ECONOMIC VALUATION FOR RECTIFICATORY JUSTICE:

THE CASE OF THE OIL SPILL AT TURKEY'S GENCELLİ BAY

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ECONOMIC VALUATION FOR RECTIFICATORY JUSTICE: THE CASE OF THE OIL SPILL AT TURKEY'S GENCELLİ BAY

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DECLARATION OF ORIGINALITY

I, Beste Gün Aslan, certify that

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ABSTRACT

Economic Valuation for Rectificatory Justice:

The Case of the Oil Spill at Turkey's Gencelli Bay

On August 29, 2018, an oil spill reached to the shores of Gencelli Bay, in Foça district, İzmir—a small scenic town which is home to environmentally protected areas with high ecosystem value and where people's livelihood depends mainly on tourism and fishery. The source of the spill was detected to be a ship en route to the ship-breaking yards in Aliağa district, one of the largest and oldest heavy industrial development zones in Turkey, with various toxic industries such as smelting plants, oil refineries, and chemical facilities. The ship soon was charged with an "on paper" administrative fine and the cleaning costs, deposited directly to the state, but far from representing the real costs of the oil spill. This thesis, first, aims to investigate to what extent this administrative fine addresses the real costs and resulting socio-environmental injustices, and satisfies the conditions for rectificatory justice, by conducting an economic valuation of the damaged ecosystem services using IPBES's conceptual framework. The analysis is based on an extensive desktop research and several in-depth interviews and focus groups with local stakeholders. Second, it attempts to identify the value articulating or political institutional preconditions (such as trust, rule of law, free speech and so on) for such a valuation exercise to become relevant in reaching just outcomes. The results suggest that real costs exceed the administrative fine even with a conservative economic valuation. Valuation assumptions and social and political institutions are central for a monetary compensation to make sense for operationalizing rectificatory justice.

ÖZET

Düzeltici Adalet İçin Ekonomik Değerleme:
Gencelli Körfezi, Türkiye'den Bir Petrol Sızıntısı Vakası

29 Ağustos 2018'de, İzmir'in yüksek ekosistem değerine sahip çevre koruma bölgelerine ev sahipliği yapan ve insanların geçim kaynaklarının temelde turizm ve balıkçılığa dayalı olduğu ilçesi Foça'da yer alan Gencelli Körfezi'nde bir petrol sızıntısı meydana geldi. Sızıntının kaynağının, sınırlarında rafineriler, petrokimya tesisleri ve demir çelik fabrikaları bulunduran, Türkiye'nin en büyük ve eski ağır sanayi bölgelerinden Aliağa'daki gemi-söküm tesislerine gitmekte olan bir gemiden kaynaklı olduğu tespit edildi. Gemiye, temizlik maliyetlerinin yanı sıra direkt olarak devletin kasasına giren ve petrol sızıntısının gerçek maliyetlerini yansıtmaktan uzak olan bir idari para cezası kesildi. Bu tez, ilk olarak, idari para cezasının ne ölçüde gerçek maliyetleri ve petrol sızıntısının sebep olduğu sosyal-çevresel adaletsizlikleri yansıtıp düzeltici adaleti sağladığını, IPBES kavramsal çerçevesi ile zarar gören ekosistem servislerinin ekonomik değerlemesini yaparak incelemektedir. Analiz, geniş masa başı araştırma, yerel paydaşlarla derinlemesine görüşme ve odak gruplarına dayanmaktadır. İkinci olarak, tez, böylesi bir değerleme pratiğinin adil sonuçlara ulaşmasını sağlayacak politik ve değerleme ile ilgili kurumsal ön koşulların (güven, hukukun üstünlüğü, konuşma özgürlüğü gibi) belirlenmesini amaçlamaktadır. Sonuçlar göstermektedir ki gerçek maliyetler kısıtlayıcı bir ekonomik değerleme ile dahi idari para cezasını aşmaktadır. Değerleme ön kabulleri ve sosyal ve politik kurumlar, parasal tazminatın düzeltici adaleti gerçekleştirmesi anlamında merkezi bir yere sahiptir.

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CHAPTER 1

INTRODUCTION

On August 29, 2018, an oil spill reached to the shores of Gencelli Bay, in Foça district, İzmir, Turkey—a small scenic town which is home to environmentally protected areas with high ecosystem value and where people's livelihood depends mainly on tourism and fishery. The source of the spill was detected to be a ship en route to the ship-breaking yards in Aliağa district, one of the largest and oldest heavy industrial development zones in Turkey, with various toxic industries such as smelting plants, oil refineries, and chemical facilities.

A brief account of the political ecology of Aliağa and its environs elucidates the motivations of the thesis in linking oil spill case and its aftermath (administrative fine, court case, cleaning process etc.) with notions of environmental justice and economic valuation of environment. Aliağa is a district in İzmir, which is located on the Aegean coast. The closeness of Aliağa to Foça district makes it critical from socio-ecological aspect, as Foça is home to social and cultural specially protected areas. Moreover, Aliağa is also home to archaeological sites such as Kyme ancient city, located at Nemrut Bay, which was abundant in diversity of fish species before the industrialization of the region. Following its designation as heavy industrial development zone by the 1961 Constitution, Aliağa witnessed the accumulation of state-led heavy industries in 1980s, such as PETKİM petrochemicals and TÜPRAŞ oil refinery, and the rise of neoliberal policies to this day, which is evident in disclosure of a whole peninsula in Aliağa by SOCAR, a private multinational company (Turhan et al., 2019). Heavy industrial development in Aliağa have brought

forth local and national environmental justice movements, initiated by 1990's anti-coal movements and evolved to local "defend life" movements of today.

Aliağa industrial zone is also home to ship-breaking yards, together with the ever-increasing number of industrial facilities in the region, leading to infamously referring Aliağa as "ecological sacrifice zone" (Turhan et al., 2019, p. 166). Ship-breaking industry is a labor-intensive industry, restricted today to the developing countries such as Bangladesh, India, Pakistan and China, where concern for environment is a minor issue. In Turkey, the ship-breaking is made in Aliağa since 1976 to provide raw materials to steel factories and the method used here is known as modified slipway recycling, where the ship is situated ashore with its stem on the coast and is cut in the sea (Neşer et al., 2008). Marine environmental pollution data obtained from the surroundings of the ship-breaking yards suggest that atmospheric pollutants, solid and liquid wastes are condensed around these areas, yet the pollutants are not directly attributable to the ship-breaking yards as Aliağa is home to other heavy industries (Neşer et al., 2008). This requires additional legislations and monitoring for proper functioning of these facilities in terms of labor safety, occupational health and environmental risks. The most current and prominent socio-ecological impact related to the ship-breaking yards in Aliağa has been the oil spill case that is subject to this thesis.

Following the oil spill, the responsible parties are detected and soon were charged with an "on paper" administrative fine of 1,644,742 TL and the cleaning costs of 25,000,000 TL, deposited directly to the state, but far from representing the real costs of the oil spill. The administrative fine is put forward in comparison with the real socio-ecological costs throughout the thesis because it is the institutional mechanism that the state responds to the injustices caused by the oil spill. The

administrative fine is given in accordance with the notice to law no. 2872, Environment Act of 1983 (Resmi Gazete, 2006). Four months after the oil spill, the lawsuit for the detection of costs and damages brought to court by İzmir Bar Association and local NGOs (FOÇEP and Yeni Foça Forum), which made it possible for the local residents to file a claim for compensation of their damages due to the oil spill. Although local residents and fishers complain about the consequences of the oil spill, and speak out their hopes for such an experience not to happen again, neither of them filed a claim for compensation. Thus, the administrative fine is the only concrete reference to the attempts of realizing justice and compensation by the state. The fact that this administrative fine is impossible to tract after it is deposited to the state makes it unable to satisfy compensation of injustices. Convenience provided by legal and governance institutions to local residents and fishers in terms of raising their voice for their damages due to the oil spill in the court is an aspect of justice as well, just as their demand that such an environmental damage would not recur. Thus, the contrast of administrative fine and real socio-ecological costs of the oil spill does not only refer to the monetary comparison of the results of economic calculation of the damages with the administrative fine, but also refers to the broader aspect of environmental justice and compensation. One year after the oil spill that is subject to this thesis, one more oil spill occurred on the same coastline, deepening the motivations to account for the environmental risks and socio-ecological justice in the area.

In this context, this thesis first aims to investigate to what extent the administrative fine addresses the real costs of the oil spill and resulting socio-environmental injustices, and satisfies the conditions for rectificatory justice, by conducting an economic valuation of the damaged ecosystem services using IPBES's

conceptual framework. Second, it attempts to identify the value articulating or political institutional preconditions (such as trust, rule of law, free speech and so on) for such a valuation exercise to become relevant in reaching just outcomes. The hypothesis of the thesis has two interrelated components around the notions of value and justice: (1) The administrative fine does not represent actual socio-economic and ecological costs of the oil spill as it is not based on a relevant valuation considering plural values of the stakeholders, and (2) the fact that the fine is deposited directly to the state creates impediments in meeting the needs of distributive and rectificatory justice as well as proper environmental governance with transparent and just institutions.

In current circumstances, achievement of justice in Gencelli Bay is impossible as methods to calculate and integrate diverse values (economic, ecological, social, deliberative etc.) presupposes and requires proper functioning of relevant value articulating institutions. The reasons why the local residents do not take legal action are found out to be lack of means to express their losses (in terms of quantitative and qualitative terms) and lack of trust to legal institutions. The results suggest that real costs exceed the administrative fine even with conservative economic calculation assumptions, and that social and political institutions are central for an economic valuation to make sense for reaching rectificatory justice.

In order to test the hypothesis, the analysis is based on an extensive desktop research and 16 semi-structured in-depth interviews conducted between 12-20 September 2019 (12 face-to-face interview in Gencelli and Yeni Foça, four over the phone) and three focus groups with local stakeholders. The list of interviews and relevant information regarding the interviews can be found in Appendix A, and the questions for the semi-structured in-depth interviews are given in Appendix B.

IPBES's conceptual framework is employed in classifying the socio-ecological damages, in both quantitative and qualitative terms.

The thesis is structured in five parts. After this introduction, Chapter 2 reviews the literature on economic valuation and environmental justice in the aftermath of an environmental damage, and gives some conceptual background necessary to test the hypothesis of the thesis. Chapter 3 introduces the socio-ecological context of the Gencelli Bay oil spill case and the economic valuation conducted to consider ecosystem services damages in the aftermath of the oil spill. Chapter 4 discusses the results from the valuation study and provides some qualitative insights in the light of the literature on environmental valuation and justice, and then concludes the thesis.

CHAPTER 2

LITERATURE REVIEW

This chapter provides some conceptual and theoretical background necessary to test whether the administrative fine paid in the aftermath of Gencelli oil spill case represents actual socio-economic and ecological costs of the oil spill, and whether the compensation process helps to achieve rectificatory justice. The review of literature relevant to the thesis is presented around two interrelated notions: value and justice.

This thesis aims at contributing to the literature on economic valuation of ecosystem services and its justice implications. Inspired from a case of oil spill at Gencelli Bay, Turkey and its aftermath (public reaction, legal and governance intervention, reluctance in value articulation and in seeking compensation, and lastly another oil spill one year later), institutional conditions for ensuring rectificatory justice and for justifying the use of economic valuation are sought. The case subject to the thesis is challenging due to its complex baseline: The ecosystem is already in a declining state in the region due to high industrial activity, and it is impossible to separate the effect of the oil spill on environment from its pre-existing conditions. Baseline is not only understood as a natural state, but is broadly understood as a state of justice, which is a relational value. Thus, institutional conditions the thesis aims at identifying are related to both value-articulating institutions, which deals with the ways to articulate plural values and incorporate them in valuation process, and environmental governance institutions. In this context, economic valuation combined with deliberative methods are proposed as an ideal method, and thus a value-articulating institution, to elicit and express plural and diverse values. The

institutional preconditions for implementing this method are expected to coincide with the institutional preconditions for environmental governance mechanisms to satisfy rectificatory justice.

The term “ecosystem services” is employed to create value-based foundation for the management and governance of nature, especially in relation to human well-being. Economic valuation is one among several methodologies used to express wide range of values (e.g. biophysical, ecological, social), some of which can be instrumental, relational, intrinsic given the interaction of the agent engaged in the valuation practice with the commodity to be valued (IPBES, 2016). The prevailing methodology used by policy makers, courts and academics is to compare the economic valuation of damages to ecosystems, for instance in an oil spill case, to an initial state, the so-called baseline (National Research Council, 2012). In this context, the ecosystem services valuation methodology has been developed over the past 20 years in order to represent total values people derive from ecosystems in either quantitative or qualitative terms by integrating various value components, and most importantly to make policy responses based on them (Costanza et al., 2017). Recent developments in the field is based on the IPBES conceptual framework (Díaz et al., 2015) which emphasizes diversity of values and valuation practices. The inclusion of diverse values is useful in linking justice to ecosystem services valuation.

Justice is relevant to the economic valuation of the damaged ecosystem services after an environmental damage, such as an oil spill, in two interrelated aspects. First of all, the reason for economic valuation conducted after an environmental damage is aimed at identifying and compensating the damages. In the history of oil spills, economic valuations are used in court cases for compensating the public, as well as channeling the compensation funds for ecosystems to reach their

baselines. While Exxon Waldez oil spill brings about political consequences and reforms such as Oil Pollution Act in 1990 and court makes use of economic valuations to make the damages of public such as tourism and fishery compensated, there are several damages that the local people of Alaska brought to court but do not receive a response as the court do not recognize such damages legally (Fall et al., 2001). These costs that the local people stated are mainly damages to their relation to the environment that they have cultural and ancestral ties to. This brings the second relevant aspect of justice to economic valuation of environmental damages forward, which is the recognition of justice as a category of value in conducting a valuation study. Justice is stated as a relational value under one of the foci of values, good quality of life, in IPBES's conceptual framework (IPBES, 2016). This recognition is required to rectify damages, as much as possible, and to identify institutional conditions that assists or blocks rectification after an environmental damage.

Although there is always room to discuss the development of broader concepts such as value, valuation, market price, nature, environmental justice and governance, the focus here is on providing the historical and ideological development of relevant conceptual tools useful in the aftermath of an environmental damage. More explicitly, the theoretical foundations of the thesis lie in the answer to the following questions: What are the approaches for economic valuation of such damages and how do they evolve in an interdisciplinary manner, and what is the justice relevance of valuation approaches and its applications. As the thesis assesses the aftermath of an oil spill in a coastal zone, a subdivision is spared for the specific challenges of damage valuation practices, in terms of environmental justice, in coastal and marine ecosystems.

2.1 Economic value and environment

2.1.1 Notions of value, nature and valuation

From a conventional economics perspective, the main underlying reason behind biodiversity loss and ecosystem degradation is market failure—a type of institutional failure, which results from externalities that are unaccounted in the use of public goods and services (IPBES, 2016). Such line of reasoning immediately calls for mechanisms such as taxes or fines that might help to internalize the externalities in the system. Yet, for non-marketed goods and services such that nature provides, the incorporation of market mechanism into decision making process inevitably brings about questions of commensurability of values, commodification of nature and assumptions of economic valuation practices.

Value, in its broadest sense, may refer to a principle or worldview, a preference or choice of an alternative over another, the importance of something as a means to some end or as an end itself. Values can then be measured in monetary, physical, or qualitative terms (Daily, 1997; IPBES, 2016). In general, the notion of value is hard to incorporate in decision making processes as it is challenging to express various value components in one single metric and convey all the relevant information for the good or service to be valued. This is especially true for the nature and biodiversity as people attach abstract connotations of value to them (Meinard & Grill, 2011). Also the need for biophysical data and thus interdisciplinary involvement in valuing nature requires going beyond reductionist perspective of expressing various values derived from ecosystems in a single metric (Cleveland, 1987; Costanza, 1980; Farber et al., 2002; Boulding, 1966; Liu et al., 2010).

Evolution of the theories of value in the discipline of economics, as accounted for in the literature, makes distinctions of how the notion is understood and employed in various schools of thought in economics, namely in classical, neoclassical and ecological economics (Gómez-Baggethun et al., 2010; Patterson, 1998). While the notion of value of nature can be traced back to the Physiocrats' conceptualization of the "land (natural resources) as the unequivocal source of all values" (Patterson, 1998, p. 106), the notion has developed through marginalist revolution to express the standard theory of value in utilitarianism, which dominated neoclassical economics to this day. The approach proposes substitutability of natural resources with human-made capital and enables "dilution of nature in exchange values" (Gómez-Baggethun et al., 2010, p. 1211), or prices. Economic valuation methodologies developed in this line with underlying assumptions to express goods and services provided by nature, can be divided into three groups: (1) revealed preference methods that includes market prices that sum up people's direct payments and non-market approaches such as hedonic pricing method, which predicts property prices around an environmental amenity as a function of environmental and other characteristics, or travel-cost method, which proposes that travel costs to an environmental amenity reflect the value of that amenity, (2) stated preference methods such as contingent valuation to elicit people's willingness-to-pay or willingness-to-accept via survey questions or choice experiments, and (3) cost-based methods which employs replacement costs and avoided costs to estimate benefits of ecosystem services (IPBES, 2016; National Research Council, 2012).

Although the economic valuation in practice is conducted towards achieving a single unit measure mutually agreed upon with some degree of scientific objectivity (which is important for policy recommendations), one needs to be aware

of the assumptions behind any economic valuation in terms of pricing nature in order to sustain transparency and while adapting valuation outcomes to real world cases. One of the prominent criticism about pricing nature states that prices signal information regarding resource scarcity and should be "considered to provide a true measure of economic value only if the market is characterized by a large number of buyers and sellers and by private property rights which are enforceable and transferable" (Farber & Costanza, 1989, p. 336). Accordingly, prices are not always reflecting the values inherent in nature and nature's benefit to human life. Moreover, unequal distribution of initial endowments also shapes the monetary values attached by various people to environmental goods and services, which is an important shortcomings of stated preference methods (Farber & Costanza, 1989). Farley (2008) employs the term "critical natural capital" to designate situations where it is irrelevant and unjustifiable to employ economic valuation methods that are based on marginal analysis, when the natural capital at stake has little substitutes and vital to conserve.

The question then is why are we attempting to value nature in economic terms, despite the drawbacks of monetary valuation? This question is also put forward in the ecological economics literature in relation to concepts of incommensurability of values and weak comparability (Martinez-Alier et al., 1998), and in the context of strong versus weak sustainability (Gómez-Baggethun et al., 2010) and post-normal science (Funtowicz & Ravetz, 1994). Although ecological economics does not rule out monetary valuation completely, unlike conventional economics approaches, which mainly employ it in order to commodify nature, it points out to the necessity of incorporation of interdisciplinary approaches into monetary valuation. Indeed, according to Farley (2012), the use of the term

ecosystem services in ecological economics literature "illustrate[s] why market allocation fails to achieve ecological sustainability or just distribution" (p. 48).

