

# Vertex for Healthier Lakes

## WINTER AERATION

Increase oxygen under ice to decrease fish kills, de-ice docks to prevent damage, and provide open water for water fowl in cold climates

## SPRING/FALL AERATION

Reduce problems caused by turnover by keeping the oxygen stable at all levels

## SUMMER AERATION

Reduce oxygen depletion due to nutrients from run-off, algae and plant concentrations, warmer temperatures, and increased waste from fish

## After Aeration

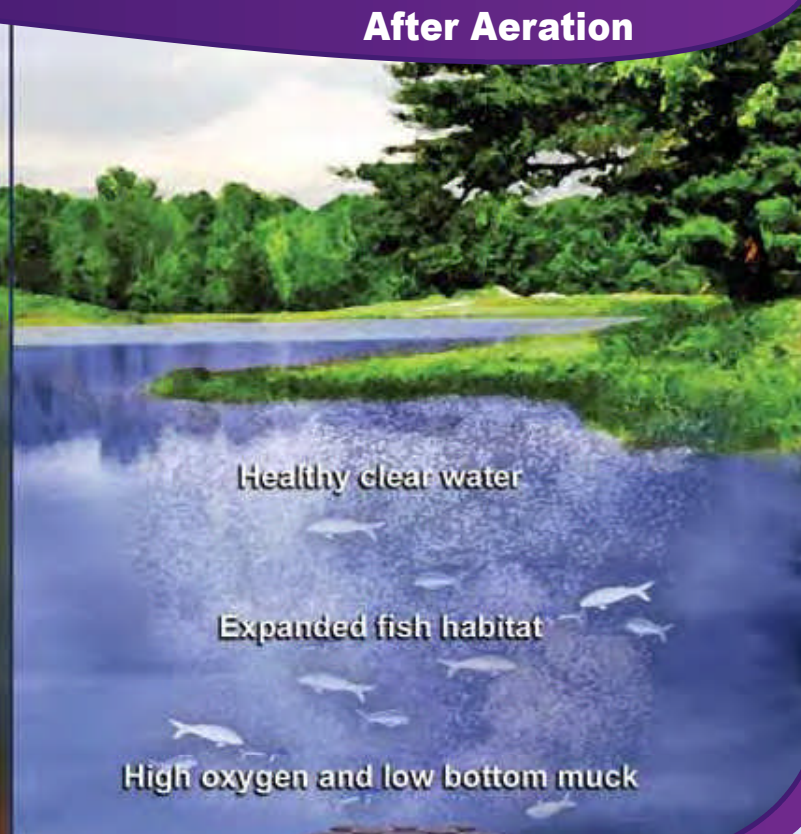


Surface algae, odor and aquatic weeds

Limited fish habitat and fish kills

No oxygen: Toxic gases and muck accumulate

## Before Aeration



Healthy clear water

Expanded fish habitat

High oxygen and low bottom muck

## Restore Lakes Naturally

Lakes that are 'stratified' inhibit levels of beneficial bacteria and their breakdown of organics. As bottom muck accumulation increases and excessive nutrients are readily available for plant/algae growth, conditions become favorable for the production of noxious gases.

Vertex's advanced diffuser design creates bubbles as small as 500 microns in diameter that form an ultra-wide column of upward moving water, "turning the lake over" and allowing oxygen to be absorbed at the lake's surface.

Vertex diffusers continuously lift bottom water to the surface where poisonous gases are expelled and oxygen is absorbed. Stratification and all its resulting problems are eliminated. Colonies of beneficial bacteria once again flourish along the bottom while nutrient levels decline and water clarity increases. Oxygen related fish-kills are eliminated and sport fisheries are improved and fish can expand their territory into the formerly oxygen-deprived portions of the lake.

*I've had Vertex aeration systems in three of my lakes for quite a while now, and I've never seen anything that does a better job. Vertex systems provide a beneficial and cost effective method of improving both the water quality of a lake and its overall health.*

*I've also found them to be virtually trouble free, so without question, I highly recommend them!*

*Bill Dance*



# Research and Development

## 15 Years of Aeration Leadership



Vertex introduced the lake aeration industry's first CoActive MicronBubble™ membrane disk technology in 1998. Since then, our rugged aeration systems have performed reliably under the worst natural conditions around the globe. From our first venturi style diffuser installations in 1980 to our technology leading AirStations™ of today, Vertex has been continuously pushing the science of bottom aeration technology forward.

