



# Does eBird Contribute to Environmental Citizenship? A Discourse Analysis

RESEARCH PAPER

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## ABSTRACT

This article explores to what extent existing environmental citizen science projects contribute to environmental citizenship. Specifically, we ask what kind of environmental citizenship does eBird—one of the world’s largest environmental citizen science platforms—co-create with its users. By applying a discourse analysis to eBird’s digital platform, we assess how it contributes to the formulation of specific social roles and environmental objects that shape an environmental citizenship unique to eBird. Using the analytical lens of collectiveness, situatedness, and connectedness, we show that eBird assumes responsibility for environmental citizenship over its users, that it promotes situated care for birds primarily through identification, and connects its users to some global environmental challenges. Through this analysis, we argue that environmental citizen science projects contribute to formulations of specific discursive environments (both material and social) where different forms of citizenship take form and take place.

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## INTRODUCTION

Citizen science often describes scientific activities pursued “by concerned and mobilized publics,” while also functioning as an umbrella term for organized research that relies on volunteers and other forms of crowdsourcing (Kimura and Kinchy 2016; 2019). According to sociologists Aya H. Kimura and Abby Kinchy, the term “citizen science” was used and developed in the natural sciences to describe volunteer data collection, specifically in the context of the research project eBird (2016; 2019). As eBird and other volunteer-driven citizen science initiatives have developed and grown, the promises of citizen science have led to perceptions that such efforts may increase scientific literacy and democratize science (Strasser et al. 2019).

However, with increasing concerns about pressing environmental issues, such as climate change and biodiversity loss, scholars now ask if environmental citizen science can also assist in fomenting environmental citizenship (Jørgensen and Jørgensen 2021). Having also emerged in the 1990s, “environmental citizenship” can be understood in relation to both citizenship and the environment (Bell 2013; Huttunen et al. 2020), reflecting an attitudinal orientation that guides civic duty towards better relations with the environment (Hadjichambis and Reis 2020). Thus, an environmental citizen pays attention to their relationship with those environments they interact with and which form part of their identity (Hayward 2012); strives for just relations between communities and local or global environments (Jørgensen and Jørgensen 2021); and pursues collective efforts, responsibility and justice, international and intergenerational obligations, and private actions affecting the public sphere (Dobson 2007). As historians Finn Arne Jørgensen and Dolly Jørgensen (2021) suggest, environmental citizenship can be characterized according to three main values: collectiveness, situatedness, and connectedness.

However, to inculcate these values in environmental citizen science and those it targets ought to be best understood as opportunity rather than obligation. Just because citizen science initiatives like eBird might be able to assist in developing environmental citizenship, does not mean they ought to (Bonney 2021). Even so, while their data makes greater impacts on environmental regulation in policy and judicial systems (Kasperowski et al. 2024), such projects tend to operationalize their volunteers as merely data gatherers (Vasiliades et al. 2021). Hence, opportunities exist for designing environmental citizen science projects towards the development of environmental citizenship and environmental data collection (Sharma et al. 2019; Carson et al. 2021). Through their design, such projects have opportunity to assist their contributors to learn to

become environmental citizens (Hadjichambis et al. 2020). Following Agrawal (2005, p. 166), engaging in “social and environmental practice” can lead to new formations of the self, a process he describes as “environmentality.” In other words, by using eBird, users may start seeing themselves and their role in the environment in new ways.

Therefore, understanding how and to what extent existing environmental citizen science contributes to environmental citizenship may assist in improving its positive socio-environmental impacts and assisting the design of new initiatives or projects. As Adamou et al. (2021) demonstrate, “citizens’ participation in environmental CS initiatives can generate scientific knowledge about the environment, actively shape their own practices, and produce environmental action.” That said, the authors also acknowledge that much more can be done. Hence, borrowing from scholarly attention to “engaged environmental citizenships” (Aslin and Lockie, 2013), we analyse the environmental citizen science platform eBird (Sullivan et al. 2009) in its potential to foment environmental citizenship, focusing on collectiveness, situatedness, and connectedness (Jørgensen and Jørgensen 2021). We select eBird because of its role in popularizing citizen science (Kimura and Kinchy 2016), its reputation as an exemplary citizen science initiative, and its longevity, size, and significant contributions to global biodiversity data (Sullivan et al. 2014; Amano et al. 2016; Bonney 2021). Started in 2002 by the Cornell Lab of Ornithology (CLO) and National Audubon Society, eBird functions as an environmental citizen science platform for birdwatchers, birders, scientists, advocates, and policymakers (Bonney et al. 2009; Sullivan et al. 2009). With more than 1 billion digital observation records (Team eBird 2021), it is the biggest biodiversity occurrence record producer in the world today (Kelling 2018). Moreover, CLO boasts that eBird demonstrates “an average participation growth rate of approximately 20% year over year” (eBird 2022c). As a frontrunner in environmental citizen science that relies on volunteer contributions, eBird wields significant influence, making it an ideal case for assessing its contributions to environmental citizenship.

