

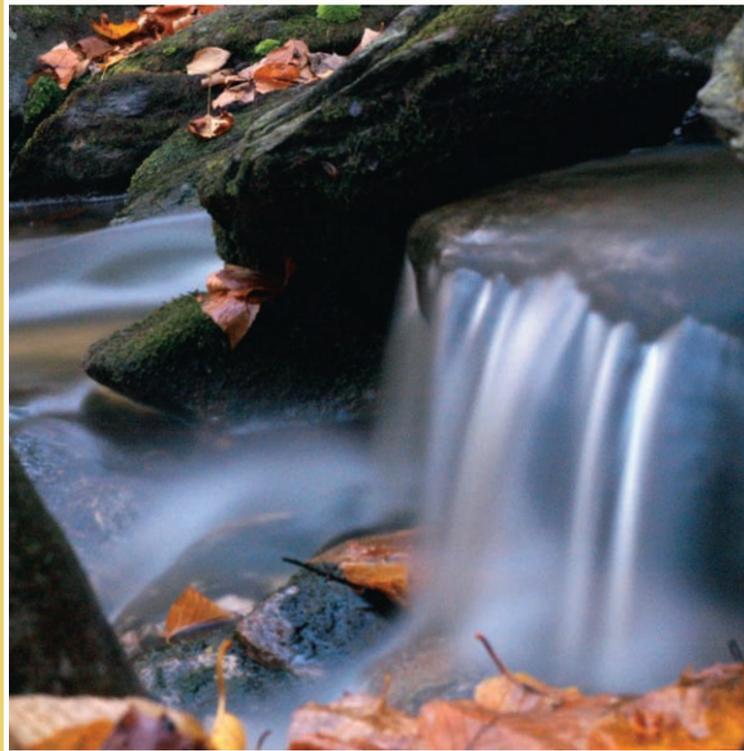
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PROTEUS

A JOURNAL OF IDEAS



Water and Our World



SHIPPENSBURG
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PROTEUS

A JOURNAL OF IDEAS

Water and Our World

VOLUME 26:1

SPRING 2009



An ancient Greek sea divinity, herdsman of seals, Proteus could be elusive by changing his form at will appearing as a lion, a serpent, a boar, water, or a tall tree. However when those who caught him succeeded in holding him fast, Proteus assumed his proper shape of an old man and told the truth.

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Proteus, Managing Editor
University Publications
Shippensburg University
1871 Old Main Drive
Shippensburg PA 17257-2299
717-477-1206
proteus@ship.edu

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Jeremiah Greenland is a graduate student in the Geography/Earth Science Department at Shippensburg University who also completed his undergraduate degree in geoenvironmental studies at Shippensburg. His primary photographic subjects are nature and action sports. Both cover photographs were taken at Tumbling Run Game Preserve otherwise known as Lewis Rocks, while hiking. The front cover was taken in September the back cover in October of last year.

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INTRODUCTION

JOSEPH ZUME
SHIPPENSBURG UNIVERSITY

“Water is the mother of the vine, The nurse and fountain of fecundity, The adorning and refresher of the world” (Charles Mackay).

“Water is life’s mater and matrix, mother and medium. There is no life without water” (Albert Szent-Gyorgyi).

Water has an overbearing influence on Mother Earth and her inhabitants. Few will doubt it is the most important substance man has ever known. Its refreshing taste is obviously unmatched by any other earthly liquid. Personally, there are times that gulping down a glass of chilled water makes me wish for a tail I could wag like a spoiled dog. For as long as I can remember, I have cherished water as being more precious than gold.

As a little boy, growing up in a small village in north-central Nigeria, I had no idea there was a tap one could simply twist and water would gush out. My entire village relied on a scattering of hand-dug wells, which were very productive during the rainy season but completely parched in the dry season. Even during the rainy season, we had to expend enormous amounts of time and energy to manually draw water from the earth. It was generally the children’s responsibility to gather water for the household—a burden that weighed heavier on girls than boys. Some unfortunate little boys like myself, whose mothers had no daughters, or daughters who were too little to help, had to wear double hats, performing both ‘girls’ and ‘boys’ tasks.

The onset of the dry season forced us to travel long distances in search of streams that still had a trickle of moisture. During these times, we prayed our families would conserve water and our quests would not take us too far. Once water was found, we would collect it in pails that we carried on our heads; the heaviness of our loads made our journeys home almost unbearable. The hardships we faced offered constant reminders

that water was a scarce resource. Every drop was worth protecting. These early experiences played a crucial role in my decision to specialize in water science.

As I read and studied, I developed a greater and greater recognition that my formative experiences with water had been widely shared by the majority of the world’s population across vast distances of time and space. Water is believed to be the only substance that has a name in every human language. I suppose whales and porpoises send sonar messages regarding water temperatures via sonar. Perhaps ants send chemical messages to their colonies when they uncover much needed supplies of the resource.

Water covers 70 percent of the earth’s surface and is buried like treasure under much of its crust. For centuries, the availability of water has influenced human settlement patterns worldwide. Many of the great ancient civilizations were anchored along large rivers; the technological and labor demands of irrigation played a crucial role in the rise of early cities. Mesopotamia, for example, was located between the Tigris and the Euphrates rivers in present-day Iraq and Turkey. Similarly, the Egyptians centered their civilization on the Nile, and the Chinese on the Yellow and Yangtze rivers. Regional geographers argue it was Europe’s numerous connecting waterways that ignited its art of shipbuilding, which eventually facilitated its colonization over the rest of the world. More recently, the discovery of a huge amount of historic climatic information stored in the earth’s oceans and

polar ice caps is helping scientists reconstruct past climates, dating back several thousand years. Similarly, dendrochronologists are now reconstructing past climates from tree rings, primarily from yearly imprints left by water in tree stems. Water, running both on and beneath the earth's surface, continually shapes the earth's crust and the evolution of all life on its surface.

Because of its unique ability to sustain life and its unparalleled destructive force, water must be adored and dreaded at the same time. According to John Bullein, "*Water is a good servant, but it is a cruel master.*" The serene characteristics of water and its beauty have inspired music and art in many societies. It is, similarly, the preferred liquid for use in special rituals and ceremonies among several world cultures. Conversely, humans have long recognized both water and its absence as ferocious destroyers. We are living witnesses to the devastating impacts of floods, hurricanes, tsunamis, and droughts—all water-related disasters.

While most of these catastrophes occur naturally, there is evidence that human activity has recently been exacerbating their impacts. And, there is growing evidence that droughts and floods have been the downfall of many civilizations. The very irrigation networks that made civilization possible in Mesopotamia probably hastened its downfall. Over the centuries, the transported water that nourished agriculture in the region also ruined its soil by depositing large amounts of salt. Scientists, environmentalists, resource planners, and policymakers are issuing increasingly strident warnings that unless we learn from the past our own global village may face water crises similar in scope to those that helped precipitate the decline of Harappa and Mohenjo Daro, ancient Mesopotamia and Rome, as well as the Anasazi of the southwestern United States.

Scientists have indicated a primary threat to the world's water resources is human activity itself. One such danger is from global warming, a phenomenon associated with human-induced emissions of greenhouse gases into the atmosphere that is changing climates throughout the world. Global warming will adversely impact the world's water resources by unleashing floods and droughts in different world regions. Such developments in turn will only exacerbate other human-created problems such as pollution, ground and surface water overexploitation, saltwater intrusion, and soil subsidence.

Taken together, these changes will exponentially intensify the problem of water scarcity that already threatens much of the world. The global distribution

of water is uneven. More than 97 percent of the earth's water is found in the oceans; its high salt content makes it unfit for most human purposes. Only 2.8 percent of the world's water is fresh, more than two-thirds of which is locked up as ice in the polar regions, thus making it unavailable for human consumption. Today, domestic and municipal purposes account for approximately 8 percent of the world's water consumption, while industry and agriculture are responsible for approximately 22 and 70 percent of all water consumption respectively. Industrialized nations use substantially more water than their developing counterparts. In the United States, for example, average domestic and municipal consumption stands at 573 liters (151 gallons) per person per day. The average daily use per person per day is 118 liters (31 gallons) in the United Kingdom, while an average of 10 liters (3 gallons) is used per person per day in Ethiopia.

The world also faces serious issues regarding water quality. As the world's population grows, industries that manufacture essential products for human use are also expanding. Effluents from these industrial sites have become important sources for both surface and groundwater pollution. For example, it is estimated that about 300-500 million tons of heavy metals, solvents, toxic sludge, and other wastes accumulate annually in freshwater. Industrial pollutants have also led to serious problems of acid

precipitation with significant adverse implications for aquatic habitats in many world regions. The increased agricultural production necessary to feed growing populations comes at a terrible cost to water quality. The use of chemical fertilizers, herbicides, insecticides, and fungicides generates substantial water contamination. The organic wastes produced by the food industry also dramatically elevate pollution loads in water. Such wastes, together with the thermal pollution generated by nuclear power stations, present formidable water quality challenges. Widespread waterborne diseases have also dramatically reduced the availability of potable water in much of the world. With competition over water resources fomenting tensions among countries throughout the world, it is clear we must develop global strategies for managing water resources.

It is crucial for us to understand the water challenges we face in our dynamically changing world. The world's human population is projected to exceed 10 billion by 2050. Industries must also meet the demand of the growing population, so too must food production and processing. In the meantime, the climate continues to change due to both natural and anthropogenic causes.

"To this day, I am amazed at how few people recognize the value and scarcity of this precious resource."

All these problems have serious implications both for quantity and quality of our water supplies. This issue of *Proteus* is dedicated to the subject of water, not simply to highlight the technical and geopolitical issues associated with it, but to examine its cultural, spiritual, and aesthetic dimensions as well.

Much of the population of the developed world has yet to directly experience the problems of scarcity I first confronted as a young child. Many Americans and Europeans continue to view water as a ubiquitous amenity, readily accessible with a simple turn of a tap.

To this day, I am amazed at how few people recognize the value and scarcity of this precious resource. After many years of living in the United States, I am still shocked to see grown men idly

chatting in restrooms for minutes at a time while the water wastefully whirls around their perfectly clean hands. Shockingly, some even leave the restroom with the tap still running.

Soon, however, even Americans and Europeans will be forced to acknowledge the realities that much of the world's population has already accepted. Water resources are finite. Rising global demand and elevated levels of pollution are threatening supplies throughout the world. It is obvious we all must work harder in order to avert the catastrophic water crisis that threatens all our futures. I hope my Western friends will be able to appreciate the value of water before it becomes more costly than gold.



Chysauster – the remains of an ancient village located at the plateau top of a long slow incline. The ruins now exist in the middle of a working sheep farm where animals graze and the surrounding farmland is worked as if nothing unusual were enclosed in its midst. (Margaret Evans)

MESSAGE IN A BOTTLE

CHARLES FISHMAN
FAST COMPANY

The largest bottled-water factory in North America is located on the outskirts of Hollis, Maine. In the back of the plant stretches the staging area for finished product: twenty four million bottles of Poland Spring water. As far as the eye can see, there are double-stacked pallets packed with half-pint bottles, half-liters, liters, “Aquapods” for school lunches, and 2.5-gallon jugs for the refrigerator.

Really, it is a lake of Poland Spring water, conveniently celled off in plastic, extending across six acres, eight feet high. A week ago, the lake was still underground; within five days, it will all be gone, to supermarkets and convenience stores across the Northeast, replaced by another lake’s worth of bottles. Looking at the piles of water, you can have only one thought: Americans sure are thirsty.

Bottled water has become the indispensable prop in our lives and our culture. It starts the day in lunch boxes; it goes to every meeting, lecture hall, and soccer match; it’s in our cubicles at work; in the cup holder of the treadmill at the gym; and it’s rattling around half-finished on the floor of every minivan in America. Fiji Water shows up on the ABC show *Brothers & Sisters*; Poland Spring cameos routinely on NBC’s *The Office*. Every hotel room offers bottled water for sale, alongside the increasingly ignored ice bucket and drinking glasses. At Whole Foods, the upscale emporium of the organic and exotic, bottled water is the number-one item by units sold.

Thirty years ago, bottled water barely existed as a business in the United States. Last year, we spent more on Poland Spring, Fiji Water, Evian, Aquafina, and Dasani than we spent on iPods or movie tickets—\$15 billion. It will be \$16 billion this year.

Bottled water is the food phenomenon of our times. We—a generation raised on tap water and water fountains—drink a billion bottles of water a week, and we’re raising a generation that views tap water with disdain and water fountains with suspicion. We’ve come to pay good money—two or three or four times the cost

of gasoline—for a product we have always gotten, and can still get, for free, from taps in our homes.

When we buy a bottle of water, what we’re often buying is the bottle itself, as much as the water. We’re buying the convenience—a bottle at the 7-Eleven isn’t the same product as tap water, any more than a cup of coffee at Starbucks is the same as a cup of coffee from the Krups machine on your kitchen counter. And we’re buying the artful story the water companies tell us about the water: where it comes from, how healthy it is, what it says about us. Surely among the choices we can make, bottled water isn’t just good, it’s positively virtuous.

Except for this: bottled water is often simply an indulgence, and despite the stories we tell ourselves, it is not a benign indulgence. We’re moving one billion bottles of water around a week in ships, trains, and trucks in the United States alone. That’s a weekly convoy equivalent to 37,800 eighteen-wheelers delivering water. (Water weighs 8 1/3 pounds a gallon. It’s so heavy you can’t fill an eighteen-wheeler with bottled water—you have to leave empty space.) Meanwhile, one out of six people in the world has no dependable, safe drinking water. The global economy has contrived to deny the most fundamental element of life to one billion people, while delivering to us an array of water “varieties” from around the globe, not one of which we actually need. That tension is only complicated by the fact that if we suddenly decided not to purchase the lake of Poland Spring water in Hollis, Maine, none of that water would find its way to people who really are thirsty.

A chilled plastic bottle of water in the convenience-store cooler is the perfect symbol of this moment in American commerce and culture. It acknowledges our demand for instant gratification, our vanity, our token concern for health. Its packaging and transport depend entirely on cheap fossil fuel. Yes, it’s just a bottle of water—modest compared with the indulgence of driving a Hummer. But when a whole industry grows up around supplying us with something we don’t

Charles Fishman is an award-winning senior writer at Fast Company. As an investigative journalist, he has reported on topics as diverse as Wal-Mart, bomb factories, and NASA. In 2007, he did a story on bottled water that changed the way he thought about water. Based on research for that article, he is working on a book exploring how water affects life around the world. He is the author of the best seller, *The Wal-Mart Effect*.

need—when a whole industry is built on the packaging and the presentation—it’s worth asking how that happened, and what the impact is. And if you do ask, if you trace both the water and the business back to where they came from, you find a story more complicated, more bemusing, and ultimately more sobering than the bottles we tote everywhere suggest.

In the town of San Pellegrino Terme, Italy, for example, is a spigot that runs all the time, providing San Pellegrino water free to the local citizens—except the free Pellegrino has no bubbles. Pellegrino trucks in the bubbles for the bottling plant. The man who first brought bottled water to the United States famously failed an impromptu taste test involving his own product. In Maine, there is a marble temple to honor our passion for bottled water.

And in Fiji, a state-of-the-art factory spins out more than a million bottles a day of the hippest bottled water on the U.S. market today, while more than half the people in Fiji do not have safe, reliable drinking water. Which means it is easier for the typical American in Beverly Hills or Baltimore to get a drink of safe, pure, refreshing Fiji water than it is for most people in Fiji.

At the Peninsula hotel in Beverly Hills, where the rooms start at \$500 a night and the guest next door might well be an Oscar winner, the minibar in all 196 rooms contains six bottles of Fiji Water. Before Fiji Water displaced Evian, Diet Coke was the number-one-selling minibar item. Now, says Christian Boyens, the Peninsula’s elegant director of food and beverage, “the one liter of Fiji Water is number one. Diet Coke is number two. And the 500-milliliter bottle of Fiji is number three.”

Being the water in the Peninsula minibar is so desirable—not just for the money to be made, but for the exposure with the Peninsula’s clientele—that Boyens gets a sales call a week from a company trying to dislodge Fiji.

Boyens, who has an MBA from Cornell, used to be indifferent to water. Not anymore. His restaurants and bars carry 20 different waters. “Sometimes a guest will ask for Poland Spring, and you can’t get Poland Spring in California,” he says. So what does he do? “We’ll call the Peninsula in New York and have them FedEx out a case.

“I thought water was water. But our customers know what they want.”

The marketing of bottled water is subtle compared with the marketing of, say, soft drinks or beer. The point of Fiji Water in the minibar at the Peninsula, or at the center of the table in a white-tablecloth restaurant, is that guests will try it, love it, and buy it at a store the next time they see it.

Which isn’t difficult, because the water aisle in a suburban supermarket typically stocks a dozen brands of water—not including those enhanced with flavors or vitamins or, yes, oxygen. In 1976, the average American

drank 1.6 gallons of bottled water a year, according to Beverage Marketing Corp. Last year, we each drank 28.3 gallons of bottled water—18 half-liter bottles a month. We drink more bottled water than milk, or coffee, or beer. Only carbonated soft drinks are more popular than bottled water, at 52.9 gallons annually.

No one has experienced this transformation more profoundly than Kim Jeffery. Jeffery began his career in the water business in the Midwest in 1978, selling Perrier (“People didn’t know whether to put it in their lawn mower or drink it,” he says). Now he’s the CEO of Nestlé Waters North America, in charge of U.S. sales of Perrier, San Pellegrino, Poland Spring, and a portfolio of other regional natural spring waters. Combined, his brands will sell some \$4.5 billion worth of water this year (generating roughly \$500 million in pretax profit). Jeffery insists that unlike the soda business, which is stoked by imaginative TV and marketing campaigns, the mainstream water business is, quite simply, “a force of nature.”

“The entire bottled-water business today is half the size of the carbonated beverage industry,” says Jeffery, “but our marketing budget is 15 percent of what they spend. When you put a bottle of water in that cold box, it’s the most thirst-quenching beverage there is. There’s nothing in it that’s not good for you. People just know that intuitively.

“A lot of people tell me, you guys have done some great marketing to get customers to pay for water,” Jeffery says. “But we aren’t that smart. We had to have a hell of a lot of help from the consumer.”

Still, we needed help learning to drink bottled water. For that, we can thank the French.

Gustave Leven was the chairman of Source Perrier when he approached an American named Bruce Nevins in 1976. Nevins was working for the athletic-wear company Pony. Leven was a major Pony investor. “He wanted me to consider the water business in the U.S.,” Nevins says. “I was a bit reluctant.” Back then, the American water industry was small and fusty, built on home and office delivery of big bottles and grocery sales of gallon jugs.

Nevins looked out across 1970s America, though, and had an epiphany: Perrier wasn’t just water. It was a beverage. The opportunity was in persuading people to drink Perrier when they would otherwise have had a cocktail or a Coke. Americans were already drinking 30 gallons of soft drinks each a year, and the three-martini lunch was increasingly viewed as a problem. Nevins saw a niche.

From the start, Nevins pioneered a three-part strategy. First, he connected bottled water to exclusivity: In 1977, just before Perrier’s U.S. launch, he flew 60 journalists to France to visit “the source” where Perrier bubbled out of the ground. He connected Perrier to health, sponsoring the New York City Marathon, just as long-distance running was exploding

as a fad across America. And he associated Perrier with celebrity, launching with \$4 million in TV commercials featuring Orson Welles. It worked. In 1978, its first full year in the United States, Perrier sold \$20 million of water. The next year, sales tripled to \$60 million.

What made Perrier distinctive was that it was a sparkling water, served in a signature glass bottle. But that's also what left the door open for Evian, which came to the United States in 1984. Evian's U.S. marketing was built around images of toned young men and women in tight clothes sweating at the gym. Madonna drank Evian—often onstage at concerts. “If you were cool, you were drinking bottled water,” says Ed Slade, who became Evian's vice president of marketing in 1990. “It was a status symbol.”

Evian was also a still water, which Americans prefer; and it was the first to offer a plastic bottle nationwide. The clear bottle allowed us to see the water—how clean and refreshing it looked on the shelf. Americans have never wanted water in cans, which suggest a tinny aftertaste before you take a sip. The plastic bottle, in fact, did for water what the pop-top can had done for soda: It turned water into an anywhere, anytime beverage, at just the moment when we decided we wanted a beverage, everywhere, all the time.

Perrier and Evian launched the bottled-water business just as it would prove irresistible. Convenience and virtue aligned. Two-career families, over-programmed children, prepared foods in place of home-cooked meals, the constant urging to eat more healthfully and drink less alcohol—all reinforce the value of bottled water. But those trends also reinforce the mythology.

We buy bottled water because we think it's healthy. Which it is, of course: Every twelve-year-old who buys a bottle of water from a vending machine instead of a 16-ounce Coke is inarguably making a healthier choice. But bottled water isn't healthier, or safer, than tap water. Indeed, while the United States is the single biggest consumer in the world's \$50 billion bottled-water market, it is the only one of the top four—the others are Brazil, China, and Mexico—that has universally reliable tap water. Tap water in this country, with rare exceptions, is impressively safe. It is monitored constantly, and the test results made public. Mineral water has a long association with medicinal benefits—and it can provide minerals that people need—but there are no scientific studies establishing that routinely consuming mineral water improves your health. The FDA, in fact, forbids mineral waters in the United States from making any health claims.

And for this healthy convenience, we're paying what amounts to an unbelievable premium. You can buy a half-liter Evian for \$1.35—17 ounces of water imported from France for pocket change. That water seems cheap, but only because we aren't paying attention.

In San Francisco, the municipal water comes from inside Yosemite National Park. It's so good the EPA doesn't require San Francisco to filter it. If you bought and drank a bottle of Evian, you could refill that bottle once a day for 10 years, 5 months, and 21 days with San Francisco tap water before that water would cost \$1.35. Put another way, if the water we use at home cost what even cheap bottled water costs, our monthly water bills would run \$9,000.

Taste, of course, is highly personal. New Yorkers excepted, Americans love to belittle the quality of their tap water. But in blind taste tests, with waters at equal temperatures, presented in identical glasses, ordinary people can rarely distinguish between tap water, spring water, and luxury waters. At the height of Perrier's popularity, Bruce Nevins was asked on a live network radio show one morning to pick Perrier from a lineup of seven carbonated waters served in paper cups. It took him five tries.

We are actually in the midst of a second love affair with bottled water. In the United States, many of the earliest, still-familiar brands of spring water—Poland Spring, Saratoga Springs, Deer Park, Arrowhead—were originally associated with resort and spa complexes. The water itself, pure at a time when cities struggled to provide safe water, was the source of the enterprise.

In the late 1800s, Poland Spring was already a renowned brand of healthful drinking water that you could get home-delivered in Boston, New York, Philadelphia, or Chicago. It was also a sprawling summer resort complex, with thousands of guests and three Victorian hotels, some of which had bathtubs with spigots that allowed guests to bathe in Poland Spring water. The resort burned in 1976, but at the crest of a hill in Poland Spring, Maine, you can still visit a marble-and-granite temple built in 1906 to house the original spring.

The car, the Depression, World War II, and perhaps most important, clean, safe municipal water, unwound the resorts and the first wave of water as business. We had to wait two generations for the second, which would turn out to be much different—and much larger.

Today, for all the apparent variety on the shelf, bottled water is dominated in the United States and worldwide by four huge companies. Pepsi has the nation's number-one-selling bottled water, Aquafina, with 13 percent of the market. Coke's Dasani is number two, with 11 percent of the market. Both are simply purified municipal water—so 24 percent of the bottled water we buy is tap water repackaged by Coke and Pepsi for our convenience. Evian is owned by Danone, the French food giant, and distributed in the United States by Coke.

The really big water company in the United States is Nestlé, which gradually bought up the nation's heritage brands, and expanded them. The waters are slightly different—spring water must come from actual springs, identified specifically on the label—but together,

they add up to 26 percent of the market, according to Beverage Marketing, surpassing Coke and Pepsi's brands combined.

Since most water brands are owned by larger companies, it's hard to get directly at the economics. But according to those inside the business, half the price of a typical \$1.29 bottle goes to the retailer. As much as a third goes to the distributor and transport. Another 12 to 15 cents is the cost of the water itself, the bottle and the cap. That leaves roughly a dime of profit. On multipacks, that profit is more like two cents a bottle.

As the abundance in the supermarket water aisle shows, that business is now trying to help us find new waters to drink and new occasions for drinking them—trying to get more mouth share, as it were. Aquafina marketing vice president Ahad Afridi says his team has done the research to understand what kind of water drinkers we are. They've found six types, including the "water pure-fectonist"; the "water explorer"; the "image seeker"; and the "struggler" ("they don't really like water that much...these are the people who have a cheeseburger with a diet soda").

