
HSWRI Aquaculture Program Research Newsletter

**** Volume 82 - 2016 ****



White Seabass Replenishment at Santa Catalina Island Since 1994

HSWRI has been working with the Catalina Island Seabass Program (CISP) since 1994. In 1997, this program was incorporated into the Catalina Island Seabass Fund (CSF) as a non-profit foundation with support and funding from the Offield Family Foundation. The first culture system was an on-shore 12 m long, 1.2 m deep raceway on the east side of the Island adjacent to the Wrigley Science Center. That facility served the program for two years culminating in the release of 1,607 juvenile white seabass from 1994-1995. With funding from the Offield Family Foundation, the Pflieger Institute for Environmental Research, the Giles W. and Elyse G. Mead Foundation, Don Knabe, and grants from Los Angeles County Supervisors, volunteers on Catalina Island designed and constructed a floating growout pen that was completed in Catalina Harbor in 1997 under the leadership of Harbor Master Doug Oudin, who has since retired. In 2000, the site operator at the time was Posh Gardiner who modified it into the net-pen system that remains in place to this day.



Figure 1. Seabass growout pen in Catalina Harbor (top); Original land-based tank system at the USC Wrigley Science Center circa 1994 (lower left); seabass being sluiced into existing pen (lower right)

The diligent efforts by CSF staff have been rewarded by great success over the years. Excellent water quality in Catalina Harbor has facilitated these efforts and supported the release of robust fish. Numerous white seabass have been recaptured around Catalina Island, even some that were released from other growout facilities along the mainland. Being in a remote location does pose challenges, however. Exposure to the public is limited and so too are volunteers. Eddy Hernandez is the current site operator, and he has

been raising white seabass independently at the CSF pens since December 2014. As a Catalina Island native and avid fisherman, he is happy to be playing such an important role in the stock enhancement of this extremely popular local fish.

In collaboration with HSWRI and the DFW, CSF has released over 90,000 juvenile white seabass. The release of more than 13,000 juveniles currently at the facility will push their total number of released fish over the 100,000 milestone – a figure truly representative of decades of hard work and dedication. One hundred and sixty of these fish have been recaptured in the wild with the oldest fish being caught close to seven years after its release and weighing in at 6.8 kg. HSWRI will re-stock the CSF pens with another 15,000 seabass in November for release in early 2017.

Understanding Fish Stress in an Aquaculture Setting

Stress physiology is an important indicator of fish health. Specifically, plasma cortisol concentrations can give insight as to an animal's response to stressors such as predator-prey interactions, water quality degradation, or may be an indicator of immune function.

In a recent study, we developed a serial cortisol response curve to determine when the cortisol response peaks in seabass after exposure to an acute stressor such as being captured in a net and removed from a tank (handling event). Twenty-five fish, averaging 16 g in weight, were stocked in 320 liter tanks and allowed to acclimate for one month. Blood was drawn from 13 fish from each tank at nine different time intervals; one prior to an acute stressor (handling event), and the rest at 30 minutes, one hour, two hours, four hours, eight hours, 12 hours, 24 hours and 48 hours post stressor. Blood was processed and samples sent to a diagnostic laboratory for further analyses. Acute plasma cortisol levels peaked at 30 minutes post stressor and returned to baseline at 24 hours post stressor. Other blood parameters measured include plasma glucose levels (which remained relatively constant) and lactate, which peaked at 30 minutes post stressor corresponding with high levels of muscle activity associated with the handling event.



Figure 2. HSWRI researchers collect subsamples of fish from cages in AHL (top); and extract blood samples from seabass (bottom)

Results from the serial trial were utilized to help design a net pen rearing field trial. Six nylon nets were stocked with 500 fish each in Agua Hedionda Lagoon, three with predator nets and three without. Fish were allowed to acclimate for four weeks prior to sampling. Blood was drawn at baseline, post stressor at 30 minutes (peak time as previously determined in serial trial), and then again for resolution of the stress response at 24 hours post stressor. Blood was processed and plasma sent to an outside laboratory for further analyses, which are pending.



Figure 3. Larger predatory fish like kelp bass often congregate around seabass net pens as a source of structure and food. Predator nets that increase the distance between these predatory fish and caged seabass may eliminate the impact of predator exposure as a chronic stressor.

The results of these analyses will be used to determine if there are differences in acute cortisol responses among fish reared in tanks vs. net pens, and in net pens with and without predator nets. Outcomes of this project will guide rearing practices in net pen systems and provide information on acute cortisol responses of white seabass when encountering common stress events in the culture environment.

Acknowledgements

This document reports on aquaculture research projects supported by numerous grants, contracts and private contributions. It also represents the hard work of many dedicated staff and volunteers throughout southern California, as well as collaborators around the country. This information was contributed by HSWRI staff and compiled by Senior Research Scientist and HSWRI Aquaculture Program Director Mark Drawbridge.

The aquaculture research program has been active for more than 35 years at HSWRI. The primary objective of this program is to evaluate the feasibility of culturing marine organisms to replenish ocean resources through stocking, and to supply consumers with a direct source of high quality seafood through aquatic farming. Please direct any questions to Mark Drawbridge at mdrawbridge@hswri.org.

Aquaculture research at HSWRI is currently supported by these major contributors:

- Avalon Tuna Club Foundation
- Cabrillo Power/NRG
- Chevron Corporation
- Der Fruchtbaum Family Trust
- Dorothea Laub; Dick Laub Fisheries Replenishment Program

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- Edison International
 - Fisherman's Landing
 - H & M Landing
 - Los Angeles Rod & Reel Club Foundation
 - Frank and Kathy LoPreste
 - NOAA's Saltonstall-Kennedy Program
 - Point Loma Sportfishing
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 - San Diego County Fish and Wildlife Advisory Commission
 - Santa Monica Seafood
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 - SeaWorld & Busch Gardens Conservation Fund
 - SeaWorld Parks and Entertainment
 - SeaWorld San Diego
 - Sempra Energy Foundation
 - Joseph S. and Diane H. Steinberg 1992 Charitable Trust
 - The California Department of Fish and Wildlife's Ocean Resources Enhancement and Hatchery Program
 - The Catalina Seabass Fund
 - The Fletcher Foundation
 - The Shedd Family
 - The U.S. Fish and Wildlife Service's Sport Fish Restoration Account
 - United Soybean Board
 - USC Sea Grant
 - USDA National Institute of Food and Agriculture
 - Western Regional Aquaculture Center (WRAC)

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