



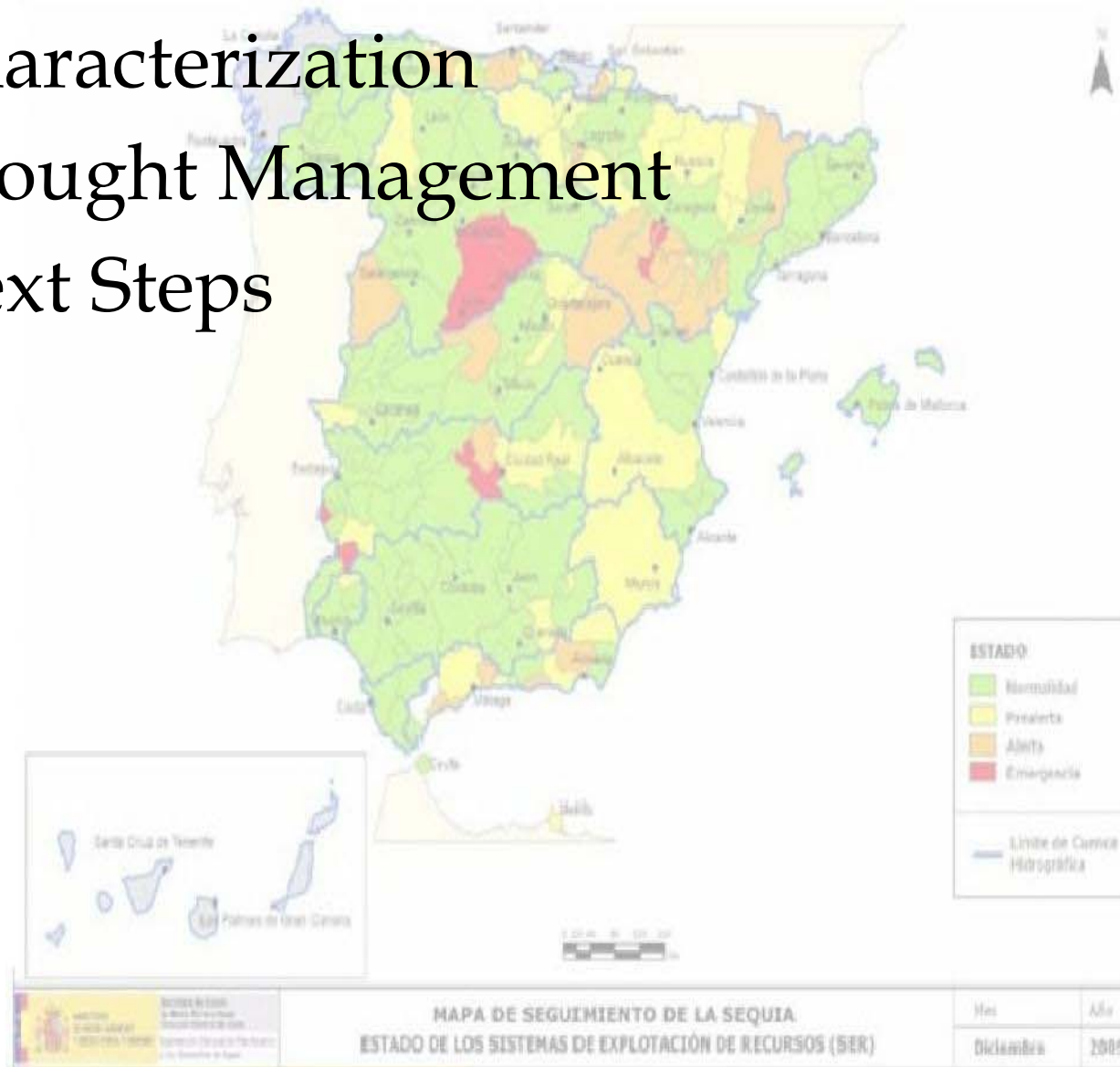
# DROUGHT MANAGEMENT IN SPAIN



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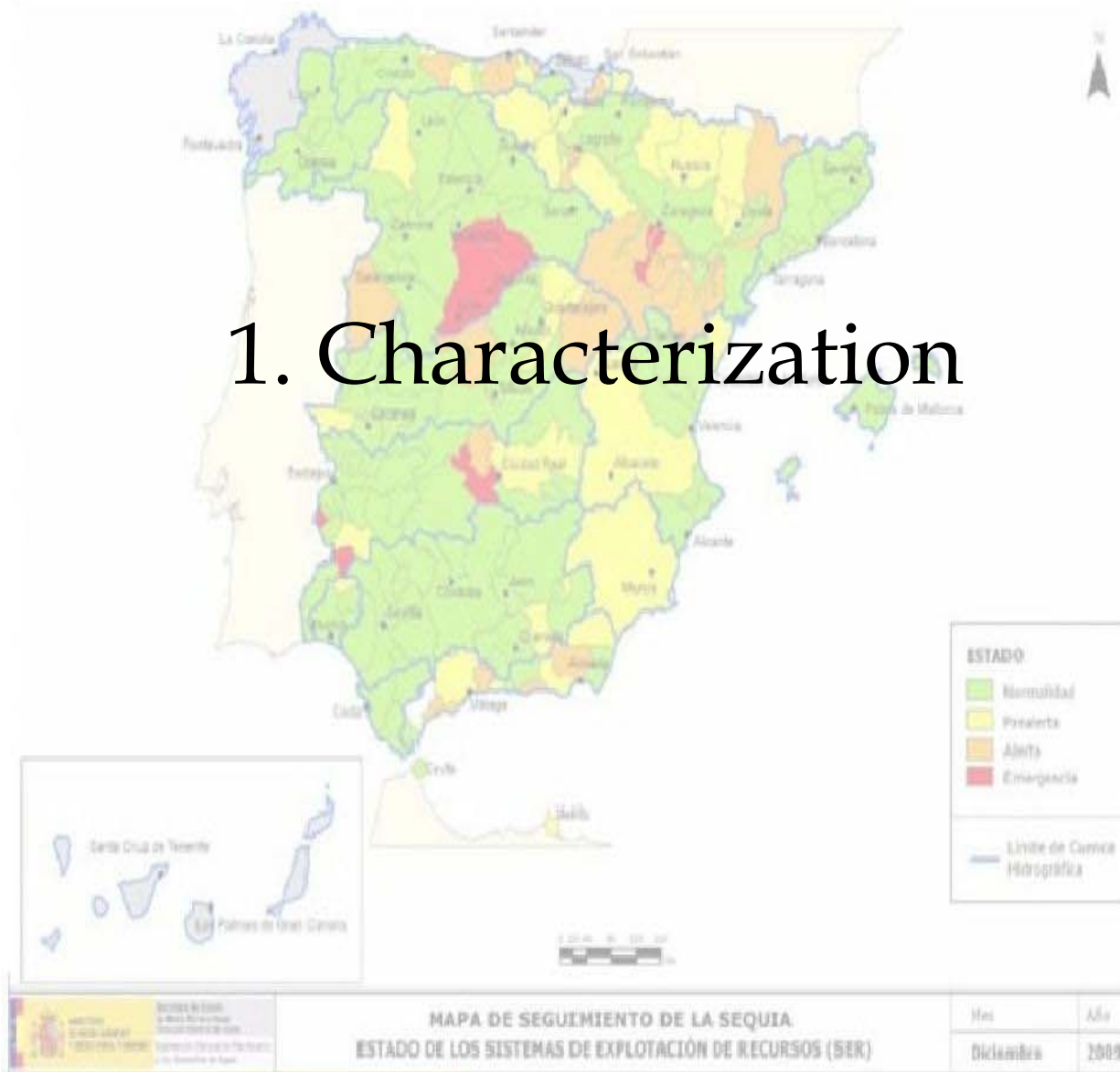
GOBIERNO DE ESPAÑA

MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO

CONFEDERACIÓN HIDROGRÁFICA DEL SEGURO



# 1. Characterization





# 1. Characterization- Dry Spain Characteristics



Europe



Spain

	Surface (km <sup>2</sup> )	Average rainfall (mm)	PET (mm)	Natural Resources (hm <sup>3</sup> /year)	Ratio per inhabitant
<b>Segura RB</b>	18.870 (3.7%)	365	827	803 (0,7%)	<b>442 m<sup>3</sup>/hab/año</b>
<b>Spain</b>	506.474	711	842	111.186	2.460 m <sup>3</sup> /hab/año

