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Y EL RETO DEMOGRÁFICO



# SPANISH EXPERIENCE ON THE MONITORING OF COVID-19 IN SANITATION.

## VATar-COVID-19 PROJECT

Francisco Javier Sánchez Martínez

[fsmartinez@miteco.es](mailto:fsmartinez@miteco.es)

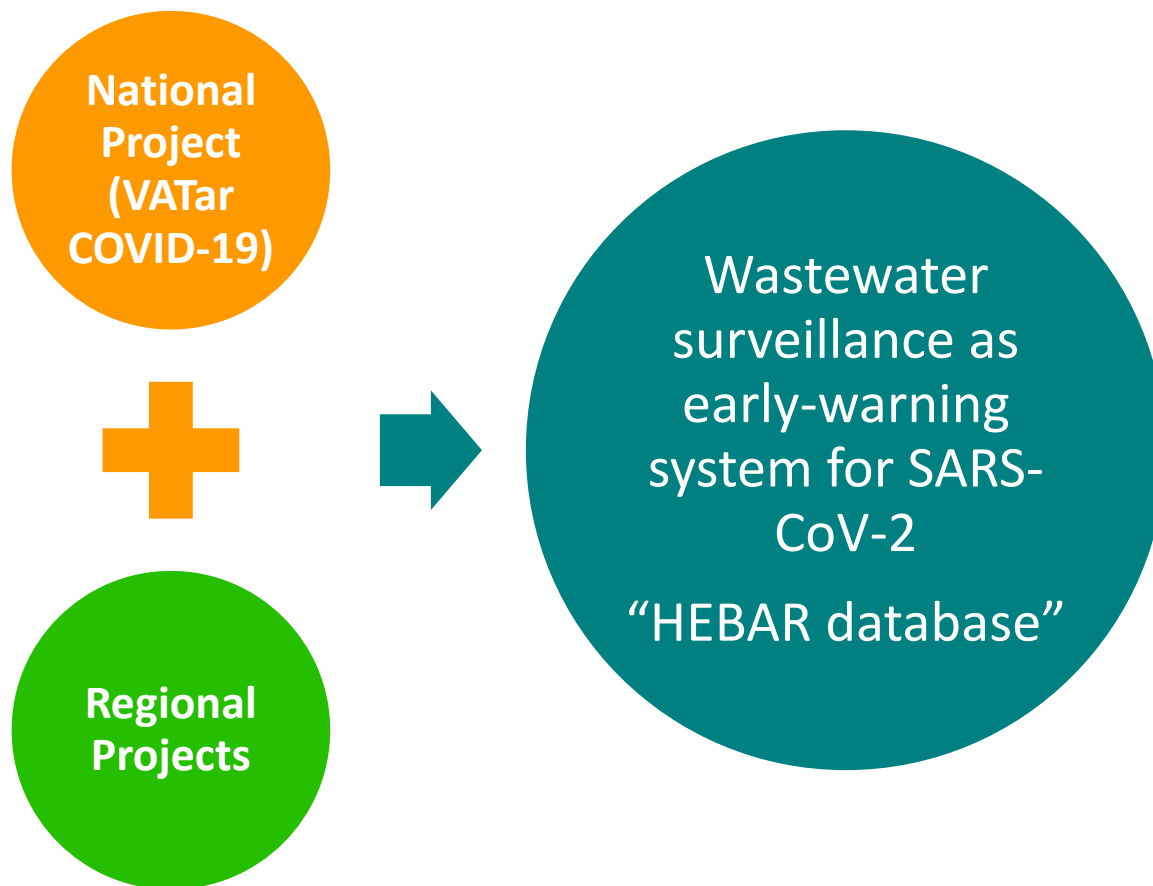
General Directorate of Water

State Secretariat for the Environment



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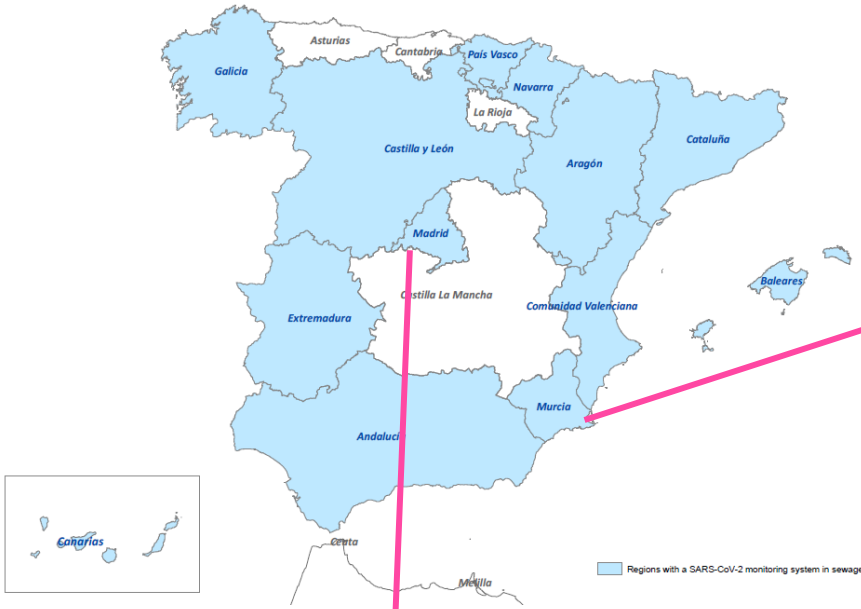
# WASTEWATER SURVEILLANCE AS EARLY- WARNING SYSTEM FOR SARS-CoV-2.





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# REGIONAL PROJECTS. MURCIA AND MADRID EXAMPLES



## Region of Murcia Project

- ESAMUR-CSIC
- First project developed in Spain: **march 2020**
- 8 WWTP are monitored (> 50% of the population)
- 1 sampling or 2 sampling/week
- Different types of sampling: WWTP, collectors, hospitals...



