



*Anax parthenope*

# Habitats in the Province of Málaga

## INTRODUCTION

Málaga covers an area of approximately 7,300 km<sup>2</sup>. It is placed in the south of the Autonomous Region of Andalusia (or Autonomous Community of Andalusia), and forms part of the Mediterranean as a biogeographic region.

This is a rather mountainous province, as there is the Baetic System, extending south-east and north-east, and makes a mountain range which is approximately 170 km long from the west to the east coast. These mountains separate at the point which is furthest from the sea (at 35 km) and can reach an altitude of 2,000 m. This mountainous range divides the province in two parts.

On one side, we have the north area with a kind of continental climate, colder winters (occasionally freezing weather), rather hot summers and lower relative humidity in general. On the other side, there is the south area with mountains and few plains (except for some river valleys), where the sea affects this more Mediterranean climate, winters are not as cold, summers are cooler and the relative humidity is higher.

The Arco Calizo Central (the Central Málaga Limestone Mountain Range) makes an obstacle for the storms coming from the Atlantic Ocean. Therefore, it rains more in the west area as storms are kept there and they decrease as we move eastwards.



Simplified orographic map of the Province of Málaga.



Most of the rivers in Málaga flow into the Mediterranean Sea. Some rivers and streams in the north of the province flow into the River Guadalete or the Guadalquivir, such as the upper basin of the Carbones River and the tributaries of the river Genil, which makes the border between Málaga and other Andalusian provinces.

The main river basins in Málaga, which form part of the Mediterranean area and spread from the west to the east, are the Guadiaro tributaries (including the River Genil), Verde, Fuengirola, which consists of the rivers Ojén and Alaminas and the Pasadas), Guadalhorce (including its main tributaries the Guadalteba, the Turón, Grande and Campanillas), Guadalmedina and Vélez.

Some river basins are less prominent and smaller, such as the south basin of the Sierra Bermeja, or the rivers and streams in the Tejeda and Almajara Mountains (those which do not end in the river Vélez).

The peculiar geological features of the Province of Málaga, where chalky areas are noticeable in the mountains, except in the Sierra Bermeja, which is formed by peridotite rocks and schist (these are also present in wider areas, especially, in the east of the province), have impact on the amount of water in its rivers and streams.

Generally speaking, all rivers in Málaga go through periods of low water level to a greater or lesser extent. This is above all due to the geomorphological features of the zone and the lack of rain for several months in the year, but it is also related to the dams and the use of underground water for homes and farming. The latter reason results in lower

groundwater levels, and dry springs, river sources, fountains, large river sections or streams.

As for the reservoirs, all river basins, except those that belong to the rivers Guadiaro and Fuengirola, have some, and they can be small or large. However, varied projects that still have not been executed, aim to build reservoirs on the two basins which do not have them.

The Guadalhorce river basin has the most reservoirs. There are five on it: one is the reservoir of the Guadalhorce and Guadalteba; one on the Guadalhorce; The Conde del Guadalhorce (the Count of Guadalhorce) Reservoir; the reservoir on the River Turón. They all form the complex called the Guadalhorce Reservoirs. There is also the reservoir at Casasola Dam, on the river Campanillas, and a smaller one at Tomillar, on the Pílonas Stream. Other reservoirs are la Concepción on the River Verde, Agujero and Limonero on the River Guadalmedina, and La Viñuela on the River Vélez.

The above river basins with reservoirs have wide sections below the dam that are dry throughout a long period of time during the year, while their upper sections have water almost all year round. In the north of the province, there is a series of lakes, most of which are endorheic, that is to say, they do not flow into sea, so they keep the water that comes from rain. These lakes are: Archidona, De Fuente, De Piedra, De Campillos, La Ratosa and Castañuela.

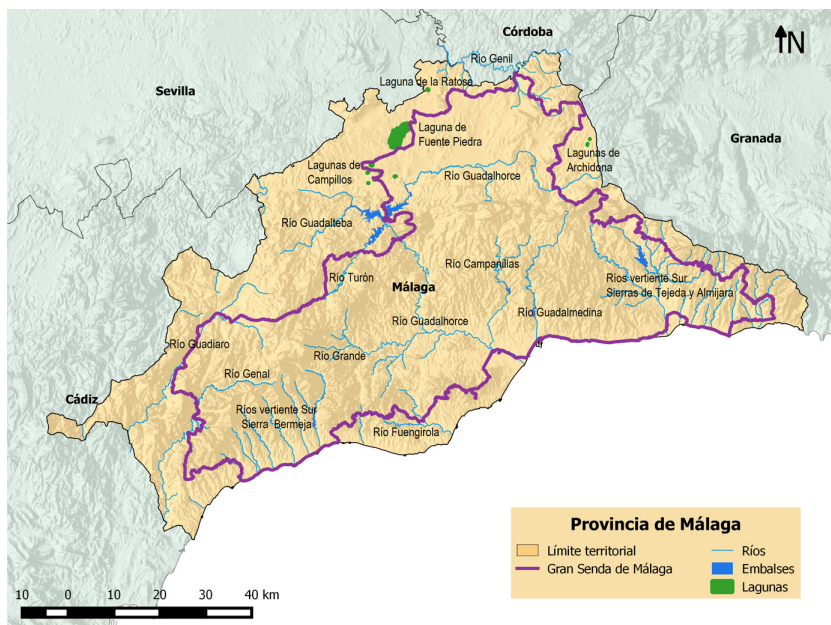
The number of freshwater lakes is the same as the number of salty water lakes. Due to drought and the increase in the number of wells used in farming for watering, the water in



