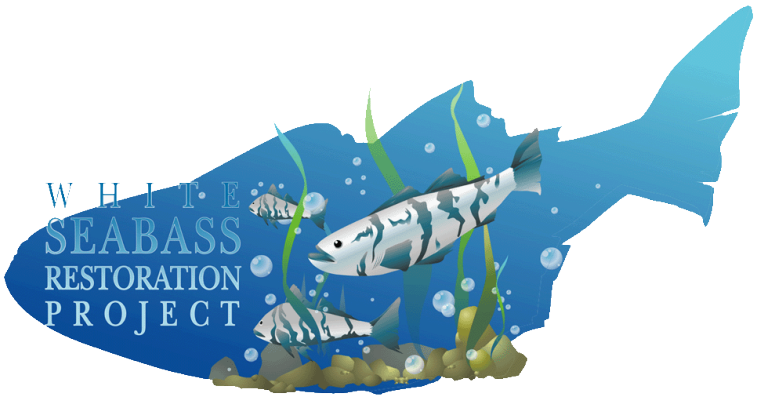
White Seabass Restoration Project



Volunteer Guide

SAN DIEGO OCEANS FOUNDATION
www.sdoceans.org

White Seabass Restoration Project

White Seabass Information

White seabass (*Atractoscion nobilis*) are one of the most commercially sought after fish in California. With white, tender and highly valued flesh, they are on almost every restaurant menu and are a prime target for fishers along the coast.

Description

Contrary to their name, white seabass are not bass at all. They are actually croakers, belonging to the family Sciaenidae (getting their name from the loud 'grunting' sounds they make with their air bladders under water). With the largest recorded individual measuring at 5' and 93 lbs, the white seabass (commonly referred to as "king croaker") is the largest member of the croaker family.

White seabass typically inhabit kelp beds and rocky reefs from Juneau, Alaska all the way down to Magdalena Bay, Baja California. Adult white seabass tend to school and can be identified by their bluish-gray, speckled dorsal region and silvery-white underside. The legal catch limit for white seabass is 28". A fish with this measurement weighs around 7½ lbs and is at least 5 years old (having been sexually mature for at least one reproductive season - which in Southern California, is from April to August).

Juvenile White Seabass

Juveniles are distinguished from adult white seabass by the dark, vertical bars on their sides. Young-of-the-year (fish that are less than one year old) are usually smaller than 2" and inhabit the open coast from 12 - 30 ft deep. These young fish are usually found drifting with small debris in shallow areas just outside the surf zone. By the time white seabass are about 2 years old, they have moved into protected bays and eelgrass beds. Larger juveniles (3-4 years old) can be found near jetties, around kelp beds and even several miles offshore, swimming near the surface.

Need for the White Seabass Project

Due to overfishing, habitat loss and the use of gillnets along the Southern California coast, white seabass populations have declined by 90% of what they were only 50 years ago!

Overfishing

Before 1950, large white seabass (often over 45 lbs) were extremely plentiful all along the Eastern Pacific. As the human population continued to explode, the demand for seafood drastically increased. This escalating demand ultimately led to the once-prevalent and large white seabass species to dwindle to the point they were could only be caught as juveniles from 10-16" long.

Adult WSB are known to feed on anchovies, market squid, Pacific sardine, blacksmith, silversides, pelagic red crab and even mackerel.

Habitat Destruction

Most of the shallow lagoons and estuaries in Southern California, where white seabass spend their early lives, have been built over by urban development. Surveys show that the loss of habitat (specifically the loss of wetlands which are important nursery habitats for WSB), has impacted the well-being of the species as a whole.

Gill Nets

The development and proliferation of gillnets has not only been blamed for depleting white seabass populations (by taking juvenile fish before they have the chance to reproduce), but also of changing entire marine ecosystems in the 1980's. These nets, draped through kelp beds and other areas and left to "soak" overnight, would wipe out anything that crossed their path (from entire schools of fish to marine mammals, sea turtles and shorebirds). Some of these monofilament nets would actually come loose and float away in the process - left only to continue "ghost fishing" throughout our oceans. Even though research consistently showed that gill nets dramatically alter a wide range of marine populations, they were not banned in coastal waters until 1990!

