

Limno-reservoirs as a new landscape, environmental and touristic resource: Pareja Limno-reservoir as a case of study (Guadalajara, Spain).

Isis Arlene Díaz-Carrión, Silvia Martínez-Pérez, Antonio Sastre-Merlín, Eugenio Molina-Navarro and Ramón Bienes-Allas

Department of Geology, School of Sciences, University of Alcalá. Ctra. Madrid-Barcelona Km. 33,6. Alcalá de Henares (Madrid, Spain)

E-mail: silvia.martinez@uah.es

Purpose:

The main purpose of this work is the study if the efficiency of an infrastructure known as “Pareja Limno-reservoir” and its suitability regarding the goals of its construction: landscape and environmental correction and compensation for a population affected by a large river regulation infrastructure.

Conceptual framework:

- Limno-reservoir: Water body created by a secondary dam built in the riverine zone of a larger reservoir. Its main goal is the maintenance of a constant water level to face up to the level variations in the main reservoir.
- Landscape: In a natural area, “landscape” is the multisensory perception of the underlying ecological relationships (Díaz Pineda *et al.* 1973), especially those relationships whose knowledge would explain the presence of the observed elements.
- Water Landscape: Landscapes which are a framework made up of a dynamic combination of physical elements (water as most relevant) and human factors (Ribas Palom, 2006).
- Environmental resource: Natural resource which yields a flux of goods and services for the human society and also for the biota related with its territory. These goods and services are renewable, marketable or not, and can be used with awareness an learning purposes related with nature preservation.

Study Area:

Pareja Limno-reservoir was built in the riverine zone of Entrepeñas Reservoir (one of the regulating reservoir of the upper Tagus River Basin) (fig. 1a). Its goal is the mitigation of some of the environmental and socio-economical impacts caused by the large water regulation infrastructures. 6·10⁶ € were invested and was inaugurated by the end of 2007.

Around 20 infrastructures of this kind has been built or projected in several Spanish reservoirs. However, Pareja Limno-reservoir is the first one that consider the recreational functionality at the same level as the waterfowl protection (fig. 1b).

Pareja Limno-reservoir is located in the vicinity of the homonym village (Province of Guadalajara, La Alcarria region, central Spain). Pareja municipality facts (INE, 2001, 2011):

- Territorial extension: 92 km²
- Population (2011): 543 inhabitants.
- Population density: 5.93 inhabitants·Km⁻²
- Main economical activity: services (54%)

Methodology:

An opinion poll was done in summer 2010 to the limno-reservoir users (sample size=160). Indirect observations and visual documents analysis were also done.

Quotable quotes:

“It is quiet and nice” (T02) ■ “It is such a pretty place” (T09) ■ “I am worried about the fish ladder :will fishes go up?” (T15)
“Islands must be inaccessible to persons in order to not disturb fauna” (T33)

