

MORE-THAN-HUMAN DESIGN IN PRACTICE

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Harnessing Anticipation in More-than-Human Design

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The Innate Connection Between Futuring and More-Than-Human Design

The emerging field of more-than-human design has future-oriented underpinnings. It asks questions about the coexistence of humans and other species in possible futures and explores transformations that involve humans, technology, and a world of vibrant and lively matter. More-than-human design pushes designers to consider the entire globe as a stakeholder, emphasising feedback loops and interactions in large systems (Forlano, 2017). The future well-being of the planet depends not only on humankind's past and present actions, but also on dominant historical narratives and acknowledgement of neglected pasts, as well as on the inherent power of designerly intentions to evoke engaging and actionable future imaginaries.

Factors such as the ones listed above shape humans' relationships with the more-than-human world and its temporalities. They also connect more-than-human design with anticipation. To anticipate means to acquire knowledge from exploring the future and using this knowledge to act in the present (Poli, 2017). Therefore, anticipation is not about predicting more-than-human futures, but instead, it is about recognising how the assumptions about those futures are constructed. In this book chapter, we aim at identifying the missing procedures that would allow for a more thorough understanding of more-than-human perspectives and temporalities. Utilising this understanding to shape present actions makes anticipating an influential process (Miller, 2018b).

A substantial amount of work within more-than-human design has focused on speculative methods to generate scenarios that challenge anthropocentric worldviews and imagine radically different futures (Forlano, 2017; Tyszczyk, 2021). However, a challenge arises when speculation is done without being conscious of its embedded assumptions. Consequently, designers may unintentionally incorporate their worldviews and conceptions of desirable futures, without explicitly stating the process by which these speculative scenarios were formulated. This can be problematic because it may evoke misguided imaginaries and disregard essential viewpoints. Integrating an anticipatory approach in more-than-human design may help designers avoid such pitfalls and unpack the complex interactions of factors and motivations grounding future visions.

Inherently, engaging in more-than-human design endeavours can provide valuable learnings from tangible projects that tackle complexity and cultivate pluriversal perspectives. By

“pluriversal” (Escobar, 2018), we refer to committed attention to multiple worldviews in the anticipation processes. In contrast to pluralistic approaches, which tend to focus on human variance within the same worldview, pluriversal approaches forefront the co-existence of multiple ways of knowing and being in the world, also of other species. This requires acknowledging the limitations imposed by our human lenses. In this task, both anticipation and more-than-human design can collaborate to achieve a more comprehensive understanding of planetary futures.

In the following sections, we analyse how recent works in more-than-human design (Coulton & Lindley, 2023; Liu et al., 2018; Romani et al. 2022; Heitlinger et al., 2021) have adopted anticipatory approaches and addressed complexity, unveiled uncertainty and created new knowledge. We then outline the potential that Futures Studies methods offer for the anticipatory approach in more-than-human projects. We exemplify the adjustment of Futures Studies methods to more-than-human design by describing a workshop method that we have developed (Epp et al., 2022). Finally, we discuss other ways by which the anticipatory approach can be integrated into more-than-human design.

Anticipation in More-Than-Human Design

Given the complexity of the planetary ecosystem, the anticipation of possible futures and the design actions embedded in them benefit from thoughtful examination. A myriad of possible futures can be envisioned – utopian, dystopian, and all in between – all of which have merits to motivate their investigation. However, how should one determine which futures deserve closer attention? While a future’s perceived likelihood or its desirability may be useful metrics for decision-making, anticipation’s value resides in the insights gained from reflecting on the reasons why certain futures are contemplated (Chia, 2004; Miller, 2018b).

Among the different forms of futuring, more-than-human design’s futures have especially reimagined humans’ relationships with the environment. Reimagination is particularly evident in speculative methods that, for example, make use of prototyping to anticipate richer relationships between humans and fungi (Liu et al., 2018), understand the interrelations of IoT devices (Coulton & Lindley, 2023), participate in multispecies debates (Romani et al., 2022) and reconfigure food as more-than-human commons (Heitlinger et al., 2021). The anticipatory approach in these works not only illustrates the complexities of more-than-human futures but also highlights the intricacies – power dynamics, normative assumptions, attention to multi-species interests – that appear when humans seek to pursue their goals which however involves frictions (Pierce, 2021) with the environment.

