


How to make a city fall in love with an animal.

Communication Strategies for Urban Wildlife Inclusion and, A Case Study on Opossums in Toronto, Ontario.

 Parth Kamlesh Shah (पार्थ कमलेश शाह)

Submitted to OCAD University in partial fulfilment of the requirements for the degree of **Master of Design** in **Inclusive Design**.

Toronto, Ontario, Canada, 2023.

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Abstract

As humans continue to encroach upon wildlife habitats, conflicts between humans and wild animals have steadily increased. The current practices of urban wildlife management are ineffective, unsustainable, and have a demonstrated history of dangerous consequences. These practices operate from a deeply anthropocentric worldview which looks at nature as a resource, and animals as objects to regulate. The decisions taken under this mindset, have led to devastating consequences for the planet, the wildlife and humans themselves.

This paper employs an inclusive design philosophy, as an alternative and ecocentric approach, to urban wildlife management. It defines this practice of aiming for a peaceful co-existence as urban wildlife inclusion. It argues that wildlife management should no longer cater only to humans, but it must consider the agency and autonomy of animals and treat them as equal stakeholders of the planet.

Along with that, it also makes a case for expanding the sphere of inclusive design to include urban wildlife in it, effectively creating a new area of inclusive design research that expands the system of inclusion beyond humans.

The paper then goes on to propose an urban wildlife inclusion framework and a communication model, which will assist in designing communication strategies for gaining and sustaining community participation for urban wildlife. This is followed by a documentation of an on-going project which utilizes the proposed framework to raise social awareness about Virginia opossum population in Toronto, Ontario. During this documentation, it also discusses the concept of "co-designing with animals".

The paper concludes that there is a need to steer ourselves towards social inclusion of wildlife and ecocentrism. It also hopes that the framework and model designed during the course of this research can act as starting points for building further models of inclusion.

Keywords

Urban Wildlife, Inclusive Design, Urban Planning, Posthumanism, Ecocentrism, Social Inclusion, Communication Strategies, Advocacy Campaign, Inclusion Framework, Virginia Opossum.

Acknowledgements

This is a non-comprehensive list of everyone who have helped to make this possible.

Dr Suzanne MacDonald: Without you this project would not have taken place. I am grateful for your unyielding enthusiasm and passion, for your exhaustive knowledge, constant motivation, and for your delicious sea-salt chocolate cakes and freshly baked cookies.

Dr Jutta Treviranus: Thank you for your continued motivation, support and empathy throughout the journey of this program. I feel deeply grateful to have been learning from you and to have known you.

I feel privileged and beyond grateful to have had these advisors, who are not only phenomenal in their fields but are also truly wonderful and empathetic human beings. :)

The opossums, raccoons, rabbits, skunks, cats, foxes, squirrels and other lovely critters who Dr MacDonald and I interacted with during the course of this project, and who we like to think as our research participants.

All the people, especially the ones who went unrecorded or were erased from history, who have contributed to the scientific, social and, cultural knowledges of these fields, on basis of which this work stands today.

Ayumi Goto, for being the first person who said this was a good idea, and for continuing to believe so. Dr Ashok Mathur and Peter Morin, who I am fortunate to have been working with throughout this master's program. Thank you for always being supportive and generous. I am truly thankful for your constant kindness.

Melissa Smith, Jess Mitchell, Michelle Gay, Teresa Lee, Arezoo Talebzadeh, Donna Bain, and all other educators, guest lecturers, and community participants, who have guided and motivated me and my cohort. A big thank you to all of you. You all are amazing.

OCAD University, for my scholarship. The Student Union, International Students office and all other administrative staff for your support.

Toronto Public Library (TPL), for abundant resources and facilities you provided.

My family and beloved friends, who have always supported me in every way possible, even though it was not always an easy thing to do. Shoutout to Prerna, for last-minute proofreading duties.

My therapist, who has been instrumental, in being where I am and in the work I could do.

My supportive cohort, with whom I started the journey of inclusive design. Tamara Crasto, for believing in this throughout, for translating complex ideas in "Parth-speak", for providing snacks, and for randomly being snarky for no reason.

Land Acknowledgement

I am grateful to have had the opportunity to be living and working on this land, which is the traditional territory of many indigenous nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. Toronto is covered by Treaty 13 signed with the Mississaugas of the Credit, and the Williams Treaties signed with multiple Mississaugas and Chippewa bands.

As an immigrant, I want to commit myself to learning the history of this land, and working towards building and advocating for decolonial practices and knowledges.

Dedicated to Pikachu and all other animal friends,
I have been fortunate to have made.



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As I walked home last night

I saw a lone fox dancing

In the cold moonlight.

I stood and watched.

Then took the low road, knowing

The night was his by right.

- Ruskin Bond.

Key terms

Anthropocentrism: A worldview which believes that human beings are the most important entity of the world. From an anthropocentric perspective, humankind is seen as separate from nature and superior to it. This concept is also referred by some as human supremacy or human exceptionalism.

Anthropogenic: environmental change caused or influenced by human activity, either directly or indirectly.

Anthropomorphism: the attribution of human traits, emotions, or intentions to non-human entities. It is considered to be an innate tendency of human psychology.

Ecocentrism: A nature-centred worldview, which dedicates inherent value to the ecosphere as a whole. It recognizes intrinsic value in ecosystems and the biological and physical elements that they comprise. Many indigenous cultures around the world have held this worldview for a long time.

UW: Urban Wildlife.

UWI: Urban Wildlife Inclusion.

UWM: Urban Wildlife Management.

For the purpose of this paper:

The word "animal" would mean all animal species (*Kingdom Animalia*).

"opossum" would mean virginia opossum (*Didelphis virginiana*).

"raccoon" would mean common raccoon (*Procyon lotor*).

"fox" would mean red fox (*Vulpes vulpes*).

"squirrel" would mean eastern grey squirrel (*Sciurus carolinensis*).

"rabbit" would mean eastern cottontail (*Sylvilagus floridanus*).

"skunk" would mean striped skunk (*Mephitis mephitis*).

Author's note:

the term "knowledges" has increasingly been used by a lot of researchers, in various contexts, as a statement against the conception of knowledge as a fixed and singularly authoritative entity. In the context of this paper, knowledges refer to different social and cultural practices and different perspectives.

the term "wildlife management" is inherently anthropocentric as it automatically puts humans in the position of power. It has been used in this paper due to a lack of better alternative.

1.0 Introduction

1.1 Background

1.2 Deep-rooted systemic flaws

1.2.1 Anthropocentrism

1.2.2 Ecocentrism

1.2.3 Research Questions

1.3 An inclusive approach

1.3.1 What is urban wildlife

1.3.2 What is urban wildlife inclusion

1.4 A framework for urban wildlife inclusion, and applying it in the real world

1.0 _____

1.1 Background

In August 2022, Lydney Town Council voted 10-3 in favour of killing a number of wild Canada geese (*Branta canadensis*). This was in response of complaints about “bird poo causing a disruption for local sports clubs” (BBC, 2022; Goodwin, 2022). The state of our current wildlife management practices and how we perceive wildlife, especially the ones which have adapted well to urban environments, leaves much to be desired.

For instance, culling¹, one of the conventional urban wildlife management methods, apart from being glaringly cruel, has a demonstrated history of ineffectiveness and of leading to disastrous consequences² by unravelling intricate connections between species (Way, 2010; Way & Brad, 2009; Valastaro & Fox, 2012; Husrevoglu, 2013; Jisheng, 2012; Branigan, 2013).

As humans continue to encroach upon wildlife habitats and ecology, conflicts between humans and wild animals have steadily increased (Carter et al., 2012). The species in question is then often deemed as “pests” or “nuisance”, abhorred by local communities, and “managed” by the authorities (Knight, 2000).

Traditional wildlife management practices involve spatial regulation of humans and wildlife, with focus on containment, removal or exclusion of animals (Boonman-Berson et al, 2016). In conversations and research on urban planning and management, wild animals have largely been treated as objects to study and regulate. Humans have so far enjoyed and abused the power of decision making in manging the landscape and the wildlife. This has not fared well for either humans or the animals.

1.2 Deep rooted systemic flaws

The issues with urban wildlife management run deeper. They stem from how wildlife is being perceived. There seems to be strict perceptions about where wildlife should be and how they should behave.

¹ Culling: selective slaughter of animals.

² In 1958, under the leadership of Chairman Mao, an extensive sparrow culling campaign was carried out in China. This resulted in increased locust population in the area, and eventually led to what we now know as “The Great Chinese Famine”. One of the deadliest man-made ecological disasters in the human history, resulting in approximately 45 to 78 million human deaths (Jisheng, 2012; Branigan, 2013) It would appear that it is unwise to go on a frenzied killing spree when you can’t quite predict the consequences of it with certainty.

For instance, Canada geese get bad reputation for being aggressive and territorial. People hate them for being “mean” (Rodrigues, 2023; DiLonardo, 2018). Bernard Quetchenbach theorizes that the biggest reason people hate geese is because they don’t yield to human demands and that’s an affront to our sensibilities (Chapman, 2019). Birds are supposed to be scared of you and fly away when you shoo them off. But geese don’t concern themselves with human notions of “bird behaviour”, and to top it off, they hang out in the “human area” where they are not supposed to be.

