

arcca

architecture california
the journal of the american institute of architects
california council

infrastructure issue

01.4



H_2O^{CA}

Water:

Reordering the Paradigm

arcCA Interviews Bill Wilson

Kenneth Caldwell

Bill Wilson is a jack-of-all-trades water guy, an environmental engineer, water resources advocate, and finance and development consultant. Kenneth Caldwell met with him in Oakland to figure out what he really does. You can find him at billwilsonwater@gmail.com.

arcCA: In terms of sustainability, I usually hear people talking about energy usage and building materials rather than about water. Why is that?

Wilson: There's been a lot of attention to cradle-to-grave materials, non-toxic building materials, window efficiency, energy efficiency, insulation. But when it comes down to the basics, like plumbing and stormwater runoff, it's pretty much been a traditional pattern. For about \$2.40 per 100 cubic feet, we can have pristine water from Hetch Hetchy. We use it once and throw it away.

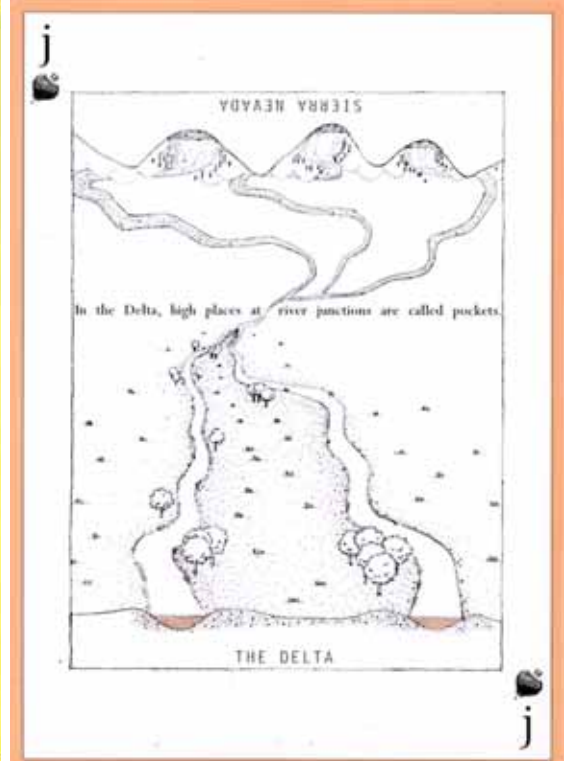
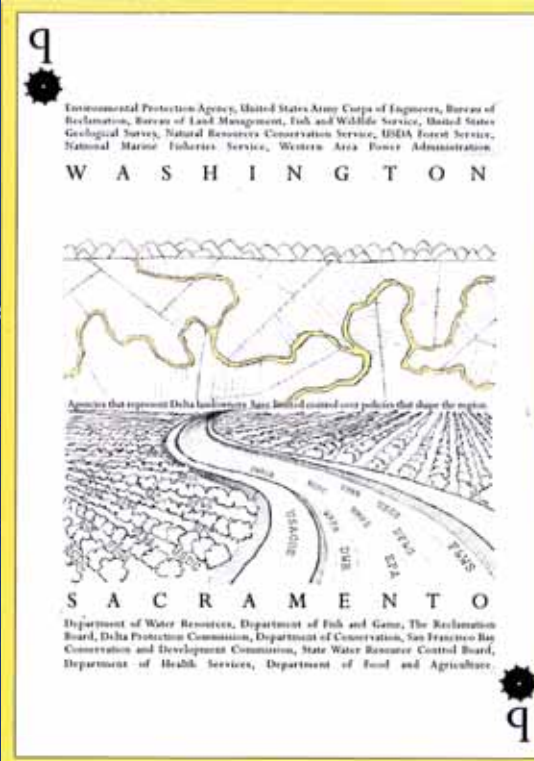
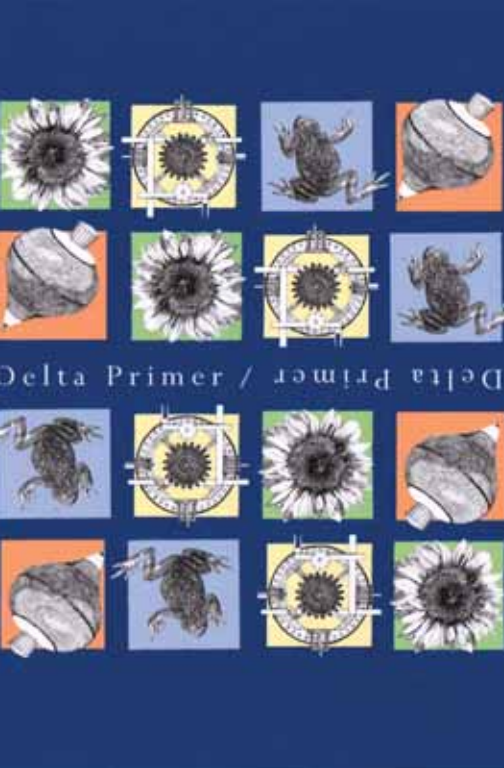
arcCA: The cost of water has been negligible in terms of the typical development model of looking at upfront costs and return on investment. It reminds me of fossil fuels for the last half century.

