International Perspectives from Spain

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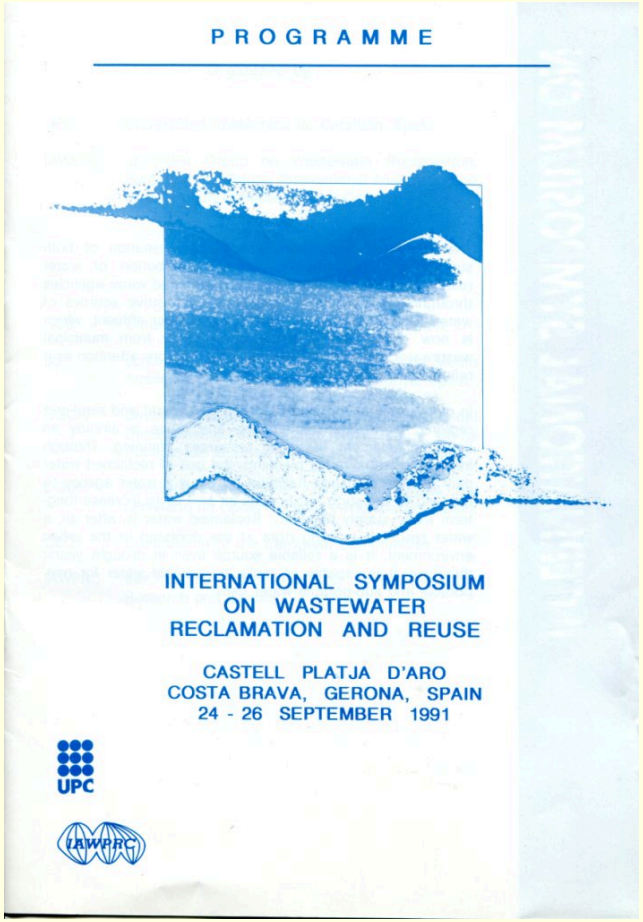
President of ASERSA

Those impressive 26 years…

- Hard to imagine that in 1991 we were inaugurating such a successful pathway…



PROGRAMME

INTERNATIONAL SYMPOSIUM ON WASTEWATER RECLAMATION AND REUSE

CASTELL PLATJA D'ARO
COSTA BRAVA, GERONA, SPAIN
24 - 26 SEPTEMBER 1991

UPC

IAWPRC

ATIONAL SYMPOSIUM ON

PROGRAMME

TUESDAY 24 SEPTEMBER

08.30 Registration
09.30 Opening Ceremony

SESSION 1: WATER REUSE PLANNING

10.00 **KEYNOTE PAPER:** Planning and Implementing Wastewater Reclamation and Reuse Projects. *Takashi Asano, USA.*

11.00 Coffee Break

11.30 Long-Range Planning for Water Reuse in the City of Los Angeles. *Bahman Sheikh, USA.*
12.00 Wastewater Treatment and … Valencia, Venezuela. *M. La… Venezuela.*
12.30 Planning for Reuse: Devel… Northern Territory, Australi…
13.00 Significance and Current S… in Sicily. *F. Croce and L. …*

WEDNESDAY 25 SEPTEMBER

SESSION 3: WATER QUALITY CRITERIA

09.00 **KEYNOTE PAPER:** Quality Criteria for Different Uses of Reclaimed Water. *James Crook, USA.*
10.00 The Clogging Capacity of Reclaimed Wastewater: A New Quality Criterion for Drip Irrigation. *B. Teltsch, M. Juanico, Y. Azov, and I. Ben Harim, Israel.*
10.30 Guideline for Environmental Enhancement in Japan. *Masahiro Takahashi, Japan.*

11.00 Coffee Break

11.30 Reuse of Treated Wastewater in Metro Chicago. *E.W. Knight, and R. Sokol, USA.*
12.00 Reclaimed Wastewater for Industrial Application. *J-H Tay, and P-C Chui, Singapore.*
12.30 Golf Course Irrigation with Reclaimed Wastewater. *R. Mujeriego, and L. Salas. Spain.*
13.00 The Scientific and Technical Programme of IAWPRC. *Thomas M. Keinath, Scientific and Technical Committe Chair, USA.*