Overall, it seems that humans have the most problems with the animals which have adapted well to urban environment. These are the animals we often despise and declare as pests³, the animals which are innovative and resilient in the face of anthropogenic destruction of their ecological habitats (or “human development”).

1.2.1 Anthropocentrism

Originating from beliefs of ancient Greek philosophers such as Aristotle and Descartes, anthropocentrism is still a dominant worldview (Rodman, 1980; Steiner, 2005). Many of the perceptions and expectations about urban wildlife behaviour are informed by anthropocentrism – a notion that humans are the most important entity in the world.

From an anthropocentric mindset, we think of the urban animals as nuisance or problems to be dealt with, instead of, thinking of them as the persistent survivors that they are, who continue to successfully prevail in the face of all the oppressive structures we have subjected them to.

The last century has seen massive loss of habitat, populations and species (Ceballos et al., 2017). There are “dead zones” in the oceans and lakes of the world, created mostly as a result of human activities, where due to low-oxygen only a handful of organisms can survive (Costa et al., 2022). The human impact on the planet is of such significance, that many researchers have named the current epoch “the Anthropocene” (Crutzen & Stoermer, 2000).

Intertwined with capitalist ideology of economic growth, anthropocentrism removes almost all moral standing from the nonhuman world, seeing it merely as a resource to use (Washington et al., 2021; Chapron et al., 2018).

Colonialism, capitalism, patriarchy and anthropocentrism are interconnected oppressive structures, that have defined the white heteronormative male as superior to other humans and animals (Shiva, 1993). These systems are founded on European white man’s perceived inferiority of the natural world (Shiva, 1993).

³ In her brilliant book “Pests: How humans create animal villains”, Bethany Brookshire (2022) poetically and accurately redefines pests as “winners in a planet full of loss”.

Most of the current wildlife management practices are rooted in these oppressive structures and the consequent need to control the nature; and manage the wildlife.

It is also noteworthy that most of the unwanted human-wildlife conflicts are happening because of the human activities. It is self-evident that populations and species will suffer when their habitat becomes degraded or is lost completely (Hanski, 2011). The rates of extinction of species are 1000 times of what they would be in the absence of human activities (Pimm et al, 2012).

The focus of most wildlife management practices has always been on how to best serve the needs, conveniences and whims of humans. Anthropocentrism cannot lead us to a sustainable future. We ought to seek approaches which adequately align with our objectives of a more balanced ecosystem and a sustainable future, and heal the damage caused by the ideological dominance of anthropocentrism.

1.2.2 Ecocentrism

Anthropocentrism is not how humans always looked at the world. Dominant in the Western society since the late 16th century, it is rooted in ancient Greek philosophy and heavily influenced by, Judeo-Christian tradition, mechanistic mindset of Renaissance, neoclassical economics, neoliberalism, modernism and postmodernism (Washington et al., 2021).

Ecocentrism, on the other hand, puts ecosystems in the centre, and all other species as equal participants of it. It dedicates inherent value to the ecosphere as a whole. It is a worldview which many people believe can be traced back to the beginning of time through examination of indigenous cultures' epistemologies (Drew, 2023). Many indigenous cultures around the world have always held a non-human centric worldview (Muradian & Gómez-Baggethun, 2021) and, speak of the law which reflects ecocentrism and belief that humans are just one of the species in the natural order of things.

1.2.3 Research Questions

The systemic flaws discussed above have led to a gap in inclusive design literature and the discourse on wildlife management practices. This paper seeks to bridge this gap, by its attempts to explore an inclusive and ecocentric approach for urban wildlife management.

The research questions that facilitate this exploration are:

- 1.What is an inclusive approach to wildlife?
- 2.How can we extend the definition of Inclusive Design to include Urban Wildlife in it?
- 3.What constitutes a framework and a model for urban wildlife inclusion?
- 4.How can this framework and model be applied in the real world?

This paper is a proposal to look at urban wildlife management from an inclusive design perspective, in order to reposition its focus from humans to urban wildlife, and approach it in a way which facilitates peaceful co-existence. Along with that, it will also look to expand the sphere of inclusive design from where it stands today, to include urban wildlife in it, as equal stakeholders of the urban areas.

1.3 An inclusive approach

The concepts of humans and wildlife peacefully sharing the same space, have been slowly emerging in finding solutions to human-wildlife conflicts. Wu (2018) calls for the need to move away from the binary standards of “cull or conserve”, and to acknowledge and respect the intelligence and resilience of urban wildlife. Toncheva & Fletcher (2022) report that a growing body of ‘more-than-human’ research is challenging the conventional anthropocentric perspective, arguing that animals should be considered ‘co-constitutive actors’ of the spaces they occupy. However, these practices are scarce. There are still no solutions on how to give wildlife a prominent role in matters of co-existence (Buller, 2014; Boonman-Berson et al, 2016).

1.3.1 What is urban wildlife

Urban wildlife is a term used for wildlife which are adapting to live in, or make use of, human-dominated areas. Depending on their interaction with urban environment, they are categorised as domesticated (cattle, pets), exploiters (rats, raccoons, cockroaches), adapters (deer, coyotes, sparrows), or avoiders (bears, cougars) (McKinney, 2006).

For the purpose of this paper, the term Urban Wildlife (UW) will refer to all animal species which have been living alongside us and, whether we like it or not, are a part of our social and ecological fabric.

Some examples for Toronto (Canada) would be raccoons, skunks, sparrows, opossums, coyotes, foxes, gulls, geese, swans etc.

Multiple studies have demonstrated that urban wildlife population differ significantly from their non-urban counterparts (Rodewald & Gehrt, 2014). It points to how quickly these animals are changing their behaviours and lifestyles to adapt to living in the urban areas. In many ways, there are as much urbanite as any human living in a city.

1.3.2 What is urban wildlife inclusion

Urban wildlife inclusion in context of this paper means, being mindful and respectful of the needs of both humans and wildlife, and co-creating sustainable solutions of co-existence, with an objective of healing the ecosystems.

It also means actively including wildlife in the conversations about urban planning, as equal stakeholders of the space. These concepts are discussed in more detail in section 4.1.

1.4 A framework for urban wildlife inclusion, and applying it in the real world.

The paper focuses in particular on increasing community participation to bring about urban wildlife inclusion. In doing so, it focuses on mass communication as a tool, to reach out to communities and gain necessary participation for urban wildlife inclusion to take place.

Section 4.0 puts forth a conceptual framework to assist in designing effective mass communication strategies for urban wildlife inclusion. To derive this framework, it incorporates ideas and draws inspiration from multiple places such as: established mass communication theories (social impact entertainment, AIDA marketing model⁴ etc.), Roger's (2003) diffusion of innovation theory, advocacy campaigns, findings from literature review on various works related to human-wildlife relationship, semi-structured interviews and discussions with community participants and, observational data on human-wildlife interactions obtained from open sources along with the researcher's lived experience.

Section 5.0, "the opossum project", an on-going endeavour for raising social awareness about opossums in Toronto, is a live example of putting this framework in practice. The data and knowledges gathered from this practical evaluation will help in further iterating the urban wildlife inclusion framework.

⁴ The AIDA marketing model, was invented by strategist Elmo Lewis in 1898. It stands for Attention, Interest, Desire, and Action model.

2.0 Research Design

2.1 Research Methodology / Research Philosophy

2.1.1 Pragmatism

2.1.2 Inclusive Design

2.2 Research Methods

2.2.1 Data Collection / Data Generation

2.2.2 Data Analysis

2.0 _____

This section would look at the research paradigm of this project along with the various research methods employed during the course of the project. Morgan (2007) defines research paradigm as a theoretical framework comprised of a set of beliefs and values, which guides how the research is conducted and knowledge conceptualized within scientific communities.

Section 2.1 Research Methodology looks at the research philosophy for this paper. Section 2.2 Research Methods goes through the methods employed to do the research. Section 2.2.1 goes through the means by which the data was gathered and/or generated, while section 2.2.2 looks at how the said data was analysed.

2.1 Research Methodology / Research Philosophy

2.1.1 Pragmatism

Pragmatism as a paradigm is based on utilizing the most appropriate methodological approach, according to the research problem being investigated (Andrew & Halcomb, 2007).

It believes in existence of multiple ways of knowing. This gives the researcher flexibility and freedom to choose from multiple sources of data, both quantitative and qualitative, and effectively opening up the research to learn from different streams of knowledge.

It also allows for careful consideration of what type of knowledge would best serve the interests of a community within a given context, including the value of experiential knowledge contributed by individuals with lived experience (Allemang, 2021).

Unlike positivism or constructivism, pragmatism does not believe in an absolute truth or a single reality. It focuses on what can be practically done in real world, and emphasizes on action. As Johnson (2004,) eloquently puts it, "Pragmatism recognizes the importance of the physical, psychological and social worlds, including culture, language, institutions and subjective thoughts. Knowledge is 'both constructed and based on the reality of the world we experience and live in', implying that although knowledge does exist in the external world, it must be experienced by individuals".

2.1.2 Inclusive Design

This research practices inclusive design ethos. The intent is to look at urban wildlife from an inclusive design and a co-design lens, with a hope that it will challenge the established status quo between humans and wildlife.