Various attempts in the ecological economics literature are made to put forward necessary (and sufficient) conditions for monetary valuation. For instance, the concept of "monetization frontier" (O'Connor, 2006) provides a clear insight into when monetary valuations give robust results and can be trusted—depending on the system complexity and ethical appropriateness. Accordingly, when system complexity is low, with simple processes without numerous scale and organizational variety, and/or deep ethical concerns and non-use values are at stake, it is possible to get robust results from monetary valuation; otherwise, the scientific quality of monetary valuation and its relevance to policy is disputable (O'Connor, 2006). In a similar vein, Kallis, Gómez-Baggethun and Zografos (2013) propose the following four conditions for monetary valuation where valuing nature can be justified:

> 1. Will that improve the environmental conditions at stake? (additionality)
> 2. Will it reduce inequalities and redistribute power? (equality)
> 3. Is it likely to suppress other languages of valuation and value- articulating institutions? (complexity blinding)
> 4. Will it serve processes of enclosure of the commons (accumulation by dispossession/neo-liberalism)? (p. 100)

Indeed, Kallis et al. (2013) maintain that monetary valuation can be justified to be incorporated in decision making processes if one answers the first two questions positively (as yes), and the last two negatively (as no). They use the example of the infamous Chevron-Texaco oil pollution case in Ecuador, to illustrate how monetary valuation is applied though a court case in an ex-post manner, but at the same time "go beyond money" (Kallis et al., 2013, p. 101) by appreciating recognition of local and symbolic values. O'Neill (2017) notes that it is possible to reconcile the two seemingly contradicting point of views on monetary valuation and nature, namely the

one that situates the cause of environmental problems in their non-representation in the market and resolves it with commodification, and the other, that sees markets as the source of the environmental problems themselves. This reconciliation is about a reflective consideration of the valuation process as an institution itself while engaging in economic valuation exercise.

2.1.2 History and use of ecosystem services valuation methodologies

Ecosystem services, ecosystem functions and non-use values attributed to nature is directly or indirectly linked to human well-being and sustainability (O'Neill, 1993). The term ecosystem services is defined as "the capacity of natural processes and components to provide goods and services that satisfy human needs, directly and indirectly" (De Groot, 1992, p. 317), or more directly in documents aimed to guide environmental policy as "the benefits people obtain from ecosystems" (MEA, 2005, p. 1). Attempts to quantify and express such benefits are achieved through first identifying ecosystem functions that have not necessarily direct effect on human well-being, and then classifying them under different categories such as food production, agriculture, recreation, energy, disturbance regulation. In general, ecosystem functions are classified as provisioning, regulating, supporting and cultural functions. Some studies also use the classification as regulating, habitat, production and information functions (Costanza, 1997; De Groot et al., 2002; Haines-Young & Potschin, 2017; MEA, 2005; TEEB, 2010).

The development of ecosystem services concept, which can be traced back to 1970s (Gómez-Baggethun et al., 2010), initially derives from the context of society's dependence on ecological processes (De Groot et al., 2002). The first conceptualization can be summarized as a "utilitarian framing of beneficial

ecosystem functions as services in order to increase public interest in biodiversity conservation" (Gómez-Baggethun et al., 2010, p. 1215). Such focus in awareness raising attempts later has turned into attempts to "mainstreaming the ecosystem services" (Costanza, 1997; Daily et al., 2011; Gómez-Baggethun et al., 2010, p. 1209) by monetizing total value of ecosystem services, which promoted through studies to estimate ecosystem services value in economic terms. The concept then gains popularity thanks to its employment in advocacy-related work, damage assessment and sustainable financing contexts (Slootweg & Beukering, 2008). The process accelerated further with Millennium Ecosystem Services Assessments, and at the end, markets and payments for ecosystem services dominate the environmental policy agenda. Gómez-Baggethun et al. (2010) express this evolution of the term around a monetary focus as "rapidly growing number of ecosystem functions have been characterized as services, valued in monetary terms and […] incorporated into markets and payment mechanism" (p. 1209).

The rapid development of the concept brings along discussions on the challenges of how to value ecosystem services that have no material benefits (Small et al., 2017), as well as the need for multiple classifications of ecosystem services (Costanza, 2008). Costanza (2018) points out to the fact that although the focus is on the benefits provided by ecosystem services, the degree to which people understand and perceive these benefits is as important a question as the need to calculate total benefits.

Highlighting the central role that institutions, governance and decision making processes play in ecosystem services valuation, IPBES proposes a conceptual framework which is inclusive of multiple value systems in order to incorporate stakeholders, local and indigenous people, multiple knowledge systems

and worldviews into the assessment (Díaz et al., 2015). IPBES is "a joint global effort by governments, academia, and civil society to assess and promote knowledge of Earth's biodiversity and ecosystems and their contribution to human societies in order to inform policy formulation" (Díaz et al., 2018, p. 270). Building on the multiple foci of value (nature, nature's contributions to people and good quality of life) in order to include non-anthropocentric (intrinsic), instrumental and relational types of values, IPBES's conceptual framework, and acknowledging the central role culture plays in ecosystem service assessment and power asymmetries between western science and indigenous and local knowledge, IPBES's conceptual framework emphasizes local and indigenous knowledge in assessments and comes up with detailed insight on how to operationalize diverse values in decision making processes regarding ecosystem services (IPBES, 2016). IPBES's framework for ecosystem services valuation is the overarching framework to categorize damages to ecosystems in monetary and qualitative terms. In this conceptual framework, the concept ecosystem services is replaced by the concept Nature's Contributions to People (NCP) (Pascual et al., 2017), which represent the instrumental types of values as a focus of value along with other foci of values, nature and good quality of life. NCP is the term used in this approach for the concept of ecosystem services, and has 18 reporting categories, which can be seen in Table 1. The notion of NCP is the key element in IPBES's framework. What makes the concept of NCP differs from ecosystem services is that NCP "elevates, emphasizes, and operationalizes the role of indigenous and local knowledge in understanding nature's contribution to people" (Díaz et al., 2018, p. 270). Table 1 provides a brief description of each NCP categories and classifies each NCP category as material, non-material and regulating NCP. Detailed descriptions of each category can be found in Appendix D.

Table 1. Reporting Categories of Nature's Contributions to People

NCP Category	Definition of Category	Material/ Non-material and/or Regulating
NCP 1. Habitat creation and maintenance	The formation and continued production, by ecosystems or organisms within them, of ecological conditions necessary or favorable for living beings of direct or indirect importance to humans.	Regulating (and non-material)
NCP 2. Pollination and dispersal of seeds and other propagules	Facilitation by animals of movement of pollen among flowers, and dispersal of seeds, larvae or spores of organisms beneficial or harmful to humans.	Regulating (and non-material)
NCP 3. Regulation of air quality	Regulation by ecosystems, of components of atmosphere. Filtration, fixation, degradation or storage of pollutants that directly affect human health or infrastructure.	Regulating (and non-material)
NCP 4. Regulation of climate	Climate regulation by ecosystems (including regulation of global warming).	Regulating (and non-material)
NCP 5. Regulation of ocean acidification	Regulation, by photosynthetic organisms (on land or in water), of atmospheric CO2 concentrations and so seawater pH.	Regulating (and non-material)
NCP 6. Regulation of freshwater quantity, location and timing	Regulation, by ecosystems, of the quantity, location and timing of the flow of surface and groundwater used for drinking, irrigation, transport, hydropower.	Regulating (and non-material)
NCP 7. Regulation of freshwater and coastal water quality	Regulation by ecosystems or particular organisms, of the quality of water used directly or indirectly.	Regulating (and non-material)
NCP 8. Formation, protection and decontamination of soils and sediments	Formation and long-term maintenance of soil structure and processes by plants and soil organisms.	Regulating (and non-material)
NCP 9. Regulation of hazards and extreme events	Amelioration, by ecosystems, of the impacts on humans or their infrastructure caused by e.g. floods, wind, storms, hurricanes, heat waves, tsunamis, high noise levels, fires, seawater intrusion, tidal waves.	Regulating (and non-material)
NCP 10. Regulation of detrimental organisms and biological processes	Regulation, by organisms, of pests, pathogens, predators or competitors that affect humans (materially and non-materially), or plants or animals of importance for humans.	Material (and non-material)
NCP 11. Energy	Production of biomass-based fuels, such as biofuel crops, animal waste, fuelwood, agricultural residue pellets, peat	Material (and non-material)
NCP 12. Food and feed	Production of food from wild, managed, or domesticated organisms and production of feed (forage and fodder) for domesticated animals.	Material (and non-material)
NCP 13. Materials, companionship and labor	Production of materials derived from organisms in cultivated or wild ecosystems, for construction, clothing, printing, ornamental purposes.	Material (and non-material)
NCP 14. Medicinal, biochemical and genetic resources	Production of materials derived from organisms used for medicinal, veterinary and pharmacological purposes. Production of genes and genetic information used for plant and animal breeding and biotechnology.	Material (and non-material)
NCP 15. Learning and inspiration	Provision, by landscapes, seascapes, habitats or organisms, of opportunities for the development of the capabilities that allow humans to prosper through education, acquisition of knowledge and development of skills for well-being, information, and inspiration for art and technological design.	Non-material (and material)
NCP 16. Physical and psychological experiences	Provision, by ecosystems, of opportunities for physically and psychologically beneficial activities, healing, relaxation, recreation, leisure, tourism and aesthetic enjoyment.	Non-material (and material)
NCP 17. Supporting identities	Landscapes, seascapes, habitats or organisms being the basis for religious, spiritual, and social-cohesion experiences.	Non-material (and material)
NCP 18. Maintenance of options	Capacity of ecosystems, habitats, species or genotypes to keep options open in order to support a good quality of life.	Material, non-material and regulating

Source: [Diaz et al., 2018]

Categories of material, non-material and regulating NCP are used in order to refer to previous classifications of ecosystem services as supporting, regulating, cultural and provisioning (Díaz et al., 2018). While regulating NCP refer to contributions of ecosystems to people as they function intrinsically, thus corresponding to supporting ecosystem services of earlier classifications, material NCP and non-material NCP refer to the content of NCP's, based on whether the contributions of nature to people is material or non-material. A category of NCP can be both material and regulating, or non-material and regulating, or material and non-material. NCP 18, maintenance of options, is classified as both material and non-material, as well as regulating. In Table 1, primary classificaion is written outside the paranthesis with secondary classification is written inside the paranthesis.

In Figure 1, the process of assessing values and conducting valuation studies in IPBES's framework is shown in steps. Diverse values of NCP's are at the center of this process. This figure will again be referred to in valuation section in Chapter 3. Brief description of steps and of relevance to the case is sufficient in this chapter to justify the use of IPBES's framework in the thesis. Identifying the purpose is the first step in a valuation study. Rectificatory justice is the purpose of the valuation study in this thesis. More specifically, the thesis conducts economic valuation after an oil spill case in order to identify the case specific conditions in satisfying environmental justice. Scoping of the process is done through case study and desktop research in order to identify plural values, that is values that are subject of economic analysis and the ones that are relational and qualitative. Economic valuation is conducted by bearing in mind the plural values by citing qualitative insights from the case studies. Besides the thesis focuses on the notion of rectificatory justice, conditions of conducting plural valuation also requires consideration of environmental justice

conditions such as participation conditions, recognition of values etc. These conditions are discussed in Chapter 2.2. Deliberative valuation is proposed in order to integrate plural values in the thesis, with several preconditions, which are discussed in Chapter 2.2 as well.

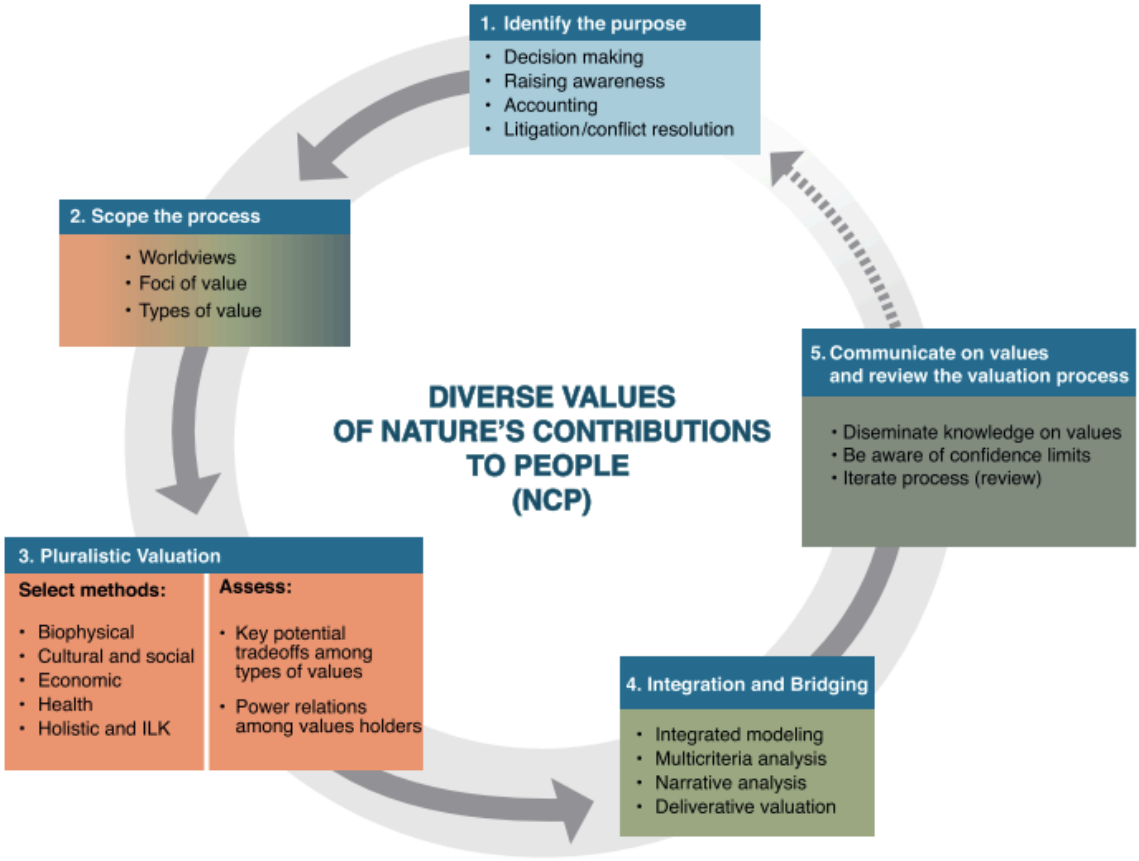

Figure 1. IPBES protocol for valuation and assessment process
Source: [Pascual et al., 2017]

IPBES approach is beneficial in terms of bearing in mind that there are types of values that cannot be reduced to the single metric (money), but still relevant for policy making purposes. According to Peterson et al. (2018), IPBES conceptual framework enables more stakeholder engagement in environmental governance and policy making and the newly introduced term NCP is also inclusive of diverse worldviews, context specific perspectives, relational values, and fuzzy and fluid reporting categories.

2.1.3 Notion of value revisited: Plurality of values and diverse valuation

Different foci of value introduced in IPBES's conceptual framework (Díaz et al., 2015) includes multiple value systems while embracing various connotations and types of value. For example, justice, rather than being considered as an external component to valuation, is directly included as a type of value in one of the foci of values, good quality of life (IPBES, 2016). This makes the valuation process which involves issues of social and environmental justice more compact. Type of values that are elicited in an economic valuation study are assigned values, that are the values of objects and based on purely instrumental relationships (Chan et al., 2018). There are also moral values, which are notions of what is right and wrong, and held values, that is broad ideas in the abstract sense such as fairness, courage. These values are not properly elicited in a contingent valuation method by willingness-to-pay surveys (Satterfield, 2001). Conflict in terms of how individuals and societies operate rationally in decision-making processes for environmental problems and the presupposed rationality required by the valuation methods leads to valuation outcomes that are not justified for application in policy making (Spash, 1997).

Besides moral and held values, that are rather too abstract and context-independent, the development of the notion of relational values in parallel with the IPBES' conceptual framework becomes relevant in justifying why do we need an ideal method to elicit and integrate diverse values. Contemplating on the types of relationships people have with nature is highly relevant in environmental policy and management (Chan et al., 2016). Relational values are defined as "derivative of our relationship with nature, reflecting elements of cultural identity, social cohesion, social responsibility and moral responsibility towards nature" (Pascual et al., 2017, p. 11) and their elicitation is the key to pluralistic valuation of ecosystem services

(Himes & Muraca, 2018). In general, need for interdisciplinary inclusion and real world application guided the development of the concept of relational value (Chan et al., 2018). What is practical about relational values are that they are more grounded in particular contexts than held values. For example, justice is a held value, yet people's search for rectificatory justice for the damages to ecosystem after an environmental problem is a relational value.

Of course, although reference to plural values have multiple benefits conceptually, they come along with questions regarding their applicability in the valuation assessments. Two main questions are at stake: (1) What are the methods to elicit plural values, given the fact that several of them are abstract, and (2) how to integrate multiple values provided by these methods, as a meaningful policy-relevant outcome, while several of them are qualitative expressions? Relational values, for instance, enrich the valuation framework, while complicating the question of proposing a method to elicit and integrate diverse values.

In particular, given the complex nature of the environmental problems and conflicts, it is argued that centralizing the participatory processes and holistic point of views is needed, as such processes where relevant environmental problems and conflicts are discussed among stakeholders in participatory manner give legitimacy and social acceptance to the process of decision making (Özkaynak et al., 2018) and fosters public awareness, knowledge sharing and increased support for conservation policies (Lopes & Videira, 2019).

The two main approaches proposed are: (1) deliberative approaches, which argues for more public participation in decision making (Wilson & Howarth, 2002) including focus groups, citizen's juries and consensus conferences (Bunse et al., 2015), (2) multicriteria decision analysis, aiming at quantification of qualitative

outcomes from a participatory process (Langemeyer et al., 2018). Deliberative monetary valuation, for instance, aims to integrate monetary values with the outcomes of deliberative processes in order to increase legitimacy of decisions by involving representative stakeholders, provide qualitative data for decision makers and consider distributional equity. Although incorporating relational values and other types of non-instrumental values increase the involvement of public to biodiversity conservation projects thus enhancing the environmental management (Chan et al., 2016), one needs to be aware of the institutional preconditions for engaging in them in context of power asymmetries, lack of trust and transparency. These preconditions are discussed both in the context of the literature in Chapter 2.3 and later in the context of the Gencelli Bay case, the subject matter of this thesis.

2.2 Justice and environment

2.2.1 Notions of environmental governance, environmental justice and rectification

Environmental governance refers to "the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes" (Lemos & Agrawal, 2006, p. 298). Political actors are not only governments, but communities, NGOs and businesses are also included. Different forms of environmental governance, such as globalized, decentralized, market-focused, across scales, depends on what political-ecological-economic relationships the institutions embody and how these relationships shape communities, environmental outcomes and actions (Lemos & Agrawal, 2006). Sustainability can be conceived as a coevolution of environmental, economic, social and political sphere, which indicates the regulation and governance (O'Connor, 2006).

Incorporation of institutional boundaries, as well as ethical, biophysical and right-based boundaries to market-based approaches to governance of ecosystem services as a hybrid approach (Gómez-Baggethun & Muradian, 2015) resonates more with the broad conceptualization of environmental justice, as the mere market-based methods cannot capture the human-nature relationship and justice as a relational value.

Early conceptualizations of the term environmental justice are closely tied to the term "disproportionate impact", in that exposures to pollution and other environmental risks are unequally distributed between race and class and environmental justice social movements (Mohai et al., 2009). Even in terms of this early conceptualization of environmental justice, the economic valuation and market-based approaches were insufficient to explain the roots of injustices, as markets are not intentionally discriminating against any group, racially or ethnically (Mohai et al., 2009).

