HSWRI Aquaculture Program Research Report
**** October & November 2010 ****

HSWRI Aquaculture Program in Florida Gathers Steam

Megan James joined the Institute in October 2010, as a Research Scientist and Aquaculture Program Manager at the Institute's Melbourne Beach Laboratory near the Coconut Point Sanctuary. Megan recently completed her Master of Science in Sustainable Aquaculture at the Institute of Aquaculture at Stirling University in Scotland. Megan will be working with California-based investigators to establish an aquaculture research program in Florida. Megan's first assignment will be assisting in the construction of HSWRI's new broodstock facility at the MBL, which is scheduled to be completed by March 2011. Megan will also be participating with Research Scientist Mike Shane and Florida Fish and Wildlife Conservation Commission (FWC) hatchery staff in collection efforts for wild red drum (*Sciaenops ocellatus*) broodstock as part of the Florida Marine Fisheries Enhancement Initiative (FMFEI).

Figure 1. Megan James is HSWRI's new Florida-based Research Scientist and Aquaculture Program Manager.

Figure 2. Mike Shane (left) and Institute volunteer Tom Sorby (right) spend the day in a boat waiting for the big one at the Big Reds Tournament.

The first FMFEI red drum broodstock collection event took the form of a "Big Reds" charity fishing tournament held on November 12-13 in the Indian River Lagoon. The tournament was sponsored by the FWC and organized by FWC Research Administrator Chris Young, with help from Mike Shane and Jonathan Shenker of the Florida Institute of Technology. Nearly 20 anglers participated in the event in which special permits were issued to catch red drum at 81-102 cm in length. This was an exciting prospect for the fishermen because it was above the normal slot limit of 46-69 cm. Institute President Don Kent, Mike Shane, Megan James, and volunteer Tom Sorby all supported the collection effort by manning "chase boats" that were set to receive brood fish after they were caught, measured,

and weighed by the anglers. Unfortunately, no suitably-sized brood fish were caught, but the event provided a solid foundation for future collaborative collecting efforts.

Happy California Fish Come from Warmer Waters

Research Scientist Jeff Smiley recently completed a range of thermal tolerance and preference experiments for white seabass (*Atractoscion nobilis*; WSB). These experiments were introduced in previous newsletter articles, including "Fish Thermal Physiology Program Heats Up at HSWRI" (Aug-Sept 2008 issue) and "Thermal Physiology Research" (Feb-Mar 2009 issue). A total of 24 trials have been completed in the thermal exposure system (TES) and horizontal thermal gradient (HTG). These experiments consisted of at least three replicate experiments for each of three size classes of fish (approximately 30, 90 and 160 mm TL).

The thermal tolerance of WSB was determined by increasing or decreasing the rearing temperature by 1 °C per day until the fish lost their buoyancy. Loss of buoyancy was our threshold measure of "tolerance". When acclimated to 20 °C for several days, WSB had a wide range of tolerance from 7 to 33 °C. However, because thermal limits can be influenced by acclimation temperature, additional trials will be conducted using seabass acclimated to temperatures other than 20°C.

The thermal preferences of juvenile WSB size classes were measured by recording the position of the fish over six days in a HTG that spanned 20 to 30 °C (Figure 3). The smallest size class had the widest range of temperature preference, spending 10-18% of their time between 21 and 28 °C. This was very different from the medium size class, which preferred temperatures between 24-27 °C and spent 30% of their time between 24 and 25 °C. The largest size class preferred the same range as the medium group, but spent up to 41% of their time between 25 and 26 °C. Currently, WSB in the hatchery are being raised at cooler temperatures of 18-21 °C, but experiments are underway to determine the feasibility of rearing WSB in warmer seawater, based on their preference. Long term holding at warmer temperatures is complicated in WSB by their extreme sensitivity to gas supersaturation.

Figure 3. Overhead photographs of large 90 mm WSB in the HTG. The gradient is operating from 20-30 °C (left to right). Fish are maintaining their position between 22 and 25 °C.

39th Annual United States – Japan Natural Resources (UJNR) Aquaculture Panel: The Present and Future of the Aquaculture Industry

Figure 4. Japanese and US representatives for the 39th Scientific Symposium of UJNR Aquaculture Panel (NOAA and the Japanese National Research Institute of Aquaculture).

In October, Research Scientist Kevin Stuart was invited by NOAA to participate in the 39th annual UJNR Aquaculture Panel in Kagoshima, Japan. The focus of the symposium was to discuss the history and role of aquaculture in meeting seafood demand, as well as systems and strategies used by the United States and Japan to promote aquaculture production into the future. The scientific symposium allowed scientists from each country an opportunity to describe their research activities and the associated challenges. This opened doors for bi-lateral collaboration between the countries, given that many of the fish production issues are shared challenges. A total of 25 oral presentations and 21 student posters were given on subjects ranging from aquaculture research policy to aquaculture production. Kevin Stuart presented the results of the Institute's work on spawning and larval rearing of California yellowtail (*Seriola lalandi*).

Along with the symposium, a very well-organized and informative series of field trips to local hatcheries were planned in and around Kagoshima Prefecture. These included the Faculty of Fisheries, Kagoshima University, Arimuraya processing plant, the Kagoshima Prefectural Fisheries Technical Development Center, Tarumiza City Fisheries Cooperative, Kagoshima Eel Corporation, Shibushi Station, National Center for Stock Enhancement, and Kurose Fisheries Company. This week-long meeting allowed Kevin the opportunity to experience Japanese aquaculture and forge new collaborations with Japanese scientists.

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. This information was contributed by HSWRI staff and compiled by Aquaculture and Fisheries Research Coordinator Dr. Kristen Gruenthal under the direction of Senior Research Scientist and Aquaculture Program Manager Mark Drawbridge.

The Aquaculture Research Program has been active for more than 25 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 traditional aquatic farming. Please direct any questions to Dr. Kristen Gruenthal at kgruenthal@hswri.org.

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

- Cabrillo Power/NRG
- California Sea Grant
- Chevron Corporation
- Cruise Industry Charitable Foundation
- Darden Restaurants Foundation
- Indian River Lagoon National Estuary Program
- National Institute of Food and Agriculture
- NOAA Fisheries
- NOAA's Saltonstall-Kennedy Program
- San Diego County Fish and Wildlife Advisory Commission
- SeaWorld Parks and Entertainment
- SeaWorld San Diego
- The California Department of Fish and Game'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

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