

Location and Track System for Andalusian Fishing Vessels (SLSEPA)



Junta de Andalucía
 Consejería de Agricultura y Pesca
 Dirección General de Pesca y Acuicultura



SLSEPA CURRENT SITUATION

Nº	"GREEN BOX"	Legislation
85	ARTESANAL FLEET (P. bogaraveo)	Resolución de 30 de diciembre de 2002, de la Dirección General de Pesca y Acuicultura, por la que se aprueba el plan de recuperación para el voraz (Pagellus bogaraveo) en el litoral andaluz y ordenación de la flota andaluza que opera con el arte de vorace
96	GOLFO CÁDIZ HIDRAULIC DREDGE (DRAGA HIDRÁULICA)	Orden de 6 de octubre de 2005, por la que se regula la pesca de la chiría (Chamelea gallina), en el Golfo de Cádiz
121	GOLFO DE CÁDIZ ARTESANAL FLEET (Fish Reserve Guadalquivir River mouth)	Orden de 6 de julio de 2010, por la que se modifica la del 16 de junio de 2004, por la que se declara una Reserva de Pesca en la desembocadura del río Guadalquivir
317	GOLFO DE CÁDIZ ARTESANAL FLEET (REST)	
28	GOLFO CÁDIZ HYDRAULIC DREDGE (REST)	
16	FISHERIES PATROL INSPECTION	
9	FISHING VEHICLE INSPECTION	
672	Total "GREEN BOX" INSTALLED	



Forecast New Installations "Green Box"

Nº	"GREEN BOXES"	Legislation
238	MEDITERRANEAN MECHANIZED DREDGES	Decreto 387/2010, de 19 de octubre, por el que se regula el marisqueo en el litoral de la Comunidad Autónoma de Andalucía y Proyecto de Orden del plan de gestión para dragas mecanizadas enviado a la COMISION EUROPEA
238	Total "Green Boxes" INSTALL IN 2012	

Total number of vessels located at the end of 2012: **672+238= 910**

Future Facilities from 2013

Nº	"GREEN BOXES"	Legislation
181	MEDITERRANEAN ARTESANAL FLEET	Proyecto de Decreto de ordenación de jornadas y horarios de las actividades de marisqueo y pesca profesional y regulación del Sistema de Localización y Seguimiento de Embarcaciones Pesqueras Andaluzas
161	PURSE SEINER	
280	TRAWLER	
622	TOTAL "GREEN BOXES" NEW FACILITIES	

At the end of 2014, the Track & Trace System of Fishing Vessels Andalusian (SLSEPA) will have a total of 1532 boats.

Inicial Investment

Cost	Object
85.886,40 €	Build and Develop Control Centre and Reception Centre

Cost per vessel

Cost	Object
1.400,00 €	GREEN BOX (unit)
1.200,00 €	GREEN BOX (maintenance unit / year) *

* Monthly cost of communications by boat 5-6 €

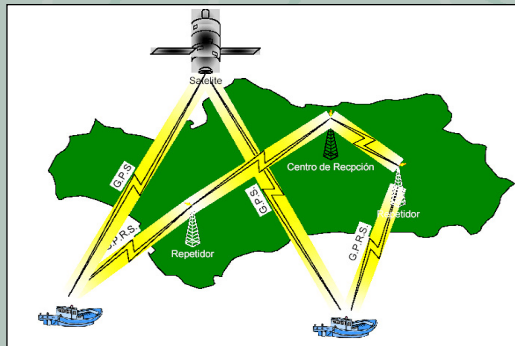
Implementation of Location and Track System for Andalusian Fishing Vessels (SLSEPA) in monitoring the fishery

System that allows Andalusian fleet Tracking:

- At real time.
- At Post-processed data

The SLSEPA has two main features:

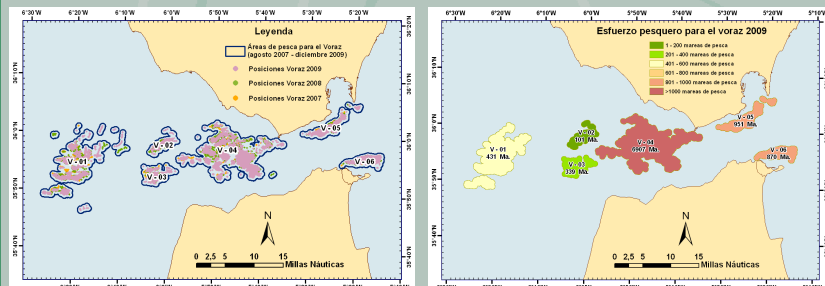
- Low cost transmission of location data
- High frequency of submission (every three minutes)



SLSEPA PURPOSE

The Location and Track System for Andalusian Fishing Vessels (SLSEPA) is created in order to achieve three basic objectives

- Evaluation and monitoring of the Fishery Resources:
 - o Sustainable Exploitation
- Monitoring compliance with legal provisions
- Safety of life at sea.



AUTHORITIES INVOLVED IN THE OPERATION OF THE SYSTEM:

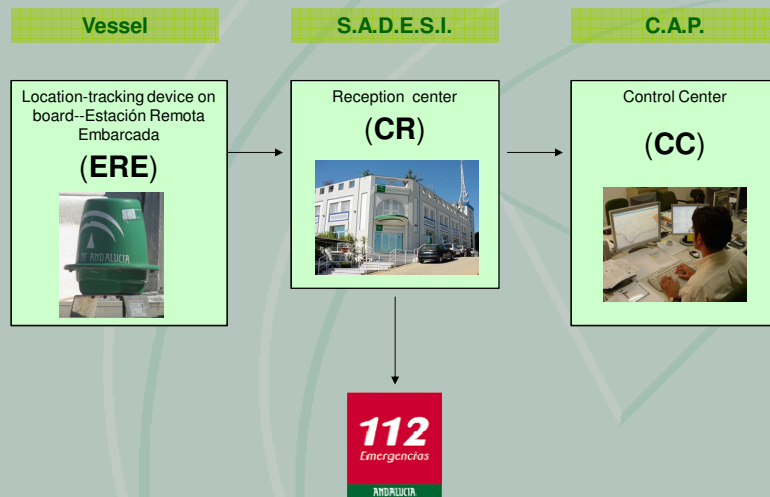
MANAGEMENT

- ✓ **Consejería de Agricultura y Pesca (Regional Authority of Agriculture and Fisheries):**
 - **Dirección General de Pesca y Acuicultura**

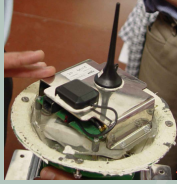
SUPPORT

- ✓ **Consejería de Gobernación y Justicia (Regional Authority of governance and justice):**
 - **Servicio de Emergencias 112 Andalucía (Emergency service)**
- ✓ **Consejería de Economía, Innovación y Ciencia (Regional Authority of economy, innovation and science):**
 - **Sociedad Andaluza para el Desarrollo de la Sociedad de la Información (SADESI).**

Basic operation scheme



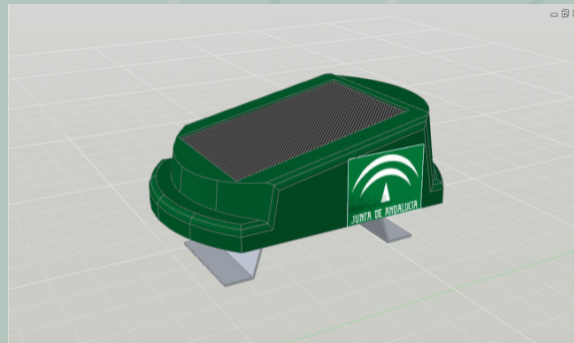
ERE in detail



- Módem GPRS/GSM
- Antena GPS
- Microcontroller storage processing and sending data



Solar "GREEN BOX"



Which data are obtained in each message?

- ✓ Registration number
- ✓ Time/date
- ✓ Geographic coordinates
- ✓ Speed
- ✓ Course
- ✓ Kilometers covered
- ✓ Member State Flag

Mapping

Data processing for
Managing and sustainable
exploitation of fishery
resources

Emergency service 112

Management of Information Security

By implementing a
Information Security
Management System in
accordance with ISO / IEC
27001:2005.

The SLSEPA ensure:

- Integrity (guarantee of reliability)
- Confidentiality (data protection)
- Availability (using data in the time needed)





Application

Filtro Cartográfico

Filtrado Actual | Filtrado Histórico | Información de Embarcación | Escenarios | Alarmas | Alarmas Filtradas | Alarmas Sistema (54)

Aparecen todas las localizaciones configuradas entre las fechas señaladas

Filtrar por Puertos

Filtrar por Buques

Filtrar por Alarmas

Filtrar por Grupos de Buques

En Puerto

En Travesía

Pescando

Eres Conectadas

Eres Desconectadas

Localizaciones Backup

Localizaciones No Backup

Fecha Inicio: 11/11/2011 00:00:00

Fecha Fin: 12/11/2011 00:00:00



Historical filtering of a group of ships (hidrahulic dredges) in a given period

Filtro Cartográfico

Filtrado Actual | **Filtrado Histórico** | Información de Embarcación | Escenarios | Alarmas | Alarmas Filtradas | Alarmas Sistema (565)