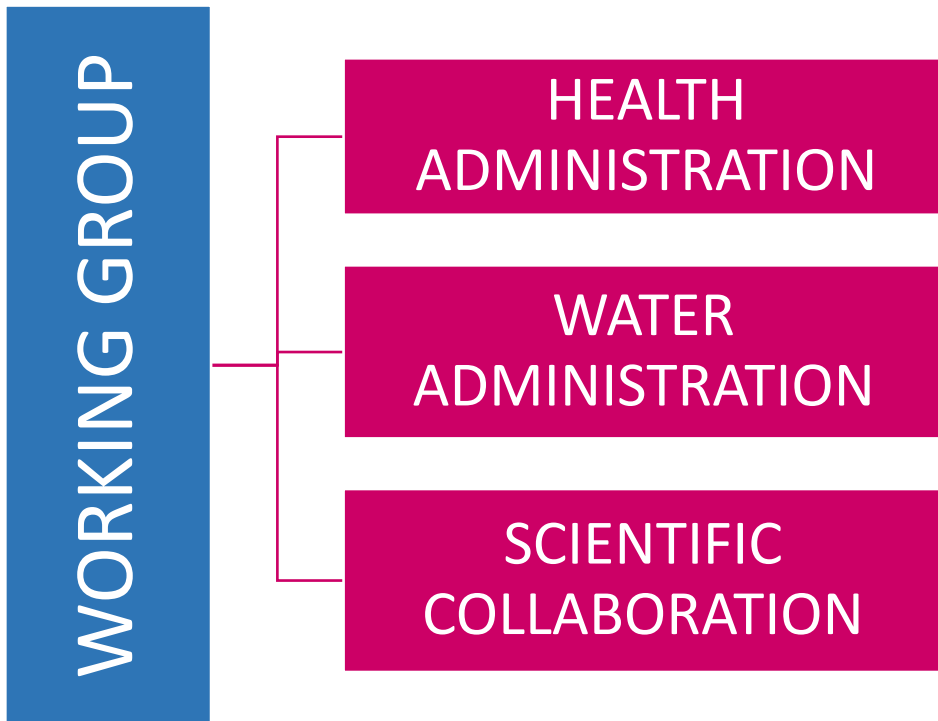
## Madrid: Vigía System

- Canal de Isabel II (CYII)
- 289 sampling points
- Almost the entire population of Madrid is monitored
- Website with weekly evolution
- Weekly reports



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# NATIONAL PROJECT: VATar COVID-19.





# WASTEWATER SURVEILLANCE AS EARLY- WARNING SYSTEM FOR SARS-CoV-2. VATar COVID-19.

## PRESELECTION OF MONITORING POINTS

- Selection of WWTP and bathing waters
- Selection completed on June 30th

## NEW WWTP

Start: 30 WWTP  
Currently: 38 WWTP

## SAMPLING AND ANALYSIS

Start: June-July 2020

## PROTOCOLS

- Monitoring protocol for SARS-CoV-2 in wastewaters and bathing waters

## REPORTS

- Bathing waters and WWTP reports
- Web MITERD

## DATA SHARING

- *Sharefile*: July 2020
- Information Exchange platform



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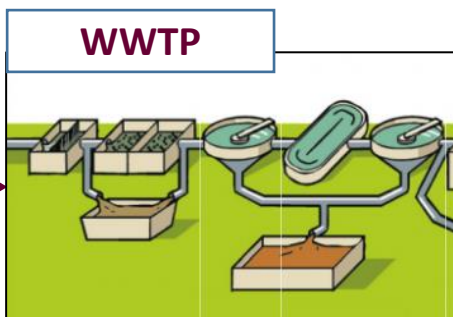
# VATar COVID-19 PROJECT LABORATORIES.

LABORATORY	NAME	ADDRES	WEB
University of Barcelona VIRUSENT <b>Prof. Albert Bosch</b>	Faculty of Biology Section Microbiology, Virology and Biotechnology. Dep. Genetics, Microbiology and Statistics	DIAGONAL, 645 Barcelona	<a href="http://www.ub.edu/virusent/erics/">http://www.ub.edu/virusent/erics/</a>
IATA-CSIC <b>Gloria Sánchez</b>	Institute of Agrochemistry and food technology	AVD. CATEDRÁTICO AGUSTIN ESCARDINO BENLLOCH,7 Paterna (Valencia)	<a href="http://www.iata.csic.es">http://www.iata.csic.es</a>
CEBAS-CSIC <b>Ana Allende</b>	Center for the Edaphology and Applied Biology of Segura.	CAMPUS UNIVERSITARIO DE ESPINARDO Murcia (Murcia)	<a href="http://www.cebas.csic.es">http://www.cebas.csic.es</a>
University of Santiago de Compostela GIPA <b>Jesús L. Romalde</b>	Pharmacy Faculty Dep. Microbiology and Parasitology	PLAZA SEMINARIO DE ESTUDIOS GALEGOS S/N-CAMPUS SUR Santiago de Compostela (A Coruña)	<a href="https://www.usc.gal/es/dep/artamentos/micrparag/index.html">https://www.usc.gal/es/dep/artamentos/micrparag/index.html</a>



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# MONITORING PROTOCOL FOR SARS-CoV-2



## Inlet

- Multiparameter probe
- Physico-chemicals parameters
- SARS-CoV-2 genetic material

## Outlet

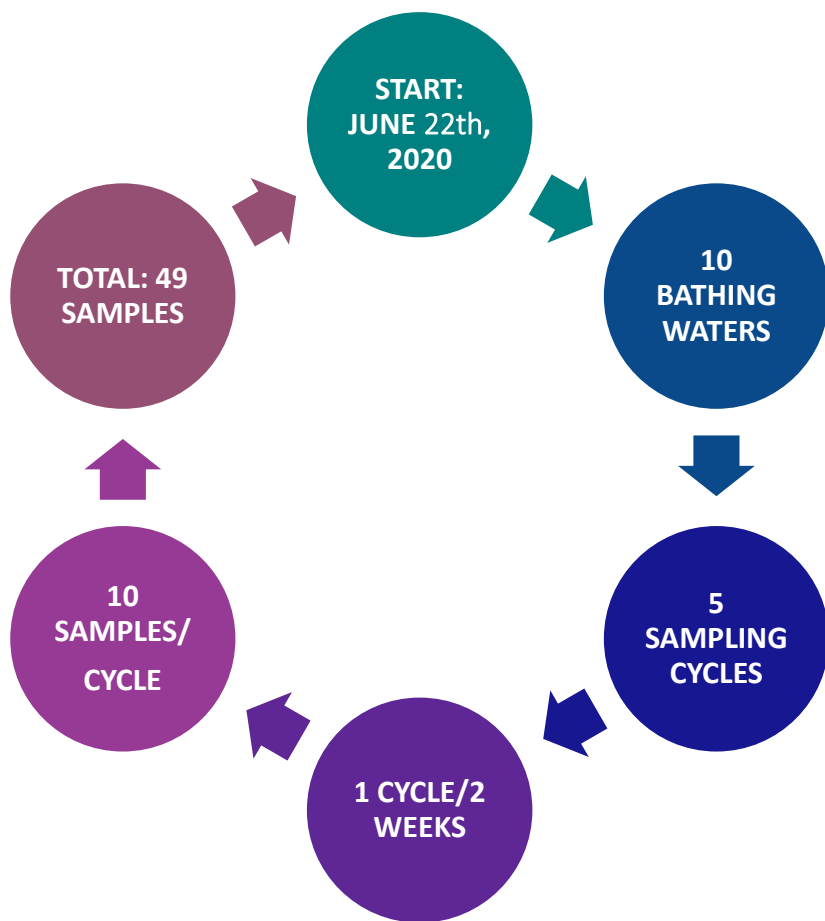
- Multiparameter probe
- Physico-chemicals parameters
- SARS-CoV-2 genetic material

- Multiparameter probe
- Microbiological parameters
- SARS-CoV-2 genetic material