STEWATER RECLAMATION

…with longtime colleagues

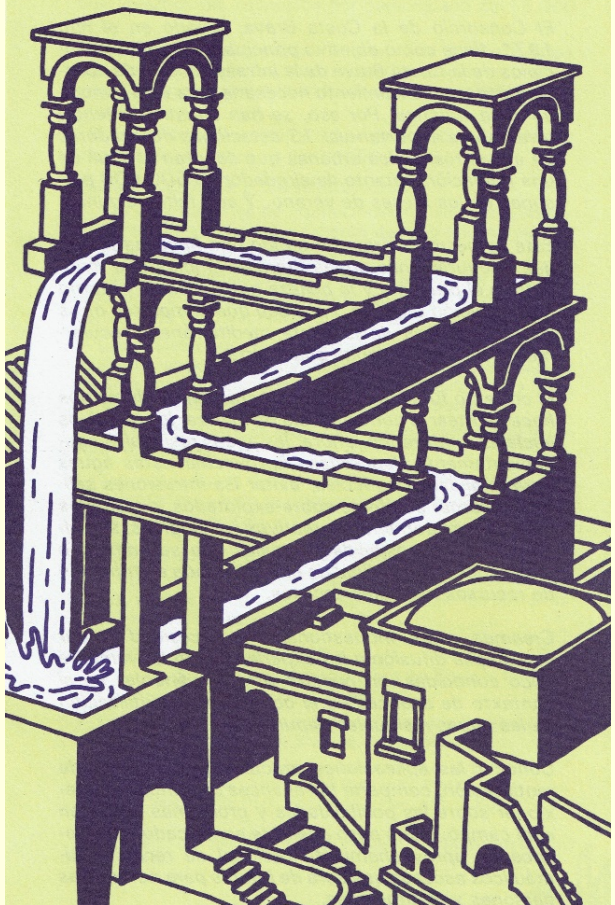
..it all had started in 1985..

JORNADAS TECNICAS SOBRE

REUTILIZACION AGUAS URBANAS

25, 26 y 27 de Septiembre de 1985

Castell·Platja d'Aro. COSTA BRAVA



26 de Septiembre

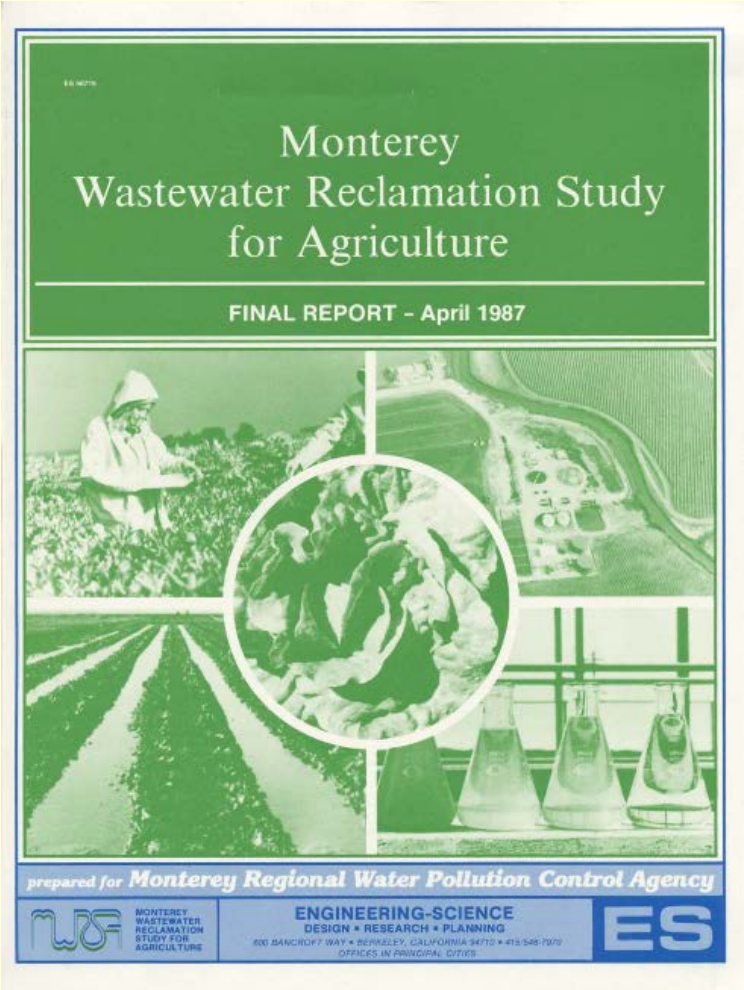
9'30 h. Ponencia:
«Planing for municipal wasterwater reclamation and reuse».
T. ASANO. Ph. D. Water reclamation specialist.
California State Resources Control Board. University of California.

