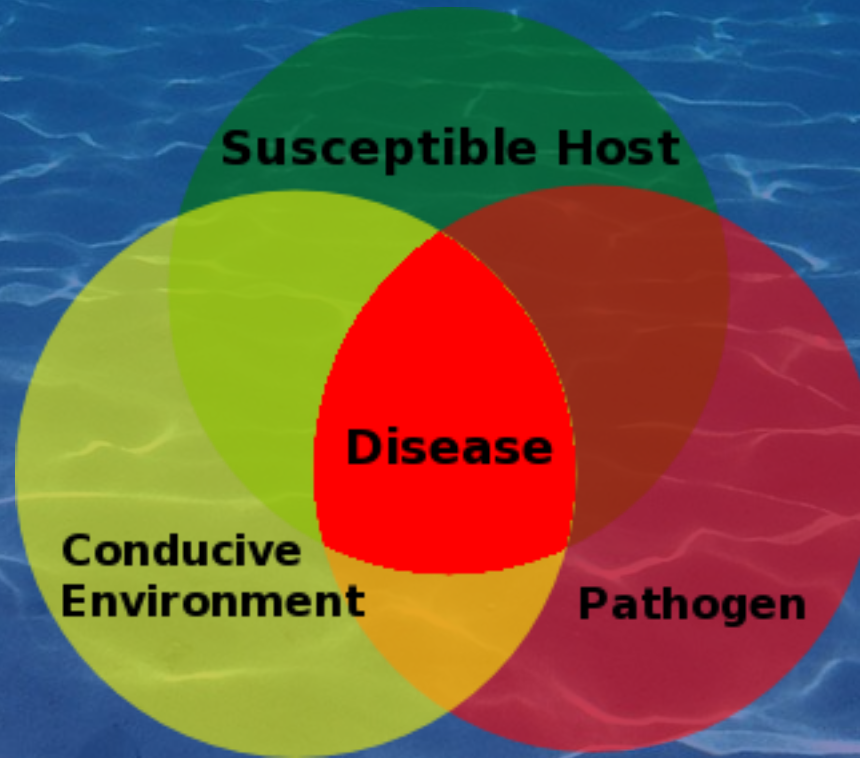


Fish Health Management Disease Prevention and Diagnosis

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Fish Health Management



Fish Health Management



- **Management practices which are designed to prevent fish disease**
 - **Good water quality**
 - **Proper nutrition**
 - **Maintaining a well working system**
- **Prevention rather than treatment**



What affects Water Quality?

- **Feeding practices**
- **Sanitation**
- **Water changes**
- **Overtreatments**



Feed Issues



- **Feed Storage**
 - $<70^{\circ}\text{F}$ and 50% relative humidity
 - Containers/pallets
 - Expiration dates
- **Feeding**
 - How much
 - How often

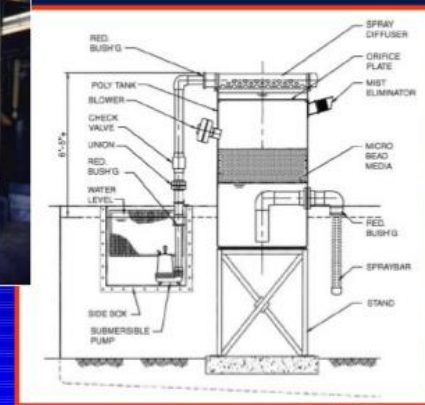


Sanitation Issues

- Net dedication
- Net disinfection
- Regular schedule of cleaning biofilters, backflushing to remove organic material



