Chapter 3
Disentangling Trade-Offs Between the State of Coastal Ecosystems with Human Well-Being and Activities as a Strategy Addressing Sustainable Tourism

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Significance Statement Coastal tourism is a major driver for the local and regional economy of many Mediterranean areas. At the same time, this industry generates threats that, added to those produced by other coastal human activities, substantially damage the coastal and marine environment. A damaged environment cannot provide many fundamental benefits for coastal tourism itself, such as for instance clear water, coastal protection and natural beauty. We propose a framework for unravelling the threats and benefits related to coastal tourism, and we present two lists of indicators of coastal tourism sustainability, to monitor the impact of coastal tourism on the natural environment (threat indicators), and to assess which threat mitigation measures can counteract it (enabling factor indicators).

Keywords Coastal tourism sustainability · Coastal tourism indicators · Coastal ecosystem services · Mediterranean coastal ecosystems

1 Introduction

Coastal tourism (CT) has been identified as one of the five priorities of the EU Blue Growth Strategy (EU Commission, 2017). In particular, the Mediterranean area attracts a higher number of tourists than any other destination in the world, as it can fully satisfy sea, sun and fun lovers providing as well a huge choice of cultural, historical and ancient attractions (Apostolopoulos et al., 2001; UNWTO, 2015). The continuous growth of the tourism sector exerts increasing pressures on the environmental resources of coastal zones, as the majority of its activities impacts substantially on the ecological integrity of coastal and marine ecosystems (Drius et al., 2019

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and literature therein), often depleting their functionality and capability of delivering fundamental Ecosystem Services (ES), i.e. the benefits people obtain from ecosystems. In addition, increasing tourism pressure adds to other human impacts (e.g. waste, pollution, water consumption, alien species introduction, habitats and biodiversity loss, overexploitation of marine resources, etc.), causing complex cumulative effects on the Mediterranean marine and coastal environment (Micheli et al., 2013).

The diversity of species, habitats and landscapes lies at the heart of many tourist attractions, therefore the protection of nature is a fundamental prerequisite for the sustainability of the tourism industry on the long term, which aims at maintaining the environmental, economic and socio-cultural spheres in balance. This concept is embedded in the sustainable tourism approach: "*tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities*" (UNEP/UNWTO, 2005). Sustainability indeed can be achieved mainly by: (i) making optimal use, protecting, and conserving environmental resources and biodiversity; (ii) respecting and conserving living cultural heritage and traditional values of host communities; and (iii) ensuring viable, long-term economic operations and fairly distributed socio-economic benefits to all stakeholders. Sustainable tourism aims also at meeting the needs of tourists, which include the beauty and the natural perceptions of recreational sites. In particular, these last are defined as part of ES, which therefore can be explicitly or implicitly used to evaluate the progress towards sustainable tourism (Böhnke-Henrichs et al., 2013; Wu, 2013). In particular, cultural services (the intangible benefits people obtain from their interactions with natural ecosystems including recreation, cognitive development and aesthetic experiences, that contribute to individual and collective human well-being), can help acknowledge the tourism–nature–well-being nexus in planning tourist destinations and their sustainability (Bachi et al., 2020; Willis, 2015). Moreover, as ES are strictly interdependent, the use of one may affect the provision of others, and the optimization of a single service might often negatively affect other services' supply (Böhnke-Henrichs et al., 2013; Rodríguez et al., 2006). However, conceptual frameworks unravelling connections among CT activities, pressures, impacts and ES are still lacking (Arkema et al., 2015; Papageorgiou, 2016).

Because of the increasing demands in the CT sector and consequently the increasing pressures exerted on the natural environment, there is urgent need of action addressing: (i) the definition of the main CT pressures and synergies with other existing human activities (HA); (ii) the characterization of relationships and trade-offs among tourism, other impacts, and benefits deriving from nature, and (iii) the measure of the level of sustainability in every destination together with the assessment of enabling factors (EF, e.g. threats mitigation measures) that can favour sustainable tourism.

