

FOOD ARTS

AT THE RESTAURANT AND HOTEL FOREFRONT

Big Scaled **BREAKTHROUGH**



DOING WELL, DOING GOOD AN AUSTRALIAN FISH IS TESTING THE AMERICAN WATERS TO PROVE THAT AQUACULTURE CAN BE BOTH PROFITABLE AND SUSTAINABLE. ERIC LEVIN REPORTS.

The distance from Perth to Sydney is about the same as from Los Angeles to New York City, roughly 2,500 miles. Stewart Graham, an Australian entrepreneur based in Perth, has made both trips many times. Looking out the window of an airliner at night, he has often been struck by the contrast between the two continents.

“Five minutes out of Perth there is not one light on the ground,” he says. “You fly for four and a half hours, and you look down on total darkness until you’re about 10 minutes from Sydney. But from Los Angeles to New York you see more lights on the ground than there are stars in the sky. I used to keep my nose on the window the whole way across the country. I just couldn’t believe how big America was.”

Two and a half years ago, a light went on in Graham’s head when, at **Mead’s** restaurant in Perth, he tasted a prized Australian game fish called barramundi. “I said, ‘This is absolutely fabulous!’” he recalls. “The waiter told me it was aquacultured. I said, ‘That’s nonsense. Everybody knows aquaculture can’t produce a product people want to eat.’ He assured me it came not only from aquaculture but from indoor aquaculture. It was the best fish I’d ever tasted. I spent the next 18 months studying the industry”

The twinkling lights during the American flyover took on a new significance: they represented a potential market for the moist firm white-fleshed fish vastly larger than could ever be developed at home.

Fast-forward to mid-2005. In a warehouse-like building in Turners Falls, Massachusetts, Graham’s year-old company, Australis Aquaculture, is growing and harvesting barramundi at a rate of 8,000 pounds a week. The American aquaculturist who runs the facility—Joshua Goldman, Australis’ U.S. executive director and president of U.S. operations—says production will reach 24,000 pounds a week by the end of the year. By expanding the facility on land the company already owns, he adds, Australis in the next two years could be harvesting 60,000 pounds of barramundi a week.

Yet that is not the remarkable part. Australis uses no hormones, antibiotics, or colorants in raising its fish, which grow to one to two pounds at harvest. It recycles 99.9 percent of its water, and the little effluent it releases is much cleaner than what EPA regulations require. It feeds the barramundi a diet lower in fishmeal and fish oil and higher in soy protein than that fed to the leading farmed carnivorous fish, salmon, in ocean pens. If Australis succeeds, its ultimate importance will be in showing that fish farming can be not only profitable, which everyone knows, but ecologically benign and sustainable, which is almost unheard of on a commercial scale.

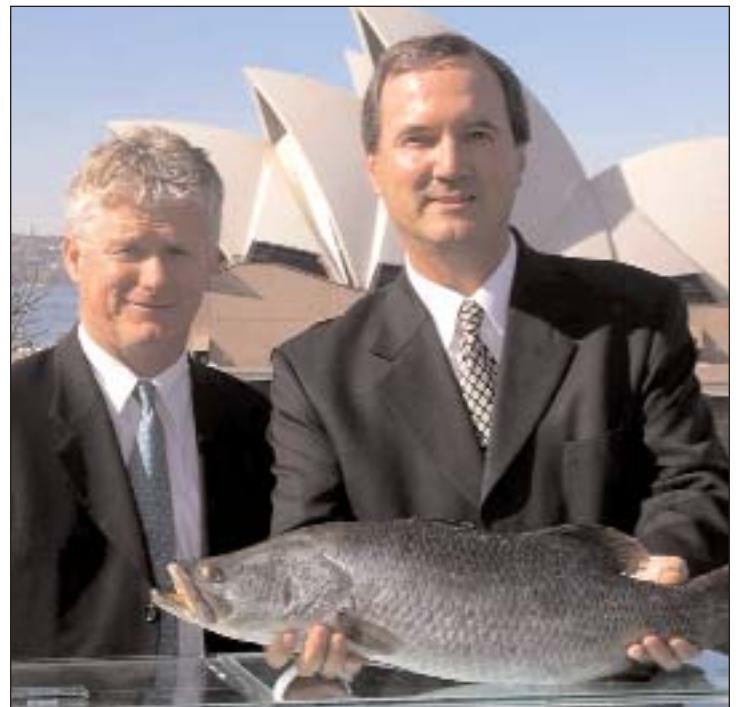
A turning point in Graham’s quest came when he contacted Goldman, an experienced and internationally known aquaculturist who

had been recommended to him by three different sources, including experts at Cornell and the University of North Carolina. “We got along famously from the get-go,” Graham reports. “My goal was to bring this fish to America and give people a truly Australian culinary experience. Josh’s vision is to make indoor aquaculture a feasible way of feeding the future population. That means high quality, a reasonable price, and a pristine environment.”