It's a startling level of thought and analysis—until you realize that within a decade, our consumption of bottled water is expected to surpass soda. That kind of market can't be left to chance. Aquafina's fine segmentation is all about the newest explosion of waters that aren't really water—flavored waters, enhanced waters, colored waters, water drinks branded after everything from Special K breakfast cereal to Tropicana juice.

Afridi is a true believer. He talks about water as if it were more than a drink, more than a product—as if it were a character all its own, a superhero ready to take the pure-fectonist, the water explorer, and the struggler by the hand and carry them to new water adventures. "Water as a beverage has more right to extend and enter into more territories than any other beverage," Afridi says. "Water has a right to travel where others can't."

Uh, meaning what?

"Water that's got vitamins in it. Water that's got some immunity-type benefit to it. Water that helps keep skin younger. Water that gives you energy."

Water: It's pure, it's healthy, it's perfect—and we've made it better. The future of water sounds distinctly unlike water.

The label on a bottle of Fiji Water says "from the islands of Fiji." Journey to the source of that water, and you realize just how extraordinary that promise is. From New York, for instance, it is an eighteen-hour plane ride west and south (via Los Angeles) almost to Australia, and then a four-hour drive along Fiji's two-lane King's Highway.

Every bottle of Fiji Water goes on its own version of this trip, in reverse, although by truck and ship. In fact, since the plastic for the bottles is shipped to Fiji first,

the bottles' journey is even longer. Half the wholesale cost of Fiji Water is transportation—which is to say, it costs as much to ship Fiji Water across the oceans and truck it to warehouses in the United States than it does to extract the water and bottle it.

That is not the only environmental cost embedded in each bottle of Fiji Water. The Fiji Water plant is a state-of-the-art facility that runs 24 hours a day. That means it requires an uninterrupted supply of electricity—something the local utility structure cannot support. So the factory supplies its own electricity, with three big generators running on diesel fuel. The water may come from "one of the last pristine ecosystems on earth," as some of the labels say, but out back of the bottling plant is a less pristine ecosystem veiled with a diesel haze.

Each water bottler has its own version of this oxymoron: that something as pure and clean as water leaves a contrail.

San Pellegrino's one-liter glass bottles—so much a part of the mystique of the water itself—weigh five times what plastic bottles weigh, dramatically adding to freight costs and energy consumption. The bottles are washed and rinsed, with mineral water, before being filled with sparkling Pellegrino—it uses up two liters of water to prepare the bottle for the liter we buy. The bubbles in San Pellegrino come naturally from the ground, as the label says, but not at the San Pellegrino source. Pellegrino chooses its CO² carefully—it is extracted from supercarbonated volcanic spring waters in Tuscany, then trucked north and bubbled into Pellegrino.

Poland Spring may not have any oceans to traverse, but it still must be trucked hundreds of miles from Maine to markets and convenience stores across its territory in the Northeast—it is 312 miles from the Hollis plant to midtown Manhattan. Our desire for Poland Spring has outgrown the springs at Poland Spring's two Maine plants; the company runs a fleet of 80 silver tanker trucks that continuously crisscross the state of Maine, delivering water from other springs to keep its bottling plants humming.

In transportation terms, perhaps the waters with the least environmental impact are Pepsi's Aquafina and Coke's Dasani. Both start with municipal water. That allows the companies to use dozens of bottling plants across the nation, reducing how far bottles must be shipped.

Yet Coke and Pepsi add in a new step. They put the local water through an energy-intensive reverse-osmosis filtration process more potent than that used to turn seawater into drinking water. The water they are purifying is ready to drink—they are re-cleaning perfectly clean tap water. They do it so marketing can brag about the purity, and to provide consistency: So a bottle of Aquafina in Austin and a bottle in Seattle taste the same, regardless of the municipal source.

There is one more item in bottled water's environmental ledger: the bottles themselves. The big spring water companies tend to make their own bottles in their plants, just moments before they are filled with water—12, 19, 30 grams of molded plastic each. Americans went through about 50 billion plastic water bottles last year, 167 for each person. Durable, lightweight containers manufactured just to be discarded. Water bottles are made of totally recyclable polyethylene terephthalate (PET) plastic, so we share responsibility for their impact: Our recycling rate for PET is only 23 percent, which means we pitch into landfills 38 billion water bottles a year—more than \$1 billion worth of plastic.

Some of the water companies are acutely aware that every business, every product, every activity is under environmental scrutiny like never before. Nestlé Waters has just redesigned its half-liter bottle, the most popular size among the eighteen billion bottles the company will mold this year, to use less plastic. The lighter bottle and cap require 15 grams of plastic instead of 19 grams, a reduction of 20 percent. The bottle feels flimsy—it uses half the plastic of Fiji Water's half-liter bottle—and CEO Jeffery says that crushable feeling should be the new standard for bottled-water cachet.

"As we've rolled out the lightweight bottle, people have said, 'Well, that feels cheap,'" says Jeffery. "And that's good. If it feels solid like a Gatorade bottle or a Fiji bottle, that's not so good." Of course, lighter bottles are also cheaper for Nestlé to produce and ship. Good environmentalism equals good business.

John Mackey is the CEO and cofounder of Whole Foods Market, the national organic-and-natural grocery chain. No one thinks about the environmental and social impacts and the larger context of food more incisively than Mackey—so he's a good person to help frame the ethical questions around bottled water.

Mackey and his wife have a water filter at home, and don't typically drink bottled water there. "If I go to a movie," he says, "I'll smuggle in a bottle of filtered water from home. I don't want to buy a Coke there, and why buy another bottle of water—\$3 for 16 ounces?" But he does drink bottled water at work: Whole Foods' house brand, 365 Water.

"You can compare bottled water to tap water and reach one set of conclusions," says Mackey, referring both to environmental and social ramifications. "But if you compare it with other packaged beverages, you reach another set of conclusions.

"It's unfair to say bottled water is causing extra plastic in landfills, and it's using energy transporting it," he says. "There's a substitution effect—it's substituting for juices and Coke and Pepsi." Indeed, we still drink almost twice the amount of soda as water—which is, in fact, 90 percent water and also in containers made to be discarded. If bottled water raises environmental and social issues, don't soft drinks raise all those issues, plus obesity concerns?

What's different about water, of course, is that it runs from taps in our homes, or from fountains in public spaces. Soda does not.

As for the energy used to transport water from overseas, Mackey says it is no more or less wasteful than the energy used to bring merlot from France or coffee from Ethiopia, raspberries from Chile or iPods from China. "Have we now decided that the use of any fossil fuel is somehow unethical?" Mackey asks. "I don't think water should be picked on. Why is the iPod okay and the water is not?"

Mackey's is a merchant's approach to the issue of bottled water—it's a choice for people to make in the market. Princeton University philosopher Peter Singer takes an ethicist's approach. Singer has coauthored two books that grapple specifically with the question of what it means to eat ethically—how responsible are we for the negative impact, even unknowing, of our food choices on the world?

"Where the drinking water is safe, bottled water is simply a superfluous luxury that we should do without," he says. "How is it different than French merlot? One difference is the value of the product, in comparison to the value of transporting and packaging it. It's far lower in the bottled water than in the wine.

"And buying the merlot may help sustain a tradition in the French countryside that we value—a community, a way of life, a set of values that would disappear if we stopped buying French wines. I doubt if you travel to Fiji you would find a tradition of cultivation of Fiji water.

"We're completely thoughtless about handing out \$1 for this bottle of water, when there are virtually identical alternatives for free. It's a level of affluence that we just take for granted. What could you do? Put that dollar in a jar on the counter instead, carry a water bottle, and at the end of the month, send all the money to Oxfam or CARE and help someone who has real needs. And you're no worse off."

Beyond culture and the product's value, Singer makes one exception. "You know, they do import Kenyan vegetables by air into London. Fresh peas from Kenya, sent by airplane to London. That provides employment for people who have few opportunities to get themselves out of poverty. So despite the fuel consumption, we're supporting a developing country, we're working against poverty, we're working for global equity.

"Those issues are relevant. Presumably, for instance, bottling water in Fiji is fairly automated. But if there were 10,000 Fijians carefully filtering the water through coconut fiber—well, that would be a better argument for drinking it."

Marika, an elder from the Fijian village of Drauniivi, is sitting cross-legged on a hand-woven mat before a wooden bowl, where his weathered hands are filtering Fiji Water through a long bag of ground kava root.

Marika is making a bowl of grog, a lightly narcotic beverage that is an anchor of traditional Fiji society. People with business to conduct sit wearing the traditional Fijian skirt, and drink round after round of grog, served in half a coconut shell, as they discuss the matters at hand.

Marika is using Fiji Water—the same Fiji Water in the minibars of the Peninsula Hotel—because Drauniivi is one of the five rural villages near the Fiji Water bottling plant where the plant's workers live. Drauniivi and Beverly Hills are part of the same bottled-water supply chain.

Jim Siplon, an American who manages Fiji Water's ten-year-old bottling plant in Fiji, has arranged the grog ceremony. "This is the soul of Fiji Water," he says. The ceremony lasts 45 minutes and goes through four rounds of grog, which tastes a little furry. Marika is interrupted twice by his cell phone, which he pulls from a pocket in his skirt. It is shift change at the plant, and Marika coordinates the minibus network that transports villagers to and from work.

Fiji Water is the product of these villages, a South Pacific aquifer, and a state-of-the-art bottling plant in a part of Fiji even the locals consider remote. The plant, on the northeast coast of Fiji's main island of Viti Levu, is a white two-story building that looks like a 1970s-era junior high school. The entrance faces the interior of Viti Levu and a cloud-shrouded ridge of volcanic mountains.

Inside, the plant is in almost every way indistinguishable from Pellegrino's plant in Italy, or Poland Spring's in Hollis, filled with computer-controlled bottle-making and bottle-filling equipment. Line number two can spin out one million bottles of Fiji Water a day, enough to load forty 20-foot shipping containers; the factory has three lines.

The plant employs 200 islanders—set to increase to 250 this year—most with just a sixth- or eighth-grade education. Even the entry-level jobs pay twice the informal minimum wage. But these are more than simply jobs—they are jobs in a modern factory, in a place where there aren't jobs of any sort beyond the villages. And the jobs are just part of an ecosystem emerging around the plant—water-based trickle-down economics, as it were.

Siplon, a veteran telecom manager from MCI, wants Fiji Water to feel like a local company in Fiji. (It was purchased in 2004 by privately owned Roll International, which also owns POM Wonderful and is one of the largest producers of nuts in the United States.) He uses a nearby company to print the carrying handles for Fiji Water six-packs and buys engineering services and cardboard boxes on the island. By long-standing arrangement, the plant has seeded a small business in the villages that contracts with the plant to provide landscaping and security, and runs the bus system that Marika helps manage.

In 2007, Fiji Water will mark a milestone. "Even though you can drive for hours and hours on this island past cane fields," says Siplon, "sometime this year, Fiji Water will eclipse sugarcane as the number-one export." That is, the amount of sugar harvested and processed for export by some 40,000 seasonal sugar workers will equal in dollar value the amount of water bottled and shipped by 200 water bottlers.

However we regard Fiji Water in the United States—essential accessory, harmless treat, or frivolous excess—the closer you get to the source of its water, the more significant the enterprise looks.

No, no coconut-fiber filtering, but rather, a toehold in the global economy. Are 10,000 Fijians benefiting? Not directly. Perhaps 2,000. But Fiji Water is providing something else to a tiny nation of 850,000 people, which has been buffeted by two coups in seven years, and the collapse of its gold-mining and textiles industries: inspiration, a vision of what the country might have to offer the rest of the world. Developed countries are keen for myriad variations on just what Fiji Water is—a pure, unadulterated, organic, and natural product. Fiji has whole vistas of untouched, organic-ready farmland. Indeed, the hottest topic this spring (beyond politics) was how to jump-start an organic-sugar industry.

Of course, the irony of shipping a precious product from a country without reliable water service is hard to avoid. This spring, typhoid from contaminated drinking water swept one of Fiji's islands, sickening dozens of villagers and killing at least one. Fiji Water often quietly supplies emergency drinking water in such cases. The reality is, if Fiji Water weren't tapping its aquifer, the underground water would slide into the Pacific Ocean, somewhere just off the coast. But the corresponding reality is, someone else—the Fijian government, an NGO—could be tapping that supply and sending it through a pipe to villagers who need it. Fiji Water has, in fact, done just that, to some degree—20 water projects in the five nearby villages. Indeed, Roll has reinvested every dollar of profit since 2004 back into the business and the island.

Siplon acknowledges the risk of slipping into capitalistic neo-colonialism. "Does the world need Fiji Water?" he asks. "I'm not sure I agree with the critics on that. This company has the potential of delivering great value—or the results a cynic might have expected."

Water is, in fact, often the perfect beverage—healthy, refreshing, and satisfying in a way soda or juice aren't. A good choice.

Nestlé Waters' Kim Jeffery may be defending his industry when he calls bottled water "a force of nature," but he's also not wrong. Our consumption of bottled water has outstripped any marketer's dreams or talent: If you break out the single-serve plastic bottle as its own category, our consumption of bottled water grew a thousandfold between 1984 and 2005.

In the array of styles, choices, moods, and messages available today, water has come to signify how we think of ourselves. We want to brand ourselves—as Madonna did—even with something as ordinary as a drink of water. We imagine there is a difference between showing up at the weekly staff meeting with Aquafina, or Fiji, or a small glass bottle of Pellegrino. Which is, of course, a little silly.

Bottled water is not a sin. But it is a choice.

Packing bottled water in lunch boxes, grabbing a half-liter from the fridge as we dash out the door, piling up half-finished bottles in the car cup holders—that happens because of a fundamental thoughtlessness. It's only marginally more trouble to have reusable water bottles, cleaned and filled and tucked in the lunch box or the fridge. We just can't be bothered. And in a world in which one billion people have no reliable source of drinking water, and 3,000 children a day die from diseases caught from tainted water, that conspicuous consumption of bottled water that we don't need seems wasteful, and perhaps cavalier.

That is the sense in which Mackey, the CEO of Whole Foods, and Singer, the Princeton philosopher, are both right. Mackey is right that buying bottled water is a choice, and Singer is right that given the impact it has, the easy substitutes, and the thoughtless spending involved, it's fair to ask whether it's always a good choice.

The most common question the U.S. employees of Fiji Water still get is, "Does it really come from Fiji?" We're choosing Fiji Water because of the hibiscus blossom on the beautiful square bottle, we're choosing it because of the silky taste. We're seduced by the idea of a bottle of water from Fiji. We just don't believe it really comes from Fiji. What kind of a choice is that?

Once you understand the resources mustered to deliver the bottle of water, it's reasonable to ask as you reach for the next bottle, not just "Does the value to me equal the 99 cents I'm about to spend?" but "Does the value equal the impact I'm about to leave behind?"

Simply asking the question takes the carelessness out of the transaction. And once you understand where the water comes from, and how it got here, it's hard to look at that bottle in the same way again.

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King Arthur's Leet by Margaret Evans, M.F.A. – a small channel where water passes from the high elevations inland to the lower villages below.

THE RESIDENTIAL URBAN LANDSCAPE AS A FRONTIER FOR WATER CONSERVATION

ROLSTON ST. HILAIRE
NEW MEXICO STATE UNIVERSITY

In the United States, growing populations in every community will face different water supply and demand issues. And the urban residential landscape might be the frontier where water conservation issues collide. Irrigation is the largest user of freshwater in the United States (Hutson et al. 2004). Irrigation used for agricultural and horticultural practices averages 2.48 acre-feet per acre (Hutson) and accounts for 81 percent of the consumptive use of water (Solley et al. 1998) in the United States. Traditionally, this consumptive use estimate includes freshwater irrigation on crops, parks, golf courses, and other recreational areas. But, increasing urbanization could mean the water used to irrigate the urban landscape will become an increasingly important factor in consumptive water use estimates. Urban landscape irrigation may not necessarily cause an increase in fresh water withdrawals from existing sources, but the consumptive water of the urban landscape as a proportion of the total consumptive use may increase. For example, in Arizona, agricultural water use is projected to decline, whilst municipal use (eg. residential water use) will double over the next 50 years (Unruh and Liverman 2008).

On average, yearly residential water use ranged from a low of 55 gallons per day per person in the temperate mesic state of Wisconsin to a high of 207 gallons per day per person in the arid state of Nevada (Emrath 2000). This difference in water use indicates that climate-related differences in outdoor water utilization contribute significantly to the high water use in arid western states (Emrath, 2000). However, landscape irrigation can average 40 to 70 percent of residential water use in the United States (Ferguson 1987), making it clear the urban landscape commands a significant portion of residential water use.

Although total fresh water withdrawals have flat-lined since 1950 and remained at about 80 percent surface water and 20 percent ground water (Hutson et al. 2004), the drivers that are tending to shift consumptive water use to the urban landscape are increasing. Urban and suburban population growth has dramatically altered the balance between consumptive water demand and available supply. This is evident in portions of the arid and semiarid regions of the western United States where rapid expansion of urban areas and increases in population have occurred during the last few decades. Between 2000 and 2008, the western states of Nevada, Arizona, and Utah experienced percentage population increases of 30, 27, and 22 percent, respectively. Although California's population growth ranked eighteenth among the states, it is the most populous state (US Census Bureau 2008). This population growth demands creative strategies to satisfy the increased demand for landscape irrigation from existing sources. Some of those existing water sources are already fully allocated or are rapidly becoming fully allotted. For example, two decades ago the entire 7.5 million acre-foot of water of the lower Colorado River basin (Arizona, California, and Nevada) became fully allotted for the first time (Unruh and Liverman 2008).

That the urban landscape might be a frontier for water conservation is clearly illustrated with the case of Nevada. In addition to Nevada having the highest population growth in the United States, the Las Vegas Valley in Nevada is one of the fastest growing metropolitan areas in the United States (Sovocool et al. 2006). Together with population growth, the increasing number of people who visit Las Vegas because of its tourism and gaming industries has mandated a serious commitment to managing the regions water supply to ensure adequate future supplies (Sovocool 2006).

Landscape irrigation contributes to most of southern Nevada's consumptive water use (Sovocool et al. 2006) which prompted the Southern Nevada Water Authority (SNWA), a regional collaborative of seven public water and waste water agencies, to craft strategies aimed at conserving water in the residential landscape.

The SNWA showed single family residences with xeric landscapes use 76 percent less water than those with turf-dominated landscapes. Xeric landscapes were composed of desert-adapted shrubs, trees, ornamental grasses, and crushed rock mulch (Sovocool et al. 2006). Total water use of households with xeric landscapes averaged 96,000 gallons less than homes with turf-type landscapes. Using xeric landscapes might be one way to conserve water in the urban environment.

While xeric landscapes are likely to flourish in Nevada because of their documented water conservation benefits, the use of xeric landscapes as a water conservation measure could influence urban landscaping in other regions of the United States. For example, the increasing frequency of summer droughts in parts of the United States, such as the Northeast, that are unaccustomed to droughts (Wolfe et al. 2008), will place increasing demand for landscape irrigation and landscapes that conserve water. Additionally, expected increases in the earth's average temperature will increase evapotranspiration which could exacerbate drought conditions (NDRC 2008). Higher temperatures will increase evaporation from outdoor water features and elevate evapotranspiration from plants. Both of those occurrences will augment the demand for water in urban landscapes.

Before xeric landscapes can be widely adopted, barriers to their adoption must be conquered. One of the highest rated barriers to installing xeric landscapes is concern about their aesthetics (Hurd et al. 2006). Consumers may select xeric landscapes as a way to conserve water if those landscapes can offer similar functions as traditional landscapes (Spinti et al., 2004). So, landscape designers and planners must incorporate the same design elements found in traditional landscapes into xeric landscapes to ensure that xeric landscapes are appealing.

As a frontier for water conservation, perhaps the greatest gain in water conservation in the urban environment will be made by improving the efficiency of landscape irrigation delivery systems. In the broadest sense, landscape irrigation is the application of water to land areas that supply the water needs of ornamental and landscape plants (St. Hilaire et al. 2008). Because landscape irrigation involves an engineered physical system that requires user input, skilled installation, and periodic maintenance, the risk of inefficiency is high. A breakdown in any one of these items or activities causes reduced irrigation efficiency. So, improving irrigation efficiency must be at the heart of any strategy that seeks to guarantee the most efficient use of water in the urban landscape.

Significant gains in urban landscape irrigation efficiency will be made if landscape water budgets are developed, irrigations are scheduled correctly, and user-friendly technology is infused into the landscape irrigation process. An urban landscape water budget, also known as its maximum applied water allowance, can be calculated to provide a quantitative estimate of an urban landscape's water budget (St. Hilaire et al. 2008). Residential urban landscapes are heterogenous mixes of turfgrass, woody, and herbaceous plant species that are valued for their aesthetics, not their production. So, crop water budgets, steeped in the concept of optimum growth and yield, are not relevant to the urban landscape (Shaw and Pittenger 2004). Rather than rely on water budgets calculations that have been developed for crops, urban landscape professionals must develop water budgeting tools that are unique to the urban landscape. Some urban residential landscapes can thrive with less water than is indicated from a calculated water budget. This fact alone offers a unique opportunity for water conservation in the urban landscape.

User-friendly technology, such as smart controllers and soil moisture sensors can remove the decision to irrigate from the hands of the homeowner. Because most conventional in-ground irrigation systems are operated by a controller that mandates operator (homeowner) intervention to adjust the daily or seasonal irrigation run times, most homeowners set the schedule and do not seasonally adjust their irrigation schedules. This results in an over-irrigated residential landscape during periods of reduced plant water demand, such as the fall to winter period (Davis et al. 2007).

Some smart controllers will automatically adjust irrigation schedules based on weather conditions. Soil moisture sensors can detect levels in soils and terminate irrigation events when soil moisture reaches set levels. Smart controllers have been reported to reduce summertime applied water by up to 42 gallons per day for residential landscapes and up to 545 gallons per day for commercial landscapes (Irvine Ranch Water District 2008a). The widespread adoption of smart controller technology or the use of soil moisture sensors has the potential to realize significant water savings.

Saving water will become a significant piece of future water management programs for rapidly growing populations (California Office of Water Use Efficiency 2006) and has implications for how water is used in the residential landscape. Environmental laws, crafted to limit ecosystem degradation, are constraining the development of new sources of water for the urban environment (Dickinson 2008). Thus, utilization of reuse water in the urban landscape is one strategy communities can use to offset the lack of new water sources. Potential sources of reuse water include effluent, storm water runoff, and nursery runoff. Reuse water is more likely to be used to irrigate golf courses, parks, and roadway medians where public acceptance

is highest and human contact is perceived to be low (Devitt et al. 2004). While irrigating the residential urban landscape with reuse water is a perfect way to extend existing water supplies, greater management skills are needed to minimize soil salinization, plant damage, health-related problems, and loss in aesthetic appearance of water features (St. Hilaire et al. 2008).

Travails are likely to occur at a frontier and water conservation in the residential landscape is no exception. A substantial body of scientific knowledge on the most effective ways to conserve water in the urban landscape is lacking. So, it is hard to predict the outcome of those travails. For example, in 1981, a court ordered the Denver Water Department to promote water conservation in outdoor landscapes. This action led to the development of xeriscapes as water conserving landscapes (Hagan 1988). In contrast, on September 17, 2007, a severe drought prompted the state of Georgia to ban outdoor watering (Brown and Pharr 2007). This decision had a financial impact of \$3.5 billion on Georgia's urban agriculture sector. These two historical events are likely to be repeated in some way. The urban sector could be the maelstrom for water conservation efforts as more water is diverted from agricultural to residential use and more constituents converge toward an increasingly scarce resource.

More research on effective water conservation measures for the residential landscape would ensure sustainable water conservation methods are developed. There should be greater public investment in this area of research. Possible research areas include understanding the relationships between residential landscape types and the potential for water conservation. Ways to divert excess precipitation into the residential landscape must be perfected. One economic incentive program, often called Cash for Grass, offered rebates for conversion of turf to xeriscapes. An economic analysis of this program, led Addink (2008) to conclude that Cash for Grass programs are an expensive way to save water. So, a research question that needs to be answered for every proposed economic incentive is whether this incentive is cost effective in promoting water conservation in the urban landscape. Finally, the block rate pricing model that many municipalities used to price water may not be fully capturing the real price of water (Dalhuisen et al. 2003). For that reason, newer water pricing models, such as the Irvine Ranch Water District's (IRWD) tiered-rate structure that reflect a water budget, should be developed and tested. The IRWD water pricing model decreased water consumption without jeopardizing the urban landscape function (Irvine Ranch Water District 2008b).