- 2010** – **Aeration systems ETL certified**
  - XL8™ AirStation introduced for large lakes
  - LargeLake™ compressor cabinet introduced
  - Compressor sound kits introduced
  - Micro-Lyfe introduced
- 2008** – Vertex Flow Control technology introduced
  - XL5™ AirStation introduced
- 2007** – First integration of aerial mapping graphics
- 2006** – First 2-year compressor warranty
  - First redundant cabinet cooling system
  - Membrane<sup>3</sup> technology introduced
- 2005** – First use of SafeStart™ compressor technology
- 2003** – Advanced unitary piston rod technology replaces rotary vane compressors
  - XL4™ AirStation introduced
- 2001** – First to publish independent testing results for diffuser lifting efficiency
  - Introduction of a data based aeration sizing program for precision equipment specifications
- 1999** – First use of CoActive membrane diffusers
- 1998** – First with a 5-year AirStation™ warranty
  - First with a 15-year airline tubing warranty
  - First with MicronBubble™ technology
- 1996** – First rust-free powdercoated aluminum compressor housing
  - Integrated GFI circuitry becomes standard for all 115 volt compressor cabinets

“Three years ago, it became evident to me that I was going to need to invest in a real aeration system. We were raising large quantities of fish and had begun to notice that the dissolved oxygen readings were getting critically low. Our once beautiful clear pond was beginning to turn green from frequent algae blooms. I consulted the specialists at Vertex Water Features.

### *The end result?*

Within one week the pond began to clarify! Within two weeks I noticed that the fish were feeding aggressively again, and the colorations and overall “look” of the fish was noticeably better.

As promised, the electrical budget stayed well within expectations. Vertex Water Features estimation of electrical costs was within one dollar of the actual result. Over the last two years, we've grown hundreds of pounds of extra fish, and we're extremely happy with the great fishing that we're experiencing for bluegill and bass.

### *Was the investment worth it?*

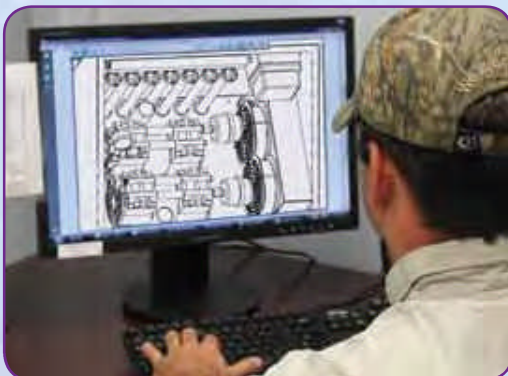
The Vertex Aeration System was an extremely good investment. It has run flawlessly without need for repairs - only simple maintenance at the end of the year. I haven't had any more stressed or dying fish, and the diffuser pads haven't needed cleaning a single time! I would do it again in a heartbeat!

Thanks again to all of the professionals at Vertex Water Features for the great advice and superior system. I'm extremely satisfied.”



**Bruce Condello**  
President/Co-creator  
of *Big Bluegill*.

Field Advisory Staff  
and website Moderator  
of *PondBoss* magazine.



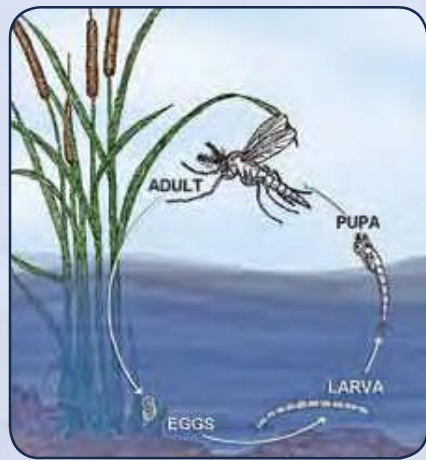
## Get the **VERTEX** Advantage

# The Case For...

## Aquatic Midge Fly Swarming Controlled with Vertex Aeration

**90% reduction in just 16 months without pesticides**

Hibbs Grove located in Cooper City, Florida was experiencing an ongoing outbreak of swarming non-biting midge flies (Order: Diptera, Family: Chironomidae) from their 6.5 acre lake preventing residents from enjoying their lakefront property. Sampling indicated an extreme infestation of midge larvae averaging 6,794 larvae/m<sup>2</sup>, more than six times the recognized 1,000/m<sup>2</sup> nuisance level.



