

# A CASE STUDY OF MANAGEMENT EFFECTIVENESS OF A MEXICAN MPA PILOT SITE: THE UPPER GULF OF CALIFORNIA AND COLORADO RIVER DELTA BIOSPHERE RESERVE



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**Alto Golfo de California y delta del Río Colorado**

**CONANP/SEMARNAT**

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**Director**

**Región Noroeste**

**Pronatura, A.C.**

# BACKGROUND

The Reserve was proposed as part of the CCA MPA Network

Proposed to be a Pilot projects in the MPA Management Effectiveness Initiative in 2000

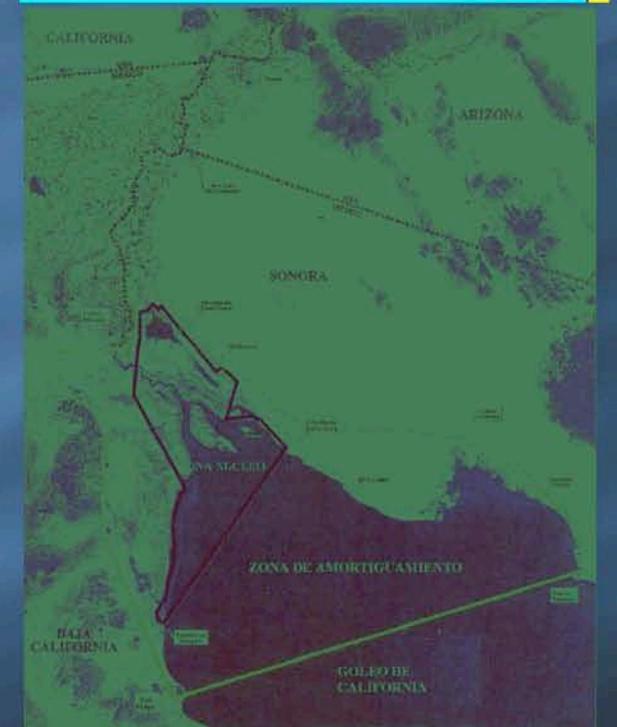
Participated in Hawaii training Workshop to review and test the MPA Guidebook in 2002

Participated in field-tasting of selected guidebook indicators (Nov.2002-March 2003) with support from WWF Gulf of California Program



## MPA SITE DESCRIPTION

- Dedicated in June 1993 by President Salinas
- Located in two Mexican coastal states (Baja California and Sonora) at the northern Upper Gulf and tidal zone of the Colorado River watershed
- One of Mexico's largest coastal-marine protected area (+900,000 ha)-70% marine-deltaic habitat
- Several endangered and sensitive species occurs in the Reserve
- Very low population density within the Reserve boundary but high outside visitation and influence
- Extreme and dynamic climatic and ocean conditions
- Economic activities mainly related to commercial commercial fishing followed by services (mainly tourism) and limited aquaculture, livestocking, mining and agriculture.



# MPA GOALS AND OBJECTIVES

**1B. To protect marine and coastal biodiversity**

**2B. To conserve and protect fisheries**

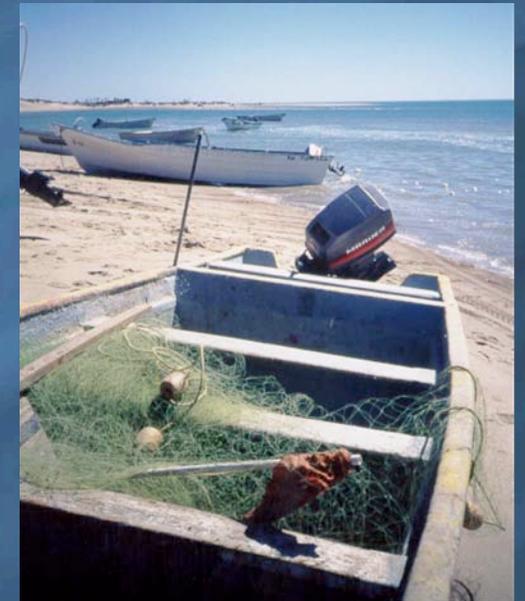
**3 B. Restore ecosystem function of key habitat  
(Colorado river delta)**

