



**SUNFLO<sup>2</sup>**®

By Liquidtek

[sunflo2.com](http://sunflo2.com)

**4**

**Where does the circulation come from?**

**3**

**How does circulation help my pond?**

**2**

**Where does the oxygen come from?**

**1**

**So why does a pond need oxygen?**





# Paul Smart

Technology Guy, Sunflo2

1

Oxygen is necessary for aerobic and facultative bacteria to convert soluble and semi-soluble Biological Oxygen Demand-BOD into inert matter.

2

**The oxygen is already there.** Oxygen is supplied by photosynthesis (algae) and surface absorption at the air/water interface.

Natural circulation is unpredictable and insufficient,

3

Bacteria (bugs) can't move on their own, therefore they need to be relocated to be in immediate contact with the nutrients and oxygen.

4

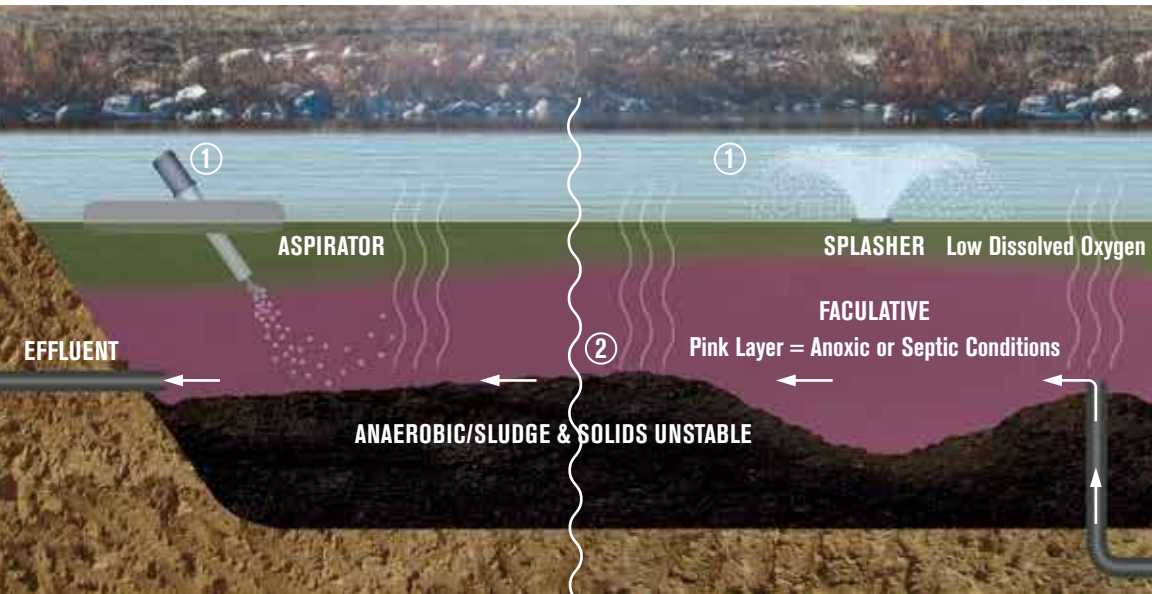
Originally, pond circulation was based on sunshine, wind and wave action. Natural circulation is unpredictable and insufficient, often leading to the addition of turbulent electric aeration.

***Sunflo2 combines knowledge of biology, chemistry, and physics with solar energy to provide cost effective circulation. In addition, proprietary software with integrated cellular technology provides real time water quality monitoring and reporting of equipment performance.***





