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SOUTHERN AFRICA

James Workman is a Donors' Fellow of the Institute studying the use, misuse, accretion and depletion of fresh-water supplies in southern Africa.

Retirement Plans for African Dams? **Apartheid's Legacy vs. Gravity's Force: What Goes Up Must Come Down**

By James G. Workman

DECEMBER 2003

BUSHBUCK RIDGE, South Africa – By 1993 even the old herdsman felt liberation had come to his people at last. Mandela free. Blacks soon to vote. Yet he remained poor and illiterate and far removed from rural village politics. So he continued his quiet wandering up in the rolling foothills as always, keeping watch all night, wide awake. He was alone with his herd in the pre-dawn hush of 13 February, when he heard a faint, unusual noise.

The sound came from the Mutlumuvi River, which cascades down out of Mpumalanga's Drakensberg escarpment. It was the rainy season, yet the river was empty. He traced the dry streambed farther upstream toward the noise where he discovered its waters trapped behind the government's monumental new structure, Zoeknog Dam.

It was more than just a dam. A grandiose yet flawed edifice like Zoeknog had come to embody the very physical expression and political tool of apartheid. Whenever threatened the regime typically clamped down the only way it knew how: tame the dark chaos by force; impose order that partitioned people, land and water by race; then pour concrete to make it permanent. During its brief reign apartheid erected one large (four story or higher) dam per month. It consolidated water and power for whites in a grip that hardened as the cement dried.

Zoeknog was only the latest installment in this master plan. It was designed at the peak of apartheid to supply free irrigation for white commercial farmers, who profited from cash crops grown by dirt-cheap labor from black 'Bantu homelands' that lacked running water. Talk about supply-side, trickle-down economics!

Happily, it became the last installment. By 1993 apartheid was gone. The once-proud ideological parents of Zoeknog dissolved, denying their concrete bastard a sense of purpose, heritage, or belonging. Civil engineers still considered the dam handsome, and gave it a prize for structural design. Yet Zoeknog became a reservoir without a cause. Torn between two incompatible goals (apartheid and Mandela), the dam grew up fatally flawed: white



The Aftermath: *Scene of the crime, but who is the criminal? Currents, corruption, chance, age and human fallibility: many things can go awry with dams erected for ideologically dubious ends, like racial superiority or minority rule.*

contractors cut corners; blacks pilfered cement to shore up their shacks.

The herdsman did not know any of this, of course. He only saw that the surface was calm, but heard the sound of moving water. He approached for a closer look, listening. In the dark, his intuition told him something was horribly wrong.

Emancipation Proclamation

The old man could not foresee how tight, white, political control would melt into the magnificent mess of African democracy. Yet now he became the first to witness a darker facet of apartheid's dissolution, in which a smooth silent surface gave way to...Oh, sweet Jesus! He saw water leaking through. Fast.

As the current awakened, it ate away at the structure, starved for freedom. Soft to the touch, water molecules are in fact abrasive to all elements. Water erodes and corrodes even the strongest stone, which this inferior cement mix decidedly was not. Gravity was hard at work, pitting an unstoppable force against a suddenly not-so-immovable object.

The herdsman watched, and discovered for himself the dirty little secret truth that all hydrologists know yet never like to admit in public:

Though rivers are eternal, dams die.

Like humans or horses, their knees weaken, joints grow arthritic, muscles tire. Neglected for young, strong, beautiful novelties, they reach a point where they can't earn their keep, wear a harness or make coherent sense. Dams can 'cheat age,' of course. Like us, they too can undergo plastic surgery, organ transplants, hip replacements, even a triple bypass of clogged arteries to prolong their days. Yet each operation grows more expensive, risky and eventually pointless against the relentless current of that ancient river, Time.

No one knows exactly when The End will come. Each dam is unique. But the world's top engineers conservatively set a dam's average lifespan at 50 years.

Five decades sounds like a long time in a region where the average human lifespan is 34. It's not. If we construct 'actuarial tables' of dam demographics, the implications turn ominous. We discover that by 2015¹ three-quarters of all South African dams — 400 large, and roughly 8,000 small and medium sized — will have outlived their purpose and become obsolete. That's the

average. For each century-old well-maintained dam with an illustrious pedigree, a year-old neglected bastard like Zoeknog must fail, retire, die.

This die-off increases where the legitimacy of authoritarian 'social engineering' depended on authoritarian hydraulic engineering. Was it pure coincidence that Mandela's release coincided with this radical new form of liberation? As a state's repressive political structure crumbles, might also the water-repressive infrastructure that propped it up? And would the end come quietly and slowly and harmlessly? Or...

No longer shackled, the Mutlumuvi River liberated itself through a seep, widened the cracks, then grew in force and momentum. It cascaded once again downhill. It bit and chewed and ground faster and faster, spreading beneath and out toward the edges seeking the weakest points of the concrete chain that had held it back for so long. Dry dirt dampened into soft soil; the ground began to shift and roll.

The herdsman looked down at the shacks in which poor black families slept oblivious to an oncoming flood of all that water and dirt and pent up energy. He raced the river downhill hoping to raise the alarm in time and get them out of the way.

Yet Zoeknog was by no means the first, the worst, or the last dam to die unexpectedly and violently. February 1985 in the Oribi Gorge of Mpumalanga: four small farm dams breached, causing \$2 million in damages. November 1989: Thornlea Dam on Mlazi River failed, damaging roads and railways. February 22, 1994: a mine dam



Unmanned Machine, Under Siege: *Gariep Dam faces multiple threats, ranging from silt, sun, age, floods, quakes, climate change, competition, free markets, and, yes, even home grown terrorists who are a cross between Osama Bin Laden and Timothy McVeigh*

¹ Date of the UN Millennium Goals target for providing universal clean water and sanitation to half the population throughout Africa.



in Merriespruit failed, killing 17 and causing \$15 million in damages. March 25, 2003: the 16-meter-high abandoned Bellair Dam collapsed, flooding 500 people from their homes and devastating a rich farming area. And these were only the ones that made headlines.

I began to wonder: Were such incidents merely random, isolated ‘protest marches’?

Or were they early, inevitable, and interlinked signs of a rising ‘emancipation movement’ that would soon permeate the subcontinent?

Menacing Mud

Tough question. To answer I considered both the underlying physical and political forces at work, shifting beneath the surface, pushing dams to the brink. And sometimes, over it.

First, the herdsman raced more than moving water; INSTITUTE OF CURRENT WORLD AFFAIRS

he raced the top threat to dams and hydraulic infrastructure worldwide: Dirt. Debris. Mud. Muck. Sand. Silt. Sediment.

By any name it is the mobilized stuff that is *not* two parts hydrogen and one part oxygen. Rivers only seem like open aqueducts carrying pure water; in reality they are conveyor belts that erode and haul organic and mineral fragments from mountaintop to ocean shore. Dams may interrupt that conveyor belt for a halting moment. But they never entirely stop it. Instead of reaching the sea, the sand gets trapped behind each dam. There it backs up and accumulates hourly, grain by grain by grain.

