



Value Added Water Quality Control Program

Our Mission

We offer turf management professionals high quality, innovative products, services and application expertise related to all areas of turf water treatment.

Our Total Solution Programs combine specialized chemistries, feed / control equipment and dedicated on-site service to create value and solve problems for our customers

Our Core Values

- **Customer Focus**- Customers drive our business.
- **Quality**-We offer unmatched quality.
- **Entrepreneurial Spirit**- An engine for innovation.
- **Ethics**-We conduct our business with integrity.
- **Teamwork**-We function as a team.
- **Continuous Improvement**-We are never satisfied.

Irrigation Water Quality

Technical Review

Negative Impacts of Poor Water Quality

- Poor plant response to fertilizers leading to increased use
- Increased water requirements
- Low Percolation rates
- Increased run off and standing water
- Localized Dry Spots
- Poor recovery in high stress areas

Negative Impacts of Poor Water Quality

- **Poorer drainage and runoff**
- **Increased herbicide usage**
- **Increased need for wetting agents**
- **Diminished greening**
- **Slower growth rates**

What is the cause of these problems?

High water pH

(Concentration of H⁺ ions)

High bicarbonate
concentration

(HCO₃)

Induced sodium problem

Irrigation Water Quality

Major Areas of Concern



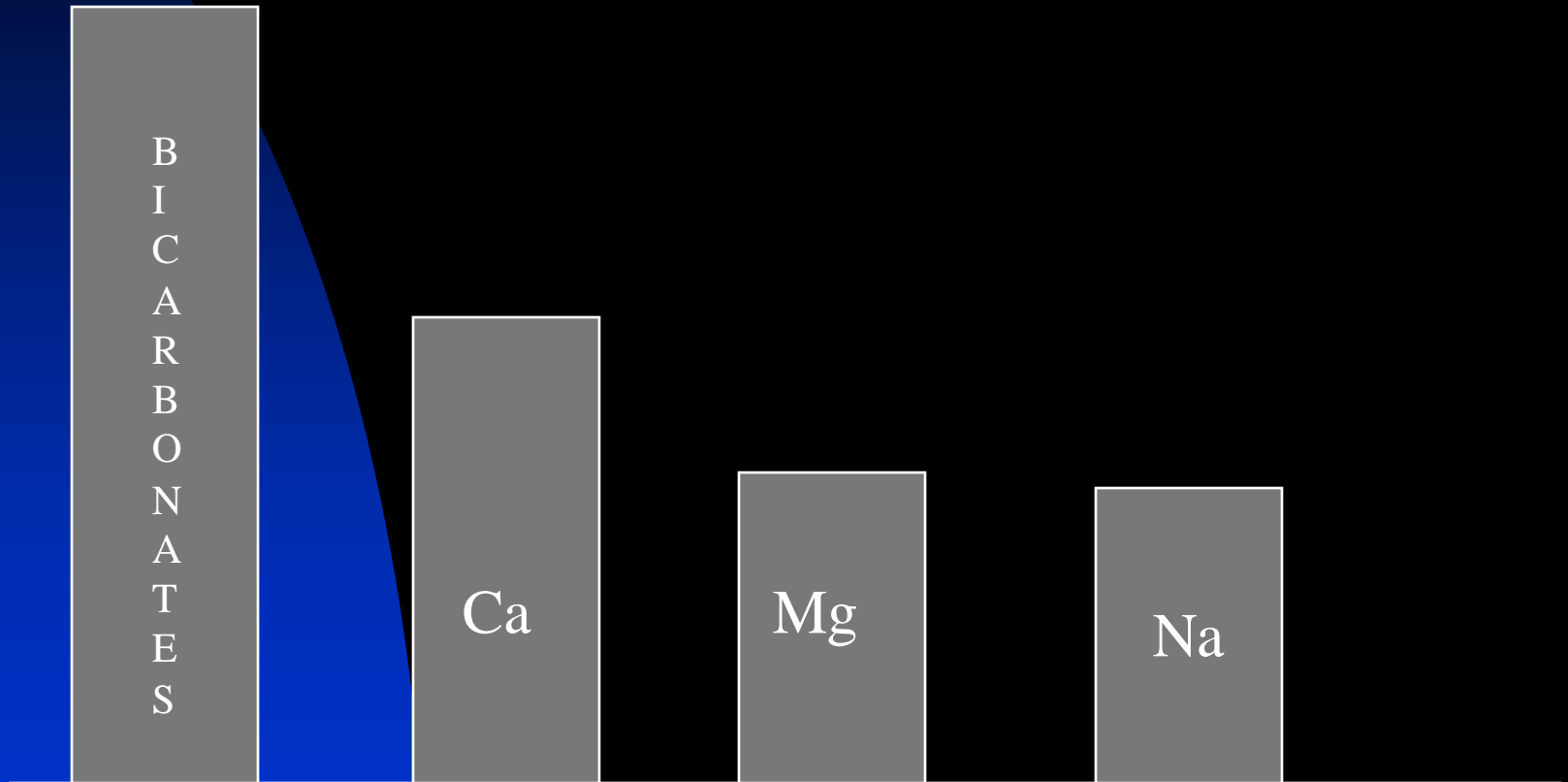
pH /Alkalinity

Bicarbonates

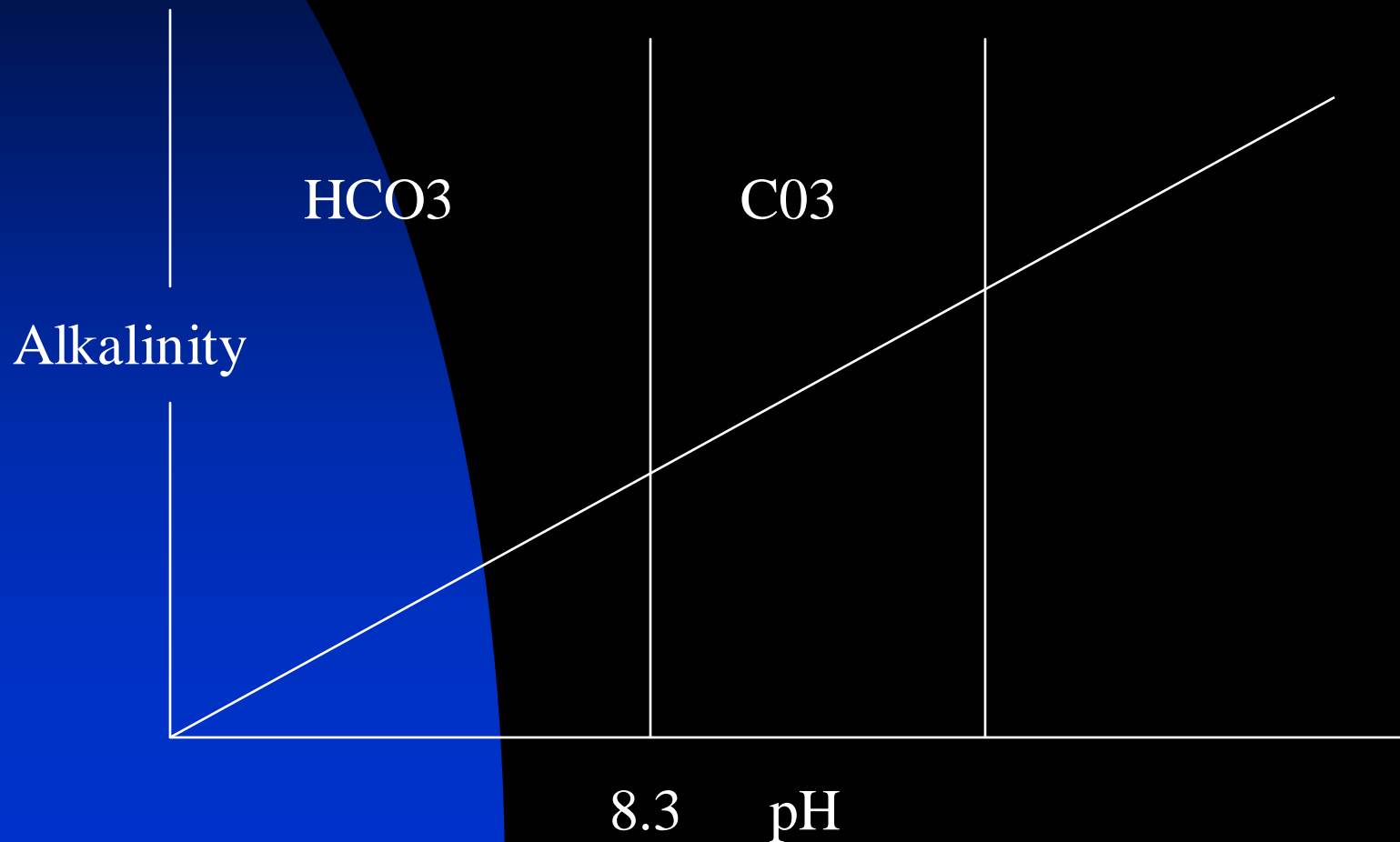
Hardness (Ca & Mg)