Considering the popularity of eBird and its role in mediating the way people experience and record birds (Sullivan et al. 2009; see Watson 2013), we hypothesize that eBird contributes to environmental citizenship. However, recognizing that environmental citizenship may be expressed differently, we ask: In what ways may eBird contribute to environmental citizenship through its digital platform? To address this question, we offer an analysis of how eBird’s discursive aspects relate to environmental citizenship as expressed through three values: collectiveness, situatedness, and connectedness (Jørgensen and Jørgensen 2021). These values have been used to characterize environmental

citizenship, and we apply them as an analytic tool to frame a discussion in which we describe the kind of environmental citizenship eBird's discourse promotes and then relate these findings to the broader concept of environmental citizenship. We pursue a discursive analysis, in part, to demonstrate how this approach can complement user-based ethnographic approaches, offering insight into the kinds of structural formations that shape the social and cultural practices of those who engage in such initiatives.

## THEORY, METHODS, AND MATERIALS

In its own words, CLO describes eBird's goal: to collect knowledge from birders about birds "in the form of checklists, archive it, and freely share it" (eBird 2022c). Hence, we understand eBird to function as a digital "archive" and birdwatching hub, which functions similarly to other archives that are curated by their developers and their users (Manoff 2004). Viewing eBird as an archival-based form of citizen science means we understand eBird to co-produce and shape discourses about human relationships to birds, defining normative ways for relating to them, including interpretation, representation, and meaning attribution (Sekula 1987; Hawkins and Silver 2017). Thus, eBird's online presence shapes an environmental discourse that co-produces online information, social practices (e.g., monitoring, recording data, sharing media), and social roles that take place through the digital.

To analyze eBird discourse, therefore, we understand discourse as consisting of structures, practices, and language that prescribe and sanction allowable values, behaviors, and attitudes (Foucault 1975; Darier 1999). eBird communicates values and practices to follow through its website and other digital media, providing instructions, forms of engagement, and news about itself and affiliated partners. Hence, we make inquiry into eBird as a part of a larger institutional system that may promote certain modes of environmental citizenship through its discourse. Since discourse "[has] effects both on what is stored within [it], and on those who use [it]" (Rose 2016, p. 221), eBird discourse would assist eBird users to co-produce specific *objects* (e.g., species, occurrence records, hotspots, checklists) and assume specific *subjectivities*—social identities or roles (e.g., "eBirder") (Bennett 2013; Rose 2016, p. 215). From this, we argue that eBird discourse co-produces objects and subjectivities that assist in determining how and in what ways eBird may foment environmental citizenship.

To assess in what capacity eBird discourse promotes environmental citizenship, we borrow from Jørgensen and Jørgensen's characterization of environmental citizenship, namely the values of *collectiveness*, *situatedness*, and

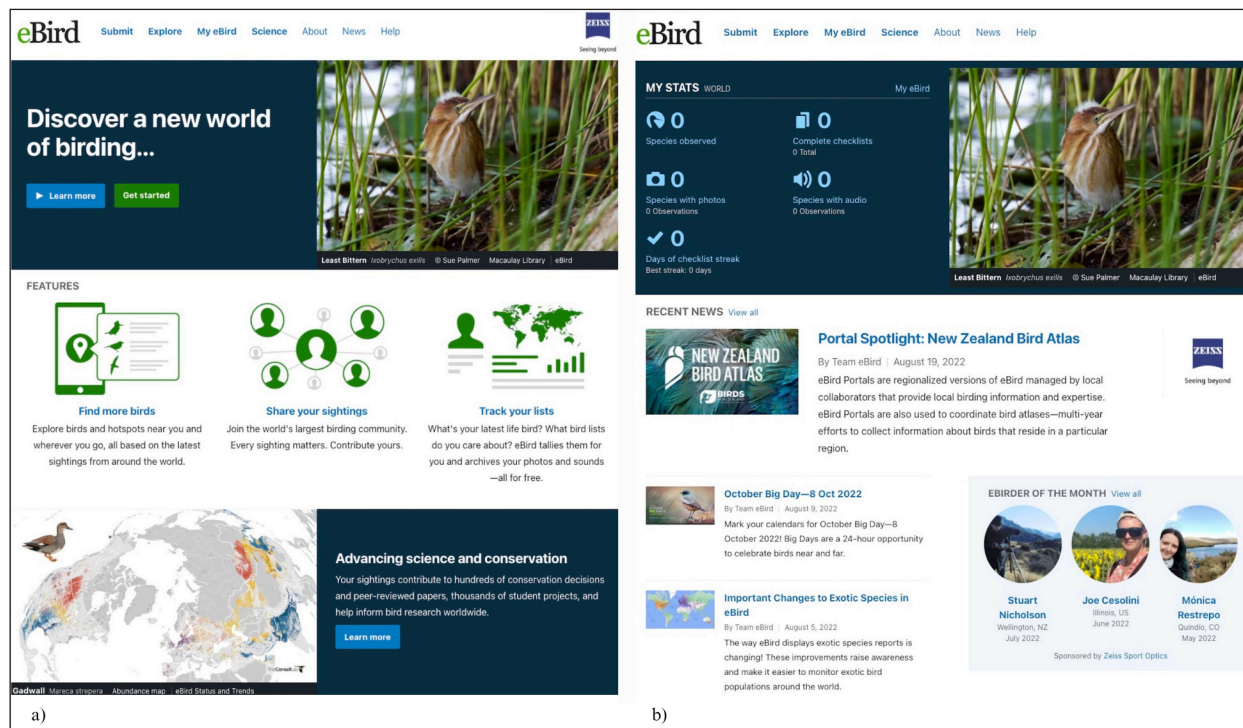
*connectedness* (2021). Basing our analysis on these values, we reflect on the social roles and objects that eBird's discursive formulations support, and their connections to environmental citizenship. Our analysis thus consists of a close reading of eBird's digital platform, namely its website, along with supporting documentation from its mobile applications and promotional materials, along with the scientific literature about eBird, where relevant. Our approach to the website is to focus on eBird's structure, interface, layout, displays and interpretation. Hence, we analyze the contractual obligations users take on to access and use eBird's digital platform, the language and information communicated by eBird, the layout and display of its webpages, and its interactive features. Further work on the broader discourses of CLO and users of eBird would bring additional contextualization and knowledge regarding the kind of environmental citizenship eBird supports.

