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The Pew Charitable Trusts

Trust



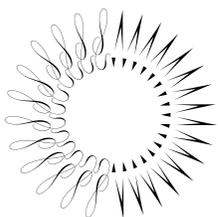
Parks in the Sea

How protecting vast regions
of water can save the ocean

Fall 2016 | Vol. 18, No. 3



AP Photo



TIME CAPSULE

“Invention is the key to progress,” said J.N. Pew Jr., seen on the left in 1942 examining an engine intended to save motorists as much as 40 percent in gas consumption. Pew was only 26 when he and J. Howard Pew, then 30, took the reins of Sun Oil Co. after the passing of their father J.N. Pew Sr. in 1912. Though young, the brothers were already proven leaders and innovators. J. Howard Pew had developed a profitable use for the heavy black residue left over after the company’s crude oil was refined, leading a team that turned it into a lubricating oil that poured better at low temperatures than anything on the market. Their creative, entrepreneurial spirit guided Sun Oil for decades—and continues to animate the work of The Pew Charitable Trusts today.

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Cover photograph by Tan Yilmaz/Getty Images

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The Pew Charitable Trusts is a public charity driven by the power of knowledge to solve today's most challenging problems. Working with partners and donors, Pew conducts fact-based research and rigorous analysis to improve public policy, inform the public, and invigorate civic life.

Pew is the sole beneficiary of seven individual charitable funds established between 1948 and 1979 by two sons and two daughters of Sun Oil Co. founder Joseph N. Pew and his wife, Mary Anderson Pew.

Knowledge Must Serve the Common Good



In 1931, Albert Einstein told students at the California Institute of Technology: “It is not enough that you should understand about applied science. ... Concern for man himself and his fate must always form the chief interest of all technical endeavors.” Today Einstein might use more gender-neutral language. But the values he wished to impart to young scientists—that knowledge must serve the common good and discovery must lead to action—demand even more attention and greater devotion in 2016 than they did 85 years ago.

Today it is more apparent than ever that the pace of scientific discovery and change continues to accelerate. Biomedical researchers are rapidly uncovering the deepest secrets of the human genome. Marine scientists continue to track the effects of human activity on our oceans. And there is new evidence that modern pharmaceuticals designed to manage pain can unintentionally lead to substance use disorders. This issue of *Trust* takes a deeper look at these trends.

Our oceans provide sustenance for billions of people and myriad wildlife—and produce more than half the world’s oxygen and absorb much of its carbon dioxide. In our cover story, you will learn how The Pew Charitable Trusts and its partners launched Global Ocean Legacy a decade ago to establish the first generation of marine parks, similar to what is often called America’s “best idea”—the national parks system created 100 years

ago. Setting aside large expanses of undisturbed ocean where no extractive activity is allowed provides the oceans, and the fisheries and coral they support, the opportunity to recover. The project’s work has resulted in the creation of nine very large parks in the sea, collectively covering an area two-thirds the size of the United States.

With only 3 percent of the world’s oceans set aside as marine parks—the International Union for Conservation of Nature says it should be 10 times that size—there is still much more to do. Nevertheless, Global Ocean Legacy’s success in protecting millions of square miles of ocean—including the recent expansion of the Northwestern Hawaiian Island Marine National Monument, also known as Papahānaumokuākea, to 582,578 square miles—is a remarkable achievement and one of many highlights in the long and distinguished career of Joshua S. Reichert. Joshua joined Pew 26 years ago and has led a growing portfolio of environmental initiatives around the world. The conservation legacy he built at Pew exemplifies what it means to perform consequential work for the benefit of others.

Advancements in science have also led to the development of opioids, which are often necessary to manage pain from illness or trauma. These drugs can be highly addictive. Since 1999, more than a quarter-million people have died from opioid drug overdoses. And too few of the millions more grappling with opioid dependence receive any treatment. This too requires a call to action. As we learn more about the addictive properties of these drugs, and why dependency is on the rise, we need new evidence-based strategies that will help address the crisis. In this issue of *Trust*, you will read about the impact of this growing problem—and Pew’s efforts to develop and support state and federal policies that improve the effectiveness of treatment for drug and alcohol use disorders.

Cutting-edge biomedical science is the first step toward finding new therapies to prevent and treat serious diseases. But now researchers also are turning their attention to enhancing human health using innovations that can—or someday might—make people’s minds sharper and their bodies stronger. A Pew Research Center survey finds that most Americans are

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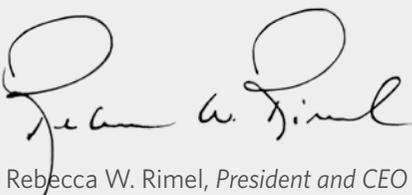
Ned Drummond

wary of these applications of science and technology. For example, 68 percent of people were “very” or “somewhat” worried about using gene editing to reduce babies’ risk of developing a serious disease during their lifetimes. Furthermore, at least 7 in 10 respondents predicted that these technologies would become available before they were fully tested or understood.

This sort of “human enhancement” is now at the doorstep of the biomedical sciences. And like ocean parks and opioid addiction, discovery must lead to informed and well-reasoned action. And in this case, it’s especially clear that the public wants the path forward to include a careful examination of the ethical and moral implications of using technology to intervene with the course of nature.

We need to make sure that discoveries and “technical endeavors” are always used to benefit humankind.

In September, Manu Prakash, a 2013 Pew biomedical scholar, was named a MacArthur fellow in recognition of his outstanding scientific contributions as well as his creation of ultra-low-cost scientific tools, including a working microscope made of paper. Explaining his vision for science in *The Washington Post*, he said, “The goal is not to just demonstrate that something is possible, but also to demonstrate that with minimal resources it can be available to the broadest group of people.” This should be our vision too: to ensure that our “technical endeavors” and breakthrough discoveries—made through hard work and rigorous research—are used wisely for the benefit of the people and the planet, and our common good.



Rebecca W. Rimel, *President and CEO*

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THE BIG PICTURE

Thousands of food processing plants throughout the nation, like this popsicle maker, are developing safety plans to identify possible points of contamination and how to mitigate them. That's thanks to a new Food and Drug Administration rule that took effect for large facilities in September after advocacy from Pew and others. The rule implements the FDA Food Safety Modernization Act, which also allows the agency for the first time to stop a facility from distributing potentially tainted products—before a single person gets sick.



The newly-designated Katahdin Woods and Waters National Monument spans more than 87,000 acres of mountains and forests in the North Maine Woods. *Zack Frank/Shutterstock*

New National Monuments on Land—and in the Sea

BY JOHN BRILEY

Roughly 150 miles offshore from New England's rocky coves and sandy beaches lies a dramatic landscape beneath the waves. Steep canyons, one of them deeper than the Grand Canyon, plummet more than 8,000 feet to the deep ocean floor, where they meet a chain of extinct volcanoes that rise thousands of feet—the only underwater mountains along the East Coast. These canyons and seamounts are home to a marine wonderland teeming with rare corals, sharks, whales, seabirds, fish, and invertebrates. As of Sept. 15, the region has another distinction: It is the first marine national monument in the Atlantic Ocean.

The Northeast Canyons and Seamounts Marine National Monument, for which Pew advocated and which President Barack Obama designated, covers

4,913 square miles of remarkable topography. Powerful currents scour the rock walls of the canyons and seamounts, revealing the hard surfaces that deep corals need to gain purchase. Scientists studying the area have documented coral species found nowhere else in the region. These corals, in turn, attract many other species, building biodiversity hotspots for a wide range of animals, from protected species such as Kemp's ridley sea turtles to marine mammals including endangered fin, sei, and sperm whales.

The designation by President Obama spares these habitats and wildlife from the threat of fishing, drilling, and seabed mining, and offers a refuge for them to better weather the effects of climate change. Ocean temperatures in the Northeast are forecast to rise nearly

three times faster than the global average, according to the National Oceanic and Atmospheric Administration, and recent research found that, in the past decade, the area has warmed faster than 99 percent of the world's ocean.

Studies show that warming waters threaten a number of fish species in the region, including cod, lobster, and scallops. Warming can drive down fish populations in numerous ways. It can reduce or change the timing of plankton blooms that fish rely on for food; it can force fish to expend more energy to regulate their body temperatures, leaving them weak and vulnerable to a range of threats; and it can drive fish to seek deeper, colder water in new habitats that could be less suitable in other ways. Marine reserves can serve as refuges for species under stress, allowing them a place to build their numbers and adapt to the shifting conditions.

The Commerce and Interior departments will jointly manage the new monument.

In August, President Obama declared two other monuments—the Papahānaumokuākea Marine National Monument, in the Northwestern Hawaiian Islands (see Page 10), and Katahdin Woods and Waters National Monument, about 220 miles north of Portland, Maine. That land, which was donated through the federal

government by Ellitsville Plantation, a private foundation, offers outdoor activities from hiking, canoeing, and hunting to mountain biking, fishing, cross-country skiing, and snowmobiling.

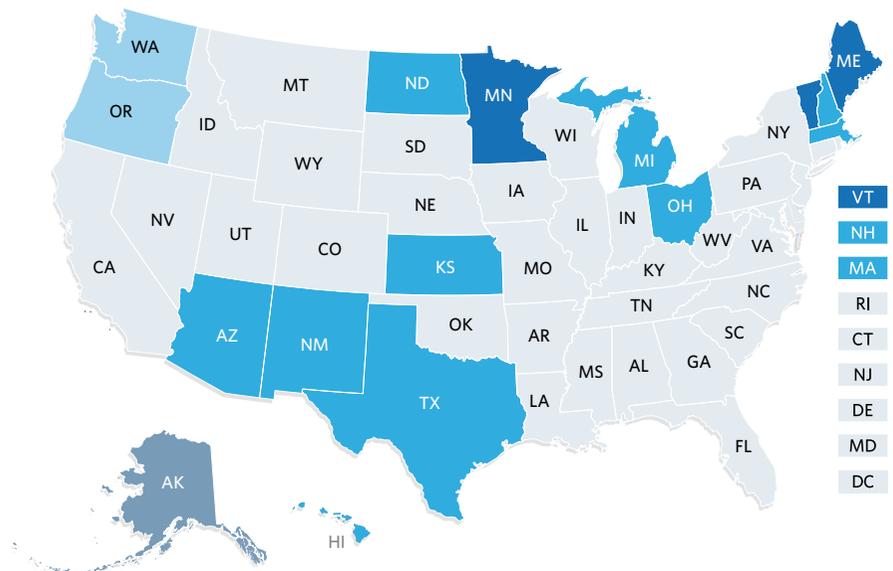
More than 200 Maine businesses and a range of citizens and interest groups backed the monument designation, including the Katahdin Area Chamber of Commerce, the Katahdin Area Rotary Club, the Greater Houlton Chamber of Commerce, the Bangor City Council, and the Maine Innkeepers Association. Studies show that the protected area will be a boon to the local economy, creating much-needed jobs and attracting tourists from around the world.

In the book *The Maine Woods*, Henry David Thoreau marveled at the untamed beauty of the region, much of which is relatively unchanged today—even after decades of logging.

“Katahdin Woods and Waters still harbors the virtues that drew Thoreau to this area more than 150 years ago,” says Mike Matz, who leads Pew’s work to protect public lands. “Locals and visitors seek out places like this for solitude, healthy recreation, and a connection to the natural world that is increasingly elusive. Protecting this area in perpetuity gives people a chance to find all of those things today and far into the future.”

Dental Therapists to Expand Care in Vermont

In June, after a five-year campaign by the Vermont Oral Health Care for All Coalition, Vermont became the third state to authorize the practice of dental therapy. It now joins Maine and Minnesota in allowing dentists to hire these midlevel providers, who function much as physician assistants do in medical practices. Dental therapists are also authorized to work with dentists caring for Native American tribes in Alaska, Oregon, and Washington.



Dental therapy policies by state

- Does not allow dentists to hire dental therapists
- Actively exploring authorizing dental therapy
- Allows dentists to hire dental therapists
- Alaska native tribes have authorized dental therapy
- Tribal access authorized and statewide use under consideration

Like millions of people across the country, many Vermonters have limited access to oral health care. Nearly 100,000 people in the state went without care in 2011 and 2012, and 38 percent of children covered by the state's Medicaid program received no dental health services in 2014.

"Dental therapy is such a powerful antidote to our state's dental care crisis because it puts providers in communities where people struggle to get the care they need," Representative Kiah Morris (D-Bennington) wrote in a *Bennington Banner* op-ed supporting the legislation. "Once they graduate, dental therapists will be able to practice in a range of settings, such as community health centers, school-based health clinics, private practices, nursing homes, and mobile dental vans."

Under the new law, which received strong backing

from legislators and Governor Peter Shumlin, dental therapists in Vermont will work under the supervision of dentists, either in the same office or remotely, with the help of telehealth technology. This flexibility will allow dental therapists to provide care to underserved people in a range of private and public settings.

Vermont Technical College plans to educate the state's dental therapists. The proposed curriculum will extend the college's dental hygiene education—the only such program in the state—by one year, creating a four-year dental therapy program.

Pew was a member of the coalition that advocated for the new law as part of its campaign to close the gaps in access to dental care by increasing the number of providers and expanding oral health services.

—Daniel LeDuc

Readers Still Like Print Books Best

Americans have more ways to read than ever before, with a range of formats and digital devices. Yet the share of U.S. adults who have read a book in the last 12 months has stayed steady in recent years at 73 percent.

The Pew Research Center surveyed Americans about their reading habits for its report *Book Reading 2016*, released in September. It also found, says report author Andrew Perrin, that "when people reach for a book, it's more likely a traditional print book rather than an e-book."

Sixty-five percent of those surveyed said they read a print book, though a sizable share read books in both print and digital formats. "Print still remains front and center in the book reading world, but there has been real change in use of e-books over the past five years," Perrin says. The share of book readers using tablet devices has tripled, and the percentage reading on phones has doubled. But the share using specific e-book reading devices has remained constant.

The study also found that college graduates are about four times as likely to read e-books and about twice as likely to read print books or listen to audiobooks compared with those who have not graduated from high school.

The research center has been studying American reading habits and the role of public libraries in the digital age over the past several years with support from the Bill and Melinda Gates Foundation.

—Daniel LeDuc

Just 6% of Americans are digital-only book consumers

% of U.S. adults who have in the last 12 months:



Note: "Digital books" includes e-books as well as audio books.

Source: Pew Research Center



When newcomers unpack in Philadelphia, they're likely to do it in Center City and the surrounding neighborhoods. A Pew study also found that new arrivals are younger and better educated than the city's population as a whole. *Katye Martens*

The Changing Face of Philadelphia

Each year as new people move in and some residents move out, Philadelphia changes just a bit.

To grasp what these changes mean for the city, Pew's Philadelphia research initiative examined data from the U.S. Census Bureau and the Internal Revenue Service. The analysis, released in July, found that even though the city has been growing modestly in the past decade, there is actually little turnover when compared with other big cities. For instance, newcomers in 2013 (the most recent year with available data) amounted to less than 3 percent of Philadelphia's overall population; in Denver it was 9 percent, in Washington almost 6 percent, and in Baltimore about 5 percent.

Most new arrivals gravitated toward Center City and its surrounding neighborhoods. They tended to be younger and better-educated than the city as a whole—more than half of the newcomers 25 or older had bachelor's degrees, which is nearly double the share of the city overall.

"We first looked at city migration in 2010," says Larry Eichel, who directs the Philadelphia research initiative. "Examining these population patterns helps policymakers as they plan the city's future—and it allows all Philadelphians some new insight into their city."

Among other findings: Half of the new arrivals are non-Hispanic white, while 36 percent of city residents fit that description. African-Americans, who represent

42 percent of Philadelphia's population, account for just 20 percent of newcomers. The Hispanic share of both new arrivals and the general population is about the same, at around 13 percent; the number of Asians moving to the city was too small to produce reliable data.

"We also looked at those people leaving," Eichel says. "In several ways, they look a lot like those coming in: better-educated than the city as a whole, with a higher percentage of whites and a lower share of African-Americans." But those leaving stand out in one key respect: age. Departing residents outnumber new arrivals in several age groups, including 0-17 and 35-49, both of which include many school-age children and their parents.

"We decided to build on this research and examine another aspect of migration in Philadelphia: who is moving from one place to another within the city's boundaries," Eichel says. "According to the latest census data, covering 2011-13, an average of 156,900 people moved within Philadelphia each year—that's far more than the number of those coming into the city or leaving it."

The analysis showed that these people more closely resembled the population of Philadelphia as a whole in terms of educational attainment, age, and household composition. But those moving within the city were more likely to be poorer or living with children under 18 than the city's overall population, and they stood out from all three groups—the overall population and those arriving and leaving—in terms of ethnicity: Nineteen percent were Hispanic, compared with 13 percent of arrivers, leavers, and residents.

—Daniel LeDuc



A LEGACY IN

Over the past decade, the Global Ocean Legacy partnership has spurred the creation of nine enormous marine reserves, conserving more than 2.4 million square miles.

