Sustainable Sea Urchins in Chile

A Report for the SUZC

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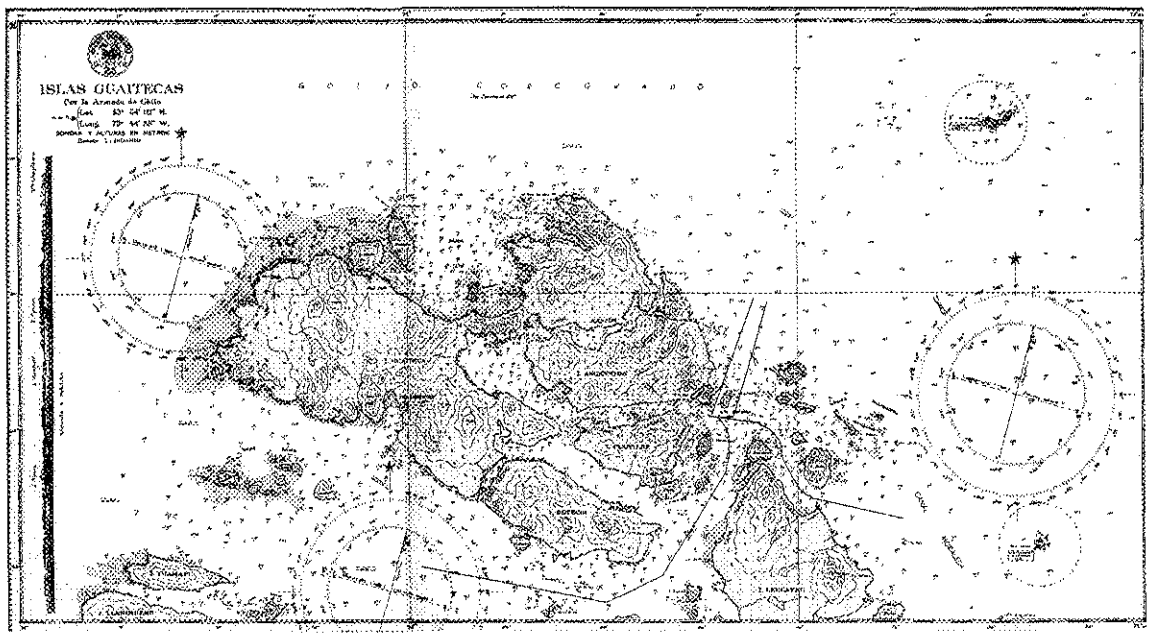
Sustainable sea urchin fisheries are rare; although many fisheries claim to be sustainable, in fact, most are not. In his paper, *Globalization, Roving Bandits, and Marine Resources,* former SUZC member Dr. Robert Steneck documents the serial depletion of sea urchin resources around the world. In 2000 Neil Andrew published a paper, *Status and Management of World Sea Urchin Fisheries,* examining the sea urchin fisheries of the world and their various management systems; he found one promising initiative, in central Chile.

In his report Andrew described the "*Caleta* System," and explained how local fishermen around a particular bay, or harbor, would form a *syndicado,* a union, that was given control over an area of the coast and fished it using a system of rotational closures. But these systems are not guaranteed. Like a lot of things that go well, the sustainability of Chile's urchin fishery is a product of fortunate circumstances, which could become firmly established or collapse quickly.

Area Management

This *Caleta* system described by Andrew in 2000 has expanded along the coast, and is called the Area Management system, in which fishermen organize collectively in *sydicados*, or unions, and are given control of Management and Exploitation Areas for Benthic Resources (MEARB's). At the time of Andrew's report there were roughly 185 MEARB's in operation, by 2007 the number had reached 454, with almost a thousand more in the pipeline.

Most of the MEA's have been established in central and northern Chile. In the southern regions, X and IX, which include the island ports of Quellon and Melinka, the centers of Chile's sea urchin fishery, the number of MEA's is rapidly expanding.