Between 1950 and 1980 the annual sport catch of white seabass declined dramatically – from 55,000 to fewer than 3,500!

White Seabass Restoration Project Supporters

The White Seabass Restoration Project is a best-management tool for preserving this species of fish. Unfortunately, ecosystems that have been overfished and destroyed by coastal construction cannot always recover on their own. Because of this fact, marine hatcheries are essential to help replenish valuable resources and return local fisheries to sustainable levels.

Oceans Resources Enhancement & Hatchery Program (OREHP)

To begin restoring fisheries that have been depleted by commercial over-fishing, the use of gillnets and/or habitat destruction, the California Department of Fish and Game instituted the Oceans Resources Enhancement & Hatchery Program (OREHP). As part of the state's new initiative, the Hubbs-SeaWorld Research Institute built an experimental marine fish hatchery in Carlsbad, CA. This pilot project was created in order to determine the feasibility of culturing ecologically respectable white seabass in captivity as well as to assess the marketability of these fish. The white seabass was selected as the primary target species for this program due to both its popularity on dinner plates and its depleted status. The funding to support the majority of OREHP's stock enhancement research comes from the sale of recreational and commercial fishing licenses.

OREHP is one of the few fish restocking programs that is dedicated toward assessing the biological, ecological and economic impacts of its efforts. Through this responsible approach and extensive, scientific review process, OREHP can be used as a model for restocking programs across the globe.

OREHP
has released over one million healthy WSB to date!

White Seabass Restoration Project Supporters

Hubbs-Sea World Research Institute (HSWRI)

HSWRI, in collaboration with San Diego State University, conducts much of the OREHP research, falling in line with the long-time mission of the Institute.

In 1963, Milton C. Shedd (one of the visionary founders of SeaWorld, San Diego) met with world-renowned marine biologist Carl L. Hubbs. Together, with other business, scientific and community leaders, they founded the Mission Bay Research Foundation, later named HSWRI. Today HSWRI operates as a not-for-profit organization with facilities in San Diego and Carlsbad, California as well as in Orlando, Florida. HSWRI is responsible for overseeing the operation of the Leon Raymond Hubbard, Jr. Marine Fish Hatchery and has developed the culture protocols required for the White Seabass Restocking Program.

Coded Metal Wires

All fish raised and released by HSWRI and SDOF are tagged in the cheek with coded metal wires. These microscopic wires contain critical life-history information (including the spawning date and location), ultimately providing HSWRI biologists with valuable information on growth rates, migration routes, survivorship, predation and mating. By scanning these wires with a special instrument, HSWRI can also determine whether or not caught white seabass are one of their hatchery-reared fish. This data is crucial for HSWRI and SDOF because it provides accurate information regarding the success of our restocking efforts.

White Seabass Heads

SDOF continues to encourage fishers to: **Turn in the heads of all legally caught white seabass!** Without collecting their heads, critical information concerning the species is lost. Even though not all fish caught are tagged, both tagged and untagged fish can provide scientists with information on the survivability of hatchery-reared and naturally reared fish. Please check out www.sdoceans.org for head drop-off locations near you.

White Seabass Restoration Project Supporters

Leon Raymond Hubbard Jr. Marine Fish Hatchery History

To support large-scale experimental restocking efforts, the Leon Raymond Hubbard, Jr. Marine Fish Hatchery was constructed and dedicated in 1995. This facility, located on the Agua Hedionda Lagoon in Carlsbad, CA, is capable of producing more than 350,000 juvenile white seabass annually. The hatchery is a unique facility that blends mariculture and scientific research to improve upon a depleted fishery and broaden our knowledge of this croaker species and its life history.

