

# Paying the price for the sins of our past

KATHERINE GORDON



Victorians have been dumping untreated sewage into the Strait of Juan de Fuca for over a hundred years. Finally, we've decided to clean up our act. But there's more to sewage treatment in the Capital Regional District than just spending \$1.2 billion on improved facilities. There are many other issues that need addressing if sewage treatment is going to be effective. And there may be opportunities to obtain benefits that go well beyond simply cleaning up the region's stinking environmental record.

**A** discussion about sewage treatment in Victoria was already long overdue by June 2006, when Minister of Environment Barry Penner ordered the Capital Regional District (CRD) to come up with a plan to deal with heavy contamination around the two sewage outfalls at Clover and Macaulay Points. Almost the last major coastal community in North America not to treat its wastewater, the CRD has been discharging raw sewage into Georgia Strait for more than a century. In recent decades, a concentrated toxic cocktail of heavy metals and

“COPCs” (chemicals of potential concern, such as hair dyes, detergents and pharmaceuticals) has been added to the mix.

While the debate to date has been focussed on treatment, however, the issues go beyond what's pouring through the pipes into Georgia Strait. The region's sewerage infrastructure – the pipes that cart effluent to the outfalls – needs serious help. The regulatory framework that controls storm-water has major gaps in it. A new effluent treatment system is also just one component of what some experts

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would like to see as a holistic and cost-effective environmental strategy for post-treatment resource recovery: recycling the treated water and converting the leftover biosolids into marketable clean energy by-products such as biodiesel, with the potential to recoup the costs of treatment. Despite some question marks around feasibility, it's been done elsewhere, they say; and it's possible to do it here too.

Debate as to whether treatment is actually required is now redundant, anyway. “There is no question that there will be a facility,” confirms CRD environmental manager Dwayne Kalynchuk; it should be up and running in ten years. A plan, anticipated to include estimated costs of as much as \$1.2 billion, will be available on June 30 this year. Victoria Mayor Alan Lowe, who chairs the CRD's sewage committee, says frankly of the costs: “It's the price we have to pay for the sins of the past.”

It's worth briefly revisiting why that's so. Despite polls that suggest the vast majority of CRD residents want to see sewage dealt with properly, there remains an unshakeable belief in the minds of some that treatment is unnecessary. What these naysayers argue is that the diluting effect of the ocean's currents adequately disperses the effluent and removes any harmful effects.

But the pollution dilution solution, says engineer and Victoria Sewage Alliance (VSA) volunteer Stephen Salter, is unacceptable. The sites directly around the two outfalls have been proven to be heavily contaminated with a variety of toxins. That contamination is potentially symptomatic of a much broader problem: the cumulative effect of the toxins may be causing harm to the environment on a larger scale. Salter compares the contaminated sites with the sooty black mark above a vehicle's tailpipe, symptomatic of its carbon emissions contributing to global warming. Saying that ocean currents disperse the effluent with no long-term negative effects, says Salter, is like saying we don't need to worry about climate change because the wind will blow away all those emissions.

### Outfalls are contaminated sites

The science supports Salter's view. A July 2006 scientific review of the CRD's 2003 Liquid Waste Management Plan (the SETAC report) confirms that 130 million litres of sewage, some of which is

known to be toxic, are discharged every day from the two outfalls at Clover and Macaulay Points. The SETAC report states in unequivocal terms: “Relying on the dilution and natural dispersion processes of the Strait of Juan de Fuca is not a long-term answer to wastewater disposal.” Among the reasons cited: “Orca whales in the Georgia Basin have been identified as among the most contaminated cetaceans in the world.”

This is not news to the Sierra Legal Defence Fund (SLDF), which up until 2006 had been working for more than a decade to demonstrate that the two outfalls are illegally polluting Victoria's front yard. In 1993, 1994, and again in 1998, SLDF ran what are known as 96-hour LC50 tests at both outfalls. These tests, conducted monthly by pulp mills in accordance with federal fisheries regulations, measure the lethal concentration of contaminants in effluent at the point of discharge into the ocean. If even one fish in the sampled water dies over a period of 96 hours, an investigation of the cause may be required. If half of them die, the effluent is deemed to be toxic.

