

rations into global cartels that manipulate prices and markets. No super seed, software app or pilotless plane will solve these problems.

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Borneo's Killer Dams

by Amanda Stephenson

Sarawak, Malaysia, is located on the island of Borneo, the third largest island in the world. Sarawak is home to thousands of endemic species, 40 indigenous groups, and one of the largest transboundary rainforests remaining in the world.

The state is also suffering from one of the world's highest rates of deforestation—only 5% of its primary forests remain. Now, Sarawak's forests and their inhabitants face another threat: the damming of its rivers for hydroelectric power.

The Malaysian government and its state-owned energy utility Sarawak Energy Berhad (SEB) plan to build 12 large dams, due to produce 7,000 MW (megawatts) of electricity. Six of them are scheduled for completion by 2020. These dams are part of a development initiative known as SCORE (Sarawak

ment began a corruption investigation into the project.

A recent Oxford study found that “even before accounting for negative impacts on human society and environment, the actual construction costs of large dams are too high to yield a positive return.”

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Corridor of Renewable Energy), created to “stimulate global and domestic investment in traditionally rural areas.” SCORE's long-term energy generation strategy includes harnessing a potential 20,000 MW of hydroelectric power.

According to an analysis by International Rivers, the proposed mega-dams will flood 2,300 square kilometers of tropical rainforest. The 1,200 MW Baram dam, the next dam slated for construction in Sarawak, will flood an area of 412 square kilometers. The projected 12 dams will produce 7,000 MW of electricity in Sarawak, although local energy demand is now just 972 MW and is only projected to reach 1,500 megawatts by 2020. The 2,400 MW Bakun dam, commissioned in 2011, is being operated well below capacity.

Much of this energy will be generated in an attempt to attract energy-intensive investments from industries such as aluminum smelters. However, as International Rivers reports:

In March 2012, the mining giant Rio Tinto cancelled its plans to build a \$2 billion aluminum smelter that would have used electricity from the Bakun Dam not long after the Malaysian national govern-

Rainforest and river species threatened

The rainforests of Borneo are home to hundreds of indigenous plant and animal species found nowhere else in the world, including the endangered Bornean orangutan, the rhinoceros hornbill, the Bornean sun bear, the Bornean pygmy elephant, and the Bornean clouded leopard.

These forests are a vital refuge for 221 species of terrestrial mammals, 420 species of resident birds, and 254 reptile species, among others. According to the World Wildlife Fund, “Between 1995 and 2010 over 600 species have been discovered—that is three species each and every month.”

Those displaced were forced to pay nearly \$15,000 for government-built homes.

If SCORE's dams are built, they will flood endangered wildlife habitat, disrupt migratory patterns of fish and birds, and fragment species populations, causing them to decline. This will not only be a loss to locals but a loss to the whole world.

It's ethnocide

To create these dams, tens of thousands of indigenous people from 20 different ethnic groups will be removed from their traditional lands and homes.

Built by the Chinese company SinoHydro, the Bakun dam flooded 696 square kilometers of old forest ecosystems and displaced 10,000 indigenous people, mainly from the Kenyah and Kayan tribes, drowning their villages, farms and the forests in which they would hunt and gather foods, medicines and other goods. Yet those displaced were forced to pay nearly \$15,000 for government-built homes, throwing families into debt. Over a decade later, many families live in extreme poverty.

Although indigenous community members have voiced opposition to the Baram dam on multiple occasions, government officials posit that the people of Baram will benefit from its construction, although an estimated 20,000 people will be forced from their homes. Families relocated during the Bakun dam construction

were promised 10 acres of farmland each, but received a fraction of this.

Communities displaced by finished dams experience severe poverty and health problems caused by poor diet and water pollution. Resettled families pay unsubsidized water and electricity bills in their government homes. Bakun dam refugees are now unable to hunt and gather in the forest, but are forced to make do with small plots of land. Mark Bujang, the head of Sarawak NGO Borneo Resources Institute, commented, "What the government is doing when they're flooding all these areas is actually killing off the culture, the traditions of the community. It's basically ethnocide."

The planned Baram dam will displace 20,000 indigenous people from the Kayan, Kenyah, and Penan ethnic groups. These communities face forced relocation to land where they cannot cultivate, plant, harvest, gather, hunt, or fish as they once did. As a result, many families will have to migrate to towns and plantations for work.

In the past 30 years, many of Sarawak's forest-dependent people have had their traditional lands taken and sold, often without their knowledge. This is possible because the Sarawak gov-

ernment does not fully recognize indigenous peoples' Native Customary Rights (NCR) claims to their land.

Not only are claims ignored, but the health of indigenous communities is an afterthought. For example, the SEB did not begin the 944 MW Murum dam's social and environmental impact assessment until the construction was already under way.

Without proper representation in Sarawak's government, tribal leaders have resorted to protest. Threatened indigenous communities erected blockades in an attempt to prevent the Murum and Baram dams from reaching completion. Participants in these blockades have been isolated, intimidated, threatened, and arrested. And even though the Bakun dam is still unable to sell all its electricity, construction of the Murum dam was completed in 2013 by China Three Gorges Corporation and SinoHydro, and its reservoir is being filled.

