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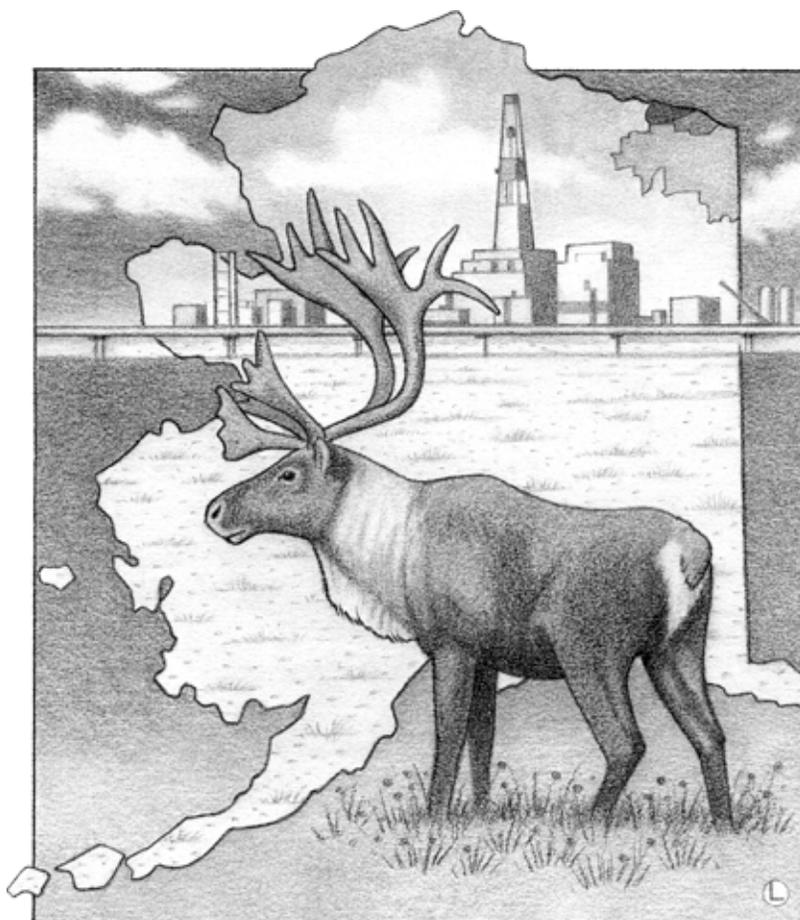
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502 SOUTH 19TH AVENUE, STE 211 BOZEMAN, MONTANA 59718-6827

PHONE: 406-587-9591 FAX: 406-586-7555

WWW.PERC.ORG PERC@PERC.ORG

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# THE CARIBOU AND ALASKAN OIL

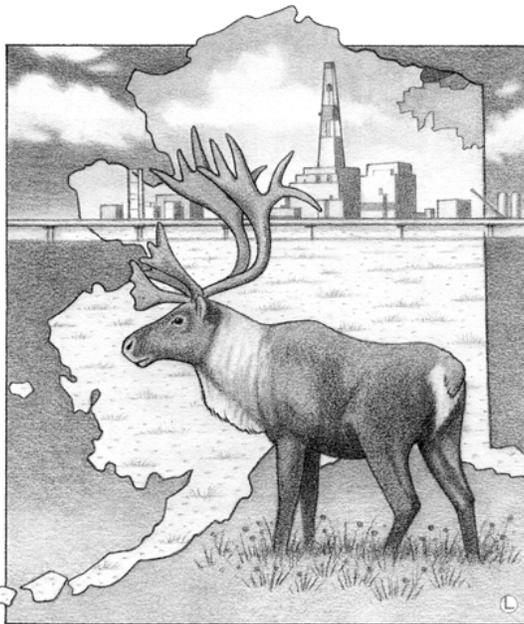
By Deborah Jacobs

As politicians debate oil exploration in the Arctic National Wildlife Refuge (ANWR), public attention has turned to the caribou. Due to their large numbers, lengthy migrations, and importance to traditional Alaskan cultures, these ruminants are probably the most prominent animal species on the North Slope of Alaska.

Opponents of oil exploration often evoke the image of migrating herds of caribou. On its Web site, the National Audubon Society (2001) warns that “no suitable alternative habitat exists for the Porcupine Caribou Herd if they are driven from their calving grounds by oil development.” It even says that the Department of the Interior predicts that oil development will “contribute to” a 20 to 40 percent decline in the caribou population, although it does not give a source for this claim.

Oil exploration since 1968 around Prudhoe Bay on the North Slope does not seem to have negatively affected the Central Arctic caribou herd. And there is little evidence that the Porcupine herd, which journeys through the area proposed for oil drilling in ANWR, will suffer harm.

Nestled in Alaska’s northeast corner, ANWR covers 19.6 million acres of the state’s 365 million acres. In 1980, Congress divided the refuge into three parts: 8 million acres of wilderness, 10 million acres of wildlife refuge that would remain off limits to oil drilling, and 1.5 million acres, known as section 1002, which can be explored for oil if Congress approves. Section 1002 represents only 8 percent of the total



*In terms of overall health, the Central Arctic herd of caribou has prospered.*

refuge, and less than 4 percent of Alaska’s total coastal plain and foothills zone (U.S. Fish and Wildlife Service 2001).

In many years, the Porcupine herd of 130,000 caribou migrates through section 1002, where cows give birth to their calves. Opponents of oil development in ANWR contend that exploration and development threaten the herd. They point to evidence that some individual caribou in the Central Arctic herd have been harmed and contend that the Porcupine is more vulnerable because it is a much larger herd affecting a smaller area.

The Central Arctic herd migrates annually from the foothills of the Brooks Range, where it spends the fall and winter, north to the Beaufort Sea coast in the spring and summer. It inhabits the Prudhoe Bay oil field during summer and early fall as cows calve and suckle their young (Maki 1992, 1702).

In terms of overall health, the Central Arctic herd has prospered (Cronin et al. 1998; Maki 1992; Pollard et al. 1996). In 1972, according to the Alaska Department of Fish and Game, the herd numbered 3,000 animals. Since then it has increased to between 25,000 and 27,000 (Maki 1992, 1703). The caribou population fluctuates naturally, reflecting factors such as predation, parasites, habitat condition, hunting, and weather (Cronin et al. 1998, 201).

Several studies conclude, however, that the oil facilities have displaced some Central Arctic caribou, especially females (Nelleman and Cameron 1996;

## CARIBOU

Whitten and Cameron 1983; Whitten et al. 1992). In 1996 Nellemann and Cameron concluded that the oil facilities have displaced many maternal females from a zone within 4 km of development structures. They also found that the number of males and females in the area surrounding the infrastructure declined by 52 percent, with a 43 percent increase in use of terrain that was 4–10 km from surface development (Nellemann and Cameron 1996, 23). Thus, they suggest that the caribou are staying away from the surface development, and this may lead them to overeat the vegetation further away, possibly leading to a reduction in nutrients.

Another hypothesis is that oil field developments impede the females' typical east-west movement during late summer. The Alaska Department of Fish and Game studied caribou movements from 1975–1978 in the Prudhoe Bay region. Individual caribou were collared and their movements tracked. The study found a higher percentage of bulls near the road system. Away from the roads there was no significant difference in the percentages of bull and cow sightings. From this the researchers concluded that cows avoid the oil-related facilities (Whitten and Cameron 1983, 145).

