

Submerged wood is actually high-quality. **TRALEE PEARCE** reports on a company that uses a remote-controlled vehicle to dive to the base of trees, cut them and float them to the surface

Logging the underwater forests

Forget the lost city of Atlantis. All over the world are very real lost forests, standing exactly where they were when they were flooded by hydro dams, their roots still implanted in what becomes lakebeds, their spooky treetops poking through the surface.

Until now, they stood as old-growth reminders of our need and greed for hydroelectric power. But a British Columbia company has an appropriately Jules Vernean business proposition to ensure that they are not lost forever.

Using what amounts to the world's first logging submarine, called a Sawfish, Triton Logging Co. Inc. has devised a way to dive to the base of the trees, cut them, float them to the surface and mill them.

Triton founder and CEO Chris Godsall had been working in the field of wood salvation — collecting logs from lakebeds and riverbeds that had been lost during the logging process — when he saw an opportunity staring him in the face at hydro dam reservoirs.

"The reason why you never heard about it is that no one who has ever been involved in these projects is particularly proud of the fact that these forests have been lost," he says from his home in Victoria. "From 1950 to 1990, most of the big projects were happening in remote parts of the world and Canada, in areas that were very difficult for people to evaluate what was really happening."

Today, there are a total of 45,000 major dams and 800,000 small dams everywhere from North America to Southeast Asia, many of which have underwater forests that Mr. Godsall thinks can be logged.

"We're not advocates of hydro dams. Our company tries not to judge what happened in the past," says Mr. Godsall, who formed Triton, named after the mythological man/fish son of Poseidon and Amphitrite, in 2000. "We try to reclaim and recover the wood with a proposition that says this is beautiful wood, we can harvest lots of it and we can deliver it as a substitute for virgin timber."

It's making the best of an unfortunate legacy, he says. "The development agenda in the 20th century, particularly with major dam development in the later half of the 20th century, looked at the costs and benefits of flooding these forests and said, 'It's a no-brainer. The power that we desire greatly exceeds the value of the wood.'"

"If you put a hydro engineer in the same room as a forester, who's gonna win that battle? The forester says, 'I'm gonna need 30 years to clear that valley' and the hydro engineer says, 'You've got five.'"

In cleaning up the reservoirs, Mr. Godsall blends business acumen and environmentalism. He has a master of science degree in business management and sustainability from the University of Bath and is the founder and former executive director of a Montreal-based non-governmental organization, Santropol Roulant (in 2000 it was named by this newspaper as one of the 10 best places to put your charitable money). It won't hurt that he and Triton were featured on a Martha Stewart TV segment last month.

Now based in British Columbia, what he calls the "epicentre of the issues of deforestation and forest conservation," Mr. Godsall believes that every time he can cut a tree underwater, he saves another tree.

He figures that in B.C. alone, that means saving about 20 million trees. "If you were to cut 50,000 board feet a day — and that's a lot of wood — 365 days a year, it would



PHOTO COURTESY OF TRITON LOGGING CO. INC.

Underwater logging fits in well with the forest-conservation movement.

take you about 200 years to log it. We think B.C. is 1 per cent of the global resource."

Mr. Godsall's thinking is in line with what is happening in the forest-conservation movement. Rorke Bryan, dean of the faculty of forestry at the University of Toronto, is a fan of reclaimed wood.

"In terms of utilization of timber, obviously the more timber we can retrieve from circumstances like this, the less have to be cut somewhere else, so that's good," says Mr. Bryan, who is trying to get his department renamed "Forest Conservation". Underwater logging "ties in with the overall message we are trying to give: If we can use the forests we're using more smartly and make the products last longer, then we don't have to log as extensively. Everything I hear about it would suggest that this is a benign and very sensible way of more effective utilization, with strong environmental benefits."

As for consumers buying the wood on the other end, Mr. Godsall says that if given the choice, they will choose wood that is completely reclaimed and was not an indigenous habitat for any animals. It just so happens that submerged wood is considered very high-quality. Mr. Godsall says wood that has been underwater for decades is old-growth and is cured of volatile organic compounds, such as turpentine. "We're still doing research about the benefits to the wood from being underwater, but we know that groups in Japan, for instance, are actually buying wood and sinking it to cure underwater."

This is all counterintuitive, of course. We think wood plus water equal rot. But absent oxygen, water, even in warm climates, is an excellent preservative.

For example, logs salvaged from Lake Superior that were submerged 100 years ago are bigger and better than lots of trees available now, Mr. Bryan says. "If it's been in a cold, anaerobic environment, the timber can be in good condition for quite a long period of time."

While Mr. Godsall is unabashedly a businessman — he has the patent on his Sawfish technology and plans to produce more for sale — he says one spin-off of underwater logging might be giving the logging industry a chance to reorganize.

"We can reduce some of the pressure on our standing forests. We've planted a lot of trees and we've got to give those trees time to grow. As we regenerate our forests, underwater harvesting is literally, a 200-year opportunity. Or a 100-year opportunity, depending on how fast we cut them. There's one lake in B.C. we could put 20 Sawfish out there for 30 years, 40 years."