Sodium

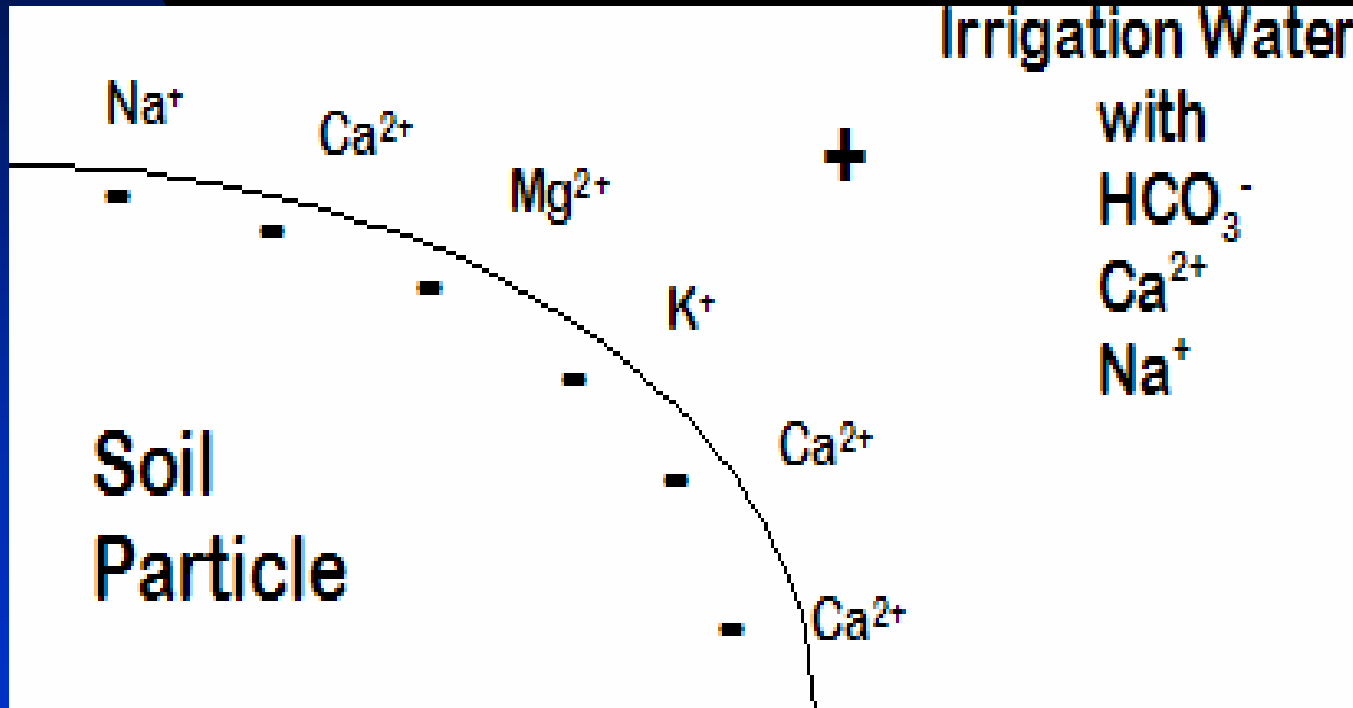
Parameters of Concern



pH / Alkalinity Relationship



Impact Of Untreated Irrigation Water

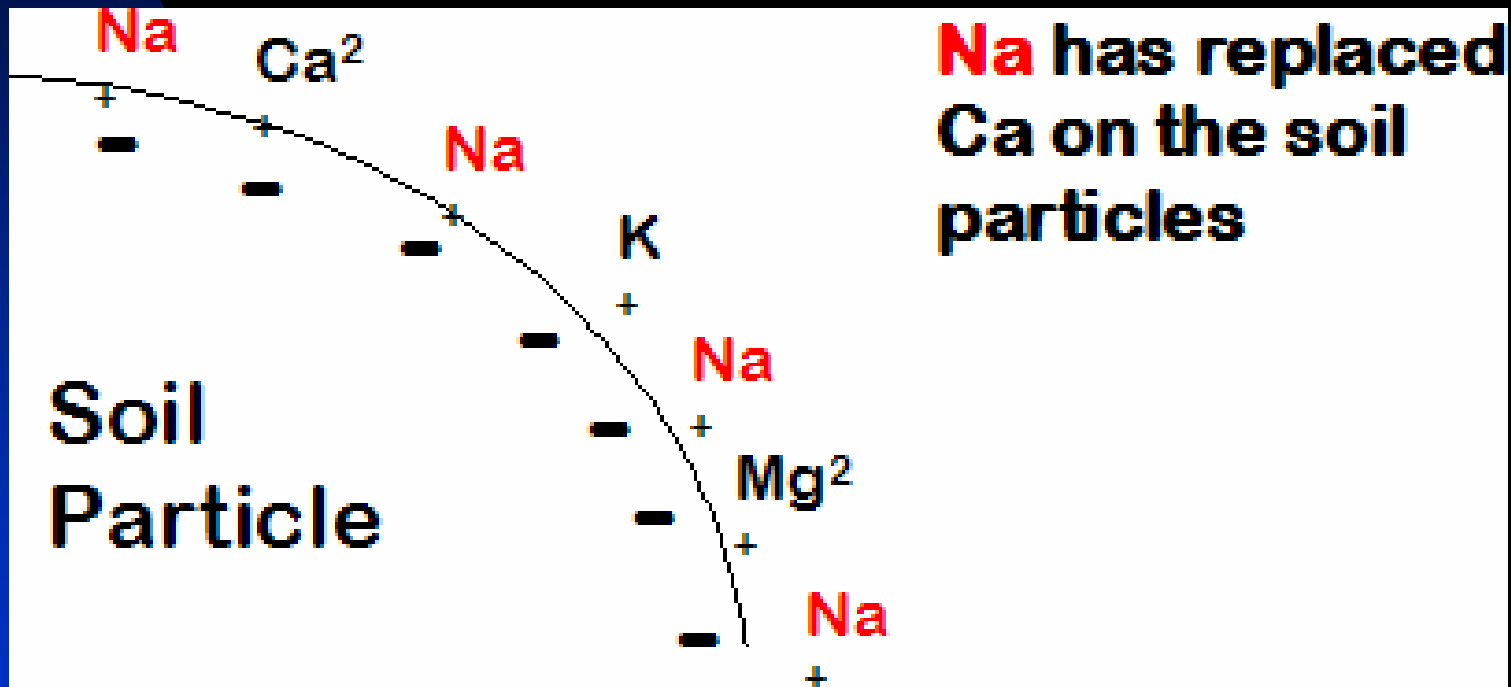


Optimum Cation Arrangement

What does high pH do?