By John Briley

A tropical beach scene with a clear blue sky, turquoise water, and a sandy shore. The text 'THE MAKING' is overlaid in white, outlined letters across the middle of the image.

THE MAKING

**Turtle Beach on Midway Atoll,
now included in the expanded
Papahānaumokuākea Marine
National Monument.**
Saul Loeb/Getty Images

"Our duty," said President George W. Bush, "is to use the land and seas wisely, or sometimes not use them at all."

He was speaking, on June 15, 2006, at a ceremony establishing the largest ocean reserve in the world, the Northwestern Hawaiian Islands Marine National Monument. In the ensuing decade, the monument—renamed Papahānaumokuākea in 2007—would be eclipsed in size eight times by other large, permanently protected marine areas around the globe.

But it regained its mantle Aug. 26, when President Barack Obama expanded the monument to cover an area nearly four times the size of California, making it the largest permanently protected area in the world. "If we're going to leave our children oceans like the ones that were left to us, we're going to have to act boldly," President Obama said. "We cannot truly protect our planet without protecting our ocean."

This decade-long bipartisan appreciation for the ocean has helped fuel momentum around the world to create great parks in the sea. Papahānaumokuākea is one of a growing number of large, highly protected marine reserves that could very well determine the future health of the ocean—and the planet itself.

With the oceans providing sustenance for billions of people and myriad wildlife, preserving these waters has never been more essential. In 2006, The Pew Charitable Trusts and its partners launched the Global Ocean Legacy project to promote the world's first generation of permanently protected marine reserves. These reserves are modeled on the same notion that led to the establishment of Yellowstone National Park in the United States in 1872, which in turn has inspired more than 100 countries to create over 1,800 land-based parks. "It would be a tall order if you tried to create Yellowstone today, but look at what it has meant to the world," says Pew's Matt Rand, who directs Global Ocean Legacy. "And that's what we are doing for the oceans."

In the past half-century, some species of sharks and other large predatory fish have declined by 90 percent or more. Experts estimate that up to 1 out of every 5 fish taken from the ocean is caught outside the law. And the United Nations estimates that 88 percent of the world's fish stocks are fully exploited or overexploited.



The Coral Sea marine reserve created by the Australian government hosts more than 400 species of fish—70 of them found nowhere else. *Daniela Dirscherl/Getty Images*

In establishing large marine reserves, governments typically ban fishing, seabed mining, and drilling. This leaves expansive areas of undisturbed waters where marine life can feed, breed, and thrive, with the beneficial effects spreading far outside the protected areas to the rest of the ocean.

Starting with the 2006 Hawaii designation, Global Ocean Legacy has worked with governments and local residents to protect more than 2.4 million square miles of ocean, an area roughly equivalent to two-thirds of the land area of the continental United States.

Those who live near the reserves often have the deepest appreciation for the protections because their local culture and history are intertwined with the sea. "I know extinction, and I know what it looks like, feels like, and smells like," says Nainoa Thompson, who grew up on Oahu and is now renowned as a master of the ancient Polynesian art of open-ocean navigation. "When we see Papahānaumokuākea, we go back to a place that—because it is protected—we can see what the ocean is supposed to look like, what it's supposed to feel like."

Collectively, these reserves harbor thousands of plant and animal species. The sanctuaries include the deepest



The Parks

PAPA HĀNAUMOKUĀKEA

LOCATION
25.7277° N, 170.4549° W

GOVERNMENT
United States

AREA
140,000 sq mi / 363,000 sq km

MARIANAS

LOCATION
17.7500° N, 142.5000° E

GOVERNMENT
United States

AREA
79,000 sq mi / 206,000 sq km

CHAGOS

LOCATION
6.0000° S, 72.0000° E

GOVERNMENT
United Kingdom

AREA
247,000 sq mi / 640,000 sq km

CORAL SEA

LOCATION
19.3920° S, 155.8561° E

GOVERNMENT
Australia

AREA
382,000 sq mi / 990,000 sq km

PACIFIC REMOTE ISLANDS

LOCATION
15.6178° N, 171.5158° W

GOVERNMENT
United States

AREA
493,000 sq mi / 1,278,000 sq km

PITCAIRN

LOCATION
24.3768° S, 128.3242° W

GOVERNMENT
United Kingdom

AREA
322,000 sq mi / 834,000 sq km

KERMADECS

LOCATION
29.2667° S, 177.9167° W

GOVERNMENT
New Zealand

AREA
239,000 sq mi / 620,000 sq km

EASTER ISLAND

LOCATION
27.1130° S, 109.3496° W

GOVERNMENT
Chile

AREA
244,000 sq mi / 631,000 sq km

PALAU

LOCATION
7.5150° N, 134.5825° E

GOVERNMENT
Palau

AREA
193,000 sq mi / 500,000 sq km



Ralf Hettler/iStockphoto



chasm in the ocean, the Marianas Trench, which plunges to 36,069 feet below sea level; 142 species found nowhere else on Earth but in waters around Easter Island; and 5,000-year-old coral in the Pacific Remote Islands Marine National Monument. The reserves also include millions of square miles of ordinary ocean habitat that, Rand says, need protection just as much as more spectacular marine features do.

“All of the world’s ecosystems are interconnected, and none is more important than the others,” he says. “By protecting a water column 150 miles from shore, we are giving a hand to coral polyps that could migrate to expand a reef. A mudflat provides habitat for species that are prey to larger creatures, and that’s a critical role in the ocean food web.” The Global Ocean Legacy sites reflect this diversity because, as Rand says, “in nature, nothing happens in isolation.”

In addition to providing benefits far beyond their boundaries as fish and mammals travel to neighboring waters, large marine reserves serve as buffers against the effects of ocean warming. Reserves don’t stop that warming or ocean acidification but do offer areas that are more resilient—because the ecosystem is intact and in

a natural balance free of fishing, seabed drilling, and other threats—where plants and animals are better situated to weather the effects of global climate change.

The nine refuges promoted by Global Ocean Legacy have been announced by the governments of the United States, the United Kingdom, Chile, New Zealand, Palau, and Australia. The project has focused on waters controlled by stable governments, with political leaders who are interested in conservation, to help ensure that the reserves last and are monitored and protected. Once a location is identified, project staff members work with scientists to identify particularly sensitive habitats or waters with remarkable features, which often helps generate public and political support for protecting such places.

Then what is often the most difficult work begins: identifying and seeking common ground with the groups that have an interest in the area considered for protection. These can range from islanders and artisanal fishermen to well-funded lobbying groups and multinational companies. With some stakeholders, it is easy to reach agreement, because a reserve can, for example, safeguard local fishing grounds from incursions by massive foreign-flagged



Getty Images

Left: The Chilean government created a marine reserve in the waters surrounding Easter Island, which is home to the iconic, centuries-old statues called moai. Above: The beaches and waters of the Chagos Archipelago in the Indian Ocean are some of the cleanest places on Earth and are now protected as a marine reserve.



This species of anemonefish is found only in the Chagos Archipelago.

iStockphoto

trawlers. With others, the effort to reach consensus can stretch on for years.

To win broad support for the Pitcairn Islands reserve, for instance, Global Ocean Legacy representatives traveled, numerous times, by plane and boat for days to reach the isolated area, where they met with local leaders. They also arranged meetings in London between those representatives and U.K. politicians, sessions that helped reassure British leaders of the islanders' desire to protect their waters.

To gain momentum for the Marianas Trench Marine National Monument, the project worked with descendants of the Chamorro and Carolinian people who settled the region as long ago as 4,000 B.C. They were eager for the opportunity because it gave impetus, says Ignacio Cabrera, chairman of the Friends of the Mariana Trench Monument, for the "revival, rejuvenation, and restoration, not just of the terrestrial and marine environment, but also of the Chamorro identity."

For all the scientific research and hard work that must be done, serendipity can play a role, too. During an aftershock that followed a major earthquake in Chile in 2015, participants in an international ocean conference sheltered in a government building in Santiago. They included a Pew staffer who introduced William Aila, a Hawaiian kapuna, or elder with strong ties to the islands' fishing communities, to Christy Goldfuss, managing director at the White House Council on Environmental Quality.

Chilean President Michelle Bachelet had just announced that her country would establish marine reserves totaling over 400,000 square miles (1 million square kilometers), including a Global Ocean Legacy site around Easter Island. Goldfuss and Aila agreed to work together, with Hawaiian stakeholders and Pew personnel, to create an even bigger sanctuary in U.S. waters. The result was this year's Papahānaumokuākea expansion.

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From its start 10 years ago, Global Ocean Legacy's effectiveness has depended upon the strong partnerships that have supported and nurtured the project's efforts. The partners knew that they would have greater leverage and opportunity to accomplish their goals by combining resources and sharing expertise. Through regular meetings, site visits, and one-on-one interactions with the project staff, the partners helped provide broad oversight and weighed in on the strategic direction of the project.

The Papahānaumokuākea expansion has now brought the Global Ocean Legacy project full circle—its first location expanded into the world's largest permanently protected park in the sea, a bipartisan achievement as a Democratic president built upon the legacy of a Republican president. In celebration of a decade of



Former first lady Laura Bush, a longtime advocate for protecting the world's oceans, was a featured speaker at a Washington dinner hosted by Pew to honor the Global Ocean Legacy partners for a decade of conservation success.

Lee Gillenwater/The Pew Charitable Trusts

collaboration, Pew hosted a dinner in Washington in September to honor the Global Ocean Legacy partners that included remarks from two leading champions of the ocean, Secretary of State John F. Kerry and former first lady Laura Bush, as well as a short documentary film narrated by Sir David Attenborough. (See the film at globaloceanlegacy.org.)

Ten years on, Global Ocean Legacy can look back on a body of work that has helped protect more than 3 percent of the world's ocean. But experts at the International Union for Conservation of Nature and other scientists say it is essential to safeguard 10 times that area to keep the ocean healthy and productive into the future—so there is much more to do.

In the new year, Pew is joining with the Bertarelli Foundation to launch the Pew Bertarelli Ocean Legacy project, a \$30 million partnership that will seek to create six more great parks in the sea by 2022. The Bertarelli Foundation has long been concerned with the ecological threats facing the ocean. It lent significant support to a Global Ocean Legacy campaign to secure creation of the British Indian Ocean Territory Marine Reserve (Chagos) in 2010, and has supported ongoing enforcement and scientific research of the reserve since then. Dona Bertarelli, who co-chairs the foundation with her brother Ernesto, also played an active role in winning designation of the reserve near Easter Island.

"This is an important and exciting new chapter in Pew's work to protect the ocean. The Bertarelli Foundation is a well-established champion for the sea, and we're energized about the future," says Rand. "We have so much more to accomplish."

John Briley is a Trust staff writer.

GLOBAL OCEAN LEGACY 2006–2016

The Pew Charitable Trusts would like to acknowledge the following partners for their generous and critically important partnership in creating the world's first generation of large-scale marine reserves:

Bloomberg Philanthropies

Lyda Hill

Oak Foundation

Robertson Foundation

Sandler Foundation

The Tiffany & Co. Foundation

Waitt Foundation



Thousands of Americans die from

opioid





Julia Pinsky's 25-year-old son, Max, died from an overdose after struggling with heroin use for several years.

Pew wants that to change, and is seeking ways to reduce inappropriate opioid use and increase treatment for people with substance use disorders.

overdoses each year

By Rob Waters | Photography by Thomas Patterson

Michelle Marikos' odyssey in the world of pain and addictive narcotics began 13 years ago at a party with her sorority sisters at California State University, Chico. One of them, who'd had too much to drink, shoved Marikos off a second-story balcony.

She was diagnosed with whiplash at a local hospital and sent home with a handful of pills, including muscle relaxants and morphine tablets. But she woke up the next morning in so much pain she could barely move, and in quick succession saw an osteopath and a neurologist—who told her that she had three crushed vertebrae and sent her to a surgeon in her hometown of Medford, Oregon.

The surgeon put her in a brace and gave her more drugs. He eventually advised against surgery, and Marikos spent the next eight years “in a haze”—taking ever-larger doses of medications in an endless cycle of pain and pills.

She took OxyContin, a powerful opioid; Percocet, a drug that combines oxycodone and acetaminophen for so-called breakthrough pain; muscle relaxants; anti-inflammatories, in high doses; anti-nausea pills; and stool softeners to minimize the constipation caused by the medications. Like most patients prescribed opioids, she says she was given no detailed information about the risks.



Julia Pinsky

She wonders if Naloxone could have saved her son. If administered soon enough after an overdose, the drug can bring a person back to consciousness. Many substance use disorder programs give it to opiate users and some police departments issue it to patrol officers. Still, says Pinsky, “we need to get it into the hands of drug users and family members, loved ones, girlfriends. Too many people don’t know what it is.”



Daniel Epting

He spent almost 30 years as a drug user, shoplifter, and prison inmate before getting clean eight years ago and becoming a peer counselor at a Portland recovery program. “They pay me to be myself and to help people navigate the system,” he says. “I have a 9-year-old daughter that’s never seen me loaded. I can’t begin to tell you how grateful I am.”

At the other end of Oregon, Sam Hancos took a different path to opioid misuse. He was 13 years old, seeking to dull the emotional anguish of his parents’ disintegrating marriage, when an older sister’s friend offered him OxyContin.

“I wanted acceptance,” he says. So he took it.

He quickly moved from taking OxyContin pills to crushing and smoking them. The high came fast that way—the drug speeding to the opioid receptors—but

wore off quickly, too, surging and receding in his brain like a roller coaster. After a week of daily smoking, Hancos woke up with a fever and sweats, his brain and body craving fresh drug. “I was addicted,” he says. He hadn’t yet turned 14.

He cut classes to get high, but says no counselor or teacher ever asked after him. He kept his parents in the dark and sold possessions to get the \$60 he needed to buy each OxyContin pill on the street. Then a friend



Lisa Greenfield

Now 23, she snorted, smoked, or shot up heroin and methamphetamines for five years but has been clean for more than 8 months. She lives in a Portland treatment center and now hopes to become a peer support specialist “It’s so nice,” she says, “to feel welcome, and wanted, and needed.”

offered to get him a drug for \$20 that would be even better than OxyContin. Hancos tried it—and loved it. It took a week before he realized that he was using heroin, a drug he’d sworn never to try.

Hancos’ next few years were horrific: He cycled in and out of treatment and homelessness, shoplifting and “doing whatever I could to get money.” When he was 21, his best friend died of an overdose. Hancos discovered his body.



In 2006, Jackson County, Oregon, medical director **Jim Shames** learned that one person a week was dying from overdoses in his county. “I said, ‘Oh my God, what’s happening? Why aren’t people screaming this from the bell towers?’”

The next year, it was almost Hancos’ turn. He injected heroin with friends and suddenly found himself unable to speak. His girlfriend noticed that he was about to pass out and dragged him into the shower to keep him awake.

That day was a turning point for Hancos. The next day, he went to a treatment center in Portland to manage his withdrawal symptoms and begged his parents to help him get follow-up care. They found a Christian recovery center in Bend, where he spent eight months and, away

from bad influences, stayed clean. Things looked hopeful: He returned to Portland and got a job. But then he got laid off and started the cycle of heroin and homelessness again. His battle with opioids was not over.

Stories like Marikos' and Hancos' are being repeated with alarming frequency throughout the nation. Since 1999, more than a quarter-million people have died from opioid drug overdoses. In 2014 (the year for which the most recent data are available), after 15 years of steady increase, almost 130 people died each day; the death toll in Oregon that year reached 522, a 13 percent spike from 2013. Most of the Oregon deaths involved opioids—whether the prescription pain relievers taken by Michelle Marikos or the black tar heroin used by Sam Hancos.

In fact, since 2009, prescription drug and heroin overdoses have been the leading cause of injury-related death in the U.S., surpassing even automobile crashes—prompting The Pew Charitable Trusts to begin, in 2014, a research and policy initiative to address the opioid epidemic.

"We saw that many states, especially those with large rural communities, were losing people to overdoses at an alarming rate," says Cynthia Reilly, a pharmacist who is director of Pew's substance use prevention and treatment initiative. "We knew that solving this problem would require a coordinated, multifaceted response from local, state, and federal officials."

Nationally, only about 10 percent of the people who need treatment actually get it.

To address this public health problem, Pew identified two major priorities: reducing the inappropriate use of opioids and greatly increasing the ability of people with substance use disorders to get treatment. "There's a sizable treatment gap," Reilly says. "Nationally, only about 10 percent of people who need treatment actually get it."

Oregon represents a case study: It is close to the national average in the number of people struggling with dependence on illicit drugs and the number who need but are not receiving treatment. "We're working to improve access to care, but the availability of treatment has not kept pace," says John McIlveen, operations and policy analyst with the state's Opioid Treatment Authority.

