

**Table S1.** Definitions and indicative excerpts of the coding scheme

EC Components	Definitions	Indicative excerpts
<b>EC Competences: Knowledge [EC-C-K]</b>		
Environmental Systems Knowledge [ESK] (Frick et al., 2004b)	Knowledge about how the natural states of ecosystems operate as well as the interrelated processes within them.	<i>"[...]the realization that butterflies are part of a dynamic and evolutionary system that goes beyond butterflies themselves (n=29). This realization happens with the observation of butterflies' relation with their environment (life cycle and needs, climate, vegetation)."</i>
Action-Related Knowledge [ARK] (Frick et al., 2004b)	Knowledge of what actions can be taken in order to address an environmental problem ("knowing how").	<i>"The SMART groups develop action plans around the geographic-specific stormwater issues in their communities."</i>
Self-Effectiveness Knowledge [SEK] (Frick et al., 2004b)	Knowledge of the benefit (effectiveness) of environmentally responsible actions, associated with targeted actions and behaviours.	<i>"[...]garden butterflies have become an indicator of their own practices. The observation of garden butterflies contributes to their self-awareness, which leads to self-regulation of their own actions. Quote 7: "Seeing butterflies in my garden is rather reassuring. I say to myself: 'well, if they're all right, then we must be doing something right'."</i>
Political Systems Knowledge [PSK] (Johnson and Morris, 2010)	Knowledge about where authority lies, and who to lobby to achieve tangible environmental results.	<i>"[...] respondents from the Kenya case study indicated a much wider range of methods by which they could lobby or communicate their ideas and interests to the authorities and possibly intervene in decision making processes."</i>
Transformative Action Knowledge [TAK] (Johnson and Morris, 2010)	Knowledge about how to negotiate with authorities to enact the transition for transformational action from the existing to the target state of an environmental issue.	<i>"Proctor Creek Watershed residents are optimistic that having valid maps and spatial data accompanied with photographs can help provide an evidence base that will prompt remedial action by city officials and motivate fellow watershed residents to increase advocacy efforts designed to improve deleterious environmental conditions. Maps speak the language of decision makers, and, in this case, the community-generated maps gave the community voice that was supported by location-specific</i>

		<i>visual evidence."</i>
<b>EC Competences: Skills [EC-C-S]</b>		
Collaboration & Social Interaction Skills [CSIS] (Hadjichambis and Paraskeva-Hadjichambi, 2020; The Council of the European Union, 2018)	The ability to engage effectively with others in common or public interest, in relation to environmental issues.	<i>"I believe that I personally working with others can help solve environmental issues".</i>
Critical Thinking Skills [CTS] (Hadjichambis and Paraskeva-Hadjichambi, 2020; The Council of the European Union, 2018)	The ability to critically analyse and evaluate environmental information.	<i>"[.]gives the Marine Champions and their communities the capacity to monitor and manage their resources without the need for external support, analysis or input."</i>
Problem-Solving Skills [PSS] (Hadjichambis and Paraskeva-Hadjichambi, 2020; The Council of the European Union, 2018)	The ability to solve problems efficiently, in a timely manner by identifying the problem and determining its cause, identifying alternatives, evaluating and selecting the best alternative, and implementing the chosen solution.	<i>"[.]volunteers worked alongside managers to design and implement studies to identify the most effective control strategy for [.] a species negatively affecting a longleaf pine ecosystem that is home to the endangered Red-cockaded Wood- pecker."</i>
Communication Skills [CS] (Hadjichambis and Paraskeva-Hadjichambi, 2020; The Council of the European Union, 2018)	The ability to express opinions, participate in discussions, debates and negotiations, and resolve conflicts.	<i>"At least 20% of respondents indicated that they had spoken to the latter (persons of power e.g., politicians) about COASST findings."</i>
Systems Thinking Skills [STS] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	The ability to develop a comprehensive understanding of an environmental issue on a conceptual and systemic level.	<i>"[.]amateur scientists around the country collect plant and tree data in an effort to better understand the effects of climate change on plant species."</i>
Evidence-Based Thinking Skills [EBTS] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	The ability to use the evidence needed to answer questions, back up claims, evaluate sources of evidence, and address questions about an environmental problem.	<i>"[.]discussions about how they can remediate the problem and further think about how they might similarly assess impairment of local waterways in their communities. [.]Once the data is obtained, students create presentations of the data and attempt to answer the question."</i>
Decision-Making Skills [DMS]	Individuals are able to participate in	<i>"The community is in control of the entire process through to</i>

