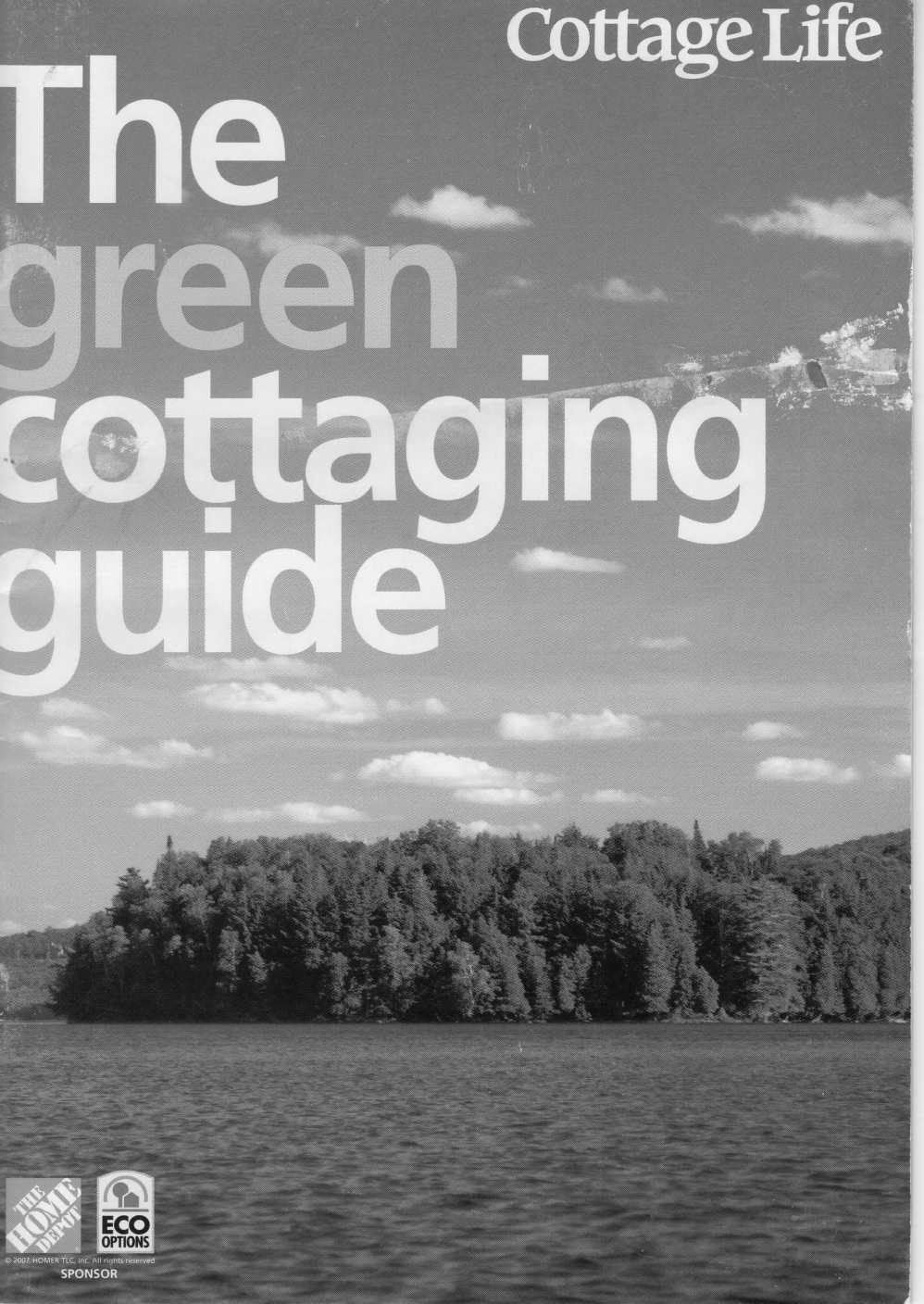
Cottage Life

The green cottaging guide



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The conserving cottage

HOW TO BUILD OR RETROFIT A GREENER GETAWAY

by Susan Nerberg
illustrations by Greg Latimer and Amanda Reed,
Levitt Goodman Architects

We've all heard the news about climate change, and people are reacting by doing their bit for the planet. Making your cottage more sustainable is no exception. But for many, the word "green" conjures up images of a utilitarian, less-than-cozy retreat with unsightly solar panels strapped to the roof. Not so. And while the off-grid cottage powered by only sun or wind is still a rarity, many energy- and water-saving principles can be worked into any structure. So whether you're renovating or building new, here's what you can do to go green.