However, the authors acknowledge that “this comparison may be misleading, since cows apparently retained collars longer than did bulls” (144). With a disproportionately larger total number of cows sighted, the number of cows near the development represents a smaller percentage than the percentage of bulls nearby. If the females do avoid certain structures, it has had no measurable impact on the herd.

Challenging the claim of individual displacement is the well-documented fact that during the herd's summer migration route the caribou walk under pipelines, which are five feet above ground—“to

spare the animals a limbo-bar maneuver” (*Newsweek* 2000). Aerial studies of the Prudhoe Bay oil fields have shown many caribou on and around surface structures (Cronin et al. 1998, 197). Noel et al. (1998, 408) observed that “even when disturbed by moving vehicles, caribou most commonly just move to another location on the pad rather than leaving the pad.”

The oil fields help relieve the caribou from insects that harass them. Studies have shown that gravel pads and roadbeds keep some insects away. In

the absence of these surfaces, the caribou move to the coast, using energy in the process and moving farther away from their inland grazing grounds (Pollard et al. 1996, 649).

The Porcupine herd is much larger than the Central Arctic herd. Section 1002 is one-fifth the size of the Central Arctic herd's calving grounds but is used by six times as many animals (U.S. Fish and Wildlife Service 2001). The caribou roam through ANWR during a 930-mile yearly migration that stretches across Alaska and Canada. They visit section 1002 for only two months,

similar to the time spent by the Central Arctic herd at Prudhoe Bay.

Some argue that if maternal females are displaced, suitable alternative habitat might not be available (Urquhart 2001). Scientists at the University of Alaska at Fairbanks say that caribou cows and calves are sensitive to human disturbances. Thus, oil development could disrupt calving patterns and decrease the number of surviving young (Pearce 2000).

Other evidence casts doubt on this view. The U.S. Fish and Wildlife Service has been investigating the impacts of potential oil development on wildlife in section 1002 for the past fifteen years. Fish and Wildlife officials point out that the herd roams over a vast expanse of territory, and calving has historically

## WHERE CARIBOU ROAM



Source: Alaska Department of Natural Resources

occurred over a fairly large area of the North Slope and the Yukon Territory (Urquhart 2001).

Even if oil development could disrupt the migration of females, improvements in technology in the last thirty years make the surface footprint of the facilities very small. The facilities at Prudhoe Bay cover 5,000 acres, or 2 percent of the oil field surface area. The 1.5 million acres of section 1002 can be explored and developed on less than 2,000 acres, or 0.14 percent of the section (Arctic Power 2001). Joseph Hegna of ARCO Alaska states: "We can explore without leaving footprints. And the footprint required for new developments is a tenth of what it once was" (quoted in Revkin 2001).

Improved three-dimensional underground survey technology and directional drilling allow for more precise, efficient, and far-reaching discovery and extraction of oil and gas reserves. Surface reserve pits, the core of environmental damage in the past, can now be eliminated through the use of waste re-injection. New ice chip roads will melt in the summer, when caribou inhabit the area. Pipelines will be elevated, as at Prudhoe Bay, and punctuated by elbows to allow for caribou movement around the field and to reduce accidental oil spills (Revkin 2001).

Companies know more about caribou management, too. They can limit exploration to the nine to ten months of the year when the caribou are hundreds of miles away.

The weight of evidence suggests that the oil facilities built in the late 1960s have not visibly harmed the caribou that migrate through the Prudhoe Bay area. While there are speculative reasons to be concerned about the larger herd of caribou migrating in ANWR, the evidence of likely harm is weak.

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*Deborah Jacobs was a research assistant at PERC during the past academic year. She begins work as a commodity merchandiser for Archer Daniels Midland in July.*

# DDT'S LEGACY: MALARIA'S RETURN

By Roger E. Meiners and Andrew P. Morriss

In 1972, the U.S. government banned the pesticide DDT. The chemical had been used excessively, especially by the federal government, which refused to respect the rights of those who didn't want it on their property. The decision to prohibit DDT's use may have played a significant role in helping the bald eagle and other birds make a comeback. But it has also allowed malaria to make a comeback.

The worry of scientists three decades ago that there was no good, less toxic, cost-effective substitute for DDT to control mosquitos and other pests is as true today as it was in 1972. A disease that was on the way to being vanquished has returned with a vengeance.

The hundreds of millions of sufferers of malaria and the millions of families that lose infants to malaria are being denied an effective solution (Attaran et al. 2000, 729). The number of countries using DDT has been whittled down to 23. It is produced in only three countries and is becoming difficult to obtain. The United Nations Environment Program has put it on the hit list for extinction (Tren and Bate 2001, 22).

Besides killing a child every thirty seconds, malaria is a recurring disease for many. Children who survive malaria past infancy suffer an average of six bouts each year, making it the most common reason to miss school; adult sufferers miss an average of ten working days a year (United Nations Children's Fund



*The disease has returned to areas in which it had been eradicated: urban areas of the Amazon Basin, Korea, Armenia, Azerbaijan, and Tajikistan.*

[UNICEF] 1999, 4). The infection rate had fallen significantly over the decades, primarily because of DDT sprayed inside homes and on mosquito breeding sites. But as a UNICEF report describes it, "DDT was widely discredited in the 1960s because of its harmful effects on the environment" (6). So the disease is nearly back to where it was 50 years ago.

The tragedy is not being ignored. Roll Back Malaria was launched in October 1998 by UNICEF, the World Health Organization, and the World Bank to "prevent and control this centuries-old scourge" (UNICEF 1999, 1).

Since DDT is unavailable in most nations, and international agencies are shy to use it even where it is legal, the UNICEF program must rely on other measures. These include "insecticide-treated mosquito nets, mosquito coils, repellants and other materials; early detection, containment, and prevention of malaria epidemics; and strengthening of local capacity to monitor malaria in affected regions" (UNICEF 1999, 8).

The goal of Roll Back Malaria is to reduce infant mortality from malaria (not the incidence of malaria) by 50 percent by 2010. Even if that optimistic level could be reached, it is nowhere near the level of success achieved by the proper application of DDT in other countries (Goklany 2000).

In malaria prevention, the focus of Roll Back

Malaria is on the use of mosquito nets. People in the tropical regions of the world all sleep under such nets. At a price of \$5 to \$10 each, they are expensive for people in countries where per capita personal income is measured in the hundreds of dollars per year. Moreover, the nets require continual retreatment—soaking the nets in liquid insecticide (UNICEF 1999, 3).

Substituting chemically impregnated mosquito nets for DDT has reduced exposure to DDT but increased exposure for many people to malaria, as well as to the insecticide used in treating the nets.

In regions where malaria is a scourge, people question the viability and morality of Roll Back Malaria when a proven cost-effective malaria-control product, DDT, already exists. In December 2000, the World Health Organization sponsored a meeting in Harare, Zimbabwe, entitled “Regional Consultation to Prepare African Countries Towards Reduction on Reliance on DDT for Malaria Control.” Delegates to the meeting issued a statement expressing the “deep concerns of the participating member states on the possible economic and health implications of any restriction made on DDT use for malaria control” (World Health Organization 2000). In sum, the delegates noted that no cost-effective or proven alternatives that are less toxic exist to replace the job DDT does.

