

the **PERFECT** Fishery

Geoduck Diving in BC



BY TIM LYNCH

Geoducks are giant deep-water clams buried up to one meter in sand and mud substrates from the lower inter-tidal to depths of 110 meters or more. They are located along the Pacific coast from Alaska to Baja and survive by eating plankton floating on the sea floor above their living-grave-like home. At a shell length of 2 mm, infant geoducks burrow into the substrate, and over the next two years reach a depth of about 60 cm (2 ft.). The plankton on which they feed is absorbed through a large meaty siphon that grows up

from the clam to the sea floor. Because of the gross penis-like appearance of the siphon, some people see geoducks as possessing aphrodisiac properties. In this context it is sometimes called the "love mussel."

Unlike other clams, if geoducks are removed from their subterranean environment, they are unable to rebury themselves and will die. BC geoducks are very long-lived – the oldest clam discovered is 168 years old. The average ages vary considerably from area to area with the lowest mean age of 26.6 years in Georgia Strait and the oldest

mean age of 60.4 years on the west coast of the Queen Charlotte Islands. They can reach a gross weight of ten pounds, but generally average about two.

All in a Day's Work

Through the leadership of the Underwater Harvesters Association (UHA), in collaboration with the Department of Fisheries and Oceans (DFO), a large component of the BC coastline has been surveyed so that divers know where to find geoducks. A crew of three serves each geoduck vessel. One crewmember works as the "tender" who stays on the boat to serve the needs of two divers who may go down together with one serving as a backup, or individually. The methods used in fishing for geoducks are unique compared to the kinds of gear and methods used in other fisheries.

Chris Sorensen, who lives south of Nanaimo, is a geoduck diver with over twenty years experience. He describes an average day of fishing: "The boat is anchored securely in a field where it is decided to harvest. Every bed that is available in a given area is known and numbered and there is a quota on each one. The buyers will give an order to the boat for say 20 or 30 cages, with each cage averaging 50 lbs. The two divers on board share the work of collecting the amount of geoduck ordered. This can be



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accomplished at one dive location, or it may be spread over several. The length of time it takes to fill an order varies from a couple of hours to possibly all day. After delivery the buyer will have all geoducks in the order processed and ready for export within twenty four hours.”

The basic equipment on the diving boat is a water pump and hose, used to cycle seawater under high-pressure when excavating geoducks from their subterranean existence, and an air compressor tank that supplies surface air to divers to ensure they are able to breathe appropriately while engaged in what can be serious manual labour. The high-pressure water hose is dropped from the pump to the sea floor along with the bags that are used to haul the geoducks back to the surface with a hydraulic lift. Where currents are



Geoduck Diver

strong the hose may have a heavy metal ring attached in order to keep it directly below the boat where it also serves as a landmark for divers.

Divers pull the hose along with them as they explore for


the black-tipped geoduck siphons showing along the seafloor. They are able to harvest an area within a radius of about 150 feet. The high-pressure water in the hose is released through a nozzle system called a “stinger” which is connected to the end of a two foot long metal pipe at a right angle to the hose. The length of this pipe can vary depending on the conditions encountered; there may be rocks present in the sand or the clams may not be very deep in the substrate. Holding the stinger and directing the 40 psi water pressure coming out of it towards the sea bottom requires strength and dexterity under sometimes difficult circumstances.

Air is provided to the divers through a floating hose, referred to in the trade as the “umbilical hose.” Digging for geoducks is a laborious process and divers require a steady supply of fresh air. For emergency purposes all divers are equipped with a tank of compressed air carried on their backs. In the event their air supply is cut off there is enough air in this emergency tank to get them to the surface. Increasingly these days the floating umbilical hose is combined with a communications cable so that there is direct hard-wired, verbal communication between the surface boat and the diver.


The disruption of the sediment during the extraction process can limit visibility for the diver. To reduce the chance of this the boat is carefully anchored against the tide. This position allows the diver to work into the tide, ensuring that the sediment is being carried away from the work area. On those occasions when the tide is flat or it is difficult to read, the sediment stirred up from the removal process will limit the ability to see the siphons and the diver will

have to move often for better visibility.

The abundance of geoducks in a given area is a determining factor on where to harvest. In high-density areas the geoducks are not likely to be very large since they are





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all feeding off the same plankton supply and there is more competition for food. For this reason geoduck fishing is generally carried out in areas where the density is in the range of twenty geoduck siphons or less per square meter. The actual process of extraction has a negligible impact on the sea floor, resulting in a slight depression which quickly fills in and disappears with natural currents.

When the diver recognizes the tip of a geoduck siphon on the seafloor he carefully and quickly removes the surrounding sediment by blowing it away using his stinger in one hand, and quickly grabbing hold of the top of the geoduck siphon with the other hand. This move has to be quick because the siphon will retract into the sand and disappear. While holding the geoduck siphon the diver then pushes the stinger vertically down along the line of the siphon. A tug of war then commences between the diver and the geoduck buried there. As the nozzle liquefies the sand and bottom residue around the siphon, there is less footing for the geoduck to get traction against and eventually the diver is able to pull it out. There is need for a delicate balance between pulling just hard enough to lift the clam and pulling on the siphon too hard. The desired result is to have a totally unblemished geoduck in hand at the end of the process. If the diver pulls too hard he may rip the siphon or separate it completely from the clam and this would reduce the value of the catch considerably.