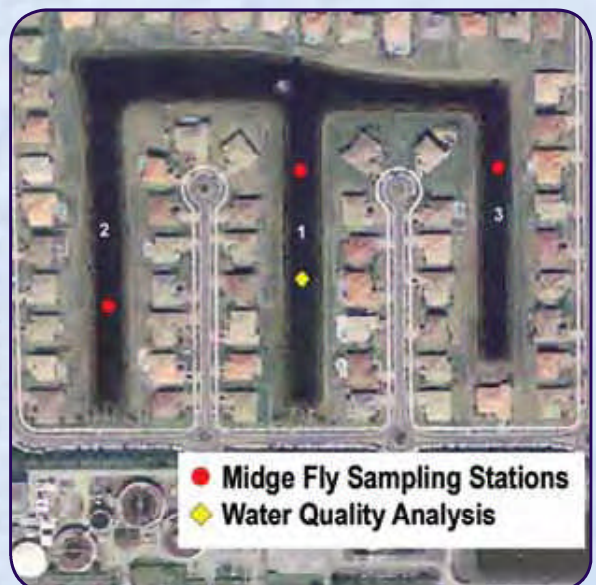
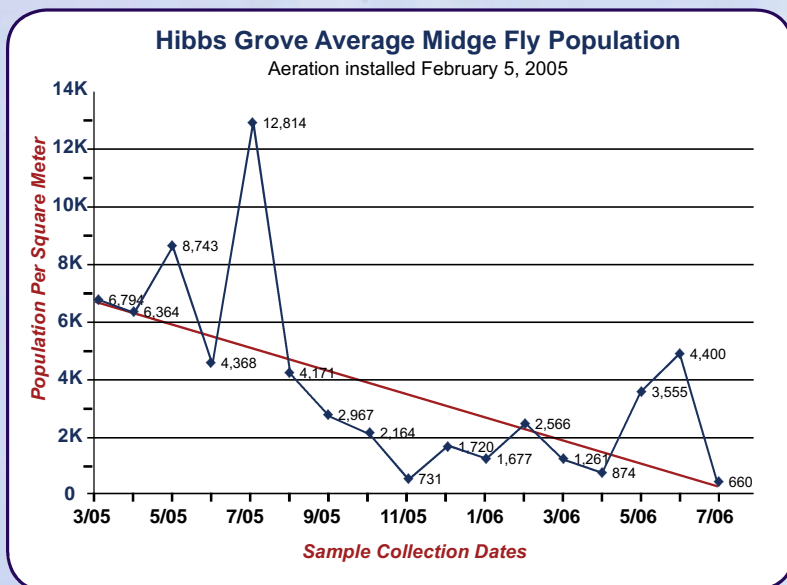
Hibbs Grove turned to the biologists at Vertex Water Features for an environmentally safe solution. Vertex installed a CoActive Air 5 aeration system that provided compressed air to five XL2™ CoActive AirStations placed at the deepest points throughout the lake, effectively circulating the entire water column 0.76 times per day.



### THE RESULTS

Oxygen levels increased immediately and accumulated organic muck on the bottom began to decompose thereby eliminating the habitat and food source that the midge larvae depended on. The improving water quality allowed predators of the midge fly, such as bluegill and aquatic insects to prey on the midges. The resulting increased predation, decreased nutrients and habitat competition contributed to a significant decrease in midge fly numbers.