(Hadjichambis and Paraskeva-Hadjichambi, 2020)	decision-making processes using consultation and discussion mechanisms to address the environmental problems facing society.	<i>decision making, management actions and reviews."</i>
Argumentation Skills [AS] (The Council of the European Union, 2018)	The ability to construct and communicate across arguments due to developed critical thinking and understanding of environmental issues.	<i>"The results of this participatory mapping approach have helped community residents to create a place for themselves at planning, code enforcement, and watershed management decision-making tables."</i>
Constructive Participation Skills [CPS] (The Council of the European Union, 2018)	The ability to constructively get involved in organizational matters regarding environmental issues.	<i>"Through a series of community meetings that educate about Toolkit monitoring, environmental and resource issues, and management solutions, whole communities become involved [...]this inherently empowers the community in their local resource management."</i>
Interacting with Media Skills [IMS] (The Council of the European Union, 2018)	The ability to interact with traditional and new forms of media as a means of communication in relation to an environmental issue.	<i>"Moreover, radio was indicated as an efficient channel for reaching a large number of people [...] using an App on a smartphone (predominantly WhatsApp) and using websites or blogs are, [...] channels for communicating about biodiversity conservation and livelihood management."</i>
Critical Understanding of Media Skills [CUMS] (The Council of the European Union, 2018)	The ability to take a critical stance regarding the role and information provided from various forms of media in the frames of preventing and solving environmental problems.	<i>"[...]interactions implied that the audience engaged with the information and, therefore, had a more intense or conscious experience of their awareness being raised, implying deeper learning. After the broadcast, many people indicated personally to us that they watched or listened with interest and expressed a curiosity about the topics discussed."</i>
<b>EC Competences: Attitudes [EC-C-A]</b>		
Willingness to Act in Society as Agent of Change [WASAC] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals express their willingness to change society and promote sustainability, educate peers to act ecologically, to be actively involved in decision-making and	<i>"[...]almost all participants had used the monitoring as an opportunity to talk about freshwater issues with others in their communities, thus arguably increasing the ability of local communities overall to engage knowledgeably in freshwater</i>

	engage in action-taking.	<i>planning."</i>
Willingness to Eliminate New Environmental Problems [WENEP] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals express their willingness to eliminate the creation of new environmental problems.	<i>"[...]researchers decided that it was necessary to create their own database of indicators representing said hazards."</i>
Willingness for Collective Environmental Actions [WCEA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals express their willingness to participate in collective environmental actions.	<i>"I participate in the community activity for promoting urban sustainability."</i>
Willingness for Networking to Solve Environmental Problems [WNSEP] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals express their interest in networking to solve local, national, and/or local environmental problems.	<i>"[...]many of the people and institutions also remained involved in tree health, helping to form interdisciplinary groups such as the Tree Health Citizen Science Network and Defra's Tree Health Policy Group."</i>
Respect for Environmental Rights [RER] (The Council of the European Union, 2018)	Individuals express a readiness to comply with legal obligations to achieve the respect and protection of environmental rights.	N/A – We have not identified/coded any excerpt in this category.
Willingness for Democratic Decision-Making [WDDM] (The Council of the European Union, 2018)	Individuals express their willingness to participate in decision-making processes with equality and fairness.	<i>"[...]one interviewee mentioned: "our chance to influence the decisions is very limited; they [the authorities] are not ready to listen to just a simple person."</i>
Willingness for Intercultural Communication for the Environment [WICE] (The Council of the European Union, 2018)	Individuals express a willingness to communicate environmental information across between people of different cultural backgrounds.	<i>"However, the consequences with regard to self-awareness involve a set of values that extend beyond the individual to include cultural values."</i>
Willingness to Take Responsibility for the Environment [WTRE] (The Council of the European Union, 2018)	Individuals express a willingness to take responsibility for previous actions which may have led to environmental problems and take decisions to address these problems.	N/A – We have not identified/coded any excerpt in this category.
Willingness for Environmental and Social Justice [WESJ] (The Council of the	Individuals express the desire to achieve environmental justice and sustainability, as	<i>"Resident knowledge was leveraged to advance meaningful engagement in community decision making that achieves</i>

