

The Future of Terrain Presentation at National Geographic Magazine

6th

ICA Mountain Cartography
Workshop

What we do: March 2008

WILDLIFE



This page features several illustrations of birds and insects. On the left, there are small photos of people. The main text is arranged in columns, with illustrations of a butterfly, a bird in flight, and a bird perched on a branch. A small circular inset shows a close-up of a bird's head.

WILDLIFE

Wildlife Progress



This page includes a map of Africa with various regions highlighted in different colors. Below the map is a photograph of three people standing together. The text is organized into several columns, providing information about wildlife progress.

WILDLIFE

WILDLIFE



This page features a map of Africa with a small illustration of a bird. Below the map is a photograph of several rows of yellow eggs in a wooden crate. The text is arranged in columns, discussing wildlife-related topics.

WILDLIFE

WILDLIFE



This page shows a photograph of a sunset over a body of water. Below it is a close-up photograph of a bird's head. The text is arranged in columns, with a small circular inset showing a globe.

WILDLIFE

WILDLIFE



This page features a circular map of Africa. Below the map is a photograph of a landscape with mountains and a river. The text is arranged in columns, providing information about wildlife.

WILDLIFE

WILDLIFE



This page is filled with detailed illustrations of various primates, including monkeys and apes, in different poses and activities. The text is arranged in columns, providing information about these animals.

WILDLIFE

WILDLIFE



This page features a 3D topographic map of a region, showing mountains, valleys, and a coastline. The text is arranged in columns, providing information about the region's geography and wildlife.

WILDLIFE

WILDLIFE



This page shows a photograph of a busy street scene with people, a motorcycle, and a yellow taxi. The text is arranged in columns, providing information about the scene and related wildlife topics.



A photograph showing a large crowd of people gathered on a beach. The ocean waves are visible in the foreground, and the crowd extends far into the background.



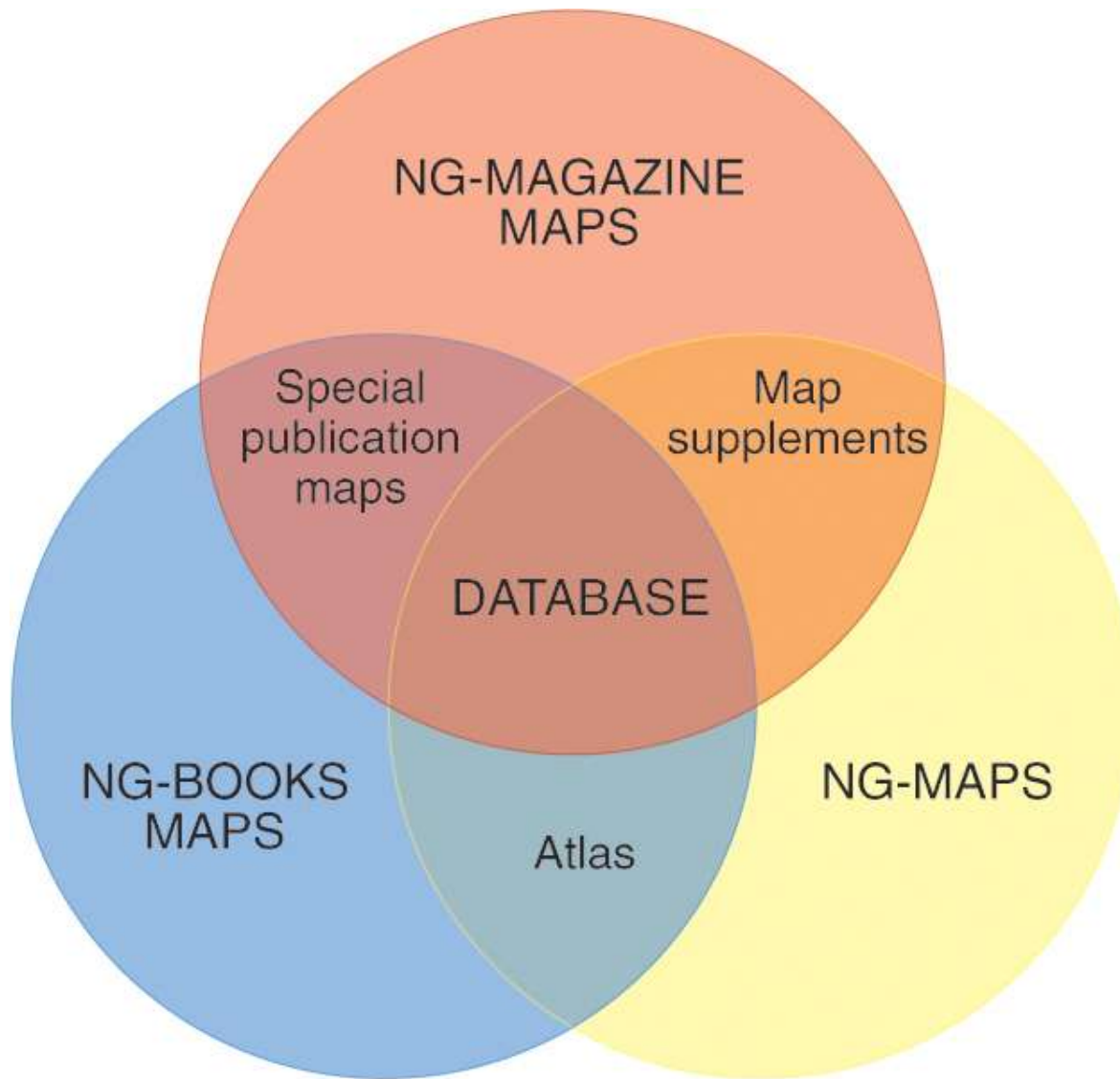
A photograph showing several people in a field, possibly engaged in an activity. Below the photo is a small map of Africa with a white line indicating a specific location.