At the hatchery, HSWRI breeds white seabass and raises them from tiny egg to fingerling (about three inches long). Juvenile white seabass go from a diet of brine shrimp (commonly referred to as "sea monkeys") to artificial pellets in order to get ready for their time in CA grow-out facilities. These vitamin-induced pellets are high in protein and are considered to be the best available food on the market.

Once WSB are tagged and transported to their new home (in either San Diego or Mission Bay), they are visited twice each day by SDOF's wonderful volunteers who feed and care for them.

Keeping to their natural hunting patterns, our white seabass are fed throughout the night by automatic feeders.

In less than three months, the fish nearly quadruple in size, from approximately three inches to almost twelve! (Ten inches is the minimum size for release). Once the fish are released, they are free to grow to adulthood and reproduce in the wild.

The San Diego Oceans Foundation

In 1997, the San Diego Oceans Foundation (SDOF) sought to establish a grow-out facility in order to become directly involved in the OHREP program. Frank Powell (now retired HSWRI Executive Director) asked SDOF to develop an inexpensive grow-out system that would produce high-quality fish. That year, a net pen concept (similar to those used in salmon farming) was selected. This pen was made so that physical operations can be conducted by a 1-2 people and was placed in a boat slip in Mission Bay.

Mission Bay and San Diego Bay Facilities

The SDOF grow-out facility in Mission Bay consists of an 8'x 8' fine-meshed net pen, one 500-square-foot marine predator barrier and a domed bird net on top. This pen can hold up to 4,000 white seabass fingerlings at any given time.

San Diego Bay pens getting their first batch of fish in 2003.

In the spring of 2003, SDOF installed two additional mariculture net-pens at the foot of Grape Street Pier in San Diego Bay. These pens are much larger than the Mission Bay facility (18' x 18') and include a walk-around platform for volunteers to utilize while at work. These larger grow-out pens have the capacity to release nearly 80,000 seabass annually.

Delivery Pipe

The delivery pipe used at the San Diego Bay facility acts like a descending run-way for fish. Flexible tubing is attached to both the HSWRI truck and the delivery pipe. Water is pumped through the flexible tubing and our new fingerlings swim down the long PVC pipe into the pens. This design allows us to successfully transport fish from the truck to the pens without inflicting additional stress to the small fish due to handling.

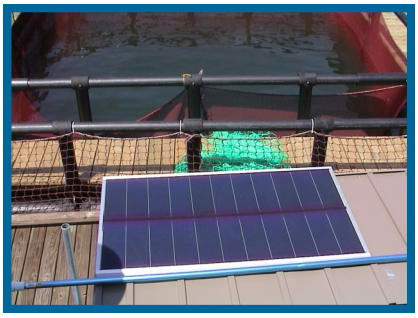
The San Diego Oceans Foundation

Automatic Feeders

SDOF's automatic feeders regulate the frequency and duration of feeding events and are powered by solar energy. At programmed intervals, a rotating arm is triggered, dispensing food into the pen. Automatic feeders provide relatively good feed distribution and are less labor-intensive than hand feeding 4-5 times each day. Although they reduce much of the labor associated with manual feeding, they must be monitored and adjusted daily to ensure that our fish are receiving the proper amount of food.

Solar Panels

There is a photovoltaic panel that generates 12-volts of electricity. The newly generated electricity runs to a pair of 120 amp hour batteries that power the facility and the automatic feeders.



Bird Net

Bird nets have been attached to the structure with polyclips and hooks (reinforced by crossing cables) in order to keep birds and vandals from disturbing the fish from above.

Containment Net

Containment nets retain the juvenile white seabass while still allowing for adequate water exchange to supply necessary oxygen to its fish residents. The nets are constructed of material that is resistant to seawater and is non-abrasive to fish. The size of the mesh is small enough to ensure that WSB fingerlings cannot escape or become entangled and large enough to remove waste.