The noteworthy form of anticipation in the studies above is their analysis of a possible future (i.e., an imaginary) in a way that has uncovered networks of interrelationships between humans and the environment. Through speculation, researchers have anticipated complex interdependencies between organic and digital environments, relations within such systems, and transformations that have implications from one system to others. This newly gained awareness has foregrounded aspects that are relevant to consider already in the present world. Subsequently, the papers written from these studies have described how phenomena in possible futures have implications for our actions in the present.

For example, Coulton and Lindley’s (2023) study on networks of human and non-human actors in IoT systems has uncovered imagined futures’ environmental, logistical and ethical implications that should be attended already in the present-day design considerations. Their speculative ontography has revealed hidden actors in IoT networks and questioned the notions

of agency when this network is no longer controlled by humans. Heitlinger et al. (2021), in turn, used the blockchain to materialise and enact possible political, legal and social structures that are necessary for equitable interspecies food to be established. These examples used existing technologies to enact the complexities of more-than-human futures in the present. This method aligns with Guston's (2013) description of prototyping as an anticipatory practice whereby interdependencies and inherent complexities of a future can be materialised and therefore anticipated. These examples illustrate how more-than-human imaginaries can be studied with current means so that their scale and relationality can be appreciated, and actions can be enabled towards them.

When considering more-than-human life, we attend to lifespans and forms of survival different from ours (Liu et al. 2018). Engaging with more-than-human perspectives also reveals uncertainties that transcend diverse temporalities. Thus, exploring these uncertainties implies considering prolonged periods, such as twenty years or more into the future (Sardar & Sweeney, 2016), as well as reflecting on the continuity of historical contexts (Bendor et al., 2021), such as the "200-year present" extending from 100 years in the past to 100 years in the future (Boulding, 2017). Understanding what might have been and remains unknown is an anticipatory approach that pinpoints overlooked perspectives, mutable factors and direct action (Adam & Groves, 2011).

Speculation can be complemented with other foresight methods, which allows for broader exploration of timeframes that we are uncertain about, or which are challenging to relate to. Analysis of the evolution of trends, for example, can inform about the sequential unfolding of events (Romani et al., 2022) and facilitate the construction of holistic future archetypes such as growth, collapse, discipline and transformation (Dator, 2019). While different human cultures have different concepts of time – linear, circular, unidirectional and static (Bell, 2009) – we should be mindful that events also precede humans and will postdate us. This recognition enables us to design for temporalities that arise from environmental transformations deeply rooted in the interconnectedness of long-evolving systems.

Addressing multiple perspectives and temporalities requires abilities to contest implicit assumptions. The more-than-human design examples discussed here have been reflexive on how futures are constructed, and this has allowed them to consider synergies between pluriversal futures. For example, designers may build "provotypes" to provoke reflection on the implications of designing for multiple species (Romani et al., 2022); employ feminist and speculative ethics of care to examine how different interspecies relations dynamically shape conceptions about relevance and value (Heitlinger et al., 2021); and use new technologies to embed collective intraspecies knowledge in future-oriented reflection (Liu et al., 2018).

Above we outlined how elements of anticipation are already implicitly present in more-than-human futuring work. We now move to describe established Future Studies methods that can amplify the anticipatory capacities of more-than-human design. Many designers are familiar with scenario development (Schoemaker, 1995; Van der Heijden, 2005), but it is less frequently discussed how these scenarios can be combined with other methods to avoid falling prey to narrow-minded and short-sighted thinking. We have selected the following methods based on their alignment with the complexity, temporalities, collaboration, and decolonization aspects inherent in more-than-human design.