Earlier this year, Australis invited representatives of the Seafood Choices Alliance (SCA) to visit its plant in Turners Falls. The SCA is an association of environment-minded restaurants, cooking schools, wholesalers, and public-interest groups dedicated to furthering what the SCA calls “ocean-friendly seafood.”

“I was a little skeptical. It sounded too good to be true,” says SCA staffer Rachel Hopkins. “But I was pretty impressed with all the efforts they’ve made.”

“We see a lot of aquaculture operations,” adds Mike Boots, director of the SCA. “This one is innovative. And they have done things that I think other operations haven’t been able to do in a cost effective way. They’re just getting under way so it will be interesting to see how economically viable it is for them. But in terms of environmental impact, it’s a step



Australis owner Stewart Graham (right) and director David O’Sullivan.

Cover: Josh Goldman is a man with a noble ambition—making aquaculture an eco-friendly, affordable source of food.

Photo by Andrea Bucci



Harvesting barramundi from Australis' indoor culture tanks.
Photo by Andrea Bucci

forward and a good model.”

Why barramundi? It isn't just because they taste good. The fish has the rare ability to synthesize long chain omega-3 fatty acids - a “good” cholesterol - from short-chain terrestrial fatty acids such as soy. A high omega-3 oil content is one of the prized attributes of salmon, but salmon are voracious carnivores that have to consume large amounts of marine-based protein to synthesize those oils.

Australis does feed its barramundi fish meal - which consists of 100 percent ground-up, dehydrated fish - but less of it than off shore farmed salmon need. Australis' food pellets are 35 percent fishmeal and 5 percent fish oil by weight, compared with the diet of a typical farmed salmon, which contains 40 percent fishmeal and 30 percent fish oil.

The reason barramundi are so adaptable is that their native habitat requires them to be. They breed in the brackish estuaries near the northern coast. “Some of the fish stay in the estuaries, some wander out to sea, and some head up the rivers,” Goldman explains. In the dry season, the river fish often get trapped in billabongs, the hot, murky pools that remain after the river flow peters out.

“The fish evolved to be strong enough to wait that out,” Goldman says. “And from an enzymatic standpoint, they developed the capability to consume freshwater organisms and convert the fat in those organisms into long-chain fatty acids.”

Under USDA regulations, Australis barramundi are considered an imported product because they originate Down Under. Australis doesn't mind the import designation. “We have the best of both worlds,” Goldman says. “From a freshness standpoint, it's locally harvested. From a sort of romantic brand standpoint, it's Australian.” After hatching in several indoor hatcheries, the fingerlings are weaned from live food to a dry diet and flown to Kennedy Airport in the same kind of two-gallon Styrofoam boxes used for shipping aquarium fish.

Every six weeks, someone drives down from Turners Falls and picks up the newly arrived shipment, typically containing about 200,000 hatchlings. Back at the plant, the newbies are slowly acclimated to their

new home-several 1,000-gallon open-topped cylindrical tanks in a room designated A (for Adelaide, an Australian city).

The basic innovations that set Australis apart are all visible in this room. They are repeated on a larger scale in succeeding rooms (designated B for Brisbane, C for Canberra, D for Darwin, and P for Perth) as the fish grow and are moved to even larger tanks. At the end of the process, after a year of care and feeding, the one-gram fingerlings, swimming 50,000 to a 1,000-gallon tank, will have grown to be one-and-a-half to two-pounders swimming 30,000 to a 140,000-gallon tank.

White PVC pipes lead from each tank to an assembly of pumps and filters in the corner of the room. There, impurities in the water are removed by bacterial action, mechanical filtration, and ozone sanitization before the water is reoxygenated and returned to the tanks. “We have a patent on the sequence of steps,” Goldman notes. “The order is quite important.” Tweaking the technology has improved performance. We are able to maintain cleaner water today while consuming less energy and less new water than we did two years ago.”

Also patented is a perforated trapdoor in the bottom of each fish tank. Jets at the side of the tank pump in clean water and establish a circular current against which the fish must constantly swim. At the tank bottom, water exits through the perforated door on its way to being cleaned. Fish that are weak, dying, or dead are inexorably sucked toward the door, known as a mort trap. With the pull of a cord, an attendant can open the door and flush out the fish that aren't making it.