Population growth, increased economic activity, and urbanization will increase the demand for water in the United States. In fact, the demand for water is already exceeding the supply (Dickinson 2008), so conservation

of the existing water supply is quintessential for both the United States and urban areas. The lack of water has the potential to jeopardize our food supply, disrupt fragile ecosystems, alter alliances among constituents, and threaten our way of life. The heterogeneity of the urban landscape and the plethora of existing urban water conservation strategies have limited a cohesive strategy for urban water conservation. Sensible water conservation standards, such as national standards for plumbing fixtures have contributed to improvement in efficiency of use of the in-house water supply. Perhaps the same could be considered for the urban landscape. This could be one step that could be used to secure our future water supplies.

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WALKING INTO THE OCEAN AS THE OCEAN ARRIVES AT CAPE MAY

HERB PERKINS-FREDERICK

The undulating, untouched sea
 extends beyond my sight;
 its surface forms a ceaseless change
 expressed upon a deeper calm.

But closer in, it rises, curls,
 creates a rolling arch of glass,
 a cavern in a liquid hill
 advancing angled to the shore

where it boils to a broken wave,
 expires, rumbling to a sigh.
 With countless clapping, splashing sounds
 it seethes, then shimmers to a froth

of shifting overlapping foams:
 island clouds that shrink, then race
 the trailing edge of ocean's breath
 as streams of sand and shells and stones

inscribe a many-channeled script,
 a fluid verse upon the floor,
 where each expression left by surge
 is washed, remade, revised once more...



Merlin's Cave at Tintagel – the entrance to the legendary cave at the base of the Tintagel Castle.
(Margaret Evans)

GEORGIA'S WATER FUTURE: EVOLVING TOWARD SUSTAINABILITY?

GAIL COWIE

GEORGIA DEPARTMENT OF NATURAL RESOURCES

LEIGH ASKEW AND COURTNEY TOBIN

UNIVERSITY OF GEORGIA FANNING INSTITUTE

We all know of water as a force of change, altering the landscape through slow, steady erosion and episodic, powerful floods. In the State of Georgia, over the past five years, we have seen water act as a different kind of force. Water, or more precisely, concerns about pending scarcity of water, have acted as a force for institutional change. Due to an uncommon coincidence of factors, the state's water management institutions are now shifting toward forms that, on the face at least, are more consistent with sustainable use of water resources.

Compared with much of the world, the eastern United States is a water-rich region. Georgia, for example, receives an annual average of 50 inches of rain statewide. Unlike the western United States, eastern water management institutions, including Georgia's, were established and developed in a climate of plenty. Over the last four decades, water management decisions were largely made in response to specific issues or needs. Systematic evaluation of resources and planning for long-term use was limited and on local or, at best, regional scales.

In recent decades, however, population growth, economic expansion, and changes in technology have markedly increased demands on the state's water resources. At the same time, regional differences in water resources and the way they are used have become more dramatic. Evidence of stresses and adverse impacts on the water resources in three regions of the state has emerged. In southeast Georgia, groundwater withdrawals have contributed to saltwater intrusion and a decline in water quality in some portions of a major aquifer. In southwest Georgia, ground and surface water withdrawals have combined to alter surface water flows in some watersheds. And, in the Atlanta metropolitan region in north Georgia, questions have been raised about the impacts of poor water quality on

the region's economic future as well as the long-term viability of its water sources. Concerns about all of these factors, in turn, have been exacerbated by a series of major droughts and interstate litigation over water resources.

By the late 1990s, these factors began to raise broad-based concerns about growing stresses on Georgia's water resources and the potential for long-term water scarcity in some areas of the state. A legislative study committee ultimately resulted in legislation that authorized water planning with a scope not before undertaken in Georgia.¹

Similar dynamics are evident throughout the eastern United States, and states have responded to these challenges with a variety of approaches to statewide and regional water planning.² Florida's response is perhaps the most comprehensive, where the state's regional water management districts systematically update water supply assessments and prepare regional water supply plans. In 2001, for example, four of the regional planning areas had resources that were deemed insufficient to meet 20-year needs and were required to submit plans to achieve the necessary water resource development projects.³ A recent update showed some plans have achieved remarkable success in increasing capacity, while others outline actions that, if taken, will provide the area with enough water in 2025.⁴

Other states in the southeast are considering or proposing statewide water and regional planning processes. In South Carolina, a bill authorizing statewide water planning was recently introduced in the South Carolina General Assembly.⁵ Legislators and stakeholders in Alabama have been exploring the options for statewide water planning "like Georgia's" but a study committee recently concluded they do not have enough data to submit a plan this year.⁶

Gail Cowie is a senior planning and policy adviser at the Georgia Department of Natural Resources and has over 20 years of experience with participatory development of environmental policy.

Leigh Askew is a public service assistant at the University of Georgia's Fanning Institute and has nearly ten years experience in group facilitation and environmental decision-making.

Courtney Tobin is a lawyer on the Public Service and Outreach faculty at the University of Georgia's Fanning Institute and works with communities on a variety of natural resources issues.

Georgia's experience with statewide water planning may prove to be instructive for similar initiatives in other states. Georgia's planning effort has resulted in significant changes in the state's approach to water management, changes that may ultimately lead to more effective long-term management of the state's limited water resources. This paper outlines significant aspects of the statewide water planning process, summarizes changes in management that are now underway, and highlights characteristics that may contribute to long-term sustainability of resource use and management.

Statewide water planning: Bringing users to the table

Georgia's Comprehensive Statewide Water Management Planning Act was adopted in 2004.⁷ The act established a process for development of a plan led by the state agencies with major responsibility for water management, followed by consideration and adoption by the Georgia General Assembly.

The act required extensive stakeholder involvement in development of the plan. To meet this statutory requirement, a broad-based technical and public input process was conducted from June 2005 to December 2007 (Table 1). This process was more extensive and intensive than seen in many statewide water planning initiatives, and proved to be critical to water planning on a scale not previously attempted in Georgia. The linchpin of the process was a series of stakeholder advisory committees.

Advisory committee composition and process

The Comprehensive Statewide Water Management Planning Act established guiding policy for the statewide water plan: "*Georgia manages water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and enhance the quality of life for all citizens*" (emphasis added).⁸ This statement required a broad planning scope, one that considered a wide range of potentially competing water uses: 1) offstream or extractive uses, where water is

withdrawn and transported for human consumption, used in industrial processes, or applied for agricultural production, among others; and 2) instream uses that occur within the banks of a water body — assimilation of wastewater, recreation, hydroelectric production, and support of fish, wildlife, and other ecosystem services.

The breadth of this planning scope required equally broad involvement in the advisory committee process. A desire to tap a wide range of interests was a fundamental premise in defining the advisory committees and determining their composition and process.

Differing geographic interests were involved through seven Basin Advisory Committees (BAC). Six of the seven were organized along river basin boundaries, with each committee's geographic boundaries encompassing one or more of the state's fourteen major river basins (Figure 1). A seventh committee represented the geographical area of the Metropolitan North Georgia Water Planning District, which was created by state legislation in 2001.

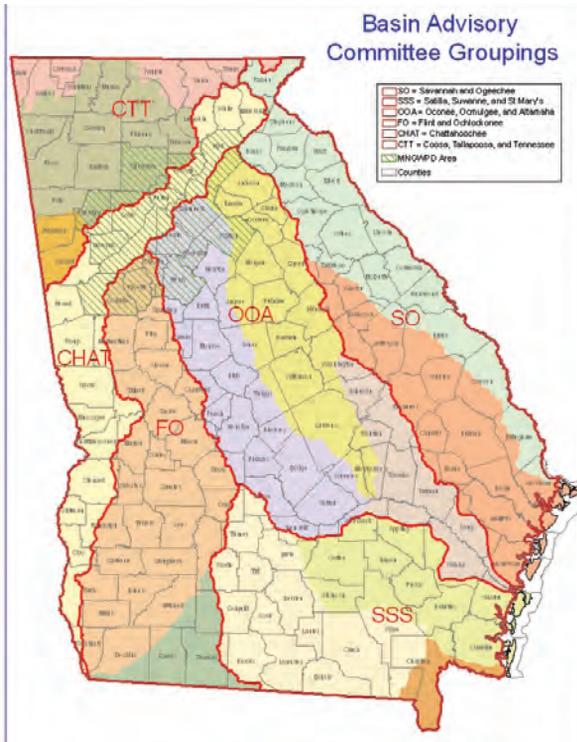
BAC members included representatives of local governments, business interests, agricultural concerns, environmental advocates, and other non-governmental organizations.⁹ These committees were convened to provide structured regional perspectives and input on water management objectives and potential policy tools and/or options. The BAC were not asked to reach consensus on specific issues. The primary goal of the committees was to build a better understanding of divergent opinions and interests in the state's water resources. Attempting to reach consensus as a product may have precluded reaching this goal and, instead, members were simply asked to provide input from a diverse range of perspectives on proposed management objectives and policy decisions. The convening state agency worked with a wide range of statewide organizations, from economic developers to canoeing enthusiasts, to identify candidates for each BAC.

A Statewide Advisory Committee (SAC) brought together representatives of organizations that had statewide interests and constituencies, in order to

Table 1. Technical and public involvement process

Component	Description
Advisory committees	
— Technical	Four committees with a total of 45 members and 10 meetings
— Basin	Seven committees with a total of 187 members and 42 meetings
— Statewide	One committee with a total of 32 members and 8 meeting
Town hall meetings	Three rounds of meetings held around the state for a total of 22 meetings with attendance over 2700
Public meetings	Two rounds of public meetings/hearings around the state for a total of 18 meetings with attendance over 1000
Web-based review and comment on draft plans	Approximately 600 comments through an interactive website and 400 comment letters received by mail

Figure 1. Basin Advisory Committees used in development of Georgia's 2008 State Water Plan



provide structured statewide perspectives on water management policy tools and/or options. SAC participants were asked to speak for their entire organization, members of which occasionally had different and/or competing interests in various parts of the state. Membership on the SAC replicated the diversity seen in the BAC membership, with leaders from the environmental, business, industry, recreation, and agricultural sectors, and city and county government associations. Again, the intention of the SAC was not to build consensus, but to gather input from a broad range of perspectives to determine the correct course for water management in the state.

In order to gain as much input as possible in the time available, advisory committee meetings were led by professional, neutral facilitators. Each meeting focused on specific water management objectives or practices (e.g., meeting instream and offstream needs for water, maintaining water quality). BAC meetings on each set of topics preceded the SAC meetings on those topics.

Prior to each meeting, committee members received a discussion paper prepared by agency staff.¹⁰ BAC meetings were structured to provide basic information on the topic and then garner opinions and comments on proposed policy options. Facilitators provided reports summarizing the discussion that occurred at the BAC meetings, which were, in turn, used to revise the proposed policy options for the SAC's consideration.

Input from the BAC often highlighted the topics or policy options that were particularly controversial. This

input helped shape the agendas for the SAC meetings. In addition, because SAC members were primarily professional staff from statewide organizations, the committee could delve into specific proposals in greater detail. For example, due to the extensive amount of comment and concern over interbasin transfers and surface storage in the BAC meetings, those topics were given additional time and addressed at a separate SAC meeting. Similarly, a computer model designed to estimate the amount of water available for use without adversely affecting downstream interests, a critical element of water planning, received detailed attention in SAC meetings.

Advisory committee outcomes

One of the challenges that faced the advisory committees was meetings were not designed to build consensus on a given topic. Instead, facilitators solicited a variety of opinions on each management objective to help shape an acceptable management plan. Creation of the management plan reflected Georgia's need to change its framework for water management, turning from managing under conditions of plenty to managing finite capacities of water resources. With such broad representation on each committee, a goal of gathering information from divergent perspectives, and given competing interests for water resources, the possibility of reaching consensus on all objectives was low.

Despite this challenge, a mail survey sent to basin advisory committee members indicated a high level of satisfaction among participants. The survey was distributed to all basin advisory committee members approximately eight months after the process was completed and 35 percent of participants responded.¹¹

Respondents indicated overwhelming satisfaction with the process itself. Of the survey respondents, 66 percent were mostly or very satisfied with the overall process. This result indicates BAC members were comfortable not seeking consensus. Simply having the opportunity to express their opinions about the management objectives, and exchange views with members from other sectors, was satisfactory for the majority of respondents.

Respondents overwhelmingly agreed the composition of their BAC was reflective of their region. More than 92 percent reported the membership balance on their specific BAC brought together the diverse interests in their watershed. However, there was frustration expressed in the lack of attendance on occasion and the tendency of some members to bring extreme views to the table.

Survey respondents reported the facilitated meetings were conducive to open and honest communications with 88 percent either agreeing or mostly agreeing with this statement. This statistic reflects an appreciation for the structure of the meetings and participants' ability to express their opinions and to hear those of others.

Members were allowed and expected to disagree, but that generally did not derail the discussions or impact respondents' ability to freely express their opinions.

The policy options proposed by agency staff were revised in response to multiple rounds of input from the advisory committees, and the working documents changed considerably over the 18-month course of advisory committee meetings. Among other specifics, discussion at advisory committee meetings emphasized the need for flexibility to adapt to differing circumstances in different regions of the state. Many also felt it was critical to maintain a full range of management practices as future options. At the same time, advisory committee members stressed the need for actions to ensure equity among different users, across different regions and river basins, and between upstream and downstream interests. Finally, advisory committee members strongly urged action be taken to fill information and data gaps *before* significant policy commitments are made. Revisions of staff proposals included provisions intended to address these major concerns as well as a number of specific issues.

This evolution in the content of the plan is reflected in responses to a final survey question about impact. BAC members who responded to the survey generally felt their input, meaning their comments and discussions about the water management objectives, was reflected in the final state water management plan. Sixty percent of respondents reported the BAC process had some or considerable impact on the final plan. Respondents generally felt the final management plan was responsive to the comments received and their comments and opinions were integrated into the final plan.

Results: Georgia's 2008 statewide water plan

In January 2008, a final Comprehensive Statewide Water Management Plan was submitted to the Georgia General Assembly. It was adopted by over 75 percent of the vote in both houses of the legislature and signed into law by the governor in February 2008. The high level of support among elected officials was due, in part, to the breadth of engagement and support built through the broad-based technical and public input process.

The final plan has three major elements that build toward more sustainable management of the state's water resources. The first is a series of resource assessments focused on water quantity and water quality. Assessments will be conducted following major hydrologic boundaries to evaluate, in a consistent manner statewide, the water available for use and the capacity to assimilate wastewater.

Water quantity assessments will estimate the capacity of individual water sources to provide water for use in a certain area while supporting other uses downstream or from that same aquifer. For surface

water sources, the emphasis is on avoiding significant deviations from historic flow patterns and so, protecting downstream users. Water quality assessments will look from a watershed perspective at wastewater treatment levels that are required to protect water quality. These assessments are the first step in moving away from the first-come, first-serve system for permitting water withdrawals and wastewater discharges that has developed over the past few decades.

Resource assessments, in turn, provide the starting point for regional water planning, the second critical step in the evolution of Georgia's water management institutions. In a guiding policy statement, the State Water Plan recognizes the following: "*The characteristics of water resources and water users vary significantly in differing regions across Georgia. Protecting the ability of the state's water resources to meet needs for water supply and assimilation of wastewater will require regional, resource-based plans that identify the management practices appropriate to the resources and users in each region.*"

The State Plan then lays out a framework for development of regional plans that will span the entire state (Figure 2). As noted above, one regional water planning district was created in 2001, out of concern for growing demand and increasing stresses on water resources in the Atlanta metro area. The State Water Plan extends regional planning to all areas of the state, including those that do not yet have evidence of resource stress. It establishes ten Water Planning Councils to guide development of regional plans. Members are to be appointed by the governor, lieutenant governor, and speaker of the house and, collectively, councils are to be broadly representative of the water-related interests in the region.

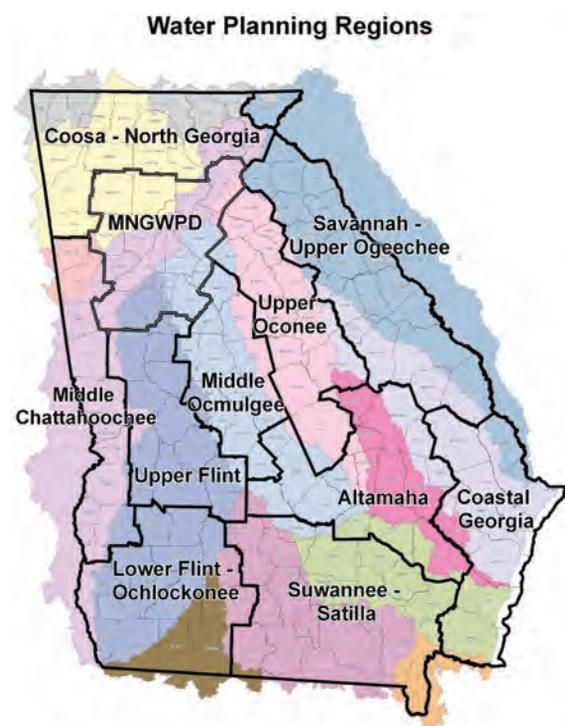
Through regional planning, water management practices will be selected, specified, and laid out for implementation. The State Water Plan provides guidance on use of practices to manage water quality as well as water supply, including water conservation, surface water storage, interbasin transfers, and management of nonpoint source pollution, among others. Implementation of regional plans will primarily occur through actions at the local level and, once regional plans are adopted, state law requires water withdrawal permits and state grants and loans be consistent with their provisions.

Finally, state law and the State Water Plan require periodic review and revision of plans on a three to five year cycle. Regional plans are to include benchmarks for assessment of plan effectiveness and identification of necessary revisions. Periodic review and revision of the state plan and the regional plans enables adaptive responses to changes in water use, forecasted demands, and resource conditions.

Resource assessments are currently underway. Preparation of regional plans is expected to begin in earnest in spring 2009, following appointment of the

Figure 2. Water planning regions defined pursuant to Georgia's 2008 State Water Plan

Water planning regions are outlined in black; the state's major river basins are shown in color



regional Water Planning Councils. It is expected the first set of regional plans developed under the State Water Plan will be adopted in 2011.

Conclusions: Managing water for current and future generations

Increasing and competing demands for resources mean the water management challenges of Georgia's future are likely to be much more complex than those of today. Meeting these challenges will require more sophisticated management and use of multiple water sources, not just the cleanest, easiest, or cheapest.

The 2008 State Water Plan provides a blueprint that may, when fully implemented, help the state meet those challenges. It is designed to provide a flexible framework for regional water planning and to move toward sustainable management of water resources over a large area with diverse resources and widely varied interests.

The State Plan, and the process that produced it, have three fundamental characteristics that have been prescribed for more effective, long-term management of natural resources:¹²

- *Greater participation by resource users.* While public involvement during plan development had an immediate purpose (ensuring the plan submitted to the General Assembly was supported and

therefore adoptable), it also served the purpose of building longer-term engagement with water users. This objective was accomplished by provision of multiple forums for input, by significant revision to the draft plan in response to public comment, and by specification of the regional planning framework.

Creation of regional water planning councils, in turn, institutionalizes a set of new seats at the water management table. Stakeholder representatives can bring local knowledge into decision making. Interests with new seats at the table range from those in the large and medium urban areas in the northern and central part of the state, to those in the extensive agricultural areas in south Georgia, to those in the rapidly-growing counties along the coast.

- *Expanded communication and coordination in use of shared resources.* The plan structures interactions between regions and communities that share water resources and provides a framework for identifying regional solutions to water management challenges. In theory, at least, this framework will increase the recognition of water sources as shared resources: upstream, downstream, across state lines, and within and between regions.
- *Improved information on resource conditions and resource use.* The plan explicitly recognizes we cannot effectively manage what we do not measure, underscoring the importance of resource assessments and increased investment in information regarding resource capacity and conditions. Results of assessments, with on-going monitoring as regional plans are implemented, will enhance the information base available for future revisions of plans and the management practices they specify.

Together, these characteristics build toward adaptive management, a cyclical learning process based on monitoring and improved understanding of resource conditions and review and revision of management approaches.¹³ And, they also build toward adaptive governance: governmental decision making about resources that involves affected parties in order to find an informed and stable consensus.¹⁴ Accomplishing both, however, will require a long-term commitment and significant investment of public resources.¹⁵

Furthermore, the approach to regional planning currently being implemented in Georgia faces two fundamental challenges, which other states undertaking such efforts also face. The first is the ongoing challenge of involving the broad spectrum of water users and the representativeness of those at the table.¹⁶ Participants saw the advisory committees that created the State Plan as reasonably representative, but questions have been

raised about whether this will prove to be true of the recently-appointed regional water planning councils.¹⁷

The second is the geography of regional planning. While resource assessments are to be conducted following hydrologic boundaries, regional planning for use of those resources will follow jurisdictional (county) lines rather than watershed lines. This approach reflects the reality of managing a system with natural and engineered features, but effectively marrying the two different geographies remains a challenge in regional planning.

For now, the long-run prognosis for changes in Georgia's water management institutions and the long-term outcomes that may result remain open questions. But, the experiment has been engaged, changes are underway, and the results will certainly bear watching.

ENDNOTES

1. The authors of this paper were actively involved in the statewide water planning process. As a policy adviser with the agency that led plan development, G. Cowie was among the core staff responsible for the project. As contractors to that agency, L. Askew and C. Tobin coordinated facilitation of the Basin Advisory Committees, were principal facilitators for the Statewide Advisory Committee, and assisted with public meetings.
2. See, for example, Pennsylvania Department of Environmental Protection, *Pennsylvania State Water Plan*, www.depweb.state.pa.us/watershedmgmt/lib/watershedmgmt/state_water_plan/background/2007_06_swp_update_info_sheet.pdf (accessed March 19, 2009) and Virginia Department of Environmental Quality, *State Water Plan*, www.deq.state.va.us/watersupplyplanning/statwat.html (accessed March 19, 2009).
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6. *International Business Times*, "Alabama State Legislators to Begin Writing Water Plan," <http://www.ibtimes.com/articles/20080724/alabama-legislators-to-begin-writing-water-plan.htm> (accessed March 19, 2009) and the *Huntsville Times*, "More Water Data Needed for Plan, Panel Chief Says," <http://www.al.com/news/huntsvilletimes/local.ssf7/base/news/1233137751314120.xml&coll=1> (accessed March 19, 2009).
7. Official Code of Georgia Annotated §12-5-520 et. seq.
8. Official Code of Georgia Annotated §12-5-522
9. See Georgia Environmental Protection Division, Acknowledgements, "June 28, 2007 Draft of Georgia's Water Resources: A Blueprint for the Future," <http://www.georgiawatercouncil.org/Documents/plan.html> for a full list of members (accessed February 10, 2009)
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11. Mail survey designed and conducted by L. Askew, C. Tobin, and R. Rawls, Fanning Institute, University of Georgia.
12. See, for example, Judith Innes, Sarah Connick, and David Booker, "Informality as a Planning Strategy," *Journal of the American Planning Association* 73, no. 2 (2007): 195-210; Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990); Sandra Postel and Brian Richter, *Rivers for Life: Managing Water for People and Nature* (Washington, DC: Island Press, 2003); and Joanna Burger, Elinor Ostrom, Richard B. Norgaard, David Policansky, and Bernard D. Goldstein (eds.), *Protecting the Commons: A Framework for Resource Management in the Americas* (Washington, DC: Island Press, 2001).
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14. Lawrence Susskind, "Resource Planning, Dispute Resolution, and Adaptive Governance" in *Adaptive Governance and Water Conflict: New Institutions for Collaborative Planning*, ed. John T. Scholz and Bruce Stiffler, 142 (Washington, DC: Resources for the Future, 2005).
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THE MOONPATH

PAM PERKINS-FREDERICK

No matter where Ann stood,
the moon laid a path
to her feet.
Once, while trying
to climb the Norway maple
in the school yard,
another kid had told her
*"If you have enough faith
you can walk on the moon's path."*

How much is enough?
And how do you tell?

Walking back to the tent
through the fragrant dark
in New Hampshire that summer,
after campfire,
Ann smelled pine,
wet dock, draining canoes,
the damp cellar smell
of a lake at night,
and two girls slipped with Ann
from the crocodile
line of campers and padded out
onto the dock, grey
in the moonlight,
warm to the soles.
As always, the moon
laid its scissoring path
straight
to each of them.
Four, counting Ann's
invisible companion
whom they'd grown to accept,
as her had parents,
not knowing what else
to do with
the shadowless Celeste
waited for, left presents,
saved seats, given
jelly beans (*"Leave them
in the crotch of the tree;
she won't eat in front of us."*)

Ann said she was nearly ready
to try the path,
solid as aluminum foil
crinkling to the horizon.
They were all nearly ready;
faith bent and flickered
about them like a fire
in sighing wind.