Menagerie of Postnormal Potentialities (Sardar and Sweeney, 2016) is an umbrella term for metaphors that can remind designers of the escalating pace of change and the possibilities of impactful events. "Black swans" are uncertain events of undetermined probability; "black elephants" are predictable but deliberately ignored events; "black jellyfish" are acknowledged

critical events with outcomes of unforeseeable scale. These metaphors can help recognise human biases and blind spots when imagining more-than-human futures. For example, attending to “black swans” reminds us of the increasing evidence of intelligence and culture in a broad range of animal species (Whiten & Van Schaik, 2007) and helps us question the solipsistic beliefs about human uniqueness. The notion of “black jellyfishes” allows us to recognise how more-than-human agencies beyond our control shape the future, e.g., how the rising sea temperatures lead to the extinction of coral reefs, consequential loss of marine diversity, and the coral reefs’ role as natural sea barriers (Kolbert, 2014). An awareness of “black elephants”, finally, helps identify anthropocentric assumptions that need more attention and a broader scope: deforestation’s effects, for example, are well-known and visible, yet it is permitted to continue at an alarming rate on a global scale. The awareness of postnormal potentialities such as these allows us to approach the complexities of the more-than-human world with humility, adaptability and a broader scope of consideration.

Backcasting (Robinson, 1982) is a method where participants adopt a desirable future as their starting point and reason what it would take to plausibly arrive at that future, working backwards to the present. Backcasting can identify future challenges and implications of co-existing more-than-human networks and has therefore been popular in sustainability research in which analysis of desirable sustainable futures requires careful reflections (Bibri, 2018). Backcasting can help us realise that desirable futures are not universal, and how therefore historic insensitivities and injustices – including more-than-human ones – have led the planet to the unsuitable circumstances of today. Vice versa, backcasting is also amenable to inclusive analyses that involve non-experts as well as non-Western and marginalised communities in the construction and evaluation of more-than-human futures. This can be done by orchestrating processes that gather multiple perspectives and counterfactual narratives (Lewis, 1973) whereby under-considered cultural narratives and values can be integrated into the co-creation of a collectively desired future. Backcasting is cognitively demanding, but this can be alleviated by making use of artefacts and narratives that render the complexities of plausible causal influence chains more comprehensible (Wilde et al., 2021). This helps make the process more inclusive and engaging for participants.

The Three Tomorrows (Sardar and Sweeney, 2016) looks at complexities and uncertainties from the perspective of degree, space and temporality. These perspectives appear on a different scale on the Three Tomorrows – extended present, familiar futures and unthought futures. As an example, more-than-human futuring on Artificial Intelligence’s consequences can situate its thinking in the “extended present” to analyse current socioenvironmental concerns such as data bias and AI energy consumption. Here, we know the socio-environmental impact of AI to a certain degree; the issues of data bias and energy consumption operate on a space of collective acknowledgement; and the worry for these concerns extends from the near-past to the near future. “Familiar futures” outlines the development of current concerns and reflects on the socio-political expectations of AI. This second tomorrow explores data bias and AI’s environmental footprint consequences separating the plausible ones from unlikely ones on a timeframe we can predict or are familiar with due to our collective future imaginaries. Lastly, “unthought futures” consider yet unknown AI socio-environmental implications, including changes in values, threats, environmental catastrophes and socioeconomic instability. In the third tomorrow, we do not know what the implications are nor the impact level of known events. It represents a space where we question our assumptions about AI and consider critical uncertainties; for this tomorrow, temporality is extended to 20 years in the future and beyond. By projecting

a more-than-human endeavour across the three tomorrows, designers engage in an insightful exploration of complexity and uncertainty, their degrees of intensity, the knowledge space that projects them and the different temporalities of the ever-emerging more-than-human world.

Causal Layered Analysis (Inayatullah, 1998) was created to enable a critical reflection on the discourses, power structures and history that generate normative futures. The objective is to contest dominant assumptions and incorporate other ways of knowing, thereby decolonialising future narratives. This goal is addressed by critically pondering trends, socio-political issues, worldviews and myths. For example, Causal Layered Analysis can be used to deconstruct the metaphor of a “network”, which often refers to complex interconnected systems – both natural and artificial. However, an analysis of the “network” metaphor on a “litany” level – statistics, trends and media – may reveal that complexity may be represented in an inherently technocentric way (August, 2022). Looking at the metaphor at the second, sociopolitical and structural layer, reveals how networks are often described by agencies that wield power, legitimacy and authority, thereby carrying implicit political ambitions, even if the result comes close to obscurity. At the third, worldview level, we may unravel underlying assumptions about efficiency and infinite growth. Finally, moving on to the fourth level consisting of myths, we might recognise that ecosystem networks have emotional underpinnings. We may notice a dichotomy between violence and harmony or detect interactional values such as balance and respect in symbiotic structures. By inviting designers to exercise a critical approach and reflection using several layers, causal layered analysis can be useful in promoting non-Western perspectives, which is a central concern in more-than-human design.