At the federal level, President Barack Obama signed into law in July the bipartisan Comprehensive Addiction and Recovery Act of 2016, which he termed a "modest" effort to address the opioid epidemic. Among other

steps, it authorizes state grant programs to expand treatment access, and it renews a grant program to help states maintain prescription drug monitoring programs—databases that can identify patients who may be overusing opioids. Not enough doctors or other prescribers use those programs, mostly because they can be difficult to access. Pew is researching the effects of strategies intended to make these systems easier to use.

What the bill does not do, says U.S. Senator Ron Wyden (D-OR), is provide new funding for those treatment programs. "The opioid crisis has hit communities all across the nation like a wrecking ball," he says. "With thousands of people on waiting lists for weeks or months before they can get treatment, it's time to [provide] funds so that people actually can get help."



The explosive rise in opioid use in the U.S. began in the 1990s when doctors started prescribing them to relieve a range of pain issues. Sales of prescription opioids nearly quadrupled between 1999 and 2014, with much of that increase driven by OxyContin and other opioids.

In Oregon, more than 900,000 people were prescribed opioids in 2013—the last year for which data are available—with each person getting an average of four prescriptions during the year. Altogether, more than 100 million pain pills were prescribed in the state that year. As prescriptions spiked, the pain pills flooded the streets, where people like Sam Hancos could buy them.

Some patients who used their medicine as directed realized that they could make \$40 or more for each leftover pill. A few turned it into a business. One study of so-called doctor shopping estimated that in 2008, a small group of patients—less than 1 percent of those getting the drug—filled an average of 32 prescriptions each from multiple physicians, obtaining the equivalent of 275,000 40-milligram oxycodone tablets.

The second spark for the epidemic was the emergence in the mid-1990s of cheap black tar heroin. Low-level dealers brought the drug from western Mexico to the U.S., where it flooded western and rural areas in particular. People who could no longer afford oxycodone turned to the cheaper, illegal opioid.

According to Jim Shames, a physician and addiction specialist, underlying both factors is the fact that brain physiology and environmental influences, such as childhood neglect or physical abuse, play a substantial role in the development of substance use disorders. "Childhood trauma," Shames says, "is a remarkable predictor of people who are going to have chronic pain, lose control of opioids, and find themselves in the same amount of pain but with a monkey on their back."

From his perch as medical director for Jackson County, of which Medford is the county seat, Shames had a front-row



As overdose deaths increased, Jackson County medical director Jim Shames helped create Oregon Pain Guidance, a group that educates doctors on how to work with pain patients and limit the opioids they prescribe.

seat to the rise of the opioid epidemic. Like many people, he says he missed the early signs. Then, in 2006, the state's medical examiner told him that Jackson County was losing about one citizen a week from pain pill overdoses. "I sat down in his office, and he pulled the charts," Shames recalls. "I said, 'Oh my God, what's happening? Why aren't people screaming this from the bell towers?'"

Shames, a soft-spoken man, didn't start screaming. But he did start calling other counties and learned the same thing was happening throughout the state. His response was to invite doctors, health insurers, hospital officials, therapists, and substance-use specialists to begin working together to find ways to reduce opioid prescribing.

This effort led to the formation of Oregon Pain Guidance, a group that educates doctors on ways to work with pain patients and to limit the number, dosage, and duration of opioids they prescribe. When the Centers for Disease Control and Prevention released a similar set of prescribing guidelines in March, Shames says, he knew his group was on the right track.

"Guidelines like these are a good start as part of a broader strategy. Doctors and other prescribers may need assistance in helping their patients treat pain," says Pew's Reilly. "And while prescription opioids are an important tool for short-term, acute pain, we need to take a different approach when managing long-term

pain. This can include using other medications that aren't opioids alongside physical therapy and other treatments."

Pew is helping states identify and implement policies that will promote the use of evidence-based approaches throughout a patient's treatment.

It's the kind of help that doctors desperately need, says John Kolsbun, an internist who joined a primary care practice in Ashland in 2010 and discovered that about 60 percent of his 750 patients were on pain pills. Like most doctors, he'd had little education about how to treat chronic pain and found that his efforts to manage his patients' pain and reduce their medications were fraught.

"They'd tell me: 'Doc, my back is going OK, but I'd do better with just a little more medication.' Or 'You don't want me to hold my grandchild again.' I was wholly unprepared."

"I had to get a large number of patients off these drugs to do my job adequately," Kolsbun says. "Every day was a battle. Three or four patients would be extremely disruptive, screaming at the top of their lungs if they didn't get the drugs."

Today, Kolsbun is the medical director for AllCare, an insurance provider with a large number of Medicaid patients covered through the Affordable Care Act. AllCare and other Oregon insurers are trying different

ways to get patients off opioids or taper their doses.

Around the nation, Medicaid has programs that identify patients at risk for misuse and then direct them to designated prescribers and pharmacists who manage their use of these prescriptions. As part of the law signed in July, Medicare is now adopting a similar provision for its at-risk patients—something Pew had strongly advocated for.

The key for this and any other intervention to be successful is for doctors to engage in honest but caring conversations with their patients, Shames says. “You have to say: ‘I know this is hard, and I’m not going to abandon you. We’re going to create a plan that’s going to keep you safer, and it’s ultimately going to help your pain more.’”



For years, the dominant model for addressing substance misuse has been to strive for abstinence through 12-step programs that provide social support. It’s an approach that often doesn’t work with opioids, Reilly says, because opioid use disorder is a disease that can’t be managed with just willpower.

The intensely addictive nature of opioids means that most people will need medical help to get off them, says the Opioid Treatment Authority’s John McIlveen. The constant high-low cycling makes it hard to engage a person in treatment because the cravings and

withdrawal are so overwhelming, he says. “Without something to help ameliorate that, they can’t function or concentrate on treatment.”

That’s where medication-assisted treatment (MAT) comes in. With this approach, people are prescribed Food and Drug Administration-approved medications, such as methadone or buprenorphine, which are designed to curb cravings and manage withdrawal symptoms. These drugs are coupled with behavioral therapy and support services such as counseling, exercise, or yoga.

While some detractors argue that MAT swaps one addictive substance for another, substance use disorder experts say it is the most effective way to stabilize opioid-dependent patients—and then try to wean them off the drugs. Like heroin or prescription opioids, methadone and buprenorphine target the brain’s opioid receptors. But largely because they are longer acting or less potent, they do so without triggering the peaks and troughs that most opioid users experience.

“The science is clear,” says Pew’s Reilly. “MAT works because it’s a holistic approach to treatment—it’s medication and support services and behavioral therapy. It’s the most effective treatment available.”

But MAT isn’t universally available—far from it. A study published last year in the *American Journal of Public Health* found that while some 2.3 million Americans were grappling with opioid dependence in 2012, only 600,000 to 700,000 were getting any type of treatment.



Central City Concern in Portland not only provides medication and counseling to Lisa Greenfield and others recovering from opioid dependence, but also doctors, therapists, and a place to live.

Medication-assisted treatment should be widely available, says Reilly. One reason it's not, she says, is that too many people, including some doctors, hold negative views toward use of these drugs.

"This is a disease, and we need to treat it that way," Reilly says. "We need to address the stigma people associate with this condition."

Another medication that Reilly and other experts believe should be more easily accessible is naloxone, a drug that—if given in response to an opioid overdose—can save the person's life. Julia Pinsky of Jacksonville, Oregon, wished she had had naloxone when she discovered her 25-year-old son, Max, lifeless in an office space that she and her husband had built on their land. Max had struggled with heroin use for several years.

"I don't know if he could have been saved by naloxone, but he might have," Pinsky says of the night Max died in January 2013. "He was dead by the time emergency responders got there. I tried to resuscitate him, the responders did, too. He might have been alive at first; opioids suppress your breathing."

Naloxone—which is available in both an injectable form and a nasal spray—can be sold over the counter in pharmacies in Oregon and many states. Many substance use programs give it to opioid users and their friends and families because of its lifesaving potential, and many police departments issue it to their patrol officers. Still, says Pinsky, "we need to get it into the hands of drug users and family members, loved ones, girlfriends. Too many people don't know what it is."

Buprenorphine plus counseling and affordable housing provided by Central City Concern, a Portland multiservice agency, have enabled Lisa Greenfield, 23, to get off the heroin and methamphetamines she'd been snorting, smoking, or injecting for nearly five years.

"I'm eight months clean," she says. "It's a miracle." It's also a miracle that she's alive. At the peak of her disease, Greenfield was injecting a gram of heroin and half a gram of methamphetamine a day. Before coming to the CCC, as everyone calls it, she went to short-term withdrawal management programs several times, each time returning to the drugs.

Today, she's on a daily dose of 24 milligrams of buprenorphine. "I don't crave heroin," she says. "If I was to try to get loaded, I couldn't; the receptors are full, and you can't get high." She gets her monthly supply from the pharmacy on the ground floor of the agency's airy, light-filled building. She goes to counseling sessions and can see doctors or therapists in the medical clinic on the second floor, where yoga, meditation, and acupuncture sessions are also held. Her room and a shared kitchen are on an upper floor.

Greenfield's father, memorialized in a tattoo on her chest, was a heroin addict who was in and out of prison before committing suicide when she was 19. Now she goes to support groups daily, does volunteer work in the



If administered in time, naloxone can save a person who has overdosed on opioids. It is sold over the counter in Oregon and many states, and some police departments now regularly issue it to patrol officers.

community, and hopes to get hired as a peer support specialist. "It's so nice," she says, "to feel welcome, and wanted, and needed."

On Tuesdays, she meets with counselors at the agency's satellite clinic on Portland's East Side. Sam Hancos gets services there as well, with help from staffers such as Daniel Epting, a peer counselor who spent almost 30 years using drugs, shoplifting, and being incarcerated before becoming clean eight years ago and getting hired at another recovery program. Epting marvels at his turn of fortune.

"They pay me to be myself and to help people navigate the system," he says. "I have a 9-year-old daughter that's never seen me loaded. I can't begin to tell you how grateful I am."

Back in Medford, Michelle Marikos has also stopped taking prescription pain pills. After surgery failed to ease her pain, she went to the Mayo Clinic in Rochester, Minnesota, in 2012 and took part in a three-week program that helps chronic pain patients withdraw from prescription drugs. She still has pain, but now she rates it at 3 on a 1-10 scale instead of the 7 or 8 she used to endure when she was taking pain medications and in a state of constant panic.

In March, working with Jim Shames, she helped organize the consumer section of the fourth annual Oregon Pain Summit, providing information and inspiration for how people can deal with pain—and transition from their pills.

Her message to other pain patients is much like the message she gives herself, over and over again: "It's OK. This pain won't kill me. It doesn't feel good, but I'll get through it. And so can you."

Rob Waters is a San Francisco-based journalist who contributes to the Boston Globe's new health publication, STAT, and has written for Mother Jones, the Los Angeles Times and many other publications.





THE QUEST FOR THE BODY PERFECT

Advances in biomedicine are leading to possibilities once relegated to science fiction: gene-editing to prevent disease, synthetic blood transfusions, and implanted brain chips. But the Pew Research Center finds Americans are deeply wary about where this all might lead.

by David Masci

Since the beginning of human civilization, people have been trying to enhance their physical and mental capabilities, sometimes successfully—and sometimes with inconclusive, comic, and even tragic results.

Up to now, most biomedical interventions have attempted to restore something in need of repair, such as vision, hearing, or mobility. Even when these interventions have tried to improve on nature—such as use of anabolic steroids to stimulate muscle growth—the results have tended to be relatively modest and incremental.

But thanks to recent scientific developments in areas such as biotechnology, information technology, and nanotechnology, the world may be on the cusp of a revolution in what scientists and futurists call human enhancement. In the next two or three decades, people may have the option to change themselves and their children in ways that until now have existed largely in science fiction novels and comic books.

Advocates for enhancement, many of whom call themselves transhumanists, argue that these new technologies will make life better. Instead of leaving a person's well-being to the vagaries of chance or nature, they say, we will take control of our species' development, making ourselves and future generations stronger, smarter, healthier, and happier.

But a survey by the Pew Research Center published in July indicates public wariness about the emerging

These concerns are shared by many ethicists, theologians, and others who worry that radical changes would lead to the creation of people who are no longer physically or even psychologically human.

For now, fears about enhancement remain theoretical. That's because although the science that underpins transhumanist hopes is impressive, researchers have yet to create the means to make supersmart or superstrong people. Questions persist about the feasibility of radically changing human physiology, in part because scientists do not completely understand how our bodies and minds work. And yet researchers are making impressive strides in areas that could ultimately form the basis of an enhancement revolution.



On Feb. 25, 2014, President Barack Obama met with Army officials and engineers at the Pentagon to discuss plans to create a super armor that would make soldiers much more dangerous and harder to kill. The president joked that “we’re building Iron Man,” but his comment contained more than a kernel of truth: The exoskeleton, called the tactical assault light operators suit, does look vaguely like the fictional Tony Stark’s famous Iron Man suit.

A little more than two years later, in April 2016, scientists from the Battelle Memorial Institute in Columbus, Ohio, revealed that they had implanted a chip in the brain of a quadriplegic man. The chip can

MANY OF THE FANTASTIC TECHNOLOGIES ONCE CONFINED TO SCIENCE FICTION HAVE ARRIVED, AT LEAST IN THEIR EARLY FORMS.

technologies that could accomplish transhumanist goals. For example, 68 percent of Americans say they would be “very” or “somewhat” worried about using gene editing on healthy babies to reduce the infants’ risk of serious diseases or medical conditions. And a majority of U.S. adults—66 percent—say they would “definitely” or “probably” not want to get a brain chip implant to improve their ability to process information.

send signals from the man’s brain to a sleeve around his arm, allowing him to pick up a glass of water or swipe a credit card.

And around that same time, Chinese researchers from Guangzhou Medical University announced they had successfully genetically altered embryos to make them HIV resistant.

These examples show that many of the fantastic

THE U.S. PUBLIC IS WARY ABOUT TECHNOLOGY FOR HUMAN ENHANCEMENT

Most Americans greet the idea of cutting-edge biomedical technologies—which could push the boundaries of human abilities and make people sharper, stronger, and healthier—with more wariness and worry than enthusiasm and hope.

A Pew Research Center survey released in July focused on public attitudes about gene editing to reduce babies' risk of disease during their lifetimes, implantation of brain chips to help people better process information, and transfusions with synthetic blood to give people more speed, strength, and stamina. Some highlights from the findings:

- At least 7 in 10 U.S. adults predict that each of these new technologies will become available before they have been fully tested or understood. Some 73 percent say this about gene editing, while an identical share says the same about synthetic blood; 74 percent say this about brain chip implants.
- Majorities also say these enhancements could exacerbate the divide between the haves and have-nots. For instance, 73 percent believe inequality will increase if brain chips become available, because initially they will be obtainable only by the wealthy.

73% BELIEVE INEQUALITY WILL INCREASE IF BRAIN CHIPS BECOME AVAILABLE, BECAUSE THEY WILL BE OBTAINABLE ONLY BY THE WEALTHY.

- Many U.S. adults think recipients of enhancements will feel superior to those who have not received them; 63 percent say this about synthetic blood transfusions in particular. At the same time, half or more think recipients of enhancements will feel more confident about themselves.
- Substantial shares of U.S. adults say they are not sure whether these interventions are morally acceptable. But among those who express an opinion, more people say brain and blood enhancements would be morally unacceptable than say they are acceptable.
- More adults say the downsides of brain and blood enhancements would outweigh the benefits for society than vice versa. Americans are a bit more positive about the possibility of gene editing to reduce disease; 36 percent think it will have more benefits than downsides, while 28 percent think it will have more downsides than benefits.
- Opinion is closely divided on the fundamental question of whether these potential developments are “meddling with nature” and cross a line that should not be crossed, or whether they are “no different” from other ways that humans have tried to better themselves over time.

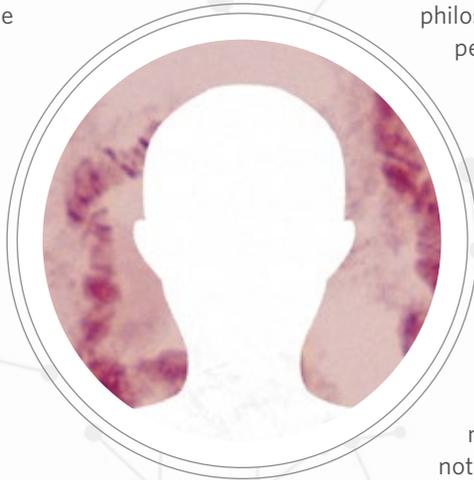
technologies once confined to science fiction have arrived, at least in their early forms. “We are no longer living in a time when we can say we either want to enhance or we don’t,” says Nicholas Agar, a professor of ethics at Victoria University in Wellington, New Zealand. “We are already living in an age of enhancement.”

