Ecogames: An Introduction

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In the 1970s, a select audience of computer nerds, economists, and museumgoers had the opportunity to engage with the original "Ecogame." Designed by the Computer Arts Society, *Ecogame* (1970) was a video game as well as an art installation and a multimedia information architecture (Stott 2021). The game simulated a national economy, allowing players to make decisions regarding resource allocation, showing them the consequences of their actions via slides projected onto the walls, indicating the mood of the nation. Depending on your performance, they might show "dole queues, civic unrest, and environmental degradation" (Stott 2021, 47). Two decades later the audience for these sorts of playful experiments would be vastly expanded. Writing from Australia in 1994, McKenzie Wark recounts turning to the early internet in her struggle to keep the biosphere safe from both global warming and nuclear winter in playthroughs of *SimEarth* (Maxis 1990), a game that allows players to tinker with the parameters that determine life on Earth. Ecogames were no longer confined to museums and conferences, they had come home, and were living inside people's desktops. In the twenty-first century, ecogames are even more prevalent, not just because you can choose to play a quick game of *Beecarbonize* (Charles Games 2023, see Figure 0.1) on your mobile phone on your way home from work, but because themes of climate collapse and environmental engagement have begun to dominate mainstream media, showing up in games more generally, both digital and analog. This book collects scholarship on this subject, exploring the themes, politics, and aesthetics of ecogames; the material and discursive contexts in which they operate; as well as the ways in which players experiment with and negotiate environmental issues in gameplay.

The term "ecogames" exists alongside alternatives: "green games," "ecocritical games," or "climate games." We prefer it for its brevity and scope. Ecogames include serious games that aim to raise environmental awareness and educate players about the values of sustainability, for instance, *Beyond Blue* (E-Line Media 2020), a diving game about marine conservation, or *The*

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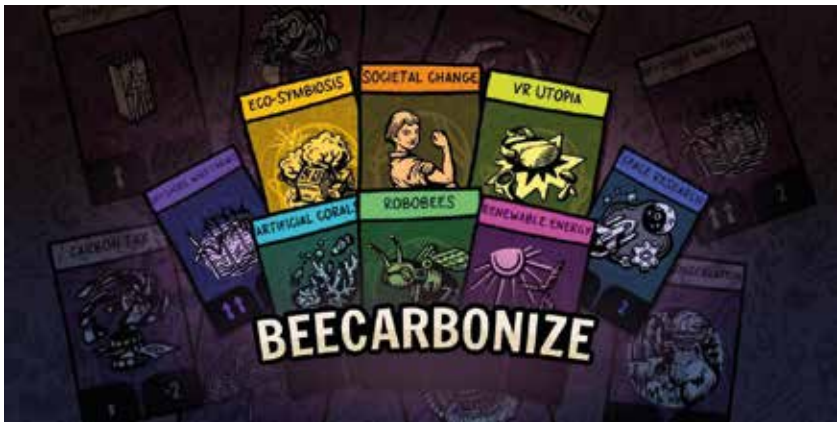

Figure 0.1: *Beecarbonize*, an ecogame where players can explore different ways to fight the climate crisis.

Forest Cathedral (Whitethorn Games 2023), about the life of celebrated environmental scientist Rachel Carson. Ecogames also include more artistic, independent works and initiatives that use elements of game design to question human–environment relations, for example, the games created and discussed by Kara Stone in this book. They also comprise more popular games that are designed for entertainment, but which simulate environmental challenges, like *The Wandering Village* (Stray Fawn 2022), a game about living in symbiosis on the back of a giant creature. Finally, even extremely commercial games can be read as ecogames if they reflect, either thematically or in terms of premise or setting, the fraught socio-environmental conditions of the present. For instance, the latest installment of the online first-person shooter franchise *Battlefield 2042* (DICE 2021) is set in a near future plagued by super storms, droughts, and the exploitation of stateless mercenaries in a flare-up of the Cold War. The game's different maps reference actual locations in the world that evoke issues like globalization and environmental degradation: a shipping graveyard in India, a Qatari city lost to desertification, a green oasis bordered by desiccated slums, and a stretch of Antarctica where Russia has started an illegal oil drilling operation.

The ecogame scholarship anthologized in this book comes from established authors, early career scholars, and artists, reflecting a broad range of writing and argumentation styles; they draw on disparate fields like media studies, art history and the study of visual culture, the environmental humanities, as well as postcolonial and Indigenous studies. It covers a broad range of subject matters relevant to the climate crisis; while this term seems to foreground aspects like "the increasing average temperature," the

chapters in this book consider those as only a "symptom" of a "much deeper sustainability crisis" that has profound social and cultural implications (Thunberg 2022, 132). The book illustrates the many different methods that inform the discipline of game studies (including analyses of industry documents and conventions, reception studies, reflections on modes of critical play) in addition to more specific game analyses that pay attention to narrative, aesthetics, affect, and symbolism. These methods correlate with three recurring perspectives on ecogames as not only an aesthetic but a broader societal phenomenon. These perspectives bring into focus games as "texts" or media products, the media industries from which they emerge and to which they contribute, and the players, individually and as collectives, as well as their constitutive practices. We see these three perspectives at work in the chapters collected in this book.

For example, Alenda Chang, in previous work (2019b) as well as her chapter in this book, addresses the benefits of games with implicit and more overt environmental messages. She relies on textual analysis and close reading to identify both harmful and beneficial representations of human–environment relations as well as other topics enmeshed with the climate crisis. Analyses like these demonstrate the urgency of the crisis, but they also inform the design of more ecologically sensitive games, for example, pushing for more environmental realism in the representation of flora and fauna (Friedersdorff et al. 2019, and Melissa Bianchi's chapter in this book). In this way, ecogame analysis infuses sustainability concerns into the design of games, encouraging the rethinking of iconic game genres and their built-in ecological biases. This is the case in *Terra Nil* (Free Lives 2023), which is publicly discussed as a "reverse" city builder. The development of more critically informed environmental game design is particularly important since, as explained below, nature as a "theme" is becoming more prevalent in both digital and analog games, which might threaten to flood the market with uncritical, romanticized, or bland depictions of natural environments (already the norm in pastoral video games according to Op de Beke 2021a).

A focus on the game industry requires a media industry studies approach as practiced by Benjamin Abraham (2022) or Sonia Fizek in her chapter for this book. Industry-oriented ecogame scholarship is interested in mapping out processes of game development and marketing, looking at their environmental impact, and exploring more sustainable alternatives. For instance, an industry perspective might interrogate console manufacturers' unquestioned drive to increase the memory and computing power of their products, as well as the resource-intensity of features like game streaming. While the authors in this book focus mostly on the digital games economy

(due to its vastly larger ecological footprint), it is important to acknowledge similar considerations in board game publishing and even game-adjacent industries like toy manufacturing, as evidenced by LEGO's welcome but half-hearted initiatives to experiment with alternatives to plastic (addressed by Nicolle Lamerichs in her chapter for this book).

Player-oriented perspectives are also valuable because while some of the games discussed in this book exhibit problematic design choices—see, for example, Souvik Mukherjee's critique of colonialism in strategy games in this book—these titles may still foster critical ecological thinking if played in alternative, non-normative ways. Focusing on practices of play as well as other forms of what we call metagaming below is of vital importance to interpret ecogames in a broader cultural context and to acknowledge the agency of active audiences. Such practices of play may include refusing to play certain games altogether (as in Rainforest Scully-Blaker's study on the /r/patientgamers community in this book) but also various ways of resisting the so-called "orthogame" (Carter et al. 2012), which refers to how a game's design implies "correct" ways of playing by making certain tactics easier or harder to implement. Hans-Joachim Backe discusses this concept in his chapter for this book, arguing that *Minecraft* (Mojang Studios 2011) can afford ecocritical discourse if played cooperatively and by pursuing self-imposed goals.

As with most taxonomies, it is important to also consider hybrid phenomena that combine two or even all three perspectives; for example, the Climate Special Interest Group (SIG) of the International Game Developers Association (IGDA) not only published a "playbook" (IGDA 2022) on how to represent human–nature relationships in games but also defines algorithms and design patterns for more economical graphics rendering and limited online capabilities to reduce the energy consumed by making and playing these games. In this case, the material context of game production and the aesthetics of games-as-texts are directly intertwined. In short, this book collects scholarship demonstrating and sometimes combining all three perspectives. It features chapters that address games' representation of the climate crisis and their means of affective and aesthetic engagement; as well as chapters on the sustainable production and distribution of games; in addition to work on the emergence and widespread adoption of alternative playing and metagaming practices. Furthermore, to ensure comprehensive coverage and a diversity of topics, we have solicited chapters for four different themed parts (see Figure 0.2): I. Today's Challenges: Games for Change, II. Future Worlds: New Imaginaries, III. The Nonhuman Turn, and IV. Critical Metagaming Practices, each of which will be introduced at length below.

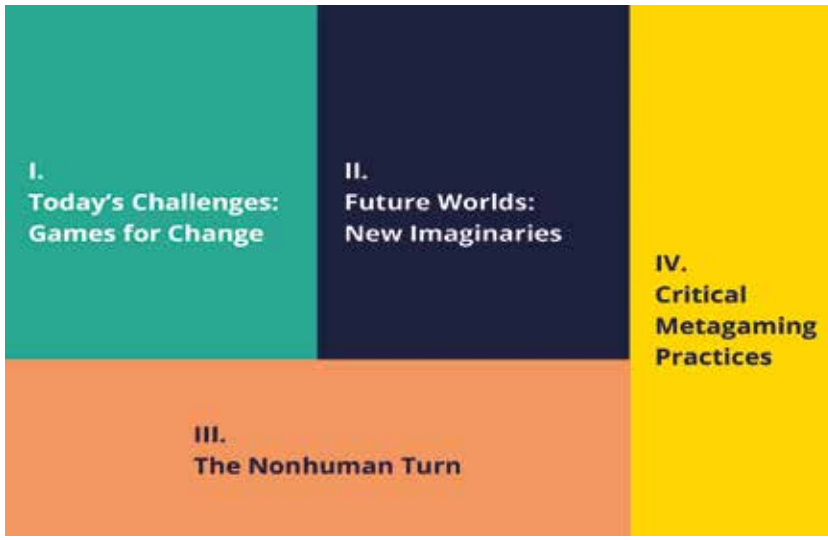

Figure 0.2: Overview of the book's structure and key categories.

This schema implies several dichotomies: an orientation towards both the present (I) and the future (II), an appreciation of both human (I–II) and nonhuman (III) perspectives, and a conceptual framework for both gaming (I–III) and metagaming (IV) practices. Together, these dichotomies provide a multifaceted account of the complexity and even the internal tensions of ecogames as defined above. While we group the chapters according to their dominant theme, they inevitably also exhibit characteristics relevant to the other parts; these overlaps will be briefly addressed below in the chapter outlines.

Before digging into these parts, however, in order to properly contextualize ecogames this introduction will provide a brief preliminary history of environmental themes in early analog games, as well as an overview of the ecogame scholarship that predates this book, on which we build, and which we hope to engage in conversation.

From early analog ecogames to recent developments

One of the oldest games still played in the world today is *Mancala*. It is a game played with seeds or beans that are moved between small depressions on a board. In other words, *Mancala* is a kind of farming sim; a game about sowing life. It takes inspiration "directly from the creation of agriculture itself" (Friedersdorff et al. 2019, 291). We open this brief history with a reference to

Mancala because the game suggests an unexpectedly immediate connection between ecology and play, one that predates the digital age. Since the bulk of the chapters in this book look at video games, we spend a little more time sketching out the history and resurgence of analog ecogames here, in the introduction, hoping to inspire and support future scholarship on the topic.

For hundreds of years playing games was a common practice that overlapped with ecological education. As Dorothea Kühme (1997) notes in her book-length study on play in German society from the mid-eighteenth to the mid-nineteenth century, games were often played outside—e.g., in "gardens or rural trip destinations" (109, translated by the editors). They were associated with being outdoors. Moreover, games were explicitly framed as part of "celebrating nature" (112), regularly occurring during social events like spring festivities. Their association with the outdoors is illustrated by some of the board games archived by the Rijksmuseum in Amsterdam. For example, the *Game of Fishing* (1870–1899, see Figure 0.3), pictures children standing on a bridge angling for fish that swim at different depths. The same compendium, *Home Games for Little Girls*, also contained a *Game of Falconry* and a *Game of Pearl Fisheries* featuring similar game boards and colorful illustrations that paint a romanticized picture of the natural world.

Beyond this focus on Western European cultures, the Digital Ludeme project—an online archive of over 1,000 older board games that were partly reconstructed and made playable via AI technology—provides a glimpse of two more historical trajectories of analog ecogames. The first involves a category of "sowing" games, similar to the aforementioned *Mancala*; while the original game is relatively well known, the category comprises 208 different variants played all over the world. Another archetype is the "hunting" game, which usually refers to competitive two-player games, in which one player plays the hunter—human or animal—and the other the role of the prey. One of the oldest games in the genre, *Cercar la liebre* (*Catch the Hare*), dates back to thirteenth-century Spain. Another game that historians surmise originated in the same time period in South Asia is *Huli-Mane Ata*, in which a tiger faces off against five lambs. In these games, the prey can usually win by immobilizing the predator through strategic positioning. The geographic spread of these hunting games points to the ways in which shared experiences with nature are translated into and communicated across generations through board games. Like the contemporary ecogames discussed in this book, this corpus of older ecogames, though groupable by genre, is far from uniform, with some games foregrounding human dominance over the hunted species and others presenting hunter and prey as more-or-less equal, or even codependent on one another.