WILDLIFE

WILDLIFE



This page features a map of Africa with the title "SHIFTING RAINS". The map shows various regions and is accompanied by text and a small inset map of the continent.



SIMPLIFIED ORGANIZATIONAL CHART

9 Magazine Cartographers

- 1 Director
- 2 Editorial cartographers
- 2 Cartographic researchers
- 1 Cartographic editor
- 1 GIS specialist
- 1 Production specialist
- 1 Cartographic designer



The Himalaya have long buffered Bhutan from political winds that rattled its neighbors but have also hampered its economic progress. Feudalism persisted until the 1950s, when the king abolished serfdom, redistributed land, and created the National Assembly.

backpacking hordes that have trampled Nepal.

On the eve of the millennium, in 1999, Bhutan granted its citizens access to television—the last country on the planet to do so. (The Internet trickled in the same year.) Euphoria reigned in the towns as the outside world in all its garish glory beamed into shops and living rooms. Pulling the lid off Pandora's box, however, raised concerns. What happens, after all, when an isolated, deeply conservative society is suddenly exposed to gangsta rapper 50 Cent and the World Wrestling Federation? Such questions carry extra weight in a vulnerable nation of 635,000 people, half of whom are under 22 years old.

Now comes the daring culmination of Bhutan's experiment: the move to democracy. Never before, say Bhutanese officials, has a beloved monarch voluntarily abdicated his throne to give power to the people. But in 2006 King Jigme Singye Wangchuck did just that, setting up an unusual convergence of

events in 2008: a coronation (the fourth king ceremoniously hands over the raven crown to his 28-year-old son, Jigme Khesar Namgyel Wangchuck, who will serve as a constitutional monarch); a centennial celebration (the monarchy's hundredth birthday was in 2007, but a royal astrologer deemed this year more auspicious); and, most important, the formation by this summer of the country's first democratic government.

The real test of Gross National Happiness, then, is just beginning. Bhutan's new civilian leaders will face a raft of challenges, not least of which is a public that remains enamored of its kings and skeptical of democracy. The outside world peers in, wondering if this once forgotten Himalayan nation might help answer some of humankind's most vexing questions: How can a society maintain its identity in the face of the flattening forces of globalization? How can it embrace the good of the modern world without falling prey to



Nicaragua. In depictions of this modern Latin American migration into the United States, the image of a great wave is often invoked, and Mexico's southern border today feels like the place in distant water where the wave first rises and swells and gathers uncontrollable propulsive force.