“There's a little Darwinism involved,” Goldman admits. “But if those fish stay in the population, they'll get picked on or cannibalized, which can lead to disease being spread. Dead fish shed billions of bacteria into the water column.”

Forcing the fish to swim has the added benefit of keeping them strong, and it improves the quality of their flesh. Currents are set proportional to the size of the fish and the size of the tank, and the population kept below the point where the fish crowd and injure one another. In harvesting its current 8,000 pounds a week, Australis is operating below capacity. Thus, without crowding, it can step up production by restocking the tanks that are empty more quickly.

Fish normally grow at different rates, necessitating another safeguard - the constant sorting of them by size into separate tanks. “Within a few days you can have enough size difference where the smaller guys will be lunch for the bigger ones,” Goldman explains. “You could go from 10,000 fingerlings to 500 in about two weeks.” The facility's strongest safeguard, however, is its indoor location which eliminates the risk that fish may escape (and spread disease or prey on other species), as may happen with ocean pens.

The athletically trim 41-year old who developed the system is something of a whiz kid, his receding hairline notwithstanding. Goldman grew up in Philadelphia, and in 1981, as a freshman at Hampshire College in Amherst, Massachusetts, began tending a solar



Grow-out manager Keith Wilda checks the fish upon arrival in harvest tanks. Photo by Andrea Bucci

greenhouse and aquarium that students had built on campus the year before. "I spent all my time tinkering with the fish tanks to basically create a nutrient sink that we could use to grow plants," he recalls. Fish waste, in other words, could be used to fertilize the plants - a concept he uses to this day at Australis, where barramundi manure is strained out and sold to local farmers as fertilizing slurry.

In his junior year, he and fellow student John Reid, aided by Hampshire's energy conservation officer, won a \$500,000 grant from the Pew Charitable Trust to study closed system aquaculture. Graduating in 1985 with a degree in cognitive science, Goldman started a company with Reid in Amherst called Bioshelters, which Goldman describes as one of "the first and longest operating tilapia farm in the country." Fertilizing with fish waste at Bioshelters grew hydroponic basil and other specialty greens.

Goldman's ride has had its bumps. After selling his interest in Bioshelters in 1986, he came to Turners Falls and started a company called Aquafuture. It saved money and conserved energy by using waste hot water from an adjacent steam plant factory to heat its greenhouses. In its tanks it raised striped bass, which seemed like a smart move because the government had banned commercial fishing for striped bass.

In 1990 Aquafuture moved across the street and built the 60,000-square-foot building that now houses Australis. Unfortunately for them, many others were jumping on the bass bandwagon. "In the decade after we started," Goldman relates, "something like 300 striped bass farms came on line and the product became commoditized." Finally in 2002, Goldman sold the company to some Chinese businessmen in Boston in what he calls "a distress sale."

Goldman became a consultant and started searching for "the next

great fish." In West Virginia he worked on a project to raise arctic char in reclaimed mine water. He advised on projects involving grouper, pompano, sea bass, and several Brazilian species.

One day in 2003 Graham called him, seeking his help in the designing of a barramundi plant. Graham wanted to see the Turners Falls operation. But Goldman, who over the years had developed several proprietary filtering and fish safety techniques there, had been retained as a consultant by the new owners and couldn't formally show it to him.

Graham prevailed on Goldman to give him what he calls "a sneak preview peek through the doorway. From that moment on, I stopped talking to him about building a plant and said, 'This is the one I want.' That it wasn't for sale didn't deter Graham, who faxed an offer to Boston from his Park office.

In the end, Graham made the Chinese an offer they couldn't refuse. They are now stockholders in Australis, a company traded on the Australian Stock Exchange. Goldman went from losing his company and its intellectual property in a distress sale to getting it back and, now, owns about 17 percent of a growing and well-funded enterprise.

Whitetablecloth restaurants are the market to which Australis wants to cater. But half a dozen Kings supermarkets in New Jersey began

carrying the product in a test in June, and talks with Whole Foods Market are in progress, Goldman says. Farther down the road would be an effort to market barramundi for sushi, which requires that the fish grow to an ideal weight of three to six pounds. That should not be a problem, given that barramundi in the wild commonly reach 15 pounds.

What about the name itself? In aboriginal Australian, the word barramundi means "fish with big scales." It has no relation to barracuda, though people may have to be told that. On a menu, the word does have a thing going for it, Goldman figures. "It's exotic, on the one hand, but 'the first and longest operating tilapia farm in the country.' Fertilizing when you see it you know how to say it," he notes. "It's not like you're going to be scared to order it because you have no idea how to pronounce it."

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