It also engages the three dimensions of Inclusive Design: recognize diversity and uniqueness, inclusive process and tools and, broader beneficial impact, in the context of urban wildlife management (IDRC, n.d.). More on this is covered in the section 3.0

2.2 Research Methods

Research methods refers to the strategies and techniques used in the collection and analysis of data, in order to learn new information or to develop a better understanding a topic.

2.2.1 Data Collection / Data Generation

Secondary research, observation research, and semi-structured interview are the methods used here to collect data.

Secondary Research

Secondary research involves collecting and studying existing data from multiple channels. In the context of this research, the data has been sourced from various places such as: published datasets, research papers, books, journals, scholarly articles, government statistics, naturalist websites, newspaper and magazine articles, social media websites, etc.

Pulling from a range of different data samples has given a broader and multi-faceted understanding of the topic. It has helped in examining and evaluating the established patterns.

Observational Research

Participants and/or phenomena are observed in their most natural settings in observational research. The goal here is to obtain a snapshot of specific characteristics of an individual, group, or setting (Jhangiani et al, 2019). The observations are made as unobtrusively as possible. This enables researchers to see their subjects make choices and react to situations in their natural setting, as opposed to structured settings like research labs or focus groups (Friese, 2022).

In the context of this research, this points to two different undertakings. First, the observation of available open data about people's perceptions of urban wildlife along with their reactions to it. Secondly, the observation of audio and video recordings of opossums taken as part of the opossum project.

Semi-structured interview

Semi-structured interviews involve asking participants a set of open-ended questions and following them up with probe questions to further explore their response and the topic of interest (Yee, 2022).

This method was chosen as it has an advantage of being free from the rigidity of structured interview questionnaires, while giving the researcher autonomy to delve into unpredicted relevant ideas around the core topic.

2.2.2 Data Analysis

A mixture of inductive coding and deductive coding and, thematic analysis was used to analyse the gathered data.

Thematic Analysis / Thematic Coding

Thematic analysis is a qualitative data analysis method which involves reading through a data set and identifying patterns across the data to derive themes (Saldaña, 2009).

This study is a hybrid approach which incorporates both inductive (data-driven) and deductive (theory-driven) coding. Although presented linearly, the research analysis was an iterative and reflexive process. The data collection and analysis stages in this study were undertaken concurrently.

Inductive Coding

Inductive coding is a ground-up approach, where the codes are inferred from the data. This means you start from the scratch and let the narrative or theory emerge from the raw data. Inductive coding helps in steering away from pre-conceived notions or biases of the researcher.

The primary purpose of the inductive approach is to allow research findings to emerge from the themes inherent in raw data, without the restraints imposed by structured methodologies (Thomas, 2006).

Deductive Coding

Deductive coding is a top down data analysis approach. In context of qualitative analysis, it usually means reading through the data set and assigning predetermined codes to it. The codes in case of this paper were created from concepts drawn from the literature review.

Deductive strategies are useful to maintain the focus on the purpose of your research and keep it organized. Inductive strategies are useful to circumnavigate research bias and keep the research grounded in data. Bingham (2022) theorizes that a data analysis process that draws on both deductive and inductive analysis supports a more organized, rigorous, and analytically sound qualitative study.

3.0 Extending Inclusion: An Inclusive Design Approach to Urban Wildlife Management

3.1 Inclusive Design: The next iteration

3.2 Who is not at the table? Power-sharing and Decentring

3.3 Broader beneficial impacts

3.4 Current practices setting up a vicious cycle

3.5 What it may look like

3.0 _____

Descartes, often hailed as the “father of the Western philosophy” famously thought that animals were merely physical machines without experiences. He reasoned that since they can’t arrange different words together to form a sentence, they lack souls and minds (Kaldas, 2015).

Many philosophers and thinkers in the West positioned humanity somewhere between animality and divinity. They maintained that out of all life forms, humans are the closest to the Gods (Steiner, 2005). Ancient Greek philosophy and their beliefs towards nature were one of the most significant socio-historical factors which influenced anthropocentric values still prevalent today (Rodman, 1980).

Anthropocentrism - the notion that humans are the most important entity in the world - portrays humanity as “owners” of nature (Muradian & Gómez-Baggethun, 2021), and promotes a worldview that animals are inferior to humans in the grand scheme of things. It persuades us to think of nature and animals merely as a resource for humans to benefit from (Washington et al., 2021).

The unprecedented loss of species in the last century (Carrington, 2018) has proven well beyond reasonable doubt that anthropocentrism is not a way to a sustainable future.

Ecocentrism, in contrast, takes a much wider view of the world. It positions humans not as isolated and above nature but, as a part of it. Studying various indigenous cultures’ epistemologies shows that many of them have always upheld non-human centric worldviews and beliefs which reflects ecocentrism (Muradian & Gómez-Baggethun, 2021; Drew, 2023). It extends the moral, ethical and communal umbrella to include land and all the life-forms which inhabit this planet in it.

Chapron et al. (2018) point out that the human-centric mindset is intertwined with the practice of industrialization and the present ideology of economic growth, which ignore the needs of other living beings on this planet. Given how deep-rooted anthropocentrism is in our current world, it is not hard to imagine that a lot of our urban wildlife management practices also stem from this ideology.

To approach urban wildlife management and urban design in a way which facilitates peaceful co-habitation between humans and urban wildlife, and to decentre ourselves, there is a need for a new perspective. One which prioritizes empathy, inclusion and kindness.

This section will put forth a hypothesis about how taking an inclusive design approach to urban wildlife management can steer us toward a more sustainable and ecocentric future. It will also advocate for expanding the current sphere of inclusive design to include other earthly beings in it.

3.1 Inclusive Design: The next iteration

Taking conception in 1950s as “barrier free design” - a movement for designing better built environments for people with physical disabilities - to where it stands now, inclusive design has kept including more and more segments of the society at each iteration of itself.

Inclusive Design Research Centre (IDRC) defines inclusive design as “design that considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference.”

When reviewed, almost all of the discussions, research papers and, scholarly articles on inclusive design, talk only about the benefits to humans (some of them even talk exclusively about how it is a great way to increase profits).



Figure 1: Inclusive Design positionality on the Anthropocentrism-Ecocentrism spectrum

Although sharing multiple values and beliefs with ecocentrism, an argument can be made that on the anthropocentric-ecocentric spectrum, inclusive design, in its current state, leans more towards anthropocentrism.

Including other species in its sphere could be a welcome shift which moves it towards ecocentrism – a worldview which promotes inclusion and empathy towards all life forms. In many ways, it means taking the empathy that inclusive design promotes for humans and extending it to all earthly beings.

To kickstart this move towards ecocentrism, perhaps we can start with the wildlife which exists alongside us. Perhaps the next iteration of inclusive design can include urban wildlife in it.

3.2 Who is not at the table? Power-sharing and Decentring

In his famous essay ‘The Land Ethic’ (1949), ecologist Aldo Leopold appeals to expand the definition of the ‘community’ to include animals, plants and the land itself.

One of the key philosophies of inclusive design is to constantly ask the question who is being left out of the conversation. Whose voice is not heard? Who is not at the “table”? This is how we will arrive at designs which bring positive change (Treviranus, 2019).