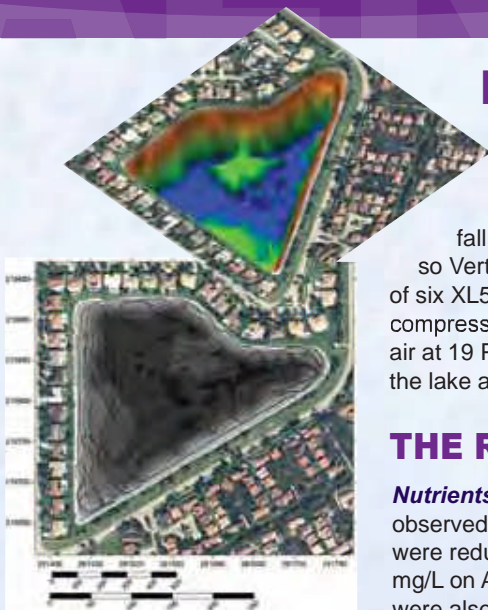
Within 16 months of the Vertex system installation, the midge fly larvae population had been reduced by 90 percent, from 6,794 larvae/m<sup>2</sup> to just 660 larvae/m<sup>2</sup>. Throughout the 16 months, there had been a visible increase in fish, dragonflies and water beetles all of which are natural predators of the midge fly larvae. With continued aeration, the oxygen levels have remained elevated and continue to oxidize bottom muck and suppress the midge fly population.



For more detailed case studies go to: [www.vertexwaterfeatures.com/pond\\_aerators\\_study.php](http://www.vertexwaterfeatures.com/pond_aerators_study.php)

# Vertex Aeration

## Phosphate and Ammonia Reduction



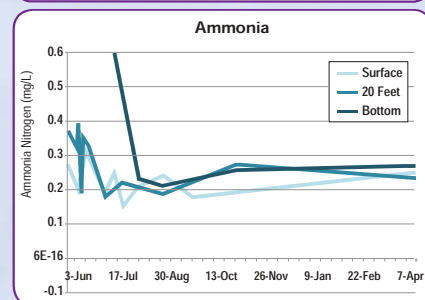
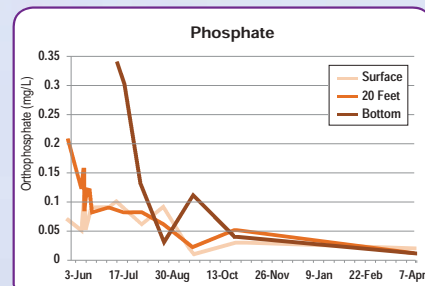
Winston Park is a residential community in Coconut Creek, Florida. Winston Park Lake is 12.7 acres (5 hectares) and has a maximum depth of 32' with an average depth of 19.5'. The lake experienced massive fish kills every fall due to a reduction in oxygen during fall turnover, so Vertex installed an aeration system consisting of six XL5™ AirStations powered by 3 Brookwood™ compressors totaling 2.25 hp; which produced 14 CFM of air at 19 PSI. This system is sized to turn the water over in the lake at a rate of 0.8 turnovers per day.

### THE RESULTS

**Nutrients:** The highest orthophosphate levels were observed at the sediment-water interface. These levels were reduced from 0.34 mg/L on July 15, 2009 to 0.01 mg/L on April 7, 2010, a 97% decline. Ammonia levels were also highest in the bottom waters, and were reduced 55% from 0.60 mg/L in July to 0.27 in April. Biological

oxygen demand (BOD) improved steadily, decreasing to the background detection limit (2 mg/L) by October 23, 2009. This represents a 60% decline in BOD.

**Oxygen transfer:** On the morning of June 24, the day after the aerators were turned on full-time, oxygen concentrations averaged only 0.7 mg/L (225 kg of oxygen in the entire lake), with surface values topping out at only 1.75 mg/L. Near complete destratification of temperature was achieved by July 8, after 2 weeks of running the aerators fulltime.



## Improved Oxygen, Water Clarity and Nutrient Levels



Heron Cay, a high-end gated residential development, was experiencing a number of problems in their 21-acre lake which is central to the community.