During the decades since the banning of DDT in the United States, research on DDT has continued. This research indicates that when DDT spraying is ended, malaria’s incidence rises markedly. In the high and moderate risk regions of Columbia and Peru, for example, the risk of malaria doubled when spraying ceased in the 1990s. The disease has returned to areas in which it had been eradicated: urban areas of the Amazon Basin, Korea, Armenia, Azerbaijan, and Tajikistan. In Sri Lanka, malaria cases fell from 2.8 million and 7,300 deaths per year before DDT spraying, to 17 cases and no deaths (Roberts, Manguin, and Mouchet 2000). When the spraying stopped in 1961, malaria jumped back to 500,000 cases by 1969 (Attaran et al. 2000, 729). The spread of the disease means that it has reappeared even in the United States and Europe.

That DDT is effective has never been the main issue; the key questions concern long-term toxicity

and environmental damage. Yet “claims of risks of DDT to human health and the environment have not been confirmed by replicated scientific inquiry,” write Roberts, Manguin, and Mouchet (2000, 33). Evidence from more than 50 years of use indicate that, properly applied, DDT is not harmful to humans or the environment in general.

DDT appeared to be so harmful in the 1950s and 1960s because of its widespread use in heavy dosages, mostly from government spray campaigns but also from overuse by private sprayers who had not learned proper conservation. When DDT is sprayed in massive doses, birds can suffer acute effects. “The fault for this lies in the massive agricultural use of DDT. Dusting a single 100-hectare cotton field, for example, can require more than 1,200 kg of DDT over 4 weeks,” write Attaran et al. (2000, 729). Unfortunately, children in de-

veloping countries are paying the cost of excessive use fifty years ago.

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Roger E. Meiners and Andrew P. Morriss are Senior Associates of PERC. Their paper, “Pesticides and Property Rights” (PERC Policy Series, PS-22), from which this excerpt is taken, is available from PERC and our Web site, [www.perc.org](http://www.perc.org). A second selection, forthcoming in the September issue of PERC Reports, will explore the reasons why DDT was overused.

### In regions

where malaria is a scourge, people question the viability and morality of Roll Back Malaria.

# HEIRLOOM APPLES: A MARKET TASTE?

By Jane S. Shaw

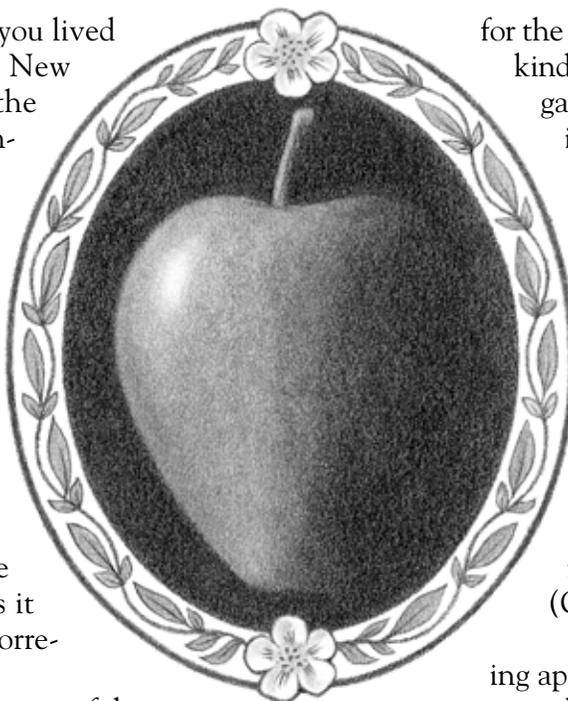
In the nineteenth century, if you lived near Albany or Kingston, New York, you might have tasted the Stroat apple. It was “roundish inclined to conic, yellowish green... very tender, rich; brisk subacid, good to very good,” according to the 1905 book *The Apples of New York*. The Stroat (or Straat) was “formerly much esteemed among the descendants of the Dutch settlers on the North river,” wrote horticulturist S. A. Beach in this volume. Even so, it had already disappeared. “We have not seen this fruit nor has it been mentioned by any of our correspondents” (Beach 1905, 208).

To Carl Pope, executive director of the Sierra Club, who brought this apple to our attention, the loss of the Stroat symbolizes how markets discard what isn’t commercially popular. Thus, he says, they carry a lesson for endangered species.

The extinction of apple varieties isn’t as serious as the loss of, say, a cheetah, he says. “But the pattern demonstrates that private markets will reliably preserve only varieties and species that serve relatively immediate commercial or other human needs. If there is no market for the Stroat apple formerly found in Kingston, New York, it will, and evidently, has, passed away. . . .”(Pope 1998).

Thus, Pope challenges the view that markets can protect species. There are several points to address in his challenge, but this short essay will merely discuss the market for apples.

When people talk about apples, they often echo Pope’s theme that commercial pressures have destroyed diversity. Keith Schneider, formerly a reporter



for the *New York Times*, compared the 14 kinds of old apple trees on his Michigan farm with the “paltry pickings” in supermarkets. “Shelf life, texture, uniform ripening and disease resistance are the most sought-after traits. Distinctive taste is barely in the first tier of breeding goals,” he wrote (Schneider 1998). In a similar vein, Bill Gifford condemned the pervasive Red Delicious apple. “Ubiquitous and mediocre, a gorgeous fraud, the Red Delicious has come to symbolize modern agribusiness at its worst” (Gifford 1998, 22).

Yet, today in the nation’s leading apple-growing state, Red Delicious trees are being ripped out. “We can’t sell

Red Delicious because there are better products here,” says a fruit researcher at Washington State University (quoted in Lester and Nelson 1999).

Pink Ladies, Fujis, Braeburns, Granny Smiths, and Royal Galas are shoving Red Delicious out of the nation’s Safeways and Albertson’s. Growers are combing through the 6,000 or so varieties of apples in existence to find new ones. At Little Owl Orchard in Washington State, Doyle and Thelma Fleming hope they have a winner in the new Cameo apple. In case they don’t, their own breeding orchard has 4,000 varieties they can consider (Guterson 1999).

Consumers who can’t wait for new specialties can find obscure apple types at Applesource, a producer offering home delivery of 75 varieties. The owner, Tom Vorbeck, lists on his Web site 43 kinds of apples suited for planting in central Illinois (applesource.com). Tree-Mendus Fruit and Skyline

Orchards (tree-mendus.com) in Michigan offer the public 200 varieties.

Growers can find cuttings of old varieties at the Sonoma Antique Apple Nursery in Healdsburg, California. To name a few: the Alexander, a Russian apple that pre-dates 1817; the Baldwin, grown in Massachusetts in 1784; and the Claygate Pearmain, recorded in England in 1821. (With apples, seeds don't germinate into true varieties; you must graft a cutting of the type you want.)

Perhaps the leading preservers of old apples are heirloom gardeners. "Since the 1970s," writes Suzanne P. DeMuth (1998, 6) in the Department of Agriculture's four-volume guide to heirlooms, "an expanding popular movement dedicated to perpetuating and distributing these garden classics has emerged among home gardeners and small-scale growers, with interest and endorsement from scientists, historians, environmentalists, and consumers."

One apple enthusiast is Carlos Manning, a West Virginia mechanic whose hobby is looking for antique apple trees. He has discovered examples of about 300 varieties, including at least two, the Western Beauty and Rainbow, that were thought to be extinct (*Amarillo Globe-News*, March 21, 2000).

Red, long-lasting apples did take over the market for a stretch of time as people marveled at having good-looking, sweet apples all year. The story of the Red Delicious apple itself illustrates how producers strive to find new varieties. In 1892, Clarence Stark of the Stark Brothers nursery in Louisiana, Missouri, held a national contest to find the best apple. One was so good that when he bit into it he supposedly exclaimed "Delicious! That will be its name" (Terry 1966, 39). Although many consumers are tired of it now, it will live on. The Fuji (the "best-keeping sweet apple in the world," according to Tom Vorbeck) is a cross between the Red Delicious and the Ralls Janet, an antique apple known to Thomas Jefferson.