Futures Workshops (Jungk and Müllert, 1987) are originally an action research method. It aims to democratise futuring through collective, democratic and inclusive stakeholder engagement. To lower the participation threshold, these methods employ multimodal techniques to encourage active engagement and participation: sticky notes, performances and visual representations (Alminde & Warming, 2020). A characteristic feature of the methods that build on future workshops is the use of three phases (Glenn, 2009; Candy & Dunagan, 2017; Epp et al., 2022): 1) critique or current issues, 2) fantasy or futuring, and 3) implementation or practical steps. Futures workshops may seek pluriversality by giving “voice” and agency also to non-human organisms and systems. This can be done by electing representatives for non-human actors (Romani et al., 2022) or by including live-action roleplaying activities that enact futures of more-than-human scenarios (Heitlinger et al., 2021). In this chapter’s later sections, we will present how one futures workshops method – Future Ripples (Epp et al., 2022) – can be adapted to more-than-human design projects.

Lastly, Futures Studies often make use of a heuristic list of important future-contingent factors. This list is called STEEPLE¹ which is an acronym of its contents – social, technological, environmental, economic, political, legal and ethical. Bearing these factors in mind can protect futuring from solely techno-centric, market-driven, Western-dominated, or other biased considerations. STEEPLE can be aligned with the posthuman perspective to overcome artificial divides and tries to forefront connections and complexity (see Ulmer, 2017, and the presentation of the Future Ripples method below).

We introduced the above-presented methods because of their compatibility with a more-than-human design’s multifaceted approach. However, not all Futures Studies methods attend to more-than-human design endeavours. The futures cone (Taylor, 1993), for example, depicted in Figure 15.1, has been an influential representation of how futures can be thought about (Gall et al., 2022), but has been criticised for several shortcomings (Howell et al. 2021):

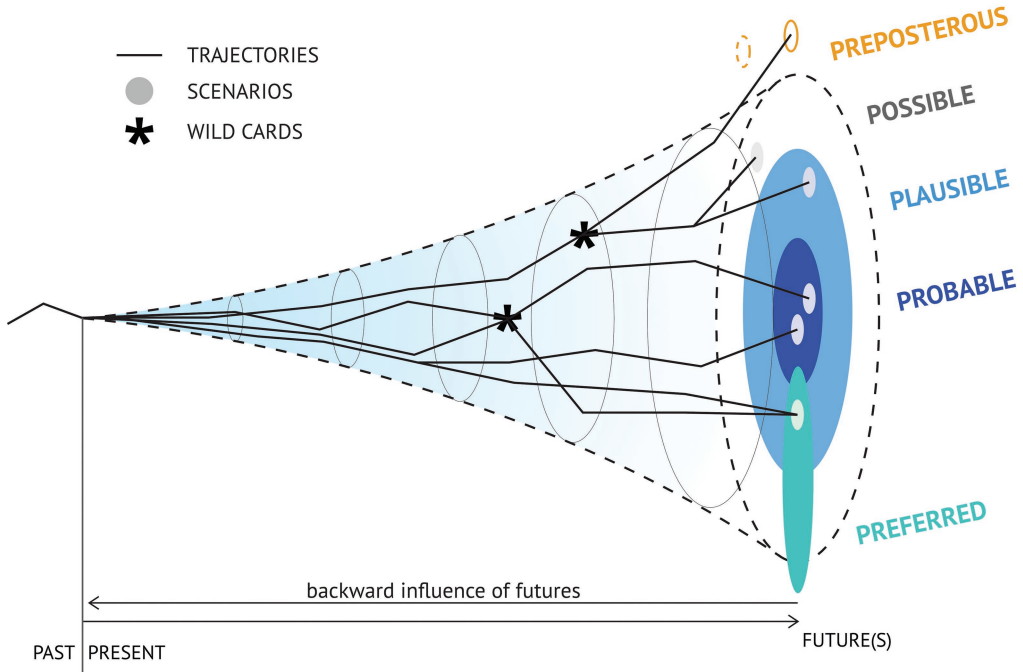


FIGURE 15.1 A simplified visualization of the futures cone, adapted from Gall et al. (2022). While the futures cone effectively portrays concepts such as intertwining trajectories, high-impact wild cards, exponential growing uncertainty, and a porous boundary of possibilities, it does not fully capture the richness of diverse perspectives, overlooked histories, and non-linear conceptions of time (Howell et al., 2021).

