

TERRA. Revista de Desarrollo Local

e-ISSN: 2386-9968

Number 8 (2021), 442-473

DOI 10.7203/terra.8.19092

IIDL – Instituto Interuniversitario de Desarrollo Local

Forgotten places. Ecological degradation and institutional abandonment in the upper basin of the Mijares river (Teruel)

Aloma Riera Rodríguez

Máster en Restauración de Ecosistemas. Dpto. de Geología, Geografía y Medio Ambiente, Universidad de Alcalá de Henares (UAH) (Madrid)

ariero@alumni.uv.es

Luis del Romero Renau

Doctor en Geografía, Universitat Autònoma de Barcelona (UAB). Instituto Interuniversitario de Desarrollo Local (Universitat de València)

Luis.Romero@uv.es

<https://orcid.org/0000-0001-5620-9979>

Míkel Pérez Pérez

Graduado en Ciencias Ambientales, Universitat de València

mipepe@alumni.uv.es

María José Leiva González

Graduada en Geografía, Universidad de Santiago de Chile (Chile)

maria.leiva.go@usach.cl



This work is distributed under the license Creative Commons Reconocimiento-NoComercial-SinObraDerivada 4.0 Internacional

ARTICLE SECTION

Forgotten places. Ecological degradation and institutional abandonment in the upper basin of the Mijares river (Teruel)

Abstract: The degradation of water quality and riparian vegetation in Mediterranean rivers is today a major environmental problem. The upper basin of the Mijares river flows through the province of Teruel from its source in the municipality of El Castellar at 1,500 meters high and forms some impressive canyons and river landscapes in this upper section of great environmental value. However, this research qualitatively analyzes the quality of its waters and the riverside vegetation to show that this great territorial resource for rural development in the area presents important levels of degradation. Subsequently, it is discussed in the light of the data obtained, that the areas in depopulation and with very little human presence also present environmental problems that are related to a very weak institutional presence in this type of territories.

Key words: rivers; environmental problems; depopulation; Teruel.

Reception: February 11, 2021

Review: April 29, 2021

Acceptance: May 26, 2021

Citation:

Riera, A., del Romero, L., Pérez, M., y Leiva, M. J. (2021). Lugares olvidados. Degradación ecológica y abandono institucional en la cuenca alta del río Mijares (Teruel). *TERRA. Revista de Desarrollo Local*, (8), 442-473. DOI 10.7203/terra.8.20373

IDEAS CLAVE / HIGHLIGHTS / IDEES CLAU

1. Las áreas en despoblación también presentan importantes problemas de degradación ambiental en sus ríos y riberas.
2. La cuenca alta del río Mijares tiene unos importantes valores ambientales, pero evidentes signos de degradación.
3. Las afecciones reales del río Mijares son mayores y más graves que las reconocidas oficialmente.
4. Las administraciones con competencias en gestión del agua no están realizando suficientes labores de control y saneamiento.

1. Depopulated areas also present important problems of environmental degradation in their rivers and riverbanks.
2. The upper basin of the river Mijares has important environmental values, but evident signs of degradation.
3. The real effects of the river Mijares are greater and more serious than those officially recognised.
4. The administrations responsible for water management are not carrying out sufficient control and sanitation work.

1. Les àrees en despoblació també presenten importants problemes de degradació ambiental en els seus rius i riberes.
2. La conca alta del riu Millars té uns importants valors ambientals, però evidents signes de degradació.
3. Les afeccions reals del riu Millars són majors i més greus que les reconegudes oficialment.
4. Les administracions amb competències en gestió de l'aigua no estan realitzant suficients labors de control i sanejament.

EXTENDED ABSTRACT¹

1. Introduction and objectives

This research has two objectives. The first is to carry out an analysis of the ecological status of Alto Mijares river ecosystem through qualitative indicators beyond the classic biological parameters, to characterize not only the ecological status of this river course, but also that of its banks and main tributaries. The methodology used is detailed below, but it supposes a different approach to that used in other works cited above, which implies an in situ and continuous analysis of this river course through field work to identify visible points of pollution, measurement of physical indicators. -quality chemicals of its waters and study of the quality and biodiversity of the riverside vegetation. The second objective is to demonstrate that unpopulated areas also have very relevant problems of environmental degradation and that these constitute a major obstacle to their rural development. The aim is therefore to analyze the causes and consequences of this situation for a depopulated territory such as the Teruel county of Gúdar-Javalambre.

The starting hypothesis based on the authors' prior knowledge of the territory is that the ecological quality of Alto Mijares is much worse than what is established in the CHJ basin plan itself. This is due to several causes: the obsolescence of the data, the scarcity of control points throughout this section, and the focus on the study of the quality of the rivers, basically based on the IBMWP index, leaving in the background other types of methodologies and of approaches, such as the study of the quality of the riverside vegetation and the environmental conditions and impacts on it.