## RESULTS

### JOINING THE eBird "COLLECTIVE"

One must join eBird to be a part of it. The eBird website makes a distinction between visitors and "users" (Cornell University 2022), with an explicit emphasis on directing visitors to become "users." It invites outsiders to become insiders through its homepage, providing direct links to account creation, advertising features available only to users, making appeals that eBird sightings advance science and conservation, and providing links to featured news from their blog and their mobile applications (Figure 1). Visitors can access some webpages but need a CLO account with a username and password to gain full access to the eBird's digital system (eBird 2022e). Without gaining membership, one cannot become part of the eBird collective.

Membership requires taking on certain responsibilities or obligations. For instance, the underlying eBird system contributes to formulating norms regarding acceptable relationships between eBird and its users. For those who make an account, they automatically agree to CLO's privacy policy and terms of use—which entail terms for CLO and some terms specific to eBird—before gaining access. Agreeing to the privacy policy makes users subject to the interests of Cornell University and not just eBird. These interests deal mostly with how personal information and online activities might be harvested for use. For instance, the privacy policy (Cornell University 2022) shapes account holders as potential donors, populations for targeted marketing, and as "users" embedded within a "logic of accumulation" (Zuboff 2015, p. 77) that aims to produce commercial value for Cornell University based on their consent and participation.



**Figure 1** eBird’s two different homepage interfaces: (a) one for those without a Cornell Lab of Ornithology account and (b) one for those with a user account. One must be a part of eBird to participate in it.

The “terms of use” point to how users can utilize the eBird system and data, defining their relationship to CLO. It grants users access to the eBird system and its publicly available functions if users agree to “behave”: to not post offensive or abusive content or falsified sightings and to use eBird data only for educational purposes. However, as previous studies show, it remains unclear if the educational purposes for which eBird allows its data to be used increase any potential improvements in environmental citizenship for users as educators or students (Surasinghe and Courter 2012; Vance-Chalcraft et al. 2022). In sum, the terms of use structure what constitutes appropriate user behavior. By agreeing to these terms, visitors become users and gain the ability to submit observations of birds to the eBird archive, which are represented back to the user as personal observation records. Setting these ground rules related to “good behavior” promotes solidarity and cohesion within the collective; however, they also underpin the one-sided contractual obligations that support eBird as an institution over its community.

## MAINTAINING SEPARATIONS BETWEEN eBird AND USER

Providing users with their “rights,” eBird’s terms also define how eBird differs from users. Users accept all risks associated with using the service and agree to not hold CLO or Cornell University responsible for any loss. Users also agree to have regional editors contact them regarding their observations

(Cornell Lab of Ornithology 2021). This ensures data will be accurate but also maintains a hierarchical separation between eBird and its users. Additionally, the services and content are not guaranteed and can be changed at any time by CLO without having to notify users. The CLO can refuse anyone access to eBird, delete accounts, and prosecute those it thinks have tried to damage their services. User contributions are considered either owned or licensed by eBird. According to the terms, users grant eBird a global, “royalty-free permanent license” to anything they submit to it. Users also agree to a broad legal framework on use of their (licensed) content. The rationale behind these terms follows a trickle-down logic, where benefits to science inevitably aid the “larger public,” and CLO will use this content “in any way to further this goal” (Cornell Lab of Ornithology 2021; eBird 2021b; eBird 2022b). Hence, users are conceptualized primarily as data providers, suggesting that the interests of CLO and the scientific community supersede the users’ interests regarding eBird. It also suggests that the eBird community is unequal, with those most aligned with the scientific community and CLO having more prestige or privilege. Such conditions promote an environmental citizenship where users work *for* eBird, although birders themselves may not feel that way.