27 de Septiembre

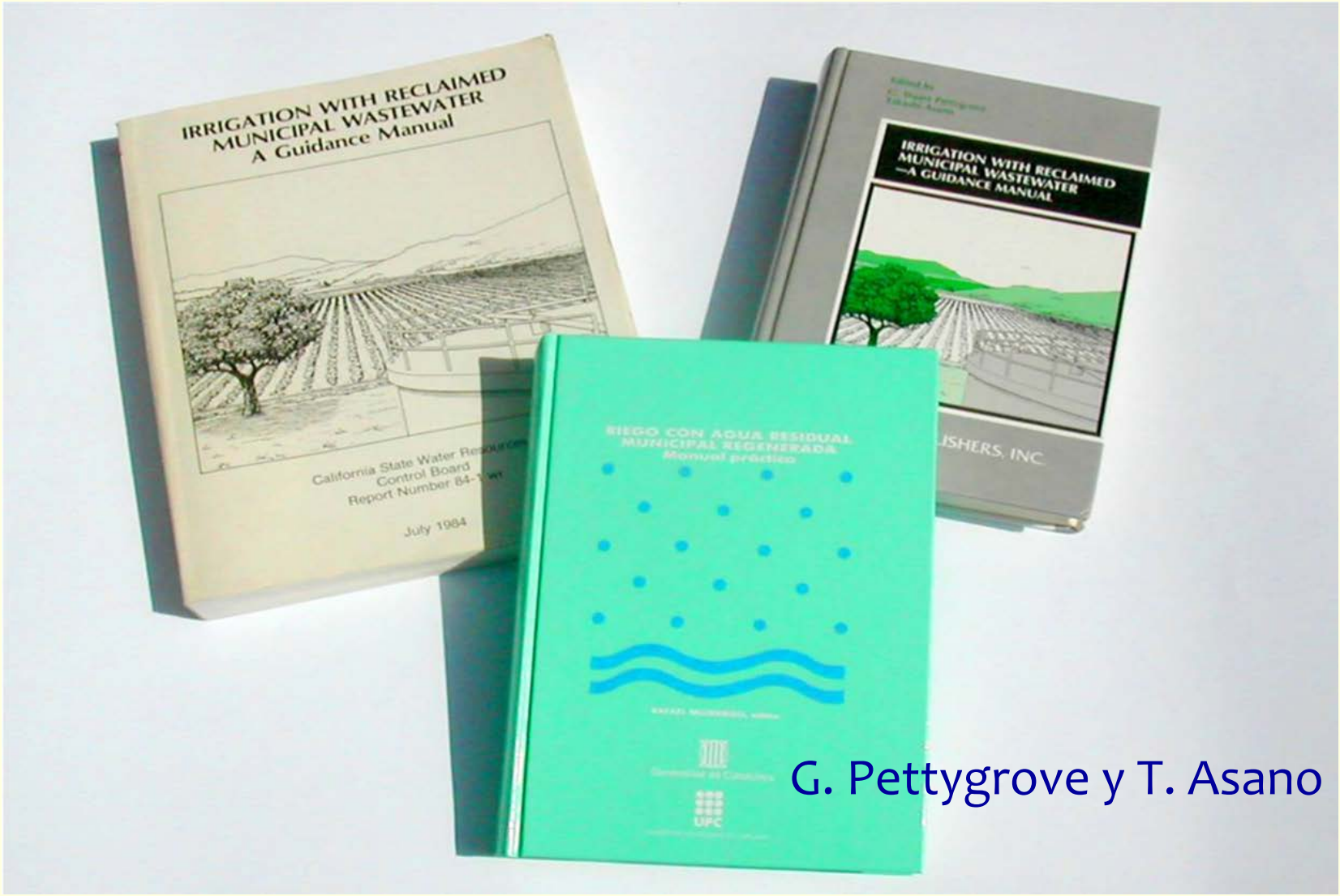
9'30 h. Ponencia:
«Reutilización de las aguas residuales depuradas en Israel».
E. IDELOVITCH. Ph. D., Vice-President.
Tahal Consulting Engineers Ltd. Israel.

16'00 h. Ponencia:
«Health and regulatory aspects of water reuse in California».
J. CROOK, Ph. D.
California Departament of Health Services. Sanity Engineering Branch.