Before the Lópezes left Managua, they had heard the counsel repeated now in certain poor neighborhoods of Central America: If you are leaving for El Norte, find Padre Flor Maria Rigoni in the city of Tapachula, 20 miles north of the border, because the first dangerous crossing you will make is not the one that takes you into the United States. It is at the southern Mexican border where the perils begin—the thugs, the drug runners, the extortionists in official uniforms, the

Cynthia Gorney, a former Washington Post South America bureau chief, is a professor at U.C. Berkeley's Graduate School of Journalism. Alex Webb has photographed extensively in Latin America. His last National Geographic feature was on the Amazon.

police and migration agents who pack undocumented migrants into detention facilities before forcing them onto buses to be deported. The Tapachula migration station was recently rebuilt, to hold 960 migrants and process them more quickly; the southward-bound buses roll out every morning before dawn.

The Lópezes rode for hours in the 90-degree heat, Jessenia standing on blocks attached to both sides of the bicycle's rear wheel. She carried her shopping bag in the crook of her arm and kept her hands on Armando's shoulders as he pedaled, avoiding migration checkpoints by veering at intervals off the pavement and onto dirt paths. They had remarkably good luck. No one assaulted them with machetes or rifles or handmade pistols fashioned from PVC pipes stuffed with gunpowder; no one beat Armando and dragged Jessenia into the weeds; no one forced them to undress so that their body cavities and secret sewn-in clothing pockets could be examined for



DEFINING THE SAHEL: Lines linking areas of equal average rainfall bound a region whose northern and southern limits have fluctuated regularly over the centuries.

150,000 (SAH) (average 1950-1980)

100,000 (SAH) (average 1950-1980)

50,000 (SAH) (average 1950-1980)

20,000 (SAH) (average 1950-1980)

10,000 (SAH) (average 1950-1980)

5,000 (SAH) (average 1950-1980)

2,000 (SAH) (average 1950-1980)

1,000 (SAH) (average 1950-1980)

500 (SAH) (average 1950-1980)

200 (SAH) (average 1950-1980)

100 (SAH) (average 1950-1980)

50 (SAH) (average 1950-1980)

20 (SAH) (average 1950-1980)

10 (SAH) (average 1950-1980)

5 (SAH) (average 1950-1980)

2 (SAH) (average 1950-1980)

1 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

0 (SAH) (average 1950-1980)

UNEXPECTED GROWTH is used to help you see how much the quality of land in the Sahel has deteriorated during the past 50 years—less than 20% and 20% are productive. It is not surprising that the Sahel has experienced a significant increase in population. This may be partly because of the levels of carbon dioxide in the air have prevented plant growth, which otherwise the world's ability to feed itself, leading to food shortages. The data also suggest that in some countries, such as Mali, the Sahel's population has increased more than expected. Study the data from the map, including the population and water.

SHIFTING RAINS

THE SAHEL | In the transitional zone at the edge of the Sahara, Earth's largest desert, rainfall varies from 8 inches a year in the dry north to 24 in the southern south. Through much of the late 20th century, rising (warmer temperatures shifted) rainfall patterns, and the greater carbon dioxide (which is hot south (black dotted line) as it did from the 1930s to 1960 (red line). After the late 1960s the Sahel moved south and became drier. Grasslands turned barren, animals lost their herds, and in the northern Sahel, desert areas, so larger and more vegetation, limited some villages. Recently, rainfall has increased, and in many places, vegetation has. Scientists project that global warming will cause precipitation to become spottier and less reliable, with heavy and light rains at different times and in different places.