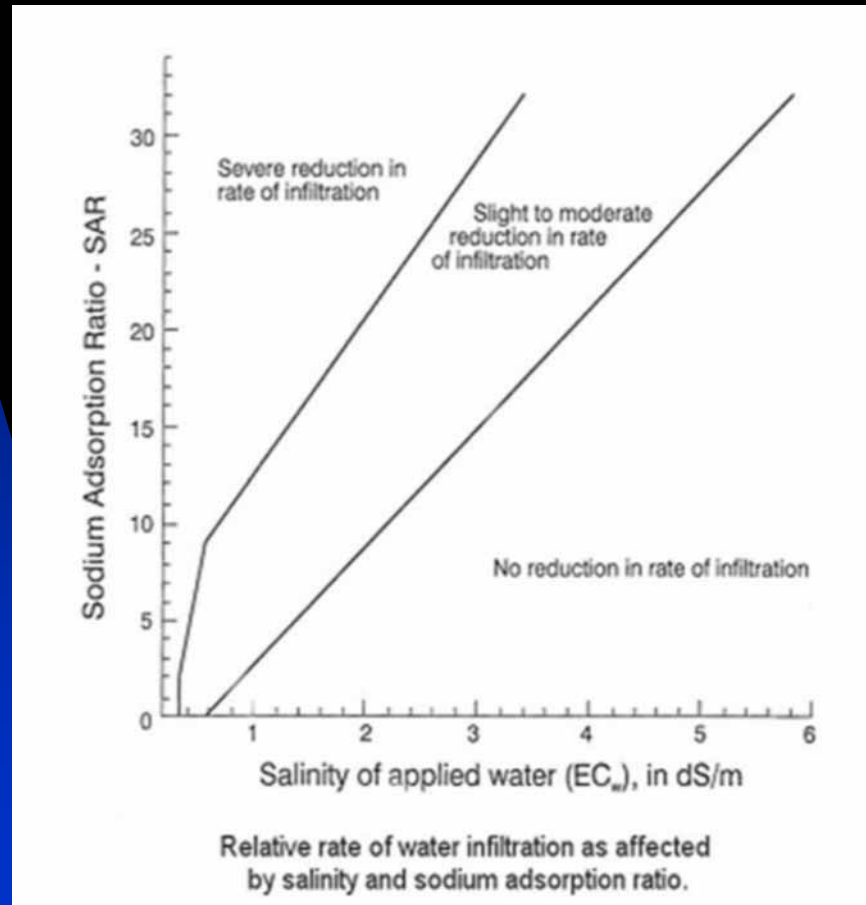
- Drives the Bicarbonate (HCO_3) Alkalinity Up
- HCO_3 ties up Calcium and Magnesium
- Makes them unavailable for cation exchange at soil sites
- Allows Sodium to become dominant cation

