Fish Health Management

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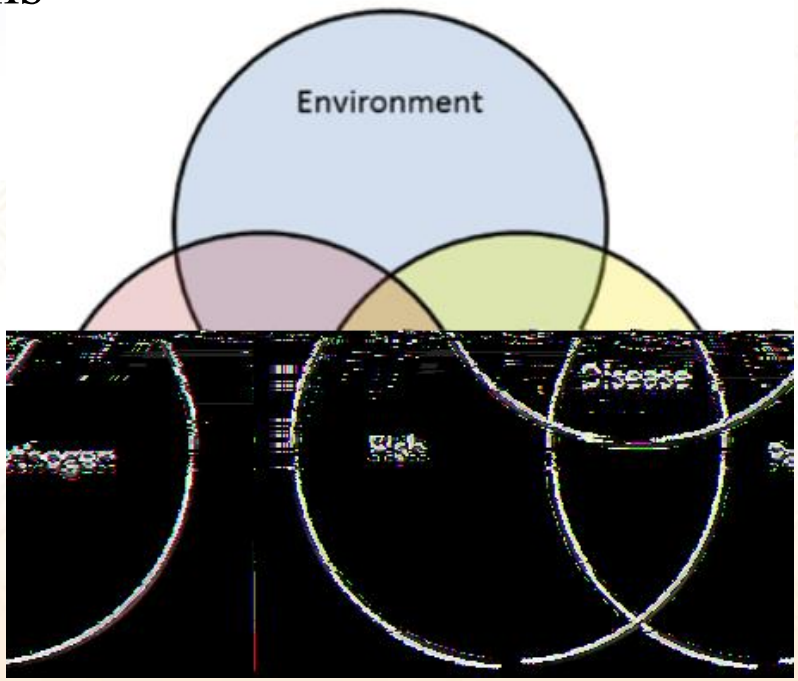
Overview of Talk

- Introduction to fish health
- Types of disease
  - Dietary
  - Water Quality
  - Infectious
- Signs of disease
- Diagnosis and treatment

http://www.ag.auburn.edu/fish/image_gallery/data/media/61/ESC.jpg

Fish Health

- Health of fish is dependent on many factors
  - Environmental conditions
    - Quality of diet
    - Stocking density
    - Quality of water
  - Sources and types of pathogens
  - Species/strain of fish



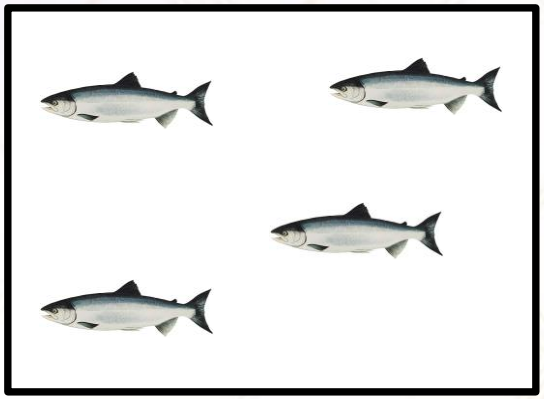
http://www.climatesignals.org/sites/www.climatesignals.org/files/reports/venn_diagram.png

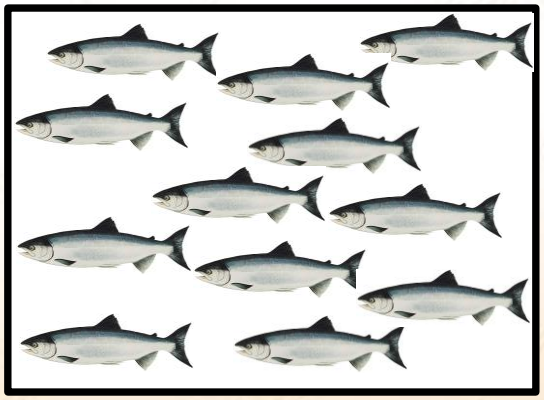
Feed

- Use a species-appropriate high quality feed
- Different formulations for different life stages
  - Starter feed
  - Fingerling feed
  - Grow-out feed
- Nutritional deficiencies lead to growth defects, internal organ dysfunction, anemia, etc.
- Poor diet can lead to immune dysfunction, resulting in increased risk of infection