In the context of the European INTERREG MED project Co-Evolve "Promoting the co-evolution of human activities and natural systems for the development of sustainable coastal and maritime tourism", we developed a conceptual framework useful for supporting decision makers and planners, which illustrate the complex

relationships and trade-offs among CT typologies, their environmental impacts, the ES linked to tourism, and the other HA exerting cumulative effect on the Mediterranean coastal environments (Drius et al., 2019). This framework can be further implemented to better characterize threats and EF related to each type of CT. With the goal to further develop its potential application, in this paper, we (i) shortly examined the framework, further expanding it with the introduction of potential EF; (ii) reviewed the main available indicator systems for sustainable coastal tourism; and (iii) applied the framework approach to guide the development of new candidate environmental and socio-ecological indicators addressing tourism sustainability.

2 The Upgraded Co-Evolve Framework

The Co-Evolve conceptual framework disentangles complex relationships among CT, other HA and coastal ecosystem services (CES), through potential threats and benefit trajectories forming a loop of interconnections (Drius et al., 2019). It was conceived in the form of a cascade model, to connect the benefits arising from CES with their effects on human well-being, and to show how HA may negatively influence the CES capacity to deliver services, which are strictly linked to the development of sustainable CT. It also highlights the dual nature of tourism, both as an industry producing threats to the environment and as an activity that may reconnect human well-being to nature. Following this scheme, CES potentially produce benefits (positive flow) towards both CT and HA (e.g. by ensuring clean bathing water and supplying seafood), but on the contrary CT and HA can threaten CES delivery (e.g. water pollution and waste generated by CT, fish overexploitation produced by intensive fisheries and so on) negatively affecting benefit feedbacks to HA and CT. Moreover, CT and HA can threaten each other, creating a bi-directional threats flow completing the loop (e.g. the industrial production of goods produces different kinds of noise and chemical pollution, which might affect CT, whereas tourist cruises can favour alien species introduction, impairing the development of the aquaculture sector), (see Fig. 1 in Drius et al., 2019). Two important concepts emerge from this framework: (i) CES are set up in the loop as fundamental component, since they provide the essential benefits for both tourism and other HA, posing nature integrity as the base of sustainability of these activities on the long term; and (ii) the threats generated from HA and CT impinging on CES provoke a negative effect on HA and CT.

In order to develop this framework for the Mediterranean, five CT typologies were mainly analysed: (i) beach tourism (i.e. all beach-based activities and nautical sports dependent on beach facilities); (ii) urban tourism (i.e. visiting of coastal villages and towns); (iii) cruise tourism (including associated activities such as embark/disembark facilities and coastal navigation); (iv) recreational boating (including yachting); and (v) ecotourism (i.e. the responsible travel and visitation to relatively undisturbed coastal natural areas, in order to enjoy and appreciate nature). Moreover, threats from CT and to CT were embedded into a new