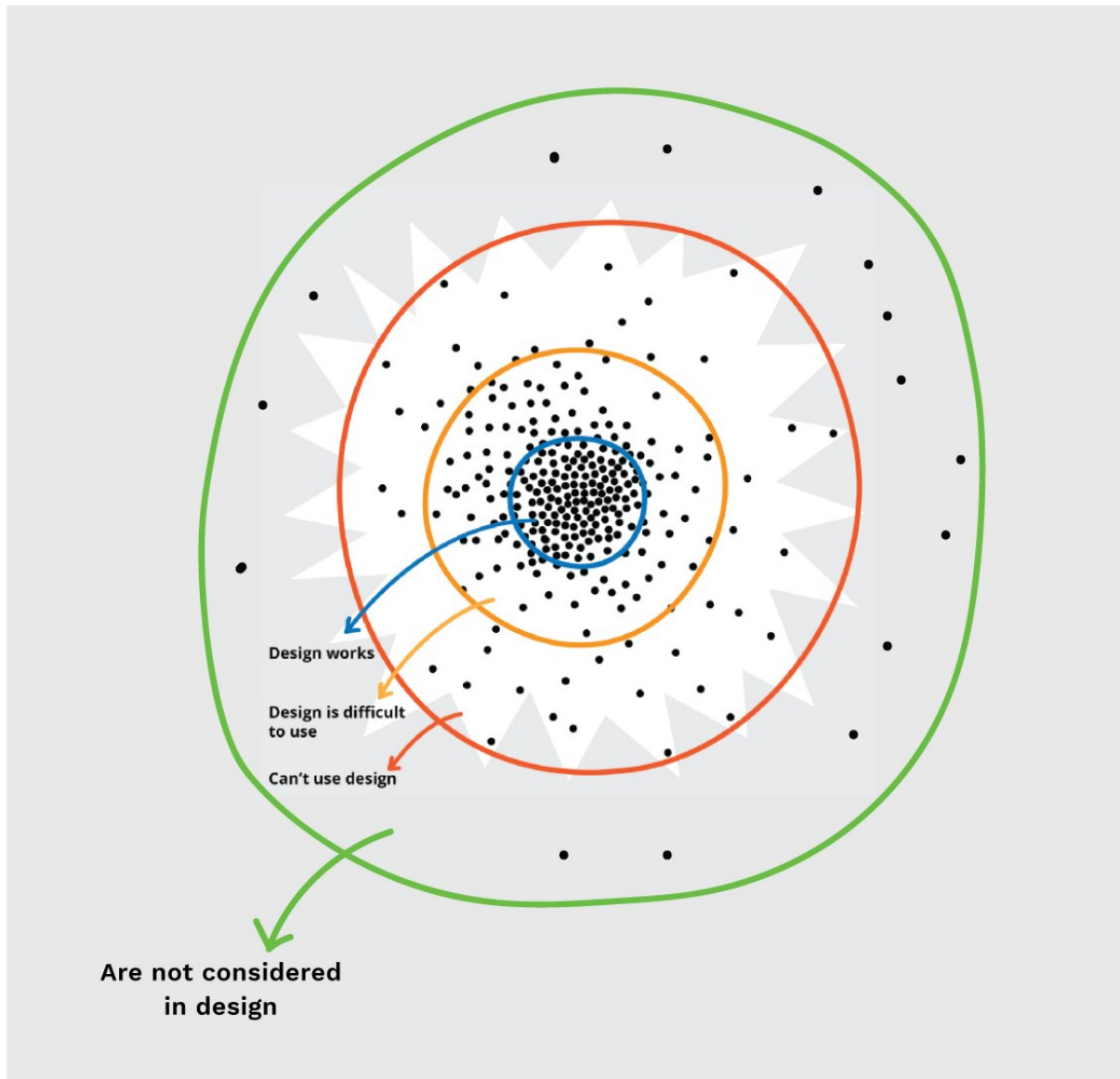


Figure 2: Inclusive Design Starburst, The Next iteration.

The scatter-plot graph represents The Starburst (IDRC., n.d.). The innermost circle depicts the users for whom “design works”. The second circle depicts users for whom “design is difficult to use”, and the third circle represents users who “can’t use design”. As a thought exercise if we plot urban wildlife species on the same chart, as habitants of the same space, they would likely need a fourth circle: the users who “are not considered in design”.

It is painfully apparent that when decisions on urban designs are made, the wildlife, the non-human residents of the land, are not on the table. Can we truly be inclusive if we work towards the betterment of only humans? It seems evident that we need to involve other

lifeforms in our consideration and, at the table where decisions are being made, for a chance at a better and balanced ecosystem.

Traditional design and decision-making process centres itself on “experts”. In contrast, inclusive design approach embraces the principles of co-design, in which the expert is merely one of the participants (and sometimes a facilitator) among community members and people with lived experiences. This allows learning from multiple sources and decentring from traditional power-centre (Sanders & Stappers, 2008).

These principles could be great starting points for decentring humans, and nudging urban wildlife management practices towards an ecocentric future.

3.3 Broader beneficial impacts

Inclusive design stresses the importance and benefit of designing systems that accounts for a diversity of experiences and marginalized needs (Treviranus, 2018b). This results in more innovative and adaptable systems, which are sturdier against unpredictable difficult events (which Taleb (2007) refers as black swan events).

Modern cities are built to meet the relatively narrow needs of only one species, humans, resulting in homogenized physical environment (McKinney, 2006). The needs of urban wildlife have been marginalized to the detriment of our urban ecosystem.

Inclusive design acknowledges diversity with informed design decisions (Waller et al., 2013), where the objective is not to design a cure-all solution, but to design an evolving and resilient system. The challenge of creating an urban environment that encompasses the needs of all inhabitants, will inevitably break away from the homogeneity, and result in an urban ecosystem that is more innovative, adaptable and dynamically resilient (J. Treviranus, personal communication, April, 2023).

The integration of diversity of species would also force us to let go of the human-centric paradigm and use more multi-sensory ways of thinking. The Boonman-Berson et al. study (2016) on human-black bear cohabitation in Colorado is a great example of this. Here the researchers developed a concept of “Multisensory Reading and Writing”. This meant “writing” and “reading” the communication between humans and black bears using senses other than vision (olfactory, auditory, tactile). For example, when humans leave their food in an open trashcan, it is an olfactory writing (communication) to the black bear to come and feast on it.

This is not to imply, that the fact that open trashcans attract bears was unknown to humans. But it is a change of perspective when it is presented as humans “writing” to bears to come and feast on it. It shifts the focus from humans and considers what is happening from the bear’s perspective. It opens up a door for a more compassionate mindset towards another species. Along with that, it opens up the possibility for innovation and using senses which are not as frequently used in urban design.

3.4 Current practices setting up a vicious cycle

The systematic alienation of people on the margins and, design catering only to mainstream/majority has led to an inaccessible environment for many. One that is also prone to succumb quickly to unwelcome changes. In a somewhat similar manner, not considering the species other than humans, or only considering them as an after-thought, while designing, has led to terrible consequences on ecosystem.

Our anthropocentric and “catering only to mainstream” behaviour has caused great harm to us as a species and to the ecosystem as well.

Treviranus (2018) presents a hypothesis about how suppression of the positive aspects of our diversity contributes to the expression of the more negative aspects of our diversity.

People often tend to project human characteristics on animal behaviours (Mota-Rojas, 2021). It could also be reasoned that people are not awfully aware of what various behaviours of different urban wildlife species mean, or what their needs are, leading to a “communication gap”.

When the differences of diversity of species (urban wildlife) are not considered in urban design, it often makes up for an environment which is hostile for the species. When you add this to the lack of awareness about their behaviour and needs, it is not difficult to conceive that negative aspects of the differences between human and wildlife would come up, leading to conflict.

For instance, imagine if people knew exactly what to do when they encounter a Canada goose (*Branta canadensis*). Imagine urban areas designed with an understanding and awareness about them. If the designed landscape has a grass-covered area with water access, geese are inevitably going to come. Better decisions need to be made to avoid conflict, than the one made by Lydney town council⁵, and that involves structural and social interventions. The key is empathy and respect.

Similar to people at the margins, species at the margins are most vulnerable to the negative consequences of an unhealthy system. Most of the current urban wildlife management practices keep alienating them further, setting forth a vicious cycle of segregation and more human-wildlife conflict.

As Oriel (2014) succinctly puts it “a world driven by human purpose is a world losing its balance.”

⁵ The 10-3 vote to cull the geese (Goodwin, 2022).

3.5 What it may look like

Mitchell (2021) theorizes inclusive design as a powerful way to approach and change systemic cycles of exclusion. An inclusive design iteration which covers urban wildlife may look something like the following scenarios.

It would mean that when you talk about an inclusive design approach for an office space, along with accessibility, diversity and, equity, you also think of ways to make the office garden more inclusive for local fauna, to cover up the trashcans more efficiently and, to make the glasses bird-friendly (anti-collision)⁶.

It would mean understanding that “human spaces” do not exist in a vacuum. They exist within the confines of the planet and it is our responsibility as a species to be mindful of other species.

It would mean that when you think of adding another lane to the highway to reduce the commute time (which, by the way, really might not be the solution), you also think about the repercussions it would have for your local wildlife, and then act accordingly.

It would mean a change in the mindset that urban areas are for humans and their pets whereas national parks are for wild animals. It would mean an acceptance of the fact that there are going to be animals which utilize what we are building for ourselves, and we need to find peaceful ways to co-exist with them.

It would mean learning and accepting of paradigms other than the one which focuses only on humans. Paradigms in which humans, like all species, are a part of the ecosystem. Paradigms in which all earthly beings and relationships with them are respected, honoured and cherished. A planet-first paradigm.

⁶ In United States alone, each year, an estimated 100 million to 1 billion birds are killed due to glass window collisions (Loss et al., 2014). Anti-collision glass designs exist. Even adding small visible patterns to glass can save a lot of birds. This is a case of simple design fix. You can literally pick up a colour marker, mark the windows and, save millions of birds, annually. But hey, that’s not a good look for the building.

4.0 How to make a city fall in love with an animal: a social inclusion framework

4.1 What does urban wildlife inclusion mean?

4.2 The SKTW communication model for urban wildlife inclusion

4.2.1 Stage Zero: Stock

4.2.2 Stage One: Knock

4.2.3 Stage Two: Talk

4.2.4 Stage Three: Walk

4.3 Reaching and sustaining the desired stage of urban wildlife inclusion

4.4 Screech, impeach and, memes.

4.4.1 Screech

4.4.2 Impeach

4.4.3 Seize the memes of production

4.5 Interventions without community support

4.6 examples of excellent wildlife inclusion communication work

4.7 Pitfalls of symbols growing too powerful

4.8 The anthropocentric route to the ecocentric UWI

4.9 Future adaptations and iterations

4.0 _____

Public participation is a key element of any social inclusion efforts (Marzuki, 2015). In order to raise and sustain public participation for urban wildlife inclusion, in this section, the researcher proposes an urban wildlife inclusion framework (figures 3,4). The framework contains, the stock-knock-talk-walk (SKTW) communication model (figures 5,7), awareness-engagement positionality graphs (figures 8,9,10) and Screech-Impeach events (Figure 11). These terms, models and, graphical representations were created by the researcher as tools to assist in designing effective mass communication strategies for urban wildlife inclusion.

The framework draws inspiration and integrates ideas and theories from multiple sources. They can be broadly classified in three categories.

(1) Literature review.