**1 S. To maintain the sustainable use of natural  
resources (marine and costal) by  
resident and visitors**

**2 S. To enhance the quality of life of Reserve  
communities**

**1 G. To ensure protection and management of  
natural resources and biodiversity**

**2 G. To promote and consolidate local  
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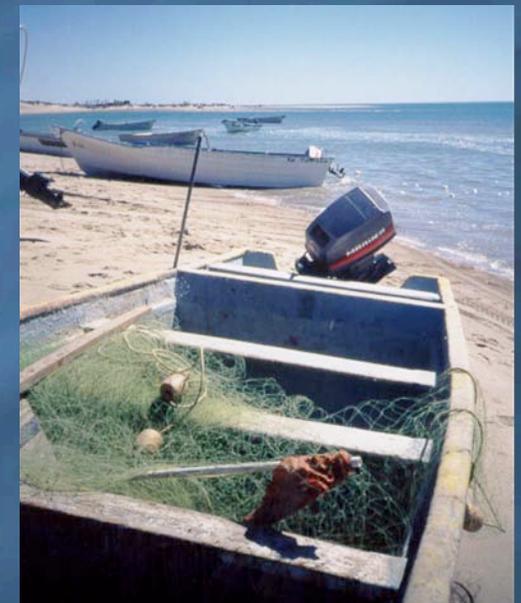
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# **METHODOLOGY: INDICATORS SELECTION AND DATA COLLECTION**

**Natural and social Indicators were selected previous and during the 2002 training workshop. In order to develop the field test the working team selected at least two indicators from each type:**

**3 Biophysical indicators**

**4 Socio-economic indicators**

**2 Governance indicators**

**Data collection was done from 12/02-04/03 using existing information (literature review, past/current projects or reports), several visits to communities and official MP public consultation process**



# BIOPHYSICAL INDICATORS

1, 2.- Key focal species abundance



Endangered species:

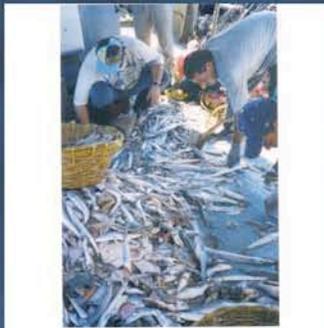
Totoaba (*Totoaba macdonaldi*)  
Vaquita (*Phocoena sinus*)

Commercial species:

Blue shrimp (*Litopenaeus stylirostris*)  
Gulf curvina (*Cynoscion othonopterus*)

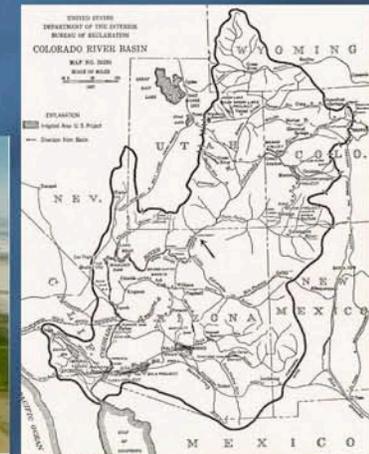


# BIOPHYSICAL INDICATORS



**10.- Community composition and structure**  
**Area reduced from human impact**  
**(seafloor trawling)**

**7.- Water quality**  
**Restoration of Colorado delta**  
**ecosystem functions**



# SOCIO-ECONOMIC INDICATORS

**3.- Household occupancy structure  
Alternatives activities beside fishing**



**4.- Local use patterns  
Improve and promote other  
fishing gear or markets**

**5.- Improve local participation**



**11.- Increase quality of life in communities**

# GOVERNANCE INDICATORS

## 1.- Management plan in review and consultation process

- Clear rules
- Surveillance and enforcing
- Improve capacity



## 5.- Improve participation and knowledge of MPA Advisory board

## THE RESULTS

The Totoaba is an endemic species to the Gulf of California that supported one of the most important finfish fishery in the region and its listed as endangered species in México and USA. The commercial fishery was permanently close since 1975. There are incidental catch of juveniles and adults in shrimp, curvina and shark fisheries and also in recreational fishery

This indicator requires moderate effort to measure due to existing regulations (closed fishery of adults) but juveniles and subadults can be monitor at low cost during trawling and recreational fishing operations.