The SLDF's results: at Macaulay Point (1993) all the fish were dead

in 1.5 hours. Clover Point: all dead in one hour. 1994: every fish dead at both points in 4.5 hours. 1998: all fish dead in 30 minutes. Despite those test results being made publicly available, no action was taken against the CRD.

Refusing to give up, SLDF then analyzed data which the CRD had gathered around the outfall sites between 2000 and 2004, measuring it against the provincial criteria for contaminated sites under *British Columbia's Environmental Management Act and Contaminated Sites Regulation*. SLDF found that 19 compounds in the sediments around the outfalls exceeded permissible limits; five of them by a factor of more than 20. These comprised a cancerous litany of chemicals and heavy metals that included lead, mercury, cadmium and copper.

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An independent scientific report commissioned by Barry Penner's environment ministry supported SLDF's findings. Convinced the CRD was incapable of reaching a negotiated agreement with the provincial government on protection of the environment around the two outfalls, Penner finally ordered it to take action on sewage treatment. The rest is history.

### Treatment options

As most people know by now, five options have been developed for consideration, essentially falling into one of two categories. The first would see two large secondary treatment facilities at Clover and Macaulay Points only. The second category is a decentralized approach, splitting treatment among four or five smaller plants scattered around the region.

All of them have pros and cons (have a look at the CRD's Discussion Paper No. 5, on its website at [www.crd.bc.ca](http://www.crd.bc.ca)), but the decentralized approach seems like a no-brainer. It's cheaper than two large plants, despite requiring more physical infrastructure to be built; there would

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be no need to build another large secondary treatment plant at Clover Point; and the Macaulay site wouldn't need to be anywhere near as big. All the proposed plants would be underground with zero odours. Diverse locations would lower the intensity of activity at Macaulay Point and Clover Point.

Perhaps most important of all, decentralization allows for potential future expansion to take advantage of water recycling and energy recovery opportunities in a way that the first option does not. Both Lowe and Kalynchuk believe decentralization is the way to go. "It makes the most sense," says Lowe. "It's cheaper, and there are more opportunities. I think that's where most of the committee is heading."

### Infrastructure and jurisdictional issues

Whatever option is adopted, however, treatment alone is not going to solve all the region's problems. Much of the region badly needs an infrastructure upgrade to install new sealed plastic pipes in place of the leaky old ones – some of them still made from a predictably porous mix of brick, clay, wood, and rolled waxed paper. In wet weather, when the level of stormwater flow in the CRD rises to more than twice that of the average Canadian city, huge volumes of rainwater enter the system through those leaky pipes (Uplands, in Oak Bay, is the worst area).

Unless the pipes are fixed, that rainwater will simply end up passing through any new treatment facility, adding unnecessarily to treatment costs. Worse: what's in the pipes in the first place is leaking out into the soil. Stephen Salter puts it bluntly: "Victoria is probably the province's largest unlicensed septic field."

The SETAC report notes: "With significant potential to contaminate land and near-shore environments and to expose humans to wastewater, sewer overflows deserve particular attention from the CRD." But it isn't the CRD that manages the pipes – it is each individual municipality within the CRD, and it's going to be up to them to deal with the issue.

Another jurisdictional conundrum: while the CRD is responsible for stormwater quality management, it has no authority to enforce stormwater bylaws – again, that's up to individual municipalities. To date, only one municipality out of the seven affected has adopted the CRD's model stormwater quality bylaw. SETAC recommends coordination of stormwater management across jurisdictions through a common authority, but there is no appetite on the part of the CRD to take over responsibility for individual municipal infrastructure.

