

To Kill, or Not To Kill the Rivers of a Precious Place

Text by Gene Warneke M.A., Carol Cespedes Ph.D. and Bruce Melton P. E.

Photos by Gene Warneke



Rio Agujas, Osa Peninsula

The other day, my seven year old daughter had just finished reading a recent issue of *National Geographic* when she said to us, “Wow, there’s so precious little left untouched in this world.” My Costa Rican wife responded in Spanish, “Yes, including the mess in your bedroom. Now please go clean it up or there will be no Baked Alaska for you tonight!”

Well, The Osa Peninsula of Costa Rica (The Osa) and the Golfo Dulce (Sweet Gulf) in the southeast corner of Costa Rica along the Pacific Ocean is actually one of the few precious places left virtually untouched in this world. The government of Costa Rica decided in 1975 to create a large national park and subsequently a national forest adjacent to the park. Now the government is on the verge of allowing destructive gravel mining of the rivers that drain into the gulf.

But first, just how precious is this area? The Osa contains the largest remnant of virgin tropical rainforest along the Pacific coast of the whole of Central America. According to various sources, *National Geographic* described the Osa Peninsula as “the most biologically intense place on earth” ¹, which could be said to include its surrounding marine environment as well. Its unique forests also contain a large number of endemic plants and animals.

How biologically diverse is this area? Well, for starters, 375 bird species are found here, 70 species of marine crabs, 61 fresh-water fishes, 46 amphibians, 71 reptiles (including the American crocodile, the Spectacled (white) caiman, 4 marine turtles: the leatherback, olive ridley, black sea and hawksbill turtles), 124 terrestrial mammals (like jaguars, ocelots, 4 monkey species, pumas, sloths and Baird’s tapir) and 58 bats. ²

The status of many of these species is endangered or threatened, and outside of zoos, can no longer be found elsewhere. Fortunately, the area is large enough for the species that need widespread areas to maintain populations large enough to keep a genetically viable and healthy population going until enough humans decide to vacate earth and leave for Eirene (aka Mars).

I just got bitten by a mosquito for the third time today, so I don’t feel like going into the incredible number of insects and non-vertebrate species that exist here. I will say that with insect repellent, this is an absolute gardener’s paradise. Most all of the tropical plants I used to see and buy in U. S., grow here naturally. There are at least 4,129 species of vascular plants (82 of them endemic), including a total of 334 trees, 26 palms and over 200 species of orchids. ³

The eastern watershed of the peninsula is drained by rivers emerging from beneath majestic pristine tropical rainforest. The rivers tumble down the slopes and through a gravely alluvial plain that extends most of the length of the Osa Peninsula. They feed fresh water to the Golfo Dulce, one of the world’s three deep-

water tropical fjord-like basins. Marlin, Rooster Fish, Sailfish and Dorado are caught in the mouth or in the nearby ocean. More than 25 marine mammal species, including 3 species of dolphin, Humpback and Pilot whales either live year-round or migrate to the gulf to mate and give birth. 4

Mangroves at several of the river mouths provide important filtration for the gulf and provide important habitat for a slew of fresh and salt water animal species, not to mention the multitude of terrestrial animal and plant species that are part of the mangrove food chain. It rains a lot in The Osa; up to 7 meters per year in the rainiest areas. The rivers have been illegally mined for gravel and sand for at least the last six years. Much occurs during the short two to three month dry period when it only rains occasionally, but it also happens year round as the river levels subside quickly after rainfalls.

The maintenance of a healthy biodiverse system depends on the quality and availability of its water supplies. Riparian habitats along rivers are extremely important because so many interlinked and parallel food chains depend on the well-being of their rivers and streams.

As I sit here writing this article in a home on the Osa Peninsula, a dozen or so dump trucks are lined up ready to be filled with river gravel and sand by large backhoes two kilometers upriver from the crossing of Highway 245 over the Rio Tigre. The concession that was granted to the mining company by the Costa Rican government allows for the company to mine huge amounts of river gravel to build up the highway for an asphalt surface and for approach ramps to a half dozen or so new bridges over the rivers. A beautiful cool fairly narrow river where we used to swim and hunt for shrimp and crawdads along the shore is now bath-water warm, four or five times wider than it used to be, looks like a wasteland and has been stripped of most of its riverside shade trees and vegetation.

