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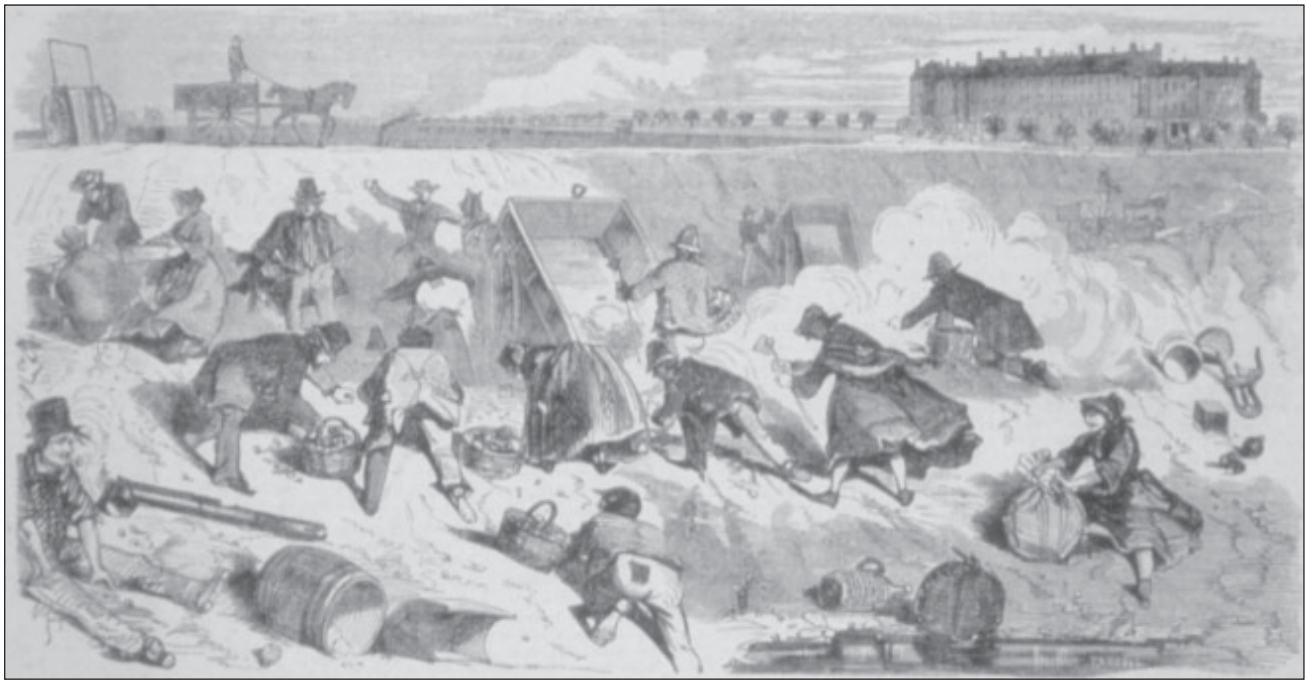

COVER STORY

For as long as humans have been discarding rubbish, other humans have sifted through it for items of value. The process is literally as old as humanity; scavenging may well be the oldest profession. For more about recycling, see page 3.

FROM THE EDITOR

Ideas—Bad and Good

Some bad ideas never die. Hydra-headed, they sprout new defenses as soon as the old ones are cut down. One of those bad ideas is mandatory recycling—not the voluntary recycling of waste products that has gone on for years, but government-required curbside recycling of household and commercial trash. As Daniel Benjamin indicates in "Recycling Rubbish," such recycling is itself highly wasteful. Benjamin's refutations of eight egregious myths about waste disposal may at last put this monster to rest.

Benjamin's article is a foretaste of his forthcoming *PERC Policy Series* paper, "Eight Great Myths of Recycling." This essay stems from a lecture he gives at teachers' workshops around the country. Using real trash, he shows how—even in a classroom—the market can be an effective disposer of waste.

PERC searches for ways to improve environmental quality through markets. Does forest certification fit that description? In "Keeping Forests Green," J. Bishop Grewell, a PERC research associate, offers a qualified yes. His essay is based on a business case study that he and others developed at Yale University's School of Forestry and Environmental Studies.

There's no certification program to protect mangrove forests, the biologically rich wetlands found along tropical and subtropical coasts. But the Mangrove Project, a nonprofit organization, helps preserve mangrove forests for the sake of those who live in and around them. Sam Nugent, administrative director, gained new insights about how to do that at the 2003 Kinship Conservation Institute, an educational program for environmental leaders conducted by PERC. He shares his ideas in "Mangrove Alchemy."

There's a lot of buzz these days about breaching dams to save fish. Ashley Fingarson, a Montana State University student who wrote in our previous issue, talked to those who actually remove dams—small, aging ones in Wisconsin.

As usual, Linda Platts' column, "Greener Pastures," reports on innovations in preservation. Dan Benjamin's "Tangents" reveals the surprising truth that demand for forest products leads to more forests. (Of course—but it flies in the face of conventional wisdom.) As for letters, Ernst "Hasty" Habicht offers another reason to question ethanol as an additive to gasoline (a topic discussed in Gary Libecap's June 2003 article on ethanol).

Jane S. Shaw

From left: Benjamin, Grewell, Nugent, and Habicht.




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Cover: Winslow Homer, *Scene on the Back Bay Lands, Boston* (1859); The Museum of Fine Arts, Houston; The Mavis P. and Mary Wilson Kelsey Collection of Winslow Homer Graphics.