Established theories, and existing data on: human-wildlife relations, urban planning, wildlife management, mass communication, entertainment education, social impact entertainment, AIDA marketing model, diffusion of innovation (Rogers, 2003) etc. were reviewed and utilized.

(2) Community participation

To make the framework multi-faceted and robust, semi-structured interviews and dialogues with community participants from the field of urban wildlife management, conservation, science communication, advertising, mass media, wildlife rehabilitation, and, psychology were carried out.

(3) Observational research

Data gathered from open sources such as news stories, magazine articles, social media websites along with the researcher's personal experience as a communication designer.

Community engagement and social awareness are two necessary ingredients to drive the inclusion efforts in this framework. Before getting into the framework, let's define what urban wildlife inclusion means, in context of this paper.

4.1 What does urban wildlife inclusion mean?

A sustainable human-wildlife relationship would have active inclusion of wildlife in the conversation when the design decisions are being made. It would mean designing the urban environment while keeping wellness of the wildlife in mind. An inclusion of urban wildlife in the social sphere, would mean that their autonomy and importance is understood, and ways to co-exist with them are co-designed.

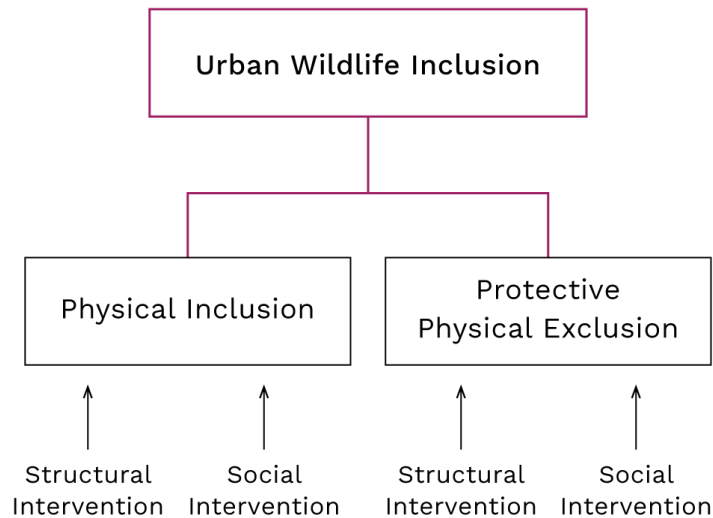


Figure 3: Urban Wildlife Inclusion

Urban Wildlife Inclusion would sometime mean physical inclusion and co-habitation with a species, and other times it would mean respectful, protective physical exclusion of the species (to various degrees). In theory, both of these approaches are examples of being inclusive of urban wildlife. Being inclusive in this context, means being mindful and respectful of the needs of both humans and wildlife, and co-creating sustainable solutions with an objective of healing the ecosystems.

Examples of physical inclusion with the help of structural interventions may look like: creating inclusive spaces for monarch butterflies (*Danaus plexippus*) by planting more milkweed species (Suzuki, 2022). The rich history of birdhouses in many ancient cultures such as “chabutaro” in Gujarat (India) or the elaborate “bird-palaces” of Istanbul (Turkey) also serve as a great example of physical inclusion of species by architectural intervention (Prabhakar, 2022; Erman, 2014).

Examples of protective physical exclusion with the help of structural interventions may look like: bear proof trashcans so bears don’t eat garbage which is unhealthy for them and they don’t associate trashcans with a food source, or bird-friendly glasses to reduce the amount of bird hits, or just building a fence around your backyard to keep the animals out.

Examples of physical inclusion with the help of social interventions may look like: communication about how bumblebees are great for the environment and harmless to humans. Examples of protective physical exclusion with the help of social intervention may look like: communication about how feeding ducks is bad for them and leads to more cases of human-wildlife conflict (NYS Department of Environmental Conservation., n.d.).

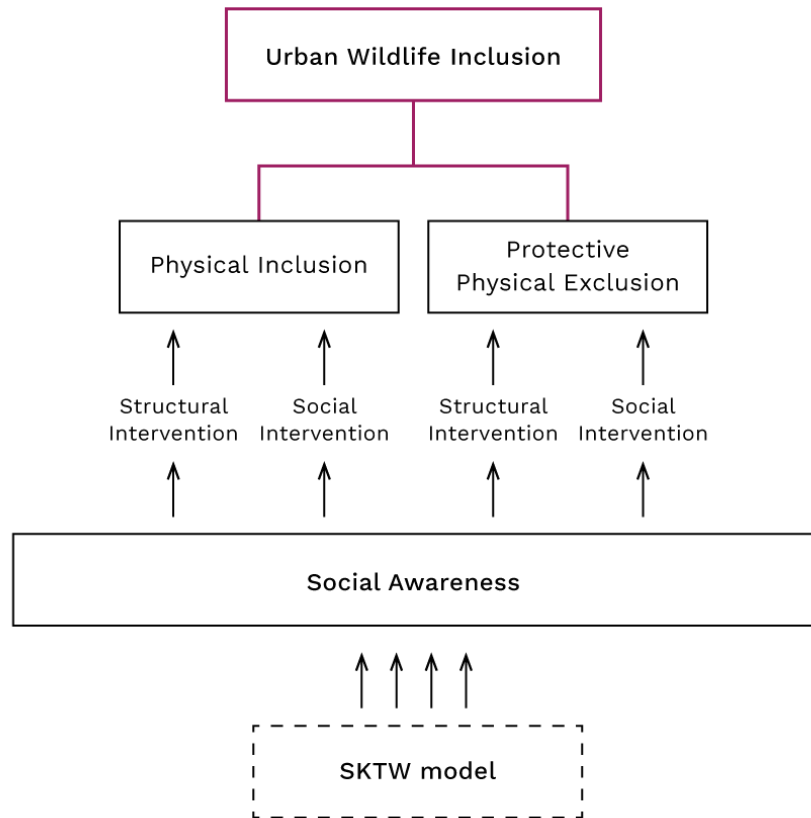


Figure 4: SKTW model relative positionality

Both physical inclusion and protective physical exclusion are equally important for better and sustainable human-wildlife relationship. They can be achieved with the help of structural and social interventions. But, for these interventions to make a lasting impact, they, arguably, need to be backed by social awareness.

Mass communication plays a vital role in creating and sustaining social awareness (Chan, 1998; Stamm et al., 2000). The proposed SKTW communication model suggests ways of doing such communication more effectively, with the goal of creating robust social awareness, on the base of which social and structural interventions for urban wildlife inclusion can be built upon.

This is not meant to be a blueprint which can be picked up and applied anywhere. Each place and each species would have its own challenges and uniqueness which must be respected and accounted for when creating a communication strategy.

Design occurs within a complex adaptive system of systems, and design decisions are not made in isolation (IDRC, n.d.). There are numerous factors to account for when designing a communication strategy. Apart from the medium being used and the objective of the communication, the strategy would also differ based on species, geography, time of the year, sociocultural aspects and, current affairs (of the human world). For instance, the

communication requirements for Reykjavík and Mumbai would understandably be quite different, and so would be the requirements for a Rat compared to a Coyote. The interconnected relations of the system and the nested social context must be considered for the communication strategy to bring forth the intended change⁷.

This framework is designed to be more suited for mass communication in a smaller geographical area (a town or a big city) than it is for large-scale national campaigns. Apart from this limitation, due to the scope of this research project, it is centred in the North American context. The researcher wishes that going forward, it can provide a good starting point to build a framework which is more diverse and adaptable.

4.2 The SKTW communication model for urban wildlife inclusion

This is the provisional conceptual model of the framework created by the researcher. Along with the principles of mass communication, it centres around “image building”. In many ways, the exercise undertaken by the framework is akin to conducting an advocacy campaign for a species.

⁷ Think of the framework as cooking instructions on a packet of ramen, once you know how to cook ramen, you can make many dishes according to your specific need, at a given time. (ramen: quick-cooking noodles).