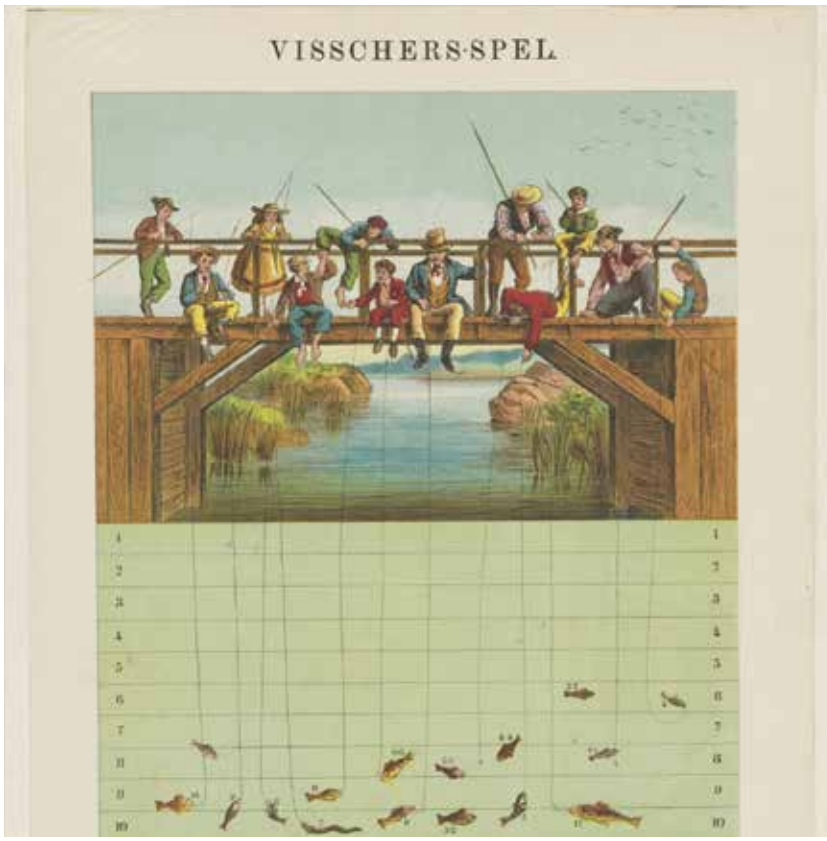

Figure 0.3: The printed game board of the *Game of Fishing* (1870–1899).

Since the beginning of the twentieth century, experiences of nature and, more recently, ecological concerns have become increasingly pervasive in board, card, and parlor games. At the time of writing, the largest online archive of analog games—BoardGameGeek—listed 1,449 games in the "environmental" category, which includes games with "themes and storylines regarding environmental conservation and management." One of the earliest titles, *Hunting in the Wilds* (uncredited 1930), also implements hunting as a theme but in contrast to the aforementioned games it simulates extractivist practices since all players represent human hunters and animals are mere "tokens," or resources to be collected. In the 1950s and 1960s, the focus of analog ecogames appears to shift from outdoor activities like collecting plants, to animals (e.g., *Wild Life*, Peter Ryhiner 1964). This shift coincides with an increasing interest in David Attenborough's animal documentaries in the late 1970s (Attenborough 2020), pointing to the importance of a media-comparative view of ecogames as a cultural phenomenon. Such a view reveals

other instances of cross-media synergy, for instance, in the case of the game *Ein Platz für Tiere* (uncredited 1965), which was explicitly derived from the popular German TV documentary series of the same name.

One of the first analog ecogames to approach sustainability in a systemic manner—rather than through personalized activities like gathering mushrooms or going on safaris—is *Ecology: Game of Man & Nature* (Bert Collins, Margie Piret, and Richard Rosen 1970). The rise of this "system's perspective" is owed to the popularization of cybernetics, a science concerned with circular causal processes like feedback loops. Especially during the second wave of cybernetics, from the 1960s onwards, such ways of thinking were often applied to social and ecological concerns. Crucially, they were often introduced to lay audiences through games (Light 2008). Much like the digital civilization simulators or god games of the present, in which this cybernetic outlook endures, the board game *Ecology* tasks players with advancing through four ages, from "Hunting," "Agricultural," and "Industrial" to "Atomic." In accordance with the environmental concerns of the time, the game emphasizes the issue of overpopulation, symbolized by the planet centered on the board, which has limited available slots that fill up quickly, particularly with four players.

As this brief history of analog ecogames illustrates, a diachronic look at this material presents a history of changing environmental sensibilities over the course of the nineteenth and twentieth centuries. For example, games from the early 1990s are characterized by the rhetoric of "saving the planet," like *60 Minutes to Save the Earth* (Seven Gates Designs 1991), *Save the World* (David Shreeve 1989), *Save the World: A Cooperative Environmental Game* (Don Strachan 1980), or *TerraTopia* (Peter and Greg Olotka 1993). This "global" perspective and the language of urgency and heroics that accompanies it can be understood in the context of—among other things—the perceived end of the Cold War and its bipolar geopolitical situation as well as rising concerns about the climate crisis; moreover, the focus on clean energy in these games is consistent with similar themes in other popular media like film and television at the time.

While nature and the climate crisis have informed the gameplay and premise of analog games for decades, since 2019 they have very quickly grown in popularity, led by popular family oriented titles like *Wingspan* (Elizabeth Hargrave 2019) and *Parks* (Henry Audubon 2019). While most older board games are exclusively competitive, this new "wave" of eco board games characteristically also includes cooperative titles like *Rescue Polar Bears* (Darren Black and Huang Yi Ming 2016), *Spirit Island* (R. Eric Reuss 2017), *CO_2: Second Chance* (Vital Lacerda 2018), *The Spill* (Andy Kim 2022),

and *Daybreak* (Matt Leacock and Matteo Menapace 2023). This abundance of ecogames will certainly influence awareness of ecological issues, particularly among younger children playing these games in the family, but it produces new ambivalences as well. In several cases, board game publishers arguably approach sustainability like a franchise, in other words: a shared repository of familiar micro-narratives, character archetypes, and action possibilities that allows for a game to resonate with younger audiences since popular culture is increasingly characterized by "media franchising" (Johnson 2013, 28). This can be positive because it slightly levels the "playing field" for smaller publishers without access to expensive licenses, but overuse can easily desensitize players towards ecological themes, leading them to see flora and fauna in games as merely decorative, enhancing "the aesthetics and feel or atmosphere a game portrays" (Friedersdorff et al. 2019, 292), instead of engaging with them on more ecological grounds.

This potential enfranchisement of nature is much less of a risk in the less commercial world of independent tabletop role-playing games (TTRPGs). This industry also features lively experimentation with environmental gameplay, facilitated by a culture of reskinning and hacking existing games. For example, Avery Alder's *Dream Askew* (2018) inspired a new genre of TTRPG called "no dice, no masters." Instead of divvying up narrative responsibilities between the players, who play their characters, and the game master, who plays the world and everything in it, games like *Dream Askew* hold all players responsible for playing "setting elements" as well as their characters. In other words, when the game's action invokes a particular setting, players are invited to speak on behalf of "the digital realm" or even "the earth itself" to try to express the powers and desires the landscape and the resources it holds. A similar experiment with the animation of otherwise static environmental settings can be found in *The Flora* (Affinity Games 2022), where players are challenged to inhabit trees and to imagine a story told from their long-lived perspectives. Other TTRPGs use collaborative storytelling practices to incubate postcapitalist ways of organizing society, for example, *Solarpunk Futures* (Solarpunk Surf Club 2021), *The Transition Year* (Affinity Games 2021), and *Sunstained* (Ray Chou and Vincenzo Ferriero 2021). Finally, TTRPGs like *Blue Planet: Recontact* (Biohazard Games 2019), *Arcology World* (Dyer Rose 2021), and *ECO MOFOS* (David Blandy 2023) imagine future worlds in which new customs, symbioses, and technologies have completely overhauled modern ways of subjugating and exploiting the Earth.

We wrap up this section on analog ecogames with a nod to the world of live action role-play, or LARP. In LARPing communities the climate

crisis has also become a more popular topic of engagement, as illustrated by the prominence of environmental titles at Nordic LARP festivals like Knutepunkt, Blackbox Copenhagen, and Grenselandet in recent years. Nordic LARP has a tradition of engaging with complicated, pressing topics like discrimination, oppression, and mental health, so its interest in the climate crisis comes as no surprise. Educational LARP initiatives share this sense of societal responsibility. For example, the Erasmus+ project Larp for Climate (2022–2024) aims to harness the social, emotional, and embodied storytelling strategies of LARP in the development of a number of LARPs and corresponding toolkits to improve climate literacy among young people. In doing so, the project actively seeks out collaboration with young people, especially activists, who already show flair and competency with playful, theatrical practices as illustrated by climate protests which often include costumes, stagecraft, mock funerals, and tableaux. Climate LARPs often enhance these practices with elements of collaborative storytelling and role-play, which may produce powerful and persuasive affects (Op de Beke 2023).

An overview of ecogame scholarship

As editors, we are fortunate to build on an existing and extremely rich body of scholarship that explores the environmental orientation of (video)games. To explain how this anthology advances and expands the field, we start with a brief overview of the critical landscape. Ecogame scholarship emerged from the field of ecocriticism in the 2010s. At this moment, ecocriticism had already entered its second wave—during which previously held distinctions between nature and culture were questioned, and work shifted under a single more hybrid notion of "the environment." Second-wave ecocriticism also saw scholars increasingly explore fictional environments treated in nonrealist modes of representation (Garrard 2014). Third-wave ecocriticism was also on its way in, introducing a more global perspective and shaking ecocriticism loose from its Anglocentric focus (Slovic 2010). Yet, at the same time, ecocriticism was, and still is, marked by a primary engagement with written texts, across various historical periods.

Some of the very first ecogame scholarship emerged from inside of, or in response to this body of work. It advocated for a widening of the ecocritical lens to include more popular audiovisual media. Hans-Joachim Backe's (2014) call to "greenshift" game studies was inspired by ecocritical scholarship and bolstered by video games' consciousness-raising potential as a pervasive,

mainstream form of entertainment. John Parham's book *Green Media and Popular Culture: An Introduction* (2015) includes a chapter on video games that is both rooted in ecocritical and video game theory. Alenda Chang and Parham (2017) were also both involved in the first special issue on ecogames published by *Ecozon@: European Journal of Literature, Culture and Environment*.

Both Parham and Chang made space within ecocriticism for the study of ecogames by launching similar arguments. They both dismiss claims like those made in Richard Louv's book *Last Child in the Woods* (2005) that video games are to blame for a so-called "nature-deficit-disorder." Video games are not in competition with the outdoors, and they are no more removed from nature than nature writing is. On the contrary, in these early publications, Chang and Parham demonstrate that a lot of ecocritical scholarship can easily be applied to game environments, for instance, Lawrence Buell's four criteria for environmental texts, as well as Timothy Morton's theory of ambient poetics (Chang 2011; Parham 2015). Moreover, textual descriptions of environments are no more direct representations of the natural world than video game environments are. Both should rather be understood as cultural constructions of nature, constructions that draw on styles, tropes, and registers that have long histories in literature and the visual arts.

More recently, scholarship on ecogames has benefited from the growing popularity of climate fiction—or cli-fi—and its enthusiastic academic reception (Trexler 2015; Johns-Putra 2016; Mehnert 2016; Schneider-Mayerson 2018; Milner and Burgmann 2018; Goodbody and Johns-Putra 2018). Studies of climate fiction tend to engage different kinds of literature than those that have been traditionally looked at in ecocritical scholarship, namely genre fiction. Video games often share these spectacular, science-fictional imaginaries. In a 2017 article, Benjamin Abraham and Darshana Jayemanne set out to map video games' response to climate change, asking, "Where are all the climate change games?" Initially, they find that video games explicitly dealing with climate change are few and far between. Many of them are developed as edutainment and remain limited in their dissemination and appeal. But, taking their cue from Deborah Jordan that "climate change is so pervasive an issue that it exceeds its own explicit thematization, springing up in other less direct ways," Abraham and Jayemanne expand the scope of their research significantly so as to analyze more generally the ways in which video game environments are figured: as backdrop, resource, antagonist, or text (78). They offer this typology, only to realize, finally, that it also fails to satisfy, because it conceives of the environment as something "largely subject to the more lively entities that inhabit it" (84). With the climate

crisis, this no longer seems the case. In conclusion, therefore, Abraham and Jayemanne suggest a "broadening of the climate problem and how it does, or could, appear in games" (84). Indeed, while games that feature the climate crisis front and center remain scarce, tropes and imaginaries fueled by what Mark Bould calls the "Anthropocene Unconscious" abound; "the art and literature of our time is pregnant with catastrophe, with weather and water, wildness and weirdness" (2021, 3). Games are no exception.

Since Abraham and Jayemanne's article, other typologies have been published mapping the ways in which environmentalism, climate change, or the weather can feature in video games (Milburn 2016; Möring and Schneider 2018; Kunzelman 2020). But there is also scholarship that predates the establishment of ecogame studies spearheaded by Chang and Parham and picked up by Abraham and Jayemanne. Being scattered, older, or coming from different intellectual traditions, this work sometimes escapes notice. For example, McKenzie Wark's reading of *SimEarth* in 1994 carefully demonstrates the power of its abstract simulation to engage players with global issues like climate change. Wark sidesteps the conflict between technophobic Luddites like Louv and those in favor of a more expansive ecocriticism like Chang and Parham, by situating her work amid a green politics that has already embraced the digital technology of the early internet to facilitate networking and information sharing. Here "the digital" is a strength rather than a weakness. It connects users across the world, and it develops systems literacy through simulation.

