We conducted a systematic evaluation of the peer-reviewed literature relating to the use of ecological indices to assess the impact of different environmental stressors in aquatic environments from Argentina. We performed a literature search in three databases: the Web of Science (WoS; http://apps.webofknowledge.com), Scientific Electronic Library Online (Scielo; https://www.scielo.org) and Online Regional Information System for Scientific Journals from Latin America, the Caribbean, Spain and Portugal (Latindex; https://www.latindex.org), using the following keywords combination: (“ecological quality” OR “ecological condition” OR “environmental conditions” OR “environmental monitoring” OR “water quality” OR pollution OR indices OR indicators) AND (Argentina OR “land use”). The search was done in January 2019 and we selected articles that use ecological indices to analyze some local problematics or stressors. The review process resulted in a total of 80 papers matching our study criteria. These articles were written in English or Spanish and published between 1996 and 2018.

From each study, we extracted the localization of the sampling sites, the ecoregion where the study had been carried out and the type of index used.

Articles were categorized according to the ecoregion/s where the study was performed, using the ecoregionalization of Argentina proposed by Burkart (1999): (1) High Andes, (2) Puna, (3) Monte of hills and valleys (4) Yungas forest, (5) Dry Chaco, (6) Humid Chaco, (7) Paraná Forest, (8) Iberá Marshes, (9) Subtropical grasslands and savannas, (10) Paraná Delta, (11) Espinal, (12) Pampas, (13) Monte of plains and plateaus, (14) Patagonian steppe, (15) Patagonian forest, (16) South Atlantic Islands, (17) Argentine Sea, and (18) Antarctica.

We distinguished six types of indices (Logan 2001, Agencia Catalana de l’Aigua 2006a, 2006b, Vugteveen et al. 2006): (1) physico-chemical, which include those indices that evaluated variables such as pH, dissolved oxygen, conductivity, nutrients, etc.; (2) biological, which include community metrics and indicators, such as richness, biodiversity, and biotic quality indices; (3) hydrological (alteration of the hydrological regime or fluvial connectivity); (4) geomorphological, related to the riparian zone; (5) functional, which encompass ecosystem functional processes (nutrient spiraling, decomposition, metabolism); and (6) multimetric, which uses different kind of metrics to evaluate the ecological condition.

We uploaded the sampling sites of each article (N=78) on Google Earth. These points were identified through:

(1) geographical coordinates (when they were provided),

(2) specific indications of the localization when they were explicit,

(3) visual localization using as reference the morphology of net drainage and the satellital image, which was compare with the localization map presented in each article. This was supported by the distance measured from reference points (e.g., roads, bridges, etc.) using the map scale, and

(4) other elements like photos loaded on Google Earth by users and labels of places that were referenced in the article.

We used different symbols to categorize sampling points according to the type of index employed:

Red triangle = Physico-chemical

Green circle = Biological

Black circle (open) = Geomorphological

Black circle (with centered black point) = Multimetric

Points dataset was saved as a kml file (Keyhole Markup Language) and later it was converted into a shapefile using QGIS 2.4.0. This shapefile was combined with one containing the Burkart (1999)´s ecoregions (https://groups.google.com/forum/#!topic/scgis-latino/J6FtFxdFRTk). Both were projected in the coordinate reference system WGS 84 (World Geodetic Survey 1984). Finally, we generated a map with the delimited ecoregions and all the sampling sites included in the reviewed literature.

References:

Agència Catalana de l’Aigua. 2006a. http://aca.gencat.cat/web/.content/20\_Aigua/05\_seguiment\_i\_control/01\_protocols/03\_Protocol\_rius.pdf. (accessed 12 March 2019).

Agència Catalana de l’Aigua. 2006b. http://aca.gencat.cat/web/.content/20\_Aigua/05\_seguiment\_i\_control/01\_protocols/12\_hidri.pdf. (accessed 12 March 2019).

Burkart, R., Bárbaro, N.O., Sánchez, R.O., Gómez, D.A., 1999. Ecoregiones de la Argentina. [Ecoregions from Argentina]. Administración de parques nacionales. Buenos Aires. http://www.sib.gov.ar/archivos/Eco-Regiones\_de\_la\_Argentina.pdf. (accessed 26 December 2018).

Logan, P. 2001. Ecological quality assessment of rivers and integrated catchment management in England and Wales. Journal of Limnology 60: 25-32.

Vugteveen, P., Leuven, R.S.E.W., Huijbregts M.A.J. & Lenders H.J.R. 2006. Redeﬁnition and elaboration of river ecosystem health: perspective for river management. Hydrobiologia 565: 289–308.