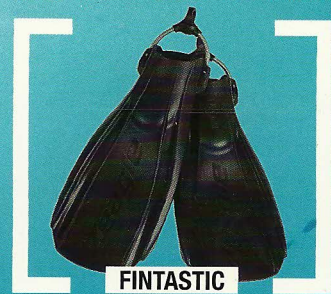


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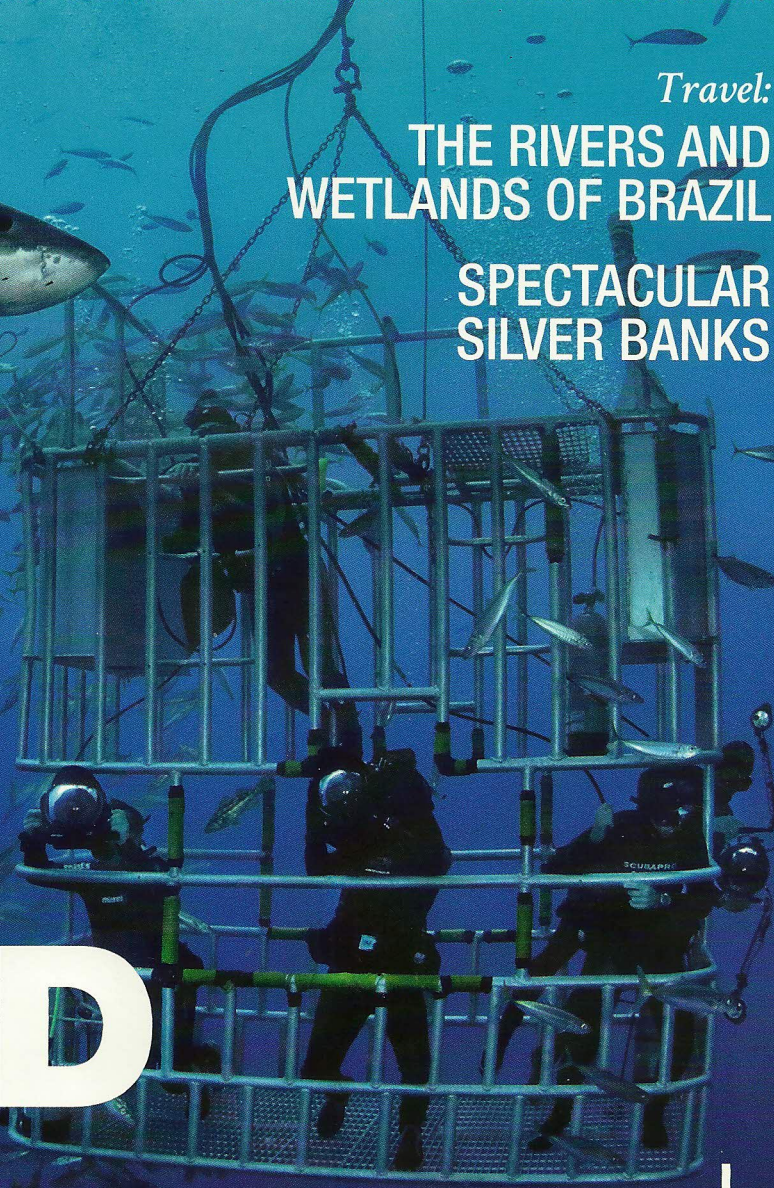
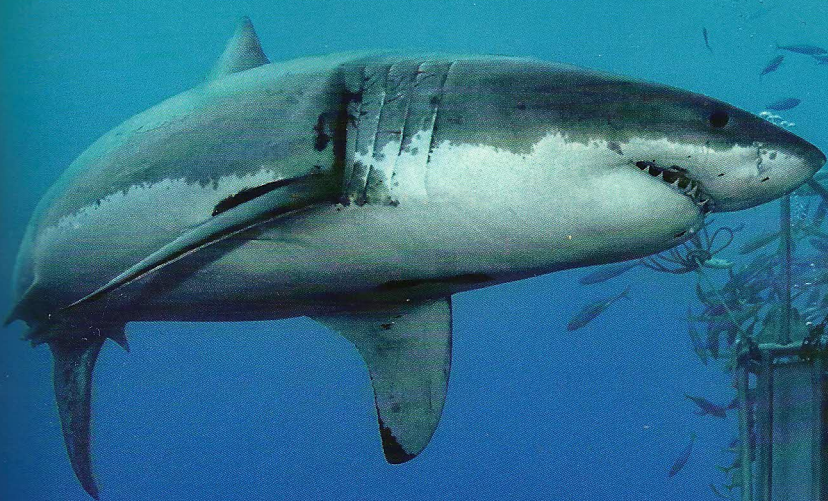
Volume 43 Number 6