While video games are uniquely multimodal, combining (textual) narrative, audiovisual, procedural, and interactive or kinetic aspects, their potential to simulate complex ecosystems is often foregrounded in ecogame scholarship (Brown 2014; Smith 2017). One method often used to analyze such simulations attends to what Ian Bogost calls "procedural rhetoric." According to Bogost, the constraints and affordances of game rules contain arguments about how the world is, or should, work. For example, in his discussion of *Animal Crossing* (Nintendo 2001), Bogost (2007) highlights how the game's central mechanic of household decoration pushes a certain consumerist practice, even while the game also suggests an alternative practice of "refinement through elimination rather than acquisition" (272). In short, procedural dynamics in video games stage arguments for how the world is run and by what rules. These rules may mimic those of the capitalist marketplace, but they can also model ecological principles like scarcity, seasonal change, relationships of predation and symbiosis, and entropic tendencies like waste accumulation and soil erosion. In the best of cases, they model both and in doing so demonstrate

the incommensurability between capitalism and the conditions of life on a finite planet.

While proceduralist approaches to ecogames remain common, some scholars have raised doubts about their ability to speak to the ways in which games influence players. As Abraham points out, games that aim to convince players of the urgency or reality of climate change by simulating its processes fail to recognize that individuals are rarely persuaded by models, facts, or rational considerations alone, especially if they already hold negative biases (2018). Instead, Abraham forwards the power of aesthetics, which bypasses any potential conscious objections to provocative simulations. Subtle choices on the level of representation, like peppering a virtual landscape with wind turbines and solar farms, as in the sci-fi shooter *Arma 3* (Bohemia Interactive 2013), do not invite any rational discussion of the viability of renewable energy. Rather, such a move harnesses the more persuasive power of an alternative vision of the future by not presenting it as an argument but by allowing it to operate on a more subconscious, affective level. Other game scholars have raised similar issues with models of persuasion based on facts. Joost Raessens refers to what Per Espen Stoknes calls the "psychological climate paradox," which holds that while the facts are out there, so far, they have not motivated people to climate action (Raessens 2019a, 2019b). To combat indifference, he suggests games should try grounding those facts in relatable, emotionally engaging stories that are in line with people's values, and which point out solutions that are within their grasp.

The problem with many simulation games may not just be that they lack persuasion; they also tend to represent the climate crisis as a managerial issue, one that, given the right resources and their proper implementation, can be resolved within existing ethical and economic paradigms. In other words, while simulation games help players develop systemic literacy, they do not necessarily cultivate ideas of systemic change. Writing about popular climate simulation games, Cameron Kunzelman argues that they position the player as an "agent of the system as opposed to a subject within the system" (Kunzelman 2020). This results in the naturalization of certain systems and a deterministic view of the climate crisis as that which is bound to happen, and to which no alternative courses of history can be imagined. Aaron Long, too, argues for ecogames to situate players differently, not as master builders, but as resilient citizens (Long 2021).

Cross-pollination between ecocriticism and game studies has proven very fruitful, but for a comprehensive study of ecogames, scholars have also had to draw on other disciplines. There are more dimensions to the climate crisis and its playful mediations than ecocriticism can attend to.

That is why in recent years ecocriticism has been caught up with by the environmental humanities, a term that delineates a much wider field of scholarship including the disciplines of environmental history, ecological philosophy, and anthropology, among others (Emmett and Nye 2017, 3). It is also the field of scholarship in which we situate this book. The environmental humanities are characterized by a more radically interdisciplinary attitude, one that is in conversation with the natural sciences. Chang's book *Playing Nature: Ecology in Video Games* (2019b) offers a great example to track this transition. The book foregoes the more ecocritical nomenclature used in her previous work in favor of concepts borrowed from biology (edge effects, mesocosm, entropy), and it reflects more extensively on the ways ecogames are developed, played, and powered. Such budding attention to the political ecology of video games was arguably present from the beginning, for example, in Parham's discussion of ecogames and their implication in neoliberal economics (2015), and Chang's article about the easy co-option and commercialization of pastoral video games and their obfuscation of social and environmental harm (2012).

Inquiries into the political ecology of ecogames have only grown in scope and importance, as evidenced by the surge of interest in the environmental impact of gaming practices (Mayers et al. 2015; Abraham 2022). Such scholarship complicates older ecocritical readings, like Matt Barton's call for more photorealistic representations and more dynamic simulations of weather without thinking through the costs of such carbon-intensive graphical innovation (2008). Paying attention to the materiality and the polluting effects of media production has only become customary in recent years (during the fourth wave of ecocriticism, for those keeping count [Slovic 2012]). But it derives from green media studies, where the politics of globalized labor and e-waste loom large. As we have already seen in film and digital media studies (Parikka 2014; Cubitt 2016; Vaughan 2019), the media industries' carbon footprint and its role in worsening the climate crisis is taken more and more into account.

Finally, a lot of scholarship about environmental video games comes from the social sciences. This kind of work tends to study either player behavior, games reception, or types of environmental design and engagement (Fernández Galeote and Hamari 2021). An excellent review article on the field of environmental gamification by Daniel Fernández Galeote et al. (2021) argues that although there is evidence that ecogames can offer engaging and informative experiences that have the potential to increase environmental awareness, in order to apply gamification most effectively, more data is needed on player identities, player contexts, and the effects of

gamification over time. In addition, Fernández Galeote et al. suggest a range of content and design-based interventions that might make environmental gamification more robust and self-reflective.

Thematic framework

Part I. Today's challenges: Games for change

Most titles explicitly designed as ecogames, which primarily include serious or artistic games, arguably fit into the broader category of so-called "games for change." This term is mainly associated with the eponymous nonprofit organization Games for Change (G4C), founded in 2004 by Benjamin Stokes, Suzanne Seggerman, and Barry Joseph. Among other things, G4C organizes an annual festival showcasing social impact games and providing a public forum for players, game developers, and other industry professionals to meet. Even primarily commercial games that lend themselves to ecological readings may also be productively interpreted within the framework defined by Games for Change as an institution (Stokes et al. 2016; Burak and Parker 2017; Pollack 2020; Salen Tekinbaş 2020).

Over the years, other game festivals (like Indiecade and Now Play This) have added to this effort, featuring program items that showcase and reward socially innovative or progressive game design. In this context, games for change are digital and nondigital games and immersive media that are designed and used with the intention to engage contemporary social issues, address real-world challenges, and drive real-world social change. Their impact consists of real-life consequences, for the world outside the magic circle of the game as well as for the players of the game, during and after play (Raessens 2015, 246–247).

The chapters collected in this part of the book speak directly to this broader definition of games for change. They discuss industry initiatives that advocate for and try to enable more sustainable development practices. They also discuss the possible impact of games with regard to the player's civic and consumer identity as well as their sense of agency, and potential to raise awareness of the existential threat caused by the global "climate crisis" (Carrington 2019; Thunberg 2022, 2). Lastly, they discuss the contexts in which games operate and come to be legible (or not) as ecogames, for example, by highlighting the influence of educational framing and self-imposed player goals, or by elaborating the importance of attending to the complicated interaction between environmental concerns and postcolonial

ones in ecogame scholarship. Thus, while the term "games for change" initially evokes the socially progressive potential of games (which are indeed the main focus of the festivals), our interpretation also explores the change-making potential of—and in—the game industry and ecogame scholarship.

To better understand what we mean by this central notion of "change" and what it entails in the context of the climate crisis, we draw on George Lakoff's (2010) differentiation between two moral systems, a conservative and a progressive one. The conservative moral system includes a number of ideas that oppose the realization of global ecological citizenship while the progressive moral system includes a number of ideas that support it. Games for change are those that argue in its favor. Ecological citizenship involves both rights and duties, for instance, "the right to a non-polluted environment and the responsibility both to refrain from harming the environment and to participate in its preservation and rehabilitation" (MacGregor 2014, 114; also see Raessens 2019a). Recognizing what it means to harm the environment, as well as what it means to protect it, is important in political philosophy because it enables us to decide "who is our friend and who is our enemy, with whom we make alliances and with whom we should fight" (Latour 2018a, 33; see also 2018b). In the words of Chantal Mouffe (2013), it allows us to "think the world politically."

The difference between the conservative and progressive moral systems Lakoff describes can be summarized as follows: a conservative, (neo)liberal capitalist let-the-market-decide ideology (no regulations, low taxes) versus the progressive idea of governmental environmental regulation; a conservative assumption that greed and economic growth are considered to be good in themselves versus the progressive ideas of generosity and degrowth; and the conservative idea of human exceptionalism, "the idea that man is above nature in a moral hierarchy, that nature is there … purely for human use and exploitation" (Lakoff 2010, 74) versus the progressive idea that there is "inherent value in the natural world" (76). This includes the notion that humankind is part of nature, and that we have a duty to nurture empathy for all beings, a duty that entails the solidarity of non-Indigenous people with Indigenous people, and of humankind with nonhuman beings (Morton 2017). These progressive ideas are in line with the central values with which we as editors started this book. We also see them reflected in many of the critiques of capitalism, anthropocentrism, and environmental exploitation launched by the authors in this volume; and finally, we see these progressive ideas imbued in many of the ecogames singled out for analysis, though not always perfectly or without bias, which is why our scholarship is important.

While Lakoff's distinction provides valuable orientation, it should also be critically assessed since it implies a rather binary worldview, which today might be interpreted as contributing to existing political polarization. In popular discourse, the gap between conservative or neoliberal and progressive framing has arguably widened and, in Lakoff's terms, even been "reified" (2010, 77); for instance, through alternative social media platforms that specifically cater to conservative subscribers and reinforce filter bubbles. In this discursive context, identifying environmental concerns where progressive and conservative interests overlap appears vital, not least to facilitate a working consensus across groups and political orientations to back up the necessary societal transformations. For example, Lakoff refers to the notion of a "regulated commons," which alleges that we "all own the air, and that that ownership should be legalized through a trust" (78). Putting a price on (clean) air and applying market mechanisms to regulate it, similar to the EU's emissions cap and allowances system, can be understood as an example of the use of conservative methods to push a progressive agenda. Such examples might meaningfully contribute to reaching global climate goals if implemented in a just and enforceable manner. Depending on the institutional contexts from which they emerge, games for change might help enable the identification of such shared interests in sustainable futures.

However, despite the currency such business-as-usual approaches still have among global political leaders (as well as, no doubt, many gamers), games for change increasingly aspire to take part in a more incisive critique of the climate crisis, hoping to enact more profound transformative change. In this way, games for change are aligned with the leading experts and activists brought together in Greta Thunberg's *The Climate Book* (2022). For these authors there is no question about the cause of the climate crisis and the decades of inaction that predate the issue's high stakes today. They trace the problem to a specific economic system—(neo)liberal, colonialist capitalism—with its focus on free markets, perpetual gross domestic product (GDP) growth, and the exploitation of people and the environment.

Another world is possible. *The Climate Book* also forwards alternative policies based on market regulations, green growth or degrowth, and a break with human exceptionalism and a plea for solidarity with all human and nonhuman beings. To bring about such change, four aspects of activism are brought into focus: "To solve this problem, we need to *understand* it" (3); to stay motivated to fight climate disruption, we should bring *feelings* like "fear, grief and anger" as well as "deep joy, enthusiasm, and gratitude" into our hearths and honor them (339); there is a need for "*alternatives* to current ecocidal practices" (392); and we need "small, individual *actions*"

as well as "collective efforts and *actions*" to bring about "planetary *system change*" possible (5, 354, our italics). These aspects correspond to the basic dimensions of human experience—*knowing*, *feeling*, *imagination*, and *action* (Kattenbelt and Raessens 2003). Together they cover the ways in which the climate crisis is "refracted" in interactive media, according to Roy Bendor (2018) and the Playful Identities research group (Frissen et al. 2015). For Bendor, the issue of sustainability is refracted in interactive media in the same way a glass prism refracts white light into a colored spectrum. Digital media reveal different aspects, or shades, of the climate crisis, making possible the process of creating and exploring progressive ecological identities through play, which can foster transformation (see Table 0.1).

Table 0.1 The refraction of the climate crisis and the different dimensions of change imaginable

Climate crisis refracted as a …	Change in the dimension of …	Progressive ecological identity in the form of …
… lack of understanding of the impact of political social economic systems on the environment.	… system thinking; ecocritical and postcolonial awareness and reflection; ecological thought.	… knowing (reflexivity of thought).
… lack of felt urgency and engagement for individual and collective climate action.	… unlocking strong motivational forces; reaching players at an affective level, involving (also aesthetic) feelings and emotions.	… feeling (intensity of experience).
… lack of alternatives for today's neoliberal capitalism.	… imagining alternative futures.	… imagination (creativity of new ideas).
… lack of individual and collective climate action.	… making other individual lifestyle choices (behavioral changes) and pushing for societal system change.	… acting (actuality and causality of action).