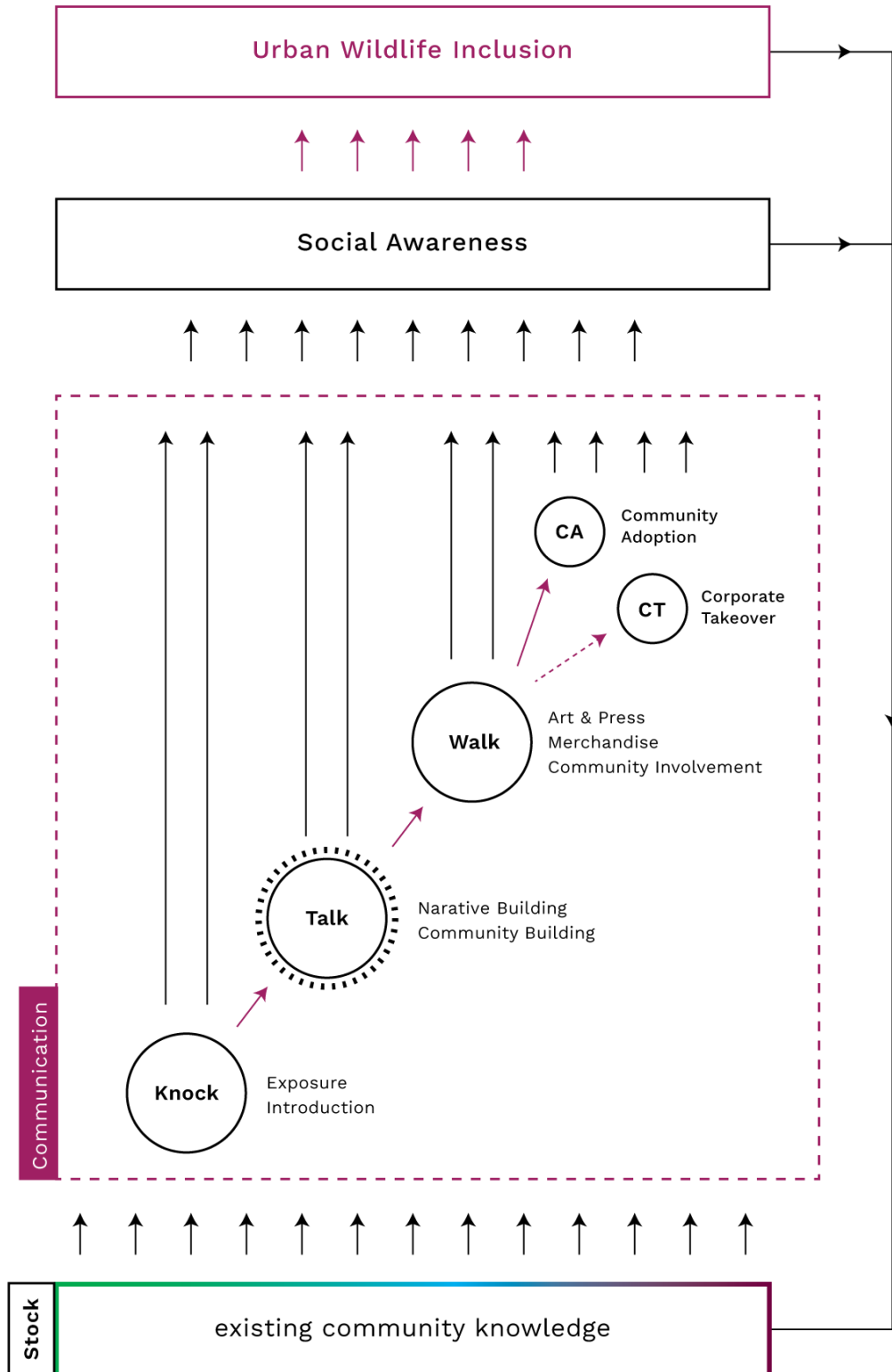


Figure 5: Stock-Knock-Talk-Walk (SKTW) Communication Model

The model has been divided into four interconnected stages. Stock, Knock, Talk and, Walk. In the following sub-section, we'll go through each of these stages.

The model starts at the bottom with "Stock" which is existing community knowledge, and eventually leads to "social awareness". In the context of this framework, social awareness is the current state of things in the social sphere. It refers to more recent events and developments. While "community knowledge" is the sum of the knowledges held by the community. It refers to practices and mindsets which are woven into the fabric of a community. The altered social awareness leads to changes in urban wildlife inclusion practices. As time passes, both social awareness and urban wildlife inclusion keep becoming community knowledge.

4.2.1 Stage Zero: Stock

The model starts with learning about existing community knowledge about the species we are communicating about. This covers available scientific knowledge, existing social knowledges and, the cultural knowledges. It is paramount to understand the background and the existing narratives about the species, and to build an evolving repository of data for it, before we start to design a communication strategy.

Urban wildlife inclusion is a collaborative effort, one driven by people. Studying available scientific data and information on the species and, learning about existing social and cultural knowledges from: people who are working in the conservation and local wildlife management field, community leaders, local businesses, regional nature societies, could be a great first step towards UWI. Local magazines, social media, news stories, published articles, books for children, surveys and opinion polls, would also help in getting a sense of community engagement and social awareness about the species.

Talking to communities will also shed a light on what historically has worked and what has not worked in the area, in regard to urban wildlife management, human-wildlife interactions and, regional mindsets about the species. This is where the preliminary narrative for the communication strategy would be conceived.

This live data repository would function as a constant source of learning which will help make the communication more effective in each stage of the model.

This is also a good stage to start co-designing and testing out your structural interventions with the species. So, when the time comes for introducing the structural innovations to people, they are already tried, tested and ready to go. Section 5.0 will talk about this practice in more detail.

4.2.2 Stage One: Knock.

This stage is about introduction and exposure. This will make use of photos and videos of the species, to increase its familiarity to people. Visibility is useful. The stage is a mixture of

facts and narratives. Albeit, the facts would be bite-sized. A reasonable medium for this stage would be social media, however, it is adaptable to other mediums.

When it comes to photographs, it would seem sensible that non-threatening or humorous photos, or photos of baby animals – to start with, would gain more engagement. For example, front-facing photos of opossum might be a better one to start with, than the side-facing photos where it is baring its teeth. However, it is equally important to showcase the “non-flattering” ones too, so that people have the full picture, and are not disillusioned later.



Figure 6: comparison of two opossums photos

Like everything in this framework, this is not set in stone. One can begin with more “serious” images, if that supports the narrative they are going for in the later stages. The narrative is the guiding star.

Here’s where you plant the seeds for your narrative. Facts like how opossums have prehensile tail and two vaginas and, how they are immune to a variety of snake-venom. Limited and selective bite-sized data. Think appetizer, not main course.

The objective of this stage is to get attention - to hook. Once the hook is in place, you can talk about “serious things”. If you start with talking about environmental sustainability and biodiversity, the communication may not have the intended reach.

Hooks need to be something people would want to listen to. Sometimes it will have to do with wacky facts, memes and, trends – mental health issues? Unemployment? Pedro Pascal? Whatever is in trend. Other times, the timeless classics are always there to help: beauty, humour, sex, violence, unusual/surprising traits. We need to get someone’s attention first, before we start talking to them.

4.2.3 Stage two: Talk.

The second stage is about narrative building. This is perhaps the most important stage in terms of communication. This is where you gather everyone around the fire and tell a story. Facts are important, fables are better!

There are several ways to build a narrative. Empirically, anthropomorphising is one of the ways which seems to work well for the purpose. *Oh, hey opossums get anxious and faint? Me too bestie!* People respond positively, and find it easier to empathise with animals they can relate to (Urquiza-Haas & Kotrschal, 2015). Anthropomorphising often helps create that bridge quickly.

However, like all fast things, it can go off the tracks very quickly. One must be wary of the downsides of anthropomorphizing. This is an especially important factor to actively keep an eye on, as we continue seeing an uptick in anthropomorphising behaviour globally (Mota-Rojas et al., 2021). You want people to relate with the animal, but you don't want them nuzzling with it. In some cases, this is a very fine line.

Another fine line to tread with anthropomorphising is, it can lead to people forming certain behavioural expectations from the animal. When those expectations are not met, it can result in a negative interaction and/or misleading narratives.

It is crucial to keep recounting the specifics about the animal and how to interact (or not to interact at all) with it, and the fact that it is a wild animal and should not be treated/handled like a domesticated pet.

It is apparent how these stages could look very different for different species. Nevertheless, the objective of the stage would still remain same: to build strong, fact-supported narrative(s). The stronger the narrative in the second stage, easier it will be to build on that and to refute the harmful narratives which may arise. Narrative building will also rely on what your third stage objectives are.

This is where you can start dispersing more facts, but it still is a narrative heavy stage. The facts are there to support the narrative. It is important to keep checking in on people's reactions and, possible sprouting of dangerous narratives. In theory, it would be easier to refute harmful narratives if your narrative is firmly rooted in facts and, has resonated with people.

Talking about benefits to humans or benefits to the ecosystem (which in a roundabout way still means benefits to humans from anthropocentric lens) is also a communication strategy which shows promise of engagement and interest.

Both talking about benefits and anthropomorphizing are deeply anthropocentric, a mindset this framework is trying to steer away from, but is still carefully engaging with for practical reasons. This is addressed in detail in section 4.8

It is a tragedy of the system we currently operate under, that it seems hardwired that every animal either needs to have a utilitarian function or look pretty, simply in order for us to justify letting it live. This is a toxic line of thought. We need to fathom that wildlife and ecosystem have merit outside of how they can be beneficial to humans.

Nevertheless, unfortunately this is the system we currently operate under, and attempts to make changes to the system would also first need to pass through the system. There is a

school of thought that believes that talking about benefits to humans could be a helpful framework to rebrand public empathy towards an animal. Especially ones which people see as nuisance or pest. For instance, the now-debunked but wildly popular factoid about opossums eating thousands of ticks, once set them up for a successful advocacy campaign (Hennessy & Hild, 2021).

A little poetic license or exaggeration, even in a support of a good cause can have insidious effects. When it comes to animals, especially the ones who are living with people, it is essential that all communication is firmly based in facts. Viral claims that are later debunked undermine public trust in experts and evidence-based science (Shiffman, 2019). "Education about zoonotic threats is challenging enough without misinformation or untested claims muddying the water" remarks Lydden Polley (2005).

The balance between building a narrative which is fact-rooted and building one which is more "people-friendly" is a difficult one to maintain. A lot of times, strong narratives are more helpful than strong facts (O'hara, 2014; Sudakow, 2017).

