actually encourage clogging, resulting in decreased water flow which strains the motor on the pond's circulation pump triggering a fail-safe shutdown of the pump or causing damage to the pump. In the case of a pre-filter rupture, the debris can quickly rush into the intake of the pump and completely compromise its operation.

[0004] What is needed is a submerged, low maintenance pre-filter that: (1) will withstand year-round use in an outdoor pond; (2) is of sufficient capacity that it will not easily clog; (3) can be submerged in a pond; (4) captures debris on a filtering surface so that it can be easily accessed by aquatic wildlife or mechanical cleaning methods; (5) can be raised above the bottom of the pond to optimize circulation and allow access to aquatic wildlife; (6) is self-cleaning; (7) may be easily camouflaged without affecting its operation.

Summary of Invention

[0005] The present invention ~~is~~ relates to a pond water circulation pump pre-filter unit (PFU). The PFU is submerged and provides structural support for camouflage, which gives the system a natural aesthetic look and provides a space for fish to hide from non-aquatic predators. The PFU comprises at least two cleaning systems: (1) biological cleaning mechanism; and (2) an internal self-cleaning mechanism. Specifically, the PFU comprises several filtering surfaces that form a repository that collects pond debris and algae on which fish, snails, frogs, and salamanders (larval stage), crayfish, bacteria, etc. (hereafter, aquatic creatures) feed, i.e., the biological cleaning mechanism. These filtering surfaces of the PFU also serve as the protective barrier that prevents large debris from entering the circulation pump yet allow smaller, harmless particles to pass unimpeded. The internal self-cleaning mechanism is a water spray mechanism used to clean the PFU from the inside-out without removing the PFU from the pond, draining the pond or physically accessing the PFU. Together, these features of the PFU improve the quality of

the water in the pond, lower maintenance costs, and extend the life of the pond's water circulation pump.

[0005a] According to a first aspect of the present invention, there is provided a pre-filter unit for a water circulation pump, comprising:

(a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump;

(b) a water supply pipe having a second port for connecting said water supply pipe to a water source;

(c) at least one water supply pipe extension connected to said water supply pipe comprising: (1) a rotating section having nozzles through which water from the water supply pipe exits, (2) a non-rotating section, and (3) a water motor interposed between said rotating section and said non-rotating section;

(d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris;

(e) a biological cleaning mechanism on the outside of said screen cage; and

(f) a frame having a length disposed beneath and elevating said pre-filter unit;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage; wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

[0005b] According to a second aspect of the present invention, there is provided a method for cleaning water to extend the life of a water circulation pump comprising

filtering algae and debris that could clog or damage said circulation pump from the water using a pre-filter unit comprising:

(a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump;

(b) a water supply pipe having a second port for connecting said water supply pipe to a water source;

(c) at least one water supply pipe extension connected to said water supply pipe comprising: (1) a rotating section having nozzles through which water from the water supply pipe exits, (2) a non-rotating section, and (3) a water motor interposed between said rotating section and said non-rotating section;

(d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris;

(e) a biological cleaning mechanism on the outside of said screen cage; and

(f) a frame having a length disposed beneath and elevating said pre-filter unit;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage; wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

[0005c] According to a third aspect of the present invention, there is provided an aquatic filtering system comprising:

(1) water circulation pump;

(2) a water source; and

(3) a pre-filter unit disposed in line ahead of said circulation pump, said pre-filter comprising: (a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump; (b) a water supply pipe having a second port for connecting said water supply pipe to a water source; (c) at least one water supply pipe extension connected to said water supply pipe comprising: (i) a rotating section having nozzles through which water from the water supply pipe exits, (ii) a non-rotating section, and (iii) a water motor interposed between said rotating section and said non-rotating section; (d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris; (e) a biological cleaning mechanism on the outside of said screen cage; and (f) a frame having a length disposed beneath and elevating said pre-filter unit; and

(4) ornamental materials for camouflaging said pre-filter unit and hiding said at least one fish from non-aquatic predators;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage;

wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and

wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

Brief Description of Drawings

[0006] Figure 1 shows an angle view of the PFU with the top filtering surface removed.

[0007] Figure 2 shows a top view of the PFU operating in a pond

[0008] Figure 3 shows a top view of a PFU partially camouflaged in a pond by ornamental rocks and a cutaway view of the PFU below.

[0009] Figure 4 shows an angle view of the PFU with the filtering surfaces in place.

[0010] Figure 5 shows a schematic of the PFU biological cleaning mechanism.