# Common Pond Problems

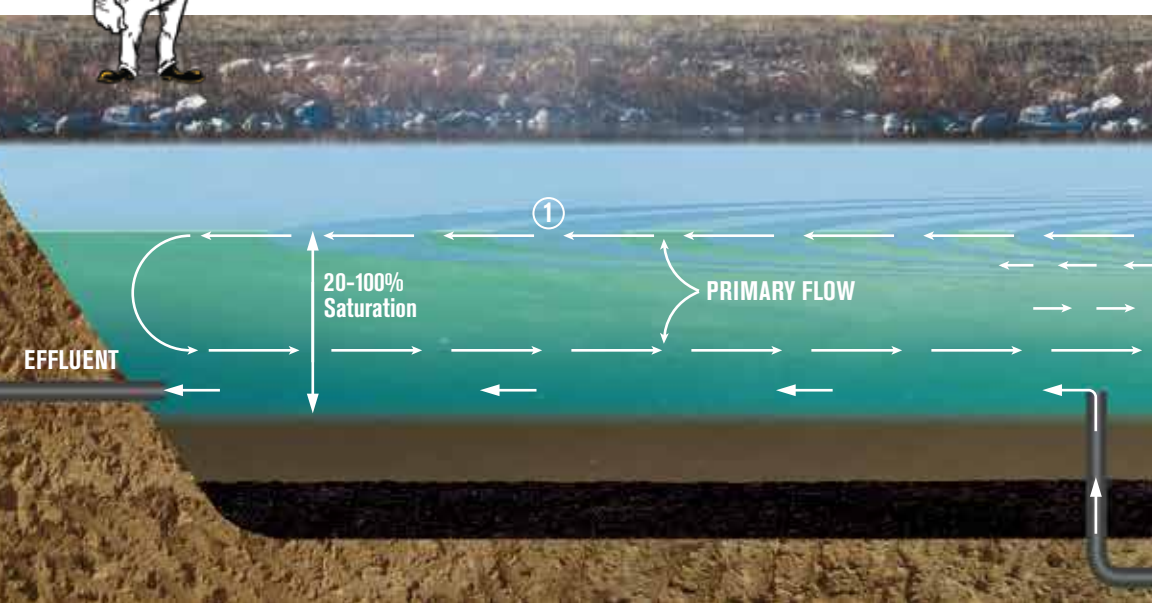


- ① • Turbulent mixing can scour or create sludge mounds.
- ① • Most aeration methods are costly to operate and maintain.

- ② • Short circuiting limits processing.
- ① • Turbulence inhibits poor solids settling followed by rising sludge.

