

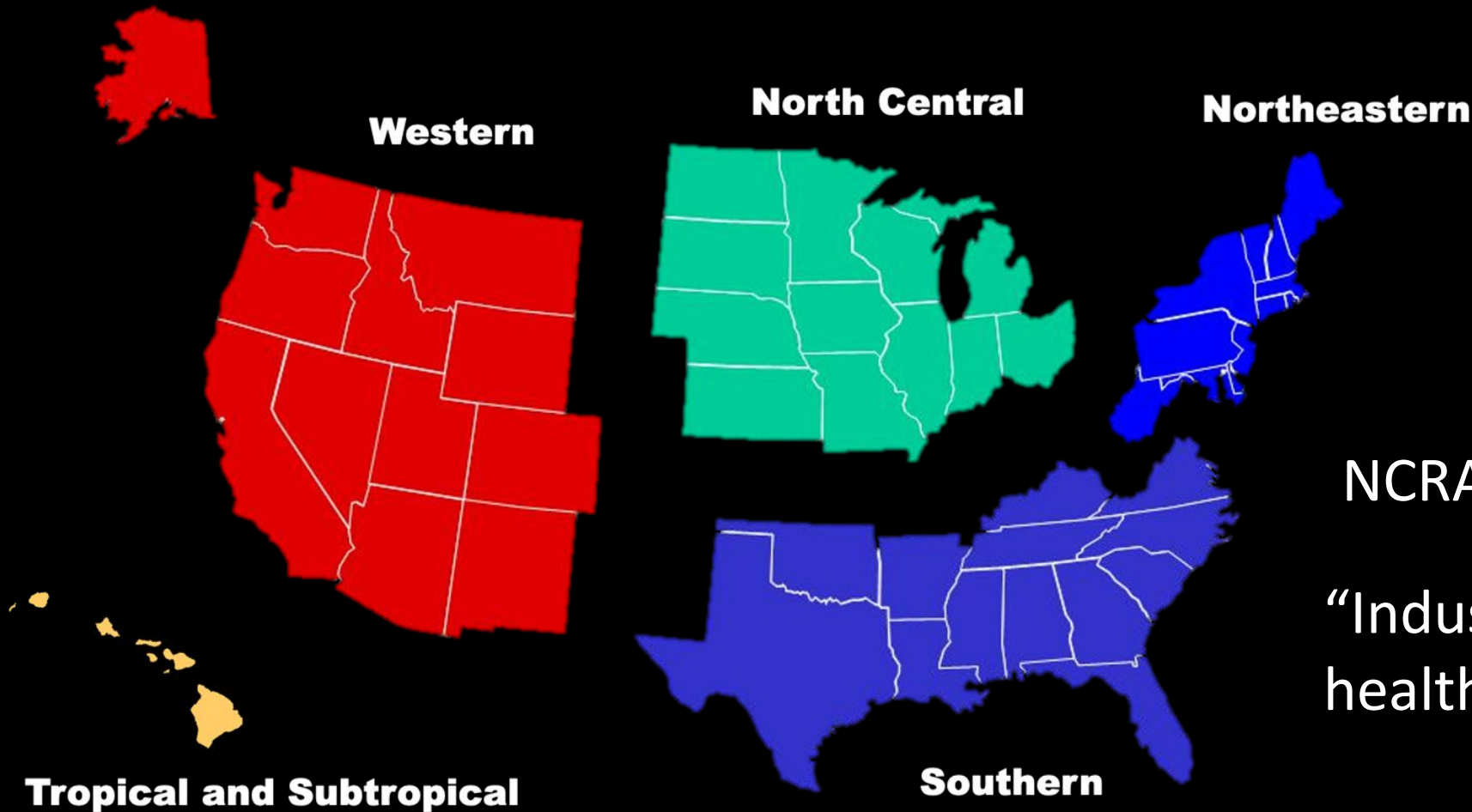
# Best management practices for the health of your farmed fish: a new tool



Laurel Sacco<sup>1</sup>, Ethan Haefner<sup>1</sup>, Nick Phelps<sup>1</sup>, Tom Loch<sup>2</sup>, Myron Kebus<sup>2</sup>, Matt Smith<sup>3</sup>



# North Central Regional Aquaculture Center



NCRAC Listening Sessions:

“Industry needs *practical* fish health resources and tools”



# Overall Goal

Address industry-identified fish health needs in the NCR by:

1. Building long-term producer and professional fish health capacity
2. Develop immediately deployable innovative solutions to production limiting diseases

# What are producers saying?

Practices are  
too general  
and aren't  
helpful

Too many  
resources...  
Where do I look?  
What do I trust?