As producers constantly try to find what pleases the customer, they discover the special, the interesting and even the old. Yet the Stroat apple disappeared. Why?

The Stroat disappeared too long ago to be a victim of modern commercialism, if that means the advent of supermarkets and nationwide transportation. But most likely it failed the market test. Applesource's Vorbeck says about heirloom apples that "something

was wrong about them, as the market changed, that caused growers not to make money on them anymore" (Gifford 1998, 24).

Saving an apple variety requires a few people who really want it and who are willing to pay someone the price of tending it. But only a few are needed. The majority may prefer bright color and consistent taste, but the minority will seek out distinctive characteristics and unusual flavors. As people have become more wealthy, their span of tastes has increased, as has their ability to satisfy them. The system of production and distribution—growers, distributors, catalogs, breeding orchards—has expanded, too, making it easier to save, ship, and sell antique apples and trees. The price of diversity has gone down.

The Stroat and others have disappeared, but the market saves many, many apples—tart, sweet, yellow, green, red, russet, acidic, nutty, aromatic, juicy, crunchy.

Can the market save the cheetah as well? If there are just enough people willing to care for the cheetah and to pay what is needed to protect

it, the answer is yes. And as time goes on, more and more people fit that description.

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Jane S. Shaw is a Senior Associate of PERC and editor of PERC Reports.

Saving an  
apple variety requires  
only a few people.

# GREENER PASTURES

## PRIVATE INITIATIVES

By Linda E. Platts

### BLOWING IN THE WIND

For generations, families who settled on the prairies and plains of the great mid-section of the United States have done battle with the wind. It has scoured their fields, flattened their crops, and sent icy fingers under the doorways of their homes. But what was once a bane has suddenly become a boon. Brokers are working their way across the Midwest and parts of West Texas offering cash for wind rights.

Wind is the nation's fastest-growing source of electricity and the capacity is expected to double within the next year. Utility companies are stepping on each other in their efforts to sign up farmers who are willing to plant a crop of sleek, 200-foot-tall turbines in their fields along with the usual corn and soybeans. In fact, some farmers have discovered that selling their wind rights is a whole lot more profitable than raising crops. And even better, they can sit on the front porch and watch the blades spin rather than hunker down over a tractor in the hot sun yet still put money in the bank.

In Minnesota, farmers can earn about \$2,000 a year per turbine, which takes up about one-eighth of an acre. Crops grown on the same fields clear about \$40 an acre.

—*New York Times*

### ALL-PURPOSE COCONUTS

A Thai farmer from a rural province south of Bangkok has found yet another use for the versatile coconut. Not only does its flesh provide food, its trunk supply wood, and its juice make a delicious drink, but now Kittti Maneesrikul is using its oil to fuel the family truck.

High fuel costs and low commodity prices have

brought suffering to many small farmers. Increasingly, coconut oil has meant cheap fuel for a growing number of the rural poor in Thailand.

The oil is extracted from the dried flesh of the coconuts and used for cooking. Afterwards, it is disposed of and often ends up in the waterways. Maneesrikul discovered that he could filter his family's used cooking oil, add a small boost of kerosene, and use it to fill the gas tank on his pick-up truck. The coconut fuel is 30 percent cheaper than diesel and saves the family about \$115 a month.

Maneesrikul has expanded his sources and now buys used coconut oil from food vendors. Although some scientists want the oil tested for possible cancer-causing pollutants, the coconut oil burns cleaner than diesel and does not produce carbon dioxide.

Coconut oil fuel could be enormously valuable to Thailand, which produces more than a billion coconuts a year. It would be particularly appropriate as an alternative fuel for agricultural equipment and fishing boats.

News of Maneesrikul's success has spread quickly. People show up at his home daily to learn his technique and others have already put their new knowledge to work. In coconut-rich southern Thailand, a ferry service has switched entirely to coconut oil for its three boats at an estimated savings of \$10,000 a month.

—*Reuters*

### WASTE NOT WANT NOT

Two companies that appear to have little in common have joined forces to build processing plants that will convert biomass to energy and create organic fertilizer at the same time. The plants will burn the waste to produce steam that can power electric generators. The leftover residue can be sold as fertilizer.

The partners are DukeSolutions, one of the fast-

est growing energy service companies in the United States, and Harmony Products, which specializes in the development and manufacture of fertilizer. Their joint venture was planned to make productive use of the waste stream from large Virginia poultry farms located in the Chesapeake watershed.

The plants will process 100,000 tons of litter annually, which will produce enough energy to heat 15,000 homes. The resulting organic fertilizer will increase crop yields, which will in turn feed the animals whose wastes are then gasified to produce energy—and of course more fertilizer.

Other advantages include reduced runoff into nearby lakes and streams from the huge poultry producers. And, the gasification technology used to turn waste into energy virtually eliminates emissions.

One processing plant is currently under construction in Harrisonburg, Va., and three others are in the planning stages. Eventually, DukeSolutions and Harmony plan to run 200 processing plants worldwide. They are already working on adaptations that will allow the plants to use other animal waste as well as industrial wastewater sludge. These waste-to-energy systems will provide a string of environmental benefits including clean, efficient energy, reduction in agricultural runoff, and organic fertilizers.

—*Environmental News Service.*

## SLIPPERY SLOPES

More than 200 million impoverished people worldwide make their homes on hillsides. These hillsides are the source of some 20 percent of the world's freshwater, and yet agricultural activities have resulted in vast deforestation and topsoil erosion. Since 1993, the International Centre for Tropical Agriculture (CIAT) based in Cali, Colombia, has been working with farmers to conserve soil and water while helping them to increase their meager incomes.

The nonprofit agency has combined the knowledge of local communities with computer-based geographic information systems to help monitor farmland and plan alternative uses. Researchers have also introduced new high-yield plants.

In the Cabuyal watershed, the changes have been significant. Better seeds have increased food production for local communities. Fencing around streams has ensured clean water to downstream households as well as to local coffee growers. In exchange, the growers have supplied farmers with water

tanks for their cattle. In newly created buffer zones around the streams, farmers have planted trees which produce a native fruit called lulo, which they can sell at local markets.

The hillsides project has expanded to areas of Honduras and Nicaragua as well as some African countries. More than 1,000 people from communities, local governments, and other nonprofit agencies have been trained in the techniques developed by CIAT. The project's ecological and economic benefits have been far-reaching.

—*Reuters*

## ON THE BRINK

A small, chocolate-brown mammal that inhabits the alpine reaches of Vancouver Island in western Canada has found a benefactor in what may be the nick of time. With just 40 Vancouver Island marmots known to exist in the wild and another 40 living in captivity, Gordon Blankenstein stepped forward to bankroll a private conservation effort.

The marmot once numbered 500 to 600 on this island, but logging and large clear cuts have disturbed its normal dispersal patterns and led to inbreeding. The lack of genetic diversity has made the marmots vulnerable to disease, resulting in several population crashes in the last decade.

Blankenstein, who built his wealth trading on the Vancouver Stock Exchange, decided it was time to give back, and he chose to do so by protecting the marmot and several other endangered animals. He has spent \$300,000 on a breeding facility and covers the \$500,000 annual operating budget.