Melinka:

In Melinka, the only permanent settlement in the Guaitecas Archipelago, six fishermen's syndicates hold fishing rights to management and exploitation areas in Bahia Low, a large bay on the northern shore of Isla Guaitecas. The rest of the area around the archipelago is an exclusive zone, reserved for the Islanders.

But the mix of management areas and open access areas caused friction even on this small scale and according to Juan Carlos Vargas, president of one of the syndicates; efforts were in progress to turn the entire exclusive zone into one management area, controlled jointly by the six syndicates.

I met Juan Carlos Vargas in the office of Ariel Vicencio, a student of Juan Carlos Castilla. Ariel's job was to assist fishermen in forming syndicates and applying for TURFs (traditional user rights for fisheries), the new acronym for management areas. Wherever things were working well the influence of either Juan Carlos Castilla or Carlos Moreno was present. Both are academics preaching the gospel of ecological economics: the balance of social, environmental and economic concerns.

"*First we solved the people problems,*" said Juan Carlos Castilla. "*Then we solved the fisheries problem.*"

The factor that enables management areas to work is fishermen buy in, literally and figuratively. The syndicates have to pay for the stock

assessments, which occur any where from twice a year to every two years. That gives individual fishermen a sense of ownership, not only of the resource, but the science. Fishermen trust the science, there is much energy saved for more important questions of how best to utilize the resources. The syndicates deal with buyers as a group, in no hurry to harvest, when prices are high, they harvest often as a group, and pay a certain percentage to the syndicate, which then distributes the money as dividends to inactive divers.

According to Castilla, fishermen have learned to work together because it is part of their history going back to the 1909. "I myself am not a communist," said Castilla. "But back in the 1920s a communist named Luis Recabarren organized workers all over Chile, including the fishermen, and that spirit of collective action has endured." Recabarren did most of his work between 1909 and 1912.[1]

For those with the most to lose the TURFs offer a safeguard against mobile harvest from depleted areas. Much as we see in the efforts of the Cobscook Bay fishermen, TURF holders want to exclude other fishermen and manage their fishery separately.

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[1] Interestingly, Maine lobstermen also organized in the early 1900s, forming the Lobster Fishermen's International Protective Association in 1907, under the vehemently non-socialist AFL. The union made inroads all along the coast and into Canada, but died out in 1912. Nonetheless, the organization provided the structure for implementing the conservation regulations that have made this fishery famous as a model for sustainability.

Open Access

While divers are registered and the registry is technically closed,[2] most of Chile is still open access to registered divers, and enforcement being what it is, anyone with a legitimate excuse for not being registered. In 2001, fishermen from Region XI, the most productive urchin zone, sought to exclude divers from Quellon, Chiloé, in Region X, but the Quellon divers had a long history of diving in the outer island of Region XI, the Chonos Archipelago. Initially a judge sided with the Region XI fishermen and barred Quellon divers from their tradition areas. But Melinka, and other communities in region IX are supplied by ferries that leave from Quellon, and when fishermen in that port blockaded the ferries, it brought the Region XI fishermen to the negotiating table. In a novel experiment the Chilean Sub-secretary of Fisheries (SubPesca) turned over control of the region to a newly established Council for the management of Benthic Fisheries (ComPeB), comprised of members of syndicates, open access area divers, processors, scientists and other stakeholders. ComPeB established a special "contiguous zone," that permitted Quellon fishermen to harvest urchins among the outer islands of Region XI up to about 150 miles south of Quellon.

The council also took on the role of overseeing research and establishing quotas, in monthly meeting of the technical advisory group,

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[2] Technically closed but if a diver who has a history in the fishery but lacks the capacity to take the registration test, wants to learn to read and write enough to take the test they can still get in.

similar to the SUCZ, and semi-annual meetings of the entire council, they hash out, **on a consensus basis**, a management system that works for the resource, the communities and the industry.