This relationship also can be seen on the website, which operationalizes account holders’ activity for the benefit of eBird. For instance, an eBird quiz functions as an engagement tool but also improves the eBird system. Though the quiz



gets framed as testing the eBirder's knowledge, it gets eBirders to assist in rating media quality (e.g., photographs) and making media more easily searchable through filters. Ratings allow eBird to utilize the best eBirder media for their own projects as well as "external research applications" (eBird 2020). Hence, media serve as resources for eBirders, other CLO projects and their users, and advertisements and promotions for CLO and their network. Quiz data also can be used to perform statistical modelling to see how "good" the eBirders are at identification or be used to train AI programs in bird identification (Bonter and Cooper 2012; Van Horn et al. 2015). By providing quizzes and media repositories, eBird creates activities that may appeal to eBirders but with an intent to capitalize on eBirder labour and data/media that serves eBird's own interests.

### BECOMING A "SITUATED" eBirder

Becoming a user grants access to the eBird website, which assists in situating users as "eBirders." This website does not refer to account holders as "users," opting for the interchangeable terms: "you" and "eBirders" (Team eBird 2012). Renaming users as "eBirders" throughout the website plays off the traditional form of "birder" while also positioning eBird as an aid that augments traditional birding through electronic tools and digitalization. This shift is significant as the layout, interpretation, and displays on the eBird digital platform all contribute to co-producing an ideal eBirder. eBird labels all users as eBirders on their individual profile pages, providing them opportunity to become visible as members. These profiles provide identities for eBirders and become their "passports" within the system, significant because it gives them "worldwide" permissions and access. Through creating a profile, users become situated as eBirders, meaning they become identifiable as individual affiliates who can publicize their birding data to a global community.

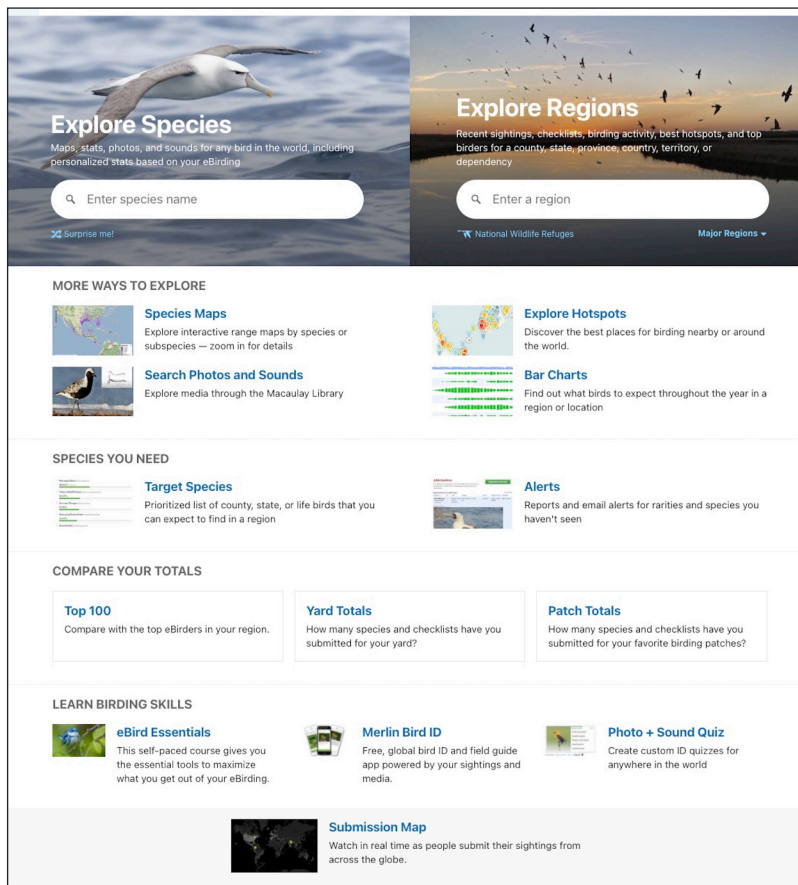
The "news" section further helps constitute ideal eBirders (eBird 2022e), revealing key values for them to embody. Specifically, as highlighted on eBird's homepage, the news section features the "eBirder of the Month" challenge. Showcasing results of these contests as short news stories from January 2014 to the present, these stories reveal eBirder perspectives on birding and eBird, how they use eBird, and what impacts eBird has had on their birding practices. In these stories, eBirders express that eBird has helped them to record more observations, increase their observations to move up ranking lists, travel to new places, and use photo and audio equipment to make their records more appealing. Many also mention sharing eBird with others and encouraging others to use it. Photographs accompanying these stories tend to depict eBirders out in the field using technical equipment—such as scopes, cameras, and binoculars—which aid in

marking eBirders of the Month as legitimate community members. Additionally, photographs often depict locales geographically distant from where eBirders live, highlighting how travel forms part of an eBirder's cultural practice. Other photographs provided by the winners showcase birds they have observed, especially "exciting" ones that signal the winners' skills in birding and photo capture. As depicted in these news articles, these eBirders function as ideal members, defined through individual activities that contribute to data capture, specialized equipment to access birds and digital media recordings of birds, and both local and global travel for acquiring bird observations.

