

# **Aquatic Bioindicators & Disease Vectors: Water Resources & Socio- Ecological Health**



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# Ecosystems & Water Resources

- **Ecosystems:** All the living organisms and non-living (physiochemical) environment with which they interact
- Water is a vital resource for humans both directly and indirectly through ecosystem services



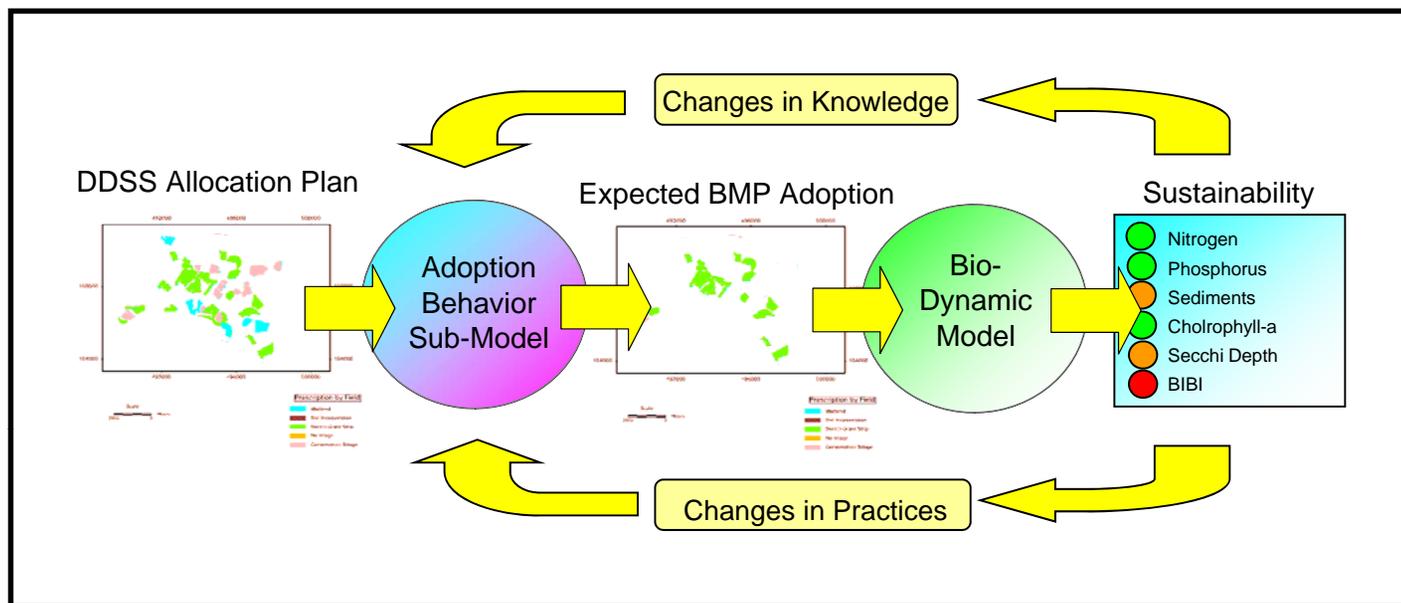
# Socio-Ecological Health & Water Quality

- “A coherent system of biophysical and social factors that regularly interact in a resilient, sustained manner”

Redman et al. 2004. *Ecosystems* 7: 161-171

- Watersheds are socio-ecological systems and water quality is a measure of socio-ecological health
- Three research projects that use socio-ecological approaches to watershed health

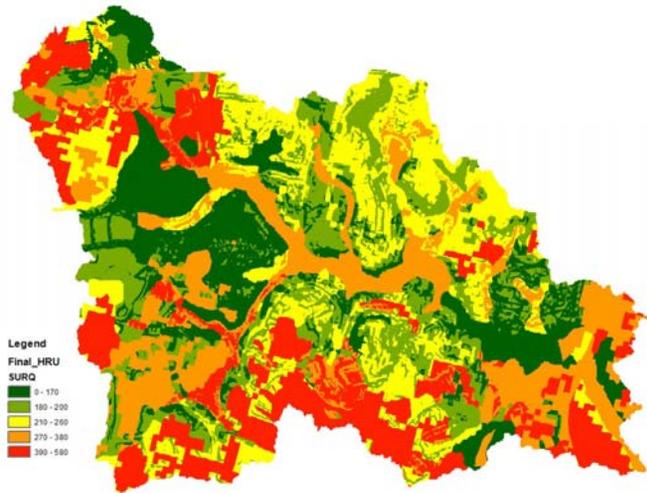
# Project 1. Development of BMP adoption behavior sub-model