In addition to these different modalities through which change can be brought about, scale also plays a role. Change can be encouraged to occur on a micro-level (involving individuals), on a meso-level (involving communities such as schools and neighborhoods), and on a macro-level (pertaining to larger publics and political agenda). For example, when played at home by yourself, *Walden, a game* (USC Game Innovation Lab 2017) can be considered a "micro" experience: "a gorgeous, meditative experience that will give you plenty of time to reflect" (according to a player's response quoted on the game's website; see Figure 0.4). But when played in schools, using the

Figure 0.4: *Walden, a game*.

Walden, a game: Curriculum Guide (USC Game Innovation Lab 2017), whole classes can learn about the importance of biodiversity and the power of civil disobedience.

The Dutch game *Wijk & Water Battle* (*Neighborhood & Water Battle*) (2015 Grendel Games) is another example of a game that aims to bring about change on a meso-level. In a first round of applications, children from two primary schools in different neighborhoods of the city of Leeuwarden took part in a "battle" that lasted for three months. In the game, whimsical water creatures live in Leeuwarden's water network. Their tiny homes are flooded regularly because of the city dwellers' intensive water consumption. The schoolchildren participating in the battle were given the chance to prevent these little creatures from drowning by managing their own water consumption. Using a smart meter and an app, they were challenged to decrease and spread out their water usage throughout the day—and encourage their family members, friends, and neighbors to do the same (see Figure 0.5).

Ecogames can also change the public and political agenda on a macro-level. For example, *All Rise* is an ecogame being developed by the *Anticiplay* research project at Utrecht University in which players take big fossil fuel companies and other environmental defilers to court (Rees 2023). This game, which is discussed in more detail in the chapter by Joost Vervoort et al. in this book, is inspired by the very popular *Ace Attorney* video game series (Capcom 2001–), where players take on the role of a defense attorney or prosecutor. It is also being made in close collaboration with the social movements (see Van der Heyden 2014) responsible for actual climate cases, like the Urgenda Foundation against the Dutch government, Milieudefensie

Figure 0.5: *Wijk & Water Battle*.

(Friends of the Earth Netherlands) against Shell, and Fossil Free against ABP, the Dutch pension fund for people working in government and education. The game's intent is to inspire players to fight for their rights and to get involved in actual climate cases. Moreover, *All Rise* has pledged to donate all of the funding it has crowdsourced to effecting real-world change by supporting the NGOs Fossil Free and Milieudefensie in their future climate court cases.

Part II. Future worlds: New imaginaries

The second part of the book explores how video games engage in imaginative storytelling to envisage climate futures using tropes, themes, and conventions common in science fiction. Just like climate fiction, the games discussed in this part speculate about the conditions of the environmental crisis, and the ways in which we will have to change ourselves, and our society in order to salvage more sustainable, equitable futures. However, as Gerry Canavan writes in *Green Planet*, an anthology on ecology and science fiction, the genre is animated by the tension between two "loyalties," hope and dread, utopia and dystopia (2014, 1). This tense division is apparent in the games discussed in this part of the book as well. Having spawned in response to and in tandem with the rise of modernity, science fiction is imbued with an ambivalence that characterizes the age's achievements:

the technological advancement, wealth, health, luxury, and leisure time—acquired for some—have come at the cost of alienation, environmental destruction, rising global inequality, pandemics, and a mass extinction that threatens human life as well as countless of nonhuman species.

In some video game genres the techno-utopian impulse that bolsters ecomodernist responses to the climate crisis reigns supreme. Ecomodernists, or proponents of a "good Anthropocene," believe in the potential of technology to curb global warming. They argue that "in the long run, next-generation solar, advanced nuclear fission, and nuclear fusion represent the most plausible pathways" to a sustainable future (Asafu-Adjaye et al. 2015, 23). They advocate for "greater resource productivity" and efficiency, since "more-productive economies are wealthier economies, capable of better meeting human needs while committing more of their economic surplus to non-economic amenities, including … the conservation of nature" (29). As Laura op de Beke (2020) has argued, in the genre of environmental god games, or Gaia games, this is precisely the kind of climate future that is typically played out. Especially since god games (and civilization simulators more generally) use "tech trees" to pace gameplay. Strategy often demands working your way down the tech tree, developing more advanced technologies by expanding industrialization. The environmental solutions, or techno fixes, "unlocked" in this way are then deployed to clean up the environmental devastation with which they were bought.

Ecomodernist narratives and gameplay are also prevalent in planetary colonization games, a genre introduced at length in Paweł Frelik's chapter in this book. They indulge terraforming fantasies in which players tame uninhabitable planets for profit or for the sake of expansion. Such fantasies smack of Elon Musk's particular brand of techno-capitalist entrepreneurship. More recently, however, video games have started to question such narratives of planetary colonization, imbuing these stories with ambivalence and skepticism. For example, in *Deliver Us the Moon* (Keoken Interactive 2018) you play an astronaut inspecting an abandoned outpost on the moon where until recently scientists were working on a solution to Earth's energy crisis by exploring helium as a new fuel alternative. While it is not important to the plot, a thorough search of the station reveals a whiteboard with some calculations on it demonstrating that the project was doomed from the very start. "Unsustainable," it says, in big red letters, underneath a list of reasons why the project would fail, like the cost of logistics and helium's low energy yield. Other subversive games about space exploration discussed in this part include *Outer Wilds* (Mobius Digital 2019), which, as Lauren Woolbright points out in her chapter in this book, drives home the danger

and instability of space, garnering more love and respect for the only planet we will ever be able to call home: Earth.

One of the main arguments wielded by ecomodernists is that the fatalism of dystopian narratives is demotivating, and that it inspires no change. This is a timely concern, given the popularity of postapocalyptic stories in entertainment media, not least in video games. "The sheer number of games developed with postapocalyptic settings and featuring urban spaces in various stages of ruin is astonishing" (Yeates 2021, 118). This postapocalyptic obsession has been brewing for a long time; as Frederick Buell points out in his book on environmental crisis in American literature, over the course of the twentieth century, conceptualizations of crisis shifted from the immediate and spectacular, to the protracted, and mundane. Crisis became a space in which to "dwell," not something to get through (2003, 183). Canavan agrees that what characterizes contemporary fictions of environmental crisis is "a sense that there is nothing left to do but somehow accommodate ourselves as best we can to ongoing and effectively permanent catastrophe" (2014, 10). Such a sense of having to carve out a living from such a new reality pervades postapocalyptic ecogames like *Frostpunk* (11 Bit Studios 2018) and *Floodland* (Vile Monarch 2022).

For Robert Yeates postapocalyptic spaces offer possibilities of "emotional rehearsal" (2021, 123), which indulge a desire to achieve mastery over challenging prospects. In her article on mastery, repetition, and failure in ecogames, Op de Beke outlines the stakes of such anticipatory play, which can serve to foreclose the future, rather than open it up to new alternatives (2021b). Whether dystopian futures inspire transformative change or not, it is clear that as a cultural obsession they make visible anxieties about societal decline, climate change, and ecocatastrophe, in addition to illustrating according to Stephen Joyce the increasing transmedial nature of the media landscape (2018). After all, "transmedia … favours infinitely suspended fictions," and the climate apocalypse, due to its protracted nature and the global distribution of its effects, offers a rich premise for transmedia world-building (7).

Both dystopian and ecomodernist narratives are prevalent in games, but science fiction is too rich and sophisticated a genre to oscillate between extremes for long. As science fiction scholars like Samuel Delany (quoted in Canavan 2014) have argued, it is the interplay between optimism and critique that fosters some of the most powerful engagements in fiction. For example, images of what Delany calls the "Junk City" (3) detail everyday scenes of decline and destitution, while also illustrating the innovative and resourceful ways in which people restore, recycle, and recombine junk

when pressured by circumstances of scarcity. Such "scrappunk" futures have only become more popular and more resonant in the twenty-first century. For example, according to Evan Calder Williams, the concept and practice of "salvage" has become "one of the fundamental structures of thought that shape how we envision future possibility" (Williams 2015, 845). This is especially apparent in video games, "where salvage as both mechanism and aesthetic has spread the widest," since it is a medium in which we are often asked to scavenge, tinker, and rebuild (856).

> That spread is due in part to the kind of meandering, snooping time games can encourage and in part because of item gathering and "crafting" systems … that have become common, rewarding players for scavenging, wreck-diving, and peering under rocks. At the heart of a wider swath of games, however, is an even more basic principle of salvage: that there may be value in the neutral, broken, dead, or passed-over. (856)

Given design conventions like these, Shawna Kelly and Bonnie Nardi (2014) argue that video games could become prime spaces in which to explore futures of scarcity. Take, for example, the garbage city builder *Flotsam* (Pajama Llama Games 2019) in which you build a raft city by roping together driftwood and plastic sourced from the ocean.

Sticking with this example for a moment, it is remarkable that while the game's premise is postapocalyptic, its tone is lighthearted and even tongue in cheek, poking fun at the ways in which hipsterish practices like click-baiting or microbrewing might come in handy after the end of the world. This turn to more lightheartedness, or levity, seems to accompany a recent desire for more optimistic visions of the future, no doubt to balance out the doom and gloom of much of what is on the news. Such stories of hope and transformation are often associated with the aesthetic register and narrative imagination of solarpunk (Williams 2019). Games that offer bright and beautiful climate futures include the game of strategic environmental regeneration *Terra Nil* (Free Lives 2023), as well as the exo-planetary dating sim and deck builder *I Was a Teenage Exocolonist* (Northway Games 2022). Especially the latter demonstrates that solarpunk values go beyond sustainability to include anticolonialism and progressive understandings of race, gender, class, and ability.

Taking the solar in solarpunk seriously, however, means paying attention to the representation of energy and energy infrastructures in games. This is an important angle of analysis championed in the field of the energy humanities. As Op de Beke demonstrates in her chapter in this book, there is

much to be gained from engaging with this body of work; in comparison to novels, video games are often much more explicit in their references to the energy systems on which we rely—and which are in desperate need of being transformed. Many games allow players to play with electrical grids and different fuel options. Moreover, the recent years have seen a proliferation of different energy landscapes in video games, from the pixelated industrial, petrochemical slums in *Norco* (Geography of Robots 2022), to the solar-powered urban, rooftop farms of *Detroit: Become Human* (Quantic Dream 2018). Inspired by Benjamin Abraham (2018), in the case of *Detroit: Become Human*, one could ask about the rhetorical persuasiveness of such subtle, largely backgrounded energy visions. What cultural work do speculative energy regimes in popular media perform? These regimes—called steampunk, solarpunk, atompunk, dieselpunk, etc.—cultivate different sets of aesthetics and different visions for the future, but most importantly, they visualize the pervasive influence of energy systems on matters of urban planning and practices of labor and leisure, and indeed all aspects of society.

Part III. The nonhuman turn

The third part collects chapters that engage with the nonhuman both in subject matter as well as philosophical outlook and practice. Nonhuman actors and agencies have not traditionally stood at the center of much humanities research. After all, to the *human*ities, the human has always been identified as the driver and focus of history, language, and culture, in such a way that it has blinded scholars to the importance of nonhuman actors in global, historical processes. In the twenty-first century such blindness can no longer be tolerated (if it ever could). Species are going extinct at an unprecedented rate due to unsustainable development, reckless resource extraction, and the changing climate, and the gaps they leave in the slowly unraveling web of life shine a light on the important roles nonhuman species play, both ecologically and culturally. We inhabit multispecies worlds and our histories, design philosophies, and ethics ought to accord with that reality. Moreover, not only do we need to come to terms with the importance of nonhuman animals, but we should also recognize the nonhuman agency of assemblages of inert matter, or technologies whose effects and abilities may lie outside of our control. Fortunately, there are a number of theoretical fields of scholarship committed to this work, contributing to what Richard Grusin calls "the nonhuman turn" (2015).

The nonhuman turn is "engaged in decentering the human in favor of a turn toward and concern for the nonhuman, understood variously in terms

of animals, affectivity, bodies, organic and geophysical systems, materiality, or technologies" (vii). Since the last decades of the twentieth century there are various theoretical fields of scholarship engaged in this effort. The ones summarized by Grusin include: actor-network theory, affect theory, animal studies, assemblage theory, neuroscience and studies of AI, new materialism, new media theory, the philosophy of speculative realism, and systems theory (viii–iv). To this list we would add disability studies and some branches of posthumanist scholarship, both of which are invested in a deconstruction of the category of the human to expose its false, or exclusionary premises. In ecogame scholarship engagements with the nonhuman take on a variety of forms, drawing on some, though not all of the theoretical traditions listed by Grusin. For brevity's sake we distinguish between three different thematic approaches: Affect and embodiment, human–animal relations, and the vitality of systems and technologies.

Affect and embodiment

One way of engaging the nonhuman in video games is to ask about embodiment. For feminist new materialism, embodiment is key because, as we have learned from disability studies, bodies are willful entities that condition our experience of the world. Bodies are porous, too, always in contact with entities, forces, and atmospheres that impact their ability to function. It is in these entanglements that new ethical and political connections can be made, exposing shared interests, associations, relations of kinship, and so on. But how do we make such connections across the dividing line of the computer screen—to entities and environments composed of bits and bytes? There are no straightforward answers here. "How we come to feel embodied in video game play is much more complicated than simply stepping out of one world and skin and into others" (Keogh 2018, 3). For Brendan Keogh the go-to metaphor of "immersion" is insufficient, even damaging, in the sense that it fuels one of the central myths of video game theory: the belief in "an effortless transferal of agency into a virtual world to take on a virtual body" (6). According to Keogh, subjectivity is never transported or immersed; rather, it is distributed over an assemblage of bodies: eyes, ears, thumbs, prosthetics (controller, mouse, keyboard), interfaces, and player characters. Our experiences of game space, and any environmental relationships we may cultivate inside of and to that space, depend on the nature of the distribution of our subjectivity across it.