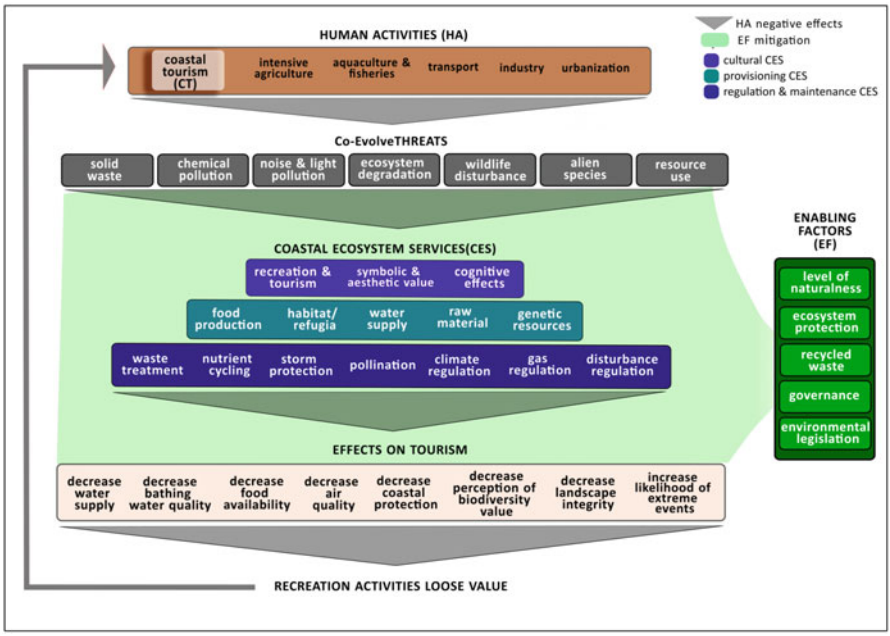

Fig. 3.1 Conceptual framework highlighting the implications of the threats from and to Coastal tourism (CT) for CT development. The negative effects flows generated by CT and by other Human Activities (HA) through their threats to coastal ecosystem services (CES) and thus to recreational activities are indicated by grey triangular arrowheads. CES are colour coded as following: cultural (violet), provisioning (teal) and regulation and maintenance (dark blue). The cream-coloured box contains a set of negative effects produced by a reduced supply of CES, which in turn impair CT assets for the development of CT industry (grey arrow). The light green area represents the mitigation effects produced by Enabling Factors (EF, in the green boxes). Figure modified from Fig. 5 in Drius et al. (2019)

"Co-Evolve threats" classification, which included new emerging threats like for instance "light pollution".

In this paper, building on case studies developed within Co-Evolve, we could expand each component of the loop highlighting the implications of the threats from and to CT for CT development (Fig. 3.1). CT and other HA generate threats, which in turn impinge on CES supply. This is reflected on CT through the loss of quality attributes of natural elements supporting coastal recreational activities (e.g. quality of bathing water, air and food, water supply, landscape integrity, climatic stability, coastal protection, perception of biodiversity etc.). Negative effects generated by the impairment in CT assets are thus directed toward the development of CT industry. The scheme emphasises that, apart from CT, other HA produce threats that can negatively affect tourism recreational activities and cumulate with threats from CT. The key role of CES is highlighted, with a particular emphasis on cultural CES for the survival of CT and for management of conflicts among HA in the long term. We further introduce some potential EF, which might mitigate and counteract