the traditional futures cone presentation of possible futures has the present world as its origin and neglects the past, enforces that a linear representation of time is adopted, and categorises futures technocratically, based on their plausibility.

Adopting an anticipatory approach in more-than-human design aids in acknowledging that there is no definitive “right” method for understanding the future. Anticipation is an intricate task with no guarantees as the future can only be known once it unfolds (Poli, 2017). However, the process of anticipation – characterised by introspection on individual assumptions and biases as well as extrospection on the broader social, political, cultural and environmental contexts (Miller, 2018a) – amplifies our awareness of the inherent dynamics and power relations shaping the discourse around future scenarios. This is particularly crucial in more-than-human design where understanding and negotiating such dynamics holds significant implications for the different temporalities that are shaped with the more-than-human world.

Future Ripples Method: A Tool for Bringing Multiple Voices to the Futuring Process

To extend more-than-human designers’ opportunities in embracing an anticipatory approach, we present a practical case of adapting the Futures Ripples workshop method (Epp et al., 2022) to a more-than-human design case. The rationale for using this method is its explicit aim of

collecting multiple perspectives, tracing asynchronous future trajectories, and enhancing the anticipatory capacity of its participants.

We developed the Future Ripples as an agile futuring method for designers, aiming to support reflection on possible futures within their practice. The method builds on a well-known Futures Studies method, the Futures Wheel (Glenn, 2009). The participants start by identifying weak signals², trends, or other future-oriented phenomena, and continue with a discussion on their future relevance from personal or professional standpoints. Through this collaborative exercise, the participants select a starting point whose first-order, second-order and third-order consequences will be then envisioned collaboratively and in parallel. The creation of each ripple consists of silent brainstorming where each participant considers the contents of the preceding layer and generates ideas about immediate consequences from some of them. These ideas are then presented to others, possibly with a requirement of selecting only those that seem intuitively most important. The expanding, concentric ripples that result from this process let participants lay out possible future trajectories (Figure 15.2). To ensure higher quality in this anticipatory process, the participants use STEEPLE as the set of future-contingent factors that must be attended to. To avoid focusing solely on a linear sequence of consequences, it is crucial to consider a variety of alternative paths. This can be achieved by prioritizing the completion of one full ripple of envisioning at a time. Finally, the fact that participants need to justify and discuss why they map a particular event to a ripple provides a way of eliciting and contrasting assumptions about the future. While originally aimed at designers, the simplicity of the method facilitates a collaborative and systemic examination of future trajectories that can encompass a wide range of perspectives.

Adapting the Future Ripples Method for More-Than-Human Design

To illustrate how anticipation might be integrated into more-than-human design, we present how we have used the Future Ripples method for more-than-human concerns. So far, we have used the method for futuring climate wearables, multi-sensory communication, novel smart materials (Epp et al., 2022) and design for the Baltic Sea. Based on these experiences, we discuss two ways the method can be used for – and adapted to – the relational and systemic interactions intrinsic to more-than-human design. Notably, this approach can be beneficial both in projects directly focusing on designing for and with other organisms, and in more conventional projects where it may be important to identify unintended harmful consequences of human intervention in the more-than-human world.

The first possibility for adapting the Future Ripples method for more-than-human design is to use the perspective of a more-than-human entity as the initial prompt. As illustrated in Table 15.1, different types of more-than-human prompts may lead to thinking about potential interventions and their consequences from different perspectives in the anticipation process. These examples highlight the possible diversity of more-than-human prompts, not an all-encompassing typology.