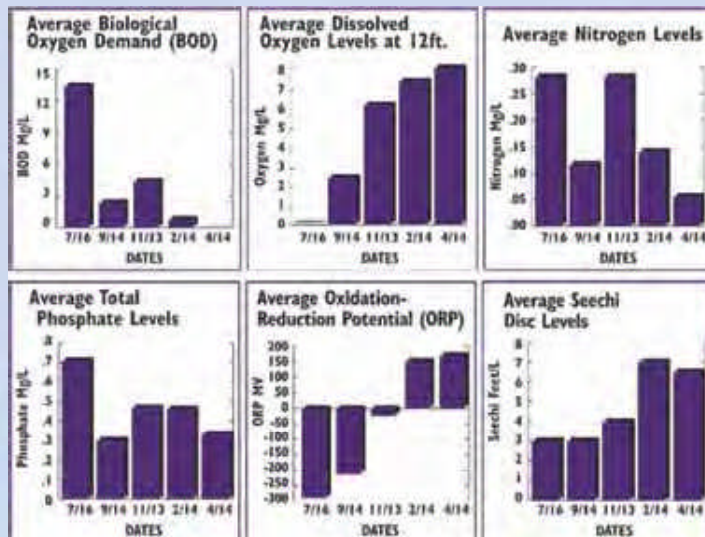
With maximum water depths over 20', stratification caused a lake with severely low oxygen levels at the bottom. Having no beneficial bacteria to break down organics, heavy muck accumulation and foul odors from hydrogen sulfide gases were present. The lake was consuming what little available oxygen there was faster than it could be replenished, and excessive nutrient levels from fertilizer runoff only made conditions worse. The lake's Biochemical Oxygen Demand (BOD) was extremely high.

### THE RESULTS

After the design and installation of a Vertex aeration system consisting of 11 diffuser stations being fed by compressors totaling only 2-1/4 horsepower, Heron Cay was set up on a monitoring schedule to determine how lake dynamics were being affected. The results over the 4 month monitoring period were dramatic. Within days of initial start-up, the systems six main objectives were beginning to be realized:

- The breakdown of temperature and oxygen stratification
- Increased oxygen levels occurred throughout the entire water column
- Decreased Biochemical Oxygen Demand (BOD) to below detection levels
- Water clarity increased by 100%, from 3' to 6'
- Excessive nutrient levels decreased; nitrogen down 80%, phosphorus down 59%

Heron Cay's lakes are returning to natural, healthy conditions.



# Membrane<sup>3</sup> Diffusers

## XL2SW™ AirStation



## XL2™ AirStation



## XL4™ AirStation



## XL5™ AirStation



## XL8™ AirStation



Since introducing our third generation Membrane<sup>3</sup> technology in 2006 Vertex Water Features has sold more than 30,000 diffuser disks without a single reported clogged or blown-out membrane. Vertex stands behind its diffuser technology with our famous 5-year "No Questions Asked" warranty. Not a 2-year warranty, or a pro-rated warranty, but a 100% replacement warranty including shipping costs.

## The Vertex Diffuser Advantage

- ◆ **NEW!** More energy efficient die cut perforations
- ◆ **NEW!** "Delta" surface pattern increases active surface area and aeration efficiency during low and moderate air flows
- ◆ **NEW!** Reformulated proprietary membrane compound increases flexibility, wear, and clog resistance
- ◆ **NEW!** Larger, stronger diffuser ring improves membrane retention and service life
- ◆ **NEW!** Redesigned and strengthened diffuser body and membrane backing plate
- ◆ **NEW!** StableTrak™ technology increases lift velocity
- ◆ **NEW!** FlowControl™ technology equalizes airflow to each disk
- ◆ **NEW!** Base unit has a hollow chamber design for adding inert pea gravel ballast
- ◆ **NEW!** Lipped base design prevents diffuser from settling into soft sediments

*"Our lake maintenance costs have dropped by 60% and the overall health and appearance of these lakes has improved significantly..."*

John Williams  
Maintenance & Resident, Lakewood Hills

Vertex Diffuser Models Categorized by Lifting Rate GPM (Gallons Per Minute) and Water Depth  
Air flow = 1.0 CFM (Cubic Feet Per Minute) per disk



Lifting rate data represents total water flow as recorded in both independent testing and real world data collected by Vertex from installed aeration systems. Lifting rate varies significantly by air flow, water depth and other factors.

\* XL8 lifting rate extrapolated from field collected XL5 data.