Biofilters



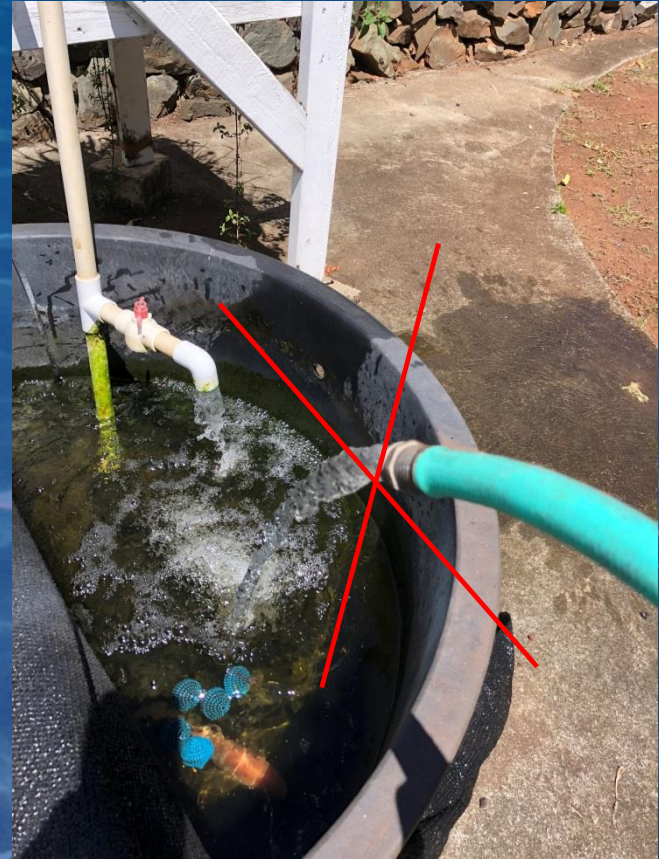
Biofiltration
Nitrification

Microbead
Biofilter



Water Change Issues

- Water exchange vs. water replenishment
- Typically, no more than 30% water exchange per day
- Chemistry of water source vs. chemistry of tank water



Overtreatment

- Do not treat with chemicals prior to diagnosis of water and/or fish.
- Flushing with clean water often alleviates fish distress from environmental etiologies.
- Multiple treatments of drug/chemical may mask bacteriological results.

Approved Drugs for Use in Aquaculture

Developed by:

U.S. Fish & Wildlife Service's Aquatic Animal Drug Approval Partnership Program

American Fisheries Society's Fish Culture and Fish Health Sections

Association of Fish & Wildlife Agencies - Fisheries and Water Resources Policy Committee's Drug Approval Working Group



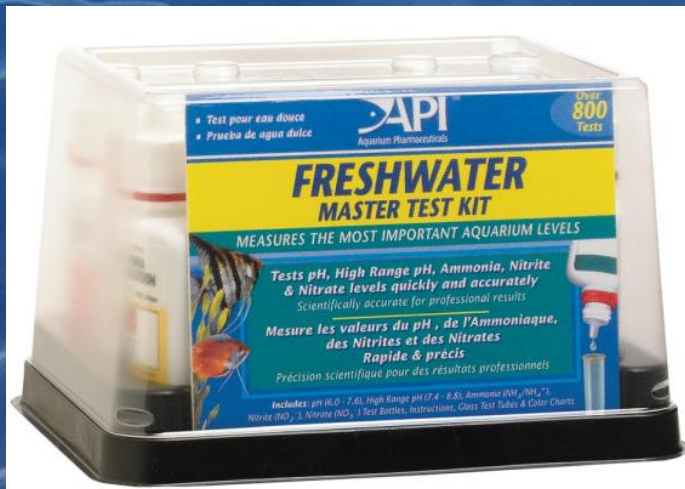
Important WQ parameters



- Temperature
- Dissolved Oxygen
- pH
- Total Ammonia Nitrogen = Ionized Ammonia (NH_4^+) + Un-ionized Ammonia (NH_3^-)
 - Toxic = Un-ionized Ammonia (NH_3^-)
- Nitrite
- Others (e.g. Total alkalinity, Total Hardness)



Water Quality Testing



Importance of history records

- **Stocking date**
- **Stocking size**
- **Source of fish**
- **New arrivals?**
- **Feeding rate and feed type**
- **Water chemistries**
- **Water source/ routine water or system changes**
- **Population vs individual**