When we used a more-than-human entity's perspective as the initial prompt, we found that it is essential to remember how the scanning process, i.e., the analysis of trends and weak signals, tends to be anthropocentric due to the human-centred nature of information outlets. This requires futuring participants to place extra effort into finding information that covers more-than-human perspectives. However, representing pluriversal ecosystems can be challenging due to limited knowledge of diverse species. This challenge should be seen as an

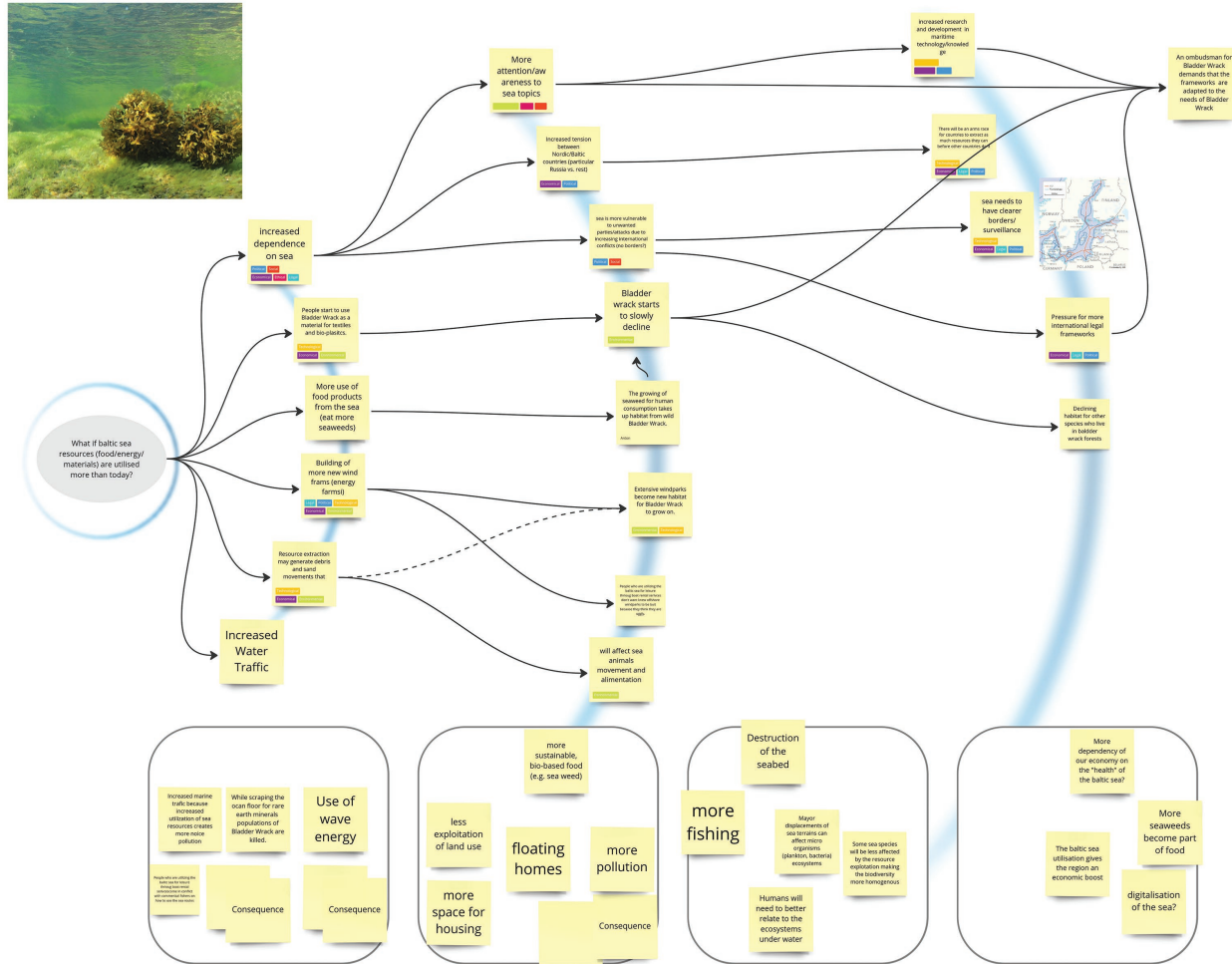


FIGURE 15.2 The outcome from a future ripples session that mapped the consequences of the Baltic Sea's increased resource utilization. In this image, consequences are laid out according to their causal order.