Source: Digital Book of Water /SRB Report 2008



# 1. Characterization- Segura River Basin, key figures

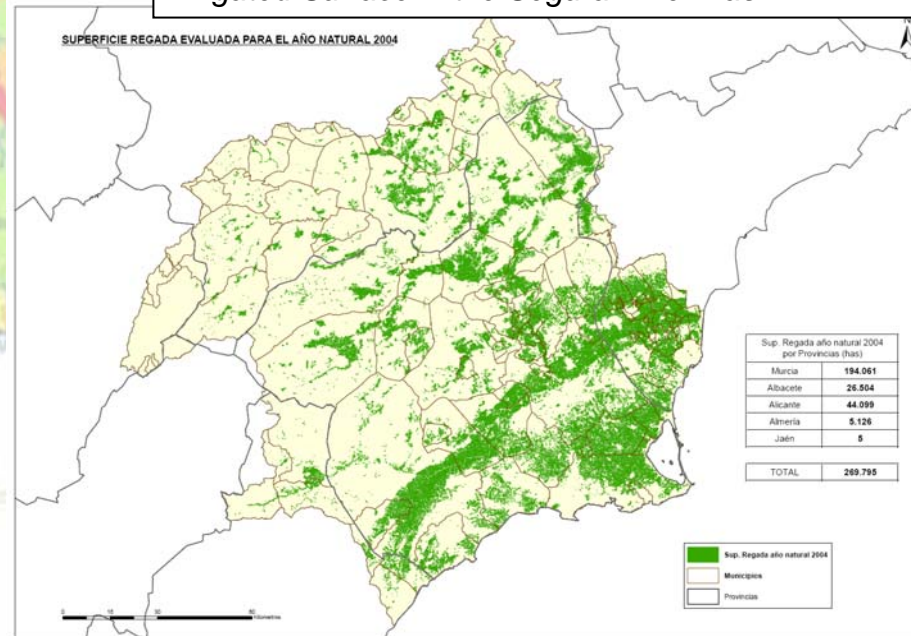
POPULATION Year 2009	1,969,370 (> 2,500,000 in summer)
TOTAL LENGHT OF CHANNEL NETWORK (Km)	1,470
IRRIGATION SURFACE (ha)	269,029
SOURCES OF WATER RESOURCES (Hm <sup>3</sup> )	Surface waters : 640, Groundwater: 220 Reutilization:110, TAJO-SEGURA WATER TRANSFER: 540

- **AGRICULTURE:** high productivity (average value production of 1.93 €/m<sup>3</sup> and a net margin of 0,72 €/m<sup>3</sup>) but intensely water-consuming (it accounts for the **80% of the demand** in the basin, 1.662 hm<sup>3</sup>/año)