Eight Great Myths About Waste Disposal

By Daniel K. Benjamin

Governments on both shores of the Atlantic and both coasts of America have recently announced plans to force businesses and individuals to recycle more trash. The European Union has ordered the citizens of the United Kingdom to roughly double their recycling rates by 2008, while the city governments of New York and Seattle have proposed mandatory expansions of existing recycling programs.

These moves are not based on new developments in resource conservation; instead they—like other mandatory recycling programs—rest on misconceptions of mythic proportions. This essay discusses the most egregious of these myths.

Since the 1980s, many have claimed that the United States faces a landfill crisis. In fact, the United States today has more landfill capacity than ever before. In 2001, the nation's landfills could accommodate 18 years' worth of rubbish, an amount 25 percent greater than a decade before.

Myth 1: Our garbage will bury us.

Since the 1980s, people repeatedly have claimed that the United States faces a landfill crisis. Former Vice President Al Gore, for example, asserted we are "running out of ways to dispose of our waste in a manner that keeps it out of either sight or mind" (Gore 1992, 145).

This claim originated in the 1980s, when the waste disposal industry moved to using fewer but much larger landfills. The Environmental Protection Agency, the press, and other commentators focused on the falling number of landfills, rather than on their growing overall capacity, and concluded that we were running out of space. The EPA also underestimated the prospects for creating additional capacity.

In fact, the United States today has more landfill capacity than ever before. In 2001, the nation's landfills could accommodate 18 years' worth of rubbish, an amount 25 percent greater than a decade before. To be sure, there are a few places where capacity has shrunk. But the uneven distribution of available landfill space is no more important than is the uneven distribution of auto manufacturing: Trash is an interstate business, with 47 states exporting the stuff and 45 importing it. Indeed, the total land area needed to hold all of America's garbage for the next *century* would be only about 10 miles square.

Courtesy of the Gulf Club at Newcastle/Rob Perry

The elegant Golf Club at Newcastle , offering a panoramic view of Seattle, is built on a former landfill. A resort destination with championship courses designed by Robert E. Cupp in consultation with Fred Couples, Newcastle should refute any worries about whether landfills can be constructively reused.

Myth 2: Our garbage will poison us.

The claim that our trash might poison us is impossible to completely refute, because almost anything *might* pose a threat. But the EPA itself acknowledges that the risks to humans (and presumably plants and animals) from modern landfills are virtually nonexistent: Modern landfills can be expected to cause 5.7 cancer-related deaths over the next 300 years—one every 50 years. To put this in perspective, cancer kills over 560,000 people every year in the United States (EPA 1990, 1991; Goodstein 1995).

Older landfills do possess a potential for harm to the ecosystem and to humans, especially when built on wetlands (or swamps), because pollutants can leach from them. When located on dry land, however, even old-style landfills generally pose minimal danger, in part because remarkably little biodegradation takes place in them.

Modern landfills eliminate essentially any potential for problems. Siting occurs away from groundwater supplies, and the landfills are built on a foundation of several feet of dense clay, covered with thick plastic liners. This layer is covered by several feet of gravel or sand. Any leachate is drained out via collection pipes and sent to municipal wastewater plants for treatment. Methane gas produced by biodegradation is drawn off by wells on site and burned or purified and sold.

Myth 3: Packaging is our problem.

Contrary to current wisdom, packaging can *reduce* total rubbish produced. The average household in the United States generates one-third *less* trash each year than does the average household in Mexico, partly because packaging reduces breakage and food waste. Turning a live chicken into a meal creates food waste. When chickens are processed commercially, the waste goes into marketable products (such as pet food), instead of into a landfill. Commercial processing of 1,000 chickens requires about 17 pounds of packaging, but it also recycles at least 2,000 pounds of by-products.

The gains from packaging have been growing over time, because companies have been reducing the weight of the packages they use. During the late 1970s and 1980s, although the number of packages entering landfills rose substantially, the total weight of those discards declined by 40 percent. Over the past 25 years the weights of individual packages have been reduced by amounts ranging from 30 percent (2-liter soft drink bottles) to 70 percent (plastic grocery sacks and trash

Available stocks of most natural resources are growing, but the reason is not recycling. Optical fiber carries 625 times more calls than the copper wire of 20 years ago, bridges are built with less steel, and automobile and truck engines consume less fuel per unit of work performed.

bags). Even aluminum beverage cans weigh 40 percent less than they used to (Rathje and Murphy 1992, ch 4).

Myth 4: We must achieve trash independence.

Numerous commentators contend that each state should achieve "trash independence" by disposing within its borders all of its rubbish. But, as with all voluntary trade, interstate trade in trash raises our wealth as a nation, perhaps by as much as $4 billion. Most of the increased wealth accrues to the citizens of areas importing trash.

Not only is the potential threat posed by modern landfills negligible, but transporting rubbish across state lines has no effect on the environmental impact of its disposal. Moving a ton of trash by truck is no more hazardous than moving a ton of any other commodity.

Myth 5: We squander irreplaceable resources when we don't recycle.

In fact, available stocks of most natural resources are growing rather than shrinking, but the reason is not recycling (Foster and Rosenzweig 2003).

Market prices are the best measure of natural resource scarcity. Rising prices imply that a resource is getting more scarce. Falling prices imply that it is becoming more plentiful. Applying this measure to oil, we find that over the past 125 years, oil has become no more scarce, despite our growing use of it. Reserves of other fossil fuels as well as other natural resources are also growing.

Thanks to innovation, we now produce about twice as much output per unit of energy as we did 50 years ago and five times as much as we did 200 years ago. Optical fiber carries 625 times more calls than the copper wire of 20 years ago, bridges are built with less steel, and automobile and truck engines consume less fuel per unit of work performed. The list goes on and on. Human innovation continues to increase the amount of resources at our command.