Operating on a consensus basis, it becomes difficult for a group of powerful player with a common interest to highjack the process. In May 2007, at a meeting to establish the quota for the season a rare event took place, scientists recommended a quota of 18000 tons, processors argued for more but fishermen argued for less. After a day of heated debated without consensus, the council put the issue to a vote, and the fishermen won. The quota was cut.

Fishermen had learned through the Area Management regime that they could control the price, to a certain extent, by controlling production, and protect their resource at the same time.

Institutional Problems

Stories are the social glue of the various sectors in any fishery and the Chilean sea urchin fishery is no different. For those who prefer to work outside the TURF system, the syndicates are portrayed as a mafia controlled by money hungry presidents, for others they are seen as the saviors of the communities and resources.

According to those on the periphery both stories are right, syndicates and management areas, TURFs, work well in some places and

not in others, they work well in Melinka for instance but further up the coast there are instances of fishermen depleting their TURFs and then raiding others.

According to Castilla it boils down to the "leadership factor," if syndicate leaders are sober, and wise, then things go well: resources grow, prices paid go up and communities thrive. If the local leadership is comprised of drunks hanging on to ignorance, then the results are disastrous.

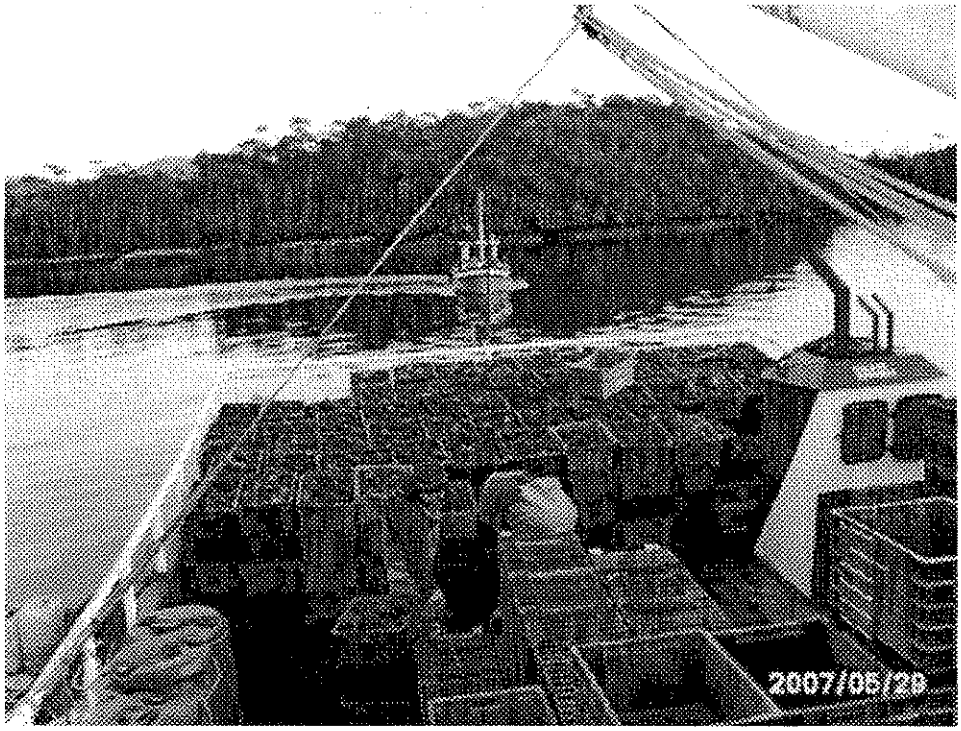
While enforcement can be strong within some unions, with fishermen who break the rules being barred from fishing for a certain number of days, but the unions rely on the government for protection from outside depredations, and according to Juan Carlos Molinet, the chairman of ComPeB, enforcement is poor.