Site selection and preparation

"The greenest thing you can do for nature is to leave it alone," says Trevor McIvor, an architect with a keen interest in sustainable design. "When this is not an option – as in building a cottage – minimize the disruption." The starting point, he says, should always be with site analysis and building placement on the lot. The orientation (north, east, south, or west), topography, vegetation, and unique natural features, such as exposed granite, all inform the cottage's design, while shoreline and side lot setbacks specified in by-laws limit its location within the site. "We tend to play off natural features, stepping the building down existing slopes," says McIvor, who's spent almost a decade designing cottages and overseeing their construction as a partner with Toronto-based Altius Architecture.

Making the cottage fit the topography – not the other way around – saves the

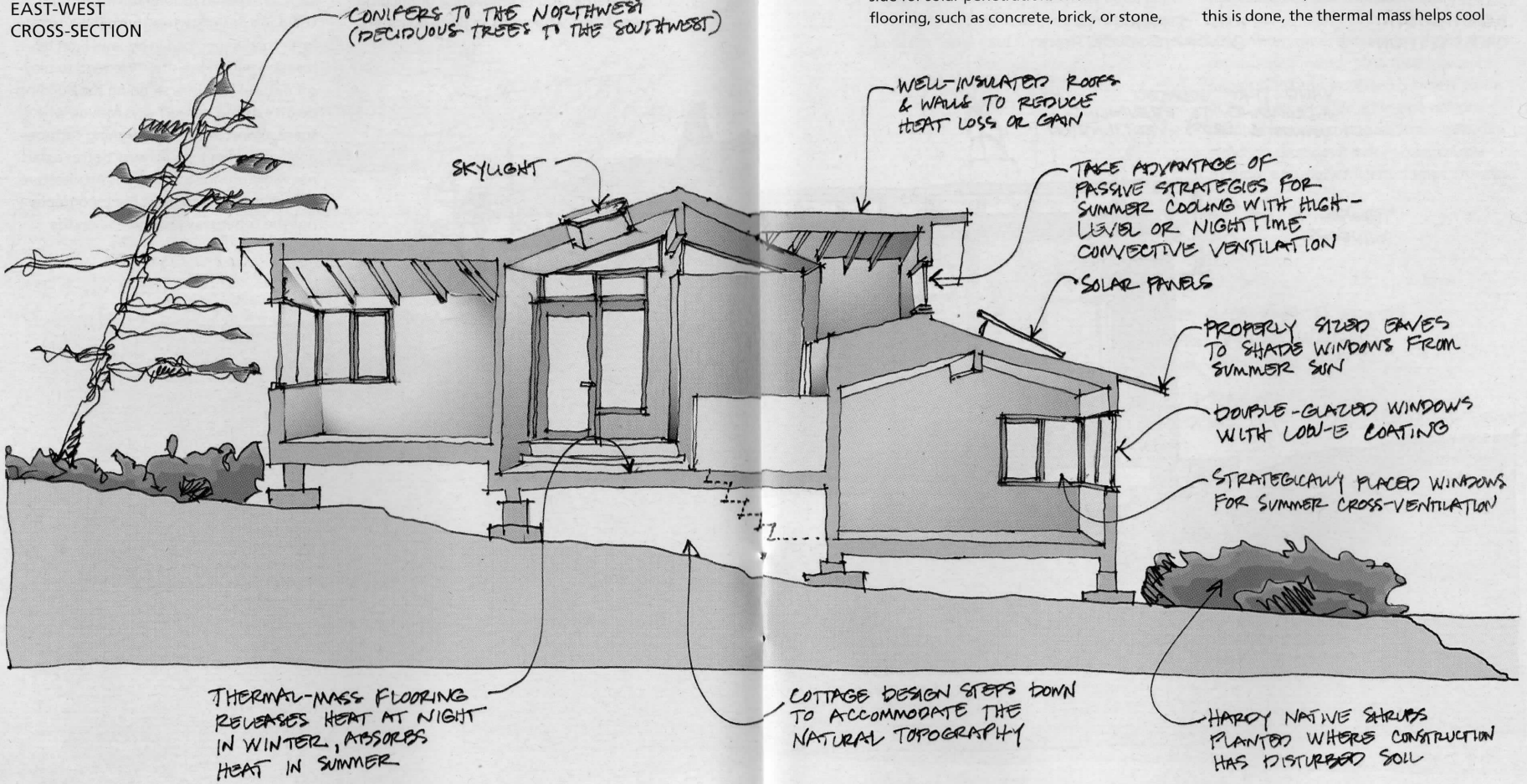
parcel from blasting and extensive grading and landscaping. It also spares existing trees and other vegetation, which provide habitat for birds, butterflies, and other wildlife. As well, a conservative approach to site work preserves as much as possible of the ground cover and root mass, minimizing soil erosion, especially during the spring runoff.

