

Centre for Port and
Coastal Studies (CEPyC)

Centro de Estudios
de Puertos y Costas

CEDEX

Spanish Framework for coastal sediment management. Regulatory conditions and impact on sediment balance

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GOBIERNO
DE ESPAÑA

MINISTERIO
DE TRANSPORTES
Y MOVILIDAD SOSTENIBLE

VICEPRESIDENCIA
TERCERA DEL GOBIERNO
MINISTERIO
PARA LA TRANSICIÓN ECOLÓGICA
Y EL RETO DEMOGRÁFICO

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DE OBRAS PÚBLICAS

PART I

Applicable Regulations and technical instructions that regulate the extraction, placement and disposal of dredged materials in Spain

PART II

Overview of dredged volumen from the Dredged Material Inventory in Spain

Coastal Law 22/1988: Article 63: Extraction of aggregates and dredging

Article 63

1. In order to grant authorisations for the extraction of aggregates and dredging activities, it shall be necessary to evaluate their effects on the maritime–terrestrial public domain, referring both to the site of extraction or dredging and, where applicable, to the site of discharge. The stability of the beach shall be safeguarded, with priority given to its requirements for aggregate replenishment.

2. The extraction of aggregates for construction purposes shall be prohibited, except for the creation and regeneration of beaches.

3. The conditions of the authorisation shall include, among others, those relating to:

- a) The term for which it is granted.
- b) The volume to be extracted, dredged, or discharged into the maritime–terrestrial public domain, the rate of these actions, and the effective working time.
- c) The procedure and machinery to be employed.
- d) The destination and, where applicable, the discharge site within the public domain of the extracted or dredged material.
- e) The means and guarantees for the effective monitoring of these conditions.

4. Should adverse effects occur on the public domain and its use, the granting Administration may modify the initial conditions to correct them, or even revoke the authorisation, without any right to compensation for the holder.

Spanish applicable regulations

Royal Legislative Decree 2/2011: approving the recast text of the Law on State Ports and the Merchant Navy.



Article 58. Extension or Modification of Ports

2, **For the modification or extension of ports, dredging and filling works may be carried out using materials** of terrestrial or **marine origin** which, by their nature, final disposal or protective isolation, **do not give rise to pollution processes** exceeding the levels required by the applicable regulations on the quality of marine waters.

Dredging works shall comply with the provisions of Article 64 of this Law.

Filling works within the port public domain shall require authorization from the Port Authority.

Article 64. Dredging works

1. The execution of **any dredging works** or the disposal of dredged material **within the port public domain**, on the basis of the corresponding project, shall require **authorisation from the Port Authority**.

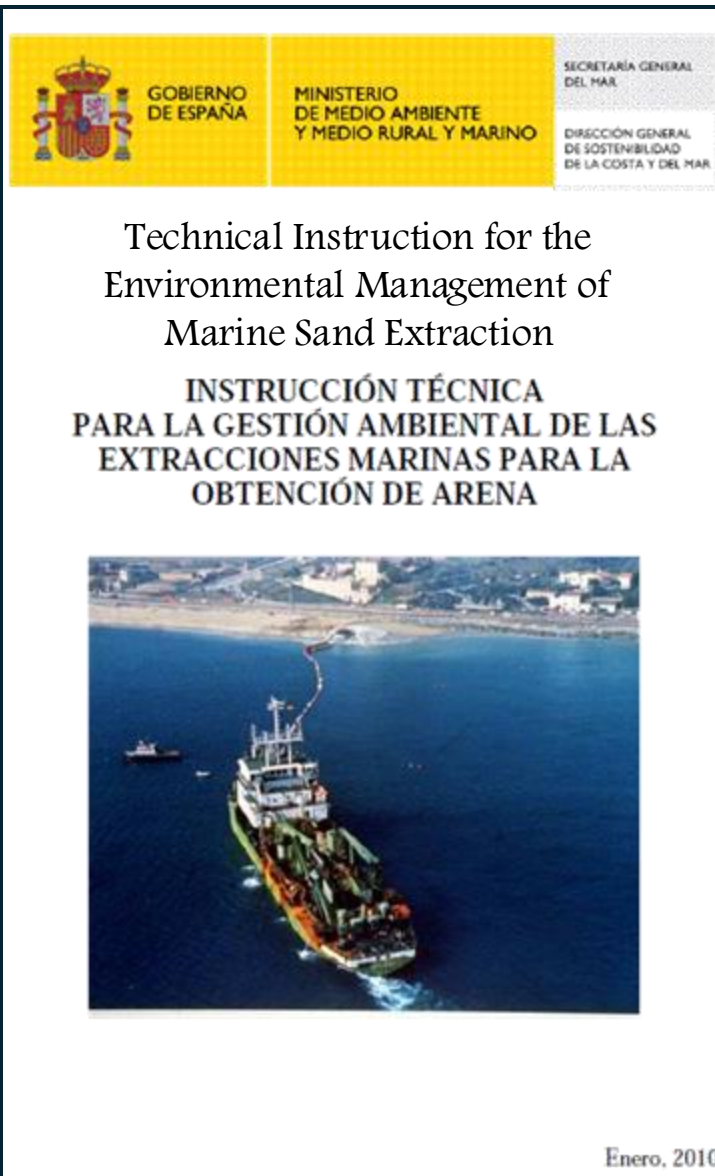
Dredging works carried out **outside the port public domain for port reclamation** shall require **authorisation from the corresponding coastal demarcation** or peripheral coastal service. Likewise, the disposal outside the waters of the port service area of dredged material from port dredging shall require authorisation from the maritime administration, following a report from the coastal demarcation or peripheral coastal service.

2. Dredging projects shall include a **study** on the **management of dredged material**, and in particular the identification of the disposal site(s) and the treatment to be applied.