Sediment eats up reservoir storage at the unsettling global average of .5 to more than 1 percent a year. In Africa’s notoriously turbid rivers, the silt load is far higher. Rivers like the Congo or Cunene or Nile or Zambezi are chocolate thick. When Kipling described the Limpopo River as “great, gray-green greasy,” he

was not simply practicing alliteration.

Indeed, Swaziland's sediment swallowed three quarters of Mkinkomo Dam's reservoir in less than 25 years. That annual rate is *three to six times* the world average.

Even within the same river, sediment loads vary sharply by elevation, season and upstream human activity — the careless farming, mining, forest-plantation roads or real-estate development that accelerates erosion and silt loads exponentially. All is flux.² Yet after a brief sample in one place, hydrologists extrapolate future silt loads, then move on. Only their creations remain behind, deceptive to the eye. During droughts South Africans glance at their reservoirs and shrug: "Why worry? Looks like the dam's still almost full."

Right, but full of *what*? Useable water stored in that dam may be only inches deep.

Experts recognize the gravity of the problem. Alessandro Palmieri, a top water official of the World Bank once assured me, "We are losing half our water storage capacity every fifty years, while global demand for water only grows." But then, immediately after this grim diagnosis, he prescribed only the hair of the dog: "To slow sedimentation, we need to build a staircase of silt-trapping dams in tributaries above existing reservoirs."

Oh, sure. Shoving silt back upstream is a splendid idea. As long as we ignore costs, impacts, physics, or other intrusive forms of reality.

The engineers' other 'solution' is to cram the thick stuff downstream, 'flushed' through or 'sluiced' over clogged-up dams. In theory each method can relieve silt pressure; in practice this works only in a few places, and even then only up to a point. Most African dams were built without sluice gates or flushing mechanisms. That leaves 'dredging' around (scraping up, slurping out and dumping back below) the dam. Here, too, Africa's experience sobers.

Namibians, for example, hire bulldozers or use scrapers to remove silt every 7-20 years from farm dams on ephemeral rivers. Never mind ecological impacts; this process got expensive, costing US\$7,000 per dam. Over time, they surrender, and sold the farm.

And those are small dams. What about big ones? Swaziland considered dredging much larger Mkinkomo

Reservoir to restore lost reservoir capacity. A feasibility study predicted: no problem. A dredger could remove 2.5 million m³ of gunk and dispose of it downstream below the dam. Bottom line? At \$3 per cubic meter, scooping out Mkinkomo's silt would set King Mswati back a cool 100 million Swazi dollars. Whoa. He decided funds were better allocated toward more urgent projects, such as his new private Learjet, or buying another virgin for his wife collection.

And so the last 25 percent of space behind Mkinkomo Dam fills quickly with mud.

It is far from alone.³ Lamented University of Cape Town hydrologist Bryan Davies: "It seems extraordinary that these gigantic and incredibly expensive reservoirs have been designed with built-in obsolescence — merely to collect silt."

Extraordinary but true. Each year the Orange River spreads another 120-millimeter-layer of silt on the floor of apartheid's hallmark Gariep and Van der Kloof Dams; planners don't even dream of expensive dredging. They only hope to buy time by performing dam-raising 'face lifts' after the lakes silt up entirely. Elsewhere, cosmetic surgery hovers out of reach. Restoring the original capacity of 40-year-old Lake Kariba would require the Herculean removal of at least one billion cubic meters of sediment. That's US\$3 billion. I don't anticipate Mugabe coughing up the cash too soon.⁴

Silt's attack on Africa's dams is relentless. "There is no practical, physical means of removing the vast quantities of existing sediment," warned South Africa's first Water Minister, Kader Asmal (as well as the most impartial global dam authority alive). "The effects are irreversible...as long as the existing structures remain in place."

So, how long is *that*?

Solar Suction

That largely depends on further threats to Africa's existing dams. Like, the sun.

While sediment quietly swallows water below the reservoir surface, evaporation silently inhales it from above. To be sure, rates vary from dam to dam and year to year; worldwide, evaporation averages five to 15 percent of a dam's contents each year. Yet again, southern

² By one estimate, "watersheds in more arid, tropical and monsoon climate regions, especially those with younger surface geology experiencing rapid change such as land clearing or deforestation, typically have much higher sediment yields. In such settings a high rate of natural or human-induced erosion leads to high rates of reservoir siltation." Unfortunately this prototype describes Africa to a T.

³ Most impoundments in the Free State, Northern and Eastern Cape, Kwa-Zulu Natal, Northern Province, Northwest Province and Mpumalanga also suffer from rapid siltation, according to UCT studies.

⁴ Africa's problem pales in comparison to equally 'silt-laden', yet far more heavily dammed rivers of India and China. Based on N. African costs, dredging the sediments accumulating in reservoirs worldwide every year would cost \$150 billion.



Guess Why They Call it the Sand River? *Rivers like this clog up dams with silt. Obsolete dams seem harmless and could just sit there like sandboxes, minding their own lack of business. But a river never sleeps. It remains a dynamic continuum, ever nudging, poking, jabbing and prodding. The stream current carries water into, around, or most likely onto, the dysfunctional dam. Whereupon it evaporates, with trouble downstream.*

Africa's deadly dry heat and wind push evaporative losses above the high end of the spectrum.⁵

Though rarely a concern to apartheid architects serving their own tiny minority, the loss has begun to alarm today's democratic scientists and officials who seek to squeeze as much finite water as infinitely as they can for everyone. Recall how Namibia's sun guzzles twice the water cities like Windhoek do, provoking a crisis (JGW-19) and deep aquifer solution. Likewise, in South Africa open-surface evaporation exceeds precipitation every month of the year in its crucial Vaal and Roiberg Dams, leading the search underground here as well.

Watching water evaporate has become intolerable. The nation dreams of the day it can guarantee 25 liters a day to each South African. Yet researchers estimated that since registered dams in South Africa probably cover a total surface area of about 3,000 square kilometers, evaporative losses would be one billion cubic meters per year, or 55 liters per person, per day.⁶

This double whammy worsens each year. I've seen farmers suffer an endless annual race to see whether silt or sun will devour their water faster. Both forces accelerate as impacts compound. Silt wedges make reservoirs shall-

lower, while exposing the same surface area to summer's heat. With warmer water, evaporation rates rise.

Fatal Gushers

At least these dual threats are gradual, silent and passive. Not so the opposite extreme, when dams fill too full, too soon, too fast to handle.

Enter the third enemy of existing dams: increased flood risks and damages.

Rivers never rest. They rise and fall and flash-flood and shrivel with naturally disturbing violence. Humans intuitively know or learn this. They adapt to it, stay out of the way or take out insurance policies accordingly. But modern society may be lulled into a false sense of security when the state announces its dam's heroic 'flood control.'