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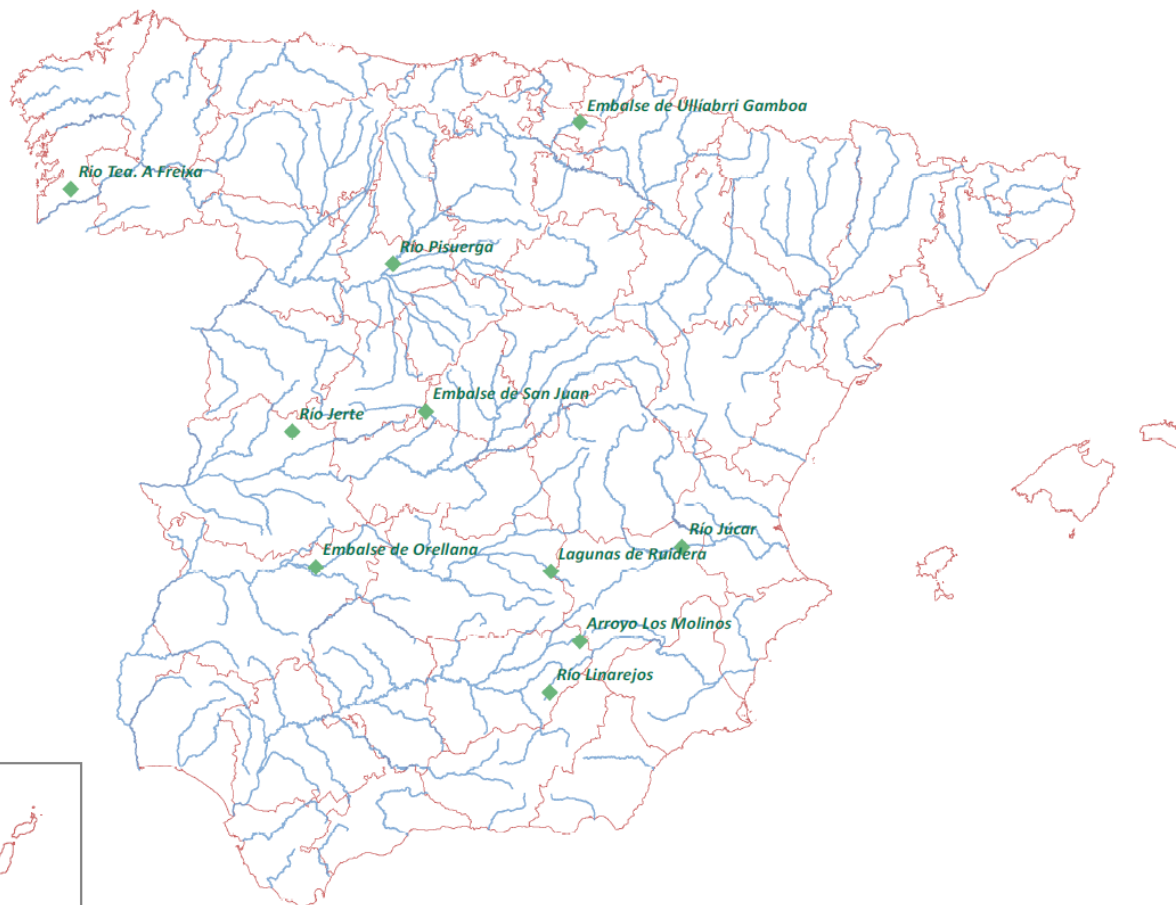
# SAMPLING IN BATHING WATERS







# BATHING AREAS SAMPLING PLAN

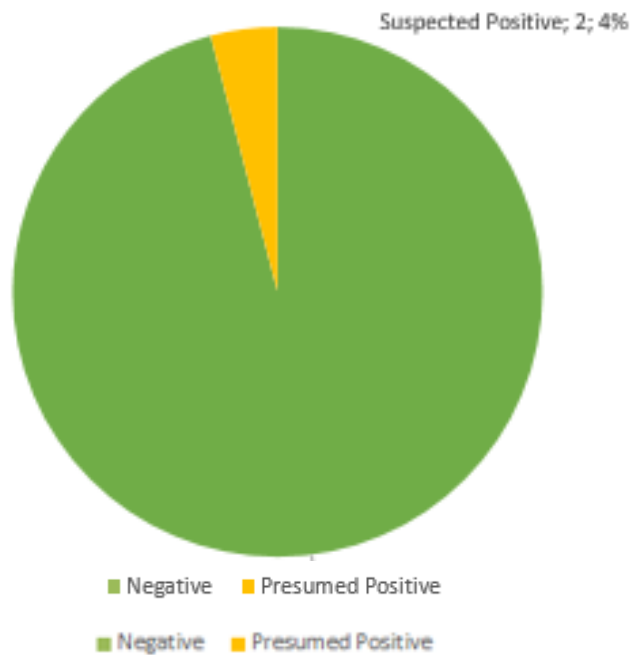


Cycle 1 (22/06/2020 to 04/07/2020)	Cycle 2 (05/07/2020 to 18/07/2020)	Cycle 3 (19/07/2020 to 01/08/2020)	Cycle 4 (02/08/2020 to 15/08/2020)	Cycle 5 (16/08/2020 to 29/08/2020)
9	10	10	10	10