Soil Sealing via Na Build Up



No Longer Optimized

Reduced Infiltration Rates



Effects of Reduced Infiltration Rates

- **Increased watering needed- General & Local**
- **Poor nutrient uptake- Decline in Vitality**
- **“Ponding” – Standing Water- Run Off**
- **Increased Overall Costs**
- **Decrease in Quality and Appearance of Turf**

**All Lead to Various Problematic Issues and a
Cycle of Costly Efforts to Treat the
Symptoms**

Treating the Symptoms

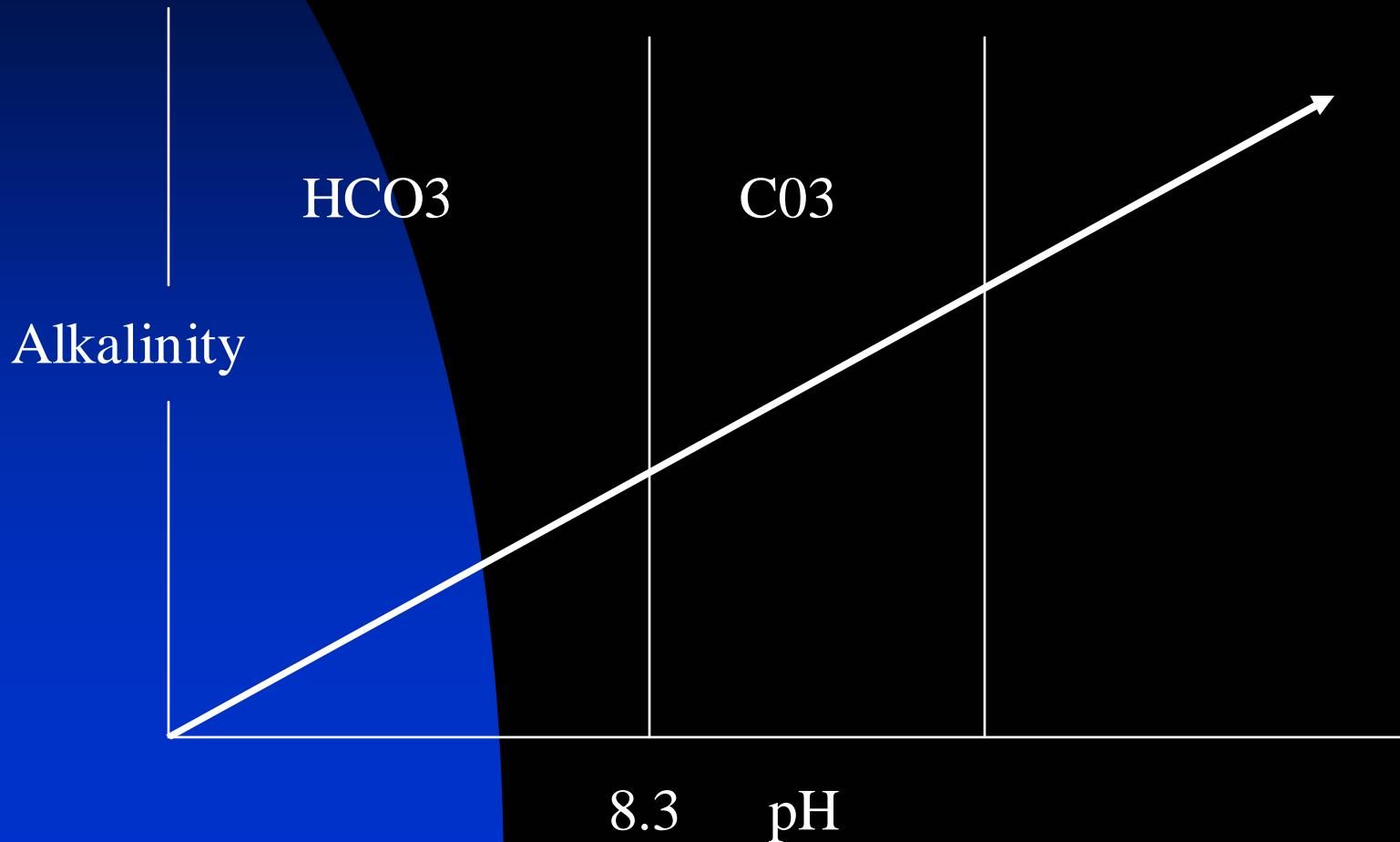
**Water, Fertilize, Water, Spray, Water,
Amendment Addition, Water**

USING POOR QUALITY WATER!!!

What does high pH do?

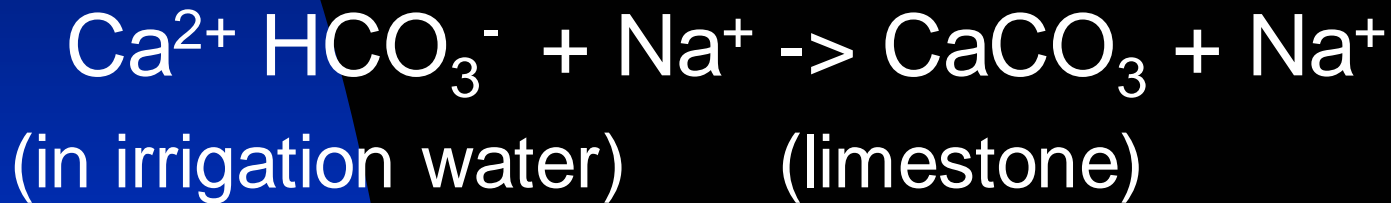
- Drives the Bicarbonate alkalinity to tie up Calcium and Magnesium (Ca_2HCO_3)
- Makes them unavailable for cation exchange at soil sites
- Allows Sodium to become dominant cation
- Forms Calcium Carbonate (Limestone)
- Seals Soil Profile
- Creates matrix to prevent fertilizer uptake

pH / Alkalinity Relationship



Formation of Calcium Carbonate

Bicarbonate (HCO_3^-) will precipitate Ca and leave Na in solution.