# DIVER



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**Diving British Columbia's newest artificial reef**

TEXT BY RICK WALL,  
VICE PRESIDENT, ARSBC

# THE INCREDIBLE HULK

The first of four planned artificial reefs in British Columbia is open to divers, we marvel at the first of the hulks to be reefed...



On a sunny Saturday morning in June, spectators gathered at Willingdon Beach in Powell River, BC, to witness a momentous change to their seascape: the sinking of the first of the floating breakwater ships from Catalyst Paper, to be re-purposed as a new marine habitat.

In 2016 Catalyst Paper engaged the Artificial Reef Society of British Columbia (ARSBC) as consultants to assess four ships for re-purposing into underwater habitat, with the aim of revitalizing Powell River as a recreational dive destination. The ARSBC vision is to sink the

remaining three vessels to form a singular dive location suitable for all skill levels.

Since 1930, the Powell River Company (now Catalyst Paper, Powell River Division) has had a floating breakwater protecting its mill's log pond and foreshore from the storms that regularly come in to Malaspina Strait. Due to the depth of the water, a traditional rock breakwater would have been prohibitively expensive to build – whereas surplus ships could be assembled into a breakwater for a fraction of the cost.

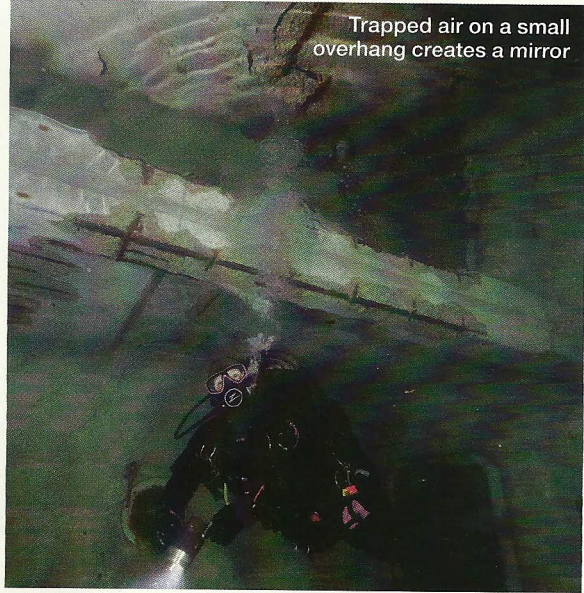
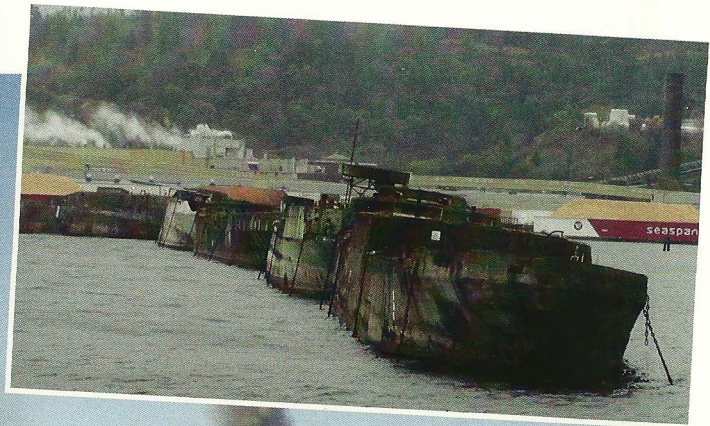
In the late 1940's mill management decided that a collection of concrete vessels would provide a permanent solution for protection of the log pond. The first four reinforced

*The vision was to have all four vessels located in the same area and within scuba distance from each other*

concrete hulks arrived in 1948, with six more added through to the 1960's. These ten historic American-built WWI/WWII ships – averaging 366 to 375 feet (112 to 114m) in length and made of 5½ inch (14cm) thick reinforced concrete – constituted the largest floating hulk breakwater in the world.