- Reuse and Desalination
- High Pressure on resources.
- Water Scarcity & Droughts

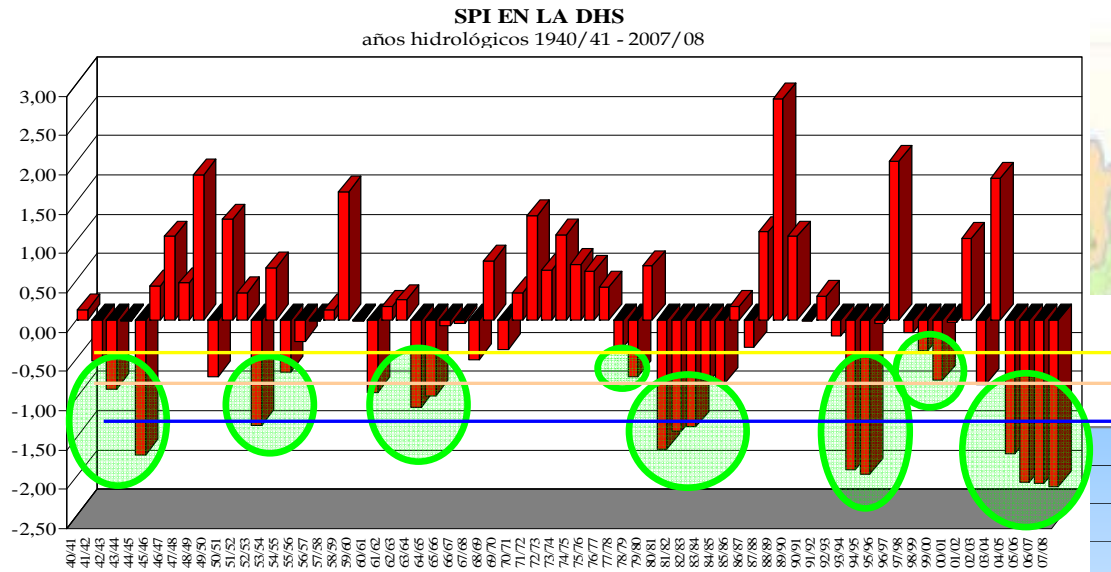


Irrigated Surface in the Segura River Basin

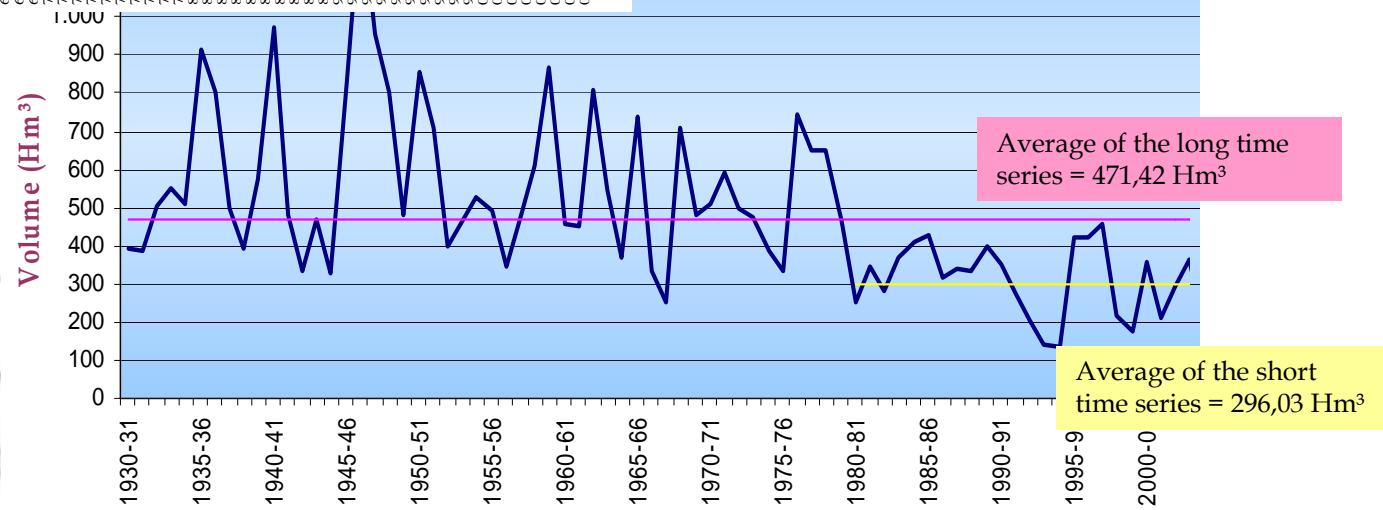




# 1. Characterization: Segura RB-Water Scarcity and Droughts

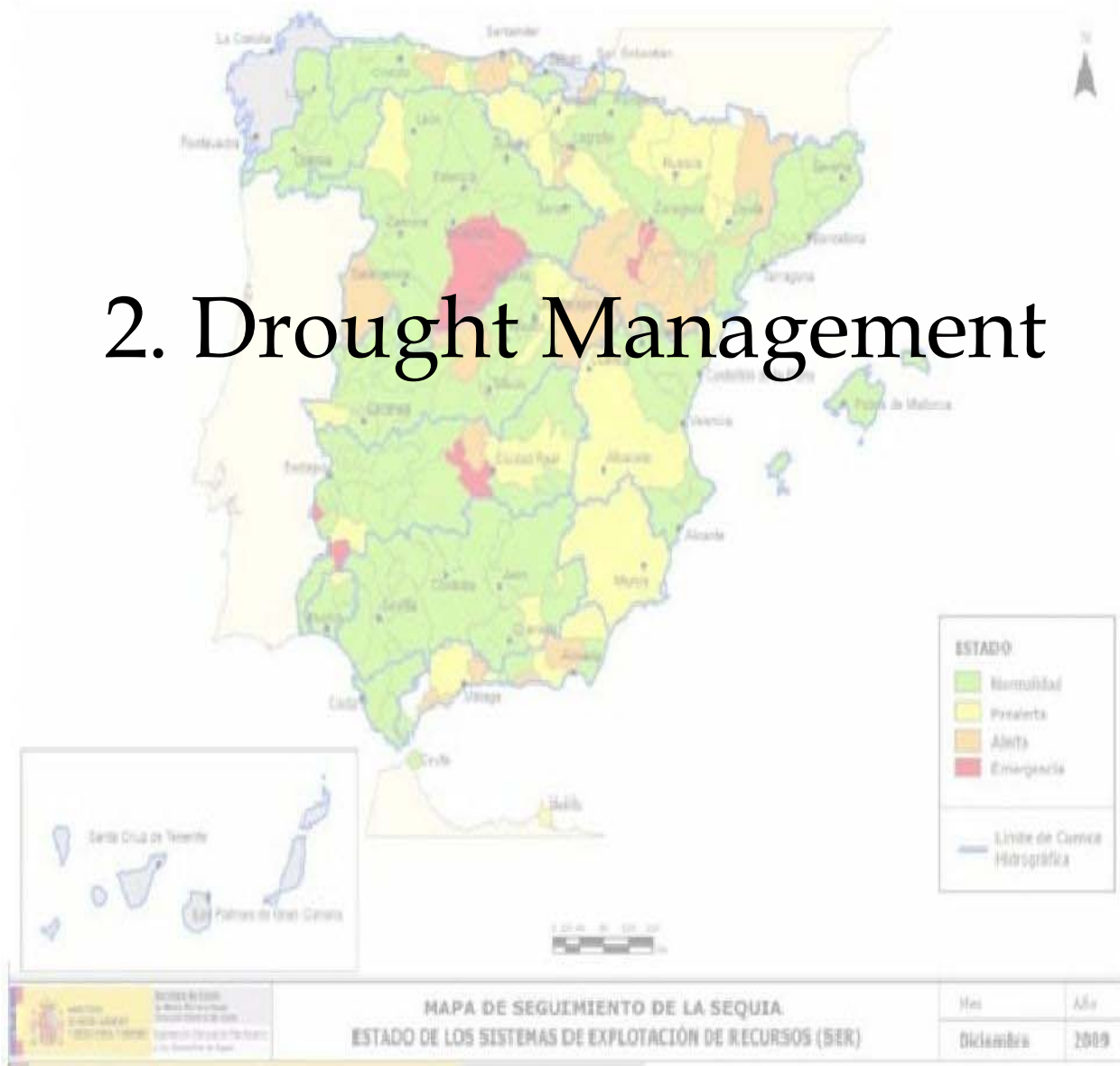


**Interannual accumulated runoff between September 1931 and September 2009**





# 2. Drought Management





## 2. Drought Management

### LEGAL BACKGROUND

Drought Management Plans Origin: the *National Hydrological Plan Law*, released in 2001.

Drought Management Plans for all Spanish River Basins were endorsed in march, 2007.