Alkalinity moves toward Carbonate CO_3 as evaporation increases pH via decomposition of CO_2

Impact of Calcium Carbonate

- **Crystalline in nature**
- **Seals Soil Further**
- **Worsens Water Penetration**
- **Binds Fertilizer- Rendering it Useless**

What is the Solution ?

Make It Rain !!

Make It Rain !!

Make It Rain !!

Make It Rain !!

Make It Rain !!

What is the Solution ?

Rain

Neutralizes the bicarbonate

Lowers the water pH

Replaces sodium with calcium

pH Control / HCO₃ Destruction



Alkalinity Destruction

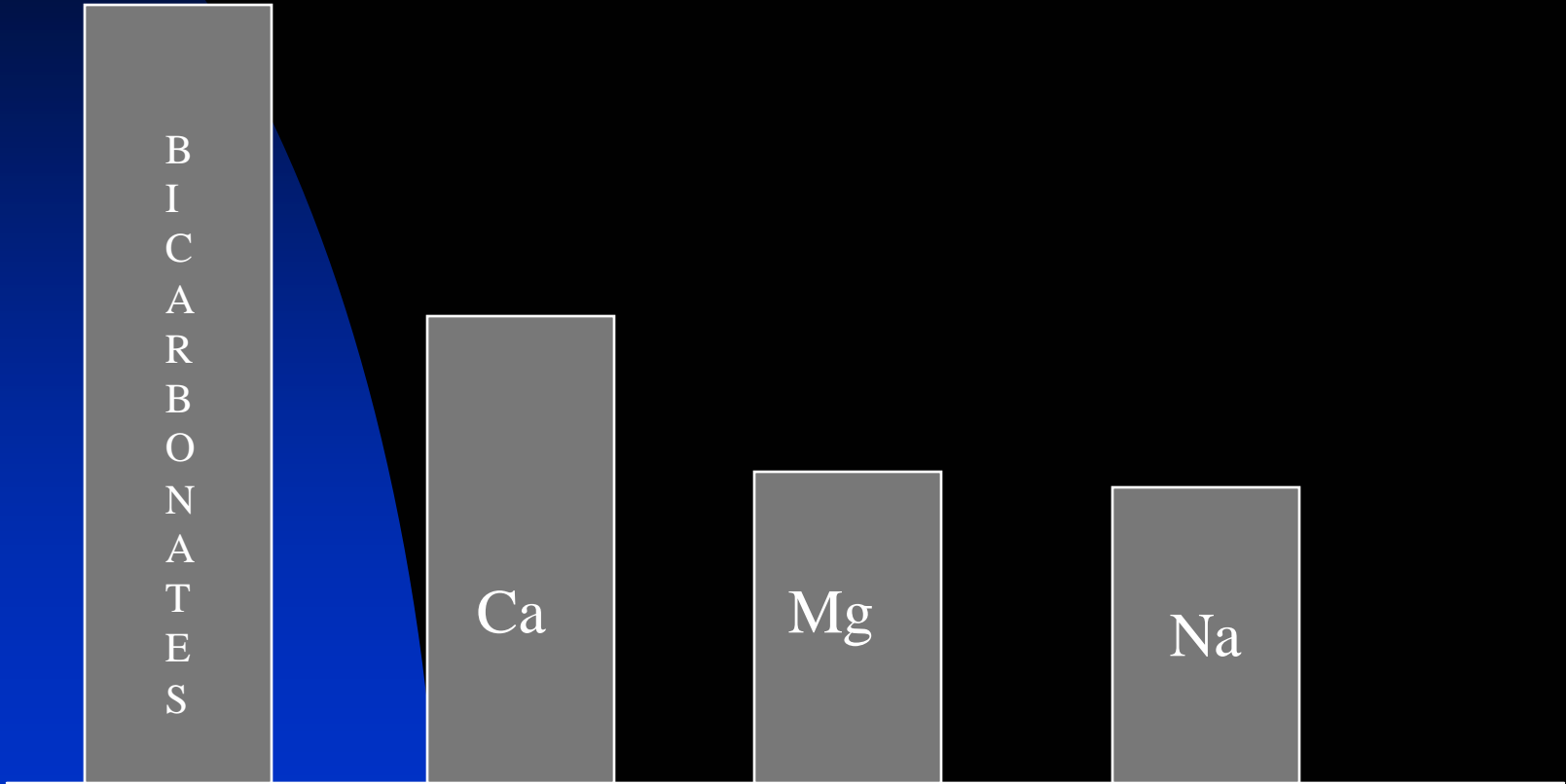


