

USING FISH COMMUNITY TO IDENTIFY SUCCESS CRITERIA FOR SEAGRASS HABITAT RESTORATION

Scapin L.*, Zucchetto M., Facca C., Sfriso A., Franzoi P.

CEMAS - DAIS, Università Ca' Foscari Venezia, via Torino 155, 30170 Venezia, Italy.
*luca.scapin@stud.unive.it

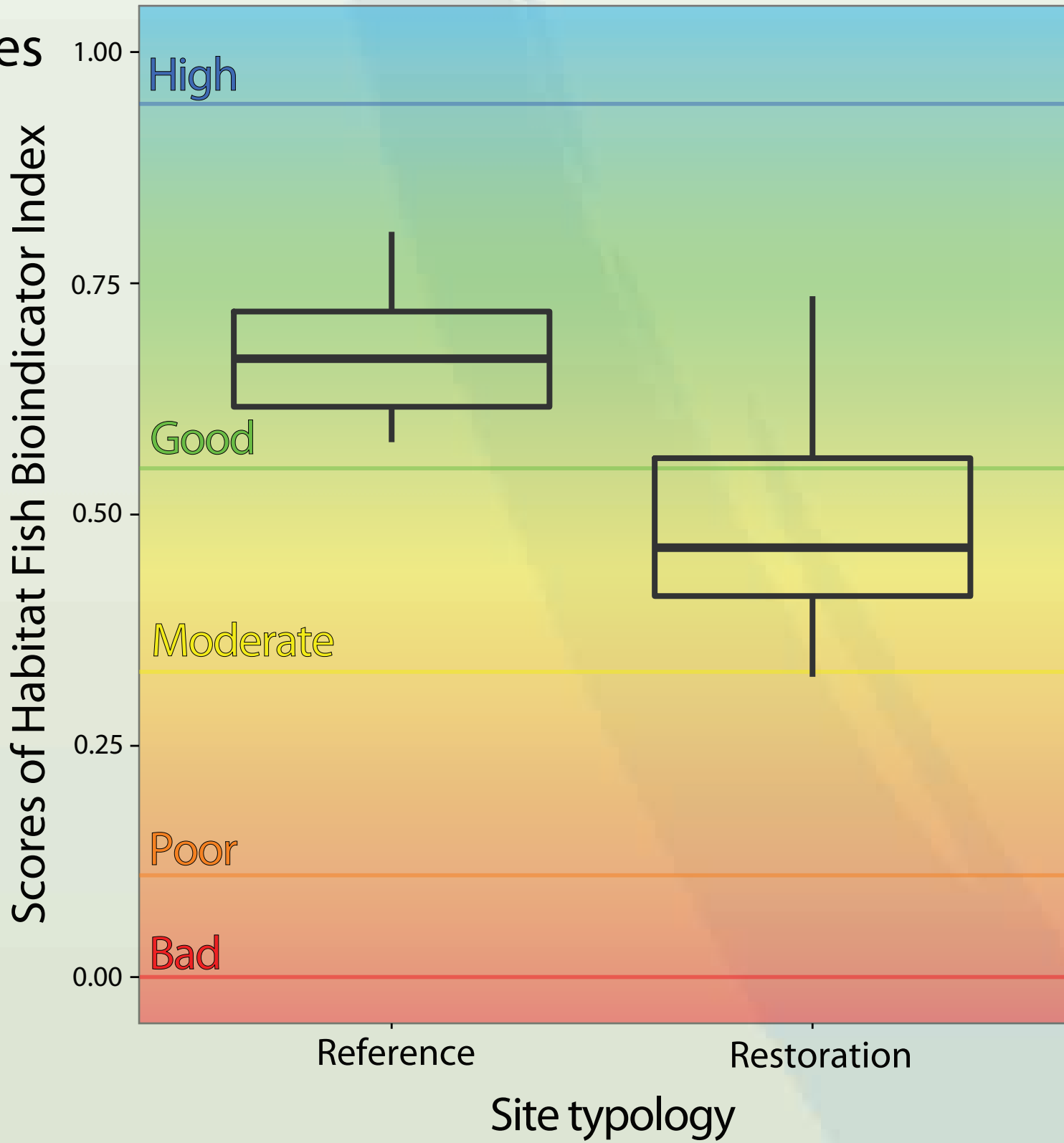
METHODS

The LIFE project N° LIFE12 NAT/IT/000331 - SeResto started in 2014 with the objective of restoring seagrass meadows in the northern Venice lagoon (northern Adriatic Sea, Italy). An expected goal of the project is the enhancement of the overall ecological status (sensu Dir. 2000/60/EC; WFD) of