Aparecen todas las localizaciones configuradas entre las fechas señaladas

Filtrar por Puertos

Filtrar por Buques

Filtrar por Alarmas

Filtrar por Grupos de Buques

En Puerto

En Travesía

Pescando

Eres Conectadas

Eres Desconectadas

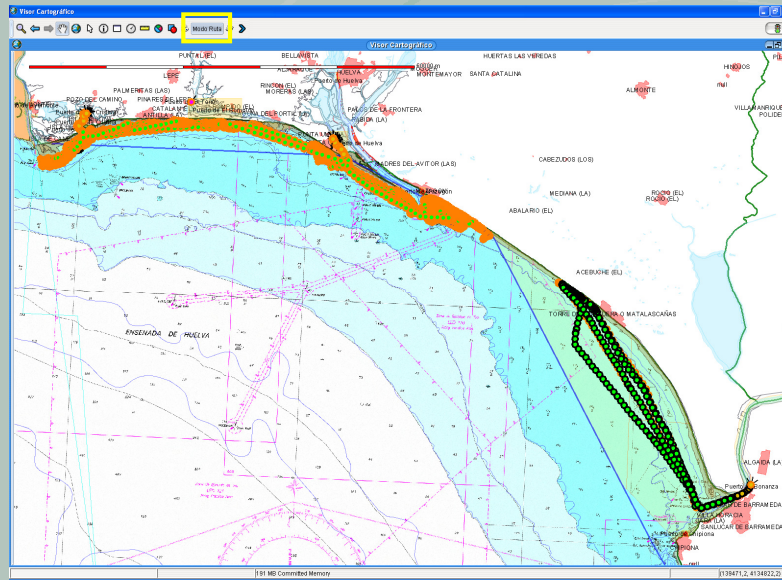
Localizaciones Backup

Localizaciones No Backup

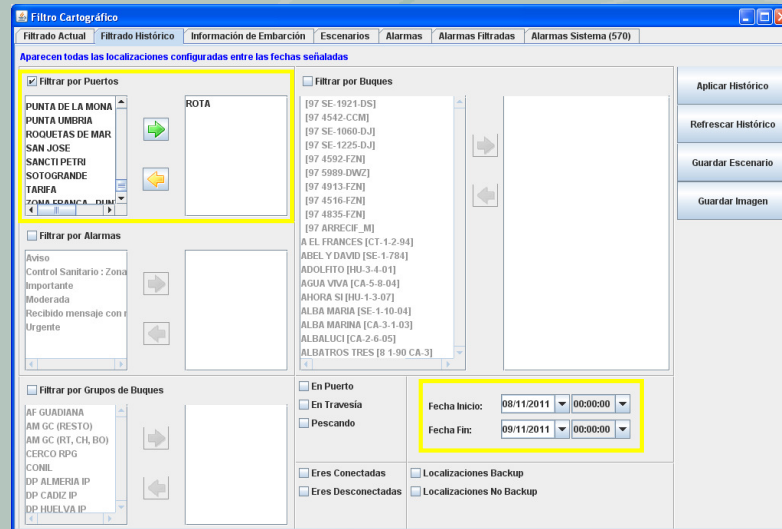
Fecha Inicio: 11/11/2011 00:00:00

Fecha Fin: 12/11/2011 00:00:00

Historical filtering of a group of ships (hidrahulic dredges) in a given period



Filtering of a number of vessels from a concrete base port in a day and for an artificial reef layer

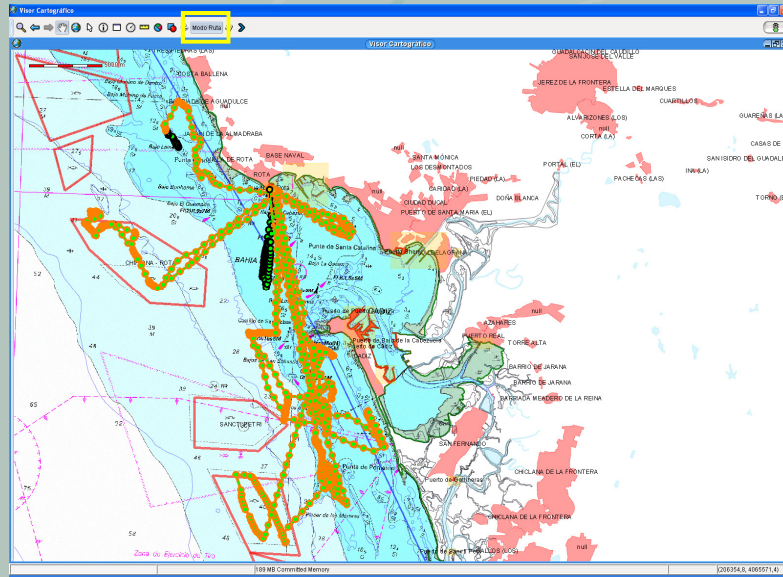


The screenshot displays the 'Filtro Cartográfico' application interface. The window title is 'Filtro Cartográfico'. Below the title bar, there are several tabs: 'Filtrado Actual', 'Filtrado Histórico', 'Información de Embarción', 'Escenarios', 'Alarmas', 'Alarmas Filtradas', and 'Alarmas Sistema (570)'. The main content area is divided into several sections:

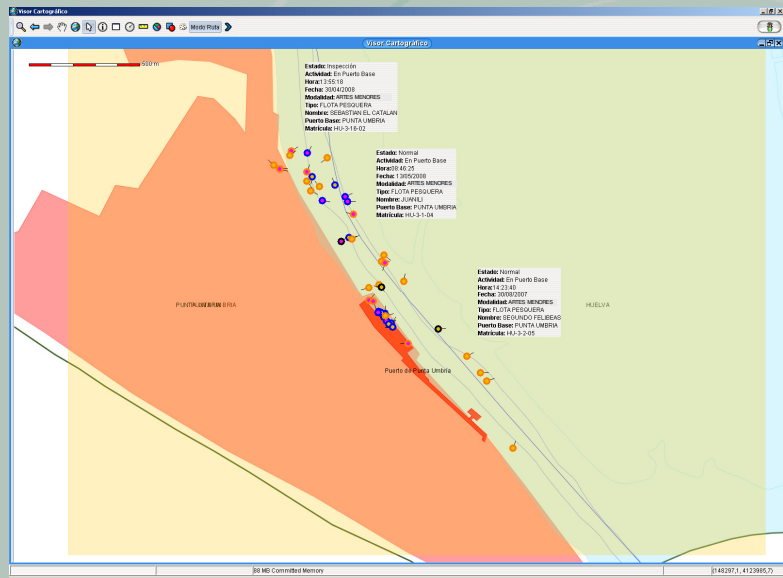
- Filtrar por Puertos:** A list of ports including PUNTA DE LA MONA, PUNTA UMERÍA, ROQUETAS DE MAR, SAN JOSE, SANCTI PETRI, SOTOGRANDE, and TARIFA. A 'ROTA' field is also present.
- Filtrar por Alarmas:** A section for filtering by alarm types, with options for 'Aviso', 'Control Sanitario: Zona Importante', 'Moderada', and 'Recibido mensaje con Urgente'.
- Filtrar por Grupos de Buques:** A list of ship groups including AF GUADIANA, AM GC (RESTO), AM GC (RT, CH, BO), CERCO RPG, CONIL, DP ALMERIA IP, DP CADIZ IP, and DP HUELVA IP.
- Filtrar por Buques:** A list of individual vessels with their identifiers, such as [97 SE-1921-DS], [97 4542-CCM], [97 SE-1060-DJ], [97 SE-1225-DJ], [97 4592-FZN], [97 5888-DWZ], [97 4913-FZN], [97 4516-FZN], [97 4835-FZN], [97 ARRECIF_M], A EL FRANCES [CT-1-2-94], ABEL Y DAVID [SE-1-784], ADOLFITO [RU-3-4-01], AGUA VIVA [CA-5-8-04], AHORA SI [HU-1-3-07], ALBA MARIA [SE-1-10-04], ALBA MARINA [CA-3-1-03], ALBALUCI [CA-2-6-05], and ALBATROS TRES [8 1-90 CA.3].
- En Puerto:** A section with checkboxes for 'En Puerto', 'En Travesía', and 'Pescando'.
- Fecha Inicio:** A date and time selector set to 08/11/2011 00:00:00.
- Fecha Fin:** A date and time selector set to 09/11/2011 00:00:00.
- Other options:** Checkboxes for 'Eres Conectadas', 'Eres Desconectadas', 'Localizaciones Backup', and 'Localizaciones No Backup'.

On the right side of the interface, there are buttons for 'Aplicar Histórico', 'Refrescar Histórico', 'Guardar Escenario', and 'Guardar Imagen'.

Filtering of a number of vessels from a concrete base port in a day and for an artificial reef layer



Detail of Port and information windows



Information window of a fishing vessel

Filtro Cartográfico

Filtrado Actual | Filtrado Histórico | Información de Embarcación | Escenarios | Alarmas | Alarmas Filtradas | Alarmas Sistema (6758)

Nombre de la Embarcación: VIRGEN CARMEN PRIMERO | Matrícula: AL-2-1-04 | Modalidad: ARTES MENORES

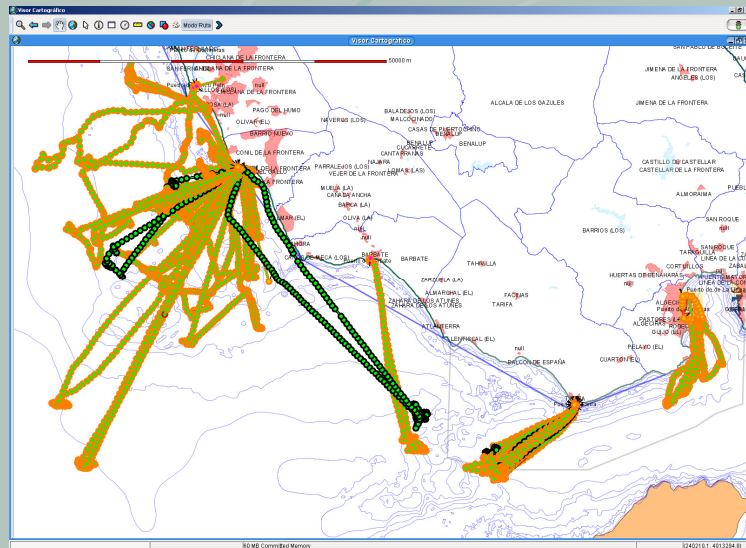
Nombre del Armador: | Nombre del Patrón: | Estado: Fallo de alimentación o batería bs

Actividad: Pescando | Latitud: N 39° 55' 14" | Longitud: W 5° 42' 42" | Velocidad: 1.13499 | Rumbo: 296.36 | Nº Satélites: 8 | Fecha: 06/07/2009 13:26:34