#### MAIN OBJECTIVES of Drought Management Plans:

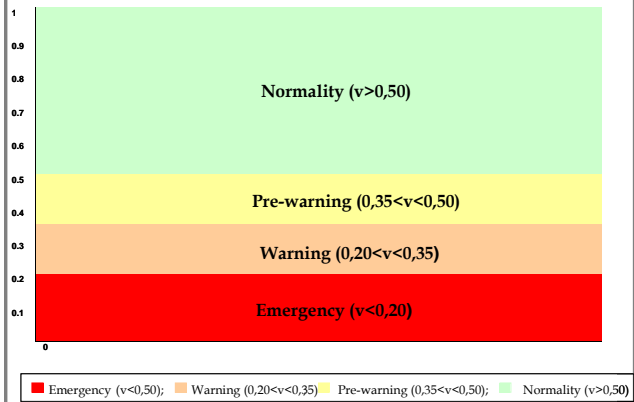
- ¿When?: It is very important because taking measures in advance is much more efficient than facing the drought effects.
- ¿How?: A sequence of measures activation should be established according to state of indicators, natural resources and expected drought evolution.
- ¿Who are the ones responsible for drought management?: Responsibility for the establishment, execution and monitoring of defined measures, as well as the coordination with stakeholders, should be assigned.



