

Light Trap Construction Materials

Main Body

- 1 19 L plastic water bottle
- 6 4" plastic funnels
- 30 Plastic zip ties (extra small)
- 1 2" x 1-½" flexible PVC coupling
- 1 3" x 2" slip fitting increaser/reducer
- 1 3" slip fitting female adapter

Bucket Top

- 1 3.5 gallon plastic bucket
- 1 Threaded bucket lid
- 1 3" slip fitting ABS coupling
- 1 4 to 5" length of 3" ABS pipe
- 2 Polyurethane foam flotation discs (# will vary)
- 1 Regular bucket lid (or other plastic material)

Cod End

- 1 3" slip fitting male adapter
- 1 8" length of 3" PVC pipe
- 1 3" PVC cap
- 1 Section of 250-400 micron nylon mesh

Light Unit

- 1 Pelican 1120 protector case with foam
- 1 Polypropylene bulkhead fitting
- 1 1" slip fit female X threaded male PVC fitting
- 1 16 to 18" length of 1" PVC schedule 40 clear pipe
- 1 1" PVC cap socket
- 1 14 to 19" length of ½" round wooden dowel
- 1 4' length of LED light strips
- 1 2' length of 18 AWG speaker wire
- 1 Digital 12V timer
- 4 Heat shrink 22-18 AWG butt splice wire connectors
- 4 Heat shrink 22-18 AWG female slide terminals
- 1 Talentcell 12V rechargeable battery 11,000 mAh

Hardware

- 3 3/16" x 2" stainless steel eye bolt
- 6 10-24 stainless steel hex nut
- 6 #10 stainless steel lock washer
- 1 Stainless steel carabiner
- 1 6' braided security cable (optional)
- 1 3-5' line for trap handle/dock attachment

Note: PVC and ABS pipes/fittings are interchangeable – when considering weight, ABS floats and PVC sinks in saltwater.

Needed Tools

- Drill
- 4" hole saw
- 2 ¼" hole saw
- 1 ⅜" hole saw
- Small drill bit set
- Soldering iron/electrical solder
- Wire crimper/stripper
- Heat gun (or lighter)
- Pipe wrench or channel locks
- Utility knife
- Ruler (optional)

Needed Materials

- Electrical tape
- Teflon tape
- Duct tape, glue or velcro
- Marine caulk or silicone
- ABS/PVC cement and primer
- Quick-set epoxy
- Sandpaper
- Plastic washers - cut out of cutting board material
- Weight for bottom of trap (optional)

Step by Step Guide for Constructing a Shanks-Style Light Trap

Main Body

1. Use a 4" hole saw to drill six holes (three sets of two) spaced evenly around the sides of the 19 L plastic water bottle. These will be used to install the funnels.
 - a. Drill four small holes around each of the 4" holes. These smaller holes will be used to zip-tie the funnels into place.
2. Use a 4" hole saw to drill a hole in the center of the bottom of the plastic bottle (top of the trap). This hole will be used to insert the lighting unit into the top of the trap.
 - a. Use sandpaper to smooth the edges of the holes.
3. Using a screwdriver, loosen the stainless steel hose clamps on the 2" x 1-½" flexible PVC coupling. Attach the larger (2") end of the flexible coupling to the outside of the 3" x 2" slip fitting increaser/reducer and tighten the hose clamp.
 - a. Attach the smaller (1-½") end of the flexible coupling to the neck of the 19 L plastic bottle and tighten the hose clamp.
 - b. If needed, use a heat gun to warm up the flexible PVC coupling to make it easier to attach.
4. In a well-ventilated area, use the appropriate PVC or ABS cement to glue the 3" x 2" increaser/reducer to the 3" slip fitting female adapter.