Keeping cool – or staying warm

When siting the cottage, consider passive strategies for summer cooling and winter heating to reduce energy use. "There should be no need to artificially cool a well-designed cottage," says McIvor. Take advantage of prevailing evening winds for cooling in summer. A wind trap, or raised vent, on the roof pulls hot air up and out, drawing cooler air in below, while strategically placed windows can be opened to increase cross-ventilation. Ideally, each room should have opening windows on at least two walls. If this isn't possible, install an opening transom window over the door (lets warm air escape) and a lower opening on the exterior wall (draws in cool air).

To bring in natural light and for solar heating in winter, orient the cottage to the sun's path, with lots of glass on the south side for solar penetration. Thermal-mass flooring, such as concrete, brick, or stone, can passively warm the cottage from October to May by absorbing heat from low-angle sun and releasing it at night. (Thermal mass refers to a material's ability to absorb heat energy.) But beware in summer – without proper shading, all that radiant heat can turn the cottage into a sauna. To prevent this, keep the sun out from June to September by building properly sized eaves (on existing cottages, eaves can be extended when re-roofing), awnings, horizontal trellises, or exterior louvres. Once this is done, the thermal mass helps cool

EAST-WEST
CROSS-SECTION



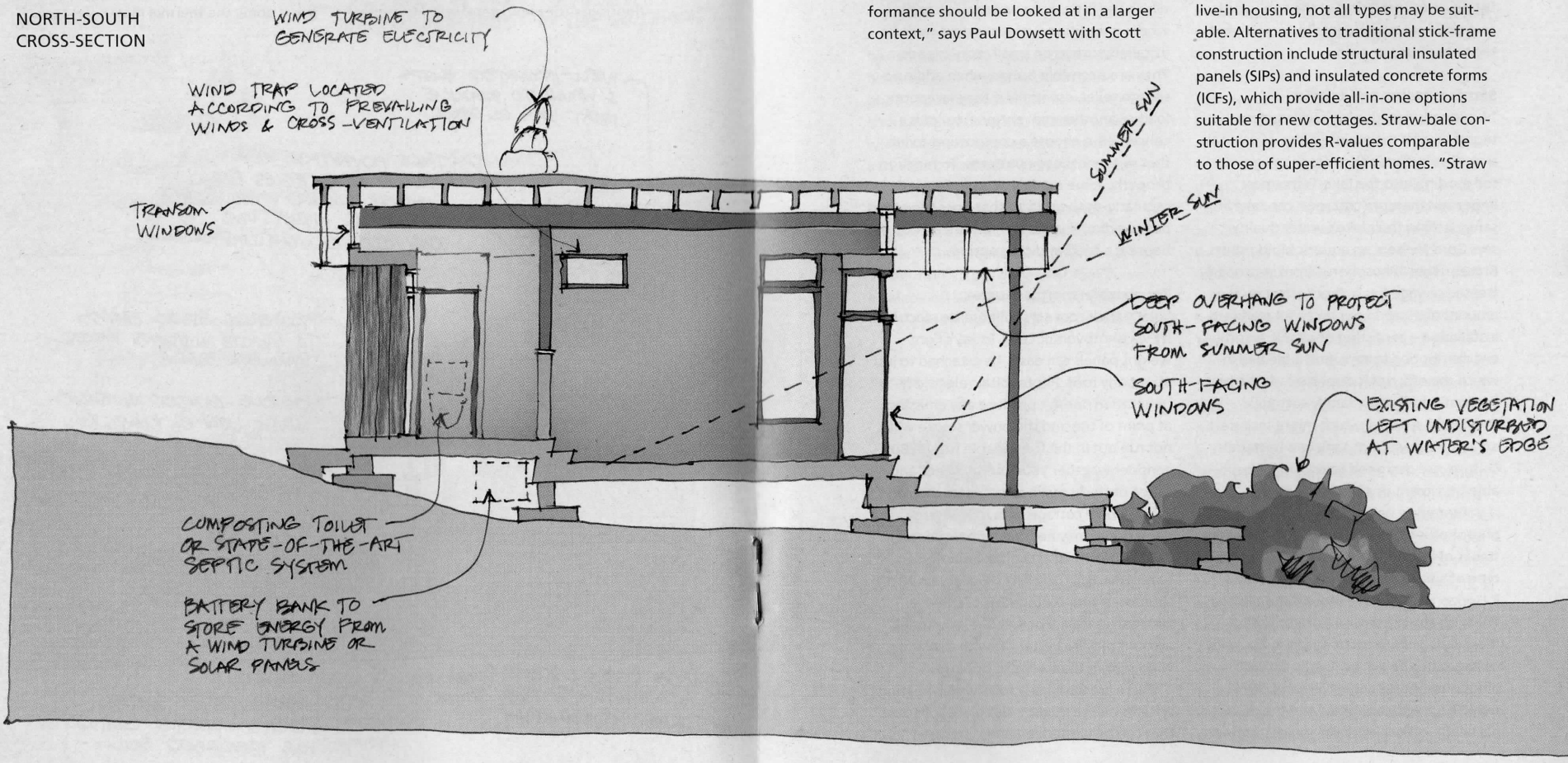
the cottage in summer. "If you keep the floor shaded during the day, its temperature will be lower than that of the air," says Peter Busby, one of Canada's foremost experts on green design and a principal with Vancouver-based Busby Perkins+Will Architects. "Expose it to night air, and it will keep the space cool all day."

The windows themselves can either block or admit the sun's radiant energy. Most new windows have a low-E (low-emissivity) coating to reduce radiant heat flow. Because such windows let radiant energy in but not out, they work best with exterior shades. On older windows without low-E coating, light-coloured blinds or curtains reflect radiant energy out.