B
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Ca

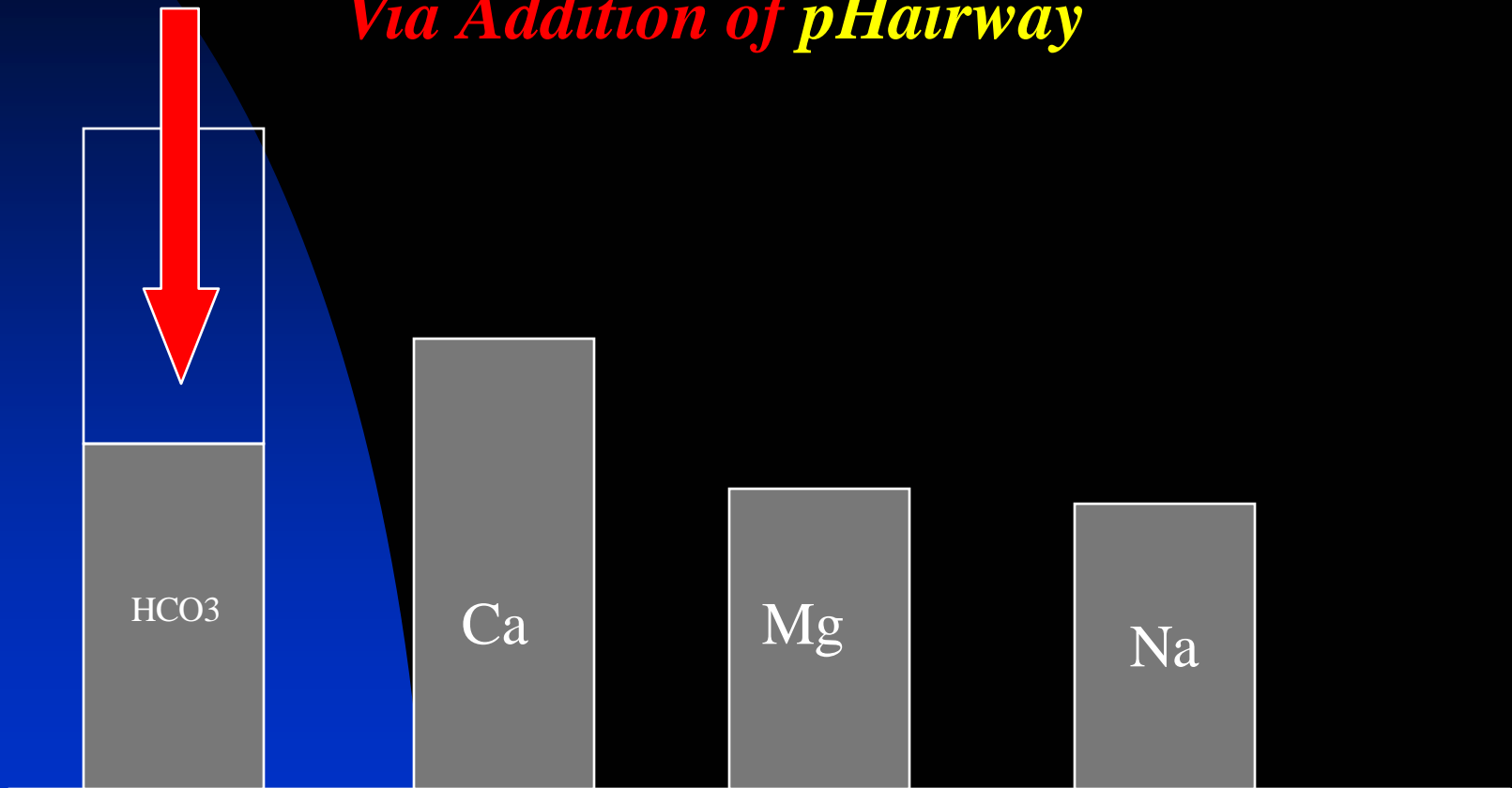
Mg

Na



Alkalinity Destruction

Via Addition of pHairway



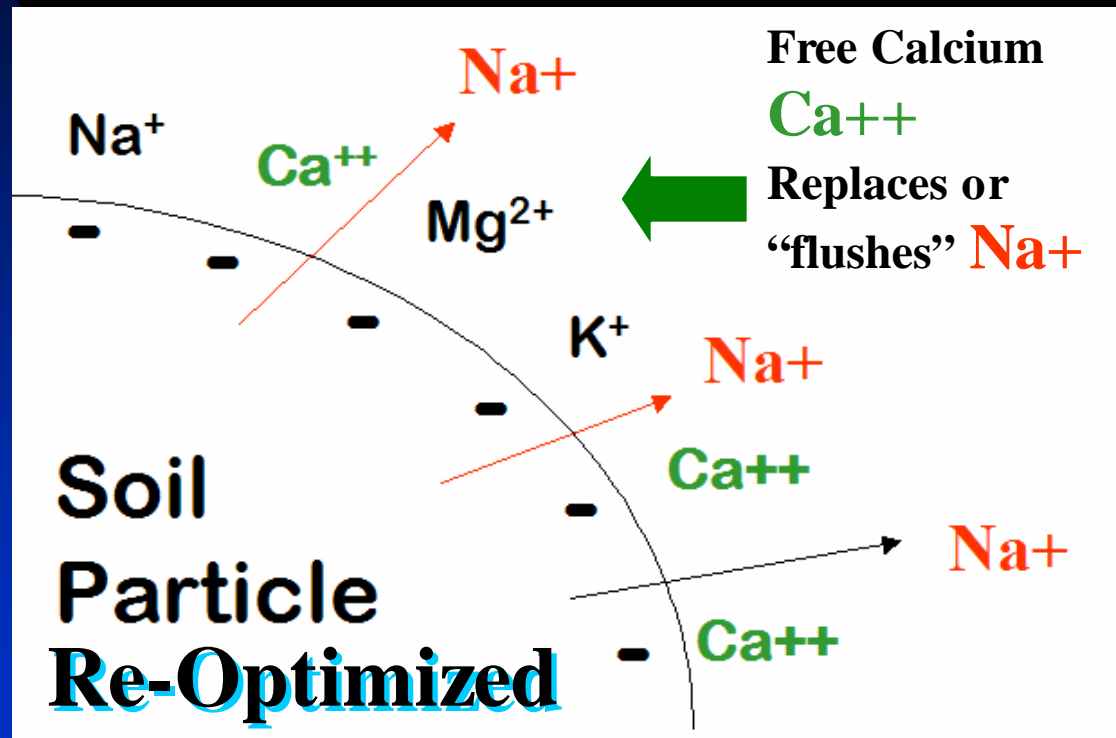
Impact of Alkalinity Destruction

Calcium Liberation



Calcium Free For Ion Exchange

Calcium Liberation



The Problems Are Fixed *Not the Symptoms*

- Calcium Promotes Porosity
- Magnesium Binds Soil
- Calcium Carbonate Matrix Destroyed
- Freed Up Fertilizer Goes To Work
- Nutrient Uptake Improves Dramatically
- Sodium is “Flushed” away

So...what is pHairway?