Through innovative game design, video games can challenge our anthropocentric biases in favor of more biocentric ways of looking at the world, by situating us differently in the landscape. For example, Adena

Rivera-Dundas argues that video games can "manipulate expectations of interactivity and experiences of time within their nonhuman worlds in order to disrupt Enlightenment-era hierarchies of domination and control" (2017, 122). Video games typically stage the relationship between players and the environment as one of domination, resting on mechanics of traversal, exploitation, or violence. What if we were to stage it differently? In her discussion of walking simulators, Rivera-Dundas argues that through careful delimitation of the player character's movement and identity, the nonhuman world is granted a sense of vitality by being comparatively more mobile, more detailed, and more alive. For example, in *Proteus* (Ed Key and David Kanaga 2013), players move at a relatively slow walking pace, which means they are allowed to observe more closely and more carefully the flora and fauna that surrounds them. Elsewhere in the game, by speeding up the time between seasons, *Proteus* also gestures at the deep(er) time of environmental processes, as well as the finality of death. Such nonhuman temporalities are also of interest to Merlin Seller (2020), whose paper on the Anthropocene simulation game *Lichenia* (Molleindustria 2019) highlights how it engages the slow, looping temporalities of ruination and rewilding, as well as the more rapid waves of change that occur after natural disasters. Seller is also attentive to the affective power of this looping experience of growth, death, and regrowth. The use of slowness, rhythm, and repetition, and the strategic delimitation of player agency, can attune players to life cycles and lifeworlds that are grander and slower, or more minute than those we are familiar with (Caracciolo 2022).

Human–animal relations

In medieval Europe many carnival games involved pigs. In the "pig-beating game" four blind men would be armed with clubs and told that if they beat a tied-up pig to death they could keep it (Porck 2020). The game sounds more like a spectator sport, exploiting the similarity between a pig's squeals and human shrieks of pain as the blind men would beat each other with sticks. Likewise, the fun of a game of greased pig wrestling is in seeing people give chase while slipping and sliding in the mud until they are quite as dirty as the hog they are trying to pacify. In short, although games like these smack of animal abuse, the real objects of their mockery are often the human participants. There is something about playing with animals that levels presumed anthropocentric hierarchies.

In recent times, such games of "animal mayhem" are back (Caracciolo 2021), offering a stark contrast to more conventional titles like *Shelter* (Might and Delight 2013), *Gibbon: Beyond the Trees* (Broken Rules 2022), and *Endling:*

Extinction Is Forever (Herobeat Studios 2022) in which beleaguered animal protagonists primarily serve as objects of empathy. In *Goat Simulator* (Coffee Stain Studios 2014) players rain down chaos on the city by embodying an indestructible, shapeshifting goat whose lashing, sticky tongue can be used to fling objects around and cause havoc in the streets. For Marco Caracciolo the goat embodies a "strange stranger" (2021), Timothy Morton's term for entities that defy human categorization since it is both animal, object, and something more ontologically murky. *Untitled Goose Game* (House House 2019) also upsets human–nonhuman binaries, not by erasing them, but by flipping the script and showing how due to their gullible blindness to nonhuman agency human characters are roped into the scheming goose's antics. The game thus highlights "the creative possibilities of interspecies collaboration" (Caracciolo 2021).

This collaborative mode of play offers interesting new ways of engaging with animals as peers. The experimental game app *Pig Chase* (Utrecht School of the Arts and Wageningen University 2012) was developed in the Netherlands by artists and researchers to complicate the relationship between consumers and farmed pigs. Human players drag their finger across a touchpad causing an attractive light to track across an interactive screen inside a pig pen. If the human can persuade a pig to follow the light with its snout to a corner of the screen, the pig is rewarded with a lightshow. *Pig Chase* draws attention to the commonalities between humans and pigs, like our capacity for boredom and our desire for play. Games of collaboration like these sidestep the pitfall of games that profess to facilitate a becoming-animal that is seamless, which raises the illusion that "players may really be able to understand and appropriate animal ways of life" (Caracciolo 2021). As Tom Tyler and Jonne Arjoranta demonstrate, video games can certainly evoke different sensoria using synesthetic design strategies like "smellovision," but these are far from comprehensive (Tyler 2013, 2022; Arjoranta 2019). Games of collaboration, on the contrary, leave space for animals to retain an element of the unknown and the unpredictable.

Melissa Bianchi has also looked at "awkward animal avatars" (2015). Bianchi argues that video games can aid us in rediscovering kinship with cephalopods. *Octodad: Dadliest Catch* (Young Horses 2014), for example, "trouble[s] the conventions of anthroponormative play" by simulating the ungainliness of octopus physiology on land, making challenges of dexterity out of normal human acts like walking, dressing, and interacting with items (Bianchi 2017, 138). Moreover, Bianchi argues that some video games foster what Donna Haraway would call tentacularity, by asking the player to distribute their subjectivity across a number of different digital platforms

and avatars, thereby calling attention to the nature of video games as player–machine assemblages. For example, when playing the squid-themed shooter *Splatoon* (Nintendo 2015–2022), you have to tend to the TV screen, the Wii U console's buttons and control stick, as well as its tablet and stylus in the manner of a many-armed creature (Bianchi 2017, 147).

As Caracciolo points out, games like the ones mentioned above may cultivate more ecological thinking but they do so using cultural registers that are uncommon in this discourse, like absurdist or slapstick comedy. A lot of this environmental weirdness provides good "clickbait," which means there is no scarcity of playful experimentation with nonhuman players or multispecies games online. For example, based on footage shared on social media the game *Stray* (BlueTwelve Studio 2022) was enjoyed by human players as well as their feline companions (@catswatchstray on Twitter). Moreover, in a recent article, Mark Johnson and Nathan Jackson (2022) investigate the notion of nonhuman game streamers, and they offer as a case study "a live fish observed by a motion tracker 'play[ing]' a game of *Pokémon Red*" (436). As the authors point out, nonhuman players raise important questions about the constantly shifting definitions of agency that inform contemporary gaming culture. Nonhuman players also feature in Michelle Westerlaken and Stefano Gualeni's game design experiences with ants (2016), and in Westerlaken's other work. They demonstrate that games are increasingly perceived as an opportunity for interspecies understanding and mediation.

The vitality of systems and technologies

If you take your hands off the controller or the keyboard, does the game still play? Some signs would suggest that it does. When player input comes to a halt in some games this leaves space for environmental processes to become foregrounded, exposing a "gently stirring rhythm of life" (Galloway 2006, 8). During these moments we are witness to what Alexander Galloway calls "the ambience act" (10). The ambience act is a diegetic machine act, which means it takes place within the story world, but instead of being executed by the player, it is run automatically and independently of player input by the machine. Machine acts, for Galloway, are expressive of "the vitality of pure matter" (8). Galloway's phrasing here is reminiscent of Jane Bennett's notion of "vibrant matter," which urges us to look at inanimate matter and to acknowledge how it acts on us, and in response to us, in recalcitrant and surprising ways (2009, viii). Bennett's project theorizes the "vitality of (nonhuman) bodies," which have "the capacity … not only to impede or block the will and designs of humans but also to act as quasi

agents or forces with trajectories, propensities, or tendencies of their own" (viii). Disruptive machine acts that behave like vibrant matter include glitches, software errors which can be grumbled at or exploited in creative gameplay. Paolo Ruffino, too, lists video games that play themselves among the games of the post-Anthropocene: posthumous games that evoke a world without humans (2020). He also lists idle games, recorded gameplay meant for viewing, the use of bots in MMOs, procedurally generated games, and games of inhumane boredom as trends in nonhuman gaming from which we can learn about the limits of human agency and "the complexities of our situated encounters with the nonhuman" (22).

Alenda Chang suggests another category of nonhuman games that she calls "bit-narratives," named after the "it-narratives" of the eighteenth and nineteenth centuries that centered on the circulation of inanimate objects during the early stages of industrial capitalism (2019b, 124–134). She explains that in more recent years this tradition has survived in the form of the commodity exposé. Bit-narratives are stories or materially self-reflexive games that feature computers or digital objects as protagonists. For example, the mobile game *Phone Story* (Molleindustria 2011) exposes the socially and environmentally exploitative practices behind the production of mobile phones, from coltan mining to sweatshop labor. It remains quite rare for video games to acknowledge their carbon footprint in-game, or to gesture at the material cost of digital entertainment, although exceptions do exist (Milburn 2016; Nguyen 2017). Other ways of engaging the nonhuman in ecogames involves focusing on aspects of hardware and software like the variations of trees and plants available in asset stores (Chang 2019a), or the flat ontology of game engines like *Red Dead Redemption*'s (Rockstar San Diego 2010) Euphoria (Holmes 2019).

Part IV. Critical metagaming practices

The final part of this book is dedicated to how critical metagaming practices can facilitate and perform ecocritical thinking; as such, it acts as an "outlook" by shifting the focus from games-as-texts, which is still the dominant mode of engagement in most ecogame literature, towards games and gaming as sites for strategic appropriation and even resistant practices. The part's focus on practice does not only describe the research "object" of the chapters it comprises but also points to a specific practice-oriented perspective, from which green media can be (re)assessed. While this is not yet common in ecogame studies, we can refer to the work of filmmaker Anuj Vaidya (2020), who offers a practice-oriented rethinking of the concept of

ecocinema. Drawing on his own experience and activities, Vaidya shifts the focus from ecocinema as a genre towards "an embodied practice" (59), which means exploring sustainable ways of powering film production and distribution via low-impact methods (like using hand-powered tools) and distribution through performance rather than streaming. In other words, Vaidya foregrounds "thinking cinematically, [which] means thinking with the apparatus (camera, projector, etc.) and the practices (story-boarding, editing, etc.) that cinema engenders" (50), rather than representations of ecological threats or sustainable alternatives.

A similar practice-oriented perspective on ecogames might expand the discourse beyond ecocritical close readings of individual games. Looking at what the player "does," beyond the framing suggested by the game, broadens the applicability of ecogames as a sensitizing concept. For instance, understanding parenting as an example of "epistemic practices" (Zamora and Herzog 2021, 38) suggests that even games without any explicit environmentalist agenda, like *God of War* (Santa Monica Studio 2018), may facilitate playful practices that speak to environmental awareness and sustainability orientation. After all, playing a parent involves "knowledge production,… sharing information and passing on knowledge to others" (4), which is what often prompts young parents to profoundly rethink their impact on the environment and the responsibility they have for passing it on intact. This example indicates why and how an emphasis on practice can be fruitful in combination with more traditional ecocritical investigations. Metagaming is a playful practice, though for the sake of clarity it needs to be differentiated it from an increasingly broad range of other "green practices" and "eco-lifestyle[s]" (Lewis 2012, 315, 318), which are also characteristically playful but do not use games as material. Below, we briefly differentiate between three types of "green" metagaming practices, even though primarily the last one will be relevant for the chapters in this part: playful practices, green practices that use games as "metaphor," and using games as material or tools.

Playful practices

The first type includes examples such as situated practices like seed bombing and guerrilla gardening, which can be productively understood, both in their historical contexts and as "blueprints" for more contemporary forms of "green citizenship" (Lewis 2012, 316), through the concept of games and play, starting, for example, with their playful appropriation of military language. Playful "green practices" also include more marginalized and ambivalent activities, like voluntary dumpster diving, and other playful

and/or gamelike practices similarly informed by principles such as self-imposed constraints, bricolage, or collective creativity. Dumpster diving has explicitly been defined and studied as a critical practice by Turo-Kimmo Lehtonen and Olli Pyyhtinen (2021). They specifically acknowledge that dumpster divers do not "simply [operate] outside consumer society [but] play with notions of value at its margins" (5), and that "dumpster diving achieves a "play form," [in other words], it becomes a sociable end in itself" (11). Inversely, based on ethnographic research, they state that a common intrinsic motivation among dumpster divers is the "refusal to play the game that is given as self-evident" (16), thus framing the negotiation of late-capitalist food systems as "gamelike." Anecdotes from an ethnographic inquiry into dumpster diving communities in Germany (Kühn 2019) suggest that the practice is—like play—characterized by unresolved ambiguities, oscillating between activism and social experiment, being illegal but not socially harmful, being voluntary for some but helping others make ends meet. Like play communities, these groups develop a shared language and knowledge. They develop their own rules and behavioral "codes" (e.g., using plastic gloves and moving slowly to avoid cuts and infections or keeping quiet to avoid disturbing others). Finally, the groups develop their own rituals such as collectively inspecting the group's haul on a nearby meadow after a dive. Another, more explicitly "designed" example of subversive gamification is pursued by the GamiFOREST project at the University of Tampere, which advocates reimagining the forest as "playspace" to foster climate awareness, via different "ways of gamifying forests."