Biologists from the nonprofit Marmot Recovery Center are capturing marmots from different colonies with subtle genetic differences for a captive breeding program. Pups will remain at the center until they reach young adulthood and then be reintroduced to their natural habitat on Vancouver Island.

To further support the center, Blankenstein is working to raise \$6 million. He is optimistic that a third of the funds will come from the public, a third from timber corporations, and a third from government agencies. Ideally, the money will be used to build a high-altitude, quarantine breeding facility on the island. This location is considered critical to avoid exposing the wild population to any rodent diseases unknown on Vancouver Island.

—*Vancouver Sun*

# LESSONS FROM THE LOBSTER LEGISLATURE

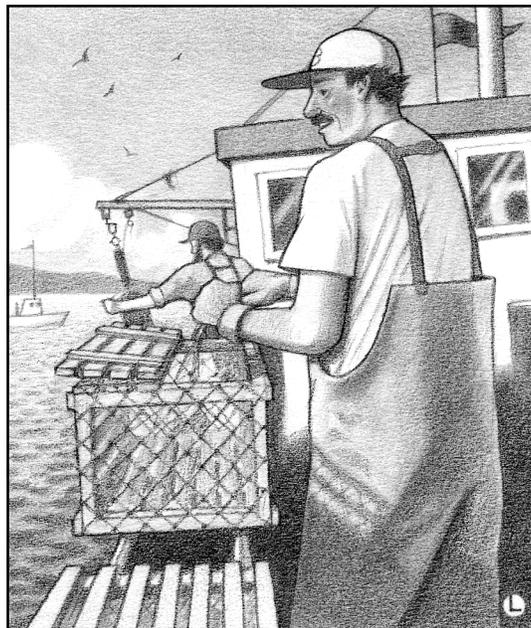
By Alan Ehrenhalt

If there's any group of American citizens you wouldn't expect to find at the cutting edge of political reform, it's the lobster fishermen along the coast of Maine. Not only do they have a national reputation for being cranky loners—they readily accept it. Leslie Dyer, a legendary activist who tried to organize them in the 1950s, ultimately concluded it was impossible. "We fishermen in Maine are as independent as a hog on ice," he said, "and just as helpless. We're more or less set in our ways and we don't like to be dictated to."

But the fact is that, at the moment, these same lobstermen are engaged in one of the country's most interesting experiments in cooperative self-government. They have created local legislative bodies that are making crucial regulatory decisions long made by bureaucrats in Washington. Some of their friends can scarcely believe it's happening. "You're taking a bunch of fishermen that work alone and asking them to get involved in a team process," says Patrice Farrey, of the Maine Lobsterman's Association. "It's a very new thing for them."

But it is happening nevertheless.

Lobster fishing is big business in Maine. More than 7,000 individuals are engaged in it, and in a good year they bring out of the water 50 million pounds of crustaceans, worth half a billion dollars—roughly 2 percent of the gross state product. So the health of the



*Maine lobstermen are engaged in one of the country's most interesting experiments in cooperative self-government.*

industry is central to Maine's economy.

In the past few years, things have been going well. After a declining catch in the 1970s and '80s that seemed to suggest trouble, the lobsters are plentiful again in the ocean waters off Eastport, Kittery and Casco Bay. The fishermen are making decent money.

But that's precisely the problem. Lobster fishing is an extremely easy business to enter—anybody with \$50,000 in capital can acquire a boat and set of traps, and head out into the water. When the catch is as good as it is now, hundreds of newcomers are motivated to give it a try. And established fishermen start putting in larger and larger units. Pretty soon, the number of lobsters begins to dwindle, and there aren't enough of them left to support all of the families dependent on catching them.

It's not just a theoretical fear. On both the Atlantic and Pacific coasts, overfishing and gradual depletion of the stock are more the rule than the exception. In recent years, it has happened with Alaskan king crab, scallops, shrimp, and sea urchins, and it has begun to happen with cod, halibut, and sea bass. Last year, the U.S. Commerce Department reported that 98 different species were overfished—in other words, fewer or smaller fish each year due to too much fishing. Since 1994, the federal government has spent \$160 million on subsidies to those hurt by overfishing

in New England, Alaska, and the Pacific Northwest.

Experts who watch these events frequently refer to them as a classic “problem of the commons”—a situation in which the relentless pursuit of self-interest by members of a community eventually destroys the livelihood of everyone within it. The individual fisherman gets to keep everything he finds, while the costs of a depleted fishing ground are shared by all. And as the resource economist Donald R. Leal points out, you can’t store fish in a silo, or just leave them in the water for next year. If you and I are competing for lobsters off Casco Bay, it’s reasonably certain that whatever I don’t take, you will catch and sell. So we both go all out, and pretty soon there’s hardly anything left.

The federal government has the authority to intervene in cases of overfishing, and over the years, it has been willing to do so. The 1976 Magnuson Act provides for “limiting access to the fishery in order to achieve optimum yield.”

In practice, the feds haven’t taken any action on the Maine lobster front in recent years. But they keep making noises about it, and that’s frightening to virtually everyone in the lobster business, because the federal government can do some drastic and unpleasant things when it moves in. It can set an overall limit on the catch. It can impose a quota on each individual fisherman. Or it can say that all fishing must take place during certain months of the year, and at no other time. For a group of individualistic entrepreneurs who don’t like to be dictated to, that would amount to the ultimate insult.

It is for the purpose of avoiding that insult that Maine lobstermen, over the past five years, have set out to create a wholly improbable new structure of self-government. They have divided the state into seven lobster-fishing zones. Each zone contains between 8 and 14 districts. Every one of the districts has 100 licensed fishermen. And the job of each of these units is to cooperate in crafting rules that will prevent overfishing and stave off the dreaded intrusion of the federal bureaucrats.

The first thing the lobster government did was to agree that it wouldn’t put a limit on fish, it would put a limit on the number of traps each fisherman could put in the water. That was a populist decision. It penalizes the big boats that were doing saturation fishing, but it allows the smaller licensees to proceed

pretty much as they always had.

Next came new rules for entry. Any new fishermen now has to serve a two-year apprenticeship before becoming a licensed lobsterman on his own.

Critics complained that the lobstermen were creating a cartel, restraining trade and protecting their own incomes as much as they were protecting the supply of fish. The lobstermen and their supporters said they didn’t have much choice. “In a sense, yes,” admits James Wilson, a University of Maine professor who is advising the group. “What we’re talking about here is a cartel that will restrict output . . . If you don’t do something to restore the fishery, you end up with a depleted fishery.”

Whatever one might think of the individual decisions, it’s hard to escape the idea that something interesting is going on here. A form of grassroots government has been created in a difficult situation, and has succeeded in making hard political choices that mainstream government has long been unable to make.

Lobster government may end up having a significance beyond Maine, and beyond the fishing industry. It’s not only an experiment in grassroots responsibility, it’s a venture in “civic environmentalism”—the doctrine that sound environmental policy can be made just as well at the local and

community level as in the corridors of the U.S. Department of the Interior or the Environmental Protection Agency.

It’s not just fishermen who find much of federal regulation on the environment to be an unacceptably blunt instrument. The same complaints come from cities stripped of highway funding by the Clean Air Act, counties hit with huge water cleanup bills under the Clean Water Act, and planners stymied by what seems to them mindlessly rigid interpretation of the Endangered Species Act.

The lobster legislature suggests a strategy for some of the local activists who are most upset with federal environmental policy: Stop grouching and start looking for ways to solve problems on a cooperative and democratic basis.

If a Maine lobsterman can do that, just about anybody can.