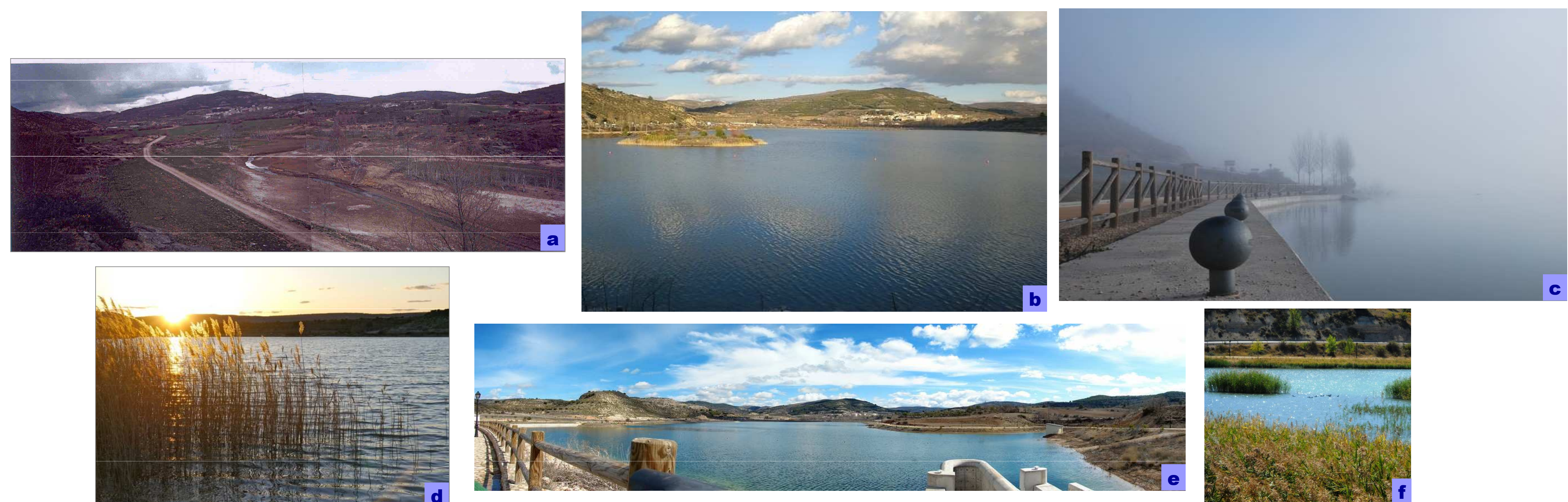


Figure 2: a) Limno-reservoir location before the construction. The area was covered by water just sporadically as a consequence of the Entrepeñas Reservoir exploitation and the decrease of rainfall since the 70s. Consequently, this distressing arid band in the drawdown zone arose. b & c) The existence of a permanent water layer offers a very different perspective, seeing the bright sky reflection in spring and summer and a foggy landscape in winter. d) Despite its youth, the shores have already been colonized with *Phragmites*, which has favored the presence of waterfowl and, consequently, the visits of “waterfowl observers”. e) Islands are being also colonized by shore vegetation. The trees planted on top of them are growing too. f) subaquatic vegetation has also experimented a big development, which is important for the river biota, favored with the construction of the fish ladder.