In response to Telang Usan assemblyman Dennis Ngau's statement that those displaced will be happy with the project, 65 leaders representing various indigenous communities in Sarawak collectively stated their opposition to the Baram dam,

We the people of Baram ... would like to reiterate urging to the government and the Sarawak Energy Berhad (SEB) to stop and revoke its plan to build the Baram Dam.

We also demand that all activities that are carried out in connection with the proposed Baram Dam be ceased forthwith as we regard the proposed dam as a real threat to our rights, lives, livelihood, lands, resources, properties, heritage, and future and urge all parties to respect our rights and choice to remain in our respective existing villages and settlements.

Unsustainable and unnecessary

While mega-dams are often touted as a source of "green energy," they actually contribute to climate change. The foul stench of sulfur emitted by the Bakun dam reservoir in Sarawak can be smelled kilometers away, and local people report that the water now causes diarrhea. According to Zach Hurwitz of International Rivers, "The carbon budget of these massive reservoirs is likely to produce as much CO2 equivalent in methane as a typical fossil fuel power plant over a 10-year span."

Flooding all these areas is killing off the culture.

Threatened indigenous communities erected blockades.

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Peter Kallang of SAVE Rivers said, “You cannot say this is a Sarawak problem. This is our national problem. If you look at the impact of a dam on the environment, this is an international problem, because it will drown one of the most biodiverse parts of the world.”

The massive dams that will submerge Sarawak’s forests present one of the greatest environmental and social threats the island of Borneo has ever faced. As Mark Bujang said, “We have seen the

widespread destruction of the forests in Sarawak, but once you build a dam there, there’s nothing left. It’s the final nail in the coffin.”

Amanda Stephenson is a writer, researcher, and filmmaker living in Oakland, CA. She is working with the Borneo Project on an educational film series documenting the environmental and social catastrophe that would follow the construction of Malaysia’s proposed mega-dams. This article originally appeared in *The Ecologist*.

Let It Burn

Why Large Fires Are an Ecological Necessity

by Monica L. Bond, Chad T. Hanson and Dominick A. DellaSala

Last winter California suffered its most severe drought in decades, with record-low rainfall and meager mountain snowpack. Drought, high summer temperatures, and wind together make the perfect storm for what some have termed “mega” forest fires that, in spite of fire suppression activities, sweep across the landscape and end only when winds die down and weather cools off. So why aren’t we, as wildlife and forest scientists, worried?

Despite the impression fostered by many in the media, politicians, the timber industry, and the US Forest Service that large fires are widespread and destructive, they are actually

infrequent and ecologically necessary. In non-drought years, western forests experience few fires big enough to affect the landscape. When

you add up all the acreage burned in the biggest fires over the past decades, it is a tiny fraction of the area historically shaped by fire. Most importantly, fires in California and across most of western North America are as natural as sunlight and rain, and have been burning in forests, shrublands, and grasslands regularly since the end of the last ice age. Natural fires include the low-burning small blazes that consume leaf litter and small saplings as well as the biggest, hottest fires that kill all the trees in a large area. In fact, the term “mega-fire” is just another name for a large fire. Not only are these fires natural, but they are ecologically necessary for the survival of many plant and wildlife communities. For these species, years with no large fires are bad fire years.

For many plants and animals large fires create the very best habitat. The occurrence of large forest fires creates special conditions—standing dead trees, fallen logs, re-sprouting shrubs, naturally regenerating conifer saplings, and nutrient-rich soils that set the stage for the new forest to follow. Because large, intense fires burned regularly over millennia, it is not at all surprising that many plants, insects, birds and other animals evolved to take advantage of these unique conditions. Many species are now dependent upon intense fire to create their prime habitat—habitat that is now much rarer than it was historically, due to fire suppression and post-fire logging.

The remarkable boom in plant and wildlife populations in the aftermath of large forest fires more than outweighs the negative effects from some

animals that prefer unburned or lightly burned forests. Moreover, contrary to popular myth, even large, intense forest fires move relatively slowly, unlike fires in grass-

lands and low-elevation chaparral (e.g., the Rim Fire of 2013 moved at less than one mile per hour on the fastest days, according to US government data); so, with rare exceptions, wildlife has little difficulty moving out of the way while fires burn.

Among the first to arrive after a large fire are the wood-boring beetles, who intently seek out heavily burned forests with specialized sensory organs that detect heat and smoke from miles away. They flock to the smoldering forest to lay their eggs on the bark of scorched trees—the more burned, the better. The eggs hatch into grubs (larvae) that burrow beneath the bark and eat sapwood for a few years before burrowing out again and flying off as adults.

This super-abundant food source hidden in the burned trees attracts a variety of woodpecker species. The woodpeckers, balanced upright on tree

trunks using their specialized stiff tails, can hear the grubs moving under the bark. The woodpecker excavates a hole, pokes in its long, barbed tongue, hooking the grub, and pulls out a

protein-rich meal, employing skills that would make any fly fisher envious. With reinforced skulls and ribs, and chisel-like beaks, woodpeckers—aptly called *carpenteros* in Spanish—are perfectly adapted for excavating nesting cavities in hard, dead trees,

For many plants and animals large fires create the very best habitat.

Wood-boring beetles flock to the smoldering forest.