USS YOGN-82 was one of 22 concrete barges built by Concrete Ship Constructors of National City, California, between 1942 and 1944. Displacing 4860 tons, she is

The stern of the huge YOGN-82



375 feet (114m) long, 56 feet (17m) wide and 38 feet (11.5m) deep. Each barge had a crew of 12 and could carry up to 63,000 US barrels (10,000,000 litres) of gasoline in 24 cargo tanks. As a minor vessel, it was simply given a designation: YO (yard oiler) G (gasoline storage) N (not self-propelled). These ships served a vital role for the US Navy during the Pacific operations in WWII, as they were often the only in-theatre fuel storage facilities available to the US forces.

After the war, YOGN-82 was declared surplus and was laid up in Pearl Harbor as part of the Pacific Reserve Fleet. It was purchased by the Powell River Company (now Catalyst Paper) in 1960 and arrived in Powell River on June 1, 1961.

*As a minor vessel, it was simply given a designation: YO (yard oiler) G (gasoline storage) N (not self-propelled)*

**Risk review**  
As the years passed and the ships had well exceeded their expected lifespans, Catalyst Paper decided that the mounting risks associated with the existing breakwater warranted a serious review. With the closure of the wood room, senior management determined that a smaller breakwater consisting of just six hulks would provide adequate protection going forward. In 2015 the General Manager at Powell River decided that the time

had come to take action. All the barges had been surveyed and the four most deteriorated were identified for reefing.

Catalyst Paper approached the ARSBC to see if reefing would be viable. They knew that the ARSBC, which had created eight major artificial reefs along coastal communities in BC, had extensive experience in planning and executing the sinking of large vessels at sea while meeting the strict environmental protection standards mandated by the federal government. For each ship of the Catalyst breakwater, the ARSBC would assess the condition and environmental state of the vessel and offer guidance in its preparation for sinking. Thus

Top left: lots of clean up work to do pre-sinking.  
Top right: The breakwater in Powell River.  
Top: Precision blasting helped the reef sink perfectly

Trapped air on a small overhang creates a mirror

Anemones on the bow show great promise for a flourishing reef

Photo: Gary Friesen, Trisha Stovel



began a long-term collaborative reefing project between Catalyst Paper and the ARSBC.

YOGN-82, *Emile N. Vidal*, *SS Peralta* and *Quartz* were identified as the vessels in need of remediation and disposal. The vessels were in no condition to be towed any great distance. The vision the ARSBC pitched to Catalyst management was to have all four vessels located in the same area and within scuba distance from each other, beginning with YOGN. The finished project would be unique in scope and scale, an economic tool to revitalize recreational diving in the Powell River region.

The ARSBC carefully reviews the general arrangements of ships during remediation and makes the determination where natural

points of internal access are to remain in place. All compartments and holds of ships are prepared to meet the environmental clean-up standards and every effort is made to make the dive experience as safe as possible; however, due to the concrete and rebar matrix, which in some areas of these ships is over 5 inches (13cm) thick, it was felt to be impractical and cost prohibitive to cut open new access along the port and starboard sides of YOGN-82, meaning it is best enjoyed as an external dive experience. Natural openings and overhead environments should be approached with caution as the wreck is intended primarily for external recreational use. Those divers who intend to explore the ship's internal compartments do so at their own risk.

*The YOGN sank in eleven minutes and remained upright all the way to the sea floor, bow facing the shore*

Top left: Prepped and ready for sinking! Above left: the YOGN team responsible for the clean up and sinking preparation. Insert: Celebratory sinking cake!

### Sink day

23 June 2018: Extensive calculations and testing coupled with best management practices resulted in a perfect sinking event. "This is the most unique and creative marine habitat project ever undertaken by our Society. Divers of all skill levels seek novelty, and this will be a dive back into maritime history for adventure divers worldwide," said Howie Robins, President of the ARSBC. Salish Sea Diving's Gary Lambeth in Powell River was delighted with the new marine installation and plans to use the



## DIVER dives the YOGN-82

As Editor of DIVER, based here in Canada, it's not often I get a chance to be among the first to dive a new reef. They're often scattered across the globe in tropical locations, not on our "cold water" doorstep. So of course I jumped at the chance to dive the YOGN-82, a mere 48 hours after sinking, aboard the first public dive charter to BC's newest reef.