3. In relation to the **disposal of dredged material**, the necessary studies or **analysis** shall be carried out to **assess the effects of the operation on coastal sedimentology and the marine biosphere**, as well as, where applicable, the potential contaminant capacity of the disposals, and the matter shall be submitted for review by the competent environmental and fisheries authorities.

4. The **Port Authority** shall forward to the maritime administration and the corresponding Autonomous Community the **data on the quantities of dredged material disposed** of, the **location** of the disposal site(s) and, where there is a **risk** that possible movement of the material may affect maritime navigation, it shall also submit to the maritime administration the results of monitoring the evolution of such disposed material.

2010: Technical Instruction for the Environmental Management of Marine Sand Extraction



The image shows the cover of a technical instruction document. At the top left is the Spanish coat of arms and the text 'GOBIERNO DE ESPAÑA'. To its right is 'MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO'. Further right, in a grey box, is 'SECRETARÍA GENERAL DEL MAR' and 'DIRECCIÓN GENERAL DE SOSTENIBILIDAD DE LA COSTA Y DEL MAR'. The main title is 'Technical Instruction for the Environmental Management of Marine Sand Extraction' followed by 'INSTRUCCIÓN TÉCNICA PARA LA GESTIÓN AMBIENTAL DE LAS EXTRACCIONES MARINAS PARA LA OBTENCIÓN DE ARENA'. Below the text is a photograph of a large dredging vessel at sea. At the bottom right, it says 'Enero, 2010'.

- Objective: To **establish the technical and environmental criteria** governing marine **sand extractions**, ensuring minimal impacts on the marine and coastal environment, while **safeguarding** sediment quality and **ecosystem protection**.
- Mandatory Environmental Impact Assessment (EIA):
 - Dredging projects exceeding **3,000,000 m³/year**
 - Dredging projects carried out in **environmentally sensitive areas**
 - Projects that **specific autonomic** regulation require it
- Environmental criteria
 - **Limit fine content** and ensure the absence of **harmful contaminants** in sediments.
 - Monitor **turbidity** and impacts on benthic habitats/seagrass.
 - **Protect underwater** archaeological/cultural heritage.
 - Establish **monitoring** and reporting programs

Law 21/2013 of December 9th on Environmental Assessment, as amended by Law 9/2018

<p>Projects Requiring <u>Simplified</u> Environmental Assessment (Annex II)</p>	<ul style="list-style-type: none">• Dredging between 100,000 and 500,000 m³.• Smaller dredging projects located near sensitive habitats, bathing waters, or aquaculture areas.
<p>Projects Requiring <u>Ordinary</u> Environmental Impact Assessment (Annex I)</p>	<ul style="list-style-type: none">• Dredging exceeding 500,000 m³ of material.• Dredging in protected or sensitive areas: Natura 2000, marine reserves, wetlands...• Marine aggregate extraction exceeding 3,000,000 m³/year (same that Technical Instruction on Marine Sand Extraction).• Simplified Environmental Assessment projects that the competent authority may decide to escalate to the ordinary procedure

Law 21/2013 of December 9 on Environmental Assessment, as amended by Law 9/2018

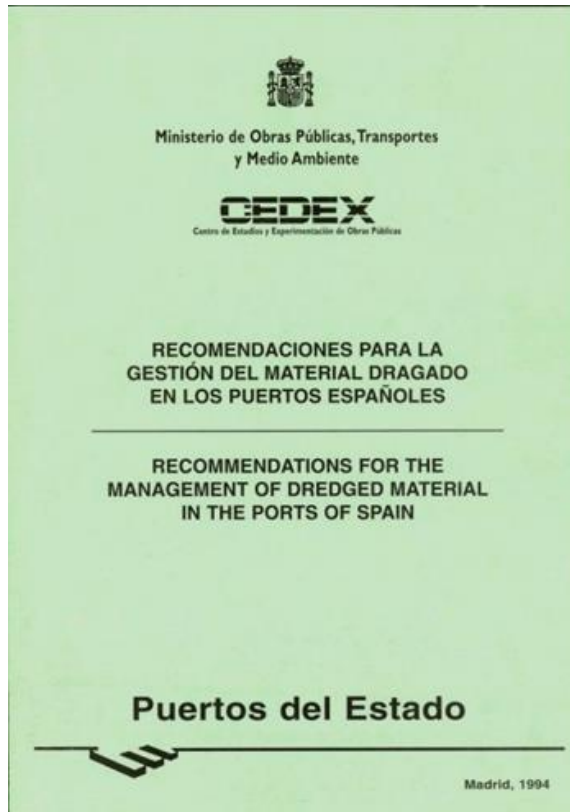
Contents of the Environmental Impact Assessment (EIA) (Art. 35-36)

- **Characterization of dredged material:** grain size, chemistry, contaminants.
- **Destination:** sea disposal, port reclamation, confinement, or reuse.
- **Effects on coastal dynamics:** currents, sediment transport, erosion/accretion.
- **Ecological impacts:** *Posidonia oceanica* meadows, benthic communities, seabirds.
- **Risks of turbidity, contaminant resuspension, impacts on fishing and shellfishing.**
- **Preventive and corrective measures:** volume limits, selection of disposal areas, operational restrictions during adverse weather, environmental monitoring.

Deadlines and Effects (Art. 41-47)

- Ordinary EIA must be resolved within **4 months** (extendable 2 months).
- Any dredging authorization granted without prior EIA is **null**.