Myth 6: Recycling always protects the environment.

Recycling is a manufacturing process with environmental impacts. Viewed across a wide spectrum of goods, recycling sometimes cuts pollution, but not always. The EPA has examined both virgin paper processing and recycled paper processing for toxic substances and found that toxins often are more prevalent in the recycling processes.

Often the pollution associated with recycling shows up in unexpected ways. Curbside recycling, for example, requires that more

trucks be used to collect the same amount of waste materials. Thus, Los Angeles has 800 rubbish trucks rather than 400, because of its curb-side recycling. This means more iron ore and coal mining, steel and rubber manufacturing, petroleum extraction and refining—and of course extra air pollution in the Los Angeles basin.

Myth 7: Recycling saves resources.

It is widely claimed that recycling "saves resources." Proponents usually focus on savings of a specific resource, or they single out particularly successful examples such as the recycling of aluminum cans.

But using less of one resource generally means using more of other resources. Franklin Associates, a firm that consults on behalf of the EPA, has compared the costs per ton of handling rubbish through three methods: disposal into landfills (but with a voluntary drop-off or buy-back recycling program), a baseline curbside recycling program, and an extensive curbside recycling program.

On average, extensive recycling is 35 percent more costly than conventional disposal, and basic curbside recycling is 55 percent more costly than conventional disposal. That is, curbside recycling uses far more resources. As one expert puts it, adding curbside recycling is "like moving from once-a-week garbage collection to twice a week" (Bailey 1995, A8).

Myth 8: Without forced recycling mandates, there wouldn't be recycling.

This view reflects ignorance about the extent of recycling in the private sector, which is as old as trash itself. Scavenging may, in fact, be the oldest profession. In the 19th century, people bid for the right to scavenge New York City's rubbish, and Winslow Homer's 1859 etching, *Scene on the Back Bay Lands* (see cover of this issue), reveals adults and children digging through the detritus of the Boston city dump. Rag dealers were a constant of American life until driven out of business by the federal Wool Products Labeling Act of 1939, which stigmatized products made of recycled wool and cotton. And long before state or local governments had even contemplated the word recycling, makers of steel, aluminum, and many other products were recycling manufacturing scraps, and some were even operating post-consumer drop-off centers.

Conclusion

Recycling is a long-practiced, productive, indeed essential, element of the market system. Informed, *voluntary* recycling conserves resources and raises our wealth. In sharp contrast, misleading educational programs encourage the waste of resources when they overstate the benefits of recycling. And *mandatory* recycling programs, in which people are compelled to do what they know is not sensible, routinely make society worse off. Market prices are sufficient to induce the trashman to come, and to make his burden bearable, and neither he nor we can hope for any better than that.

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Daniel K. Benjamin is professor of economics at Clemson University, a senior associate of PERC, and a regular PERC Reports *columnist. This essay is adapted from a longer paper, "Eight Great Myths of Recycling," forthcoming from PERC.*

Certification Competition

By J. Bishop Grewell

As environmental certification in the United States has grown, standards such as "dolphin-safe tuna" and the LEED rating system for "green" buildings have become commonplace.[1] Such certification helps consumers select products that experts have deemed "eco-conscious."

Some people consider certification a free-market way of ensuring environmental protection, while others think it smacks of bureaucratic regulation. The experience of the forest products industry—companies engaged in timber management and the production of pulp, paper, and wood products—suggests that competing certification can be both a free-market and an environmental success.

Mandy-Scott Bachelier

Certification helps consumers select products deemed "eco-conscious." The experience of the forest products industry suggests that certification can be both a free market and an environmental success.

In the early 1990s, the forest products industry came under fire for clearcutting, chemical use, and supposedly inadequate protection of wildlife habitat and water quality. A group of nongovernmental organizations formed the Forest Stewardship Council (FSC) and developed a certification program in 1993. This put pressure on the forest industry, and soon International Paper pushed for industry self-certification. The company's leadership resulted in the Sustainable Forestry Initiative (SFI).

The FSC and the SFI are the two most popular certification programs in the United States. Measured by land covered, the SFI is by far the larger, while the FSC certifies more companies. By 2003, the SFI had certified 200 forest management companies and 116 million acres; the FSC included over 9.6 million acres of forest land and 489 forest management companies.

While both SFI and FSC share the goal of improving forest management, each has different origins, objectives, processes, and standards. "The SFI originated with the realization that the forest industry lacked credibility with the American public," explains Jimmy Bullock, who promotes and coordinates SFI certification for International Paper's southeast U.S. forest lands. "And we realized that unless we regain the public's trust, that ability to gain access to fiber and a fair regulatory playing field could become a problem."[2]

The Forest Stewardship Council (FSC) limits clearcut to 40 acres and requires landowners to minimize chemical use. The Sustainable Forest Initiative (SFI) certification requires research into increased use of integrated pest management, limits the size of clearcuts to 120 acres, and has "green-up" requirements.

As the largest member of the American Forest and Paper Association (AF&PA), the industry's major trade group, International Paper was in a unique position to take charge. Using its influence, the company pushed the AF&PA to develop certification of its own—the SFI.

The Sustainable Forest Initiative certification requires research into integrated pest management, limits the size of clearcuts to 120 acres, and has "green-up" requirements—trees replanted on a clearcut must meet a minimum height before a new clearcut can be made on an adjacent site. The SFI standard also encourages riparian (streamside) protection, requiring seeding where soil erosion is likely, quality culverts, and sediment filters such as straw bales or filter fences.