*Alan Ehrenhalt is editor of Governing magazine. This article is excerpted, with permission, from a longer one which appeared in the October 2000 issue of Governing.*

■

*Stop grouching  
and start looking  
for ways to solve problems  
on a cooperative and  
democratic basis.*

■

# THE HIGH COSTS OF HANDS-OFF MANAGEMENT

By Holly Lippke Fretwell

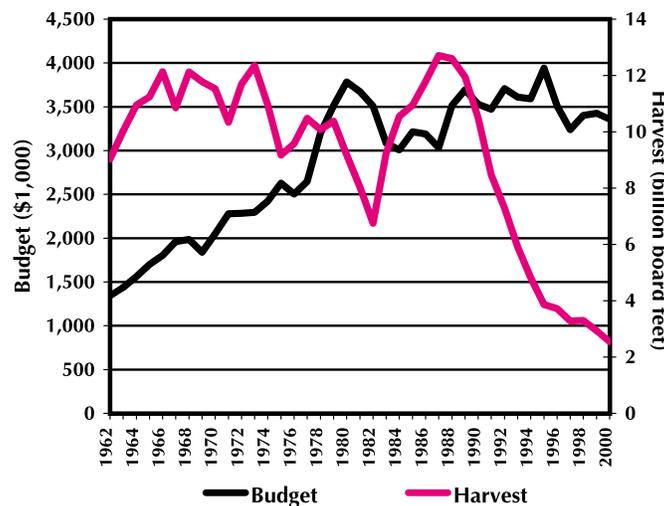
The Forest Service and other federal land management agencies are reverting to a custodial management style typical of earlier times. This shift from active to passive management comes at great cost. While highly motivated special interest groups are using their influence to lock up national forests, taxpayers are paying the price through shrinking recreational access, lost returns on valuable assets, wasteful government spending, and poor land stewardship.

Since the late 1980s, timber output has declined 75 percent, but the costs of the timber program show no reciprocal decline. The overall agency budget has continued to hover around \$3.5 billion annually since 1988, even as timber output and revenues have fallen. (See figure.)

Many special interest groups maintain that halting all timber harvests on national forests will restore these forests to ecological health, but experience says otherwise.

In Santa Fe, N.M., the Forest Guardians, a nationally known advocacy group, has dedicated itself to ending all commercial logging on federal lands. And yet in 2000 fires burned out of control in nearby Los Alamos, incinerating many of the forests this group hoped to preserve through zero-cut policies. In the aftermath, the group's executive director, Rex Wahl, sees the situation differently: "[J]udicious cutting of small trees is what's needed" (*Billings Gazette*, August 18, 2000) to prevent future catastrophe, he says.

BUDGETS HIGH,  
HARVESTS DECLINING



Sources: Budget data: Office of Management and Budget (1999). Harvest data: Jim Culbert, budget assistant, U.S. Forest Service, Washington, DC, by fax, March 31, 1998; Forest Service (2001).

In many cases now, the public input process is dominated by special interest groups such as the Forest Guardians and other like-minded groups. As a result, there has been a virtual halt to rational forest planning and management.

Litigation and appeals continue to block efforts to protect forests using hands-on management. A pilot project to restore national forest land surrounding Flagstaff, Ariz., is just one example.

About 1,500 acres of forest burn each year near Flagstaff threatening community health, the economy, and the ecological integrity of the forest. To deal with this problem, several groups including the Forest Service, the Grand Canyon Trust, and Northern Arizona University, as well as numerous local, state, and county officials came together to form the Grand Canyon Forests Partnership. This collaborative partnership set out to analyze 10,000 acres annually and come up with a plan that would return natural ecosystem function to the urban-wildland interface. Appropriate treatment would reduce the risk of catastrophic fire and serve as a demonstration project for other communities.

Implemented in 1998 and exempt from public input and appeals, the first project compared different restoration prescriptions on a 300-acre plot. Based on the information gathered in the first project, the second project was designed to treat 9,000 acres and to be the first in a series of landscape-scale ecosystem restorations. So far, three appeals and one lawsuit

have been filed against the completed environmental assessment and another lawsuit is expected. Appellants include the Forest Guardians, the National Forest Protection Alliance, and the Forest Conservation Council. Meanwhile, catastrophic fire near Flagstaff does more damage every year to habitat for the endangered goshawk and the Mexican spotted owl than any other forest activity.<sup>1</sup>

Throughout the West, other projects to reduce fire risk through thinning or to salvage fire-burned timber are meeting a similar fate.

- In the fall of 2000, the Flathead National Forest in Montana withdrew one of its largest timber sales. The project would have thinned a dense, 3,000-acre ponderosa pine forest in order to restore the open-canopy typical of its historical structure. The sale was withdrawn when two environmental groups filed a lawsuit to require a supplemental environmental impact statement.
- In the Blue Mountains of Oregon, harvest on the Wallowa-Whitman National Forest declined from nearly 300 million board feet a year in 1987 to less than 50 million in 1997. Loss to bug depredation is growing (Fretwell 1999).
- In 2000, the Forest Service withdrew 56 timber sales on dozens of national forests across the South. Though many of these sales were intended to create habitat and restore ecosystems for endangered, threatened, and sensitive species, they were challenged by the Sierra Club and other environmental groups (McCabe 2001, 4).<sup>2</sup>

Experts on forest health from many backgrounds agree that the national forests cannot heal themselves within a relevant human time frame. Fire ecologist Steve Arno suggests: “With management—thinning, harvesting, and a carefully controlled burning program designed to encourage growth of native plant and tree species—we can slowly reduce the risk of severe wildfires and disease, creating a more natural range of conditions, which is the first step in ecosystem restoration.” As a former chief of the Forest Service and a wildlife biologist, Jack Ward Thomas, says: “Biologically speaking, eliminating harvesting, while continuing to control wildfires, would have significant adverse effects on bird and mammal species that thrive on early succession forest conditions” (quoted in Peterson 2000, 14).

Not only have costs increased with added regu-

lations and restrictions, but so have confrontations between the agency and the public. The late Senator Hubert Humphrey sponsored the National Forest Management Act for the very purpose of involving the public in Forest Service planning and reducing conflict. Humphrey said the act would mean that “forest managers could practice forestry in the forest and not in the courts” (quoted in Fedkiw 1996, 193). Ironically, increased public participation has only intensified the debate over federal land use. The number of appeals rose from more than 1,000 per year at the end of the 1980s to more than 2,600 by 1993 (Fedkiw 1996, 212).

The public input process allows private individuals and special interest groups to halt timber sales and harvests without regard to the forest plans and the science that supports those plans. The taxpayers, the Forest Service, and the ecological integrity of the forest pay a high price, while those filing the appeals pay relatively little.

#### Notes

1. John Gerritsma, urban interface, Coconino National Forest, U.S. Forest Service, Region 3, Flagstaff, AZ, telephone interview, Nov. 3, 2000.

2. Additional data provided by Don McKenzie, Southeast field representative, Wildlife Management Institute, Ward, AR, telephone interview, Jan. 30, 2001.

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*Holly Lippke Fretwell is a Research Associate with PERC and author of Public Lands Report IV: Is No Use Good Use? from which this article is excerpted. The full report, edited by Linda E. Platts, is available on PERC's Web site ([www.perc.org](http://www.perc.org)) or from the PERC office.*

WHERE RESEARCH AND  
POLICY MEET

# TANGENTS

By Daniel K. Benjamin

**economist**, n. *a scoundrel whose faulty vision sees things as they are, not as they ought to be.*

—after Ambrose Bierce

Throughout the nineteenth century, Arctic exploration dominated popular culture in Europe and America, much as space exploration did in the twentieth century. Both quests involved competitive races for major geographic prizes; both led to fame and honors for the returning explorers; and both had their share of death and disaster, sometimes leading to calls for cessation of the efforts.