Then Ann gave a high
funny whisper: *"She's
going to try it!
O stop her someone
don't let her --"* and
they strained their eyes,
almost able to see
a shadow on the short
dock ladder detach itself,
move over the bright folding
and unfolding. *"She's
doing it, she's walking
on the moonpath"*
and they could nearly see
a fainting, a dimming,
a thin blot moving out
on the rich and winkling
glimmer. Their shoulders
touched, they clasped. Ann
strained forward
from their arms. *"Celeste
did it, I can do it, I can!
I got faith, watch and see!"*

And she was down the ladder
stepping forward
from the bottom rung.
Communal faith soared
to a blinding knowledge
of walking
and the shame of not
having believed. The two
surged forward to the edge

of the dock as Ann's foot
met wrinkling silver
as Ann let go the ladder
beatific smile,
outstretched arms,
*"Celeste!
Wait!"*
and sank.

The rest was a confusion
of hauling her up again
and standing, all three
on the dock, listening
to Ann's dripping,
watching the moonpath,
clear of any darkness,
glow to the farthest edge.
"Did she really do it?"
*"Yes. I didn't think
she'd leave me."*
"But it was so beautiful."
*"Look! A cloud's covering
the moon, the path's
going! Can she
come back?"*

"No," said Ann, wet
straight-backed. "No.

Not now."

Originally published in
*No Sorrow that Light
Won't Try to Wipe Away*.
Middleborough, MA: Rock
Village Publishing, 2006.

Pam Perkins-Frederick is the Bucks County Poet Laureate, a fellow at the Virginia Center for Creative Arts, a Robert Fraser poetry contest winner, and was honored by the Pennsylvania Center for the Book in 2008. She has been published in the United States and abroad. Her book, *There is No Sorrow that Light Won't Try to Wipe Away*, was published in 2006. She earned a M.F.A. from Vermont College and loves books, water, plums, puns, and thunderstorms.

OF SLEEP

PAM PERKINS-FREDERICK

Sleepless, I drift
with closed eyes in the dark.
See flattened, soft waves,
a surf gone drowsy,
swash on deserted beaches,
repeating its sweeps
that flatten to lace
and vanish
It's rolling shells,
nudging flops of seaweed,
a pull-push, slow burying
the still, silver fish

I can think myself
onto that liquid's
surface;
I'd be barely wetted,
no sinking.

I long to lean
into the water's cooling light clasp,
to let it rock me like a chip on the waves,
bearing me along
as if the lightest of burdens,
sliding me over rocks
as if the wave were a wind
lazily shaping a long banner,
coiling, curling.
A liquid unwinding.
Easing up the slant
of the sand
and washing back again.

No sleep?
That would be sleep.

Originally published in *A Leaf Gnawed to Lace*.
Richlandtown, PA: Petoskey Stone Press, 1992, 1993, 2002.

PILLARS UNDERGROUND

PAM PERKINS-FREDERICK

Imagine the river sliding
 along its bed
 in the forest,
 floored with roots and leaves
 rock-ribs and stones.
 Imagine the borders of it:
 grass hanging over like a child's
 too-long bangs, the under-bank scooped a bit,
 concave from the roll of the water.
 Imagine the water pressing against the bank,
 fingering the roots, nuzzling them,
 feeling how smooth they are,
 and how deftly they twist,
 bent here, forking there, slick and black
 beneath the surface.
 Imagine the river trying to swing on the roots,
 curl around behind enough to get a hold
 then sending out a concavity
 like a dug paddle's signature.
 Imagine the river not content, wanting more,
 tucking its ripple further behind,
 discovering that tiny hole,
 and the mud's washing freely,
 widening the space. Imagine the river
 excited, rubbing the roots harder now,
 wanting to open up earth behind all of them,
 scrubbing away the soil laid down centuries ago,
 working back to the root behind the first,
 and the next.

It's opening up secret caverns under the trees of the bank,
 halls of water lit aslant
 with a bounce of light,
 the trees' roots now pillars, a hall
 of pillars and rippling coins of light
 on the ceiling.
 Imagine the river playing,
 making happy sucking noises
 as it flows through the halls,
 stroking the roots,
 strumming them with its hundreds of cold fingers.
 Imagine the river opening up the earth
 all underneath.
 Imagine the whole world
 running with a cold humming
 a sub-vocal watery singing
 just beneath the grass
 underneath the towns and prairies,
 under the roots of mountains.
 Imagine it plucking the roots for music
 to sing to.
 Imagine it ecstatic.

Originally published in *No Sorrow that Light
 Won't Try to Wipe Away*. Middleborough, MA: Rock
 Village Publishing, 2006.



Fishing Village – a small village along the coast of Cornwall. (Margaret Evans)

IRRIGATION SYSTEMS AND VALUES: UNDERSTANDING THE PROCESS OF SELF-GOVERNING WATER RESOURCES IN NORTHERN ITALY

BEATRICE MARELLI
UNIVERSITY OF MILAN
AND UNIVERSITY OF BRESCIA

Common-pool resources (CPRs) are natural or man-made resources shared among different users, a condition that produces a competition for their utilization leading often (although not necessarily) to their degradation or even to their destruction (Hardin G. 1968). A vast number of valuable natural resources falls in this category and today shows chronic problems of overuse. Examples are the world forests, fisheries, water basins, biodiversity, and even the atmosphere.

As broad bodies of literature and empirical evidence (Ostrom 1990, 1998, 1999, 2005; Agrawal and Clark 2001; Cardenas 2000) have demonstrated, management of common pool resources implies an institutional construction that would be able to take into account not only physical attributes of the resources, but also attributes of the communities called to protect them. According to Ostrom (1992, 2005; Ostrom and Ahn 2008) among these attributes generally accepted by the community, there are values of behaviour, vehicle of shared learning and explanations about foundations of social order (Ostrom V. 1980), crucial variables of relevance for institutional analysis. After a brief review of related literature, I am going to analyze how internal and shared values can affect institutional evolution in farming irrigation systems. The discussed hypothesis maintains that in small farm communities individual values can interact in the course of time with the process of water management, leading to an institutional evolution that translates these individual demands for changes in the rules in use applied by the groups. Such a topic has been addressed analyzing two small self-organized farm communities in northern Italy, having as support a qualitative methodology of investigation based on in-depth interviews. This

allowed focus on the internal values of the appropriators of the resource, key variables for the explanation. As a result, the research found the existence of a common set of values is extremely useful in increasing the institutional performance and in controlling opportunistic behaviours. It is also important to recognize genuine trustworthiness appeared as an independent and non-reducible reason for explaining how communities achieve collective action compliance.

The results also support Ostrom's (1998, 1999) idea of a core relationship existing among trust, reputation, and reciprocity. It has been found indeed these variables are dependent on the community's past experiences and on the capacity of its members to recognize a major common interest in preserving resources. Once in place, those factors enhance the capacity of a community to govern its commons and, particularly, to foster the process of institutional adaptation that is necessary for a long term management of water resources.

Theoretical background

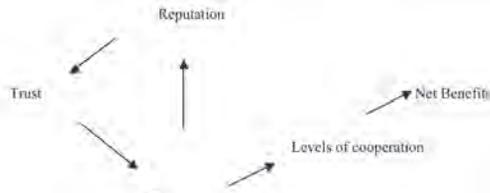
According to Ostrom (1998), elaborating conditions where governing and solving social dilemmas (including common pool resources) successfully happen, it is possible to identify individual attributes at the core of human behaviours as the following (Ostrom 1998, 1999):

- the individual expectations regarding other people's behaviour (trust);
- the norms that individuals learn from socialization and past experiences (reciprocity);

Beatrice Marelli is a member of the political science faculty at the University of Milan and the economics faculty in the Department of Social Sciences at the University of Brescia. She is a guest researcher at Humboldt University (Berlin) in the Department of Agricultural Economics and Social Sciences. Her main interests are related to collective action problems, institutional arrangements for environmental sustainability, common-pool resources, and human values.

- the identities that individuals intentionally create through their own behaviour and internalisation of norms (reputation).

Trust, reciprocity, and reputation are relationship constructions that fill a gap of indeterminateness of the objective social foundation (Cella 1994). According to Ostrom (1998) the existence of a mutual reinforcement among these variables, considered to be at the core of the general behavioural explanation, can be dynamically illustrated as follows:



Source: Ostrom (1998)

Reputation, trust, and reciprocity act through a positive retroaction circle. Therefore, it seems impossible to individualize them among dependent and independent elements. Every variation on a single variable strikes again into the chain on the others, amplifying the initial effect, that could be both positive and negative.

The reinforcement among these individual attributes depends on structural variables, such as existence of small communities, their past experiences, possibilities for a direct communication, and the existence of symmetrical affairs on the resource. All such factors engrave on the cost of internal and social agreements, from which it derives the cooperation level, initially reached through individuals' ability to set aside selfishness.

Jon Elster's contribution provides support of this perspective (1993, 1995). He analyzes altruistic motivations by identifying different actors' groups according to different levels of propensity to cooperation. The group that appears to be more relevant in terms of accomplishing communal argument is formed by those people who act according to the categorical imperative of Kant, that answers to the following question: "What happens if all of us would act so?" This powerful person's appeal does not deal with the real results or private purposes because it is connected to what could be verified if everyone abstains from the cooperation. Such motivation would forbid the egoistic behaviour, bringing the community exactly to an opposite outcome respect to the utilitarianism. For this reason, these results could be extremely important for understanding individual contributions in matters of commons management.

Rationality and values

Since informal ties are broadly diffused as a structural base for social relationships, the self-interest point of view does not occupy a core position in the current relational environment. According to Hirsch (1976), the main question is not concerned with whether individuals are sociable or altruistic in their objectives, but rather is focused on the possibilities of realizing the prevailing objectives of sociality and altruism in the community. For the author, constraints of the scarcity and demands of social morality constitute the two social limits to growth. For this work, they can be helpfully interpreted as consequential bonds derived from the missed solution of the social action dilemmas, like the ones we observe in governing common pool resources and as a consequence in water management. Limitation to individual selfish behaviour, imposed in the collective interest, could be more effectively respected if the sense of obligation would come interiorized. Already in the mid 1970s, Hirsch made emerge an interpretative urgency for the generality of the goods that will then be developed by Ostrom for common pool resources in the mid 1980s:

"The public perception of society's costs in its complex will contribute to encourage the social morality, but it will not be enough to assure it until the individualistic behaviour will preserve its own legitimacy in comparison to the broad sphere of the collective action. Once more, the individualistic behaviour can be an obstacle to the satisfaction of the individual preference". (Hirsch 1976)

Such overcoming, if it points out a predisposition to shared collective beliefs and to be open to a comprehensive vision of cooperative ethic (Sugden 1986), does not require the abandonment of rationality. In fact, according to the sociological tradition (Boudon 1997, 2000, 2003), actions which are apparently not referable to some consequential explanation nor analyzable as effects of instrumental reasons, do not have to be viewed as completely detached from every rational logic. In these cases, actors follow principles founded upon reasons to which they simply feel obliged to conform to. This is the case of a collective belief genesis, whose content becomes an object of voluntary adhesion by the individuals. Boudon referred to his work as an axiological perspective and quoted Weber's value rationality (*Wertrationalität*) as a fundamental contribution to contemporary studies focused on moral feelings. For the present research, what is more interesting is distinguishing between the axiological rationality and the instrumental one of economic kind. In this manner, one of the limits of the utilitarian model emerges with greater clarity: not knowing how to explain attribution of values phenomena. Instead, axiological rationality expressly foresees cases in which the subject does not choose to maximize immediate benefits, but chooses to follow "correct" principles not guided by personal will.

According to Weber, a collective belief is formed when its content becomes an object of adhesion by individuals (Boudon 1997); this occurs only if valid reasons for accepting it do exist (*deutend Verstehen*). The theory of collective beliefs can be interpreted in a manner that has to be concerned with rationality because these beliefs are felt as strong by social actors. According to Boudon (2000), a theory is rational in a cognitive sense when it leans on reasons of theoretical character the actor believes are strong in that particular context (values rationality, according to Weber). The advantage of this vision in comparison with the irrational one is it easily explains essential phenomenological data: the actors have a sense of conviction, not internalisation or constraint. The implicit or not directly observable character of the reasons, both at the individual and the collective levels, does not jeopardize the scientific quality of an analysis based on them. Such issue has given support to the present research, since it stresses the fact that when an interaction system has an interest for all the participants, the operation rules derived from it obtain a positive value. The exploitation process linked with governing a common pool resource allows a group of users to give a content to the concept of axiological rationality.

Hypothesis and method of investigation

The hypothesis suggests individual values are the determining variables in social networking and in the institutional crafting of governing natural resources. In particular, Ostrom's model explains decisions at the micro level of the interaction substantially affecting the management and the evolution of small self-governing irrigation systems over time. Individual requests can bring the institutions, under certain conditions, to substitute the search for collective benefits derived from the resolution of common dilemmas with the pursuit of individual demands. This leads to an erosion of the collective meaning of the institution itself, nullifying the realization of more broad community outcomes. In contrast, under different conditions, internal values (i.e. Boudon's axiological rationality) can be extremely useful in increasing the institutional performance and in controlling opportunistic behaviours. According to such a hypothesis, the levels of trust and trustworthiness among community members are important explanative variables because they further the learning process enabling it to generate availability of mutual social interactions. For the achievement of a sustainable institutional arrangement governing water resources, the existence of the feedback loop among trust, reputation, and reciprocity is highly desirable.

I explored this issue investigating how two small farm communities in northern Italy have managed water over time, focusing on the values they applied in this self-governance process. I selected these two groups because they share the same physical attributes of the

resources in use and the same institutional structure, but show different outcomes in terms of sustainable management of natural irrigation streams.

The theoretical purpose is achieved with a qualitative method of investigation to focus on internal values and emotional feelings among the actors involved in the resource management. For collecting the data, in-depth semi-structured interviews were conducted with half of the members of each community.

The case studies

Both case studies analyzed in this research (Roggia La Farfenga and Roggia La Gabbiana) are based on the plain area south of the city of Brescia, in the Lombardy region of northern Italy. They are *consortia*: self-governed irrigation groups (supported at the local and regional government level) with the aim of allowing farmers to use the resources available on their land autonomously. These organizations were aimed to manage both the water naturally available from the basins presented in the ground area of the municipality and the network of man-made channels necessary for irrigation purposes during the farming dry season. The *consortia* have traditionally occupied substantial part in the agricultural environment of the area, since the land where the two groups are placed in is characterized by richness in sand and poorness in clay. For this reason, the fields have always required important flows of water for the maintenance of a minimum level of productivity of the different crops developed for the livelihood of the local population, whose main activity historically is farming. Located between the Alps and the rich land of the Padana plain, these communities did not face difficulty in capturing the right quantity of water needed for their fields until they had adopted a traditional rotation of crops, based on periodical changes of the exploited areas that guaranteed regeneration of the soil and a constant care for the whole network of ditches.

Both institutions were informally established by the end of the 19th century in the same municipality's territory (Borgo San Giacomo) by autonomous groups of farmers who, in common, were exploiting irrigation ditches.

The Farfenga consortium spans two different local municipalities, Borgo San Giacomo and Orzinuovi, following the Roggia Farfenga, the spring-fed river that constitutes the main source of water for the agriculture community. It is composed of three different streams that join in the locality of Rossa, Orzinuovi, the head of the central water basin, for an extension of 2.5, 1.7 and 1.6 km respectively in a north-south direction. In this first branch we find natural springs that generate enough water for irrigation. In the second and third branches the main part of the natural flow comes from a few natural springs in minor channels. The three branches link around half a kilometre before the first

irrigated land. This should assure irrigation equality for all the fields that are part of the consortium, without oscillations in the availability of the resource according to different locations of the lands to be irrigated.

The spring water river Gabbiana follows exactly the same oxbows of Farfenga, sharing the head with it and then the main stream, just half a kilometre east. It is important to stress the fact Gabbiana runs right through the village of Borgo San Giacomo, therefore changing the physical attributes this second community is going to face, bringing different appeals and requirements during the management process.

Currently both communities are composed of about forty households, including farmers who grow corn for the food market or for livestock feed in fields of a limited dimensions. In fact, very few members of these groups can be considered big land-owners since the average extension of a farmer's property is around ten hectares.

The municipality had not been through substantial processes of migration and the communities' members are part of a consistent social environment, sharing a widespread sense of affiliation to the territory also due to the same culture. A high level of attachment to the local community has also been developed thanks to the respect of some religious norms of Catholicism that helped increase a cognitive substrate among the farmers of an implicit respect for the past and social tradition.

Both groups have a formal body of representatives, with a president and other officers, whose members are elected every three years. Decision-making happens at the constitutional level through this body, but informal interactions provide the basis for what happens at the formal level. Members are mainly males who hold title to property, but those who rent land can also be part of the decision-making process. Those who depend on the water include farmers and their families who live on the land year round, and extended family members or friends who might help with farm work. The majority of farmers are over 50 years old, and younger members are leaving the communities in large numbers, so the social reality as a whole is aging from year to year. The average level of education of these communities is lower than the rest of the village population since the obligation to attend school until the secondary level has only recently been extended in Italy.

It is relevant to stress land in this part of the country is highly valued in the marketplace, and crops consistently bring in high prices. As said, these lands also benefit from European subsidies and the farm communities therefore are affluent; there are no members who live at subsistence level. However, some differences in income among households do exist: members range from average middle class to upper-middle class. Additionally, while some members' income remains the same from year to year, other members receive increases in income over time.

This happens within the groups, without substantial differences among the communities.

It is clear the two institutions face similar physical and social environments, over which they could craft autonomously self-governing irrigation systems over time. To do that, they needed to establish agreements regarding irrigation times, rotation of the crops, and preservation of the main and secondary ditches. With water being a national commodity, these informal arrangements and social ties amount to an attempt to regulate the usage of a natural resource whose primary importance was becoming an object of competition among different social-economical alternative uses. Clarifying the inability of a private property right on water, the national and local law gave plenty of space to the farmers about interventions on managing rules about allocation of the resource, such as rotation time rules among different fields. However, the two communities have developed their own process of institutional construction in different manners.

About the Roggia Farfenga consortium, we have indications the institution began at the end of the nineteenth century, but the first official notation about the group did not appear until 1910. At that time, a gathering of local farmers created maps of the land and initiated a constitution as a more formal group. The group employed an engineer to work on the maps and to construct a rotation scheme for water use, but these were not officially recorded or regarded seriously by the consortium. In 1944, they began to discuss a rotation scheme once again, but they were unable to reach consensus with regard to how it would work. Due to problems of scarcity and contestation of rules by those who lived outside the community but still cultivated land, the group was only able to draft its official statute in 1993.

Even if the constitution formalized the consortium and established rules about keeping records of water usage and approving yearly schedules to facilitate water management, this has not meant an achievement of common understanding among irrigation facilities.

On the other hand, the La Gabbiana consortium has been able, since the beginning of its establishment in 1931, to connect a formalization of the institution with a common agreement and a sense of environmental awareness connected with the irrigation practices.

In this second case, the farmers recognized the importance of clarifying immediately in the bylaws what the objectives were of the whole group: the usage, the conservation, the defence, and the implementation of the common property, as well as its administration.

Results from the case studies

No significant differences in the vision of the resource in the two communities have been noticed. Most of the farmers face the issue of managing water and are able to recognize the physical value of this commodity in contemporary society. They acknowledge

water has particularities with respect to other assets they use for farming, such as seed and the land, which they do not perceive as the same issue of scarcity and urgency. Indistinctly all the farmers have noticed a reduction in the availability of water during the past two decades due to significant changes in agricultural practices that have brought a transformation in the way common pool resources are more generally used. The consortia themselves began as traditional agricultural villages where crops were combined and planted in rotation in order to maximize soil fertility and crop yield. During that time, the farmers paid consistent attention to the water channels: they were cleaned monthly, and the water patterns were monitored to make sure excess water was flowing into underground cisterns to provide for future uses. However, a shift occurred in the consortia conception of common pool resource in the 1980s when the European Union pursued a decision to subsidize corn crops, causing corn prices to outpace those of other crops. Following the rational calculations of many other consortia in Italy and the rest of Europe, these two communities ended rotation practices and shifted to a monoculture of corn.

As this culture requires water primarily from May to the first half of August when crops are ready, Farfenga stopped monitoring the water channels for the rest of the year to make sure water was flowing properly and being appropriately stored by the cistern system. Whereas natural springs and streams had previously been sufficient to irrigate every field in the village, the intensive use of water from May to August necessitated the construction of two new wells, respectively in the late 1980s and late 1990s. The unsustainable water usage persisted, causing the first well to run dry in the first decade of the corn monoculture, and the second well is currently in a state of serious depletion. Farmers are also planting more seeds to increase corn yields, so each field requires more water during peak season.

Due to these conditions, all Farfenga farmers are experiencing scarcity. However, their approach to the situation varies from household to household: some farmers recognize scarcity as a serious problem and wish to alter usage patterns accordingly, others do not acknowledge it as a concern and do not wish to alter usage.¹ It is important to recognize the farmers' attitudes about water management are not related to their own water problems: some farmers face scarcity all year and do not wish to alter usage patterns, while others who do wish to initiate new practices are not yet facing year-round scarcity.

Farfenga has experienced a social environment based on local leaders who have brought the institution to pursue selfish appeals instead of common outcomes. In this group, members have very little trust in the consortium or the board of representatives, even if elected by themselves.² This appears to be strictly linked with the recent history of corruption this group has faced, in turn related to selfish behaviours

just mentioned: leaders took advantage of power positions for rent-seeking for a long time. This broke the trustworthiness among the community members, sharing suspicion instead of building networks of mutual support and approval among the users.

In the Gabbiana consortium, farmers did not stop either the constant maintenance of the channels or developing water allocation procedures. The group has experienced a higher level of trust, probably due to the presence of individual attributes of a different kind among community members and representatives. A common sense of awareness has been noticed about the mutual benefits of trustworthiness, as well as higher attention and investment in social networks that have allowed the community to establish its institutional development on trust basis.³ These profitable expectations regarding other people's behaviour could be grounded in both the individual and the group levels. We found positive past experiences such as mutual adherence to agreements and successful conclusions of consortium activities have enabled members to learn from socialization how to invest more in the community⁴. In turn, these identities the farmers intentionally created through their own behaviours have helped an internalization of common values and social norms found extremely well shared among all Gabbiana members. It has been recognized that a high level of mutual understanding regarding norms violations probably was generated on the same well-established trust bases of the community. This has led to a better sense of affiliation and awareness of respect for the group, with a strong feeling of responsibility by the single user for the common. Water streams even ceased to be just an instrument of profit and became a source of sharing identities: "We have to understand that the channel is ours, it is made by us, and we are that channel."⁵

Discussion and conclusions

Why have these communities performed in such different ways over time? According to the discussed hypothesis, at the base of the institutional performance, there are internal and shared values that mark farmers while they are managing natural resources. The main goal of these case studies has been to show the role that internal and shared values play in the process of institutional construction for water management. In the empirical analysis a positive relationship exists between the achievement of sustainability of the institutional arrangements and the presence of values connected with altruistic behaviours in self-governing irrigation systems. These values are vehicles of collective learning and foundations of social order inside the community of users, as well as instruments of consciousness regarding the necessary institutional adaptation and flexibility. However, opportunistic behaviour is very likely to be found in communities of this kind. According to Repetto (1986), inevitably most

of the available rents are captured by those with power, influence, and wealth, and rent-seekers think using the resource efficiently is much less important than gaining control of the allocation mechanism. Institutional rules that require irrigators to cover the cost of operating and maintaining their systems and to contribute to the recovery of the initial investment in the institution, could help contain rent-seeking behaviours. However, that process could also be extremely challenging as the Farfenga group showed. The norms applied in informal relationships and used in cultural tradition are forms of a shared knowledge and as such implicitly fostered by an innermost circle. This process of internal-values establishment with positive outcomes has not been achieved in the Farfenga case. The main reason could reside in the features of the internal values of the community members. Data show a clear preference by these farmers towards selfish behaviours and attitudes, carried out in a short-time view of the exploitation process. Not seeing a common and shared benefit in cooperation, members' inability of dialogue and deficiency of reciprocity made the institution collapse. Where substantial temptation to engage in opportunistic behaviour does exist, no set of rules will be self-organized (Ostrom V. 1980). In such regard, the present research found the existence of a common set of internal values is useful in increasing the institutional performance and in controlling opportunistic behaviours. If participants do not view the specific rules crafted to organize a particular irrigation system as being appropriate, a behaviour that violates accepted norms may not be sanctioned.

As in the Farfenga case, if a formal structure is viewed as illegitimate, behaviour that undercuts the maintenance of that structure will not be viewed with disapprobation. Consequently, if opportunism becomes the dominant mode of behaviour in irrigation systems, ultimately all users will be hurt. When institutions are well crafted, opportunism can be substantially reduced, and even if the temptations can never be totally eliminated, they can be held in check. Moreover, the data brought evidence that the existence of a small number of social actors with Kantian aspects in rural irrigation groups has remarkable effects on overcoming collective action problems.