Spanish applicable regulations



1994 RMDM: First guiding framework for management of dredging material

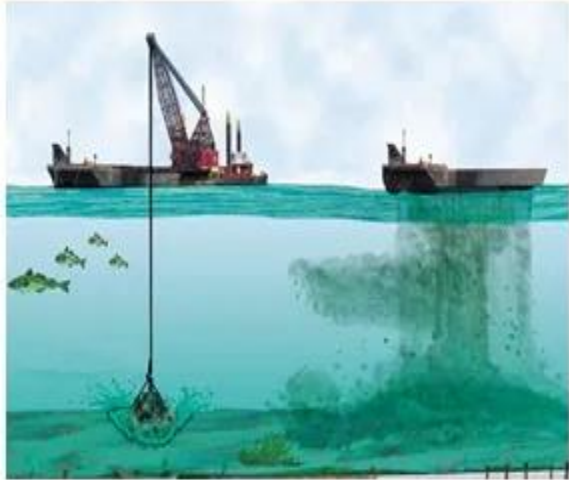


2014 (rev. 2015) GCMD: Updated by Interministerial Commission on Marine Strategies, replacing 1994 guidelines with environmental criteria



2021: Final version refining and formalizing the 2014 guidelines

Clasificación de dredged material



Directrices para la caracterización del material dragado y su reubicación en aguas del dominio público marítimo-terrestre

Guidelines for the characterization of dredged material and its relocation within waters of the maritime-terrestrial public domain



COMISIÓN INTERMINISTERIAL DE ESTRATEGIA MARITIMA 2021

Physical characterization

- Granulometry

Biological characterization:

- Previous toxicity test: ecotoxicity essay over *Vibrio Fischery*
- Liquid phase: over *Paracentrotus lividus*
- Solid phase: over *Ampelisca brevicornis* and *Corophium* sp

Chemical characterization (over > 2mm fraction)

PARAMETER	ACTION LEVELS			Category R
	ACTION LEVEL A	ACTION LEVEL B	ACTION LEVEL C	
Hg (mg/kg)	0,35	0,71	2,84	17
Cd (mg/kg)	1,20	2,40	9,60	72
Pb (mg/kg)	80,0	218	600	1000
Cu (mg/kg)	70,0	168	675	2500
Zn (mg/kg)	205	410	1640	2500
Cr (mg/kg)	140	340	1000	1000
Ni (mg/kg)	30,0	63,0	234	1000
As (mg/kg)	35,0	70,0	280	1000
Σ 7 PCBs (mg/kg)	0,05	0,18	0,54	4
Σ 9 HAPs (mg/kg)	1,88	3,76	18,80	110
TBT (mg Sn/kg)	0,05	0,20	1,00	3,0

CATEGORY A

CATEGORY B

CATEGORY C

CATEGORY R

Non-hazardous waste

Hazardous waste

Spanish applicable regulations

The classification of dredged material determines its final destination....

CATEGORY A

- ✓ Productive use (reutilization)
- ✓ Sea disposal in non-restricted and restricted zones (no included exclusion zones)

CATEGORY B

- ✓ Productive use (reutilization)
- ✓ Sea disposal in non-restricted zones ($Z > 15$ m)

CATEGORY C

- ✓ Subaqueous confinement
- ✓ Productive use (reutilization) when no biological toxicity is detected
- ✓ Sea disposal in non-restricted and restricted zones when no biological toxicity is detected
- ✓ Sediment treatment for A or B classification

CATEGORY R

- ✓ Sediment treatment for A,B or C classification
- ✓ Subaqueous confinement
- ✓ On-land management

Guidelines for the characterization of dredged material and its relocation within waters of the maritime-terrestrial public domain

Article 26: For all dredged material considered non-hazardous sediment, including projects exempt from characterization and materials exempt from chemical and biological characterization, a study must be carried out on **alternative productive uses versus sea disposal**.

Uses in public works:

- a) Beach nourishment.
- b) Creation of solid land and improvement of terrains.
- c) Fills, replacements, and coverings.
- d) Construction of submerged berms.
- e) Confinement of other contaminated dredged material.
- f) Coastal defense, such as creation of bars, slope protection, etc.
- g) Construction of earthen dykes and dams.
- h) Remediation of contaminated soils.
- i) Production of construction materials (bricks, cement, etc.).

Uses in agriculture and fisheries:

- a) Aquaculture, regeneration of shellfish beds.
- b) Enhancement of fishery resources.

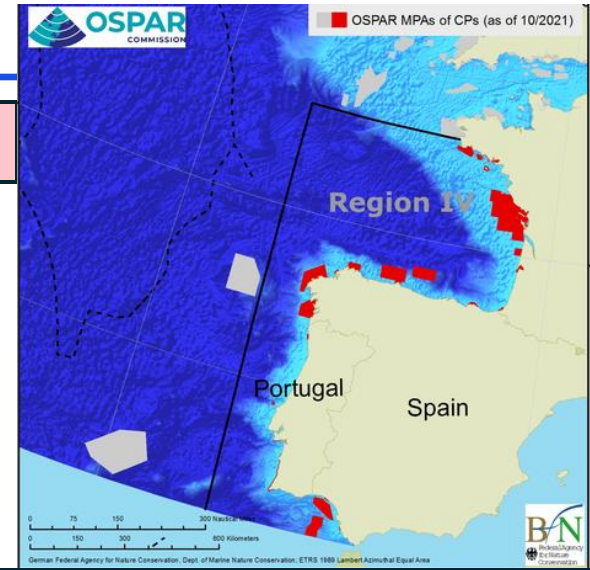
Environmental uses:

- a) Restoration of contaminated seabeds.
- b) Regeneration and creation of wetlands.