2. Methodology

In our case, part of the Mijares riverbed has been established as an object of study, specifically from its source to the Arenoso dam. It should be noted that this is a study whose information has been obtained through field work, specifically through sampling along the riverbed. Throughout the research, several methodologies have been used to assess the ecological status of the Mijares River. When studying the vegetation present in the riverbed, two different methodologies have been applied: the *in visu* identification and the vegetation transects, the second one focused on the riparian vegetation and applying the Gentry Method (Gentry, 1988) and following the methodological adaptation of La Roca (La Roca and Hurtado, 2011). As a support tool in the *in visu* identification of flora species, the Plantnet application has been used, which bases its recognition on photographs taken of the leaves, the flower, the fruits, the bark and the habitat, and compares them with the images present in its database, resulting in a list of possible species, whose characteristics are similar to those of the species to be determined. Finally, Mateo's work on wild flora in eastern Iberia has also been used (Mateo, 2013).

On the other hand, the research has been complemented with the study of the aquatic environment through the analysis of the water quality, in which various physical and chemical parameters of the water have been taken into account, such as odor, turbidity, color, floating elements and pH, as well as aquatic vegetation. Once the results have been obtained, the quality of the water is evaluated qualitatively, giving it a value between one and five from the normalization of the results of each variable in five classes. Finally, after identifying areas with signs of anthropization, both environmental impacts and

¹ Traducción exclusiva de los autores / Authors' exclusive translation.

points of contamination have been mapped. When making all the cartographies included in the study, the various Geographic Information Systems, such as QGIS and ArcGis, have been used as a support tool, in such a way that the study of the spatial distribution of the various variables is facilitated.

3. Results and discussion

This river basin is in Argon's county of Gúdar-Javalambre, so that the Mijares acts as the backbone of this territory. Its waters run through eleven of the 24 municipalities of Gúdar-Javalambre county. This high mountain region brings together important Special Protected Areas as the Mijares river in Olba. The upper basin of the Mijares River is located around 1.200 meters above sea level. It is made up of the Sarrión valley, located between the two large dome-shaped orographic structures that are the Gúdar mountain ranges to the north and Javalambre to the south where the river is embedded in neogene detrital materials, but is capable of creating narrow valleys almost no continuity solution.

The quality of the waters experiences a degradation as the waters move away from the source. This fact may be due to the absence of human influence in the highest parts of the river and that, as it passes along its course, they are increased. Of the 11 municipalities that host the upper Mijares basin, Cedrillas and El Castellar present the sections with the highest water quality. It must be taken into account that these are depopulated municipalities where, therefore, there are not many sources of contamination. In them we find ecosystems of deciduous forest, riparian forest and evergreen forest, which are home to species such as Scots pine (*Pinus sylvestris*), hazelnut (*Corylus avellana*) and poplar (*Populus nigra*), representative of each of these ecosystems. and that give them a high quality. Likewise, the results obtained during the turbidity study corroborate the good condition of the Mijares River. On the other hand, within the municipality of Formiche Alto, the river experiences a decrease in the quality of its waters, which is indicative that significant environmental impacts are beginning to appear. Some of the species identified are watercress (*Rorippa nasturtium-aquaticum* and *Apium nodiflorum*), duckweed (subfamily Lemnoideae) whose presence is an indicator of contamination. In the same way, water degradation is reflected in the turbidity study where the water acquires more yellowish colors with the presence of solid particles. Subsequently, throughout the basin, the quality of the waters remains low. Among the remaining municipalities, it is worth highlighting Sarrión. In it we find a large number of altered riparian ecosystems, all with the presence of the species mentioned above, to add the reed (*Arundo donax*), included in the Spanish Catalog of Invasive Exotic Species (MITECO, 2007).

Contrary to what one might think, unpopulated areas with little industrial activity also present worrying levels of degradation and environmental pollution. On the one hand, one of the great problems in the management of inland waters in Spain, and therefore in the planning of rural areas, is that the government action of confederations and autonomous bodies is mainly focused on the main river axis. In the case studied, not only are there important affections and discharges in Mijares itself, but also some of its tributaries such as the Mora, Palomarejos and Albentosa, provide very low quality water from urban discharges, livestock operations and problems of diffuse organic pollution derived from agricultural crops.

On the other hand, the rest of the public administrations with direct competences in environmental and territorial management carry out a government action and a very weak institutional presence in a territory, precisely due to its condition as a depopulated

territory, geographic isolation and lack of opportunities labor, it should be just the opposite.

4. Conclusions

The main source of contamination of the river Mijares and its tributaries today is the incorporation of raw wastewater. According to data from the Aragonese Water Institute itself, only eight of the 24 municipalities in the Gúdar-Javalambre region have a WWTP in service (IAA, 2019). This means that two thirds of the municipalities, and approximately 30% of the population of the county, do not treat their water, or have primary and obsolete treatment systems, some of them more than fifty years old that provide significant amounts of water. residuals to the Mijares and its tributaries. To this must be added particular cases of treatment plants that do not seem to work properly, as is the case of Formiche Alto, or of neighborhoods in Olba that have little population, but that only have septic tanks. Another notable problem is the pollution produced by the few industrial activities present in the area, from the Formiche slaughterhouse to the Fertinagro fertilizer company or the Escaleruela fish farm, whose purification systems seem insufficient due to the contributions of low-quality water from its effluents, or by air pollution in the case of the fertilizer factory. In any case, both in the field work carried out, as well as in the one prepared by González (2017), it can be concluded that the existing spills in the Mijares and its tributaries do not coincide with those recognized and registered by the CHJ in its reports and studies. on water quality.