This announcement splits an existing dam; it divides it against itself from the start. To absorb floods it must stay as empty as possible. That runs exactly counter to its other goals, namely to stay full. A nation desperate to store water or generate power maintains no patience, interest, space, or time in its reservoir's capacity to absorb an unexpected deluge. So it overflows. Managers of Mozambique's gargantuan Cahora Bassa Dam should have let the Zambezi rise behind it slowly over two years. But political pressure built to rev up hydroelectric power. So they plugged it tight, to fill up fast. When heavy rains upstream overfilled it, alarmed managers opened all eight sluice gates (plus five power turbines as an emergency measure) to drain surplus water before the river overtopped in a disaster.

According to hydrologist Davies, as the dam wall began to shake in harmonic convergence the managers and engineers really did not know what might happen. They ran. Ah. How comforting.

Next, 'flood control' pits existing dams against each other. A single reservoir will delay floods downstream, reduce their size by at least a quarter, or divert water elsewhere through pipes or canals. Compound this by a half dozen dams on the same river, as hundreds of thousands of subsistence farmers move into the fertile and 'safe'

⁵ Debate turns on whether small dams fight the sun better than large ones. Some studies in Namibia conclude that they do, but only because the water vanishes faster, leaving nothing more to evaporate.

⁶ Arthur Chaptman and Hugo Maaren of the Water Research Commission and John Carter of the Department of Water Affairs and Forestry.

floodplains right beneath each dam. Now multiply this on all African rivers crossing uncoordinated borders.

Can you say, 'domino effect?' Mozambique sure can.

When bad floods hit the region in 2000, Cahora Bassa failed to respond to dam releases upstream, and was belatedly forced to throw open its sluice gates. This time its man-made flood dumped more than 14,500 cubic meters per second into the lower Zambezi and its delta at a time when people were moving onto the floodplain to plant crops. The release killed 105 people and left 250,000 homeless.

That's when old dams *don't* collapse. What happens when, like Zoeknog, they do?

Fear of Failure

Engineers like to point out, accurately enough, that the odds of an existing dam crashing are relatively low: 1 in 10,000 a year. Still, that's up there with the rate of passenger-jet, car, train and cruise-ship crashes. The difference is that, as people grow aware of dangers they can avoid them for other private options. Media exposure and consumer advocates reduce risks of human transport through corrective legal and market forces.⁷

Water transport lacks those forces. Ageing, unregulated, unfunded, intransigent, abandoned, ignored and often poorly maintained dams are all too often the rule, not the exception. Even America's own top civil engineers just gave their U.S. dams a 'D.' They lobbied, in vain, for \$1 billion (not the current \$2.9 million) a year to make them safe.

To its credit, democratic South Africa has set all the right abstract legal statutes down on paper. In Chapter 12 of the new National Water Act, 'dam safety' features prominently. Registered dams are classified according to 'hazard potential'; automatically, the bigger they are the riskier they are considered. To wit: Every vertical meter a dam raises, also raises a red flag for every corresponding horizontal kilometer downstream. The Water Act ranks hazard by class;⁸ rigorous regulation is supposed to apply; and the threat of prosecution should make owners pay for dam inspection, or face stiff consequences.

In practice, this elaborate system simply can't hold water.

It just costs too much and takes too long for South Africa to keep an eye on its 540 large, 10,000 medium and countless more very small dams. The upshot is unsettling. Dams fail without warning, insurance, account-

ability, legal recourse or punitive measures.

By default, 'self-regulating' engineering associations made lukewarm effort to prosecute the builder of Zoeknog for gross negligence. They gave up in 1998 on procedural grounds after the defendant insisted that all documents be translated into Afrikaans. But at least Zoeknog had a defendant.

Deadbeat Dads, Orphaned Dams

More revealing was the aftermath of last year's curious 'incident' near Montagu in the Western Cape, which compounded the most devastating deluge in decades.

Though the 16-meter high Bellair Dam was 30 years past retirement, locals claimed it seemed in 'good condition' and appeared 'structurally sound.' Until it burst, that is.⁹

Its spectacular collapse proved embarrassing, for the democratic government had just announced its controversial "decision to build 18 new large dams in a technically, environmentally and socially responsible way." So after Bellair crumpled, the government vowed to take aggressive punitive action. It would make a poster candidate out of Bellair to ensure that all other dam owners complied with safety codes across the nation. It ostentatiously initiated "legal steps against the Bellair Irrigation Board, which was the registered owner of the dam and therefore responsible for the operation and maintenance, and the need for some upgrading had been identified."

But a funny thing happened on the way to prosecution. The Bellair Irrigation Board "appeared to have vanished" according to Department of Water Affairs (DWAF) safety chief Willie Croucamp, who was left empty-handed, hoping: "There must be an owner."

There wasn't. Andrew Schofield, who managed a wildlife reserve next to the dam said: "The old irrigation board was responsible for the dam. Seeing that the irrigation board doesn't exist anymore, I don't know who they'd [DWAF] be going after.

The last record of an irrigation board meeting was 2001. Croucamp conceded that white "farmers who were part of the irrigation board had sold off their farms" and walked off.

The dirty sneaks. On the other hand, why wouldn't they? Water was no longer dammed, stored, reserved by color. New water fees ate up their net-revenue margins. The nonracial democratic government had kicked out the

⁷ Thanks to Ralph Nader, auto factories no longer manufacture my 'unsafe at any speed' 1963 Corvair, while global trade in Volvos expands briskly.

⁸ Class 1 farm dams; Class 2 Irrigation Board dams; and Class 3 biggies like Gariep, Vaal, Van der Kloof

⁹ Willie Croucamp, head of the Water Affairs division of dam safety, had classified Bellair as having 'high hazard potential,' not because there was anything wrong with it structurally, but because roads and buildings downstream ramped up the potential loss of life and property.

crutches and props of white agriculture, making it less and less profitable, or even viable. The state accelerated farmland reform through incentives and pressure, buying out whites to resettle blacks. It was Zoeknog all over again, but now it was hitting private dams. With apartheid's structure swept aside, the only thing left was its infrastructure, and few wanted responsibility for the oldest, most expensive and dangerous edifices.

So rather than pay for upkeep, white farmers just walked off like deadbeat dads, abandoning dozens, hun-



Culture and People, R.I.P. *This new plaque commemorates the drowned past beneath one of South Africa's apartheid monuments, Van Der Kloof Dam. But a plaque may not be enough in an increasingly litigious nation.*

When it comes to man-made and -owned dams, there is no such thing as an 'act of God.' Descendants of a submerged society can sue for damages, retroactively. Dams already have been re-christened; labels honoring dead apartheid 'fathers' have been chiseled off and replaced with the names of living tribal earth mothers.¹⁰

Now attorneys go a step further. They take the side of displaced people, filing class-action lawsuits for litigants who range from the 50,000 Zambezi Thonga to Nile Nubians to the Senqu BaSotho.

Modern dam liability is another issue. The burden of proof now rests on dam owners, whose structures are presumed guilty until proven innocent. The owner assumes added responsibility for the increased risk of people who move in downstream. This converts dams from assets into liabilities.

dreds, perhaps thousands (no one knows how many) of their progeny. Overnight, their once proud, young, strapping, concrete offspring became ugly, costly and sickly orphans. And we know what happens to African orphans.