Population Density (persons per square km)

More than 1,000
100 to 1,000
10 to 100
1 to 10
0 to 1

Source: United Nations, World Population Prospects, 2004

Scale: 0 to 1000 km

0 to 1000 miles

0 to 1000 miles

0 to 1000 miles

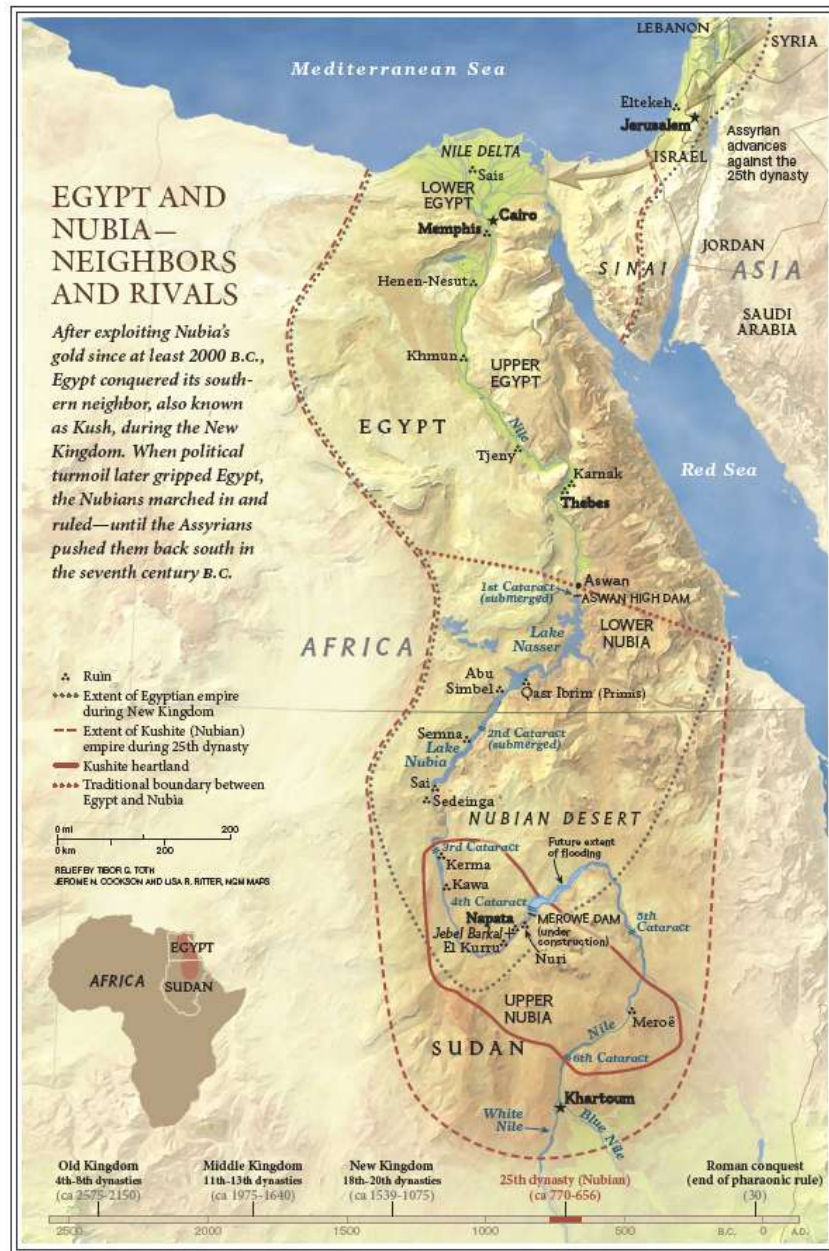
0 to 1000 miles

0 to 1000 miles

0 to 1000 miles

0 to 1000 miles

0 to 1000 miles



have to take care of this place, and then it will reveal itself to you.”

Her words echo in my ears a few days later as I slowly work my way across a crumbling pali (nā pali means “the cliffs” in Hawaiian) on the trail to the Kalalau Valley. Sweat falls in steady drops from my hat to the narrow trail, which wends a very fine line between a rock wall and a sheer 800-foot drop to the sparkling sea. Early Western visitors reported seeing Hawaiians running along these trails, sometimes two abreast. Today a parade of “flightseeing” helicopters buzz by like giant gnats.

Despite the difficulty of the trail, I pass several people coming and going, some of the half-million visitors from all over the world who flock here each year. The ones I meet include some serious hikers, a few college kids in bathing suits and sandals, and one or two obvious “Kalalau outlaws”—bearded men in their 40s or 50s with ragged clothes and furtive looks. These modern-day hermits live in the remote valley, eluding occasional roundups to evict them.