Third problem: trucked liquid waste, or TLW. Commercial enterprises and the food industry generate about 26 million litres of TLW each year: oils and chemicals that must be transported from their source to a proper disposal facility. While the CRD has a policy on managing TLW, it has no regulatory authority to enforce bylaws against offenders who may be "opening up the night valve" – quietly disposing of toxic waste themselves to avoid the cost of having it removed properly.

It doesn't stop there. Think you're immune from the issue because you're on a septic field? Think again. The contents of your septic field (septage) still have to get taken to a treatment facility every few years. Septage, says SETAC, "contains the full range of contaminants." But yet again, the CRD lacks any authority to implement its septage policies. You may not get out of the bill for the new treatment facilities either, by the way – while the cost of taking your septage is passed on to your municipality by the CRD, there's nothing to stop the municipality passing that cost on to you. Only if you make yourself completely

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independent of the treatment system (as the new Dockside Green development in downtown Victoria is attempting to do) can you count on not sharing the cost.

A few more things to think about: biosolids, or sludge – the solid stuff left over after the wastewater has been treated and disposed of – must still be dealt with. Right now it is trucked to the Hartland Landfill; that appears to remain the most likely plan.

Last but not least: COPCs (chemicals of potential concern). Every household in the CRD is adding to the environmental problem each time we flush pharmaceuticals, rinse fat and grease down the kitchen sink, and wash our hair, dishes and laundry. While the CRD guides how business disposes of its contaminants through source control regulation, it simply can't do that in individual homes: monitoring and enforcement would be next to impossible. Secondary treatment (the level of screening most likely to be adopted in the June 30 plan) will remove up to 95 percent of contaminants, but not all of them. Five percent may not sound like much, but in the context of 130 million litres of sewage a day, it is still a significant concern.

### On the home front

New source control programs are in the works to attempt to encourage individual responsibility in this area. That includes minimizing detergent use (the manufacturer-recommended amounts are vastly excessive); reducing water consumption; and being diligent about responsible disposal of household chemicals.

Washing fat down the sink is a big no-no – apart from clogging your own kitchen pipes, that's contributing to the estimated 60 percent of total fats that CRD households are currently adding to the sewerage system.

Eating habits have a role to play – the more organic whole food we eat, the fewer chemicals literally come out the other end. Even returning prescription pills to the pharmacy rather than flushing them can make a difference.

And low-flush and composting toilets and flow-control shower heads should be in your future, if they're not already in your home (the less you flush, the less you'll have to pay for treatment).

### Costs – and cutting-edge common sense

Costs are certainly on the minds of many CRD taxpayers. But Stephen Salter says that the estimated capital building costs of \$1.2 billion may not be as bad as they sound.

For a start, the CRD's engineering consultants have explained that the cost estimates seem larger than expected because they have been grossed up by a factor of 1.56 in anticipation of contingencies and inflation.

The estimates are also based on a 60-year life span for the new infrastructure. That includes the potential for capacity expansion as the CRD's population grows over that period, based on current usage. If CRD residents and municipalities follow advice to improve the pipes and reduce water consumption and waste production, that

expansion might never be necessary. “A litre of prevention is worth nine litres of waste,” says Salter.

The other major plus for CRD taxpayers is the potential for the treatment plants to be used for resource recovery. If what goes in comes out as usable water, energy for heating, and fuel for vehicles – all marketable products that can be sold – the CRD may be able to recoup some or all of the costs of treatment.

In a July 2006 presentation to the CRD by the Victoria Sewage Alliance, engineer Dr David Bagley told the CRD: “Sewage contains ten times the energy needed to treat it.”

The implication is that if treatment plants are constructed appropriately, leftover solids can be converted into alternative energy – biodiesel, biogas, and heat – and treated liquid waste into water usable for irrigation, cooling, and possibly even drinking (if the “yuck” factor can be overcome).

Bagley says that the CRD could produce enough biodiesel to run 200 buses, and enough biogas to run 5,000 cars. A comparison by Bagley of the per household cost of treatment without recovering the water and energy with the potential cost of resource recovery treatment, indicated that the latter could end up costing less than one quarter

of the former – a savings of several hundred dollars per household. It’s time for a shift in thinking, says Bagley: from waste disposal to waste recovery.