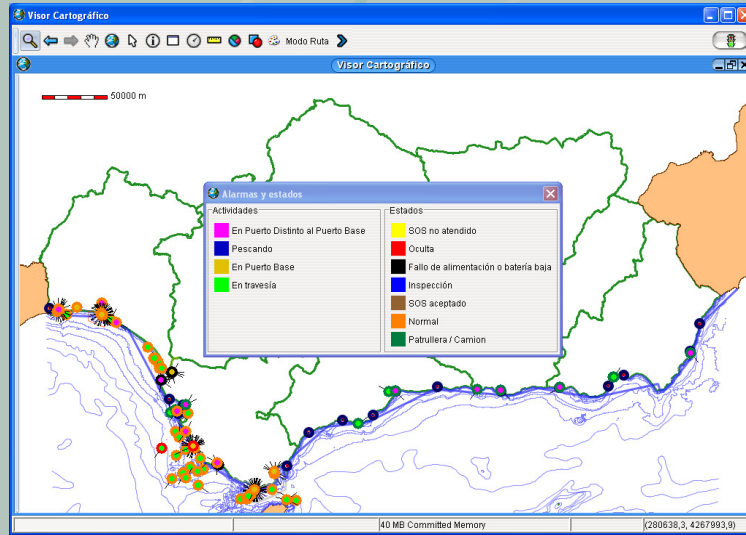
Localización Backup:

Matrícula: AL-2-1-04 | Modelo: ALANDZ1 | Fabricante: NOXUM | Versión: Version 1.5.1

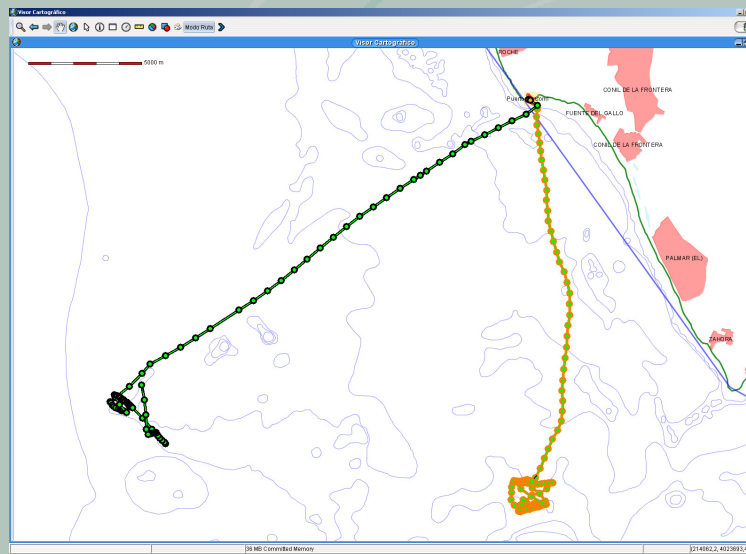
Locations Viewer (route mode)



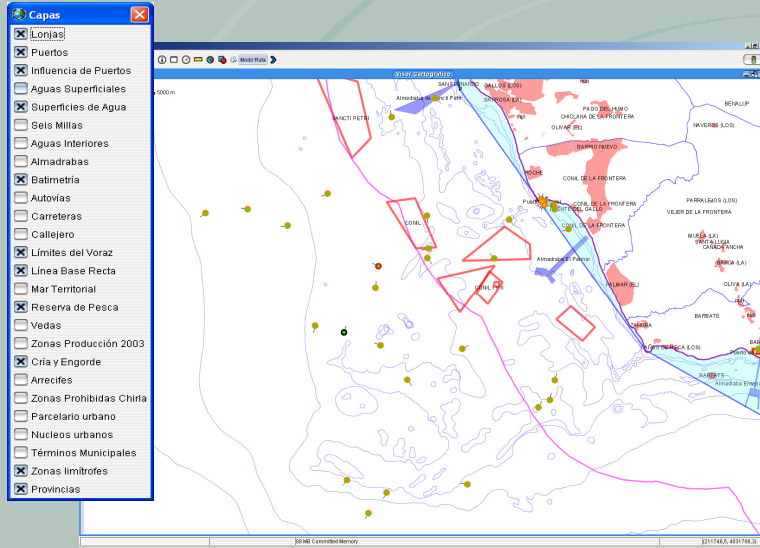
Color Coding of Locations



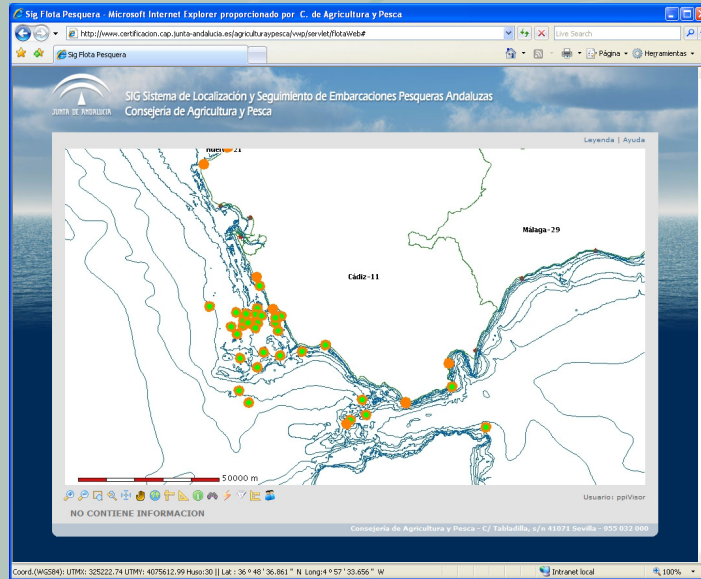
Filtering History Locations



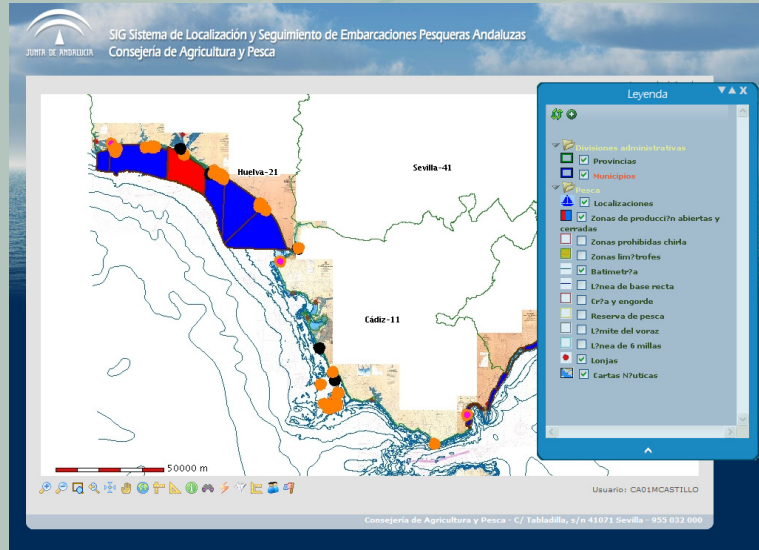
Layers available in the Cartographic Viewer



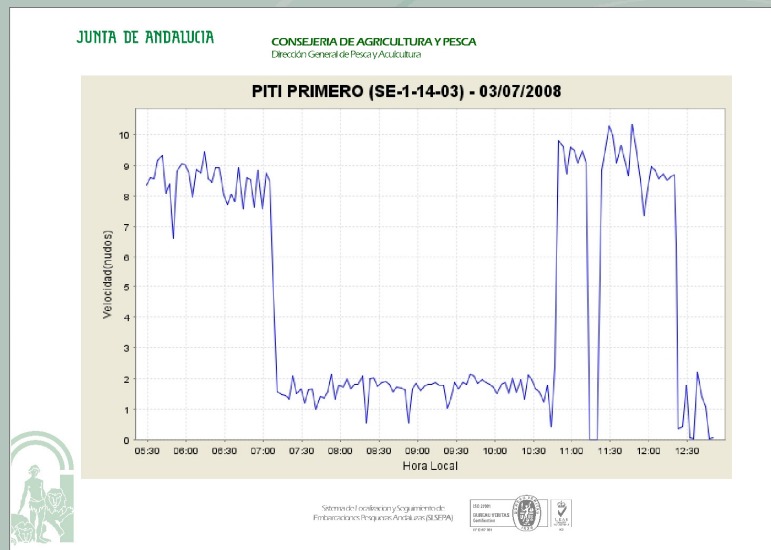
SLSEPA Web Viewer (used by inspectors on line)



Web Viewer SLSEPA with layer of bivalve mollusc production areas



Using of data by Inspection Service for Fisheries and Aquaculture



SLSEPA applicability for the Management of Fishery Resources

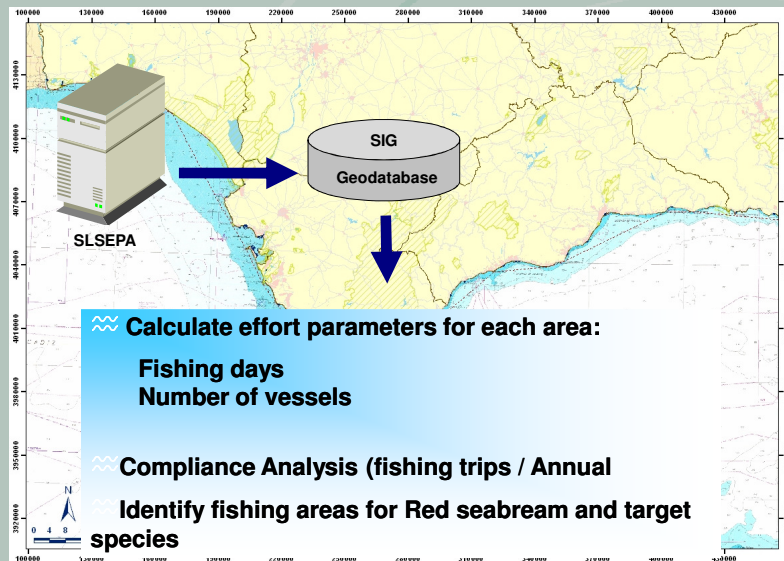
GENERAL PURPOSE:

- Knowing the current status of the fishery associated with red seabream fleet in the Strait of Gibraltar, from the analysis of fishing effort and its relation to fish production landed (catches)