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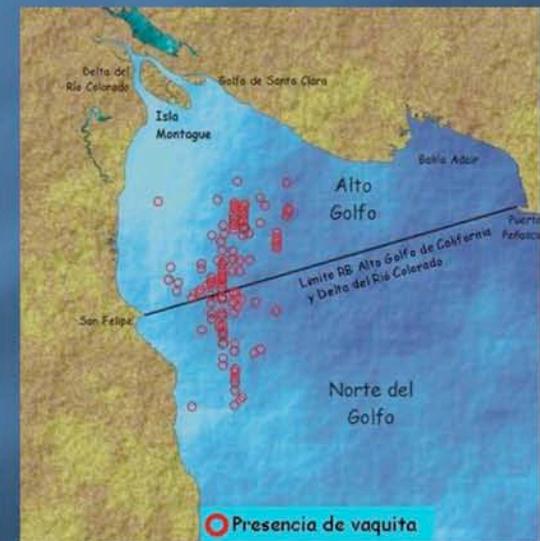
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## The vaquita or GC harbor porpoise

The vaquita is one of the most endangered species in the world with the smallest range and a population of ca. 600 indiv. Its current range is well known and a monitoring program is underway

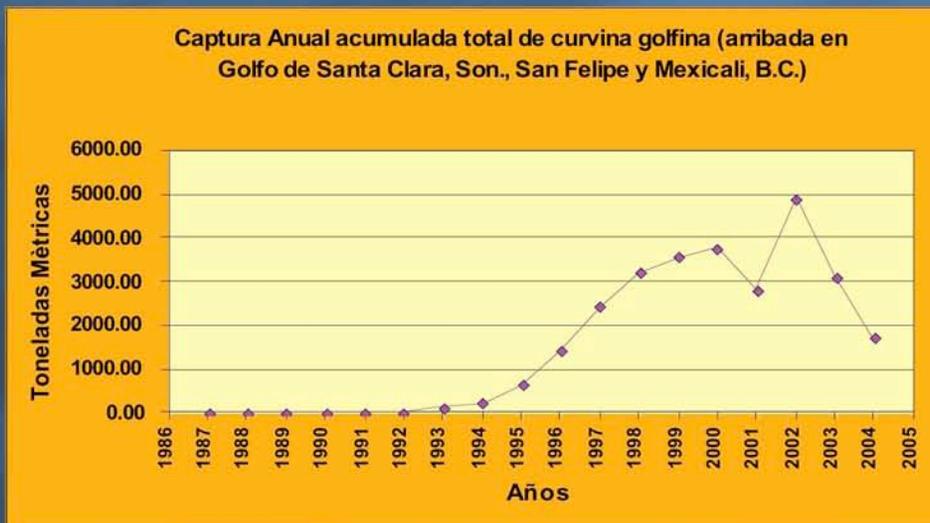
Is an indicator fairly easy to measure due to existing baseline data, sampling coast low, requires minimum number of specialists but high level of training. The methods to monitor and estimate abundance are being now evaluated, specially those that use porpoise sound detection



## Gulf curvina

The Gulf curvina is a marine fish species apparently restricted to the Gulf of California that supports the most important finfish fishery in the Reserve. The commercial fishery started in 1994 and its harvest during its spring migration for spawning and nursing at Core Zone. There are incidental catch of juveniles in shrimp fishery and also in recreational fishery

This indicator requires moderate effort to measure and allow to estimate reproductive stock abundance or population stability during just a short period (reproductive season) but juveniles and subadults can be monitor at low cost during trawling and recreational fishing operations. There is a good abundance and population records due to existing monitoring program



## The Blue shrimp

The blue shrimp is the most important commercial species in the Gulf of California and the Reserve. Started in the 40's with large boats and now there are two fleet. Its is also one of the most regulated fishery with temporal close season, limited effort zoning and fishing gear regulations. There are a sufficient baseline data due to permanent monitoring surveys and landings records at the three Reserve's fishing communities