Know Your Fish:

- **Natural Habitat**
- **Natural foods**
- **Temperature for growth and well being**
- **Disposition**



Early Detection

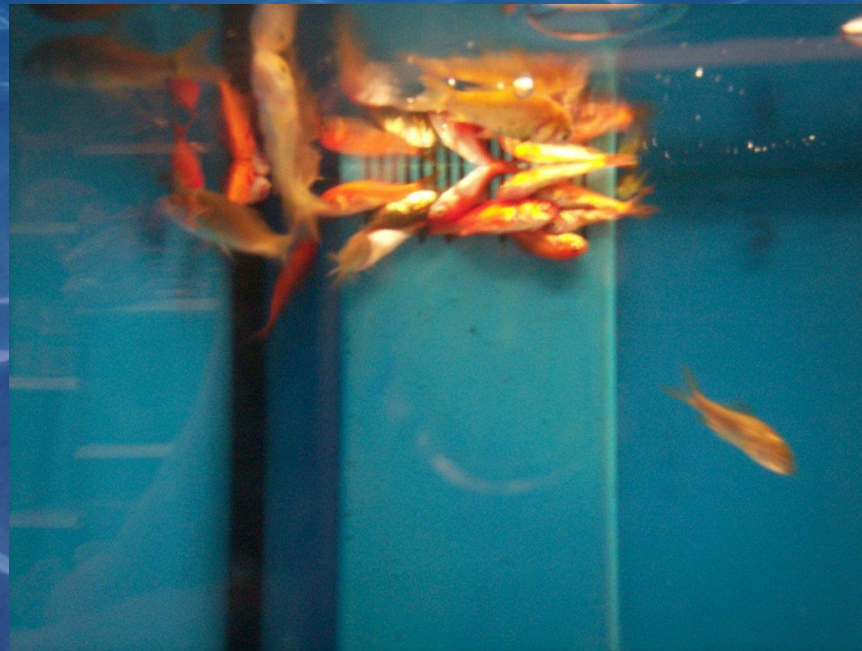
Daily observation

**Feeding Activity
Behavior**

Appearance



Dead or dying fish usually means it is too late!



Determining if fish are sick: Feeding Activity

- Are the fish feeding aggressively?
- 5 minute rule
- Seasonal changes
- Feed quality and storage



Determining if fish are sick: Behavior

- Do they appear lethargic?
- Are they listless in shallow water?
- Are they gasping (piping)?
- Are they rubbing against surfaces (flashing)?



Determining if your fish are sick: Appearance

- Presence of sores or lesions
- Ragged fins
- Abnormal body parts – e.g. distended abdomen, popeye
- Presence of growths or spots on body, fins, or gills