The Forest Stewardship Council (FSC), in contrast, is an international certification program developed by environmental organizations, led by the World Wide Fund for Nature (WWF). It was founded after the 1992 Rio de Janeiro Earth Summit failed to achieve a binding forestry convention. The council, which is funded by private foundations, claims to have the most rigorous international forest management standards.

The riparian standards of the FSC and the SFI are pretty much the same. The FSC, however, limits clearcuts to 40 acres—a size, the council contends, that mimics the range of a natural fire. The FSC requires that forest landowners minimize the use of chemicals, rather than just research their reduction. And the FSC has a number of socio-economic requirements that include consultations with indigenous peoples, standards addressing the general welfare and finances of employees, and assessments of the social impacts of logging operations. The SFI requires none of these, relying on U.S. law to address such issues.

Which system is better? Some environmental groups claim the SFI standard is industry "greenwashing" and contend that the FSC is true "green" certification. The WWF has asked several corporations, including International Paper, to prove their environmental commitment by pursuing FSC accreditation even though they have achieved SFI standards (WWF 2001).

But the forest industry considers the FSC standard impractical, its social objectives unreasonable, and its environmental agenda unscientific. The industry objects to the FSC's bias against plantation forestry (where trees are grown like a crop).[3]

Much of forest certification discussion deals with whether the FSC or the SFI is a better system and which will win out. But that is like asking whether Coke or Pepsi is empirically better and which should dominate the world market.

Just like rivalry between Coke and Pepsi, healthy competition between

the two certification brands has provided benefits: environmental innovation for the SFI and practical restraints on the FSC. In 2000, the SFI program created a Sustainable Forestry Board to manage its program. Two years later, it balanced the board with representatives from industry and the environment. More important, the board became independent from the AF&PA, the industry association that formed it. This has given the program a better reputation and has led to new environmental programs as part of the SFI process. Some impetus for these changes arose from the FSC's "greener" reputation and its more demanding standards.

At the same time, the FSC has had to reconsider some standards. Where it competes with the SFI in the United States, it cannot go overboard with costly requirements. One sign of restraint is that it is considering broadening certification opportunities for plantation forestry.

One-size certification does not fit all. SFI is tailored to the large forest products companies, which often grow trees on plantations and use herbicides and fertilizers. FSC works better for smaller landowners who do not use intensive forest management and who produce wood for niche products such as artwork or "green" buildings.

Anderson-Tully, which owns around 300,000 acres of land along the lower Mississippi River, recently became FSC-certified. It is a small-to-medium-size player in the forest-products industry. The company grows high-quality hardwood sawlogs on a long rotation using natural regeneration. It has a specialty market of customers who pay a premium for "green" products, and thus pursuing the FSC's tougher standards made good business sense.

As long as there are customers who are willing to pay premiums for environmental quality, the FSC will have a niche. As for SFI, major retailers such as Home Depot and Lowe's rely on it. They require their suppliers to meet the SFI standards, mainly to avoid negative publicity from environmental protestors, not because customers are paying more for the certified products. The retailers do not charge a higher price for certified wood.

Yet retailers of paper products do not demand such certification. So what is the motivation of International Paper, which produces mainly pulp and paper? According to IP and other forest products companies, the SFI arose to clean up the acts of bad players whose flawed forest-management practices gave the industry a black eye. (Indeed, initial SFI standards merely reflected practices that IP was following.) This may have been an attempt at forestalling regulation, but it may also have created competitive barriers to smaller companies. Some small companies were kicked out of the AF&PA for failing to get certified.

So, questions about motivation remain. Are businesses getting certified to preempt regulation? To engage in public relations? To form a cartel? Are environmental groups attempting to create momentum for mandatory government certification? No matter what the motives, healthy competition ensures an abundance of options on the regulatory plate.

NOTES

1. "Dolphin-free tuna" is a government-regulated label; LEED is the "Leadership in Energy and Environmental Design" standard developed by the U.S. Green Building Council.

2. Jimmy Bullock, International Paper, telephone interview, May 1, 2003.

3. Richard Boitnott, independent forestry consultant, e-mail correspondence, March 13, 2003.

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J. Bishop Grewell, a research associate for PERC, is a recent graduate of the Yale School of Forestry and Environmental Studies and author with Clay Landry of Ecological Agrarian *(Purdue University Press). This article is based on an unpublished case study that Grewell wrote with Brian Albans and Mike Spagna.*

Often, because of a lack of clearly defined property rights to the resources of the forests, local inhabitants fall victim to exploitation. At right: Seedlings grown by Sri Lanka's Small Fishers Federation will be used to combat erosion.

TURNING GREEN INTO GOLD

By Samuel S. Nugent

Courtesy of Mangrove Action Project

Celebrated for their biodiversity but exploited for financial gain, mangrove forests are at an environmental and economic crossroads. These diverse wetlands, found along tropical and subtropical coasts, play an important role as buffer zones between land and sea. They remove silt and sediment from fresh water as it empties into the ocean, while buffering the coast from erosion and storm damage. An estimated 75 percent of all tropical marine fish spend some part of their lives in the rich web of mangrove roots, which are breeding grounds and nutrient-rich nurseries.

Many small coastal communities depend for their livelihoods on the products of mangrove forests. But often, because of a lack of clearly defined property rights to the resources of the forests, local inhabitants fall victim to exploitation. Timber, shrimp farms, resorts, residences, and mining can all degrade the environment, and once the resources are diminished or depleted, contribute to the loss of livelihood for local people.

The end result has been a dramatic loss of mangrove forests. As much as half the world's mangroves have been destroyed in the past 50 years, and declining fisheries have been linked to this destruction.