Turbulent Tremors

Whether slow or sudden, these failures of evaporating, silting, flooding, ageing, crumbling neglected dams could yet be isolated 'protest marches' rather than an 'emancipation movement.' But two more insidious enemies may tip the scales.

One force attacks dams from below: seismic activity.

Ideally, dams are built high up, in ravines as deep as possible, places where the earth's warped crust is most fidgety. The Great Rift of Africa corresponds to some of the Great Dams of Africa: new, old and proposed in the future. On top of an existing propensity to shudder, large dams can add 'reservoir-induced seismicity,' where the weight and lubrication of water triggers man-made earthquakes (JGW-10). Tipping the scales at 170 billion metric tons, Kariba (5.8 on the Richter Scale) and Aswan High (5.3) are but the most noticeable. Katse triggered 90 smaller 'events,' as did Cahora Bassa.

Each one slightly loosens the foundation upon which the dams were built, ageing them just a little bit faster, and raising the odds of dam failure from an already disturbing 2.4 percent of all dams (which killed 12,000 people last century), to 4 percent or higher — as in China (where 'domino effects' of 3,200 dam-bursts have killed more than 100,000 people in the last 50 years alone).

The Snowmelts of Kilimanjaro

An more ominous force attacks dams from above: climate change.

Most of us rightly worry about the underlying 'causes' of global warming and 'greenhouse gasses.' This leads to vigorous debates, in which we, say, compare the methane releases of shallow hydropower dam reservoirs against coal-burning plants, or emissions-free nukes, wind-farms, solar power, etc.

Even the most hardheaded skeptics who doubt humans are accelerating global warming don't deny climate is, in fact, changing.¹¹ Southern Africa will be hardest hit. And the most severe changes involve rivers.

These changes got personal on 7 January 2001. Led

¹⁰ The two dams of the 1963 Orange River scheme are no longer called the Hendrik F. Verwoerd and P.K. Le Roux Dams, but rather the Gariep (Khoi, for "Great River") and Van der Kloof (from the cliff) Dams.

¹¹ According to the IUCN, Last century's .5-degree centigrade heat rise will escalate another 1.7 degrees C by 2100, shifting the seasons and reducing rainfall 5-20 percent. Annual flows down the Zambezi, Ruvuma or Orange are declining, while droughts appear to be increasing in frequency and severity. Mounting heat speeds up evaporation and transpiration. Runoff shrinks just as demand for water grows 90 percent in the next 15 years.

by my father, who was in turn inspired by Hemingway, I staggered atop Kilimanjaro with him smiling and me reeling like a drunk. I cooled my altitude-addled brain against its equatorial snowcap. It was a rare treat. By January 2015 that white glacial 'roof of Africa' will have melted away into ether and memory. As it does, related effects will ripple across the continent below. Tanzanian subsistence farmers I met at Kilimanjaro's base already had to adapt to altered runoff.

Some argue this unpredictability only reinforces the demand for reliable reservoirs. I wish South Africa's 18 new dams luck; may they prove resilient and elastic. But I fear for the stockpile of intransigent existing dams. Unable to adapt, any change is for the worst.

No sooner does drought-driven evaporation empty silted-up dams than intense deluges slam into the emptiness, and vice-versa. Between 1999 and 2002 the region endured the worst floods in 1,000 years, followed in 2003 by the worst drought in a century. Slow-rising, slow-lowering placid reservoirs must absorb massive tide-like ebbs and flows. Even decades ago, when dams were new and strong, they were never designed to withstand these far more extreme pressures, flows, droughts and demands. Now they're brittle and stiff and tired, without adaptive gates or built-in flexibility.

You can't teach an old dam new tricks. You can, however, teach its trainer.

Free speech! Free trade! ...Free rivers?

Indeed, all these mounting physical threats may pale in comparison to how abstract shifts in southern Africa's human values — namely liberalization of economics, politics, ideas and culture — further undermine existing dams.

First, open debates open new options. While there is no substitute for water, mankind is constantly inventing new technology and economies to improve access to it or harness its energy. Silt-free, evaporation-free boreholes and groundwater yield the cheaper, decentralized water that dams can't hang onto. What's more, the price of solar cells has dropped tenfold, as has wind power; both can fill the void left by the lost reservoir capacity of old ones. Even a new form of small-scale hydropower may offset aging, worn-out hydropower dams where, after 30 years, operating costs rise prohibitively due to increasing need for repairs.¹²

Second, while the law of gravity hurts Africa's exist-

ing dams, it can't hold a candle to the law of supply and demand. Of 14 countries¹³ surveyed in a global report about residential and industrial water, prices rose in 12 of them faster than inflation rates. Since democracy, South Africa reported the world's largest percentage increase, a significant jump of 20.4 percent in the price of water over last year. At higher prices, demand falls and relative supply rises. And since all South Africans are guaranteed their first 25 liters free, for health, hygiene, drinking and cooking, the rate increase only cuts into waste and abuse. Incentive-driven voluntary conservation by free people, free farms and free enterprises remains, by far, the cheapest 'technology' to offset dying dams.

Third, lifting trade sanctions against South Africa also lifted its rivers. To the chagrin of anti-globalization/anti-dam activists, the global liberalization of commerce lets 'virtual water' play a powerful role. It gives value to Africa's unique water-wise exports, from sorghum to wine grapes to eland, ostrich and kudu steaks, while punishing what had been dam-dependent and protected thirsty crops like rice, cotton, beef and sugar cane. Trade puts those water-subsidized exports on a diet, so rivers get healthy.

Fourth, sunlight disinfects stagnant water. It also disinfects the process that makes dams obsolete. The most water-wasteful and expensive dams in Africa were conceived in backroom deals as a political sop to a vested interest group, replete with kickbacks. Only apartheid leaders like Hendrik Verwoerd could silence debate and create white elephants such as Gariiep, Pongolapoort or Zoeknog dams. Transparency allows healthier options (or stronger and more flexible dams) to emerge.

Declaring War on...Dams?

Economic interests fuel strategic military priorities. These too may target obsolete dams.

As free trade drives each nation to focus on its core comparative advantages, southern Africa turns to its unparalleled biodiversity and ecotourism. Accordingly, Dr. Freek Venter, Kruger National Park's water manager, turned to its nature-harming dams within the region's premier tourist destination.

Floods damaged many of Kruger's small dams. Repairing them made no ecologic sense for his species-rich rivers. More importantly, repairs made no economic sense; it would cost three to five times less to simply remove them. Still, with budgets tight, where might he find

¹² Alexander Gorlov, a Soviet engineer who helped build Egypt's Aswan Dam, felt so guilty and shocked by the devastation dams cause that he invented the Gorlov Helical Turbine to generate dam-free power, converting a stream's kinetic energy into electricity with 35 percent efficiency (15 percent higher than conventional turbines). The decentralized turbines can be placed where dams cannot.