A unique product resulting from a carefully controlled manufacturing process that combines urea and sulfuric acid. The resulting product is contaminant-free, and contains additives to control metal corrosion. The unique nature of pHairway has enabled it to earn several U.S. patents covering various use, compositions, and methods of manufacturing.

The Chemical



Specifications

GUARANTEED ANALYSIS

Total Nitrogen
Water Soluble (Urea).....15.00
Phosphate Sources.....0
Potash Sources.....0

Sulfur from Sulfuric Acid...16.00

PHYSICAL PROPERTIES

Crystallization Temperature...42+3F
Viscosity at 68 F.....49 centipoise
Specific Gravity at 68 F....1.52
Pound per Gallon at 68 F....12.70
Gallons per Ton.....157.48

pHairway Actions - Review

- ***Lowers pH***
- ***Neutralizes bicarbonate***
- ***Increases water penetration***
- ***Increases nutrient availability***

Turf Response To pHairway

- **Greatly improved response to fertilizer**
- **Increased infiltration and percolation rates**
- **The elimination of “ Dry Spots”**
- **A pronounced “ Greening”**
- **Improved draining /elimination of standing water**
- **Improved recovery in high stress areas**
- **Longer half life of herbicides**

Economic Benefits of pHairway

- Less water usage
- Less energy consumption
- Less fertilizer use
- Decreased use of expensive wetting agents
- Less hand watering- Labor
- Less herbicide use
- Longer equipment life
- Increased “playability”

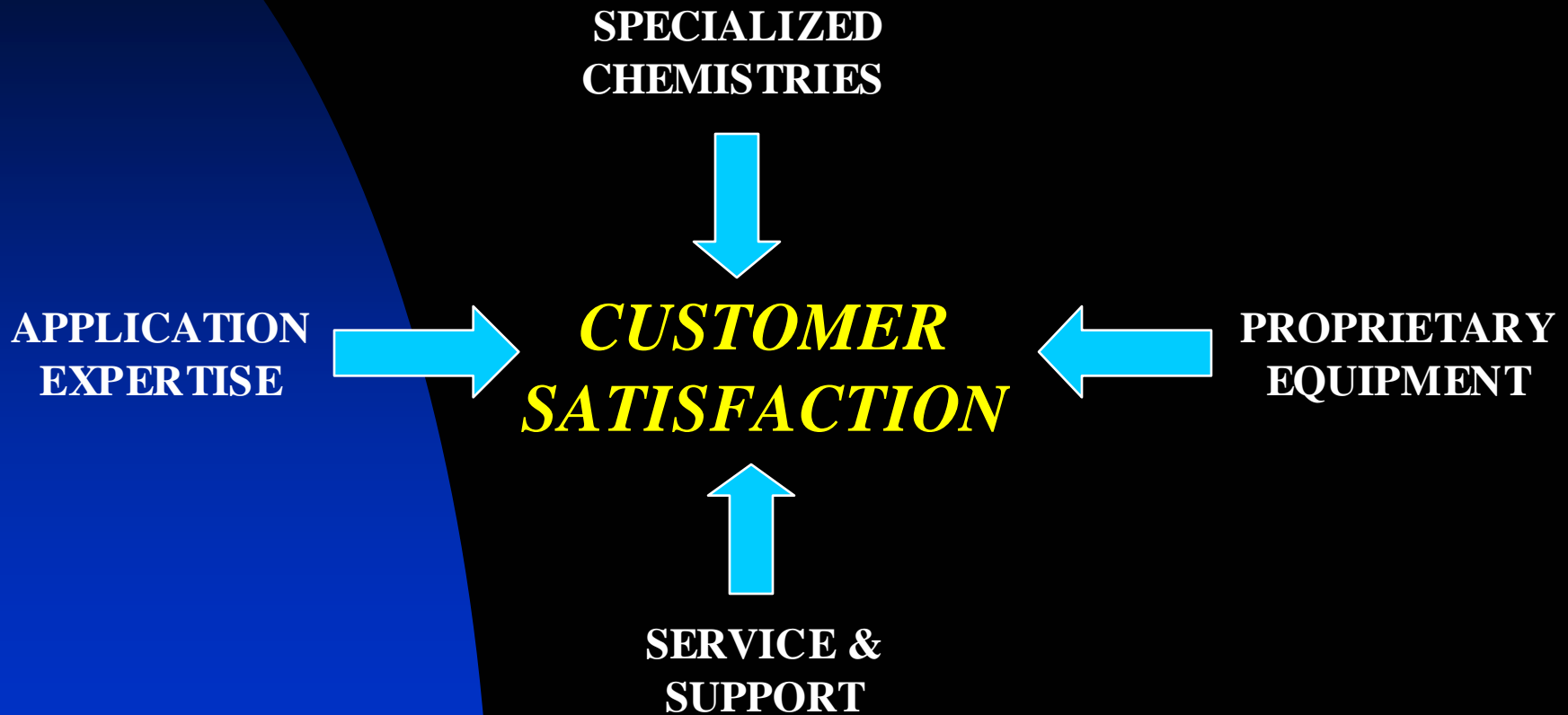
Why pHairway?

- Proven Reliable – 100's of successes
- Safe for Environment and People
- Convenient Hands Off Approach
- Guaranteed Quality
- Specialized Formulation
- Continuous Flow Manufacturing Process
- World Leading Supplier

Why Prime Turf ?