Environmental activists have slowed the exploitation of these forests by convincing governments to set aside vast tracts of coastal areas as protected regions. Unfortunately, local governments and nongovernmental organizations often lack the financial resources to enforce protection, and many regions continue to experience illegal timber harvests and other unsustainable uses.

Nor have these well-intentioned governmental efforts achieved sustainable use of mangrove resources for local inhabitants. Government-owned lands with open access tend toward overuse, and resources are sometimes allocated on the basis of political favors.

An alternative is management of the mangroves by the fishers and farmers who have traditionally inhabited the mangrove forests. Although they may not

have legal deed to these lands, they have practiced sustainable use for many years. Establishing ownership rights among mangrove forests is the first step toward poverty reduction among coastal communities.

One community group that has been highly successful in combating the destruction of mangrove forests is the Small Fishers Federation of Sri Lanka (SFFL). The SFFL is funded primarily by investing proceeds from its projects back into the organization, with a few capital-intensive projects funded through grants from international agencies.

This group of individual fishers and small fishing communities banded together in 1984 to fortify themselves against the powerful influence of large corporate and political interests. The SFFL now includes 22 percent of the nation's independent fishers and more than 146 fishing communities throughout the country.[1] The federation helped define clear fishing rights for its members and worked with local and regional enforcement agencies to enforce them.

The SFFL established nurseries to replant degraded forest areas, raised freshwater fingerlings to be sold to inland fishers to restock inland waters, and conducted a host of other environmentally beneficial projects. A tuna processing plant has given added value to local fishers' catches. The group channels a percentage of its profits into revolving loan programs.

Courtesy of Mangrove Action Project

SFFL also supports social welfare. In Southern Sri Lanka, the group opened a small vocational school for disadvantaged youth. Money from business endeavors provides playground equipment and sanitation facilities for several preschools and supports community education centers.

In 2003, the SFFL hosted Sri Lanka's first environmental tourism group from the United States and Australia since the end of Sri Lanka's 12-year civil war. During the welcoming ceremonies, Sri Lanka's Minister of Fisheries commended SFFL for doing "what the Government of Sri Lanka could not; providing environmental education and conservation benefits to the people of Sri Lanka."

Not every community effort is so successful. In some cases, private property rights are not protected, and corruption can play a role. Consider a small fishing village of some 30 families in the Puttalam district of Sri Lanka. Throughout its history, the families had fished in—and claimed traditional rights to—approximately 40 acres of mangrove forests. In 1996, a developer visited the village and inquired as to who owned the property they fished. Each villager reported that, in fact, no one owned the land, and that it was open to everyone according to traditional rights that allowed locals to harvest from the land. Returning to the capital city of Colombo, the individual claimed legal ownership by filing a few documents with the court.

The village had no legal recourse when the developer returned, cut their forests, and installed private shrimp farms. By their own admission, they didn't "own" their land. Without the forests, however, local fish populations disappeared, and by January 2003, the shrimp farm's wastewater had leached salt water into surrounding groundwater, affecting the village's secondary crop, coconuts. Had there been a history of legal recognition of private property or community rights, this invasion could have been averted, or damages to the villages could have been recovered.

Even if the rights of traditional indigenous people are respected, there is a need for additional income. As

healthy mangrove systems are restored, schools of fish begin to flourish, and the fisheries rebound substantially. But fishing alone may not be enough to alleviate poverty in coastal communities.

Other sustainable by-products of mangrove ecosystems can supplement fisheries' income without reducing fish harvests or depleting mangroves. The following list proposes activities that could provide income from coastal forest resources while promoting the protection of those resources.

- *Bamboo*. A 60-hectare bamboo plantation can produce the equivalent of 500 hectares of trees for use as building material (Environmental Bamboo Foundation 2002, 22). In addition to providing an inexpensive source of high-quality renewable construction material that promotes higher returns than mangrove wood, bamboo can lower the demand for mangrove wood for construction.
- *Coconut husks*. Coconut plantations provide numerous products such as coconut meat and milk, but coconut husks have traditionally been waste products. A simple process of converting husks to charcoal can make the husks marketable. Coconut charcoal can be used for cooking, heating, and as the heating base for smoking meat and fish. When carefully steamed, charcoal can be made into activated charcoal for use in water purifiers. This use of coconut husks will reduce the demand on mangrove wood for charcoal.
- *Fish smokehouses*. Well-designed fish smokehouses could replace current fish preservation by sun drying and open pit fires, a slow and relatively unsanitary system. Smokehouses would lower spoilage, increase efficiency, and reduce dependence on mangrove wood for fuel.
- *Surimi paste*. Made from a variety of white fish, surimi is used around the world. It is known to consumers in the United States in the form of artificial crabmeat. Surimi processing lengthens the shelf life of fish and increases the value of smaller fish. It would give local people another incentive to protect the mangrove ecosystem that nurtures numerous small fish.
- *Small-scale aquaculture*. Tilapia (a carp-like fish) can be raised in small ponds at minimal cost. Tilapia benefits the pond ecosystem by removing algae and oxygen-depleting plants. Larger tilapia can be sold for filets, while smaller fish can be processed as surimi. Raising tilapia can reduce the demand for other fish in the mangrove forest area. Because tilapia can be harvested year-round, it can provide a food source while wild fish are breeding.
- *Small-scale ecotourism*. Recent years have seen a growing affluent population that travels internationally to observe or protect rare or endangered ecosystems. Ecotourism can take the form of bird watching, fly fishing, scuba diving, or biodiversity awareness tours. Mangrove forests would benefit because the protected areas increase in value as biodiversity increases.