5. Check the length of the funnel ends inside the trap to ensure the lighting unit won't touch/bump up against them. Trim ends if needed.
 - a. Drill two small holes on either side of the small opening of the 4" funnels.
 - b. Install small zip-ties across the small opening of the funnels to reduce the size of organisms capable of swimming into the trap.
6. Drill four small holes around the large opening of each 4" funnel that match the four small holes in the body of the trap. Use these holes to zip-tie the funnels into the main body of the trap.
 - a. Apply a thin bead of marine caulk or silicone around the funnels to ensure that they are securely attached to the trap (optional unless there is >2mm gap around funnels).

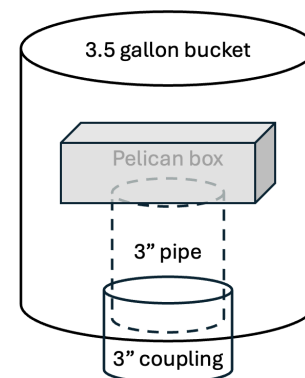


7. Drill two small holes on each side of the 19 L bottle (near the top of the trap) and install stainless steel eye bolts using hex nuts, lock washers, and plastic washers. These will be the attachment points for the trap handle and bungee cord that holds the bucket top in place.

Bucket Top – Removable

Instructions for a non-removeable bucket top (bolted to the trap body) can be found at the bottom of this document under “Light Trap Modifications”.

1. Install the threaded lid onto the 3.5 gallon bucket.
 - a. Use a heat gun to warm up the outer piece of the lid to make it easier to snap onto the rim of the bucket. A mallet may also be helpful.
2. Use a 4” hole saw to cut a hole in the bottom of the bucket. Insert the 3” slip fitting ABS coupling through the hole, with at least 1” extending past the bottom of the bucket (see diagram). Use marine caulk to attach the coupling to the bucket.
 - a. When the bucket is placed on top of the trap, the extended length of the coupling will rest inside the 4” hole on top of the trap body, which will help hold the bucket in place.
3. Use ABS cement to attach a segment of 3” ABS pipe to the coupling inside of the bucket. The length of the pipe segment can vary, but ensure there is enough space inside the bucket for the Pelican box to sit on top of the pipe (see diagram).
 - a. This step is optional, depending on the amount of foam used and the level of waterproofing desired. Adding an additional pipe segment can help prevent water and organisms from getting into the foam.
4. Use a utility knife to cut the polyurethane foam into donut-shaped discs. Add layers of foam to the bucket, surrounding the interior coupling/pipe. The number of layers of foam doesn’t matter, so long as the trap floats.
 - a. Alternatively, use spray foam.



5. Cut another circular ring out of any waterproof plastic material (e.g., regular bucket lid, yard sign) and place it on top of the foam. Seal the edges with marine caulk or silicone.
 - a. Alternatively, seal the foam by painting it with topside boat paint, or by wrapping it with pipe wrap tape.
6. (Optional) Install a stainless steel eye bolt in the center of the threaded bucket lid. Run a bungee cord through the eye bolt, and attach each end of the bungee to the eye bolts on the trap body to hold the bucket in place.

Cod End

1. Use a 1- $\frac{3}{8}$ " hole saw to drill six holes (three sets of two) in the 8" length of 3" PVC pipe. Before drilling the holes, take into account the overlap of the PVC fittings that will be glued to either end of this length of pipe.
 - a. Modifications for high catch/high mortality sites (optional): Use a longer length of 3" PVC pipe, use a larger hole saw, and/or drill additional holes to increase water flow through the cod end.



2. Use scissors to cut a piece of 250 um nylon mesh to fit on the inside of the cod end (roughly 7" x 7"). Ensure all six holes are covered by the mesh.
3. To ensure the epoxy adheres properly, use sandpaper on the inside of the pipe to roughen the surface, then wipe clean with a paper towel. Insert the piece of mesh and temporarily hold it in place using tape. In a well-ventilated area, coat the inside of the pipe with quick-set epoxy to glue the mesh.