The first thing that hits you is the scale of the YOGN (pronounced locally as "yo-gan"). This is a very big ship - long, wide, and tall. Hitting the stern deck at about 80 feet (24m) we first stumble upon a few patches of grass, dirt and weeds, a reminder that just two days ago this hulk was floating above water. A few shiner perch swim around too, the odd shrimp, and even a starfish on deck. The locals are no doubt interested in what the hell just happened to their neighbourhood.

The deck space is gigantic, with lots of nooks and crannies for life to take hold, and lots of openings for water flow. Vertical metal structures decorate most of the central top deck, kinda like a jungle gym underwater. Hatches are sealed shut to prevent diver penetration, but there are a couple of "overhang" areas that collect air bubbles, making for some great photo opportunities.

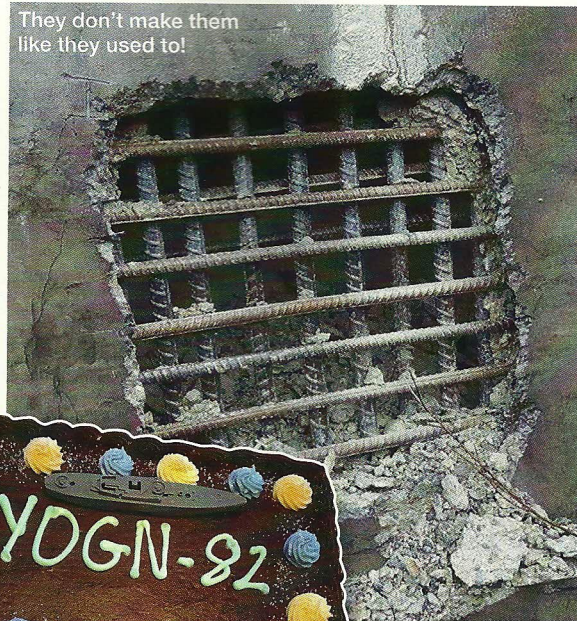
The stern has a huge anchor chain that drapes over the number 82, but as this was a barge, there's no engine room, or propeller or even your typical superstructure. Don't let that put you off though, there's plenty to see and discover.

One thing that sets this apart from most artificial reefs, is that there's already a ton of life on here. Because it spent many years as a floating breakwater, the lower third of the vessel has been submerged for a long time, gathering residents. Descend to the sand and slowly work your way up, you'll see the bottom of the reef is covered in white and orange anemones, a great start for the reef, and positive sign for things to come.

The YOGN-82 is a very enjoyable and fun dive. It's sat perfectly level, and is great for anyone who can dive below 60 feet (18m). Most importantly, I have a feeling it is going to flourish with marine life over time. The nutrient rich waters of the Salish Sea, paired with the concrete structure and the existing life on the hull, all point towards this becoming one of BC's best and most habitable artificial reefs yet.

*By Russell Clark, Editor*

They don't make them like they used to!



The proposed arrangement of all four hulks

The emerald waters of the Salish Sea - high in nutrients and good water flow will help make the YOGN-82 a successful reef, and a great dive site

YOGN wreck site for training the next generation of divers. The YOGN sank in eleven minutes and remained upright all the way to the sea floor. The ship is positioned with the bow facing the shore line and is accessible only by boat. Two mooring floats have been installed to mark her location on the sea floor.

A considerable amount of technical thinking went into the successful sinking of the YOGN-82, including some pretty fancy mathematic calculations and, frankly, a little good fortune. YOGN-82 had 18 storage full tanks, each 38 feet (11.5m) deep. Not all the tanks were dry; some leaked sea water so maintaining stability meant constant pumping and transferring of water - not to mention the dozens of fisher cracks under constant stress. Unlike the destroyers where linear shape charges cut a

clean line through the steel hull, this method could not be used on concrete. Tests were conducted on land using a high explosive charge known as Data Sheet. This is a C-4 explosive, designed to pulverize concrete to dust thereby allowing seawater to flood the ship, but not intended to cut through thickly interlaced rebar. Divers on the site will note that some concrete remains attached to the rebar, and it is for this reason that visitors should treat it as a potential unstable environment.

The combination of careful planning and experience of the ARSBC's management team and its subcontractors yielded a successful sinking of the YOGN-82. We now know what is possible and with each successive concrete ship sunk, I expect the recreational dive experience will get even better. [ ]

The Artificial Reef Society of British Columbia is a registered non-profit society based in Vancouver, British Columbia. The Society has an experienced team who consult on the creation of long-term stable marine habitats using ethical means of vessel preparation