

# BUILDING A TURBULENT RIVER

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This handout describes how to build a turbulent river or stream, and particularly, how to model the water,

1. Begin by locating the potential river on your layout, and then searching the web for suitable pictures. Many turbulent rivers have rocky banks, with rocks and cobbles/boulders on the bed.
2. Cast from latex molds (your own, or purchased) about twice as many rocks as you think you will need.
3. After deciding on the type of stream and its location on your layout, rough in the river valley using a mesh of cardboard strips, window screen or chicken wire. Place the rock castings on this mesh, and deform the mesh so that the castings fit nicely. You may want to give a downstream tilt to your river, but don't make it too steep. A one-percent grade should work well. However, if your river is embedded in immovable benchwork, a gradient will make pouring the water difficult.
4. Cover the mesh with wet pieces of newspaper (about 5 cm square) to smooth out the underlying mesh.
5. Cover the wet newspaper with strips of plaster cloth – I suggest applying in 5 cm squares, with a few millimetres of overlap. Smooth the plaster cloth with your fingers to work the plaster into the holes of the plaster cloth. Wrap your rock castings in cling wrap, and then place them onto the wet plaster cloth, and if necessary deform the plaster cloth to accommodate the castings.
6. After 24 hours, the plaster cloth will be dry and hard. Now smooth a coat of Plaster of Paris over the plaster cloth (I use my fingers to apply the plaster). Be sure that in the river bed, the plaster completely covers the plaster cloth with no holes. The “water” you will add later has a way of finding all of the small holes in the river bed and then dripping onto the floor. Again, wrap the rock castings and fit them into their locations, building up Plaster of Paris around the castings if necessary. Remove the castings and let the plaster set for 24 hours.
7. At the ends of your river, build a dam so that when you add “water” it cannot run out. I have used .010 styrene sheet as a dam, cementing it onto the plaster river bed with a caulk type glue (I love “Amazing Goop”, from your local hardware store). The reason for using thin styrene is that after the “water” has set solid, you can sandpaper away the styrene and only show the “water”.
8. Paint your rock castings carefully. I use acrylics, trying to highlight all of the different facets of the rocks. Use pictures for your guide to appropriate colours.

9. Paint the river bed and valley walls. Most of this will be covered with scenic materials, so you don't have to be precise. Keep the colours pale – perhaps browns for the dry river banks, and a gray or sandy colour for the river bed. Makes the colours a bit darker along the main part of the flow (technically, the “thalweg”).
10. When the paint is dry (a few hours), you can glue in place the rock castings. Again, I use Amazing Goop. Walthers Goo would be OK.
11. As part of your earlier preparation, you should have on hand lots of broken rock – scree for the valley walls and cobbles and boulders for the river bed. Keep the scree and boulders to about 1 – 2 feet maximum. Only a few rivers move boulders larger than this. I make scree from rock castings I don't like or have rejected. Break them up with a hammer, and sieve the broken pieces to remove the fine dust. Stain the pieces with acrylics – various shades of gray usually look appropriate.
12. Pack the broken rock around the base of the rock castings, and put a layer about one boulder thick down the thalweg. Grade the sizes outward toward the banks. But note that there is commonly a rim of boulders along the rivers banks at flood level. When you have spread these boulders and scree, glue everything down tightly with carpenter's yellow glue. Spray the rocks and scree with water (add a few drops of dishwashing soap). Dilute the carpenter's glue about 50/50 with water, add a few drops of dishwashing soap. Apply to the wet rocks and scree with an eye dropper. Let this dry for a few hours.
13. Decide on the colours and textures you want for the river banks. I use sifted and dried dirt from my garden along with various ground covers from Woodland Scenics and other suppliers. I usually paint an area about 5 x 5 cm with 50/50 carpenter's glue/water, and sprinkle on the scenic material (try putting the material in a teaspoon and tapping the teaspoon). Use slightly different colours and textures, and blend the edges together so there are no sharp lines. I then mist the area with water (plus dishwashing soap), and apply more of the 50/50 glue mixture with an eye dropper.
14. Pile scree around your rocky outcroppings, spray with water, and glue down with the 50/50 mixture. If the scree has been around for a while in your imagination, grasses and mosses may be growing up between the stones, so sprinkle a little Woodland Scenics grassy material onto the scree.
15. When you are happy with the looks of your river banks, and when the glue has dried at least overnight (and preferably for a day or two), you are ready to pour the water. Make sure the river bed is well sealed and that there is a dam at the end (s) of your river. If your river is separate from the benchwork, and the valley can be tilted, now is the time to prop up one end of the river to make the bed effectively horizontal. This makes pouring the water easier. If the river bed is fixed in benchwork, obviously the water will all flow to the downstream end. So I strongly advise that rivers embedded in benchwork have horizontal bottoms. If your river is tilted, try pouring small batches of

water from the upstream end. Some of it may stay at the upstream end rather than pooling at the downstream end.

16. Read the instructions for your water material carefully and do exactly what they say. Pour the water into your river bed, and if necessary, use a small pointed stick to break up the meniscus at the edge of the water. I suggest you do at least two fairly thin pours to build up the depth. Woodland Scenics makes various dyes that can be mixed with the water, but keep this subtle. Moving water can be almost any colour, depending on the presence or absence of suspended sediment, the direction of the light, and the mix of sun and cloud. Use prototype photos to choose the colour you want. If you do not use too much dye, your water will be more transparent, and you'll be able to appreciate the detail you built into the sand, gravel and boulders on your river bed.

I like Woodland Scenics "Deep Pour Water Clear", which comes with excellent instructions. Other brands work well, including the polyester resin sold at Michaels (don't forget to buy the hardener, sold separately). I did not have success with Envirotex – it did not set up hard even after three weeks (it's possible the one I bought had almost exceeded its shelf life). (Al Hough told me after the clinic that Envirotex requires temperatures of around 40 degrees C to set properly).

17. When the water is set hard (this may take days), you can use Woodland Scenics "Water Waves" to make waves. It comes as a clear paste that you apply to your water surface with a flat stick (coffee stirrer). Unless you are modelling class four rapids, the waves in most rivers are seldom more than a foot or two high. Turbulent waves commonly spread from obstructions at the river bank, so study prototype photos.

18. The Water Waves set up quickly (one day). You can then paint the crests of the waves. I use white acrylics, with an almost dry brush, just lightly brushing across the tops of the waves. Pure white looks a bit stark, so I usually add a small touch of gray to the white before painting. Many waves do not break and do not have white caps. Study prototype pictures to judge how much white painting you want.