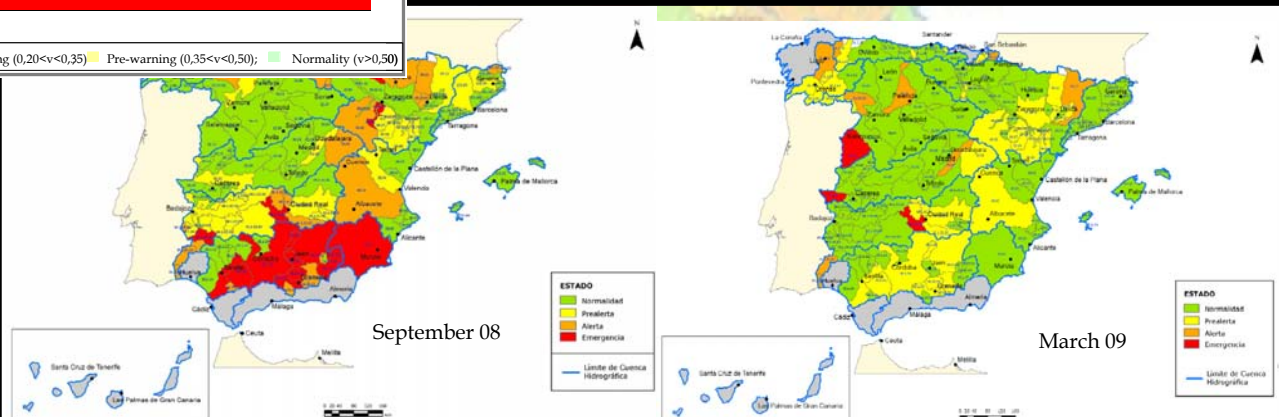
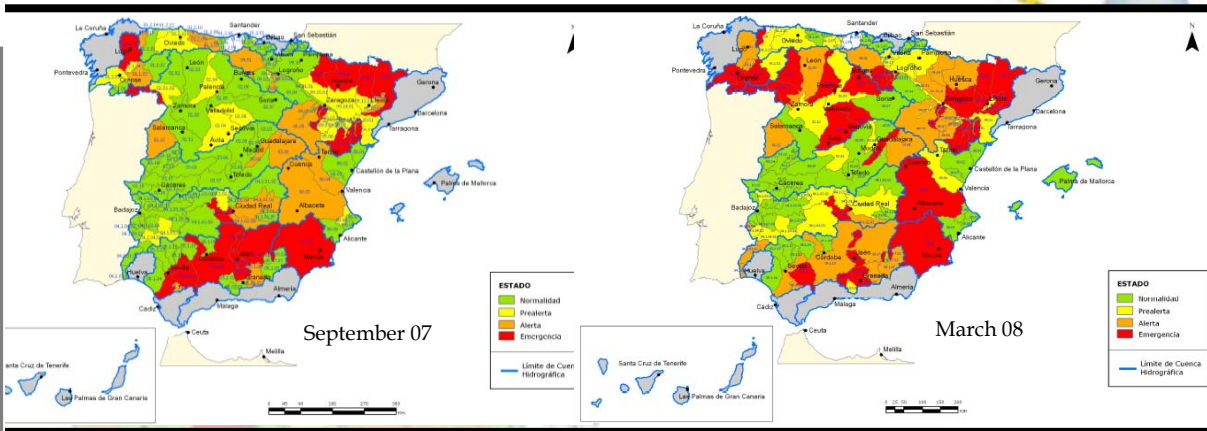
## 2. Drought Management- INDICATORS