One of the technologies that may herald this new age is a powerful gene editing method known as CRISPR, which is much faster, cheaper, and more accurate than earlier gene editing methods. CRISPR, which stands for clustered regularly interspaced short palindromic repeats, is already dramatically expanding the realm of what is possible in the field of genetic engineering. “CRISPR’s power and versatility have opened up new and wide-ranging possibilities across biology and medicine,” says Jennifer Doudna, a researcher at the University of California, Berkeley and a co-inventor of the technique.

CRISPR is already being deployed in the fight against cancer and other deadly diseases by, for instance, trying to reprogram immune cells to fight specific types of tumors. But a more intriguing possibility involves making genetic changes at the embryonic stage, also known as germline editing. The logic is simple: Alter the gene lines in an embryo’s eight or 16 cell stage (to eliminate the gene for a given disease, for example), and that change will occur in each of the resulting person’s trillions of cells—not to mention in the cells of his or her descendants.

Some transhumanists see great opportunities in making changes at the embryonic level. “This may be the area where serious enhancement first becomes possible, because it’s easier to do many things at the embryonic stage than in adults using traditional drugs or machine implants,” says Nick Bostrom, director of the Future of Humanity Institute at Oxford University.

But for many philosophers, theologians, and others, the idea of “designer children” veers too close to eugenics, the 19th- and early 20th-century philosophical movement to breed better people. And, indeed, wariness about many of these possibilities is heightened among more religious people. The Pew Research Center developed an index of religious commitment to categorize the people it surveyed and found, for example, that 64 percent of those with the highest commitment said that gene editing to reduce babies’ risk for disease was “meddling with nature and crosses a line we should not cross,” compared with 28 percent of people with a low religious commitment who agreed with that thought.



People have long used chemicals such as caffeine to sharpen their focus and generally improve their cognitive ability. Today, many are using drugs prescribed for brain-related illnesses such as attention deficit hyperactivity disorder or narcolepsy to help them focus better or remember more.

ADVANCES IN COMPUTING AND NANOTECHNOLOGY HAVE ALREADY RESULTED IN THE CREATION OF TINY COMPUTERS THAT CAN INTERFACE WITH PARTS OF OUR BRAINS.

But although editing embryos could conceivably help eliminate or “edit out” a host of maladies in people before they are born, it also offers parents an opportunity to change their unborn children in nontherapeutic ways, from altering hair or eye color to endowing their offspring with greater intellectual or athletic ability.

Drug companies may soon make and market much more powerful “smart” pills specifically designed to improve memory, perception, and reasoning. But dramatic improvements in cognition may not come until scientists figure out how to implant and operate powerful computers in our brains.

Advances in computing and nanotechnology have already resulted in the creation of tiny computers that can interface with parts of our brains. This development is not as far-fetched as it may sound, because both the brain and computers use electricity to operate and communicate. If, as some scientists predict, full brain-machine interface comes to pass, people may soon have chips implanted in their brains, giving them direct access to digital information, with the ability to call up mountains of data instantly and without ever having to look at a computer screen.

Genetic engineering also offers promising possibilities, although there are potential obstacles as well. Scientists have already identified certain areas in human DNA that seem to control our cognitive functions. In theory, someone's "smart genes" could be manipulated to work better, an idea that almost certainly has become more feasible with the recent development of CRISPR. "This would allow us to do so many different things," says Anders Sandberg, a neuroscientist and fellow at the Future of Humanity Institute at Oxford University. "The sky's the limit."

But some scientists maintain that it will probably be a long time before we can bioengineer a substantially smarter person. For one thing, it is unlikely there are just a few genes or even a few dozen genes that regulate intelligence, which makes bioengineering a genius much harder.

Given the brain's importance, cognitive enhancement might be the holy grail of transhumanism. But many futurists say enhancement technologies also will probably be used to transform the whole body, not just one part of it. This broader effort will almost certainly include the creation of synthetic or "smart" blood.

Researchers have already created artificial blood in an effort to ease shortages and help patients who need immediate transfusions. But, as with CRISPR and gene editing, artificial blood also offers a host of enhancement possibilities. For instance, synthetic blood could be engineered to clot much faster than natural human blood, preventing people from bleeding to death. Synthetic white blood cells also could potentially be programmed and receive software updates that would allow them to fight a variety of threats, such as a new infection or a specific kind of cancer. Finally, smart blood could carry much more oxygen around the body, greatly improving strength and stamina.



So where is all of this new and powerful technology taking humanity? The answer depends on whom you ask.

Having more energy or even more intelligence or stamina is not the endpoint of enhancement efforts, many transhumanists say. Some futurists, such as inventor Ray Kurzweil, talk about the use of machines not only to dramatically increase physical and cognitive abilities but also to fundamentally change the trajectory of human life and experience.

But others, like Boston University bioethicist George Annas, believe Kurzweil is wrong about technological development and say talk of exotic enhancement is largely hype. "Based on our past experience, we know that most of these things are unlikely to happen in the next 30 or 40 years," Annas says.

He points to many confident predictions over the past half-century that didn't materialize. "In the 1970s, we thought that by now there would be millions of people with artificial hearts," he says. Today, only

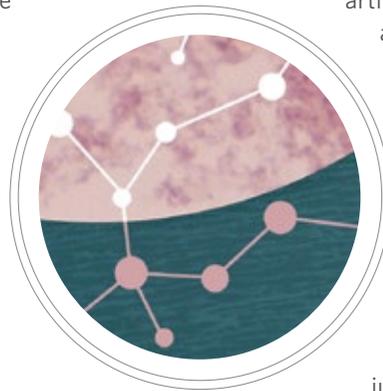
a small number of patients have artificial hearts, and the devices are temporary bridges to keep patients alive until a human heart can be found for transplant.

In spite of the intense disagreements about the utility and morality of trying to "improve" humanity, many thinkers on both sides of the debate share the belief that if

just some of these potential developments come to pass, human society will probably change significantly.

For the first time in human history, the biggest material changes in our society will not be occurring outside ourselves—in the fields, factories, and universities that have shaped human civilization—but inside our bodies, in our brains and muscles and arteries, and even in our DNA.

David Masci is a senior writer and editor at the Pew Research Center.





THE MAN WHO FINDS COMMON GROUND

In Canada's Northwest Territories, Stephen Kakfwi pursues a balance between protection of the vast boreal forest and sustainable development for its residents.

by Sheldon Alberts
Photography by Katye Martens



The final installment in a series of stories profiling the people of Canada's boreal forest.



Stephen Kakfwi was born to the land, in a wilderness region so grand that the adjective most frequently used to describe it, “spectacular,” can seem insufficient.

Consider just a few of the natural wonders within Canada’s rugged Northwest Territories: the deepest lake in North America, the continent’s second-longest river, the largest unpolluted lake on the planet, a jagged-edge mountain range with 9,000-foot peaks and 3,000-foot-deep river canyons, a hidden waterfall twice the height of Niagara Falls, a boreal forest three times the size of Britain.

“There is incredible land everywhere you go,” says Kakfwi.

A former territorial premier, past president of the Dene Nation, and lifelong Indigenous rights activist, Kakfwi has spent decades working to balance protection of the mostly pristine areas of the landscape with sustainable economic development for First Nations communities.

Ask Kakfwi what he holds special, and he says it’s not just iconic sites such as Great Bear Lake or Nahanni National Park Reserve, a World Heritage site in the Mackenzie Mountains. It’s the intimate places that live in his memory, places infused with personal importance.

“What is closest to me is the land where I was born,” Kakfwi says. “Everywhere I look, there are stories. There are spiritual, sacred sites. And those are beautiful to me—in my heart and my mind, not just visually.”

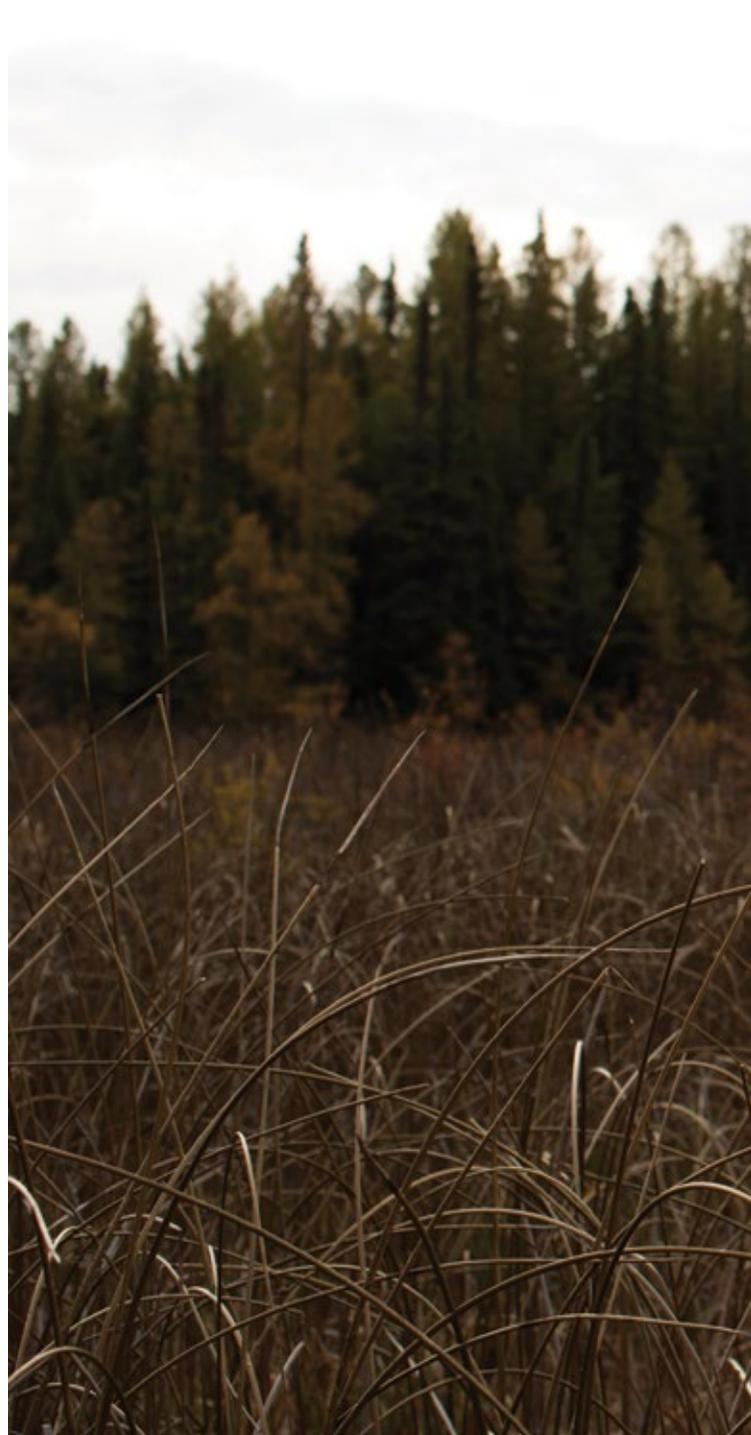
Kakfwi was born in 1950 on the northern edge of the Territories’ vast boreal forest region near the Arctic Circle, at a hunting camp on the shores of Lake Yelta. He spent his early childhood in tiny Fort Good Hope, a Dene village along the 1,080-mile-long, north-flowing Mackenzie River.

“There was literally nothing there. There was a little grocery store, a church, and that was it,” he says.

“For the first five years of my life, I lived off of moose and caribou, rabbits, ducks, and the berries that we find in the woods, in the bush. ... We depended 100 percent on the bounties of the land, on the wildlife, the birds, the fish.”

Under a government assimilation policy, Kakfwi was removed from his home at age 9 and placed in Canada’s residential school system. When he returned to Fort Good Hope, he relearned the Slavey language and reconnected with the Dene culture, which draws its sustenance and spiritual health from the land.

Dene leaders in his community taught him the traditional methods of hunting and trapping. He learned



how to skin a moose in the frigid cold of deep winter, and the importance of using every part of the animal for food and clothing. Kakfwi says the land became his place of solace and recovery.

“On days when I was heartbroken and lonely, and feeling sad and sorry for myself, I used to go to this hill. And on the hill, there was a stand of birch trees. Not very big birch trees, just small, little birch trees. I used to go there and lay underneath those trees, looking up at the sky,” Kakfwi says.



Stephen Kakfwi is a former territorial premier, past president of the Dene Nation, and lifelong Indigenous rights activist. In the boreal, he says, “there is incredible land everywhere you go.”

“There’s a way to get comfort from the earth and from the land, just by laying on it, by connecting.”



Kakfwi’s connection to the land has shaped a career spent fighting for recognition of the rights of Indigenous people, including the right to make decisions about development and conservation on traditional territories where they have lived for thousands of years.

As a young man who came of age when the civil rights movement was at its height in the United States, Kakfwi thought protests could secure greater rights for his people, and protection for the land from unchecked development. Over time, and following the guidance of Dene elders, Kakfwi came to understand that change could come through collaboration with governments and industry.

Kakfwi was elected in 1983 to lead the Dene Nation, an organization representing five Dene tribal groups, and

"On days when I was heartbroken and lonely, and feeling sad and sorry for myself, I used to go to this hill. And on the hill, there was a stand of birch trees. Not very big birch trees, just small, little birch trees," Kakfwi says. "I used to go there and lay underneath those trees, looking up at the sky."







Kakfwi lives in Yellowknife, the capital of Canada’s Northwest Territories, which includes 235 million acres of boreal. Through the International Boreal Conservation Campaign, Pew is working with local residents and officials throughout the region on land use policy to protect the forest.

worked to build a framework for Indigenous land claims. The Dene Nation’s traditional territories are known as Denendeh—Land of the People.

Kakfwi became a member of the territorial legislature in 1987 and held several cabinet portfolios, including minister of resources, wildlife, and economic development. He was premier from 2000 to 2003, working for change from within governments that has paid dividends.

It has taken decades, but there is a growing understanding of the value that First Nations bring to land use planning in the boreal region, and their historical knowledge about striking a balance between industrial activities and protection of the Earth, he says.

As Indigenous people, “we believe inherently that we are part of the Earth. We’re not separate. We don’t have dominion over it,” Kakfwi says. “Keeping our culture alive is all about being part of the land, being part of the wildlife, the fish, and the birds.”

Just as all people have rights that must be respected, those who seek to extract the region’s resources should acknowledge that the Earth also has rights, he says.

“The Earth is a living being. It’s a living creature. And you have to respect the Earth,” he says.

“Elders say the Earth loves us ... because it’s been taking care of us for thousands and thousands and thousands of years,” he adds. “It takes care of us, no matter how much we misbehave.”



But people have not always taken care of the Earth in return. The boreal forest region in the Northwest Territories is a place rich with natural resources, including diamonds, gold, rare earth minerals, silver, uranium, and oil and gas reserves. The capital city, Yellowknife, markets itself as the Diamond Capital of North America.

Although natural resources fuel the northern economy, Kakfwi says development has proceeded without proper consideration of its impact on the land or on the well-being of its original inhabitants.

“Our history is marked with people that have come, opened up mines, and then left behind a land that has been devastated. Water has been polluted. And for what? Just for very specific interests,” Kakfwi says.

“We have to get to the day when every one of us—every government in this country, every government in



Kakfwi says that applying traditional Indigenous knowledge about the boreal must be central to any policy for the land—because no one knows the forest better than those who have lived in it for millennia.

the world—will respect the rights of the Earth. To keep the water clean, to protect the wildlife, to protect the land, and make sure things are done in balance, and all things are sustainable.”

Those beliefs formed the underpinning of Kakfwi’s work in the territorial legislature and his professional life since leaving public office.

He played central roles in developing and implementing a protected areas strategy for the Northwest Territories. He helped settle long-standing land claims by several Indigenous communities, including his own tribal group, the Sahtu Dene, and backed First Nations-led land protection measures that include Indigenous co-management of conservation areas.

Kakfwi is currently a senior adviser with the Indigenous Leadership Initiative. Through the International Boreal Conservation Campaign, The Pew Charitable Trusts works closely with Kakfwi and the initiative on land use planning and policy in the Northwest Territories and across Canada, supporting Indigenous communities as they exercise their rights

and responsibilities as stewards of traditional lands.

Governments are learning to “accept that we have to do business with the First Nations people ... because they have rights,” says Kakfwi, who was a strong supporter of a transfer of powers known as devolution. In 2014, that process resulted in the government of the Northwest Territories assuming control over land use and resources from Canada’s federal government. The role of Indigenous governments is formally recognized within the process, laying a foundation for more locally accountable and responsible decision-making on lands and resources.

Kakfwi stresses that traditional Indigenous knowledge, which is sensitive to the needs of people and the environment, is essential. No one knows the land better than those who have lived on it for millennia, he says.

“The Dene have always had a plan for our land. Every year, for thousands of years, we have decided who’s going to go to the fish lakes, which families are going to go to the mountains, which ones are going to go on

the river, which ones are going to go to the [river] delta areas. We decide that amongst ourselves," he says.

"Where are the places where the moose are plentiful? Where is the best fish? Which areas should we leave [alone] for a few years until they become plentiful again? That's land use planning, and that's what we've done."