European Union, 2018)	well as justice within current and future generations.	<i>environmental justice and policy change. Our approach is consistent with environmental justice principles [...] and authentic public participation in environmental and other public health decision making."</i>
<b>EC Competences: Values [EC-C-V]</b>		
Biospheric Values [BV] (Bouman et al., 2018)	Values which reflect a concern for the environment without a clear link to human beings.	<i>"Saltmarshes are a complex and undervalued resource. Getting an insight into the saltmarsh world has sparked my interest into their conservation".</i>
Altruistic Values [AV] (Bouman et al., 2018)	Values which reflect a concern on the welfare and wellbeing of others.	<i>"[...]like to think that all the effort that we all do has an even further life beyond the program; that once it all comes together it is available for others to use, like the marine consortium or Hatfield [Marine] Science Center. People use what we have learned to make educated decisions, and I appreciate that."</i>
Egoistic Values [EV] (Bouman et al., 2018)	Values which reflect a focus on the costs and benefits of a choice, and on the power or achievement related to self-interests.	<i>"Reason for subsequent engagement in project's activities: "I participate in RCI activities as each time I learn something or improve my skills"."</i>
Hedonic Values [HV] (Bouman et al., 2018)	Values which reflect a focus on satisfying personal desires with minimal effort.	<i>"I had never studied this and I wanted to learn more about it; it's important to meet researchers", "I wanted to gain knowledge – excellent, in-depth knowledge."</i>
<b>EC Competences: Behaviours [EC-C-B]</b>		
Activism Behaviours [AB] (Stern, 2000)	The active involvement in environmental organisations, demonstrations, campaigns and pro-environmental social movements.	<i>"[...]a small number of individuals (3 [8%]) became engaged in community organizing efforts (e.g., strengthening local ordinances that regulate beach use)."</i>
Non-Activist Behaviours [NAB] (Stern, 2000)	Actions towards supporting public policies, such as explicit support for environmental regulations, willingness to pay higher taxes, fees or contributions aiming on environmental protection, and voting.	<i>"In all regions, the survey participants agreed on [...] fines as solutions for coastal litter."</i>
Private Sphere Behaviours [PSB] (Stern,	Behaviours in the household and personal	<i>"Gardening changes consisted of planting more pollinator-</i>

