

INSTITUTE OF CURRENT WORLD AFFAIRS

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LIFE AFTER DEATH IN SINGAPORE'S RIVERS

8 October, 1987

Mr. Peter Bird Martin  
Executive Director  
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Hanover, NH 03755 USA

Dear Peter,

Strolling along the lower Singapore River last month, I hardly recognized the waterfront of my first visit there, ten years ago. I remember describing that part of the river, running through Singapore's old business district, as the most fascinating cesspool I'd ever seen. Since 1977, Singapore has run a campaign to clean up its rivers and revive aquatic life in the dead waters. The pace, scope, and intensity of this campaign is perhaps unmatched by those of water quality improvement efforts anywhere in the world.

On that introduction to Singapore, I remember wandering past the new skyscrapers of the multinational banks, angered by their contrast with the squalor below. But the life along Singapore's waterfronts interested me more than the sterility of the newer areas -- glossy in the corporate and hotel centers, drab in the more pervasive housing developments. I followed the courses of Singapore's major south-draining streams through trading, industrial, and finally incongruously rural areas until the streams became mere drainage ditches, lined in concrete. I picked my way, gingerly, through bustling open-air food wholesaling districts, where vegetable garbage and packing materials were washed directly into storm drains. I passed through boat yards where carpenters repaired sampans, tongkangs, twa-kows, and other Chinese-style vessels I never learned to identify.

Every few hours on these walks, I stopped at hawkers' stalls near the river to try some new delicacy -- an endless variety of noodles or globby, luridly-colored bean-and-gelatin drinks. I marvelled at the low overhead of these businesses, as cooks poured peels, grease, and washwater into the gutters or threw them onto the riverside mud. Further upriver, the hammering and woodchips of cabinet-makers' and coffin-makers' yards gave way to the grunts, quacks, and putrid run-off of backyard pig and duck farms, curious anachronisms adjacent to the booming construction sites of Singapore's now ubiquitous highrise apartment blocks.

It occurred to me that these riversides were none too healthy, and that the stinky waters themselves were devoid of any desirable aquatic life, as I carefully washed muck off my rubber thongs and feet each evening, even sacrificing a toothbrush to pursue the grease and grit that had seeped into callouses and under toenails.

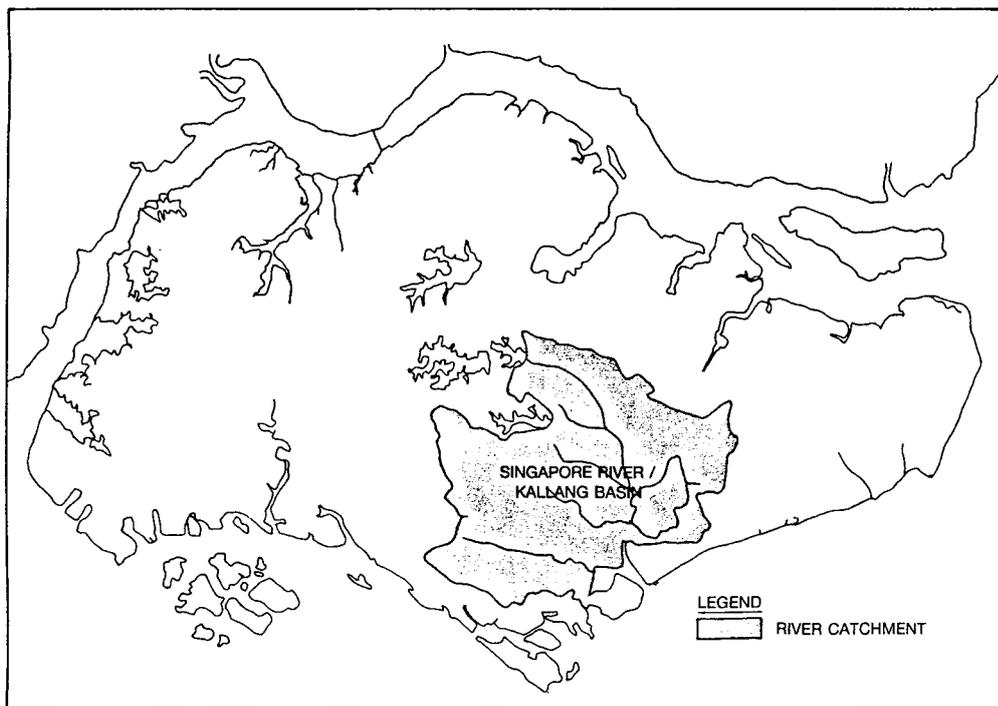
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In 1977, Singaporeans were self-consciously on the brink of middle-class nationhood. Waterborne diseases were still more common than the otherwise high levels of public health would lead one to believe. Jet-setters rode glittering capsule elevators to the tops of corporate towers to see the panorama of boat life, squatter settlements flotsam and jetsam on the water and riverbanks. The panorama allowed Singaporeans to romanticize the old town's historical image, and transcend the conspicuous filth and untidiness of the rivers that flew in the face of the high-tech lifestyle to which many Singaporeans had begun to aspire.