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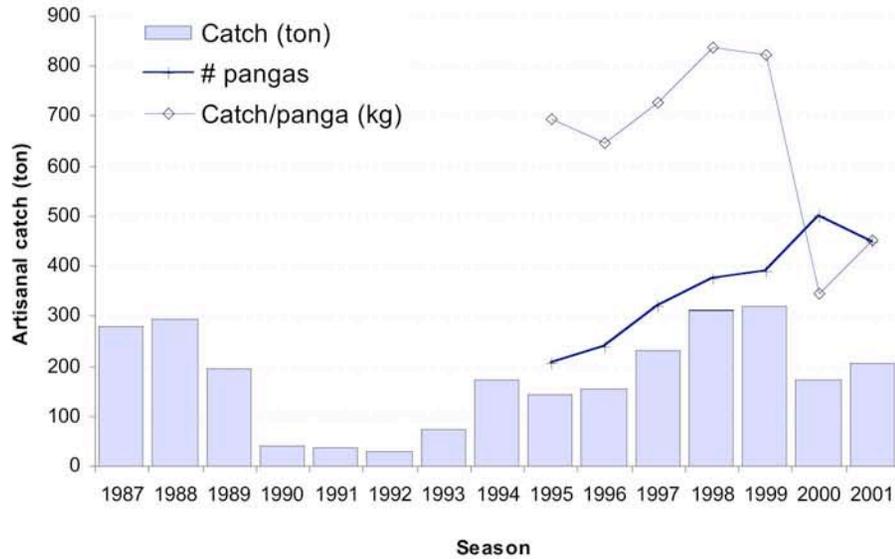
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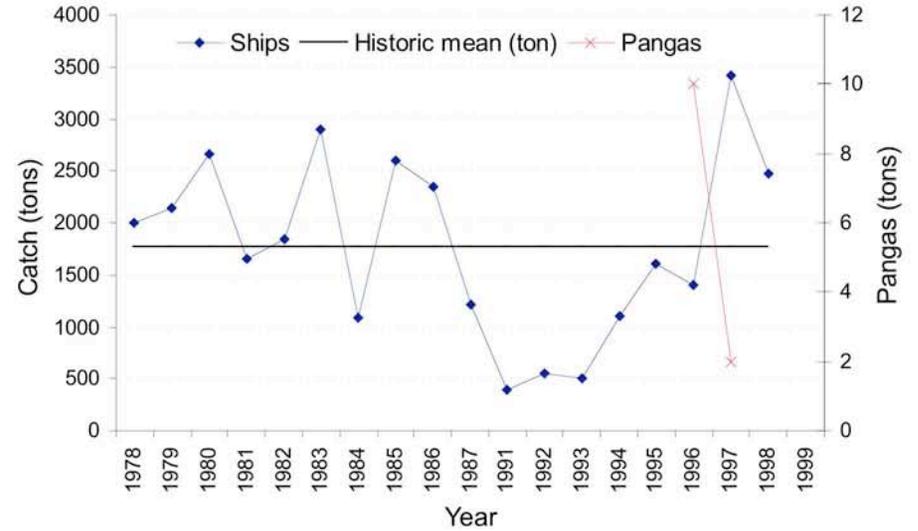


