

Download: https://www.dropbox.com/sh/4bre1gvjob0103x/AAALY7i3VMmW2xFeO2_nfNLKa?dl=0

1. Photos related to this study



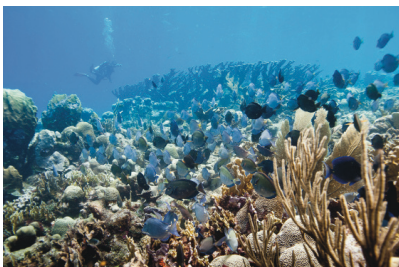
01) Reef fish gather at a coral reef site in the waters of Curaçao. Although coral reefs cover less than 0.1% of Earth's surface, they house more than 30% of total marine biodiversity, are a key source of fisheries production, and provide shoreline protection for more than 100 million people living next to coastlines.

Photo: SECORE International / Tom Moore



02) Dead elkhorn coral skeletons with a lone remnant live colony (left side) in the waters of Curacao. Corals form the architectural basis for one of the most diverse ecosystems on the planet – but in every ocean they are under siege. Global warming and ocean acidification are causing stress and disease for corals.

Photo: SECORE International / Valérie Chamberland.



03) A SECORE diver is inspecting a reef in the waters of Curaçao.

Photo: SECORE International / Paul Selvaggio.



04) Close-up of a SECORE Seeding Unit with golf ball corals (*Favia fragum*) growing on it. This Seeding Unit was outplanted onto a reef in the waters of Curaçao.

Photo: SECORE International / Valérie Chamberland



05) After 6 months, 75 per cent of the Type II tetrapods were firmly lodged in crevices or had become cemented to the reef framework by encrusting benthic organisms such as sponges, crustose coralline algae and hydrocorals, and were hardly distinguishable from the reef framework.

Photo: SECORE International / Valérie Chamberland



06) Dr. Dirk Petersen, Executive Director and founder of SECORE International

Photo: SECORE International / Reef Partol



07) Valérie Chamberland, SECORE research scientist and lead author of the new study.

Photo: SECORE International



08) SECORE developed new settlement substrates (SECORE Seeding Units) that self-stabilize on the reef. These substrates can be produced and handled en masse. They are made of plain concrete using molds. The tiles are four-armed shaped, forming a tetrahedron. Grooves down their arms promote coral settlement, where the recruits are protected during handling. This image was made during a SECORE workshop in Mexico. Photo: SECORE International / Paul Selvaggio



09) Ready for the big move! Settlement tiles covered with tiny settlers of the boulder brain coral are marked and lined-up to be outplanted by the SECORE team at CARMABI Marine Research Station, Curaçao.

Photo: SECORE International / Kelly Latjinhouwers



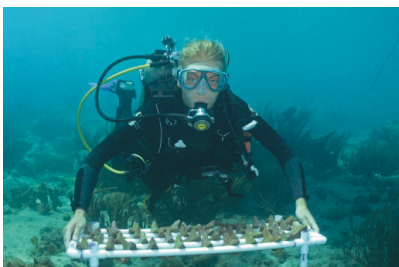
10) Participants of a SECORE workshop on coral restoration in Curaçao are outplanting Seeding Units onto a reef in the waters of Curaçao.

Photo: SECORE International / Benjamin Mueller



11) Participants of a SECORE workshop on coral restoration in Curaçao are preparing a transect, in which the Seeding Units covered with settlers will be outplanted afterwards.

Photo: SECORE International / Benjamin Mueller



12) A SECORE diver with a tray of Seeding Units that will be outplanted onto a reef in the waters of Curaçao soon.

Photo: SECORE International / Benjamin Mueller



13) Close-up of a SECORE Seeding Unit with a boulder brain coral growing close to its center.

Photo: SECORE International / Valérie Chamberland

2. Photos related to SECORE's general sowing approach

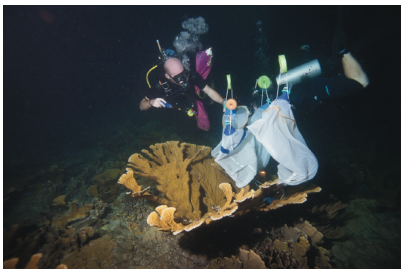
Important notice:

The following images mostly show SECORE's coral fertilization and restoration work, using coral species, which are broadcast spawners – meaning that these corals release bundles of eggs and sperm when they spawn instead of ready-developed larvae as so-called „brooding species“ do. However, the golf ball coral, which was used in our study, is a brooding coral that releases relatively few and large larvae that settle right after their release. So fertilization work was not done in the study, which is described in the paper.



01) A SECORE diver is putting a net on an elkhorn coral, growing on the Bocana Chica Reef, Mexico. The net is used to collect coral spawn, which is released by the corals during the annual mass spawning event.