In early 1977, Singapore's Prime Minister, Lee Kuan Yew, challenged the government to clean up the nation's rivers: "...In ten years, let us have fishing in the Singapore River and fishing in the Kallang River. It can be done." In Singapore, what Lee says, the government does. By the end of the year, the Ministry of the Environment had traced the most obvious pollution to its sources in the two river basins. The Singapore and Kallang River basins together are roughly contiguous to the most highly urbanized areas of the island state. Reports spelled out measures to clean up the waters and riverbanks, identifying fourteen government bodies that would need to cooperate on various aspects of the clean-up.

Over the next year, the Ministry of the Environment prepared a master action plan for completing the project. Some people joked that the plan's ten-year target was Singapore's race to the moon.



Map showing the Singapore and Kallang River basins. These two major catchments cover a fifth of Singapore's total land area. About half of the island's built-up area is located within this area.

When I returned to Singapore last month, the nation was in the midst of its Clean Rivers Commemoration 87, a ten-day blitz of water-oriented exhibitions, sports events, and multimedia extravaganzas. One of the celebration's more serious spectacles was an excellent exhibition on the river clean-up, slickly presented in the lobby of one of Singapore's glitzy new hotels built on landfill along the old mouth of the Singapore River. The day I was there, hundreds of blue-and-white uniformed school kids hopped from one section of the exhibit to the next. They had been well-briefed. I watched as several groups of 12-year-olds got 100 percent right answers on a computerized quiz about the river clean-up, which began when most of them were infants.

The kids seemed to have memorized plenty of numbers:

Since 1977, 21,000 households, businesses, and other premises in the Singapore and Kallang River basins were connected to sewers or relocated to areas where they were less likely to cause serious pollution problems. Also, modern sanitation facilities (i.e., sink drains and water-flushed toilets of some sort) were provided to 12,000 homes that had previously used old-fashioned nightsoil buckets collected by the government, and 700 latrines directly overhanging rivers and drains were "phased out."

The pig and open duck farms also had to go. By 1982, 610 pig farms were moved elsewhere in Singapore, or the owners compensated to close their businesses. Ducks are now allowed only in sheds with waste collection and disposal -- 483 farms were collected. The kids knew that there had been 75,000 pigs and 125,000 ducks on these farms!

About 5,000 food hawkers were ordered to move into markets and food centers with running water, fixed cooking bays, sewers, and refuse disposal service. (Many of these centers are run by the Ministry of the Environment.) Hawkers throughout Singapore are constantly admonished to dump food, cooking and washing wastes only into sanitary sewers, not into storm drains. By 1984, all vegetable wholesalers had also been moved to a new government-run wholesale market.