In the Gabbiana case, farmers did not stop either the constant maintenance of the channels or developing water allocation procedures. The reason seems to reside in a shared awareness regarding responsibilities on the part of the whole community with regard to the resource, as well as personal exposure of long-term planning among them. In particular, the person called

to supervise stream maintenance has had a key role in this consciousness of the whole group about the need for constant attention to water infrastructures. He has been able to recognize the channels were as important a resource as the water itself. As a consequence, he has directed his efforts on activities, given for free, whose objective was to ensure an optimal level of stream preservation over time. This sort of innovator has helped the community to overcome short-term exploitation of the resource, bringing it toward a more general level of consciousness about needs of sharing communitarian values among farmers. In his own behaviour, he clearly shows Kantian aspects, as well as a strong consistency with Boudon's axiological rationality.

As Gabbiana case shows, in order to decrease opportunistic behaviours community members need to invest voluntarily in coordination activities such as monitoring and sanctioning, along with constant irrigation channel maintenance. Coordination could be achieved by learning how to do joint tasks better, by assigning one person the responsibility to be in charge of other users, and by establishing a rule specifying how particular activities are to be undertaken, along with establishing how that same rule is monitored and enforced by participants, external enforcements, or both.

This research stressed the existence of a common set of values is extremely useful in increasing the institutional performance and in controlling opportunistic behaviours. An important point to recognize is that genuine trustworthiness, i.e. the individual preferences consistent with conditional cooperation, is an independent and non-reducible reason for explaining how communities achieve environmental preservation. Trust is the most powerful instrument of connection between institutional arrangements and values. It is enhanced when individuals are trustworthy, networked with one another, and acting within institutions that reward honest behaviours (Marshall 2005).

The present results also support Ostrom's (1998, 1999) idea of a core relationship existing among trust, reputation, and reciprocity. It has been determinate, indeed, that those factors are dependent on the community's past experiences and on the capacity of their members to recognize a major common interest in preserving the resources. Once in place, those factors enhance the capacity of a community to govern its environment and, in particular, to foster the process of institutional adaptation that is necessary for a long term management of water resources.

ENDNOTES

1. From the comment of one member: "There is no problem. We face the same situation every year and, in any case, we can have another well. I do not see so much urgency. There is no crisis regarding water, overall here."
2. "I do not trust anyone else than the members of my family. Why should I trust them?" (one member of Farfenga referred to the board of representatives).
3. From the words of one past leader of Gabbiana: "I trust them, why should not they trust me? I really think all of them are honest. I treat themselves as I am used to behave with myself. They are all friends to me and I hope I am considered a friend by them."
4. From the words of a former secretary: "It is sometimes difficult to make an agreement that could be good for everybody, but the only way is speaking with people, the dialogue, and make that they could understand that there is something that is good for all. I cannot count how many kilometers I did going from one ranch to another one, but once obtained the agreement all is okay, is over, and I am happy, even if it has been hard to make."
5. From the words of the current secretary of the consortium.

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NOTES OF A ZAHORÍ (WATER DIVINER)

LINDA C. EHRLICH

CASE WESTERN RESERVE UNIVERSITY

Landscape/seascape

Stories pressed down over centuries.

(Your hand,
a piece of driftwood
twisting in the waves.)

Banyan trees uprooted in the last hurricane. Enormous trunks, a canopy of branches, but shallow roots that grow under the walkways and crack the concrete. *Wayang*, upheaval of the gods. The night the street became a river. I placed my feet on pavement and it flowed away beneath my feet.

New Year's beach. Jellyfish noon. And little boys with their teddy bear armwings to keep themselves afloat. Silly seagulls bob in the waves; medusas beguile them with their translucent sacs of venom.

The years fly by, but now and then, an ocean rises up to inundate our days. Oceans in the middle of a city where roosters crow from rooftops in the humid dawn.

(This water self
the world will not accept)

Always, circles in the sand. Small children with a stick. Rings. A larger hand pulling them back from the waves.

From rough rocks lining the road, amateur fishermen cast their nets. All they bring up are worthless needlefish, but they practice and practice, holding one piece of the net between their teeth. The wind carries their words away.

(Always battered women on the shore in slashed veils.)

Full moon of the restless star. Crystal-vase ocean at three in the morning.

Some look for water underground. Others look for long-abandoned bombs.

There is a difference.

WINTERS IN SALMON COUNTRY: THE NEZ PERCE TRIBE'S INSTREAM FLOW CLAIMS

MARK D. SOLOMON
UNIVERSITY OF IDAHO

A State Court Rules

As the first snows of the 2000 water year started falling in the high country, Idaho Fifth District Judge Barry Wood issued his decision ruling against the Nez Perce Tribe's claims for instream water flows in Idaho's Snake River basin.¹ Judge Wood, presiding over the Snake River Basin Adjudication (SRBA), handed down his ruling in a state courtroom in Twin Falls, Idaho: 286 miles by air, 390 miles by road, 630 miles by river, and a world away from tribal headquarters in Lapwai on the Nez Perce Reservation. Tying together the Nez Perce Tribe and the farmers of the Snake River basin was the river and the common need for water to survive in the arid American West. Dividing them were the rugged mountains and steep canyons of central Idaho, one hundred fifty years of physical and legal conflict, and a cultural gulf with few, if any, bridges.

Judge Wood ruled that while the 1855 Nez Perce Treaty with the federal government guaranteed the Nez Perce the "right of taking fish at all usual and accustomed places in common with the citizens of the territory," it did not guarantee them there would ever again would be fish to be fished for at those places. Wood then raised the stakes for the tribe by ruling that the tribal reservation allotment program of the federal government in the late 1890s had diminished the extent of the Tribe's sovereignty over its own reservation, raising the possibility of tribal extinction.² He concluded "the Nez Perce do not have Indian reserved instream flow water rights extending beyond the boundaries of the present Reservation, where ever those boundaries may be."³

The court's order was immediately appealed by the tribe to the Idaho Supreme Court along with a companion suit seeking removal of Judge Wood from the SRBA court due to a previously undisclosed

apparent conflict of interest. Prior to hearing on appeal, the parties to the ruling agreed to settlement mediation and a stay of proceedings. The mediation was successfully completed in 2004. History and the river continue to flow.

The Nez Perce People and their Land

The Nimi'puu, the Nez Perce people, have lived in what we now call portions of Idaho, Oregon, and Washington since time immemorial.⁴ At the time of first contact with Anglo civilization in 1803, when Lewis and Clark descended half-starved from the Clearwater Mountains into the camas and salmon country of the Nez Perce, this people's aboriginal lands covered fourteen million acres stretching from the Wallowa country in the west to the Bitterroot Mountains in the east, from the headwaters of the Salmon River in the south to the Palouse River in the north. Never a single tribe as much as a collection of individual bands related by blood and custom occupying different areas within their territory, the a band followed the seasons from camp to camp, meeting with the other Nez Perce bands when the camas root was ready to dig and the salmon ran in the rivers.⁵

The Snake River and its major tributaries – the Salmon, Grande Ronde and Clearwater rivers – define the land of the Nez Perce. The Snake, flowing at an average rate of thirty-six million acre-feet per year at present-day Lewiston, Idaho,⁶ also defines the freshwater world of the salmon runs that once filled its creeks, rivers and lakes. Historically, salmon runs were estimated to have ranged from five million to eight million adult fish annually in the Snake and its tributaries.⁷

In the traditions of the Yakama, Umatilla, Warm Springs, and Nez Perce, the spirit of the salmon—

Mark D. Solomon is a doctoral candidate in the University of Idaho's interdisciplinary Waters of the West Program. A former Latah County (Idaho) commissioner, he has been recognized as one of the Thirty Heroes of the Clean Water Act (2002) for his commitment and ability as an advocate for the protection of the nation's water resources.

Wy-kan-ush-mi Wa-kish-wit—is sacred life. The tribes believe that the salmon was created along with an ideal habitat in which to enjoy its existence and that for thousands of years the salmon unselfishly gave themselves for the physical and spiritual sustenance of human beings. The salmon's abundance shaped the culture, religion, society, and even languages of the four tribes. The majority of calories that the Columbia Basin tribes consumed came from salmon, elevating the reverence that the tribes placed on this incredible gift. Their religions always thanked the Creator for the bounteous blessing of salmon; they also thanked the salmon for offering themselves as food for humans. (Columbia River Inter-Tribal Fish Commission)⁸

Idaho's Snake River

The Snake's headwaters, rising from the high Teton Mountains along today's border between Wyoming and Idaho, lie far south, beyond the land of the Nez Perce and upriver of Hells Canyon, the deepest gorge in North America. Here the Snake River flows westward across a vast dry plain overlying deep basalt flows formed by a crustal hot spot now centered beneath Yellowstone National Park.⁹ Despite its aridity, the Snake River Plain's generally flat topography provided the quickest travel route for westbound settlers along what came to be known as the Oregon Trail.

Few stayed in this high desert country until the expansion of settlement in the Salt Lake basin by adherents of Joseph Smith's Church of Jesus Christ of Latter Day Saints (Mormons).¹⁰ In this desert country, diverting water out of the streams and rivers to irrigate agricultural land was the only way to grow enough food to survive. Over the next one hundred fifty years, seventeen dams were built on the upper Snake River and its tributaries to support agriculture and Idaho's growing population centers. Beginning in 1905 when the gates were closed at Milner Dam, the entire summer flow of the Snake River was diverted just above Shoshone Falls (the upstream end of salmon habitat more than eleven hundred miles from the ocean) sending the river into a network of a thousand miles of irrigation canals.¹¹

Judge Wood's courtroom was in Twin Falls, a few miles from Milner Dam, centered in the geographic and political hub of modern Idaho's irrigated agriculture economy. Vast geographic, economic, political, and cultural differences separated the Nez Perce people from Judge Wood and most of the other residents of Twin Falls and its surrounding irrigated agricultural landscape.

The Nez Perce Treaties

In 1855, the Nez Perce bands gathered in Walla Walla at the request of Territorial Governor Isaac I.



Stevens to negotiate a treaty with the United States. As recounted by the Nez Perce and recorded by Nez Perce historian Alvin Josephy,¹² many of the bands, including some of the most powerful leaders such as Looking Glass, were away hunting buffalo on the other side of the Bitterroot Mountains hundreds of miles distant and were not present when the talks began. For convenience, Stevens recognized a minor leader, Lawyer, who had been converted to Christianity by missionaries and learned some English, as the bands' spokesman even though the other leaders present had not awarded him that responsibility. To cement his leadership position with Stevens, Lawyer agreed to cede the Nez Perces' rights to 7.5 million acres of their aboriginal lands. Looking Glass, having heard of the meeting, quickly journeyed back across the mountains to Walla Walla, arriving before the signing ceremony saying, "My people, what have you done? While I was gone you have sold my country... Go home to your lodges. I will talk to you."¹³ Looking Glass was unable, however, to overcome Lawyer's argument to the leaders that they could not now go back on the agreement he made with the white men. In the end fifty-six Nez Perce leaders signed the treaty in which the United States agreed the bands would have sole control over the 6.5 million acres of their reservation as well as the right to hunt and fish at all their usual and accustomed places outside the reservation boundary.¹⁴

With the cession of their land, the division of the Nez Perce people along religious and band affiliation lines began. In 1860, gold was discovered by prospectors trespassing on Nez Perce land north of the Clearwater River and in the lower Salmon River country. A second treaty gathering was convened by the order of the territorial governor at Lapwai in 1863 to address the white encroachment. With some 1855 Treaty signers selling supplies to miners at gold-

fever prices, a growing restiveness among other tribal members unhappy with the outcome of the 1855 Treaty, and the recent suppression of an armed uprising of the Yakama, Spokane, Cayuse, and Palouse tribes as a backdrop, tension among the treaty negotiators was high. Again, as in 1855, Lawyer was chosen by the white negotiators to represent the Nez Perce. He was persuaded to reduce the reservation to ten percent of its 1855 Treaty size. The lands of Lawyer and his followers' bands were included in the proposed new reservation while those of Joseph, leader of the Wallowa band, and several others who had the stature to challenge Lawyer, were not. Thunder-Eyes, speaking for the anti-Lawyer, anti-treaty faction said, "the Nez Perce nation [is] dissolved", and that from then on they would be "friends, but a distinct people."¹⁵ The subsequent 1863 treaty signed by Lawyer and his faction established a reservation of approximately 750,000 acres and reserved the same hunting and fishing rights established in the 1855 Treaty.¹⁶

The Nez Perce were increasingly a divided people, weakened in their ability to resist further violations of their sovereignty and their treaty rights.

In 1877, Joseph and his non-treaty band from the Wallowa Valley were forced from their lands and pursued by the United States Army in a thousand mile flight across Idaho, Wyoming, and Montana in search of their freedom in Canada. Captured just south of the Canadian border, the non-treaty Nez Perce were sent to the Oklahoma Indian Territory and eventually re-settled in permanent exile on the Colville and other reservations in eastern Washington State.

As part of the federal government's policy of opening western lands to white settlement, the General Allotment Act of 1874 opened the Nez Perce reservation to white settlement in 1893 after allocation of one hundred sixty acres to each tribal member. Non-treaty bands and non-treaty tribal members were not included in the allotment.

Through all these times of crisis for the tribe, the salmon were a constant for the Nez Perce, held apart from the world of chaos created by increasing contact with the encroaching whites, returning year after year to offer themselves to the Nimi'puu. That too would soon change.

Building an Irrigated Landscape

With the beginning of the twentieth century a new use of the region's rivers came to the fore: construction of dams for electrical generation. While the irrigation dams in the Upper Snake River had reduced the river's flow in its uppermost reaches, they had not noticeably affected salmon runs due to their location upstream of Shoshone Falls, the river's natural barrier to the salmon. Downstream, spring flows rejuvenated the river current in the Thousand Springs reach of the river. Beginning in 1901, the construction of private hydroelectric

dams increasingly blocked entire watersheds and river systems to salmon access. Salmon were now restricted to the lower and middle reaches of the Salmon River, the forks of the Salmon, and the mainstem of the Snake River.

With the entrance of the federal government into dam building on the mainstem of the Columbia with Bonneville Dam in 1937, and with the erection of twenty more dams on the Columbia and lower/middle Snake over the ensuing thirty-five years, the salmon that had provided the life of the Nez Perce began to disappear. By 1991, five runs of Snake River salmon and steelhead were listed as threatened or endangered under the Endangered Species Act.¹⁷

Meanwhile groundwater pumping was taking its place alongside surface water irrigation as a driving force in southern Idaho's agricultural economy. Farmers were pumping more than 4.5 million acre feet of surface water onto approximately one million acres of land to produce the crops, livestock, and processed food products.¹⁸ The 2002 value of irrigated agricultural products in the Magic Valley surrounding Judge Wood's courtroom was \$1.56 billion.¹⁹ An additional \$1.9 billion in value was added to those products in the Magic Valley by food processors.²⁰

Claiming the Water

In 1993, the Nez Perce Tribe filed suit against Idaho Power Company claiming damages to their treaty fishing rights by the construction of Idaho Power's Hells Canyon Dam Complex. Federal Judge Larry Boyle for the District of Idaho shocked the Tribe with his ruling that their treaty rights did not allow for damages because the "tribes do not own the fish, but only have a treaty right which provides an opportunity to catch fish if they are present at the accustomed fishing grounds."²¹ Although settled out of court while pending appeal before the Ninth Circuit Court of Appeals, Boyle's decision in *Nez Perce v. Idaho Power* served notice to the tribe that they faced a hostile judiciary in Idaho.²²

The Nez Perce Tribe is not alone in its relation to the courts. Because of Native American status as dependent sovereigns of the federal government, all legal actions involving tribes and tribal members are heard in federal court, not at the state level. However, in 1952, Congress carved an exception to that rule when it passed the McCarran Amendment waiving federal immunity in state water adjudications.²³

United States Senator Pat McCarran (D-NV) had been asked to help resolve a private water rights dispute in Nevada's Quinn River basin that included federal ownership. Attempts to resolve the dispute in state court had been stymied by the federal government's refusal to waive its immunity and appear in state court. McCarran applied a broad brush to the matter ending federal immunity for all water right claims whenever

a state proceeded with a basin-wide adjudication. The Department of Interior voiced their objections to the over-reaching consequences of the proposed amendment in testimony before the Senate Judiciary Committee specifically as it applied to the “*Winters* rights” of the nation’s tribes.²⁴

In 1908, the U.S. Supreme Court ruled in *Winters v. U.S.* that when the federal government reserves land for purposes such as Indian reservations, forest reserves, military bases, parks, wildlife refuges, and other federal uses, the water necessary for the purpose of the land reservation is also retained by the federal government. Importantly in the generally arid western states where “first in time, first in right” is the basis of state water law, the priority date for the federally reserved water is established as the date of the land reservation. As most Indian reservations were established before statehood, Indian *Winters* rights are generally the most senior water rights in a state.²⁵

The McCarran Amendment passed, unchanged, as a rider on the appropriation bill for the Department of Justice. Tribes would now have to argue before state judges for the water rights promised them in their treaties with the federal government. Only a final decision by a state supreme court could be appealed by a tribe to the United States Supreme Court as an issue of federal law.

In 1984, Idaho initiated the Snake River Basin Adjudication (SRBA) to settle all water rights claims in the area of the state drained by the Snake River.²⁶ Stretching from its headwaters in Wyoming to its exit from the state at Lewiston, the Snake River Basin includes not only the Nez Perce Reservation, but also all of the Nez Perce aboriginal lands ceded by treaty. Those treaties specifically included the tribe’s retention of the right to fish at their “usual and accustomed places,” even when off the reservation. To defend their treaty rights the Nez Perce would claim their reserved *Winters* rights.

As a basin-wide adjudication, the Nez Perce tribe was compelled by the McCarran Amendment to assert and defend their *Winters* claims for instream water in state court.²⁷ In 1994, the tribe filed claims for 1,134 water rights to support “fish habitat and channel maintenance”²⁸ in accordance with the 1855 Nez Perce treaty:

The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with the citizens of the Territory.²⁹

The Nez Perce claims, if approved, would account for “105 percent of the average annual flow of the Snake, Clearwater, and Salmon Rivers combined.”³⁰ Idaho Power Company, the State of Idaho, the Potlatch Corporation (a forest products company and Idaho’s largest private landowner), and a coalition of irrigation

districts filed as interveners. Overnight, the political distance between the tribe’s northern Idaho reservation and the irrigated agriculture center of southern Idaho’s economic power structure shrank to zero.

The SRBA Judge

As the Snake River Basin Adjudication entered its fifteenth year evaluating water rights claims, its long-serving and well-respected presiding judge, Daniel Hurlbutt, announced his retirement. In February 1999, the Nez Perce tribe submitted a letter to the Idaho Judicial Council putting the state on notice as to the tribe’s expectation that the next SRBA judge must have judicial experience and extensive a knowledge of water law, as well as no actual or perceived conflicts of interest.³¹ In March 1999, interim SRBA Presiding Judge Barry Wood was appointed by the Idaho Supreme Court as permanent SRBA Presiding Judge. Eight months later, Wood handed down his decision ruling strongly against the Nez Perce’ claims. In doing so, he went a significant step further than the previous *Nez Perce v. Idaho Power* court, finding that the 1893 opening of the Nez Perce Reservation to white settlement had diminished the reservation by the extent of all lands not currently owned by tribal members, or held in trust for the tribe by the federal government, within the 1863 Treaty boundaries. Wood arrived at this conclusion even while acknowledging existing case law did not support his decision.³²

Judge Wood broke the fragile peace between the tribe and the people who had occupied their lands and used their water. His order found the various Nez Perce treaties and agreements did not imply the right to enough water for fish to live in, but only the right to fish, and that the sovereignty of the tribe over their homeland was reduced to the 17 percent of the reservation still in tribal hands after the allotment and termination policies of the early 1900s. Both findings were highly emotionally charged and even more highly questionable in their legal basis in the federal common law.³³

The tribe appealed the decision and in a separate filing and sought the removal of Wood as SRBA judge on the grounds his own and his family members’ ownership of several rights subject to SRBA jurisdiction constituted conflicts of interest. Judge Wood was removed by the Idaho Supreme Court from his SRBA position. The court found the election of Wood’s brother-in-law, Daniel Eismann, to the Supreme Court created an ethical conflict for the Supreme Court itself. Eismann was elected to the court in a campaign against Justice Cathy Silak shortly after Silak had authored the court’s opinion upholding the federal government’s water rights in Idaho wilderness areas under the *Winters* doctrine.³⁴ During his election campaign, Justice Eismann had publicly stated he would not recuse himself from ruling on water right

claims appealed from his brother-in-law's court. As the court could not unseat their new colleague, Justice Eismann, they unseated Wood to preserve the ethical standing of the court.

Settlement

In the year prior to Wood's ruling against the instream flow claims, the State of Idaho and the Nez Perce tribe agreed to enter mediation in an attempt to settle the tribe's *Winters* claims. Six years later, with appeal of Wood's ruling stayed at the Idaho Supreme Court, the tribe, state, and the federal government (acting in its capacity as trustee for the tribe), agreed to settle the tribe's instream flow claims out-of-court for a mixture of instream flow rights, regulatory protections for endangered species, monetary awards, and other measures.³⁵ The State of Idaho, acting on behalf of its water rights holders, agreed to send water downstream to support the salmon so vital to the survival of the Nez Perce people. The federal government agreed to provide funding for the settlement and to enter into joint operating agreements for federal fish hatcheries in the tribe's Clearwater River basin homeland.

In 1994, the dispersed non-treaty bands of the Nez Perce partnered with the National Park Service to honor their Wallowa homeland with the creation of an interpretive center at Wallowa Lake.³⁶ In 1997, the on-reservation descendants of the treaty bands, utilizing funds granted to the tribe to offset the damage done to the reservation and their treaty fishing rights by the construction of Dworshak Dam on the north fork of the Clearwater River, purchased 10,300 acres of Chief Joseph band's ancestral homeland in the Wallowa country. (Another five thousand acres were subsequently added to the tribe's holdings in Joseph Canyon.) While the land sales contain covenants restricting the use of the lands to fishing and wildlife purposes,³⁷ for the first time in 130 years, the Nez Perce people, "treaty" and "non-treaty", were to some extent, home in the heart of their ancestral lands.

Could There Have Been a Different Outcome?

If the Pacific Northwest is defined as "wherever the salmon can get to," as Tim Egan writes in his 1990 book, *The Good Rain*, then Twin Falls and Lapwai are worlds apart. Shoshone Falls, one of two natural salmon-blocking cataracts on the Snake River that gives the city of Twin Falls its name, historically marked that regional boundary until man-made dams started moving the boundary further and further downstream to its present location at the base of Idaho Power Company's Hells Canyon Dam. Shoshone Falls no longer flows at its thundering pace, the waters of the Snake River dammed and diverted above the falls into a thousand miles of canals delivering water to desert soil for farming. The people who settled here, who turned the water onto their fields to build an irrigated

agricultural empire, have never had salmon as the center of their lives. They and those who followed them across southern Idaho's Snake River plain—taking the salmon's water so they could live—did not then and do not now live in the Pacific Northwest Egan describes.

The Nez Perce people do, and have done so since time immemorial. Salmon are for them both a physical and a sacred being, offering themselves for the good of the Nez Perce people, to sustain them in body and soul. Most of the salmon's range in what we now call Idaho is Nez Perce aboriginal land. As recognized in the treaties the Nez Perce negotiated with the United States government, they could somehow accept and live on a fraction of their former lands, but they could not and would not live without the salmon. The treaties specifically retained to the Nez Perce the right to fish at all their usual and accustomed places. But today, the salmon are killed by passage through and around the eight mainstem dams on the lower Snake and Columbia rivers that stand between Idaho and the Pacific Ocean. Those that survive the passage are confronted by headwater streams often dewatered or degraded by agriculture, grazing, mining, logging, and urban use. The salmon are struggling to continue to offer themselves to the Nez Perce, and the Nez Perce people are struggling to rebuild the salmon's Idaho home.

Whether the Nez Perce could have prevented their conquest by EuroAmericans will never be known. Their choices were constrained by the pressure of white settlement on their lands and the body blow to their strength as a people delivered by an epidemic of deadly diseases to which the Indians had no resistance. The divisions that grew within the Nez Perce people as they tried to adapt to these overwhelming forces made their task even more difficult as different bands were forced in separate directions by their acceptance or rejection of treaties, culture and religion. Federal policies of tribal assimilation and termination that threatened the tribe's very existence persisted until the 1970s.