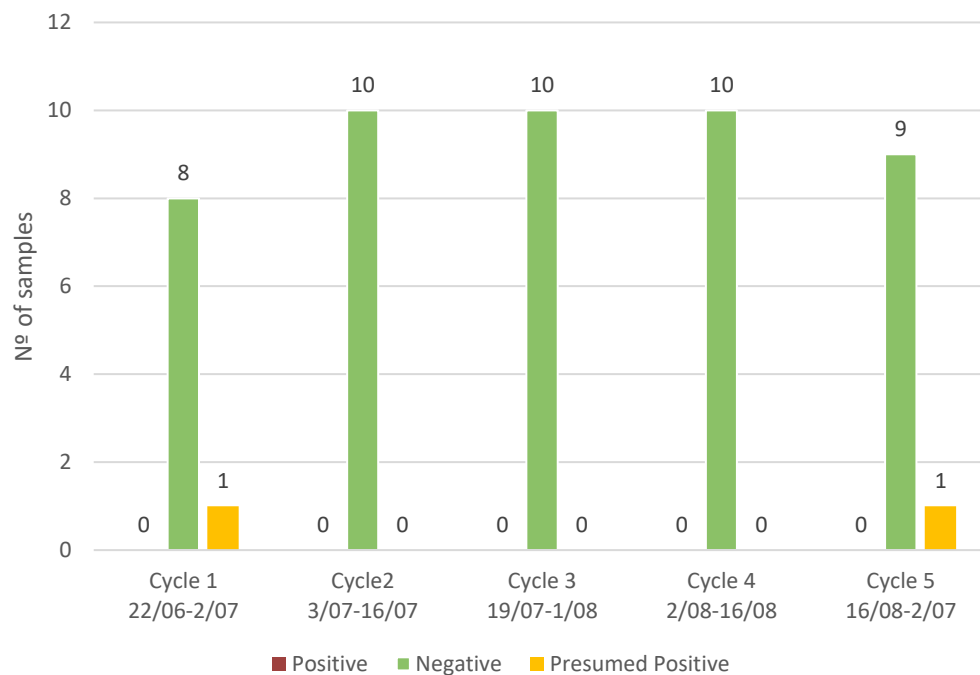


# BATHING AREAS. RESULTS OF SARS-CoV-2 MONITORING.

### Results SARS-CoV-2 bathing areas



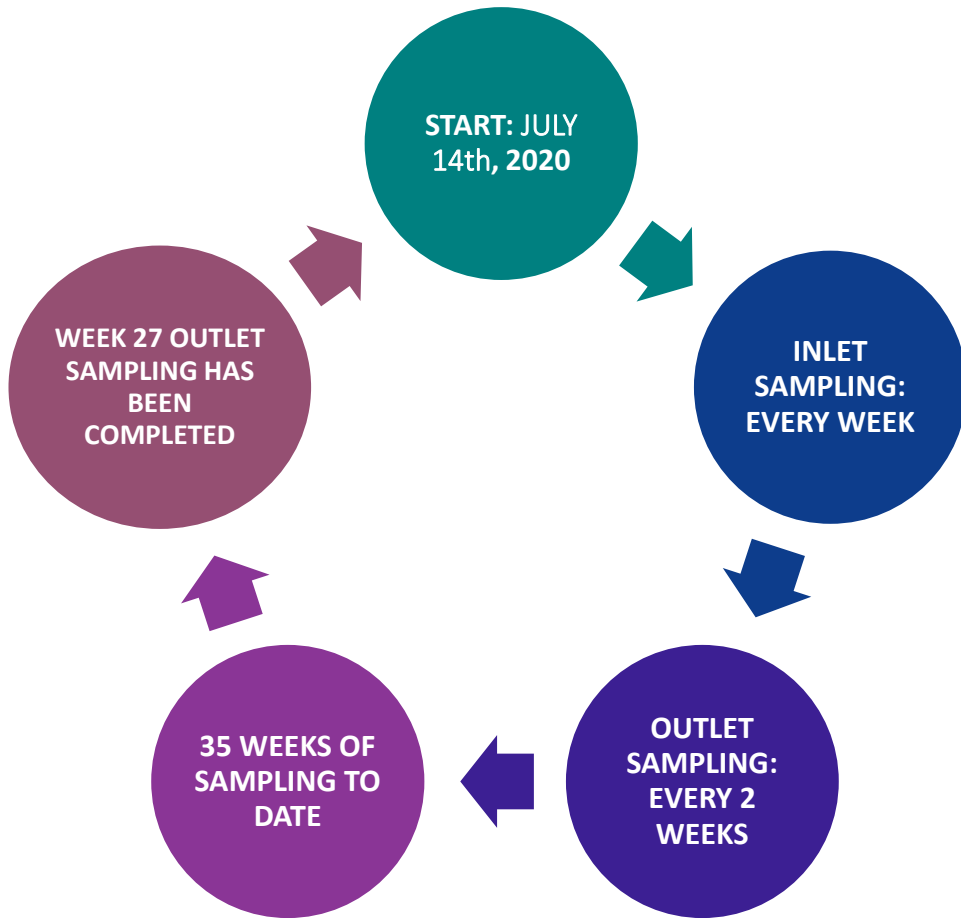
### Results SARS-CoV-2/Sampling cycles





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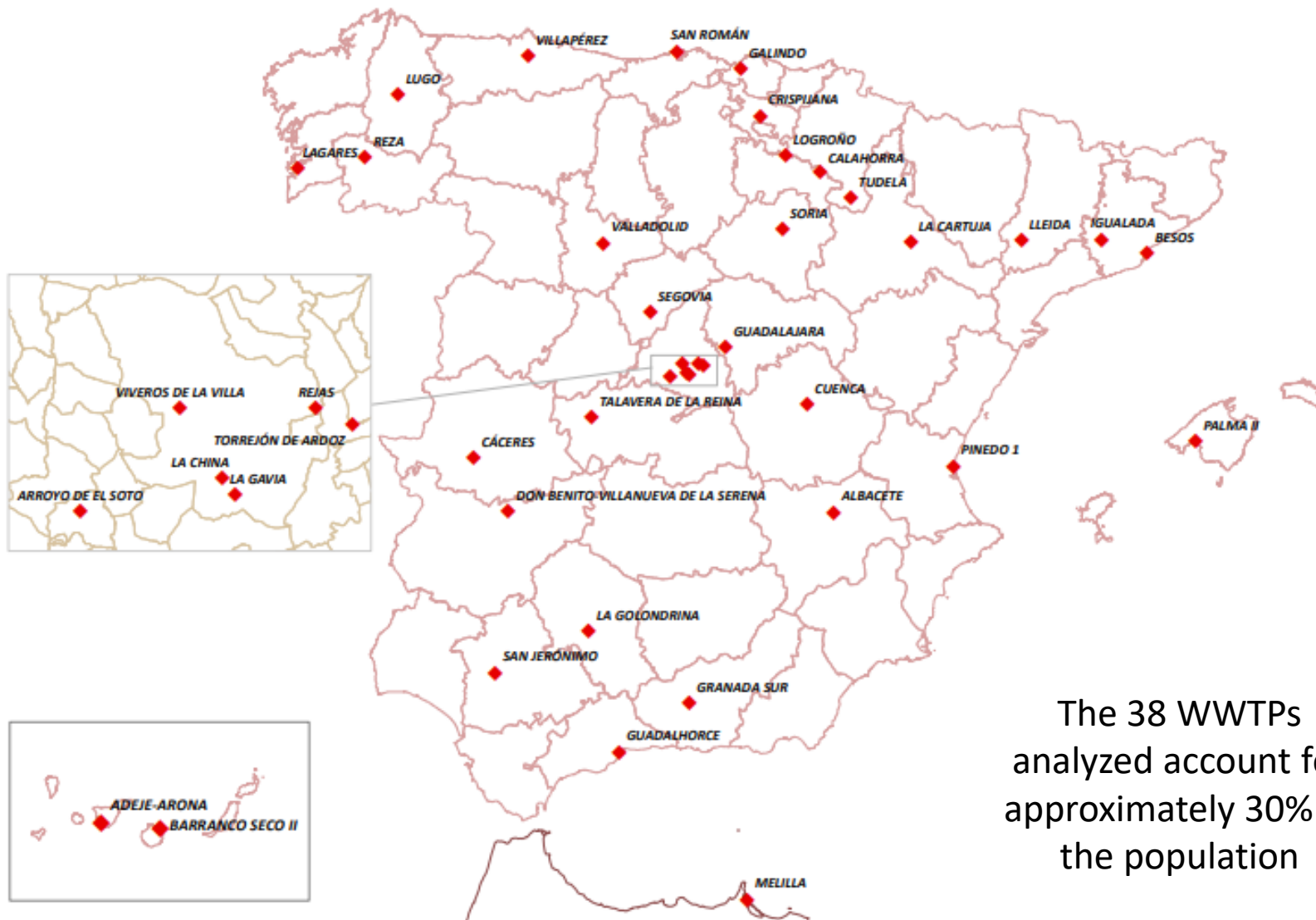
# SAMPLING AT WASTEWATER TREATMENT PLANTS (WWTPs).