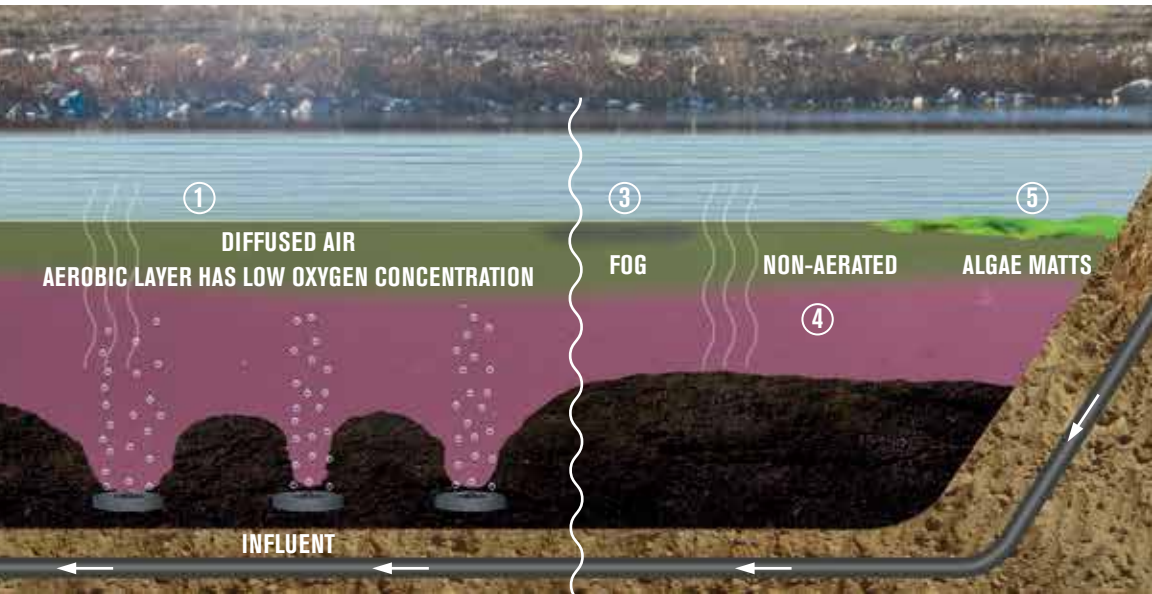


## Sunflo<sup>2</sup> Technology

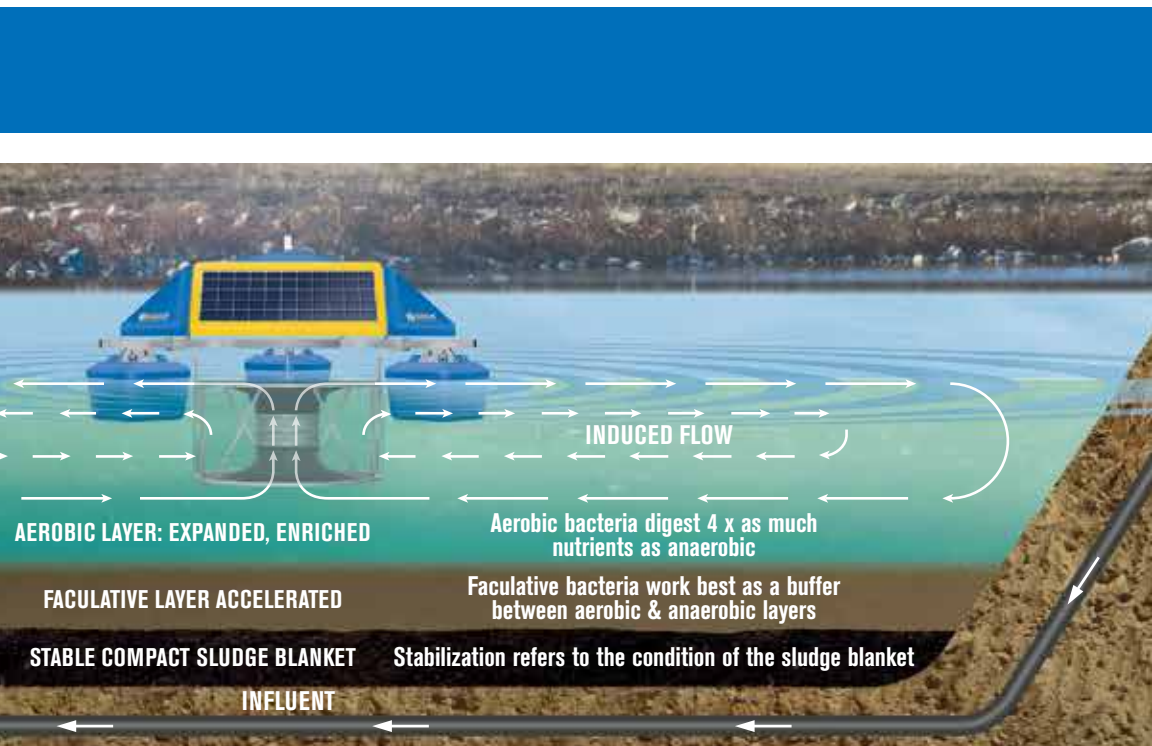


- Odor control occurs as dissolved oxygen increases in upper half of pond.
- ① • Non-turbulent circulation distributes the load uniformly.

- Oxygen rich aerobic layer accelerates aerobic bacteria
- Accelerated aerobic digestion reduces algae and improves clarity as nutrients become limited.



- ③ • FOG (Fats, Oils, Grease) float and limit wind/wave action.
- ④ • Gases/odors escape unabated when the oxygen layer is too thin.
- ⑤ • Algae mats and blooms are caused by excess nutrients.
- ④ • Inconsistent and unreliable BOD removal.



- Short circuiting is minimized or eliminated.
- Continual **SURFACE RENEWAL** increases oxygen absorption.
- FOG is dispersed into the water column and digested.
- Solar circulation method reduces energy costs.



# SHALLOW-FLO™

*Uses solar power and Sunflo2 Technology to provide re-oxygenation through surface renewal, water quality information and performance data in ponds of limited depth. (4'- 10' or 1.5m-3m).*



## Benefits:

- Continuous recirculation of the top half of the pond.
- Non-turbulent laminar circulation increases MCRT (Mean Cell Residence Time).
- Real time water quality monitoring and documentation.