International regulations

OSPAR Convention – Protection of the Northeast Atlantic

- Promotes **prevention, reduction, and monitoring measures** for human activities, including port dredging and coastal regeneration works.
- Spain: applies to **Cantabrian and Atlantic waters**
- Annual report of dredging activities



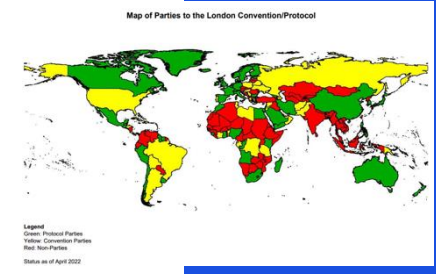
Barcelona Convention – Protection of the Mediterranean Sea



- Promotes reduction of pollution and protection of biodiversity in the Mediterranean.
- Spain: Dredging activities in **Mediterranean ports**
- Biannual report

London Convention – Prevention of Marine Pollution by Dumping of Wastes

- Control and limit the dumping of solid and liquid wastes at sea from ships, platforms, and coastal or terrestrial activities.
- From 1972 the convention was the basis for **disposal and sea dumping protocols** used by the State Ports



PART II

Overview of dredged volumen from Dredged Material Inventory in Spain

- ✓ CEDEX, in collaboration with State Ports Authority, has been preparing an **annual dredging inventory** since 1993: **“Inventory of Dredging in Spain’s State-Owned Ports”**
- ✓ The purpose of this report is to **collect, analyse,** and **store** in a database the **information** on dredging carried out by state-owned ports during a **year**
- ✓ The compiled information, the environmental characterisation of dredged material, and its geographical parameters constitute the **basic data** required to document the reports that Spain must submit as a contracting party to **international conventions** (OSPAR, London, and Barcelona)
- ✓ Information includes dredging data from **46 ports of general interest,** managed by **28 Port Authorities**



GENERAL SECTION

General information of the dredging project that does not change, even if the works span several years.

Single record existing for each dredging project, whether its duration is annual or multi-year

- PORT AUTHORITIE
- PROJECT TITLE
- PROJECT DESIGNER
- START AND END DATES
- DREDGING PURPOSE
- EXECUTING COMPANY
- TOTAL DREDGED VOLUME

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SPECIFIC SECTION

Specific information that may vary annually within the same dredging project

Dredging projects carried out within a single year will have only one record, two or more years will have two or more records, one for each year

- YEAR
- ANNUAL DREDGED VOLUME
- VOLUMES DISPOSED AT SEA, CONFINED OR REUSED
- DREDGED MATERIAL CLASSIFICATION (CATEGORY)
- DESTINATION

ENVIRONMETAL SECTION

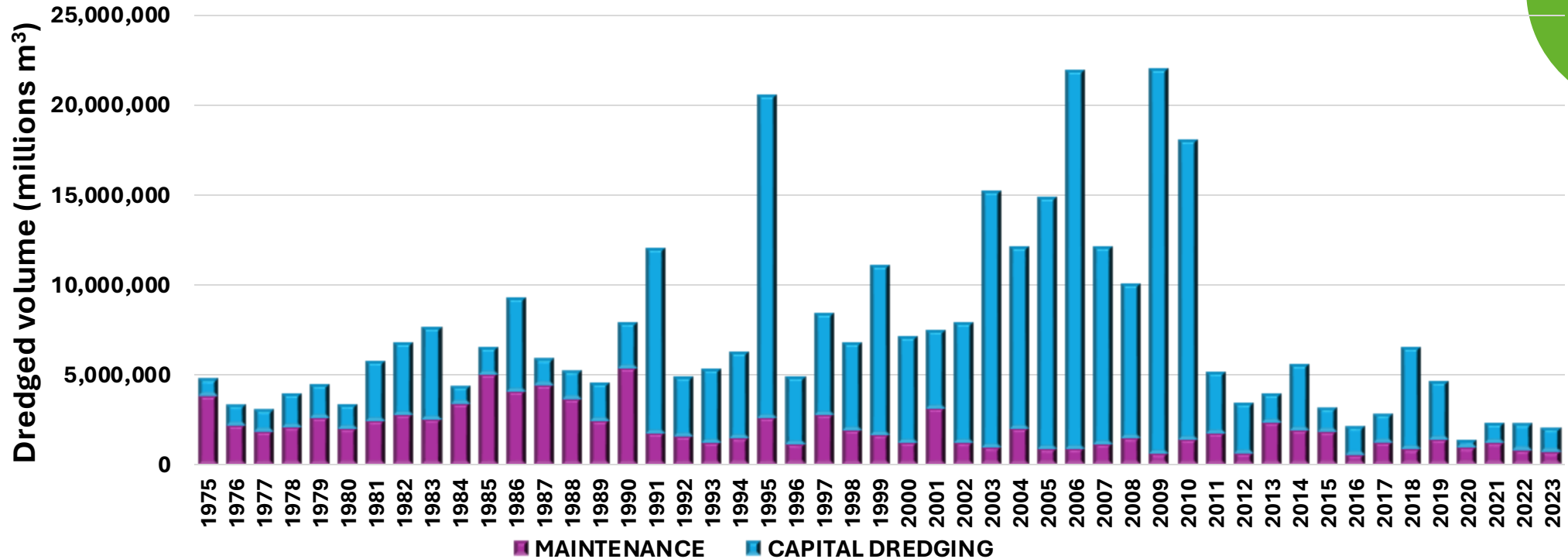
Information of the analytical and granulometric characteristics of dredged material

Dredging projects carried out within a single year will have only one record, two or more years will have two or more records, one for each year