### eBirders AS DATA GATHERERS

eBird discourse frames eBirders as data gatherers. The "Submit" section directs users to make detailed observations, using specific locations over broad areas to make observations "more valuable for analysis." eBird requests specific data related to place, time, "observation type," behavior, and other metadata, including media files. By providing species lists, eBird can attribute a null (0) count to all bird species not seen, which becomes part of the eBirders submission and frames how birding ought to be done (eBird 2021b). The submit section thus enables users to log detailed observations of birds and provides protocols and systems by which these observations get realized. In these ways, eBird discourse promotes a merit-based form of "citizenship" revealed through performance and rankings.

The "My eBird" section also encourages eBirders to increase the number of logged observations through self-evaluation and sets the context by which records come to matter. By providing three different numerical displays of eBirder submissions, this webpage emphasizes eBird's values regarding what users submit. This page points eBirders towards what data matters and where, providing tools by which eBirders can self-measure their activity, engagement, and performance. For instance, links to the "alerts" webpage allows eBirders to subscribe to notifications related to ABA Rarities (rare birds in any predefined area in the world) but also birds that have not been recorded in a chosen area. These alerts assist eBirders to find birds of special interest to the eBirder and the birding community. They promote observations for specific species, helping birders to complete checklists and allowing them to target their data collection in respect to bird species they most desire to record. Additionally, they frame "rarity" as a desirable (data) quality, shaping birding culture towards making observations of uncommon or rare occurrences. In other words, eBird provides means to situate eBirders' interest or care for birds towards target species or areas, which may or may not assist eBirders to care for other birds, other species, or other places.



**Figure 2** The explore page on eBird’s website helps situate eBirders to care for birds in multiple locations around the globe.

Lastly, eBird discourse frames data gathering as necessity. The exploration section directs users to see archival data visualized in different formats that enable birders to locate birds (Figure 2). eBirders can search for specific species, hotspots, media, or bird sightings at any given location visualized as a list of bar charts tracking species presence and abundance over the months of a year. Such visualization assists eBirders to know what birds to expect, including where and when, giving eBirders a sense of what these locations might be like, with respect to habitat and potential quality for birdwatching, while also facilitating the process of species identification and thus the logging of (presence and absence) records (Wood et al. 2011). This section also features “Species you need,” suggesting to eBirders what species they ought to prioritize and log by comparing eBirders’ lists with aggregate lists. Finally, eBird features total comparisons, providing links to see users ranked according to species observed by region, yard, or patch (eBird 2021a). Ranking eBirders based on number of species recorded and number of completed checklists is intended to stimulate users to log more observations in eBird through “tabular outputs” (Wood et al. 2011, p. 3). These categories frame exploration in terms of competition and hierarchies among users. By doing so, eBird discourse involves eBirders in a temporal politics that

aims to increase their productivity and efficiency of record collection (eBird 2022a; Williamson 2020). Thus, a plethora of features shape a peculiar situatedness focused on rare species, speciose places, and high user ranking—all aspects that serve eBird interests well.

## HELPING eBirders “CONNECT” TO ENVIRONMENTAL ISSUES

### eBirders AROUND THE GLOBE

eBird’s digital platform emphasizes a global scale. The eBird homepage encourages user interaction in respect to user submissions, exploration of eBird data, and staying informed about recent eBird developments across the globe. It showcases eBird’s capacity worldwide, brokering the space between eBirders and every bird occurrence record captured on its platform. Hence, the homepage functions as a display of power as well as orientation for eBirders to gather data across large spatial scales. By framing eBird and its members efforts as global, the discourse formalizes eBirds’ concerns as universalistic, which orients eBirders to connect to large-scale environmental challenges facing birds.

Simultaneously, focusing on the global in its layout and portrayal of eBirder data could deemphasize the need for

situatedness of caring for specific places and beings. eBirder profile pages display worldwide submissions statistics. Such reinforces the notion that birdwatching by eBird standards means to watch birds globally not just locally, contributing to a homogenous and universalistic birding culture that may be less attendant to the relative value of bird communities and their cultures, which may vary from one location to the next (Clucas and Marzluff 2012). Even though birding takes place in specific locations and eBird helps facilitate such activity by providing checklists at a local scale, the eBird platform also purposefully connects users to a broader, global collective with responsibilities for collecting bird observations around the world.