most of these lakes take less time to disappear.

In the north of the province and, especially, on the coast, where rivers and streams have been particularly damaged because of the urban

development, reservoirs for livestock-farming and agriculture, and artificial ponds, ornamental fountains, water tanks, canals and any other source of water which is not affected by biocide are particularly important for dragonflies.



Simplified map of the river system in the Province of Málaga and the Great Málaga Path.

## HABITAT

### Lotic Ecosystems

Lotic ecosystems refer to places with flowing or running water, which can run fast or slow, and it is channelled. It mainly includes rivers and streams or springs.

There are two types of these systems:

They can be perennial and temporary water bodies. However,

these two types can exist in the same river or stream, especially when there is drought throughout the year, or because of factors that are not natural, such as the existence of reservoirs or when water is sucked from underground sources.

There can be several sections along river basins:



• **Upper course.** The water here is pure, cold and its flow continuous. It is also shallower and its river bed steeper. There are big rocks and gravel in the river bed, as well as fewer trees around, so it is rather sunny. Normally, river sources and cold pure springs can be found in these upper sections. Not many species can adapt to these conditions.

• **Middle course.** Generally speaking, these sections have continuous flow nearly throughout the year. Their river beds are not as steep as the upper course and have more trees and bushes on the riverbanks. Above all, there are willows and oleanders, although some rivers that flow through peridotite rocks have

more open spaces on the riverbanks. In summer, some parts can get dry, and separated river pools can be created.

• **Lower course.** These river beds are wide and sunny, with slow running water, probably, a bit deeper than in other sections and cloudy or murky due to the sediments they carry. The plant life beside rivers mainly consists of oleanders, rushes and reeds, bulrushes and trees, such as willows and poplars. Parts or entire lower river sections tend to get dry. At the river mouths, water can dam up for a long time, actually, for months or years, and make ponds, which are to be explained in further sections.



1. Upper course of the River Verde. 2-3. Middle course in the rivers Ojen and Castor. 4. Lower course of the River Fuengirola.



Other lotic ecosystems are:

- **Perennial streams.** Generally speaking, the water in these streams is pure and shallower sections alternates with those that have higher water velocity. These courses are narrow and can have more or less plant life on the riverbanks, depending on the geological features of the terrain and its use.

- **Temporary streams.** These streams are placed in the higher areas, at the beginning of the river basins, but they can also be in the middle or lower altitudes. Anyhow, they are tributaries of other rivers or large streams, and they only have water during the periods of rain. The water they carry is flowing and clean, but when the rain is torrential, these streams can carry sediments.

- **Springs.** These water bodies are clear, cold and with a small flow, which can be more powerful. They can be often found in the higher mountainous areas,

and there are not many water plants, but rushes, oleanders and blackberries can be seen on their banks.

- **Canals and irrigation channels.**

There is to make a difference between two kinds of canals or channels. Some of them are irrigation channels that are usually narrow but deep, so there are not likely to be homes for dragonflies. Other canals are used for draining water from the rain or to channel streams. These are wider, carry smaller amounts of water and the plant life close to the ponds made by rivers and streams. The second kind can be shelter for a large number of species.

A kind of ditches called “acequias” are small irrigation channels used for channelling water for irrigation. Most of these water bodies are temporary, which means that the water is transferred only when it is necessary for watering an area.



Major de la Parra Stream in Ojén: Perennial spring (on the left) and the spring at the source of the Jorox in Alozaina (on the right).



Los Pilones Stream (on the left) in Mijas: temporary stream that has water during rainy period. Rainwater channel (on the right) in Teatinos neighbourhood in Málaga.

## Lentic Ecosystems

Lentic ecosystems are characterized by still terrestrial waters, such as lakes or ponds. They can be natural or artificial. The main difference between these and lotic ecosystems is the water temperature, which is often higher in the former ones. They are also richer in aquatic plants, particularly emergent ones.

### • Temporary ponds.

They are normally small and shallow, and can be completely dry for some time during the year, as they usually get fulfilled with rain. These ponds can be natural or artificial bodies of water, though they are mainly made for giving water to livestock and wild animals. Their banks are usually covered in rushes. They are likely to be found in

open sunny areas, but also in forests, where water temperature is lower thanks to the shady areas.