Today, the context of environmental justice has become broader and expanded into "the expanding sphere of a discourse" (Schlosberg, 2013). With this expansion, environmental justice covers a range of issues, such as human-nature relationship, where the relation is linked to social justice. New social movements that are outcomes of new conceptualization of environmental justice, are just energy transitions and food justice movements, and represent well practices of equity, recognition, participation, delivery of basic capabilities in just and inclusive ways. (Schlosberg, 2013). Environmental justice, thus, has six equally relevant dimensions: recognition, participation, economic distribution, ecological distribution, subsistence and creation (Aydın, 2019). The expanded understanding of environmental justice is operationalized in IPBES's conceptual framework, where justice and governance is considered as a value category under one of the foci of values, good quality of life.

Conducting an economic valuation in order to rectify environmental damages and to restore the environment to its initial state, i.e. baseline, is widely used in ecosystem services literature, especially after an oil spill (Depellegrin & Blažauskas, 2012; Kennedy & Cheong, 2013; National Research Council, 2012; Paine et al., 1996), and the use of market-based instruments are justified in the context of rectification even by people who strictly oppose market-based instruments in environmental governance (O'Neill, 2017).

Arguments for restitutive ecology (O'Neill et al., 2008) precede development of the notion of rectificatory justice in relation to the environment. Restoration in case of an environmental damage is cautiously understood as recovering an environment to a natural initial state, a baseline. This definition is probably the first idea that comes to mind with the term "restoration". Yet, restoration is justified in terms of relationship of human to nature, when it is "understood as a way of redeeming past wrongs, as a means of restitution" (O'Neill et al., 2008, p. 148). That is, the initial state, the baseline cannot be only understood as a natural state determined by biophysical variables only, but it is a relational domain in which people's relation to nature and their understanding of justice and institutions related to this relation are part of the baseline conditions to which the restoration is supposed to be aimed at.

O'Neill (2017) develops the idea under the term rectificatory justice, and introduces two dualities: economic valuation ex-post versus ex-ante an environmental damage, and backward-looking versus forward-looking contexts. Based on these dualities, O'Neill (2017) argues that being in favor of economic valuation in backward-looking legal contexts, ex-post an environmental damage and being against in forward-looking policy-making context in which commodification

of an environmental good is the issue ex-ante are two positions that are not necessarily in conflict. Through the examples of court cases on Exxon Waldez oil spill and Texaco-Chevron oil pollution, O'Neill (2017) justifies the use of monetary values in expressing the losses of the community and ecosystems. Yet, rectificatory justice is not only about restoring prior levels of welfare, which is not possible as a total restoration, but also about "righting a wrong that has been committed" (O'Neill, 2017). Therefore, the prior state that the rectification is aimed at is not only a level of welfare but also a state of justice, and this perspective may not be captured by legal institutions aimed at rectification due to the limitations of such institutions (O'Neill, 2017).

2.2.2 Justice implications of economic valuation of ecosystem services

Literature on justice implications of economic valuation of ecosystem services primarily focuses on payments for ecosystem services (PES) and distributive justice (Garmendia & Pascual, 2013; Gómez-Baggethun et al., 2010; Sharife & Bond, 2013), which represent forward-looking policy-making context and ex-ante environmental justice. For the purposes of the thesis, restriction of this literature to the ex-post environmental justice cases would be beneficial. Large part of this restricted literature deals with oil spills and the court cases and litigation process that follows them. Whether rectificatory justice is satisfied and the institutional conditions for satisfying rectificatory justice are the topics only subtly referred to in the literature, most of the time.

Exxon Waldez oil spill case in 1989 is the case for which many environmental assessments and economic valuations are held both in terms of court processes and for research (Carson et al., 2004; Paine et al., 1996; Slootweg &

Beukering, 2008). This is followed by a literature on the next oil spills among which, Deepwater Horizon oil spill in the Gulf of Mexico in 2010 being the most hazardous (Rivera et al., 2012; Soto & Vázquez-Botello, 2013). For the case of Deepwater Horizon oil spill, where the baseline is complex and the attempt to identify and compensate as many impacts as possible is targeted, use of ecosystem services framework is found beneficial in terms of policy and legal responses (National Research Council, 2012).

Even though the Exxon Waldez case represents a turning point in terms of oil spill history as it initiated the U.S. Oil Pollution Act of 1990 and led to the development of policy responses based on economics and environmental sciences such as Natural Resource Damage Assessment (National Research Council, 2012), whether the rectificatory justice is satisfied in this case is a question. In case of large oil spills, it is argued that admissible claims are not possible for full compensation, and do not cover the overall costs of oil spills (Liu & Wirtz, 2006). Studies on the long-term consequences of Exxon Waldez oil spill on communities suggest that inability of the court in responding cultural and non-material compensation demands of the Alaskan communities had a justice implication and a factor to worsen long-term effects, especially on the side to more injustices for the natives (Fall et al., 2001).

Returning to the criterion Kallis et al. (2013) proposed in justifying economic valuation, the authors apply the criteria to The Chevron-Texaco Case in Ecuador, where long-term oil pollution and the upcoming legal process are the central issues. They conclude that environment benefits from such valuation, and hence the fine is redistributive as it is divided between marginalized indigenous communities that are affected by the pollution. Moreover, the valuation process does not directly favor the

dominance of economic values and value-articulating institutions, and the process recognizes the identity and right of self-determination of local people. Overall, economic valuation is justified in this case as the application of it justifies four criteria proposed previously. But still, this is not a concluding remark for the justice and economic valuation relation, because the ability of large corporations escape responsibility and benefit from power asymmetries in legal processes complicates the quest for justice through economic valuation (O'Neill, 2017). Unequal access to participation, uneven distribution of benefits and exclusionary management are instances of set of problems economic valuation pose for justice (Corbera, 2015; Matulis, 2014), and they lead not only to inability of the courts and policy instruments to bring about rectificatory justice, but also to inability to elicit and operationalize plural values such as justice by communities, to be used in court cases and policy instruments.

2.2.3 Institutional requirements of rectification through economic valuation

Attempting to bring about rectificatory justice by legal and governance institutions, and attempting to elicit plural values such as justice through various value-articulating institutions are interrelated, so are the institutional requirements for these attempts. Categorizing the institutional failures behind biodiversity loss and ecosystem degradation as

> law and policy failures […], market failures (externalities in the use of public goods and services), organizational failures (e.g., lack of transparency and political legitimacy in decision making), and informal institutions failures (e.g., break of collective action norms due to erosion of trust and reciprocity) (IPBES, 2016, p. 118)

would be helpful for initiating a quest about institutional requirements for rectificatory environmental justice rather than restricting the preconditions to merely

market mechanisms and losing the track of big picture of political mechanism. This point of view represents a side of two contradictory frameworks to address environmental problems, namely market environmentalism and institutional framework. The institutional framework address the environmental problem as "collective action dilemma" (Muradian & Cardenas, 2015) instead of market failure. The importance of institutions are emphasized and new approaches to integrate institutional framework into the ecosystem services valuation are discussed in the literature (Jacobs et al., 2016; Meinard & Grill, 2011; Pritchard et al., 2000), and reflection of this framework to the concept of environmental values is that environmental values are "not ideologically neutral, but culturally constructed value-articulating institutions, i.e. constructed set of rules or typifications" (Gómez-Baggethun et al., 2010, p. 1215).

Environmental valuation methods such as cost-benefit analysis, contingent valuation, multicriteria analysis and deliberative valuation are also value-articulating institutions, which determines who participates and at which capacity, which data will be used and how it will be gathered, how the conclusions are reached (Vatn, 2009). In order to choose between various valuation methods, Vatn (2009) proposes three dimensions to consider: Rationality (social versus individual), the characteristics of the good to be valued (simple and individual versus complex and common) and human interaction with the good to be valued (instrumental and communicative). Vatn (2009) concludes that deliberative methods are best suited for common goods where people not necessarily act instrumentally but show social rationality when engaging with the good, such as environmental goods.

Deliberative institutions such as citizen's jury, consensus conference, focus groups, are based on deliberative democracy theory which assumes communicative

rationality, i.e. open exchange of arguments in order to reach an agreement, and through these institutions, political process of valuation which yields ordinal ranking is possible as opposed to economic process of valuation where the economic value in cardinal form is the outcome (Bartkowski & Lienhoop, 2018; Jacobs, 1997; Spash, 2007). There are also attempts to incorporate monetary valuation outcomes with deliberative institutions, which requires more complex assumptions regarding the commensurability of values (Bartkowski & Lienhoop, 2018). As opposed to stated preference surveys' assumptions regarding agents (having full information about the environmental good or service at stake, being self-interested, holding pre-defined preferences), participant of a deliberative valuation process is assumed to be a reflexive citizen, who considers society's and future generation's interests and socially construct her preferences (Bartkowski & Lienhoop, 2018; Wilson & Howarth, 2002). These are the institutional conditions for agents to elicit their values in a deliberative process, which is based on an assumption that environmental and social preferences are not predefined as usually non-familiar goods are at stake (Vatn, 2007), and through deliberation, it is necessary to elicit second-order preferences (preferences about our preferences) instead of only first-order preferences (Bloomfield et al., 2001; Bruckner, 2011; Carballo, 2018). In the context of ecosystem services valuation framework, second order preferences can be thought of as relational, moral and held values. Just as in "unwilling addict" (Carballo, 2018) analogy in forming second-order preferences (which can be summarized as when cigarette-addicts are given a cigarette, they would accept it, which would be their first-order preference, but they may be in a situation that they do not want to smoke for health reasons, which represent their second-order preference), most of the values

concerning the environment are ethical and relational, which would not always be possible to be elicited directly but needs deliberation to reveal.

Moreover, there are normative institutional requirements for value-articulating, legal and governance institutions to function such as fairness, competence, power, empowerment and education of participants, representation, background inequality, knowledge asymmetry, transparency and trust (Berbés-Blázquez et al., 2016; Guttman, 2007; O'Neill & Uebel, 2018; O'Neill, 2001; Ravetz, 2011).

2.3 Challenges for economic valuation and justice in marine ecosystems

Marine ecosystems are composed of oceans and their connectors and extensions, which cover 70% of the Earth's surface and provide more than 60% of the total economic value of the biosphere, of which the coastal zone is particularly significant (Costanza, 1997; Müller et al., 2016). Indicators that are mostly used in the literature for economic valuation of marine ecosystem services range from food production (fisheries) to water storage and provision, coastal protection that refers to the presence of biotic structures that disrupt water movement, climate regulation and cultural services, which are recreation and tourism that is usually expressed by the number of visits to an area (Müller et al., 2016).

Conducting an economic valuation for total value of ecosystem services requires the relevant ecological, economic and social data, which poses a challenge. Conducting an economic valuation after an environmental damage, in order to detect the environmental harms and express them in monetary terms, is even more challenging. Early examples from environmental forensics, the discipline which focuses on identifying harms after an environmental damage, deals with oil spills,

which pose great risks to the marine ecosystems by humans, causing irreversible damages to ecosystems and human life (Boem & Murphy, 2015). The fact that oil spills usually occur in non-pristine areas in the marine environment, which are already damaged by industrial practices, is the main challenge in identifying the direct effects caused by a specific oil spill (Boem & Murphy, 2015). This challenge can be referred to as inability to identify baselines, which is an important step in calculating costs and effects of an environmental damage (National Research Council, 2012). Baselines can be thought as the initial conditions of the ecosystems and socio-ecological conditions that is affected by the ecosystems; in case of an area which is already highly industrially contaminated, identifying the baselines poses a challenge.

Impacts of oil spills can be understood in three levels, which are determined by the characteristics of the oil spill itself (determinants such as place, time and distance to the coast of the oil spill), institutions that provide intervention to the oil spill (in the form of cleaning, litigation, compensation), as (1) direct impacts, (2) societal impacts, and (3) economic impacts, several of which are irreversible (Mendelssohn et al., 2012), and the closeness to the coast makes the effect worse in terms of both the increased direct effect to the societies and of the inability of microbial processes that the sea itself provided to degrade petroleum at the coastal waters (Hazen et al., 2016). A study conducted in Çeşme, İzmir after Lady Tuna oil spill in 2016, for instance, suggest that the oil spill caused enzymatic reactions in benthic organisms and fish population (especially in sea bream), as well as petroleum hydrocarbons (PAH) in sediments and *Posidonia oceanica* in several stations (T.C. Dokuz Eylül Üniversitesi Deniz Bilimleri ve Teknolojisi Enstitüsü, 2017).

Economic valuation of damaged ecosystem services is a literature developed following large oil spills in industrial history. Exxon Waldez in 1989, Prestige oil spill in 2002, Deepwater Horizon in 2010 are the most prominent accidents both in terms of their effects and legal consequences. While studies have often used contingent valuation either ex-post or ex-ante an oil spill (English et al., 2018; Loureiro et al., 2009), ecosystem services approach has also become common in expressing damages to ecosystems after an oil spill. (Cohen, 2006; Garza-Gil et al., 2006; Loureiro et al., 2006; McDowell Group, 1990; National Research Council, 2012; Rivera et al., 2012; Silliman et al., 2012; Yim et al., 2012).

As the benefits from marine ecosystems are mostly unknown or invisible to public, and their attitudes, perception and engagement are shaped by direct use of these services, participatory methods play an important role in articulating such values (Lopes & Videira, 2019). Calculation of economic benefits of each ecosystem service and adding them on the same monetary metric would provide a measure, but in terms of coastal and marine ecosystems where several knowledge asymmetries are at stake, one needs to consider different approaches to aggregate the benefits. Economic valuation, in general, has issues that can be referred to as challenges both on theoretical foundations (such as rationality assumptions, incommensurability, incomparability) and on the validity of calculations (practical obstacles such as framing, institutional setting, societal aggregation, uncertainty, ignorance, and political obstacles such as manipulation, representation, participation, corruption) (Aydın, 2019). Also, in terms of coastal and marine ecosystems sum of the parts of the ecosystem is less than the value of the whole system, as the goods and services provided are intrinsically connected (Beaumont et al., 2007). The consideration of the interaction of natural, social and built capital is required to consider in order to

deal with coastal hazards efficiently (Pérez-Maqueo et al., 2007), lack of consideration of one these capitals leads to intensify hazards as the lack of relevant governance mechanisms as a part of social capital, for example, may be relevant for the environmental damage.

CHAPTER 3

CASE STUDY AND ECONOMIC VALUATION

3.1 Context and description of the case

In this section, socio-ecological background of Gencelli, which is directly affected by the oil spill, is specified. Gencelli, officially referred to as Cumhuriyet Neighborhood, is situated on the border between two districts in İzmir: Foça and Aliağa. While the former is associated with tourism, fishery, protected areas, the latter is a peninsula with intense industrial development. Eski Foça, which is given the specially protected area status in 1990, covers the largest part of the Foça district and encompasses natural and archeological SİT zones (Başak & Bann, 2011).

Yeni Foça refers to the part of Foça district, which is closer to Aliağa and is not designated as protected area. Gencelli Bay in Cumhuriyet Neighborhood is situated in Yeni Foça. Along the shore of Gencelli, which is polluted by the oil spill, most of the residencies belong to Foça district, while few of them belongs to Aliağa officially. Today, Gencelli is a small neighborhood in Yeni Foça with population of 882 in 2018[1] and is crowded mainly by retired residents some of whom are permanent residents while some use their residencies as summerhouse. In Figure 2, Eski Foça lies to the south of Haydar Aliyev Forest, and from the area designated as Fevzi Çakmak and Çakmaklı belongs to Yeni Foça.

[1] Population data is derived from Türkiye İstatistik Kurumu [TÜİK].

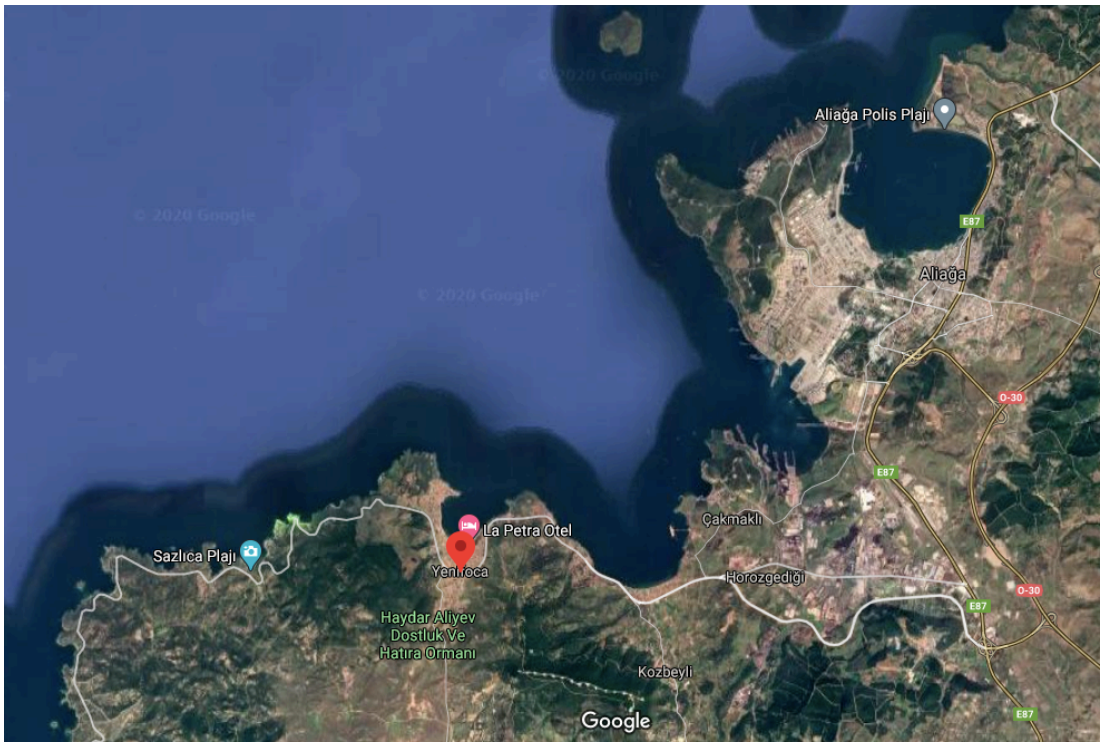

Figure 2. Foça and Aliağa
Source: [Google Maps]

Proximity of Gencelli to Aliağa makes the region more exposed and vulnerable to the industrial development in Aliağa. As many local residents of Gencelli state in their own words, "it is not a coincidence that the oil spill occurred in Gencelli…"[2] (Local1, Local Resident, I1) as Aliağa and its environs are named "ecological sacrifice zone" (Turhan et al., 2019). One of the local residents enumerates promptly the various industries in Aliağa as

> refineries, petrochemical industries, ship breaking yards, LNG (liquefied natural gas) facilities, imported and exported coal storage facilities, paint industry, six iron-steel plants with electric arc furnaces, shipyards, pulp and paper industry, hazardous waste incineration facilities, fertilizer production plants, thermal power plants, basalt quarry, iron-steel by-product industry…[3] (Local3, Local Resident, FC3)

[2] "Gencelli'de böyle bir sızıntı olması tesadüf değil…"

[3] "Rafineri, petrokimya tesisleri, gemi söküm tesisleri, LPG dolum tesisleri/depo, LNG-NG dolum tesisleri/depo, limanlar, ithal ve yerli hurda depoları, ithal ve yerli kömür depoları, boya sanayi, 6 ark ocaklı demir çelik fabrikası, tersaneler, kağıt ve selüloz sanayi, tehlikeli atık yakma tesisleri, gübre fabrikaları, termik santral, bazalt ocağı, demir-çelik yan ürün sanayi…[3]

This is due to the fact that it is inevitable to be 5 km away from Aliağa, as shown in Figure 3 and at the same time not being affected by the industry. Almost all residents use the phrase "it was not a surprise,"[4] (Local1, Local Resident, I1) when starting to describe the oil spill case in Gencelli Bay. This is because the area was exposed to various polluters, including noise pollution from FSRU (floating storage regasification unit) ship in Nemrut Bay, Çakmaklı. The existing conditions in Gencelli in terms of environmental degradation is linked to the search for environmental justice in the region. Local residents describe the memories regarding 50000-people human chain protests, from Aliağa to İzmir, against thermal power plant in Aliağa on May 6, 1990.