Yet there is a key difference between the two waves of exploration. The twentieth century space race involved primarily the bureaucracies of two national governments, while the nineteenth century polar expeditions were undertaken by both private organizations and national governments. Because the expeditions all involved common goals, prospective rewards, and penalties, we are immediately led to a question familiar to readers of this column: How well can the private sector perform a function traditionally conceived as the natural province of the government? According to recent research by Jonathan Karpoff (2001), the answer for Arctic exploration appears to be: Better than the government itself.

Government-sponsored polar expeditions tended to be larger and better funded than private expeditions. Yet by most measures, the government expeditions fared poorly. They made fewer major discoveries, introduced fewer technological innovations, were subject to higher rates of scurvy, lost more ships, and had more explorers die.

There were four major goals of nineteenth cen-

tury polar exploration: the discovery and navigation of the Northwest Passage (connecting the Atlantic and Pacific oceans via a northern route); reaching the North Pole; traversing Greenland; and discovering the fate of the lost John Franklin expedition of 1845. A private expedition was the first to navigate the Northwest Passage and another private group was the first to cross Greenland. Yet another private venture discovered the fate of the Franklin expedition.

*Government-sponsored polar expeditions made fewer major discoveries, introduced fewer innovations, lost more ships, and had more explorers die.*

The sole portion of a major Arctic prize that can be credited to a publicly sponsored expedition is the initial verification that a Northwest Passage exists. And even in this case, four of the 66 crew members died, and the rest were near starvation when rescued by another expedition.

Not only did private expeditions yield more success; they did so more safely and at lower cost. For example, an average of six crew members died on each public expedition, compared to an average of only one on private expeditions.

Moreover, public ventures lost ships at twice the rate of private ventures, and suffered from debilitating scurvy at nearly four times the rate of private expeditions. And private expeditions used far fewer crew members and less vessel tonnage.

It might be thought that these differences were due to confounding factors. It is possible, for example, that public expeditions concerned themselves more with “minor” discoveries that yielded less spectacular, but still socially important outcomes. Alternatively, public ventures might have been directed at the

## TANGENTS

riskier, more difficult challenges eschewed by private expeditions. Neither of these conjectures is borne out by the facts.

Karpoff uses the records of 92 different expeditions to examine statistically a wide variety of success measures. He finds that private expeditions were more effective—indeed, about five times as successful—regardless of the measure used. Moreover, he is unable to find any evidence that public expeditions undertook riskier or more difficult projects than did private.

What, then, accounts for the superior performance of the private sector? The fundamental—and often fatal—disadvantage of public expeditions was that they were often initiated and organized by individuals different from those ultimately appointed to command them. Thus, the key planners often lacked the incentives to plan correctly. And even though the actual leaders of public expeditions had strong incentives to do well (if only to survive), they were often saddled with crews, ships, or plans that made success unlikely. In contrast, private organizers generally led the expeditions themselves—and so bore the full brunt of the decisions they had made.

The consequences showed up in a variety of contexts. First, private leaders undertook far more extensive preparations. Second, they uncovered and exploited information that was crucial to success. For example, private explorers routinely utilized

native sealskin clothing, while public ventures stuck with far less protective wool garments. Private ventures also learned native techniques of shelter construction and overland travel, while public expeditions used tents and largely eschewed dogsleds, skis, and snowshoes. Third, the privately funded expeditions acted on the widely recognized fact that small parties were better able than large parties to move quickly and support themselves in the Arctic. Governments, in contrast, continued to mount fatally large expeditions up until 1875.

Overall, Karpoff concludes that “men died and ships were lost not because of the public nature of the funding *per se*, but rather because of the perverse incentives, slow adaptation, and ineffective organizational structures that frequently accompanied public funding.” Of course all of this refers to events of a century or more ago. I shall leave it up to the reader to decide whether there is a message here for today.

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Karpoff, Jonathan M. 2001. Public versus Private Initiative in Arctic Exploration: The Effects of Incentives and Organizational Structure. *Journal of Political Economy* 109(11): 38–78.

*Daniel K. Benjamin is a PERC Senior Associate and Professor of Economics at Clemson University. “Tangents” investigates policy implications of recent academic research.*

## What's new

# PERC UPDATE

A new program headed by **Roger Meiners** and **Andrew Morriss** and sponsored by the Roe Foundation focuses on the publication of PERC-related material in law reviews. Recently, Morriss and **Richard L. Stroup** published “Quartering Species” in *Environmental Law*. **Bruce Yandle** and Morriss have written “The Technologies of Property Rights,” forthcoming in the *Ecology Law Quarterly*. “The Destructive Role of Land Use Planning,” by Meiners and Morriss, was published in the *Tulane Environmental Law Journal*.

The *Chicago Journal of International Law* has accepted an article on environmental aspects of foreign policy by **Terry L. Anderson** and **J. Bishop Grewell**.

PERC is pleased to welcome two Julian Simon Fellows this summer. **Robert McCormick**, Professor of Economics at Clemson University, will study how laws and regulations affect the supply of natural re-

sources such as wild game, water, and forests. **Seth Norton**, Aldeen Professor of Business at Wheaton College, will research the link between economic institutions and population growth. Julian Simon Fellowships are provided for senior visiting scholars whose research reflects the spirit of the work of the late Julian Simon.

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**Dominic (Nick) Parker**, a former PERC Fellow, is now a Research Associate at PERC, where he is studying conservation easements. He recently completed a master's degree in applied economics at Montana State University.

PERC Research Associate **Bishop Grewell** will attend the Yale School of Forestry this fall pursuing a master's degree in environmental management. Recently, Grewell was a runner-up for the Felix Morley Journalism Award. **David Gerard**, a PERC Research Associate, is moving to Carnegie Mellon University, where he will study the relationship between environmental regulations and technology.

Three new fellows will spend the summer at PERC. **Anna Michalak**, a Ph.D. candidate in civil and environmental engineering at Stanford, will study information requirements for identifying pollutants with **Terry Anderson**. **Sean Mulholland**, who is pursuing a Ph.D. in applied economics at Clemson University, will study trusts with **Roger Meiners**. **Joshua Utt**, a Ph.D. candidate in economics at Washington State University, will work with visiting Julian Simon Fellow **Robert McCormick** on carbon sequestration.

**Dana Joel Gattuso** has joined PERC as our Washington, D.C., liaison. She will help plan seminars and increase our communication with policy makers and opinion leaders. She can be reached at [dgattuso@perc.org](mailto:dgattuso@perc.org).

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PERC's fourth Public Lands report *Is No Use Good Use?* has just been published. The paper (an excerpt from which appears on p. 14) examines the growing tendency for the federal government to set aside land rather than manage it. The paper, written

by **Holly Lippke Fretwell** and edited by **Linda Platts**, is available on PERC's Web site, [www.perc.org](http://www.perc.org).