- GRANULOMETRY CHARACTERIZATION
- CHEMICAL CHARACTERIZATION
- DREDGED DESTINATION COORDINATES

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Dredging Activity in Spain



1975-1993

5.7 millions m³

1994-2010

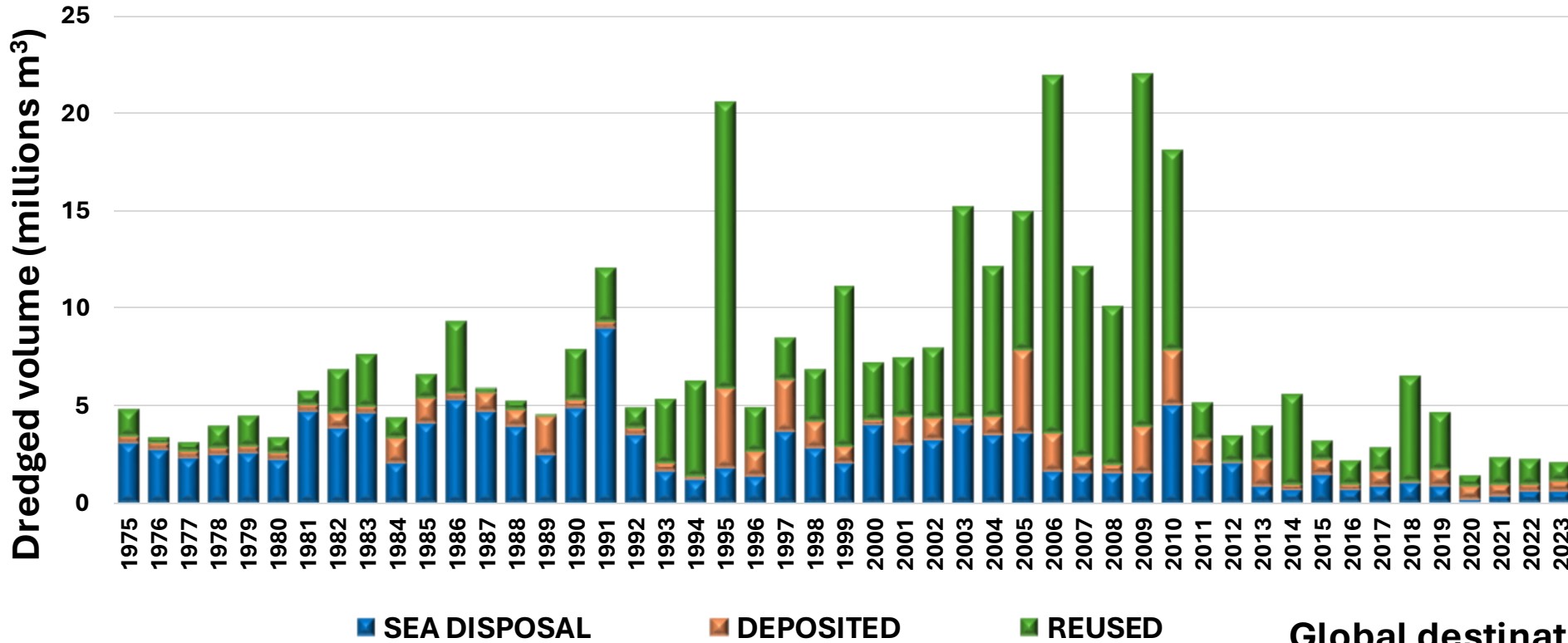
12.1 millions m³

2011-2023

3.5 millions m³

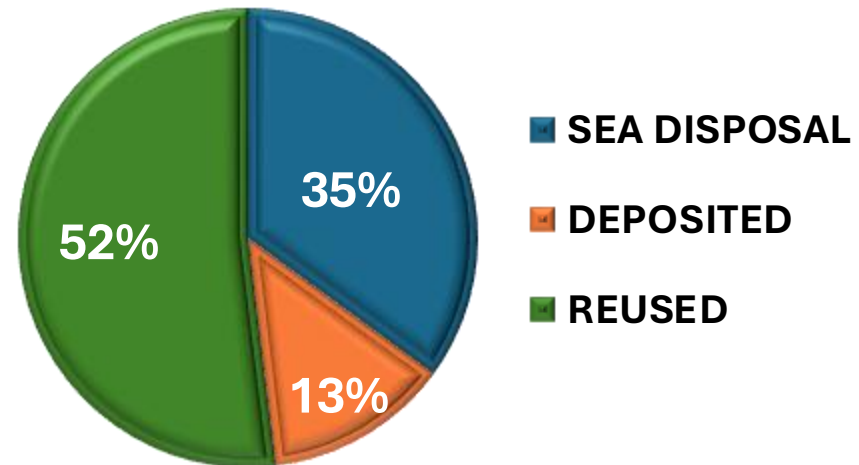
Large dredged volumes linked to major port expansions in Spain (Valencia, Barcelona, Gijón, 2003–2010).

Dredging Activity in Spain



Global destination 1975-2023

- ✓ 1975-1994: sea disposal (62% of total volumen)
- ✓ From 1994: Significant rise in the volume of reused material
- ✓ 1975-1994: 25% reutilization
1995-2023: 63,5% reutilization