# Cabinets & Compressors



## QuietAir™ Cabinet

- ◆ SafeStart™ technology for full pressure restarts
- ◆ Powder coated aluminum for a more durable, attractive finish
- ◆ All QA2 – QA4 Cabinets have redundant cooling systems with ventilation grill and high capacity fans
- ◆ Easy access design with lock and key
- ◆ Easy plug-in connection to waterside electrical service
- ◆ Heavy duty, light-weight mounting pad included
- ◆ QA4 has Integrated cabinet muffler for quieter operation
- ◆ Available as VBS – remote valve box (sold separately)

## Sound Kit

Vertex has developed a Sound Kit for those times when the cabinet must be placed in areas closest to buildings and outdoor recreation areas.

*For each 10 decibel drop, humans perceive the sound to drop by half*

All new cabinets can be shipped with or without the Sound Kit to suit the needs of the customer and the restrictions of the site. Let us help you to design a system that meets all requirements



## Bottomline™ Tubing

- ◆ Use with standard PVC solvent weld cement
- ◆ High wall thickness for long term durability
- ◆ Remains flexible in cold temperatures
- ◆ Over-sized for high flow
- ◆ Self-weighted for easy installation
- ◆ Available in 100' & 500' increments
- ◆ Available in 3/8" to 1" inside diameter

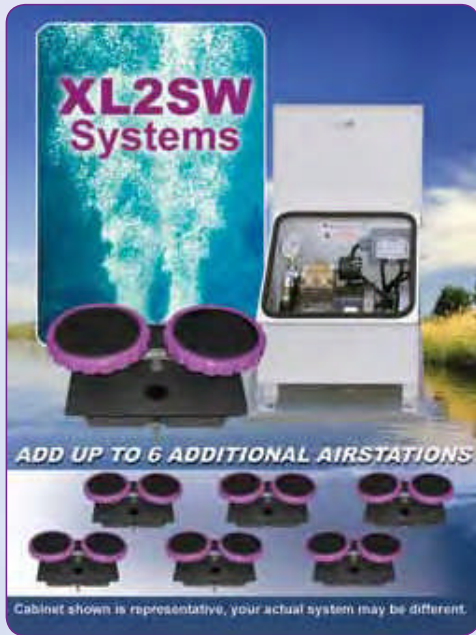


## Brookwood™ Compressor

- ◆ Highest flow rate of any compressor in its class
- ◆ Available in 115V 60 Hz or 220V – 240V, 50/60 Hz
- ◆ Oil-free – requires no lubrication
- ◆ 2 – 4 times the duty cycle of other compressors
- ◆ Thermal overload protection
- ◆ Superior piston design provides higher pressure, quieter operation and longer life than vane compressors

# CoActive Aeration Systems

with SafeStart Technology



## XL2SW™ Shallow Water Systems

For depths between 4' and 8'



SYSTEM NAME	TOTAL AIRSTATIONS	QUIETAIR™ CABINET	TOTAL COMPRESSORS	TOTAL HP	CFM	MAX PSI	ETL
AIR 1	1	Small QA1	1	1/3	2,5	35	✓
AIR 1+	2	Small QA1	1	1/3	2,5	35	✓
AIR 2	2	Medium QA2	1	1/2	4,3	35	✓
AIR 3	3	Medium QA2	1	1/2	4,3	35	✓
AIR 4	4	Large QA3	2	1	8,6	35	✓
AIR 5	5	Large QA3	2	1	8,6	35	✓
AIR 6	6	Large QA3	2	1	8,6	35	✓
HF 2	2	Medium QA2	1	3/4	5,6	25	✓
HF 3	3	Medium QA2	1	3/4	5,6	25	✓
HF 3+	4	Medium QA2	1	3/4	5,6	25	✓
HF 4	4	Large QA3	2	1 1/2	11,2	25	✓
HF 5	5	Large QA3	2	1 1/2	11,2	25	✓
HF 6	6	Large QA3	2	1 1/2	11,2	25	✓
HF 7	7	Large QA3	2	1 1/2	11,2	25	✓

*"We had lost everything summer before last. We installed a Vertex aeration system and made it through a terrible hot summer without one dead fish. We are very pleased."*

John Autry  
Texas Pond Owner

Install all electrical equipment in accordance with the National Electrical Code and all local codes.