The solution is to improve the workings of the unions. Among other things people like Ariel Vincencio are stationed in Melinka to help raise the consciousness of the local leaders. Vincencio, works for the University of Chile and is steeped in ecological economics—he educated me, and I have written at length on the subject. He, in a sense, helps people get the story straight, and this is a continuation of Recabarren's mission, to educate people.

The Basic Fishery

The dominant players in the fishery are the owners of the *lanchas de acarreo*, carrier vessels, and the small boat operators who work for them in the remote areas of the south. The *acarreodors* are 60 to 80-foot boats that guide *faenas*, fleets of a dozen or more small boats, to harvesting areas in the unpopulated archipelagos at around 45S degrees latitude. The divers and crew of a *faena* live aboard their boats for months at a time, and harvest the surrounding area. The divers use "hookas"—compressors and hoses—and harvest about 1000 pounds a day in 3 to 5 hours. The *acarreodors* make the 100-mile trip from Quellon to the *faenas* almost daily, bringing supplies and carrying back as many as 50,000 pounds of sea urchins.

Acarreodor with *faena*



Dive boat approaching the *acarreodor.*

Amazingly, harvests in Region IX have been consistent at around 40 million pounds for the last 20 years but several factors contribute to this, one is what Carlos Moreno calls hyper stability, catches remain constant while average size decreases.[3]

Another factor has been a steep reduction in effort due to the shift of divers from the urchin fishery into the salmon aquaculture industry.

Regulations: Chile regulates the sea urchin fishery in open areas through closed season and size restrictions. The legal minimum size for

[3] With the exception of 2006, which saw a surprising increase in average size.

urchins is 60mm, and the season lasts from March 15 to October 15—the equivalent of September 15 to April 15 in the Northern Hemisphere.

Studies have identified an informal rotation scheme followed by the *faenas,* and this is tradition is being formalized through ComPeb, much as the Maine DMR formalized the traditional lobster season on Monhegan Island.

Enforcement

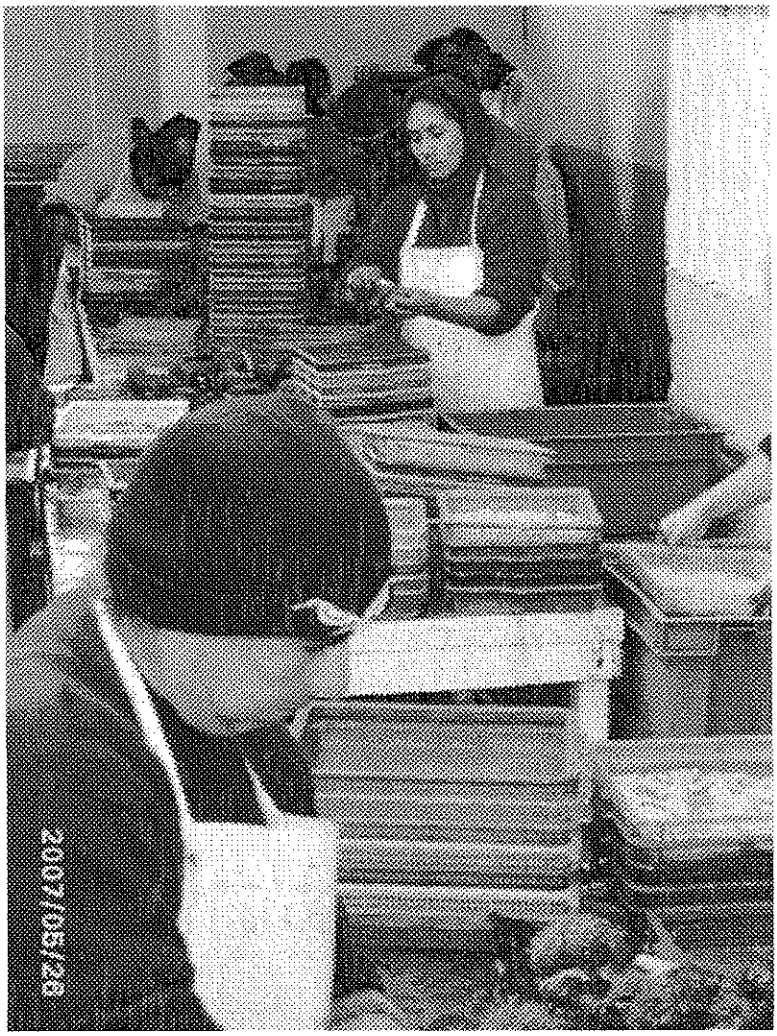
All *acarreodors* must call at Melinka, where inspectors from the national fisheries service, SERNAPESCA, measure samples of the catch, check the captain's log noting the quantity and location of the harvest.