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After seeing the new waterfronts themselves and this exhibit, I approached the Ministry of the Environment to try to get some more detailed information about technical aspects of the river clean-up. This turned out to be trickier than I'd expected, despite the big public-relations whoopla associated with the clean-up celebrations. Information about anything the Singapore government has a hand in (which is almost everything going on in Singapore) is not easy to come by, doled out in highly polished but extremely limited form. The river clean-up is no exception. Even the public-relations officer dealing with the clean-up had to get special approval "from above" to talk with me, and any documents I was shown had to be cleared first. I soon got used to these clearance procedures, in a system where anything not specifically released to the public is treated as highly confidential. Mentioning that I had worked for several years in the United States on plans for cleaning up severe water quality problems seemed to help a lot.

Noting that I was looking at similar issues in other Southeast Asian nations did even more. Singaporeans are intensely proud, even chauvanistic, of their success in such fields compared with their neighbors.

Even if bureaucrats responsible for specific segments of a project can't point to anything tangible in the way of progress -- yet -- they solemnly point to their Plans. In Singapore, a plan is a Plan. As a unitary state (i.e., one without built-in divisions and conflict in authority and jurisdictions) the government can speak with one voice. The Ministry of the Environment, as the lead agency in the clean-up effort ordered by Mr. Lee, did not need to concern itself unduly with conflicts in interest and jurisdiction between local, state, and federal agencies, for example. Questions of equitably distributing the costs and displacement associated with the river clean-ups were not subject to the public debate, accusations, and eventual fine-tuning that Americans call "the democratic process." But Singapore's press had covered the clean-up in detail, and had subjected the versions of the plans released for public consumption to general speculation and questions.

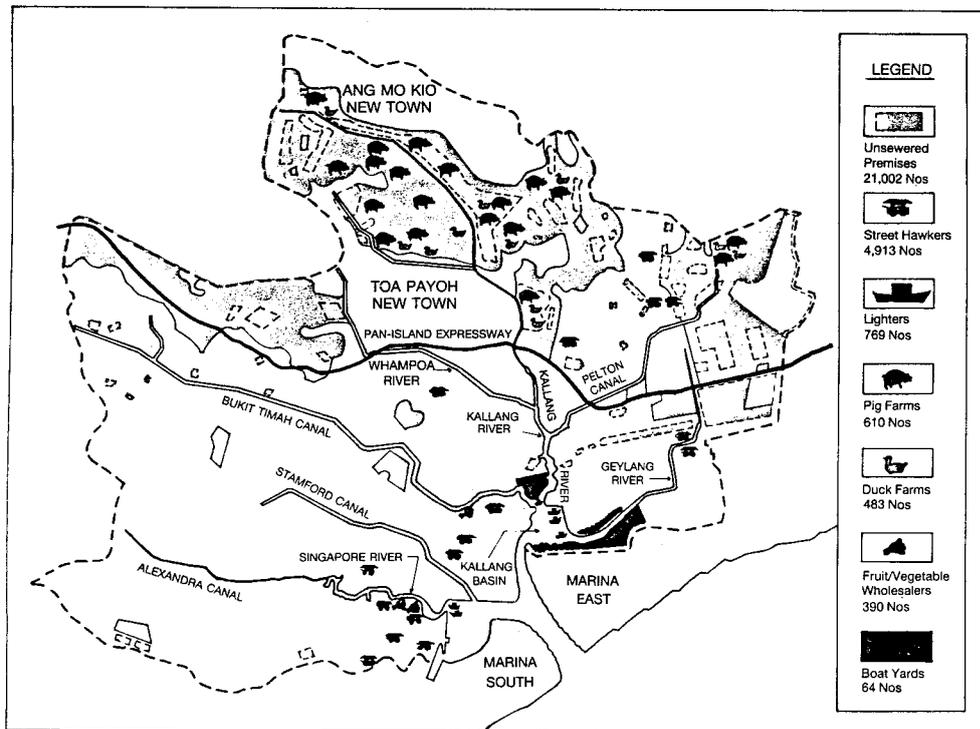
I learned that, according to the Ministry of the Environment, cleaning up the rivers had required resettling 26,000 families. Occupants of five major squatter settlements were moved by the Housing and Development Board to government flats or compensated to vacate their unsewered riverine sites according to government scales of payments. 2,800 small industries, such as charcoal dealing, engine repairing, metal working, and carpenters were moved to government industrial estates or "flatted factories" (multi-storey or strip-type structures and yards leased to businesses and provided with water, sewer, electric, and security services). 800 small boat operators on the Singapore River were moved to Port Authority mooring places. Most of the 64 boat yards of 1977 went out of business, largely due to the general downturn in Singapore's small shipping trade with the dominance of large container ships and the demise of the river-oriented economic activities associated with the river clean-up and riverside land clearing.