TABLE 15.1 Examples of more-than-human prompts that can be used in anticipatory processes

<i>Type</i>	<i>Example prompt</i>
The internal experience of an animal	“You are a coastal porpoise whale that faces increasing navigation problems and has stress symptoms due to noise pollution from ships in the heavily trafficked Baltic Sea Archipelagos”
Technological agency	“A new electrical boat motor is 12dB quieter than an oil-based motor providing the same horsepower”
Meeting the observed need of an animal	“Humans need to decrease noise pollution from traffic in order to not disturb porpoise whales”
Observed challenge for a whole ecology	“Increased water temperatures due to global warming affect the living conditions of all species in the Baltic Sea”
An environmental disruption	“A Norwegian oil tanker runs aground near the Curonian Lagoon biosphere polygon, Lithuania”
A new environmental protection regulation	“Motors that are louder than 90dB are forbidden in the Baltic Sea”

opportunity for reflection, knowledge gathering and uncertainty recognition. Lastly, when addressing more-than-human futures, it is already explicit that we are touching on environmental and ethical issues. As other works have demonstrated, STEEPLE categories can be reconfigured to expand their scope (Dumit, 2014). For more-than-human design, this requires rethinking how the STEEPLE categories could account for more precise and relevant more-than-human factors, such as Cultural + Floral + Faunal + Cybernetic, to give an example.

The second possibility for adapting Future Ripples to more-than-human concerns is assigning a representative to advocate for the interest of a particular species throughout the process. The idea of humans representing the interests of a specific more-than-human entity is established in more-than-human design research (Wakkary, 2021; Light, 2022; Clarke et al., 2019; Romani et al., 2022). Some call this representative a ‘spokesperson’ to highlight active advocacy of the species. Others call this ‘ombudsmen’ to highlight that human language – and perception in general – is not necessarily the most efficient way to know another species. Yet others assign ‘species diplomats’ to shift perspectives to the human effect on the species, thus asking how humans should behave to leave the best impression on the respective species. While being mindful of the limits of assigning an interspecies representative, such representation can help identify indirect consequences of design interventions on a particular species or whole environment.

In our Futures Ripples on the Baltic Sea, we assigned a spokesperson for the bladderwrack seaweed (Figure 15.2). We chose this species since it is a cornerstone species, creating living conditions for a broad range of other species in the ecology. We found that the processes benefited from making the represented species more present through images or other tangible material acting as a constant reminder to consider their perspectives. Additionally, we found that an introductory round where everyone defined their perspective improved this process. It clarified both the position of species represented, as well as the various human viewpoints: subjective (based on personal feelings or opinions); objectivistic (based on facts and evidence); and detached (seeking to maintain a sense of impartiality and neutrality).

When attending to more-than-human perspectives in the futures ripples, the consideration for other species enhanced creativity by requiring us to think from a novel perspective. However, we also believe that our limited knowledge about a given species poses challenges for further

ideation. Representing more-than-human perspectives requires comprehensive background research to prevent participants' perspectives from being based on their own experiences and assumptions only.

Anticipation in More-Than-Human Design: Nurturing Relationality, Embracing Ways of Being and Knowing, and Fostering Transparency

In this chapter, we have discussed how more-than-human design might benefit from approaches of anticipation – and vice versa – as the more-than-human perspective intrinsically explores diversity, complexity and uncertainty. Merging more-than-human design with anticipation may broaden our understanding of futures by allowing us to reflect on the meaning of desirable futures and evaluate the alternatives that emerge from futuring processes. To crystallise the crucial aspects of this process, we provide the following considerations for further integration of anticipation within more-than-human design.

Relationality, Cause and Consequence

A central aspect of more-than-human design is the quest to understand how relationality affects emerging phenomena in design. In this context, Future Ripples – and other methods of anticipation – can be used to think of cause and consequence in systems identified in more-than-human design processes. Here, anticipation supports non-linear consideration of causalities, thereby supporting pluriversal possibilities and addressing diverse temporalities, both of which are essential perspectives when managing complex interspecies networks that transcend human lifespans (Adam & Groves, 2011).