¹³ Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, the Netherlands, South Africa, Spain, Sweden, the United Kingdom and the United States

Damning 'The Kaffirs' by Damming the Streams

South Africa's Interwoven History of Rivers and Race

A grotesque and vicious cycle was set in motion on March 21, 1960. On that day peaceful, nonwhite mass protests against despised, racially segregating 'pass laws' triggered brutal and lethal retaliation by the government at Sharpeville and the Cape. Reported in detail, the massacres repelled overseas investors; 68 million pounds sterling of foreign currency fled the reserve bank overnight. The nation seemed too unstable, the apartheid state too weak.

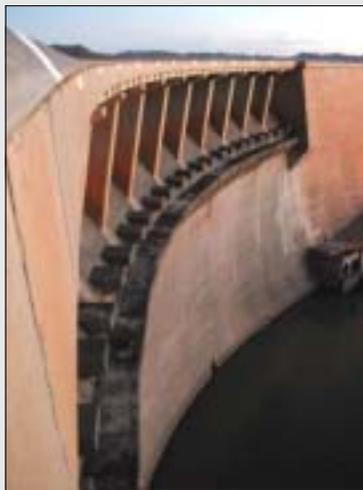
South Africa determined to prove them all emphatically wrong.

Within weeks, and in the same breath, the government banned opposition parties and announced the continent's most ambitious public-works project: it would dam the Atlantic Ocean-bound Orange River and divert its flow into the Indian-Ocean-bound Fish River to water crops of potential white voters.

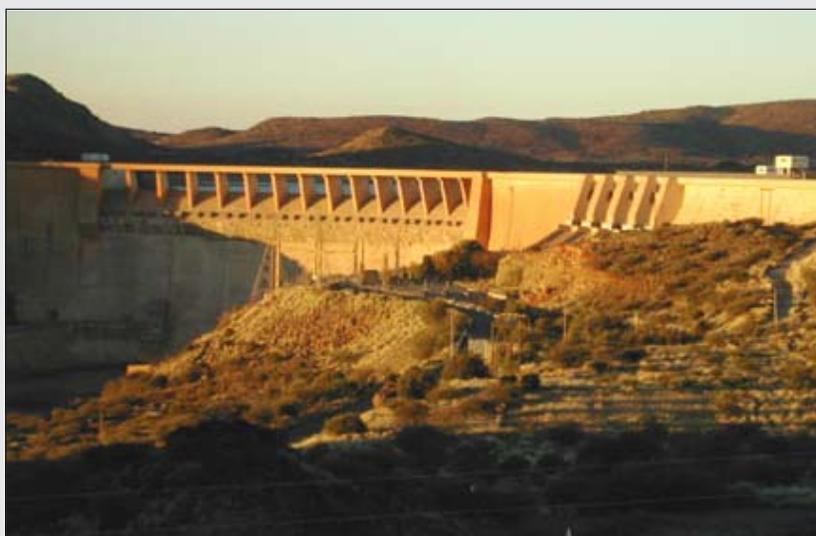
The project would displace rural blacks in order to irrigate white farms, employ white labor, increase white exports and consolidate white support. The audacity the state's massive, 'progressive' water-transfer scheme (sweetened with lucrative deals for foreign contractors) muted critics of its massive, regressive power-transfer scheme.

Action, reaction. Based on this proven model the number of dams escalated from 100 in 1948 to 520 large (and 10,000 medium or small) dams in 1990. Right next door, then-Rhodesia kept pace with its own 200 new large (3,000 medium/small) dams to irrigate crops of its minority, voting constituents. The white oligarchies are now history, but they bequeathed black South Africa and Zimbabwe a solid inheritance: two-thirds of all dams in the Dark Continent.

Today, South Africa alone ranks 13 in the world in the number of dams, a legacy of technological pride yet ideological shame.



Gariep Dam



Van Der Kloof Dam

funds and specialists to demolish these obstacles to Africa's fastest growing economy?

Enter the peace dividend.

The end of anti-communist and anti-ANC border skirmishes against Mozambique and Angola left South Africa's armed forces idle. They had time and resources to attack something else at home. Recognizing their inclination, and need for training exercises, Venter asked if they'd be keen to blow up obsolete Kruger Park dams. Soon he'd enlisted South Africa's army in the nation's new liberation movement.

Demolition for Detente

As competition intensifies over international rivers (see JGW-12, 14, 22), armies may start to view dam removal as more than a training tactical exercise. Dam-busting may move up the chain of command into a long-term strategy to avert trans-African wars.

Sounds far-fetched?

Consider how every single one of southern Africa's water-stressed nations has raised hostility levels with their neighbor(s) over who gets water from the rivers flowing through and between them. Right now, ten nations in the north are arguing fiercely over who gets a 'fair share' of the Nile River's water without going to war. Ditto in arid West African countries sharing the Senegal and Niger River waters throughout the Sahel.

At the current delicate 'tipping point,' every new proposal to construct additional dams on stressed rivers exponentially increases tension between nations. Sabers rattle. Presidents posture. Diplomats scurry.

Does the reverse not stand to reason? New proposals to remove of old, obsolete, existing structures (whether safety hazards or not) can only relieve strains between neigh-



One of Kruger's Doomed Dams: *On the lower Sabie River, which is the most species-rich in southern Africa, dams damaged by floods are being removed to restore biodiversity.*

boring nations, and strengthen long-term détente.

Osama Bin Laden meets Timothy McVeigh

And then there's the wacko with a truck or plane full of explosives.

Last year Hercules Michael Viljoen, 52, and his accomplices Leon Peacock, 42, and Allan Rautenbach, 22, were tried in court for plotting to blow up the Gariiep Dam. Viljoen testified that members of his cell had met others on the wall of that Dam and took a "Warrior's Oath" to unleash a "Night of Terror."

The story would almost be amusing if it were not unsafely within the realm of possibility. I have stood on that same dam wall and on Van der Kloof, farther downstream. Both are virtually unmanned machines, without an official in sight. South Africa has not taken the precautionary steps the US did after 9-11, of guarding its dams from becoming potential targets that al-Quaeda¹⁴ or others could easily turn into new 'weapons of mass destruction.'

Rautenbach confessed his operation aimed at blowing up Gariiep Dam. But Viljoen claimed dam-busting re-

quired "an act of God that can't be hastened by humans."

Learning to Let Go

Don't be so sure of that. Dismantling a repressive brittle structure to allow free movement and sustainability need not involve violence or force.

Transitions may be graceful and flattering. Mandela proved this as apartheid smoothly dissolved into non-racial democracy. His successors here may prove it too as, one by one, obsolete apartheid dams dissolve into rivers.

After all, these structures did not emerge overnight, in a vacuum, without logic. They grew organically like a shell to serve the state's political self-interests and needs. But as a living society continues to evolve dynamically, it may outgrow the fossilized structure of its earlier, immature stages of development. Even the intricate conch or chambered nautilus at some point sheds its obsolete shell, and moves on. If it didn't, it would die, trapped within its own technology.

For awkward humans, this process is painful and emotional. We find it hard to let go. We invent euphemisms for transitions in employment, age or health. We

¹⁴ Wisely so, as it turned out. U.S. unearthed documents showing Al-Quaeda did, in fact, consider dams as viable targets to bring the West to its knees.