Once removed, each geoduck is placed into a bag that the diver trails alongside. Periodically the diver empties his bag into the main bag attached to the high-pressure water hose below the boat. Logically, the number of geoducks that can be transported by the diver at any one time will depend on their weight. When there is sufficient catch in the main bag it is hauled to the surface. In order to protect the geoducks from becoming damaged during this process, such as shells breaking or siphons being smashed, plastic coverings are placed between each layer of geoducks. At the surface the bag is carefully emptied onto a table and the geoduck shells are rubber-banded. The entire clam is then washed and placed into specially

approved UHA cages. Throughout this process extreme care is taken not to damage the geoduck from its natural state, at all times the emphasis being on preserving the natural quality of product.

Market Changes

Geoduck diving in Canada went from a fishery that harvested about 12 million pounds in 1987, which everyone recognized was too high to be sustainable, to a fishery that today harvests 3.5 to 4 million pounds per year. At this quantity the industry is sustainable. As well, the economic value is dramatically different now. Chris Sorensen talks affectionately of the days when BC Ferries purchased his product for their famous clam chowder. Back then, geoducks were selling in the range of seventeen cents a pound, which made the activity very high-risk for the return. By comparison, the landed price in 2002 was \$9.50 CDN per pound. Reducing the number of participants and implementing a quota system was key to bringing the market to where it is today.

"You had to fish in order to keep your license back then," Chris explained, "so a lot of guys dropped out. In the end there were only 55 licenses, and now these are owned either individually or in partnership. Prior to the quota system you had high landings with little financial return. We all recognized that wasn't going to be sustainable for protecting the stock and preserving the business. As the fishery went up in value the Association invested more and more in science and management. It finally became apparent that fishing volume wasn't the issue. The priority was how much money you get paid for what you produced. When it finally came down to it, UHA members voted for equal quotas and that worked out the best because every license has an equally vested interest," concluded Chris.

Creating the Perfect Fishery

With the investment being made in live fish markets by Asian entrepreneurs in Canada, the geoduck fishery was

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Since 1997 the UHA has planted between 250,000 and 700,000 seedlings annually.

able to establish new markets in Asia as well as across North America. Prior to the advent of live fish technology, geoducks were sold to processors for freezing and that product was primarily sold to the Japanese. The live fish industry opened the way for geoduck divers to deal directly with the open world market rather than going through a fish processor. As new markets developed and the demand increased, the geoduck license owners realized that a regulated fishery provided a stable business environment. It is in this context of an amicable working relationship that has evolved between UHA and DFO over the past fifteen years that geoduck diving is seen as “the perfect fishery.”

One significant factor is the small number of fishermen that comprise the fishery. There are forty-two vessels in the Canadian geoduck fishing fleet, and fifty-five licenses. Each license allows a catch of 72,000 pounds. As well, all geoduck license holders are members of UHA, and their license fees serve to purchase the required logbook from the UHA Research Society. UHA Research is a non-profit organization, established through the UHA membership fees with the mandate to oversee and support good harvest and management practices. The geoduck diving community is a very close network of professionals who know and respect each other’s contributions, as well as those of the regulators.

When UHA and DFO adopted the Individual Vessel Quota (IVQ) system in 1989, it was agreed that a third

party validation company would be hired to validate the dockside monitoring. This requirement of the quota management system is paid for from the licenses. The dock weight of the catch transferred from the vessel to the buyer determines the amount of payment and the value to the boat, and these numbers are recorded in the UHA Research logbook at each landing.

Comparing past history with present day management practices, James Austin, UHA President, described the situation: “The notion of catch per unit effort, or volume, doesn’t work anymore in the geoduck business. It tended to reflect abundance in a given area, but it had no correlation to market price. What is happening now is that the diver is working more slowly to protect the quality of product for the live market. In the past it was all about speed, and this no longer applies,” said Austin. “It’s all about providing a better quality product, which means no shell breakage and careful handling all the way to the consumer. The ultimate goal is to protect market prices, so for this reason catch per unit effort in geoduck diving doesn’t make sense.”



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Another positive factor in this fishery is the excellent working relationship that has evolved between UHA and DFO. It has come about, in large part, because of budget cuts in government funding. As a consequence of these cutbacks DFO was having difficulty meeting its regulatory obligations. Many of the programs in place for geoduck management have been initiated and funded by UHA through a variety of government departments such as the Department of Environment, as well as DFO. UHA is now paying 100 per cent of the management of the geoduck fishery.