Stocking Density

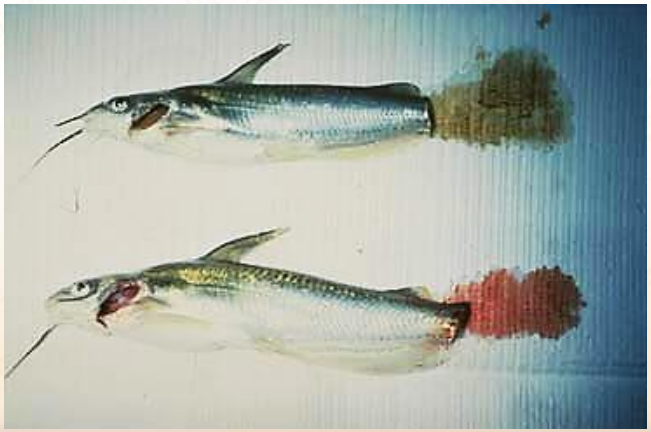
- High density increases disease transmission
- Reduces water quality
- Increases stress





Water Quality

- Poor water quality can
  - cause stress and hinder immune responses
  - support the growth of unwanted microbes
  - directly result in mortality



Water Quality Parameters

- Temperature, pH, dissolved oxygen
- Nitrogen
  - Ammonia
    - NH_3/NH_4^+
  - Nitrite (NO_2^-)
  - Nitrate (NO_3^-)
- Chlorine
- Alkalinity and hardness
- Dissolved gases

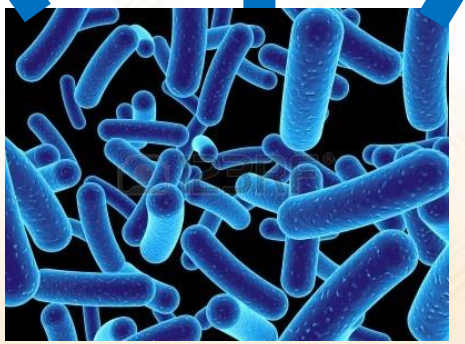
Total Ammonia Nitrogen (TAN) - ppm
Use this table to find out when ammonia levels will start to become toxic to your fish

Temp (°C)	pH										
	6.0	6.4	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4
4	200	67	29	18	11	7.1	4.4	2.8	1.8	1.1	0.68
8	100	50	20	13	8.0	5.1	3.2	2.0	1.3	0.83	0.5
12	100	40	14	9.5	5.9	3.7	2.4	1.5	0.95	.61	0.36
16	67	29	11	6.9	4.4	2.7	1.8	1.1	0.71	0.45	0.27
20	50	20	8.0	5.1	3.2	2.1	1.3	0.83	0.53	0.34	0.21
24	40	15	6.1	3.9	2.4	1.5	0.98	0.63	0.4	0.26	0.16
28	29	12	4.7	2.9	1.8	1.2	0.75	0.48	0.31	0.2	0.12
32	22	8.7	3.5	2.2	1.4	0.89	0.57	0.37	0.24	0.16	0.1

Nitrogen Cycle

Biological filtration

NH_3/ NH_4^+ → NO_2^- → NO_3^-



Bacteria are necessary!

Maintaining a Biofilter

- Adequate surface area
- Aeration – O_2 is required
- Limited use of chemicals in the system
  - Disinfectants
  - Antibiotics
  - If used, the microbes need time to recover and recolonize

Infectious Agents

- Fish are susceptible to various infectious agents
  - Bacteria
  - Viruses
  - Fungi
  - Parasites

Opportunistic Infectious Agents

- Cause disease when fish are stressed or injured
  - Organisms may always be present in a system
  - *Flavobacterium, Streptococcus*
- Although these organisms are present, the immune system of healthy fish prevents disease outbreaks

Primary Infectious Agents

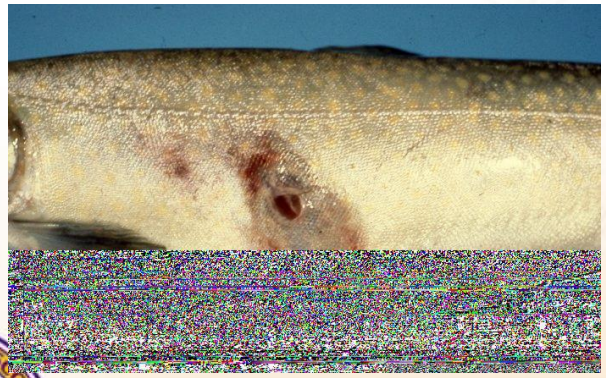
- Pathogens that infect healthy fish
  - Tend to cause more severe infections
  - Tend to be harder to treat
- Prevent using strict biosecurity measures
- Stressful conditions will allow these to spread faster and be harder to treat

Susceptibility of Fish to Infection

- Young fish tend to be more susceptible
- Some pathogens are species or strain-specific, while others infect many species
- Stress increases susceptibility
  - Temperature, pH, water quality, etc
- Nutritional deficiencies increase susceptibility