### DROUGHT ACTION PLANS-DROUGHT INDICATORS

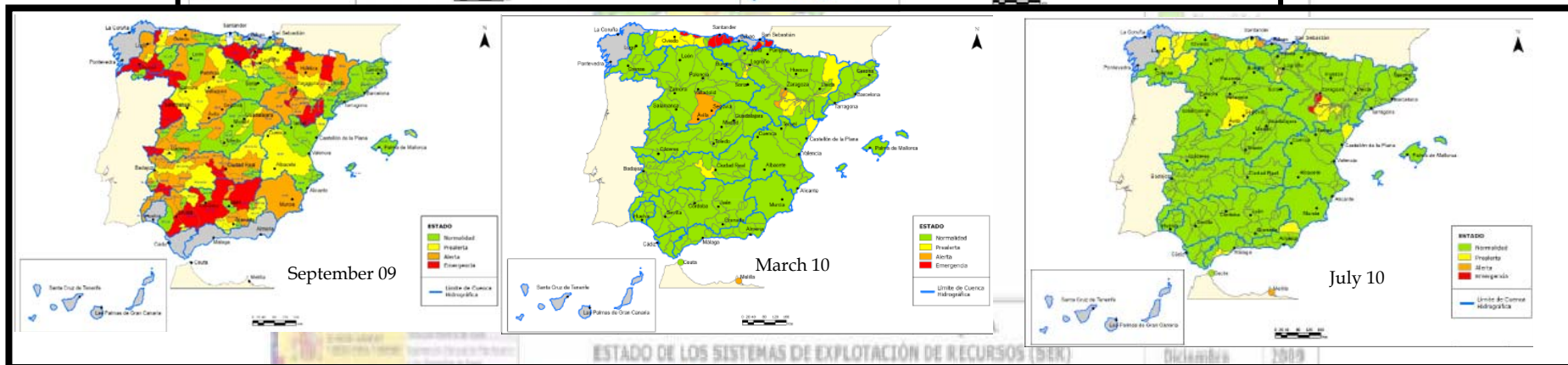
#### State index. Threshold Values



#### LEYENDA

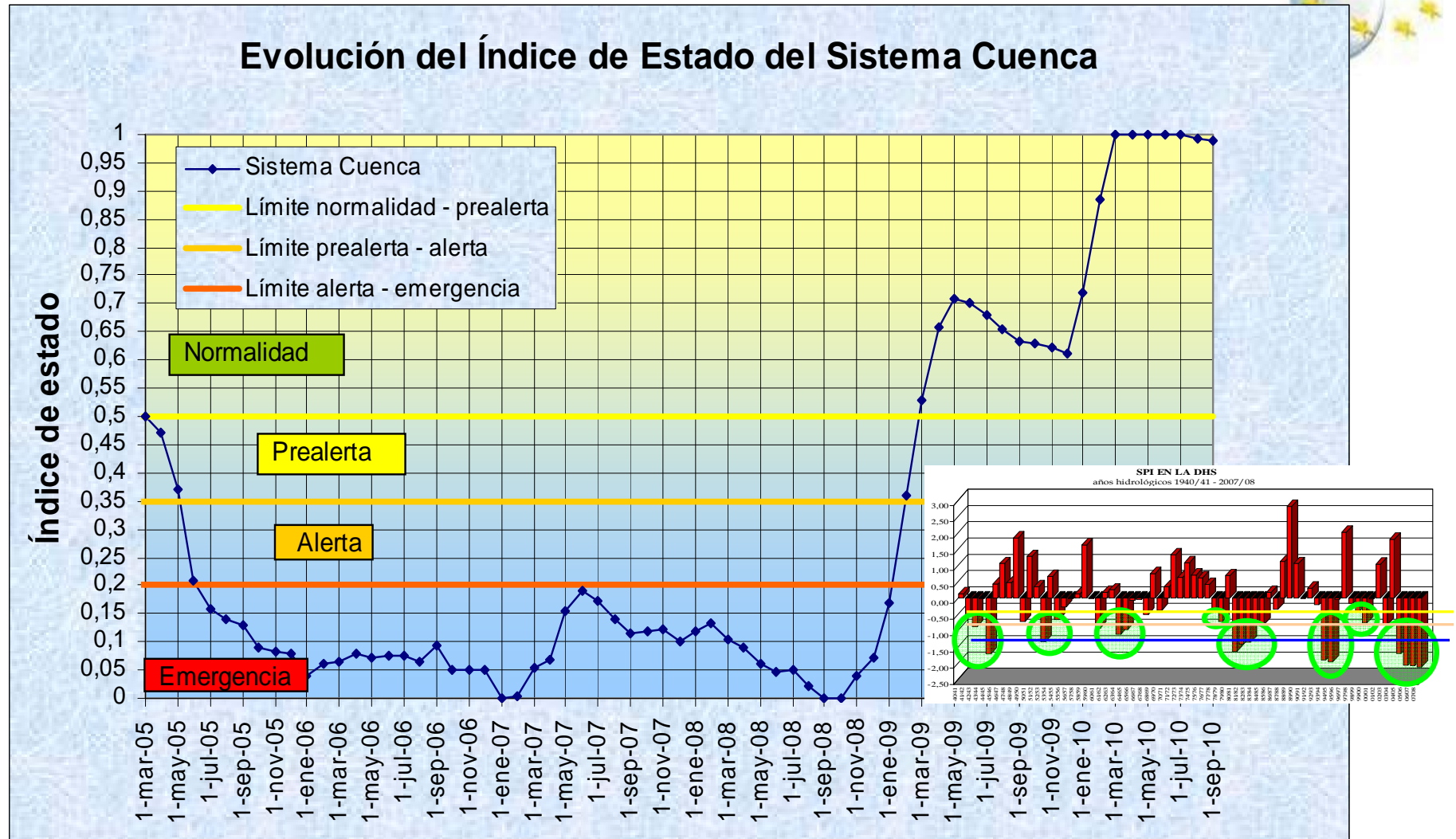


Fuente: <http://www.marm.es>





## 2. Drought Management- Segura River Basin Drought Indicator



Updated information can be checked at:

[https://www.chsegura.es/chs\\_en/cuenca/sequias/gestion/index.html](https://www.chsegura.es/chs_en/cuenca/sequias/gestion/index.html)