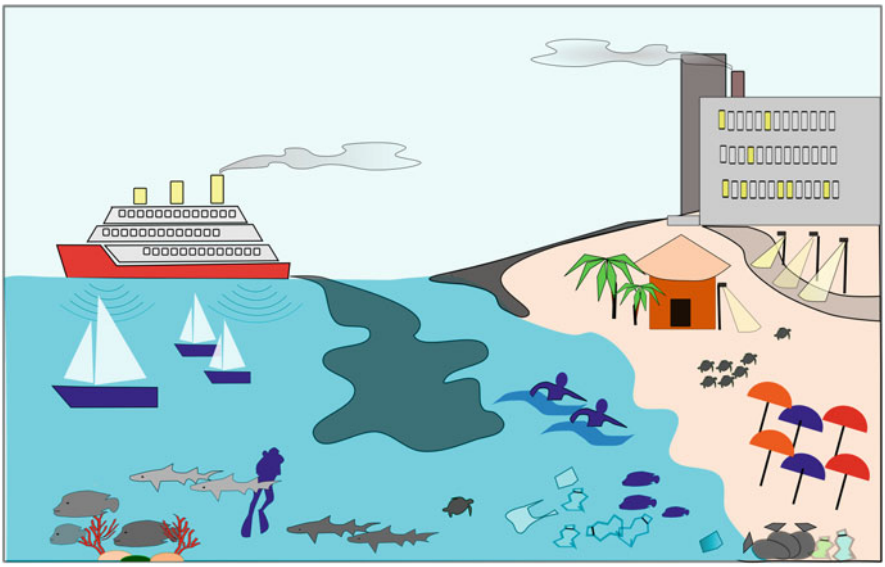

Fig. 3.2 Sketch example on how coastal tourism (CT) and other human activities (HA) affecting CT recreational activities can impinge on coastal ecosystem services (CES) supply. The CT cruise industry, land based industrial and tourism infrastructures pollute the coastal waters of a beach resort; water pollution (Co-Evolve threat) negatively affects coastal water nutrient cycling (regulating CES), fact that, in the long term, provokes a decrease in bathing water quality in the resort, thus affecting most of recreational activities, such as swimming, snorkelling, spearfishing, and nautical sports. Therefore, a coastal resort whose bathing water quality is scarce is likely to lose attractiveness and ultimately to decline (negative effect on CT industry). Other potential threats generated by CT and HA and impinging on CES (e.g. solid waste, light pollution and ship noise) are represented. These threats negatively affect touristic appreciation of natural sites, life cycle and even survivorship of marine organisms, on which various coastal recreational activities depend

negative feedbacks toward CT. Examples of key EF towards tourism sustainability are: governance and environmental legislation (e.g. rigid control on waste production), coupled with the maintenance of a high naturalness level and an effective ecosystem protection. Examples on how CT and HA, by affecting CT recreational activities, can impinge on CES supply are reported in the sketch of Fig. 3.2.

3 Existing Indicators for Sustainable Coastal Tourism

Sustainable tourism good practice requires a constant monitoring of the impacts generated by the tourism industry, to determine whether they are acceptable or not, introducing the necessary preventive and/or corrective measures (Asmelash & Kumar, 2019; McCool et al., 2001). At the same time, sustainability should ensure tourist satisfaction, provide meaningful experiences, raise awareness about sustainability issues and promote suitable practices. In this way the provision and maintenance of cultural ES is guaranteed. An efficient monitoring can be performed by

means of clear, simple and flexible indicators based on qualitative and quantitative data (Schianetz et al., 2007), which should have the following characteristics: (i) present the current state of sustainability at the destination; (ii) monitor the results of activities and policies carried out at the destination in order to develop and implement sustainability; (iii) warn about the changes that are taking place. Moreover, indicators should be seen as a vehicle to generate community consensus in working towards shared goals (Gahin et al., 2003). Various international organizations so far have put sustainable tourism indicators on their agenda. Two major international initiatives are the Global Sustainable Tourism Council (GSTC) and the United Nations World Tourism Organisation (UNWTO). The GSTC has developed two sets of criteria with the aim of setting tourism sustainability standards among the various stakeholders, by targeting tourism private actors (hotel owners, tour operators etc.) and tourism destinations (e.g. GSTC, 2013). UNWTO has recently put into force the initiative "Towards a Statistical Framework for Measuring Sustainable Tourism" (MST) which aims at developing measures for sustainable tourism taking into account the economic, environmental and social dimensions and the global, national and subnational spatial level (UNWTO/MST, 2016).

Grounded on the initiatives taken by the UNWTO and the GSTC, EU institutions have developed their own frameworks, launching in 2013 the European Tourism Indicator System (ETIS). ETIS intends to provide not only a management tool, but also to help destinations to monitor and measure their sustainable tourism performance, by using an easy to use, shared, and comparable approach for collecting data and information. ETIS is based on 27 core indicators and 40 optional indicators, subdivided into four categories (https://ec.europa.eu/growth/sectors/tourism/offer/sustainable/indicators_en): (i) destination management; (ii) social and cultural impact; (iii) economic value, and (iv) environmental impact. The core indicators capture the baseline information to understand, monitor and manage the performance and impact of tourism activities at a destination, providing possibilities for comparisons over time and a basis for sustainable management. The supplementary indicators address further specialization, covering issues such as cultural routes and accessible tourism (European Union, 2016).

Starting from ETIS, some studies have tried to develop alternative indicators. For example, the INTERREG project Med MITOMED+ tested the ETIS indicators on target Mediterranean destinations and suggested a new set, tuned for coastal areas, providing an online open platform, where local governments can calculate their own indicators (Brščić et al., 2020). Apart from this, MITOMED+ underlined the importance of involving all tourism stakeholders in the management of the destination and helped them analyse the current impact of tourism on local economies, environments and societies and understand the benefits of using indicators. Whatever the context, all the indicator systems currently available have a prevalent socio-economic nature and they seem to ignore the importance of CES for the long-term sustainability of CT, as well as the primary role of coastal ecosystems and their functions for the existence and prosperity of CT. This induced us to conceive a new approach, in the

context of the Co-Evolve framework, for developing sustainability indicators for CT, which focus on coastal ecosystem protection, embracing a holistic perspective.