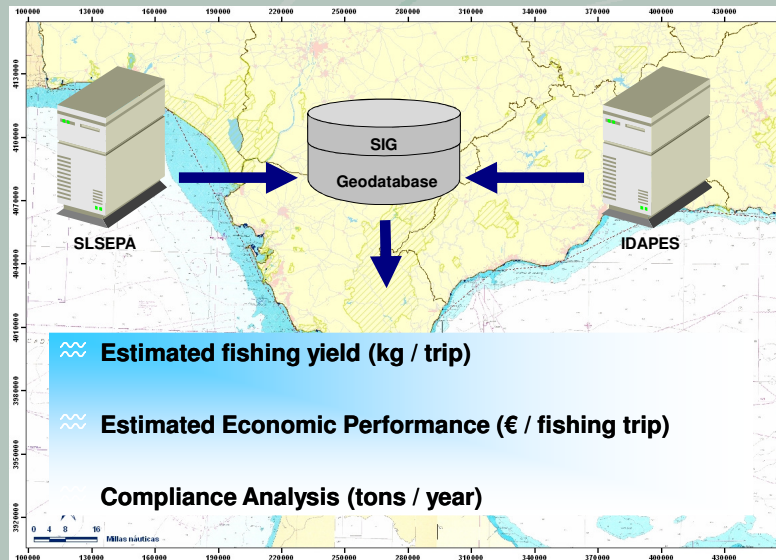
SPECIFICS PURPOSES:

- Location and demarcation of the main fishing areas
- Assessment of fish and economic production for target species and main accessory species.
- Estimated effort expended by the fleet in each fishing area and its temporal evolution.
- Estimation of fishing and economic performance in each fishing area for the red seabream and main accessory species and their evolution over time.
- Estimating the degree of compliance with current regulations by the fleet associated with this fishery

Methodology of the post-process data SLSEPA



Methodology of data crossing SLSEPA with IDAPES



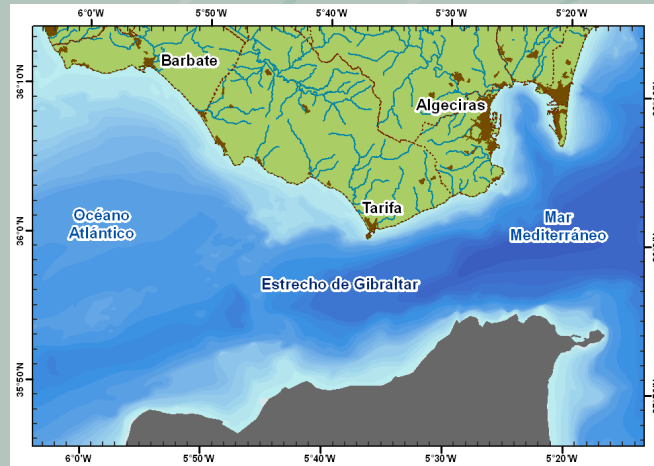
Fisheries Resource Assessment of the fleet operated by "voracera"

BACKGROUND:

- In early July 2006 the 103 vessels fleet included in the census were controlled by the Location and Track System for Andalusian Fishing Vessels (SLSEPA) of the Department of Agriculture and Fisheries.
- Today the 91 Andalusian fishing vessels fishing exclusively for Red Seabream have installed the device ERE, 58 of them have home port in Tarifa, Algeciras and the remaining 27 in Conil and Barbate.
There are also other boats with home port in Ceuta, included in the census of authorized vessels fishing for Red Seabream in the Strait of Gibraltar, which has no control procedure.

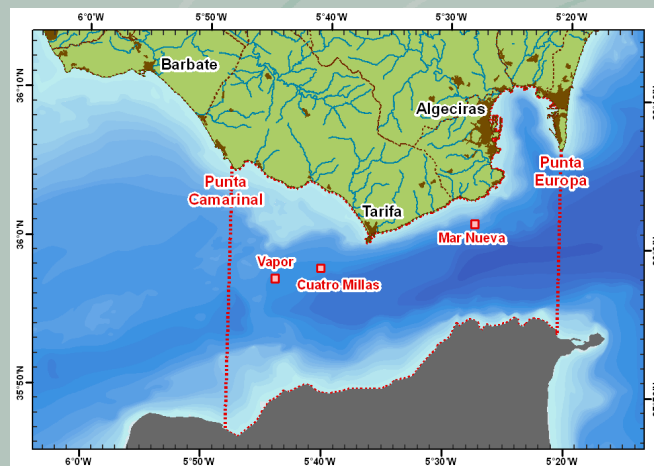
GEOGRAPHIC SCOPE OF THE FISHERY:

“geographic scope for the red seabream fishery”



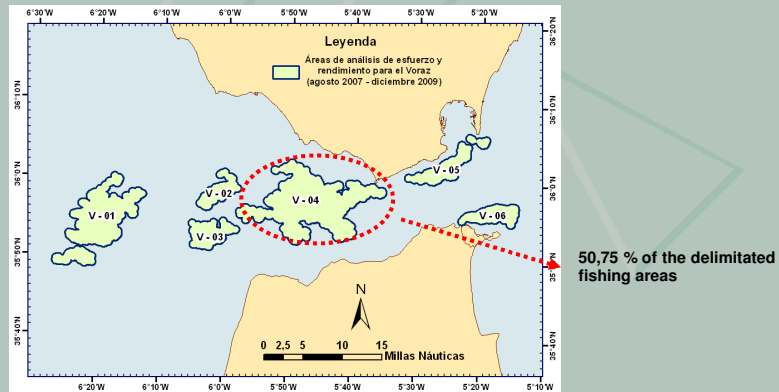
GEOGRAPHIC SCOPE OF THE FISHERY :

“Regulation area for the Red Seabream fishery and closed seasons”



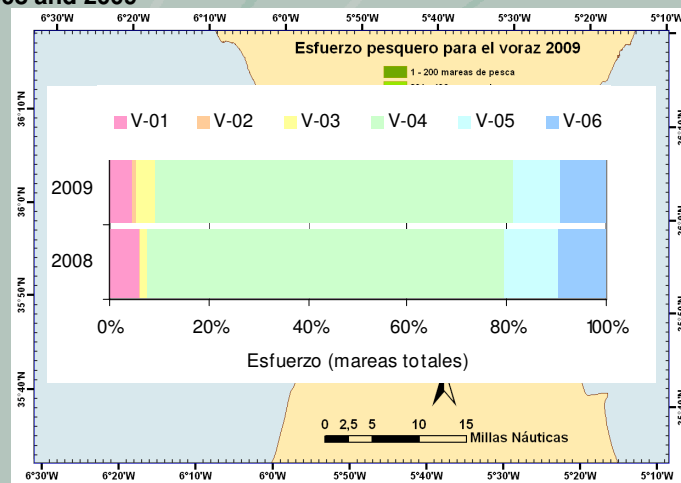
RESULTS: Delimitation of Fishing Areas

From the analysis of positioning of the ships whose speed are in the range of fishing activity (speed between 0.5 and 3 knots, hold for 9 min) from August 2007 to December 2009 six fishing areas have been obtained for redseabream and / or incidental species.



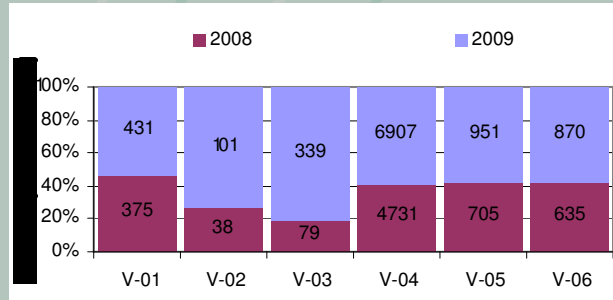
RESULTS: Estimated Fishing Effort

- Fishing effort by bounded area
- More than 72% of the effort is done in the V-04 area in 2008-2009
- Proportion of fishing days is very similar in each area between 2008 and 2009



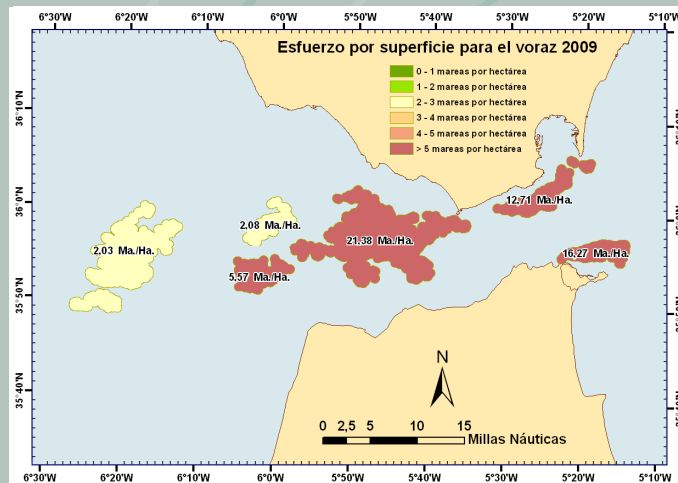
RESULTS: Estimated Fishing Effort

- In all areas there were less fishing days in 2008 than in 2009.
- The greatest difference was found in the V-03 area



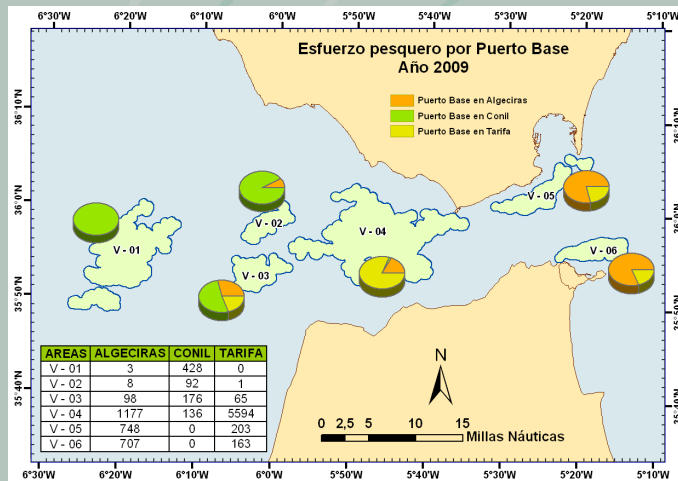
RESULTS: Estimated Fishing Effort

- Fishing Effort Measured by area of each enclosed area
- The V-04 area has the highest number of trips per hectare