Photo: SECORE International / Paul Selvaggio



02) SECORE divers are putting nets on an elkhorn coral, growing on a reef in front of the Curaçao Sea Aquarium, Curaçao. The nets and their collection cups are used to collect coral spawn, which is released by the elkhorn corals during the annual mass spawning event.

Photo: SECORE International / Paul Selvaggio



03) The spawn of an elkhorn coral is floating into the collection cup, which is attached to the center of the net. This photo was made during spawn collection at a reef in front of the Curaçao Sea Aquarium, Curaçao.

Photo: SECORE International / Paul Selvaggio



04) Different samples of collected coral spawn in the lab of CARMABI Marine Research Station, Curaçao.

Photo: SECORE International / Tom Moore



05) Close-up of a spawning coral in the waters of Curaçao. This coral is a broadcast spawner, which releases egg and sperm bundles instead of larvae like brooding species do.

Photo: SECORE International / Benjamin Mueller



06) Ana Anita Isabel Cerone Flores, employee of the aquarium at Xcaret Eco Park Mexico, is helping with the fertilization work.

Photo: SECORE International / Paul Selvaggio



07) Coral fertilization work at the aquarium of Xcaret Eco Park Mexico. Eggs and sperm have to be mixed carefully first. Later on all fertilized eggs need to be rinsed with fresh seawater to foster larvae development.

Photo: SECORE International / Paul Selvaggio



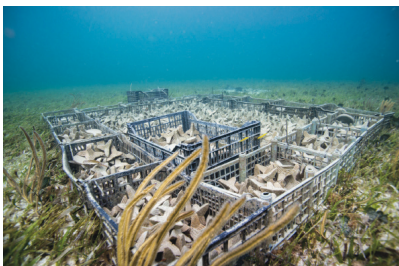
08) Coral fertilization work at the aquarium of Xcaret Eco Park Mexico. Eggs and sperm have to be mixed carefully first. Later on all fertilized eggs need to be rinsed with seawater to foster larvae development.

Photo: SECORE International / Paul Selvaggio



09) Close-up of coral eggs.

Photo: SECORE International / Paul Selvaggio



10) 2000 SECORE tiles are put into the ocean prior to larvae settlement to develop a thin layer of crustose coralline algae, bacteria, and many other microorganisms. Together they form a complex biofilm that is one of the main requirements for a successful larvae settlement for most of the coral species.

Photo: SECORE International / Paul Selvaggio



11) SECORE's vision for large-scale restoration: A Seeding Units covered with tiny settlers has been sown from a boat and is now tumbling towards the ocean floor, where the reef is.

Photo: SECORE International / Reef Patrol



12) SECORE Seeding Units are scattered across a reef. Those tetrapods are specifically designed substrates that are self-stabilized and attach to the reef via natural processes.

Photo: SECORE International / Reef Patrol



13) SECORE's vision for large-scale restoration: Seeding Units covered with tiny coral settlers have been sown from a boat and are now tumbling towards the ocean floor, where the reef is.

Photo: SECORE International / Reef Partol



14) Dirk Petersen, Executive Director of SECORE, is showing a Seeding Unit with a tiny boulder brain coral growing on it.

Photo: SECORE International / Valérie Chamberland



15) SECORE members collect staghorn coral gametes in the waters of Curaçao.

Photo: SECORE International/ Barry Brown



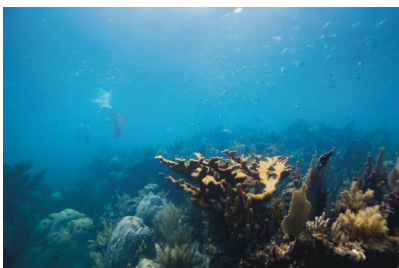
16) Close-up of a coral settler growing on a SECORE substrate. The initial settler is usually around one millimeter in size and can easily be overgrown by algae or buried by sediment. Predation is a common threat. The tiny corals can be accidentally eaten by algae scrapers such as sea urchins, or fed on by natural coral predators such as butterflyfish and parrotfish.

Photo: SECORE International / Reef Patrol



17) An elkhorn coral (*Acropora palmata*) growing on a reef in the waters of Puerto Morelos, Mexico.

Photo: SECORE International / Paul Selvaggio



18) An elkhorn coral (*Acropora palmata*) growing on a reef in the waters of Puerto Morelos, Mexico.

Photo: SECORE International / Paul Selvaggio



19) Success story: This elkhorn coral was outplanted by SECORE five years ago. During that time it has grown into a mature colony, which even spawns together with the other elkhorn colonies in the waters of Curaçao.

Photo: SECORE International / Paul Selvaggio