4 Applying the Co-Evolve Approach for Developing Sustainability Indicators

We started exploring the nexus between CT and CES. On the one hand, CES supply CT with manifold benefits essential for its existence, such as, for instance, the intrinsic value of a natural coastal landscape; on the other hand, unsustainable CT (e.g. water pollution from recreational boating or cruising) negatively impact CES. Then, we investigated the threats from CT to coastal ecosystems and their services and the EF for the protection of coastal ecosystems and their services, always in relation to CT. Finally, we developed our own list of indicators, to be added to the existing ETIS supplementary indicators. The criteria followed to identify the indicators were: data accessibility, data availability and local scale (NUTS3 or Pilot Area) applicability. We proceeded in two steps, first building a provisional list of indicators based on data accessible at the Mediterranean level, and then excluding all those indicators whose data were not available or valid at local scale. Thus, the final list of indicators is the result of a consultation with the partners of Co-Evolve, which provided information on data availability at local scale for some indicators.

Table 3.1 reports the list of indicators, distinguished into Threats and Enabling Factors. Regarding the threats, we identified "Percentage of artificial land cover classes with respect to total surface" as a proxy to express the threat Air pollution, as we could not find a standardized data source valid for all Mediterranean destinations that would report reliable measurement. The indicator is based on the Corine Land Cover spatial database and it can be computed at 10-km wide coastal strip within the NUTS3 region. Air pollution is produced by transportation and industry; in the case of coastal tourism, cruises, airplanes and road vehicles are likely to be the major vectors of this source of pollution. The threat Water Pollution in the Mediterranean Sea is principally the direct result of the discharge of untreated or partially treated sewage into the immediate coastal zone, and it is obviously very relevant for coastal tourism. It can be expressed by the indicator "Percentage of bathing sites with excellent water quality" based on the database WISE, which refers to microbiological pollution only. The indicator "Artificial sky brightness" expressing the threat Light pollution is starting to be considered, albeit marginally, in indicators systems (e.g. GSTC, 2016). Coastal cities and highly developed tourist areas are hotspots of light pollution, representing a relevant new threat element for the monitoring of coastal tourism. It is now recognized that artificial lights impact, even many kilometres away from their sources, on the natural cycles and behaviour of urban and marine fauna that depend on land to complete its life cycles (e.g. sea turtles nesting), (Davies et al., 2014 and literature therein). Ecosystem degradation and

Table 3.1 List of threats indicators for coastal ecosystem protection, developed within the Co-Evolve project

Threats	Co-Evolve indicators	Measure	Scale	Source
Air pollution	Percentage of artificial land cover classes with respect to total surface	Percentage	Value computed at 10-km wide coastal strip within NUTS3	Corine Land Cover 2012 http://land.copernicus.eu/pan-european/corine-land-cover/clc-2012/view
Water pollution	Percentage of bathing sites with excellent water quality	Percentage	Value computed at NUTS3/PA level	WISE – Bathing Water Quality Reporting under Directive 76/160/EEC http://dd.eionet.europa.eu
Night time light pollution	Artificial sky brightness	mcd/m^2	Value computed at 10-km wide coastal strip within NUTS3	Falchi et al. 2016 supplementary data service http://doi.org/10.5880/GFZ.1.4.2016.001[a]
Ecosystem degradation and fragmentation	Natural land cover classes/artificial land cover classes	Number	Value computed at 10-km wide coastal strip within NUTS3	Corine Land Cover 2012 http://land.copernicus.eu/pan-european/corine-land-cover/clc-2012/view
Noise pollution	Percentage of people exposed to road noise	Percentage	Value computed at city/PA level	EEA portal https://www.eea.europa.eu/data-and-maps/data/data-on-noise-exposure-2
Waste production	Municipal waste per capita annually produced	Kg/year	Value computed at city/PA level	Data available at municipality /NUT3 level

