

Update on Inland Shrimp Farming in West Texas
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Seventeen shrimp producers in Texas on 1,906 acres produced 6,831,238 pounds of shrimp worth \$13,662,476 in 2005. Other information on Texas shrimp farms can be found at the Texas Aquaculture Association web site <http://www.texasaquaculture.org/>. At one time West Texas shrimp farms contributed significantly to the state's overall farm-raised shrimp production. Six farms with almost 200 acres once made up the industry in West Texas, but only one farm remains in West Texas that is operating on a consistent basis, Permian Sea Organics. Permian Sea Organics (formerly Permian Sea Shrimp Company) in Imperial, Texas has 64 surface acres of ponds (Figure 1).



Figure 1. Permian Sea Organics and Imperial, Texas in the background.

Bart Reid, Owner and General Manager of Permian Sea Organics, stocked only 20 acres in 2005 and produced 20,000 pounds of shrimp. He stocked on a low density basis and raised the shrimp organically, feeding only 24 thousand pounds of feed and the shrimp utilized the natural productivity in the ponds for additional nutritional needs. The survival for the 2005 crop was 70%. As the name implies, Permian Sea Organics has an organic certification for the shrimp raised at the facility. There is a long history of shrimp farming in West Texas, and it has not been easy for the operators whom took on the challenge in the remote area.

In 1972 two Ward County, Texas gravel pit operators, Hal Brown and Dean Phipps asked the local county agent to help them explore the possibility of using saline ground water in some of their gravel pits for aquaculture. In 1973 County Extension Agent Johnny Harris, with the assistance of Dr. James Davis and Dr. Jack Parker of Texas A&M University (both gentlemen now retired), stocked the first shrimp using the inland saline waters. Early experiments were crude and little data were obtained, other than survival, indicating the biological feasibility of shrimp cultivation in West Texas. Stocking continued, and gradually a body of information has been accumulated supporting commercial shrimp farming there. In the late 1980s and early 1990s Vernon Holcomb, Jack Parker (a different Jack Parker) and Charlie McKaskle all tried pilot shrimp farms inland. Holcomb's ranch was in Stanton, Texas; Parker's attempt was made in Crockett County near Iraan, Texas; and Mc Kaskle's ranch was in Martin County. McKaskle produced commercial crops of shrimp (one in 1989 of 810 pounds per acre and another of 2,166 pounds per acre in 1990). In 1990 McKaskle produced 9,100 pounds of shrimp in 4.2 acres. The farms closed for several different reasons. Holcomb's aquifer dried up during a drought year and Parker's farm produced an average of 1,068 lbs./ac. in 1989 but could not get viable seed stock the following year and the bank took the farm.

Durwood Dugger conducted a feasibility study for the Pecos County Water District No. 3 in May 1991 which was entitled "The Feasibility of Aquaculture in Pecos County and Far West Texas". In July 1992 Texas A&M University (TAMU), the Texas General Land Office, and Pecos County Water District No. 3 opened a new R&D Center in Imperial jointly. Redfish and shrimp were grown at the pilot facility consisting of six one-acre ponds. The R&D facility had some problems with ponds sealing the first year, but produced 1,140 pounds of shrimp. The pilot helped pave the way for a commercial group from Florida (Triton) to come in on property nearby the pilot. In 1993 and 1994 Triton produced commercial crops of shrimp and then closed. The Triton farm was purchased by C.E. Selinger of Odessa, Texas and a group from India and reopened as Pecos River Aquaculture in 2001, and other groups have had crops there since. The farm is leased but not in production in 2006.

Production averages from the various farms in West Texas ranged from 3,000 to 4,500 lbs./ac. and some have gone higher. The highest production reported to this author was with the Super Shrimp (*Litopenaeus stylirostris*) in 1996 at the Regal Farm, where

6,000 lbs./ac. was reached. Through the years at various farms and now at his own farm, Bart Reid has played a large pioneering roll in assisting West Texas shrimp farming.

The aquifer used by shrimp farms in the Imperial area is the Cenozoic Alluvium, water remaining from the Permian Sea. Farms drew and still draw from the same source. Salinity varies from 10 ppt to 15 ppt. There are no fresh water zones in that area, and no discharge water leaves any farm. This water is not used in any other form of agriculture on a large scale. Some of the farms in the past maintained reservoirs and some had created wetlands, which received the effluent and provided habitat for the endangered pupfish. The surface water seeps back into the aquifer through porous, sandy soils.

Red clay soils can be found in the Pecos River basin for making ponds. Permian Sea Organics also utilizes water from the Pecos County Water District #3 when filling the ponds and mixes with the higher salinity aquifer water. Permian Sea Organics is utilizing "organic culture" to better utilize niche markets. According to Bart Reid of Permian Sea Organics, the University of Texas Marine Science Institute and Nichols State University formed the Organic Aquaculture Institute, Inc. (OAI), a nonprofit 501c3, and have been conducting research in organic marine fish and shrimp aquaculture at the Imperial farm. OAI is also doing extension and education as part of its mission. OAI has partnered with the International Initiative for Sustainable and Biosecure Aquafarming (IISBA). Michael Schwarz (Virginia Tech) says the mission of IISBA is to foster academic and industrial collaborations to establish new seafood manufacturing entities. This initiative will encourage sustained production of safe and wholesome seafood products. Initially, the initiative was an open collaboration among the Association Réunionnaise de Développement de l'Aquaculture (ARDA; France), Virginia Tech Aquaculture center (USA), Blue Ridge Aquaculture Inc. (VA, USA), the Organic Aquaculture Institute (OAI; TX, USA), Institut Français de Recherche pour l'Exploration de la Mer (IFREMER, France), INVE (Belgium), and the Virginia Seafood Agricultural Research and Extension Center (VSAREC, USA). IISBA merges international programs of excellence in aquaculture research, extension and industrial application for comprehensive identification, prioritization and implementation of research from scientific validation to industrial realization. Other international private and research-oriented programs of excellence have expressed an interest in partnership with IISBA, and are being evaluated on a case-by-case basis for membership. IISBA had its inaugural reception at the WAS 2006 meeting in Bali, with high levels of interest expressed from aquaculture research, industry, and government programs and agencies around the world. Requirements for USDA organic certification can be found on the following web site <http://www.ams.usda.gov/nop/indexIE.htm>.

Bart Reid has worked for a number of years to make sure his own practices met the US standards for organic certification. Mainly, he avoided chemicals and antibiotics, did not crowd shrimp in ponds and fed organic feed -- all in line with U.S. regulations. Marty Mesh, executive director of Florida Organic Growers in Gainesville, Florida, said his U.S.-accredited group certified the shrimp "USDA organic" because Reid followed the rules. Reid thought this label might help his products compete with foreign shrimp flooding into the United States from Asia and South America. He claims that he can

charge \$5 a pound wholesale for the organic shrimp, compared with \$2 for conventional shrimp.

Ground water quantities are still unknown in West Texas and are a source of uncertainty to any operating farm. However, marketing the shrimp appears to be one of the biggest uncertainties and one of the biggest challenges. Some of the shrimp can be sold fresh at harvest to local markets, but that market is easily saturated. The organic certification of the shrimp opens up new markets, mainly in California, where the majority of the shrimp can be sold. Permian Sea Organics has also taken additional steps to open up other markets. Shrimp can be purchased from them over the Internet or directly from their shrimp store and restaurant in Imperial.

West Texas Saline Groundwater References

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