Types of Fish Disease

Infectious

- Parasitic
- Bacterial
- Viral
- Fungal

Typically requires medication

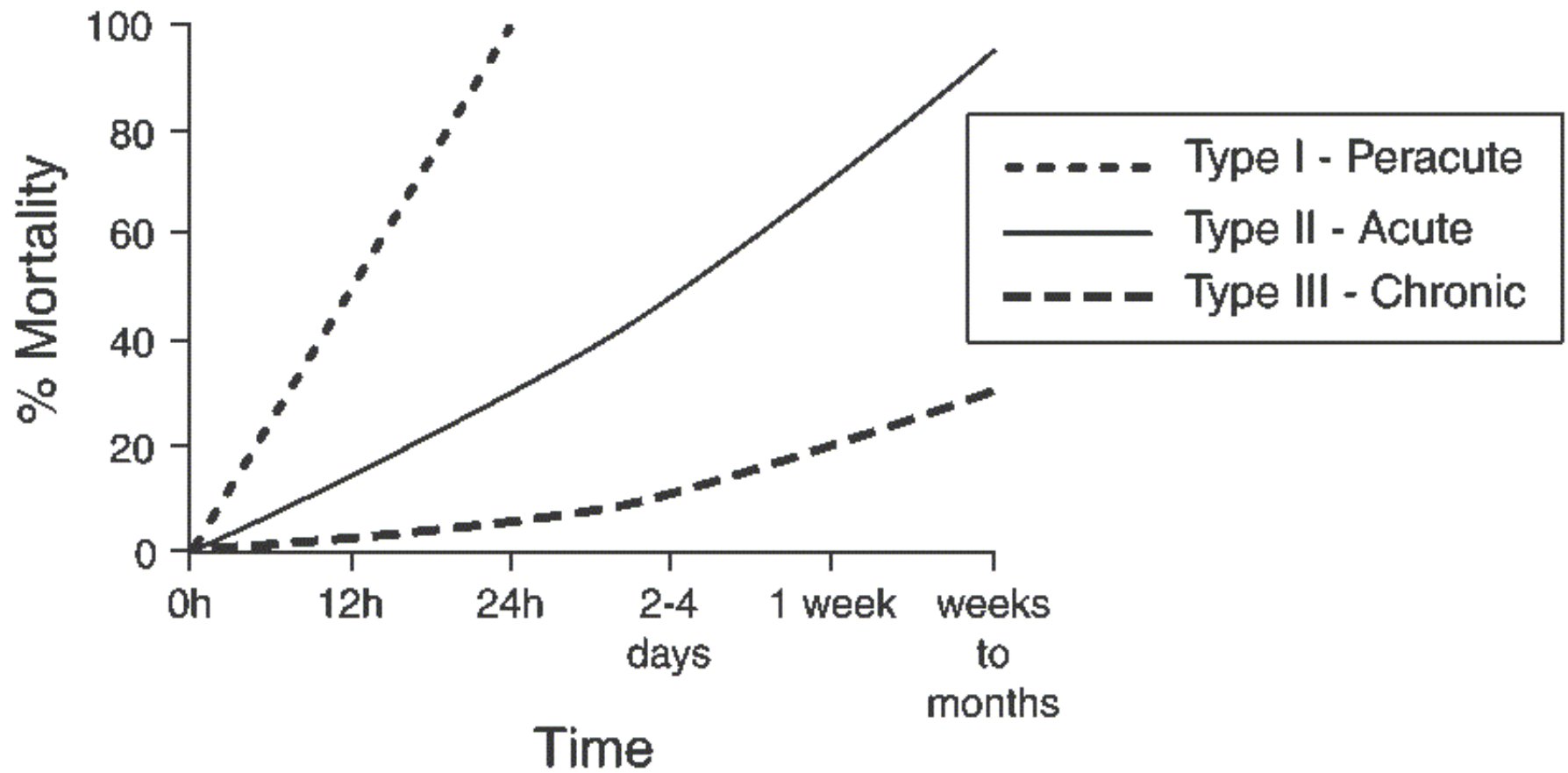
Non-Infectious

- Environmental
- Nutritional
- Genetic

Requires changing management strategies

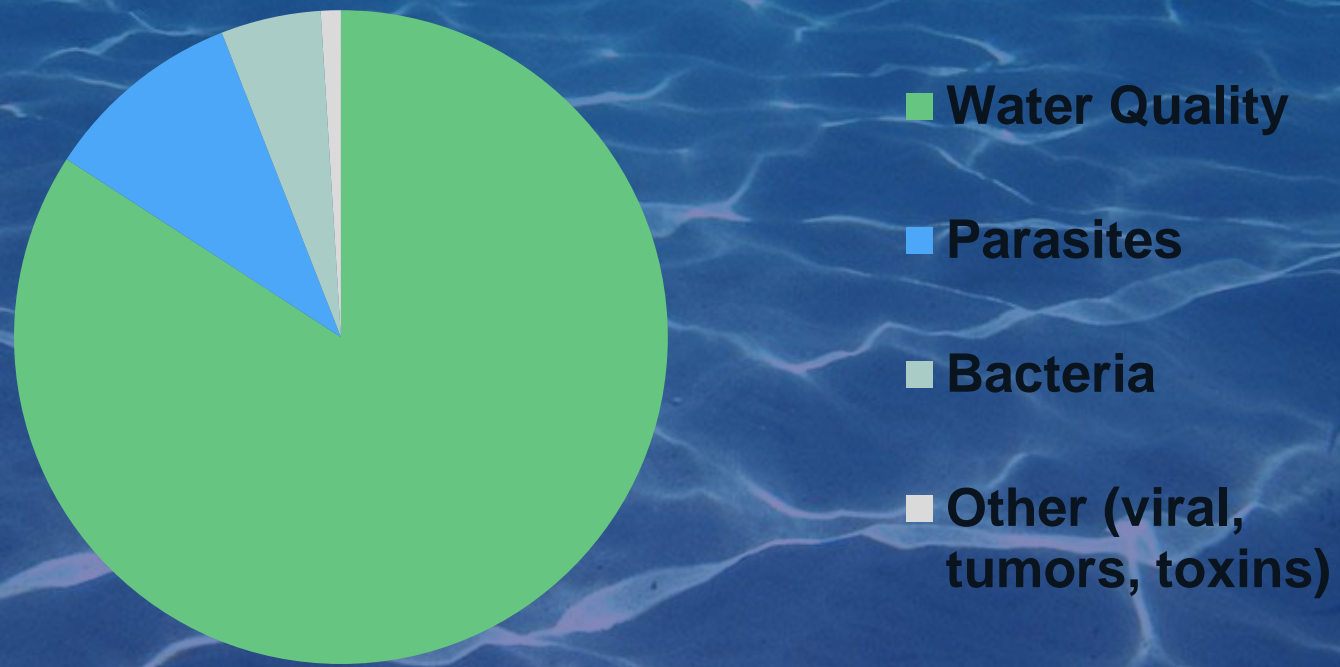


Mortality Curves



Diagnostic Cases

Cause of Disease



Fish Diagnostics

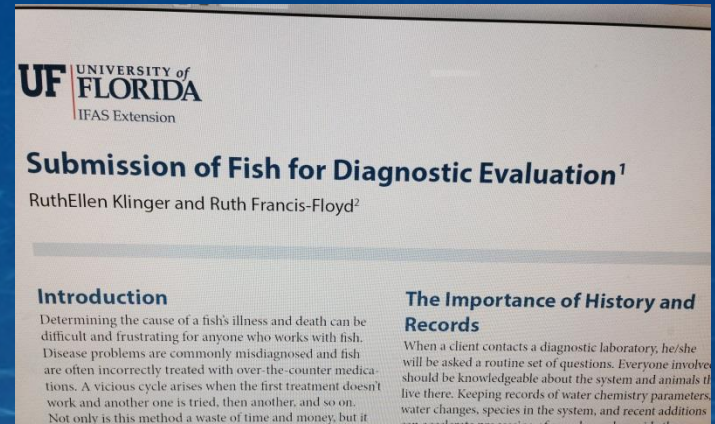
- **History**
 - **System**
 - **Water**
 - **Fish**
- **Water Chemistries**
- **Fish Examination**



What makes a good sample for examination?

- Moribund fish, number dependent on population and value
- Less than 6 hours dead, if kept cold and wrapped (not left in water or frozen)

<http://fisheries.tamu.edu/files/2013/09/Submission-of-Fish-for-Diagnostic-Evaluation.pdf>



Obligate vs Opportunistic Pathogens

- **Obligate**
 - Requires animal host to replicate
- **Opportunistic**
 - Does not require animal host to replicate
 - Nutrition from organic material
 - Naturally occur in soil and/or water
 - May also be part of natural microbial population in fish (i.e. on skin, digestive tract)



Treatment

**Food Fish
Approved Drugs
for Use in
Aquaculture**

**Ornamental
No regulation**

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