The Sawfish, a version of the kind of remotely operated vehicles (ROVs) used in such marine operations as oil rigs, Joe McInnis-style marine research and search-and-rescue missions like one for the Russian sub Kirsik, answers two major challenges that previous loggers faced.

The first was the inefficiency and danger involved in other methods.

There have been efforts to harvest submerged trees by pulling the trees up from their roots, or by sending divers down with hydraulic chain saws. None of these was particularly safe or efficient. Divers had to ascend and descend with each tree and they couldn't, for instance, reach depths of 700 feet, which some of the trees in B.C. require. The Sawfish can go that deep and can cut 36 trees each time it dives.

The other issue was the fact that waterlogged wood sinks, so getting the trees to the surface was a problem. The Sawfish is equipped with 36 reusable air bags, which are screwed into the trees to help them float. The process had to be tweaked; the original air bags sent trees rocketing to the surface and into the air, which is not very safe.

The Sawfish is tethered to the surface and operated remotely by a person in a control room who uses cameras and sonar readings to navigate.

"It's basically a video game. We plan to hire kids straight out of the arcades at Yonge and Bloor," Mr. Godsall jokes, adding that they actually have to also be highly trained engineers.

And those engineers have to be able to think like loggers — not usually a required skill. But Mr. Godsall says he lucked out thanks to geography.

"In B.C., the great thing is that even the marine technologists and engineers we brought in have sawdust running through their blood. That's not true when you go to Florida or Aberdeen, Scotland, or Houston, Tex., where a lot of the ROV technology is centred. They could get their brains around it right away."

August, 2002, saw the first tree cut by a Sawfish. "It was amazing. It cut a couple trees, then stopped working," Mr. Godsall says matter-of-factly. By February, 2003, and two million dollars later, it was fixed.

The Sawfish is now being used to log Douglas fir and cedar at Lois Lake, which is south of Powell River and was flooded in the 1930s. Triton also owns an exclusive 10-year licence at Kinbasket Lake on the boundary of Alberta and B.C., cov-

Sawfish at work

1. The Sawfish sits on a barge and is launched into a lake by a crane.

When it disengages from the crane, it is free to swim around, powered by a 40-horsepower electric motor and using a vegetable-oil based hydraulic system. It is flown like a remotely operated toy from a control room, which in the case of the Lois Lake operation is a 6-by-6-foot container, modified from an old army communications control room. The operator watches eight cameras and a sonar reading. He or she moves the Sawfish using its eight thrusters, five lateral, three vertical.

2. The Sawfish thrusts down to the bottom of the lake, at depths of up to 1,000 feet. It makes its way to a tree. When visibility is limited, sonar allows the operator to find trees. The Sawfish is manoeuvred up to base of the tree.

3. A grapple grabs the tree and secures the Sawfish snug up to it.

4. An air bag (reusable) is bolted into the tree. The Sawfish blows up the air bag underwater, giving the tree 500 pounds of lift, which is generally big enough to lift a 70-foot tree that's three feet at the butt.

5. Using a 55-inch chain saw, the Sawfish cuts just below where the air bag is attached. It launches off the stump. The whole tree rotates and the butt end of the tree is forced to the surface, with the canopy pointing downward. The Sawfish can cut 36 trees per submersion.

6. The tree is floating upside down on the surface. A crew member goes out with a tug boat and corals the tree with a lasso-style "choker" and tows it to a barge.

7. The air bag is removed. The trees are attached to "boom sticks," which keep them tethered together. Each boom stick can carry about 10 trees. A tug boat can tow 10 boom sticks, so about 100 trees.

8. At Lois Lake, the logs are taken to a site where the trees and the boom sticks are taken out of the water. The wood is milled wet. Since it is heavy and waterlogged, it is not moved via waterways, but by trucks.

9. The wood is then dried either in a conventional or "radio-frequency" kiln (like a microwave oven) or air-dried. In the summer, a tree that has been underwater 60 to 70 years will air-dry in 10 to 15 days. The radio-frequency kiln is used for large timber that would take years to dry.

ering a primary cedar forest valued at more than \$100-million. Future operations include Ootsa Lake, where 10 million trees were flooded in 1956.

Triton gets these licences from the Ministry of Forests and pays a stumpage fee.

Mr. Godsall says the Sawfish leaves as light a footprint as possible. "It's slightly bouyant, so we use a small downward thrust to keep it off the lake bottom. It doesn't touch," he says.

Cleaning up the reservoirs also happens to render them more useful to residents. Trees can be a hazard for boaters, as water levels rise and fall. And on Lois Lake in particular, which is included in a Powell River canoe route, that's not insignificant.

Mr. Bryan of U of T agrees, based on the health of the lake. "The last thing you want in a big reservoir is a lot of debris on the bottom — standing trees or not — contributing to decomposition. So from an environmental standpoint alone, I would say it's good to get the trees out."

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