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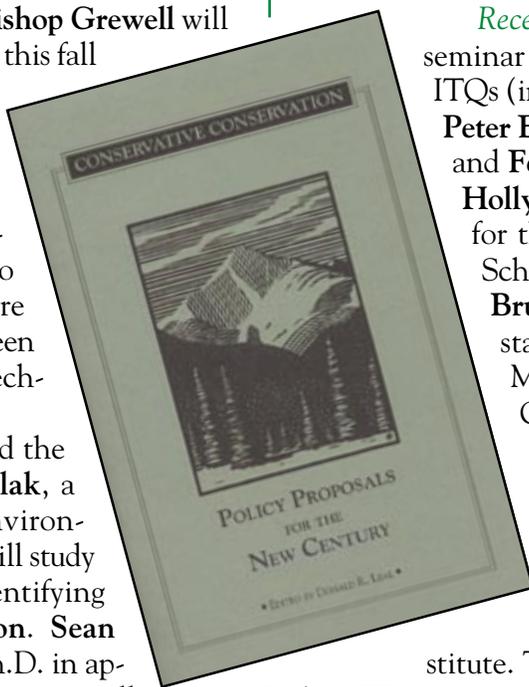
PERC has just published a collection of proposals for improving federal environmental management. "Conservative Conservation," edited by **Donald R. Leal**, recommends policies affecting endangered species, national monuments, grazing rights, recreation, and water markets. The booklet is available on PERC's Web site, [www.perc.org](http://www.perc.org).

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*Recent presentations:* **Don Leal** gave a seminar in Washington, D.C., on fishing ITQs (individual transferable quotas) with **Peter Emerson** of Environmental Defense and **Felix Cox**, a Gulf Coast fisherman. **Holly Fretwell** was the keynote speaker for the National Forest Counties and Schools Coalition conference in Reno. **Bruce Yandle** addressed congressional staffers on Capitol Hill for the Mercatus Center and spoke at the Office of Personnel Management Executive Training Center and the University of North Alabama. **Terry Anderson** lectured on Capitol Hill, at the Office of Management and Budget, and at the American Enterprise Institute. This month he addresses the Outdoor Writers Association. **Richard Stroup** and **Jane Shaw** lecture in Costa Rica in June at a teachers' seminar directed by **J. R. Clark**, who holds the Probasco Chair of the University of Tennessee at Chattanooga.

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*Additional information:* **Bruce Benson's** article, "Federal Immunity from Toxic Substances," which appeared in *PERC Reports* in March, was excerpted from *Cutting Green Tape*, edited by **Richard L. Stroup** and **Roger E. Meiners** and published by Transaction Press. This collection of essays assesses the enormous liability imposed by federal policies on toxic substances. The book stems from research sponsored by the Independent Institute of Oakland, California. To order *Cutting Green Tape*, call 1-800-927-8733 or contact [www.independent.org](http://www.independent.org).



## “CLEAR-CUT” REVISITED

A PERC Reports reader who wants to remain anonymous asked us to take his name off our mailing list. He had just read the article, “Clear-Cut,” by Wallace Kaufman (March 2001).

“A lead article defending clearcutting?” he exclaimed. “What in the world does bad, outdated forestry have to do with free market environmentalism? Send someone to the library to read about New Forestry, especially studies by Jerry Franklin and his colleagues.<sup>1</sup> Even MacBlo<sup>2</sup> has reformed and given up clear-cutting!”

### Wallace Kaufman replies:

I do understand why the reader suggests studying the New Forestry methods of Jerry Franklin and others. I don’t understand how he reads a blanket endorsement of clear-cutting into the chapter selected from my book.

Besides making an unjustified generalization, the writer misses four main points:

First, as I stated in the article, loggers were cutting “pine trees that had taken over old fields and pastures.” These fields and pastures had been themselves clear-cuts. Instead of a crop of hay or corn being clear-cut every year, my neighbor, like most owners of second-growth forest, was harvesting a crop after 35 or 40 years. Environmentalists who protest clear-cuts but love cropland and pasture have strange priorities. Why aren’t they out protesting horse farms that might revert to forest but for the consumerism of horse lovers?

The second point follows from this. I pointed out that “a clear-cut does not destroy nature itself but the nature we love and have become accustomed to seeing.” A clear-cut is temporary, as farms are not. (Nothing against farming—just using them for perspective.) Even clear-cutting hardwoods where farming never existed is usually second-growth cutting, and the forest rapidly regenerates from intact roots. Where pine plantation replaces hardwood forest, the ecosystem is changed, of course. Now we have a for-

est farm where wildlife are welcome and the growing trees won’t be disturbed for at least two decades.

Third, clear-cuts in this part of the world (southeastern United States), and in many others, do not create biological deserts. They often contain more animal biomass and biodiversity than do old-growth forests. There’s some debate about whether they also lock up more carbon than old-growth forest does.

Finally, my neighbor would have given up a significant amount of money to do a selective cut. In other words, he would have been paying tens of thousands of his own money for the sake of people who like to see tall trees.

If environmentalists want to manage private forest lands, they would be a lot more convincing if they were willing to invest their own money—individually or through organizations. I bought my 112 acres so that I could let the big trees stand. When environmentalists really care enough about forests, they will also pay for preservation with their own money instead of demanding that others pay for their preferences.

My choice means I’m forgoing (read paying) thousands of dollars a year to enjoy my trees. It means I don’t go trekking in Nepal, skiing in Vail, send kids to private universities, have two bathrooms, rent a beach cottage, or buy my clothes at REI and Eddie Bauer. My only regret has been that in 1996 a hurricane clear-cut big swathes of my old growth. Shall we regulate the weather, too?

### Notes

1. The New Forestry, espoused in the early 1990s by Jerry Franklin, Professor of Forestry at the University of Washington, and others, emphasizes modifying clear-cuts to leave wildlife habitat.

2. MacMillan Bloedel is one of Canada’s largest forest products companies.

*Wallace Kaufman is author of Coming Out of the Woods: The Solitary Life of a Maverick Novelist (Perseus Publishing) and No Turning Back: Dismantling the Fantasies of Environmental Thinking (iUniverse.com, Inc.).*

EXCERPT

## WHAT IS THE STATE OF HUMANITY?

By Indur M. Goklany

Since 1800, global population has increased about sixfold. Manufacturing industries have increased seventy-five times in value and coal production 500 times. Overall, global economic product has multiplied more than fiftyfold. Despite the environmental disruption which might have been caused by this activity, the state of humanity has never been better.

In the last two centuries, the average person's life expectancy at birth has doubled, infant mortality is less than a third of what it used to be, and real income has grown sevenfold. Food is more affordable. A child is less likely to go to bed hungry and a woman is far less likely to die in childbirth. Children are more likely to be in school than at work.

People are more educated and freer to choose their rulers and express their views. They are more likely to live under the rule of law and are less fearful of being arbitrarily deprived of life or limb, freedom, property, and other basic human rights. Not only is work less physically demanding, but people work fewer hours and have more leisure time and money to devote to optional pursuits.

Although gaps between richer and poorer nations may be expanding in terms of per capita income, gaps in the critical aspects of human well-being (particularly life expectancy, infant mortality, hunger and malnourishment, and literacy) have for the most part shrunk over the past half century.

With respect to life expectancy, infant mortality and hunger, developing countries are better off than were developed countries at equivalent levels of income. These improvements have come from reducing death and disease due to inadequate food supplies and infectious and parasitic diseases such as cholera, malaria, typhoid, diarrhea, dysentery.

*This excerpt comes from "Economic Growth and the State of Humanity," by Indur M. Goklany, a PERC Julian Simon Fellow in 2000. The paper, complete with references, notes, graphs, and tables, is available on the Web at [www.perc.org](http://www.perc.org), or from PERC.*

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