WATER BAR

A device used on gentle slopes along paths, driveways and roads to divert runoff into vegetated areas. It helps to reduce erosion and runoff.

SIZING AND DESIGN

STEP 1 – **Determine slope**. Find the slope of the land where the water bars will be located. Follow the steps below to determine slope. See Figure 1.

a. Place one stake at the uphill end of the slope and another at the downhill end (Figure 1).

b. Tie a string to the uphill stake at ground level. Use a string level to level the string between the two stakes and tie string to downhill stake.

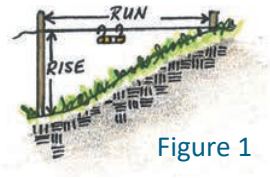

Figure 1

c. Measure the length of the string between the stakes. This is the run or length.

d. On the downhill stake, measure the height from the ground to the string. This is the rise or height.

e. Divide the rise by the run and then multiply the result by 100. This is the slope.

SLOPE (%) = (RISE ÷ RUN) X 100

STEP 2 – **Determine how many water bars are needed**.

a. Compare your percent slope to the waterbar spacing in Table 1 to determine how far apart the water bars should be.

b. Divide the length of your path by the spacing between water bars from Table 1 to get the number of water bars you will need. Round to the nearest whole number.

LENGTH OF PATH / WATER BAR SPACING = # WATER BARS

EQUIPMENT & MATERIALS

- Measuring tape
- Shovels
- Saw
- 6" x 6" Pressure treated or other rot-resistant timbers or logs
- Two 18" lengths of 1/2" steel rebar (per water bar)
- 3/4" Washed stone
- Mulch

Table 1 – Suggested water bar spacing

Percent Slope	Spacing between water bars (ft)
2%	250
5%	130
10%	80
15%	50
25% +	40

TIP: Alternatively, you can place the water bars to target erosion-prone areas.

STEP 3 – **Determine material needs**.

Timbers or Logs: Water bars should be installed at about a 30 degree angle to the path and should extend six inches off both sides of the path. Measure the width of your path at the angle you intend to install them. To determine the length of timbers or logs you will need, multiply the number of water bars by the width of the path plus one foot.

NUMBER OF WATER BARS x (PATH WIDTH + 1ft) = TIMBER LENGTH (ft)

Washed Stone: Each bar should have a trench about 12 inches wide and six inches deep along the entire uphill length and an apron, or small dry well, at the outlet end. Allow about one cubic foot for the apron for each bar. To determine the volume of washed stone needed, multiply the number of bars by the volume needed for each bar using the equation below (assumes a twelve-inch wide and six-inch deep trench). If needed, multiply the result by 0.037 to convert cubic feet to cubic yards.

$[1ft^3 + (0.5ft^2 \times LENGTH\ (ft))] \times NUMBER\ OF\ BARS = WASHED\ STONE\ NEEDED\ (ft^3)$

INSTALLATION

STEP 1 – **Dig**. Dig a trench for the wood timber or log that is at approximately a 30° angle across the path. The trench should be deep enough so the top of the timber or log will be almost flush with the trail on its downhill side, once in place. Be careful to dig only as deep as needed to set the timber to make sure that the soil under the water bar is stable (Figures 1 and 2).

STEP 2 – **Prepare timbers**. Prepare materials by cutting the timbers or logs to the appropriate length according to the design. Many lumber suppliers will cut them to length for you. Remember that each timber should extend six inches on each side. Drill $^1/_2$-inch diameter holes approximately six inches from the ends of each timber.

STEP 3 – **Install timbers**. Install the timber or log by placing it snug against the downhill side of the trench. The timber should be level and have no high points or voids under it.

STEP 4 – **Secure timbers**. Secure the timber with rebar stakes, making sure that the rebar is pounded down flush or slightly recessed with the top of the timber to avoid any sharp edges.

STEP 5 – **Backfill the water bar**.

a. Dig a 12-inch wide and six-inch deep trench along the uphill side of the timber.

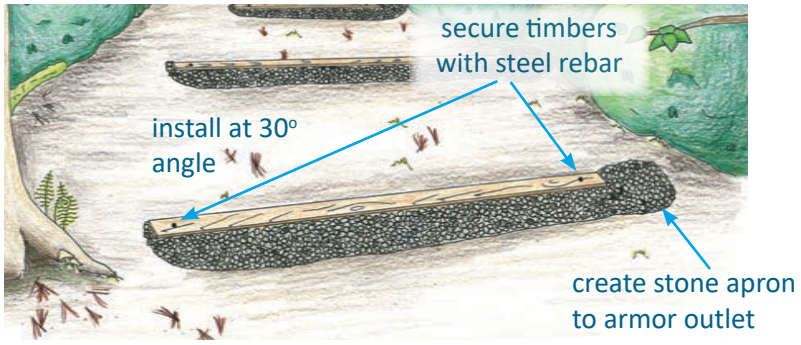

Figure 1. Top view of water bar.

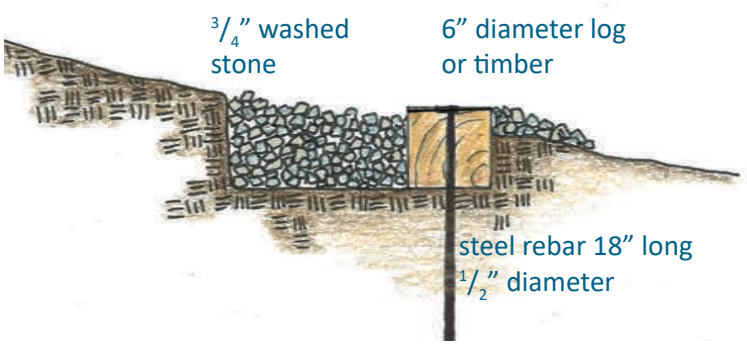

Figure 2. Side view of water bar.

b. Fill the trench with washed stone, leaving a few inches of the timber exposed.

c. At the outlet of the waterbar, place an apron of washed stone to prevent erosion.

d. Pack soil and gravel up against the downhill side of the timber so that the top of it is flush with the path.

e. Cover all disturbed soil with seed and mulch or cover with leaf litter.

MAINTENANCE

INSPECT: Seasonally and after large storms, look for signs of erosion or accumulated sediment.

CLEAN: Remove accumulated sediment, leaves and debris as needed. The stone may need to be cleaned or replaced periodically if void spaces get filled with sediment. Remove and replace with clean stone or remove clogged stone, wash and reinstall.

DESIGN REFERENCE

Maine Department of Environmental Protection. Conservation Practices for Homeowners. Fact Sheet Series. May 2006.

Figure used with permission from the Maine Department of Environmental Protection.

ADDITIONAL PRACTICES

Rubber razors are a type of water bar constructed from heavy rubber material, such as conveyer belt material, sandwiched between lumber. See the Maine Department of Environmental Protection and Portland Water District joint fact sheet for design and installation information.