Green practices that use games as "metaphor"

A second category includes "green practices" that use games as "metaphor." For example, the short video *Game of Moulds* playfully features time-lapse footage of growing fungi set to the soundtrack of, and mimicking shot for shot, the iconic intro to HBO's TV series *Game of Thrones.* More directly "on topic," the performance art performance *Forest* by Emke Idema (n.d.) uses a giant board game as a spatial metaphor to explore a speculative dendrocene future, an "age of the tree," in which "felling or even damaging trees has become [synonymous with] murder." Not only designers but also academics have used metaphors of games and play to make sense of creative ecopractices. For example, Allen Abramson and Robert Fletcher (2007) understand rock climbing and "adventure sports" (3) in general as "deep eco play," or as an unfolding "epic struggle between two opposed forces,… the climber and the particular configuration of rock" (6), which modulates the practitioners' relationship to nature. More recent practices that have

been summarized using the metaphor of "hacking the Anthropocene" (Hamilton et al. 2021, 13) also emphasize that "Anthropocene politics are staged as both urgent and playful" (12). These practices are relevant in that they prototype alternative modes of civic participation and engagement (though not always explicitly environmentalist ones). For example, recent practices like yarnbombing are discussed as examples of contemporary "DIY citizenship" (Orton-Johnson 2014) and allow for the playful exploration of more sustainable versions of the self, using a distinct "'maker' identity" (145).

Using games as material or tools

While the practices mentioned above are relevant in broader discussions about play and the ecological self and deserve to be studied further, this book focuses on a third category, which more narrowly defines metagaming as using games as "material" or tools to "think through." In their eponymous book, Stephanie Boluk and Patrick LeMieux (2017) similarly describe metagaming as "mak[ing] a game out of a game" (2), referring to examples like "complex house rules, arcade cultures, competitive tournaments, and virtual economies" (3) built around digital and analog games. Accordingly, "metagames transform video games from a mass medium and cultural commodity into instruments, equipment, tools, and toys for playing, competing, spectating, cheating, trading, making, [and] breaking" (4). In addition to the practices focused on altering the experience of the game, we also introduce a focus on those practices that "think through" games about something else entirely. Academic interventions like "ClimateFortnite" (Boykoff 2019, 22), which involved a team of environmental scientists streaming the popular battle royale game *Fortnite* (Epic Games 2017–) while talking with fellow players about the climate crisis, can thus be placed in this category. The project alludes to the potential of tapping into massively popular games like *Fortnite* as unique communication channels with teenagers and young adults, but—by design—it only reached a small audience and could not be maintained or replicated. Using examples like these as a jumping-off point, the chapters compiled in this part explore "how [players] do things with videogames" (Bogost 2011), use them as material or simply as inspiration for individual and/or collective ecological practices that are playful or even metaludic (i.e., giving rise to new, emergent rules of playing "with" the game rather than abiding by its own rules).

Operating with these three tentative categorizations allows for differentiating "green" metagaming from related terminology, for example, what Pablo Abend, Benjamin Beil, and Vanessa Ossa call "playful participatory practices" (Abend et al. 2020). With that term, the editors of the eponymous

anthology refer to "playful appropriations of media technology within current digital media cultures" (1). They situate such instances of "co-production, co-creation, and co-creativity" (3) as extensions of Henry Jenkins' notion of participatory cultures. Thus, while they discuss similar practices (e.g., "modding" [33] or "livestreaming" [75]), Abend, Beil, and Ossa are more concerned with the game industry and culture (i.e., participation as opposed to rampant commodification). Instead, this part of the book considers gaming practices as performative engagements with issues like sustainable futures. The term implicitly acknowledges the "latent contradiction between media as 'institutionalized structures, forms, formats and interfaces for disseminating symbolic content' … and as an 'open set of practices relating to, or oriented around, media'" (Lünenborg and Raetzsch 2017, 13) with the goal of "question[ing] the analytic primacy of media as technologies or as institutions" (25), which is still dominant in a lot of contemporary ecogames research. In our thematic context, this distinction between media objects and media practices can refer to creative playing practices that prompt or are deliberately extended into labeled art exhibits as in the case of the work done by the artist duo Eloïse Bonneviot and Anne de Boer. They often stage workshops and performances aiming to (re)experience the virtual ecologies of video games like the space exploration game *No Man's Sky* (Hello Games 2016) and *Eco* (Strange Loop Games 2018) (Op de Beke 2022). To account for these contradictions, Margreth Lünenborg and Christoph Raetzsch (2017) define the role of media in social movements and other contexts as "complex sociotechnical institutions" (17) rather than mere communication channels, which implies an understanding of those that engage in or observe them as "performative publics" (26).

To illustrate this tension between (para)text and practice, consider, for example, the self-imposed challenges originating in player communities for games like *The Sims* (Maxis 2000), which dictate alternative goals and playing conditions and are organized via *YouTube* and other social media platforms. These challenges are usually valorized for offering original, well-balanced metagaming rules that increase gameplay variability, but occasionally they touch upon pertinent societal and lifestyle aspects, including sustainability. They are often archived on dedicated websites and, thus, gradually develop from grassroots practices into de facto "genres" if they turn out to be popular enough. For example, the "Apokalypse Challenge" turns the casual slice-of-life simulation *The Sims* into a survival game, in which players "get to live through their child and teen years as if their life is normal but once they move out of their family home the apocalypse starts." This suggests that "simulat[ing] futures of scarcity" (Kelly and Nardi 2014), by which

games can raise ecological awareness, is not just an established gameplay trope in commercial games but, increasingly, a metagaming principle that audiences gravitate towards, both because it is recognizable and spreadable (for instance, by live streamers; see Jenkins, Ford, and Green 2013), but also because it creates interesting choices and gameplay constraints. Another example is the "Veggie Farmer Challenge," also invented for *The Sims*, which requires "play[ing] through five generations with each one being obsessed with a specific type of vegetable and the color of that vegetable, and they'll be only allowed to earn money through their vegetable crop sales." The *Ultimate Sims Guides* website demonstrates that devising these challenges as metagames is an inherently participatory process as commenters often suggest their own challenges or variations. For example, a player called Leontine proposes a "Gardening Challenge" in which a sim needs to live outdoors and either eat or sell vegetables they planted themselves. These challenges evidently "remix" the gameplay systems of the host game in creative ways, but they simultaneously explore individual pathways to socio-climatic imaginaries as defined by scholars like Manjana Milkoreit (2017).

In addition to decentralized metagame challenges emerging from player communities, there are a few institutional initiatives that have selectively used games as "material" to promote climate awareness. For example, the esports organization FlyQuest devised a campaign to crowdsource the planting of trees called *TreeQuest* in 2020, using its own popularity and the League of Legends Championship Series (LCS) as a platform. The campaign comprised its own metagaming rules: planting one tree per in-game kill by FlyQuest players, ten trees for every Ocean Drake taken by any team, and a hundred trees for every FlyQuest victory. Thus, rather than arbitrarily donating to reforestation efforts, the organization tied the societal benefits to in-game events and conditions, appealing to the internalized logic of (digital) gaming culture.

Published research on this third category of playful green practices which we call metagaming is still scarce. An early example is Cameron Kunzelman's article on playing *Minecraft* as a vegetarian (Kunzelman 2013), informed by the author's horrifying experience of having to kill a pig in the game to acquire food and survive. The notion of performing vegetarianism as a distinct "style" of "being ecological" (Morton 2018) has proven conceptually productive. In response to Kunzelman, James Stanescu notes that "play[ing] as a vegetarian/vegan" "does not usually mean avoiding hunting or domesticating" but primarily "not eating meat that occurs/drops as premade" (2013). Michelle Westerlaken (2017) reflected on her own "vegan

run" of *The Legend of Zelda: Breath of the Wild* (Nintendo 2017), in which she approaches veganism as a "general and interpretable ideology, not a strict set of rules" (5). That is, by emphasizing the more paidic quality of her own metagaming approach, Westerlaken reflects on her idiosyncratic experience of veganism through Michel Foucault's notion of "self-fashioning" (9). She points out the scope of these often-marginalized practices, claiming that vegan player communities exist for games such as "*Stardew Valley*, *Skyrim*, *Oregon Trail*, *The Sims*, *Minecraft*, *Fallout*, *Civilization*, and *DayZ*" (3). As these studies illustrate, "vegan runs" as a type of metagaming practice can raise important questions pertaining to the definition of vegetarianism as a "social identity" in real life (Nezlek and Forestell 2020, 45).

Another area of existing research on green metagaming practices includes ecomodding, which means inserting ecological sensibilities into commercial games by modifying them, often using tools provided by the games themselves. Kyle Bohunicky (2017) makes important observations on how these mods question the procedural rhetoric built into the original games, "confronting players with missing animal populations, and perhaps a degree of unease over *Skyrim*'s speciesist tendencies" (81) or how "romantic environmental mods" (83), improving the rendering of landscapes in *The Elder Scrolls V: Skyrim* (Bethesda Game Studios 2011), may reenact similar reductionist interpretations of the natural sublime as those pioneered by Edmund Burke and eighteenth-century landscape painters. However, Bohunicky's article focuses more on the mods as (para)texts than on (eco) modding as critical practice. To complement this perspective, their text can be read against Nicole Kurashige's (2019), who defines game mods as "(counter)public discourse" (2) and "as responsive or reactive forms of digital rhetoric and composition" (16) that allow players to "challenge, resist, and subvert the procedural rhetoric encoded in a game" (2). This text, similar to an earlier analysis of "rhetorical strategies" in game mods (Werning 2018, 308), frames modding as a discursive practice or, as defined by Stefan Werning, an "ongoing conversation" (317) rather than a collection of interconnected, derivative "texts."

Given the scarcity of research on metagaming as a green practice, it is important to also look beyond the disciplinary boundaries of media studies, for example, towards musicology, which brings into the picture studies like Kate Galloway's (2020) article on soundwalking in *Stardew Valley* (Concerned Ape 2016). Soundwalking, which straddles the line between "creative and research practice," is defined as "any excursion whose main purpose is listening to the environment" (166). That is, Galloway essentially "remediates" this originally embodied practice within the virtual environments

of *Stardew Valley*. Her method does not have an explicit ecological focus but is more concerned with the RPG genre itself; still, observations on "the varied mix of animal sounds" (168) or how the game acoustically marks the "changing of the season [which] brings about different wildlife encountered in the valley, shifts in the characteristics of the valley's flora and fauna, and fluctuations in the resources available for foraging" (171) suggest ample potential for negotiating questions of environmental literacy and fostering players' awareness of their natural surroundings.

Pushing the boundary of green metagaming practices, the chapters in this part specifically explore the conceptual link between metagaming and the need for shared imaginaries of sustainable futures. Authors like Amitav Ghosh and Roy Bendor agree that the climate crisis is exacerbated by a concurrent "crisis of the imagination" (Ghosh 2016; Bendor 2018, 130–131), the consequences of which are anything but imaginary. As we fail to imagine ways to avoid or at least mitigate the climate crisis and develop more sustainable future communities, public support for important initiatives is being eroded, and the legitimacy of climate advocates and political leaders is called into question. According to Bendor, playing games as "unfinished media" (Bendor 2018, 146) enriches the imagination and may make speculative future scenarios appear attainable and worth the effort; even more so, using games as material to collectively envision alternative ways of "doing things" more sustainably can be even more empowering and inspire practitioners to collaborate in writing the rules of these "imaginary worlds" (148) rather than "just" playing by them.

Book structure and chapter outlines

Part I. Today's challenges: Games for change

The chapters collected in Part I speak to the role of games and the game industry in fostering progressive change and climate justice, focusing on matters of terminology, design, impact, and engagement. In her chapter ("Change for Games: On Sustainable Design Patterns for the (Digital) Future"), Alenda Chang examines ecocritical initiatives emerging from within the digital game industry, specifically the Climate Special Interest Group (SIG) of the International Game Developers Association (IGDA). She explains how these initiatives advocate for designing games that feature "green content" with overt environmental messages, aiming to bypass or break psychological barriers for environmental action. In addition to these

"matters of content," Chang also discusses so-called "matters of context": the urgent call to minimize the carbon footprint of ecogame production and consumption. In doing so, her chapter aligns with Sonia Fizek's chapter on the rhetoric of the Association for UK Interactive Entertainment (Ukie) *Green Games Guide* and Rainforest Scully-Blaker's on alternative modes of consumption that exert pressure on and promote change within the game industry. Importantly, Chang demonstrates the multiplicity of the term "games for change," a motif that the following chapters expound on and present in different variations.

For example, Péter Kristóf Makai's chapter ("Do You Want to Set the World on Fire? Amplifying Player Agency to Demonstrate Alternatives to the Climate Crisis") starts off this discussion with powerful case studies of two games: *Fate of the World* (Red Redemption 2011) and *Democracy 4* (Positech Games 2022). Both games are entertainment products that simultaneously explore a vast amount of environmental data and concepts. Makai calls them "social impact games" and investigates how they model the "wicked problem" of the climate crisis, dwelling particularly on the ways in which they situate players as agents in interrelated systems, differentiating between representations of change on a micro- (individual cognition or behavior), meso- (neighborhoods or local politics), and macro-level (national or international policy agendas and imaginaries). This distinction is also productive in other analyses of simulation games in this book, like Paweł Frelik's reading of energy systems in planetary simulation games. Makai contrasts his case studies, and particularly their precarious framing of human agency within climate systems, with two recent sustainability-themed expansions for *The Sims 4* (Maxis, The Sims Studio 2014), a clear-cut entertainment game franchise that simulates a single household. While the comparison establishes a broad spectrum of potential "impact games," Makai cautions that easy gameplay and the "outsize effect of player agency" in *The Sims 4* may fuel a consumerist fantasy rather than inspire critical thinking.