Figure 3. Gencelli Bay in Yeni Foça and Nemrut Bay in Aliağa
Source: [Google Maps]

[4] "Sürpriz olmadı tabi."

References to the previous damages to the environment of Gencelli, and current environmental problems of the region (in 2019) such as dross from iron-steel facilities (shown in Figure 4) of the region are the most recurring themes of in-depth interviews and focus groups conducted; with some memories of protests for environmental justice, reflecting the hopelessness of people. Trust to the environmental governance and justice institutions had already decayed before the oil spill case at Gencelli Bay, as the conversations from case study suggest.

Figure 4. Manmade mountains of dross from iron-steel facilities

3.1.1 Baseline of the ecosystem services at Gencelli Bay

While social-ecological background designates the baseline of Gencelli as a "prior state of justice" (O'Neill et al., 2008) and cannot be quantifiable, a quantifiable baseline can be expressed in monetary terms via benefit transfer. Baseline, in this sense, delineates yearly total economic value of the ecosystem services of Gencelli, that are faced to degradation due to the oil spill. In the legal context of environmental damage assessment, baseline refers to "conditions that would have existed at the assessment area had the discharge of oil not occurred" (Paine et al., 1996, p. 205).

The fact that in practice baselines are hard to express due to anthropogenic changes before the oil spill and due to lack of relevant data. It is usually the case for regions in which oil spills occur that ecosystem services of the region already degraded, creating complications in identifying damages in comparison to a baseline (National Research Council, 2012).

Monetary values are adopted from previous studies in benefit transfer method, and applied to Gencelli. Environmental damage assessment studies are usually conducted in order to call attention to the ecosystem's values prior to the damage. Such benefit transfers are common in ecosystem services valuation after oil spills (National Research Council, 2012). Reference values for various marine ecosystem services, that can be directly linked to Gencelli Bay ecosystem, can be found in Table 2.

Table 2. Reference Values for Total Economic Value

Ecosystem Services	Definition	Unit Value ($/ha/y)
$ES_{Habitat}$	Habitat creation	8
$ES_{Nutrient}$	Nutrient cycling	3.677
ES_{PO}	Nutrient cycling by *Posidonia oceanica*	19.002
ES_{BC}	Biological control (for predator mechanisms)	38
ES_{Direct}	Direct production from nature's resources via food production and raw materials	97
ES_{DR}	Disturbance regulation	88

Source: [Costanza et. al. 1997]

These values represent the world average for ecosystem services calculated through various economic valuation methods. Although it is not always justified to employ these values to specific ecosystems with different specifications, benefit transfer is used in order to point out to the total ecosystem services at stake and raise awareness for them. In the literature, average values for recreation and cultural ecosystem services also exist but they are not included.

Based on reference values in Table 2, and acknowledging the area directly affected by the oil spill conservatively as 15 km^2, which is derived from the expert report ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019), baseline monetary values for the ecosystem services of Gencelli Bay that are jeopardized by the oil spill can be found in Table 3. In order to calculate baseline values for fish, fish statistics for Foça district requested from İzmir Metropolitan Municipality is employed. In these statistics, information on total fish hunted and brought to the İzmir Fish Market in years 2018 and 2019 for each fish species are provided (see Appendix E). As inferred from the interviews, not all fish hunted in Foça district are brought to the Fish Market in İzmir, many of them are sold to the local restaurants, local fish markets and local people. Local officials declared the length of the shores affected by the oil spill as seven km ("Bakanlık: Foça'da petrolün aktığı deniz yüzme ve balık avlama için uygun hale getirildi", 2018), yet it is conservatively assumed to be 2.5 km in the expert report for the court in order to express the directly affected coastline ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019). From İzmir Metropolitan Municipality Fish Market website[5], the average yearly prices are derived for each fish species, and multiplied by the quantity of fish hunted. This value is proportioned for 2.5 km of directly affected area out of 40 km total shoreline of Foça district. The average yearly economic value, expressed in 2018 prices is presented in Table 3. In terms of other categories, monetary values are expressed in 2018 prices and in TL[6].

[5] Retrieved from http://eislem.izmir.bel.tr/balikhalfiyatlari.aspx
[6] Potential effects of inflation is considered in the calculations, both in the baseline calculation and in the following calculations.

Table 3. Baseline List of Gencelli Ecosystem Services

Ecosystem Services	Value/year (TL)	Valuation Method
Habitat creation	123,103.491	Benefit transfer
Nutrient cycling	56,590.272	Benefit transfer
Nutrient cycling by *Posidonia oceanica*	292,383.072	Benefit transfer
Biological control (for predator mechanisms)	584,667.897	Benefit transfer
Direct production from nature's resources via food production and raw materials	1,440,301.02	Benefit transfer
Disturbance regulation	1,353,941.907	Benefit transfer
Fish	1,801,130	Market values (direct market valuation)

Table 3 shows 1-year contribution of each ecosystem components to total economic value (TEV). In order to avoid double-counting ES_{fish} and ES_{Direct} averaged when calculating TEV.

$$ES^{TEV}_{marine} = ES_{Habitat} + ES_{Nutrient} + ES_{PO} + ES_{BC} + ES_{DR} + (ES_{fish} + ES_{Direct})/2$$

$$ES^{TEV}_{marine} = 4{,}031{,}402.149 \text{ TL (in 2018 prices)}$$

Lastly, based on this value, a 3-year NPV is calculated assuming 13.455% risk-free rate for 3-year Turkish treasury bond[7] and zero discount rate using the NPV formula below. A justification and an explanation on the choice of discount rates in this thesis are given in Chapter 3.2.2.1.

$$NPV = \sum_{t=0}^{t} \left(\frac{C_t}{(1+d)^t}\right)$$

$$NPV\ of\ ES^{TEV}_{marine} = \sum_{t=0}^{2} \left(\frac{ES^{TEV}_{marine}}{(1+d)^t}\right)$$

The result is an interval (10,716,614.0082 – 12,094,206.447 TL) in 2018 prices representing economic valuation of the three-year TEV of marine ecosystem services

[7] Retrieved from EVDS, Central Bank of Turkey's database.

of the area that is under the risk of degradation due to the oil spill. Three-year time period, which is taken from the expert report, is a precautionary estimate of recovery time of the ecosystem.

3.1.2 Oil spill and its aftermath

On 29 August 2018, at 21.00 an oil spill occurred on the offshore of Tavşan Island, Aliağa from a ship heading to the ship-breaking facilities in Aliağa peninsula. Until the midnight, the oil spill reached to the shores of Gencelli, which is situated at six km away from Tavşan Adası. Location of Tavşan Island and condition of ship-breaking yards can be seen in Figure 5, Figure 6 and Figure 7.

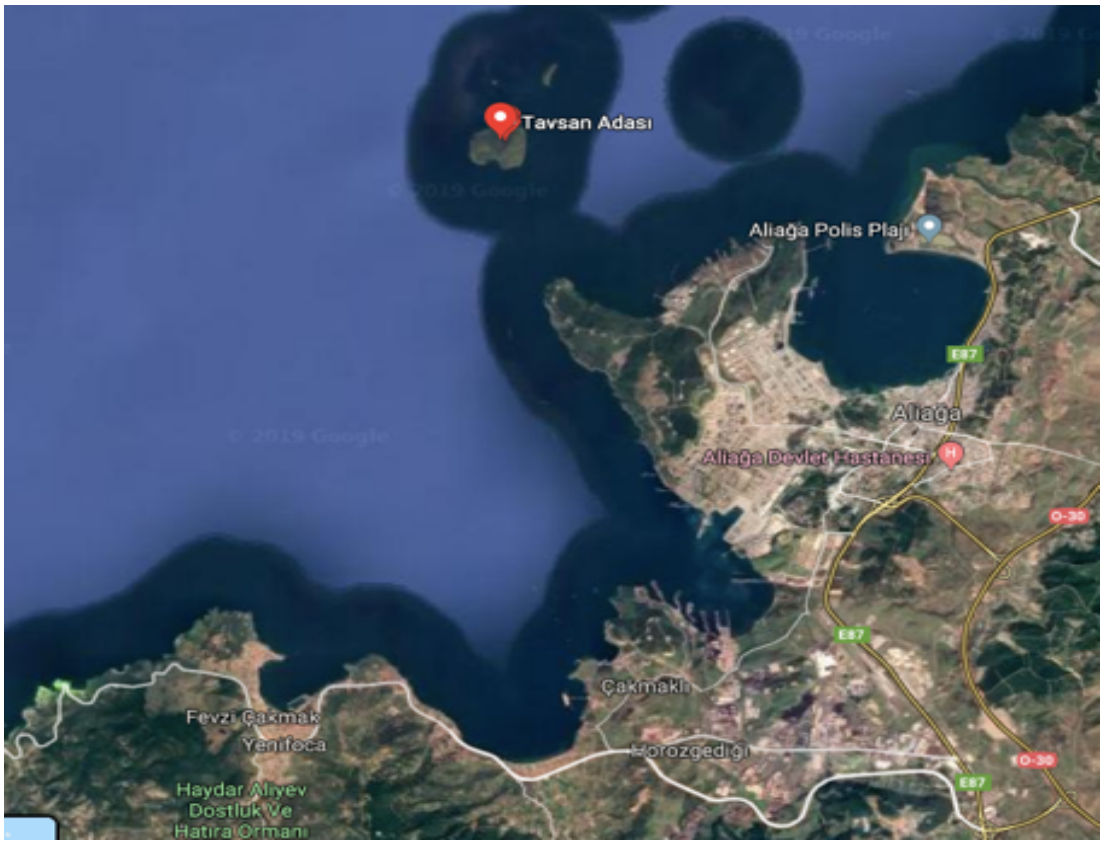

Figure 5. Tavşan Island
Source: [Google Maps]

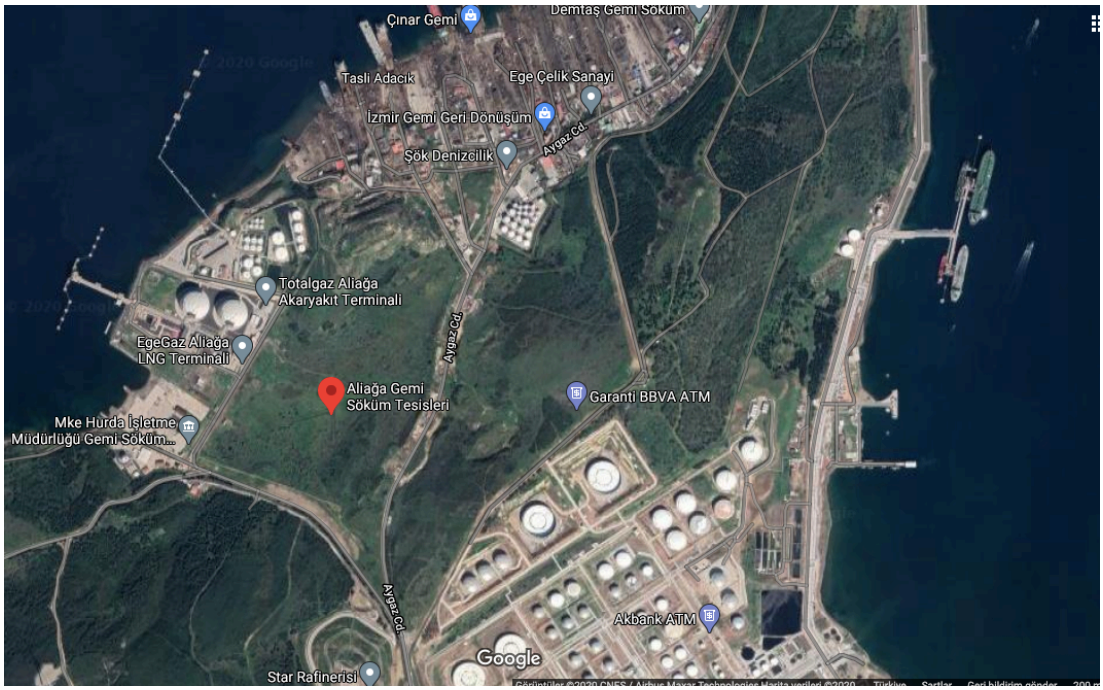

Figure 6. Ship-breaking yards of Aliağa
Source: [Google Maps]

Figure 7. Ship-breaking yards

Gencelli shores, that is directly affected by the oil spill is shown in Figure 9.

Figure 8. Gencelli shores directly affected by the oil spill
Source: [Google Maps]

In the following weeks, the cleaning processes are conducted (see Figure 9, Figure 10 and Figure 11), and lawsuit for the detection of costs is opened by residents of Gencelli and local NGOs. Although the oil spill is received reactions and protests from local residents, NGOs and fishers; correspondents of Foça TUDER (Tourism Managers, Investors and Craftsmen Association) declared in a press release that Eski Foça is not affected by the oil spill at all in order for tourists not to cancel their reservations ("Foça'da deniz yüzeyindeki kaba pislik temizlendi, yüz kişilik ekip çalışmaları sürdürüyor", 2018). First intervention to the spread of the oil spill is made by UZMAR, a company in Aliağa, later the cleaning process is leaded by a professional company named Seagull, with the help of local businesses. Total of 2400 tones of solid waste and 50000 m^3 solid waste is removed with the help of 3156 trucks ("Bakanlık: Foça'da petrolün aktığı deniz yüzme ve balık avlama için uygun hale getirildi", 2018). Professional equipment for cleaning was provided by Seagull,

yet the tractors and trucks which carry wastes to Aliağa are provided by municipality and local businesses.

Figure 9. Cleaning of the oil spill 1
Note: Photo courtesy of local residents.

Figure 10. Cleaning of the oil spill 2
Note: Photo courtesy of local residents.

Figure 11. Cleaning of the oil spill 3
Note: Photo courtesy of local residents.

On 8 September 2018, the ship responsible for the oil spill is detected by TÜBİTAK MAM oil fingerprint analysis and by satellite images acquired from a private construction company. The ship is held responsible for an administrative fine of 1,644,742 TL along with the cleaning costs of 25 million TL. On 12 January 2019, the case has concluded and the court found the residents eligible for compensation. Yet, no one filed a claim for compensation. The expert report provided to the court is prepared by experts specialized in environmental sciences, medicine and aquaculture ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019).

The cleaning process is finished on 2 October 2018, and authorities from Ministry of Environment and Urbanization declared that Gencelli Bay is turned to its initial state without making results for the analysis of samples taken from the bay after cleaning process public.

On 25 September 2019, one year after the first oil spill that, another oil spill occurred on the same shores, this time caused by discharge from PETKİM's waste pools and the case resolved similarly by making the liable parties responsible for paying the administrative fine and cleaning costs. According to the local residents communicated over the phone, the effect of this oil spill is not as devastating as the previous one. A shot from the cleaning processes for the second oil spill can be seen in Figure 12.

Figure 12. Oil spill in 2019
Note: Photo courtesy of local residents.

3.2 Valuation attempt for rectification for the case of Gencelli Bay

3.2.1 Methodology and data collection

IPBES's framework for ecosystem services valuation presented in Chapter 2 is the overarching framework to categorize damages to ecosystems in monetary and qualitative terms in this thesis.

In order to calculate and express damages caused by the oil spill in monetary terms, the NCP categories which are relevant to the case and that can be valued monetarily are identified, based on in-depth interviews and desktop research. For the other NCP categories that are relevant for the case but cannot be monetarily valued, constraints such as lack of data, institutional conditions for value elicitation etc. are discussed. A summary of findings related to the damages identified for each NCP category, along with short definitions of the categories, are given in Appendix D. IPBES's framework is not only restricted to utilitarian values as it is reflected in the concept of NCP. In order to consider the relational and moral, and connect the

discussion to environmental justice, an attempt to integrate qualitative insights from the case studies is reflected.

Data for the valuation in the case of Gencelli Bay comes from three sources: case study, desktop research and relevant authorities. 12 semi-structured in-depth interviews are conducted in Gencelli and Yeni Foça between 12-15 September 2019, three semi-structured in-depth interviews and one short interview with a local resident between 16-26 September 2019 conducted over the phone. The questions directed to each group of correspondents (which are grouped as local residents, fishers, people working for real estate sector, people working for tourism and service sector, people working for health sector, local authorities, lawyers) are given in Appendix B. As the interviews are guided by the methodology of semi-structured interviews, unlike questionnaires, they start with more general, open-ended questions and topics. The interviews are evolved as two-way communication, thus although Appendix B includes all questions commonly directed to all correspondents from each category, depending on the involvement and interest of the correspondent regarding the oil spill case and environmental issues, additional questions are directed. Three group interviews are also conducted, which are referred to as focus group 1 (29-30 March 2019, Yeni Foça), focus group 2 (26-29 April 2019, İstanbul), and focus group 3 (12 September 2019, Eski Foça). In Appendix A, information on interviews and focus groups is given. Fish statistics for Foça district in 2018 and 2019 are requested from and provided by relevant authorities during visits to the region, and given in Appendix E. Other relevant data for economic valuation, collected through desktop search, is found from Turkish Statistical Institute (TUİK), Sahibinden.com, The Ministry of Health of Turkey, World Health Organization (WHO) and TCMB EVDS (Central Bank of the Republic of Turkey Electronic Data

Delivery System). Details regarding the data which are employed in economic valuation are provided in relevant sections. Moreover, data for benefit transfer is derived from seminal works for ecosystem services benefit transfer (such as Costanza et. al., 1997; De Groot et al., 2002).

3.2.2 NCP categories that are relevant for the case and economically valued

NCP categories that are relevant for the case and economically valued are NCP 1 (habitat creation and maintenance), NCP 3 (regulation of air quality), and NCP 16 (physical and psychological experiences). Economic valuation is expressed monetary terms for the damages caused by the oil spill for each NCP category. Indicators, data and economic valuation methodologies applied to each category are summarized in Table 4. The details of the valuation and outputs are given in the subsections and Table 5. In Appendix D, an inclusive summary of NCP framework applied to the Gencelli Bay oil spill case is given.

