

Community Guide to Amended Sediment Caps



What Are Amended Sediment Caps?

Amended sediment caps are covers placed on top of contaminated sediment in rivers, streams, bays and lakes to keep people and wildlife from being exposed to contaminants. Like conventional caps, amended caps act as barriers between contaminated sediment and overlying clean sediment and water. However, amended caps also contain added materials called “amendments” that treat contamination.

Amended sediment caps often are used with other cleanup methods, such as dredging (digging up and disposing of contaminated sediments). They can treat sediment contaminated with organic chemicals, like petroleum products, PCBs, pesticides and solvents, and metals.

How Do They Work?

Amended caps both isolate and treat contaminated sediments. They typically are constructed of layers of sand, gravel or soil that create a barrier over the

contaminated sediment. Amendments are either mixed into those materials or placed as a separate layer. (Amendments that are directly mixed into sediments are discussed in [Community Guide to In Situ Sediment Amendments](#).) Some amended sediment caps are a single layer of amendment without other materials.

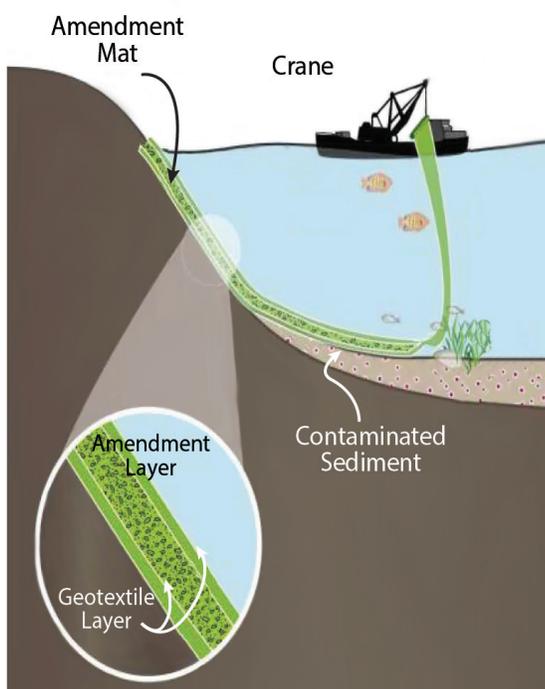
Contaminants in sediment can be present on the sediment grains or within the water between grains, called “porewater.” Treatment occurs as contaminants move from the sediment grains to the water and then into the amendment layer of the cap. Contaminants either sorb (stick) to amendments or are converted to forms that can’t pass through the cap to the clean sediment and water above.

Three main types of amendments are used in amended caps: activated carbon (See [Community Guide to Granular Activated Carbon Treatment](#)), organoclays and phosphate additives. Activated carbon and organoclays both sorb organic contaminants. Organoclays also can make the cap less permeable, which slows the movement of water and contaminants. Phosphate additives react with metals to form solid materials that can’t pass through the cap. Other less common sediment amendments include iron particles and microbes (small organisms), which react with contaminants and convert them to less harmful forms.

The cap is often placed from a boat or barge moving over the contaminated area. Cap materials and amendments are poured into the water or injected through pipes directly to the top of the sediment. Amendments also can be contained within a mat made of a strong material called geotextile. The amendment mat is unrolled, much like a roll of carpet, over the sediment surface or as a layer within other capping materials.

How Long Will It Take?

Placement of an amended sediment cap can take a few days to several months. Construction time will depend on several factors that vary site to site. For example, construction will take longer where:



Amendment mat is placed atop sediment as a cap to keep contaminants in place.

- The contaminated area is large.
- The water is deep.
- The design of the cap is thick or complex.

Amended sediment caps can work for many years when properly maintained. They stay in place for as long as the contaminants remain in the sediment.

Are Amended Sediment Caps Safe?

When properly built and maintained, an amended sediment cap keeps contaminants in place. Because capping does not involve digging or mixing the sediment, installation does not stir up contaminants into the water. The materials used in caps are not harmful to people or wildlife, and they create a barrier between contaminants and the plants and animals living in the clean sediment above. Caps are inspected to make sure water currents, storm activity and boats don't damage the cap.

How Might They Affect Me?

You may see increased truck and boat traffic as cap materials and equipment come to the site. Placement of the cap may involve boats or barges in the contaminated area, so boat and shipping traffic must be coordinated and limited during that time. Following placement of an amended cap, shipping or recreational activities may be limited to prevent damage to the cap.



Photo used courtesy of Dixon Marine Services, Inc.

Placement of an amendment mat containing organoclay.

Why Use Amended Sediment Caps?

Amended sediment caps can be the primary cleanup method or can be used with other methods, like dredging, that might not remove all the contaminants from sediment. Amended sediment caps can be more resistant to erosion than conventional caps, and the amendments treat, rather than just contain, the contaminants. They are thinner, which is important for flood control and maintaining an adequate water depth for boating and shipping. Amended sediment caps have been selected for use at many Superfund sites and other cleanup sites across the country.

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Example

Past waste dumping at the Tennessee Products Superfund site contaminated the sediment in Chattanooga Creek with coal tar and other contaminants.

Between 1997 and 2006, contaminated sediments were dredged twice from the creek for disposal in an offsite landfill. After coal tar was detected in sediment in 2006, a nearly 6,000-foot-long amended cap made of a layer of organoclay over a 1-foot layer of soil was constructed atop creek sediments. The goal was to isolate the coal tar and keep it from entering the creek. By 2007, testing of the creek water showed that contaminant concentrations were below target levels. Routine inspections and sampling since construction of the cap show that it continues to isolate the contamination.

For More Information

- About this and other technologies in the Community Guide Series, visit: <https://clu-in.org/cguides> or <https://clu-in.org/remediation/>
- About use of cleanup technologies at a Superfund site in your community, contact the site's community involvement coordinator or remedial project manager. Select the site name from the list or map at <http://www.epa.gov/superfund/sites> to view their contact information.