## Applications:

- Primary, secondary, tertiary and storage ponds.
- Storm water ponds.
- Evaporation or cooling water ponds.
- Shallow lakes or reservoirs.





# DEEP-FLO™

*Uses solar power and Sunflo2 Technology to de-stratify bodies of water over 10'(3m) of depth, while providing desired circulation, water quality information and performance data.*



## Benefits:

- De-stratification of lakes, ponds or reservoirs using three intake depth settings.
- Non-turbulent horizontal and vertical circulation.
- Dissolved oxygen and temperature probe at each intake level.

## Applications:

- Lakes and reservoirs.
- Drinking water reservoirs.
- Evaporation or cooling water ponds.
- Agricultural processing ponds.
- Industrial storage ponds.



# RECYCLE-FLO™

*Cost effective, solar powered, floating transfer pump powers a fountain or discharge to another area/pond.*



## Benefits:

- Relocating water from one pond to another or from one area to another.
- Discharge options include land application or fountains.
- Operates sun up to sun down.

## Applications:

- Storm water/storage ponds.
- Evaporation ponds.
- Decorative ponds.
- Irrigation.





# FLOATING SENSOR PLATFORM

*Self-contained, portable water quality sensors measuring and reporting treatment system conditions in real time.*



## Benefits:

- Replaces traditional water sampling and laboratory expense.
- Portable method of measuring water quality at pond influent and/or effluent locations.
- Real time water quality monitoring & documentation.

## Applications:

At influent location to provide an indicator of water quality that needs treatment.

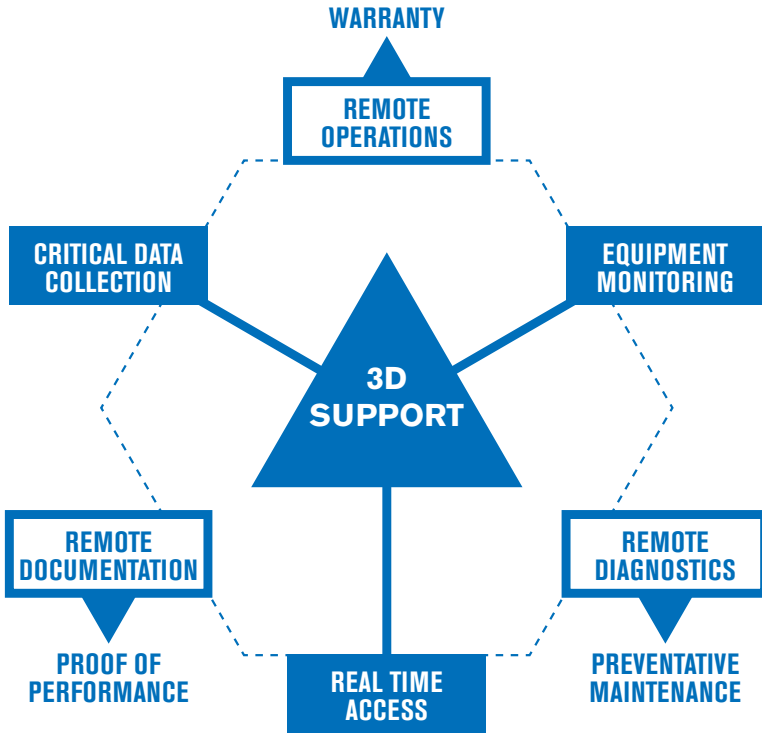
At effluent location to provide an indicator of water quality leaving the pond.



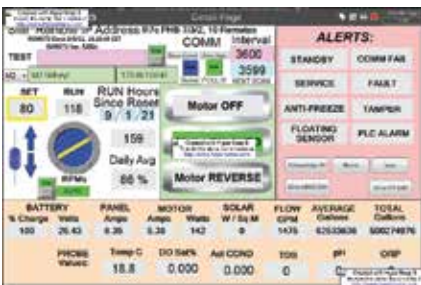
# 3D SUPPORT SYSTEM

## 3D Support provides:

1. The engineer and operator with “visibility and knowledge” regarding what is happening biologically in the pond and how the equipment is performing.
2. The manufacturer and operator with real time observation and crucial documentation so that operators are not on their own as they strive to meet the community needs and maintain regulatory compliance.
3. Cellular link for real time data on an hourly basis will document anomalies, trends and maintenance considerations.



