Great Lakes Fish Health Committee – Research Priorities

October 21, 2002

General priorities:

1. Methods and measures
    a. Identifying and validating predictive indicators of health
    b. Improved methods for sampling/counting fish and pathogens
    c. Validated methods for classifying health and exposure of individual fish and populations
    d. Integrated health information management and health policy research and development

2. Population Ecology of Disease
    a. What are the population regulating effects of disease?
    b. Transmission dynamics
        i. Aspects of the agents (ex. microbial ecology)
        ii. Aspects of host interactions
        iii. Descriptive ecology (what is there and where is it?)

3. Ecological determinants of health
    a. How do management decisions affect the manifestation of fish health and disease?
        i. Exotics, stocking practices, toxins
    b. How do non-anthropogenic variables affect the same?
        i. Climate, nutrition, genetics etc
    c. Can management effectively respond to major ecosystem disruptions?

4. Research Development and Support
    a. Training of highly qualified individuals
    b. Pre-planning workshops
    c. Outbreak/response capacity (need to see the events and investigate)
    d. Need to think about how to move forward in a multi-risk, multi-disciplinary fashion

Specific research priorities:

1. Nutritional determinants of health
    a. Role of lipids in determining and predicting health status
    b. Role of thiaminase producing organisms in Great Lakes ecosystems
    c. What changes in nutrient cycles have zebra mussels caused?
    d. Modeling the outcomes in shifts in nutrient stores due to invaders
    e. What is the relation of parental nutrition to reproductive success?

2. Disease ecology
    a. What is the nature and significance of differences in susceptibility to specific diseases between different fish species?

b. What is the source of Renibacterium in the whitefish subfamily?
c. How do fish stocked disease-free become infected with Renibacterium?
d. What is the role of piscivorous fish in the transmission of fish diseases?
e. What are the vectors and movements of Large Mouth Bass virus and heterosporidia?
f. What are the interactions and dynamics of populations of Aeromonas salmonicida and fish populations?
g. How are diseases transmitted within and between species?
h. What affects the virulence of IPNV?

3. Surveillance and descriptive epidemiology
a. What are the geographic ranges of important pathogens?
b. Can we develop sentinel salmon broodstock as predictive indices of EMS?
c. What is the species distribution of important pathogens and what do they do?
d. What are the pathogens and parasites found in the Baltic-Caspian that can be moved in ballast water?
e. What are the reservoirs of disease agents in lake ecology?
f. What is the nature of gonad development of fish influenced by sewage outflow (estrogen mimics issue)?

4. Testing and Sampling
a. EED diagnostic tool
b. Can non-lethal methods for sampling for Renibacterium be developed?
c. Development and application of sampling and testing wild fish (field methods).
d. Statistical sampling approaches for wild fish pathogens.
e. What is the fate of hatchery released fish post-stocking in the lakes?

5. Disease Control
a. When should salmonids not be moved past barriers (from a disease perspective)?
b. Do the supposed advantages of broodstock culling for Renibacterium outweigh possible genetic losses?
c. Can immunostimulants be protective against BKD in hatcheries?
d. Does vaccination in hatcheries increase pathogen virulence?
e. Controlling parasites in the Great Lakes: Why isn't Whirling Disease a problem here?

6. Disease causation and impacts
a. Cancers versus colds – How to differentiate diseases that are themselves a big concern versus those that simply reveal underlying stressors
b. Stress mediated diseases
c. What are the impacts of energy pathways on BKD transmission?
d. What are the nitrate levels in the Great Lakes and how do they influence fish health?
e. What are the causes of natural mortality and how do we accurately estimate the amount of mortality – natural and otherwise – in wild fish