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# WASTEWATER TREATMENT PLANTS INCLUDED IN PROJECT VATar COVID-19.

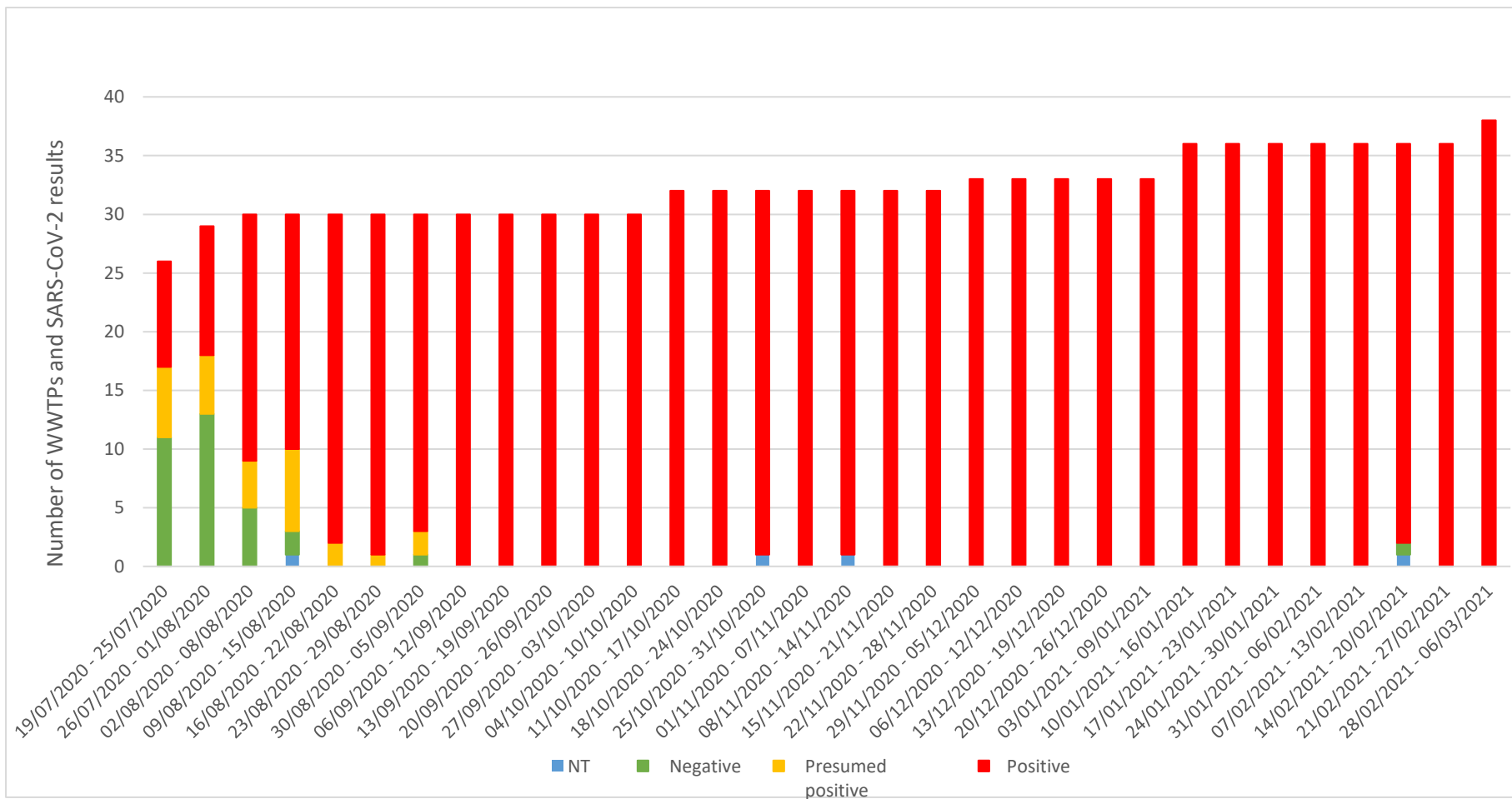


The 38 WWTPs analyzed account for approximately 30% of the population



# WASTEWATER TREATMENT PLANTS. INLET RESULTS.

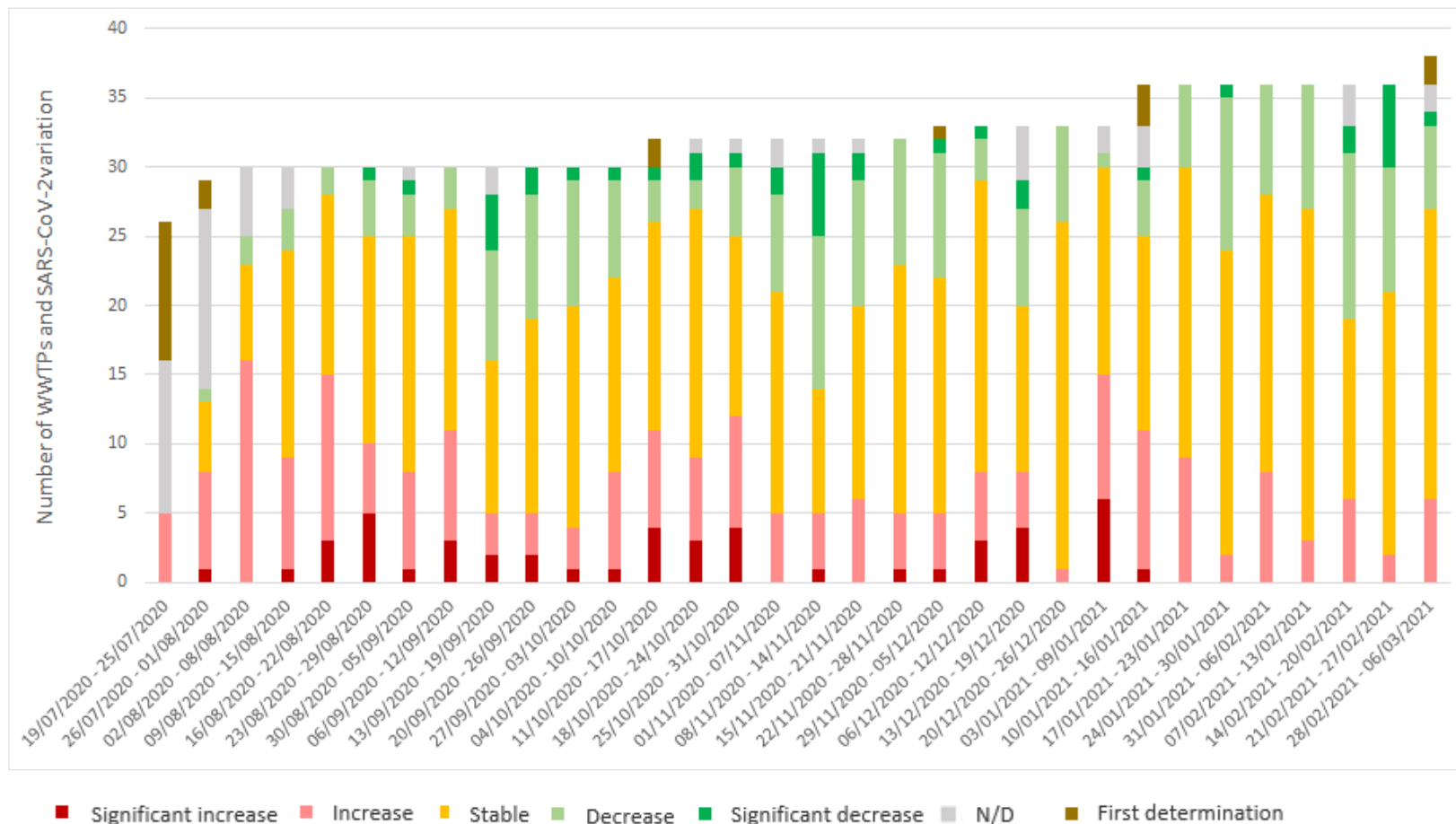
## WWTPs inlet monitoring and SARS-CoV-2 results for every week