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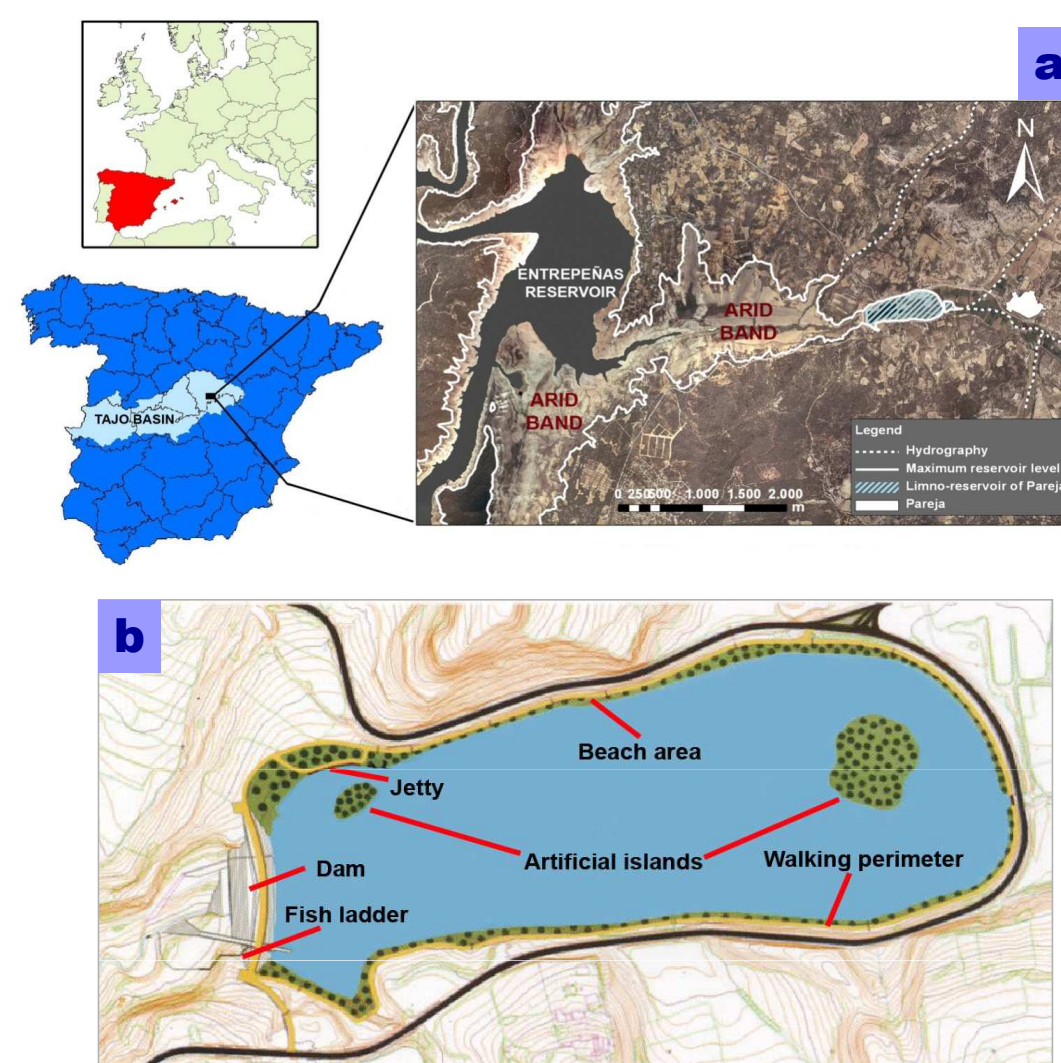


Figure 1: Pareja Limno-reservoir location (modified from Molina-Navarro *et al.*, 2010) (a) and diagram (b)

Limno-Reservoir and recreational functionality:

Rural tourism is not among the principal sources of local economical growth in Pareja; however the presence of ‘second residence tourists’ is clear during summer season either in Pareja or neighboring municipalities. The presence of this kind of tourism is related to the construction of a reservoir in the area having water as the main attractive. Backpackers are the other main sub category of Non-residents group (fig. 3a)

Nevertheless, residents also use the limno-reservoir. This use takes place during the whole year, but it also rises in summer time (fig 3b).

Recreational uses in the Pareja Limno-reservoir:

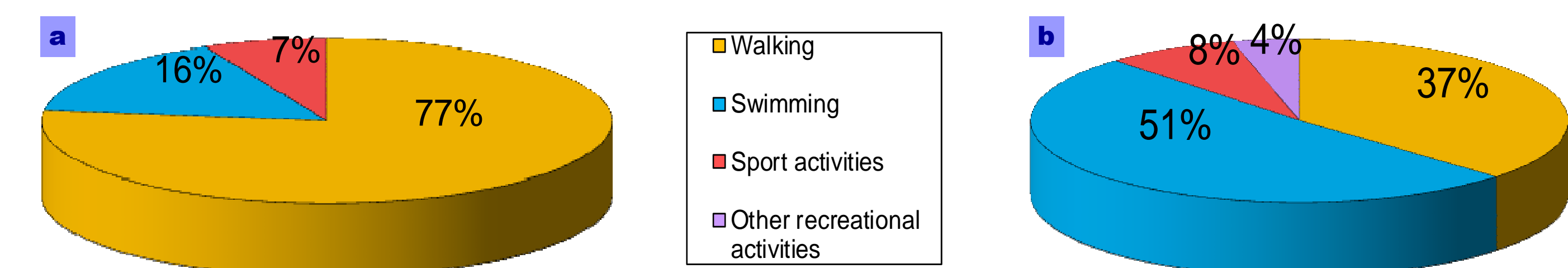


Figure 3: Recreational uses in the Pareja Limno-reservoir during summer by Pareja Village residents (a) and non-residents (b)

Other types of tourism taking place in Pareja limno-reservoir are **study tours** (each academic year study tours at fall and winter terms) and **sporting events tourism** (Since 2008 Pareja’s Triathlon is organized early summer) (fig. 4).