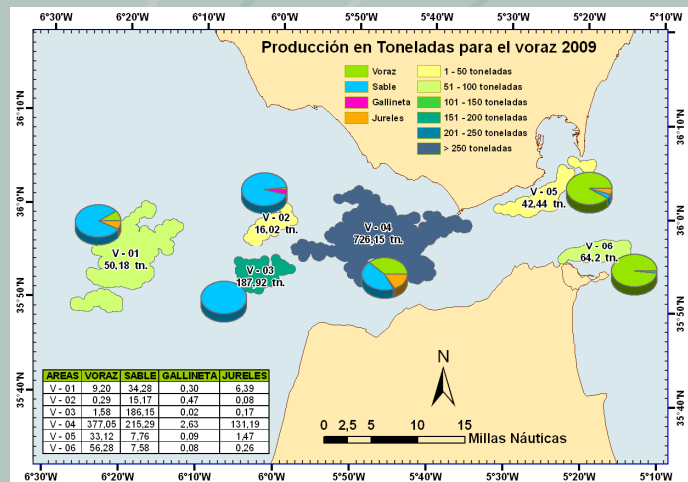
RESULTS: Estimated Fishing Effort

- Fishing Effort Measured by Port Base
- There is a clear segregation of the fleet



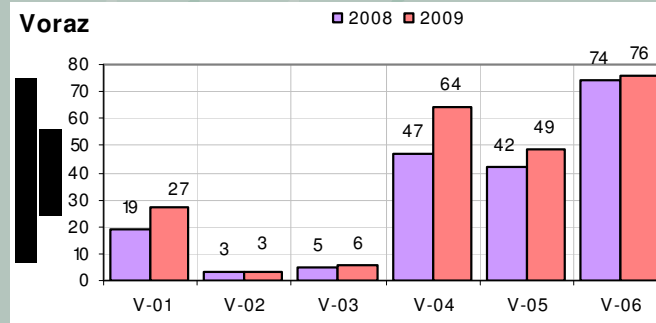
RESULTS: Fish Production (landings)

- Fish production by area and species
- V-04 is the area that has increased the production of Red Sea bream, scabbard fish and mackerel.



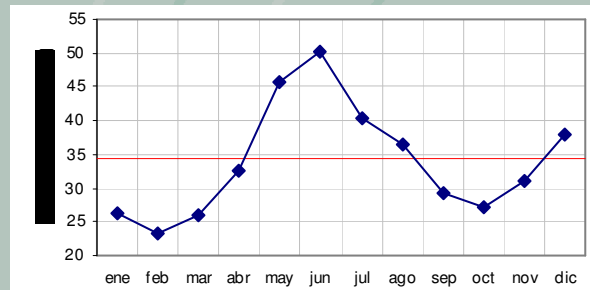
RESULTS: Fish Yield Estimation (CPUE):

- The areas of highest yield (kg / trip) for Red Seabream are V-06, V-04 and V-05
- In 2009 the yield has been higher than in 2008, especially in V-04, V-01 and V-05.



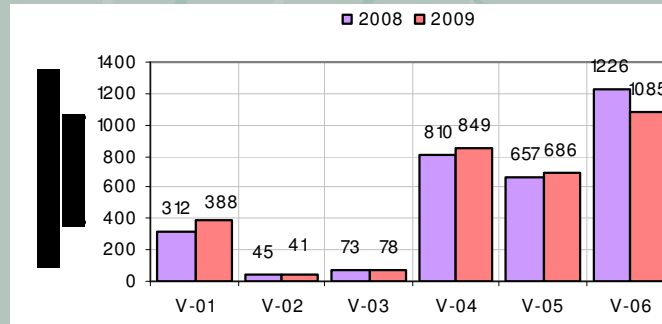
RESULTS: Fish Yield Estimation (CPUE):

- Monthly variations from the mean in kg / fishing trip of red seabream obtained between 2008 and 2009.
- There is a clear increase in red seabream landings in summer and a small topping in December.

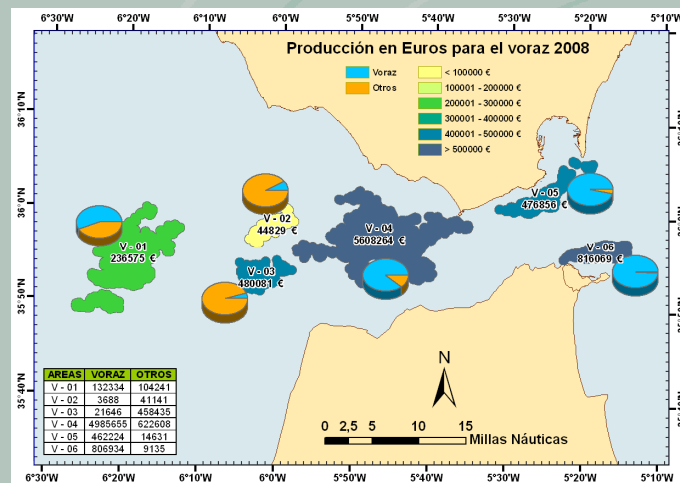


RESULTS: Estimated Economic Performance (€/fishing trip)

- The greatest economic return is obtained in the areas V-06, V-04 and V-05, because it also produces the largest catches
- While in 2009 the catch and effort were considerably higher, economic performance was not affected, even in V-06 decreases with respect to 2008.



RESULTS: Estimated Economic Performance (€/fishing trip)



GENERAL CONCLUSIONS

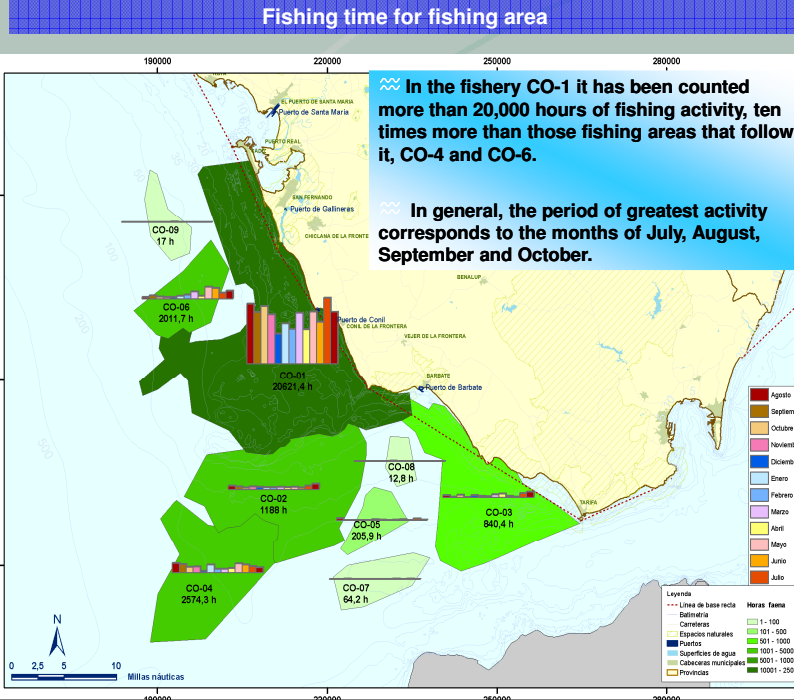
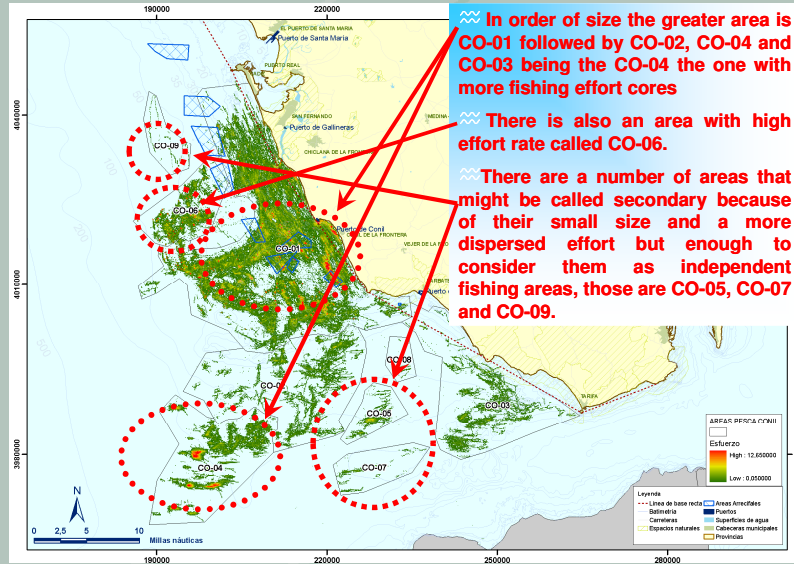
- From SLSEPA objectively have been identified six fishing areas the Strait of Gibraltar.
- The area with greater surface, fishing effort and fish production has been V-04.
- It has detected a clear segregation of fishing area bounded by the fleet of each port.
- Both the fish yield (kg/fishing trip) and economic (€ / fishing trip) is larger in area V-06.
- The performance shows a clear seasonality, being higher at summer months and at the end of the year
- For 2008, in 2009 the fishing effort was greater in all fishing areas.
- Catches have increased in 2009, but economic performance has been negatively affected in 2009, particularly in major areas where Red Seabream is captured (V-06).