…a historical landmark…

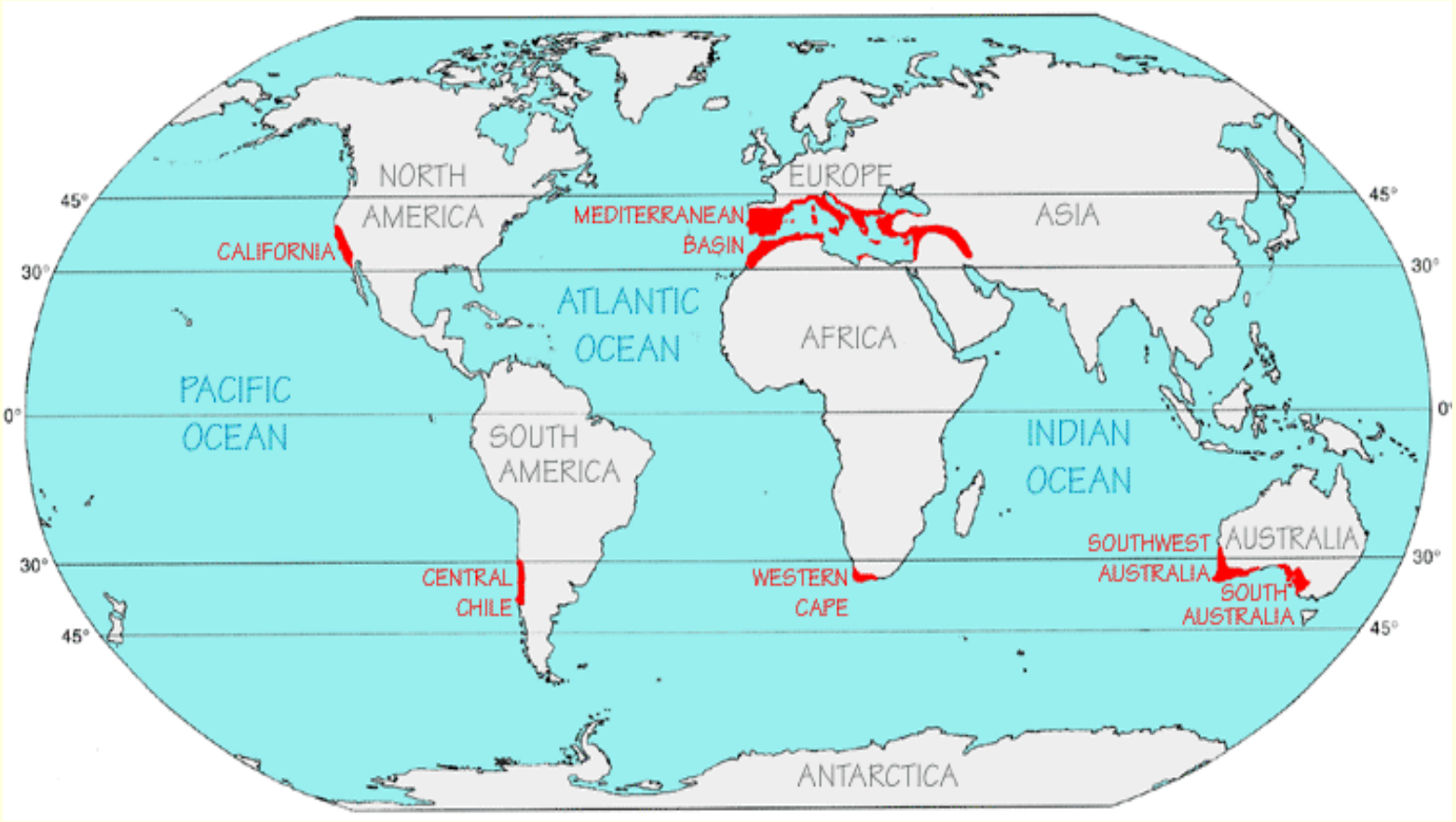


… an institutional reference



