

Around the Region
continued from page 2

as the consequences of the mortality rate on the overall population. Prior to this year's deaths, the gray whale population was estimated at 27,000, a number considerably higher than the population when the 1999-2000 strandings occurred. Then, as many as 6,000 of the whales may have perished, according to Weller.

Although the cause of the millennial die-off was not determined, researchers since have brought better tools to bear in sleuthing such incidents. Techniques for analyzing tissue, blood and skin samples have advanced a great deal, Weller says. Additionally, the San Ignacio Ecosystem Science project now employs drones, which help greatly in documenting the health, size and overall body condition of whales. Weller and Swartz expect the current research triggered by the NOAA declaration to last two years or more.

In Mexico, gray whales (*Eschrichtius robustus*) generally stay in and near Baja California waters but travel south to locations including Puerto Vallarta's Banderas Bay during "cold years," says Mexican biologist Astrid Frisch. A sickly looking juvenile gray whale was spotted there this past season, but quickly departed the bay, probably in search of food, she says.

So far, no "Unusual Mortality Event" declarations have had to be made for humpback whales. But worries also are being expressed about the state of food sources for humpbacks. Though their food differs from that of the gray whale, humpbacks—like grays—feed intensively each year in northern waters before wintering off the Mexican coast and further south.

Concern about the health of gray and humpback whale populations, while primarily ecological, has an important economic dimension. The two spe-

cies are the star attractions of a growing Mexican ecotourism industry. (See "Whale-watch boom raising hopes in Mexico"—EcoAméricas, April '18.) Says Swartz: "At the end of the day, if the whales don't show up the local people are stuck."

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Solar power reaches remote indigenous villages in Brazil

Brazil's fledgling but fast-growing solar market is broadening its geographic reach as equipment prices drop and efficiency increases, with panels now popping up not only in rural areas but also on even more remote indigenous lands.

Currently accounting for just 1.1% of Brazil's installed capacity, solar power is expected to reach 4.5% by 2027, mainly due to the installation of large-scale photovoltaic parks, the government says.

In indigenous communities, what solar installations exist typically have been limited to small one-panel systems that power shortwave-radio communication among villages. Otherwise, indigenous communities have relied for the most part on diesel generators to provide electricity.

This, however, is notably not the case in the Xingu Indigenous Territory, a 10,200-square-mile (26,400 sq-km) Indian reservation in the western state of Mato Grosso. Inhabited by 16 tribes with a total of 6,000 members, Xingu is Brazil's largest indigenous producer and

user of photovoltaic power.

Solar power came to the Xingu through a project created by the Socio-Environmental Institute (ISA), a 25-year-old Brazilian environmental organization that promotes land protection and quality-of-life improvement for the Xingu and other indigenous communities.

In 2009, ISA began researching how Xingu villages might transition from diesel generators to solar power. In 2016, the group initiated a significant program of solar-panel purchases and installation to begin such a transition. Thus far it has used US\$1 million in national and foreign grants and donations to buy solar systems, transport them to the Xingu reservation and train the Xingu to install and maintain them.

Contributions to the project, called Xingu Solar, have come mainly from the Michigan-based Charles Stewart Mott Foundation, which provides grants for environmental projects. Other donations have come from Rainforest Foundation Norway, a conservation nonprofit headquartered in Oslo; the Norwegian Church Aid, an Oslo-based humanitarian organization; and Brazil's National Climate Fund, a government fund that disburses several hundred million dollars a year in loans and grants.

Xingu Solar now provides solar power amounting to 33 kilowatts-peak (kWp)—the quantity of electricity produced under optimum conditions—to 65 of 102 Xingu villages spread throughout their reservation. By year's end the project is expected to provide 60 kWp to those same 65 villages by increasing the number of installed solar panels in their systems.

Despite the near doubling of peak output this year, the total amount of solar energy to be generated under Xingu Solar will be very small—only enough to power 60

U.S. homes. Nearly all of the remaining 37 Xingu villages lack electricity—in most cases because they are new or very small; ISA thus far has not been able to raise funds to bring solar systems to them as well.

Most of the 65 Xingu villages with solar electricity have systems of two to eight panels. Community centers located in four of those villages have solar systems with up to 30 panels. The systems have reduced diesel consumption by 75% at these centers, which provide educational and health services for local residents and for smaller settlements nearby.

The Xingu put electric power to a variety of uses, ranging from well-water pumping and school lighting to health-center refrigeration of vaccines and anti-venoms.

The transition is reducing reliance on distant sources of expensive diesel fuel and cutting noise and air pollution, with carbon-dioxide emissions from diesel combustion currently at 600 metric tons annually—half the rate before solar-panels were installed. Says Marcelo Martins, ISA's Xingu Solar coordinator: "All of these solar benefits improve their quality of life."

Says Ianukula Kaiabi Suiá, president of the Xingu Indigenous Territory Association: "When diesel generators break down, we have to take them several hundred miles away to get fixed. Solar systems, which seldom break down, require much less and cheaper maintenance."

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