A new era for the Nez Perce and the other Columbia River tribes began with the 1974 *Boldt* decision affirming the Columbia River tribes right to half the salmon fishery.³⁸ Shortly thereafter, the gates were closed at the Army Corps of Engineers 700-foot high Dworshak Dam across the north fork of the Clearwater River on the Nez Perce reservation. To compensate the tribe for the harm Dworshak Dam caused to the tribe's fishing and hunting rights, the federal government agreed to a mitigation plan. The provision of funding to implement the plan had an intentional objective—to provide resources for the tribe to help struggling salmon populations through habitat restoration and hatchery programs—and an unintentional (for the Corps) byproduct: enabling the Nez Perce to more actively advocate for their treaty rights and by connection, the salmon.

The decision in Judge Wood's court in Twin Falls was never seriously in question. The tribe had filed instream flow claims totaling the entire flow of the Snake River at Lewiston, its furthest downstream location in Idaho. Finding in favor of the tribe would have dried up irrigated agriculture in southern Idaho, by far the largest economic sector of the entire state. No state judge would issue such a ruling and Judge Wood proved no exception. The appeals of the SRBA court's ruling were where the Tribe and the salmon's rights would be fought for and possibly won—probably not at the Idaho Supreme Court where the same forces present in the District Court were at play—but at the next stop in federal court. It was at this point, with appeals pending, that settlement negotiations became the focal point for deciding the tribe's and the salmon's rights to water.

It took another five years to bring the negotiations to fruition, but in the end the salmon that managed to get past the eight mainstem dams were guaranteed enough water to survive within their current range downstream of southern Idaho's irrigation and power dams. At a minimum, the state agreed the Snake River flows established by the Swan Falls Agreement would be provided for downstream instream flow. The state also agreed to provide up to 427,000 acre feet in flow augmentation for salmon from water stored behind southern Idaho dams. The tribe is to receive \$95.8 million and up to 11,000 acres of land to support fishery and wildlife habitat acquisition, restoration, and protection. Among other provisions, the tribe is to assume sole management of the federal fish hatchery at Kooskia and joint management of the Ahsahka federal fish hatchery just below Dworshak Dam. It will also receive support for other tribal hatchery programs.

The settlement is not without its detractors within the tribe. There are tribal members who wanted the tribe to pursue its case to its full extent within the court system or, alternatively, argued that the settlement compensation agreed to was inadequate. Whether the \$95.8 million compensation was adequate was highlighted on April 7, 2008, when four downstream Columbia River tribes and the federal government signed an agreement giving those tribes just under one billion dollars for salmon restoration. In return for ten times the money given in compensation to the Nez Perce for settling actual treaty rights, all the downstream tribes need to do for their money is remain silent for ten years whenever talk of breaching four lower Snake River dams to restore salmon runs surfaces. The Nez Perce Tribe, while party to the negotiations on the status of the lower Snake River dams, refused the proposed terms and did not sign the final agreement.³⁹

With the finalization of the settlement of the Nez Perce tribe's instream flow claims, the last major hurdle to resolution of the 1984 Swan Falls Agreement—the settlement of the dispute between Idaho Power Company and southern Idaho upstream irrigators that

gave birth to the Snake River Basin Adjudication—was passed. The originally stipulated water conflicts of the Magic Valley irrigators and Idaho Power had been settled.

Six hundred and thirty river miles downstream and a world away, the Nez Perce people and the salmon continue their physical and spiritual partnership, dependent more than ever on each other for survival. The settlement assures there is enough water in the rivers for the salmon to find the way to their natal streams, and enough resources for the tribe to restore and protect the river and stream habitat to support spawning conditions. But the salmon must still somehow survive their passage through and around the lower Snake and Columbia rivers' eight fish-killing mainstem dams and reservoirs and the Nez Perce people must still survive challenges to their culture, traditions, and sovereignty.

The winter snows are melting once again, filling rivers, and carrying young salmon downstream to the sea. When they return to Idaho as adults a few years from now, the Nez Perce will be there as they have been since time immemorial to bless them and to receive the salmon's offering of themselves for the good of the people, the Nimi'puu. The cycle continues.

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Land's End – the rocks at Land's End on the western tip of Cornwall. (Margaret Evans)

THE LIFE-GIVING SPRING: WATER IN GREEK RELIGION, ANCIENT AND MODERN, A COMPARISON

EVY JOHANNE HÅLAND
BERGEN, NORWAY

In Greece, springs in caves have long played a central role in religious beliefs and practices. In ancient times springs, represented water nymphs. Today springs are dedicated to the Virgin Mary (*Panagia*) under her attribute of the Life-giving Spring (*Zōodochos Pēgē*). Both ancient and Christian believers have expressed their beliefs in rituals connected to purity and water by fetching holy water from the caves dedicated to these female divinities. The water is thought to be particularly healing and purifying during the festivals dedicated to the goddesses and saints. These beliefs are reflected in the modern festival of the Life-giving

Spring, which is celebrated on the first Friday after Easter Sunday, the Resurrection of Christ. During this festival, Athenians visit the Virgin Mary's chapel inside a circular Spring House, hewn in the rock on the southern slope of the Acropolis to obtain life-giving water. The Sacred Spring is situated inside a cave over which is constructed a church (Plate 1). Many believers underscore the importance of being baptised in water from one of the many sacred springs, which are dedicated to the Virgin. Cults dedicated to the sacred and healing spring-water, have also been important for political purposes both in ancient and modern Greece.



Plate 1: The church dedicated to the Life-giving Spirit, Athens: The Holy Spring is behind the low wall (author photograph).

Evvy Johanne Håland, PhD., is a historian/researcher, in Bergen, Norway, Her most recent publications include, *Greek Festivals, Modern and Ancient: A Comparison of Female and Male Values*, Norwegian Academic Press, 2007; *Women, Pain and Death: Rituals and Everyday-Life on the Margins of Europe and Beyond*, Cambridge Scholars Publishing, 2008 (editor); and forthcoming, *Competing Ideologies in Greek Religion, Ancient and Modern* (2009). Since 1983, her fieldwork has taken her to the Mediterranean, mainly Greece and Italy where she has been researching religious festivals since 1987. evyhaa@online.no

Cleaning the Acropolis caves

At nine o'clock in the morning on Saturday, April 4, 1992, my mother and I arrive at the cave of the Life-giving Spring.¹ Eirinē Melas, who cleans the Acropolis caves on a monthly basis (Plate 3), tells us it is dedicated to Agioi (cf. *Agios*, i.e. Saint) *Anargyroi*, the patron saints of healing.² Eirinē has carried out this task since the death of her husband who worked at the Acropolis.³ Today, Eirinē's daughter, two other women, and a young man, Panagiotis, are also present. He shares Eirinē's religiosity, and, during our stay, he presents several newspaper cuttings about the "cave-churches."⁴ I always have regarded the two caves as caves, but my informants always refer to them as churches. With the exception of Panagiotis' participation, the key performers of the rituals in the caves are women. They assert that since childhood they have been brought to the Life-giving Spring to fetch holy water along with their mothers: "It has always been like this." A clear example of how Greek children are socialised, this is a common response to researchers' questions—a reaction that underscores the differences between the perspective of many Greeks and the more linear view of time and history shared by most Western Europeans.⁵

Eirinē tells me her arrival this day was delayed by a visit to a church in Monastiraki. While she lights candles and fetches water in the cave, we chat about the annual festival dedicated to the Life-giving Spring, scheduled in the cave in approximately a month. It is not clear whether the festival will be celebrated this year due to two practical problems, one the actual date of the festival in 1992, coincides with the celebration of Workers Day on May 1. The second is the relationship between the new parish priest and the celebrants: According to Eirinē's daughter, the young successor to the elderly priest in the nearby Byzantine Church resists participating at the festival, claiming it represents a pagan custom. During the conversation, I learn the previous year, the younger priest stated he was ill, suffering from a heart disease. "But, we don't believe that," added Maria.

Despite the commonalities between Orthodox practices and popular traditions, tensions between the two often come to the fore during celebrations.⁶ In 1991, the festival was observed only after Eirinē's son invited a priest from the University of Piraeus to officiate at the ceremony. Later that day, Eirinē and Panagiotis tell me they also plan to talk with the priest from Piraeus to ensure the ceremony will be held.

Eirinē plans to be here during the afternoon on May 1, but the service/mass will be in the morning, starting at approximately 8:30.

The cave is situated within the archaeological quarter of the Sanctuary of Asklepios, the ancient healer of sickness, and today the entrance is secured with bars and several padlocks. When they reach the cave this morning, everyone washes in the spring and drinks the water. The two women assert the water is miracle-working and healing. They have been here regularly since childhood. They explain that among the many icons in the cave, the most holy represents the Panagia and the Child. In front of the icon, one of the women arranges a bunch of flowers (nasturtium). So, even if the cave is still dedicated to Agioi Anargyroi, in reality the Panagia is the one who gets the gifts.



Plate 2: The entrance to the Sacred Spring, the Acropolis cave at Athens (author photograph).

Similarly, while the icon of Agioi Anargyroi is still in the cave, the *tamata* (i.e. metal plaques depicting a vow or request) are mainly dedicated to the icons of the Panagia. The most common offering is a silver- or gold-plated ex-voto representing the person or limb that has already been, or is seeking to be, cured by the icon in combination with the water. Before she leaves the cave, the flower-arranging woman fills a bottle with holy water, in keeping with a tradition she learned from her mother when she was five years old. The other woman also brings with her a bunch of flowers. She only "gives half of it to the icon in this cave, because the other half is going to be offered to the icon of the Panagia in the other cave, where we will go when we have finished here."⁷ She states "this is the oldest church in Greece, and Paul was preaching here." She lights the candles in front

of the icon, and she and her partner light the many olive-oil lamps. All the devotees fill their bottles with water, while saying "even if it is not raining, there will always be water in the cave."

After a while, Eirinē fills a bucket with holy water, which we carry further up the rock into the other cave-church along with a candelabrum for votive candles as well as a broom, some soap, and other objects. The church opens above the theatre of the ancient god, Dionysus. This cave is dedicated to the Panagia *Crysoḥpēliōtissa*, or the Chapel of Our Lady of the Golden Cavern (Plate 4).⁸ Within, Eirinē or someone else lights a lamp every evening.

On the walls of the church are faded Byzantine paintings, but the cave was also important for the ancients. The two churches are from the fifth or the sixth century. In both churches we see a newspaper

article framed and glazed. Panagiotis tells me that he put it up himself. He does not remember exactly when and where the article was published, only that he “found (i.e. read) it some years ago, . . . the year I was on Tinos during the Panagia” (i.e. August 15, 1989). The article describes the legend behind the cult dedicated to the Panagia Crysospēliōtissa in this particular cave. Eirinē and Panagiotis recount the article in their own way: “In the beginning of Christianity there was a miraculous icon in this cave. It was painted by Agios (i.e. the Evangelist) Luke (i.e. during Mary’s lifetime). Roxane, the daughter of a pagan medical doctor, was approached by Panagia in a dream, who asked the young woman “to set her free.” “She was imprisoned.” In other words, the icon was buried here.⁹ After three dreams, Roxane asked the other Christians to go along with her. By digging up the icon, she liberated the Panagia, who then appeared to her in a vision. The Panagia promised to help Roxane liberate Athens from the Goths. When their leader, Alaric, came, he wanted to destroy the city. But a light appeared before them,¹⁰ and Alaric, who was a Christian himself, departed after recognizing an image of the Panagia

on the city-wall. The article also asserts many of the pagan Athenians interpreted the miracle in their own way—they thought the goddess Athena, who was believed to be the protector of her namesake city, had appeared on the city-wall. The miracle happened in August 395 and therefore 15 August is celebrated here in commemoration of the miracle.¹¹ Unable to date the article precisely, I am also aware of the potential interpretative biases of my informants. Their accounts of the article emphasize the magical powers of the icon, and we are able to see the similarities between the pagan and Christian beliefs. Accordingly, they also maintain the icon was brought to the cave when people who did not believe in Christianity were present. The article does not say anything about that part of the story. Instead, it recounts how the icon helped the Athenians save the city from the assault of the Goths.¹²

My informants tell me at an earlier time, they used to be in both churches during the festival dedicated to the Life-giving Spring. They always started in the Life-giving Spring, and sometimes they continued the celebration in the Crysospēliōtissa. In the cave dedicated to Panagia Crysospēliōtissa, they perform a memorial service called “Nine days after the Dormition” on August 23.¹³

There were once two storeys separated by a wooden-floor in the chapel dedicated to Panagia Crysospēliōtissa. The upper-floor was situated where the ladder leading up to the icon of the Sleeping Panagia (i.e. her *Epitaphios*) stops (cf. Plate 4). While Eirinē is cleaning, she arranges the candelabra she brought from the cave dedicated to the Life-giving Spring on a certain place, claiming this is where the “holy table” used to be, and “there was a church above,” referring to the second floor.¹⁴ She continues explaining this actual “upper” church “is named after the death or ‘Dormition’ of the Panagia, because the icon from 1894 depicts her death.” They decorate the icon with olive-oil lamps and flowers. They also decorate the rest of the cave, but they leave all the lamps in front of the icon of the Panagia and the Child. When asked if the location of the lamps is purposive, Eirinē replies “No.” The most important icon was actually moved to Moscow; only a copy remains in the cave. Many votive offerings have been dedicated to this copy in the cave.

The first time I visited the cave, August 19, 1990, I also saw icons dedicated to the Panagia Athiniotissa and Agios Attikos.¹⁵ The cave contains many icons of different saints (cf. Plate

4), including Agios Constantine and Agios Gregorios. Several icons hang over older Byzantine frescos, which are not restored (i.e. in 1992). There is also a picture of the Holy Ephraim. He suffered martyrdom under the Turks, who burned him. His remains are in a monastery, dating to the eleventh century, in the neighbourhood of Nea Makri. According to my informants, many miracles have occurred there: Panagiotis’ cousin Sophia, who was barren, reportedly became pregnant following a visit to the monastery.¹⁶

Religious symbols, stories, and legends play a central role in nurturing the faith of many followers. During my visit, Panagiotis supplies me with several small pictures of different saints and other gifts, for instance a medallion of Agios Pandleimon, the Healer, the patron-saint of invalids and cripples. I also received a picture representing a tree, which had a cross inside it when it was cut.¹⁷ They also tell me a miracle has probably occurred recently in the church at Kypseli dedicated to Agios Ephtimidios: Last week, they found blood on the icon of Jesus Christ. They summoned experts, who were unable to pinpoint the source of the blood. I also learn that some years ago, Eirinē found all the icons broken when she arrived at the cave-church. This is why both the churches are now locked



Plate 3: Eirinē Melas carries out the monthly cleaning of the Acropolis caves starting in the church dedicated to the Life-giving Spring (author photograph).

up with bars and secured with chains and padlocks. Aided by volunteers, Eirinē managed to repair some of the broken icons, and she received several new ones. Panagiotis lights the incense burner and emphasizes the incense is from Athos and is called desert-flower. Eirinē tells him to polish all the framed and glazed icons with Ajax and wash-leather.¹⁸ Meanwhile, Eirinē sweeps and dusts all the icons. In both churches she scrubs the candelabras with steel wool and olive oil.

When she has finished sweeping, she sprinkles water from the Life-giving Spring throughout the cave. Then, after seeing to it that all the lamps are lit, we return to the first church. Once there, my informants show me a hole in the ground close to the entrance sill. This is where they used to behead the priests they explain. To protect themselves, the priests used to hide in the water behind the wall on the right side of the icon. Eirinē and Panagiotis are eager to share their beliefs and interpretations with me and teach me more about the caves. According to them, an ancient column, situated in the middle of the ground floor, served as the “holy table (see Plate 1), and has relics from saints inside!¹⁹ Panagiotis emphasizes that formerly this church had a “greater church above,” and (the emperor) Constantine built it. Accordingly, the church dedicated to the Life-giving Spring was part of the large Byzantine Church-complex covering an extended area. He shows another picture of Ephraim, the monk who was burned on May 5, 1426. May 5 is now an annual holiday, celebrating the saint in the monastery that is dedicated to him. “There he lays in a silver-coffin and over his relics is the Byzantine banner decorated with the two eagles.” In the cave are many icons (cf. Plate 1) as well as many votive offerings.

While talking about icons, my informants recount a popular belief among many Greeks that the holy icon on Tinos is the work of the Evangelist, Luke. They say when King Paul became ill his family bestowed all



Plate 4: The cave dedicated to the Panagia Cryso sp li tissa or Chapel of Our Lady of the Cavern at Athens (author photograph).

the gold and precious stones that cover the icon. The icon in the cave dedicated to the Life-giving Spring was made in 1917, and shows, according to Panagiotis, “how the water was turned on formerly, when there was a fountain here.”²⁰

Upon our departure, Eirinē wishes my mother and me “Happy Easter” and adds, as most faithful Greeks do, “Happy Resurrection” (*Kalē Anastasē*).

“New” Friday in the “White Week”: The Celebration of the Life-giving Spring

Easter celebrations in Greece last throughout the week that follows Easter Sunday. The first week after Easter is known as the “White Week” or the “Bright Week.” (*Lamprē* signifies both bright and Easter in Greek). On New Friday in the White Week, the Greeks commemorate the Virgin Mary under her attribute of *Zōodochos Pēgē*, the Life-giving Spring. The festival is a part of the spring festivals, which are celebrated during the first week after Easter. In several places, on this day, there are special services and processions followed by folk dances.²¹ In Athens, the festival is celebrated in the church dedicated to the Life-giving Spring, which is situated inside the archaeological site of the Athenian Acropolis.

In 1992, the Friday after Easter coincided with May 1, which is the annual Workers Day.²² This is also a general holiday also for the guards working at the Acropolis area. Approximately two months before the Easter celebration, some guards told me they believed officials might close the entire Acropolis area on May 1, which would prevent pilgrims from visiting the Life-giving Spring on the feast day.

It remained unclear for some time whether the “holiday of the workers,” a more secular celebration, would win out over the religious celebration, which is rooted in the traditional customs and value systems of the common people.²³ Both festivals represent the people, but one is related to a modern and Western-oriented nationalist ideology while the other represents



Plate 5: The priest packs up his briefcase, situated in the middle of the altar, in the church dedicated to the Life-giving Spring at Athens (author photograph).

the "Romeic" (or inward-facing Orthodox Christian) tradition to which the overwhelming majority of Greeks still adhere.

Finally the Acropolis-authorities decided to keep the area open for a short period of time, and the popular religiosity of the Greeks triumphed. The festival is celebrated from 8:30 until 11:00 A.M. The guards working at the Acropolis are on duty at the two entrances to the Acropolis area. Greeks from the neighbourhood are "filtered out" from the rest of the people, and only the Greeks are admitted into the area. To the many frustrated tourists, the message is quite clear: "only Greeks are admitted, since it is their festival."²⁴ So, the Romeic ("inside") tradition gains the victory over the "Hellenic" practice, which is "outward-directed" (i.e. the "common Ancient heritage" which the Greeks shares with the Western world). As in other instances, the Romeic tradition is hidden from Europeans and other Western people.²⁵ Underscoring the tensions between the popular religious traditions and official practices, the parish priest claimed the Romeic ritual was pagan and refused to officiate. Accordingly, he had to be replaced by another celebrant.

During the ceremony, which takes place at the cave dedicated to the Life-giving Spring, Athenians fetch Life-giving holy water. Many people are present, old and young, female and male. The service lasts for two hours, and the officiating priest is the same as the year before. Several tables are set up outside the entrance to the cave-church. They are laid with a variety of special breads brought by the participants as offerings, particularly the round holy bread, *prosporo*, which is blessed by the priest. In addition, the ceremony also features sweet breads (cakes sprinkled with sugar icing), which are baked and offered at annual festivals dedicated to saints. Inside the church several candles are lit in the candelabras. The censer of the priest, which is decorated with little bells, is suspended on one of the candelabras near the altar (cf. Plate 7). At the altar, in front of the wall behind which is the spring, the priest is officiating. When he concludes the mass, he starts to assemble the rest of the holy bread, which he has blessed and distributed to the participants. He also packs up his briefcase, which is situated in the middle of the altar (Plate 5).

Although most of the participants have left with their small bottles of holy water and pieces of holy bread, some people still flow into the cave-church. An old priest leaves, carrying with him a bottle of holy water for the following year. People who flow into the

cave-church also wash in the spring and drink from the water.

The water scoop is often used in the cave dedicated to the Panagia, the Life-giving Spring, during the festival. A man using crutches sits next to the spring occupied with drawing water (Plate 6).²⁶ Supplied with the water scoop, he continually receives empty bottles, which he fills and returns to the people who are queuing up. Other people drink from the spring, sprinkle their heads, or fill small bottles they have brought for just this purpose by putting the bottles directly into the spring. In the middle of the ground floor, a basket filled with pieces of bread is placed on the ancient column (cf. Plate 7), i.e. the "holy table," containing the saints' bones. When the last slice of bread is taken, a faithful seizes the basket and pours the rest of the crumbs over him. While people are occupied with their own water-fetching ritual, the guards working at the Acropolis become more and more impatient: They are shouting, arguing that we have to get out (Plate 7).

But, the people ignore the officials and continue to fetch water and bread, to drink and eat, to kiss the various icons, and cross themselves. Eirinē becomes very angry and argues ardently with the head of the guards. At 11 o'clock, we are more or less thrown out. The evening service is cancelled, but the Acropolis authorities are forced to open the church, let people in, and keep several guards on duty for more than three hours on May 1, 1992.



Plate 6: A man on crutches sits next to the spring and is occupied with drawing water in the church of Life-giving Spring, Athens (author photograph).

The cults in the Acropolis caves at Athens: continuity and change

Ancient Greeks generally viewed springs and pools of water in caves and caverns as manifestations of the divine. With the spread of Christianity, most of the caves were transformed into churches, as in Athens, where we find the church dedicated to the Life-giving Spring. Here, and in other locations, Christian symbols have replaced pagan ones.

Initially the Life-giving Spring and its surroundings were sacred homes of the water nymphs. The structure housing the spring dates back to the late sixth century B.C., and several remains of votive reliefs depicting nymphs have been found throughout the area.²⁷ Pan was also worshipped there from the fifth century B.C. onward. A large marble altar or altar-table (*IG II² 4994*) bearing the names of Hermes, Aphrodite, and Isis might suggest these gods also have been linked to the spring since they were worshipped in the area.

Sometime before the middle of the first century, a modest shrine for Isis, an Egyptian import, was established on the slope just south of the Archaic Spring House beside an even smaller temple to the goddess Themis.

So, the original cult of the spring, followed by the Archaic round Spring House, later situated within the Asklepion, or the sanctuary of Asklepios in the City (cf. Plate 2) are very much older than the shrine of Asklepios, which was dedicated in 419/418 B.C. by Telemakhos of Acharnai, a devout private donor.²⁸ The sacred territory of the spring was not officially marked until this last quarter of the fifth century, the era of Telemakhos's beneficence, when a marble boundary stone inscribed with the words *horos krenes* (boundary of the spring) was placed, establishing the limits of the Spring House terrace.

Asklepios owes his status and popularity to the healing of sickness. His daughter who is named simply *Hygieia* (Health), also illustrates the healing aspect. News of the miracle cures drew hordes of visitors to Epidaurous, the home or original cult centre of Asklepios (cf. Paus. 2.26,8), and gave rise to a regular health business. The worship of Asklepios, was introduced into Athens on the occasion of the plague of 429 B.C. According to the Historian Thucydides: "In the city of Athens it [the plague] appeared suddenly, and the first cases were among the population of Piraeus, where there were no wells at that time, so that it was supposed by them that the Peloponnesians had poisoned the reservoirs" (Thuc. 2.48). "Words indeed fail one when one tries to give a general picture of this disease; and as for the sufferings of individuals, they seemed almost beyond the capacity of human nature to endure" (2.50). The "cure" followed a ritual, during which patients washed in the Sacred Spring, offered at an altar, and then retired to the *stoa* (a porch or portico not attached to a larger building) where the mysterious process of incubation (*egkoimēsis*) was assisted by incense from the altars (cf. Paus. 2.27,1 f.). This ceremony and the religious excitement it encouraged produced dreams, through which Asklepios was supposed to effect his cure. Many ex-voto tablets to Asklepios and Hygieia have been found showing the portion of the anatomy treated. These were affixed to a wall or were inlaid in the columns; larger votive stelai, some showing the god visiting sick patients in their sleep, were affixed to the stoa steps. The traveller and writer, Pausanias, living in the second century A.D., recounted the votive offerings he saw while visiting the Acropolis cave (1.21,4-7).