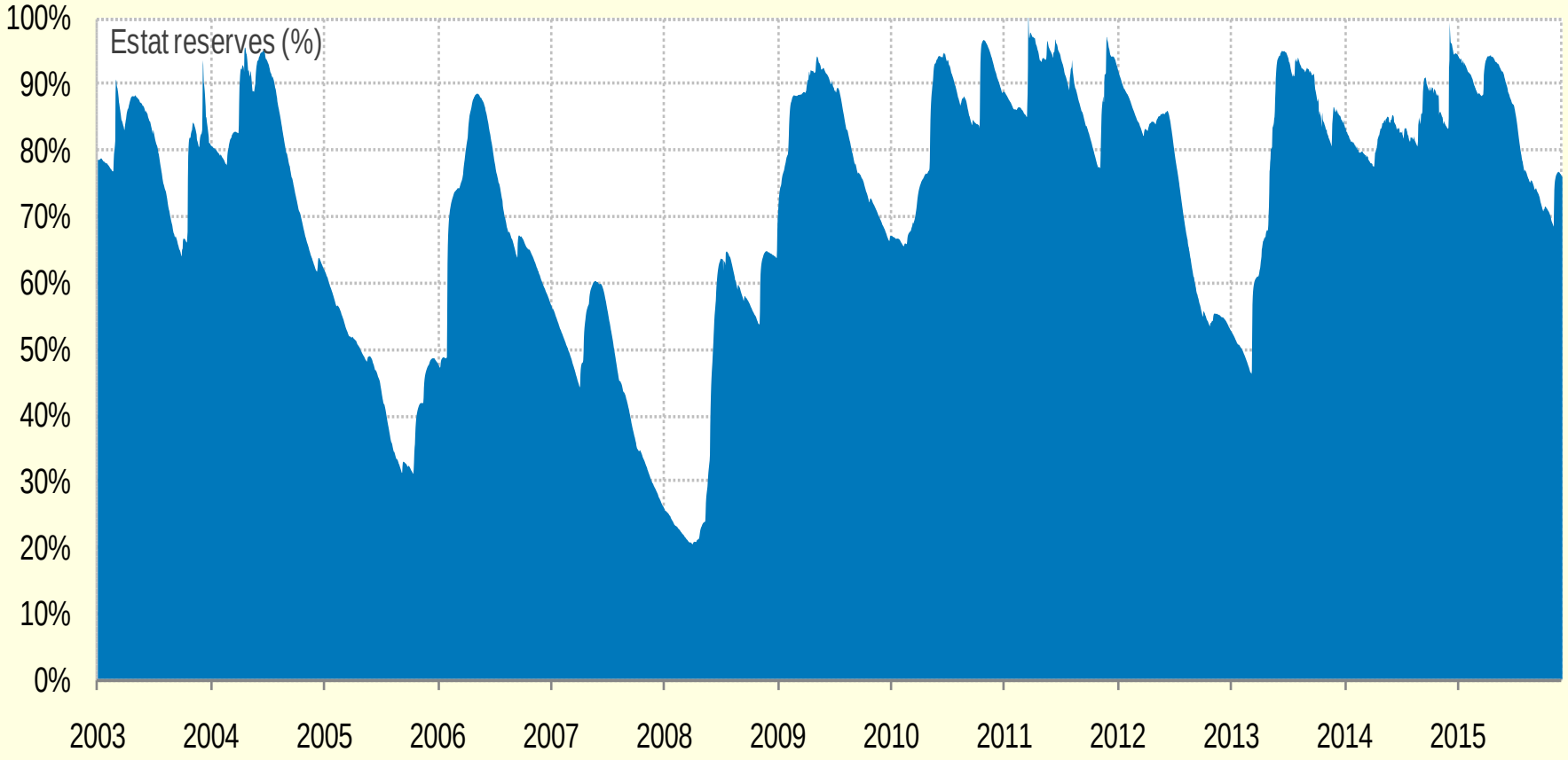
G. Pettygrove y T. Asano

..Mediterranean regions...