Wilson: Yes. Water doesn't really model as a return on investment item when you're doing a project. But if you have a water limitation on your project, then it probably won't happen. For instance, take a redevelopment project in a major urban or suburban area, where you are increasing density, as most planners advocate. Yet the sewer system is set up for a much lower density, and that means a few miles of sewer lines are going to have to be replaced. That has a huge impact on development.

Most projects try to get rid of rainwater and wastewater and hand it off to a centralized public system. These models don't really respond well to capital costing, but if you don't have them solved, you are really in trouble. The cost of water is cheap, but the cost of no water is really expensive.

Water in environmental engineering is actually a matter of strategic planning, but it's not trying to fit into this upfront capital cost, five-year return on investment, bean-counter approach that we've been conditioned to.

Cover of arcCA 01.4 (fourth quarter, 2001),
design by Bob Aufuldish.



arcCA: I think there is some public awareness about water, but it's still not like fuel or the materials we hear so much about. They are tactile and visible. Water is almost invisible.

Wilson: I think the general public is becoming more aware of the problem and doesn't want to use water once and throw it into the ocean. But the actual codes and requirements for building and for development projects work against water resource efficiency, although that is starting to change. Here in California, we just got a new, user-friendly graywater code. We are confronted with many of the same policy issues over rainwater harvesting.

arcCA: When did you first figure out that there was a huge problem?

Wilson: I was working on a coral reef project down in Jamaica in the late 1980s, and I witnessed the entire coral ecosystem around most of the island of Jamaica turning into an algae-dominated system. I discovered that it was probably mostly due to nutrient pollution from unrestricted wastewater discharges.

Since then, I have been focused on wastewater treatment plant design, financing of wastewater treatment plants, and decentralized wastewater recycling. My motto is, "Get all this sewage out of the ocean and onto the land where it belongs." Because land-based systems, aside from needing water and nutrients, are uniquely equipped to deal with the impacts of wastewater applications, whereas marine ecosystems are very delicate in regard to pollution or nutrient upsets.

arcCA: So you observe too much of a kind of algae, you do research on the plankton in the waters disrupting the food chain, you figure out how many waste treatment plants need overhauling, and then you plan for them?

Wilson: Yes, and that requires a process solution. Our wastewater collection systems are overly centralized. And part of that is because the model was for centralization. But once you've got all the wastewater from a whole area, say the entire L.A. basin, being treated at the beach, and you need recycled water ten miles inland, how do you get it back there? A