SERNAPESCA inspector at Melinka.

The captain must also report to a private organization called Pupelde, which collects data for the government and ComPeB. No urchins can be sold without a ticket from Pupelde, citing the name of the diver who harvested the urchins, the weight of the day's landings, the depth from which they came, and how much bottom time the harvesting took.

Processing/Markets

Urchin divers supply two markets: the export market to Japan, and the domestic market. Export urchins are processed locally in Quellon, where buyers pay around 240 pesos per kilo (24 cents/pound, divers in the *faenas* receive about 17 cents/pound) at the dock, buying from *acarreodores* in the morning and local divers in the late afternoon. The urchins are trucked to local processors, and buyers may make several trips a day between the wharf and the processor. Local processors extract the roe, pack it in 1-liter containers and ship it on for final processing, freezing, and export.



Processing plant near Quellon, Chiloé, Chile.

Urchin roe ready for shipping.

Divers supplying the local market work as deep as 25 fathoms, and receive around $1/pound for top quality urchins, but fatalities and diving related sicknesses are reportedly much higher among them. Urchins are sold in local fish markets. Folks eat them raw and cooked.

"Fat Sea Urchins 3 for $2.00" for sale in the market at Valdivia, Chile

Assessment

In 2001 the government abandoned standard stock assessments in favor of using "indicators" to gauge the condition of the resource. Indicators range from standard measures such as CPUE, to the sales of dive equipment, and levels of contention among harvesting sectors, and within sectors on the borders of the various regions. Among other things increasing sales of equipment and a lack of contention tend to indicate a healthy resource, and vice versa.

Latent effort, and ecological damage caused by salmon farms.

Most of the net pens where Chileans grows 240, million pounds of salmon a year, are located in Region X and Region XI, in the midst of the best urchin areas. While the salmon farms siphon off effort in the urchin industry, divers can make better money working on salmon pens than they can harvesting urchins, pollution from the farms, in the forms of chemical and nutrient loading, is believed by some to threaten the health of the urchins, and one *syndicado* president, Victor Ruiz, spends his spare time researching the increase of red tides in Region IX.

At the same time a dramatic shift in the salmon industry, such as a disease outbreak or automation, could put hundreds of divers out of work and many would end up back in the *faenas*. ComPeB has no plan to deal with a large influx of divers[4], but the group is devising an overall strategy aimed at sustainable harvesting.

Calling the urchin fishery in Chile truly sustainable is a stretch, much of what makes it sustainable is poorly understood, and may rely on tenuous circumstances. But they seem to have been given a reprieve, and through the use of ecological economics models, are developing

[4] At the time of my visit Chile's salmon industry had largely escaped serious problems, but in August 2007 an outbreak of Infectious Salmon Anemia (ISA), the disease that wiped out Maine's salmon industry in 2000/2001, began spreading around the island of Chiloé. In addition an increasing sea lice problem and import alerts due to the increasing level of chemical residue in Chilean farmed salmon could lead to a shrinking industry and an increase in divers shifting beck to sea urchins.

fisheries regulations aimed at balancing social, environmental and economic interests.