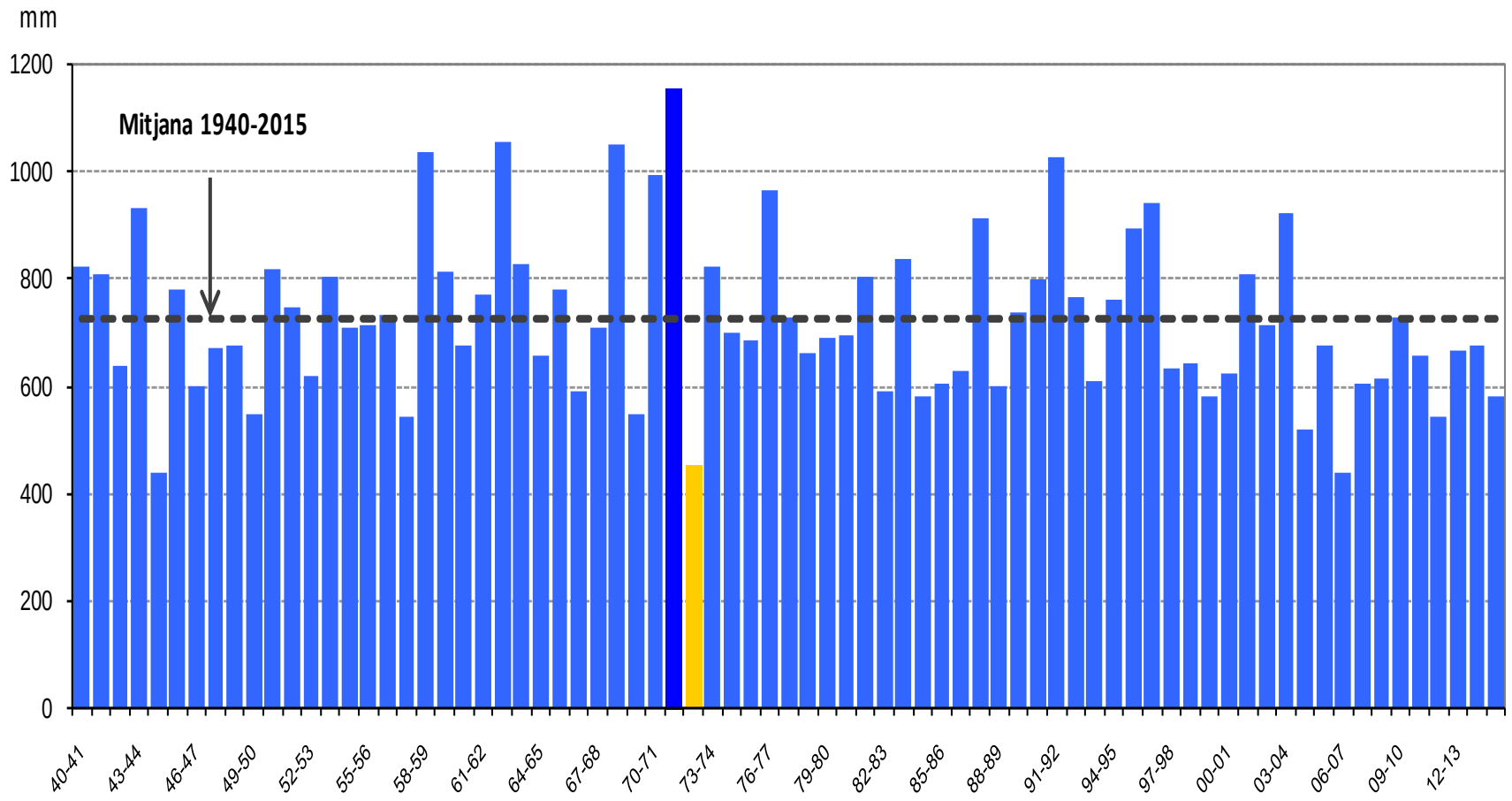
Ecosystems of the World, Vol. 11, *Mediterranean-Type Shrublands* (F. DiCastri, D.W. Goodall and R.L. Specht, Eds.), Elsevier, Amsterdam, 1981. ***Courtesy of Prof. X. Martín-Vide***