Table 4. Indicators of NCP Categories and Data for Economic Valuation

NCP Category	Indicator	Data	Economic Valuation Method
NCP 1. Habitat creation and maintenance	Link between primary production by dominant phytoplankton species in Gencelli Bay and habitat creation for fish (Biophysical indicator), market price for sea bream (economic indicator). Loss in biophysical terms due to the oil spill case is expressed as economic values.	Biophysical data from the expert report (see Appendix B), market prices from İzmir Metropolitan Municipality Fish Market and financial data from EVDS	Direct market valuation
NCP 3. Regulation of air quality	Costs related to human health problems of the respiratory system due to the oil spill case	Population data from TUİK ADNKS, family medicine units and dependency ratio data from the Ministry of Health of Turkey, unit cost per outpatient visits from WHO, financial data from EVDS, insights from interviews with local doctor at Family Medicine Unit of Yeni Foça and with pharmacist	Direct market valuation of workforce loss due to respiratory health problems of the dependent population and estimation of total cost of outpatient visits to family center unit that is attributable to the oil spill
NCP 16. Physical and psychological experiences	Losses in real estate sector due to the oil spill case	Housing data from Sahibinden.com, insights from interviews for individual losses	Hedonic pricing method, direct market valuation

3.2.2.1 NCP 1 - Habitat creation and maintenance

Habitat creation and maintenance, as a reporting category of NCP, refers to "the formation and continued production, by ecosystems or organisms within them, of ecological conditions necessary or favorable for living beings of direct or indirect importance to humans" (Díaz et al., 2018, p.7). Expert reports enumerate typical habitat damages caused by petroleum hydrocarbons released after an oil spill occurrence. Irreversible damage to the habitats for fisheries, benthic algae, aquatic plants (especially *Posidonia oceanica*), benthic invertebrates is at stake in case of an oil spill, while the scale of the damage depends on the characteristics of the oil spill. The area affected by the oil spill and its trajectory, baseline characteristics of the ecosystem, characteristics of winds and currents at the time of oil spill, seasonal characteristics are instanced as characteristics of an oil spill. In terms of Gencelli Bay

oil spill case, inability to identify some of these characteristics combined with the deficiencies of relevant data hinders economic calculation of damages. In order to express damages to habitat aftermath of the oil spill, experts employ an unpublished data on the primary production by dominant phytoplankton species in Gencelli Bay in order to link primary production by dominant phytoplankton species to habitat creation for fisheries through ecological efficiency analysis ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019). Based on a conservative assumption that an area of 15 km^2 is directly affected by the oil spill, 11421 kg fish loss per year is the estimated biophysical impact of the oil spill. From a precautionary perspective, experts reported that three-years' time is the minimal requirement for the ecosystem to recover. By directly multiplying the biophysical impact for three years with the market price of sea bream, experts express the monetary value of the habitat damages as 787,706.00 TL in 2018 prices.

This direct calculation can be enhanced by giving it an economic insight. Calculation in expert report presupposes zero discount rate between time periods without justification, and it does not account for inflation. These two components are integral parts of economic valuation of net present value. Net present value (NPV) is expressed by the following formula, where C_t stands for periodical cash flows provided by the service, t for time period and d for discount rate. Periodical cash flows in this case is represented by multiplying biophysical effect of expected yearly fish loss in kg with average fish prices in the market. Market prices for fish is derived from İzmir Metropolitan Municipality Fish Market[8], by averaging yearly minimum and maximum prices for sea bream, which is the prevailing species of fish with economic value in the area.

[8] Retrieved from http://eislem.izmir.bel.tr/balikhalfiyatlari.aspx

$$NPV = \sum_{t=0}^{t} \left(\frac{C_t}{(1+d)^t}\right)$$

The choice of discount rate is an important part of calculating net present value, as this choice reflects the tradeoff between present and future values. While the common practice is to take risk-free rate which is the yield of government bond of the same maturity as discount rate, arguments for "social discount rate" and "zero discount rate" suggest that the choice of discount rate is a value judgement to be justified (Hanley et al. 2009). Proponents of zero discount rate suggests that a discount rate of, say 10%, would lead to devalue the effects of an environmental damage in the long run (Hanley et al., 2009), creating intergenerational equity concerns. For the purposes of this thesis, economic value of damage to this NCP category is expressed as an interval constructed by assuming two discount rates: 13.455% is taken as a risk-free yield from three-year Turkish treasury bond[9] and zero discount rate is taken as an extreme. Arranging the values into the following equation, the economic valuation for the damages to habitat creation and maintenance can be expressed as the interval (1,973,800.72307 TL – 2,196,658.035 TL) from the perspective of 2018.

$$NPV_{fish} = \sum_{t=0}^{2} \left(\frac{Fish\ loss\ in \frac{kg}{year} \times \overline{P_t}^{fish}}{(1+d)^t}\right)$$

This interval is a conservative monetary estimation of damages caused by oil spill on habitat for fish, for two reasons. Firstly, the calculation is based on assumptions on future and present benefits, market prices, and the probable length of the impacts of oil spill. In the calculations, wholesale price for sea bream is employed in order to ground the analysis on reliable and tractable data. Yet,

[9] Retrieved from EVDS, Central Bank of Turkey's database.

employing retail prices, which includes added values to the good, would increase the economic valuation results. Secondly, there are other direct damages to the habitat creation and maintenance function of the ecosystem caused by oil spill which could not be captured by economic analysis due to lack of case-specific data. In-depth interviews provide qualitative insight and individual witnesses on such damages. Local residents denote the oil spill as a "nightmare", referring to the observed effect of oil spill on crabs, fish, seagulls and *Posidonia oceanica*.

3.2.2.2 NCP 3 - Regulation of air quality

Regulation of air quality, as a reporting category of NCP, refers to the "regulation (by impediment or facilitation) by ecosystems, of CO2/O2 balance, O3, sulfur oxide, nitrogen oxides (NOx), volatile organic compounds (VOC), particulates, aerosols, allergens" as well as to the "filtration, fixation, degradation or storage of pollutants that directly affect human health or infrastructure" (Díaz et al., 2018, p.7). This category is remarkably related to the case as the insights from in-depth interviews and expert report suggest. Local residents who witnessed the oil spill case refer to their inability to breathe, worsening symptoms of their already existing asthma, and continuation of such effects for the following 20 days of oil spill. Local doctor at the Family Medicine Unit of Yeni Foça states that outpatient visits with respiratory problems increased 25% following the oil spill. While this increase reached its peak in the following one month of the oil spill, it continued at a slower rate after one month. Expert report emphasizes the health effects caused by vaporization of petroleum hydrocarbons after the oil spill ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019). Vaporization speed of petroleum hydrocarbons depends on the type of petroleum hydrocarbons released,

and in any case widens the spread of chemicals after an oil spill to a larger area ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019).

Estimation of economic damages caused by unregulated air quality is possible by making several assumptions. Focusing only on the patients who consulted the Family Medicine Unit of Yeni Foça, the proposed economic valuation provides a partial estimate of the damages to health caused by the oil spill. The valuation methodology adopted for this category categorize the damages as the addition of increased costs by outpatient visits to health centers, which is mainly comprised of vulnerable population, and workforce loss of companions to patients. The following assumptions are made:

(1) Vulnerable population is defined as the portion of the population that is aged between 0-14 and 65+. The ratio of this group to the overall population is referred to as total age dependency ratio and it is 44.3% for Aegean Region of Turkey (The Ministry of Health of Turkey, 2019).

(2) Due to the lack of age dependency data that is specified at district or neighborhood-level, the ratio for Agean Region is assumed to calculate vulnerable population in Gencelli and Yeni Foça.

(3) Population data is derived from TÜİK ADNKS. In 2018, population of Yeni Foça is 8934 and Gencelli, as a neighborhood in Yeni Foça, is 882.

(4) The Ministry of Health of Turkey reports 258.436.607 total visits in 2018 to Family Health Units in Turkey (The Ministry of Health of Turkey, 2019). There are 26.252 Family Health Units in Turkey, 1338 of which is in İzmir. On average, a Family Health Unit in İzmir provides health service to 820 patients.

(5) Due to the lack of data specific for Yeni Foça and Gencelli, average of İzmir is assumed to be valid for Yeni Foça and Gencelli.

(6) Each patient from vulnerable population is assumed to be companioned for one day during the visit to the Family Medicine Center with a working companion, who is earning minimum wage. In case of a patient from non-vulnerable population, companion is not assumed and minimum-wage earner is the patient in this case. Thus, the calculation of the costs is the same for both population groups.

(7) Unit costs per outpatient visits to health centers with no beds is assumed 18.55 $ (2008 as base year) based on country-specific data from WHO[10].

Based on these assumptions, economic damages are expressed as an interval between economic values calculated by assuming (1) initially 820 patients, which is the country-average, visit the Family Medicine Unit of Yeni Foça, and this number increased by 25% as inferred from the doctor in the Family Medicine Unit of Yeni Foça, (2) the oil spill posed a risk to overall vulnerable population, causing the whole population visit the doctor. For two cases, total cost of patients for the Family Medicine Unit is calculated, as well as workforce loss of their companions in terms of daily minimum wage. The minimum and maximum values expressing the economic valuation of the damages can be expressed by the interval (108,927.011717 TL – 420,617.6700690 TL) in 2018 prices.

Based on assumptions (1)-(7), the interval is an underestimate of the economic values of the total damage to the health system. Firstly, the calculation only considers the Family Medicine Unit system, as direct insight is gained on

[10] Retrieved from https://www.who.int/choice/country/country_specific/en/

how much the number of patients increased after the oil spill, from the local doctor at the Family Medicine Unit. Considering some of the patients who had more severe condition consulted to hospitals, the costs to health system would be greater as a result of oil spill. Secondly, the calculation only estimates the costs following one month after the oil spill. Yet, respiratory diseases, which are at stake in this case, have extensive costs in the form of disability adjusted life years (DALY) (Bo Lundbäck & Gibson, 2013). In the EU, DALYs lost per year due to the respiratory diseases is estimated to be 5154 days, which corresponds to annual monetized value of 283.4 billion € in 2013 (Bo Lundbäck & Gibson, 2013). Consideration of DALY, drug costs, future effects of the respiratory diseases, and inpatients along with outpatients would increase the monetary values attained from calculation. Limitation of data and inability to conceptualize ongoing effects of the respiratory diseases in the form of NPV with proper discount rates restrain the relevant calculation.

3.2.2.3 NCP 16 - Physical and psychological experiences

Physical and psychological experiences, as a reporting category of NCP, refers to the "provision, by landscapes, seascapes, habitats or organisms, of opportunities for physically and psychologically beneficial activities" such as "healing, relaxation, recreation, leisure, tourism and aesthetic enjoyment based on the close contact with nature" (Díaz et al., 2018, p.16). Arguments from in-depth interviews refer to this category from two perspectives. The first one is from the perspective of local residents of Gencelli, who claim that the main reason why they did not file a claim for compensation of the damages is that their properties' prices continuously rise instead of falling, making them unable to ask for monetary compensation for a

damage caused by the oil spill to their property. The second perspective is of people who engage in economic activities such as real estate, tourism and service sector in general, in Gencelli and its surroundings. People from the service sector in Gencelli claim that due to the oil spill they had several economic losses, especially for the month following the oil spill. As Gencelli neighborhood is mainly crowded with summerhouses with quiet surroundings, service sector is not much developed here. There are smaller grocery shops and one café on the beach. Two business owners from the service sector in Gencelli are interviewed (a café owner and owner of a grocery shop). Other people from service sector that are from surroundings of Gencelli, namely Yeni Foça and Eski Foça, do not share similar complaints in terms of the effects of the oil spill. They either decline to talk, or claim that the oil spill is no way affected them because it occurred in Gencelli, as opposed to fishermen and local people from the same regions who claim that although the most severe and direct effects were in Gencelli, there are some effects of the oil spill in Yeni Foça.

This part of the thesis aims, in response to local residents' arguments about property prices, at analyzing how much of the change in property prices can be attributable the oil spill with hedonic regression model, and at observing whether the local residents are right in their arguments that their properties enhance in value through time. To that end, there are two data sets obtained from Sahibinden.com, which is one of the widest online shopping platforms for buying and selling real estate, is employed. The first data set is monthly average house prices per m^2 in neighborhood level for Foça, between December 2016 and February 2020. Shown in Figure 13, Yeni Foça average represents neighborhoods of Yeni Foça except Gencelli and Fevzi Çakmak. Gencelli neighborhood average is represented separately, Fevzi Çakmak neighborhood is omitted due to discontinuities in data.

Foça averge represents the average of house prices in overall Foça district, including Eski Foça, Yeni Foça and the villages.

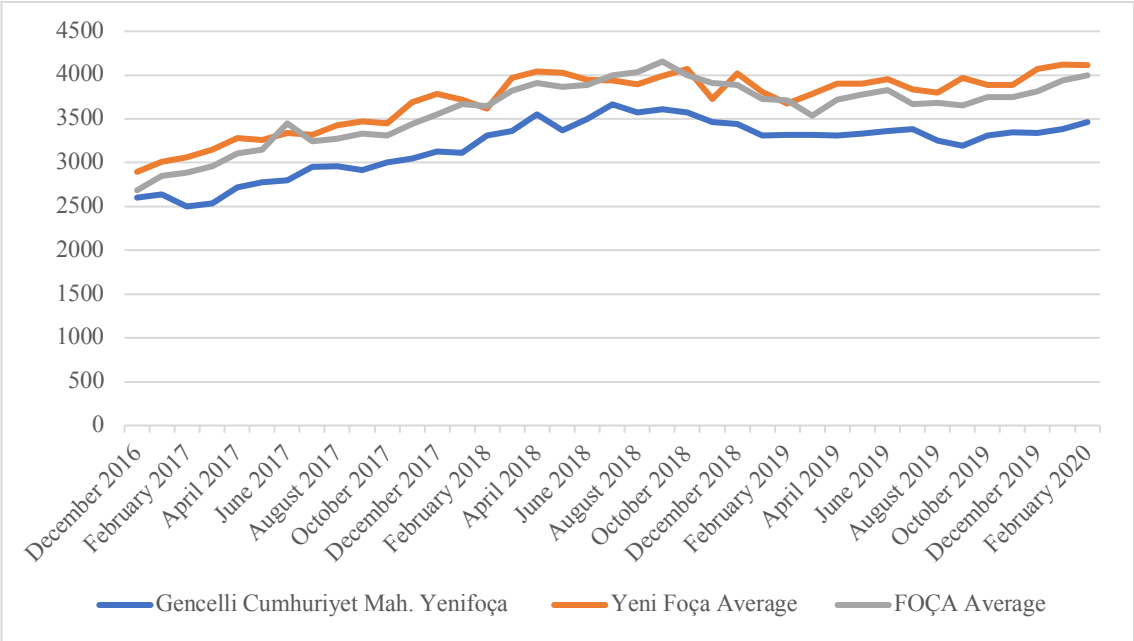

Figure 13. Average house prices per m^2 in Gencelli, Yeni Foça and Foça
Source: [Sahibinden.com]

Comparing three-year trends of Gencelli and Yeni Foça house prices, they both have increased 36.46% and 36.35% respectively. Two-years trends are 4.5% and 14.6% increase, while in the last year increases in house prices have been 4.25% and 11.72% respectively in Gencelli and Yeni Foça.

Second data set consists of property characteristics and environmental characteristics of 221 houses on sale in Foça district on March 2020, when the data is collected. Property characteristics are expressed in three variables: number of rooms, age of the property (a dummy variable which takes values one for properties aged 0-5 years), and house size in m^2. Environmental characteristics are captured in one variable, which represents the distance of the property to the sea. This is a dummy variable which takes values one for properties which have distance to sea less than

100 m. Summary statistics are shown in Table 5. In this data set, there are 47 houses from Eski Foça, 61 from Gencelli, 113 from Yeni Foça. On average, properties on sell in Gencelli are newer, bigger and closer to the sea than properties in Yeni Foça and Eski Foça. Based on the assumption that some environmental characteristics have an effect on property prices, hedonic price models are employed as an empirical strategy to estimate impact of environmental characteristics on prices while isolating other effects that have an impact on property prices, such as property characteristics (Bishop et al., 2014). There are several limitations in using hedonic models. We only observe the values for the properties on sale, we assume that agents have perfect information when buying a property in terms of all environmental conditions and market prices adjust quickly to change in environmental attributes. We also omit various macroeconomic effects on housing sector that is hard to account (Bishop et al., 2014). These macroeconomic effects on the housing sector for the time period of the valuation can be instanced as macro indicators affecting housing sector such as GDP growth rate, construction sector growth rate, exchange rates, unemployment rate, and relevant information on housing loans and interests. In the second quarter of 2018, in Turkish housing sector, construction sector growth rate is 6.9% and exhibits an increasing trend, while annual growth rate of the economy is 7.4% and inflation has increased 15.39% compared to the previous year (GYODER, 2018). Depreciation of TL against dollar and euro has continued through the valuation period, while GDP, as an economic indicator, is recovering from the effect of 2016 coup d'état attempt. While the population in major cities is in an increasing trend, which positively affects the housing sector, declining trend in foreign direct investment inflows and foreign real estate sales continued throughout the valuation period, contributing negatively to the housing sector (GYODER, 2018). Housing

loan interest rates have been on the rise since the second quarter of 2017, and the share of housing loans decreased in May 2018, compared to the same month of the previous year (GYODER, 2018). These macroeconomic indicators on housing sector need to be considered while interpreting hedonic pricing valuation output.

Table 5. Summary Statistics by Location

	N	Mean	sd	Min	Max
EF					
Property prices	47	1.059.148,9	784.189,78	355.000	4.600.000
Distance to the sea	47	.809	.398	0	1
Number of rooms	47	3.596	.925	2	6
Property size (m^2)	47	128.83	90.245	40	640
Age of the property	47	.149	.36	0	1
G					
Property prices	61	599.704,92	377.790,83	25.000	3.000.000
Distance to the sea	61	.934	.25	0	1
Number of rooms	61	4.148	1.138	3	7
Property size (m^2)	61	173.672	87.039	42	490
Age of the property	61	.721	.452	0	1
YF					
Property prices	113	566.884,07	497.344,47	179.000	4.500.000
Distance to the sea	113	.575	.497	0	1
Number of rooms	113	3.54	.973	2	6
Property size (m^2)	113	123.947	58.986	10	385
Age of the property	113	.646	.48	0	1

Notes: Location (EF for Eski Foça, YF for Yeni Foça, G for Gencelli Cumhuriyet Neighborhood). Distance to the sea is a dummy variable, which takes values 1 for distance < 100 m. Age of the property is a dummy variable, which takes values 1 for properties aged 0-5 years. N: sample size, sd: standard deviation

In order to observe the effects of property's distance to the sea on its price and isolate this effect from other characteristics of the property, the following 6

regression models (1)-(6) are estimated and results are reported in Table 6. In these models, "$\ln Price_i$" represents natural logarithm of the property price of the i^{th} house, "sefrontdummy" represents the dummy variable for property's distance to the sea, "housesizem2" represents size of the property in m^2, "newdummy" represents the dummy variable for the age of the property, "numberofrooms" represents the number of rooms in each property, "year" represents the year in which the notice for selling property announced online (either 2019 or 2020), "Location" represents whether the property is in Eski Foça, Yeni Foça or Gencelli. In the model, there are also location dummies (ef_dummy, yf_dummy, g_dummy) and interaction terms of location dummies and the dummy for distance to the sea respectively (EskiFoçaSea, YeniFoçaSea, GencelliSea).

