

## **Magdalena Bay, B.C.S.**

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Jutting out prominently from the Pacific peninsula of Baja California Sur in Mexico is the magnificent Magdalena Bay. Because of its unparalleled beauty and biodiversity, as well as the peculiar oceanic conditions unique to this oceanic region, it is ranked by the World Wildlife Fund as one of the nine most important coastal habitats needing protection in all of Mexico. And if there were ever a time to be talking about protecting this area it is now, because there are myriad environmental pressures and commercial fisheries management issues that urgently need to be addressed if this jewel of the eastern Pacific is to remain bountiful and diverse for future generations of humans to enjoy.



Satellite photo, looking northwest over the central part of Magdalena Bay. Shown is the central part of the open southern bay, including San Carlos, Isla Margarita, and the beginnings of the 70-mile mangrove system running north (right). This photo shows about 75 miles of the 140-mile long bay. (photo: NASA)

### ***Oceanographic Conditions and Biodiversity of Magdalena Bay***

Magdalena Bay is located at the meeting point for the two most influential currents of the Eastern Pacific: the cooler California current system from the north—an extension of the Alaska current—and the warmer, more tropical South American current from the southern Pacific. This confluence creates water temperature fluctuations unique to the region, and this temperature variation is thought to be the primary contributor to the astonishing biodiversity of the region, which has been identified in the past as one of the richest, if not the richest, estuarial waters in the world.

What can be found here is startling in its variety: squid, crab, shrimp, snook, sea bass and other corvina, grouper, yellowtail, yellowfin, skipjack, sardines, mackerel, and other minor pelagics, flounder, halibut, many species of birds, scallops, turtles, different species of sharks, rays, and of course, the gray, humpback and occasional blue whales, attracting thousands of whale watchers to Magdalena Bay every winter.

Because Magdalena Bay is located at this vortex of north/south water movement, conditions are created offshore for huge upwellings of nutrients from the benthic - or bottom—regions of the sea, causing explosions of phytoplankton, in particular the pelagic red crab, *Pleuroncodes Planipes*. It has been demonstrated in studies that many pelagic organisms, like yellowfin and skipjack tuna, marlin, and whales, as well as whale sharks and rays, are drawn from far away and preferentially congregate here because of the abundance of this planktonic creature.



Pelagic red crab (*Pleuroncodes Planipes*) upwelling, (photo: Phillip Colla, [www.oceanlight.com](http://www.oceanlight.com))

Because the pelagic red crab can exist in water temperatures ranging from 9-28 degrees Celsius, they are at home here in the fluctuating water temperatures found around Magdalena Bay. They have been known to drift as far north as Vancouver and as far south as Peru with the currents at work in the region. This vast span of habitat gives one an idea of the kind of influence this region of the ocean has on the entire eastern Pacific coastline, and why it is in everyone's best interests to

work together in identifying the host of problems currently facing the region.

### *Commercial Exploitation and the Human Effect*

The different problems currently pressuring this region are, without meaning to sound



The cash crop of Magdalena Bay, the Monterey sardine. (photo: Bain Smith)

poetic, legion, and we will begin by discussing the paramount issue to the continued biological health of the bay: **the sardine**. Magdalena Bay is considered by many to be the main breeding ground and nursery for much of the sardine population on the west coast of North America, because it's the one place that continually holds sardines year round in the Pacific. The total catch for Magdalena Bay was

328,986 metric tons for the years 1990 to 2003. 70% of the sardine catch here is the highly desirable – for human consumption- Monterey sardines.

ASUNTO: CAPTURA DE SARDINA POR VARIEDAD CORRESPONDIENTE A LOS AÑOS 1990 AL 2003.

AÑO:	CRINUDA:	MACARELA:	MONTERREY:	JAPONESA:	BOCONA:	OTROS:	TOTALES:
1990	2,735,591	0	6,565,420	0	1,641,355	0	10,942,366
1991	1,975,352	0	4,938,382	0	1,975,352	987,676	9,876,762
1992	7,047,264	0	2,806,714	0	5,337,335	0	15,191,313
1993	6,750,369	0	5,356,815	0	523,560	455,445	13,086,189
1994	463,960	48,365	23,847,313	0	157,805	60,200	24,577,643
1995	1,245,715	230,695	22,466,045	0	316,230	0	24,258,685
1996	1,870,475	2,647,750	18,008,588	138,510	187,500	194,025	23,046,848
1997	4,732,830	4,627,417	10,535,839	40,150	4,326,330	0	24,262,566
1998	8,820,079	2,714,400	1,434,090	343,500	3,690,030	235,050	17,237,149
1999	6,064,837	1,014,961	8,102,261	87,090	2,194,627	626,340	18,090,116
2000	1,371,500	398,580	32,494,790	0	1,812,769	92,160	36,169,799
2001	2,417,755	242,170	30,874,448	0	2,204,990	177,480	35,916,843
2002	2,179,985	3,384,656	33,705,804	251,490	1,084,620	307,450	40,914,005
2003	2,782,220	44,600	31,435,006	221,920	931,900	0	35,415,646
<b>Total:</b>	<b>50,457,932</b>	<b>15,353,594</b>	<b>232,571,515</b>	<b>1,082,660</b>	<b>26,384,403</b>	<b>3,135,826</b>	<b>328,985,930</b>

