

Site	Contaminant	Year Constructed	Project summary	Target AC	Delivery Methods	Project Web Link
AC Projects Completed in North America						
USN Hunters Point San Francisco Bay, CA	PCBs & PAHs	2015	1 acre pilot study that includes ca 0.5 acres of SediMite and 0.5 acres of AquaGate+PAC.	4 - 6 %	Telebelt®	USN Hunters Point Case Study
USN Sierra 1B Pier Pearl Harbor, HI	PCBs & mercury	2015	11,000 ft ² under-pier pilot study with ~ 4,400 ft ² of SediMite and 4,400 ft ² of AquaGate+PAC.	2.5%	Gravity fed hopper with pneumatic conveyance to an under-pier operator who directed the output over specific 10' x 10' cells.	USN Sierra 1 B Case Study
Mirror Lake Restoration Dover DE	PCBs	2014	Full-scale 4.9 acre remediation of lake and downstream with SediMite.	5%	Telebelt® in deeper areas of lake; induction air horn, vortex spreaders, and by hand in nearshore	Mirror Lake Case Study
Puget Sound Naval Shipyard Bremerton, WA	PCBs & mercury	2012	0.5 acre pilot study to evaluate the efficacy of AC application under an active Navy pier. Product was AquaGate+PAC.	4%	Telebelt® over-water and under pier sections of the project.	PSNS Case Study
Berry's Creek, NJ	Mercury & PCBs	2012	Small test plots (30 x 30 ft) with AC placed on the surface of a phragmites marsh using three approaches: 1) granular carbon only, 2) granular carbon with a 2 inch coarse sand cap, and 3) fine granular carbon in the form of SediMite™. Activated carbon dose was 5 percent by dry weight of sediment in the top 10 cm. SediMite™ application rate was 5 kg/m ²	AC 5% SediMite™ 5 kg/m ²	GAC as a slurry using a hydroseeder. Coarse sand was delivered to plot using a telebelt and manually layered over the treatment area. SediMite™ was applied using a Vortex TR Aquatic spreader.	EPA, 2013
Lower Duwamish Slip 4 Seattle, WA	PCBs	2011	Dredged areas on the banks and riverbed at the head of the slip included a filter layer of well graded sandy gravel, amended with sand-size granulated activated carbon.	0.5%	Sandy gravel with GAC mixed upland and placed using a dredge bucket.	Slip 4 Lower Duwamish Case Study
Onondaga Lake Pilot Study Onondaga County, NY	Chlorinated benzenes & PAHs	2011	1 acre capping plot to demonstrate the implementability of mixing/slurrying GAC and sand on-shore and placing the material over a pre-defined depth and area. The project informed full scale construction planning and implementation.	0.25 - 1.0 lb/ft ²	Sand/GAC slurry mix system mixed with water and pumped through a pipeline and booster pumps to a hydraulic spreader barge. Slurry placed in a series of parallel lands.	Onondaga Lake Pilot Case Study
Canal Creek, MD	PCBs & mercury	2010	Twenty-four test plots, each 8 meters by 8 meters to evaluate the performance of three AC applications in a wetland: two pelletized AC products (AquaBlok and SediMite), and a PAC slurry. Pilot project under ESTCP ER-200625 and ER-200635.	3%	Depending upon the test product, a Vortex spreader, hydroseeder, bark blower, or by hand. Many of the test plots were accessible on-foot, in the submerged wetlands the spreaders were used on a boat.	Canal Creek Case Study
Naval Air Station, Cottonwood Bay, Dallas TX	PCBs, PAHs, chromium, lead	2009	Small-scale pilot project that tested reactive mats featuring a 0.28 lb/ft ² activated carbon, 0.23 lb/ft ² apatite, 0.28 lb/ft ² organoclay amendment mixture and an AOS 80 geotextile.	0.28 lb/ft ²	Prototype reactive mats rolled up and deployed from a john-boat by divers. Divers secured the mats in the shallow bay with anchors, anchor screws, and blocks. Some of the treatments were further covered with sand.	SERDP ER-1493 NAVFAC TR-2366-ENV Technical Report
Bailey Creek, Fort Eustice, VA	PCBs	2009	Pilot-scale studies of SediMite in 225 m ² plots within a marsh and in the main channel.	5%	Vortex spreaders from boat	Bailey Creek Case Study