Another way to retrofit an existing cottage for solar gain is to add opening skylights, with shades that block the heat while allowing light in. They open to create nighttime convective ventilation even when there's no wind. Ceiling fans – or a dip in the lake – do the trick on very humid days or when airflow is stagnant.

Proper insulation minimizes heat gain in summer and heat loss in winter; it's one of the best ways to curb energy use year-round. Sprayed-in-place foam and foam panels tend to provide more R-value (resistance to heat transfer) per inch than batt or other rigid board insulation. "But insulation performance should be looked at in a larger context," says Paul Dowsett with Scott Morris Architects in Toronto. "Consider how much energy it takes to make the material. Is it using non-renewable resources? Can it be recycled at the end of its lifespan?" Commercially available green insulation can be made from recycled glass, mineral wool, cotton, or soybeans. Whatever your choice, consider the product's potential for releasing harmful gases or supporting mould growth, and keep in mind that since there are creatures that love to use some insulation as take-out bedding or live-in housing, not all types may be suitable. Alternatives to traditional stick-frame construction include structural insulated panels (SIPs) and insulated concrete forms (ICFs), which provide all-in-one options suitable for new cottages. Straw-bale construction provides R-values comparable to those of super-efficient homes. "Straw

NORTH-SOUTH CROSS-SECTION



bales also take less energy to produce than most conventional insulation," says Dowsett. "It's a natural material that can easily be returned to the earth at the end of its life cycle, especially if sealed with a clay-based plaster." A green roof – a roof structure with living plants in a layer of lightweight growing medium – is another effective way to insulate. If you are retrofitting, start insulating at the top – roofs and attics are major contributors to a cottage's heat loss or gain.