### SCIENTISTS, RESEARCHERS, AND “ATLASERS”

eBird’s global claims are tied up with its scientific appeals. However, eBirders typically are not represented as part of the scientific activities of eBird; the discourse generally keeps them separate through its science section and elsewhere on the website (Team eBird 2012; 2016). This separation stems from eBird’s initial design, which targeted scientists and then, eventually, birders (Loy 2009). To some degree, eBird discourse attempts to scientize the practices of eBirder data collection through protocols (eBird 2021b; Loy 2009) while framing their contributions as integral to making scientific advancements that can inform conservation policy; but it also maintains a conceptual, discursive boundary between the roles of eBirders, researcher or scientist, and the role of “atlasers,” which exists on regional portals designed for bird atlas groups. Inevitably, creating and maintaining such categories discursively disenfranchises most eBirders from the scientific community while placing eBird squarely within it.

## DISCUSSION

By analyzing eBird discourse, we identify subjectivities (or social roles) that it helps to co-produce, including visitor, “user,” “you,” “eBirder,” “researcher,” “scientist,” “atlasers,” and “eBirder of the month.” How eBird represents these roles and engages them through its digital platform contributes to what being an “environmental citizen” of eBird could mean. Our analysis exposes how eBird, by prescribing agreements, encouraging certain interactions over others, and representing birds and nature through digital media, co-produces objects for and in which an environmental citizenship specific to eBird can take shape. eBird’s digital platform culturally entrains others to interact with birds in particular ways. It (re)defines the cultural practice of birdwatching, notably by emphasising ID skills, species rarity (even though interaction with common species probably

constitutes a significant reason for eBird’s use (Mittermeier et al. 2021)), its specific recording methodology, and the personal accrual of species and checklists. eBird and its users co-produce a unique “environment” through their interactions with the physical world and their digital representations of it along with the social means for how to interact with it. That is, the co-production of subjectivities and objects through eBird’s digital platform lays the basis for an environmental citizenship unique to eBird, which in turn can be used to understand what it means to be an environmental citizen.

### eBird ENVIRONMENTAL CITIZENSHIP

Discussions on environmental citizenship encompass multiple concerns for different communities, such as individual responsibility, action towards a common good, and planetary interconnection and interdependence (Melo-Escribuela 2008; Cao 2015). Though conceptions of environmental citizenship vary, we rely on collectiveness, situatedness, and connectedness to frame our analysis. These environmental citizenship values suggest that environmental citizens support and engage in pro-environmental actions individually and with others, help address structural and situated contexts that produce undesirable environmental consequences, and work towards environmental justice democratically using the best knowledge available (Hadjichambis and Reis 2020; Jørgensen and Jørgensen 2021). With this in mind, we discuss what form of environmental citizenship eBird discourse may assist to co-produce, and how these findings inform thinking about environmental citizenship.

The eBird digital platform mobilizes eBirder labor and data as a collective effort but discursively situates eBirders as individuals through accounts, lists, and rankings. *Collectiveness* entails “individuals working collectively toward a common good,” often defined by collaboration and shared responsibilities that strengthen communities and support environmental activism efforts (Schild 2016; Jørgensen and Jørgensen 2021). Through account creation, profiles, individual stats, eBirder rankings, eBirder-of-the-month stories, and the promise to experience something unique, eBird individualizes eBirders. It participates in similar strategies of individualization, such as the promotion of “climate citizens” (Vihersalo 2017). Through its platform, eBirders have the chance to become exemplary eBird citizens through roles such as eBirder of the month, a top ranked eBirder, a bird expert, or reviewer. Similarly, anomalies, bad data, bias, or mistakes can then be assigned to specific eBirders contributing data as opposed to eBird’s systems or operations, as differential qualities of birder submissions are considered when modelling eBird data at large spatial scales (Kelling et al. 2015). In this way, eBird remains “safe” because its regulatory target becomes data quality and contributor skills as opposed to the assumptions, values,

and practices instituted by eBird (Yu et al. 2014; Gilfedder et al. 2019; Bonney 2021). By individualizing its “citizens,” eBird itself and its core members become the common good that the collective actions protect and make thrive.

Simultaneously, the collective efforts towards building this digital archive through species checklists contribute to more than just eBird and some users. eBird’s claim is that contributions will assist people to learn more about birds, to know more about birds, and to conserve birds through science (eBird 2022c). Perhaps capturing the outcomes of bird identifications and abundance assessments through species lists helps to bring together activist or naturalist communities together that feel responsible to gather the best possible knowledge of birds in specific areas (see Kasperowski et al. 2024). But by emphasizing identification and rarity, the common good that eBird presents appears rather narrow compared with the kind of collectiveness imagined by a broader conception of environmental citizenship.

The responsibility for conserving birds, therefore, appears to be located more precisely with eBird and its data users rather than with eBirders. As the eBird terms make explicit, eBird’s interest lies in using user contributions to benefit the science community, with the public defined as a secondary beneficiary. Thus, although eBird provides impressive services to eBirders, eBird science data and its political and social implications are stressed as that which will deliver on conserving birds with the added support from a learned environmental citizenship through the use of its platform. Finally, though we do not speculate here or theorize what might be the common good for birds in general or specific bird species, the limits of integration between eBird and the broader CLO digital space potentially inhibits an environmental citizenship that collectivizes eBirders to act on behalf of the common good for birds.