## Remote Valve Box Systems

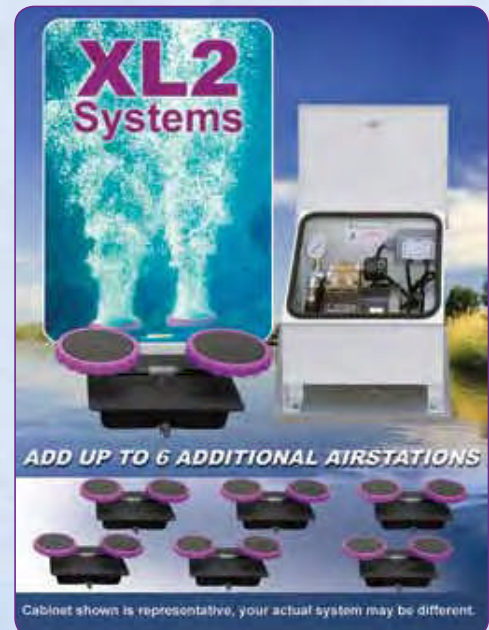
No power near the pond? No problem. Vertex's line of Remote Valve Box Systems allows installation of the cabinet wherever it is convenient. Simply locate the system cabinet where you do have power and deliver the air as far as needed through 1" PVC pipe. At the shoreline of the pond simply install a Vertex Remote Valve Box to divide the air into separate airlines.

## XL2™ Systems

For depths between 9' and 20'

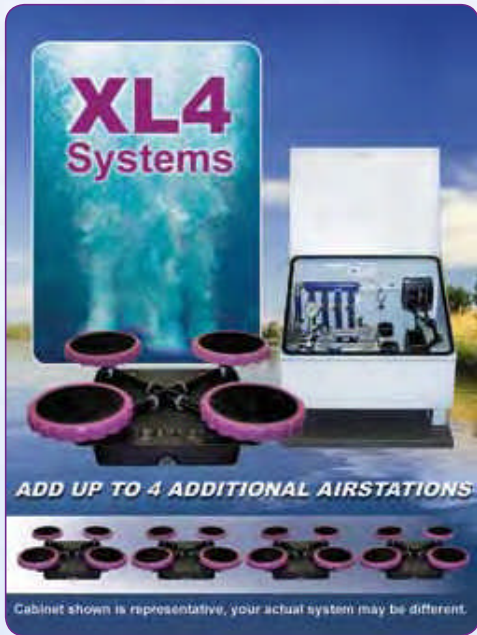


SYSTEM NAME	TOTAL AIRSTATIONS	QUIETAIR™ CABINET	TOTAL COMPRESSORS	TOTAL HP	CFM	MAX PSI	ETL
AIR 1	1	Small QA1	1	1/3	2,5	35	✓
AIR 1+	2	Small QA1	1	1/3	2,5	35	✓
AIR 2	2	Medium QA2	1	1/2	4,3	35	✓
AIR 3	3	Medium QA2	1	1/2	4,3	35	✓
AIR 4	4	Large QA3	2	1	8,6	35	✓
AIR 5	5	Large QA3	2	1	8,6	35	✓
AIR 6	6	Large QA3	2	1	8,6	30	✓
HF 2	2	Medium QA2	1	3/4	5,6	25	✓
HF 3	3	Medium QA2	1	3/4	5,6	25	✓
HF 3+	4	Medium QA2	1	3/4	5,6	25	✓
HF 4	4	Large QA3	2	1 1/2	11,2	25	✓
HF 5	5	Large QA3	2	1 1/2	11,2	25	✓
HF 6	6	Large QA3	2	1 1/2	11,2	25	✓
HF 7	7	Large QA3	2	1 1/2	11,2	25	✓