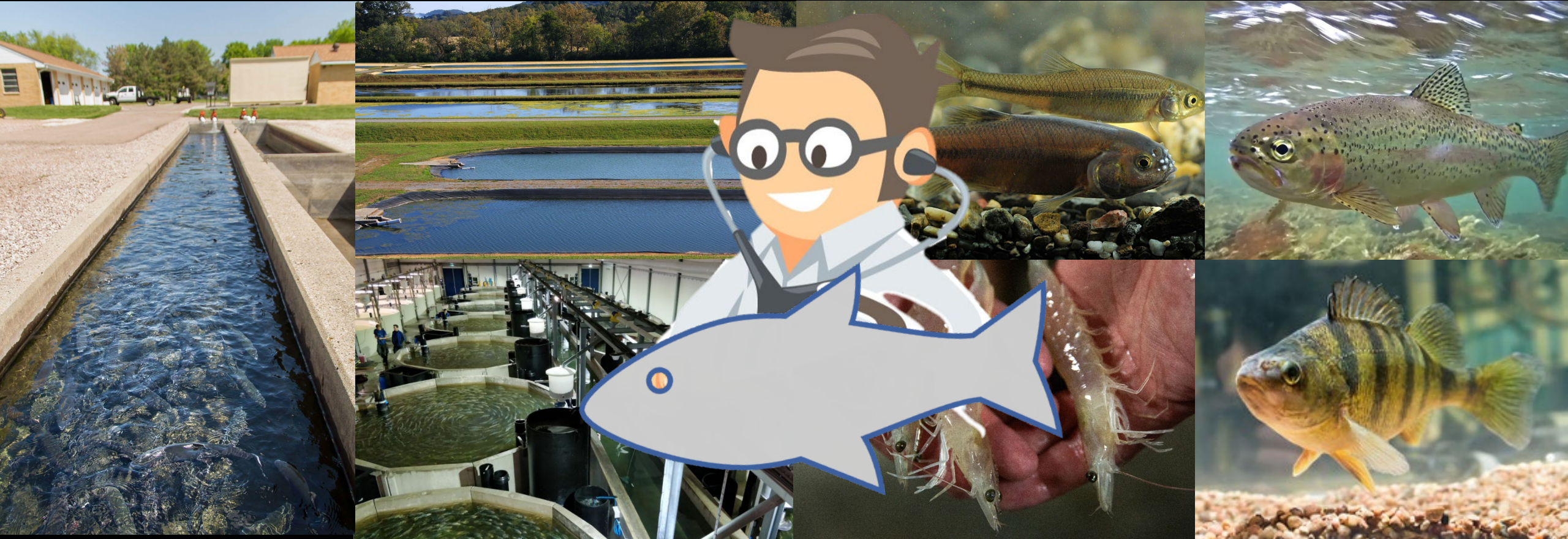
Feels  
overwhelming  
...Where do I  
start?

Fish Health  
Best  
Management  
Practices



# Fish Health Navigator

Identify fish health concerns and provide resources to inform best management practices for a range of NC farm conditions





# Major Tool Elements



Start

BMPs

Output

Initial Questions

Guiding questions to identify where BMPs are most needed

Why it's important to address  
Resources to implement BMPs



# Initial Questions

**Fish**

Salmonids | Percids | Baitfish | Centrarchids | Catfish |  
Moronids | Tilapia | Koi/Goldfish | Shrimp/Prawns

**System**

Pond | Raceway | Recirculating Aquaculture  
System (RAS)