SDOF Volunteers

SDOF's White Seabass Restoration Program (which is a small portion of the larger program operated by HWSRI) not only encourages ocean stewardship and the sustainable use of our marine resources, but also directly enhances Southern California fisheries. Because volunteers maintain the grow–out facilities, our financial overhead is minimal but out efforts are gigantic.

It is evident that our program has been very successful, however if we are to continue our success and take the next step—we need community support. In order to successfully run two grow-out facilities in San Diego, we need dedicated and dependable volunteers to help maintain the facility and to help monitor and feed the fish. Volunteers are needed for both Mission Bay and San Diego Bay facilities.

Logging White Seabass Activity

The day-to-day happenings at the pens are noted and recorded by SDOF volunteers. Log entries include notes on feeding response, activity patterns, fish health, weather, water quality, predator presence and facility concerns. This information is entered online and is transmitted directly to SDOF staff and researchers at HSWRI to help optimize culture protocols and track fish status.

Fish Health and Diseases

Frequent and careful observation our white seabass can offer early indications of serious problems before reaching the point of calamity. ***There is no substitute for time spent in observation.*** Only this will help us gain a better understanding of what is normal and what is abnormal with regard to fish behavior. A decline in feeding response can indicate disease or simply be due to changes in the ambient water temperature.

Feeding

The most important aspect of disease prevention in raising white seabass is feeding. Fish can turn cannibalistic if not properly fed. Fish that feed very aggressively when fed by hand are probably not being given enough food and are likely aggressive toward each other. Please check the automatic feeders and indicate whether or not you filled them in your log. * This will tell us if they are working correctly and dispersing food throughout the night.

Bacteria in decaying food uses oxygen and produces toxic ammonia and sulfide. These bacteria may also cause infection in the fish. Overfeeding should be avoided! In order to avoid overfeeding, please feed at a slow rate (15 - 20 minutes per cup).

Dead fish can quickly degrade oxygen levels as well, so all dead fish must be removed on a daily basis. Dead fish should not be dumped over the side, but must be bagged and thrown away in the trash.

Mortalities

Physical injuries appear to be the most common cause of white seabass mortality in cage systems. Fish who bite each other in the head region during a feeding frenzy cause ruptured eyes and white patches in that area. Crescent–shaped patches on the back or sides also result from antagonistic behavior.

Abrasions from birds appear as two converging lines on the side of the fish where it was held in the bird's beak. Cormorants are known to dive underwater and peck at fish through the containment net. These wounds often appear as punctures on the side of the fish. External injuries can become infected with bacteria and soon progress to ulcers, generally resulting in the death of the fish.

Fish Health and Diseases

Common Diseases

Below are pictures of common white seabass diseases (the fish in the pictures are NOT actually white seabass, but the diseases manifest themselves in similar ways).

As disease progresses, fish may become darker in color, separate out from the school, or hang just under the surface, finally losing equilibrium. Visible lesions (e.g. grey/white patches, open ulcers, hemorrhaging) should be noted.

Cloudy-eye

Fin Rot

Pop-eye

Emergency Contact Information

In order of preference:

SDOF Office: 619-523-1903 (M-Th, 9 AM - 6 PM)

Program Manager - Crystal Bessette (Mobile): 619-820-0967

General recapture location and number of white seabass recovered along the southern California coast since 1990.

With a heightened awareness about the state of our oceans, tighter restrictions on the use of gillnets, programs like OHREP and the support of people like you, California's white seabass populations are beginning to make a slow and steady come back!

Volunteer Responsibilities

As with all of our programs, the White Seabass Restoration Project is supported entirely by volunteers! As a result, each volunteer should feel a sense of ownership and a responsibility in maintaining the grow-out facilities.

If you find something in need of repair and you feel it is within your capacity to fix it, please do so! If you notice something in need of attention, but don't know what to do, just let us know and we'll get someone out there to take care of it.

WSB Volunteer Checklist

1) Take note of seal or bird presence- if they seem to be getting into the net, please report it immediately!