The government is considering applications for ten more gravel and sand mining concessions on six of the Osa Peninsula's short-running northeast flowing rivers. Each concession covers one to two kilometers of river. Added up, the concessions will allow mining on eighteen plus kilometers of the Osa's rivers. The concessions are back-to-back along much of the rivers where they cross the relatively flat alluvial coastal plain. There is almost no monitoring by government agencies because of a lack of manpower. The few environmental protection measures written into the concessions are largely ignored by the concessionaires.

This heavy in-stream mining involves the excavation and removal of a living river. All the little meanders, pools, riffles, rocks, bars and bends are taken out of the river. The river flattens and widens. The well-compacted bed, that took centuries to form, no longer confines the remaining gravel. Multiple braided shallow streamlets replace the river. The unconfined gravel shifts endlessly clouding the water with fine sediments. The shallower water flows faster, eroding more. Bank caving destroys the streamside vegetation. This unique eco niche disappears. The process of river bed formation is a 'geologic process'. Once the riverbed is removed, it can only be recreated over geologic time frames. The gravel will basically keep moving until this geologic process is complete.



Rio Cano Seco below Ciudad Niely showing multiple braided shallow streamlets from in-river gravel mining & loss of adjacent farmlands

The lives of the river animals are destroyed. The big holes under banks that were protected by overhanging roots are lost. Insects and crustaceans no longer find homes in the rapidly shifting gravel. The shallower shadeless water warms and the oxygen concentration is lowered. This environment is hostile to all but a few.

The river is the core of a region's ecology. Damage cascades away from the river and continues decades after the mining stops. The loss of the insects in the river, for example, impacts birds and bats as well as fish. If the insects' streamside habitat is destroyed by in-stream mining, those insects no longer exist and the animals that depended on them for food must look elsewhere to survive. The food they eat, in-turn, is some other animal's food. If the food supply of other animals is used by the animals that once depended on the river for survival, those other animals must also look elsewhere for food to survive. The only thing that stops the chain reaction is when the animals cease to exist.

The cumulative impacts decrease biodiversity in the surrounding mountains and forests. They can have a disastrous effect on aquifers and water supply. Salt water reefs, mangroves, and fisheries are impacted or killed by the large quantities of fine silt that continue to cloud the river long after the excavators have gone. The impacts are so long-lived that many areas in North America, such as Central California, have programs to restore river mining damage from the 1850s gold rush.

And sadly, this "river-side" is completely unnecessary. Costa Rica has abundant sources of the same gravel and sand deposits in nearby areas. Open-pit mining outside of the riverbeds would be an environmentally less damaging option.

Many developed nations have banned the practice of in-stream mining. Costa Rica should join them now and stop using rivers as sources of building material before the natural bounty of living rivers, the otters, caiman, frogs, fish, crustaceans, birds and abundance of insect life disappear completely, leaving a tragically impoverished environment.

Costa Rica has garnered worldwide acclaim for its system of national parks and reserves earning more than a million visitors every year. Yet it continues to neglect one vital area of the environment: it has failed to give adequate protection to its rivers and streams, the consequences of which could destroy or degrade this country's rich natural endowment and allow for the degradation of one of those few precious places left on earth.



Rio Tigre being mined for gravel and sand

Gene Warneke, M.A. is a freelance photojournalist with a B.A. in Anthropology and an M.A. in Geography living on the Osa Peninsula. Carol Cespedes, Ph.D. is the owner of Halintours, Inc., a tour company specializing since 1986 in ecotourism in Latin America. Bruce Melton, P.E. is a registered engineer specializing in critical environmental issues for 25 years, film maker and documentary producer.

- 1 Although National Geographic is often cited by various sources, we were not able to confirm this.
- 2 Maarten Kappelle, Marco Castro, Heiner Acevedo, Luis Gonzalez & Huberth Monge, *Ecosystems of the Osa Conservation Area*

(ACOSA), Costa Rica: Instituto Nacional de Biodiversidad, Proyecto ECOMAPAS, 2003, pp. 111 – 113.

3 *Ibíd.*, pp. 115 – 117.

4 Acevedo-Gutiérrez, A. 1996. Lista de mamíferos marinos en Golfo Dulce e Isla del Coco, Costa Rica: *Rev. Biol. Trop.* Vol. 44, pp. 933-934.