The measure and the scale of application of the indicators are also reported. *PA* Pilot Area
[a]Falchi F, Cinzano P, Duriscoe D, Kyba CCM, Elvidge CD, Baugh K, Portnov B, Rybnikova NA, Furgoni R 2016. Supplement to: The New World Atlas of Artificial Night Sky Brightness

fragmentation leading to lower abundances and often to species richness declines is considered the most pervasive threat to diversity, structure, and functioning of marine coastal ecosystems and to the goods and services they provide (Lotze et al., 2006). We identified the indicator "Natural land cover classes/artificial land cover classes", whose data is available through the Corine Land Cover spatial data. For the threat "Noise pollution", standardized data at adequate scale, related to the impact on biota do not currently exist. For this reason, we decided to employ information referred to human health, assuming that it can be valid for wildlife as well, using as indicator the "Percentage of people exposed to road noise" populated through the EEA database. However, anthropogenic underwater noise is now

recognized as a relevant world-wide problem, and recent studies have shown a broad range of negative effects in a variety of taxa (e.g. marine mammals, Erbe et al., 2019). The ACCOBAMS Agreement (*The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area*) has undertaken a work aiming at identifying noise hotspots and areas of potential conflicts with cetacean conservation (ACCOBAMS, 2016).

Shifting to the threat "Waste production", there is a lack of studies quantifying how much solid waste the tourist population produces and how it engages in total and separately collected recyclables. Several studies have used the production of waste by the resident population as a proxy for calculating the seasonal variation of waste production in different towns and regions with high amount of tourists, assuming that residents and tourist produce the same waste amount. However, there is no scientific evidence on whether the proportion of waste generated by the tourist population is the same as that of the resident population, and whether the effect of the tourist population on waste production extends or not over the months following the direct tourist pressure (Mateu-Sbert et al., 2013). Although EU statistical datasets provide valuable information on the trend of waste production, no clear relationship with touristic presence can be done. This considered, the chosen indicator was "Municipal waste per capita annually produced".

For Enabling Factors (EF) suitable at NUTS3 or local scale, we identified five indicators (Table 3.2). To express the level of ecosystem protection in a coastal destination the indicator "Extent of coastal Natura 2000 sites" proved very adequate. In fact, this information is constantly up-to-date through the dedicated EU Natura 2000 portal following the reporting provisions of the Habitats Directive, 92/43/EEC (Table 3.2). Similarly, the EF Level of naturalness can be expressed by the indicator "Area of natural and semi-natural habitats (based on Natura 2000 sites and EU habitats)", whose data can be retrieved from the same portal. A very important aspect to consider for the effective protection of coastal ecosystems is the governance of protected areas, for instance that of Natura 2000 sites. Governance issues relate to the existence and implementation of tourism, environmental planning policies, action plans and public expenditure assessment as well as the involvement of and interaction with public and private stakeholders in the planning process. The indicator we chose is a categorical one (yes/no), i.e. the "Implementation of Natura 2000 management plans". To counteract the threat "Waste production", we selected the EF indicator "Municipal waste recycled per year", whose data are available at NUT3 level. However, also in this case, it is not possible to distinguish the proportion of waste recycled by the tourist population in comparison to that of the resident population. Finally, the fifth indicator we proposed is related to environmental legislation, namely "Adequacy of legislation tackling pollution", which includes the above-mentioned threats (noise, air, water and light pollution). Here the indicator can be categorized into three levels (low; intermediate; high), after an accurate investigation on the existing local measures in each coastal destination.