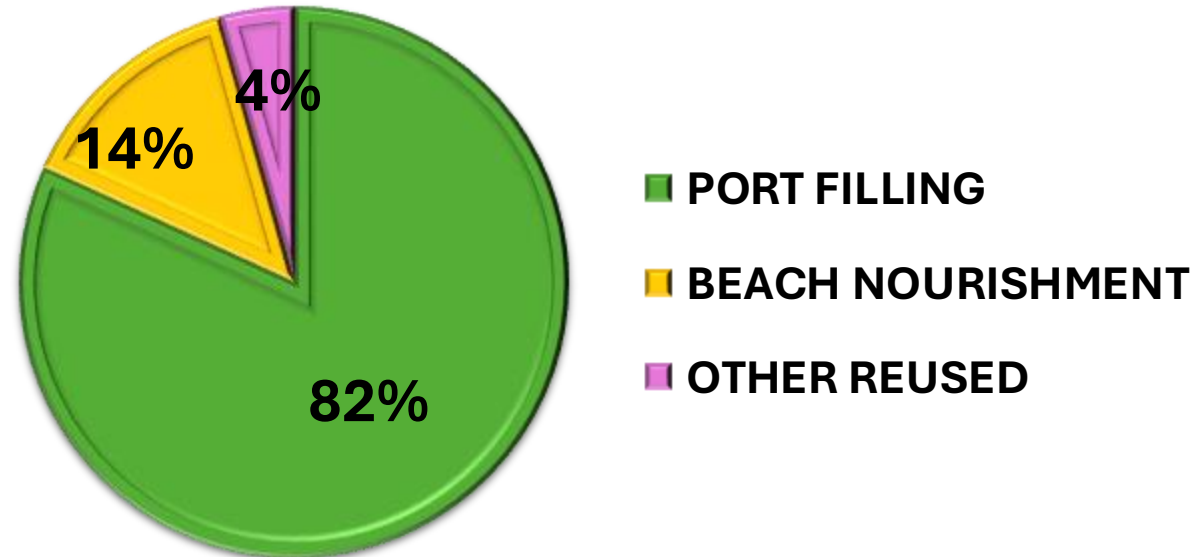
➤ PORT FILLING



➤ BEACH NOURISHMENT



% Dredged volumen with a reused destination in 1975-2023

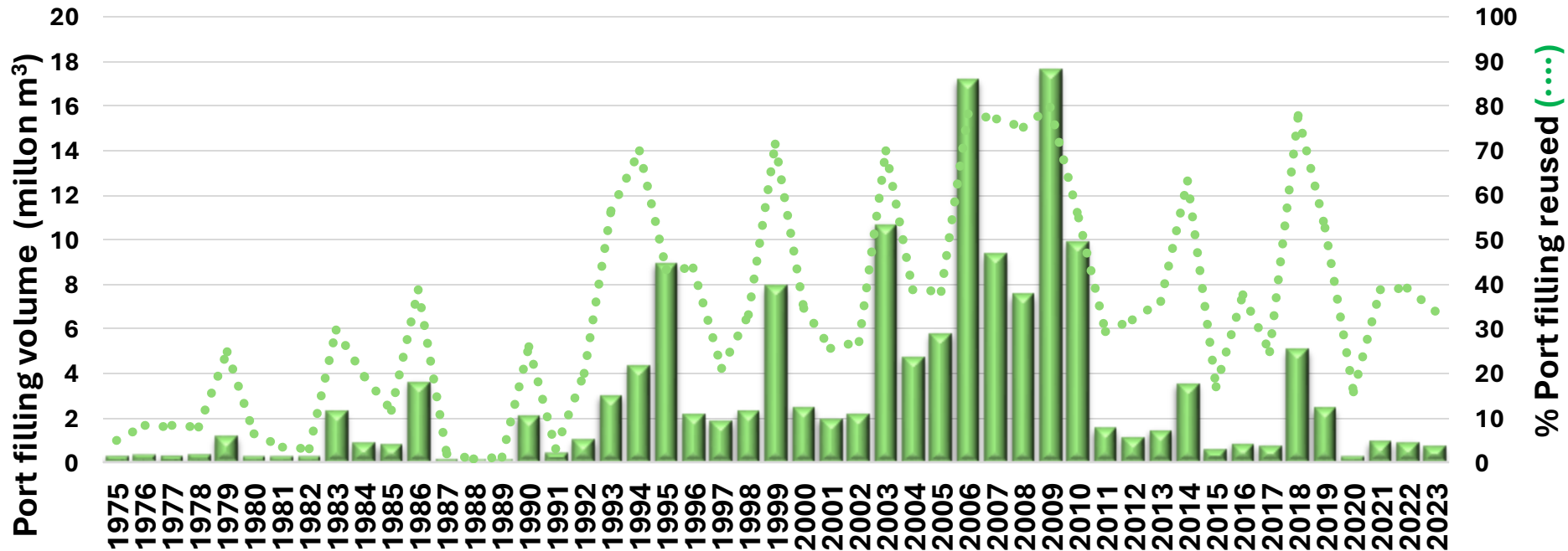


➤ PORT FILLING



**2006: 17 M m³ to port filling
(78% of total dredged volumen in that year)**

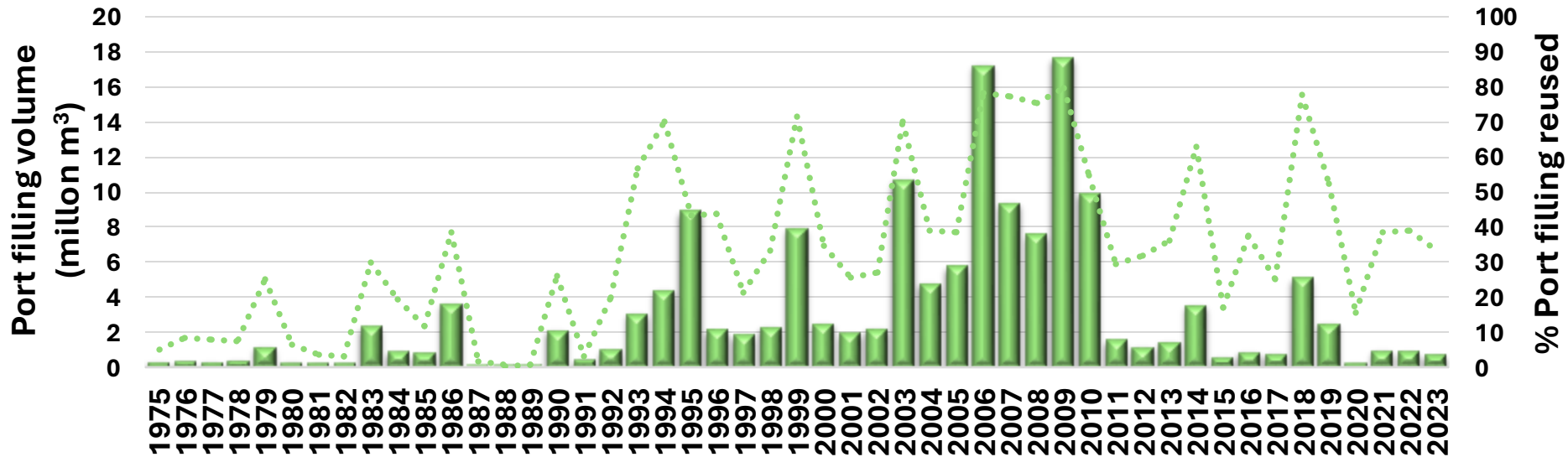
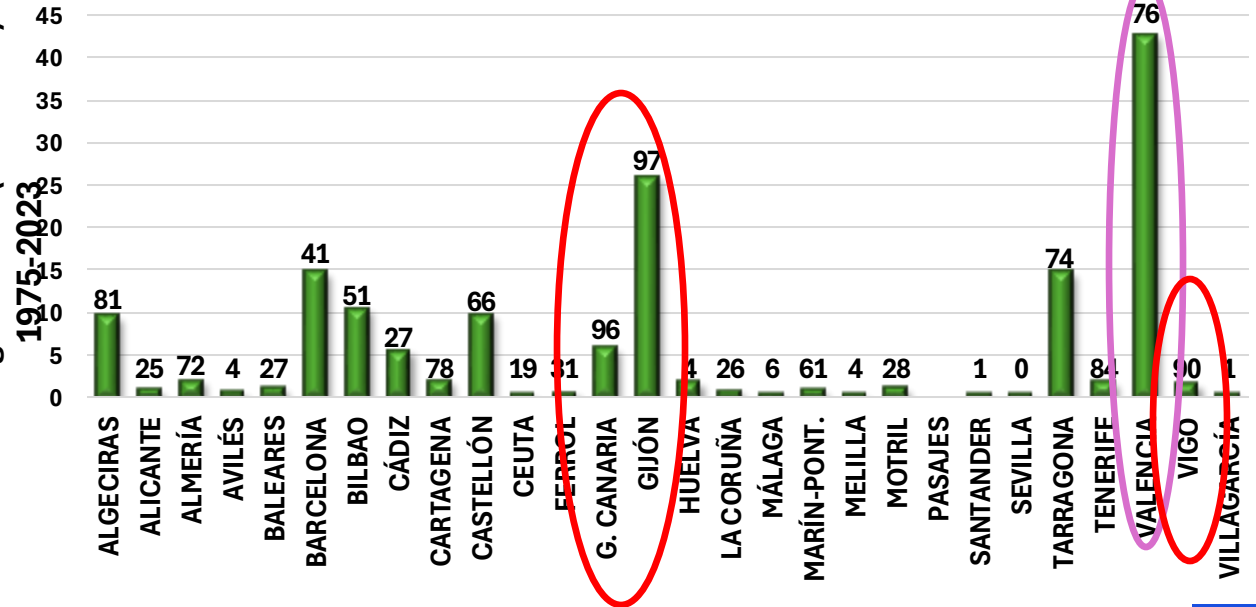