(1) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \beta_5 * Location_i + \beta_6 * ef\_dummy_i + \beta_7 * EskiFoçaSea_i + \varepsilon_i$

(2) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \beta_5 * Location_i + \beta_6 * g\_dummy_i + \beta_7 * GencelliSea_i + \varepsilon_i$

(3) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \beta_5 * Location_i + \beta_6 * yf\_dummy_i + \beta_7 * YeniFoçaSea_i + \varepsilon_i$

(4) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \varepsilon_i$

(5) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \beta_5 * i.Location + \varepsilon_i$

(6) $\ln Price_i = \beta_0 + \beta_1 * seafrontdummy_i + \beta_2 * housesizem2_i + \beta_3 * newdummy_i + \beta_4 * numberofrooms_i + \beta_5 * i.Location + \beta_6 * i.year + \varepsilon_I$

Table 6. Summary of Regression Outputs

	(1) lnPrice	(2) lnPrice	(3) lnPrice	(4) lnPrice	(5) lnPrice	(6) lnPrice
seafrontdummy	.257***	.318***	.318**	.27***	.294***	.294***
	(.08)	(.075)	(.131)	(.08)	(.072)	(.072)
housesizem2	.003***	.003***	.003***	.003***	.003***	.003***
	(0)	(0)	(0)	(.001)	(0)	(0)
newdummy	.106	.119*	.11	-.14**	.112*	.111*
	(.066)	(.066)	(.066)	(.069)	(.066)	(.066)
numberofrooms	.137***	.135***	.135***	.118***	.134***	.134***
	(.033)	(.033)	(.033)	(.038)	(.033)	(.033)
Location	.223***	-.297***	-.831***			
	(.076)	(.041)	(.095)			
ef_dummy	.899***					
	(.22)					
EskiFoçaSea	.183					
	(.18)					
g_dummy		-.315				
		(.225)				
GencelliSea		-.24				
		(.237)				
yf_dummy			1.093***			
			(.206)			
YeniFoçaSea			-.033			
			(.157)			
1.Location						
2.Location					-.829***	-.829***
					(.094)	(.094)
3.Location					-.595***	-.595***
					(.083)	(.083)
2019.year						
2020.year						.001
						(.066)
_cons	11.294***	12.82***	13.357***	12.282***	12.546***	12.546***
	(.27)	(.151)	(.19)	(.133)	(.128)	(.132)
Observations	221	221	221	221	221	221
R-squared	.519	.519	.517	.332	.516	.516

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The results suggest that the property's closeness to sea has a positive effect on its price, and the effect is statistically significant. Although the interaction terms with location dummies and distance to sea dummy do not give statistically significant results, meaning that the effect of property's being close to the sea on its price does not differ significantly with the location of the property. Controlling for the locations, property's being close to the sea has a significantly positive effect on its price. Specifically, we can attribute 29.4% of the property price to its closeness to sea characteristics.

The calculation of the economic value of the damages caused by the oil spill has further assumptions. It is stated that the trend for property prices in Yeni Foça and Gencelli were similar compared for the last three years, while it has changed to Gencelli's disadvantage later. First assumption is that increase in property prices in Gencelli could have been as high as in Yeni Foça, had it not been for its environmental conditions, as they had similar initial trends. Second assumption is that distance to the sea captures the environmental characteristics of the properties. For 61 properties on sale at the time of data collection, 29.4% of the average property price in Gencelli, which is 599,704.92, is attributed to its environmental properties. Then this value is expressed in 2018 prices, and increased by 10.1%, which reflects the difference between Yeni Foça and Gencelli properties' two-year price trends. Lastly, based on this value, a three-year NPV is calculated assuming 13.455% risk-free rate for 3-year Turkish treasury bond[11] and zero discount rate as in previous calculations. The result is an interval (764,622,539.098 TL – 862,912,747.89 TL) in 2018 prices representing economic valuation of the damage to the environment after the oil spill.

[11] Retrieved from EVDS, Central Bank of Turkey's database.

This interval represents an overestimate in a sense that the valuation attributes all of the potential losses to the oil spill, which is not the case. The area is already under the effect of increasing industrial development. On the other hand, the interval represents an underestimate in a sense that the values reflect the losses for the properties that are on sale at the time of data collection. Yet, there are many losses accruing to people from service sector in the form of revenue loss, and the effect of reputation loss due to the oil spill on surrounding areas of Gencelli creates a potential loss as well. These are not considered in this valuation.

3.2.3 An attempt to integrate diverse values

In this sub-section, insights gained from in-depth interviews and focus groups are presented in the context of NCP categories that are not economically valued but is part of other value types in IPBES's frameworks. Table 7 summarizes NCP categories for which economic valuation is conducted with the outcomes of valuation.

Table 7. Summary of Results for Economic Valuation

NCP Category	Economic Valuation Method	Result of Valuation (TL)	Comments and assumptions
NCP 1. Habitat creation and maintenance	Direct market valuation	Interval 1,973,800.72307 TL – 2,196,658.035 TL	Expressed as three-year effect (NPV)
NCP 3. Regulation of air quality	Direct market valuation	Interval 108,927.011717 TL – 420,617.6700690 TL	Expressed as one-month effect
NCP 16. Physical and psychological experiences	Hedonic pricing method, direct market valuation	Interval 764,622,539.098 TL – 862,912,747.89 TL	Expressed as three-year effect (NPV)

For NCP categories that is not considered in economic valuation due to lack of market mechanisms and/or alternative means to refer in valuation are NCP 2, NCP 7, NCP 8, NCP 10, NCP 12, NCP 13, NCP 15, NCP 17, and NCP18. For these categories, qualitative insights from focus groups and interviews are provided in this

chapter. For NCP 1, NCP 3, and NCP 16, for which economic valuation is conducted, the insights that are not included in economic valuation are also mentioned. These are non-material and/or regulating aspects of these categories that are not included in economic valuation. The remaining NCP categories are either irrelevant to the case or impossible to trace beyond local state. A summary of descriptions of 18 NCP categories and their relevance to the case is given in Appendix D. As mentioned earlier, the notion of NCP primarily encompasses instrumental values in terms of human-nature relation. Other types of values, that are not classified under NCP, i.e. relational values such as justice, are also pointed out based on qualitative insights from the fieldwork.

In terms of NCP 1, habitat creation and maintenance, economic valuation is conducted based on various conservative assumptions. The outcome of economic valuation does not represent well several aspects of Gencelli Bay ecosystem that contributes habitat creation and maintenance. A local resident states that "in the oil incident, the life perished in the sea. We have seen with our own eyes crabs covered with petroleum and died."[12] (Local5, Local Resident, I2). The fact that crabs do not possess economic value in the region hinders quantification in terms of this category of value. Also, the fact that data is unavailable in terms of sea creatures that have no commercial value is also a hindrance. In this regards, local residents show a capacity to search and acquire knowledge of nature's contributions to people. They reflect an awareness that the oil spill has unrecoverable consequences on habitats. One local resident states that:

> They cleaned it really well, yet there are hardly any crabs on the coast. Beforehand whichever stone you removed, a crab would jump out of it…

[12] "Petrol olayında da deniz kenarındaki canlı hayat tamamen öldü. Yengeçlerin petrole bulaştığını öldüğünü gözümüzle gördük yani."

> Even three or four of them. Now, there is none. Maybe after three or four years… (Local5, Local Resident, I2)[13]

The direct effect of the oil spill at Gencelli Bay is on the coastline. Although one of the fishers claim that the oil spill would not affect much fish population by stating that "The spill affected the coast, I do not think it would have much of an effect, in the coast you only have sea bream,"[14] (Fiher3, Fishers, I8) from a profit-maximizing perspective (as sea bream has less economic value than the offshore fish species), local residents are aware of the ecosystem provided by Gencelli Bay to the non-commercial fish and this awareness affect their relation to the oil spill and degraded ecosystem in the form of emotional reaction. One local resident state that:

> It is not possible not to get affected. Before anything else, the condition of those fishes was terrible, they were almost glued to the sea. Because, here there are freshwater resources underground coming to the sea […] thus, fish larvae and little fish were common here. Now, they have gone. (Local11, Local Resident, I11)[15]

This comment is remarkable in the sense that NCP 6, regulation of freshwater quantity, regulation and timing, is eliminated during the desktop research from the list of relevant NCP categories in this case. Yet, as the case is a marine ecosystem which is now has no links to the freshwater, a local resident who have lived in the region more than 30 years reveals an information regarding that category, as well.

[13] "Gerçekten de iyi temizlediler, ama halen kıyıda yengeç tek tük var. Eskiden mesela hangi taşı kaldırırsanız kaldırın altından en az bir tane firlar giderdi. Üç-dört tane birden... Şimdi yok. Ancak üç-dört sene sonra belki."

[14] "Sızıntı da kıyıya vurdu, çok bir etkisi olduğunu sanmıyorum kıyıda çıksa çıksa karagöz maragöz çıkar."

[15] "Etkilenmemek mümkün değil bir kere her şeyden önce o balıkların o halleri de çok kötü yani balıklar resmen yapışmıştı. Çünkü burası alttan ve şeyden tatlı su gelir tepeden yani dere de vardı […] şimdi tatlı su olunca küçük hayvanlar veya yumurtalar hep buralarda bırakılırdı mutlaka küçük balıklar vardı kenarda onlar kalmadı."

In terms of NCP 2, pollination of dispersal of seeds and other propagules, just as for NCP 6, before conducting the fieldwork, the category seemed irrelevant to the case. Although still not directly relatable to the oil spill, during the interviews one local resident claimed that, "Bees are dying, look bees are dying. […] I am collecting dead bees from the ground."[16] (Local2, Local Resident, I1). This effect is hard to tract beyond local level and to attribute to the occurrence of the oil spill. This is because the unavailability of relevant data, and the activation of even more industries in Aliağa following the oil spill. When the oil spill occurred, there is only TÜPRAŞ refinery in Aliağa. In the following year, SOCAR's STAR refinery initiates its operations in Aliağa. The availability of more than one attributes, together with unavailability of biophysical data, make it uneasy to attribute dead bees to the oil spill. All in all, this remark is insightful in a sense that local residents of Gencelli are aware of the environment around them and the involvement with the environment is important for them.

An economic valuation is conducted for NCP 3, regulation of air quality, with health impacts of the oil spill is assumed to the indicator of the damages caused by it. Yet, there are still non-material effects of the oil spill that come under this category. Local residents complain about the ever-worsening conditions of air quality in the region due to the industrialization in Aliağa. People from environmental justice movements (Yeni Foça Forum and FOÇEP) discuss during focus groups the meaning of the unavailability of air quality data for Aliağa (Focus Group 1). Local pharmacist in Yeni Foça states that "beforehand asthma medication covers three or four shelves,

[16] "Arılar ölüyor, bakın arılar ölüyor. […] Yerden ölü arılar topluyorum."

now seven shelves do not suffice."[17] (Health1, Pharmacist, I6). Respiratory problems are the most common symptoms of the ones affected by the oil spill. As the local doctor states, "there has been 25% increase in incoming patients with respiratory problems. Respiratory illnesses increase every year, but the last year following the oil spill the increase was more."[18] (Health2, Doctor, I7).

NCP 7, regulation of freshwater and coastal water quality, is another category that is adversely affected by the oil spill. Just as in previous NCP categories, for this category there is unavailability of data as well. Thus, qualitative insights from the fieldwork contributed much to the elicitation of values regarding this category. A local resident, whose house is just by the sea, has opportunity to observe the density of *Posidonia oceanica*, which is known as the seagrass and crucial for marine ecosystems, and claimed that, "*Posidonia oceanica* has also affected, I suppose. It is certain that they have affected. This year they are rare in the coastline."[19] (Local6, Local Resident, I3). Apart from its crucial role in primary production for the marine ecosystem, lifeless *Posidonia oceanica* hits the shore and as they form dense material along the shore, they protect the coastline. Figure 14 shows the *Posidonia oceanica* in Gencelli shores.

[17] "Zaten bu bölgede astım ilaçları eskiden benim üç dört rafımı kaplarken şimdi yedi raf yetmiyor yani astım ilaçları ile ilgili."

[18] "Bu olaydan sonra bana gelenler oldu, nefes darlığı şikayetiyle gelenlerde %25 artış oldu. Sürekli artıyor yıldan yıla ama son yıl daha çok artış oldu."

[19] "Erişte dediğimizin latince ismi ne (Poseidon çayırı) onlar da etkilendi sanıyorum. Onlar kesinlikle etkilendi. Kesinlikle bu sene kıyıya az vurdu, geçen sene geliyordu kıyıya bu sene yok."

Figure 14. *Posidonia oceanica* in Gencelli shores

NCP 8, formation, protection and decontamination of soils and sediments, is also a category of NCP that the qualitative insights from the fieldwork shade light on. This NCP category is directly related to the cleaning process of the oil spill from the coast, and the local people's witnesses in the aftermath of the cleaning process. Local residents claim that, "After a month, our son came from İstanbul with his friends. He likes walking on the coast barefoot. It looks clean but, one day he walks barefoot and came home with his feet covered in bitumen."[20] (Local2, Local Resident, I1). They attribute this to the stone chips that are placed on the coast before the oil spill by Aliağa Municipality. As the professional Seagull's trucks, which conducts the cleaning process, cannot enter to the coast, the waste is removed with municipality's tractors. This yields spread of tiny stone chips covered in petroleum on the way to Aliağa, where the waste is taken and stored.

[20] "Bir ay sonra mı oğlumuz geldi İstanbul'dan arkadaşıyla, o da yalınayak yürümeyi sever sahilde. Bir çıkmış, tertemiz görünüyor ama görünüşte hiçbir şey yok, tabanlarının altı zift içinde eve geldi."

NCP 12, food and feed, is an important NCP category relevant to the region. Although Foça district as a whole, has been home to productive fisheries, fishing as an economic activity is nowadays focused on Eski Foça part of the district. This represent an already declining baseline conditions in terms of fisheries in Gencelli and Yeni Foça, before the oil spill. A local resident of Gencelli, who is an amateur fisher, states that after the oil spill although they "do not have many people who engage in fishery as a professional activity, the ones who engage in fishery amateurly did not go fishing."[21] (Local1, Local Resident, I1). A fisher from Yeni Foça Fish Cooperative state that,

> There is a declining trend in fish population in the world, in Turkey the decline is more. Yet here, in Yeni Foça, there is 30% decline every year. We go and buy fish from İzmir Fish Market and sell in Yeni Foça. The fish that is gathered in Yeni Foça does not meet the needs here. There is no fishing activity at large scale in Yeni Foça and Gencelli, there is one trawl operating and it sells to İzmir Fish Market. It is not easy to find reliable data, fishing is an irregular sector here.[22] (Fisher5, Yeni Foça Fish Cooperative, I12)

This category of NCP is thus the seemingly most relevant to the oil spill, but due to the existing conditions of ever-increasing industrialization and unavailability of data, it is not easy to attribute the change to the oil spill directly. An elder fisher's account of Nemrut Bay in their childhood is also remarkable,

> At Nemrut Bay, we have the world's most precious fish species, we have seen them when we were children. There was red mullet. We were feeding

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[21] "Bizim burada profesyonel anlamda balığa çıkıp satan kimse yok. Amatör olarak balığa çıkanlar da çıkamadı."

[22] "Dünya genelinde balık sayısında bir azalma var zaten Türkiye denizlerinde daha fazla azalmak suretiyle, ama burada Yeni Foça'da %30 azalma oluyor her yıl. Ama burada çıkan balık buraya yetmiyor, biz İzmir halinden alıyoruz her sabah gidip. Zaten büyük çapta balıkçılık yok Foça'da, 1 trol var o da İzmir haline satıyor. Kesin bir veri bulmak zor, düzensiz bir sektör."

> the whole İzmir from there. In 60s, sea breams and dentex… You must see the pictures. One of them weighted 10-12 kg. I was fishing hundreds of kilos of lobsters, and selling to the Americans, to the hotels, to the markets. Where are they now, brother?[23] (Fisher4, Fisher, I9)

contrasting the conditions of Nemrut Bay of this day, as the place which have "fish that are black"[24] (Fisher3, Fisher, I8) because of the pollution of the sea.

Many local residents of Gencelli have domestic animals, which are also affected by the oil spill. These effects classified under NCP 14, materials, companionship and labor. Respiratory problems occurred in animals as well, while some animals who enter the sea are covered in petroleum. Many of the residents interviewed in Gencelli have been there since childhood and now they have grandchildren. That is why the place is important for them; the place where they learned how to swim, and witnessed much more better conditions in terms of nature. They want their grandchildren to live up to the nice experiences they had with the place. Such values elicited are related to NCP 15, learning and inspiration, NCP 17, supporting identities, and NCP 18, maintenance of options. The interviews also suggest that local residents' knowledge on nature's contributions and economic valuation methods, their concerns for intergenerational equity and environmental justice, affect the extent of the values they elicit.

Damage to NCP 16, physical and psychological experiences, of the oil spill is valued in economic terms via hedonic pricing method. Yet, effects of the oil spill to tourism is left unaccounted in economic terms due to unavailability of data.

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[23] "Nemrut Körfezi'nde olan balıklarımız dünyanın en değerli balıkları vardı orada çocukluğumuzda görürdük barbun vardı orada, İzmir'i besliyorduk oradan. 60 yıllarında mercanlar, trançalar resimleri gör 10 kilo 12 kilo tanesi burada biz 100 kilo Istakoz yakalıyorduk marketlere veriyordum, Amerikalılara veriyordum, tatil köylerine veriyordum. Nerede şimdi o mallar birader?"

[24] "Nemrut İskelesinde ordan çıkan balıklar siyah."

Although people from tourism sector in Eski Foça and TUDER declared that the oil spill does not affect the tourism sector ("Foça'da deniz yüzeyindeki kaba pislik temizlendi, yüz kişilik ekip çalışmaları sürdürüyor", 2018), the people who involve in tourism in Gencelli do not share the same opinion. Gencelli is mainly crowded with summer houses, in terms of tourism activity, there is a small café on the beach. The owner of the café states that, "We have lost one month, even after a month… We did not earn much on that period. Our summer has gone waste. We could not even breathe. Best times were gone. September is the best time here."[25] (Tourism1, Tourism Sector, I4).

Focus groups and interviews not only provide insights on NCP categories and human-nature interactions at Gencelli Bay and its surroundings. They provide insights on other types of values, such as relational, moral etc., and they reflect environmental governance and justice mechanisms relevant to the case. In terms of environmental governance, the intervention is made following the oil spill at local and national scales. The local resident who first encounters the oil spill in the evening of 29 August 2018 states that,

> I immediately called İzmir Governorship, no one responds. Then the district governor, and no one responds. Then I called the gendarme, they said they have no responsibility. Whose responsibility is this, then? Coast Guard officials came at 2.00 a.m. I called the head of the neighborhood.[26] (Local12, Local Resident, I13)

[25] "Bir ay bir zaman kaybı oldu burada. Bir ay sonra bile... Şimdi zaten o dönem bizim burada bile işlerimiz azaldı ablacım. Yani birden bitti, yaz bitti. Yani yazımız zehir oldu. Nefes alamıyorduk ki burada. En güzel zamanlar gitti. Burası eylül ayında en güzel zamanın geçirildiği yer."

[26] "Hemen İzmir Valiliğini aradım, kimse yok. Kaymakamlığı aradım kimse yok. Jandarmayı aradım, bizim vazifemiz değil dediler. E kimin vazifesi bu? Sahil Güvenlik geldi 2de numune aldı. Muhtarı aradım."

The head of the neighborhood, then, "called the metropolitan municipality, their local service directorate. They said they are aware of the situation. I was worried then, as a head of the neighborhood, in case they blame me for it."[27] (Govern1, Local Governor, I4). Even though the head of the neighborhood resents for the oil spill by saying that,

> Even in Africa, such a thing would not occur. In our beautiful İzmir, this happens, and everyone remains silent as if it is normal. How is it possible, what kind of an ideology is that? That is, this place is a derelict, abandoned place, for no one cares.[28] (Govern1, Local Governor, I4)

As a local governor, ends up obeying the governance mechanisms that are governed by the national scale institutions. After the cleaning process ended, officials from Ministry of Environment and Urbanism declared that the Gencelli Bay has returned to its initial situation and it is safe to go fishing and to swim without reference to any chemical analysis of water samples taken from the sea after the cleaning process ("Bakanlık: Foça'da petrolün aktığı deniz yüzme ve balık avlama için uygun hale getirildi", 2018). Without any reference to individuals' and ecosystem's damages, the administrative fine to the responsible ship is emphasized as if the justice has been satisfied. Yet, insights from the fieldwork suggest that local people require precautions to be taken in order not to witness a similar occurrence. Head of the neighborhood states that,

> When I appear on TV, I thanked to Ministry of Environment, I thanked thousand times to those workers and officials. I said, hopefully such an event would not happen again. I mean there is no guarantee that it will not happen

[27] "O gün ben büyükşehiri aradım bu yerel hizmetler müdürlüğünü, dediler ki haberimiz var, bu olaydan haberimiz var. Ben de hani bildirmedi demesinler bir muhtar olarak, sonra topu bize atmasınlar."