He specifies (1.21,4): "In it there is a spring, by which they say that Poseidon's son Halirrhothios (Seafoam) deflowered Alkippe the daughter of Ares"

The baths were important in the shrines of Asklepios, since the ancient Greeks believed Asklepios would not accept or come into personal contact with patients who had not been washed. Accordingly, sacred springs are mentioned in all three hundred twenty documented Asklepia.²⁹ The clear bubbling water of a spring, rising out of the earth by a power, habitually regarded as a water nymph, was, in the imagination of the ancient Greeks, a gift of the water deities, the goddesses by which all life on earth was fed.³⁰ Accordingly, it is quite understandable that

even pure water was considered to have therapeutic properties. Ancient medicine employed water treatments in various ways for a great variety of maladies including eczema, rheumatism, gout, and psychosomatic disorders. The physician, Galen (approximately A.D. 129-199) gave detailed instructions for particular water treatments, which took place in Pergamon in Asia Minor.

In the fifth or the beginning of the sixth century A.D., all the buildings were demolished and on the foundations a large three-aisled Christian basilica was built to the memory of Ag. Anargyroi, the patron saints of healing.³¹ When early Christians built a structure on the remains of the Asklepion, the sanctuary dedicated to the ancient god of healing became a Byzantine Church. Here, under the patronage of Ag. Kosmas and Ag. Damianos (i.e. Ag. Anargyroi), many of the healing

traditions of the ancients continued under the cloak of Christianity. When the area around the Asklepion was excavated in 1876, the cave with holy water also became dedicated to the Panagia.³²

Some scholars have emphasized the continuities in the cults of male divinities at the site—first the pagan, Asklepios, and then the Christian, Ag. Anargyroi.³³ In the practical rituals of contemporary locals, however, the female Panagia has emerged as the most important saint. In antiquity, the two Acropolis caves were dedicated to the water nymphs and Artemis³⁴ respectively, and later they became churches where the Panagia is worshipped. In other words, in the two caves there have been cults dedicated to female fertility and healing divinities in ancient (i.e. archaic) and modern times, even if the names of the divinities have changed. The male elements in the Classical (Asklepios and Dionysos respectively, Asklepios nevertheless together with Hygieia) and the Byzantine periods



Plate 7: One of the impatient guards working at the Acropolis within the church dedicated to the Life-giving Spring (author photograph)

were intermezzos.³⁵ Even as Christian divinities have replaced pagan ones, the archetypal symbols of the Life-giving Spring as well as many of its attendant rituals have remained almost completely unchanged. Indeed, contemporaries continue to fetch the holy water from the cave much as their ancient counterparts did more than two thousand years ago.

From the Life-giving Spring at Athens to other cults of the Life-giving Spring

Holy water, *agiasma*, is found in most contemporary Greek sanctuaries, but some sanctuaries offer water that is said to possess especially strong miracle working properties. And several caves with springs, which were dedicated to ancient gods and goddesses, particularly water nymphs, are now transformed to chapels dedicated to the Panagia. The linkages between female divinities and water are particularly striking on the Aegean island of Tinos, the site of a chapel dedicated to the Life-giving Spring—that belongs to the greatest shrine of Greek Orthodoxy.

In 1822, a pious nun named Pelagia saw a series of visions in which the Panagia ordered her to persuade island elders to search for her buried icon in a barren field and to build a church on that spot. On January 30, 1823, the icon was unearthed at the site of a Christian church that had been built on the ruins of a pagan temple to Dionysus and then destroyed by the Saracens during the tenth century. The miraculous discovery of the icon took place only two years after the first uprising of what would become known as the Greek War of Liberation. The Greeks would have to wait until 1832 before the major European powers recognized their independence.

During the violent and uncertain birth of modern Greece, many patriots found comfort and hope in the miraculous developments on Tinos. Pelagia eventually became recognized as a saint in 1971, when the Greek government also decreed Tinos a sacred island. In addition to the thousands of pilgrims who visit Tinos

on their own, several pilgrimages are organised by representatives of the Orthodox Church in connection with the most important festival on August 15.

The first excavations on Tinos brought to light the ruins of the foundations of the Byzantine Church, including a deep but dry well. Some months later, in 1823, the cornerstone of the church of the Life-giving Spring was laid. Later, the icon was found approximately two meters from the well, and local leaders oversaw the construction of a big church above the chapel dedicated to the Life-giving Spring. So, the chapel or church dedicated to the Life-giving Spring, which is formed as a cave, is situated below the Church of the Annunciation.³⁶ On the day of the laying of the cornerstone of the Holy Church, the formerly dry well became filled with water and has since become a rich fountain—a development that quickly became recognized as one of the most important miracles of the Panagia of Tinos.³⁷ Some faithful not coming from Tinos however, believe the Panagia sent the water herself to provide a cleaning agent for her dirtied icon.³⁸

Pilgrims view the sacred water as a miracle-working agent and have long collected it in bottles, which they then take home. Baptisms are not performed in the church itself but in the baptistry, located off the chapel of the Life-giving Spring. During the Dormition of the Panagia, on August 15, many children are baptised in the chapel of holy water, in the Life-giving Spring (Plate 8).³⁹

Rituals connected with water are very important, both in modern and ancient Greece, as is exemplified in the festival dedicated to the Panagia, under her attribute of the Life-giving Spring. In this connection, it is important to mention the establishment of the festival dedicated to the Life-giving Spring in Constantinople by the Patriarch in 1833.⁴⁰ Through the important blessing of the *agiasma*, we again encounter holy water, a very old purification symbol, whose significance was re-established by the Patriarch in service of the national ideology in the same year the Greek struggle for independence came to a successful conclusion. In Greece, then, popular traditions and symbols merge with the ideology of nationalism.⁴¹ In this manner, belief systems that might otherwise appear contradictory have become complementary and interdependent.

From the Greek context to other Mediterranean and Middle Eastern Springs

Resonating far beyond Greece, the underlying religious patterns found in the Acropolis caves and on the island of Tinos are also at work in the stories and traditions associated with a much more famous cave in Lourdes, France. Here, beginning in February 1858, Bernadette Soubirous (1844-1879), had eighteen



Plate 8: A child is baptised in the chapel of holy water in the Life-giving Spring, Tinos (author photograph).

mystical visions, during which the Virgin Mary appeared to her. During the ninth vision, in front of several spectators, Bernadette started to scratch the earth with her fingers and a thin jet of water began to pour forth. In 1862, the Catholic bishop decided to build a sanctuary in connection with the cave. Later, Bernadette became a nun and in 1933 she was sanctified. This religious centre has been characterised as the greatest pilgrimage centre in the world. In addition to pilgrims coming on their own, "Assumption priests," since 1873, have organized "National Pilgrimages" in Paris. In 1963, the first organised pilgrimage for the poliomyelitis took place, eventually disabled persons in wheel chairs also participated, thus, paralleling the circumstances on modern Tinos. Next to the cave with the marble Holy Virgin in Lourdes are the fountains and the pools where the pilgrims take their baths. Today, the pilgrims, much like their counterparts on Tinos, fetch holy water from the cave in small bottles. In addition, the church sends small bottles of water all over the world at the request of people who do not have the opportunity to personally visit Lourdes. The main church built over the miraculous cave, where Bernadette had the visions, is dedicated to the "Immaculate Conception." In the cave, a marble Holy Virgin indicates the spot.

Throughout much of the Catholic world, images of Bernadette kneeling in the cave while she receives a vision have been reproduced. One such image is found on the backside of a small church in the little south Italian village of Villammare, dedicated to the Holy Virgin under her attribute of Saver of the port (*Maria S.S. di Portosalvo*).⁴² Other places in the Mediterranean and Roman Catholic world also have holy springs, including *Il Santuario Pietrasanta*, in the village of San Giovanni a Piro, situated in the mountains over the Bay of Policastro in southern Italy. The most important statue in the church represents the Madonna and the Child, and the spring in San Giovanni a Piro is also thought to be particularly healing and purifying.⁴³

The ancient and Christian demands for ritual purity have their parallels in Islamic rituals, since prayer is valid only when performed in a state of ritual purity, and therefore has to be preceded by ablution, *wudu'*. The Koran (5:8-9) ordains: "...wash your faces and your hands up to the elbows, and wipe your heads and your feet up to the ankles...."⁴⁴ The duty of ablution accounts for the presence of fountains in the mosque courts.

In conclusion, springs are connected to healing and purification both in the ancient Greek and Graeco-Roman worlds and in the modern Mediterranean and the Middle East. In ancient and contemporary Greece, water has been linked with exceptional powers. Water is also often viewed as dangerous, because it is around such sources where the *Nereids* may gather.⁴⁵ Even as the official religions of the Western, Mediterranean, and Middle Eastern worlds have diverged, water

remains a central motif. Water has fertility-enhancing, healing, purifying, and protecting powers; in the form of holy water, it is central to many rituals designed to ward off evil and ensure blessings. It is also used in conjunction with different magical remedies. It is said the spring at the Church of Christ at Spata lends power to stones gathered there, these, added to holy water and passion flowers, make a charm which protects a house from illness.

Throughout the ages, springs have been places to which one is directed by a dream for the cure of illnesses; "silent water" is said to cure muteness and rainwater is said to cure warts. Today, people from throughout the world come to Lourdes and Tinos, because of their holy healing and purifying waters, which the pilgrims take home in bottles. In diverse cultures, modern sanctuaries are often situated at places where ancient pre-Christian people also made pilgrimages to holy springs, for example in Greece, where Agia Marina of the Holy Springs has her church next to the ancient site of a temple holy to the goddess, Themis.⁴⁶ The holy city of Mecca is situated on a place where, in earlier times, were found a stone and a holy spring.⁴⁷

ENDNOTES

1. I have not attempted to disguise the location of my field research, although I have used pseudonyms to protect the identities of the individuals who are discussed in this article.
2. See also Loukatos 1982: 153, cf. nevertheless *infra* and Håland 2003, 2005, 2007. It may be noted that Saint in Greek is Agios (m.) or Agia (f.), Agioi (pl.).
3. He was working here for 31 years.
4. I am particularly grateful for this, because I would probably not have been able to track them down without his help. I learned this when talking with several other persons, who found the ritual quite uninteresting compared to the other materials found in the Acropolis-area. Certainly, the two other women may also have been present because of curiosity.
5. For the problem with different histories, see Håland 2007: ch. 2 f., 6, cf. Hastrup 1992. See also *infra* for the problematical dating of a newspaper article.
6. Such as the Anastenaria, cf. Håland 2007: ch. 3 f., 6 for discussions of the practical problems that may arise, resulting from the (sometimes) difficult relations between the official Orthodox Church and popular religion, i.e. in practical life, we meet another reality than the official one given by Alexiou 1974.
7. She leaves the rest of the flowers in the other cave, and departs soon afterwards.
8. Eirinē always finishes her cleaning of the church dedicated to the Life-giving Spring before she goes up to the *Crysospēliōtissa*. Cf. the ritual on Aegina, where they fetch the icon of the Panagia to get rain, Håland 2005.
9. Cf. Håland 2003, 2007 for the Tinos-legend, etc., see also *infra*. Cf. also Kephallēniadē 1990 and 1991.
10. Cf. Hdt. 8.65, 8.84; Xen. Hell. 2.4,14 f.; Diod. 14.32,2 f. and Clem. Al. Strom. 1.24,163,1-3 for other pre-Christian parallels.
11. So, in this instance another meaning is added to the celebration of August 15, the Dormition of the Panagia.

12. They also tell that today the icon is to be found in the church dedicated to the Panagia Crysospēliōtissa, in the neighbourhood of Omonia square. They also call it Eirinē (i.e. Peace) or the Sleep, i.e. the Death.

13. In 1992 the ritual was not performed. Some days before the festival Eirinē and Panagiotis were cleaning and tidying up both churches, but Eirinē goes to the church in Monastiraki on the festival day. She does not tell why, but it might be that they have difficulties when trying to find a priest. Early in the morning, a woman reaches the entrance to the theatre of Dionysos, asking if the ceremony is going to be performed. But, she gets a negative answer.

14. Over the table is a Byzantine wall-painting representing Agios Athanasios from the 16th century. Several dates are also scratched on the rock.

15. So one may suggest that even if the cult dedicated to Athena on the top of the Acropolis was prohibited in the 5th century, when Athena's Parthenon was transformed into a church dedicated to the Panagia after the termination of the Panathenaia in 410 A.D., it has continued in one of the cave-churches on the slope of the same rock.

16. I observe a cross, which looks like a phallus, and they tell that it is sewn.

17. Cf. the story behind the "split column", Economides 1986: 22-24.

18. It is worth mentioning that after a while the leader of the guards working at the Acropolis-area comes around. He got a copy of my permission-letter to do research in the caves. All the way, I experienced that they found it quite incomprehensible that I was as interested in talking with the people performing their religious rituals as with the archaeologists.

19. Cf. ancient Greek death-cult and the belief that the power of the dead was most strongly experienced in the neighbourhood of the grave, cf. Garland 1985: 4 and fig. 1 for a parallel to the bones of the saints in the cave.

20. Panagiotis also tells that the best candles are made of honey, cf. the beeswax-candles on Aegina.

21. See also Tsoatakou-Karbelē 1991: 98 f.; Megas 1992: 184-187.

22. May Day is also celebrated with other particular customs, i.e. people gather spring flowers. With these they make wreaths and hang them on their front door.

23. Cf. Håland 2007: particularly ch. 2. For the following, cf. also Herzfeld 1986, 1992.

24. Arriving directly with a delayed plane from Karpathos, I was late, and the guards would not let me enter: They take me for one of the other ordinary tourists who are persistent outside the entrance-gate, even though most of them know why I am here. They say that, "the festival is only celebrated for the Greeks." Finally, they admit me into the area because I am able to present the letter I got from the Acropolis-authorities, giving me permission to visit the caves in connection with my research.

25. Cf. Herzfeld 1992: for the term "disemia", a two-way-facing system of meanings that can be part of a public discourse, cf. also Dubisch 1995: ch. 9 for the distinction between insider and outsider, dikoi (our own) and xenoī (strangers or foreigners). Cf. Håland 2007: ch. 2 f., 6, forthcoming.

26. See also Håland 2003: fig.3 and 2005: fig.8.

27. See also Håland 2003: fig.4; Travlos 1971: 127, 138, fig.178, cf. figs.192 f. Fig. 192 is also dedicated to Pan, cf. the following. Also Hdt. 6.105, cf. Ar. *Lys.* 720-723; Eur. *Ion.* 492-502, see also Men. *Dysk.* 432-434. For the Athenian Acropolis, see for example Hurwit 2004.

28. Travlos 1971: 127. The ancient Athenian calendar year began in the summer of one of our years and ended in the summer of the next, accordingly ancient dates are often expressed in slashed terms.

29. See Kasas and Struckmann 1990.

30. Cf. Håland 2003, 2005, for the importance of the water nymphs.

31. Travlos 1939/41: 35-68, cf. Travlos 1971: 128.

32. Travlos 1939/41: 68.

33. Loukatos 1982: 153.

34. For Artemis' connection with springs, see Håland 2003. In the Acropolis cave, she is worshipped with her brother Apollo, Paus. 1.21.3.

35. Cf. the cult dedicated to Agia Marina beneath the Hill of the Nymphs at Athens where people fetch Holy water from the spring connected to the church sacred to Agia Marina, particularly during her festival on 17 July, Håland 2005, 2007.

36. See Håland 2003, 2007, forthcoming for a more detailed account also for the following.

37. Foskolos 1996 presents the most important miracles of the Megalochari of Tinos.

38. Blum/Blum 1970: 59.

39. See Håland 2003: fig.2.

40. Loukatos 1985: 165.

41. For the similarities between life-cycle passages and the rituals performed in connection with important passages during the cycle of nature, see Håland 2006, 2007.

42. Håland 1990: ch. 2.

43. Håland 1990: ch. 2 and 7.

44. Quoted from Grunebaum 1981: 10.

45. Cf. Blum/Blum 1970; Håland 1990, 2003, 2005 also for ancient material.

46. Blum/Blum 1970: 324, cf. Håland 2005: Agia Marina and the former Nymphs. See also n.34 supra.

47. For the relations between traditional popular religiosity and Islam see also for example, Bourdieu 1980; Eickelman 1981. Cf. also Grunebaum 1981.

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LIQUID LEVIATHAN

DAVID LEE KEISER
MONTCLAIR STATE UNIVERSITY

When tongues frost with singular snowflakes and
Fractal patterns collapse under bated palates
Manna dissolves

When necks slicked with sweat
Garner gold beads and
Bodily deltas cleanse
A momentary flush of glandular renewal

When nipples conduce water and
Mammary glands spike with hormones
Nutritional alchemy

But when we in the West hear others drink urine
We say so sick so unsanitary so unwise
Or so it seems
When we in the west hear that Bikram
Heats past one hundred and five
We say Namaste for our lube job

And when we see sweat as unwomanly
The sweat we regret serves us best
Left alone to its own glandular devices

When water flows from loins
Rich with stolen minerals
Golden kidneys excrete
Sweet saccharin syrup
But beneath the sugar
Is Sugar

When Indian boys swim in harbors sullied with toxins
Legs remember brown water
When Yoruban priests drink acid rain
Osun takes note in his hara
And when Chinese dams leave Laos rivers powerless
Peasants spawn against the current

But swimming into tides
Steels souls tethered to perpetual drought
Aquatic epiphany!



Tintagel Doorway – one of the doorways to the legendary King Arthur’s castle at Tintagel through which one can view the sea with miles of visibility in nearly every direction. (Margaret Evans)

COMPETITIVE STRUCTURE OF THE GLOBAL DESIGN, BUILD, AND OPERATE (DBO) WATER SUPPLY INDUSTRY

EDWARD PITINGOLO
SHIPPENSBURG UNIVERSITY

“Water, water everywhere, nor any drop to drink.”

Samuel Taylor Coleridge, Rime of the Ancient Mariner

In the United States we take for granted the fact water is readily supplied to us by a governmentally related entity or a private water company. We go to the faucet and with a turn, water is readily dispensed. There are water fountains for drinking in many public locations and venues, as well as fountains for aesthetic purposes. When the bill comes for the water service, we willingly pay the requested amount for this valuable commodity. When water service is disrupted due to a variety of events including natural disasters and pollution, we have the technology to return water service to normal within a reasonable amount of time. We rarely deal with permanent water supply shortages.

Globally, this may not be the case. Although industrialized countries enjoy a similar water scenario, other countries do not. Emerging and Third World countries have water infrastructure problems, some due to the apparent lack of development and others to cultural components. For example, many of our fellow citizens worldwide believe water is a free right, much like the air we breathe, and expecting monetary remuneration for providing water service is tantamount to taxing the air we breathe. Therefore, going to a water source and carrying water home is normal and expected – and free. However this causes multiple problems, including reinforcing poverty, as infrastructure development, that is developing undeveloped countries, hinges upon providing a stable supply of clean water.

Tension exists between those expecting free water and private companies entering a country and providing

water service, proponents of water privatization. Governments of those countries believe in the free-right concept and do not (or cannot) fund outright the development of water infrastructure. Their citizens expect free water. Moreover, non-governmental organizations (NGOs) regularly oppose and fund challenges to establishing water infrastructure of the type we in the United States and other industrialized countries presuppose.

The design, build, and operate (DBO) water supply industry is examined from the viewpoint of an international water supplier, a French company, Veolia Environnement. By examining the competitive nature of the industry, a larger picture of water supply is presented. Additionally, since economic development and water supply go hand in hand, Veolia's presence in China is portrayed as a case of the cultural imperatives of the water business. Assessing the competitive nature of the water industry from accepted strategic models occurs.

Water constitutes a basic need to sustain all life. Without water, all life as we understand it will die. Civilization's success relies on the ability to supply its citizenry with water, dating back historically to the aqueducts of the Roman Empire. Often undertaken as the responsibility of a government to provide water supply infrastructure, the nature of the industry evolved with private service providers designing, building, and operating water distribution systems. This collaboration

between public governmental entities and private subcontractors flourishes in today's global market environment.

Industrialized nations typically enjoy a stable pure supply of water that easily envelops daily living at the turn of a faucet. However, emerging and Third World countries have degraded water distribution, often impure, with an unstable supply. Approximately one billion people globally currently do not have adequate water supply (Anonymous, 2004). This translates to challenges and opportunities for firms providing design, build, and operate (DBO) services.

The combination of industrialized nations subcontracting water utility systems and developing infrastructure in emergent and Third World countries provides Veolia Environnement, currently one of the largest providers of DBO services, with ample market share opportunity. Cultivating appropriate strategic plans encompassing global, cultural, and political aspects ensures the potential for success. Examining component pieces of the competition of the water supply industry reveals expectations for strategically managing the firm. Evaluating Veolia's position in the industry reveals insights into the future role of developing global infrastructure in water supply that enables economic development.

Global economic development requires infrastructure enabling sustainable growth. The basic nature of water supply and other environmental services provided by Veolia indicate the importance of its services. Obsolescence occurs only in the technology employed, not in the customer demand. This ensures stability and growth as the population expands globally. Economic development in the former Soviet bloc countries, China, and Third World nations also guarantees the viability of the water supply, the water treatment industry, and Veolia Environment into the foreseeable future.

The Global Competitive Structure of Design, Build and Operate Water Supply Systems

Storied history. Describing Veolia's heritage, Chairman and CEO Henri Proglio, states: "Founded at the dawn of the industrial era and the start of urban development, Veolia Environment has constantly adapted to the changes in our societies over the past 153 years." This illustrates the confidence through which Veolia conducts its operations. Founded in 1853 through an Imperial Charter of the French Emperor Napoleon III, the Compagnie Générale des Eaux (CGE) mission was providing water to French metropolitan areas and irrigating French farmlands. CGE accumulated other companies in a conglomerated portfolio of operations, including other environmental ventures dealing with waste management (Veolia History 2006).

After securing water supply rights to Venice in 1880, CGE began global operations by expanding across Europe. Ahead of the environmental curve, in 1884 the firm began treating wastewater, in contrast with the practice of discharging waste into nearby bodies of water. Throughout the twentieth century, CGE acquired companies in a variety of industries specializing in environmental processes. By 1980, CGE consolidated into a new organization known as Omnium de Traitement et de Valorisation (OTV), providing the design, build, and operate (DBO) aspect to its operations. The core companies of today's Veolia came together through acquisitions in the 1980s, including Connex, Onyx, and Dalkia. These holdings became Vivendi Environnement in the 1990s, part of Vivendi Universal, and became a separate company through an initial public offering in 2000.

Veolia maintains independence with no parent company and its stock trades on the Paris Bourse and the New York Stock Exchange. For fiscal year 2005, its water supply systems segment represented thirty-five percent of total sales, increasing as a percentage of total revenues. Sales volume increased to over thirty-five billion dollars in 2005, which amounts to over twelve billion dollars of sales for Veolia's water system segment. Veolia's operating income for the same fiscal period rose to almost three billion dollars and the water system segment constitutes half of Veolia's operating income. The company operates on all populated continents. Forty-eight percent of its total business is from its home country of France and is decreasing. Operations in Europe outside of France total thirty-three percent and is increasing. Sales in the Americas remain stable at ten percent while the nine percent of operations in the rest of the world is increasing (Veolia History 2006).

Characteristics of the industry. Although its origins rest in antiquity, centralized water distribution systems became commonplace through the industrial revolution and its concomitant urbanization (Chao & Chuang-lin 2007). Municipalities and regional governments often provide water systems through quasi-governmental entities. These authorities may own and operate their facilities, charging consumers for water consumption through a mechanized measurement meter. Outsourcing water supply capacity occurs where the governmental unit maintains ownership of the facilities and distribution network, but the subcontracted entity manages the operations. In a comprehensive approach, this concept results in the design, build, and operate (DBO) service: a municipality contracts the management of the entire project and maintains ownership. This public-private partnership, characterized by transparency, exists where there is no differentiation between the water utility provider and the municipality (Mann, C. C. 2007).

Private water holdings also exist where a company buys the water rights, then builds, and owns the water

distribution system. This concept causes global cultural concerns as the perception for the individual rights to water are the same as the individual rights to air. True water supply privatization, where a private firm owns the supply, the purification system, and the distribution lines, contains the possibility for exploitation of the end-user according to some opponents (Bate 2004).

As Asia, Eastern Europe, and Africa emerge economically, a stable, pure water supply is essential. The lack of a stable water supply precludes development. Since water supply infrastructure must be in place for economic development (Chao & Chuanglin 2007), these areas provide the growth opportunities for this industry. They represented nine percent of total sales in Veolia's sale volume and this percentage is increasing (Veolia History 2006).

To accomplish better efficiency in providing water, future incarnations as "Total Water Supply Systems" evolve where water purification and wastewater treatment will combine in producing potable water supplies (Anonymous 2001). Positioning the company for this eventuality, waste management represents the second largest segment of Veolia's business, with twenty-six percent of sales. Veolia also operates an institute for the purpose of innovation and educating people in environmental issues (Veolia History 2006).