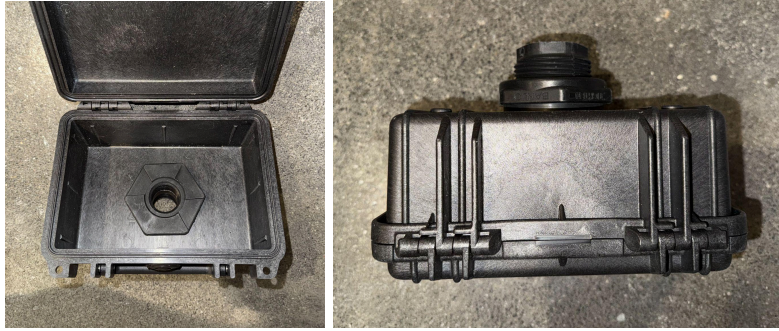


4. Drill a small hole in the middle of the 3" PVC cap and install a stainless steel eye bolt using two hex nuts and two lock washers. This will be the attachment point for a weight, if using.
 - a. For added security (optional): Use plastic washers underneath the lock washers. Use leftover quick-set epoxy to coat the hex nuts and washers.
 - b. Note: Check the buoyancy of the trap in the water by attaching different weights at different line lengths. You may find you don't need a weight at all for the trap to sit appropriately (the trap body submerged and bucket top above the water line)!
5. In a well-ventilated area, use the appropriate PVC or ABS cement to glue the 3" PVC cap and the 3" slip fitting male adapter to either end of the PVC pipe with the mesh screen.



Light Housing

1. Use a 2- $\frac{1}{4}$ " hole saw to drill a hole in the bottom of the waterproof Pelican box.
 - a. Use sandpaper to smooth the edges of the hole, ensuring that no plastic fragments interfere with the gasket on the bulkhead fitting.
2. Use a wrench to tightly fasten the polypropylene bulkhead fitting to either side of the waterproof box (with the O-ring on the outside of the box). Add marine caulk around the inside fitting (optional).



3. In a well-ventilated area, use PVC primer and cement to glue the 1" PVC cap and 1" PVC threaded male fitting onto either end of the 16 to 18" length of clear PVC pipe.
 - a. Note: Ensure the clear PVC pipe extends below the bottom set of funnels. Length of pipe may need to be shortened or extended depending on trap configuration.

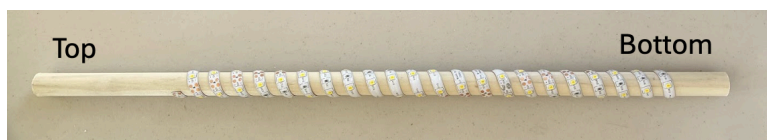


4. Wrap Teflon tape around the 1" PVC threaded male fitting and screw it into the polypropylene bulkhead fitting.
 - a. Ensure that the fitting is fully installed, as this is a potential weak point in the light housing.



Light Unit

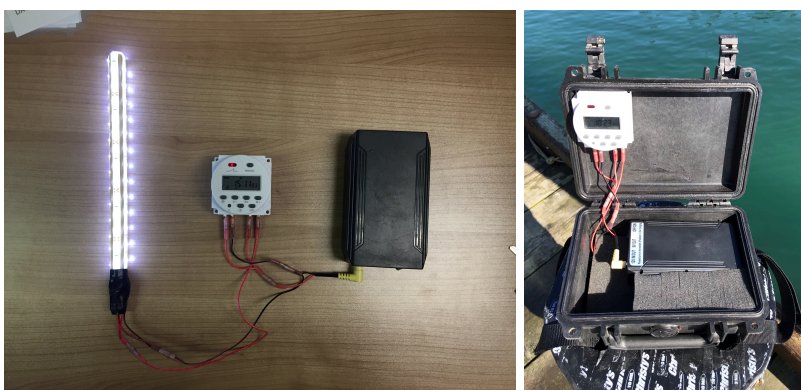
1. Remove the paper backing from the 4' LED light strip to expose the adhesive. Wrap the LED light strip around the round dowel, and use a hot glue gun to secure each end.
 - a. Length of the dowel may vary depending on the length of your clear PVC pipe (. Begin wrapping the LED light strip within 1 to 2" of the bottom of the dowel to maximize light output inside the trap.