… water stored in reservoirs…



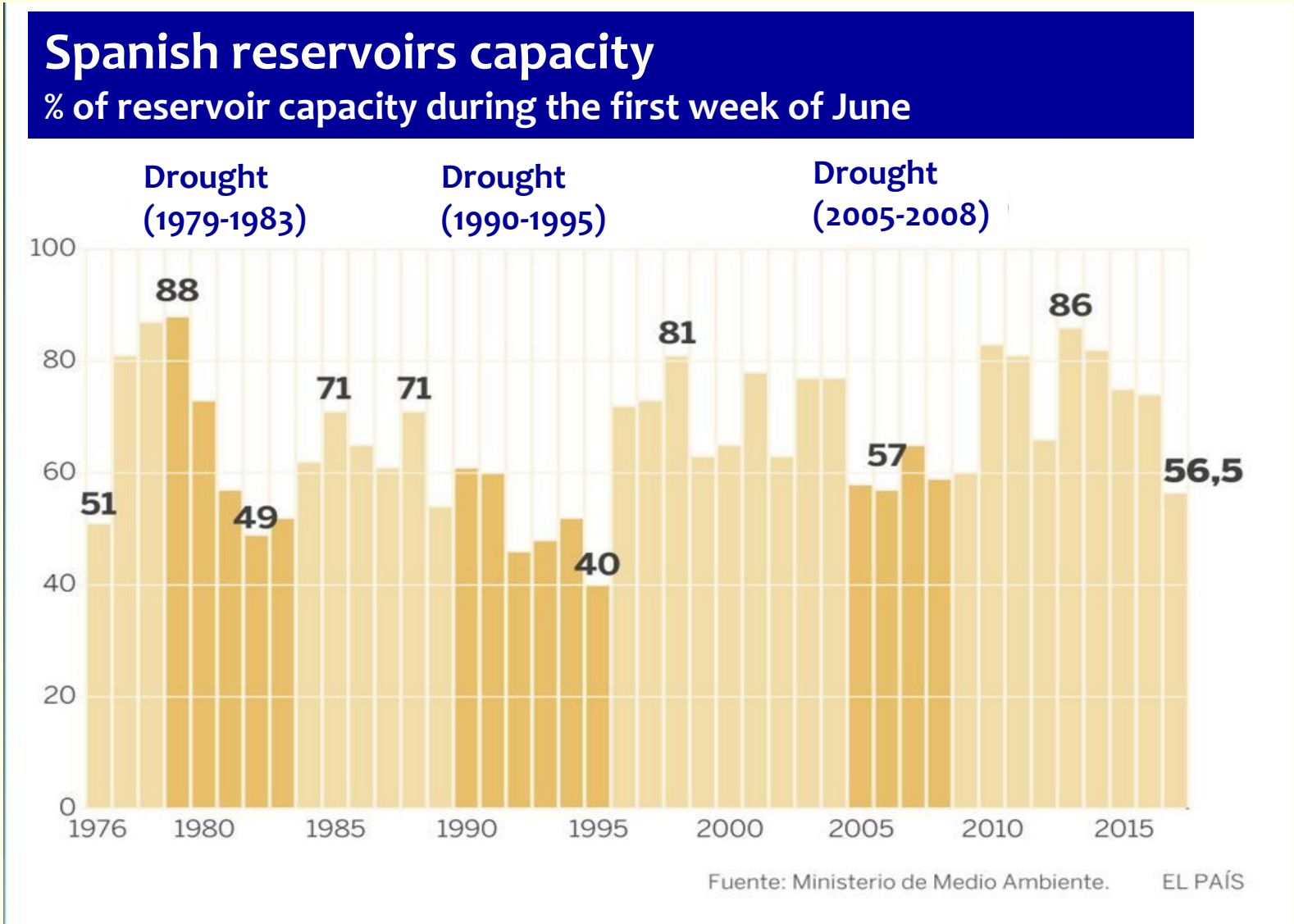
Reservoirs of the Llobregat and Ter river, providing water supply to Barcelona Metropolitan Area

… even more so in the coast…



Annual precipitation in the Llobregat and Ter river basins, supplying Barcelona Metropolitan Area

… episodic droughts…



… comparable states…

Feature	California	Spain
Size	424,000 km^2	505,000 km^2
Population (2016)	39.3 Million	46.5 million
Coast line	1,300 km	5,000 km
GDP, 2016	$66,000 /person	$36,000/person
Irrigated surface	3.9 million ha	3.6 million ha
Water use for irrigation	42,000 hm^3/y (80%)	15,000 hm^3/y (2015) (65%)
Mean water allocation	11,000 $m^3/ha{\cdot}y$ (3.6 fpy)	4,200 $m^3/ha.y$ (1.4 fpy)
Total economic value	$45,000 Million (2012)	€40,000 Million (2015)

… but different legal status…

- All waters are ***a public good***, excepted in the Canary Islands
- Water use rights, including reclaimed water, are allocated
- Economic and financial issues: ***water can not be sold***
- Water allocation, water quality and financial requirements have to be completed
- We keep highlighting that
  - there is no "water market": it raises a negative public reaction
  - instead, we need a transparent "water services market"
- Reclaimed water is a reliable, self-sufficient, local and sustainable water supply

… first golf course, CCB 1989

… first Title 22, Vitoria, 1994

9.2 mgd production
5,700 AF storage

Barcelona, 2003-2009…

Regulations … RD 1620/2007

- After more tan 20 years of debates
- A leading and useful regulation that allowed to progress
- But still raises considerable debate and needs adaptation

MINISTERIO
DE MEDIO AMBIENTE

ANEXO I.A: CRITERIOS DE CALIDAD PARA LA REUTILIZACIÓN DE LAS AGUAS SEGÚN SUS USOS

CALIDAD REQUERIDA

USO DEL AGUA PREVISTO	VALOR MÁXIMO ADMISIBLE (VMA)				
	NEMATODOS INTESTINALES[1]	*ESCHERICHIA COLI*	SÓLIDOS EN SUSPENSIÓN	TURBIDEZ	OTROS CRITERIOS
1.- USOS URBANOS					
CALIDAD 1.1: RESIDENCIAL[2] a) Riego de jardines privados.[3] b) Descarga de aparatos sanitarios.[3] c) Otros usos domésticos.	1 huevo/10 L	0 (UFC[4] /100 mL)	10 mg/L	2 UNT[5]	OTROS CONTAMINANTES[6] contenidos en la autorización de vertido aguas residuales: se deberá limitar la entrada de estos contaminantes al medio ambiente. En el caso de que se trate de sustancias peligrosas[7] deberá asegurarse el respeto de las NCAs.[8] *Legionella spp.* 100 UFC/L (si existe riesgo de aerosolización)
CALIDAD 1.2: SERVICIOS a) Riego de zonas verdes urbanas (parques, campos deportivos y similares).[9] b) Baldeo de calles.[9] c) Sistemas contra incendios.[9] d) Lavado industrial de vehículos.[9]	1 huevo/10 L	200 UFC/100 mL	20 mg/L	10 UNT	