Estimates place global market sales at approximately \$1.5 trillion dollars by 2015, doubling current market revenues. These growth expectations occur where Veolia conducts its smallest segment, but still represents a major presence (Anonymous 1999).

Intensity of rivalry among competitors. Economic competition consistently changes as companies strive to stay ahead of their competitors. According to Porter, "firms that gain competitive advantage in an industry are often those that not only perceive a new market need or the potential of a new technology but move early and most aggressively to exploit it" (1990). Two of the largest companies providing water supply systems are French, Veolia and Suez Lyonnaise. The French provide a favorable environment for water developers (Mann, C. C. 2007). This enables a national competitive advantage that translates to international success when moving into global territories (Porter 1990).

Companies compete for governmental contracts, voraciously attempting to increase revenues. When proposing any component of the operation, similar scoped projects require similar sized companies, and large firms encompass the economies of scale necessary to implement large projects. Some of the largest competitors regularly compete against each other: Veolia, Suez Lyonnaise, Berlin (Germany) Water, and Thames Water. In addition to competing in the contract bidding process, these companies buy shares in other companies or parts of quasi-governmental authorities. By purchasing shares of local entities, these firms accomplish a strategic goal in addition to

adding market share: obtaining an in-country cultural advantage for securing additional contracts (Zin 2004).

Currently, the number of water service providers totals twenty thousand. These range from large concerns operating multiple water systems trans-nationally to local authorities operating one water supply systems. By 2015, experts expect this number to decrease to five thousand as existing firms fuel growth in market share by merger and acquisition (Anonymous 1999). Expectations are that eighty companies will dominate the global market by 2015 with a sixty percent market share; the top-ten companies by sales volume will capture approximately forty percent of the global market; the smaller companies making up the remainder of the five-thousand will garner the remaining forty percent (Anonymous 1999).

Porter's five forces. Porter developed the model encompassing forces related to competition. His analysis outlines five important sources that determine competitive power and their relationship on competitive rivalry: bargaining power of suppliers, bargaining power of buyers, threat of substitution, threat of new entry, and competitive rivalry (1985).

Bargaining power of suppliers relates the ability of suppliers to affect market conditions and prices. Since supply factors consist of multiple sources in multiple countries the bargaining power of suppliers is determined to be low.

Figure 1, Porter's Five Forces (1985).



Bargaining power of buyers corresponds to the potential for customers to exert pressure on the firm. Although serving large numbers in urban areas requires expertise and only major water supply companies have the ability to maintain contracts, there are sufficient numbers of suppliers in the market. Additionally, customers could obtain their own knowledge and employ their own resources. Therefore, this force rates a medium power.

Threat of substitution corresponds to customers having the ability of substituting one product for another. Pertaining to water supply and distribution, this signifies governmental entities substituting a utility plant for another system, such as individual wells serving residential enclaves. Another substitution calls for customers to implement their own resources to develop water systems. Because these substitutions are possible and do occur, but do not characterize a major shift in the marketplace, this threat warrants a medium assessment.

Threat of new entry signifies new competitors coming into the market. Although many competitors exist, long-term contracts characterize the nature of the industry. This force assesses low because of the costly barriers to enter a market. The feasibility of establishing a second water utility in a given region determines this assessment, not only because of the cost for duplicate infrastructure but also because rights and franchises for distributing water are exclusive.

Competitive rivalry assessment results from the combination of the first four forces. Evaluating the contributive forces, the competitive rivalry in the water supply system is low to medium, warranting continued evaluation. If a significant amount of new water system development occurs in the twenty-first century reducing the growth potential, this may change (Porter 1985).

Geographical influences. Because of the urbanization resulting from industrialization occurring first in Europe, developing water supply infrastructure became paramount. Imperial decree set the French evolution in process, creating a favored industry.

Approximately one billion people currently do not have adequate water supply. The areas affected epitomize the geographic areas where future growth will occur (Anonymous 2004) and the major companies are poised to capture these markets. In many countries, controversy exists over true water privatization, where water companies actually own the systems they operate. Surprisingly, true water privatization is less common in the United States than in other countries and continents (Bate 2004).

The global competitive nature of the water supply system evolved over centuries, and industrialization expedited its growth. Economic development can only occur after the construction of primary infrastructure. Water supply services exist on a scale ranging from public utilities constructed, owned, and operated by governmental entities, to a public-private partnership between the governmental entity and firms such as Veolia, to completely privatized operations. The water supply design, build, and operate industry will continue growing, doubling in the next ten years. However, this growth occurs in geographic areas that now represent the smallest segment of current industry operations. Through mergers and acquisitions, the total number of suppliers will diminish by 75 percent in the next

decade. Analyzing competitive rivalry utilizing Porter's five-forces model reveals that competitive rivalry exists in a medium range as most of the contributing forces lie in that range.

Although over 90 percent of Veolia's current business takes place in Europe and the United States, the locations accounting for the remaining 10 percent represent the majority of future growth. Its current revenue base exists in industrialized nations; future revenue growth can only come from developing countries (Veolia 2006). Veolia is a global leader in this industry.

The Competitive Structure of Design, Build and Operate Water Supply Systems in China

DBO in China. The People's Republic of China, governed as a communist state since its revolution in the 1940s, has allowed free-market transactions since 1978. Since then the resultant growth in their economy averages approximately 10 percent per year, almost three times the rate of major western nations. This growth shows no sign of abating and at times has reached 12 percent. China's growth continues to direct infrastructure development. Economic growth represents a primary focus for the government, expecting their blend of communism and capitalism to save them from the fate of the former Soviet Union. For continual economic development, infrastructure construction must occur first, and water supply systems represent the primary component of that infrastructure (Chao & Chuang-lin 2007).

The central government invites companies to negotiate the nature of their operations in China. This acts as tacit approval for local and regional governments to utilize these companies (Tan, Li, and Xia 2007). Operating in China since 1997, Veolia became the premier water supply systems provider in that country, investing over one billion dollars as of 2004. Other water supply system companies operating in China are Berlin Water, Thames Water, and the other French company, Suez Lyonnaise (Zin 2004).

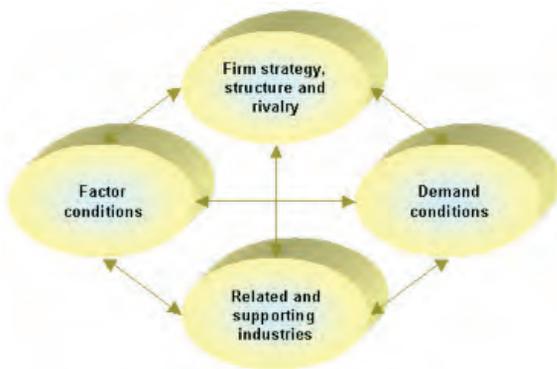
Porter's diamond model. In his book, *The Competitive Advantage of Nations*, Porter (1990) defines a model that provides reasoning why some companies succeed in the global competitive environment and others do not. Attributing success to characteristics in the home country of the organization, Porter defines these features and relates them in four points of a diamond, with bidirectional flows moving to and from each point. The four points are:

- **Factor conditions** are resources and inputs classically identified by economists as the factors of production such as skilled labor, developed infrastructure, and technological advances. These conditions aid in developing a competitive advantage for various industry segments. Porter defined several subcategories and demonstrated these initial advantages constitute building blocks

from which companies may build additional competitive advantages.

- **Demand conditions** prognosticate via home country customer wants and needs, products and services, signaling demand trends internationally. Market signals, Porter contends, provide national advantages if the signals extend to international trends.
- **Related and supporting industries** present in the home country offers competitive advantages. Often industries develop within a network of associated industries and the presence of these industrial partners aid in advancing a national competitive advantage.
- **Firm strategy, structure, and rivalry** encompass conditions in a home country that establish organizational structure, management methodologies, and the attributes of domestic competitiveness. In the home country, cultural aspects play a significant role in determining the competitive advantage in international operations.

Figure 2, Porter's Diamond (1990).



Utilizing Porter's diamond, companies' access and develop home country aspects enabling a competitive advantage on a global basis. At the national level, Porter's diamond enables governmental policy makers to favor developing competitive advantages in various industries.

Employing Porter's diamond to evaluate Veolia's home country competitive advantage that translates to an economic benefit in the Chinese market aids in developing corporate strategy. For example, France has a sufficient skilled labor pool, industrialized infrastructure, and enjoys groundbreaking technological advances related to the water system supply organization. Demand conditions for a pure and stable supply of water enabled Veolia to develop services comparable to those needed in China. Veolia also developed sewage treatment in France, again allowing for cross boundary trading in this particular service. Since the Imperial Decree by Napoleon III, governmental policy has favored the water supply system industry.

Refining Porter's diamond, Dunning (1993) distinguished parameters for international components. Defining multinational enterprises (MNEs) the author asserts companies enjoy a more pluralistic motivation for global trade. As this relates to Veolia in China, its status as a MNE allows a systematic advantage of lowering its transaction costs in international markets. Veolia's multi-national enterprise status (MNE) provides tools for continued strength in the marketplace (Dunning 1993).

Veolia's involvement in China requires strategic planning to enhance its competitive position. Part of that strategic planning is accessing the competitive advantage Veolia brings to China based upon competitive advantages enjoyed by Veolia in its home country, France. Porter's diamond presents a model for evaluating the competitive position translating from France to China. After analyzing the home country competitive advantage of Veolia, we can surmise the various attributes included in Porter's Diamond consisting of economic factors, factors of production, consumer demand, interrelated industries, and governmental policy, present Veolia a significant home country competitive advantage. This benefit translates globally particularly in its Chinese operations and contributes to the success of Veolia as the premier source for water system supply in China.

Virtuous expanding cycle versus vicious cycle of decline on a sliding scale. Global trade and the factors composing trade often further industries and their respective companies. These decision processes amplify in magnitude creating a composite affect. This affect sometimes represents positive momentum and Porter (1990) defines this as a virtuous expanding cycle where forward momentum causes positive benefits for companies, their industries, and the foreign countries in which they do business. Conversely, negative attributes expand in a cause and effect relationship as well. The amplitude and direction of these negative affects is the vicious cycle of decline. This cause and effect relationship, amongst multiple factors in the international trade environment, allow for economic growth or economic decay. Part of the reason Third World countries experience delayed development in comparison to the rest of the world rests partly with this theory. As various policies, procedures, and cultural attributes prohibit economic development, a vicious cycle of decline exists. Industrialized nations benefit from their related set of economic attributes that enable a virtual expanding cycle. This concept applies to industries, home countries, and international trading partners in its application (Porter 1990).

Global environment. A virtuous expanding cycle exists for the water system supply industry as globalization spurs potential development of previously underdeveloped countries. This positive cycle exists because of the human demand for stable and pure water supplies plus the fact positive developments in

any given society cannot take place without sources of water. This economic development of providing water supply infrastructure creates positive changes in culture and politics, thus fulfilling the definition of a virtuous expanding cycle (Porter 1990).

Exploitation is possible in super-poor countries in geographic areas such as Africa, where exploitation of resources and faulty policies may stifle benefits and the vicious cycle of decline continues. Attempts must be made at providing suitable water supplies, because current water situations permanently hinder any development.

Chinese environment. The circumstances providing for global virtuous expanding cycles or vicious cycles of decline exist with the Chinese market. Economic development begets economic development; there exists a virtuous expanding cycle in China, that supporters of capitalism claim provides benefits across an array of political and social issues. Hopefully, as their economic system expands through the benefits of water system infrastructure, positive advantages will occur in China within the human rights area. Concern continues over the intent of the central government in its policies toward personal liberties.

Benefits in trade processes contribute, in an amplified way, towards a benefit of human civilization. This virtuous expanded cycle presents itself in the global trade of water system suppliers. The opposite, embodied by the vicious cycle of decline presents itself when policies and applications of trade are convoluted for illicit means. For the most part, both globally and in China, water system development presents the virtuous expanding cycle. This important identification represents part of the strategic plan for Veolia as it continues its course in globalized trade, reaching transnational status.

Competitive Impact on Veolia Environment

Organizations require strategic planning for successful foreign operations. Multiple attributes apply including cultural aspects of the firm, foreign environment, political ramifications of trans-global trade, and international trade relationships. Veolia must ensure its business process paradigms address multiple international characteristics with a systemic orientation. While trading in China, for example, Veolia must reasonably assure its stakeholders that effective corporate management enables globally consistent business processes. Factors potentially derailing Veolia and its competitive advantage require discernment and reconciliation for smooth operations. Potential factors causing problematic circumstances include government upheavals, anti-water privatization concerns, and the inability to anticipate and implement market place changes. As market growth includes factors new to Veolia management, an adequate framework established in strategic planning requires

implementation. This framework must include goal seeking scenarios for profit maximization and market penetration; reorientation of business processes; organizational metrics accessing foreign operations; and control mechanisms that alter unsuccessful programs. Various paradigms, such as Porter's five forces and diamond models present tools for assessing and managing foreign operations. Generating consideration for multiple attributes of the company related to transnational operations becomes part of the mission and vision of the firm.

Veolia must define its perception for sustainable growth in global situations, particularly its Chinese operations. Determining the attributes that govern appropriate courses of action in differing circumstances is a priority. Although predicting future events may prove futile in large part, discerning future economic patterns represents a prerequisite for long-term strategic planning. A model consisting of paradigms for at least a ten-year time frame must be included in organization policy. A combination of sensing market place evolutionary iterations based upon experience will enable Veolia continued leadership in its industry.

Veolia's background consists of a strong national advantage for its industry. This national advantage translates to economic advantages in foreign marketplaces. Veolia must foster this national advantage through its own operations in conjunction with the home country. Similarly, multiple home country advantages require development as each foreign operation contains the potential for a future home country, adding to its competitive strengths.

As a multinational enterprise, Veolia must strategically plan a "national diamond" (Dunning 1993) that creates a competitive advantage for the organization in the countries it operates. This is particularly true for its Chinese operations as the reduced transaction costs favoring Veolia may be explored for diversion to potential investment reaping additional profits. This presence in Asia serves as the origination for future ventures in this geographic locale.

Business change occurs constantly. Veolia must seek out, through market signals, the potential for change and innovation. The decision making of the firm requires a composition that embraces change initiatives. By sensing and embracing the possibilities for change, Veolia presents a continual leadership role in the global industry.

Veolia faces multiple considerations in managing its global operations, and in particular its Chinese operations. Differing strategic plans encompassing variations in its enterprises impart models that assess the competitive environment and allow the firm to plan accommodating scenarios for successful ventures. Veolia's embrace of substantive models that permit and encourage change consist of positions for policy and procedure development consistent with sustainable

growth. Its core strategic plan must comprise the following attributes:

- Expect and manage for sustainable growth, developing a consistent vision and mission, correlating to applicable models.
- Export the national advantage internationally (Porter 2000).
- Exploit its role as an MNE (Dunning 1993).
- Explore change initiatives.

General Summary

Beginning with a rich history in antiquity as in the aqueducts of the Roman Empire, water distribution epitomizes the basic infrastructure requirement for society's economic development. Partly the responsibility of government and partly the undertaking of private enterprise, water supply systems provide tangible benefits across a given spectrum. The basic need for water will not diminish and the continual implementation of water system capabilities remains on the horizon.

Equally noble with the task of ensuring a water supply is the history of Veolia Environment. Pioneers in developing water supply system technologies, the firm evolved into a premier global producer of water supply systems. Its current operations ensure continued growth in foreign markets. Veolia maintains success in assessing and scanning its competitive environment.

The global marketplace for water distribution systems continues to expand, either as a forerunner to future economic development or as simply supplying the basic component of life that is water. Varied levels of water supply systems exist globally between the industrialized nations and its poorer counterparts. This supports multiple potential for the water supply DBO under either circumstance, continuing to supply industrialized nations or developing poorer geographical regions. The emerging economies of Asia present substantive opportunity, particularly its Chinese investment. As these opportunities evolve, this sector must adapt with the market place.

This industry encounters a mix of applicable structures for its operations. Water supply DBOs must exploit their market position to encompass any potential structure whether a public-private partnership or true water privatization. Eventually developing products encompassing sewage treatment with water supply in a unitary ecosystem provides benefits to the existing product mix. This potential model combining total water management better allocates economic resources.

Employing models, such as Porter's five forces that accesses competitive rivalry and Porter's diamond model accessing the home country's strengths fostering a competitive advantage abroad enables strategic planners a view of the necessary direction required for

managing the firm. Veolia shows considerable foresight by its early investment in China. Its collaboration with the Chinese warrants exploration for continued benefits. Veolia's national advantage and previous export of this advantage enables consistent capture of economic benefits from lower international transaction costs. Any water supply DBO Chinese relationship furthers the need for evaluation based upon the political ambivalence and direct nature of the communist country. Successful operations require devising plans that employ scenarios for any contradicting governmental developments. Veolia may export its competitive advantages as it discerns translatable concepts from dealing with the Chinese to other emergent ventures.

The water supply DBO products and services exist in a virtuous expanding cycle in both the countries it operates in and by the nature of its products and services; their operations convert to extended societal benefits. The potential exists, particularly with true water privatization, for exploitation in a given society specifically in Third World countries. Convoluting doctrine and policies may continue the vicious cycle of decline encountered in these poor nations; nations that can least afford negative implications.

This sector's tool kit in dealing with the global environment in total and individually with its Chinese operations consists of multiple strategic planning attributes. These attributes comprise goal-seeking scenarios for achieving management's intentions and incorporating multiple dynamic paradigms that require continuous improvement. Veolia's environment scanning capabilities derive from its home country advantage, adding competitive advantages because of the favorable home country environment.

Change in the water supply system industry remains continuous; therefore, management must expect and employ techniques seeking opportunities for change. Veolia must incorporate its varied history and success, and utilize its history as a springboard for growth and not an anchor. For example, any DBO must examine new technology and embrace the model of the total eco-system water management attribute. This strategic planning enables forward momentum for this industry and its global operations.

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FLYING OVER FOUR RIVERS IN MAINE

MARY KATE AZCUY
MONMOUTH UNIVERSITY

The indestructible
sun light
mirrors
silver or titanium
onto the rivers'
reflecting
surface.

The limit
of shapes—

leaves,
cuts,
scraps—

that reflect
the blue sky.

The white sun
beckons
like rescue
signals

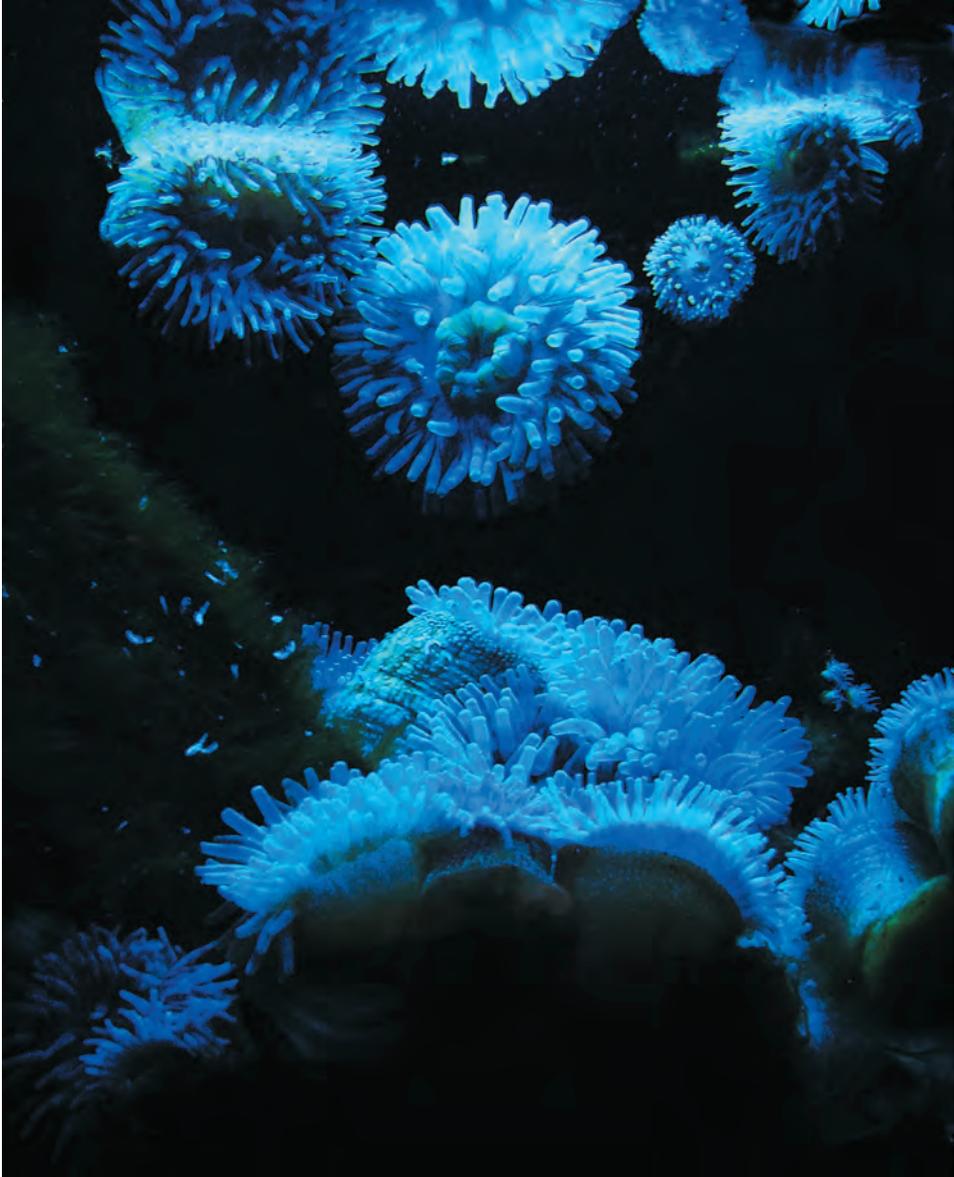
or the devil
dancing
like a
satyr.

The yin-yang
symbol
cut
from sheet metal,

the surface
polished
with aluminum
of rippled air,

leaving only the
clouds
etched
and moving.

Rivers and lakes
like puzzle shapes
of islands,
water,
the mysterious
land,
and
my heart—
lost to my children,
as I fly alone—
in the center.



Anemonies – found in the aquarium in Plymouth, England. (Margaret Evans)

THE PHOTOGRAPHY

MARGARET EVANS
SHIPPENSBURG UNIVERSITY

In June 2006 I visited the southwestern coast of England where my friend Hilary from the Peace Corps days in the early 1970s now lived. We had kept in touch but had not seen each other in over 30 years. Nevertheless, we immediately recognized each other at the train station in Bristol where we had arranged to meet.

Along with her husband, Mike and their two grown children, Hilary lives in Plymouth on the southern coast of Devon County. To the west lies the Peninsula of Cornwall County, a land full of romantic and mystical Celtic legends.

Hilary and I went on a six-day tour of Cornwall and Devon, stopping at peaceful towns and sleepy fishing villages as well as historic places along the way.

In Devon, we visited an aquarium and climbed Dart moor to see ancient ruins, including a working water “leet,” a channel that allows water to flow from higher to lower elevations, attributed to King Arthur. We visited Tintagel, the legendary castle home of King Arthur himself and of Merlin’s Cave, which is snuggled deep within the rocks far below. We saw small fishing villages, the rocks at Lands End, and places of higher elevation where the sapphire sea seemed to be visible from all directions at once.

The Images:

- *Chysauster* – the remains of an ancient village located at the plateau top of a long slow incline. The ruins now exist in the middle of a working sheep farm where animals graze and the surrounding farmland is worked as if nothing unusual were enclosed in its midst. (Page 4)
- *Merlin’s Cave at Tintagel* – the entrance to the legendary cave at the base of the Tintagel Castle. (Page 18)
- *Tintagel Doorway* – one of the doorways to the legendary King Arthur’s castle at Tintagel through which one can view the sea with miles of visibility in nearly every direction. (Page 56)
- *Fishing Village* – a small village along the coast of Cornwall. (Page 28)
- *Land’s End* – the rocks at Land’s End on the western tip of Cornwall. (Page 44)
- *King Arthur’s Leet* – a small channel where water passes from the high elevations inland to the lower villages below. (Page 12)
- *Anemonies* – found in the aquarium in Plymouth, England. (Page 66)
- *Coral Reef* – found in the Plymouth aquarium. (Page 68)
- *Floating, Sleeping Seal* – found in the Bristol Zoo, Bristol, England. (Page 68)

Margaret Evans is professor of photography and visual communications in the Communication/Journalism Department at Shippensburg University. She has been making portraits of humans, animals, landscapes and manmade objects for over 35 years. Many of her photographic works have been in major exhibits throughout the United States.



Coral Reef – found in the Plymouth aquarium. (Margaret Evans)



Floating, Sleeping Seal – found in the Bristol Zoo, Bristol, England. (Margaret Evans)

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