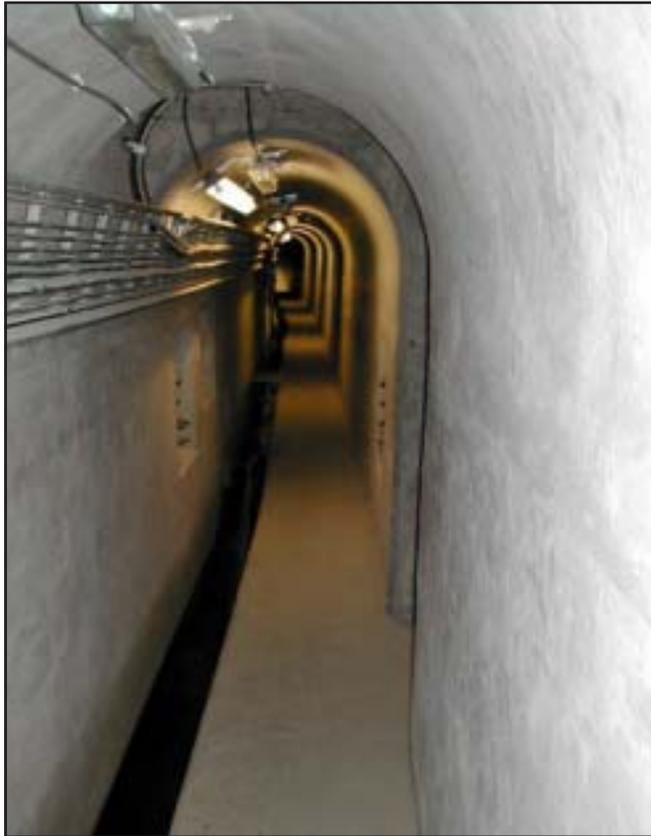
invent morticians and obituary writers to dress up the dead. We invent actuarial tables so brokers can sell us life-insurance plans, health plans, retirement plans, death and disability plans.

We invent no such plans for obsolete dams.

Surprisingly few people care to ask, or dare to answer: What happens in the afterlife? What do we do after a dam wall 'hits the wall' and can't stand up any longer? Who calls the convalescent hospital? The hospice? The undertaker? Is there even anyone *to* call?

It is invariably someone else's problem, perhaps an elderly herdsman's. It turned out, happily, that he heroically outraced the waters that broke through Zoeknog Dam. No one died. Others haven't been — and in the future may not be — so lucky.

I once asked a skilled Zimbabwean dam builder, him-



Inside the Shell: *It is a very odd feeling to descend into the bowels of Africa's tallest dam in Lesotho, walking between high-pressure water on one side of the concrete, and air on the other.*

self retired, about how he would approach the end of an old dam's long and fruitful existence. Would he help remove it as an economic, social, health and safety hazard?

His response was telling. It illuminated the emotional attachment many engineers feel for their creations. Before my eyes he went through seven stages of denial, resistance, bargaining, then broke off. "Oh I wouldn't be able to face doing anything like that," he confessed, his face contorted in an anguish that was only part theatrical. "It would feel like, like, ... a kind of infanticide, or euthanasia. A betrayal of a friend. I don't know any engineer who could."

Euthanasia may be the right word. We can help dams depart from our lives and rivers as painlessly as possible for all parties concerned, after celebrating their lives and grieving their loss. Or we can pretend to ignore the worsening condition; keep them on the treadmill; force them to work against the odds, operating heavy machinery; prolong their death rattle; and try to convince ourselves we do not contribute to the suffering and mayhem that results when at last they give.

Zoeknog's damage did not end with its collapse. It continues to 'bleed' massive sediment, causing a loss of in-stream river habitat and fish deaths. I toured the wreckage with Sharon Pollard, director of Save the Sand River, into which the Mutlimuvi River flows freely once more. The group has managed to rehabilitate the landscape, stabilize upstream tributaries, and ensure that rather than subordinate rivers to dams, dams adapt to the watershed to which they belong.¹⁵

And Zoeknog itself? All that remains of the dam is the late, great, overflow tower, nicknamed 'Morning Glory.' It awaits the heavy hand of Ronnie Kasrils, the former leader of military intelligence for Umkhonto we-Sizwe, the armed wing of the ANC back when it was banned and in exile. Now, as Minister of Water Affairs he is planning to detonate the tower.

No one knows the whereabouts of the old herdsman. Perhaps he too has retired. But possibly he'll still be watching in the background as the democratic government pushes the button that will blow up the last useless remnant of apartheid hydraulic engineering.

And maybe he'll smile, knowing that Africa's liberation movement never really ended by removing the apartheid regime. It just focused on another obsolete form of oppression. □

¹⁵ During the last drought South Africa even reportedly began what in the past would have been unthinkable. It threatened to seek, find and destroy any and all unauthorized private dam building without a permit for use of the water.

Rivers on the Verge of a Nervous Breakdown

The emerging environmental art, science and politics of ‘stream psychoanalysis’ may doom existing dams.

By James Workman

ALONG THE SABIE RIVER, South Africa – Native Africans rarely seek therapy when confronting trauma in their lives, no matter how brutal the oppression or bleak the affliction. ‘Current’ ordeals are a different matter. All across the subcontinent, but starting right here, troubled, turbulent, tearful patients have been diverted into the consulting rooms of a new breed of trained specialist, who takes temperature and tissue samples, then asks:

Doctor: Sooo.... Tell us what’s been troubling you.

Patient: I just feel like... I’m on the brink. I hardly recognize myself. It’s embarrassing.

Doctor: Embarrassing.

Patient: Yeah. Because it’s all my fault. I can’t cope. Sometimes I just...lose it.

Doctor: You say ‘lose it.’ Can be more specific?

Patient: When all the garbage backs up and overwhelms me I get sick, and contaminate those closest to me until, finally, they just leave me alone. Or, when stressed from non-stop labor, I sink down deep into my bed and refuse to come out.

Doctor: And they leave you alone once again.

Patient (snorting): I wish! No, they find me. They’ve got an underground movement that infiltrates my hiding places to drag me out into the heat. But that’s nothing...

Doctor: Compared with?

Patient: Well, when I drink too much I swell up bloated, tear things apart; I become a flood of emotions, raging and gushing uncontrollably. Later I hate myself.

Doctor: You sound pretty hard on yourself.

Patient: Wouldn’t you be? You should see the mess I make.

Doctor: ‘Mess’ by whose definition?

Patient: What do you mean by that?

Doctor: Never mind. What happens after these breakdowns?

Patient: Oh I calm down. But it’s a little late. They don’t just forget or forgive, and why should they?

(Doctor remains silent) No. They lock me in a straightjacket and chastity belt, you know, in case I break loose again. Or they inject me with chlorine medication.

Doctor: You consistently refer to a mysterious ‘they.’

Patient: That’s right. They. You know, humans. People.

Doctor: Ah. Tell me about your relationship with ‘people.’

Patient (brightening): Oh they’re great. They’re smart and interesting and always coming up with new ideas. And you know what? They need me.

Doctor: And they are the only ones who do.