Stephen Salter couldn’t agree more. In October 2006, Salter travelled to Sweden to look at treatment plants in Stockholm, Gothenburg, and Kristianstad, world leaders in the recovery of energy and water from sewage treatment. “I went expecting to find cutting-edge technology for recovering energy from waste. [But] the main force at work in Sweden is cutting-edge common sense.”

Part of the strategy lies in taking a holistic approach to the issue of sewage treatment, resource recovery, heat and transportation. In Gothenburg, for example, solid waste is diverted to the wastewater treatment plant to produce more biogas. That biogas is injected into the city’s natural gas distribution network, where it is available to fuel biogas-powered cars. Heat from the treated sewage is extracted by the city’s energy company and injected into the district heating network, where it provides hot water and space heating for 36,000 apartments. The wastewater treatment plant is paid for all of it.

## The questions and the future

There are questions around the resource recovery options that Salter and his colleagues espouse. What portion of treated waste can be captured in the form of gas for heating, for example, and how much might escape into the atmosphere, adding to climate change woes? Will enough energy be recovered to justify the expense? It takes energy, after all, to produce energy.

Biosolids also tend to have high moisture content, requiring extra drying before burning (for comparison, think how long it takes wet wood to produce heat in your fireplace as opposed to dry wood).

Gasification – converting the biosolids into gas energy – must still deal with remaining contaminant content to ensure it doesn’t simply end up coming out of exhaust pipes or heater vents.

Water recovery has a solid international track record of success, but requires tertiary treatment rather than secondary – a higher level

of management that is not being considered by the CRD and which comes with a higher price tag. Any recycled water also needs to be returned to its users – which means more pipes. Because treatment plants tend to be built in low-lying areas to take advantage of gravity, it also more than likely means more pumping stations and storage tanks, all of which cost money.

The potential to recoup capital and treatment costs through resource recovery needs, in other words, to be considered with care. Nonetheless, the potential environmental benefits may bridge any financial gap in the equation. Salter believes that the questions can all be addressed by what he jokingly calls “sewagenuity.” He thinks what’s required is to apply the vast technical knowledge available to the problem, utilize proven solutions from other parts of the world, and harness public sentiment to support the upfront capital costs of those solutions in order to reap the long term-benefits. With that kind of will, anything is possible.

There’s room for optimism his vision will become reality: the CRD seems to be leaning in that general direction. There’s clearly work to be done in other areas to make it all happen. But perhaps if energy being used to continue tilting uselessly at the windmill of maintaining

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the status quo were to be diverted into campaigning for the holistic approach advocated

by Salter and his colleagues at the Victoria Sewage Alliance, it might really only be ten years before residents of the CRD can enjoy the benefits of smaller tax bills and clean-running buses.

Best of all: once a facility is in place, David Suzuki Foundation salmon conservation biologist John Werring says that as long as the sediments around the existing outfalls are left alone and not disturbed, they will eventually be buried under normal, harmless sediments. Recovery of the water health around the outfalls should be rapid. We will be able to gaze out at Georgia Strait, resident and visitor alike, and admire the ocean view – comfortable in the knowledge that it no longer hides two of the worst contaminated sites on British Columbia’s otherwise idyllic coast.

*On the CRD’s website, [www.crd.bc.ca](http://www.crd.bc.ca), look at the SETAC report of July 12, 2006, and Discussion Papers Nos. 5 and 6.*

*The provincial Ministry of Environment report confirming the contaminated sites findings can be found at [www.env.gov.bc.ca/main/prgs/docs/sq\\_crd\\_outfalls.pdf](http://www.env.gov.bc.ca/main/prgs/docs/sq_crd_outfalls.pdf)*



Katherine Gordon is an author and freelance writer based on Gabriola Island, where her septic field compels rigour in managing what goes down the pipe: oils and fats, chemicals, and even coffee grounds will all help destroy the system.