Detailed Description of the Invention

[0011] The present invention ~~is~~ provides a water circulation pump pre-filter unit (PFU) supported by a frame having legs for placement of the PFU inside and at the bottom of a pond. The frame supports the filtering surfaces elevated above the bottom of the pond making them easily accessible to fish in the pond, increasing the total available surface area of the filtering surfaces

What claimed is:

1. A pre-filter unit for a water circulation pump, comprising:

(a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump;

(b) a water supply pipe having a second port for connecting said water supply pipe to a water source;

(c) at least one water supply pipe extension connected to said water supply pipe comprising: (1) a rotating section having nozzles through which water from the water supply pipe exits, (2) a non-rotating section, and (3) a water motor interposed between said rotating section and said non-rotating section;

(d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris;

(e) a biological cleaning mechanism on the outside of said screen cage; and

(f) a frame having a length disposed beneath and elevating said pre-filter unit;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage; wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

2. The pre-filter of claim 1, further comprising: a second water supply pipe extension positioned on one side of said pump intake pipe, said second water supply pipe extension comprising a rotating section, a non-rotating section, and a water motor interposed between the rotating section and the non-rotating section.

3. The pre-filter of claim 1, wherein said filtering surfaces have a total surface area that is greater than the area of said pump intake pipe aperture.

4. The pre-filter of claim 3, wherein said filtering surfaces are pleated.

5. The pre-filter of claim 3, wherein said filtering surfaces comprise a plurality of filtering layers.

6. The pre-filter of claim 5, further wherein said filtering layers are a mesh material.

7. The pre-filter of claim 1, wherein said frame comprises leg supports for elevating the screen cage above the bottom of a pond.

8. The pre-filter of claim 7, wherein said frame further comprises materials for camouflaging said pre-filter.

9. The pre-filter of claim 7, wherein said leg supports are adjustable.

10. The pre-filter of claim 7, wherein said frame further comprises materials for hiding said at least one fish from non-aquatic predators.

11. The pre-filter of claim 1, wherein the circulation pump holds algae and debris against the outside surface of the screen cage by suction.

12. The pre-filter of claim 1, wherein said mechanical self-cleaning mechanism provides a source of water for a pond.

13. The pre-filter of claim 1, wherein the screen cage has the shape of a cylinder, sphere, pyramid, cone, prism, or other polyhedron.

14. The pre-filter of claim 1, wherein the temperature of the pond is controlled to optimize break down of algae and debris by the biological cleaning mechanism.

15. The pre-filter of claim 1, wherein the device is used in an aquatic habitat other than a pond.

16. The pre-filter of claim 1, wherein the circulation pump is inside the screen cage.

17. The pre-filter of claim 1, wherein the first port and the second port traverse the frame.

18. The pre-filter of claim 1, wherein the first port and the second port traverse the screen cage.

19. A method for cleaning water to extend the life of a water circulation pump comprising filtering algae and debris that could clog or damage said circulation pump from the water using a pre-filter unit comprising:

(a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump;

(b) a water supply pipe having a second port for connecting said water supply pipe to a water source;

(c) at least one water supply pipe extension connected to said water supply pipe comprising: (1) a rotating section having nozzles through which water from the water supply pipe exits, (2) a non-rotating section, and (3) a water motor interposed between said rotating section and said non-rotating section;

(d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris;

(e) a biological cleaning mechanism on the outside of said screen cage; and

(f) a frame having a length disposed beneath and elevating said pre-filter unit;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage; wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

20. The method of claim 19, wherein said pre-filter further comprises a pressurized air source augmenting the water source.

21. The method of claim 19, wherein the pre-filter is submerged in the water being filtered.

22. The method of claim 19, wherein said mechanical self-cleaning mechanism is a water spray mechanism for cleaning the pre-filter unit without removing the unit from the water being cleaned, draining the water, or physically accessing the unit.

23. An aquatic filtering system comprising:

(1) water circulation pump;

(2) a water source; and

(3) a pre-filter unit disposed in line ahead of said circulation pump, said pre-filter comprising: (a) a pump intake pipe having an aperture defining an area and a first port for connecting said pump intake pipe to said circulation pump; (b) a water supply pipe having a second port for connecting said water supply pipe to a water source; (c) at least one water supply pipe extension connected to said water supply pipe comprising: (i) a rotating section having nozzles through which water from the water supply pipe exits, (ii) a non-rotating section, and (iii) a water motor interposed between said rotating section and said non-rotating section; (d) a screen cage surrounding said pre-filter unit having a front, back, left, right, top and bottom sides, at least two of said sides having a filtering surface configured to collect algae and debris; (e) a biological cleaning mechanism on the outside of said screen cage; and (f) a frame having a length disposed beneath and elevating said pre-filter unit; and

(4) ornamental materials for camouflaging said pre-filter unit and hiding said at least one fish from non-aquatic predators;

wherein said pre-filter unit draws water into the circulation pump from at least two sides of said cage;

wherein said pump intake pipe and said rotating and said non-rotating sections are parallel to each other and to the length of said frame; and

wherein the at least one water supply pipe extension is a mechanical self-cleaning mechanism configured to loosen algae and debris impacted in said filtering surfaces.

What Claimed Is:

Claim 1. A filter device comprising:
a biological cleaning mechanism and an internal self-cleaning mechanism;
wherein the filter device is a pre-filter unit for a water circulation pump.