Table 3.2 List of enabling factors indicators for coastal ecosystem protection, developed within the Co-Evolve project

Enabling Factors	Co-Evolve indicators	Measure	Scale	Source
Ecosystem protection	Extent of Natura 2000 sites	ha	Value computed at PA level	https://natura2000.eea.europa.eu
Level of naturalness	Area of natural and semi-natural habitat (based on Natura 2000 sites and EU habitats)	ha	Value computed at PA level	https://natura2000.eea.europa.eu https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification
Waste recycled	Municipal waste recycled per year	kt/year	Value computed at city/PA level	Data available at municipality/ NUT3 level
Governance	Implementation of Natura 2000 management plans	yes/no	Value computed at PA level	https://natura2000.eea.europa.eu
Environmental legislation	Adequacy of legislation tackling pollution	low/interme-diate/high	Value computed at PA and wider level	Data available at municipality/ NUT3 level

The measure and the scale of application of the indicators are also reported. *PA* Pilot Area

5 Final Remarks

CT is a major driver for the local and regional economy of many Mediterranean areas. On the other hand, it can affect ecosystems through manifold pressures, which can contaminate air and water, cause noise and light pollution, and alter the health of wildlife populations. CT and the HA occurring along the Mediterranean coastline share space and resources, leading to conflicts for often-divergent uses. In addition, the overexploitation of natural resources degrades and depletes coastal habitats, with negative feedbacks for all HA. Hence, both tourism and the other activities have to consider their dependence on CES, and technical and political actions have to be put in practice to reach a compromise that preserves natural resources in the long term. The implementation of indicators to express, on the one hand, the threats from tourism to coastal ecosystems and, on the other hand, the enabling factors which could minimize such threats, represents a precious means to make CT more sustainable and thus to enjoy the Mediterranean coastal ES in the long term. This paper contributed to the advancement of these issues by embracing an ecological view that goes beyond the socio-economic one, which is the one prevalently adopted to assess sustainable tourism development. In particular, starting from the conceptual framework developed by Drius et al. (2019), we proposed some EF, which take into account the protection and the management of the environmental assets. Besides,

based on the main existing indicator sets for sustainable tourisms, we suggested and described a new approach for developing sustainability indicators, focussing on coastal ecosystem protection and adopting a holistic perspective.

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References

ACCOBAMS. (2016). Overview of the noise hotspots in the ACCOBAMS area. Part I – Mediterranean Sea. Final report by Maglio A, Pavan G, Castellote M, Frey S, 45 pp.

Apostolopoulos, Y., Leontidou, L., & Loukissas, P. (2001). *Mediterranean tourism: Facets of socioeconomic development and cultural change* (336 pp). Routledge.

Arkema, K. K., Verutes, G. M., Wood, S. A., Clarke-Samuels, C., Rosado, S., Canto, M., et al. (2015). Embedding ecosystem services in coastal planning leads to better outcomes for people and nature. *Proceedings of the National Academy of Science, U.S.A, 112*, 7390–7395.

Asmelash, A. G., & Kumar, S. (2019). Assessing progress of tourism sustainability: Developing and validating sustainability indicators. *Tourism Management, 71*, 67–83.

Bachi, L., Carvalho Ribeiro, S., Hermes, J., & Saadi, A. (2020). Cultural Ecosystem Services (CES) in landscapes with a tourist vocation: Mapping and modeling the physical landscape components that bring benefits to people in a mountain tourist destination in southeastern Brazil. *Tourism Management, 77*(2), 104017. https://doi.org/10.1016/j.tourman.2019.104017

Böhnke-Henrichs, A., Baulcomb, C., Koss, R., Salman Hussain, S. S., & de Groot, R. S. (2013). Typology and indicators of ecosystem services for marine spatial planning and management. *Journal of Environmental Management, 130*, 135–145.

Brščić, K., Planaguma, L. P., Raschi, A., Marchi, V., Šugar, T., Lovrečić, K., & Poljuha, D. (2020). *Tourism, 68*(2), 144–155. https://doi.org/10.37741/t.68.2.3

Davies, T., Duffy, J. P., Bennie, J., & Gaston, K. J. (2014). The nature, extent, and ecological implications of marine light pollution. *Frontiers in Ecology and the Environment, 12*(6), 347–355.