the northern lagoon, and thus also to restore the fish communities associated with seagrass meadows.

Aim of this work was to identify characteristics of the fish assemblage most associated with reference habitats, and test them as potential indicators to track restoration progress towards desired conditions.

RESULTS

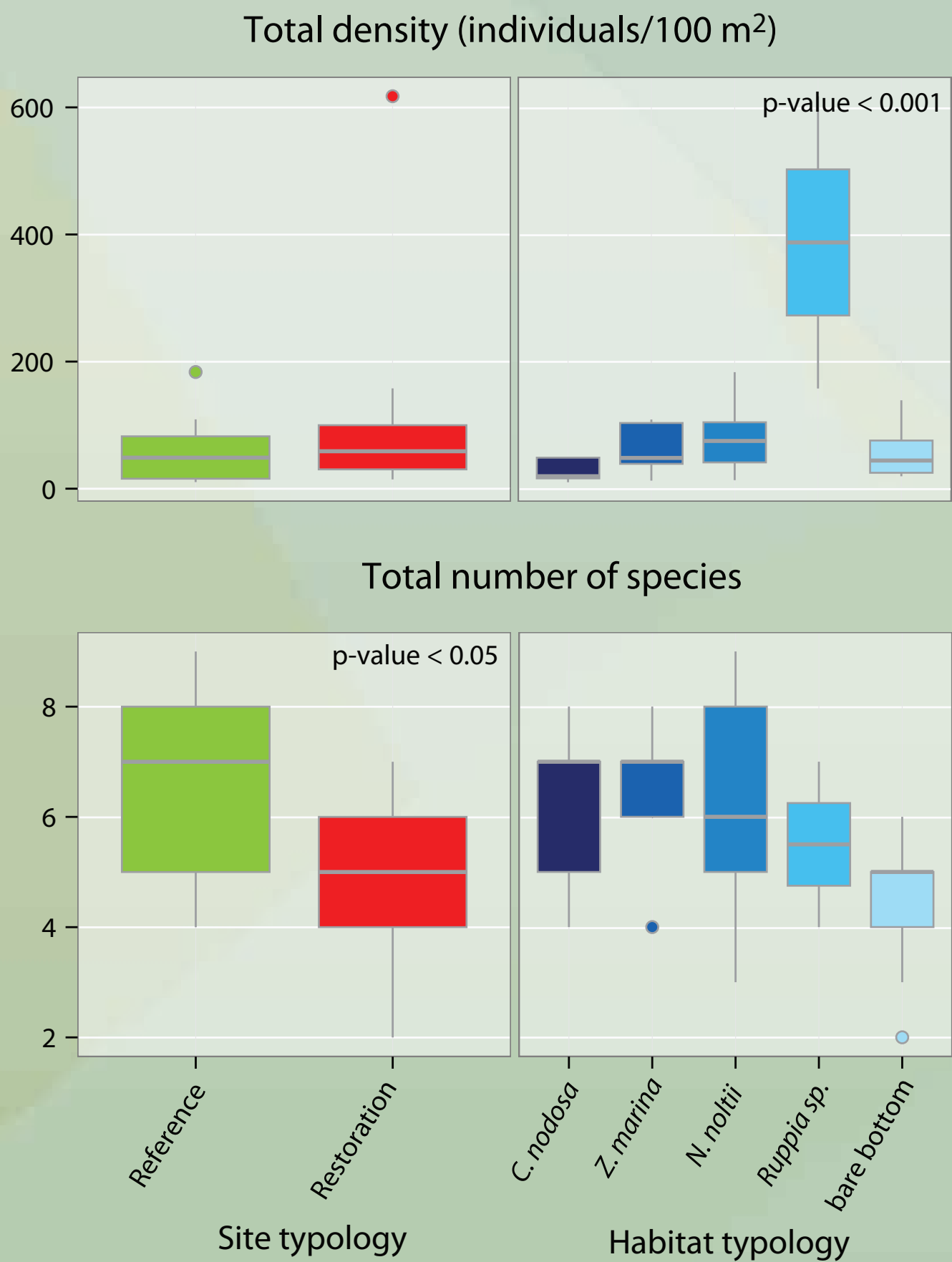
- #1. Margalef's richness of hyperbenthivorous/zooplanktivorous/piscivorous species (calculated on biomass)
- #2. Total density of biomass
- #3. Number of lagoon resident species
- #4. Mean individual weight of benthivorous species