**2009: 17,6 M m³ to port filling
(80% of total dredged volumen in that year)**



➤ PORT FILLING



Port filling volumen (millon m³)



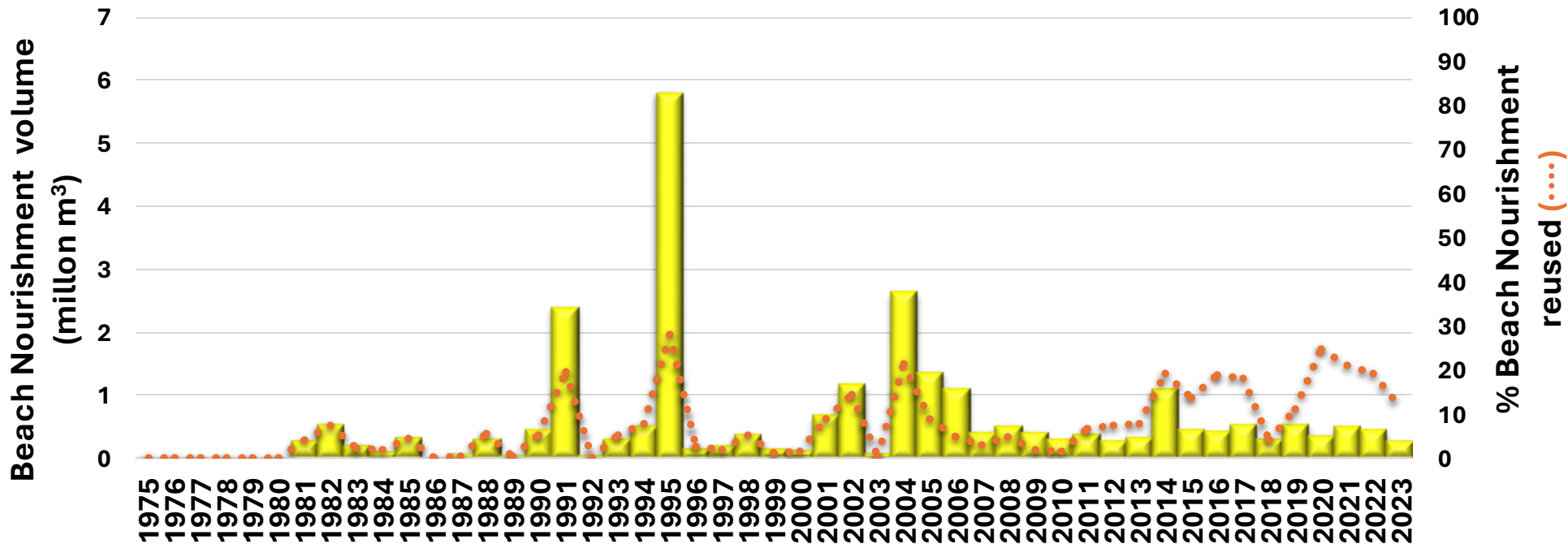
➤ BEACH NOURISHMENT

Total: 25.4 M m³ (1975-2023) → 7% of the total dredged volumen

↻ Average: 309.351 m³ /year

1995: 5.7M m³ → Huelva Port (5 M)

