Task Update HE-09-03c
Ecosystems, Biodiversity and Health: Decision-Support Tools and Research

Montira Pongsiri, PhD, MPH
U.S. Environmental Protection Agency
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Outline

• Background
• Interdisciplinary Approach
• Research Projects
• Community of Practice
• Anticipated Results, Links to Decision-Making
### Ecosystem Services

As provided by the diversity of life on earth

#### Provisioning Services
- Food
- Freshwater
- Wood and fiber
- Fuel
- Clean Air
- Medicines

#### Regulating Services
- Climate regulation
- Flood regulation
- Disease regulation
- Water purification

#### Cultural Services
- Aesthetic
- Cultural
- Recreational
- Spiritual

#### Supporting Services
- Nutrient cycling
- Primary production
- Soil formation

Adapted from the Millennium Ecosystem Assessment, 2005.
Biodiversity loss is accelerating

Infectious diseases appear to be emerging and re-emerging at a faster rate

* Modified from Morens et al. 2004 *Nature* 430:242
Interdisciplinary Forum and Workshop on Biodiversity and Human Health
September 2006

US EPA, Yale Center for EcoEpidemiology, Smithsonian Institution, World Conservation Union

- Outreach effort
- Interdisciplinary participation
- Encouraged interdisciplinary collaboration, in the U.S. and internationally
- Workshop discussions on case studies and mechanisms, research priorities, & types of data and models needed to map biodiversity change and emerging diseases
Biodiversity-Health Research Initiative
U.S. EPA

- Exploratory research funding – competitive extramural grants and interagency agreements
- Qualitative and quantitative relationships - how do anthropogenic drivers of changes in biodiversity affect the transmission of human infectious disease?
- Interdisciplinary research approach, including decision-makers
- Encourage coordination of earth observations with field data
- International and domestic projects
Why is this Research Important?

- Root causes of disease emergence and spread should be explored to assist in prevention and mitigation
- Lack of integrated tools and approaches that link biodiversity to human health
- Environmental and social factors contribute to these diseases – and environmentally-based and behavioral approaches can help reduce the disease burden
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EPA Regional Science Workshop
*Landscape/Biodiversity Change and LD: Science and Application*

September 22 -23, 2009

- The first EPA-sponsored forum to address decision-making and management applications related to the emerging science of Lyme disease risk monitoring and prevention in the context of biodiversity and landscape change -

- Raise awareness for stakeholders on the current and emerging state of the science related to the integrated, ecological nature of LD;
- Explore and share stakeholder roles and understanding of the LD;
- Identify decision-maker needs for research community
- Develop a Community of Practice allowing researchers, managers and practitioners to collaborate and plan for integrating new science into real world applications and decision-making
Value of New Science & Science-Policy Tools: Improved Decision-Making and Societal Outcomes

New Science & Policy Tools
- best management practices
- integrated pest management
- guidance on individual risk

Uncertainty
Integration

Joint Benefits
- Disease Prevention
- Ecosystem Protection

Interdisciplinary Research   Integrated Decision-Making   Societal Outcomes
Protecting Biodiversity, Protecting Human Health

- Environmental factors contribute to emerging diseases and environmental strategies can reduce their burden
- Development of new tools to monitor and forecast risks
- Information that can be used to value biodiversity conservation
- Improved communication and outreach
- Improved analysis of land use planning
- Better communication and coordination among environmental and health managers
Partners

- US Centers for Disease Control and Prevention (CDC)
- Cary Institute of Ecosystem Studies
- Rutgers University
- UCLA
- Washington University
- Center for Health Applications of Aerospace Related Technologies (CHAART) at NASA Ames Research Center
- Gorgas Institute (Panama)
- Yale Center for EcoEpidemiology
- Smithsonian Institution
- US Group on Earth Observations (GEO)
Biodiversity and Human Health:

EPA recognizes the importance of healthy ecosystems for our health and well-being, and conserving biodiversity is a primary way to sustain healthy ecosystems and the services they provide to us. One ecosystem service EPA is trying to better characterize is disease regulation – that is, maintaining biodiversity may protect us against emerging diseases like Lyme disease and West Nile virus.

The biodiversity-human health project complements existing domestic and international priorities to assess and manage emerging human diseases and ecosystem health hazards. But the research program is unique in its plans to link earth observations to the societal benefits outlined in the Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan; (1) understanding the environmental factors affecting human health and well-being, and (2) understanding, monitoring, and conserving biodiversity (GEOSS 2005).

http://www.epa.gov/ncer/biodiversity
pong.siri.montira@epa.gov