2) Hand feed the fish (gauge the amount and rate based on feeding response). Please ensure that all pellets are being eaten to avoid contaminating the local waters with added nutrients.

3) Make general observations about fish health and activity (i.e. look for bulging eyes, ragged fins, scaring and slower, surface swimmers).

4) Check for mortalities. If found, please remove, place in a plastic bag and discard into the trash. Bottom mortalities will be removed by divers during pen cleanings.

5) Check the automatic feeders, fill to the top & replace the lid.

6) Check the food supply in the dock container. Please call if there are only 1-2 bags left.

7) Collect and dispose of all marine trash surrounding the pen.

8) Clean off bird droppings on or around the grow-out facility, using a broom and seawater. Check the solar panels and remove droppings with the spray bottle as needed.

9) Before leaving, please make sure that the bird net is tightly secured on all sides. Any open crevice can allow birds to enter and eat fish. Please zip-tie small holes and report larger ones.

10) Fill out the log sheet. Take the yellow copy home and submit data online.

This is a SAMPLE log sheet for reference ONLY.
Please DO NOT use this sheet to log white seabass activity.

SAN DIEGO OCEANS FOUNDATION

White Seabass Restoration Project
Daily Monitoring Log

Name: _____

Date: _____ // _____ // _____ **Time:** _____ ❑AM ❑PM

Facility: ❑Mission Bay ❑SD Bay: Pen #1 ❑SD Bay: Pen #2

H0 Temp: _____ °F

Cups Fed: _____

# of Mortalities: _____

Feeding Response:
- ❑ 0 - Not visible
- ❑ 1 - Not feeding
- ❑ 2 - Feeding slowly
- ❑ 3 - Feeding normally
- ❑ 4 - Feeding aggressively

Bottom Mortalities? ❑Yes ❑No

Net cleaned? ❑Yes ❑No

H20 Quality: ❑Oil Sheen ❑Pollution Spill ❑Red Tide

Weather: ❑Sunny ❑Overcast ❑Rainy ❑Windy

Birds? ❑Yes ❑No

Seals? ❑Yes ❑No

Comments: _____

_____

_____

_____

SAMPLE

Please leave the white copy at the grow-out facility and **take yellow copy home to submit online** within 24 hours of volunteering.

www.sdoceans.org
p: (619) 523-1903 f: (619) 523-1979 e: volunteer@sdoceans.org

WSB Project Supporters

Hubbs-SeaWorld Research Institute (HSWRI) is dedicated to providing effective solutions to conflicts that arise between human activity and the natural world. Scientists at HSWRI breed and rear the white seabass that are delivered to SDOF's grow-out pens and provide scientific input for the program.

The CA Department of Fish and Game oversees the white seabass project and provides funding for the HSWRI hatchery and other Ocean Resources Enhancement Hatchery Program (OREHP) sponsored research. OREHP funds are acquired through the sale of marine enhancement stamps on all commercial and recreational fishing licenses from Pt. Arguello to San Diego.

The Port of San Diego is a major financial supporter for our San Diego Bay pens! They have donated the much-needed pier space as well as generous financial assistance grants on a yearly basis.

Marina Village Marina has donated the use of a boat slip for our Mission Bay net-pen and continually supports SDOF with other in-kind donations.

The United Anglers of Southern California organizes quarterly meetings between California grow-out facilities, HSWRI and the CA Dept. of Fish & Game. They also coordinate operations essential to the expansion of the white seabass program.

The San Diego County Fish & Wildlife Commission provided financial assistance in 2003 to help purchase our San Diego Bay grow-out pens.

SAN DIEGO OCEANS FOUNDATION

1875 Quivira Way, Suite C-5 | San Diego, CA 92109
p: (619) 523-1903 | f: (619) 523-1979 | www.sdoceans.org

Executive Director

John Valencia, john@sdoceans.org

Program Manager

Crystal Bessette, crystal@sdoceans.org

Marketing & Outreach Manager

Marianne MacGuidwin, marianne@sdoceans.org

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