- Singular Focus on Water Quality
- Years of Golf Turf Expertise
- Water Expertise
- Local Service
- Experienced- 100's of Applications
- Dedicated To Customer Service
- Specialized Monitoring and Feed Equipment
- Specialized Delivery Equipment and Expertise

"The Value Added Difference"



The Equipment

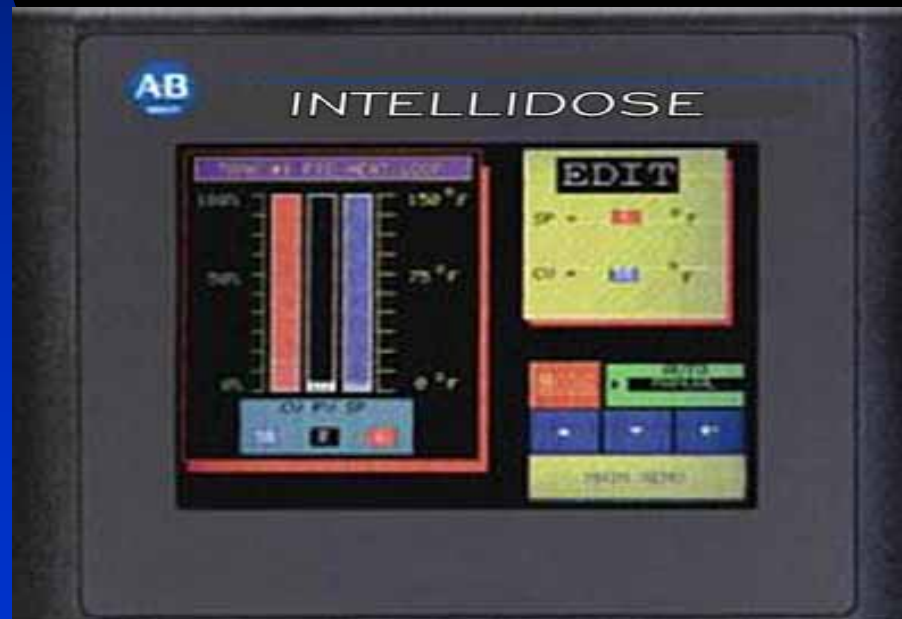
- **pH Control & Fertigation Applications**
- **New IntelliDose Controller Technology**
- **Improved Sensor Response**
- **Multiple pH Set Point Flexibility**
- **Remote Control Capability**
- **Proven Reliable Components**



G2 Injection Station

The Controller

INTELLIDOSE
PROGRAMMABLE CHEMICAL MANAGEMENT CONTROLLER



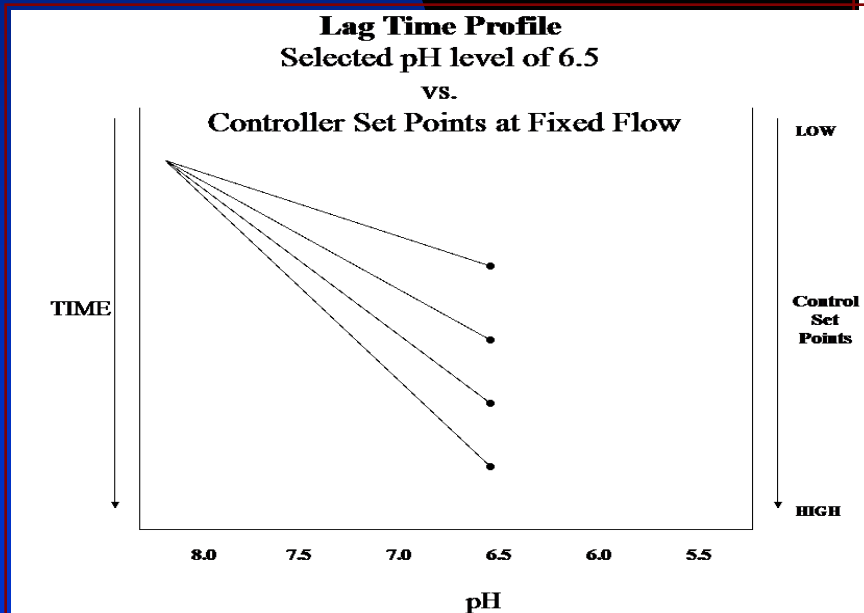
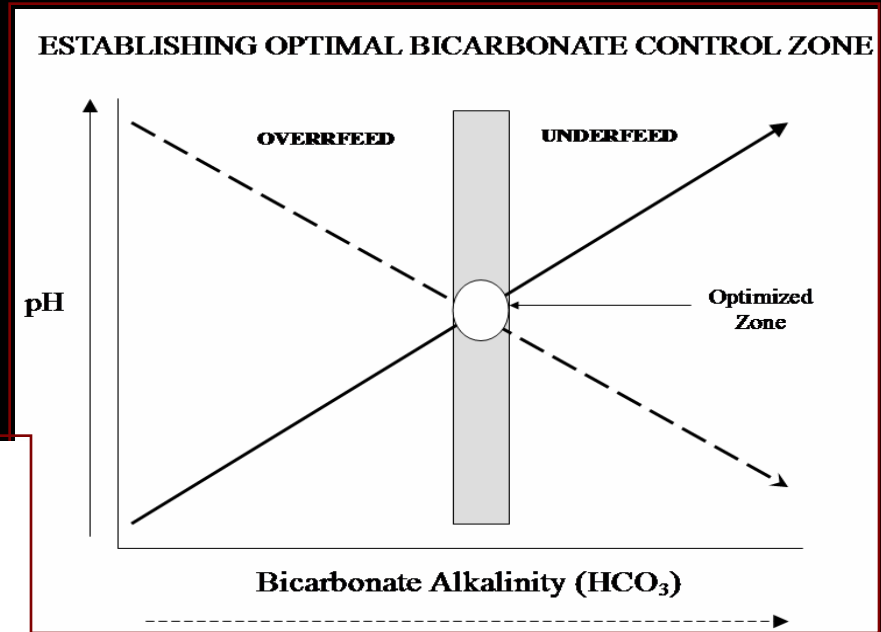
The Service

- **Safe, Efficient Delivery**
- **Equipment Installation and Service**
- **System Audits**
- **Service Contracts**
- **Start Up And Winterization Programs**
- **Special Performance Monitoring Programs**
- **Rapid Response To Trouble Shooting Calls**
- **Water & Soil Testing**



The Service

Performance Optimization Program



Implementation

- Equipment and Installation Scope Out
- Deliver and Install Injection Station and Chemical Storage Tank
- System Shakedown and Calibration
- Chemical Delivery Requirements Identified
- First Delivery - Training – Full System Start Up