Claim 2. The filter device of claim 1 further comprising:
a pump intake pipe;
a water supply pipe;
a frame;
a first port used to connect the pump intake pipe to a circulation pump, said circulation pump providing a conduit for water out of the pond by suction of water;
a second port used to connect the water supply pipe to a water source, said water source providing a conduit for water into the pond;
at least one water supply pipe extension having holes;
a screen cage having an inside and outside surface; and
at least one fish that eats algae and debris.

Claim 3. the filter device of claim 2, the water supply pipe extension further comprising a rotating section and a non-rotating section, a water motor interposed between the rotating section and the non-rotating section, and wherein the holes are on the rotating section.

Claim 4. The filter device of claim 2, further comprising at least two water supply pipe extensions positioned on either side of the pump intake pipe and further comprising a rotating section and a non-rotating section on each of the at least two water supply pipe extensions, a water motor interposed between the rotating sections and the non-rotating sections, and wherein the holes are on the rotating sections.

Claim 5. The filter device of claim 4, wherein the water supply pipe, the pump intake pipe, water supply pipe extensions, rotating sections and the water motors are located inside the screen cage.

Claim 6. The filter device of claim 2, wherein the screen cage further comprises at least two filtering surfaces that form a repository to collect pond debris on which the at least one aquatic creature feeds.

Claim 7. The filter device of claim 6, wherein the filtering surfaces provide a protective barrier that prevents large debris from entering the circulation pump.

Claim 8. The filter device of claim 2, wherein the frame has leg supports to elevate the screen cage above the bottom of the pond.

Claim 9. The filter device of claim 8, further wherein the frame supports materials to camouflage the filter device.

Claim 10. The filter device of claim 2, wherein the circulation pump provides a suction of pond water that holds pond debris against the outside surface of the screen cage.

Claim 11. The filter device of claim 10, wherein the at least one aquatic creature cleans the outside surface of the screen cage by eating the algae and debris.

Claim 12. The filter device of claim 2, wherein the internal self-cleaning mechanism is a water source for the pond.

Claim 13. The filter device of claim 4, wherein water from the water source enters the water supply pipe and exits the nozzles in the rotating pipe extensions to spray clean the surfaces of the screen cage.

Claim 14. The filter device of claim 6, wherein the filtering surfaces are pleated.

Claim 15. The filter device of claim 6, wherein the at least two filtering surfaces comprise a plurality of filtering layers.

Claim 16. The filter device of claim 2, wherein the screen cage has the shape of a cylinder, sphere, pyramid, cone, prism, or other polyhedron.

Claim 17. The filter device of claim 2, wherein the temperature of the pond is controlled to optimize the feeding activity of the fish.

Claim 18. The filter device of claim 8, wherein the leg supports are adjustable.

Claim 19. The filter device of claim 15, further wherein the filtering layers are a mesh material.

Claim 20. The filter device of claim 2, wherein the device is used in a habitat for the at least one aquatic creature other than a pond.

Claim 21. The filter device of claim 5, wherein the circulation pump is inside the screen cage.

Claim 22. The filter device of claim 2, wherein the first port and the second port traverse the frame.

Claim 23. The filter device of claim 2, wherein the first port and the second port traverse the screen cage.

Claim 24. A method for cleaning water to extend the life of a water circulation pump comprising:
Filtering water debris using a pre-filter unit comprising a biological cleaning mechanism and an internal self-cleaning mechanism; wherein the pre-filter unit is a filter device for a water circulation pump.

Claim 25. The method of claim 24, wherein the filter device further comprises:
a pump intake pipe;
a water supply pipe;
a frame;
a first port used to connect the pump intake pipe to a circulation pump, said circulation pump providing a conduit for water out of the pond by suction of water;
a second port used to connect the water supply pipe to a water source, said water source providing a conduit for water into the pond;
at least one water supply pipe extension having holes through which water from the water source is expelled;
a screen cage having an inside and outside surface; and
at least one fish that eats algae and debris.

Claim 26. The method of claim 25, further comprising a pressurized air source augmenting the water source.

Claim 27. The method of claim 25, wherein the filter device is submerged in the water being cleaned.

Claim 28. The method of claim 25, wherein the internal self-cleaning mechanism is a water spray mechanism used to clean the pre-filter unit without removing the unit from the water being cleaned, draining the water, or physically accessing the unit.

Claim 29. An aquatic filtering system comprising:
a pre-filter unit;
a water circulation pump;
a water source; and
ornamental materials to camouflage the pre-filter unit;
wherein the pre-filter unit is in line ahead of the circulation pump;
wherein the pre-filter unit comprises a biological cleaning mechanism and an internal self-cleaning mechanism; and
wherein the pre-filter unit is a filter device for the water circulation pump.

Claim 30. The method of claim 29, wherein the filter device further comprises:
a pump intake pipe;
a water supply pipe;
a frame;
a first port used to connect the pump intake pipe to a circulation pump, said circulation pump providing a conduit for water out of the pond by suction of water;
a second port used to connect the water supply pipe to a water source said water source providing a conduit for water into the pond;
at least one water supply pipe extension having holes through which water from the water source is expelled;
a screen cage having an inside and outside surface; and
at least one aquatic creature that eats algae and debris.