Good land use planning is about striking a balance, he adds, and about recognizing that the land is worth more than just the minerals or resources that lie within it.

"When you come into my country, I expect you to live as a good citizen, to respect the rights of everybody else, to take care of the land and the water and the wildlife, and leave it the way you find it," he says.

"I've always carried that with me. And I think all our people carry that with us. And it's no different from a person that lives in a city that has a yard. Nobody is going to go into that yard and contaminate it. I mean, it's just totally unacceptable. So why should we be any different from that?"

As global demand for natural resources increases, Kakfwi worries that neglect of the environment's health could push the Earth out of balance. Dene prophecies have foreseen a future, he says, where the great Deh Cho River becomes just a little creek on its way to the Arctic Ocean.

"The Earth maintains the balance. The air is good to us. The wildlife is good to us. The water's bountiful. The temperatures and the climate are all made in order to sustain humans," Kakfwi says, but the Earth "can only handle so much."

"The weather is changing. And our people have known that for many, many years. They see the changes. The permafrost is melting. The grounds are shifting. The Arctic ice is starting to melt. The people can read the signs. It's caused us concern for many years, because we know, inherently, you have to keep a balance."



Still, Kakfwi is an optimist. In recent years, the Northwest Territories has protected millions of acres of the boreal that have ecological and cultural significance to indigenous people. These include the Horn Plateau National Wildlife Area (Edézhíe), Ramparts River National Wildlife Area (Ts'ude niline Tu'eyeta), and the proposed Thaidene Nene National Park Reserve. Nahanni National Park Reserve, created in 1972, was recently expanded and is now six times its original size.

Kakfwi believes that ongoing collaboration among governments, First Nations people, and industry in the boreal region is creating a path to economic prosperity without compromising the health of the environment.

"We have more and more people now that come to the North, make it their home, want to keep the land and water [healthy] but also have some responsible, sustainable development occur," he says.



Fall colors brighten the boreal forest on the outskirts of Yellowknife. The city of 19,000 is located along the northern shore of Great Slave Lake, one of the deepest and largest freshwater lakes in the world.

Indigenous people "have slowly won the battle, where now we are—by law and by policy and practice—in the room when mines are being planned, oil and gas projects are being developed. We have a say. We are consulted. Our consent has to be often sought. ... Now, in the Northwest Territories, they talk to us."

Kakfwi has never forgotten what he learned as a boy, when he sought out a small stand of birch trees for healing. The way to connect with the land, to learn to respect and use it sustainably, is to pay attention to the details, the small things and quiet places that make up the greater whole.

Whenever he travels, he likes to take a walk to get oriented and to understand the new environment. He studies the trees, the landscape, the birds overhead, and even the ants.

"Anywhere you go, if you haven't been there before, you will feel a little bit lost, because you cannot see past the next tree. And so we encourage people to go for walks, to pay attention," he says.

"And once you have that, your comfort zone is very, very different. You establish a relationship with yourself, with everything around you. And then you become a part of it."

Sheldon Alberts is a Trust staff writer.



FAST FACTS

- ▲ The boreal forest in Canada's Northwest Territories covers 235 million acres, three times the size of Britain. About 88 percent is intact.
- ▲ Great Bear Lake is the largest unpolluted freshwater lake in the world, and the eighth largest in area.
- ▲ The forest is the breeding ground for 150 million to 500 million birds, representing more than 200 species.
- ▲ The Mackenzie River is the second-longest in North America; only the Mississippi is longer. It flows from south to north, into the Arctic Ocean.
- ▲ Virginia Falls, in Nahanni National Park Reserve, is twice the height of Niagara Falls.
- ▲ The Dene Nation represents five Indigenous tribal groups in the Northwest Territories: Gwich'in, Deh Cho, Sahtu, Tlicho, and Akaitcho.
- ▲ Nahanni National Park Reserve, in the Mackenzie Mountains, was the first site designated by UNESCO as a World Heritage site.
- ▲ Great Slave Lake is the deepest lake in North America at 2,014 feet.

Refugees Surge to Europe in Record Numbers

The Pew Research Center finds that the 1.3 million people seeking asylum in 2015 was nearly double the previous high, set after the fall of the Iron Curtain and collapse of the Soviet Union.

BY CAROL KAUFMANN

Even during times of war and political unrest, European Union member nations, as well as nonmembers Switzerland and Norway, never experienced the number of asylum-seekers that came knocking on their doors in 2015.

Europe received some 1.3 million applications for asylum in 2015—more than in any year in the past three decades and more than twice as many as in 2014, according to analysis published in August by the Pew Research Center.

The number of migrants is nearly double the amount in 1992, the previous record-setting year. At that time, some 700,000 people, mainly from Eastern Europe, headed to Western Europe, eager to seize opportunity after the fall of the Berlin Wall and the dissolution of the Soviet Union. Europe also saw another boom of asylum-seekers in the early 2000s, after the Kosovo War, when some 460,000 applied for asylum in the EU, Norway, and Switzerland, mainly from Kosovo and Albania.

“2015 amounted to about one-tenth of all asylum applications received during the past 30 years by current EU countries, Norway, and Switzerland,”

says Phillip Connor, a research associate at the Pew Research Center and author of the report. “We saw an astonishing amount of applications.”

Connor says the time was right for the Washington-based research center to augment its studies of global demographic trends by collecting “facts and data behind the reports and media images of the refugee crisis during the past few years to see how the movement stood up historically. We saw lots of reports about the refugee crisis in the past year but no central place for the numbers to come together.”

The report used data from Eurostat, the European Commission’s statistical agency, which have been gathered in a consistent and systematic way and provide others studying the issue with a new perspective on the global concern. “These data give some important insights into source countries and the demographic characteristics of the migrants,” says Richard Alba, distinguished professor at the Graduate Center, City University of New York.

Overwhelmingly, they came from the Middle East; about half began in Syria, Iraq, or Afghanistan, with the number of asylum-seekers from these three countries alone more than quadrupling between 2013 and 2015. The largest group was from Syria, which accounted

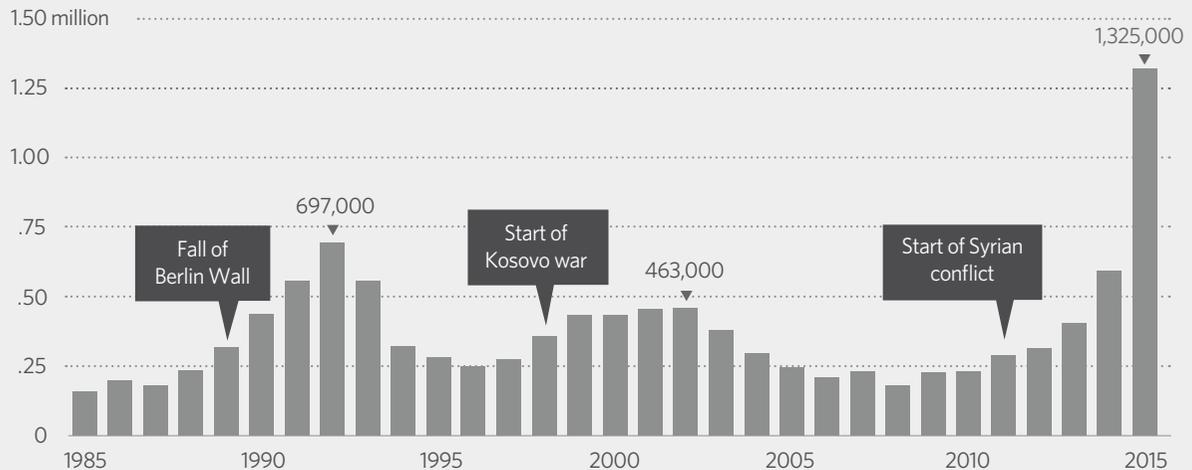
for nearly 30 percent of all European asylum-seekers in 2015—378,000, compared with 49,000 in 2013. Other migrants came to Europe from Kosovo, Albania, Pakistan, Eritrea, Nigeria, Iran, Somalia, Ukraine, Serbia, Russia, Bangladesh, and Gambia. Four in 10 were young men ages 18-34; overall, nearly 73 percent were male.

Alba says that’s largely because “the migration is so dangerous and uncertain.” He adds: “In the cases of migrants from the Middle East, families have often been left behind in



In 2015, the largest number of asylum-seekers came from Syria—like these refugees waiting at a Budapest train station—and their primary destination was Germany.
Spectral-Design/Shutterstock

Number of asylum-seekers in Europe surged to record 1.3 million in 2015



The Pew Research Center

camps [in Lebanon or Turkey]. No doubt, in some cases, if the young men are able to establish themselves in Europe, they will send for families.”

The primary destination for asylum-seekers continues to be Germany. Europe’s most populous nation received applications from an unprecedented 442,000 individual first-time asylum-seekers in 2015, the highest number received by a European country in a single year during the past three decades. That reinforces a long-standing trend: Germany has received more asylum applications since 1985 than any other country, accounting for 32 percent of applications (France, at 11 percent, is the next highest).

What’s more, asylum applications in Germany substantially understate the actual number of migrants to the country, according to Alba. “The bureaucracy in Germany has been overwhelmed and been unable to register all of the intended asylum claims,” he says.

Consider this comparison to grasp the pace of the migration and its potential impact on Europe: The United States, with a population of some 320 million and significantly more landmass than any European country, is about 14 percent foreign-born. But it took 10 years, from 2005-15, for this percentage to rise a single point, from 13 percent. Meanwhile, notes Connor, “the percentage in several smaller European countries rose a percentage point in a single year. That’s huge.”

Such a shift has a significant effect on many aspects of daily life, including the housing market, social services, and the educational system—which now may be accommodating students who can barely speak the local language.

In addition, some of these children may have come alone. The number of unaccompanied minors, children under 18 without guardians, applying for asylum in Europe has spiked since 2008, with nearly half of the

198,500 unaccompanied applicants from 2008-15 arriving in 2015 alone. Unlike Europe’s asylum-seekers as a whole, the country of choice for these younger migrants—almost 40 percent of whom came from Afghanistan—is Sweden, which received 29 percent of the applications of unaccompanied minor refugees from 2008-15.

Overwhelming majorities of European citizens disapprove of how the EU has handled immigration, according to the center’s analysis. Perhaps not surprisingly, the disapproval was generally greatest in countries that had the most asylum applications. Some 850,000 arrivals in 2015 entered Europe through Greece before heading north. Ninety-four percent of Greeks were dissatisfied with the way the EU handled the influx, as were 88 percent of Swedes, 77 percent of Italians, and 75 percent of Spaniards. In Germany, two-thirds of the citizenry didn’t approve of the EU approach to the migration crisis.

In addition, a separate Pew Research Center survey this year revealed that half or more of the respondents in eight of 10 European nations say incoming refugees increase the likelihood of terrorism in their country. And in five of the nations surveyed, half or more of the respondents say refugees will take away jobs and social benefits. More than 6 in 10 adults in Hungary, Poland, and Greece say they have an unfavorable opinion of Muslims.

“The refugee flood in Europe is something that begs to be understood,” says Alba. “Pew is informing Americans about this critical subject for our times. The report makes a valuable contribution.”

Carol Kaufmann is a Trust staff writer.

The Two Political Parties Move Further Apart

In a pivotal election year, the Pew Research Center finds that America's two major parties are less demographically aligned than at any point in the past 25 years.

BY CHARLES BABINGTON

As the United States becomes more ethnically diverse, better educated, and less religious, the two major political parties are evolving the same way but at such differing paces that the parties' electorates look less alike than at any time in the past quarter-century.

The Democratic Party is becoming less white, less religious, and better educated at a faster rate than the country as a whole, while aging at a slower rate. The reverse is true for the Republican Party. GOP voters lag behind the nation in becoming more racially diverse, better educated, and less religious. And the Republican electorate is aging more quickly than the overall U.S. electorate.

These are among the main findings of a Pew Research Center study released in September of voter trends from 1992 to 2016 called *The Parties on the Eve of the 2016 Election: Two Coalitions, Moving Further Apart*. The trends outlined in the report pose obvious challenges for the Republican Party, whose base remains overwhelmingly white in a nation growing increasingly nonwhite. But they also present concerns for Democrats, who still rely on whites for most of their votes and who have not widened their small edge in party identification among U.S. voters.

Some of the sharpest movements uncovered by the study, which included more than 8,000 voter interviews this year, involve education levels. In the eight years since President Barack Obama was first elected, whites with no college experience have become 14 percentage points more likely to affiliate with the Republican Party. Fifty-nine percent of whites with no college experience now identify as Republican or lean Republican, while only one-third identify as Democrats or lean Democratic. That's a dramatic shift from 2007, when Democrats held a slight edge among non-college-educated whites.

Less-educated white men are abandoning the Democratic Party faster than their female counterparts are. Today, white men without a college degree (65 percent) are much more likely than white women without a college degree (51 percent) to

identify as or lean Republican.

Setting education aside, white voters in general—who were roughly divided in their partisan leanings eight years ago—are now much more likely to identify as Republican or lean Republican (54 percent) than to say they identify as Democrats or lean Democratic (39 percent).

Despite all this, the overall balance of party identification has changed little. This year, 48 percent of registered voters identified as Democrats or said they lean Democratic, compared with 44 percent who identified as or leaned Republican. These numbers haven't changed since 2012. The GOP has offset Democratic gains among several demographic groups by improving its standing among older voters—who also make up a larger share of the electorate today—and among white voters, men, and those with lower levels of education.

For all its success with minorities, the Democratic Party still relies on whites for well over half its votes. The 2016 Democratic electorate was 57 percent white. Still, that's a significant drop from the 76 percent in 1992. The Republican Party's shift is far less dramatic. Its electorate this year was 86 percent white, compared with 93 percent white in 1992.

Carroll Doherty, director of political research at the Pew Research Center, says he's especially struck by the pace of change in party affiliation among college-educated voters. "The changing racial dynamics are pretty well known," Doherty says, but the education changes are more surprising. What's particularly noteworthy, he says, is that "attitudinally, more educated adults are becoming more liberal, and leaning more Democratic."

Still, neither party should be too quick to draw big conclusions, he says, because voting habits among demographic groups (Hispanics, for instance) can shift unpredictably.

The study's findings should especially worry Republican leaders hoping to win presidential elections in 2020 and beyond, says Norman Ornstein, a political

and congressional scholar at the American Enterprise Institute. Demographically, “Republicans are heading in the wrong direction,” he says.

But Republican leaders may have a hard time convincing rank-and-file members that they need to reshape their strategies or policies to meet the nation’s changing demographics, Ornstein says. That’s because these demographic voting trends apply mainly—for now, at least—to presidential races, and not to campaigns for the House of Representatives and Senate, where Republicans continue to prosper. Population shifts, House redistricting practices, and the two-senators-per-state rule (which favors small states) combine to help Republicans do relatively well in nonpresidential elections.

As a result, Ornstein says, “the GOP lacks incentives to change.” An official Republican post-mortem analysis after Mitt Romney’s loss in the 2012 presidential race called for a more inclusive party message—especially regarding immigration—to reach voters. But GOP leaders got little support for this idea from the rank and file.

Democrats shouldn’t become complacent, though. For one thing, they rely heavily on younger voters. Yet millennials (now ages roughly 22 to 36) have far less faith in government than did their parents and grandparents, Ornstein says. To solidify the loyalty of these unenthusiastic voters as they age, he says, Democrats—seen as the pro-government party—“must have a message that resonates.”

Amy Walter, national editor of the nonpartisan *Cook Political Report*, says all the demographic trends highlighted in the report might not hurt Republicans in the short run. “Relying on an older, whiter, no-college base does not always spell disaster,” she says. Republicans can stay competitive in presidential races if they excel at voter turnout, and various other factors help them in congressional and gubernatorial races.

But over the next 20 years or so, Walter says, Republicans must find ways to broaden their appeal. What happens, she asks, to a coalition that depends on older, whiter voters in a country growing less white? She says Republicans must remember that the next cohorts to enter their 50s, 60s, and 70s will be less white than today’s older Americans.

Partisan competition aside, Walter says, it’s troubling to contemplate the implications for American society and democracy if the nation becomes increasingly divided between one party that’s heavily identified with nonwhite and well-educated voters, and another party that relies overwhelmingly on white and less-educated voters.

Simply put, Walter says, “it’s not good.”

Charles Babington has written about politics and policy for The Washington Post and Associated Press.

An Evolving Electorate

The Pew Research Center report is based on 253 surveys and more than 340,000 interviews among registered voters conducted from January 1992 to August 2016. Some of the major findings:

Race

Declines in the percentage of white Americans (and white voters) continue; non-Hispanic whites now make up 70 percent of registered voters, down from 84 percent in 1992. The share of Hispanic voters has nearly doubled, from 5 percent in 1992 to 9 percent. The share who are black has edged up, from 10 percent to 12 percent. The share describing their race as mixed or “other” has grown from 1 percent to 5 percent.