In summary, the future of environmental sustainability lies in the ability of private enterprise to regulate the consumption of resources through the incentives provided by private property rights. When it comes to mangrove forests, those property rights should be held by local people—those who have traditional rights to the mangrove resources.

NOTE

1. Anuradha Wickramasinghe, director, Small Fishers Federation, personal correspondence, January 2003.

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Environmental Bamboo Foundation. 2002. *How to Preserve Bamboo—Vertical Soak Diffusion Method.* Bali, Indonesia: Environmental Bamboo Foundation.

Samuel S. Nugent is administrative director of the Mangrove Action Project, a nonprofit organization based in Port Angeles, Washington, dedicated to the conservation of mangrove forest areas. Nugent was a 2003 fellow at the Kinship Conservation Institute conducted by PERC.

UNDAMMING WINS PRAISE

In Wisconsin, some individuals and organizations aren't just talking about removing dams. They are quietly getting rid of them. These dams are now obsolete and fail to meet current safety standards. At right, dismantling of the Baraboo River's Linen Mill Dam begins.

Wisconsin Organizations Free Up Rivers

By Ashley Fingarson

Courtesy of Sand County Foundation

Motivated by a love of free-running rivers, environmental activists are arguing for the removal of some of the thousands of dams that dot river systems throughout the United States. Pressure is building to breach—that is, partially deconstruct—dams on the Snake River that prevent salmon from swimming to the ocean. There is even talk about tearing down dams as mighty as the Glen Canyon Dam, which created the massive Lake Powell in Utah.

In Wisconsin, some individuals and organizations aren't just talking about removing dams. They are getting rid of them. A number of factors—the desire for free-flowing rivers, the high costs of maintaining old dams, and the dangers posed by aging dams—are behind the removals. In addition, these individuals and groups are documenting the biological effects of dismantling a dam.

At the heart of this project is the Sand County Foundation, a nonprofit organization based in Madison, Wisconsin, which manages the property on which Aldo Leopold wrote *A Sand County Almanac*. The foundation's goal is to follow in Leopold's footsteps by promoting "ethical and scientifically sound land management" (Sand County Foundation 2003). Rehabilitating Wisconsin's flood plains is part of that management, which can mean the removal of old levees and aging dams to restore the flow of rivers and recreate more traditional riparian habitat.

Wisconsin has close to 4,000 dams, mostly private constructions, many very old. They were built to power grain mills or saw mills, to transport logs from logging sites, and to provide hydropower. Most of these dams are small—they create a reservoir with a water volume of less than 100 acre-feet (an acre-foot is the amount of water that covers an acre one foot deep, or 43,560 cubic feet). These dams are now obsolete. They no longer provide economic gains for the owner, fail to meet current

safety standards, and are deteriorating.

According to Wisconsin law, any dam structure abandoned by the owner and too costly to maintain can be removed by the state's Department of Natural Resources, at taxpayers' expense. The state has taken down more than 100 dams in the past three decades. But the number of eligible dams exceeds the state's ability to dismantle them quickly, and many private owners face high costs of repair for dams that are no longer of economic value.

So private organizations such as Sand County have stepped in to contribute funds and move the process along. "Typically, dam removal costs less than $40,000, and it is a one-time cost," says Brent Haglund,[1] president of Sand County. Working with the state, the River Alliance of Wisconsin, the National Fish and Wildlife Foundation, and the U.S. Fish and Wildlife Service, Sand County helped remove four dams from the Baraboo River between 1997 and 2001, liberating nearly 120 miles of water.

With each dam removal, says Brent Haglund, "not only is that stretch of river able to flow freely, but so are hundreds of miles of streams that supply that portion of the river." The Baraboo removals also yielded "cleaner water, additional recreational activity, and increased economic development." Haglund cites the towns of Baraboo, Reedsburg, and LaValle as beneficiaries.

Although returning a river to a more natural state is a high priority, safety is the leading reason. An unsafe dam "is likely to burst with a thunderstorm," says Haglund. In July 2001, two people drowned in the undertow around the Baraboo's Glenville Dam, which did not have protective features or adequate warning—its removal came two and a half months too late. Sand County strives to prevent such catastrophes.

But dismantling a dam has an environmental impact, just as initial construction of the dam did. Removal "disrupts and reconfigures the existing physical environment and eliminates an entire ecosystem," report Martin Doyle and Emily Stanley, ecologists who investigate dam removals. Removing a dam is "not a gentle process," they say (Doyle and Stanley 2003, 20).

The biggest impact comes from the sediment that has accumulated behind the dam. Dismantling must be careful or too much sediment may be released, damaging downstream wildlife such as freshwater mussels. One option is to transport sediment to a designated area away from the river, although this is costly.

Not all communities welcome dam removal. Frequently, residents adjacent to a dam feel that it is "a part of the landscape," or a "symbol of man's triumph over nature" (Grossman 2002, 145, 13). "Dam busters" must acknowledge this perspective and provide incentives for residents to embrace the removal, as Sand County did when it bought the LaValle Mill and Dam, a dam built to power a grain mill. Sand County "relieved the previous owner of several hundred thousand dollars in repairs," says John Laub,[2] Sand County's river program manager. The organization then sold the mill structure "at a very affordable price to a local farming couple." It is now an antique business.

One dam at a time, the people of Wisconsin are changing their landscape. The success of these dam removals may well have an impact on future decisions about bigger dams around the country. And meanwhile, these removals are saving wildlife habitat, and perhaps human lives as well.

NOTES

1. Brent Haglund, president, Sand County Foundation, telephone interview and e-mail correspondence, June 16, 2003.
2. John Laub, river program manager, Sand County Foundation, e-mail correspondence, July 7, 2003.