# CoActive Aeration Systems

with SafeStart Technology



## XL4™ Systems

For depths 16' and deeper



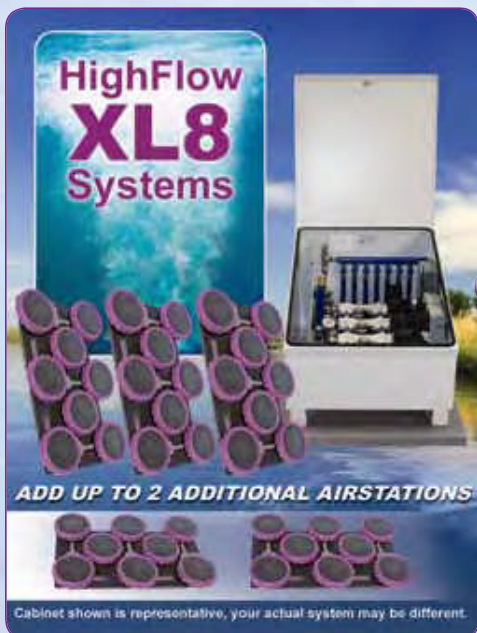
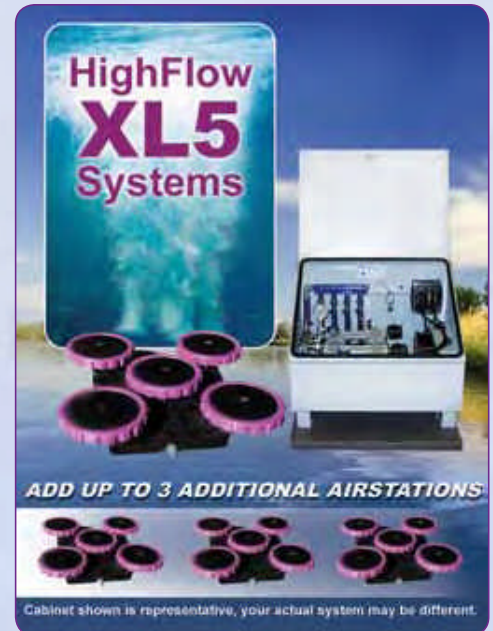
SYSTEM NAME	TOTAL AIRSTATIONS	QUIETAIR™ CABINET	TOTAL COMPRESSORS	TOTAL HP	CFM	MAX PSI	ETL
AIR 1XL	1	Small QA1	1	1/3	2.5	35	✓
AIR 2XL	2	Medium QA2	1	1/2	4.3	35	✓
AIR 3XL	3	Large QA3	2	1	8.6	35	✓
AIR 4XL	4	Large QA3	2	1	8.6	35	✓
HF 1XL	1	Medium QA2	1	3/4	5.6	25	✓
HF 2XL	2	Medium QA2	1	3/4	5.6	25	✓
HF 3XL	3	Large QA3	2	1 1/2	11.2	25	✓
HF 4XL	4	Large QA3	2	1 1/2	11.2	25	✓
HF 5XL	5	Large QA3	2	1 1/2	11.2	25	✓

## XL5™ Systems

For depths 8' and deeper



SYSTEM NAME	TOTAL AIRSTATIONS	QUIETAIR™ CABINET	TOTAL COMPRESSORS	TOTAL HP	CFM	MAX PSI	ETL
HF AIR 1XL5	1	Medium QA2	1	3/4	5.6	25	✓
HF AIR 2XL5	2	Medium QA2	1	3/4	5.6	25	✓
HF AIR 3XL5	3	Large QA3	2	1 1/2	11.2	25	✓
HF AIR 4XL5	4	Large QA3	2	1 1/2	11.2	25	✓



220V -240V systems require the purchaser to provide GFCI protection on their electrical supply circuit.

*"The decision to become a Vertex Water Features dealer was one of the easier decisions that I have made. Their quality, customer service, attention to detail and reputation are second to none."*

Mark Litwiler  
PondRX

## XL8™ Systems

For depths 8' and deeper

SYSTEM NAME	TOTAL AIRSTATIONS	QUIETAIR™ CABINET	TOTAL COMPRESSORS	TOTAL HP	CFM	MAX PSI
HF AIR 3XL8	3	Large Lake QA4	4	3	22.4	25
HF AIR 4XL8	4	Large Lake QA4	4	3	22.4	25
HF AIR 5XL8	5	Large Lake QA4	4	3	22.4	25