With abundant water, rich soils, and plenty of papaya, coconut, and java plum trees, Kalalau has provided refuge for many outcasts over the years. In 1893 several Hawaiians with leprosy

AS I WATCH THE SUN MELT INTO THE SEA, A PASSING SHOWER UNCOVERS A MAGNIFICENT RAINBOW. HOW COULD HUMANS TRASH SUCH A PARADISE?

moved their families to the valley to keep from being banished to the dreaded leper colony on Moloka'i. When the deputy sheriff of Waimea came to round up the sick ones, a well-known cowboy and crack shot named Ko'olau refused to go without his wife and son. The standoff lasted into the night, until shots rang out and the deputy fell dead. Hawaii's new provisional government, fresh from deposing Queen Lili'uokalani, feared an open revolt and sent the army after the cowboy. But Ko'olau evaded his pursuers in the cracks and crags of the valley, eventually dying there of his disease. “Ko'olau the Leper” became a modern folk hero of Hawaii.

Decades later another group of social outcasts sought peace in the valley—young hippies who spent years living off the land and communing with nature until eventually they were roused

out by the law. At a bend in the trail I meet one hiker of that generation and ask him if he'd been to Kalalau. “I was there in the 1960s,” he said with a warm smile. “It was pristine. Everybody ran around naked. But hey, it was the '60s!”

When I finally reach the magical valley with its folded cliffs and sinuous beach, the vibe is more frat party than nudist retreat. Dozens of campers, some apparently long-term, are scattered among the trees behind the beach. A group of college kids have a boombox blaring, and a woman with bright red hair is shaving her legs in the valley's famous waterfall. Bags of garbage, old coolers, and discarded tents are strewn about the campsites and sea caves, waiting for work crews to haul them out by helicopter—the greatest expense for the cash-strapped park.

“The challenge of managing Kalalau is its isolation, which is also its attraction,” state parks administrator Dan Quinn told me later. “If we'd get more people carrying out what they carry in, it would be a better experience for everyone.”

As I watch the sun melt into the sea, a passing shower uncorks a magnificent rainbow. How could humans trash such an earthly paradise? The fictional Shangri-la, as portrayed in James Hilton's 1933 novel *Lost Horizon*, was inspired