# WASTEWATER TREATMENT PLANTS. INLET RESULTS.

## Monitoring of WWTPs inlet variation for every week

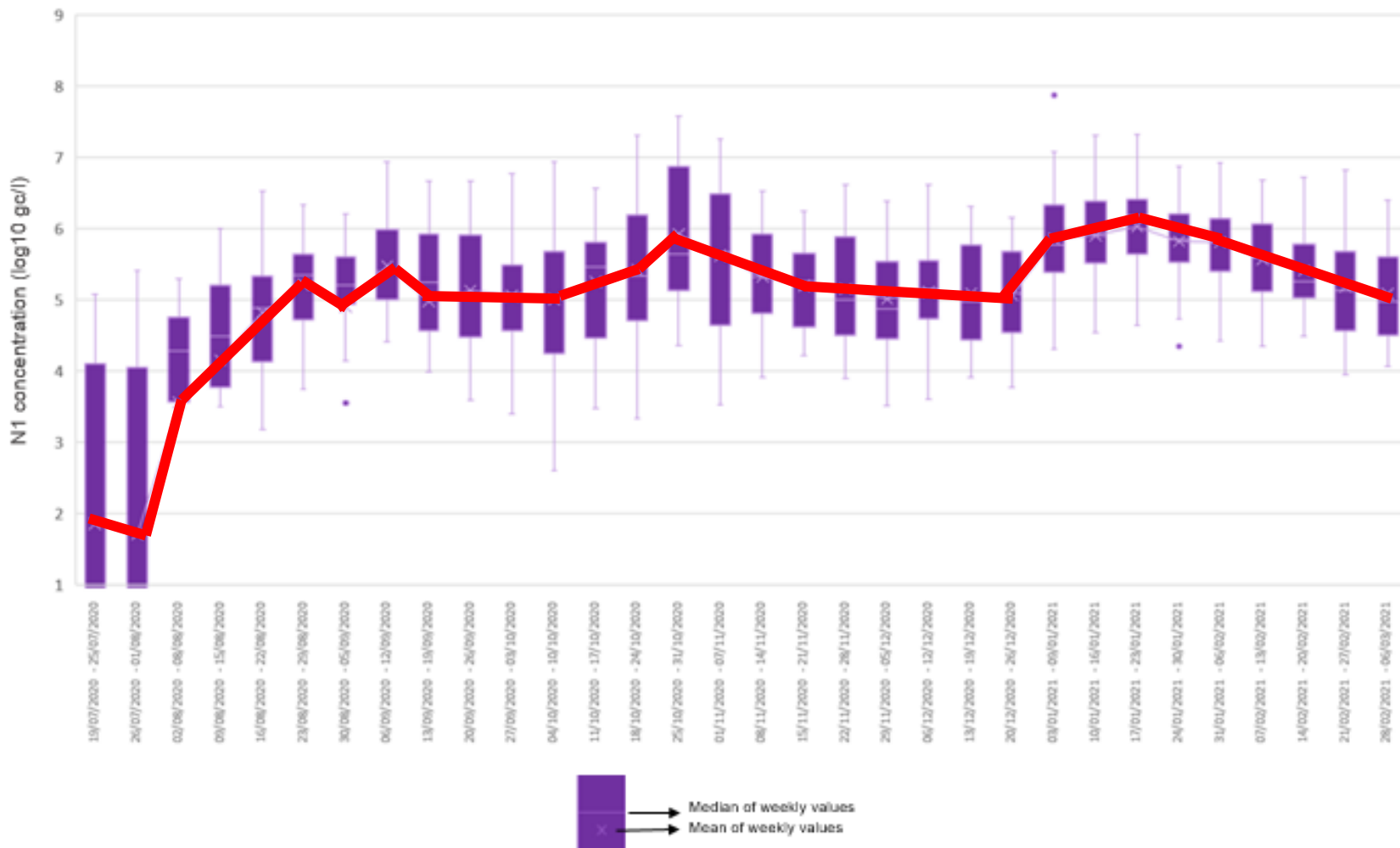


N/D: No data. Mainly due to negative results for both weeks.