Septic systems and toilets

"A properly functioning septic system, together with the maintenance of natural shoreline buffers and protection against soil eroding into the lake, is the most important measure cottagers can take in safeguarding their lake's water quality," says Gord Nielsen, an aquatic biologist in Bracebridge. "Phosphorus from improperly treated sewage has a direct effect on the amount of algae in our lakes." A standard installation – consisting of a tank, an effluent distribution system, and a tile bed in which the effluent is dispersed – is the best first option for most family cottages. (Advanced systems, which might include an aerobic treatment tank or a bacterial culture, are designed to provide acceptable treatment in a smaller space.)

A promising new technique to remove phosphorus from effluent (still in the early stages of implementation) uses a specific type of soil – known as pre-Cambrian B Horizon soil – in and around the tile bed. The high aluminum and iron content of these soils – which occur naturally on many cottage sites or can be locally sourced – binds phosphorus chemically and physically. The septic contractor and the municipal health officer will help you determine the best location for the tile bed; in general, the farther from the lake, the better.

Reducing the effluent flow to the septic tile bed minimizes the risk of untreated or partially treated water escaping. Graham Smith, also a partner at Altius, suggests installing low-flow (six-litre) or, even better, dual-flush (three-litre/six-litre) toilets to reduce wastewater. Composting toilets, which use little or no water, work well where a traditional septic system can't be installed, such as on small rocky islands. They are a sensible option when adding a second toilet, especially if the extra septic load of another conventional toilet is a concern. But choose a composting toilet that suits your usage patterns. To function properly, some models need to be used regularly, or the culture that does the composting dies. If use is infrequent, an outhouse is a tried-and-true option.

Renewable energy sources

Solar panels convert sunlight into electricity via photovoltaic cells. Today's lightweight panels can easily be attached to just about any roof. Photovoltaic electricity generation doesn't produce any emissions at point of use and the power source will not run out in the foreseeable future. But consider whether your energy needs and usage patterns make solar a wise choice: In a seasonal cottage with high energy demands, it may not make financial sense as the upfront costs can take many years to recover. Paul Dowsett suggests a rule of thumb – if your cottage is more than 400 metres from a power line, your bank account may be better off with a solar or wind system than a hydro hookup.

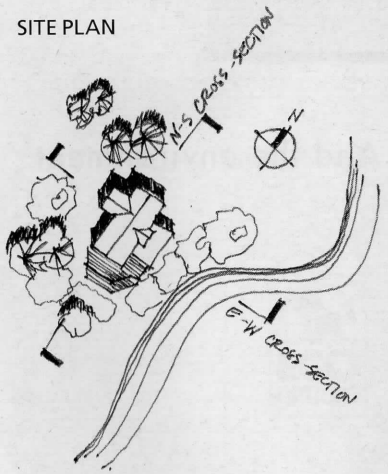
There are also many solar water-heating systems on the market: flat plate collectors that can be winterized and systems in which a metallic solar collector is suspended inside clear vacuum tubes. All require a storage tank and, likely, an auxiliary water heater, which uses a small amount of energy to boost the temperature from sun-warmed to hot, if needed.

Other renewable options include wind power and geothermal (also known as water- or ground-source) heating and cooling. While these, like photovoltaic panels, are certainly eco-friendly, they may not be appropriate for your cottage. Wind turbines are only cost-effective in areas with good and reliable wind (breezes are not enough); a geothermal heating system works best in a well-insulated building with a constant, moderate demand for heat.

Backup systems and generators

Being green shouldn't end when there's a power failure. While the conventional backup solution – a gas generator that powers an electrical subpanel – keeps the refrigerator and a few lights on, it also produces emissions and noise. Adding a muffler and specifying a propane or diesel generator (that runs on biodiesel) make the backup system more environment friendly, but there are even greener alternatives. A battery bank that's charged by regular hydro could power a cottage for a week, depending on its size and the cottage's energy needs. Where smart meters are available, the charging could be set for off-peak hours, when electricity is less costly. Battery backups can be designed to come on automatically if there's a power outage and create no local emissions or noise. Another option is to use hydro for everyday cottage needs, but install a small solar or wind system just big enough to charge a battery backup. If you also install a net metering system, as long as the batteries are charged, the excess power from your solar or wind system goes back into the grid, saving you money on electricity bills.