St. Louis River Superfund Site Duluth, MN	NAPL/PAHs	2006	11 acres of cap that included a reactive core mat with AC to absorb advected PAH-porewater during consolidation. The cross section of the cap was 0.5 ft (15 cm) sand/activated carbon mat/2.5 ft (75 cm) sand.	0.4 lb/ft ²	Reactive mats attached to outer sheet-pile wall and unrolled toward shore from a moveable barge. Overlapping RCMs stapled and allowed to sink, followed by sand placement	ITRC 2014 Olta and Hornaday, 2007
Grasse River, Massena, NY	PCBs	2006	0.5 acre pilot project with AC mixed into PCB-contaminated sediment.	3.2 - 5%	Two application methods tested: "roto-tiller" and tine sled. The tiller is an enclosed device that first applied (via spraying) activated carbon onto the sediment surface, followed by mixing of the material into near-surface sediments using the roto-tiller (was used with and without mixing). The tine sled device included direct injection of activated carbon into near-surface sediments.	Grass River Pilot Project Web Site
Hunters Point 2005 Pilot Project San Francisco Bay, CA	PCBs & PAHs	2005	Pilot project under SERDP-1207 and ESTCP ER-200510.	5.1%	Two types of GAC applications were tested. In the first, the AC was spread onto the surface of the sediments via a backpack spreader located on an Aquamog and then a rotovator arm mixed the GAC into the sediments. With the second application GAC was sprayed onto the rotovator and mixed.	SERDP-1207 ESTCP ER-200150 Hunters Point 2005 Case Study
Anacostia River, Washington, DC	PCBs, PAHs, chromium, lead	2004	1100 m ² area was capped with a coke-filled RCM and covered with 15 cm of sand.	24 kg/m ²	Twelve 3.1 m x 31 m coke-filled RCMs were placed with a 0.3 m overlap using a crane with a clamshell. A diver followed the unrolling mat to insure proper placement. A sand layer (~15 cm) was then placed above the RCM by particle broadcasting to	McDonough et al, 2006 ITRC 2014
AC Projects Completed in Europe						
Grenlandsfjords, Norway	Dioxins/furans	2009	Pilot project to demonstrate efficacy of a hydraulic application of AC/clay mixture at depth. Plot size was 40,000 m ² at a depth of 100 m. Comparative plots also included crushed limestone, and clay-only cpas.	2 kg/m ²	Dredged clean marine clay was mixed with a coal-derived powdered AC (d80 < 45 µm) in 10:1 dw ratio. To increase the density of the clay + AC slurries the salinity was increased by adding NaCl, and was pre-mixed for at least one hour in the hopper dredger tank to a water content of 56–70% prior to placement. A hopper dredge was used in reverse mode: the intake pipe was as a tremie with the material released approximately 5 m above the seafloor.	Grenlandsfjords Case Study
Trondheim Harbor, Norway	PAHs	2008	Pilot project evaluating three treatments: AC, AC+clay, and AC covered with sand for erosion protection. Test plots were 225 m ²	5 kg/m ²	For sediment settling the powdered AC was mixed with NaCl in a 100-L cement blender to saturate the AC pore system with water that was slightly heavier than surrounding water. For the AC-only and AC+clay fields, this slurry was pumped out with a flexible manually operated 5 cm hose. For the AC+clay field, AC and bentonite were mixed 1:1:6 with 10%-NaCl and pumped out as described above.	Trondheim Harbor Case Study Cornelissen et al, 2011

[Table updated and amended from Patmont et al. Projects were included here only where there was adequate available documentation.](#)

Abbreviations

AC - activated carbon

GAC - granular activated carbon

PAC - particulate activated carbon

PAH - polycyclic aromatic hydrocarbons

PCBs - polychlorinated biphenyls

RCM - reactive core mate

TBT - tributyl tin

dw - dry weight