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Socio-economic analysis

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Socio-economic analysis of the service supporting the Bathing Water Directive

Each year millions of Europeans (and also extra-European people) spend their holidays or weekends at Europe's diverse and beautiful beaches and bathing areas. In the last years many of them started to take an interest in the quality of water in which they will bathe. Europe is the world's no. 1 tourist destination, and the tourism industry has become a key sector of the European economy, generating over 10% of EU GDP (directly or indirectly) and employing around 10 million citizens (EEA Report/N. 9/2016).

The competitiveness of the European tourism industry is dependent on the quality of tourist destinations, including the quality of bathing water at those destinations. In line with standard economic theory a benefit is defined as a change that increases human wellbeing and a cost as a change that decreases human wellbeing. Human wellbeing is determined by people's preferences. The measurement of preferences is achieved by finding out an individual's maximum willingness to pay for a benefit or for the avoidance of a cost, or their minimum willingness to accept compensation for tolerating a cost or forgoing a benefit. But many of the beach assets such as clean bathing water and clean beaches, are not traded in markets, there are no market prices and consequently information about people's preferences in the context of beaches is very scarce. However, the competitiveness of the European tourism industry is dependent on the quality of tourist destinations, including the quality of bathing water at those destinations. The bathing closures (temporary banning of bathing in a bathing water) and the classification of bathing areas as "scarce" can generate a loose of economic value also related to the change of bathing tourist destinations.

The aim of this report is to provide a quantifiable socio-economic understanding of the value of Chioggia bathing waters, and the influence of bathing water quality (BWQ) to bathers, beach users, for the local economy.

A key question for bathing waters policy concerns the 'value' of the influence of BWQ on the range of benefits provided and the resultant changes in value that may be caused by a decrease (or increase) in Bathing Water Quality (BWQ). The outputs of the services linked to the products showing potential bacterial pollution sources impacting on a bathing water are envisaged to help clarify the costs and benefits by identifying the monetary (and other) value(s) of bathing waters, the costs associated with a deterioration of BWQ and individuals' willingness to pay (WTP) for an improvement in BWQ.

A variety of frameworks are used across the literature reviewed for the classification of benefits from bathing waters. Examples include ecosystem services (Ghermandi et al., 2010) and total economic value (TEV) (Hynes et al., 2013; Oliver et al., 2016; Johnston et al., 2017).

Papadopoulou et al., (2018) with a review identified various benefits of bathing waters organized under several categories (economic, health and wellbeing, social and cultural) showing some methods and approaches for measuring the benefits of bathing waters and the implications of changes in BWQ for local and national economies. The review by Papadopoulou et al., (2018), shows that there is limited literature on the impacts of a change in bathing water classification on the benefits provided by bathing waters. Quantitative measures that have been used include changes in the 'number of visitors' and 'frequency of trips' to bathing water sites due to an improvement or deterioration in BWQ. A part of the review identified what is known about the importance people put on information (signs and signage) about BWQ as a factor influencing beach visit decisions. Water quality along with wider notions of 'beach cleanliness', is frequently cited as one of the top three factors influencing beach choice decisions. Information on bathing water/beach values (e.g. economic, socio-cultural) can play a key role informing management decisions (e.g. planning facilities, determining access and transport capacity) (Ballance et al., 2000).

Phillips et al., (2018) used tried to understand more fully the purpose and benefits of bathing water visits. Trough a trip generating function (TGF) and individual travel cost model (ITCM) they examined how the number of visits an individual makes to a site changes as travel costs (distance and time) change, whilst other factors that would influence the choice are kept constant (such as substitute sites, household size, age, and household income). This is interpreted as the WTP for access to the sites, and a minimum indication of how valuable the benefits of a visit are perceived to be (based on the common economic assumption that if the benefits were perceived to be less than the costs, the activity would not be undertaken). The WTP is interpreted as a minimum indication of how valuable a visit is to the visitors (based on the common economic assumption that if the benefits were perceived to be less than the costs, the visit would not be undertaken). This is calculated as the current (baseline) or reduction in the number of trips to a site multiplied by the value per trip measured in terms of travel costs. Moreover, they estimated the number of annual visitors to sites using available tourism data; values for improvements in bathing water quality and beach characteristics, in terms of WTP for these improvements. The monetary value of benefits, which are derived by individuals from visits to bathing waters, was measured in terms of their WTP for access and recreation opportunities, which represents the surplus (net benefit) that individuals experience from recreational visits to bathing waters over and above the costs associated with those visits. WTP per visit was £8.90 and was calculated based on individual travel cost models (ITCM).