SITE PLAN



In the end, says Graham Smith, dealing with power failures comes back to the cottage itself. A well-designed structure can eliminate many of the problems cottagers try to overcome with technology (think air conditioning or space heating), and minimize the electricity need in the first place. In the winter, for instance, a properly insulated cottage that's sited to take advantage of passive solar heat and equipped with a carefully designed plumbing system should stay warm enough to keep the pipes from freezing, with little or no artificial heating. What's more, installing energy-efficient appliances and maximizing natural light reduces the size, complexity, and cost of any backup system. What's true for emergency power also goes for the actual cottage. "The bottom line," says Smith, "is that conservation by design is still the first and best option to consider."

30 take-action tips

HOW TO COTTAGE MORE LIGHTLY, STARTING NOW

by Steve Stockton
illustrations by Monika Melnychuk

Cut down and clean up your runoff

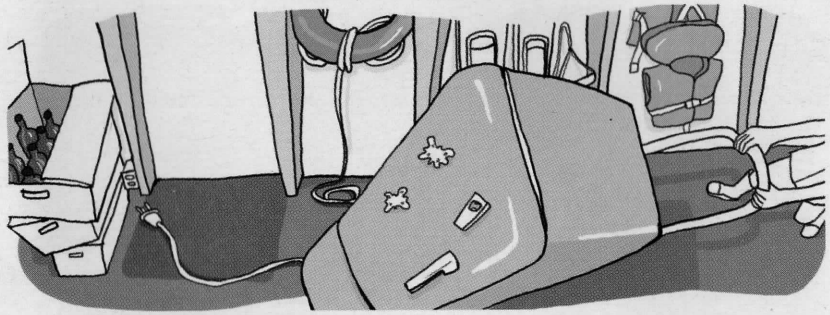
1 Sniff out a sick septic system Leaking and overloaded septic systems are a major source of phosphorus in the lake, fuelling algae growth and causing water quality to decline. Inspect your septic bed periodically for odours or puddling and, if need be, call in the pros. And get the tank pumped out every three to five years. If you're having a big crowd to the cottage, rent a porta-potty instead.

2 Kick the lawn habit About 50 per cent of rainfall rolls right over short grass to the water, carrying with it harmful fertilizers and pesticides. Better to replace a lawn with native plants, such as dogwood and black-eyed Susans, which readily absorb most surface water. If you must be a turfhead, keep the grass at least 30 metres from shore, mow it no shorter than eight centimetres high, and eschew chemicals.

4 Replace hard, paved surfaces with more porous ones Instead of asphalt or concrete surfaces for paths and drives, use wood chips, small pebbles, permeable paving stone, or anything else that allows runoff to soak into the soil. You can also plant a small rain garden, a planted depression designed to catch overflow water around paved areas.

5 Stock up on green cleaners What goes down the drain and into the septic can still make its way to the lake. Many detergents and soaps on the market contain phosphates, so watch what you buy. And avoid using household chemical cleaners, which destroy the beneficial bacteria that break down waste in your holding tank. There are much less toxic alternatives now, such as products with green certifications (e.g., the federal government's EcoLogo; see "Green Resources," p. 13) and tried-and-true DIY cleaners, like baking soda, vinegar, and lemon juice.

3 Don't soap in the lake, ever Even if a soap says it's phosphate-free and biodegradable, it can hurt aquatic life. All "biodegradable" means is it's capable of breaking down, with the help of *soil* bacteria.



6 Hook a rainbarrel up to your eavestroughs It's such an easy thing to do, with significant benefits. By catching rainfall before it hits the ground, you can greatly reduce runoff. (For those who associate runoff only with summer rainfall, it also comes in winter and spring, in the form of snowmelt.) Even temporarily storing rain in a barrel until after a storm lets up helps reduce erosion. Newer rainbarrels are designed to keep out mossies so the water won't become a breeding pool for them.

7 Pick up after your pooch Yes, there's already wildlife poop around the cottage, but modern *CSI*-style tracking of pollutants has identified dog-doo as a major source of water pollution in many areas, one that carries coliform bacteria that can make people sick. Bury or toss it in the back forty, or flush it down.