Fish community is significantly different between restoration and reference sites (p-value <0.001) and between seasons (p-value <0.05), as shown in nMDS. From bare, unstructured habitats, that are still prevalent in restoration sites and support species like *Aphanius fasciatus* (APFA), *Knipowitschia panizzae* (KPA) and *Pomatoschistus marmoratus* (PMA), fish community changes along progressively more structured habitats, i.e. from short- and narrow-leaved *Ruppia sp.* and *N. noltii* meadows, to taller- and broader-leaved *C. nodosa* and *Z. marina* meadows. Reference sites support indeed high densities of seagrass specialists, with also *Gobius niger* (GNI) and *Salaria pavo* (SPA) being strongly linked to seagrass habitats.

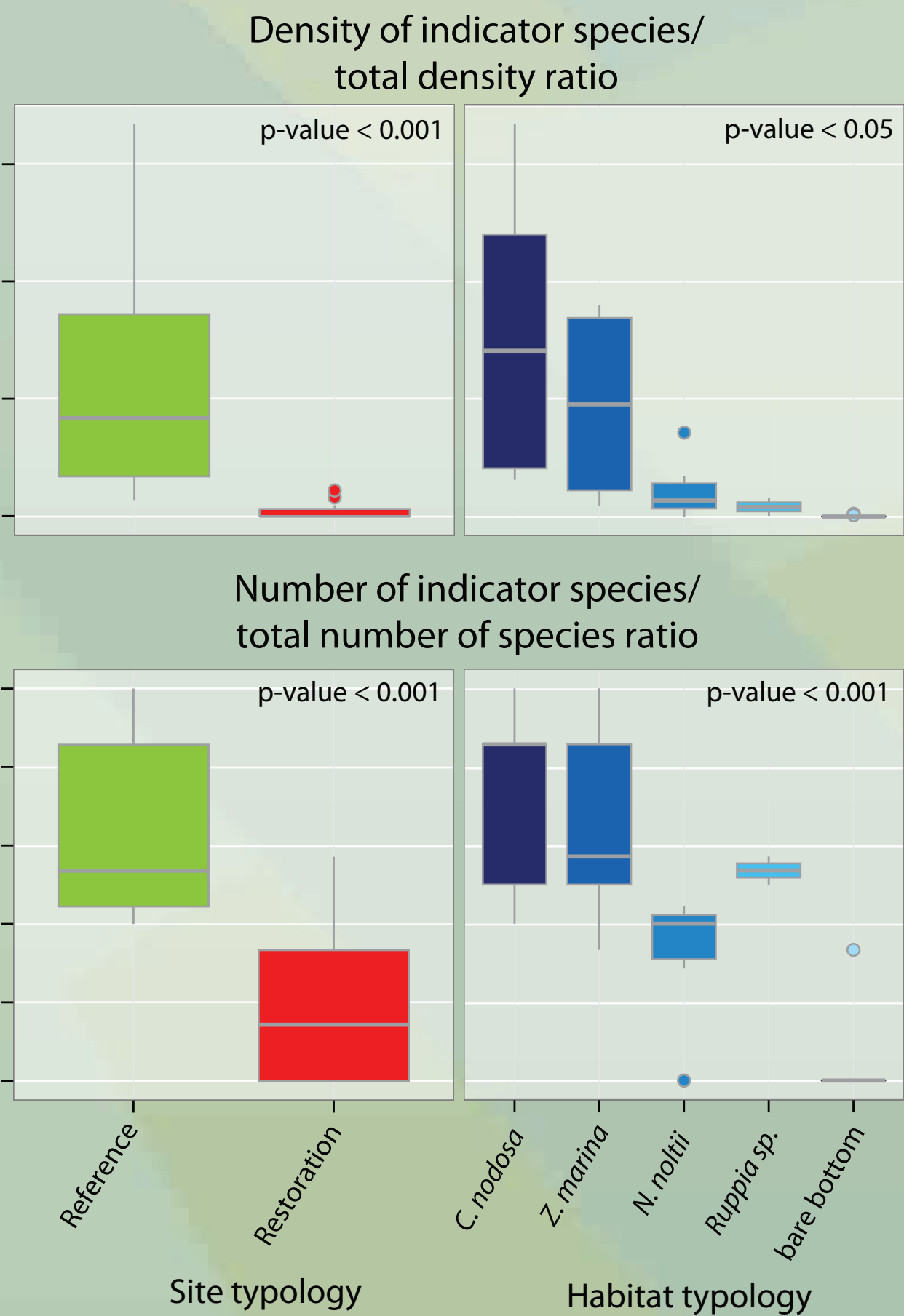
Total number of species in fish community is significantly lower in restoration sites compared with natural meadows, while no significant differences are found in total density. Proportion of indicator species selected from nMDS analysis (both in terms of density and species number) is significantly related to site typology, showing lower values in newly-transplanted sites. Moreover, both metrics based on indicator species show significantly increasing values at increasing levels of habitat structure.

Whole-community metrics



Metrics based on indicator species:

G. niger, *N. ophidion*, *S. pavo*, *S. typhle*, *Z. ophiocephalus*



CONCLUSIONS