Overall, 87 percent of black voters identify as Democrat or lean Democratic, while 7 percent identify as or lean Republican. Among Hispanics, Democrats hold a 63 to 27 percent advantage over the GOP in party identification.

Age

In 1992, more GOP voters were under age 50 (61 percent) than over 50 (38 percent). Today, 58 percent of Republican voters are 50 and older. Democratic voters are almost evenly divided between those under 50 and those 50 and older. The rate of aging among Democrats since 1992 (when 42 percent were 50 and older) has been less steep than within the GOP.

While older voters moved toward the GOP during President Obama’s term, young voters remain Democratic. Among voters ages 18 to 29 this year, 59 percent identified as Democrats or leaned Democratic, compared with 35 percent Republican.

Education

The share of voters with a college degree or more has increased by 10 points since 1992, from 23 percent to 33 percent.

Better-educated voters are increasingly identifying as Democrats and expressing liberal attitudes on a range of issues. Since 1992, the share of Democratic and Democratic-leaning registered voters with at least a college degree has risen, from 21 percent to 37 percent. Among Republicans, 31 percent have at least a college degree, up slightly since 1992.

Religion

While Americans remain religious, the share of registered voters who are religiously unaffiliated—describing themselves as atheist, agnostic, or “nothing in particular”—has increased from 8 percent in 1996 to 21 percent today.

In 1996, 1 in 10 Democratic voters was religiously unaffiliated; today that share has nearly tripled, to 29 percent. The share of Republicans not affiliating with a religion has also increased, but from 6 percent to 12 percent.

A Month at the Bottom of the World

On a winter mission to Antarctica, a Pew staffer works to protect a unique environment



STORY AND PHOTOGRAPHY BY RYAN DOLAN

AUG. 2—PUNTA ARENAS, CHILE

I'm at the southern tip of South America, in the city known as the gateway to Antarctica. Sunlight beams through clouds onto the gray waters of the Strait of Magellan. At the end of a huge concrete dock is my home for the next month: the Nathaniel B. Palmer, a 308-foot National Science Foundation research vessel, its bright orange hull rising from the water in warm contrast to the wintry surroundings.

The Palmer's glow reminds me why early European explorers named this place Tierra del Fuego, the "Land

of Fire." As Magellan and his crew sailed into the strait that now bears his name, they saw canoes piloted by indigenous people who had painted their skin and built bonfires in their boats to keep warm while at sea.

Five hundred years later, the Palmer—with a crew from the National Oceanic and Atmospheric Administration's Antarctic Marine Living Resources (AMLR) program—will embark on a monthlong voyage south through the Strait of Magellan, across the Drake Passage, and onward to the Scotia Sea, the Antarctic Peninsula, and the South Shetland Islands. This is the fifth and final year that this AMLR group will make the winter trip.

It's an adventure traveler's dream itinerary. But I'm here to work alongside scientists from the United States, Chile, Germany, and Peru, in hopes of better understanding the variability of Antarctic krill, the shrimplike crustacean that forms the base of the food web in the Southern Ocean and is a staple food source for many Antarctic species, including penguins.

It's the middle of the austral winter, so aside from a smattering of other scientists working in research stations across the Antarctic continent, the Palmer will be alone in the vast darkness as it crunches its way through the sea ice. Most research in Antarctic waters takes place in the summer months, when migratory species and Antarctic predators are most active. Very little of this work has been done in winter, leaving much about this fragile ecosystem during these dark and cold months unknown.

Krill and the species that feed on them face growing threats. The Antarctic Peninsula and the surrounding waters are warming faster than anywhere else on Earth, which scientists suggest is driving declines of the tiny creatures that have adapted to thrive in sea ice conditions.

Also, over the past 40 years, commercial fishing for krill—used in nutraceuticals such as omega-3 supplements and in feed for farmed fish, including salmon—has become increasingly concentrated in this area, particularly in coastal regions. This is reducing the local availability of krill near penguin colonies, which can make it harder for penguins to find food.

What we learn on this voyage could add to the body of science that informs fisheries management policies, which might help the krill populations and

The Nathaniel B. Palmer carves a path through the pancake ice layering the Bransfield Strait.

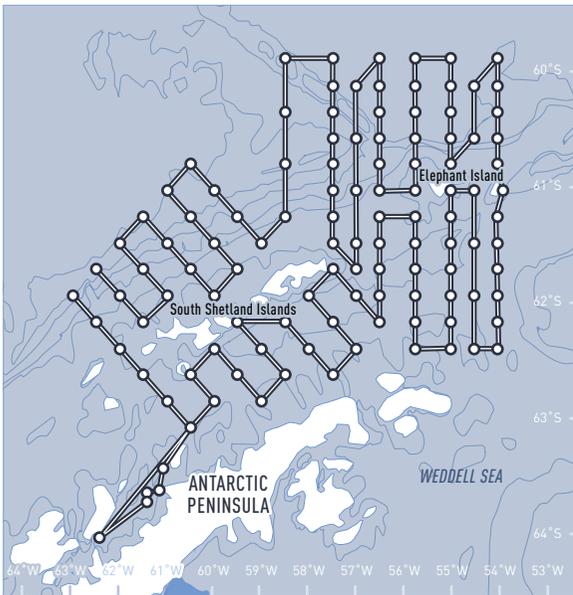




Sunrise sets the rugged peaks of Livingston Island aglow.



The research crew looks onto the waters near Elephant Island.



The Antarctic Marine Living Resources Winter Survey sailed to appointed monitoring sites to gather data on a critical staple for penguins, the small fish called krill, which have been heavily fished for commercial purposes in recent years.
The Pew Charitable Trusts

the predators that rely on them. We will also gather a host of data on other aspects of this near-pristine ecosystem. But first, onward to the ice. I'm well-aware that I'm headed for some of the roughest waters in the world—and even the most experienced polar scientists are impressed to hear that I'm doing this in the winter. While I'm pretending to be a hardcore Antarctic explorer, I've brought along some seasickness medications just in case.

AUG. 7

We are now in the Bransfield Strait; icebergs hundreds of feet tall tower in the distance. I'm in the ship's lab when I hear loud rumbles along the hull and feel the boat vibrating. I run to a porthole and see waves of pancake ice—large slabs with edges rounded from rubbing against each other—undulating on the waves around us.

My first view of sea ice is thrilling, but it belies a grim reality: Because of warming trends in the region, vast portions of the Scotia Sea and the Bransfield Strait are uncharacteristically ice-free this winter. While this is bad news for Adélie penguins and crabeater seals, the thin ice will allow the Palmer to forge farther south than the AMLR Winter Survey has ever gone. Our destination is the southern part of the Gerlache Strait, an area of austere beauty, where we hope to find Antarctic krill. And where there are krill, there are penguins, seals, and whales.

In the few days we've been on the ship, my body clock has been turned upside down—apt, perhaps, considering that we're at the bottom of the Earth. I work from 8 p.m. to 8 a.m., so I rarely see the full midwinter sun, which appears for only about seven



Adélie penguins head off for a swim.

hours a day, with about two hours of twilight on either end. I have no complaints, though, as the dusky daylight hours bathe this alien landscape in a gauzy, muted color palette. The wildlife doesn't seem to mind the low light conditions either; I've spotted seabirds—albatrosses, skuas, and a few species of petrel—and a couple of fur seals.

I've also seen a bounty of other wildlife through a microscope lens. We are here in part to study zooplankton—tiny animals that drift in the ocean—and learn how they are responding to changes in their environment.

AUG. 15

We've entered the Gerlache Strait, renowned for its spiky icebergs and humpback whales, which help draw summer tourists on cruise ships. Within hours, I too fall for the Gerlache, which is at once spectacular, raw, humbling, and alive. The crystalline water is sprinkled with pieces of sea ice and icebergs that growl and creak. Every shifting wave, rotating iceberg, and evolving cloud feeds an ever-changing kaleidoscope of color and shape.

In an area hardest hit by the impacts of climate change, the Gerlache and its surrounding waters are also sensitive to human impacts. In addition to an annual decline in sea ice coverage, the region is one of the most heavily fished for Antarctic krill. With an overall decline in krill biomass, the cumulative impacts on the area are fueling fears that overconcentrated fishing is pushing the penguins that live here to travel farther to find food, putting them at risk.

Despite these challenges, almost on cue I hear faint splashing sounds below, signaling a group of Adélie penguins jumping through the water. Adélies are small,

topping out around 28 inches, but as they leapfrog past one another they look even tinier, dwarfed by the icebergs, our boat, and the massive scale of our surroundings. If someone hadn't pointed out the penguins, I would have missed them. And they were right in front of me.

AUG. 22

While each day on board the Nathaniel B. Palmer holds surprises, the survey conducted by the Antarctic Marine Living Resources program is a finely tuned operation: The ship has followed a predetermined grid each year since 1990, allowing the scientists to sample from the same sites every mission to help show year-over-year changes in the ecosystem. Since 2012, researchers have carried out this work in winter, further broadening our understanding of this remote and unique ecosystem.

Researchers use acoustic equipment to locate krill and measure their biomass. AMLR staff then use the data to prepare biomass estimates for the entire region. In daylight, crew members stationed in what we call the ice tower, high above the deck, peer through binoculars to observe conditions, including the prevalence of sea ice, as well as whales, seals, penguins, and other seabirds.

Once we reach a predetermined sampling site, we deploy a monitoring instrument 750 meters deep, which measures ocean conductivity (salinity), temperature, and fluorescence (the presence of chlorophyll). These indicators help scientists assess how well a given site will support organisms at the base of the food web—and by extension, the species that rely on them for food.

We've already encountered temperatures as low as minus 20 degrees Celsius (minus 4 F) with a wind chill of minus 47 C (minus 53 Fahrenheit), winds over 40 knots, swells splashing onto the deck, and thick patches of sea ice that can cause hourslong delays. So before going on deck to deploy the Isaacs-Kidd midwater trawl—a conical net-and-bucket device used to collect zooplankton samples—we don our extreme cold weather gear, steel-toe rain boots, and hard hats.

The winch operator lowers the net from a crane to a depth of 170 meters, while the captain holds the ship at a steady 2 knots to maintain tension on the cable and minimize damage to specimens caught in the net. Once the net reaches the desired depth, the winch operator slowly brings it back to the surface, where the deck crew hoses it off and removes the codend—a little bucket attached at the end of the net, where, if all went well, the zooplankton samples have been collected. I will then spend hours in the ship's lab staring at the microscopic creatures, which hold clues to the health of an ecosystem and are often bellwethers of how life is adapting to change.



Above: Storm clouds roll across Discovery Bay off Greenwich Island. **Right:** The sunrise north of Elephant Island in Antarctica.

SEPT. 2—PUNTA ARENAS, CHILE

After a long, choppy crossing over the Drake Passage, which put me in sickbed for a few days, we've finally made it back to South America. As the Nathaniel B. Palmer eases into dock, I've never been so happy to see dry, level land, but I'm also not ready for the adventure and discovery to end. I've finally experienced the beauty and serenity of the Antarctic, and I will miss it, just as I'll miss working with the dedicated team of world-class scientists who have accomplished so much here in recent years.

Prior to the first U.S. AMLR Winter Survey five years ago, scientists could only speculate about how the Antarctic ecosystem fluctuated in winter. Now those researchers know that a large percentage of Antarctic krill overwinter in the Bransfield Strait, making it a key refuge for species like Adélie penguins and crabeater seals—a fact that raises further alarm over the rapid decline in sea ice coverage.

Still, the scientific community has only begun to understand Antarctica and the Southern Ocean in winter. To continue expanding that knowledge—and to help others safeguard the region's unique biodiversity—will require a continued government commitment to maintain missions to the region, including during its coldest, darkest months.

Ryan Dolan is an officer with The Pew Charitable Trusts' global penguin conservation campaign.





Living Shorelines Connect the Land and the Water

Research shows that natural elements provide better habitat and erosion protection than man-made seawalls and bulkheads.

Living shorelines that include natural vegetation and other materials foster greater biodiversity than seawalls, according to a recent research project conducted by Rachel Gittman, a postdoctoral researcher at the Northeastern University Marine Science Center. In the Pew-supported study, Gittman looked at the effects of shoreline protection on coastal ecosystems. She compared many different species and the abundance of each species found on seawalls and bulkheads with those found on living shorelines. Her study resulted in an article, "Ecological Consequences of Shoreline Hardening: A Meta-Analysis," published in the journal *BioScience*. Trust sat down with Gittman to learn more about her work.



What are shoreline protection structures, and why do people build them?

Shoreline protection structures include bulkheads and seawalls, which are vertical walls constructed parallel to

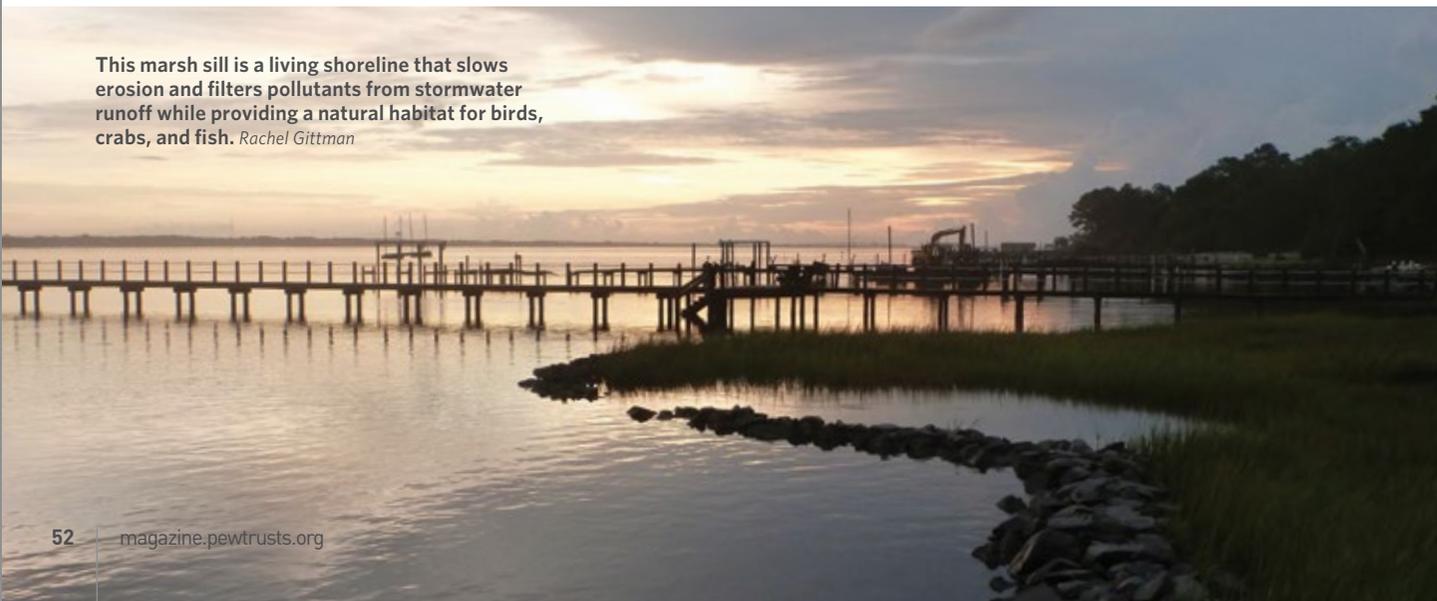
shore at the high-water line, on the landward of where tides come in. They can also be made of rock or rubble called riprap, placed directly on the shoreline at or above the high-water line. Or they can be breakwaters and sills made of rock, rubble, or oysters that are constructed parallel to shore, on the seaward side of tidal areas. The breakwaters and sills are often paired with marsh plants, to make a type of "living shoreline."

Property owners build shore protection structures to prevent or slow erosion, which can impact nearshore property and infrastructure.

What is a living shoreline?

People can mean different things when they refer to living shorelines, so it can be a bit confusing. It's a broad term that can encompass everything from an unmodified or natural shoreline to a restored shoreline with a combination of soft native plants and hard materials such as rocks or oysters. The National Oceanic and Atmospheric Administration describes a living shoreline project as one that "incorporates natural vegetation or other living, natural 'soft elements' alone or in combination with some type of harder shoreline structure, like oyster reefs, rock sills, or anchored large wood for added stability.

This marsh sill is a living shoreline that slows erosion and filters pollutants from stormwater runoff while providing a natural habitat for birds, crabs, and fish. *Rachel Gittman*





gmc3101/iStockphoto



Zachary Bartscherer/The Pew Charitable Trusts

Bulkheads and seawalls, left, can weaken and fail, especially during storms. But coastal grasslands, right, are a natural buffer during hurricanes, absorbing waters from storm surges and floods.

Living shorelines connect the land and water to stabilize the shoreline, reduce erosion, and provide ecosystem services, like valuable habitat, that enhances coastal resilience.” My Pew-supported research focused on comparing the ecology of a shoreline that has not been modified with those that have.