In fact, much of the "clean-up" consisted of removing exactly those activities responsible for the economic vitality of Singapore's rivers since the 1820s, when the island was Stamford Raffles' Straits Settlement. It is difficult and not particularly meaningful to distinguish between actions the government would probably have taken in the name of slum clearance or urban redevelopment from those taken only in the interest of improved health, water quality, or riverside aesthetics. While cleaning the river itself was not originally envisioned as an essential element of Singapore's comprehensive national development plans, most aspects of the clean-up had already been incorporated in these plans before the clean-up was emphasized as a separate goal. Those riverside activities not removed from the area have been closely regulated with clear and simple rules on what is allowed on the river and what is now prohibited.

Because the Prime Minister had personally backed the river effort, appropriating money for it was not much of a problem. Many of the elements of the clean-up were already accounted for or easily added

to the responsible agencies' operating and capital budgets. More important, perhaps, Singapore's government has little trouble gaining control of any piece of land it needs in the interest of national development. Land to be cleared as part of the river clean-up was often moved to the top of priority lists for acquisition. Because Singapore's massive program of public housing and slum or squatter clearance was all set up to deal with those dislocated from the riversides, few particularly unique logistics needed to be worked out. Whether or not the people moved are happy with the radically different housing and working alternatives provided is another matter. But they have clearly moved from the "old" Singapore to the new.

After the old riverside users were gone, huge amounts of debris, old pilings, and highly-polluted muck remained. The Public Works Department dredged muck, mud, and debris from the banks and river bed, rebuilt river walls where they had been damaged or where the cleared banks were unstable. The Parks and Recreation Department put in turf and landscaped much of the newly-cleared riverside. In the Kallang basin, tons of sand were brought in by the Drainage Department to form beaches. (There was considerable doubt about this decision, as sand beaches at river mouths are not particularly natural features, and may not remain clean sand for long without constant, costly maintenance.)

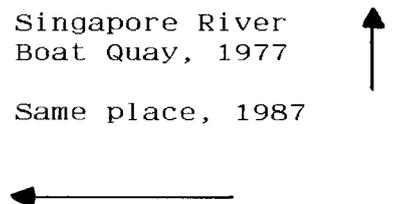


Map showing locations of polluting activities along rivers, canals, and major drainage ditches.



Singapore River  
Boat Quay, 1977

Same place, 1987



Whampoa River, 1977

An enormous investment, but one not clearly visible along the river banks themselves, has been the provision of separate sanitary sewer service and storm drainage to virtually all developed areas in the Singapore and Kallang River catchments. No more raw sewage is being routinely discharged into either of these rivers or the drains that flow into them. Over the past decade, Singapore has also upgraded sewage treatment facilities for the entire urbanized area. Sewage treatment plants serving this area now treat wastewater to standards considerably cleaner than those observed by many American cities discharging treated sewage into the ocean. (Singapore's six treatment plants have been upgraded to produce effluent with 20 parts per million of material exerting biochemical oxygen demand, or BOD, on surrounding waters, and 30 parts per million of suspended solids.)

A month before the ten-year clean-up target, Singapore's Primary Production Department stocked the rivers with thousands of fish and prawns. Results of recent biological surveys of the rivers by the National University's zoology department have allowed the government to proclaim "the rivers are alive!" With improved water quality and habitat conditions, reports of catfish, prawns, mangrove and flower crabs, mussels, cuttlefish, tortoises, and ikan bilis (the tiny transparent fish that form a base for much Malay cooking) brought skeptical Singaporeans with rods and small nets to the banks of the rivers while I was in Singapore. (I only found one woman who had caught anything -- a very small catfish.)