It is important to keep in mind that, this is the last stage where you'd still have a good handle on the narrative. From here on, rebutting harmful narratives will increasingly keep becoming the priority.

Raccoons in some parts of Canada and USA are an interesting study for this. The detrimental narratives are giving a strong competition to the facts. The healthy narratives do not seem to be strong enough to refute the unhealthy ones or, are in compliance with them. There are numerous instances of people trying to keep them as pets, even in the places where it is illegal to do so (Tarver, 2014). The communication that they are wild and, should not be interacted with for their own good, does not seem to have really transpired.

4.2.4 Stage three: Walk.

This is the action stage. This is where things in the physical world start happening. The narrative has the steam now. It will be picked up by people and used for various purposes. The merchandize (usually starting with tee-shirts) will start to appear in the physical world. This would invariably involve the narrative getting twisted and new narratives sprouting.

This is where things will start to go out of hand. The narrative is, to a good degree, a self-sustaining entity now. The degree of control you had over it will wane. It is now in the hands of people (and the "free market", but we will get to that later).

The essential task now would be to observe and maintain the narrative and, keep putting forth more facts to support it. This is a fact-heavy stage, since narrative is already in place. More information-dense and fact-heavy communication can be done, as there is now an appetite for that. The facts will help in keeping the narrative closer to the reality.

An effective way to support the narrative is to get the local artists involved. Murals, graffiti, illustrations, merchandize, stories, interactive street plays – any and all ways of

engagement which strengthens the narrative and the facts. This will involve providing space for money making opportunities to sprout, for the artists and local small businesses whose goals align with the cause. The intention is to infiltrate the sociocultural fabric of the society with the animal and, build a community around the cause. *Opossum lovers club? Hell yah.*

As this keeps on, it will eventually lead to two intermingled paths. Corporate Takeover and/or Community Adoption.

Corporate Takeover

A path the "Walk" stage could go to is corporate chains and big brands abducting the narrative. To a large extent, this is unavoidable in the current economic system. Anytime a symbol would gain traction and would have a connection with people, brands typically will hop on the wagon to pick up the "latest trendy thing".

They will then proceed to twist the narrative, in order to monetize it and squeeze profit out of it, till it loses all its meaning. Once the narrative is no longer profitable, they will discard it and move on, leaving behind the empty husk of the narrative.

Bottom line, thanks to their economic and political resources, brands have the power to pick up a symbol/narrative and, hammer in the new meaning to it, the one which complies with their objective (making money). Before you know, the animal (symbol) starts getting associated with something completely random, demolishing the original narrative. The raccoons in Toronto are currently somewhere at the beginning of this stage, with brands such as Porter Airline starting to use them as a logo.

Another corporate takeover, which can actually go either way, is an animation film picking it up. This is a double-edged sword and it can end up really well or really terribly. For instance, the famous 2003 Disney movie "Finding Nemo" wreaked havoc of such a huge proportion on the clownfish (*Amphiprioninae*) population that they went locally extinct in some areas of Southeast Asia, reports professor Karen Burke da Silva⁸ (2016). Or the insidious consequences that the cult classic, 1975 movie "Jaws" had for shark population, including popularizing shark hunting as a sport and even influencing government policies about sharks⁹ (Francis, 2012).

When corporate takeover looms large, one would need to keep finding ways to strengthen the original narratives, spreading facts, and aiming for community adoption. Newspaper

⁸ Of course, the elephant in the room in the "finding nemo" disaster is the capitalistic system and lack of strict environmental laws which allowed cruel harvesting of the fish, which often included bleach-poisoning entire coral reefs.

⁹ On average, humans kill around 100 million sharks in a year, while sharks kill around 6 humans worldwide (Rice, 2018), most of which are cases of sharks mistaking humans for another animal. For perspective, here is a quick list of animals/things, with number of people they kill each year. Deer (130), Coconut (160), Dogs (25,000), Champagne Cork (24), Hotdogs (77), Ladders (113). You are also more likely to get bitten by a New Yorker than by a Shark (Cohen, 2022).

articles, magazines, press, local community centres, local conservation and nature clubs, all of this could be of advantage. (Of course, it would not hurt to have economic and political resources by your side.)

Mindful corporate takeover can be a welcome exception. However, more often than not these takeovers are exploitative and extractive. Corporations take over for their own benefit, and the animal (or person) used to polish their reputation, usually ends up losing in the end (Treviranus, J., personal communication, April, 2023).

Community Adoption

This is when a community adopts a species, and makes it a symbol of the community: A sports team picking it up as their mascot. A local band or a theatre or a library promoting it or even just talking about the animal could be very helpful for social inclusion.

As mentioned earlier, collaborating with local artists, influencers and small businesses who understand the objective and assist in further strengthening the narrative will help greatly in the long run.

All of these could be very beneficial to the cause, and give it a solid platform to work further. Mindful community adoptions like these can give the narrative more longevity. It also helps that, unlike corporate symbols, this would not be associated purely with money, but it'd be woven into the fabric of the space, and associated with pride and identity.

Positive community adoptions can lead to a robust platform to dissipate facts about a species and, build mindful inclusive spaces for them with the support of the people.

The Asiatic lions (*Panthera leo persica*) of Gir (India) and the communities living with them in the Gir National Park is an exceptional example of community adoption. A number of local communities, along with their cattle, live side by side, in harmony with an apex predator. Thanks to their excellent social awareness, the human-wildlife conflict is surprisingly minimal. This is a community adoption which stems from deep-rooted cultural and social values of respect and kindness. It is supported by powerful and often door-to-door local campaigns and also by effective government policies (Kumar & Pathan, 2015). The case of Jawai (India) is also a compelling one, where communities have peacefully co-existed with leopards (*Panthera pardus*) since centuries (Kunzru, 2015).

An appealing scenario of community adoption, which can work quite well in smaller towns, is the town centring its tourism around the species. It is important that the tourism stays responsible and doesn't take over the original objective of a balanced ecosystem. As a rule of thumb, always ask, what is best for the ecosystem of the land.

In other words, one must stay vigilant that the community adoption doesn't get taken over by corporations at any stage.



Once the third stage is in progress, the most important job is to keep an eye on the narrative and nip the potentially dangerous narrative in the bud, with facts. *Yes, raccoons are incredibly cute, but remember that they are wild animals and are best left alone and appreciated from distance.* One can of course also start new narrative(s) if that is what's needed to refute the harmful ones. The goal here is to funnel the public engagement and awareness into a healthy community adoption stage.

As we move towards the coveted community adoption stage, another constructive thing would be to get children involved. Some effective ways to do that could be: getting educators and facilitators involved with the cause, getting the writers & illustrators of children's literature to tell stories about the species. Children are the future of conservation. Early exposure to urban wildlife and the ways that they are intermingled in our lives could see positive outcomes for the cause (Trautner, 2017).

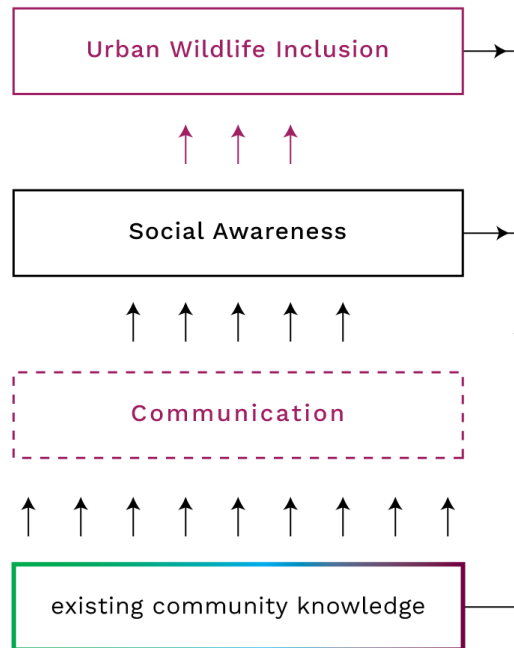


Figure 7: compact graphical representation of SKTW model

In practical scenarios, the stages of the SKTW model don't have distinct boundaries and tend to fuse into each other. They are also not linear in nature. Once they are in action, they will continue to be in action, with varied intensities over time. This means that along with stage three, stage one and two would also be simultaneously in progress. New data and new factors will keep emerging, making it important to keep evolving the communication and the narratives with it. The live repository will also keep growing, as it accounts for the effects of the communication and outreach.

In an ideal scenario, with community adoptions, social awareness, and momentum behind the narrative - a push for policy interventions can be made. These can take the form of actual laws, which would aid greatly in the objective of mindful urban wildlife management practices.

The story of P-22 is a glowing example of this. The beloved Los Angeles mountain lion (*Puma concolor*), whose narrative played a pivotal role in the advocacy campaign and in raising 90 million USD for building a very important wildlife crossing over a busy highway (Ward, 2022).

4.3 Reaching and sustaining the desired stage of urban wildlife inclusion

For a community or a place to reach a desired stage of UWI, it would need to have a certain amount of social awareness and a certain amount of community engagement. Both of these measures simultaneously need to be above a certain mark to have mindful UWM practices.

