

# Color Restoration

Redwood is often preferred for outdoor living projects because of its attractive appearance, unsurpassed stability, and the durability of its heartwood. Over time however, any exterior wood's appearance will change color.

## Wood Discoloration

Sunlight, moisture, temperature, microorganisms, dirt and soot contribute to the discoloration of any wood used outdoors. Effects can range from wood turning a driftwood gray due to ultraviolet radiation and precipitation, to it turning nearly black as a result of mildew growth, soot accumulation or extractive staining. Black discoloration may also result from iron in nails or other hardware or from contaminated finishes and airborne particles.

The first step toward a remedy is to identify the source of discoloration. Using simple household chemicals and a little logic, the cause of wood discoloration can be easily determined.



### Mildew

Mildew most often occurs in moist environments. Mildew is a superficial fungus growth that lives on the surface of the wood but does not degrade its structure. Mildew may be found on the moist, north wall of buildings, on shaded decks and in moist areas with a restricted air flow. A relative humidity of 70 percent or more at the wood surface is ideal for mildew growth.

Mildew commonly appears as numerous small dark spots on the surface of the wood. Gray, fan-shaped areas spread below these spots as spores from the original colony multiply and are washed down the surface. Severely infested areas may appear uniformly gray or black.

To test for mildew, apply a drop of common household bleach (5% sodium hypochlorite) to the small, black spots in an inconspicuous area. Mildew spots will disappear within one or two minutes. Dark spots which are not removed by bleach may be dirt, extractive or iron stains. To remove a mild case of mildew, scrub the surface with a mild cleanser or detergent. Next, rinse with household liquid bleach to kill surviving spores; then rinse with water. For more severe mildew infestations, use a stiff bristle brush to scrub the wood with a solution of one cup of trisodium phosphate (TSP), one cup of household liquid bleach, and one gallon of water.

**NOTE:** Household bleach should NEVER be mixed with detergent containing ammonia; fumes can be fatal particularly in unventilated or enclosed areas.

### Extractive Bleeding

Naturally occurring chemical extractives in redwood are in large part responsible for its beauty, stability and durability; however, sometimes these water soluble extractives migrate to the wood's surface. High concentrations cause a discoloration referred to as extractive bleeding.

Extractive bleeding appears in several forms. Some boards, high in extractive content, may turn very dark if unprotected by finishes and exposed to moisture. Extractives may bleed through paints if stain-blocking oil or alkyd primers are not used. In other cases, extractives may discolor the face of paints or other finishes if they are allowed to drip over them.

Oxalic acid, readily available in paint and hardware stores, is used to diagnose and remove extractive stains. A solution of oxalic acid crystals dissolved in water should be applied to a small discolored area. Extractive stains will fade and disappear in twenty minutes or less following this application.

To completely remove the extractive stains, wash with one cup of TSP and one cup of household liquid bleach mixed in a gallon of water. Rinse thoroughly and follow with an application of four ounces of oxalic acid crystals dissolved in one gallon of warm water in a non-metallic container. Apply this to one entire board or surface area at a time with a soft brush. When the wood dries thoroughly, rinse with clean water.

Where extractives have bled through a paint or stain film and are not readily removed by the oxalic acid solution, the only remedy may be to repaint, using a compatible stain-blocking primer.

**CAUTION:** Oxalic acid is poisonous but not dangerous if precautions are taken. We recommend that you hire a professional painter to work with this chemical. If you do the work yourself, wear rubber gloves and be careful not to let the acid or solution touch your skin or eyes. Wear old clothes. Try not to spill any on plants. When you have finished, wash containers, clothes, and brushes thoroughly.

### Iron Stain

In the presence of iron and water, the naturally-occurring tannins in redwood react to form a dark, blue-black iron tannate precipitate. This reaction occurs in any species of wood with a high tannin content. Long-term iron exposure can cause deterioration which appears similar to charring or decay. This is the reason noncorrosive hardware is recommended when building with redwood that will be exposed to the weather. Iron stains may be easy to diagnose because they are often near nail heads, screw heads or other hardware.

Some iron stains may not be directly associated with nails and hardware. Scattered discrete, dark flecks may result from the use of steel wool or wire brushes, or from airborne iron dust from machinery. This type of staining occurs almost immediately after the iron-contaminated redwood becomes wet.

Rough or surfaced green redwood sometimes has inky black marks where it has come in contact with fork lift blades, rollers, strapping or other sources of iron. Iron contaminated finishes or water may also result in a gray-to-black discoloration which is usually uniformly distributed.

A two part indicator solution is used to test for the presence of iron on a wood surface. Apply a 19% solution of hydrochloric acid, followed by a 12% aqueous solution of potassium ferro-cyanide. The formation of a blue color upon application of these reagents indicates the presence of iron.

Most iron stains can be removed by using the oxalic acid solution as described earlier for removing extractive bleeding.

### Other Sources of Staining

Nails, mortar, and concrete mixes can also cause staining in redwood. Nail stains may be difficult to remove because they penetrate deeply and it can be difficult to prevent them from recurring. The following removal method is usually the most satisfactory short of replacing the nails. First, countersink the nails and swab the holes with a water repellent. When dry, fill the nail holes with a durable exterior wood filler compatible with the finish system to be used.

Lime found in mortar and concrete mixes can cause severe stains when spilled or tracked onto redwood. These black stains cannot be removed by sanding and no known bleaching agent can remove them. The only solution in the case of this type of staining is prevention.

### Commercial Cleaning Solutions

Many commercial products are available for removing discolorations and restoring the new appearance of wood. These products are available in powder or liquid concentrate form and are typically based upon non-chlorine bleaches, detergents and/or oxalic acid.

The advantage of using commercial products is that they are intended for a specific use, come with comprehensive instructions, and are quite effective. Under normal circumstances, well-maintained redwood structures require only periodic cleaning with such products to remain looking great.

### Powerwashing

Powerwashing has gained wide acceptance as a method of cleaning and restoring the surface of redwood decking, fencing, siding and other outdoor structures built with redwood. Properly performed, there are several advantages to powerwashing, including savings in time and labor costs.

Keep in mind, however, that water and pressure are fundamental enemies of wood and that improper powerwashing can do more harm than good. For best results, hire a professional painting contractor experienced with powerwashing.

The equipment should be capable of 2000 psi operating pressure and should deliver a minimum of 4 gallons of water per minute. Under normal conditions, pressures of 1000 to 1200 psi should not be exceeded as this can result in erosion of the softer earlywood, resulting in an uneven, rough surface.

Where wood siding is concerned, flashing and caulking should be checked carefully before powerwashing to prevent moisture from entering the wall cavity behind the siding. Wait several sunny, dry days after washing before applying a protective finish.

## Refinishing

Once a redwood structure has been cleaned and restored, it is time to apply a protective finish. Remember, high-quality products containing mildewcides, water repellents, and ultraviolet protection provide the best performance. Carefully follow finish manufacturer's recommendations regarding application conditions, coverage rates, and number of coats.

Natural finishes are not exceptionally durable and may require reapplication in from one to three years. By maintaining these finishes on a regular cycle, the amount of preparation prior to refinishing will be greatly minimized.

Refer to the **Humboldt Redwood Finishing Guide** for further information on how to protect and maintain exterior redwood structures.

