# 2011 Winner: Yamazaki Double-Weight Branchline

Innovative Japanese Design to Reduce Seabird Bycatch Wins Both the Smart Gear 2011 Grand Prize, and the Tuna Prize

For the first time since the Smart Gear competition was established in 2005, a winning design, that reduces the accidental catch and related deaths of sea birds in tuna fisheries, has won more than one award.

Kazuhiro Yamazaki, a captain on a Japanese tuna vessel, is the 2011 Smart Gear winner, receiving a $30,000 grand prize, and also received the special tuna prize of $7,500, offered by the International Seafood Sustainability Foundation (ISSF)

The winning design – a double-weight branch line – sinks long line hooks beyond the range of seabirds, such as albatrosses and petrels, and reduces injuries and fatalities to crews caused by rapidly recoiling weights and hooks.

Results have been staggering. The device has proven to be safe and effective at reducing seabird bycatch in pelagic (tuna) longline fisheries. In 2010, over 95,000 branch lines with the Yamazaki double weight system were hauled with no injuries to fishermen, reducing seabird bycatch by 89% more than un-weighted branch lines, with no effect on fish catch rates.

How it works

The Yamazaki double-weight configuration consists of two leads placed at either end of a 1 to 1.5 meter section of wire or wire trace. This weighted section is inserted into a branchline 2 meters above the hook. The weight nearest the hook is free to slide along the branchline while the second lead is fixed.

The double weight reduces the danger of weight recoil injury to crew members by spreading the mass of the weights across the wire trace, as two smaller weights are better than one, and by including a sliding weight that dampens the speed at which the weight recoils.

The double weight system is also easier to handle on deck than a single weighted swivel – it is easier to coil and it prevents jackknifing as it is thrown into the water in line setting.

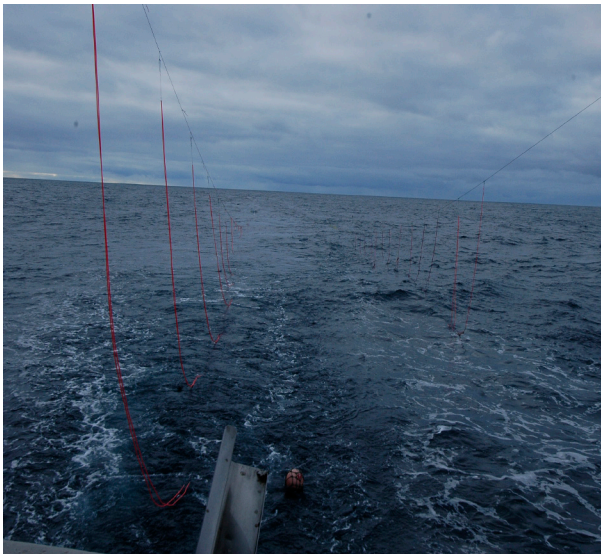
## Double-Weight Branchline Fast Facts

When a research effort to find best practice seabird bycatch mitigation in the Japanese fleet fishing in the South Africa began, Kazuhiro Yamazaki, Fishing Master of the F/V Fukuseki Maru No 5, quickly emerged as the leader and innovator in this fleet.

The double weight system he conceived was in reaction to the need he saw to weight branchlines in a way that was safe and acceptable to Japanese fishing masters.

As a result, the simple and cost-effective device is proving to solve the seabird bycatch problem in tuna fisheries.

The results of which will ensure the sustainability of the tuna fishery and the livelihoods for fishing generations to come - all in a way where the catch of fish is a critical part of the solution.



## Conservation Potential

The conservation potential of Yamazaki double-weight branchline is substantial. It is an innovation that meshes practicality and safety with function and conservation, and breaks down the barriers to the adoption of branchline weighting as a seabird bycatch mitigation measure in world tuna commissions and in domestic fisheries.

Branchline weighting and bird scaring lines deployed properly are the key to seabird conservation in tuna longline fisheries. Used in combination with night setting seabird bycatch should can be reduced to the lowest level possible.

This innovation has also paved the way for the Agreement for the Conservation of Albatrosses and Petrels to endorse the simultaneous use of branchline weighting, bird-scaring lines and night fishing as best-practice seabird bycatch mitigation in pelagic longline fisheries. Trials with this device reduced seabird bycatch compared to un-weighted branchlines by 89% with no effect on fish catch rates. It has the potential to spread conservation success to the oceans of the world and allow tuna fisheries, and albatross and petrels to coexist.