The agreement between UHA/DFO includes an Annual Work Plan, which provides details on the activities for the year and the cost commitments of both the DFO and the UHA. For 2003, the total cost to DFO for managing the fishery was about \$522,400, with \$206,800 of that contributed directly by the UHA. The contribution by DFO is more than offset by licence fees paid to the government, which in 2003 amounted to \$378,679. For the year, the total cost to the UHA for co-managing the fishery and carrying out the above activities, including the contribution to DFO, was about \$2.1 million.

On several occasions the Association expanded programs to include components that were not being considered. Examples of arrangements between UHA and DFO as well



Geoducks packaged for shipping.

as other government agencies include: stock assessment surveys for enhancement of the fishery, implementing a paralytic shellfish poisoning (PSP) sampling program; decompression sickness (bends) management; contracting out an independent review of DFO science and management; water quality testing and surveys to ensure fishing



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takes place in areas that meet strict water quality standards; and paying the salaries of three employees of the DFO involved in geoduck fishery management and science.

In many cases it was the UHA that advanced the science of their product by funding the salaries of scientists working at DFO. This relationship has grown to the degree where DFO or other government departments come to UHA with suggestions for programs they may consider funding. All proposals are considered and UHA negotiates objectives that ensure the overall mission to further protect and enhance a sustainable quality geoduck business.

But the relationship between geoduck divers and government could be on a collision course if politicians include the geoduck fishery in treaty negotiations with First Nations. There are no First Nation's ceremonial linkages associated with geoducks in Canada. However, the possibility does exist that diving privileges could be allowed as part of on-going negotiations. The extent to which such events would disrupt the eco-system that is being nurtured in order to perpetuate the supply of geoducks is open to debate and will be watched closely.


Geoduck Distribution – A Global Affair

Graphically dubbed the "elephant trunk clam" by the Chinese due to its large, meaty siphon, geoduck is prized for its incredibly sweet flavour and crunchy texture. Over the past decade this market has grown significantly. Geoducks are exported live and are extremely popular in Hong Kong, China and Japan, where these giant clams are considered a rare taste treat. The market in Asia is largely a high-end restaurant market where 30 percent of the total weight of a live geoduck can be consumed soon after the geoduck is killed, thereby ensuring peak pleasure from the eating experience.

As noted earlier the success of the geoduck market in Canada is attributed to the investment made by Asian business in the development of a viable Canadian live fish market industry. This industry has made it possible for geoduck divers to supply live product directly to the mar-

ket, independent of any processor. A fully integrated distribution system is critical to ensure that the product harvested on the west coast of Canada one day, is available for purchase in Hong Kong, China or Japan within the next day or two.

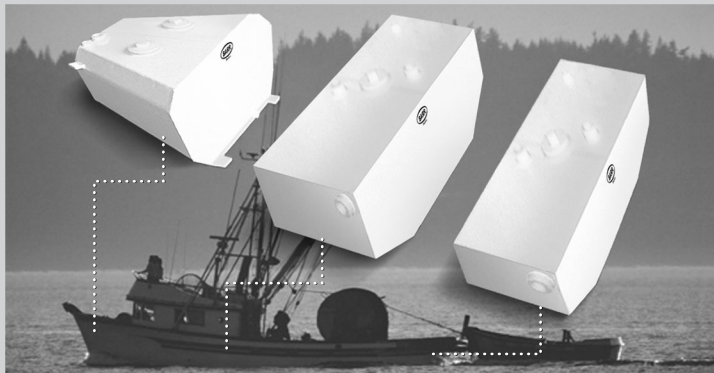
Claude Tchao, President of Tri-Star Seafood Supply Ltd, Richmond BC, and a pioneer in the Canadian live fish industry, maintains that the global market for geoducks will double by 2010. He describes the present global market as comprising 70 percent of the demand coming from Far East Asia, and the remaining 30 percent serving North America. Currently the global market is 10 million pounds a year of which the Canadian wild geoduck divers provide about 4 million pounds. The remaining 6 million pounds come from the US including 1.5 million from aquaculture. With new aquaculture sources scheduled to come on line over the next six years, some in Canada but most in the US, Tchao expects the available consumption of geoduck will increase to 20 million pounds annually.

British Columbian geoduck license owners demonstrate how good husbandry of a Canadian natural resource can serve to establish a viable and sustainable business enterprise. Being closely aligned with global distributors, they are able to closely manage the supply of their product, and ameliorate fluctuations in price. Given that the growth in the market is expected to continue to expand, particularly as the market in China increases, the challenge will be to determine if Canadian wild geoducks are a select component of a burgeoning exotic market, or if the supply should be opened up further to retain market share. What a nice conundrum to have. 

*Photographs and statistical content courtesy of the Underwater Harvester's Assn. Web site: www.geoduck.org
Reference provided by the UHA Self-Governance paper:*

CO-OPERATIVE MANAGEMENT OF THE GEODUCK AND HORSE CLAM FISHERY IN BRITISH COLUMBIA.

A Case Study for Fisheries Co-ops & Beyond - Realigning Fisheries Management. UHA - June 23-24, 2003.



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