As Sea Watch observed recently in visiting the two sardine processing plants on Magdalena Bay, the only government regulation that currently applies to the sardine industry is a 15 cm minimum length<sup>1</sup>. The sardines being caught in and around the bay are shrinking in size and many are under the 15 cm limit. A one-pound oval tin produced for human consumption, just two years ago, used to hold 7-9 sardines. Now, this year the same can holds 14-15 sardines per can.



Mag Bay sardines are getting smaller (photo Bain Smith)



Oval cans now hold 14 to 15 sardines up from 7-9 just a year ago

<sup>1</sup>

Medidas de manejo: NOM-003-PESC-1993 (D.O.F. 31/12/93). Establece, entre otros, tallas mínimas de captura para sardina Monterrey (150 mm de longitud patrón LP), crinuda (160 mm LP), anchoveta (100 mm LP). Se limita el ingreso a la pesquería al norte del paralelo 20° N.

**Sardine Reduction**, or burning, is where 70% of the total sardine catches go, including



This 60 ton burner has been replaced with a 1000 ton burner at the Calmex plant. The 60 ton burner has been sold to the Moon plant, creating the capacity to burn 1060 tons per day of sardines for low quality fish meal.

the desirable Monterey sardine. The reduction process—an outdated, 100 year old method of creating fishmeal—is an incredibly wasteful process that eliminates most of the sardine’s nutrients and creates as a by-product a lot of solid organic waste, as well as the putrid stench wafting from the plant every afternoon, impossible to ignore in and around the town of Puerto San Carlos.

Also impossible to ignore is the superior profitability of

this part of the industry, as it requires a fraction of the employees that the canning process requires in order to remain profitable. The fishmeal created by reduction is in increasingly higher demand from the chicken and pig industries, spurring a recent addition in capacity from 100 to 1000 tons/day. These industries rely on the fishmeal for protein, as does the burgeoning aquaculture industry, which prizes the sardine fishmeal for notoriously picky eaters like salmon and tuna. This new, added pressure on the sardines from aquaculture, exacerbated by the recent sardine permits issued to Mitsubishi for its tuna ranchers to take an additional 200 tons of sardines a day from Magdalena Bay has caused paroxysms of concern from the community, the industry, and environmental organizations about the long-term sustainability of the sardine fishing practices in Magdalena Bay. **Something needs to be done in terms of enforcing existing regulations and creating a monitoring system of sardine size and biomass.** Otherwise, be assured that as the other fisheries continue to be depleted, there will be over fishing of sardines in Magdalena Bay.



The labor intensive sardine canning process. (photo: Bain Smith)

Not mentioned yet in this discussion of the sardine industry is the well-documented pollution created by the disposal of organic materials being dumped in the bay by the sardine canning and reduction processes. Even though the massive tide movements into and out of the bay breathe sea water into the bay every day, **this addition of organic matter needs to be monitored.**

### *The Human Effect*

One would assume that the town of Puerto San Carlos, where the two main sardine canneries are located, received a substantial benefit from this

industry's existence and profitability. However, to visit the town, located at the end of a long, narrow peninsula, one would never know it, based on the extreme poverty, unregulated human growth, lack of municipal infrastructure, open sewage pits throughout the town, and high levels of untreated human pollution (fecal colliform levels are nine times the safety standard in the bay) seen in the water. And because there is little in the way of employment outside the sardine industry, the large numbers of unemployed locals here turn to drugs, and one can not avoid witnessing this cultural detritus daily in the streets.



Open sewage pit in the town of Puerto San Carlos. (photo: Bain Smith)



money and infrastructure, unregulated growth and growing dependency on drugs gives the town little chance to develop what could have been a booming tourist industry. **The now depleted estuarial waters of Magdalena Bay were some of the best snook, corvina and green grouper fishing in the world 25 years ago.**

The town of San Carlos has grown rapidly with poor people looking to eke out a subsistence living from Magdalena Bay. The lack of regulations and enforcement in the Sea has caused a tremendous strain on this fragile marine environment. The lack of



Tar paper houses with no sanitary facilities or water are springing up all around the estuaries.