PRACTICAL CASE STUDY IN THE ARTESANAL FLEET OF CONIL DE LA FRONTERA (CÁDIZ)

Delimitation of fisheries

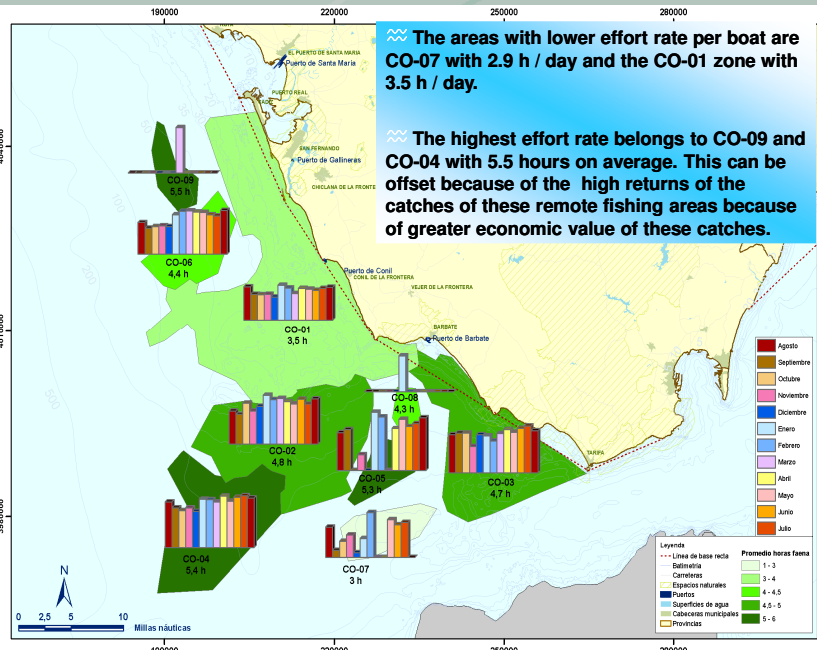
From the analysis conducted with the raster layer from August 2007 to August 2008, we have obtained nine fishing areas.

Zona	Superficie (Km2)	Hectáreas
CO-01	899,35	89935,01
CO-02	419,40	41940,40
CO-03	364,87	36486,97
CO-04	311,24	31124,28
CO-05	63,64	6363,86
CO-06	132,80	13279,67
CO-07	94,34	9434,17
CO-08	32,16	3215,88
CO-09	63,08	6308,09
Total	2380,88	238088,34





Average fishing time by fishing area and boat



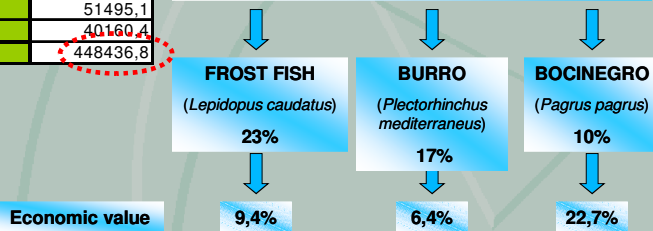
Catches Data

Mes	Total
Agosto 2007	42453.1
Septiembre 2007	31350.3
Octubre 2007	27609.8
Noviembre 2007	24665.6
Diciembre 2007	16695.1
Enero 2008	25032.0
Febrero 2008	18932.5
Marzo 2008	30971.8
Abril 2008	35480.0
Mayo 2008	61639.1
Junio 2008	41952.0
Julio 2008	51495.1
Agosto 2008	40160.4
Total (Kg)	448436.8

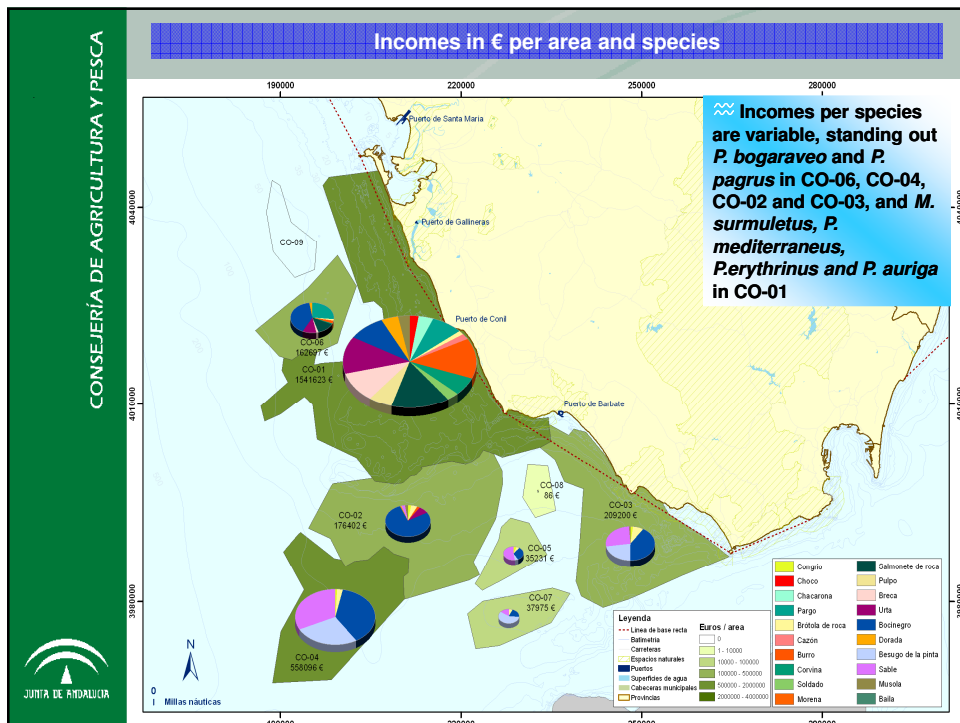
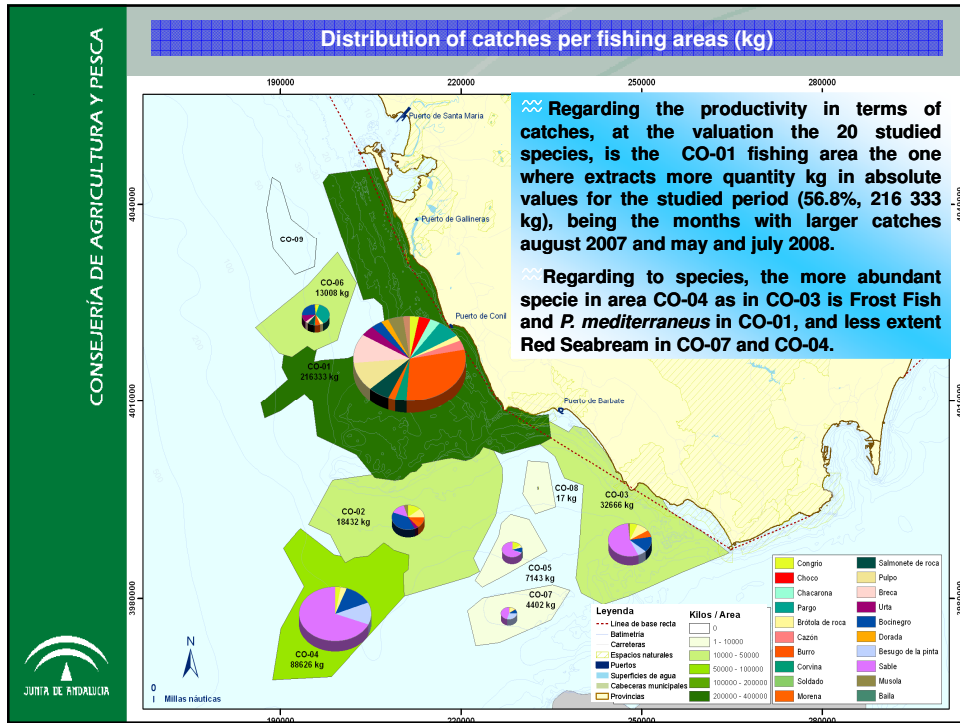
≈ In the year of study the catches made by the fleet of Conil were more than 400 tons what has represented a turnover of over € 3 million.

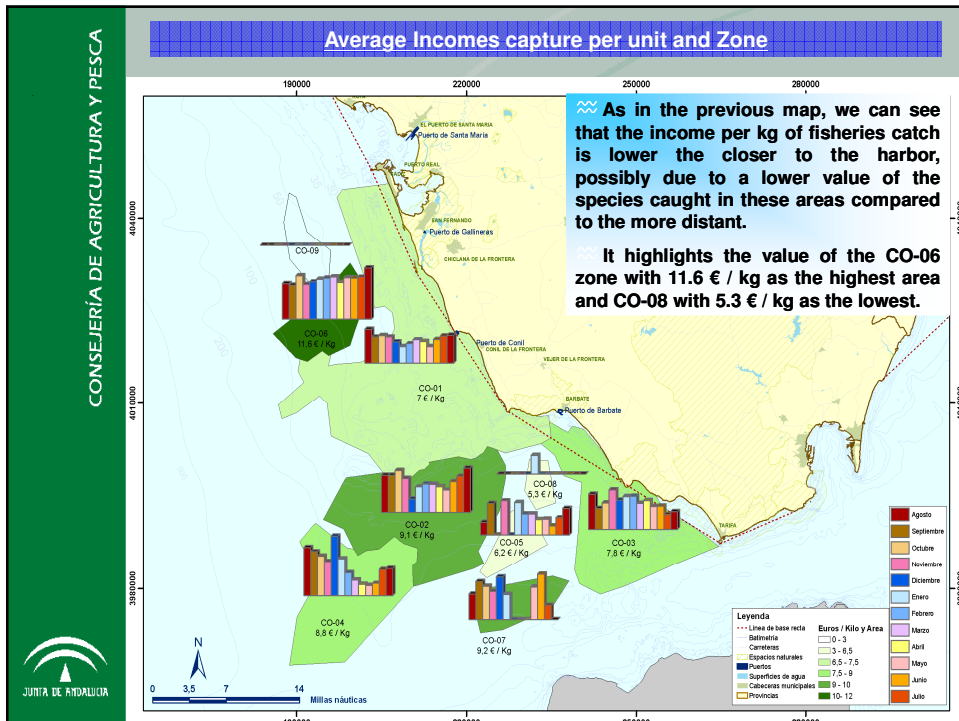
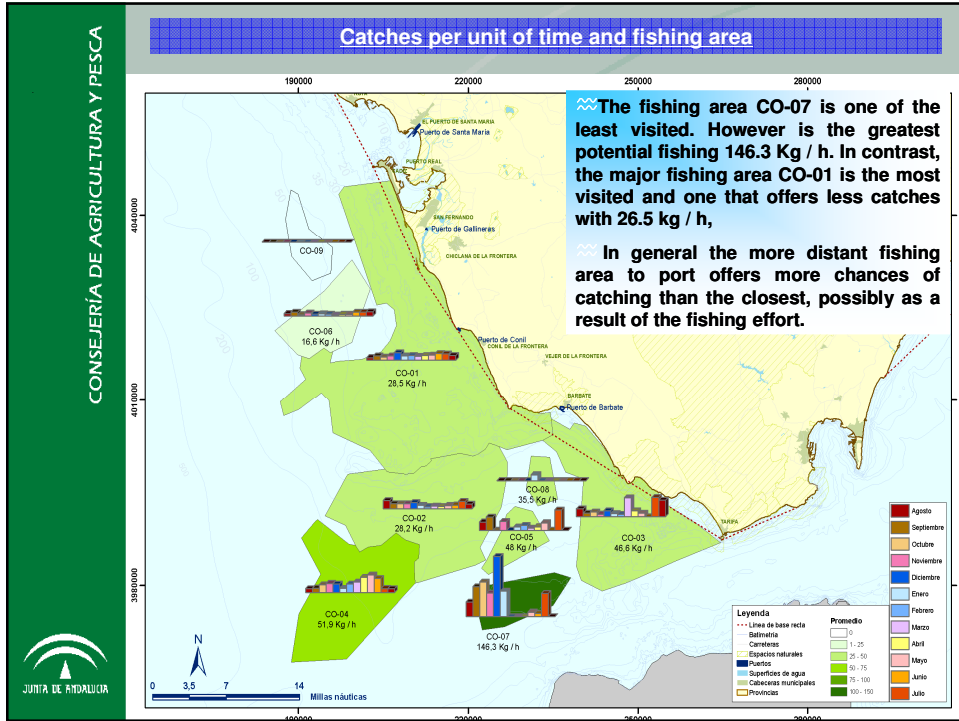
≈ The study has been raised with regard over 20 species of commercial interest, which a further analysis has been carried out further on the 7 declared species with the certified quality mark of the competent government.