2000)	lifestyle of individuals that have direct environmental effects.	<i>friendly plants, planting in succession, leaving areas of grass unmown, encouraging weeds and the cessation of pesticide use."</i>
Other Behaviours [OB] (Stern, 2000)	Individual actions with an indirect effect to organisations individuals belong to and their consequent effects on the environment.	<i>"In both programs, participants recorded extensive conservation volunteer actions after completing naturalist certification training. These included citizen science, education, and stewardship activities in both states."</i>
<b>EC Actions [EC-A]</b>		
Collective Actions [CA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Participatory actions such as community actions to tackle environmental problems.	<i>"Open responses received from the participants' showed that our methodology promoted critical discussions and can lead to community actions to tackle air pollution."</i>
Individual Actions [IA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Responsible actions situated at the personal level.	<i>"Participants also expanded their on-site efforts beyond COASST, most often by removing debris."</i>
Private Sphere Actions [PrSA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Actions that affect the relations between individuals and societies.	<i>"There was a strong and positive correlation between environmental activity and public activity, which again indicates that people who engage in pro-environmental behavior in their personal sphere would also be willing to be active in the public sphere."</i>
Public Sphere Actions [PuSA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Actions that affect the relations in societies.	<i>"[...]students have initiated awareness activities in their schools with the help of teachers and staffs."</i>
Local Scale Actions [LSA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Actions which are situated in the local level e.g., community, village, town.	<i>"[...]this increase in knowledge and awareness is related to the intentional implementation of local pro-conservation behaviour."</i>
National Scale Actions [NSA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Actions which are situated in the national level e.g., country	<i>"Over the last few years, I've been coordinating the issue of separating recycling materials, working on a national-level publicity project."</i>
Global Scale Actions [GSA] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Actions which are situated in the global level e.g., actions implemented in more than one country.	<i>"IPW can be considered a global citizen science project with volunteers from over 20 countries."</i>

EEC Outcomes [EEC-O]		
Development of Healthy Relationship with Nature [HRN] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Human-nature connection refers to the developed ability of citizens to reverse the trends of the immediate past and present, with the aim of protecting and preserving nature.	<i>"Thanks to RCI I understood how fragile is the sea: now I am more careful of my behaviour, while diving and in everyday life."</i>
Prevention of New Environmental Problems [PNEP] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals adopt aligned attitudes and actions with the precautionary principle and taking measures to protect the environment.	<i>"It is clear that education [...] is the crucial reason that serves as a precondition to the formation of a civic identity of people who are concerned for and take action to preserve the environment."</i>
Solution of Environmental Problems [SEP] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals evaluate various alternatives, select the appropriate stance or action, and participate in decision-making processes.	<i>"Students brainstorm about who they should contact in their communities to develop action plans both for the education of the general population and the development of possible remediation plans."</i>
Achievement of Sustainability [AS] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Individuals embrace sustainable principles and practices, detect and address unsustainability and promote actions that encourage sustainability.	<i>"[...]55% indicated that their engagement with the Redmap programme had further increased their interest in marine sustainability."</i>
Achievement of Critical and Active Engagement and Civic Participation [CAE] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Citizens are empowered to take part in democratic processes and respond to issues of unsustainability.	<i>"As students explore nature, collect data on climate change and participate in scientific citizenship, they are at some level making connections about humankind's impact on the environment. The more frequently they participate in these practices, the more likely they are to form strong opinions, beliefs and even identities. Individuals who develop identities as community members are more likely to contribute to the community in which they identify."</i>
Promotion of Inter/Intra-Generational Justice [IGJ] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Citizens focus on justice issues within current generations (intra-generational justice), and preserve the needs of future generations thus, contribute to sustainability	<i>"Sites in the partnership benefit from the involvement of multiple federal agencies that work to leverage collective staff and financial resources, coordinate monetary investments, and engage with local partners to improve environmental quality"</i>

	(inter-generational justice).	<i>and economic development opportunities.”</i>
Practice of Environmental rights & Duties [ERD] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Citizens protect the environment for the common good and are empowered to assert their environmental rights, including the right to obligate the political system for supporting them on environmental issues.	N/A – We have not identified/coded any excerpt in this category.
Addressing Structural Causes of Environmental Problems [SCEP] (Hadjichambis and Paraskeva-Hadjichambi, 2020)	Citizens address the structural causes (i.e., politics, economic growth, population growth, urbanisation, intensification of agriculture, rising energy use, transportation), that lead to environmental problems, and promote structural changes that enhance sustainability.	N/A – We have not identified/coded any excerpt in this category.