Makai's reflections on difficulty depend on context, especially the player's competence and previous experience with similar games, which is an aspect that Hans-Joachim Backe elaborates upon with his chapter ("Between the Lines: Using Differential Game Analysis to Develop Environmental Thinking"). Backe shifts the focus from specific games to the players and the impact they have on the ecocritical potential of play. The commercial titles he draws on as case studies exhibit similar issues as Makai identified in *The Sims 4*, but Backe proposes harnessing the potential of idiosyncratic, non-normative playing practices for educational purposes. He highlights how video games are experienced and understood very differently depending on

the context of play, taking into regard, for instance, the player's familiarity with the genre or the experience of solitary as opposed to cooperative play. With this perspective, Backe seeks to intervene in ecogame criticism that would preemptively dismiss titles like *Minecraft* or *ARK: Survival Evolved* (Studio Wildcard 2017) as "games for change" without considering alternative ways of playing them. The importance of play, and game reception is also reflected on by Gabrielle Trépanier-Jobin, Maeve Charre-Tchang, and Sylvie Largeaud-Ortega in this book, who report on a large-scale reception study of the diving game *ABZÛ* (Giant Squid Studios 2016).

Thomas Bjørner and Henrik Schønau-Fog's chapter ("A Dynamic Engagement Model to Provide Ecological Awareness of the Climate Crisis through Video Games") also foregrounds the individual player experience, but from a more general perspective, seeking to extrapolate a more holistic conceptual model. Their dynamic engagement model (DEM) facilitates ecogame analysis by mapping how, as "games for change," they can raise awareness of the climate crisis and foster sustainable behavior change. The model comprises characteristics of persuasive engagement before, during, and after gameplay, as well as during moments of dis- or reengagement, thereby acknowledging how ecogames need to be understood as part of a broader consumption experience. The model is compatible with most if not all games discussed in this book as it applies equally to "serious" and entertainment games; in fact, the primary case study, *Cities: Skylines* (Colossal Order 2015), is both a bestselling strategy game and available as a custom TeacherGaming version for educators worldwide (Wawro 2018).

The next two chapters in this part bring ecogame studies into conversation with postcolonial criticism. In "Postcoloniality, Ecocriticism and Lessons from the Playable Landscape," Soraya Murray draws on insights from postcolonial (game) studies to critically reassess how players—by engaging in "intended gameplay," which Backe refers to as the "orthogame" in his chapter—are exposed to certain assumptions embedded in video game environments. For example, Murray criticizes exploitative colonial attitudes within many game spaces and genres, starting with *Sid Meier's Civilization* (MicroProse 1991). In that regard, the chapter can be read alongside Merlin Seller's contribution to this book—equally interested in landscapes—which deconstructs the technical makeup of in-game environments in a discussion of the colonial implications of the lawn. On a more affirmative note, Murray also acknowledges the alternative, more sustainable relationships to the land forwarded in ecogames like *Firewatch* (Campo Santo 2016), *Flower* (thatgamecompany 2009), or *Walden, a game* (USC Game Innovation Lab 2017). Her critique of survival games like

Minecraft but also her emphasis on the "critical value of counter readings" directly connect with Backe's aforementioned chapter; Backe's advocacy of non-normative playing practices may offer a remedy for neocolonial bias in games and aligns with Murray's call for more "nonideal" playing styles of "ideologically difficult" games in important gaming paratexts like Let's Play videos and online games journalism.

Souvik Mukherjee continues this line of argumentation with a specific focus on narratives of dominance that underpin popular video game tropes like exploration and empire building. His chapter ("No Cyclones in *Age of Empires*: Empire, Ecology, and Video Games") explicitly formulates the need for "postcolonial ecocriticism" that considers how human agency, identity politics, and diversity intersect with climate politics in digital games. Such a theoretical position would help unlock the full potential of games for "modelling the complexities of the ecological crises and countering stereotypes" as well as their "potentially significant influence on shaping public perception around environmental issues." For example, Mukherjee's nuanced investigation of animals and their connection to representations of Indigeneity in games like *Red Dead Redemption* and *Far Cry 4* (Ubisoft Montreal 2014) provides a valuable context for Melissa Bianchi's analysis of animal photography as a gameplay trope, which may easily reenact neocolonial ways of "looking" at in-game fauna and flora.

Finally, the chapter by Joost M. Vervoort, Carien Moossdorff, and Kyle A. Thompson ("Games for Better Futures: The Art and Joy of Making and Unmaking Societies") outlines a logical next step given the different interpretations of "games for change" featured before. They advocate for making games that not only reflect but actively foster system change by rethinking and dismantling societal institutions. The authors aptly remark that many "serious" ecogames, despite being designed for that purpose, "have yet to have an impact at scale." Inversely, commercial AA and AAA games have grown to eclipse other media in size and intensity of engagement but, not least due to their complicated production process and desire to reach the broadest possible audience, they are still slow to meaningfully explore socio-ecological crises and sustainable futures. The authors consequently argue for breaking down barriers between more narrowly defined "games for change" and commercial titles. For that purpose, they reframe and actively use crowdfunding as an "interaction ritual" and draw on their own Kickstarter campaign for a game about taking companies to court for their ecological and societal transgressions as a case study. While Chang's chapter outlines ecoconscious change "from within" the games industry, Vervoort, Moossdorff, and Thompson emphasize external forces such as

crowdfunding to highlight the malleability of institutions as well as the activist potential of ecogame development.

Part II. Future worlds: New imaginaries

Part II comprises chapters that explore the kinds of speculative storytelling video games engage in and the critical engagement with the climate crisis that is enabled thereby. Rather than start this section of the book with a straightforward example, we kick off with a chapter that does a bit of preparatory work. In "Climate–Game–Worlds: A Media-Aesthetic Look at the Depiction and Function of Climate in Computer Games," Sebastian Möring and Birgit Schneider propose a framework to conceptualize climate or weather in games, using as an example the online multiplayer crafting game *Eco*. The chapter aims to support scholars and students who seek to make climate and climate change legible in games, even if they do not explicitly announce it as a theme. The framework helps readers recognize the way climates, biomes, and environments are featured in games, and how they can be read ecocritically. This forms a useful start, since the other chapters in this section almost exclusively discuss commercial games whose environmental or climate rhetoric is made explicit through interpretation.

For example, the next two chapters, which are well read in tandem, discuss big-budget postapocalyptic games whose environmental themes might not be immediately apparent. They do, however, engage the issue of an ecologically diminished future, and in doing so posit what can be understood to be a grim climate future. In "Healing a Life out of Balance: Slowness and Ecosophy in *Death Stranding*," Víctor Navarro-Remesal and Mateo Terrasa Torres draw on the work of theologian Raimon Panikkar to unpack themes of disconnection, isolation, but also regeneration in *Death Stranding* (Kojima Productions, Sony Interactive Entertainment 2019), paying attention to the laboring body of its protagonist and its vulnerability to a hostile climate. As they demonstrate, postapocalyptic games like *Death Stranding* acknowledge the extent and irreversibility of societal and ecological collapse, but they also often make space for stories of found family, community, healing, and resistance.

Hitting many similar notes, Gerald Farca's chapter ("Ecology in the Postapocalypse: Regenerative Play in the *Metro* Series and the Critical Dystopia") analyzes themes of death and renewal in *Metro Exodus* (4A Games, Deep Silver 2019), while elaborating on the concept of regeneration and what it has to offer ecogame analysis. Both Farca's chapter and the one preceding it engage important notions of temporality like slowness, recurrence, and

seasonality. Temporality, specifically inertia and flow, is also central to Laura op de Beke's chapter in this same section, and further down, it becomes a subject of interest for Scully-Blaker in his study of slow gaming. Moreover, Farca's discussion of the sublime resonates with other references throughout the book, to the ludic sublime (Navarro-Remesal and Terrasa Torres; Trépanier-Jobin, Charre-Tchang, and Largeaud-Ortega), the technological sublime (Fizek), stuplimity (Paolo Ruffino) and the petrochemical sublime and gamified sublime (Op de Beke).

Leaving the Earth behind for a moment, the next two chapters discuss how the vastness of space and the availability of other planets to colonize helps bring into focus environmental issues, using themes like finitude, planetary boundaries, and our ability to break them (or not) through extraplanetary colonization. In "There Is No Planet B: A Milieu-Specific Analysis of *Outer Wilds*' Unstable Spaces," Lauren Woolbright uses a method developed by ecomedia scholar Melody Jue to analyze the dizzying, unmoored experience of playing the space exploration game *Outer Wilds* (Mobius Digital 2019). Woolbright argues that from such a place of uncertainty and instability *Outer Wilds* creates opportunities for players to reconsider their attachments to dreams of spacefaring, technological hubris, in favor of a newfound appreciation for planet Earth.

Taking a more bird's-eye perspective, in "Green New Worlds? Ecology and Energy in Planetary Colonization Games," Paweł Frelik looks at the gameplay conventions of science fiction games about extraplanetary colonization, interrogating their ideological assumptions about technology, progress, and nature. In his critique of colonialism and extractivism in this gaming (sub)genre, Frelik echoes much of the criticism launched by Murray and Mukherjee in earlier chapters, though Frelik also singles out a number of exceptions to the rule: planetary colonization games like *Factorio* (Wube Software 2020) and *Imagine Earth* (Serious Bros. 2021) which simulate ecological feedback loops to environmental degradation, and *Rimworld* (Ludeon Studios 2018), in which social micro-dynamics are often demonstrated to be more important for a community's survival than feats of technological innovation.

Like Frelik, Laura op de Beke also directs her attention at a popular, and deeply commercial, genre of video games. Her chapter ("Dark Play and the Flow Time of Petroculture in Oil-Themed Games") brings game studies into conversation with the study of petroculture by looking at oil tycoon games, especially the way in which these games envision the past, present, and future of oil extraction. She concludes that while they acknowledge the questionability of oil's timeliness in the present, they also exhibit a reluctance

to let go of oil and an inability to conceive of a future beyond it. Op de Beke's focus on representations of energy systems picks up where Frelik left off, and her even-tempered consideration of the ambivalence of oil-themed games perfectly sets up the next chapter, which is also concerned with the ways in which games might and might not fulfill their ecocritical potential.

We close this part with "The Underrealized Ecocritical Potential of *ABZÛ*" by Gabrielle Trépanier-Jobin, Maeva Charre-Tchang, and Sylvie Largeaud-Ortega. Singling out *ABZÛ* from a host of recent environmentally engaged diving games, the authors perform an ecocritical reading that highlights the game's warnings against unfettered extractivism and human exceptionalism. In the second half of the chapter, however, the authors qualify this reading by juxtaposing it with a reception study in which it becomes apparent that these themes are not reliably picked up on by its players. In other words, this chapter helps articulate that even though playful media propagate climate futures of all kinds, the extent to which their environmental themes and values are recognized (and embraced) by players is contingent on disparate factors that exist beyond the fiction. This insight links back to the chapters by Backe and Mukherjee, as well as the more general emphasis on player agency and interpretation elaborated in the final part of the book on critical metagaming practices.

Part III. The nonhuman turn

The chapters in this part of the book develop the nonhuman turn in game studies in interesting and thought-provoking ways. Jordan Youngblood's chapter ("'Have You Ever Heard a Worm Sing?': The Spectral Ecology of *Kentucky Route Zero, Act V*") draws on the work of Timothy Morton, one of the foremost philosophers of the nonhuman, to unpack the poetic language, game mechanics, and imagery of *Kentucky Route Zero, Act V* (Cardboard Computer 2020), which features an unassuming cat as player character. Youngblood specifically analyzes the way the game perforates the boundaries between the human and the nonhuman, the living and the dead, emphasizing the mingled coexistence of ghosts, animals, humans, and discarded matter. His detailed discussion of Morton's philosophy provides helpful context for its use in Backe's chapter and the theme of connecting bodies and environments, or perforating across perceived borders, also informs micha cárdenas' work introduced in her chapter below.

Merlin Seller shifts the focus from animals to plants in her chapter ("Hiding (in) the Tall Grass: Rethinking Background Assets in Video Game Plantscapes"), where she performs a comprehensive cultural and visual

analysis of grass assets in video games, especially lawns, using *The Last of Us Part II* (Naughty Dog 2020) and *Flower* as case studies. She argues that more focused consideration of "plantscapes" offers an important provocation to the disciplinary assumptions of game studies regarding agency and interactivity, foreground and background. In their ubiquity and marginality in video games, grass assets often escape the instrumentalizing impulse that seeks to make other fauna and flora functional or interactable, thus folding them into anthropocentric frames of reference. In a visual medium, this is not necessary, and plants—grasses especially—do enact a passive, framing force that can be studied from disciplines like cultural history. Seller's emphasis on the importance of visual culture aligns with Murray's argument about playable landscapes. It also offers some welcome counterweight to the more proceduralist perspectives represented in this book.

Joost Raessens' chapter ("*Symbiosis*, or How to Make Kin in the Chthulucene") describes in detail the VR installation game *Symbiosis* (Polymorph 2020), an elaborate storytelling experience inspired by Donna Haraway's work that involves prosthetics, audiovisual design, as well as olfactory and gustatory elements to explore deeply embodied ways of making kin in the Chthulucene. By inhabiting playable characters like a human–orchid–caterpillar hybrid, a symbiosis between a human and a toad, a slime mold, and a multibody—consisting of a head, a body, and an AI—*Symbiosis* gives shape to a speculative imaginary of a future of deep, deliberate human and nonhuman entanglement.