## VT SCADA CONTROLS



## CUSTOM REPORTS

The screenshot shows a data table with multiple columns and rows, representing a custom report generated from the SCADA system. The table contains numerical and text data, likely representing system performance metrics over time.



# BENEFITS



## Benefits to SUNFLO<sup>2</sup> Products

**Real time knowledge of what's happening in your pond.**

**Predictable results based on *sound scientific evidence.***

**Reduced operational expenses**

**Provides baseline data that identifies anomalies, trends and maintenance considerations.**

**Easy online access to equipment performance.**

**No service contracts.**

**Proof of performance.**

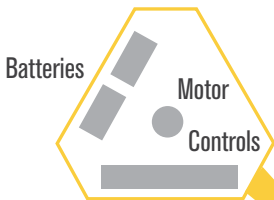
**A healthy pond.**



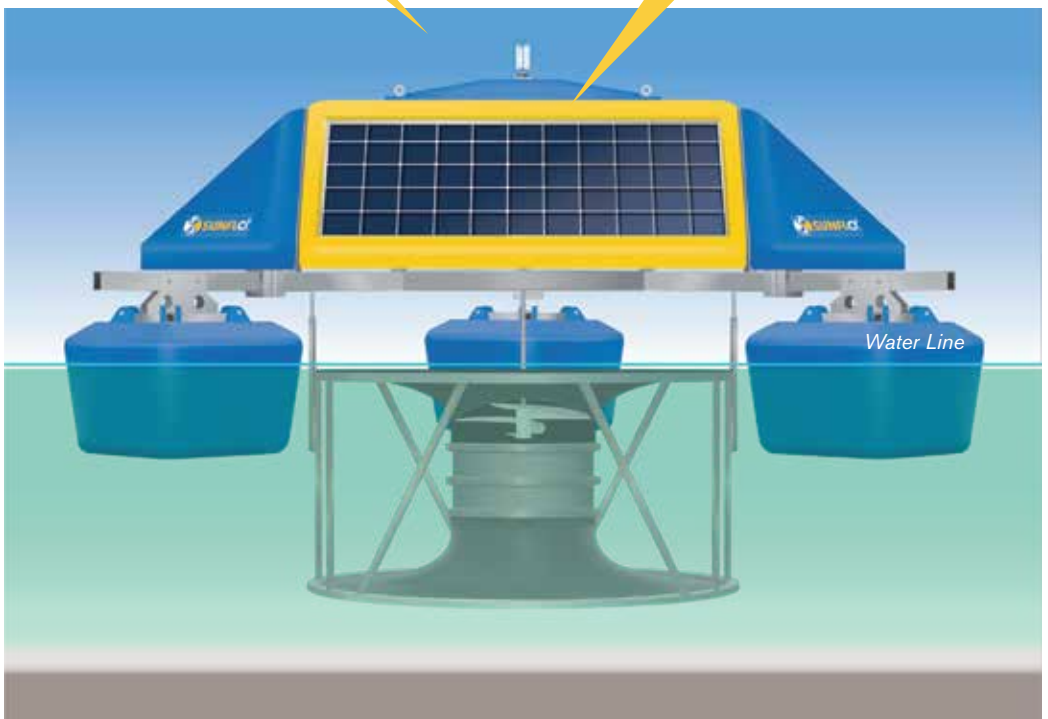
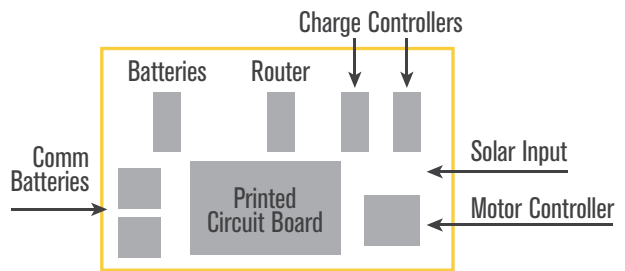
## ABOVE THE SURFACE