# WASTEWATER TREATMENT PLANTS. INLET RESULTS.

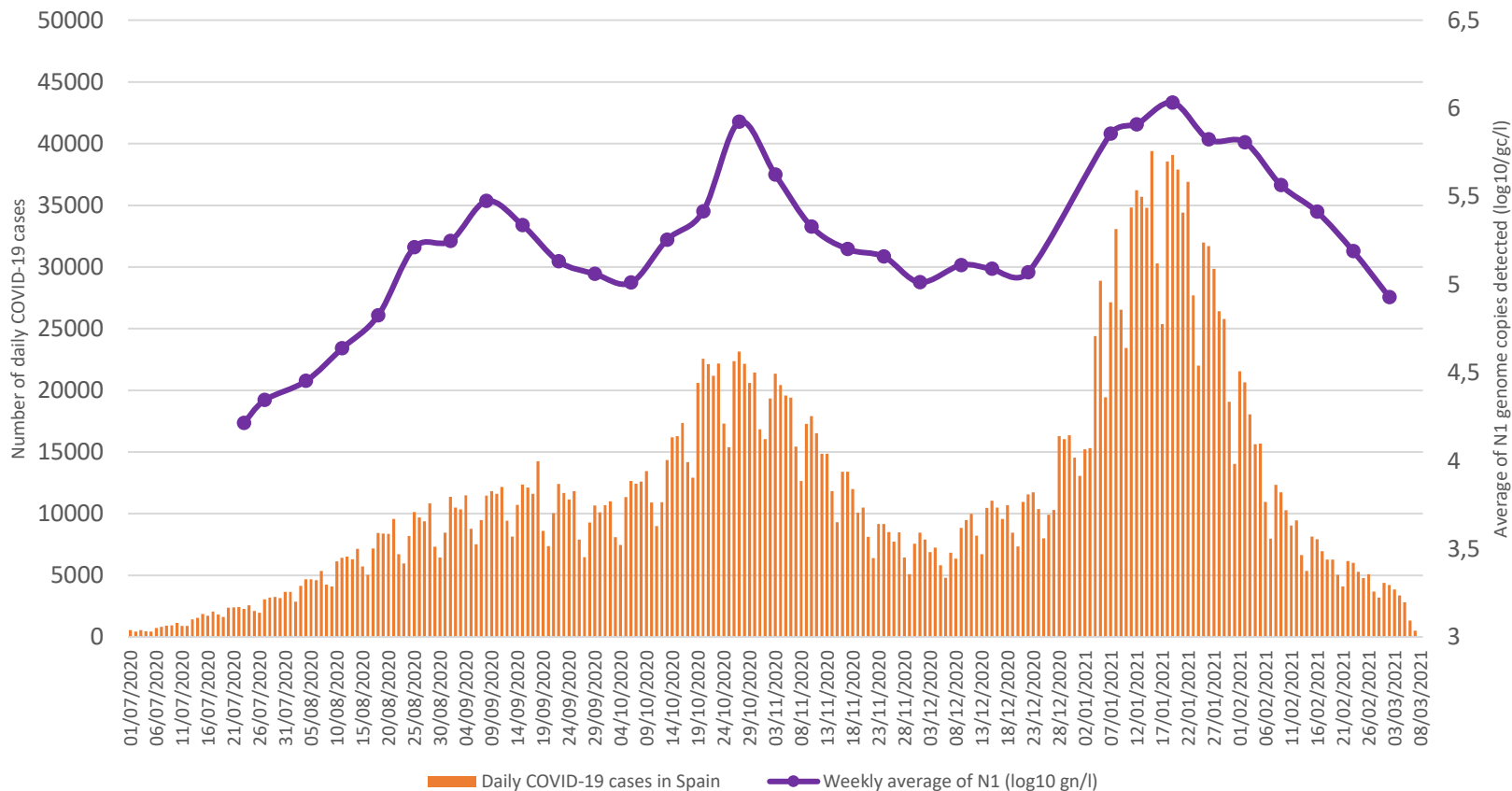
Detected levels in the 38 WWTPs for every week





# WASTEWATER TREATMENT PLANTS. INLET RESULTS.

## Weekly average of genome copies detected and daily confirmed cases of COVID-19 cases in Spain



Source: Carlos III Health Institute, ISCIII

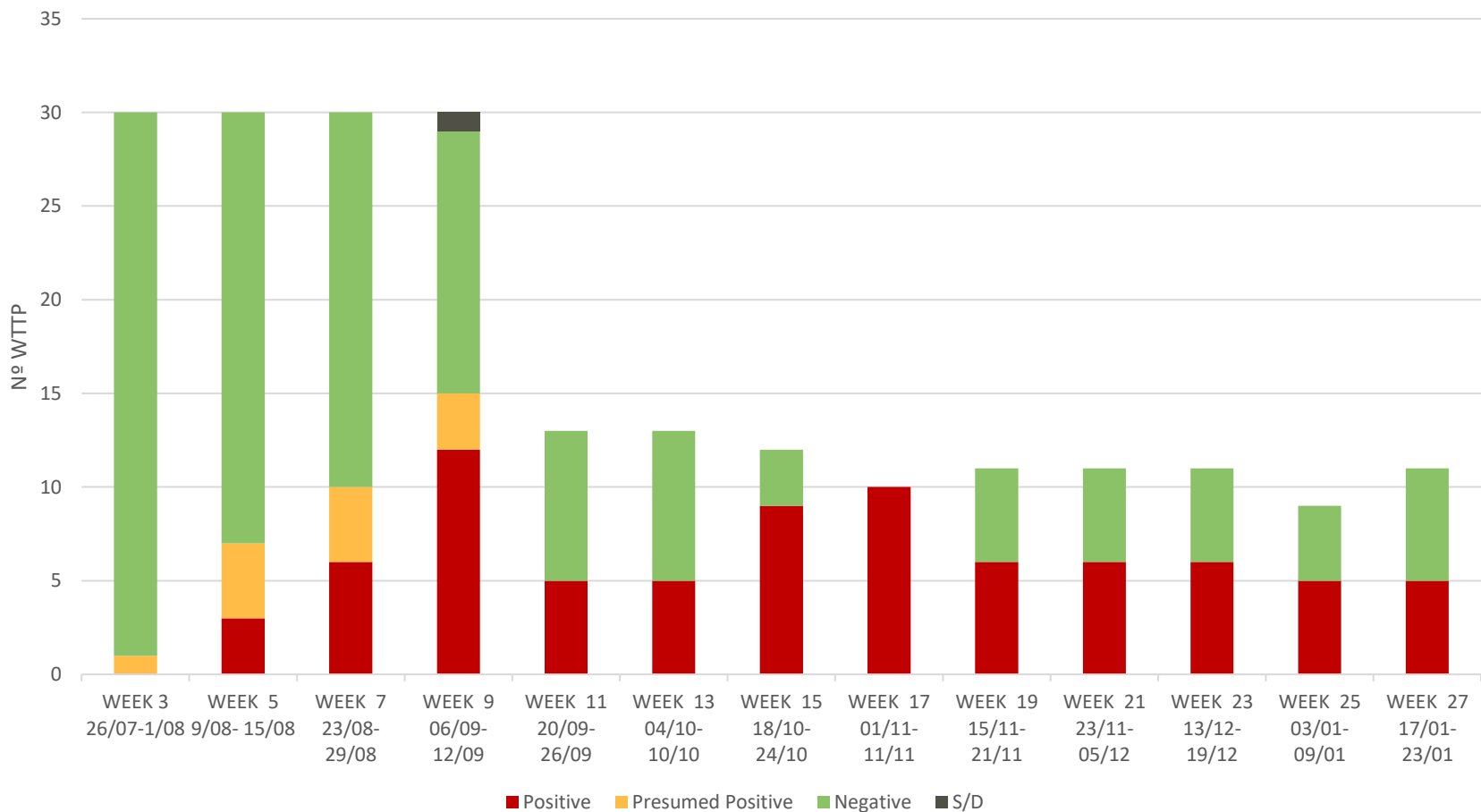
The total number of diagnosed cases refers to the total Spanish population. The 38 WWTPs analyzed account for approximately 30% of the population





# WASTEWATER TREATMENT PLANTS. OUTLET RESULTS.

Global results/week





# INFORMATION EXCHANGE.

## ❖ PHASE 1: DATA EXCHANGE VIA *SHAREFILE*

- REPOSITORY OF ANALYTICAL RESULTS OF WWTP AND BATHING AREAS (REAL TIME)
- WATER AND HEALTH ADMINISTRATION AT BOTH REGIONAL AND NATIONAL LEVEL.
- BATHING WATERS AND WWTP REPORTS (every week)

## ❖ PHASE 2: PLATFORM WEB

- VIEWER

<https://miteco.maps.arcgis.com/apps/webappviewer/index.html?id=720cacb0354e4e44ac48bf833f0c0dcf>

- DASHBOARD

<https://miteco.maps.arcgis.com/apps/opsdashboard/index.html#/aab0e0653d694289b310f6485f9f2226>





## WEBSITE

Tabla 1. Resultados y evolución de SARS-CoV-2 en la entrada de la EDAR.