Where are living shoreline projects being used in the United States?

Living shoreline projects can be found along all of our coastlines, including the mid-Atlantic, Gulf Coast, and Pacific Coast. In particular, they have become increasingly popular on the North Carolina coast, along the shores of the Chesapeake Bay, and in Puget Sound. My colleagues and I studied these types of living shorelines in North Carolina and found that they provide better habitat for juvenile fish and crustaceans and also performed better in terms of providing erosion protection during a Category 1 hurricane than shorelines with bulkheads.

What did you find when you compared engineered structures with unmodified shorelines?

In completing our meta-analysis, we found a lower biodiversity and abundance of marine organisms along seawall and bulkhead shorelines than along unmodified shorelines. Essentially, there is a little over a 25 percent loss in biodiversity and also around a 35 to 40 percent loss in abundance when you have a seawall instead of an unmodified shoreline.

Why is biodiversity of coastal species and abundance of individual organisms important?

Maintaining biodiversity can help maintain what are called “ecosystem functions and services.” For example, bivalves such as oysters and mussels filter nutrients and

pollutants, improving water quality. Small crustaceans and fishes also serve as prey for larger commercially and recreationally valuable fishes. The more diverse and abundant organisms are in an ecosystem, the less likely human activities or natural disturbances will result in a loss of ecosystem function or of an entire species.

Why do living shorelines support greater biodiversity and abundance?

Organisms are adapted to the range of environmental conditions found along their native, natural shorelines. When the shoreline is modified by a shore protection structure, those environmental conditions may change—and, in some instances, may no longer be within the range suitable for some organisms.

What is the significance of your research on this issue?

Our research provides further evidence that shoreline hardening—particularly the construction of seawalls and bulkheads—can have significant, adverse effects on coastal ecosystems.

Based on what you learned, do you have recommendations for shoreline protection?

I would recommend that the ecological consequences of constructed shore protection structures be considered when deciding how to protect property and infrastructure found along shorelines. Living shorelines should be considered as a viable alternative to seawalls and bulkheads. With the right amount of education and incentives, it’s possible that we could persuade private property owners to think about the long-term sustainability, resilience, and ecological function of their shorelines rather than having a static, short-term view of shoreline protection.

A Healthy Partnership

Through a series of research-based initiatives, the Robert Wood Johnson Foundation and Pew are collaborating to shape a healthier nation.

BY DEMETRA APOSPOROS

When a new building is constructed or roadway developed or factory built, it often has health effects that ripple through the surrounding community. But how to measure that?

In 2009, the Robert Wood Johnson Foundation—the nation’s largest philanthropy dedicated solely to health—wanted to see if a process called health impact assessments, known as HIAs, could help provide policymakers with the information they needed to make good decisions about the impact of projects on the public’s health. HIAs, conducted by a collaboration of researchers, government officials, and decision-makers, evaluate a project’s full impact on the surrounding community’s health. Recognizing a shared interest in improving public health through the use of strong, evidence-based programs, the Princeton, New Jersey-based foundation turned to Pew to help determine whether HIAs were as effective as they appeared to be. Known as the Health Impact Project, the collaboration, which has recently expanded, also laid the groundwork for other partnerships designed to improve the nation’s health.

“Back in 2009, HIA was one of the few concrete tools for bringing health considerations into the decisions of other sectors outside of health care,” says Pew’s Rebecca Morley, who directs the Health Impact Project. “RWJF wanted to test the tool, ensure its rigor, and scale it to multiple sectors.” The project was able to confirm that HIAs were indeed a rigorous tool that could improve public health, and it also began to support assessments around the nation. Since the collaboration began, the number of HIAs conducted in the United States has increased from about 60 to approximately 400, over 100 of which were funded by RWJF.

Many of the early assessments focused on the health impacts of decisions relating to the built environment—such as transportation infrastructure, city planning, and housing developments. The assessments considered how the project—be it a new road, a mixed-use development, or updates to a senior housing complex—would affect the overall health of people living in the area. For example, a

new development might result in more traffic and pollution, which could harm current residents, but might also bring needed affordable housing units or a new supermarket that could provide fresh fruits and vegetables to an underserved population.

Last year a far-reaching HIA by the Department of Housing and Urban Development looking at locations around the country concluded that the quality, affordability, location, and community of public housing for seniors and disabled families all have an impact on residents’ physical and mental health by reducing illnesses, injuries, and stress. Another recent HIA, of the light rail system in St. Paul, Minnesota, drew lines to community health in a different way by examining a series of land-use changes for a new transportation system connecting the Twin Cities. The project proposed running the system through low-income and immigrant communities where many businesses are on the ground floor of buildings that have apartments above. The HIA revealed that existing zoning regulations would have effectively prohibited such businesses from being allowed to continue with implementation of the new transport system. The finding, which would not have otherwise come to light, led local authorities to change the zoning laws, preserving the mom-and-pop shops—some of which sold fresh produce and ethnic foods—as well as the community’s diversity.

In 2017, the Health Impact Project will use the framework of a health assessment to tackle a national public health concern. Motivated by the crisis of lead-poisoned water in Flint, Michigan, the project will examine how the toxin can affect communities—through water, housing, and soil—and deliver concrete, comprehensive, and definitive recommendations for protecting citizens from the damaging effects of this heavy metal.

“We viewed HIAs as having great promise in exploring the multiple determinants of health—the notion that health is produced more by your physical and social environmental factors than by health care,” says Pamela Russo, RWJF’s senior program officer for the Health Impact Project, noting that with “a lot of depth in government work and government affairs, [Pew] can take advocacy further than we can.”

Robert Wood Johnson also turned to Pew when confronting another significant national health concern: childhood obesity.

By 2010, obesity among children had nearly tripled in three decades, with corresponding increases in Type 2 diabetes and other related illnesses. But another statistic also attracted RWJF's attention—most children consume more than 50 percent of their daily calories at school. Determined to advance what the foundation calls a “culture of health” in the U.S., RWJF worked with Pew to develop the Kids' Safe and Healthful Foods Project, which focuses directly on what's served in school cafeterias around the country.

“The Robert Wood Johnson Foundation has been critical to accelerating the progress made in child nutrition,” says Jessica Donze Black, who until recently directed the project at Pew. “Its emphasis on backing this work through a partnership built on solid research and programmatic and policy support changed the dynamic.”

Using a variety of approaches, including HIAs, economic analyses, scientific polling, and advocacy, the project team worked to increase awareness and ensure the adoption of healthier standards for meals and snacks in schools mandated through the 2010 Healthy, Hunger-Free Kids Act. Implementation of these standards—the first updates in 30 years—began in 2012 and means that today over 30 million young people are receiving more fruits, vegetables, and whole grain-rich selections, with lower amounts of sodium and trans fats every day.

“We recognized that the most important approach to making change around childhood nutrition in communities was through policy,” says Jasmine Hall Ratliff, program officer at RWJF. “Pew led a great effort around collaborative and coordinated work, from farm to school folks, to hunger folks, to nutrition folks, to funders themselves who had an interest in this work.”



Most recently, RWJF has begun working with the Pew-MacArthur Results First Initiative, which helps state and local policymakers apply an innovative approach to evidence-based policymaking, including a customizable cost-benefit model, to their policy and budget choices. RWJF's support will expand the Results First Initiative to encompass state health care programs.

The 5-year-old partnership between Pew and the Chicago-based John D. and Catherine T. MacArthur Foundation has worked in 22 states to help them identify programs that are most likely to produce positive outcomes for their residents and make the most of limited taxpayer dollars.

For example, in New Mexico, Results First helped the state assess the costs and benefits of its programs in early education, child welfare, and adult criminal justice. Since completing the analysis in September 2012, New



Robert Wood Johnson Foundation's partnerships with Pew aim at a common goal of healthier communities. *iStockphoto*

Mexico has directed \$104 million into evidence-based programs shown to deliver high returns. The majority of the funds have been dedicated to child welfare and early education programs, including pre-K, early literacy, improvements to early childhood programs, and evidence-based home visiting.

States eager to embrace the Results First approach have been especially interested in evaluating health policies, as medical care absorbs an increasingly large portion of their budgets, and RWJF's involvement will help to make this happen. “We want to help states make wise, evidence-based decisions with their scarce resources,” says Kerry Anne McGeary, senior program officer at RWJF. “A major part of the outcome we hope to achieve is improved population health, well-being, and equity. We recognize we won't achieve equity unless there are evidence-based funding decisions—which is something Results First does well.”

Susan Urahn, Pew's executive vice president and chief program officer, says the strong collaboration with the Robert Wood Johnson Foundation has served both organizations well, allowing projects to be more effective—and have a more transformative impact on improving public policy—than could be possible working independently.

“Strong strategic partnerships like those with our colleagues at Robert Wood Johnson are like force multipliers,” she says. “We are grateful and delighted to have partners like RWJF who share a commitment to research-based policy that truly improves the lives of people throughout the country.”

For more information about philanthropic partnerships at Pew, please contact Senior Vice President Sally O'Brien at 202-540-6226 or sobrien@pewtrusts.org.

Demetra Aposporos is a Trust staff writer.

RETURN ON INVESTMENT

*The Pew Charitable Trusts applies a rigorous, analytical approach to **improve public policy, inform the public, and invigorate civic life**, as these recent accomplishments illustrate.*

IMPROVING PUBLIC POLICY



Commercial fishing vessels like this one in the North Sea will face greater scrutiny from nations that signed the Port State Measures Agreement. *Guy Vanderelst/Getty Images*

A treaty to fight illegal fishing

The Port State Measures Agreement, a U.N. treaty designed to prevent illegally caught fish from entering into the global market, went into effect in June after 30 governments, including the European Union, committed to what is the world's first binding agreement to strengthen inspection protocols for

foreign-flagged fishing vessels coming into their ports. Now those suspected of illegal fishing face a higher risk of being turned away at ports or having their catches and vessels seized. This at-port policing is safer and more efficient and cost-effective than confronting illegal operators on open waters.

European Union to prohibit bottom trawling below 800 meters

On June 30, the European Parliament, Council of Ministers, and European Commission reached a deal to prohibit bottom trawling below 800 meters in EU-controlled waters of the North Sea and the northeastern Atlantic Ocean. This 360,000-square-mile expanse—more than twice the size of California—includes the continental slope, an area of high diversity of fish species and deep-water bottom habitat for cold-water reefs and coral gardens. Pew has been working to establish a ban on bottom trawling in this region since 2007 to protect fragile marine ecosystems and maintain healthy fish stocks.

Western lands initiative makes progress on protections in Alaska

On July 29, the Bureau of Land Management issued its final plan for 7 million acres of public land in Alaska's eastern interior. Pew has been working with Alaska Natives to raise awareness of the conservation value of this land to ensure that the BLM extends substantial administrative protections to the unique areas in the region, including the White Mountains National Recreation Area, the Steese National Conservation Area, and the Upper Black River.

Caribbean nations form shark sanctuaries

Four Caribbean nations announced new shark sanctuaries in June. St. Maarten and the Cayman Islands closed their exclusive economic zones to commercial shark fishing. Together, these two countries' protected areas cover 46,000 square miles, which expands the world's 14 sanctuaries to cover a total of 5.9 million square miles—an area bigger than Canada. In addition, Curaçao and Grenada announced that they would introduce shark sanctuaries legislation to protect an additional 22,000 square miles of ocean. Pew worked closely with all four jurisdictions during the past two years as part of a larger goal to protect sharks from overfishing and promote policies that help maintain sharks' crucial role in marine ecosystems.

CITES increases protection for sharks and rays

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) extended protections in October by listing silky sharks, three species of thresher sharks, and all nine species of mobula rays. Two-thirds of the 182 CITES member governments voted to add the species to Appendix II, which requires

that any catch of the animals be deemed sustainable before trade in fins and gill plates can begin again. This important step furthers Pew's goal of reducing shark and ray mortality to sustainable levels so populations of these ancient predators can begin to recover.

Shhhh! Recreation contributes billions to U.S. economy

Pew released a peer-reviewed white paper in March that showed visits to quiet recreation areas—places with nonmotorized activities such as hiking, mountain biking, camping, hunting, and fishing overseen by the Bureau of Land Management in 11 western states and Alaska—supported 25,000 jobs and generated \$2.8 billion for the U.S. economy in 2014. Pew's western lands initiative and environmental science teams collaborated with outside experts on the first analysis of its kind. Pew's initiative seeks to protect BLM's undeveloped public land, which is critical to maintaining large ecosystems and the species that depend on wild terrain.

Commercial tuna fishing contributes billions to the global economy each year

To mark World Tuna Day on May 2, Pew released *Netting Billions: A Global Valuation of Tuna*, a report that included the first estimate of the annual revenue generated by commercial tuna fishing around the world. It found that commercial fishing vessels catch enough tuna to contribute more than \$42 billion to the global economy every year. That's greater than the gross domestic product of more than half of the world's 196 countries. Highlighting the ecological and economic value of this fish is an important element of Pew's global tuna conservation campaign, which is working to end overfishing of five commercially fished tuna stocks in the Atlantic and Pacific oceans by 2018.

At least 30% of the ocean needs protection

A peer-reviewed study supported by Pew and released in March found that protecting at least 30 percent of the ocean is necessary for achieving fisheries and marine conservation goals, which include protecting biodiversity, avoiding collapse of some fish populations, maximizing fisheries yield, and minimizing trade-offs between conflicting concerns such as ecotourism and commercial fishing. The review of 144 published studies found there is a strong scientific consensus on safeguarding a minimum of 30 percent of the world's oceans, a finding that will inform the development of future conservation benchmarks and policy efforts.

U.S. finalizes first standards for drilling in Arctic waters

The Department of the Interior released new offshore drilling regulations in July that include most of Pew's recommendations to improve drilling safety and oil spill prevention in the U.S. Arctic Ocean, which is home to sensitive wildlife habitats and extreme weather conditions requiring specialized rules. Over the past six years, Pew has developed guidelines for these regulations, proposing them to federal regulators and providing technical expertise and detailed science-based recommendations. The rules now require measures such as oil spill response plans that are tailored to the Arctic, a separate relief ship available should an operator lose control of a well, and critical containment equipment in the Arctic.

FDA to strengthen safety of compounded drugs

On July 7, the Food and Drug Administration issued draft guidance prohibiting compounding of drug products—the creation of customized medicines to meet a patient's unique needs—that are essentially copies of commercially available or approved drugs. Compounded drugs are not FDA-approved and therefore untested for safety and effectiveness. FDA's guidelines uphold the integrity of the regulatory framework for pharmaceutical manufacturing and compounding, which is designed to ensure that patients receive safe and effective medications. Pew submitted comments largely in support of the draft guidance, agreeing that it strongly supports public health. FDA will review this input before issuing final guidance for implementing the provision of the Drug Quality and Security Act that pertains to compounded drugs.

Federal rule would regulate payday lending

The Consumer Financial Protection Bureau in June proposed the first federal rule to regulate payday and other high-cost, small-dollar loans. Citing Pew research, the proposal's recommendations include effectively eliminating the two-week, lump-sum payday loan and shifting the market to installment loans to be paid off

in months instead of weeks. During a comment period, Pew's small-dollar loans project will work to add to the proposal an ability-to-repay benchmark of 5 percent of a borrower's pretax monthly income that could save millions of borrowers billions of dollars.

Federal regulators have proposed rules for payday lenders that include many recommendations from Pew.

Alex Parlini/The Pew Charitable Trusts



States create and strengthen budget stabilization reserves

In the spring, Kansas, Oklahoma, and Wyoming enacted laws that created or modified their budget stabilization—or rainy day—funds, which can help states manage large swings in revenue. Previously, Kansas was one of four states without a rainy day fund. Oklahoma established a second reserve fund that will help smooth its most volatile revenues. Wyoming strengthened its fund by adopting evidence-based withdrawal provisions and procedures. Pew worked in all three states, providing testimony, state-specific research, and technical assistance to legislators and other stakeholders.

5 states to begin evaluating tax incentives

Alabama, Colorado, Hawaii, Utah, and Virginia passed legislation this year to evaluate their economic development tax incentives. They join 22 states and the District of Columbia, which since 2012 have enacted bills that provide legislators with empirical evidence on the outcomes of incentives. Policymakers are able to use this information to shape policies that obtain the best possible results for the states' taxpayers and economies. Pew collaborated with stakeholders and provided state-specific research to legislators and evaluators.

Kentucky will study local fiscal monitoring laws

This year, Governor Matt Bevin (R) signed legislation requiring that Kentucky's Legislative Research Commission study the impact of municipal bankruptcy laws and methods of monitoring local governments, and include an examination of best practices used by other states. The law draws on Pew's research, and supporters of the legislation have asked Pew to provide technical assistance during the development of the study.