The *situated* aspect of environmental citizenship suggests that environmental citizens engage directly with their environments through lived experience, outdoor activities, and place-based learning. Having positive interactions in these contexts fosters feelings of concern and care for environments and non-human life forms (Szerszynski 2006; Jørgensen and Jørgensen 2021). Connecting species observations to specific locales on eBird incentivizes eBirders to visit these outdoor sites, possibly at the expense of visiting other locales. Unlike bird atlases that typically visualize species ranges that cover vast areas, eBird catalogs and connects GPS coordinates to observations of different bird species at different times of the year, creating destinations for birders. Following from this, eBird contributes to specialized outdoor experiences for eBirders. Many eBirder-of-the-month stories mention that eBird helps direct eBirders to new places for birdwatching or helps them plan trips around bird identification. Undoubtedly, eBird satisfies eBirders’ preference for destination variety

and greater species richness per locale (Kolstoe and Cameron 2017). By providing detailed information on bird species worldwide, its directed emphasis on encouraging eBirders to submit and increase observations promotes learning through the lived experience of birding outdoors.

Directing users to create records as well as promoting the value of its archive, eBird assists users to become attached and invested in eBird. By making it possible for eBirders to digitize, create, and store records through eBird, eBirders can become increasingly reliant upon eBird as part of their cultural birding practice, which may entail complications related to how eBirders experience birds and their habitats (Arts et al. 2015, pp. S666–S667). Photographs and audio recordings on eBird, for instance, can be read as digital proxies for birds that may prevent or stimulate watching birds outdoors (see Proppen 2021). Such attachments, however, seem to be driven by identification, suggesting that identification constitutes the primary form of care for birds. Identification, particularly of species, implies a relationality of care rooted in making audio/visual records. This practice, therefore, suggests the promotion of an environmental citizenship further removed from “situated dwelling and care” (Szerszynski 2006, p. 95) even though it still might increase caring for others (Sharma et al. 2019). To some extent, if caring for birds is about identification and data accrual made visible in rankings and lists, then caring for birds becomes entangled with the social status of eBirders. It also means that caring for some birds is more important than for others. Though eBird promotes species identification, the implementation of AI for identifying species from audio and visual media might change this situated form of care (Truong and Van der Wal 2024). With less demand on identifying species, environmental citizenship through eBird will likely be oriented around producing the best quality audiovisual digital files over intimate familiarity with birds.

*Connectedness* refers to one’s abilities to understand the implications of environmental data collection for environmental issues, including the uneven distribution of environmental burdens and the lack of inclusion of minorities and indigenous knowledge in conservation (Gould et al 2018; Jørgensen and Jørgensen 2021). These key issues brought up in the environmental citizenship and related literature do not readily feature on eBird. Probably, this is because eBird data does not explicitly address these issues, even though birdwatching does (Kronenberg 2014, pp. 624–625; Rutter et al. 2021). Yet, anyone can use eBird who can afford access to a networked device that can create a CLO account. The eBirder-of-the-month articles evidence some diversity, and the CLO supports racial equality (Fitzpatrick 2020; Team eBird 2020). Nonetheless, by funneling eBirders into competitions, ranking, contests, and hierarchies, eBird supports a traditional birdwatching citizenship represented by anthropocentric white, privileged males (Lee et al. 2015;



NASEM 2018; Rutter et al. 2021; Jönsson et al. 2023). To immediately abolish this system, as some argue, would counter birding's "competitive spirit" (Sullivan et al. 2014, p. 33) and dismantle a standard tool in eBird to modify citizen science behavior and keep them logging recordings (Wood et al. 2011). Additionally, key environmental concerns about the impacts and injustice surrounding technological development, energy use, and waste (Fuchs 2008) as well as leisure tourism or long-distance travel are scarce (Lenzen et al. 2018). This paucity makes sense when one considers that active eBirders rely upon specialized field equipment and travel, which form core aspects of their (male) eBirder subjectivities (Rosenblatt et al. 2022). Additionally, nature tourism stemming from birdwatching continues to be seen as a vital path towards sustainable development (Ocampo-Penuela and Winton 2017; Schwoerer and Dawson 2022). Hence, since eBird's operations depend upon the past and present of birding culture and its technologies, the environmental issues surrounding these topics remain peripheral to eBird and eBirder interaction.

What issues does eBird directly connect eBirders to then? eBird assists eBirders to make connections between their data and more bird-specific environmental issues, such as through the science and news sections. These issues include species abundance and distribution, climatological impacts, habitat, light pollution, and air pollution (eBird 2022d news). Thus, eBird provides ways for eBirders to see how their records contribute to scientific projects that address important environmental concerns over birds. Other issues affecting birds, such as hunting, pesticides, cats, and collisions with man-made structures, are harder to come by because eBird likely does not promote all the scientific applications of its data (e.g., Demezas and Robinson 2021) or because its data may not be made applicable to these issues. Where eBird does not address such topics, other websites operated by CLO (e.g., All about Birds) may cover them. Nevertheless, with no general website search function for information on eBird's own website along with limited capacity for browsing and inconsistent tagging of news articles, eBird's performance at connecting eBirders to these issues constrains the kind of citizenship it promotes.