Emphasising the Transformative and Experiential

The experience of engaging in an anticipatory process is transformative because it suggests that the present time is malleable and how we consider futures represents how we are in the present (Poli, 2017; Epp et al., 2022). Transformative experiences enable us to develop a deeper sense of empathy towards the more-than-human world, rooted in current realities and enacted through thorough contemplation. This approach aligns with more-than-human design's emphasis on situated knowledge (Haraway, 1988), where the tenet is that knowledge is embedded in and thus affected by the concrete historical, cultural, linguistic and value context of the knowing person. This implies that assumptions about the future emerge from this baggage and anticipation happens from a particular situated perspective. The transformative quality emerges through sharing exchange and discussion of subjective knowledge, facilitating a “cross-pollination” of understanding among workshop participants (Halskov & Dalsgård, 2006).

Externalising Thoughts Facilitates Collaboration

More-than-human design is highly collaborative and co-creative as it emerges through the co-constructive capacities of people, technologies and other species (Wakkary, 2021). This process requires the externalisation of interconnected chains of arguments, as well as explicit consideration and integration of multiple and potentially conflicting perspectives. For example, since all participants of Future Ripples workshops were tasked to research a specific topic and

formulate insights based on it, a diversity of perspectives was already introduced at the very onset of the method's execution. This diversity then branched further out as the process continued (see Figure 15.2). Overall, the maintenance of multiple perspectives is more successful when their expression, exploration and documentation are at the heart of the process.

Transparency, Trust and Flux

Few things are more important than the collective imagination of radically better futures, yet such efforts are often dismissed as wild speculation, idealism, or unrealistic utopia. Considering this, the Futures Studies methods introduced in this chapter have the potential to make more-than-human designs and future visions more persuasive. This is because a more formal and accountable process for breaking down arguments and chains of thoughts facilitates comprehension of events' causality and environmental transformations. However, such activity demands being transparent on how futures are constructed and from what situated knowledge they are extrapolated. The methods proposed in this chapter aim to acknowledge own assumptions, consider various perspectives, and ascertain the extent to which unknown elements have been accounted for. Thus, futures ought to be revisited and reassessed consistently and iteratively.

Conclusion

Anticipation offers an approach for more-than-human designers to peer through time and enriches the understanding of designing for pluriversal futures. As Manzini and Tassinari (2023) highlight, this process enables a paradigm shift towards new modes of existence and action, thus generating new modes of design. These new modes of design involve attending to the different temporalities experienced by human and more-than-human organisms and systems. To attend to those temporalities, we need to be aware of our role in the process, the values we embed and the factors we ignore. By placing this emphasis on the exploration of futures, anticipation aims at highlighting our situatedness in the process of attending more-than-human endeavours.

Futures exploration is not only forward-driven, but it also involves questioning the past and overall, our position in the present. Moreover, outlining expectations, beliefs, methods, and lines of action used and identified throughout the anticipatory process helps external stakeholders better understand the relevance of more-than-human imaginaries. These are important points for the nascent field of more-than-human design, which is still searching for its place in the academic/design community and seeking wider acknowledgement.

However, much work remains to be done in the conscious integration of anticipation within more-than-human design. We have presented some Futures Studies methods that could support this integration. Yet, representing more-than-human perspectives in futuring activities is still a matter of research. To encourage further work, we suggest considering the following questions:

- What methodological approaches could support a more nuanced representation of more-than-human beings' perspectives in anticipatory processes sensitive to the complexities of what is WEIRD (Western, Educated, Industrialised, Rich, and Democratic)?
- How do we shape more-than-human future imaginaries by including specific more-than-human perspectives in anticipatory practices, given that resource and capability constraints may prevent other perspectives' consideration?

Acknowledgements

Although we the authors represent different nationalities, we work in the same Finnish university. We acknowledge that our shared academic context has the potential to both enhance and limit our viewpoints, as well as to influence the narrative in this chapter. Therefore, with this chapter, we call for further introspection of our position as designers and/or researchers in more-than-human endeavours. This work has been supported by the Research Council of Finland grant 330124.

Notes

- 1 An extension of the ETPS framework by Aguilar (1967).
- 2 Opposite to trends, weak signals are seemingly insignificant events that hold the potential to shape the future (Kamppinen et al., 2002, as translated in Holopainen & Toivonen, 2012).

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