From 20 species studied, three of them represent 50% of the catch.

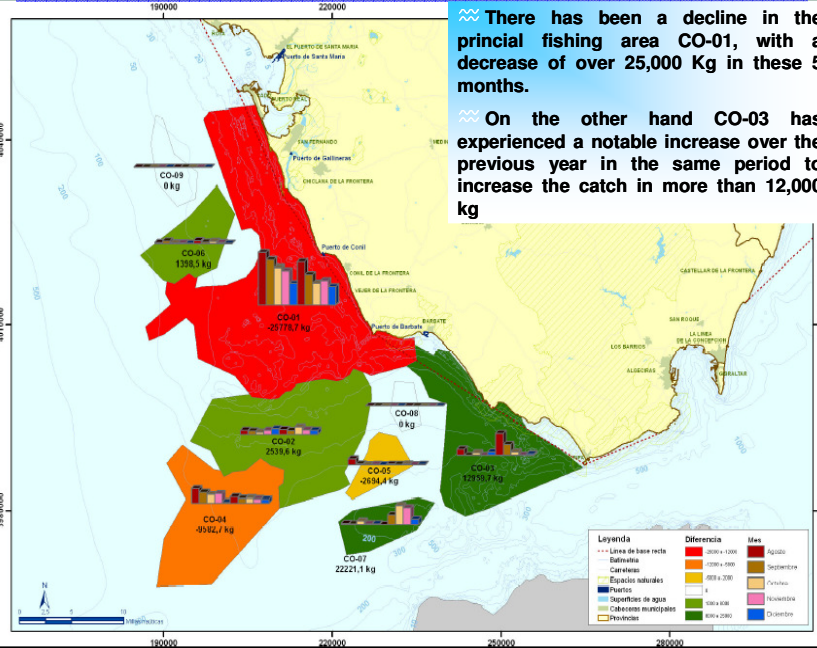


However, the more valuable catches are the "Soldado" (*Microchirus azevia*), who is sold about 23€/kilo

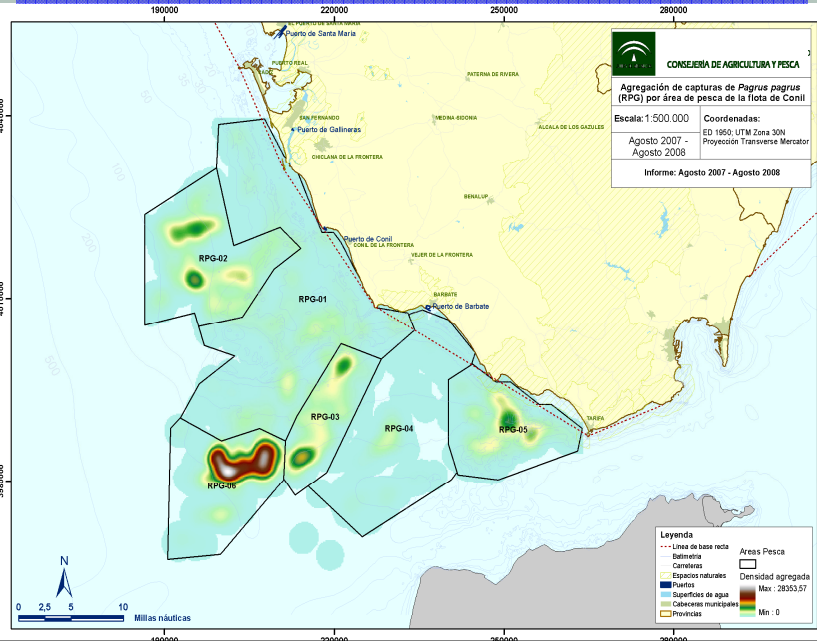


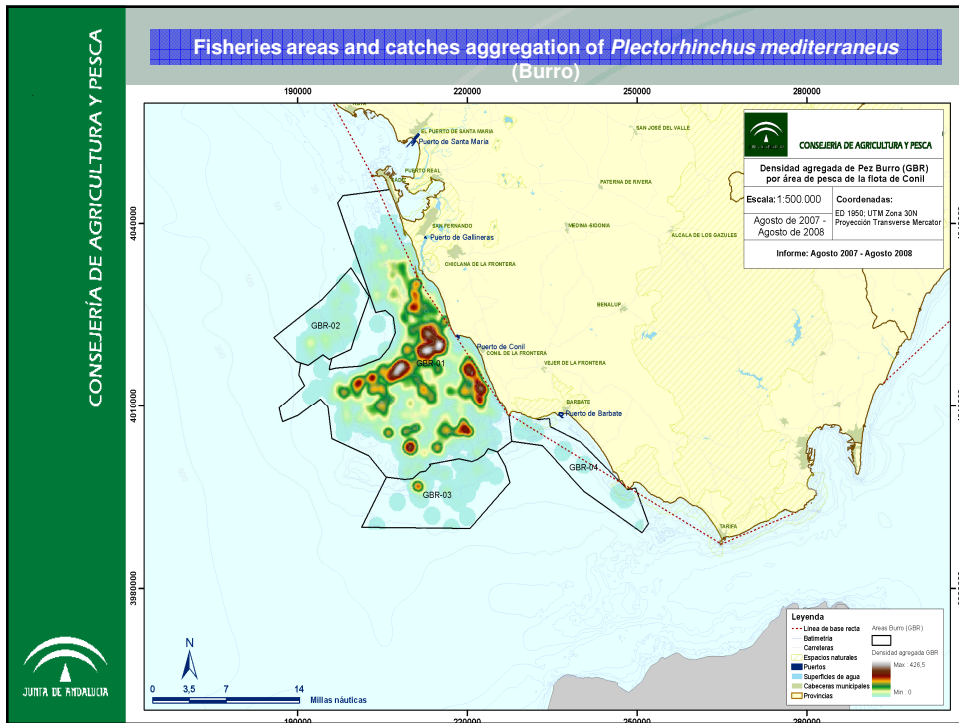
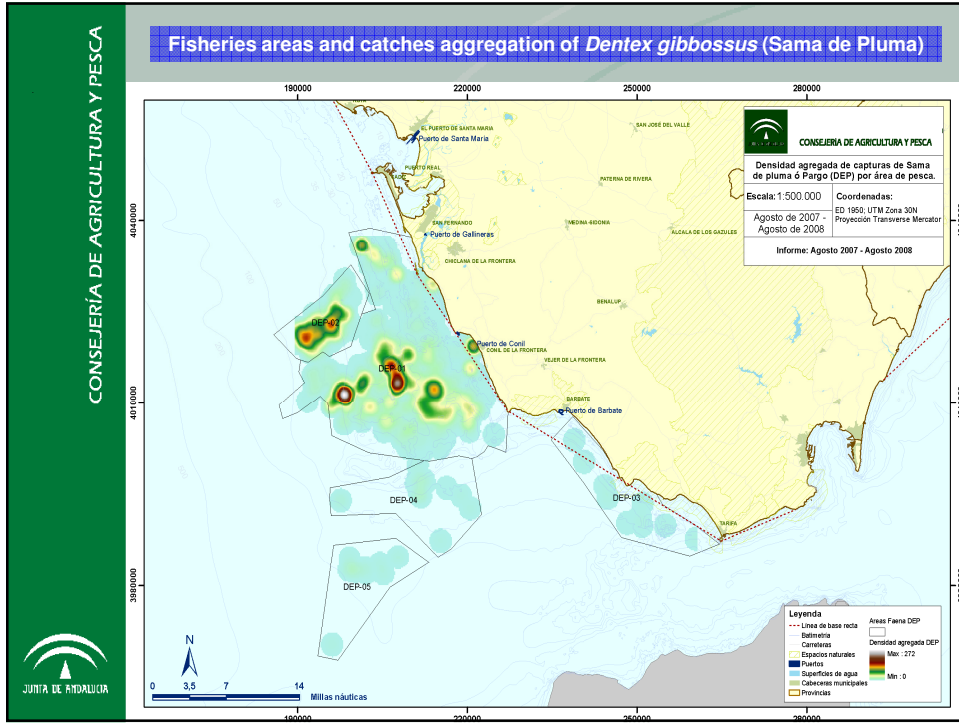