According to the WTP value estimated by Phillip et al., (2018) we calculated which could be the value of economic value for the Chioggia bathing water areas due to

the bathing closures. Of course we just can assume this elaboration a proxy and we have to the take into account all the limits of this numbers.
According to the data 2017 by Hotels Association of Chioggia Municipality, the tourist presences in Chioggia bathing areas (Isola Verde and Sottomarina), during the bathing season (May-Sept), were 1.235,000, of which 455.000 in Isola Verde and 780.000 in Sottomarina.
If we consider the value of WTP calculated by Phillips et al., (2018) in euro (€10,00) the bathing water economic value is € 12.350.000.
Table 1., shows the economic value per day of all the bathing waters belong to the two areas. In order to evaluate the tourist presences in each bathing waters, we considered a homogeneous distribution of the tourist along the two areas and then multiplied these value for the length of each bathing water. Furthermore, we also provided daily average economic value for the different months of the bathing season. The distribution of tourists in the different months was provided by Hotels Association of Chioggia Municipality. Taking into account these data it is possible to estimate the economic loss of each day of bathing closure. For example, if we have the bathing closure of IT005027008003, IT005027008004 areas in only one day in August, we have a total loss of 28524,79 euro.

Tab. 1. Economic value per day of all the bathing waters belong to the two areas.

Code Bathing water area	Name Bathing water area	Length of coast (m)	Tourists/day	Daily average economic value (entire season)	Daily average economic value May 2017	Daily average economic value June 2017	Daily average economic value July 2017	Daily average economic value August 2017	Daily average economic value September 2017
IT00502 7008001	Sottomarina 200 metri sud inizio diga s. Felice	495	514	5136	1002	5639	7364	8570	3055
IT00502 7008002	Sottomarina 1000 metri sud inizio diga s. Felice	685	711	7106	1386	7802	10188	11857	4227
IT00502 7008003	Sottomarina 1600 metri sud inizio diga s. Felice	963	999	9990	1949	10967	14323	16668	5942
IT00502 7008004	Sottomarina 3000 metri sud inizio diga s. Felice	1066	1107	11065	2158	12149	15865	18463	6582
IT00502 7008010	Sottomarina 3800 metri sud inizio diga s. Felice	767	796	7959	1552	8738	11411	13280	4734
IT00502 7008005	Sottomarina 4600 metri sud inizio diga s. Felice	937	972	9724	1897	10676	13942	16226	5785
IT00502 7008006	Isola verde 300 metri sud inizio diga destra foce fiume brenta	662	812	8119	1584	8914	11641	13547	4830
IT00502 7008007	Isola verde 1100 metri sud inizio diga destra foce fiume brenta	583	716	7158	1396	7858	10262	11943	4258
IT00502 7008011	Isola verde 1400 metri sud inizio diga destra foce fiume brenta	243	298	2985	582	3277	4279	4980	1775
IT00502 7008008	Isola verde 1150 metri nord inizio diga sinistra foce fiume adige	351	430	4303	839	4724	6169	7180	2560
IT00502 7008009	Isola verde 500 metri nord inizio diga sinistra foce fiume adige	585	717	7174	1399	7876	10286	11971	4268
Total		**7336**	**8072**	**80719**	**15745**	**88620**	**115731**	**134684**	**48016**

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