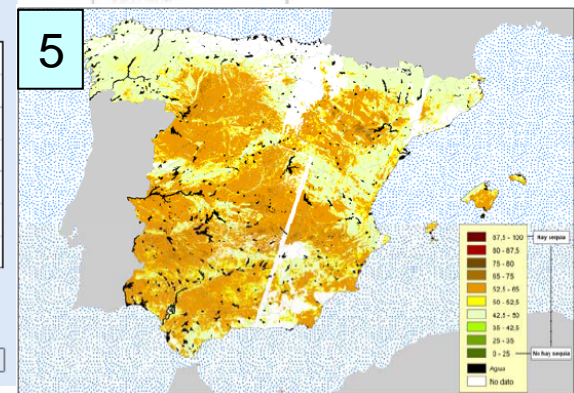
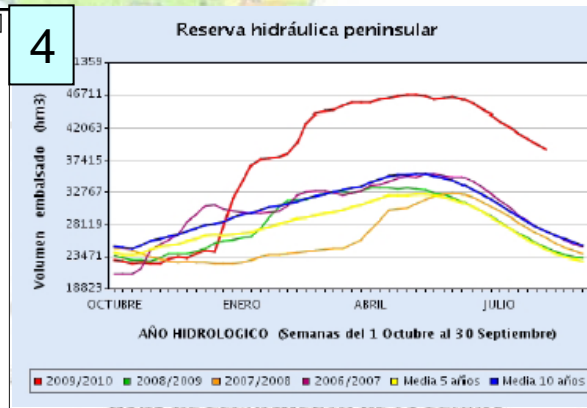
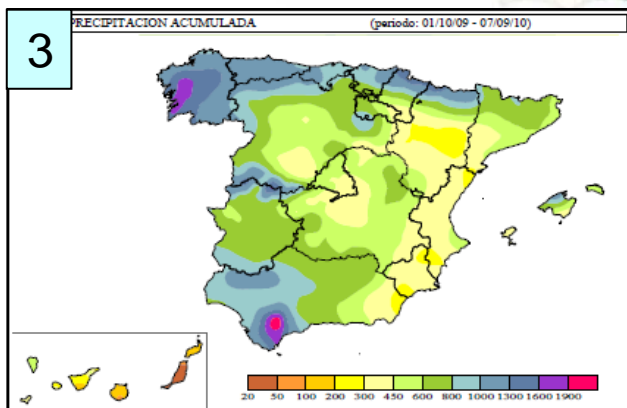
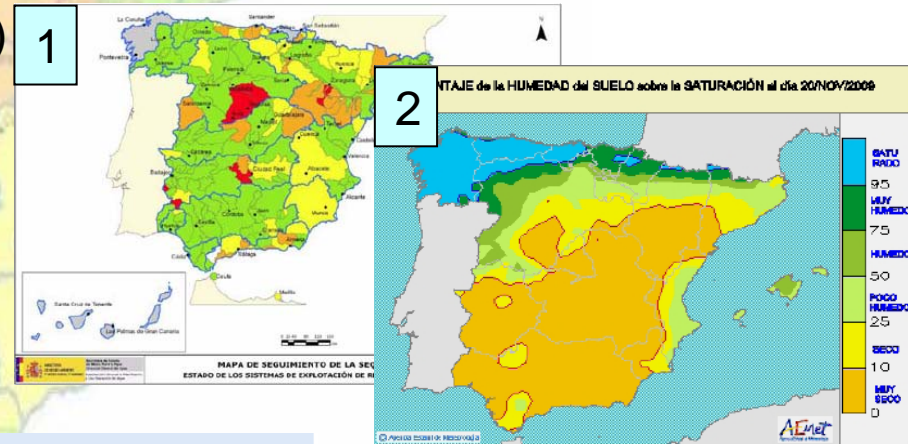
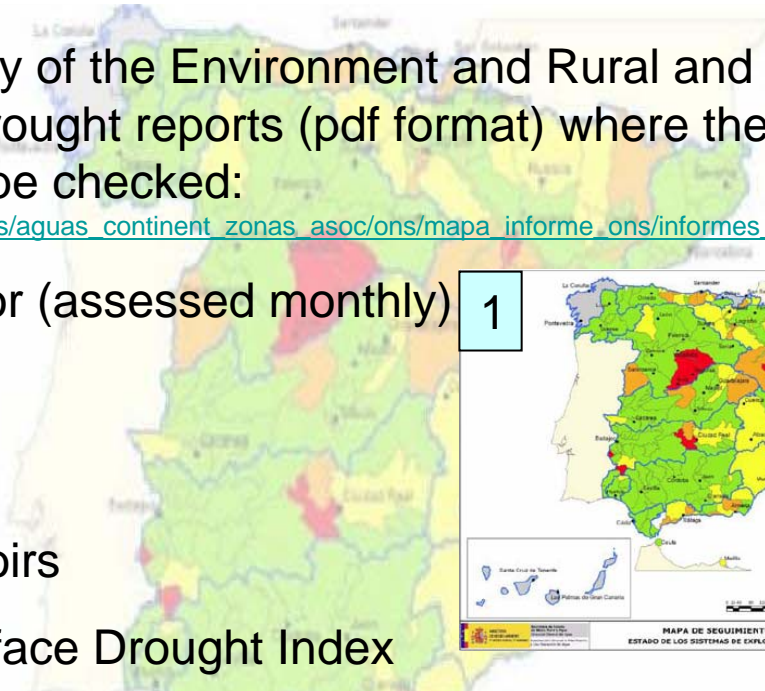


## 2. Drought Management- Other parameters

The Spanish Ministry of the Environment and Rural and Marine Affairs publishes weekly Drought reports (pdf format) where the following parameters, among others, can be checked:

([http://www.mma.es/portal/secciones/aguas\\_continent\\_zonas\\_asoc/ons/mapa\\_informe\\_ons/informes\\_cuenca.htm](http://www.mma.es/portal/secciones/aguas_continent_zonas_asoc/ons/mapa_informe_ons/informes_cuenca.htm))

- 1. Drought indicator (assessed monthly)
- 2. Soil Moisture
- 3. Precipitation
- 4. Water in reservoirs
- 5. Normalized Surface Drought Index



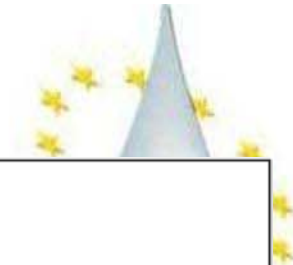


## 2. Drought Management- MEASURES

Several measures are defined in the Drought Management Plans of the river basins. Some of them are listed below:

- Weekly monitoring System
- New desalination plants were constructed
- **OPERATION OF THE WELL STRATEGIC NETWORK**
- Emergency investments in new infrastructures to increase water resources or to improve demand management.
- Water rights transfer, using water transfer infrastructure (up to 70 hm<sup>3</sup>/year)
- **Restrictions to irrigation supply, up to 50%**
- **Improving installations and networks to reduce water losses.**
- **Modernization of irrigation systems**
- Economic measures to compensate farmers for water supply restrictions.
- Administrative measures, including a drought decree to improve water resource management