Identifying Disease in a Population

- Behavior changes
  - Off feed
  - Piping
  - Erratic swimming
  - Lethargy
- Physical changes
  - Lesions
  - Popeye
  - Dropsy
  - Discolored gills



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http://www.ag.auburn.edu/fish/mediagallery/files/2013/08/751.jpg

What to Do Next

- Remove any dead fish immediately
- If possible quarantine sick fish
- Review water quality records; check feed
- Contact a veterinarian and/or submit fish to a diagnostic lab
  - Ship live if possible
  - Dead on ice is next best

Treatments

- Work with a veterinarian on developing a treatment strategy
  - Antibiotics may work for bacterial infections
    - Difficult if fish are off feed
  - Chemical/bath treatments may work for fungal or parasitic infections
    - Limited approval
    - Impractical for pond culture

"An ounce of prevention is worth a pound of cure"

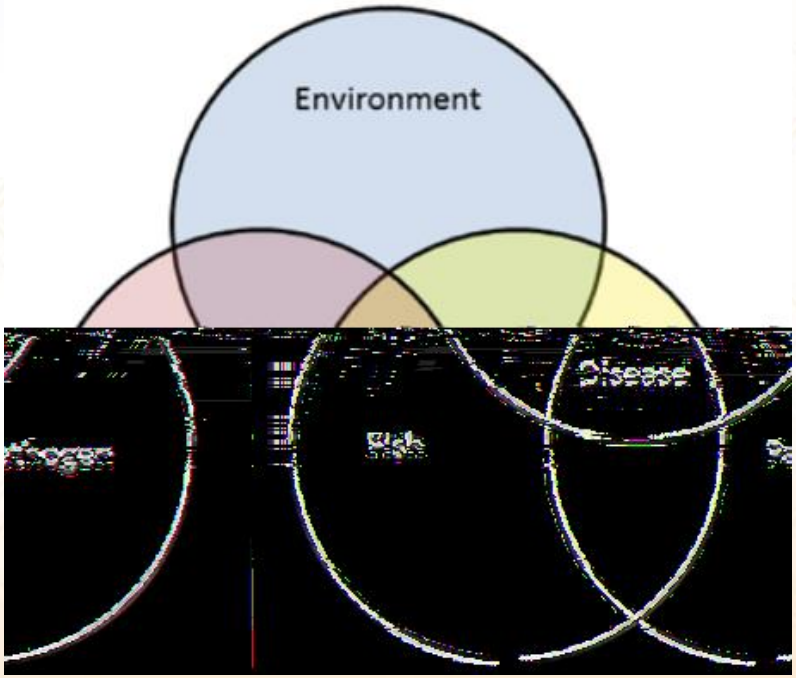
- Purchase eggs/fingerlings from a reputable dealer; ensure certified pathogen-free
- Vaccinate if available
- Maintain proper water quality
- Implement strict biosecurity measures
  - Disinfect equipment
  - Quarantine incoming fish
  - Limit access
- Be familiar with common diseases
- Train staff to recognize disease signs

Minimizing Stress

- Use appropriate stocking densities
- Maintain proper water conditions
- Minimize handling
- Maintain good water quality
- Use an appropriate feed
- Reduce the presence of predators

In Summary…

- Fish health is dependent on many factors
  - Environmental
  - Types of pathogens
  - Fish species and age



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In Summary…

- The best treatment is prevention
  - Quality fish
  - Good water quality
  - High quality feed
  - Minimize stress
  - Minimize cross-contamination between systems

In Summary

- If abnormal mortalities occur and signs of disease are present
  - Consult a fish health professional
  - Submit specimens for diagnostic testing
  - Apply treatments as directed
  - Review biosecurity protocols

Resources

- RAC Publications: https://www.ncrac.org/publications
  - Biosecurity: https://www.ncrac.org/files/biblio/FS115Biosecurity.pdf
  - Whirling disease: https://www.ncrac.org/files/biblio/Whirling2.pdf
  - Grubs: https://www.ncrac.org/files/biblio/TB115.pdf
  - Aeromonas: https://www.ncrac.org/files/biblio/SRAC0478.pdf
  - Columnaris: https://www.ncrac.org/files/biblio/SRAC0479b.pdf
  - Ich: https://www.ncrac.org/files/biblio/SRAC0476.pdf
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  - Nitrite: https://www.ncrac.org/files/biblio/SRAC0462.pdf
  - Health management: https://www.ncrac.org/files/biblio/NRAC0111.pdf
  - Water chemistry: https://www.ncrac.org/files/biblio/NRAC0170.pdf
  - Stress: https://www.ncrac.org/files/biblio/SRAC0474.pdf