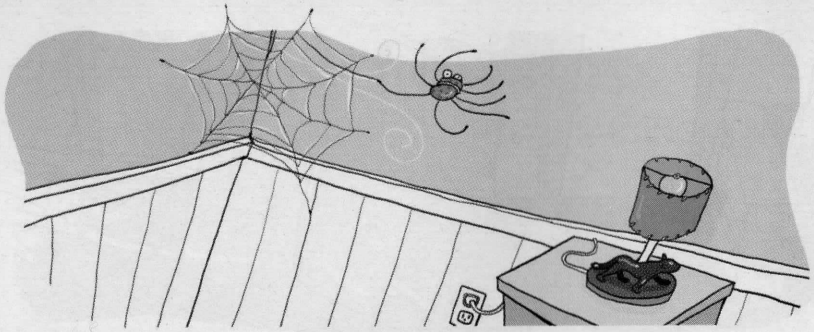
8 Refuel away from the water When you need to top up gas tanks, such as chainsaws, generators, pumps, and boat engines, do it well back from shore, preferably over a tray and in a shelter with a hard floor. Have a rag on hand for mopping, to make cleanup easy.

Shrink your cottage energy bill

9 Plant a tree or two Green giants are great insulators of the cottage. Plant deciduous trees on the south and west sides of the cottage, to provide shade in summer and let sun inside throughout the winter. Conifers on the north and northwest sides block cold winds in winter with their thick evergreen boughs.

10 Switch the cottage wattage Compact fluorescent bulbs last up to ten times longer and use about one-quarter the electricity of incandescent ones.

11 Retire that old beer fridge It's been great for your overflow beer stash, but the ancient fridge in the boathouse is sucking more than four times the electricity of a newer, energy-efficient model, and could be costing you up to $130



12 Listen to Charlotte When sealing up cracks in the cottage, keep an eye out for spider webs. Spiders like to weave them in the path of airflow (a.k.a. air leaks) to catch insects.

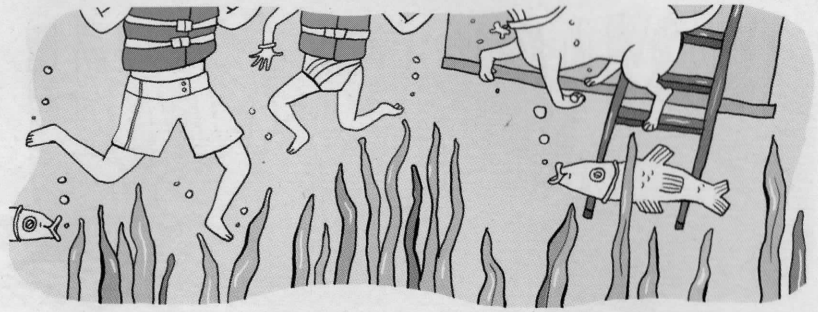
a year (or a few two-fours). At the very least, unplug it between visits and definitely over the winter. The cottage kitchen fridge is another energy hog if it's 10 years old or more. Keep it out of the sun and away from the stove to improve its efficiency. And check the door seal; if it isn't tight enough to hold a piece of paper in place when closed, repair or replace it.

13 Hold the heat in hot water Wrap your hot water tank in an insulating jacket, available at most hardware stores. When you're away for the week, turn the setting down from "hot" to "warm" or "low." Or switch to an on-demand system, which heats water only as needed.

14 Beware the phantom load Unplug electrical devices like televisions, stereos, or computers after they're turned off or they'll continue to steal power. More convenient, hook them into a power bar with a switch.

15 Hang curtains or blinds And keep them closed as much as is practical – they help hold cool or warm air inside (and they're much better at preventing bird-window collisions than bird silhouettes). In the winter, curtains on south-facing windows should be opened during the day to let the sun in and closed at night to keep the heat in. Insulated curtains, such as window quilts, are an excellent way to increase your heat efficiency.

16 Don't be a night polluter Floodlights and other high-wattage outdoor bulbs are not only energy eaters, they are inappropriate at the cottage. They cause light pollution on our lakes, messing up the mating and feeding behaviour of wildlife, reducing boaters' ability to see navigation lights, and stealing our view of the stars. Replace them with low-wattage lamps. And turn them off unless you really need them. Same goes for indoor lights.