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# 2011 Runner-up: The SeaQualizer

Innovative Bycatch Release Device Wins $10,000 Award

The SeaQualizer is a noninvasive, pressure activated, fish recompression tool that is capable of releasing fish at targeted depths, and was awarded a $10,000 prize as runner-up in the 2011 Smart Gear competition.

The winning team, that comprises Bill Brown, Jeffery Liederman, Patrick Brown, and Ryan Brown from the Florida based company, Finovation Inc., came up with the idea for the SeaQualizer to address a significant problem in the management of some recreational fisheries - the mortality of bottom dwelling fish that are released at the surface as bycatch.

These fish have air bladders, and when they are brought to the oceans surface from depth they undergo barotrauma. This is when the fish cannot release the gas in the airbladder quickly enough to prevent expansion of the air bladder when brought to the surface on fishing gear.

Once released, with their air bladder expanded, the fish are unable to return to the original depth where they were captured, and as a result the mortality rate is very high.

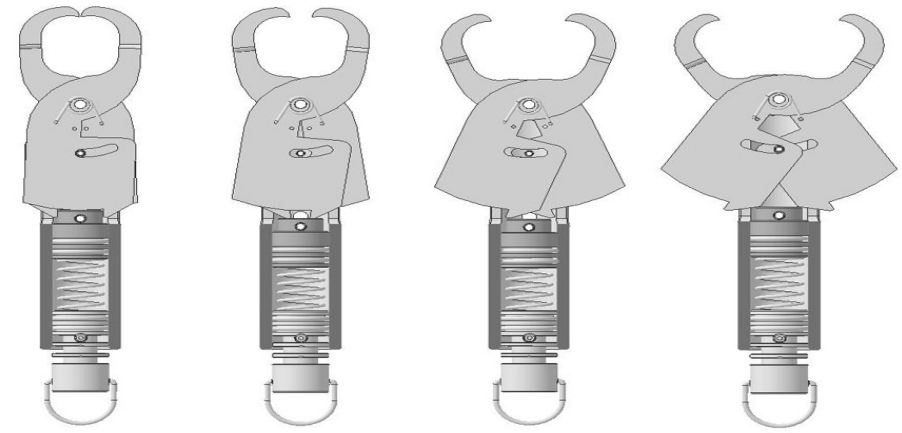


Diagram illustrating the SeaQualizer sequence of release

How the SeaQualizer works

The SeaQualizer works by non-invasively securing articulating jaws to a fish's lower lip, that has been caught at depth. To return the unintended catch, the reverse end of the mechanism is fastened to a weighted fishing line, via a long-line clip, that is then returned to a depth.

This provides adequate recompression so that when released, the fish can swim away with minimal buoyant force acting against it.

The device is triggered by a pressure differential at a specified depth. It reduces the time and effort for the angler to repeatedly reel heavy weights all the way up from the bottom.

## SeaQualizer - Fast Facts

The SeaQualizer represents a breakthrough in bycatch release technology that could have a major impact on the management of recreational fishery mortality.

This pressure activated, fish recompression tool can accommodate the release of many species of fish, both large and small. Large species of fish, such as the Warsaw or Goliath Grouper require a significant amount of weight to overcome the resultant buoyant force while small species of fish require a compact profile to accommodate their small mouths.

Although several techniques have been introduced to mitigate this bycatch mortality, none are widely used in many recreational fisheries and others have not proven to be effective.

## Conservation Potential

Management of many fish species including the valuable red snapper in the Gulf of Mexico and rockfish in the Pacific include the mandatory release of undersize fish and catch limits that require the release of significant numbers of fish. If survival could be improved for these fish, significant improvements could be made in management and stock levels of these valuable fish species.

Studies have suggested that survival rates greater than 50% are possible, depending on the species and the depth from which they are raised. Species such as the rockfish are usually caught in less than 200' of water and when recompressed have shown survival rates of up to 90%.

With its user friendly capabilities and the tested effectiveness of this device, the SeaQualizer could be widely accepted by the recreational fishing community and if so, could make a significant contribution to the reduction of bycatch mortality in many recreational fisheries and contributing to improved sustainable management and increased fishing opportunities.