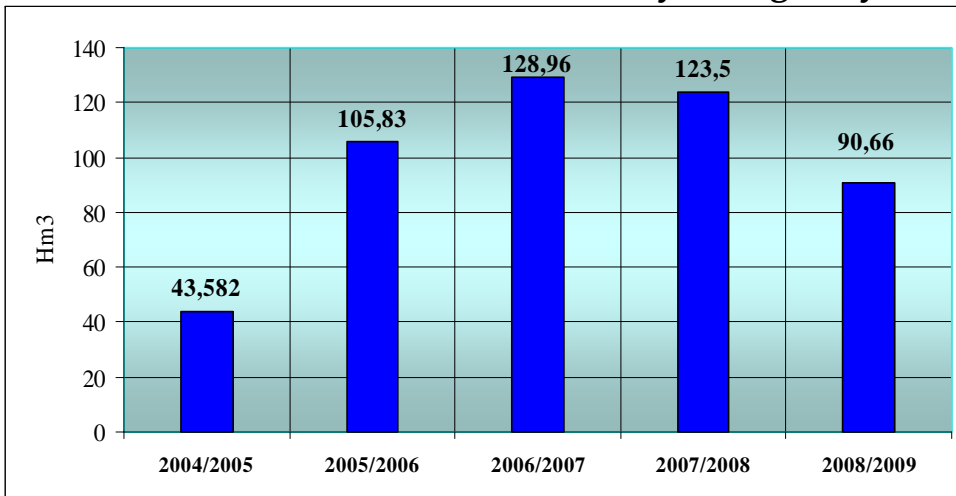




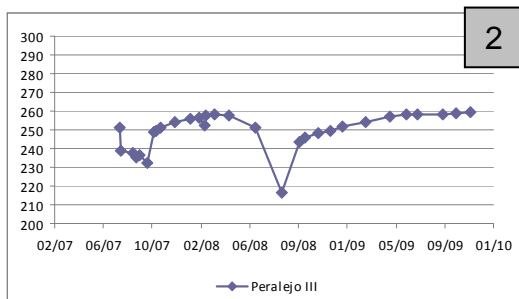
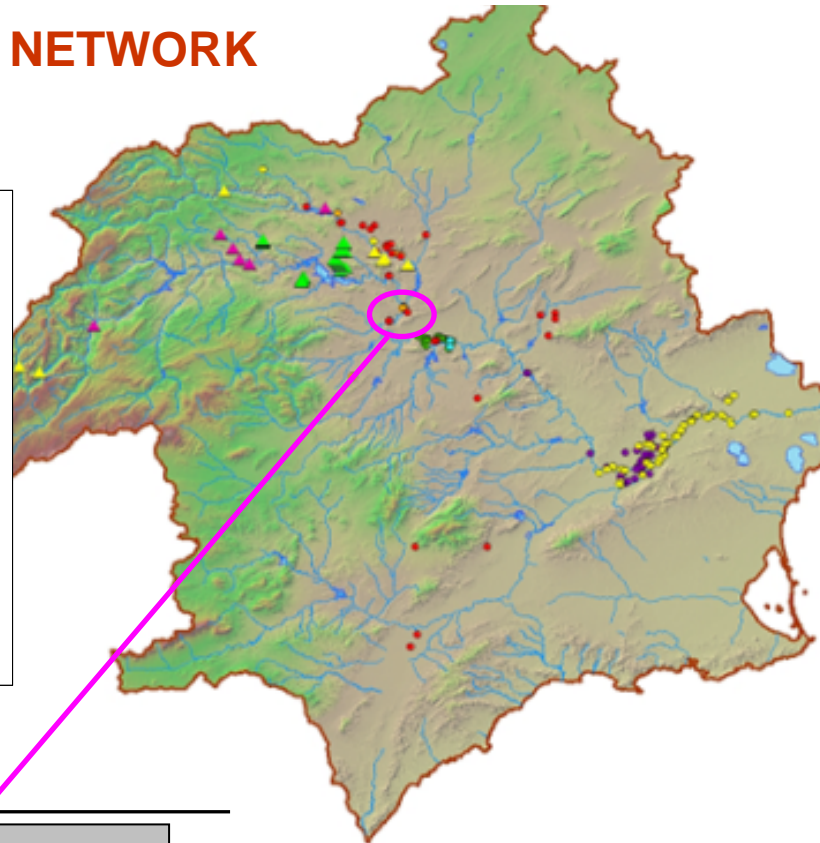
## 2. Drought Management- MEASURES

### WELL STRATEGIC NETWORK

Abstracted volume at the end of the Hydrological year.



**Total Volume (2004/09) = 492,44 Hm<sup>3</sup>**



**Peralejos Wells:**

- 1. Abstraction
- 2. Water level in wells

1

AÑOS HIDROLÓGICOS			
	2006-2007	2007-2008	2008-2009
<b>Sondeo</b>	<b>Volumen m<sup>3</sup></b>	<b>Volumen m<sup>3</sup></b>	<b>Volumen m<sup>3</sup></b>
Peralejo 1	1.135.642 m <sup>3</sup>	1.875.917 m <sup>3</sup>	0
Peralejo 2	1.162.145 m <sup>3</sup>	1.849.093 m <sup>3</sup>	0
Peralejo 3	686.700 m <sup>3</sup>	1.295.705 m <sup>3</sup>	0
Peralejo 4	863.856 m <sup>3</sup>	1.233.288 m <sup>3</sup>	0
<b>Total</b>	<b>3.848.342 m<sup>3</sup></b>	<b>6.254.003 m<sup>3</sup></b>	<b>0</b>

Fuente: Comisaría de Aguas- Confederación Hidrográfica del Segura



GOBIERNO DE ESPAÑA

MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO

CONFERENCIA HIDROGRÁFICA DEL SEGURO





### 3. Next steps



## Revision of Drought Management Plans:

After the last drought period, a revision of all Drought Management Plans is being carried out at National level



## Expert Network on Water Scarcity & Drought:

- MAIN TASKS (among others):
  - Support the **definition of commonly accepted indicators** for water scarcity and for droughts in Europe.
  - Support the creation of **Drought Risk Maps**, through commonly agreed methodology and scales.
- Lead countries: Spain, France and Italy

The Segura River Basin has been selected by the *Spanish Ministry of the Environment and Rural and Marine Affairs* as the **SPANISH PILOT RIVER BASIN**, within the Expert Network on Water Scarcity and Droughts.





# THANKS FOR YOUR ATTENTION

For further information, please visit: <http://www.chsegura.es>



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