[1] Considerar en todos los grupos de calidad al menos los géneros: Ancylostoma, Trichuris, Ascaris.
[2] Deben someterse a controles que aseguren el correcto mantenimiento de las instalaciones.
[3] Su autorización estará condicionada a la obligatoriedad de la presencia doble circuito señalizado en todos sus tramos hasta el punto de uso
[4] Unidades Formadoras de Colonias.
[5] Unidades Nefelométricas de Turbiedad.
[6] ver el Anexo II del RD 849/1986, de 11 de abril.
[7] ver Anexo IV del RD 907/2007, de 6 de julio.
[8] Norma de calidad ambiental ver el artículo 245.5.a del RD 849/1986, de 11 de abril, modificado por el RD 606/2003 de 23 de mayo.
[9] Cuando exista un uso con posibilidad de aerosolización del agua, es imprescindible seguir las condiciones de uso que señale, para cada caso, la autoridad sanitaria, sin las cuales, esos usos no serán autorizados

… emphasis on terminology…

- ***To reclaim (regenerar):***
  - To provide adequate quality for the intended use
- ***To reuse (reutilizar):***
  - To provide water to users, using
    - a (*dual*) distribution network
    - a storage facility
    - water user regulations
- Well aware of other designations:
  - Recycled water (California, Australia); NeWater (Singapore), Purified water (San Diego), Aigua Nova (Catalunya)


WATEReuse
BARCELONA 2011
26-29 September
Agbar
IWA
International
Water Association

… dual domestic supply, 2012..

- El Prat de LLobregat (65,000 people), near airport
  - 200 new homes (2,650 planned)
  - dual distribution: 960 m (ø160 mm) and 850 m (ø110 mm)
  - 25 % of domestic water used is reclaimed

… industrial reuse, since 2012…

Phase I (2012): 7 hm^3/y (5,700 AFY)
In 2016: 4 hm^3/y (3,250 AFY)
Phase II: 10 hm^3/y (8,100 AFY)
Phase III: 20 hm^3/y (16,200 AFY)

doi: 10.2166/wrd.2016.199

… a high quality reclaimed water

Table 5 | Reclaimed water quality at the outlet of Camp de Tarragona AWRP and in the water distribution network to the Camp de Tarragona industrial park

Legionella spp. (cfu/L)[a]	*Escherichia coli* (cfu/100 mL)[a]	TSS (mg/L)	Turbidity (NTU)	Helminth eggs (ova/10 L)
<80	<1	<2	<0.2 – 0.3 (<0.6 in	<1

[a]Detection limit of the analytical metho

Reclaimed water from the Camp de Tarragona AWRP has an average electrical conductivity of 20 µS/cm and a TOC lower than 0.2 mg/L, which makes it perfectly suitable for

the number of water users during the second semester of 2014 and reach the 2 hm^3/year production capacity established in the action program approved by the CWA.

An economic analysis made by the AITASA-Veolia operating company indicated a production cost of 0.5 €/m^3 for advanced reclaimed water, during the 1-year guarantee

El Port de la Selva, CCB, 2015

Basin Surface: 14.5 km^2

Recent drought < 350 mm/y

Water supply: 305,000 m^3/y

Sanitation: 185,000 m^3/y

http://demoware.eu/en/results/deliverables

Demoware EU project , CCB

160,000 gpd
73 AFY (50%)

In summary…

- Promoting water reuse since 1985 has been a real challenge
- Our 32-year history covers a wide diversity of water uses
- The inspiration of California and Florida has been instrumental
- Have promoted "circular economy": more than technology
- We still have to develop two basic methodological tools:
  - The commitment to document our projects in detail
  - The conviction that "expert/advisory panel" help in overcoming regulatory challenges
- Continued information and outreach efforts by ASERSA in collaboration with IWA-SGWR and WateReuse Association
- The wide Mediterranean Region is still calling for leaders
- The next drought may help us to find it

Thank you

for your attention