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# 2011 Runner-up: Turtle Lights for Gillnets

## Design to Reduce Turtle Bycatch Wins $10,000 Award

Coastal gillnet fisheries are one of the most common forms of fishing throughout the world and have been associated with significant sea turtle bycatch rates. In Baja California, Mexico, investigations have reported 800 loggerhead turtle interactions in coastal gillnets from one fishery in a year, while fisheries off the coast of Northern Peru have reported interactions with over 300 green sea turtles.

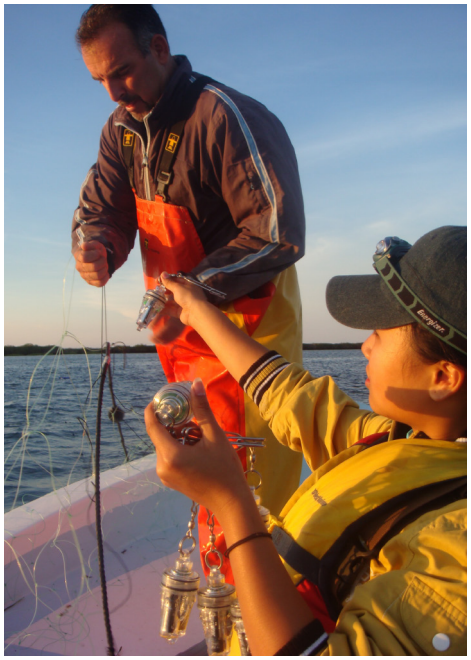
In response to this increasing challenge of bycatch, Shara Fisler, from the Ocean Discovery Institute in San Diego, and John Wang, from the University of Hawaii, examined the behavioral and physiological studies, that show found visual cues play important roles in sea turtle foraging and orientation. By investigating potential visual based strategies as a way to reduce sea turtle interactions with gillnet fisheries, the team developed the award winning design 'Turtle Lights for Gillnets'.

Using widely available fishing lights (LED or chemical lightsticks) to illuminate gillnets, the design creates enough of a warning signal to alert sea turtles to the presence of a barrier, allowing them to avoid it. Experiments with illuminated nets were conducted in Baja California, and the trials reduced green turtle bycatch by 60% without affecting the fishery target catch rates or catch value.

Lights attached to the nets create enough of a warning to alert sea turtles to a barrier

The long-standing innovative approach by this team has also resulted in the formation of the Bycatch Mitigation Research Program, helping to develop students as future leaders in fisheries management and marine conservation, while examining new bycatch reduction technologies.

Research into the turtle lights for gillnets design has continued to support opportunities for a science-focused education experience of students, to explore ocean conservation concepts, develop quantitative skills, and conduct critical marine research alongside fishermen, scientists, and fishery managers.



Attaching LED lightsticks to a bottomset gillnet

### Turtle Lights for Gillnets - Fast Facts

Innovative design uses widely available fishing lights (LED or chemical lightsticks) to illuminate gillnets.

Experiments were conducted in Baja California, but can be adapted in any coastal gillnet fishery.

During the trials several different lightsticks were tested, and placement along the floatline of the gillnet differed.

Results from trials in Baja California indicated a 60% reduction in green turtle bycatch.

The use of lightsticks to illuminate gillnets in order to reduce sea turtle bycatch has not been tested in gillnets fisheries prior to this research and is a creative use of a widely available product.

The Turtle Lights for Gillnets and their ability to reduce the bycatch of turtles has the potential to be an effective device for turtle conservation all over the world.

## Conservation Potential

Testing and analysis of the Turtle Lights for Gillnets design will continue, examining the effects of illuminated nets on additional sea turtle species such as the critically endangered leatherback and loggerhead sea turtles. This area of research will also examine different wavelengths of light that may make gillnet fisheries a more selective and ultimately a more sustainable form of fishing. The team will also continue to examine the effects on target species and catch value for each gillnet fishery.

The innovative collaboration between the Ocean Discovery Institute, the University of Hawaii, and other partners, has also resulted in the establishment of a unique research platform to develop and test sea turtle bycatch mitigation strategies. The team plans to continue to examine a variety of methods that may reduce sea turtle bycatch as well as determine their impacts on target fish catch when adopted into a gillnet fishery.

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