**Water Source**

Ground | Surface | Municipal

**Purpose**

Food | Stocking | Bait

Salmonids

System

Pond

Raceway

RAS

Source

Ground

Surface

Municipal

Ground

Surface

Municipal

Ground

Surface

Municipal

Food

Food

Food

Food

Food

Food

Food

Food

Food

Stocking

Stocking

Stocking

Stocking

Stocking

Stocking

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Stocking

Bait

Bait

Bait

Bait

Bait

Bait

Bait

Bait

Bait

Purpose



Salmonids

Percids

Centrarchids

Catfish

Moronids

Tilapia

Baitfish

Koi/Goldfish

Shrimp/Prawns

System

Pond Raceway RAS

Pond Raceway RAS

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Source

...and so on

Purpose



About

Contact

# Fish Health Navigator

A resource to guide best management practices in aquaculture

Start



Funding provided by the  
North Central Regional  
Aquaculture Center



## Select the type of fish being raised on your farm:

Salmonids

Percids

Bait

Centrarchids

Moronids

Catfish

Tilapia

Koi/Goldfish

Shrimp & Prawns



## Select your farm's aquaculture system:

Pond

Raceways

RAS



Select your farm's water source:

Ground

Surface

Municipal



Select the purpose for fish raised on your farm:

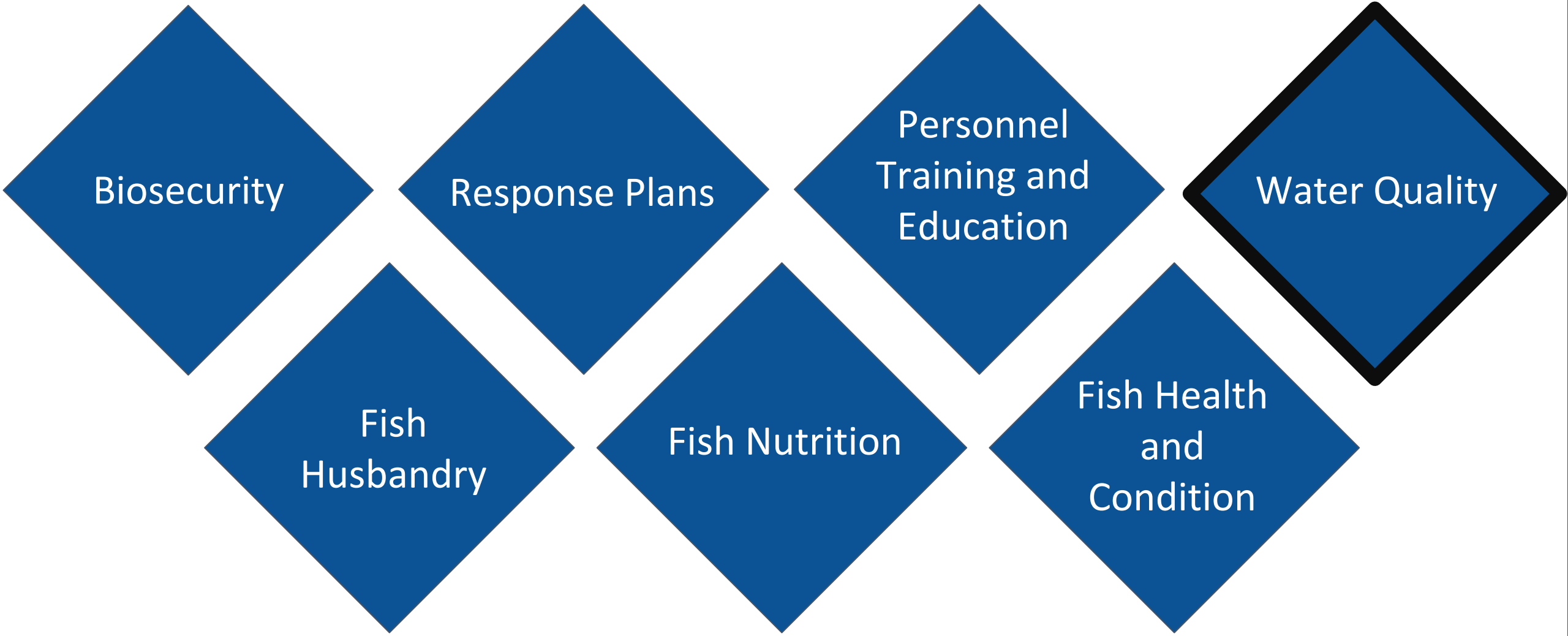
Food

Stocking

Bait



# Select a Fish Health Topic



# Water Quality

Select which water quality metrics are tested on your farm:

✓ Dissolved Oxygen

✓ Nitrite

✓ Ammonia

✓ pH

✓ Temperature

Water Hardness

Alkalinity





# Water Quality

Is incoming water treated for microbes?

Yes

No

Not sure

Not applicable

# Water Quality

Identified fish health concerns for your farm:

**Daily water quality monitoring does not include tests for water hardness and alkalinity**

Recommended BMPs to address identified fish health concerns:

**Measure water hardness daily:** Insufficient hardness may result in osmoregulatory stress for fish, disrupting their electrolyte balance and compromising their ability to regulate internal fluids. Conversely, excessive water hardness can pose challenges for fish by impeding nutrient uptake and hindering metabolic processes. **Expand explanation**

**Measure alkalinity daily:** Acidic conditions resulting from low alkalinity can impair fish respiration, hinder nutrient absorption, and weaken immune responses, increasing susceptibility to diseases and other health issues. Conversely, excessively high alkalinity levels may also disrupt fish physiology and impair metabolic functions. **Expand explanation**

## Identified fish health con

### **Daily water quality moni**

## Recommended BMPs to

### **Measure water hardness**

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fluids. Conversely, excess

uptake and hindering metabolic processes. **Expand explanation**

**Measure alkalinity daily:** Acidic conditions resulting from low alkalinity can impair fish respiration, hinder nutrient absorption, and weaken immune responses, increasing susceptibility to diseases and other health issues. Conversely, excessively high alkalinity levels may also disrupt fish physiology and impair metabolic functions. **Expand explanation**

Water hardness refers to the concentration of dissolved minerals, primarily calcium and magnesium, which play crucial roles in various physiological processes of fish. Ensuring appropriate water hardness levels is vital for supporting fish growth, development, immune response, and overall health. Insufficient hardness can lead to "soft" water conditions, which may result in osmoregulatory stress for fish, disrupting their electrolyte balance and compromising their ability to regulate internal fluids. Conversely, excessive water hardness can lead to "hard" water conditions, which may pose challenges for fish by impeding nutrient uptake and hindering metabolic processes. High levels of water hardness can also contribute to the accumulation of mineral deposits in aquaculture infrastructure, potentially impacting water quality and system performance. Mineral deposits can also serve as a surface for bacteria to create biofilms upon, which are very difficult to remove even with deep cleaning and disinfection.

By measuring hardness levels daily, you can identify deviations from optimal ranges and take corrective actions to maintain stable conditions for your fish population. Adjusting water hardness levels may involve supplemental treatments such as the addition of mineral supplements or the use of water softening agents, depending on the specific requirements of your fish species and the characteristics of your water source.

# Water Quality

## **SRAC 0464: Interactions of pH, Carbon Dioxide, Alkalinity and Hardness in Fish Ponds**

*Breaks down alkalinity, hardness, and pH and their importance to aquaculture and organism health*

<https://srac.tamu.edu/categories/view/25>

## **SRAC 4606: Interpretation of Water Analysis Reports for Fish Culture**

*Page 3-8: Overview of water quality parameters and their interpretation as well as the importance of water quality as a limiting factor in aquaculture*

<https://srac.tamu.edu/categories/view/25>

## **An Overview of Aquaponic Systems: Aquaculture Components: Page 12-13**

*Overview of equipment (including effectiveness and cost (tables 10 &11)) for environmental system monitoring and water quality testing*

[https://www.ncrac.org/files/inline-files/aquaculture\\_components.pdf](https://www.ncrac.org/files/inline-files/aquaculture_components.pdf)

# Next Steps

Current:  
Content, R Shiny

Summer 2024:  
Test the tool

Fall 2024:  
Deploy the tool

**Contact us**

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SCAN ME