



## Sustainability Assessment of Capture-Based Tuna Aquaculture in Mexico

Jose Zertuche

Juan Vaca

Ricardo Vidal

Instituto de Investigaciones Oceanologicas  
 Universidad Autonoma de Baja California Ensenada  
 Baja California, MEXICO

Raul Del Moral

CONACYT

Ensenada

Baja California, MEXICO

Barry Costa-Pierce

Don Robadue

University of Rhode Island  
 Narragansett, Rhode Island, USA

Charles Yarish, Professor

University of Connecticut

Stamford, Connecticut, USA

### Background

Over the past two years tuna farming in large nearshore net pens has expanded rapidly along the Baja Pacific coast north and south of the Tijuana-Ensenada Corridor. Mexican tuna are now estimated to comprise ~10% of global tuna production (~35,000 tons). The rapid development of tuna farming is being driven by increasing demand from high priced Japanese and USA markets for the farmed tuna, which are higher reportedly higher in oil content and make them especially desirable for sushi. Farm gate prices for Mexican farmed tuna are currently reported to be ~\$12,000/ton.

Tuna ranching/farming is one of the fastest growing forms of aquaculture in the world today. Operations are expanding in Mexico, Japan, Canada, and the Mediterranean for *Thunnus thynnus*, *T. obesus*, and *T. albacares*. Farming of the southern bluefin tuna (*T. maccoyii*) which began in 1991 is today the most valuable sector of South Australia's growing aquaculture industry.

Unlike closed systems' aquaculture where the fish's life cycle is controlled in a "closed systems aquaculture production network" where fish are bred from captive broodstock, fed formulated feeds and reared in captivity (Costa-Pierce, 2003), Mexican tuna farming operations use wild caught fish for stocks and feeds. FAO has termed this practice "capture-based aquaculture" (Ottolenghi et al., 2004).

There is a need to comprehensively review the science basis of the new tuna farming operations, and to assist the farms to move towards long-term sustainability. A strong scientific basis for the farms is needed, which would include support from an international, university-based cooperative

research program to assist the tuna farms with best practices, good governance and stewardship; in short, to embrace the principles and practices of “ecological aquaculture” (Costa-Pierce, 2002). If done correctly, Mexico could serve as a global center of excellence for evolving an environmentally and socially sustainable tuna farming industry.

### Scientific Assessments to be Conducted

I. Fisheries Assessments of Tuna and Sardines: Assemble, analyze, and synthesize the existing scientific basis of tuna and sardine stock assessments of populations along southern California, the northwest Baja, and Gulf of California coasts in terms of fish abundance, distribution, size classes, migration patterns, fishing and aquaculture impacts.

II. Aquaculture Assessments: Assemble, analyze, and synthesize the existing locations and document site selection processes, water depths and oceanographic conditions. Document the husbandry, aquaculture production networks, management structures, food cycles, live feed and nutrition issues; disease reports, surveillance and control procedures.

III. Governance and Social Assessments: Assess current governance and regulatory frameworks, access rights, quotas and farm leases, worker conditions, labor issues, entitlements, transferability schemes, and license security issues. Conduct social science evaluations of interactions between tuna and sardine fishers and tuna farming operations.

### Assessment Study Team and Report

We have assembled an experienced group of international scientists in fisheries, aquaculture and the social sciences to conduct a “Marine Science Assessment of Tuna Aquaculture in Mexico” (MSATAM) that will conduct multi-disciplinary investigations of tuna fishing and farming in order to inform the policy, science, and government communities in Mexico and internationally. The work will be based over a 2 year period at UABC in Ensenada, with contributions from the UABC and from the Universities of Rhode Island and Connecticut.

A report will be formulated based upon findings of the assessments with an emphasis on developing more sustainable multi-trophic aquaculture ecosystems and enhancing interactions between tuna fishers and tuna farming as a direct outgrowth tuna fishing. Recommendations will be made on Best Practices and methods needed to develop successful and economical captive reproduction, feeds, and non-polluting systems for tuna farming. The report would be informed by field research, synthesizing available published and non-published reports in Spanish and English, and from results of international work groups, especially the *ad hoc* GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/ Fattening Practices (Lovatelli, 2005), reports by the World Wildlife Fund and other ocean NGOs, and World Aquaculture Society who have produced important information that needs to be considered and synthesized. The report will be an important summary of the current situation of bluefin tuna farming in Mexico, will identify problem areas, and propose solutions.

### References

- Costa-Pierce, B.A. 2002. *Ecological Aquaculture*. Blackwell Science, Oxford, UK.
- Costa-Pierce, B.A. 2003. [Use of ecosystems science in ecological aquaculture](http://www.uri.edu/cels/favs/costa-pierce.pdf). *Bull. Aquacul. Assoc. Canada* 103(2): 32-40. <http://www.uri.edu/cels/favs/costa-pierce.pdf>
- Lovatelli, A. 2005. Report of the Third Meeting of the Ad Hoc GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean. Rome, 16-18 March 2005. FAO Fisheries Report. No. 779. Rome, FAO.
- Ottolengui, F., Silvestri, C., Giordano, P., Lovatelli, A. and New, M.B. 2004. Capture-based aquaculture. The fattening of eels, groupers, tunas and yellowtails. Rome, FAO. 308p.