No baseline biological study of the river was done before the river clean-up program began. Scientific study was not the point of the project, and apparently almost everyone believed that the river was so grossly polluted that people simply could not support any kind of desirable aquatic life with septic bottom conditions, high ammonia content, and less than the one part per million dissolved oxygen content necessary for most fish to survive. (The rivers overall had water quality at their mouths about equivalent to that of Singapore's treated sewage effluent now.) Now the rivers' dissolved oxygen content is up to about three parts per million, and it's possible to see clearly to a depth of about a meter, remarkable for any tropical river flowing through an urban area.

Singapore is a nation of campaigns. They often reflect heavy commitments of government resources, and heavy-handed determination to see that these investments "pay off." Singapore's industrial productivity campaigns of the 1960s and 1970s are well-known producing both radically improved standards of living for many Singaporeans and hefty profits for corporate investors. In the 1970s and early 1980s, the family planning campaign was so successful in lowering birth rates that the government has recently done a pro-natalist about-face. Singapore makes no bones about its Draconian measures against illegal drugs, including death for convicted dealers. Less intense campaigns have enforced Singapore's stiff fines for littering and illegal parking. Some of my current favorites are the current courtesy campaign, aimed at softening Singapore's notorious brusqueness in business and other interpersonal dealings, and the "Try Mandarin First" drive, to get Chinese Singaporeans to address strangers in Mandarin, not dialects, and avoid often-awkward fumbling to determine a common language for communication. A promoter's dreamland, Singapore's government programs are heralded by posters, jingles, and specially-targeted education drives.

But I'd never thought of clean water in terms of media hype! The slogans of the Clean Rivers Commemoration -- Clean Rivers - Better Life, and The Rivers Are Alive! were border-line catchy. The celebration's themesongs, however, are impossible to forget. They were broadcast over television and radio waves at frequent intervals while I was in Singapore, and shopkeepers hummed them sweeping the walkways in front of their stores. (Here's the chorus to one: River of life, sparkling along our shores/ River of life, reflect the strength within us/ You're the link to a bright new future/ A friend to us all, river of life.)

Reading through some of the Ministry of the Environment's pamphlets one day while sipping iced fresh coconut juice in an immaculate hawkers' center by the Singapore River, I wondered if Singapore's clean-up efforts supported or contradicted the assertion that stringent pollution control is something that poor developing nations cannot afford. The way Singaporeans might put it, however, is that it's something a middle-class nation can't afford to ignore.

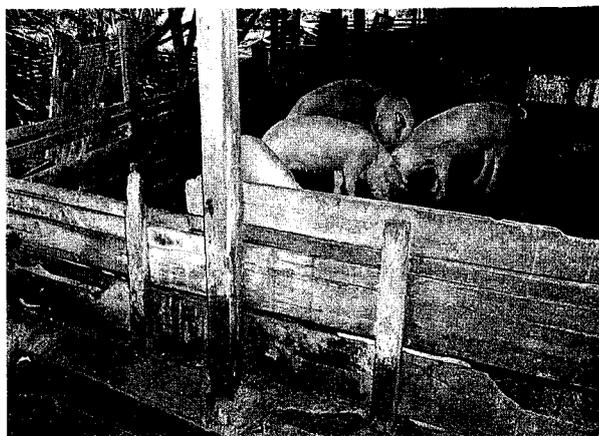
So what's next? In 1985, the Urban Redevelopment Authority announced a plan to promote water sports near the river mouths. They also want to develop trendy offices, boutiques, and entertainment complexes behind preserved or restored facades of riverside shop-houses and warehouses. And for the past three years, the Parks and Recreation Department has been working with an ornithologist to develop ways to attract birds back to Singapore....

Sincerely yours,

*Judith Meyer*



Kallang River, 1977 ↑



Pig and duck farming, 1977 →



Maps and pictures from the Ministry of the Environment, Singapore.

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