Figure 4: Diverse recreational functionality: different types of users. Triathlon (running [a] and swimming [b]) / study tour at winter term (c) / swimming and walking during summer (d and e).

Final considerations:

— The opinion poll results suggest that people have noticed the environmental benefit of this infrastructure, both in the recreational sense and as a place which favors the landscape and the presence of fauna (especially waterfowl) (fig. 5).

— There is an important amount of people going for a walk or doing sports. Besides, triathlon competitions in the Pareja Limno-reservoir have been included in the regional and national official schedule. It is also remarkable the swimming activity during summer. Finally, several teaching centers (even universities) go regularly to the limno-reservoir for learning activities.

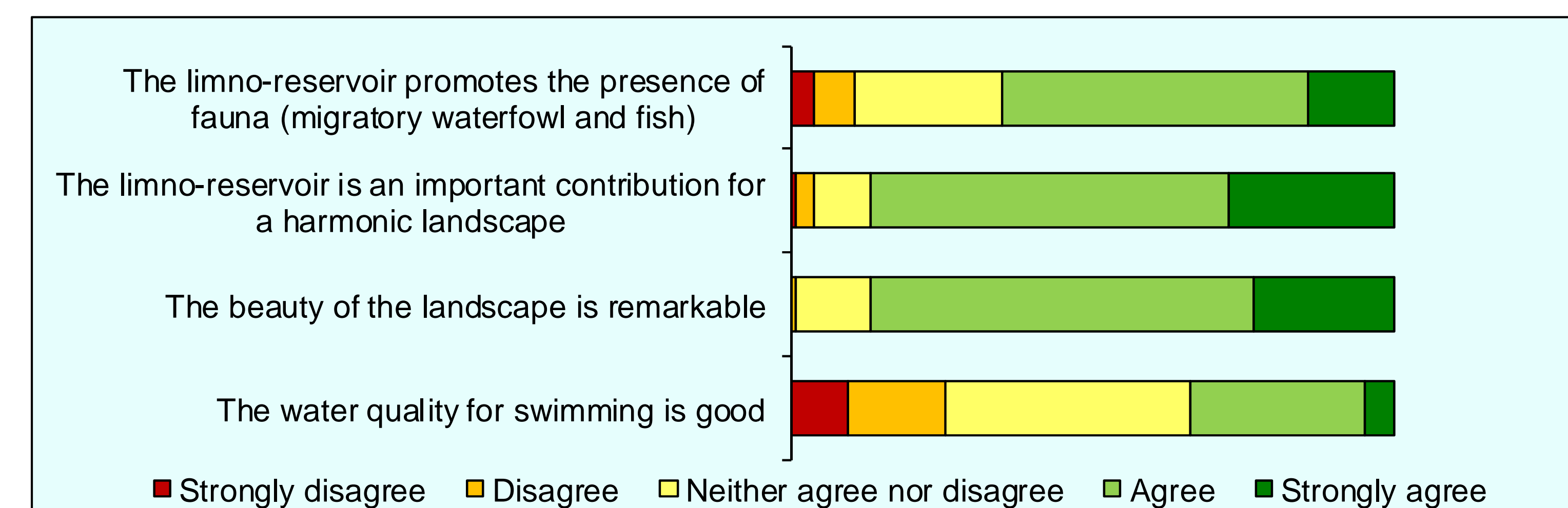


Figure 5: Landscape evaluation of the Pareja Limno-reservoir summer users.

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