

- The effects of human intervention or activity can only be “understood” through the wide lens of One Health

EEE in Uxbridge: Surveillance

- https://www.theatlantic.com/science/archive/
- 2021/06/dengue-mosquitoes-defanged/619161/

Working outside of silos: Conservation, Public Works, Planning, Health

Working with those outside of town government: local hunters, hikers

EEE in Uxbridge: Intervention

- https://www.theatlantic.com/science/archive/
- 2021/06/dengue-mosquitoes-defanged/619161/

Through more intense surveillance could we identify locations for intervention and education?

The daunting task of understanding the multilayered, constantly shifting and silent factors which determine those locations

Can the Lens Be Widened?

WHAT IS COMPREHENSIVE VECTOR CONTROL?

For most vector-borne diseases, prevention by targeting vectors is the first and best approach. Millions of people have already benefitted from vector control, with major reductions in malaria, Chagas disease and onchocerciasis. But vector control has not been used to its full potential or sustained for maximum impact on other diseases. A comprehensive approach is required that enables:

INCREASED CAPACITY

BETTER COORDINATION

IMPROVED SURVEILLANCE

INTEGRATED ACTION

Effective proven vector control approaches include:

INSECTICIDE-TREATED BED NETS deployed on a mass scale

COMMUNITY-WIDE SPRAYING of insecticides inside houses on surfaces where vectors rest

USE OF LONG CLOTHING AND TOPICAL REPELLENTS for personal protection

COVERING, EMPTYING AND CLEANING OF CONTAINERS used for domestic water storage

ELIMINATION OF OLD TYRES AND CONTAINERS by good solid waste management/clean up campaigns by local communities

HOUSE IMPROVEMENTS by installing window screens, plastering walls or changing from thatch roofs

DRAINAGE OR TREATMENT OF STAGNANT WATER with chemical or biological larvicides

Promising new approaches on the horizon include:

RELEASE OF MODIFIED, TRANSGENIC OR STERILE VECTORS to suppress or replace wild populations

SPATIAL REPELLENTS to stop vector entry into households and other areas

VECTOR TRAPS AND TARGETS with or without toxic baits for control/ surveillance

NEW INSECTICIDES with different modes of action

MORE EFFECTIVE COMBINATION of vector control with medicines and vaccines

FOR MORE INFORMATION
www.who.int/vector-control

READ THE FULL GLOBAL VECTOR CONTROL RESPONSE AT
www.who.int/vector-control/publications/global-control-response/

Using the Wide Lens of One Health in Uxbridge: Going Beyond the Brochure

- IPM of course
- Introduction of predators
- Creating diversity of habitat and open space (forest, field, wetlands)
- Using Green Infrastructure principles
- Limiting zoonotic spillover through Low Impact Development

1.

Silos…

Community education: Council on Aging, Public Schools, Historical Commission, Library, Town Clerk and Town Manager, Accountant + numerous clubs, churches, social media groups……

https://en.wikipedia.org/wiki/Adult_education

Or no Silos?

https://en.wikipedia.org/wiki/Adult_education

The Shack in Wisconsin

Other Local One Health challenges

- Comprehensive Emergency Management Plan (CEMP)
- Disasters
- Hoarding
- Battery Electrical Storage Sites
- Dam removal
- Bikeways and recreational space

Towards a One Health Perspective

- How Many Species on Earth? It's Tricky.
  - Scientists have named and catalogued 1.3 million species.
  - Investigators estimate there are 8.7 million species on the planet, plus or minus 1.3 million.

Carl Zimmer in the New York Times,

August 23, 2011

- "*Man is the highest rated animal, at least among the animals who returned the questionnaire.*"
  Robert Brault, software writer and poet

EGO

NATURE

Conclusion

- *The fact is that no species has ever had such wholesale control over everything on earth, living or dead, as we now have. That lays upon us, whether we like it or not, an awesome responsibility. In our hands now lies not only our own future, but that of all other living creatures with whom we share the earth.* **David Attenborough, Life on Earth**

Thank you