Drius, M., Bongiorni, L., Depellegrin, D., Menegon, S., Pugnetti, A., & Stifter, S. (2019). Tackling challenges for Mediterranean sustainable coastal tourism: An ecosystem service perspective. *Science of the Total Environment, 652*, 1302–1317.

Erbe, C., Marley, S. A., Schoeman, R. P., Smith, J. N., Trigg, L. E., & Embling, C. B. (2019). The effects of ship noise on marine mammals –A review. *Frontiers in Marine Science, 6*, 606. https://doi.org/10.3389/fmars.2019.00606

EU Commission. (2017). Report on the blue growth strategy. Towards more sustainable growth and jobs in the blue economy. Commission Staff Working Document on Blue Growth 2013–2016. https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/swd-2017-128_en.pdf. Accessed 31 Jan 2021.

European Union. (2016). The European Tourism Indicator System ETIS toolkit for sustainable destination management, 32 pp., electronic version ISBN 978-92-79-55247-2. https://doi.org/10.2873/983087.

Gahin, R., Veleva, V., & Hart, M. (2003). Do indicators help create sustainable communities? *Local Environment, 8*(6), 661–666.

GSTC. (2013). Global sustainable tourism council criteria and suggested performance indicators for hotels and tour operators. Retrieved from http://www.gstcouncil.org

GSTC. (2016). Global sustainable tourism council industry criteria with suggested performance indicators for tour operators. Retrieved from http://www.gstcouncil.org

Lotze, H. K., Lenihan, H. S., Bourque, B. J., Bradbury, R. H., Cooke, R. G., Kay, M. C., Kidwell, S. M., Kirby, M. X., Peterson, C. H., & Jackson, J. B. C. (2006). Depletion, degradation, and recovery potential of estuaries and coastal seas. *Science, 312*, 1806–1809.

Mateu-Sbert, J., Ricci-Cabello, I., Villalonga-Olives, E., & Cabeza-Irigoyen, E. (2013). The impact of tourism on municipal solid waste generation: The case of Menorca Island (Spain). *Waste Management, 33* (12), 2589–2593.

McCool, S. F., Moisey, R. N., & Nickerson, N. P. (2001). What should tourism sustain? The disconnect with industry perceptions of useful indicators. *Journal of Travel Research, 40*(2), 124–131.

Micheli, F., Halpern, B. S., Walbridge, S., Ciriaco, S., Ferretti, F., Fraschetti, S., Lewison, R., Nykjaer, L., & Rosenberg, A. A. (2013). Cumulative human impacts on Mediterranean and Black Sea marine ecosystems: Assessing current pressures and opportunities. *PLoS One, 8*(12), e79889.

Papageorgiou, M. (2016). Coastal and marine tourism: A challenging factor in marine spatial planning. *Ocean Coastal Management, 129*, 44–48.

Rodríguez, J. P., Beard, T. D., Jr., Bennett, E. M., Cumming, G. S., Cork, S., Agard, J., Dobson, A. P., & Peterson, G. D. (2006). Trade-offs across space, time, and ecosystem services. *Ecology and Society, 11*(1), 28.

Schianetz, K., Kavanagh, L., & Lockington, D. (2007). Concepts and tools for comprehensive sustainability assessments for Tourism destinations: A comparative review. *Journal of Sustainable Tourism, 15*(4), 369–389.

UNEP/UNWTO. (2005). Making tourism more sustainable – A guide for policy makers, 222 pp.

UNWTO Tourism Trends Snapshot: Tourism in the Mediterranean 2015 edition, ISBN (electronic version): 978-92-844-1692-9.

UNWTO/MST. (2016). Measuring sustainable tourism: Developing a statistical framework for sustainable tourism. https://webunwto.s3-eu-west-1.amazonaws.com/2019-08/mstoverviewrev1.pdf. Accessed 31 Jan 2021.

Willis, C. (2015). The contribution of cultural ecosystem services to understanding the tourism–nature–wellbeing nexus. *Journal of Outdoor Recreation and Tourism, 10*, 38–43.

Wu, J. (2013). Landscape sustainability science: Ecosystem services and human well-being in changing landscapes. *Landscape Ecology, 28*, 999–1023.