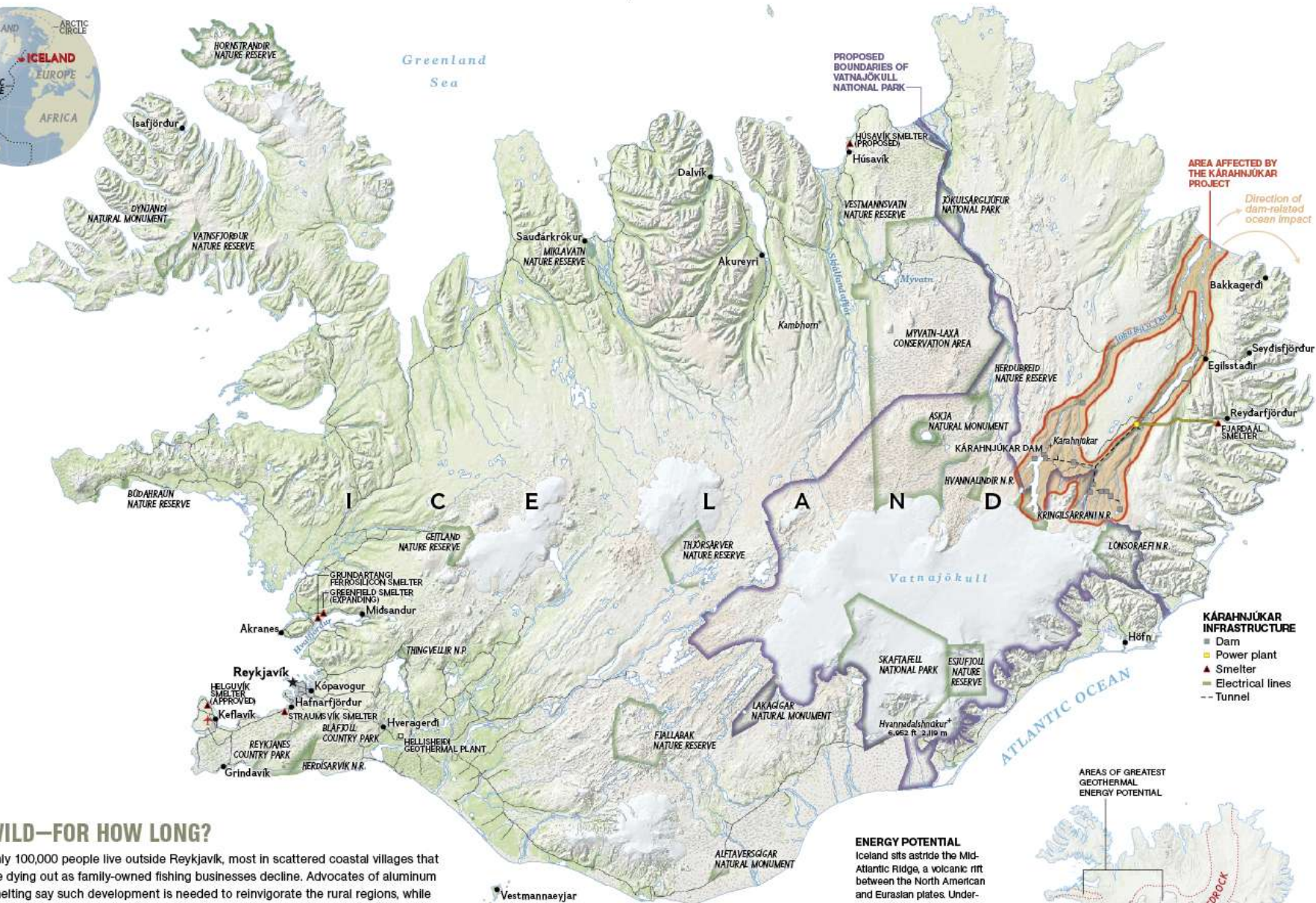
by the Buddhist concept of Shambhala, a mythical place of peace and tranquility reached by enlightened beings. Maybe we aren't there yet.

On my last day in Kalalau, however, I meet someone who seems well along the way. A young outlaw with a massive backpack bounds down the last stretch of trail as I'm starting the long climb out. He drops his burden at my feet, sprawls on the grass, and tells me his name is Eric. He's planning to stay for two months in a cave up the valley, foraging, meditating, and “getting centered” with the universe. “You go back up that valley and there are rock platforms, taro fields, sacred altars all the way up,” he says. “It was a metropolis in there! It's the land of the menhune, the ancient ones. It's primal!”

Eric is bright, articulate, and seems utterly at peace with himself and the world. We chat for a while, and then he picks up his 75-pound pack as if it were full of feathers and lopes down the trail, singing a joyful tune. “Enjoy your journey on planet Earth!” he shouts in parting. And for the rest of the day, I do.

► Pacific Apertures Explore Nā Pali's magnificent beaches and vistas, and find out where the images were taken in an interactive map at ngm.com.





AREA AFFECTED BY THE KÁRAHNJÚKAR PROJECT
 Direction of dam-related ocean impact

KÁRAHNJÚKAR INFRASTRUCTURE
 ■ Dam
 ■ Power plant
 ▲ Smelter
 — Electrical lines
 - - Tunnel

AREAS OF GREATEST GEOTHERMAL ENERGY POTENTIAL



WILD—FOR HOW LONG?

Only 100,000 people live outside Reykjavik, most in scattered coastal villages that are dying out as family-owned fishing businesses decline. Advocates of aluminum smelting say such development is needed to reinvigorate the rural regions, while environmentalists press for new national parks to support tourism, the fastest growing industry. Last year the government created Vatnajökull National Park (purple) to offset wilderness lost to Kárahnjúkar (orange), though most of it is ice.

ENERGY POTENTIAL
 Iceland sits astride the Mid-Atlantic Ridge, a volcanic rift between the North American and Eurasian plates. Underground water heated by molten rock warms 90 percent of homes, and glacial rivers can be dammed for hydroelectricity.



Vestmannaeyjar

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