[28] "Afrika'da böyle şey olmaz. Bizim güzelim İzmirimizde böyle bir şey yapılıyor ve burada sessiz kalınıyor yani, sanki normalmiş gibi davranılıyor. Bu nasıl bir şey, bu nasıl bir zihniyet yani? Yani burası sahipsiz, terkedilmiş bir yer, hiç kimse bakmıyor."

> again. As long as these industrial facilities operate, and the ship-breaking thing…[29] (Govern1, Local Governor, I4)

The lack of precautions is instanced by almost every local resident. As the local people also agree upon, the second oil spill just after the oil spill subject to the thesis did not come as a surprise,

> On September 25, 2019, it was released into the sea and the source is PETKİM STAR refinery. The previous spill was denser, this one is dispersed into the sea and it is uncertain how long the spill will continue. Unfortunately, we are exposed to breathing the air that hurts our nasals and we constantly sneeze.[30] (Local3, Local Resident, I14)

States a local resident after the second oil spill on the same coastline on the anniversary of the one that is the subject matter of this thesis.

Despite all this mourning and dissent, and after the lawsuit for the detection of damages enable the local residents open a file for compensation ("İzmir'deki ham petrol sızıntısı: Bilirkişi davacıları haklı buldu, tazminat davası yolu açıldı", 2019), no one seek justice for their damages. When local residents are asked for why they did not file a claim for compensation, the answers can be grouped in two categories. Firstly, they are unable to express their losses. They either lack the means or knowledge to express them. For example, although in the thesis through hedonic pricing model, an estimation for the damages brought about by the oil spill is expressed, a local resident claim that they did not file a claim for compensation because,

> We do not know what to say. Actually, there is a confusion in all of us, I mean we can all file a claim if we want but would that be for tangible or intangible compensation? For example, if we would have a business, we

[29] "Yani ben hatta televizyona çıktığımda da Çevre Bakanlığına teşekkür ederim dedim, o işçilere o personele binlerce defa teşekkür ederim. İnşallah böyle bir olay bir daha başımıza gelmez dedim. Yani gelmeyeceğinin bir garantisi yok. Bu sanayi tesisleri burada oldukça, o gemi sökümü..."

[30] "25 Eylül sabaha karşı denize salınmış PETKİM STAR rafinerisinden kaynaklanmış. Geçen seneki daha yoğundu bu sefer denize parsiyel olarak dağılmış ve ne kadar süreceği de belirsiz. Genizler yakan ve sürekli hapşırmak zorunda kaldığımız bir havayı soluyoruz ne yazık ki."

> would say we lost revenue. But if we say our houses lost their value, it is not the case, they gain value on the contrary.[31] (Local3, Local Resident, I11)

Another answer given by local residents to the same question is more complex, and it links the quest for justice to the broader institutional context:

> I did not think about filing a claim for compensating my damages. This place is a heavy industrial zone, which is open to pollution. Every year such events occur. A year ago, treatment plant has started operating and released all pollutants to the sea, then for the whole year we deal with that. Now, that FSRU ship poses a great risk, if something goes wrong with that, this place would level with the ground. There are even no human rights in the country, how would they concern about environment? Kyme ancient city is trapped among the industrial facilities… This is a Middle Eastern country, there are injustices. By the way why should I file a claim, the process would be long and inconclusive. Even for a case that is obscured this much. I do not believe that the petroleum spilled is a waste from a ship. There is information pollution.[32] (Local12, Local Resident, I13)

This quote has touched upon various aspects of justice. First of all, it reflects a skepticism regarding the source of the oil spill. Although there is officially declared that the source of the spill is from a ship heading to the ship-breaking yards, the fact that the relevant documents (satellite images and laboratory analysis) are not presented to public in a transparent manner fed this skepticism. The justice institutions in the country is not trusted by the people.

All in all, while there is an attempt of plural valuation in the thesis, there are several hindrances in achieving the proper plural valuation and integration of plural

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[31] "Yani ne diyeceğimizi bilemiyoruz. Aslında biraz da öyle bir şaşkınlık var yani açsak hepimiz açarız da yani mesela manevi bir tazminat mı olacak maddi mi olacak. Mesela bir işletmemiz olup da müşteri kaybetseydik insanlar terk edip gitse derdik ki şöyle bir zarara uğradık. Şimdi mesela desek ki evimiz değer kaybetti tuhaf bir şekilde tam tersine değer kazanıyor değer kaybetmiyor bir de daha üstüne koyuluyor."

[32] "Zararlarım için tazminat davası açmayı düşünmedim. Burası ağır sanayi bölgesi, kirliliğe açık bir bölge. Her sene bu gibi şeyler oluyor. Bir önceki sene arıtma tesisi yapıldı tüm kirleticileri kıyıya gönderdi, onunla uğraştık o sene. Şimdi o doğalgaz çevrim gemisi büyük risk, bir şey olsa burada taş üstünde taş kalmaz. İnsan hakları bile yok çevreyi mi düşünecekler ülkede... Kyme antik kenti sanayi içinde kaldı... Burası bir Ortadoğu ülkesi, hukuksuzluk var. Ayrıca neden dava açayım, o süreç çok uzun ve getirisi olacağını düşünmüyorum. Hele bunun gibi örtbas edilen bir olayda. Petrolün bir geminin atığı olup sızdığını düşünmüyorum, örtbas edildi. Bilgi kirliliği var."

values in meaningful manner in terms of policy and people. It was stated that the deliberative valuation methods are proposed as a means to integrate diverse values, in IPBES's protocol for valuation study, depicted in Figure 1. Two focus groups, as part of the fieldwork, are composed of environmental activists of Yeni Foça Forum and FOÇEP, who are also local residents of Gencelli and Yeni Foça. The third focus group is composed of environmental activists of Foça Forum, most of whom are residents of Foça. In order to achieve deliberation, people from various backgrounds are supposed to be willing to participate the process. That is, the requirements of the deliberative democracy, such as ability to gain and share knowledge, free speech, transparent institutions, should satisfy. In the oil spill case, there is information asymmetry and non-transparency, that leads people to skepticism even on the basic information. Some people go further in terms of their skepticism to claim that "Why do you think such things happen? Because Greece does not want us to grow, it wants to destroy our tourism." (Local8, Local Resident, I5). Also, in the fieldwork, it is observed that the people from housing and tourism sector hesitate to participate to even a short talk about oil spill, or environmental concerns in general. They are either guided by their economic motives or they are afraid to express their ideas due to institutional conditions that are at stake in the country.

CHAPTER 4

DISCUSSION AND CONCLUSIONS: A CRITICAL APPRAISAL OF ECONOMIC VALUATION FOR RECTIFICATION

The aim of this study was two-fold: Based on the oil spill case in Gencelli and its aftermath, the thesis aimed at firstly, investigating to what extent this administrative fine addresses real costs and resulting socio-economic injustices, and satisfies the conditions for rectificatory justice using IPBES's conceptual framework on biodiversity and ecosystem services assessment; secondly, identifying institutional preconditions, either value articulating or political, such as trust, rule of law, free speech etc., for such a valuation exercise to become relevant for reaching just outcomes. The results suggest that, even with the conservative monetary calculation based on strict assumptions and with challenges in finding data for several damage categories, monetary damages from economic valuation exceeds the administrative fine. Integrating these monetary values with the plural values elicited by the interviews, such as conception of justice and intergenerational equity, makes the conditions of satisfying rectificatory justice through economic valuation even more complex, as they cannot be expressed in monetary terms.

Overall, justice is relevant to the Gencelli Bay oil spill case in two interrelated ways: (1) as a motivation for conducting economic valuation after the oil spill in order to identify and rectify damages that are attributable to the oil spill, (2) as a category of value elicited in valuation study. As a category of value, justice requires integration of deliberative approaches to economic valuation in order for it to be elicited in an ideal way.

Insights provided by the case study to the region raises two distinct discussions regarding rectificatory justice. First of all, when local residents are asked for the reasons why they did not file a claim for compensation, their responses reflect a lack of knowledge for expressing their losses before the judiciary. They claim that their houses did not lose their value, and even got more valuable in time. They also think that their intangible losses do not have correspondence in legal institutions. Upon more deliberation, it is observed that the local residents lack the means to elicit their values in such a context of environmental governance. This is mainly because of the administrative fine that is deposited directly to the state, from which the locals did not claim any rights, as they lack the means for rectification.

Secondly, as the administrative fine is a fine which is executed without reference to the real costs, this thesis attempted at conducting an economic valuation for the damages. The results reveal that the reals costs are much greater than the administrative fine even with a conservative estimate. Considering the qualitative insights from the case study, which cannot be expressed in monetary terms, the burden of the environmental and social damage caused by the spill is even worse. Ideal form of rectification for local residents lies in the assurance from relevant institutions that a similar case will not recur. Instead, authorities emphasize that "the Gencelli Bay has returned to its initial state," an indicator for success of the oil spill management. "Initial state" is presented as an ideal baseline, which is devoid of socio-ecological context, and makes no sense in terms of environmental justice in this case as the "initial state" is already degraded by heavy industries at Gencelli Bay. In addition, another oil spill occurred on the same coastline on the anniversary of the oil spill that is subject to this thesis, justifying local residents lack of trust for environmental governance and justice institutions.

Case-specific conclusions of the thesis are stated as follows. Firstly, the Gencelli Bay case is about the challenges brought with the complexity of the baseline ecosystem and socio-ecological conditions, in particular when combined with the problems of data availability. Inseparability of baselines from socio-ecological context adds up to these challenges, making economic valuation of the damages difficult. Secondly, economic valuation can be justified when conducted in the aftermath of an environmental justice, with the aim of rectificatory justice. In this particular case, although the economic valuation outcomes exceed the administrative fine, people do not seek compensation of their damages whereas they could. This leads to the third case-specific conclusion, that is, institutional preconditions such as trust for legal institutions, perceived transparency of environmental governance institutions and knowledge of means to elicit values determine people's attitudes towards justice.

In fact, the oil spill case at Gencelli Bay satisfies four conditions of Kallis et al. (2013) for justification of economic valuation. Even in this case, which is a forensic context ex-post of an environmental damage, where economic valuation is justifiable for rectification (O'Neill, 2017), economic valuation does not suffice to bring about rectificatory justice. Unequal access to participation, uneven distribution of benefits and exclusionary management are instances of set of problems economic valuation pose for justice (Corbera, 2015; Matulis, 2014). The prevailing institutional conditions in Turkey is a drawback in implementing the findings of economic valuation outcomes in order to achieve rectificatory justice. Exclusionary governance of environment and short-cuts to sustain environmental justice with administrative fines that are non-transparent are the major issues specific to the case of Gencelli Bay. In order to elicit plural values, IPBES's framework is employed. In order to

properly elicit and integrate plural values, deliberative methods are proposed to be best suited for environmental goods (Vatn, 2009). Deliberative methods require several institutional requirements, as well, in order for it to properly function, such as communicative rationality.

Attempting to bring about rectificatory justice by legal and governance institutions and attempting to elicit plural values such as justice through various value-articulating institutions, i.e. deliberative methods, are interrelated; so are the institutional requirements for these attempts. Rule of law, transparency of environmental justice and governance institutions are found to be the institutional requirements for economic valuation in reaching just outcomes.

APPENDIX A

LIST OF INTERVIEWS

Focus Groups

Focus Group 1 (FC1) – 30 March 2019, Yeni Foça, İzmir with Yeni Foça Forum and FOÇEP participants

Focus Group 2 (FC2) – 26 April 2019, İstanbul with Yeni Foça Forum and FOÇEP participants

Focus Group 3 (FC3) – 12 September 2019, Eski Foça, İzmir with Foça Forum participants

In-depth semi-structured interviews

On 13 September 2019

Interview 1 (I1) – Gencelli with local residents (Local1, Local2 and Local3)

Interview 2 (I2) – Gencelli with local residents (Local4, Local5)

Interview 3 (I3) – Gencelli with local resident (Local6)

Interview 4 (I4) – Gencelli with café owner and former head of neighborhood (Govern1, Tourism1)

Interview 5 (I5) – Gencelli with two fishers and two local residents (Fisher1, Fisher2, Local7, Local8)

Interview 6 (I6) – Yeni Foça with local pharmacist (Health1)

Interview 6 (I7) – Yeni Foça with local doctor at family medicine unit (Health2)

Interview 8 (I8) – Yeni Foça with a fisher (Fisher3)

Interview 9 (I9) – Yeni Foça with a fisher (Fisher4)

On 14 September 2019

Interview 10 (I10) – Gencelli with local residents (Local9, Local10)

Interview 11 (I11) – Gencelli with local residents (Local11, Local3)

Interview 12 (I12) – Yeni Foça with fishers of Yeni Foça Fish Cooperative (Fisher5)

On 18 September 2019

Interview 13 (I13) – Over the phone with a local resident of Gencelli (Local12)

On 26 September 2019

Interview 14 (I14) – Over the phone with a local resident of Gencelli (Local3) after the second oil spill

APPENDIX B

SEMI-STRUCTURED INTERVIEW QUESTIONS

Open-ended questions directed to fishers:

1. How many years have you been involved in fishing industry? Amateur or Professional? How many years have you been in Yeni Foça? What are your experiences here in terms of fishing? What is the most common fish species? What can you say about the trend over time?
2. How do you evaluate the last one year in Yeni Foça and Gencelli in terms of fishery?
3. What do you think this declining trend in fisheries is related to?
4. Are you aware of the oil spill in 2018? What are the effects of the oil spill on the fisheries? Did you feel a significant decline in fish population? Was the decline more than the previous years?
5. Did you ever attempted to file a claim for compensation (for your damages caused by the oil spill or any other industrial activity here) or to seek your rights in other form? Why?

Open-ended questions directed to people from tourism and service sector:

1. How many years have you been involved in tourism industry? How many years have you been in Yeni Foça? What are your experiences here in terms of tourism?
2. How was the tourist profile change in years? And what about the number of tourists? Does it decline or increase over the years?

3. How do you think tourism can be developed here? What do you see missing in Yeni Foça compared to other touristic areas?
4. What if Yeni Foça would be a cultural city/ or if there were an ancient city here (or concretely, Kyme ancient city that is trapped between the industrial facilities were developed and opened to tourists), how do you think the number of tourists are affected?
5. What are the positive and negative comments you receive from incoming tourists?
6. Are you aware of the oil spill pf the previous year? Did it affect tourism industry? Did you observe tourists who ended their holidays before the planned time due to the oil spill? How did it affect the tourists?

Open-ended questions directed to people from health sector:

1. Are you aware of the oil spill pf the previous year at Gencelli Bay? After this spill, was there an increase in people who consults you? What was their complaints and symptoms? Were there any health problems in people who enter the sea after the spill?
2. What are the most common illnesses in the region? What affects this?

Open-ended questions directed to local residents:

1. Were you in Gencelli or Yeni Foça at the time of the oil spill previous year? Have you witnessed the case? Can you detail your witnesses, your thoughts and emotions?
2. Were you in here in time of cleaning process? Can you detail your experiences? Do you think the sea and the coast are completely cleaned? Was

there any notice, during the cleaning process, that it is not safe to enter the sea?

3. Have you any tangible or intangible losses due to the case? Was there any change related to your relation to the sea (do you go fishing, swimming as before)?
4. Do you consider to file a claim for your losses in order to compensate them? Why?

Open-ended questions directed to local governor:

1. How was the reactions from the public after the oil spill? Which institutions are involved in the aftermath? Were the public content with the cleaning? Was it easy for you to reach to the officials when you are first noticed about the oil spill?

APENDIX C

SEMI-STRUCTURED INTERVIEW QUESTIONS (TURKISH)

Balıkçılık sektöründe çalışanlara yöneltilen açık uçlu sorular:

1. Kaç senedir balıkçılık sektöründesiniz? Amatör mü profesyonel mi? Kaç yıldır Yeni Foça'dasınız? Bu bölgedeki deneyimleriniz neler? En çok tutulan balıklar? Yıllar içinde miktarının ve balık türünün değişimi hakkında neler söyleyebilirsiniz?
2. Yeni Foça ve Gencelli bölgesinde balıkçılık bakımından son 1 seneyi nasıl değerlendirirsiniz?
3. Balık sayısındaki bu değişimi neye bağlıyorsunuz?
4. Geçtiğimiz seneki petrol sızıntısından haberiniz var mı? Denize etkileri neler oldu? Belirgin bir etki hissettiniz mi? (Balık sayısı azalıyor dediyse) Azalma miktarı geçmiş yıllara göre daha mı hızlı oldu?
5. Bu zararlarınız için (petrol sızıntısı olayı veya genel olarak yakınlarda sanayi bölgesi olmasının verdiği zararlar) tazminat davası ya da başka şekilde hakkınızı arama gibi bir teşebbüsünüz oldu mu? Neden?

Turizm ve hizmet sektöründe çalışanlara yöneltilen açık uçlu sorular:

1. Kaç senedir turizm sektöründesiniz? Kaç yıldır Yeni Foça'dasınız? Bu bölgedeki deneyiminiz neler?
2. Müşteri profili ve yıllar içinde değişimi sizin açınızdan nasıl oldu? Yıllar içinde arttı mı/ azaldı mı?
3. Bu bölgede turizm nasıl geliştirebilir sizce? Diğer turistik bölgelere göre Yeni Foça bölgesinde eksik gördüğünüz ya da olumlu gördüğünüz yanlar neler?

4. Burası bir kültür kenti olsaydı/ burada bir antik kent olsaydı (Aliağa'da sanayi bölgesi içinde kalan Kyme antik kenti geliştirilseydi vs.) sizce daha fazla turist gelir miydi?
5. Gelen turistlerden aldığınız bölge hakkında olumlu-olumsuz yorumlar neler?
6. Geçtiğimiz sene 30 Ağustos'ta yaşanan petrol sızıntısından haberiniz oldu mu? Yakın zamanda gerçekleşen bu sızıntının turizm sektöründe bir etkisi oldu mu? Geçen sene bu sızıntıdan sonra tatilini yarıda bırakan vs. gözlemlediniz mi? Turistleri nasıl etkiledi?

Sağlık sektöründe çalışanlara yöneltilen açık uçlu sorular:

1. Geçtiğimiz sene 30 Ağustos'ta Gencelli'de gerçekleşen petrol sızıntısından haberdar mısınız?
2. Bu sızıntıdan sonra size başvuran insanlarda bir artış oldu mu? Şikayetleri nelerdi? Denize girenlerde herhangi bir sorun oldu mu?
3. Bölgede en çok görülen hastalıklar neler sizin gözlemlerinize göre? Bunu neler etkiliyor?

Yerel halka yöneltilen açık uçlu sorular:

1. Geçtiğimiz sene 30 Ağustos'ta gerçekleşen petrol sızıntısı sırasında burada mıydınız? Olaya tanık oldunuz mu? Gözlemleriniz, duyumlarınız, duygu ve düşüncelerinizi anlatır mısınız?
2. Olay sonrası gerçekleşen temizlik faaliyetleri sırasında burada mıydınız? Bu esnadaki gözlemlerinizi paylaşabilir misiniz? Denizin ve sahilin tamamen temizlendiğini düşünüyor musunuz? Temizlik sırasında denize girilmemesi ile ilgili bir uyarı var mıydı?