Keep a healthy shoreline

17 Rebuild the buffer zone If your cottage waterfront has been stripped of its native shrubs, trees, and grasses, do your lake a favour by replanting this "buffer zone." It traps harmful runoff in roots and decomposing leaves, helps to prevent erosion, and is a rich habitat for shore dwellers essential to a healthy aquatic ecosystem. Ideally, the buffer should be as wide as your waterfront and as deep as 30 metres, but if that sounds too daunting, start small with a strip that's a few metres deep and enlarge it over a few years. (See "Green Resources," p. 13.)

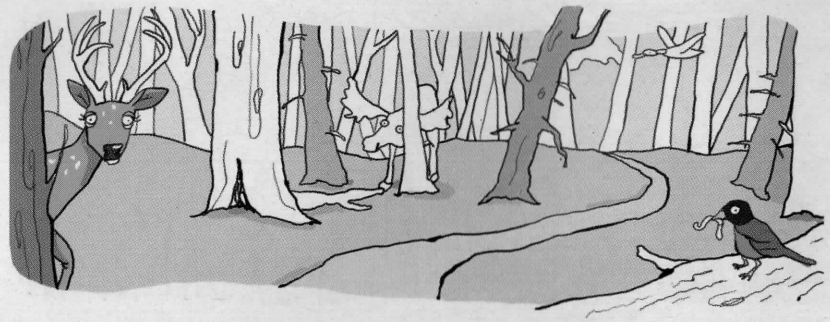
18 Let sleeping logs lie Driftwood and fallen trees at the shoreline may look like clutter to you, but they provide vital hiding places, feeding grounds, and spawning areas for lots of aquatic creatures, such as fish, frogs, and salamanders. So resist the urge to tidy up the "debris." Or, if the waterfront is already devoid of woody habitat, install a log or two in the water yourself. Check with the Ministry of Natural Resources (MNR) to see if permits are required.

19 Opt for a low-impact dock If you're ready for a new dock, choose a floating, pipe, or a cantilever dock, which cause much less disturbance to lakebed habitat than the traditional crib dock. Ideally, choose a design that minimizes modifications to the shoreline.

20 Go easy on water weeds Yes, they make the kids squeal, but they also hold sediment in place and are home to lake critters. Don't strip all the weeds away; designate a small area to swim in and contact the MNR *before* you clear it.

Recycle or reuse your cottage stuff

21 Unload that cap collection You know those beer caps you've been saving for decades? Well, you can recycle them at the same place as the bottles: The Beer Store.



22 **Reduce your hoard of old running shoes** You can mail any used runners to Nike Recycling Center (c/o Reuse-A-Shoe 26755 SW 95th Ave., Wilsonville, OR 97070), where they're ground into Nike Grind, a material for sports tracks.

23 **Make your leftover paint last longer** Tip the cans upside down; the paint creates an inner seal around the lids, so air can't seep in and dry it up.

24 **Compost bear-free** If you're at the cottage at least every other weekend, you can compost food scraps indoors, using worms. "Vermicomposting" containers emit little or no smell, so they don't attract wildlife. But the worms need feeding a minimum of every two weeks.

Protect our wildlife

25 **Be a considerate boater** When close to shore, drive at a "no-wake" speed (10 km/h within 30 metres of shore) to guard aquatic nurseries from wave and prop action, and prevent erosion.

26 **Keep the aliens away** Before you launch in a new lake, drain bilge water and bait buckets and scrub the hull bottom to avoid transferring exotic species, which can wreak ecological havoc.

27 **Get the lead out of the tackle box** Too often, lead sinkers and jigs are ingested by aquatic feeders like loons, fatally poisoning them. Switch to non-lead substitutes, and save our icon.

28 **Let dead trees stand** Not just for woodpeckers, these "snags" act as hotels for a host of other birds, mammals, and insects.

29 **Post nesting- and spawning-area signs on your waterfront** Give a heads-up to boaters, especially visiting ones, about the critical habitats of birds and fish on your lake.

30 **Create a wildlife corridor** Many animals and birds won't cross open areas, needing dense vegetation to get from the top of your lot to the water's edge. Chart a course through the low-traffic areas of your property and fill it in with native shrubs, grasses, and flowers.

More tips at cottagelife.com/greencottaging.