The kinds of connections eBird leads eBirders to are thus selective and tend to support eBird's culture rather than call it into question. Certainly, eBird could do more in this respect, but given the context of environmental citizen science, especially projects starting at the turn of the century or earlier, we should not be surprised that it does not (Loy 2009). Within environmental citizen science, making connections between key environmental issues and the citizen scientist has not been viewed as a priority. Though citizen scientists typically call themselves "participants" (Eitzel et al. 2017), organizers of some environmental

citizen science projects refer to citizen scientists as "avian biological sensors," "citizen sensors," data processors, and non-specialist consumers of data products (Goodchild 2007; Wiersma 2010; Catlin-Groves 2012, p. 11; Verma et al. 2016, p. 76), which decontextualizes observers and renders their contributions to environmental citizen science as devoid of any non-scientific traces or potential biases. Such perspectives reduce the accountability that these types of initiatives have for citizen scientists. Additionally, eBirders are expected to educate themselves. Becoming an eBirder supposedly provides an "informal science education" that assists users to "become better scientists by understanding and using standardized data-gathering techniques, exploring bird data through visualization tools, and interacting with experts" (Sullivan et al. 2009, 2283). To this end, eBird discourse provides ample training opportunity. However, this desire to lead eBirders into the social role of a scientist remains somewhat unrealized through eBird discourse, which positions eBirders as recipients and consumers of eBird's scientific results. eBird's attitude towards eBirders would suggest that the responsibility for making connections beyond eBird rests with the eBirders themselves. Since eBird promotes data collection as the ultimate virtue for an eBirder, eBird discourse does not represent a radical break from framing citizen scientists as data providers and is not incentivized to connect eBirders to environmental issues that its data does not directly support.

## CONCLUSION: WHERE DOES (eBird) ENVIRONMENTAL CITIZENSHIP TAKE PLACE?

The critique that environmental citizen science focuses more on science than the citizen (Jørgensen and Jørgensen 2021) could be made in respect to discourse on environmental citizenship. Though the environmental citizenship eBird discourse helps promote through its digital platform likely results in a spectrum of "conditional commitments" (Hobson 2013), our analysis highlights that eBird's objects give meaning to the environment as a concept and may engender a specific form of environmental citizenship. One must be a citizen of something, and eBird helps make the environment to which eBirders become citizens. By having little to no external links and connections to other knowledge bases, the eBird platform universalizes its approach to birding culture and presents the environment as knowable in the same ways for all persons. Brokering a global scale, it sets itself up as a homogenous worldwide system for everyone. At the same time, eBird's environment remains rather limited, populated predominantly with

birds and key locales for identifying them. Simultaneously global yet niche, this environment, we argue, makes a broadly conceptualized form of environmental citizenship that much harder to realize, because its co-constructed environment gets passed off as *the* environment.

Based on our analysis, eBird discourse demonstrates that eBird helps to co-produce its own specific environment in which its unique version of environmental citizenship may take place, illustrating that different environments exist for different citizens (see [Ellis and Waterton 2004](#)). This analysis highlights that environmental citizenship is not just learned but also made—a process that accompanies participatory research where different “modes of environmental citizenship...[get] valued over others” ([Pritchard and Gabrys 2016](#)).

eBird’s discourse co-produces the objects and social roles by which their citizenship becomes possible. This co-produced environment outlines for eBirders what they need to know and do to take part and realize this project. Simply put, we argue that environmental citizenship in eBird consists mainly of accumulating digital records of birds. Considering that earth processes are now characterized as being in the Anthropocene, in which human activities constitute a geological force, eBird, arguably the most successful environmental citizen science initiative to date, has opportunity to adjust its discourse to promote a more expansive environmental citizenship. To complement this analysis, we hope to see additional studies, such as through user-based studies and other approaches, that address the contribution to environmental citizenship by eBird or other environmental citizen science initiatives.

Moreover, this analysis suggests that discussions surrounding environmental citizenship ought to consider that the construction of environments through social, political, and cultural processes need to be taken into account when conceptualizing what environmental citizenship may look like and where it takes place. Environmental citizenship must accommodate the multiple environments and duties of citizen scientists as co-constructed within environmental citizen science initiatives like eBird. We hope this article acts as an impetus for further research on assessing and developing the capacities for environmental citizen science to foment environmental citizenships.

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## COMPETING INTERESTS

The authors have no competing interests to declare.

## AUTHOR CONTRIBUTIONS

JDP was responsible for the conception and design of the work; acquisition of data and drafting of the work. JDP, DK, and RVW all made substantial contributions to analysis and interpretation of data and draft revisions and approved the final draft.

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