3. Olay sonrası maddi veya manevi bir zarar, kayıp yaşadınız mı? Denizle ilişkinizde bir değişim oldu mu (eskisi gibi balık tutuyor musunuz, eskisi gibi denize giriyor musunuz vs.)?
4. Bu zararlar için tazminat davası açmayı düşündünüz mü? Neden?

Yerel yöneticilere yöneltilen açık uçlu sorular:

1. Olayla ilgili halktan gelen tepkiler nasıldı? Hangi kurumlar ilgilendi temizlik ile? Yeterli görüldü mü? Kirlilik fark edildiğinde yetkililere ulaşmanız kolay oldu mu?

APPENDIX D

NCP REPORTING CATEGORIES SUMMARY

Reporting Categories of Nature's Contributions to People	Explanation of the Category	Relevance to the Case	Physcial Impact	Economic Valuation Methodology	Under/over estimate
NCP 1. Habitat creation and maintenance	The formation and continued production, by ecosystems or organisms within them, of ecological conditions necessary or favorable for living beings of direct or indirect importance to humans. E.g. growing sites for plants, nesting, feeding, and mating sites for animals, resting and overwintering areas for migratory mammals, birds and butterflies, roosting places for agricultural pests and disease vectors, nurseries for juvenile stages of fish, habitat creation at different soil depths by invertebrates	Relevant. Habitat for (1) Fisheries (2) Benthic algs (3) Plants (*Posidonia oceanica*) (4) *Benthos& Testacea* (5) *Benthic Crustocea*	Source: Expert Report. biophysical impact 34263 kg in 3 years. Calculation of primary production in terms of expected loss in fish production in three years. Monetary valuation expressed as an interval 1.973.800,72307 TL – 2.196.658,035 TL in terms of fish prices in 2018.	3-year NPV calculated average prices	Underestimate

NCP 2. Pollination and dispersal of seeds and other propagules	Facilitation by animals of movement of pollen among flowers, and dispersal of seeds, larvae or spores of organisms beneficial or harmful to humans	Weakly relevant	Case 3, In-depth interview 1: Local1 and Local2 claim that they have collected large amounts of dead bees from their garden previous year, they did not realize dying of bees at such a rate before. Local3 confirmed that fainted bees are observed everywhere in the last year.	Cannot be valued economically. No economic activity related to bees in the region.	Cannot be valued economically
NCP 3. Regulation of air quality	Regulation (by impediment or facilitation) by ecosystems, of CO2/O2 balance, O3, sulfur oxide, nitrogen oxides (NOx), volatile organic compounds (VOC), particulates, aerosols, allergens. Filtration, fixation, degradation or storage of pollutants that directly affect human health or infrastructure.	Relevant. Vaporization of petroleum hydrocarbons (PHCs) is at its maximum level following 1-3 hours of spill. Lesser the density of PHCs, the more it vaporizes.	Respiratory problems continued at least 1 month after the spill increasingly (Interviews from local doctor), even prevailed after 1 month in a decreasing rate.	Direct market valuation. Calculation of health impact.	Underestimate. Records of air quality for this region is not open access as opposed to many areas in the country. No objective assessment to detect loss in air quality.
NCP 4. Regulation of climate	Climate regulation by ecosystems (including regulation of global warming) through: • Positive or negative effects on emissions of greenhouse gases (e.g. biological carbon storage and sequestration; methane emissions from wetlands). • Positive or negative effects on biophysical feedbacks from vegetation cover to atmosphere, such as those involving albedo, surface roughness, long-wave radiation, evapotranspiration (including moisture-recycling) and cloud formation. • Direct and indirect processes involving biogenic volatile organic compounds (BVOC), and regulation of aerosols and aerosol precursors by terrestrial plants and phytoplankton.	Not relevant. Too complex a category to scale beyond local. Not tractable.	-	-	-
NCP 5. Regulation of ocean acidification	Regulation, by photosynthetic organisms (on land or in water), of atmospheric CO2 concentrations and so seawater pH, which affects associated calcification processes by many marine organisms important to humans (such as corals).	Not relevant. Too complex a category to scale beyond local. Not tractable.	-	-	-
NCP 6. Regulation of freshwater quantity, location and timing	Regulation, by ecosystems, of the quantity, location and timing of the flow of surface and groundwater used for drinking, irrigation, transport, hydropower, and as the support of non-material contributions. Regulation of flow to water-dependent natural habitats that in turn positively or negatively affect people downstream, including via flooding (wetlands including ponds, rivers, lakes, swamps). Modification of groundwater levels, which can ameliorate dryland salinization in unirrigated landscapes.	Not relevant. No link to freshwater.	-	-	-

NCP 7. Regulation of freshwater and coastal water quality	Regulation – through filtration of particles, pathogens, excess nutrients, and other chemicals – by ecosystems or particular organisms, of the quality of water used directly (e.g. drinking, swimming) or indirectly (e.g. aquatic foods, irrigated food and fiber crops, freshwater and coastal habitats of heritage value)	Relevant.	*Posidonia oceanica* population declined at higher rate than previous years, this plant has a function in protecting the coast.	Cannot be valued economically.	Cannot be valued economically
NCP 8. Formation, protection and decontamination of soils and sediments	Formation and long-term maintenance of soil structure and processes by plants and soil organisms. Includes: physical protection of soil and sediments from erosion, and supply of organic matter and nutrients by vegetation; processes that underlie the continued fertility of soils important to humans (e.g. decomposition and nutrient cycling); filtration, fixation, attenuation or storage of chemical and biological pollutants (pathogens, toxics, excess nutrients) in soils and sediments.	Relevant. Coastal pollution is said to prevailed after the cleaning due to the municipality having mixed stone chips with sand in the Gencelli coast. One local claimed that the cleaning company have taken stones and did not return, so much stone, the loss of which makes his home vulnerable to tides now.	Complete cleaning of the coast became harder to make.	Cannot be valued economically.	Cannot be valued economically
NCP 9. Regulation of hazards and extreme events	Amelioration, by ecosystems, of the impacts on humans or their infrastructure caused by e.g. floods, wind, storms, hurricanes, heat waves, tsunamis, high noise levels, fires, seawater intrusion, tidal waves. Reduction or increase, by ecosystems or particular organisms, of hazards like landslides, avalanches.	Not relevant. Too complex a category to scale beyond local. Not tractable.	-	-	-

NCP 10. Regulation of detrimental organisms and biological processes	Regulation, by organisms, of pests, pathogens, predators or competitors that affect humans (materially and non- materially), or plants or animals of importance for humans. Also the direct detrimental effect of organisms on humans or their plants, animals or infrastructure. These include e.g.: • Control by predators or parasites of the population size of animals important to humans, such as attacks by large carnivores, or infestation by liver fluke, on game or livestock), • Regulation (by impediment or facilitation) of the abundance or distribution of potentially harmful organisms (e.g. venomous, toxic, allergenic, predators, parasites, competitors, pathogens, agricultural weeds and pests, disease vectors and reservoirs) over the landscape or seascape, • Removal, by scavengers, of animal carcasses and human corpses (e.g. vultures in Zoroastrian and some Tibetan Buddhist traditions), • Biological impairment and degradation of infrastructure (e.g. damage by pigeons, bats, termites, strangling figs to buildings), • Direct physical damage to crops, forest plantations, livestock, poultry and fisheries by mammals, birds and reptiles, • Damage caused by invertebrates as pests of agriculture, horticulture, forest, and stored products, and by affecting health of domestic animals, • Direct damage caused by organisms to humans by e.g. frightening, hurting, killing, or transmitting diseases, • Regulation of the human immune system by a diverse environmental microbiota.	Relevant.	Increase of microorganisms, increase in diarrhea in people right after the accident stated by the doctor in Yeni Foca.	Cannot be valued economically.	Cannot be valued economically

NCP 11. Energy	Production of biomass-based fuels, such as biofuel crops, animal waste, fuelwood, agricultural residue pellets, peat	Not relevant.	-	-	-
NCP 12. Food and feed	Production of food from wild, managed, or domesticated organisms, such as fish, bushmeat and edible invertebrates, beef, poultry, game, dairy products, edible crops, wild plants, mushrooms, honey. Production of feed (forage and fodder) for domesticated animals (e.g. livestock, work and support animals, pets) or for aquaculture, from the same sources.	Relevant.	Decrease in fish population, and the existence of fish from the affected coast in the fish markets. Yet, in Yeni Foça and Gencelli, recreational fishing is more common than professional fishing.	Although amateur fishermen and Yeni Foça Fish Cooperative assert that there is a decline in fish population, the effect is hard to attribute to the oil spill.	Cannot be valued economically.
NCP 13. Materials, companionship and labor	Production of materials derived from organisms in cultivated or wild ecosystems, for construction, clothing, printing, ornamental purposes (e.g. wood, peat, fibers, waxes, paper, resins, dyes, pearls, shells, coral branches). Live organisms being directly used for decoration (i.e. ornamental plants, birds, fish in households and public spaces), company (e.g. pets), transport, and labor (including herding, searching, guidance, guarding).	Relevant.	Fieldwork: Cats, dogs, seagulls are affected. Dead seagulls, cats having respiratoty problems, dogs were swimming in the oiled sea, people could not control.	Cannot be valued economically.	Cannot be valued economically
NCP 14. Medicinal, biochemical and genetic resources	Production of materials derived from organisms (plants, animals, fungi, microbes) used for medicinal, veterinary and pharmacological (e.g. poisonous, psychoactive) purposes. Production of genes and genetic information used for plant and animal breeding and biotechnology	Not relevant.	-	-	-

NCP 15. Learning and inspiration	Provision, by landscapes, seascapes, habitats or organisms, of opportunities for the development of the capabilities that allow humans to prosper through education, acquisition of knowledge and development of skills for well-being, information, and inspiration for art and technological design (e.g. biomimicry)	Relevant.	Swimming, amateur fishing, meetings, diving.	Cannot be valued economically.	Cannot be valued economically
NCP 16. Physical and psychological experiences	Provision, by landscapes, seascapes, habitats or organisms, of opportunities for physically and psychologically beneficial activities, healing, relaxation, recreation, leisure, tourism and aesthetic enjoyment based on the close contact with nature (e.g. hiking, recreational hunting and fishing, birdwatching, snorkeling, diving, gardening)	Relevant.	Losses in real estate sector. Losses in tourism activities, yet there is not enough data to calculate tourism losses.	Loss of people doing economic activities related to tourism. House prices (hedonic pricing).	Underestimate. We only observe house prices that are on sale.
NCP 17. Supporting identities	Landscapes, seascapes, habitats or organisms being the basis for religious, spiritual, and social-cohesion experiences: • Provisioning of opportunities by nature for people to develop a sense of place, belonging, rootedness or connectedness, associated with different entities of the living world (e. g. cultural, sacred and heritage landscapes, sounds, scents and sights associated with childhood experiences, iconic animals, trees or flowers), • Basis for narratives, rituals and celebrations provided by landscapes, seascapes, habitats, species or organisms, • Source of satisfaction derived from knowing that a particular landscape, seascape, habitat or species exists.	Relevant.	Childhood memories, people who are raised in Foça, having guests.	Cannot be valued economically.	Cannot be valued economically

NCP 18. Maintenance of options	Capacity of ecosystems, habitats, species or genotypes to keep options open in order to support a good quality of life. Examples include: • Benefits (including those of future generations) associated with the continued existence of a wide variety of species, populations and genotypes. This includes their contributions to the resilience and resistance of ecosystem properties in the face of environmental change and variability, • Future benefits (or threats) derived from keeping options open for yet unknown discoveries and unanticipated uses of particular organisms or ecosystems that already exist (e.g. new medicines or materials), • Future benefits (or threats) that may be anticipated from on- going biological evolution (e.g. adaptation to a warmer climate, to emergent diseases, development of resistance to antibiotics and other control agents by pathogens and weeds).	Relevant.	Reference to "grandchildren" in many interviews in the fieldwork.	Cannot be valued economically.	Cannot be valued economically

APPENDIX E

FISH STATISTICS

The followig data on two-year fish statistics from Foça district in 2018 and 2019 (in kg), is requested from and provided by İzmir Metropolitan Municipality.

No	Fish Name (English)	Scientific Name	Fish Name (Turkish)	2019	2018
1	Octopus (Sea)	*Octopoda*	Ahtapot (Deniz)	80	10
2	Leerfish (Sea)	*Lichia amia*	Akya (Deniz)	420	20
3	Trout (Freshwater)	*Oncorhynchus mykiss*	Alabalık (Tatlı)	1768	0
4	Whiting (Big)	*Merlangius merlangus*	Bakalyar (Büyükboy)	3510	2370
5	Whiting (Small)	*Merlangius merlangus*	Bakalyaro (Küçükboy)	23530	3730
6	Mullet	*Mullus*	Barbun (Tekir)	1850	1550
7	Red Mullet		Barbun (Kaya)	3130	1972
8			Bülbül (Deniz)	570	170
9	Bream (Freshwater)	*Abramis brama*	Çapak (Tatlı)	60	210
10	Sea Bream	*Sparus Aurata*	Çipura (Deniz)	1410	1170
11	Shrimp	*Caridea*	Çimçim (Deniz)	17350	3590
12	Sea Bream (Culture)		Çipura (Kültür)	9391	7970
13	Common eagle ray	*Myliobatidae*	Çuçuna	20	0
14	Flounder	*Platichthys flesus*	Dil	480	0
15	Solea	*Solea solea*	Dil (Cangıdez)	365	1302
16	Squid	*Teuthida*	Donuk Kalamar	0	100
17	Sardine	*Sardina pilchardus*	Donuk Sardalya	120	0
18	Anglerfish (Sea)	*Lophiiformes*	Fener (Deniz)	1330	400
19	Shade-fish (Sea)	*Argyrosomous regius*	Granyoz (Deniz)	1120	900
20	European anchovy (Sea)	*Engraulis encrasicolus*	Hamsi (Deniz)	165887	74340
21	Hypoplectrodes	*Hypoplectrodes semicinctum*	Hani (Deniz)	360	130
22			Hanos (Deniz)	280	110
23	Scorpion Fish	*Scorpaena*	İskorpit (Deniz)	10	110
24	Annualar sea bream	*Diplodus annularis*	İsparoz (Deniz)	1078	584
25	Horse mackerel (Sea)	*Trachurus trachurus*	İstavrit (Deniz)	23422	2160
26	Horse Mackerel	*Trachurus trachurus*	İstavrit (Sarı Kanat)	0	24
27	Pickerel	*Maena smaris*	İzmarit (Deniz)	2064	1812

28	Lobster (Sea)	*Homarus*	İstakoz (Deniz)	50	0
29	Salmon (imported)	*Salmo salar*	İthal Somon (Tatlı)	60	0
30	Japanese anchovy	*Engraulis japonicus*	Japon Hamsi	2976	84
31	Squid (Sea)	*Loligo*	Kalamar (Deniz)	1080	1202
32	Turbut (Sea)	*Psetta maxima*	Kalkan (Deniz)	200	20
33			Kamit (Deniz)	480	0
34	Spottail (Sea)	*Diplodus vulgaris*	Karagöz (Deniz)	770	320
35	Shrimp (Sea)	*Caridea*	Karides (Deniz)	6840	4490
36	Mullet (Sea)	*Mugilidae*	Kefal (Deniz)	7750	14403
37	Swordfish (Sea)	*Xiphias gladius*	Kılıç (Deniz)	535	190
38	Red searobin	*Triglia lucerna*	Kırlangıç (Deniz)	80	40
39	Large bluefish (Sea)	*Pomatomus lacépède*	Kofana (Deniz)	70	0
40			Kolorit (Deniz)	580	36
41	Chub mackerel	*Scamber japonicus*	Kolyoz (Deniz)	8796	2098
42			Köpek (Deniz)	505	110
43			Kraça (Deniz)	444	358
44	Bogue (Sea)	*Boops boops*	Kupez (Deniz)	59358	22600
45	Grouper (Sea)	*Epinephelinae*	Lahoz (Deniz)	0	60
46	Sea bass (Culture)	*Dicentrarchus labrax*	Levrek (Kültür)	8407	5640
47	Sea brass (Sea)	*Dicentrarchus labrax*	Levrek (Deniz)	580	480
48	Gilt-head sea bream	*Sparus aurata*	Lidaki (Deniz)	1970	1579
49	Mediterranean sand smelt (sea)	*Atherina hepsetus*	Lokum (Deniz)	220	0
50	Blue fish (sea)	*Pomatomus saltator*	Lüfer (Deniz)	880	160
51	Bluefish	*Pomatomus saltatrix*	Lüfer (Küçük)	860	4032
52			Marya (Deniz)	140	110
53			Masko (Deniz)	100	60
54	Saddled seabream	*Oblada melanura*	Melanur (Deniz)	990	3240
55	Red seabream (little)	*Pagellus erythrinus*	Mercan (Büyükboy)	3580	1360
56	Red seabream (big)	*Pagellus erythrinus*	Mercan (Küçükboy)	8880	5788
57	Whiting (Sea)	*Merlangius merlangus*	Mezgit (Deniz)	1600	1600
58	European hake (Sea)	*Merluccius merluccius*	Mırlan (Deniz)	7560	3420
59	Sand steenbras (Sea)	*Lithognathus mormyrus*	Mırmır (Deniz)	860	40
60	Atlantic bluefin tuna (Sea)	*Thunnus thynnus*	Orkinoz (Deniz)	20	10
61	Parrotfish	*Scarus frenatus*	Papağan (Deniz)	0	90
62	John Dory (Sea)	*Zeus faber*	Peygamber (Deniz)	110	30
63	Sardine (Sea)	*Sardina pilchardus*	Sardalya (Deniz)	154750	135238
64	White seabream	*Diplodus sargus*	Sargoz (Deniz)	50	0

65	Dreamfish (Sea)	*Sarpa salpa*	Sarpa (Deniz)	6370	3010
66	Carp (Freshwater)	*Cyprinus carpio*	Sazan (Tatlı)	346	430
67	Dentex (Sea)	*Siparidae*	Sinarit (Deniz)	110	12
68	Dusky spinefoot (Sea)	*Siganus luridus*	Sokkan (Deniz)	100	0
69	Cuttlefish (Sea)	*Sepia officinalis*	Sübye (Deniz)	90	150
70	Surmullet (Sea)	*Mullus surmuletus*	Tekir (Deniz)	18552	12750
71	Alosa (Sea)	*Alosa fallax*	Tırsı (Deniz)	44208	11250
72	Bullet tuna (Sea)	*Auxis rochei*	Tombik (Deniz)	3720	3130
73	Aegean tuna (Sea)	*Pagrus*	Trança (Deniz)	0	10
74	Pike (Sea)	*Esociformes*	Turna (Deniz)	40	80
75	Mackerel (Sea)	*Scomber scombus*	Uskumru (Deniz)	3226	2218
76	Alalunga (Sea)	*Thunnus alalunga*	Yazılıorkinos (Deniz)	4995	3780
77	Crab (Sea)	*Brachyura*	Yengeç (Deniz)	10	0
78	Eel (Freshwater)	*Anguilliformes*	Yılan (Tatlı)	10	50
79	Garfish (Sea)	*Lepisosteidae*	Zargana (Deniz)	180	110
			TOTAL	623693	350602

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