***Panga Gillnetting and the Fragility of the Bay's Habitat***

Magdalena Bay wetlands are coastal wetlands.



Many !00s if not 1000s of gillnets choke all the estuarial back waters of Magdalena bay. Almost everything is gone.

While most coastal wetlands are brackish (a mix of salt water and fresh water), the water found in the shallow bays and mangrove channels of Magdalena Bay is hypersaline (more salty than ocean water). Hypersalinity occurs, in part, because there is minimal fresh water input to the bay from the bordering Magdalena Bay area causes the water to evaporate at a high rate, thus leaving behind water with salinity higher than that of the ocean. As a result, the plants and animals living in Magdalena Bay must not only be adapted to the common coastal wetland conditions, but also to the intense heat and high concentrations of salt present in a hypersaline wetland.



Magdalena Bay's estuaries were home to many commercially valuable species of animals, and were once reputed to have been some of the best snook and white sea bass (corvina) fishing in the world. Because so many who have moved to Magdalena Bay are not employed by the sardine industry, they make their living the only way they know how, by using the bounty of the bay for their livelihoods. Unfortunately, the two main fishing practices here, subsistence gillnetting and shrimp trawling, are incredibly destructive to the fragile ecology here.

We joined the panga boat gillnetters as they motored up into the Magdalena Bay estuaries and mangrove forests, a practice repeated daily by the hundreds, to catch corvina, flounder and other commercially viable fish species with monofilament gillnets. On the trip that Sea Watch took with two subsistence gillnetters, the 500 foot gillnet was thrown into a small estuarial opening and gathered 30 minutes later. What they

**This net, like many that day, yielded not a single fish. (photo: Bain Smith)**



**Days catch of small fish including baby shark on top (Mike McCaffigan)**

produced for this effort was 4 fish, only one of which was commercially viable, a solitary small corvina, or sea bass. The two fishermen told us they would repeat the process 5-6 more times that afternoon to make the trip worth it to them for a day's work. What was most shocking was the scarcity of fish they caught. The estuaries appeared to be bereft of fish, acutely troubling because these mangrove estuaries act as nurseries, providing the perfect habitat to feed and protect immature fish and shellfish as they mature. As they become less vulnerable to predation, they will move out into the bay and continue to grow, but much of this pattern has been choked off by the hundreds of pangas fishing the estuaries daily.



Subsistence panga fishermen with gillnet, applying their craft.  
(frame grab: Armando Figaredo)

### *Bay Shrimp Trawling*



Deploying the shrimp trawling net "chongo". (photo: Bain Smith)

Days catch is often only a few fish - ½ milk crate full was typical during out time there.

The final chapter of Sea Watch's journey to Magdalena Bay took us on a shrimp trawling expedition. This is a nightly ritual for many subsistence fishermen living in and around the bay, who, with or without the sanctioned permits allowing them to fish, take off at sunset as one of 300-500 panga boats that trawl the bay for shrimp by night.

We jetted across the bay and stopped near Punta Belcher on Isla Margarita.



For every “lanza”, 3 kilos of shrimp, 30 kilos of unintended, dead by catch (frame grab: Mike McGettigan)

**At the end of the night a boat has killed 300 lbs of juvenile fish to get 30 lbs of shrimp that are sold for \$140.00. It has used 135-150 liters of fuel, 7 liters of oil, costing about \$105.00. The income for the nights work for two people is approximately \$35.00.**

While “chongo” trawl nets are officially proscribed as an illegal practice in Magdalena Bay - so instead, they call the “chongos”, “Mag. Bay Specials” - we were soon making a “lanza”, or throw, of the trawling equipment into the bay to a depth of 100 feet, and we circled slowly around the area for an hour, scraping and shaking hundreds of square meters of ocean floor for shrimp, which, not lost on the fishermen, has unseated tuna this year as America’s most popular seafood. After an hour’s trawling, the net and “bolsa”-where all the catch falls into-were brought up and dumped inside the boat. What we witnessed was nothing short of slaughter. For 3 kilos of the shrimp these fishermen desire, there was an additional 30 kilos of “by catch”, or unintended catch, almost all juvenile groupers, baby flounders and other smaller fish and shellfish, all dead. When we did the math and realized that these guys would repeat the process 4-6 times that night, and multiplied it by the 300-500 boats out that night, one didn’t need to be a scientist to realize that there were 45-60 tons of bottom fish killed nightly in the bay by the “illegal practice?” of bay shrimp trawling.