Last 10 years: 15% of total dredged volumen has been used for beach nourishment



InfoMAR

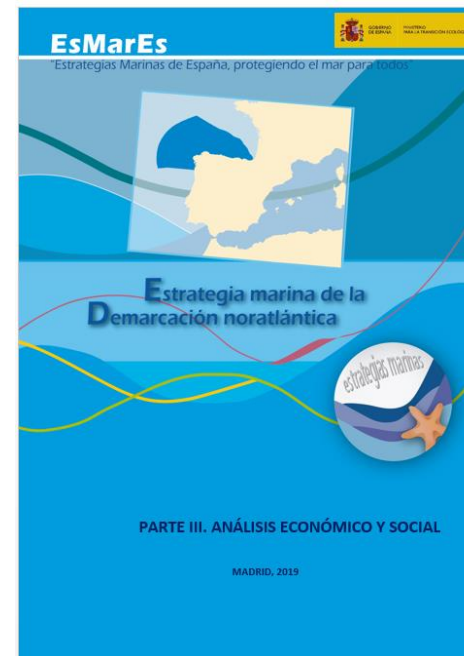
Sistema de Información sobre el Medio Marino
Marine Environmental Information System



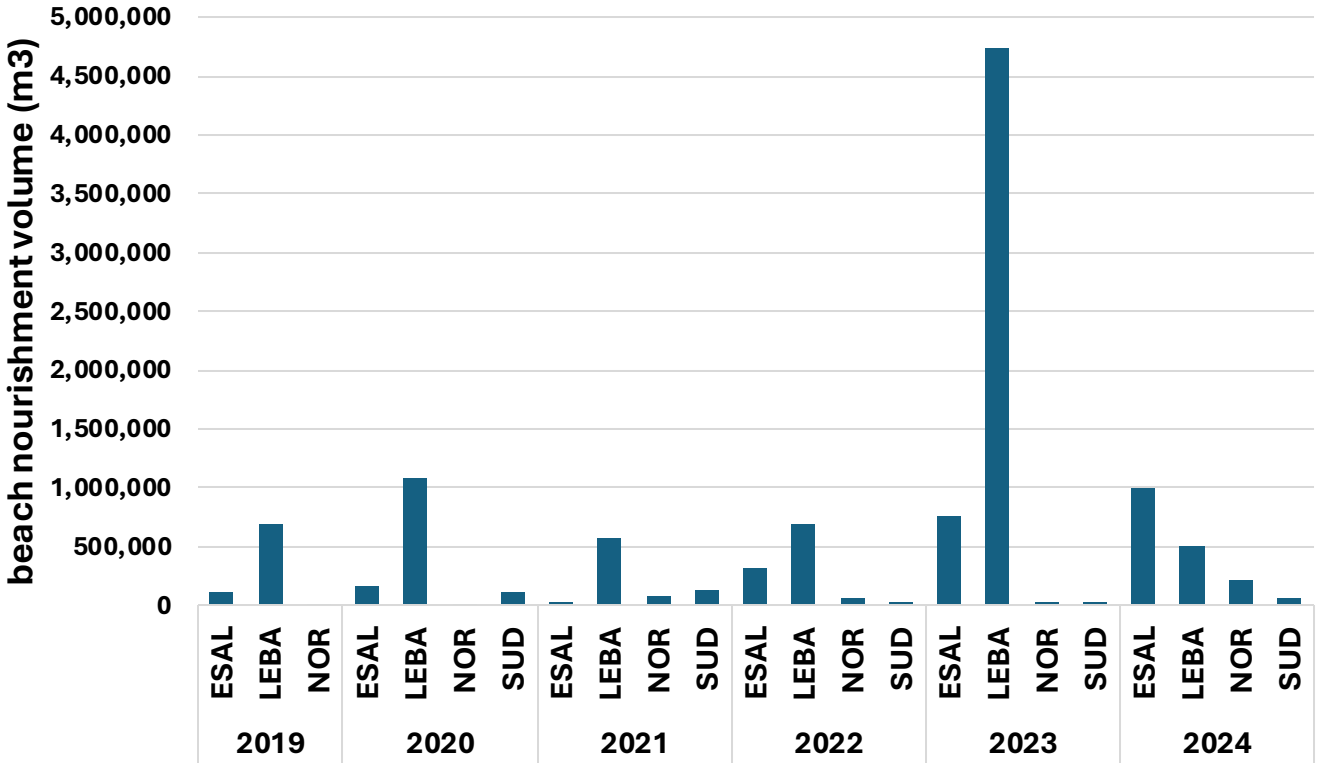
Since 2019, Spain has had the “*Inventory of Aggregate Extraction for Beach Nourishment*”, created within the framework of the Marine Environment Information System (Infomar)



Expanding the information collected on the volume of **sedimentary material** used for **beach nourishment** in Spain during a year, including regional ports and state-owned ports.




Evolution of Beach Nourishment by Marine Demarcations



✓ Greatest sand nourishment on the Levantino-balear beaches

CONCLUSIONS

- ✓ **Spanish regulation** includes several different laws regulating marine dredging activities and the management of dredged material.
 - ✓ The national **Dredged Material Inventory** compiles information of all dredging operations carried out by the 28 State Port Authorities in Spain.
 - ✓ The introduction of specific **environmental regulations** has contributed to increase the reuse of dredged materials.
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THANK YOU FOR YOUR ATTENTION

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