Patient: No, sure. Everything living needs me. But not like people do. They need me in a way I never knew

possible until recently. I mean, they can’t get enough of me, day or night. *(pauses)* I think they love me.

Doctor: I see. And they have told you so.

Patient: Oh, please. No, no. Not yet. But they don’t have to. You can just tell.

Doctor: Describe the outward manifestations of this...affection.

Patient: Well the usual. They have urges, physical needs. They drink me. Plunge into me. We moved in together. Share a wide bed. Then, starting not too long ago, they got me to provide food. They’re always hungry, and so I’m happy to share. And tidy! You should see how much they need me to clean themselves and their stuff and haul away their crap. They even harness me to generate all kinds of wonderful things.

Doctor: Sounds like an awful lot of effort on your part.

Patient: Yeah. Huh. Funny, I never really thought about it, but I guess it is.

Doctor: Well. At least they reward you.

Patient: Actually, no they don’t. But I don’t mind. I’d give more, and work harder if I could, you know, if it would make them happier. Only...

Doctor: Only?

Patient: It’s just getting so hard to make them happy. So many demands, constantly wanting my time and energy and my, you know, body *(blushing)*. It’s gratifying to be needed, except for these ‘spells.’

Doctor: All work and no play makes...

Patient: Not all work. Sometimes, when I’m feeling chic and bubbly and fast and looking glossy, people gravitate to me. They come and play, rolling with me and paddling me and making me giggle with them and we get this rush.

Doctor: I see.

Patient: But even that aspect of our relationship never seems to endure. After they’ve had their fun with me they always go off and...

Doctor: Dump you.

Patient: Thanks. That’s a pretty way of putting it.

Doctor: Well, maybe it’s what you really want.

Patient: Hey, look, don’t get angry with me!

Doctor: I’m not angry with you.

Patient: Or, or with them! We’re still together, you

know. I'll leave right now if you talk badly about them!

Doctor: I wouldn't dream of it.

Patient: They're doing the best they can.

Doctor: Of course they are. But perhaps we should go back to the matter of your breakdowns, your indigestion, your ulcers and...

Patient: It's just that they have needs I must satisfy. Legitimate, life-or-death needs. If it weren't for me they'd fall apart.

Doctor: I see. And if it weren't for them you'd you fall apart.

Patient: Don't be silly. That's why I'm here, paying all this money for a fancy shrink like you. It's not about me; it's for them. You see I can't *afford* to fall apart. If I break, collapse, or shrivel up, I drag them down with me. They depend on me.

Doctor: And meeting their needs means you must set aside the needs of...

Patient: Of what? The garden? The birds? The fish? The animals? I still take care of them. I haven't forgotten one aspect of our Home.

Doctor: Actually (*glancing at a medical clipboard*) it appears that you have.

Patient: Have what?

Doctor: Forgotten one.

Patient: (*trying in vain to see the clipboard*) Which? What are you talking about?

Doctor: Oh I think you know exactly what I'm talking about.

Patient (nervous): I don't. Where is this going?

Doctor: You've been lying there, telling me in great detail and satisfaction about others' water needs, and uses, and actions, and what they take, and want, and borrow and harness. But you've conspicuously failed to mention one significant individual, and projected that individual's repressed yearnings onto others. I find that rather interesting.

Patient: C'mon. Which individual? Who is it?

(*Silence. Doctor starts to doodle in his notepad, pencil scratching. A full minute passes.*)

Patient: Me?

(*Silence. The clock ticks.*)

Patient: But that's *ridiculous!* I'm, I'm just a river. An element. Not a human. I'm not even sentient or, technically speaking, alive. I can't have needs.

Doctor: Too true. How silly of me! Well, I guess we're through here. No need to come back again. The hour is up.

Patient: It's only been 17 minutes!

Doctor: Regardless, we're wasting your time and mine. I had been under the false impression that you wanted to help people and others.

Patient: I do.

Doctor: It appears they'll do just fine without you.

Patient: But they *won't!* They're doomed if you don't cure me. Weren't you listening?

Doctor: I heard how you don't need health or integrity to survive. You don't need freedom to meander on your own. You don't need to swell up and

overflow from time to time. Seems you don't need anything at all.

Patient: (*eyes tearing up*) The hell I don't!

Doctor: Oh, really? Then what, exactly, *do you need?*

Silence. The patient starts sobbing uncontrollably.

The Doctor sits passively, handing a box of Kleenex.

The patient blows its nose, eventually recovers, and through the sniffles braves a smile, even a snort and giggle.

Patient: It's funny, you know. No one's ever asked me that question before.

* * *

They're asking it now. Big time. Legally required consultations between hydro-ecologists (aka 'stream shrinks') and South Africa's rivers are at the cutting edge of developing a therapeutic answer that the rest of the world may start to follow.

Here's what stream shrinks have discovered:

1. Some dams can make everyone and everything sick. Even structurally safe dams become hazards if they too drastically alter the temperature, biology and chemistry of water in a river. They either degrade water that people need to drink, or degrade water for native plants and critters that people need to eat.

2. Dead dams create stagnant water, which encourage bilharzias and algae blooms and incubation for insects carrying malaria, sleeping sickness or other infestations.

3. Reservoirs trap suspended pollutants in one place instead of flushing them less harmfully out to sea, and concentrate toxic ingredients up the food chain.

4. Often constructed within a subsistence economy



Crocodile Love: "Sure, you can have our water, as soon as you pry it from our cold, dead jaws." How much water does a river need? In southern Africa, nature has the constitutional right to ecological flows, but the exact quantity is a matter of debate.

dependent on fish and wildfoods provided by a river, these rural poor bear the brunt of an obsolete dam's ongoing impacts.

5. A river needs seasonal floods to scour it, clean it, flush it, knock back vegetation, and restore resilience and structure to its banks and fisheries.

Exhibit A: The Pongolo/Maputo River showed a marked reduction in the diversity of floodplain forest species after dam construction upstream. Exhibit B: The forest on the floodplain of Kenya's Tana River is slowly dying out as it loses its ability to regenerate because of the reduction in high floods due to a series of dams upstream. Exhibit C: the reduced Kafue flows into the Zambezi have reduced food and diversity at the confluence.

So after diagnosing the ways in which dams can worsen hunger and disease, stream shrinks prescribe a heavy dose of 'environmental flow requirements.' EFRs are the hydraulic art of releasing meaningful artificial floods downstream to mimic the rivers' original pulse, to restore biotic health, water quality and sources of human sustenance.

Understandably, dam owners and upstream users who grew fat and happy as the river deteriorated, may not welcome this EFR prescription.¹ But by revealing the roots of the crisis, by making all the previously invisible tolls transparent and tangible, the stream psychoanalyst places the political, economic, legal and moral burden squarely on the shoulders of the beneficiaries.

The required shift is part Copernicus science, part JFK politics: as society rediscovers that finite streams *don't* revolve around human development but rather the reverse, their leaders urge us to ask not what rivers can do for us, but what we can do for rivers.