**Data:** Quantitative social data: Interviews and surveys pre & post education interventions

**Operation:** Filter DDSS BMPs based on the likelihood of adoption

**Application:** Assess long-term water quality impacts of BMPs under changing behaviors and climate



## Traditional physical and chemical measures of water quality

- ‘Static’ measure at a specific time
- Largely ignores complex social and ecological impacts
- Expensive

**Biological monitoring of aquatic systems is a complementary method of quantifying water quality using a socio-ecological systems approach**



Tubificid worm

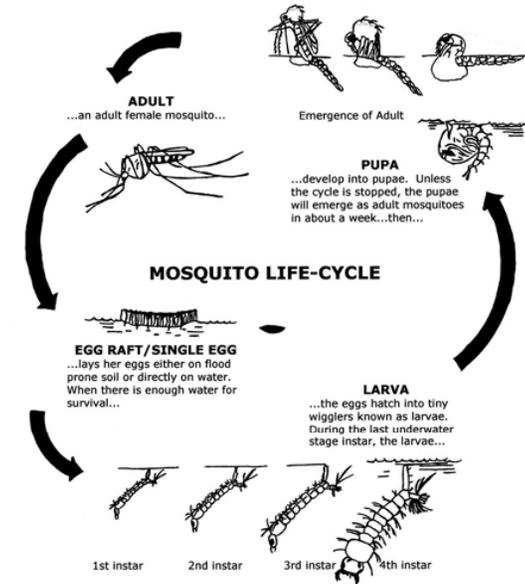


Caddisfly



# Project 2. Watersheds & Disease-Vector Mosquitoes

Disease-vector and pest mosquitoes utilize wetlands and other storm water structures



Research into the ecological and social dimensions of mosquito-related concerns

Mosquitoes are expected to expand their distribution and abundance under most climate change scenarios

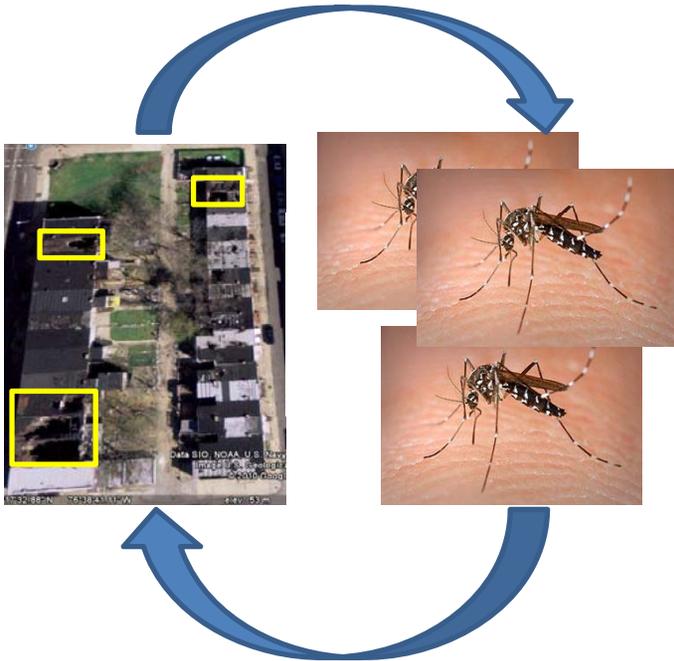
Water is often captured in anthropogenic containers, especially within urban landscapes

Container-utilizing mosquitoes pose the greatest health threat in urban watersheds



Asian Tiger Mosquito

Urban decay leads to greater mosquito exposure



Mosquito pestilence leads to reduced use, valuation, and care of outdoor environment

# Develop and evaluate passive and active education strategies to optimize community-based mosquito management



Passive education print material



Citizen science workshop



**Project 3.** Develop and test transferable processes of engaging stakeholders to optimize and implement strategies that restore and conserve coastal marshes and local communities under stress from sea-level rise.



NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