# Shrimp landings

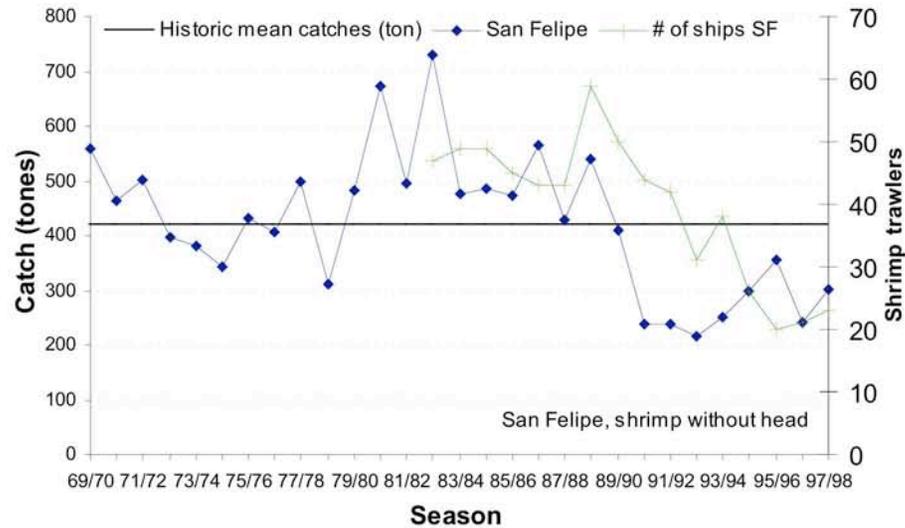
## Golfo de Santa Clara



## Puerto Peñasco



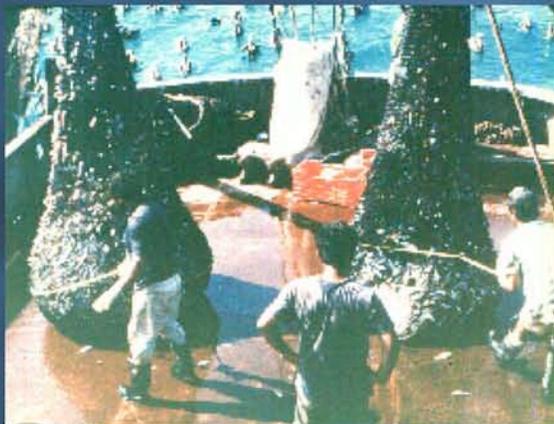
## San Felipe



## Community composition and structure Area reduced from human impact (seafloor trawling)

The blue shrimp fishery by industrial fleet (trawling) generate a large amount of by-catch that have produced changes in diversity and stability in benthic-demersal communities in the Reserve. There is baseline data of these changes and plans to develop surveys to monitor with observers the authorized fleet that is conditioned to use by-catch excluders, smaller nets and other environmental limitations.

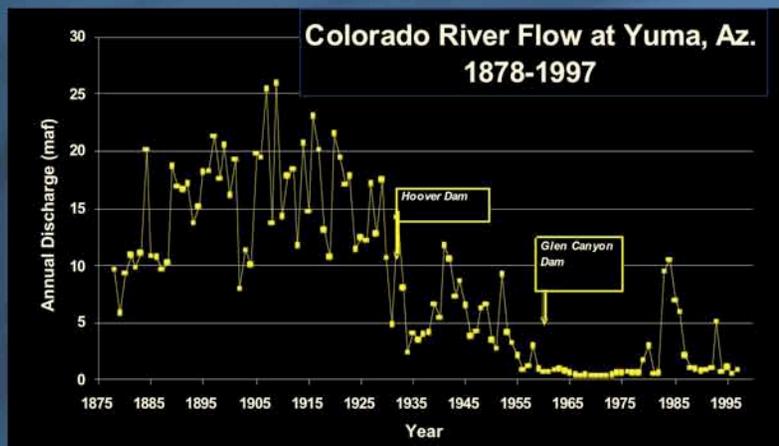
This indicator requires moderate effort to measure due to existing regulations and specific permits (# boats) to operate in known time and space (specific trawling zones).



## Water quality. Restoration of delta ecosystem functions

The Colorado River watershed is one of the most regulated in the world. Its delta is probably the most impacted. There is now evidence of ecological changes in water quality and ecosystem functions in wetlands and adjacent marine area. There is baseline data of these changes and surveys to monitor responses of ecosystem to pulse flows of the river and other water sources (agriculture, municipal or ground water)

This indicator requires moderate effort to measure. Aspect too complex to try and to control it due to many influence sources: There are several projects that are generating data on responses of populations and habitats to river pulse flows that can be monitor



## SOCIO-ECONOMIC INDICATORS

The socio-economic structure of the Reserve's fishing communities includes a dominant fishing sector in one community and divided fishing and services (related to tourism) in the 2 other. Emerging activities beside fishing include beach tourism, aquaculture, recreational fishing, ecotourism and mining. Local participation and quality of life in communities relates to the size of the population and capacity to attend by managers and other institutions.

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## GOVERNANCE INDICATORS

The Reserve has the first Management plan official in México (1995) but recent changes in legislation forced to review and updated it. During 2003 this review and public consultation took place. The proposed Plan includes changes in zoning, specific fishing gear regulations, a special protection zone for vaquita among others. The public consultation promoted important reactions in communities, local groups and NGO's, that generated nationwide debate, increasing coordination of environmental and fishing authorities and important changes in legislation

The two indicators are fairly easy to measure, specially the one that relates to the Management plan. The proposed plan contains clear rules, increase the surveillance and enforcement effort and strength capacity for monitoring, funding and local participation, specially in the Reserve Advisory Council



## CONCLUSIONS

From the 10 indicators selected and tested, the majority (9) proved to be useful to measure the MPA management effectiveness.

The biophysical indicators with less limitations included the vaquita and shrimp and with high limitations the totoaba and curvina

All Socioeconomic and Governance indicators selected have more relevant strengths rather than limitations due to the accessibility of data

The results of this case study contributed to:

Review of Reserve MP

Develop and implement a Reserve Monitoring and Management effectiveness Program

Share results with Monitoring Department of CONANP

Integration of Annual Operation Program

Increase capacity of staff and funding opportunities