That makes river shrinks the hottest thing in interdisciplinary science today. Their discipline merges public finance, politics, physics, economics, hydrology, sociology, biology and, aquatic ecology to bring about a more 'mentally balanced' patient. To discover "exactly how much water a river really needs," and, equally important, *when* that river needs it the shrinks have developed over 200 different EFR methodologies.

Their market is exploding open like Vienna a century ago. Only now, the Sigmund Freuds and Carl Jung of this discipline all have been concentrated in South Africa, Australia and the western United States.

In these places expansive education and contractive water have combined to both hone their skills and make theirs a competitive, nationally respected, potentially lucrative and fiercely demanded practice. Dry and water-scarce regions from Morocco to China and from the Mekong to Colorado River can't get enough of their treatment. Politicians ignore lingering social stigma to put their rivers on therapy. For life. The price of ignorance has outstripped the cost of checkups.

So how does it work? Will our patient make it? What does a river, in fact, really need?

No two 'patients' are alike, even within a single nation, a single watershed, or even a single given day. All is flux. The challenge is to identify the pattern and contours of that flux, and give a river as much room as possible to again 'be itself' in order to survive.

Compare rivers to 'blood circulation.' After a century of trial and error, doctors can safely tap a small portion of a human's blood to transfuse or store for emergency. The body adapts, the marrow creates enough new blood to keep the body functioning. Physicians know exact quantity they can withdraw without plunging the donor into shock, trauma, coma, or death. They adjust according to his or her health, body weight, blood pressure, height, age, and blood type, knowing that each body has the moral, legal and functional right to keep enough blood itself.

The same rules apply to rivers. Yet nations have only begun to calibrate this delicate scientific balancing act. Knowing humanity's survival depends on a river's survival, leaders reluctantly concede that streams, too, require a certain quantity of pumping water for themselves. In the most progressive and advanced constitutions in the world, that requirement is enshrined as a moral, legal and functional right. Which is why South Africa requires (the establishment of) Environmental Flow Requirements, and by law must make each river undergo therapy before people can extract additional drops as economic transfusions.

Early scientific results have been encouraging and rewarding. Yet as this practice spreads more ageing dams will inevitably lack the structural or storage capacity to release those badly needed and legally required prescription flows.

In these cases, the only way to truly mimic the original current is simply to let the river flow as it did before construction of the now-obsolete dams, and remove them altogether. □

¹ Some claim 'only affluent societies' enjoy the 'luxury' to be 'environmental' about rivers. Poor, developing Africa can't afford it. But ironically exactly the opposite is true. First, the bulk of southern Africa's formal cash economy depends on biodiversity as a revenue engine and tax base. Second, a majority of local communities, especially rural people, depend on biodiversity for the bulk of their informal food, shelter and trade subsistence economy.

Kariba Dam Beneficiaries

In fairness, many existing dam impacts are positive while the dam still operates.

For example, despite sediment and evaporation and the displacement of native people, Kariba Dam generates electricity, as well as fish. It is hard, if not impossible, to weigh the current jobs, food and opportunities against what was lost when the dam began to fill.



Harvesting the Inland Sea: *These kapenta fishing rigs haul in one of the region's most lucrative crops.*



(Left) Kapenta Fish: *Not much to look at as individuals, but eaten heads, tails, bones and all the schools provide a nutritious source of protein. (Right) Eye of the tiger:* *Annual fishing tournaments for Kariba's tiger fish continues to pump recreation dollars into the black hole that is the Zimbabwean economy.*



Net Menders: *Here, the introduced kapenta fishery has proven a boon, feeding and employing thousands of Zambians and Zimbabweans.*

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Fellows and their Activities

Alexander Brenner (June 2003 - 2005) • **CHINA**

With a B.A. in History from Yale in 1998 and a Master's degree in China Studies and International Economics from the Johns Hopkins School of Advanced International Studies, Alex in China, focused on the impact of a new government and a new membership in the World Trade Organization on Chinese citizens, institutions and regions both inside and far from the capital.

Cristina Merrill (2004 - 2006) • **ROMANIA**

Born in Bucharest, Cristina moved from Romania to the United States with her mother and father when she was 14. Learning English (but retaining her Romanian), she majored in American History at Harvard College and there became captain of the women's tennis team. She received a Master's degree in Journalism from New York University in 1994, worked for several U.S. publications from *Adweek* to the *New York Times*, and will now spend two years in Romania watching it emerge from the darkness of the Ceauscescu regime into the presumed light of membership in the European Union and NATO.

Andrew Rice (May 2002 - 2004) • **UGANDA**

A former staff writer for the *New York Observer* and a reporter for the *Philadelphia Inquirer* and the Washington Bureau of *Newsday*, Andrew is spending two years in east-central Africa, watching, waiting and reporting the possibility that the much-anticipated "African Renaissance" might begin with the administration of President Yoweri Museveni. Andrew won a B.A. in Government from Georgetown (minor: Theology) in 1997 after having spent a semester at Charles University in Prague, where he served as an intern for *Velvet* magazine and later traveled, experienced and wrote about the conflict in the Balkans.

Matthew Rudolph (January 2004-2006) • **INDIA**

Having completed a Cornell Ph.D. in International Relations, Matt is spending two years as a Phillips Talbot South Asia Fellow looking into the securitization and development of the Indian economy.

Matthew Z. Wheeler (October 2002-2004) • **SOUTHEAST ASIA**

A former research assistant for the Rand Corporation, Matt is spending two years looking into proposals, plans and realities of regional integration (and disintegration) along the Mekong River, from China to the sea at Vietnam. With a B.A. in liberal arts from Sarah Lawrence and an M.A. from Harvard in East Asian studies (as well as a year-long Blakemore Fellowship in Thai language studies) Matt is also examining long- and short-term conflicts in Burma, Thailand, Laos and Cambodia.

Jill Winder (July 2004 - 2006) • **GERMANY**

With a B.A. in politics from Whitman College in Walla Walla, WA and a Master's degree in Art Curating from Bard College in Annandale-on-Hudson, NY, Jill is an ICWA Donors' Fellow looking at Germany through the work, ideas and viewpoints of its contemporary artists. Before six months of intensive study of the German language in Berlin, she was a Thomas J. Watson Fellow looking at post-communist art practice and the cultural politics of transition in the former Soviet bloc (Czech Republic, Slovakia, Poland, Croatia, Hungary, Latvia, Romania, Slovenia and Ukraine).

James G. Workman (January 2002 - 2004) • **SOUTHERN AFRICA**

A policy strategist on national restoration initiatives for Interior Secretary Bruce Babbitt from 1998 to 2000, Jamie is an ICWA Donors' Fellow looking at southern African nations (South Africa, Botswana, Mozambique, Zambia and, maybe, Zimbabwe) through their utilization and conservation of fresh-water supplies. A Yale graduate (History; 1990) who spent his junior year at Oxford, Jamie won a journalism fellowship at the Poynter Institute for Media Studies and wrote for the *New Republic* and *Washington Business Journal* before his years with Babbitt. Since then he has served as a Senior Advisor for the World Commission on Dams in Cape Town, South Africa.

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