On the whole, temporary ponds comprise some other lentic ecosystems which dry up in summer, such as artificial ponds or reservoirs, ditches, lakes and pools, as well as mining ditches.



Temporary ponds at the olive groves in Archidona.



• **Small lakes.** These are standing water resources that tend to be larger than temporary ponds or pools and have perennial water bodies. They get water from streams filled with rain and surface runoff or from groundwater. They can have salty or freshwater. The vegetation on their shores is typical for riverbanks and varied. It includes reeds or reedbed, bulrush, cane reed and bushes, above all.

This kind of spots is rather suitable for dragonflies, above all in the case of freshwater lakes, which can shelter a large range of species. Salty water lakes or lagoons

are less diverse in dragonflies, but those species that can be found here are rather important like *Lestes macrostigma*.

Some deserted and flooded quarries, as well as river and stream sources can be added to this group if they are separated from the sea and stop getting the surface water from a river. Species diversity depends on many factors, such as the geologic features on the terrain, the depth of the pools and the number of aquatic or shore plants. Sometimes, the flooded quarries and the river or stream sources can both be inhabited by dozens of species.



Small lakes: 1. Laguna Grande [Large Lagoon] in Archidona 2. Group of lakes if La Ratosa-Castañuela (Aameda - Humilladero). Bodies of water similar to a lake: 3. Soliva Lake in Málaga City, an old clay quarry, which has been naturalized (photo taken in 2017). 4. Source of the River Vélez (in Vélez-Málaga), which is often not supplied by surface water and does not flow into the sea.

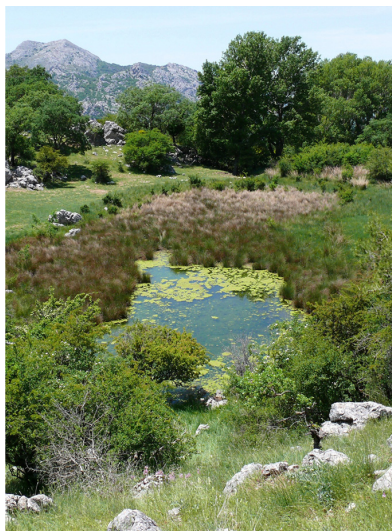


• **Lakes and ponds in high areas.** These bodies of water are usually small and placed at an altitude of over 1,000 metres, which is why the water is cold almost all year round, especially if they are deeper, when this water gets warmer only in summer.

The altitude and the temperature affect the presence, as well as the number of aquatic or shore plants and dragonflies, which are fewer than in lower areas. These waters can be perennial and temporary, which also restricts the presence of the Odonata in these spots.

• **Reservoirs.** The main feature of the reservoirs are changeable water levels and their depth, which is why there are no aquatic and shore plants nor most of dragonfly species.

In Málaga, there are small and medium reservoirs which keep the same water levels, as they are not used for watering or for supplying homes, and, eventually, they became



Hondonero Lake in Villanueva del Rosario, one of few small lakes in the mountains in Málaga at an altitude of approximately 1,210 metres.

part of nature, where a rich and diverse colonies of dragonflies live. There are also dams on small rivers, where some important communities of dragonflies can be found as well.



1. El Nacimiento Dam at the river source in El Burgo. 2. Medrana Dam in Marbella 3. Caicunes Reservoir in Alozaina.



• **Artificial Ponds.** These include small ornamental pools in parks and gardens, as well as big reservoirs which supply with water for farming and livestock, golf courses and fire safety. These ponds are normally waterproof, so they have no contact with groundwater and the water-bearing stratum; the water is chlorinated, and therefore almost all aquatic life is eliminated, and aquatic plants are regularly being cut together with the animals on them. Sometimes there are only few or no plants due to the features of the ponds (their depth, vertical position of the walls, no ground where the plants can grow, and so on).

All these factors reduces dragonfly diversity. However, those ponds which are not taken care of and they become

naturalized can become similar to small lakes, and even have the same species. This way they can become a real oasis for dragonflies and damselflies.

This group of ecosystems includes small springs and fountains, or rubblework drinking troughs for livestock. These water bodies are perennial and they are normally placed close to villages or in the countryside.

Depending on how they are use and the features of the pool, such as its size, depth, plant life, as well as the characteristics of the surrounding (altitude, habitat where they are placed, exposure to the sun, overflowed water, and so on.) there are some Odonata, like *Orthetrum chrysostigma* o *Cordulegaster boltonii*, which can adapt to this kind of structures.



1. Big manufactured pond in the Industrial area Parque Tecnológico de Andalucía in Málaga. 2. A small pond in the Town Garden Center in Torremolinos. 3. Reservoir for watering a golf course in Marbella. 4. Drinking trough and spring in the Sierra de las Nieves in Yunkera.