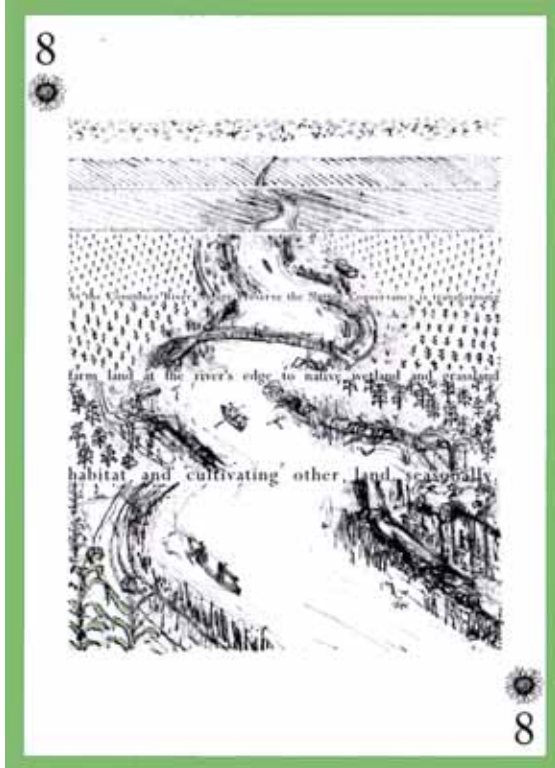
lot of energy gets expended, and there's the cost of putting in a whole new pipeline back to where it started.

arcCA: So you're advocating smaller, decentralized wastewater treatment plants?

Wilson: That's where it fits into the work of architects. For instance, it's now possible to develop wastewater recycling plants inside major buildings and on campuses.

arcCA: Do these on-site systems exist?

Wilson: Yes. There are now about twenty high-rise buildings between New York and Boston that recycle their own wastewater. They use it for toilet flushing, HVAC systems, cooling tower make-up water, fire protection and irrigation of podium landscaping. There are several buildings that do the same thing with stormwater runoff, like the new Bank of America building in Manhattan. I was just involved in the design of a cistern for the new Cathedral Civic Medical Center in San Francisco, which SmithGroup is designing.



left and above: Jane Wolff, *Delta Primer Playing Cards*, William Stout Publishing, 2003

arcCA: Are the municipalities listening?

Wilson: It's difficult for them, because most decision-makers in municipalities don't understand wastewater. They've been used to turning it over to their consultants. That's been the business model, which was formed on the federal government paying for everything. To replace that lack of funding, there have been state revolving funds and then bonding. Now these towns don't have any bonding capability. Or, if they did, it would preclude all their other needs for the next thirty years.

The wastewater treatment engineering profession is very conservative. You are apt to get yesterday's plant. Or you'll get tomorrow's plant, but it's very energy inefficient or very capital intensive. In a lot of cases, municipalities pass on the expense, including side effects, to the ratepayers. When the ratepayers find out about it, they're usually not too happy.

arcCA: You have to change the operational model and the business model?

Wilson: Yes. Twenty years ago, I could see that

the business model wasn't going to work in the absence of federal funding. Some possibilities for alternative financing include privately issued tax-free municipal bonds and the tax-free municipal lease. You take the existing rate structure, the staffing for the municipality, their current operating expenses, the various funding options, and the costs for those funding options over time, and you compare the various scenarios until you find one that optimizes revenue return to the municipality, minimizes the cost, and maximizes the protection of the rates. Then you can project that out in a fifteen- to thirty-year curve against projected cost of living increase and things like that. This approach gives the municipality good options and leaves them in control. They're not at the mercy of a typical privatization, where they lose control of their municipal infrastructure and the rates.

arcCA: Are you encouraged?

Wilson: Codes and building standards are starting to adjust, slowly but surely. Even some of the regulatory requirements are now starting

It's now possible to develop wastewater recycling plants inside major buildings and on campuses. That's where wastewater treatment fits into the work of architects.

to reflect this need for nutrient removal in wastewater treatment and stormwater mitigation. The next big thing is going to be endocrine disruptors and pharmaceuticals and chemicals that go right through a conventional wastewater treatment plant.

arcCA: But what about the economic collapse?

Wilson: The result is that municipalities are looking for innovation. At the state level, places like Pennsylvania and New York see that the old model doesn't work and endorse the models I discussed as a viable option for meeting their requirements, especially in areas like the Chesapeake Bay watershed, where municipal plants that discharge into rivers are under a lot of pressure. Or in South Florida, where they have to protect coral reef ecosystems. Our proposals for water treatment plants have innovative core processes, low maintenance, efficient operation, are cost effective to build, and include rational financing schemes. But the point is, you have to look at water—where it comes from, how it is used, and where it goes—as an interdependent system. ©