Build-your-own Solar Birdbath
By Mel Hinton, San Diego Audubon Society

It is well known that birds are attracted to water, especially running water as in a fountain. However, most fountains or small ponds require a 120-V electrical pump which is expensive to install and potentially dangerous. Here is a solar-powered alternative you can make yourself. This solar birdbath is inexpensive, easy to build, and uses readily available parts. The two designs shown (ground and patio installations) are just examples of the many ways a home built solar-birdbath can be configured.

If the birdbath is going to be placed near ground level, two 5-gallon buckets are used: one for a reservoir and a second one that functions as a casing to prevent the sides of the hole from caving in. The reservoir bucket nests inside the casement bucket. This allows the reservoir bucket to be easily removed for cleaning. A 14 inch saucer, the kind that goes under a potted plant, forms the birdbath basin. Water is pumped from the reservoir to the basin by a solar-powered pump. It then drains back to the reservoir via a one inch high standpipe. Thus the system is a closed loop that continually recirculates the water as long as adequate the sunlight is present.

These photos of a display setup show how the system is assembled. (The casement bucket used in a ground level installation is not shown.)

 Modification of Component Parts

**Buckets**
For a ground installation the casement bucket is partially buried with only a few inches showing above ground.

- Cut a notch in the top rim of the reservoir bucket for the tubing and electrical line to pass through. A hacksaw blade works well for this.
• Drill several holes in the bottom of the casement bucket to allow any spilled water to drain.
• Spray paint the top of the buckets to blend with the soil or vegetation if desired. Roughing up the surface with sandpaper will improve adhesion.

**Basin**
Two different basins are shown in the photos: a sturdy terracotta saucer made of polyethylene and a homemade concrete basin in the patio display. Other options and colors are available from garden stores or Home Depot. The bottom of the basin should be large enough to fit over the mouth of a five gallon paint bucket and should be at least 1 ½ inches deep. (Ceramic basins will not work since it’s almost impossible to drill a hole in a ceramic.)
  • Drill a 7/8” diameter hole in the basin about 3” from the rim.
  • Make a gasket (2” diameter with a 1” hole) from an old inner-tube or cork sheet to fit the standpipe and make a seal. Various sealants may also be used prevent water from leaking around the standpipe.
  • Install the standpipe (a kitchen sink hose guide) with the threaded portion on the bottom and gasket on the top face of the basin. This will maintain a one inch water depth in the basin.

**Tubing and Spout Assembly**
Use flexible tubing for the water supply line. The size of the tubing required depends on the diameter of the outlet port on the pump. Normally, 1/4” or 3/8” OD vinyl tubing will work. (It may be necessary to heat the end of the tubing in hot water to make it slip over the connecting points.) Cut the desired length of 1/4” copper tubing and bend one end to form a spout. The other end will be connected to the vinyl tubing coming from the pump. Use a small can as a form when bending the tubing.

**Installation**
Select a location that has lots of sun and is good for viewing. It’s also desirable to have some bushy cover nearby that birds can use to hide from predators. Adding a nearby perch made from a pole or dead branch will allow birds to inspect the area before visiting the birdbath. (Birds like to check for predators before flying near the ground.) Trim the bushes at the bottom so birds can see any cat lurking nearby.

The casement bucket should be buried so that it extends at least one inch above the surface and is level. (If you don’t have a level, place the basin on the bucket and add a little water to check for a level surface.) Fill the casement bucket with enough sand or dirt so that the reservoir bucket rests on the file material and does not form a tight seal with the casement bucket. If the two buckets form a tight fit, it will be difficult to remove the reservoir bucket without pulling up the casement bucket.

Locate a small post near the basin as a support for the copper spout. Use plastic cable ties, wire, or staples to attach the copper tubing to the support post. Make sure the spout is positioned so the reservoir bucket can be removed for cleaning without hitting it. Once
the placement of the post has been determined, bend the tubing at a point slightly below ground level and connect it with the vinyl tubing. Use a tight double wrap of wire around the connection to prevent any leakage. Add dirt, rocks or vegetation to hide the tubing and exposed portion of the buckets as desired. Place a 1½” sink strainer over the standpipe to keep feathers and leaves from getting in the reservoir. If animals use the basin and knock it off center, try placing four small stakes around the perimeter of the basin to keep it in place.

**Solar Collector Placement**

The collector should face south and be located where there is minimal shade from trees or structures. Also, place the panel as high as possible to get maximum sun during mornings and late afternoons. Most electrical cords are about 10 feet long which may limit the placement options. Different companies supply different collector designs so there is no standard method for mounting the solar collector.

![Sample Ground Installation](image-url)
An alternative design for a patio or small yard is to use a large pot or half of an oak barrel and place the birdbath in the middle with plantings around the sides.

Maintenance

Always stop the pump when it is out of the water. Simply covering the solar collector with a towel will suffice. Running the pump without water will damage the pump so check the water level every few days, especially if the birdbath has had a lot of use. (Birds will splash a surprising amount of water out of the bath.) If the pump has been out of water, the pump must be submerged before restarting to prevent cavitation.

If the pump stops or flow is reduced in full sun, debris or a clogged filter may be the problem. Follow the manufacturer’s instructions to clean the filter or impeller. During periods of warm weather, algae may buildup in the basin and reservoir. To clean the unit, lift out the reservoir and rinse with fresh water. If a heavy coat of algae has formed, fill the basin with a 10% Clorox solution for a few hours then dump the solution down the drain. Cover the basin during this process and thoroughly rinse with fresh water afterward. Algaecides may be use if they are safe for wildlife.

Also check the electrical connection between the pump and the solar panel for moisture or corrosion.
**Pump Kits**

There are a number of small solar pump kits available through Amazon and other suppliers. (The same or similar units may be offered under different names by different distributors.) Kits using brushless pumps are recommended since they are the most reliable. Also, select models that have a waterproof electrical connection between the solar panel and the pump. Several pump kit options are listed below.

**Parts List for Solar Birdbath**

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<tr>
<th>Item</th>
<th>Source</th>
<th>Price</th>
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| **Pump kit:** 9v-AquaJet pro kit, Includes supplemental battery | Silicon Solar Inc. ([www.siliconsolar.com](http://www.siliconsolar.com))  
Sku:Aquajet-pro-kit-9v-v1 | $90    |
| Magicfly 12V 5W Brushless pump kit                  | Amazon and others                          | $54    |
| Magicfly brushless- pump kit: 9V 1.8W solar fountain | Amazon and others                          | $20    |
| Basin, use a saucer for large pot – 14” or greater in dia. | Garden store or Home Depot                 | $15-$20|
| Danco Kitchen Spray Hose Guide                      | Home Depot                                  | $4     |
| 5-gallon buckets                                    | Home Depot or paint store                   | $3 each|

**Miscellaneous parts:**

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<tr>
<th>Item</th>
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<th>Price</th>
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<tbody>
<tr>
<td>3 feet 1/4” or 3/8” OD vinyl tubing (as needed)</td>
<td>Ace Hardware/ Home Depot</td>
<td>varies</td>
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<tr>
<td>2 feet 1/2” O.D. copper tubing</td>
<td>Ace Hardware/ Home Depot</td>
<td>varies</td>
</tr>
<tr>
<td>1 1/2” Sink strainer</td>
<td>Ace Hardware/ Home Depot</td>
<td>$3</td>
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**Estimated Total:**  
$60-$130