Counties in Maryland and Pennsylvania commit to evidence-based policymaking

Two counties—the first local governments outside of California—have partnered with the Pew-MacArthur Results First Initiative, a joint project of Pew and the John D. and Catherine T. MacArthur Foundation, which collaborates with state and local governments to implement an effective approach to evidence-based policymaking. Montgomery County, Maryland, and Allegheny County, Pennsylvania, will serve as important case studies for other counties. Results First helps governments identify and invest in programs that provide the greatest return on investment for taxpayers.

New federal rules protect consumers' rights with banks

On May 5, the Consumer Financial Protection Bureau proposed rules to prohibit financial companies from including mandatory arbitration clauses in their customer agreements that ban consumers from participation in class-action lawsuits. A Pew survey found that 91 percent of consumers favor having the right to join class-action lawsuits, but most account agreements now don't allow consumers to take their disputes to court and instead require resolution of disputes with a third-party decision-maker, with small opportunity to appeal. Pew's consumer banking project has advocated for the elimination of clauses that restrict consumers' participation in class-action lawsuits.

Membership in Electronic Registration Information Center grows

Last summer, New Mexico, Ohio, West Virginia, and Wisconsin became the newest members of the Electronic Registration Information Center, known as ERIC. Now, 20 states plus the District of Columbia, representing nearly a third of the nation's eligible voters, are part of the nonprofit organization. ERIC works to improve voter roll accuracy and streamline the registration process for newly eligible voters. Since helping to establish ERIC in 2012, Pew has offered ongoing assistance to the center, which is governed and managed by its member states.

Maryland, Alaska, and Kansas pass criminal justice reform bills

- On July 11, Alaska Governor Bill Walker (I) signed a package of criminal justice legislation putting his state at the forefront of research-based policies designed to protect public safety, hold offenders accountable, and control corrections costs. The state had projected its prison population would rise by 27 percent over the next 10 years but now forecasts that the reforms will reduce the amount by 13 percent, cutting costs by \$380 million. Some \$98 million of those savings will be invested over the next six years into recidivism reduction programs, pretrial supervision, violence prevention programs, and victims' services.
- On May 19, Maryland Governor Larry Hogan (R) signed into law legislation to enhance public safety, hold offenders accountable, and control corrections costs. The Justice Reinvestment Act is projected to reduce Maryland's prison population by nearly 1,200 inmates within 10 years, freeing up at least

\$80.5 million for investment in efforts to reduce recidivism rates by expanding and improving substance abuse treatment programs and enhancing community supervision practices.

- On April 11, Kansas Governor Sam Brownback (R) signed juvenile justice legislation that diverts lower-level offenders from court and limits how long young people can be held in detention or residential facilities, among numerous other

policy improvements. The legislation is expected to reduce the number of youth sent to out-of-home facilities by 60 percent and free up \$72 million for reinvestment by 2022. This legislation is a result of Pew's efforts to work with states to promote data-driven, fiscally sound policies and practices in criminal and juvenile justice systems.



Louisiana, Oklahoma, and Utah are studying criminal justice reforms with help from Pew. *iStockphoto*

3 states announce initiatives to safely reduce populations, costs in criminal and juvenile justice systems

- On June 17, Louisiana Governor John Bel Edwards (D) and other state leaders directed the state's Justice Reinvestment Task Force to develop data-driven recommendations to protect public safety while reducing the state's corrections population and costs. Recommendations will go to the governor and Legislature in March for consideration during the 2017 session. Pew will provide technical assistance and data analysis to state officials throughout this process.
- In August, Oklahoma state leaders launched a review of the state's criminal justice system aimed at developing data-driven reforms to better protect public safety, hold offenders accountable, and control corrections costs. With assistance

from Pew and the Crime and Justice Institute, the Oklahoma Justice Reinvestment Task Force will submit recommendations to the governor and Legislature in December for consideration during the 2017 session.

- Utah Governor Gary Herbert (R) and other state leaders announced on June 16 the formation of a juvenile justice working group that will conduct a data-driven examination of the state's juvenile justice system and issue policy recommendations aimed at protecting public safety, holding youth accountable, containing costs, and improving outcomes for youth, families, and communities. The group will submit its findings and policy recommendations for consideration during the 2017 session. Pew will provide technical assistance and data analysis, similar to the effort that resulted in a comprehensive package of adult criminal justice reforms in 2016.

Negative political views soar

In June, as the 2016 presidential campaign was unfolding amid intense division and animosity, the Pew Research Center found that partisans' views of the opposing party were more negative than at any point in nearly a quarter-century. For the first time since surveys began in 1992, majorities in both parties expressed not just unfavorable but very unfavorable views of the other party. Sizable shares of Democrats and Republicans each said the other party stirred feelings not only of

frustration, but also fear and anger. More than half of Democrats (55 percent) said the Republican Party made them "afraid," while 49 percent of Republicans said the same about the Democratic Party. Among those highly engaged in politics—those who said they vote regularly and either volunteered for or donated to campaigns—70 percent of Democrats and 62 percent of Republicans said they were afraid of the other party.

For the first time since surveys began in 1992, most voters in each party had very unfavorable views of the opposing party as they prepared to vote in the presidential election. *Katye Martens*





Before the Brexit vote in June, two thirds of Britons said they wanted powers returned from the EU to their government. *Michael Tubi/ Getty Images*

Beyond Brexit, Euroskepticism still strong

Ahead of the June 23 U.K. referendum on whether to remain in the European Union, the Pew Research Center released a report finding Euroskepticism on the rise across Europe. Some two-thirds of Britons and Greeks, along with significant minorities in other key nations, want some powers returned from the EU to

national governments. The report's findings received major attention in domestic and international media, including the BBC, *The Independent*, *The Telegraph*, Agence France-Presse, Reuters, the *Financial Times*, *The New York Times*, *The Washington Post*, *Handelsblatt*, *Die Welt*, and *El Mundo*.

How religious Americans differ from nonreligious

Highly religious Americans are happier and more involved with family but are no more likely to exercise, recycle, or make socially conscious consumer choices, according to an April Pew Research Center report. Nearly half of highly religious Americans—defined as those who say they pray every day and attend religious services each week—gather with extended family at least once or twice a month. By comparison, just 3 in 10 Americans who are less religious claim the same frequency. However, in several other areas of day-to-day life, highly religious Americans appear to be very similar to those who are not as religious. For instance, highly religious people are about as likely as other Americans to say they lost their temper recently, and they are only marginally less likely to say they told a white lie in the past week.

Israel's religiously divided society uncovered

A Pew Research Center survey released in March found deep divisions in Israeli society—not only between Israeli Jews and the country's Arab minority, but also among the religious subgroups that make up Israeli Jewry. The report received significant attention from Israeli media and elite stakeholders. During a briefing hosted at his residence, Israeli President Reuven Rivlin commented, "This survey must be placed before the decision-makers in Israel, before the government of Israel. Your survey and its significant findings must serve as a wake-up call for Israeli society to bring about some soul-searching and moral reflection."

How neighborhoods are changing in Philadelphia

In May, Pew's Philadelphia research initiative released a report on gentrification and other types of neighborhood change in the city. The study revealed that even limited alterations can have a significant impact. Based on income, the analysis showed that only 15 of the city's

372 residential census tracts gentrified between 2000 and 2014, and that 164 tracts—more than 10 times as many—experienced significant drops in median income during the period studied.

Northern Liberties, near downtown Philadelphia, once was industrial, housing a tannery, cigar factory, and breweries. But in recent years, residential construction and housing prices have been on the rise. *Katy Martens*



More than \$10 million for the arts

On June 13, the Pew Center for Arts & Heritage announced 53 grants totaling more than \$10 million to support the Philadelphia region's cultural organizations and artists. The 2016 awards provide funding for 12 new Pew fellowships, 36 project grants, and five advancement grants. One grant goes to

Opera Philadelphia to implement a new business and program model that will feature a multivenu festival launching in 2017, and another to the Please Touch Museum to research and develop exhibitions, programs, and strategies to increase audiences.

Grants support low-income families

On March 22, the Pew Fund for Health and Human Services in Philadelphia announced it would provide more than \$8.5 million over three years to 45 local health and social service organizations to assist more

than 22,000 of the region's low-income young people and their families. This is the Pew Fund's 25th year of support for area agencies serving the most vulnerable members of the community.

The Pew Fund for Health and Human Services has served the Philadelphia region for 25 years.

Katye Martens



In the age of big data, survey research will not only survive but thrive

BY MICHAEL DIMOCK

The next frontier of public opinion research is already visible in the “big data” revolution. Through the digital traces of our everyday activities, we are creating a massive volume of information that can tell us a lot about ourselves. Smart data science can identify patterns in our behaviors and interests. And in some domains, such as predicting consumer spending and who will vote, algorithms may already be surpassing what surveys can do on their own.

Cellphones are replacing the home phones we relied on for decades, and online surveys—of varying quality—are flooding the marketplace with daily numbers, leaving consumers awash in data, and rightfully skeptical.

But in the age of big data, it’s important to remember what surveys are uniquely suited to do. Asking Americans about their values, beliefs, and concerns can tease out meaning from mountains of data and uncover the motivations behind the choices we make—providing a path to understanding not just what we do, but why. If history is a guide, survey research will not only survive but thrive—by taking advantage of what big data provides, and delivering what it cannot.

The survey world is unquestionably facing disruption. Cellphones are replacing the home phones we relied on for decades, and online surveys—of varying quality—are flooding the marketplace with daily numbers, leaving consumers awash in data, and rightfully skeptical. But with every challenge comes a new opportunity. Cellphones have strengthened, not weakened, a pollster’s ability to reach a balanced cross section of the American public. Online surveys allow researchers to ask new kinds of questions, track individuals’ views

over time and reach key populations of interest, all without interrupting people with long phone calls during dinner. The market for information about ourselves will continue to drive innovation and the refinement of best practices in online surveys, just as it did for other survey methodologies in the past.

The future of public opinion is more than just a technical issue. As more data about ourselves becomes available at ever faster speeds, a broader question arises: What role do we want public opinion to play in a democracy? Critics warn of “hyperdemocracy,” where the public’s raw will is so immediate and vivid that it drives the political process and empowers demagogues. A world without survey research is just as threatening; we’d be left with pundits and politicians who tell us what we want rather than listening to what we say.

On Nov. 9, a new president-elect will claim a mandate and use the election outcome as evidence of the public’s will. But elections are imperfect, offering relatively few choices in a limited time frame, and driven, in some cases, as much by personality and circumstance as by substance. Millions of Americans won’t show up to vote, and many of those who do will be unsatisfied with the choices in front of them. Big data may predict this year’s election results, but what we need—now more than ever—is a broader and deeper grasp of the public’s sentiments regarding this country’s direction. And to understand that, we still have to ask.

Michael Dimock is president of the Pew Research Center. This article originally appeared in The Wall Street Journal on June 7.

THE NATION IN BLACK AND WHITE

Nearly eight years after Barack Obama's election as the nation's first black president—which engendered a sense of optimism among many Americans about the future of race relations—a series of flashpoints around the country has exposed deep racial divides and reignited a national conversation about race. A Pew Research Center survey released in June showed profound differences between black and white adults in their views on racial discrimination, barriers to black progress, and the prospects for change.

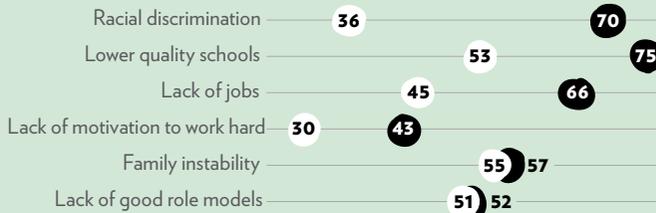
PERCEPTIONS OF HOW BLACKS ARE TREATED VARY BY RACE

Percentage saying blacks are treated less fairly than whites in the United States . . .



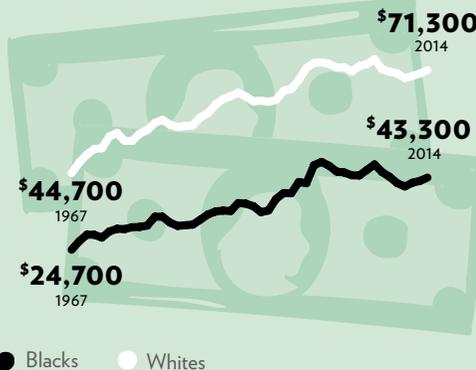
BLACKS ARE MORE LIKELY TO CITE DISCRIMINATION AS A REASON FOR NOT GETTING AHEAD

Percentage saying each of these is a major reason that blacks in the U.S. may have a harder time getting ahead than whites . . .



RACIAL GAPS IN INCOME PERSIST

Median adjusted household income in 2014 dollars



MANY BLACKS ARE SKEPTICAL THAT THE U.S. WILL EVENTUALLY ACHIEVE RACIAL EQUALITY

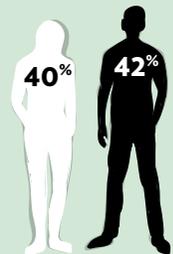
Percentage saying . . .



Our country has made the changes needed to give blacks equal rights with whites

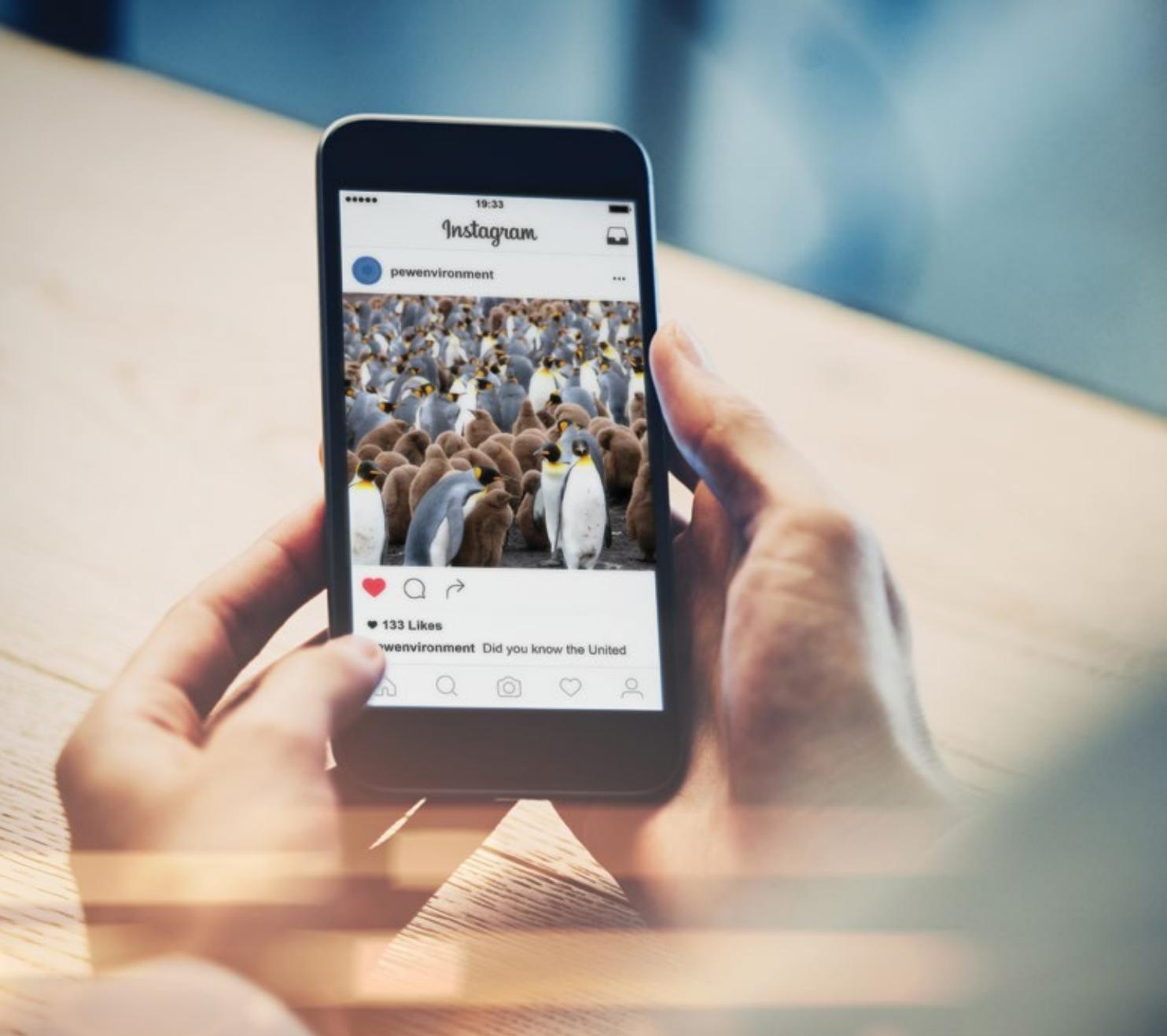


Our country will never make the changes



Our country will eventually make the changes





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is all about being part
of the land, being part of
the wildlife, the fish, and
the birds.”**