The application of a multimetric index showed that restoring seagrass habitat in the northern Venice lagoon could enhance the ecological status of fish fauna in this area, which has undergone substantial anthropogenic alterations in last decades. In order to verify such hypothesis, monitoring of seagrass specialists such as *Syngnathus typhle*, *Nerophis ophidion* and *Zosterisessor ophiocephalus* (Franzoi et al., 2010), but also of *Gobius niger* and *Salaria pavo*, could be used to track restoration development and assess its success.

Results also suggest that not all plant species form equivalent habitats for fish. Different fish assemblages may colonise habitats recreated with either the tall- and broad-leaved *Cymodocea nodosa* or the shorter- and narrower-leaved *Nanozostera noltii*. Hence, different endpoints in fish communities of restored habitats are expected.

REFERENCES

Franzoi P., Franco A., Torricelli P. (2010). *Fish assemblage diversity and dynamics in the Venice lagoon*. Rendiconti Lincei, 21(3), 269–281. <http://doi.org/10.1007/s12210-010-0079-z>

Zucchetto M., Franco A., Scapin L., Ciccotti E., Torricelli P., Franzoi P. *Uncertainty in developing fish-based multimetric indices* (in preparation).

The LIFE12 NAT/IT/000331 - *Seagrass RESToration* project is funded by European Union's LIFE+ financial instrument and contributes to the environmental recovery of a Natura 2000 site (SIC IT3250031 - Northern Venice Lagoon).



www.lifeseresto.eu
Life SeResto