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GREENER PASTURES

By Linda Platts

Shark Haven

The world's largest fish has found a safe haven in the waters surrounding a tiny Caribbean island. Two environmental groups have purchased the 5-acre Little Water Caye Island off the southern coast of Belize and will manage the surrounding waters as a protected area for the reclusive whale shark.

Conservation International, based in Washington, D.C., and Friends of Nature, from Belize, joined forces to establish the reserve. Conservation International came up with most of the $300,000 purchase price, while the Belize group has hired rangers and will manage the reserve. The area near the island is the only known gathering spot for whale sharks.

Plans call for a research facility on the island and a ranger station to manage fishing and tourism in the area. Scientists expect to learn more about the breeding and migratory habits of the fish, which is listed as a threatened species.

The whale shark, which despite its name is not related to whales, is known to reach a length of 46 feet and weigh up to 15 tons. And it has a mouth to match its size. Using a four-foot-wide opening, this filter feeder sucks in huge amounts of water as it swims and then filters the nourishing plankton, krill, fish, fish eggs, and squid.

Local fishers who have traditionally caught snapper in the area have agreed to cooperate with the project. Rather than fish in the protected areas, they will bring boatloads of tourists and divers to see the whale sharks, which are harmless to people. The rangers will establish appropriate limits to prevent harassment of the giant fish.

—Associated Press

Home on the Range

In California, conservation easements are saving more than astonishing landscapes; they are saving livelihoods. The California Rangeland Trust is preserving working cattle ranches.

The fledgling group was founded in 1998 by the California Cattlemen's Association with the help of a $400,000 grant from the David and Lucille Packard Foundation. It was prompted in large part by the state's relentless growth and the disappearance of range-

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lands. At 35 million residents, California is more populous than Canada. Traditional suburban development along with ranchettes are gobbling up open rural land. Furthermore, efforts to preserve prime farmland have shifted development pressure to rangelands.

The rangeland trust is similar to the land trusts often backed by environmental organizations. They both seek to save open space, wildlife habitat, scenic landscapes, and watersheds. However, the California Rangeland Trust, which is run by ranchers, has another top priority, the preservation of working ranches as viable businesses. In order to further this goal, the trust offers ranchers access to advisors from private industry, the University of California, and government agencies to help landowners protect the environmental quality of their land as well as the economic stability of their ranching operations.

In just five years, the trust has protected more than 70,000 acres from development with both donated and purchased easements. Dozens of other ranch families have offered to sell development rights on more than half a million acres, but funds to purchase these rights are not yet available. Meanwhile, ranchers anxious to stay in business are feeling the competition from foreign beef producers as well as the pressure of debts and inheritance taxes.

Jack Varian is one of the fortunate ranchers who has already sold development rights to the trust. His 17,000-acre spread between the coast and the Sierra Nevada Mountains offers stunning views that have been the backdrop for television commercials. The proceeds from the sale of the easement allowed the 67-year-old Varian to pay off a $1.5 million debt, set aside $1 million as a nest egg, insure that the ranch would pass to his four children, and—no less importance—made it possible for Varian to continue ranching his land. He also has diversified his income by allowing people to hunt on his land for a fee and offering four cattle drives a year for city slickers.

—San Jose Mercury News

Weedbusters

A disaster for some is an opportunity for others. When noxious weeds invade Montana pastures and hillsides, two enterprising Missoula teenagers reap the benefits. Jonathan and Matthew Rich have spent the summer collecting, sorting, and selling thousands of weevils and flea beetles that feed on knapweed and leafy spurge, some of the state's most invasive weeds.

The idea originated with their father, Bob Rich, a forester for the state who works with biological agents to control weeds on state lands. The business is in the capable hands of his sons, as are all the crawling insects.

Using cloth nets resembling butterfly nets, the boys collect thousands of leafy spurge flea beetles and knapweed flower weevils as they wade through dense patches of weeds. The knapweed root weevils are tougher to collect as they live on the ground. To round up these weevils, the boys built a 30-by-30-foot bug corral using galvanized metal flashing.

The bugs live comfortably in old ice cream containers stored in the family refrigerator until they are sold. Typically, customers are seeking an alternative to chemical herbicides. The going rate is $100 for 100 root weevils, 200 flower weevils, or 1,000 flea beetles.

However, the boys are careful to warn people that biological control agents are not a quick fix for weed infestations. The bugs do not kill the weeds, which are both their home and food, but instead stress the weeds, making them more susceptible to other weed management tools. Sheep grazing, competitive plants and even herbicides are needed to knock back the weeds. It usually takes several years to see results, but they can be dramatic.

Business looks good for next summer as fires burn across the state clearing even more land for invasive weeds. And the success of another weed, Dalmation toadflax, means the brothers will be expanding their product line with more bugs.

—Missoulian

USE THEM OR LOSE THEM

By Daniel K. Benjamin

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

—after Ambrose Bierce

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There is a widespread view that economic growth, with its suburban sprawl and paper-hungry copying machines, dooms us to shrinking forests. Yet recent research yields persuasive evidence of the opposite: Just as a higher demand to consume bread and beef leads to more land devoted to growing wheat and cattle, so does a higher demand for wood products lead to expanding forests.

To reach this conclusion, Andrew Foster and Mark Rosenzweig (2003) have studied the determinants of forest cover in India, where, after decades of deforestation, about 50 years ago the amount of land devoted to forests began rising rapidly. By 1999, forest cover in India was more than double what it had been in 1951, and the amount of biomass in those forests had increased even faster.