- 570 watts of solar panels
- Two 100 Amp-hour deep cycle batteries
- Brushless 24V DC motor
- Roto molded "Turtle Dome" and foam-filled floats
- Smart control system
- Operating beacon, bird deterrent, lifting lugs, solar pyranometer
- Stainless steel frame

FRAME-TOP VIEW



CONTROL PANEL-FRONT VIEW



## BELOW THE SURFACE

- Roto molded intake, throat, and distribution dish with support frame.
- Patented 24" diameter injection molded, glass filled nylon impeller passes 4" solids.
- Stainless steel shaft with centering hub, freeze sleeve, trash gate.





## COMMON Q & A's

### **Why do we use solar and what happens if the sun doesn't shine?**

*Unlike wind, solar is predictable and occurs every day (you can easily sunburn on a cloudy day). The units are designed with sufficient panels to operate during cloudy/overcast days.*

### **How much oxygen does one unit provide?**

*It depends on your pond's loading, flow and surface area. Typically, one unit will add five times what mother nature provides or on average, 10 lbs of oxygen per acre per hour (240lbs/ac/day).*

### **What angle are the panels set at?**

*37 degrees on all units except 45 degrees on FSP (Floating Sensor Platform).*

### **How are units anchored?**

*Shore to shore with stainless cable or with a ball/chain on large ponds/lakes.*

### **How many units do I need and where?**

*This largely depends on the size of pond, the loading conditions, retention time, prior history and future treatment objectives.*

### **How much energy can I save?**

*Up to 30 Horsepower per unit dependent on factors including what type of aerators you may be using currently.*

### **Why the triangular floats and 3 sided design?**

*A three sided design assures that at least one panel is facing the sun despite anchoring variables. Floats are tapered to minimize flow obstruction and to prevent damage when ice is present.*

### **Are there any payment options?**

*There are several payment options such as rent/lease/energy buy-back or just plain cash.*

### **How are units shipped and what is delivery time?**

*Via factory trailer or common carrier in 30-60 days.*



# INSTALLATIONS



## GRIDLEY, CA

Installed to reduce and redistribute sludge in the effluent and increase dissolved oxygen in waste being transferred from turbulent aeration in the primary pond. Initial response has been favorable, documenting an increase in dissolved oxygen from 0.2 ppm to 1.5-2.0 ppm in first 48 hours.



## WICHITA, KS

Two fountains placed in adjoining ponds, powered by one solar powered unit. Fountains have increased evaporation and appearance to minimize complaints by nearby home-owners and reduce the need to discharge.



## SIDNEY, MT

Sidney, MT has four Deep-Flo units in a three acre by 15' deep pond with 5-7 days retention. Waste is 30-50,000 mg/l of BOD from sugarbeet processing waste. This lagoon is in essence an anaerobic digester without a cover. Sunflo2 units have documented uniform temperatures top to bottom (no stratification). A Sunflo2 Floating Sensor Platform Model was recently added to document pH and ORP values to provide the operator information on an hourly basis for flow or chemical adjustment.



# INSTALLATIONS



## CERRALVO, NUEVO LEON

Installation in a non-aerated and organically over loaded pond (250 lbs BOD/ac/day). A multi-probe meter monitors dissolved-oxygen, pH, temperature and several nutrient values in real time. Nuevo Leon university is taking influent and effluent samples weekly to document performance.



## WILTON, ND

This unit is in a private lake and equipped with cellular communication system. Unit experienced  $-40^{\circ}$  F air temp and  $-85^{\circ}$  F wind chill while still maintaining operation in a lake with 30" of ice cover.



## WASHBURN, ND

The City of Washburn, ND is loaded at 25 lbs of BOD/acre/day and has 188 days of retention which are at or near design limits for a community of 1300 residents in this northern climate. In the past, the city has had significant odor events and is expecting significant population growth in the next 3-5 years due to a new industry (carbon capture facility). They installed one Sunflo2 solar circulator with Sunflo2 technology to identify future treatment capacity based upon reduced odors and improvements in dissolved oxygen.



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