Código EDAR	EDAR	Municipio	Resultado SARS-CoV-2	Evolución desde la semana anterior <sup>1</sup>	Unidades logarítmicas de diferencia	Precipitaciones (mm) día muestreo/día anterior	
EDAR_01	PINEDO 1	VALENCIA	Positivo	Disminución	-0,95		
EDAR_02	DON BENITO – VVA. DE LA SERENA	DON BENITO	Positivo	Estable	-0,05		
EDAR_03	LA GOLONDRINA	CÓRDOBA	Positivo	Estable	0,00		
EDAR_04	GRANADA SUR	GRANADA	Positivo	Estable <sup>2</sup>	-0,11		2
EDAR_05	REZA	ORENSE	Positivo	Estable	-0,04	0,2	
EDAR_06	GUADALHORCE	MÁLAGA	Positivo	Estable	-0,23		0,8
EDAR_07	LA CHINA	MADRID	Positivo	Estable	-0,18		
EDAR_08	LA GAVIA	MADRID	Positivo	Disminución	-0,45		
EDAR_09	TORREJÓN	TORREJÓN DE ARDOZ	Positivo	Estable	-0,32		
EDAR_10	SAN JERÓNIMO	SEVILLA	Positivo	Disminución	-0,71		
EDAR_11	TUDELA	TUDELA	Positivo	Estable <sup>2</sup>	-0,19		
EDAR_12	CRISPIJANA	VITORIA	Positivo	Estable	0,18		0,8
EDAR_13	GALINDO	BILBAO	Positivo	Estable	0,27		8,1
EDAR_14	LOGROÑO	LOGROÑO	Positivo	Aumento	0,72		
EDAR_15	LA CARTUJA	ZARAGOZA	Positivo	Disminución	-0,79		
EDAR_16	VILLAPEREZ	OVIEDO	Positivo	Aumento	0,53		0,2
EDAR_17	PALMA II	PALMA DE MALLORCA	Positivo	Aumento	0,99		



CONTROL MICROBIOLÓGICO EN AGUAS RESIDUALES COMO  
INDICADOR EPIDEMIOLÓGICO DE ALERTA TEMPRANA DE  
PROPAGACIÓN DE COVID-19

INFORME RESULTADOS EN EDAR

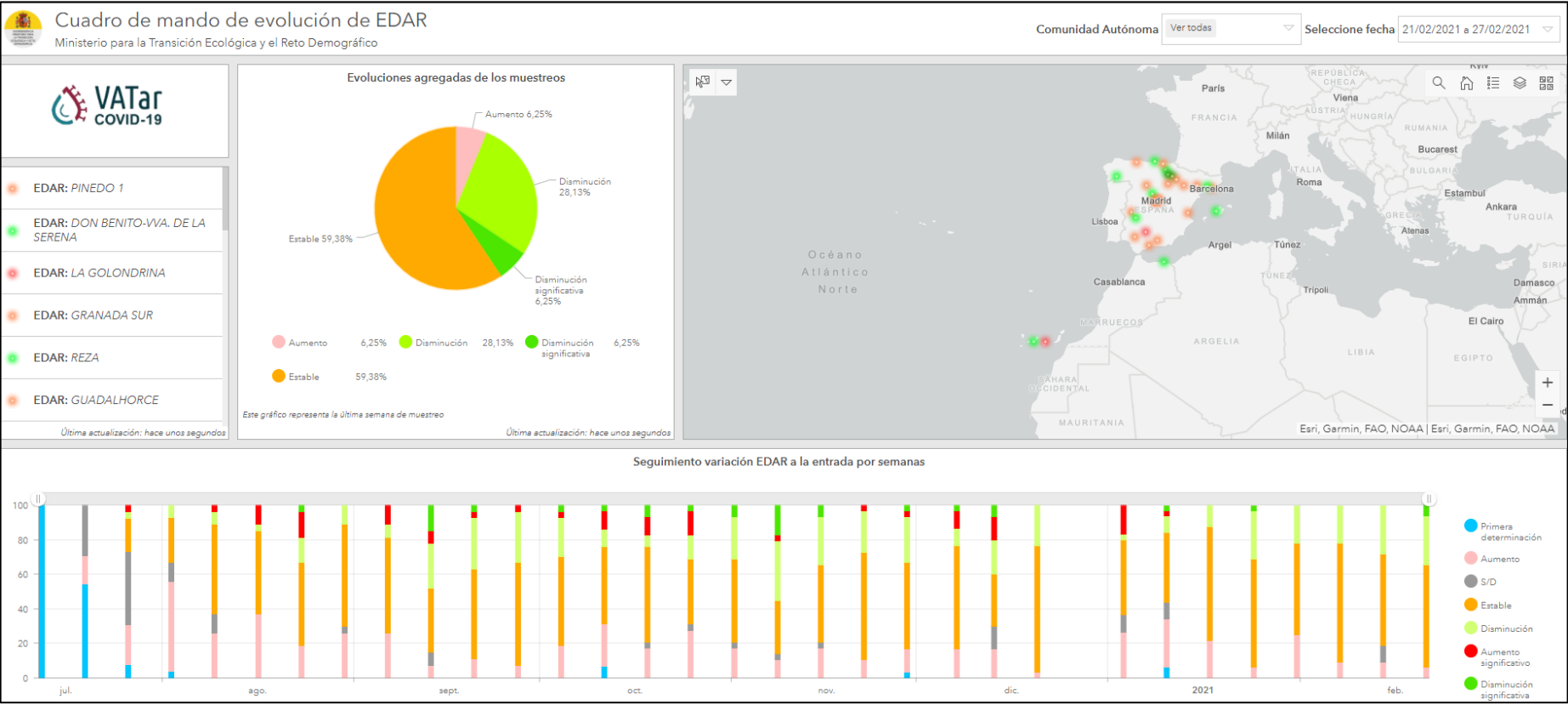
SEMANA 33 (28 de febrero a 6 de marzo de 2021)



CONTROL MICROBIOLÓGICO EN AGUAS RESIDUALES COMO  
INDICADOR EPIDEMIOLÓGICO DE ALERTA TEMPRANA DE  
PROPAGACIÓN DE COVID-19

NOTA TÉCNICA EXPLICATIVA  
SOBRE LA TÉCNICA  
Y  
VARIABILIDAD DE LOS RESULTADOS

# DASHBOARD.





## CONCLUSIONS.

- ❖ Regional projects are happening in coordination with the national project.
- ❖ Collaboration between national, regional and local authorities on health and wastewater is important.
- ❖ Wastewater surveillance is a useful warning system for SARS-CoV-2, there is a adequate correlation between the current epidemiological situation and the concentration of RNA material in sewage is observed, with several limitations:
  - ❖ Precipitation can decrease the concentrations.
  - ❖ Different patrons in behavior of the population during a day (Work days, holidays..)
  - ❖ Limitations in the laboratory process



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**THANK YOU FOR YOUR  
ATTENTION**