India is an excellent locale to study the impact of economic growth on forestation because the markets for wood products there are largely closed off from the rest of the world. The Indian government has imposed high tariffs on wood products such as furniture, and most of the demand for wood in India is for fuel, which is rarely imported. In addition, because wood for fuel has a low value relative to its cost of transport, fuelwood markets in India are limited geographically, typically extending no farther than the local village. Hence changes in demand for forest products should have a direct impact on local forests. By examining the link between economic forces (such as income, population, wages, and agricultural productivity) and afforestation across 250 villages from 1971 to 1999, the authors are able to separate the effects of each of these factors on forest cover.

The key finding of this research is that villages where economic growth prompted the largest increases in the demand for forest products (including fuelwood, paper products, and wood furniture) had the greatest growth in forest cover. In effect, where it was most profitable to *use* forest products, it was also most profitable to provide the forests that would ultimately supply those products.

The authors also note that secure property rights played a key role in producing this result. For example, the Joint Forest Management Program in India, which provides villagers with a share of sales proceeds from timber extracted from public forests, was implemented in the 1980s. This gave villagers an added incentive to ensure that the forests would be there to meet higher demands for wood products. This conclu-

By 1999, forest cover in India was more than double what it had been in 1951. In effect, where it was most profitable to use *forest products, it was also most profitable to provide the forests that would ultimately supply those products.*

sion is consistent with other research on forests that I have written about in this column (see "Avoiding the Ax," December 1997) and with Trupti Mehta's *PERC Reports* article on community forest programs in India and Nepal (June 2002).

Another finding from the study is that the demand for forests as environmental goods does not appear to play any significant role in the extent of forest cover in India or other developing countries. The basis for this perhaps surprising conclusion comes from examining patterns of income growth and forest growth in dozens of developing nations. The authors find that faster economic growth is associated with faster forest growth only in those nations that are "closed" economies—that is, where the added demand for wood products has to be met by added local supplies. For "open" economies, where the higher demand for wood products can be supplied by imports as well as local forests, economic growth does *not* increase forest growth. If the demand for environmental amenities were the key force at work, then faster economic growth should lead to faster forest growth everywhere, regardless of the economic openness of the country.

The authors also examine the potential link between agricultural productivity and forest cover. Rapidly rising agricultural productivity could have led to cutbacks in acres planted (and thus more forest cover), as less land was needed to produce the same amount of food. Alternatively, it could have led to expansion of acres planted, as farmers sought more markets for their products. Foster and Rosenzweig find that in India, higher agricultural productivity during their study period created pressure to expand the amount of cultivated land (reducing forest cover) to sell the added agricultural output on world markets. (For the world as a whole, this effect is not likely to hold true. Higher output on a global scale would lower prices, reducing or even reversing the incentive to convert forests into fields.)

The bottom line reached by Foster and Rosenzweig (2003, 633) is sufficiently striking that I think it is worth quoting at length: "[C]onservation-based measures that either reduce the demand for forest products (e.g., recycling of paper or the inhibition of suburban homebuilding) or place local restrictions on forest exploitation do *not* save trees" (emphasis added). That is, just as the demands for Wheaties and corn flakes have induced farmers to grow more wheat and corn, using virgin pulp for newspapers and two-by-fours in construction appear to yield more forested land, not less. For those readers who wonder how to save the trees, a simple aphorism might help fix the message: Use them or lose them.

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LETTERS TO THE EDITOR

Turkey Oil or Snake Oil?

My initial reading of an early article about the "thermal depolymerization" (TDP) process that turns turkey waste into oil and gas ("Greener Pastures," June 2003) was that it smacked of snake oil. In the April 2003 edition of *Access to Energy*, Arthur Robinson took note of the TDP process. He did not pass judgment on the process, but forecast that if it is as cost-effective as hyped, it will soon be under attack by the environmentalists and anti-technologists. Their ultimate goal, he believes, is not protection of the environment but rather the elimination of energy sources as a means to shut down and control society.

John D'Aloia, Jr.
St. Marys, KS

Hidden Risks of Ethanol?

I read Gary Libecap's piece on ethanol (ethyl alcohol) with a good deal of interest ("Environmental Phantasm," June 2003). I have long opposed gasohol on a number of grounds—economic, environmental, and scientific.

One argument against ethanol stems from the fact that it is completely miscible with water. Adding ethanol to gasoline increases the water solubility of hydrocarbons in gasoline, so that larger quantities of these substances could reach the drinking water supply. Some of these (like benzene) are dangerous if inhaled or ingested.

There ought to be some serious studies of the effects of gasohol spills in terms of mobilizing some of the toxic, low-molecular components of gasoline into water. In particular, attention should be given to benzene, one of the major molecular constituents of gasoline and a substance of worrisome proven toxicity.

Certainly methyl tertiary butyl ether [MTBE, the chief oxygenating alternative to ethanol] has created problems, but the substance is by no means as serious a threat to the potability of groundwater as benzene. And if my guess is correct, the propensity of ethanol to solubilize benzene in water may be a way to put an end to what has grown into a far larger boondoggle than I ever would have thought.

Frankly, I hope I'm dead wrong, If not, the result of increasing percentages of ethanol in motor fuel is really very unpleasant to contemplate.

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PERC REPORTS

Many visitors are drawn to Montana to see Yellowstone and Glacier national parks. But the spectacular scenery extends throughout the state, as this private ranch in the Crazy Mountains (known to Montanans as the "Crazies) amply illustrates.

Mandy-Scott Bachelier

Published in Bozeman, Montana, PERC Reports *offers readers a forum for discussion about market approaches to protecting the environment. Topics in this September issue range from recycling to improving the quality of forests—those in the United States as well as coastal mangroves around the world.*

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