Raessens' motif of voluntary hybridization and mutation is further unpacked in Colin Milburn's chapter ("Mutate or Die: Neo-Lamarckian Ecogames and Responsible Evolution"). Milburn homes in on the trope of mutation, or mutagenesis, in three recent video games featuring nonhuman protagonists trying to survive in hostile, anthropocenic environments. Drawing on the trope's history in science fiction discourse, Milburn argues that in these games the pressures to adapt represents the need to change tactics in a warming world. In its engagement with resistance and adaptation, Milburn is concerned with the same themes that run through the chapters by Farca as well as Navarro-Remesal and Terrasa Torres. The reading's grounding in science fiction scholarship also strengthens this chapter's ties to the previous part on future worlds, although its engagement with nonhuman characters, and the posthuman politics of mutagenesis, means it is equally at home in this section on the nonhuman.

Paolo Ruffino's chapter ("No Man's Game: The Infinite Boredom of Procedurally Generated Environments") looks at procedural content generation (PCG) in *No Man's Sky*, tracing how it displaces humans as both players

and creators of games through the automated creation of inhumanly vast and boring environments. In its attention to virtual environments and the assets used to populate them, Ruffino's chapter complements Seller's on grass assets, but instead of the visual marginality of plants, he is concerned with the labor politics behind PCG, asking how it marginalizes humans in ways that are provocatively beneficial, such as when they instill humility, and ways in which they are not, such as when they devalue human labor.

The last two chapters prefigure the book's final part on metagaming by exploring how innovative uses of game design and theory can bridge the supposed gap between nature and culture. In her chapter ("Trans Ecologies in Digital Games and Contemporary Art"), micha cárdenas explores how her own work as a game designer and that of other artists, generates trans ecologies that perforate boundaries between bodies, species, and environments. To do so she draws on theories and concepts from Black and Indigenous studies, for example, Tiffany Lethabo King's notion of an ecotone, or a transitional space like a shoal. In cárdenas' multidisciplinary artwork *Sin Sol* (2018), this ecotonal space is occupied by Aura, the glitchy protagonist from of an augmented reality game about wildfires.

Finally, Kara Stone's chapter ("The Earth's Prognosis: Doom and Transformation in Game Design") gives a brief overview of her work as a game designer. Talking through four of her works—*Ritual of the Moon* (2019), *Humaning* (2017), *the earth is a better person than me* (2018), and *UnearthU* (2022)—she explains how her thinking draws on insights from the field of animal and disability studies. For example, she explains how her games are in conversation with scholarship on the medicalized experience of time, the labor of care, and the possibility of transformation in the face of death. Stone's chapter provides a seamless link to the subsequent part on metagaming practices, and the chapter by Jordan Clapper, who also reflects on their game-making practice, but with more of a focus on process.

Part IV. Critical metagaming practices

Jordan Clapper starts off the metagaming part with their chapter ("What Do We (NDNs) Do with Games?"), a critical investigation of Indigenous game design, comparing Ashlee Bird's game *Full of Birds* (2018) with their own performative practice of game making as Indigenous ecoscholarship. Similar to cárdenas, Clapper emphasizes the urgent need for an inclusive perspective on the climate crisis and the numerous "blind spots" of commercial ecogames but foregrounds the empowering potential of amateur game making rather than cárdenas' trained "design" approach, as well as

the Indigenous experience instead of trans identities. They employ autoethnographic reflection to show how self-made games can offer alternatives to Western imaginaries, media histories, and naturecultures and challenge. Game making here emerges as a metaludic activity that is pleasurable as well as driven by (self-imposed) goals and constraints but, as in the chapter by Stefan Werning below, the question arises how this alternative content can carve out a persistent niche for itself within the contemporary games industry and gaming culture.

In their chapter ("Imagining the Future: Game Hacking and Youth Climate Action"), Chloé Germaine and Paul Wake continue with the theme of game making rather than "playing by the rules." In contrast to Clapper's and Stone's chapters, which also concern the scholar-as-game maker, the authors modify existing games and embrace the materiality of analog rather than (primarily) digital games. They outline a replicable approach based on "hacking" board games to critically engage young people with the climate crisis and empower them to imagine and work towards sustainable futures. Similar to Vervoort, Moossdorff, and Thompson, the authors foreground deconstructing and dismantling (games as) institutions, albeit with a focus on younger rather than adult audiences. Their technique synthesizes existing youth participatory action research (YPAR) methods and is exemplified using the game *Orchard* (Anneliese Farkaschovsky 1986), designed for children aged three and up. The metaludic qualities of "hacking" board games stem from the joy of deconstructing the game-as-product but also from the bricolage approach afforded by the tactility of board game components.

Rainforest Scully-Blaker shifts the focus from grassroots game making towards alternative consumption practices with his chapter ("Reframing the Backlog: Radical Slowness and Patient Gaming") on the /r/patientgamers subreddit, a community of players resisting the focus on novelty and "disposable" experiences that characterize commercial gaming. Accordingly, the "patientgamer" ethos suggests that play may be reframed to undercut logics of efficiency and productivity through "cozy gaming" and "radical slowness," a deliberate failure to keep up with the pace of capitalist consumption as a political, metaludic act. In turn, the increasing cultural relevance of "cozyness" finds its way back into the games themselves, for example, as a gameplay mechanic and metric in iconic recent titles like *Valheim* (Iron Gate Studio 2021). While the chapter frames slow gaming as a metaludic practice, a form of social playing "with" rather than "of" games, the theme of temporalities is one that runs throughout the other parts as well.

At scale, slow gaming can and hopefully will challenge games industry practices and institutions, a goal that even more explicitly guides the chapter

("Material Infrastructures of Play: How the Games Industry Reimagines Itself in the Face of Climate Crisis") by Sonia Fizek, which scrutinizes the rhetoric of sustainable game production on the basis of the *Green Games Guide*. The argument directly connects with Chang's chapter but revolves around the *Guide* as a "playbook," which implicitly frames "greening" the games industry as a metagame. The concept of materiality in game production, which informs both this and Ruffino's chapter, builds a bridge to the nonhuman turn and the corresponding part of this book, especially in light of Jane Bennett's notion of vibrant matter, which highlights the agency and vitality of seemingly "dead" matter like game consoles and data centers. This theoretical context can provide a foundation for Fizek's more specific analysis of agency in game production, which the *Guide* rhetorically situates downstream of more carbon-intensive processes of extraction and manufacturing allegedly beyond the game industry's control.

The last three chapters transcend the industry focus by including fans and fan practices, which form an important part of the extended value network around games as a commodity. Nicolle Lamerichs' chapter ("Sustainable Fandom: Responsible Consumption and Play in Game Communities") establishes the concept of "sustainable fandom" and shows how sustainability gradually informs discourses and practices in fan communities such as "ecocosplay." These can be productively understood as playful (according to Nina Lieberman) or even metaludic, not least due to their reliance upon humor and cognitive as well as social spontaneity. In that regard, the chapter creates a foundation for Bianchi's and Werning's work on in-game photography below by exploring the potential but also the characteristic constraints of player creativity expressed via cocreative fan practices.

Melissa Bianchi's chapter ("A Field Guide to Monsters: Practices of Wildlife Watching in Video Games") frames in-game animal photography in *New Pokémon Snap* (Bandai Namco Studios 2021) and *Monster Hunter Rise* (Capcom 2021) as a means of negotiating human–animal relations. By juxtaposing close readings of the games with writings about observing and photographing real animals, Bianchi draws attention to the ambivalence of in-game fauna, which may spark ethical discussion about nonhuman agency but also reify problematic aspects of the human–animal divide. Her chapter harkens back to Backe's distinction between the orthogame and idiosyncratic playing practices, as her examples usually straddle the line between both and illustrate how one shapes the perception of the other and vice versa.

In the final chapter ("Remediating Green Practices: Landscape Photography and Nature Documentary Filmmaking in Video Games"), Stefan Werning expands on this dichotomy by conceptualizing in-game nature

photography and videography as metagaming fan practices but also as remediated forms of real-world "green practices." Via early amateur nature photography as context, the author highlights the potential of its virtualized counterpart to promote environmental literacy, but he also warns of its potential to perpetuate romanticized perceptions of nature as suggested by critics of the "natural sublime." While the chapter by Möring and Schneider analyzes representations of climates in digital games, the material compiled by Werning shows how players aesthetically engage with in-game climate through metagaming, by inhabiting the perspective of a photographer. Drawing on examples produced in *Red Dead Redemption 2* (Rockstar Studios 2018) and *Grand Theft Auto V* (*GTA V*, Rockstar North 2013), the chapter also points to the political implications of ready-made "photo modes" as well as the institutional prerequisites for scaling up these practices, in, for example, educational contexts, to unlock their socially transformative potential.

Future avenues of ecogame scholarship

While the chapters in this book showcase an enormous diversity of games, topics, and angles of analysis, the field of ecogame scholarship is so multifaceted and in such rapid development that there are inevitably subjects that remain to be explored further, and in more depth. As the climate crisis worsens, we are likely to see engagement with it rise in entertainment, education, and politics. To wrap up this introduction, therefore, we'll briefly highlight some avenues for future research, formulating questions that we find particularly current and promising.

Firstly, we would encourage further study of the particular insights and affordances offered by media modalities beyond digital games. This includes further study of board games and their material components, the multisensory experiences offered by interactive VR applications, the pervasive, activist potential of alternate reality games, as well as the deeply embodied, social experiences made possible by LARP.

Secondly, in the study of playful climate futures there is still a lot of work to be done to map the use of energy imaginaries in games. How do the stories, images, or feelings that video games propagate engage with themes of energy, energy transition, or energy infrastructures such as pipelines, electricity grids, and data centers? Can video games make energy visible, or tangible? Can they increase energy literacy?

Furthermore, as we mentioned above, metagaming is the most exploratory part of the book, which means that many of the questions and concepts that

it raises would benefit from more extensive research. In particular, one of the aspects it highlights is the relationship between gaming practices and the institutional contexts they operate in and/or seek to transform. Many critical practices position themselves in opposition to the established cultural industries; yet, they still often have to operate within corporate-controlled boundaries or are limited in terms of their scalability and impact on the material conditions of contemporary games and play. Companies also often co-opt player activity and, more often than not, closely control its framing, as in the case of the *Pokémon GO* (Niantic 2016) "sustainability week," during which developer Niantic commits to planting a tree for every player walking 5 km on the so-called "community day." Thus, the ecological contribution of the developer is inherently linked to "productive" player behavior, stimulating in-game activity and addressing lapsed gamers. To cultivate a more finely tuned sense of what counts as environmental engagement in game culture, therefore, we need more studies on greenwashing in the digital entertainment industry.

Additionally, while the chapters in this book emphasize the informative, persuasive, and critical potential of games and metagaming practices, it is important to remain aware of the carbon footprint they entail. For example, game streaming can offer unique benefits in terms of reaching specific target audiences through personalized communication. However, as Laura Marks (2020) points out, streaming also has a profound material impact on the environment, particularly with higher resolutions and lower latency, both of which require more capable—and energy-intensive—data centers. Thus, the hypothetical notion of "green streaming" would need to look beyond themes or subject matter and also consider alternatives to existing formats, which may include deliberately offering shorter or lower-resolution content. A case in point is Kara Stone's recent project *Solar Server* (2022): "a solar-powered web server set up from [their] apartment balcony built to host low-carbon videogames." Other conceivable impacts of green streaming conventions on games might involve the emergence of new genres catering specifically to the interests of "green streamers" and their communities. One can imagine, for example, video games streamed for short periods of time each day during moments when the solar grid is producing a surplus of electricity.

Next, as we mentioned above in the introduction to Part I, *All Rise*, a game currently in development about taking ecocidal companies and governments to court, we hold out hope for the service that games can provide when linked to existing environmental movements. Hein-Anton van der Heijden argues that all major social change is accompanied by forms of political citizenship and social movements (2014). From abolition to socialism, labor movements, and feminism, activist organizing has been

pivotal in the fight for emancipation and justice, as well as in the general dissemination of progressive values. Ecogames might facilitate system change when we connect them to civic action. Asking about games and environmental activism broadens the field of ecogames to include examples that might otherwise remain unnoticed. What are the games you play when you occupy a coal mine and need to pass the time; and what do you play during a climate protest to lift your spirits?

A final research direction to be explored further pertains to the way in which games and the climate crisis are linked in what Lindsey Grace (2021) describes as macro- and metapersuasions. In contrast to micro-persuasion, which is triggered by playing a specific game that can "change a player's interests, activities, or opinions" (120), macro-persuasion requires the work of organizations such as Games for Change, that "support and form a community, foster citizen participation, express creativity, or practice desired skills" (122). Within this context of macro-persuasion, the fact that specific game titles lack widespread recognition is less important than the fact that Games for Change, through their institutional network, attracts and catalyzes substantial public interest. Building on Grace's work, ecogame scholars have yet to look at the use of game jams to incubate sustainable design practices and development cultures. Such work could expand on existing scholarship about game jams (Locke at al. 2015; Kultima 2021), applying its insights to the study of ecojams, both of them hosted by established institutions as well as grassroots initiatives. Last but not least, metapersuasion takes place via "blogs, websites, forums, and threads" (2021, 131), that is, networked, grassroots, online initiatives. The importance of such public reflection is corroborated by Vervoort et al. in their chapter for this book. Media coverage, discussion, and analysis, as well as a game's embrace by an active community of fans, modders, hackers, and critics, helps amplify its potential to exercise socially progressive change. Significantly, metapersuasion includes the work we do as ecogame scholars and the interpretive labor performed by the audiences they seek to engage—using books like the one you are reading right now.

Ludography

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