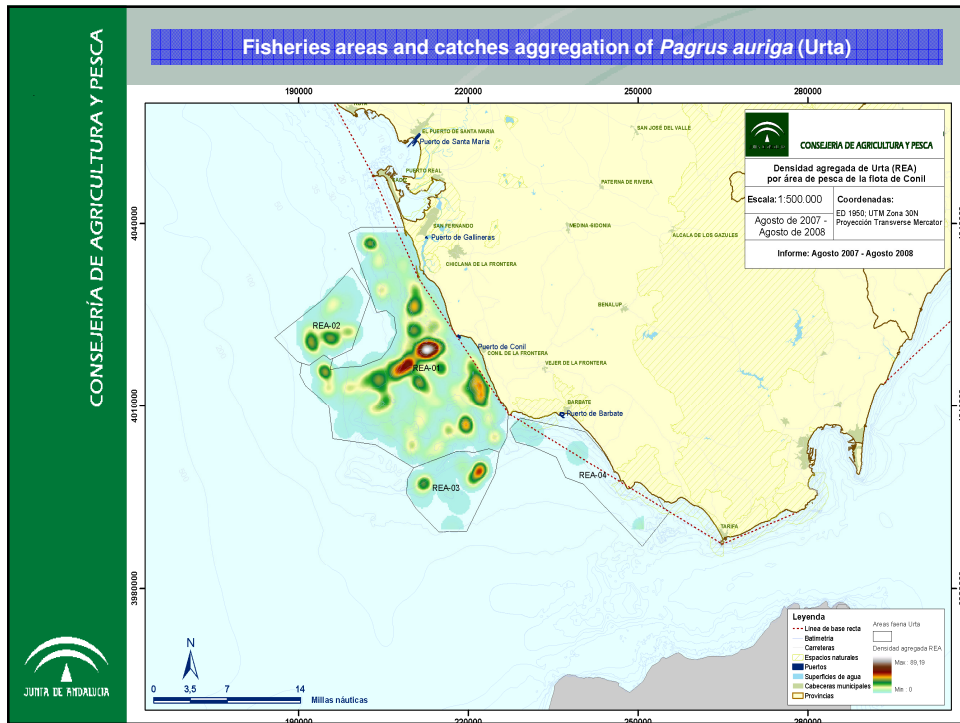
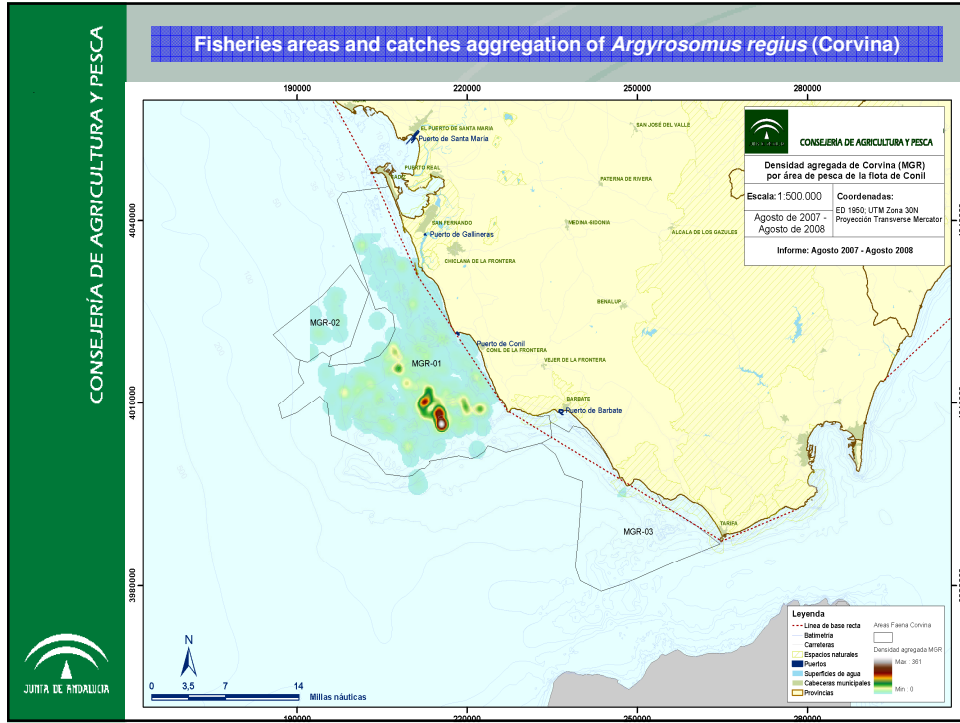
Evolution of the catches done between August-December 2007 VS August-December 2008

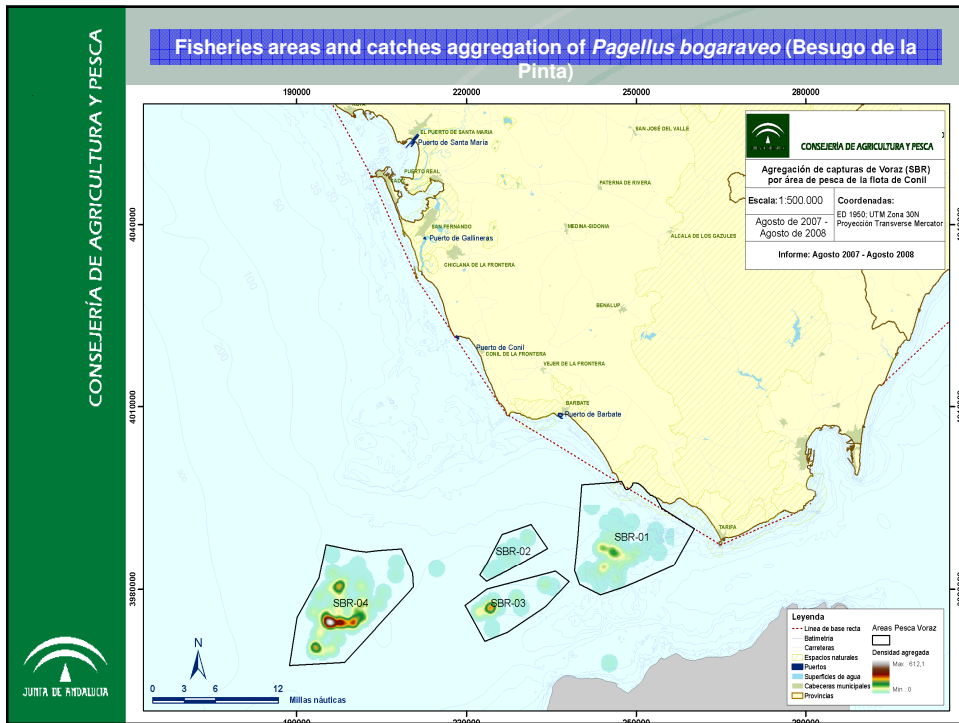
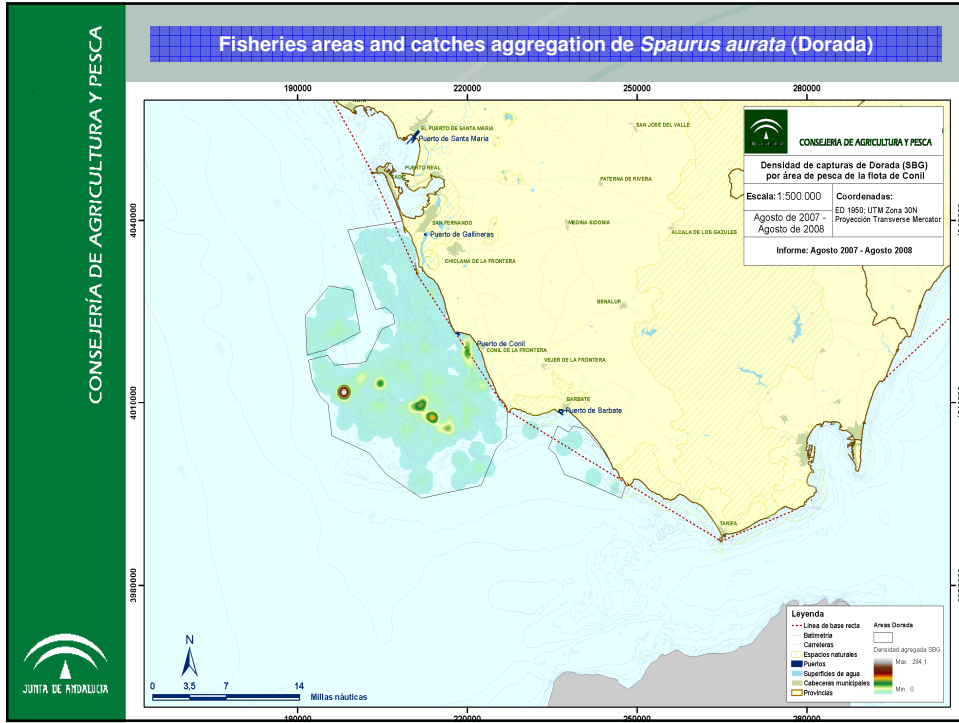


Fisheries areas and catches aggregation of *Pagrus pagrus* (Pargo or bocinero) in Conil









CONCLUDING REMARKS

- New fishing areas have been identified
- Fishing Effort amounts was approx. to 26,000 hours of time fishing, and an average of 2.100 h / month.
- Each vessel works an average of 2.9 hours each fishing day
- The overall catches of all the fishing areas has been 448,437.8 kg which has supposed 3.18 million € for the studied period.
- The most exploited fishing area in kilograms of catches is the CO-01,
- May 2008 is the month with more catches, with 61.639 kg, However, August 2007 is the most profitable with € 432,759.
- The most profitable fisheries match those associated with fishing areas of the Red Seabream.
- The most profitable fishing area in catch per kilogram are CO-06, with 11.6 € / kg, and in a second group CO-07, CO-02 and CO-04 with about 9 € / kg.
- *A. regius*, *P. auriga* and *P. mediterraneus* are closest to the fishing port, and they are also quite profitable in absolute terms.



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