2. At the top end of the wooden dowel, peel back the LED light strip to expose the copper dots. Solder positive (red) and negative (black) wires to the positive and negative copper dots on the LED light strip.
 - a. Use flux when soldering, and add heat shrink tubing over the solder point to secure the connection. Then, use electrical tape to secure both ends of the LED light strip to the wooden dowel.



3. Wire the lights and battery to the timer using 22-18 AWG female slide terminals and 22-18 AWG female spade connectors. Use a heat gun to seal the connections.
4. Secure the timer to the lid inside the Pelican box using velcro, glue, or tape.
 - a. Use soft foam (cut to size) to hold the battery in place. Make sure the battery does not hit any buttons on the timer when the Pelican box is closed.



Light Trap Modifications

Main Body – Toilet Flange

Other Materials Required:

- 1 3" / 4" ABS toilet flange
- 1 3" length of 3" PVC
- 4 1/4" x 1.5" galvanized hex cap bolts
- 4 1/4" galvanized hex nuts
- 4 1/4" galvanized flat washers
- 4 Plastic washers - cut out of cutting board material

1. Use a 4" hole saw to drill six holes (three sets of two) spaced evenly around the sides of the 19 L plastic water bottle. These will be used to install the funnels.
 - a. Drill four small holes around each of the 4" holes. These smaller holes will be used to zip-tie the funnels into place.
2. Use a 4" hole saw to drill a hole in the center of the bottom of the plastic bottle (top of the trap). This hole will be used to insert the lighting unit into the top of the trap.



3. Use the appropriate PVC or ABS cement to glue the 3" length of 3" PVC between the toilet flange and the 3" slip fitting female adapter.
4. Bolt the toilet flange to the bottom of the trap, making and using plastic washers as needed
5. Check the length of the funnel ends inside the trap to ensure the lighting unit won't touch/bump up against them. Trim ends if needed.
 - a. Drill two small holes on either side of the small opening of the 4" funnels.
 - b. Install small zip-ties across the small opening of the funnels to reduce the size of organisms capable of swimming into the trap.
6. Drill four small holes around the large opening of each 4" funnel that match the four small holes in the body of the trap. Use these holes to zip-tie the funnels into the main body of the trap.
 - a. Apply a thin bead of marine caulk or silicone around the funnels to ensure that they are securely attached to the trap (optional unless there is >2mm gap around funnels).

Bucket Top – Fixed

By bolting the bucket to the body of the trap, you can use the existing handle on the bucket to lift the trap (eliminating the need to install a separate handle). However, cleaning the trap may be more difficult, since you will not be able to remove the bucket top.

Other Materials Required:

- 1 4" slip fit coupling
- 4 1/4" x 1.5" galvanized hex cap bolts
- 4 1/4" galvanized hex nuts
- 4 1/4" galvanized flat washers
- 4 Plastic washers - cut out of cutting board material

1. Cut a hole in the bottom of the 3.5 gallon bucket to match the hole in the bottom of the 19 L plastic bottle (this should be at least 1-1/2", recommended 4" for easier cleaning).
2. Drill four 1/4" bolt holes down through the bucket to connect it to the trap. Secure four 1/4" bolts with plastic and stainless steel washers.
 - a. Seal the washers and bolts with marine caulk or silicone on the inside of the bucket.



3. Use silicone to seal the gap between the middle hole on the jug and the middle hole on the bucket.
4. Attach 4" PVC coupling around the big hole in the bucket using marine caulk.
5. Add layers of rigid foam. The number of layers of foam doesn't matter, so long as the trap floats.
6. Enclose with threaded bucket lid.