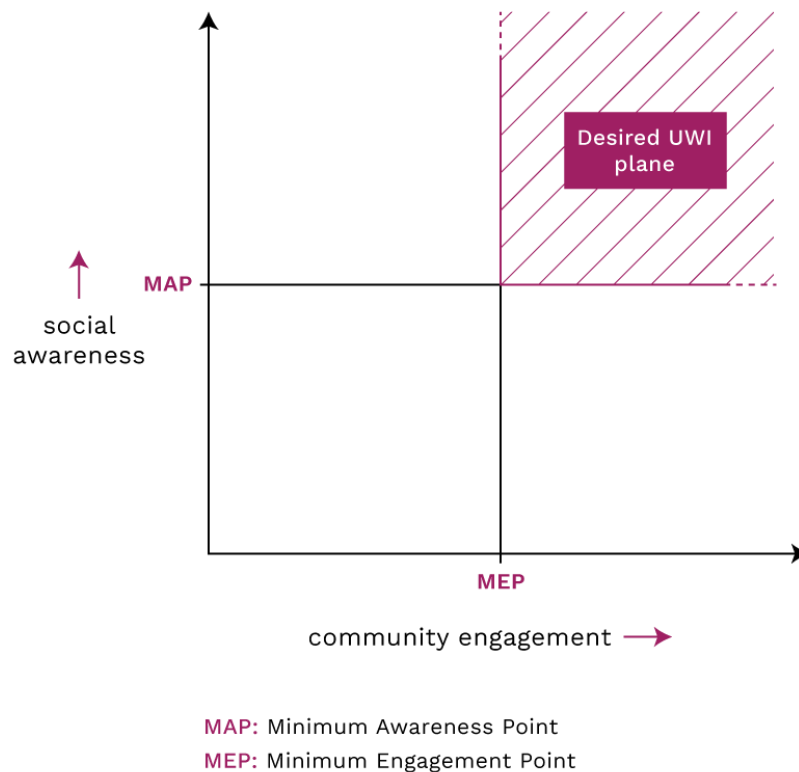


Figure 8: Awareness-Engagement Graph

This graph depicts the desired level of UWI in context of social awareness and community engagement. Here, community engagement doesn't refer to physical engagement with the species (encountering the species in physical world), but it refers to social presence of the species. A snake's physical engagement is much lower than a pigeon's. Meaning, in your

daily life, you are less likely to encounter a snake than a pigeon. However, snakes have a very high social presence thanks to mythology, symbols, public fear and, many other associations with them. This makes their community engagement scale higher.

Before building communication strategy, it would help to determine where one stands in the graph and then, accordingly plot a course of action (with the help of SKTW model) to reach the UWI plane.

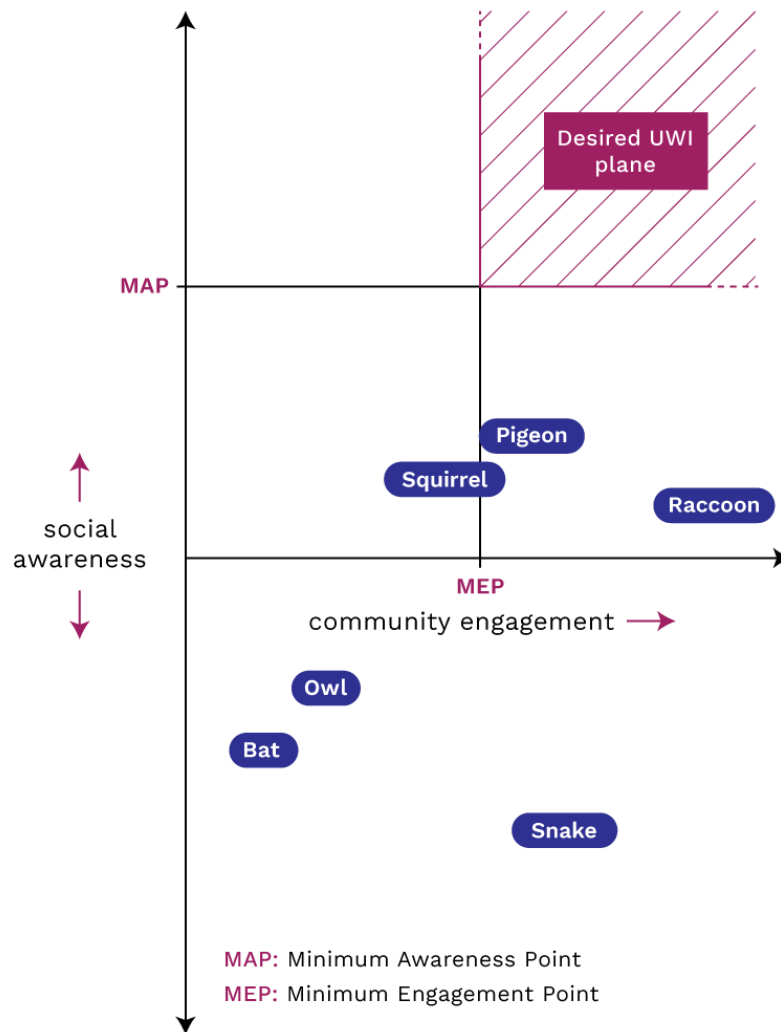


Figure 9: Charting urban wildlife on AE graph

This is an example of charting a species on the awareness-engagement graph – locating their AE point (Awareness-Engagement Point). Different species would need different communication strategies based on their current standing on the graph. What would work for a raccoon would not work for a bat. Species can also have negative public awareness; this means there are existing harmful narratives about the species, making people misinformed about them. This is conceivably worse for the species than having no narrative/no information.

The AE points of the same species would be different in different locations and at different times. This makes the AE graph of a species unique to the location and ever-changing with the time. The AE points in figure 09 are based on observational research, conducted in context of Toronto in 2022.

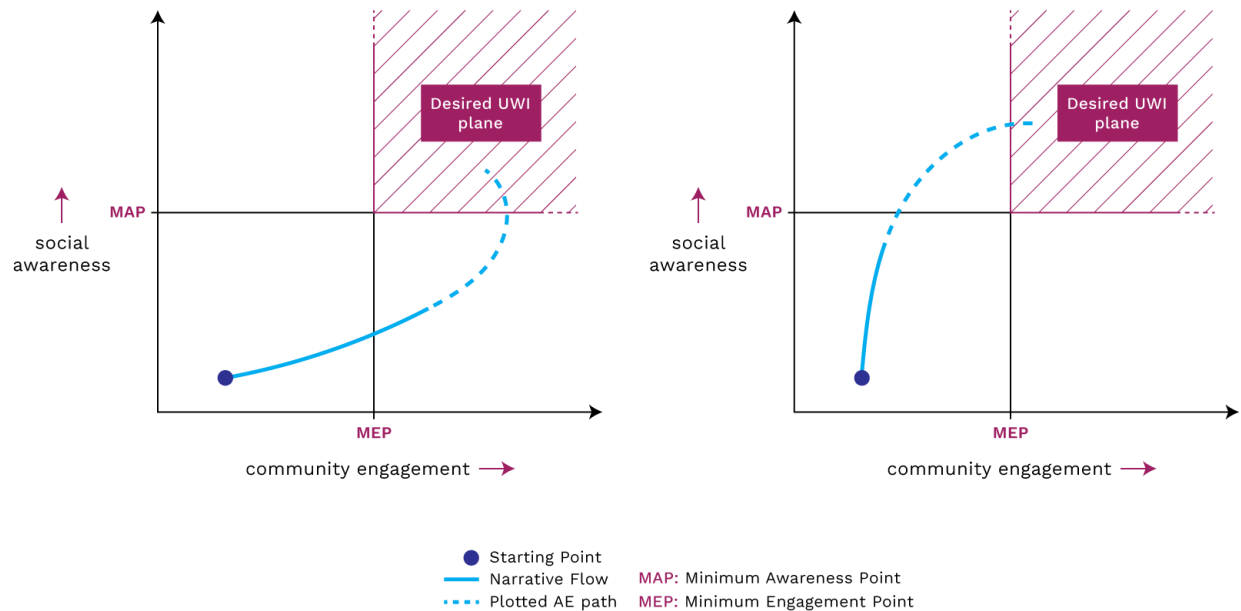


Figure 10: Plotting path of action on AE graph

Once the starting point is located, the AE path to reach UWI plane from the starting point can be plotted. A narrative flow is required to follow the plotted AE path. The SKTW model helps in designing communication strategies which would generate the desired narrative flow.

Narrative heavy communications: entertainment infused communication, mediums such as social media (Instagram, TikTok, YouTube), mediums which reach larger audience - would usually move the AE point horizontally forward. While, fact heavy communications: information dense communications, science journals, research papers, detailed blogs, any communication which have more facts than narrative/story - would usually move the AE point higher up in the graph.

Both of these communications (narrative heavy and fact heavy) need to be utilized to reach the desired UWI plane. High but far left AE point (very few people know/care a lot) could be ineffective and far right but very low AE point (lot of people know very little /are misinformed) could be dangerous.

In reference to AE graphs, the SKTW model would usually advocate a course of action which goes right first (more community engagement) and then gradually rises higher up (more social awareness) to reach the UWI plane.

4.4 Screech, impeach and memes

Narrative-building is a dynamic process. One needs to keep monitoring the external factors which could affect the narrative flow. In an ideal scenario, the narrative flow will follow the plotted AE path and help reach the intended awareness-engagement balance. However, in practice, there would be multiple factors changing the narrative flow.

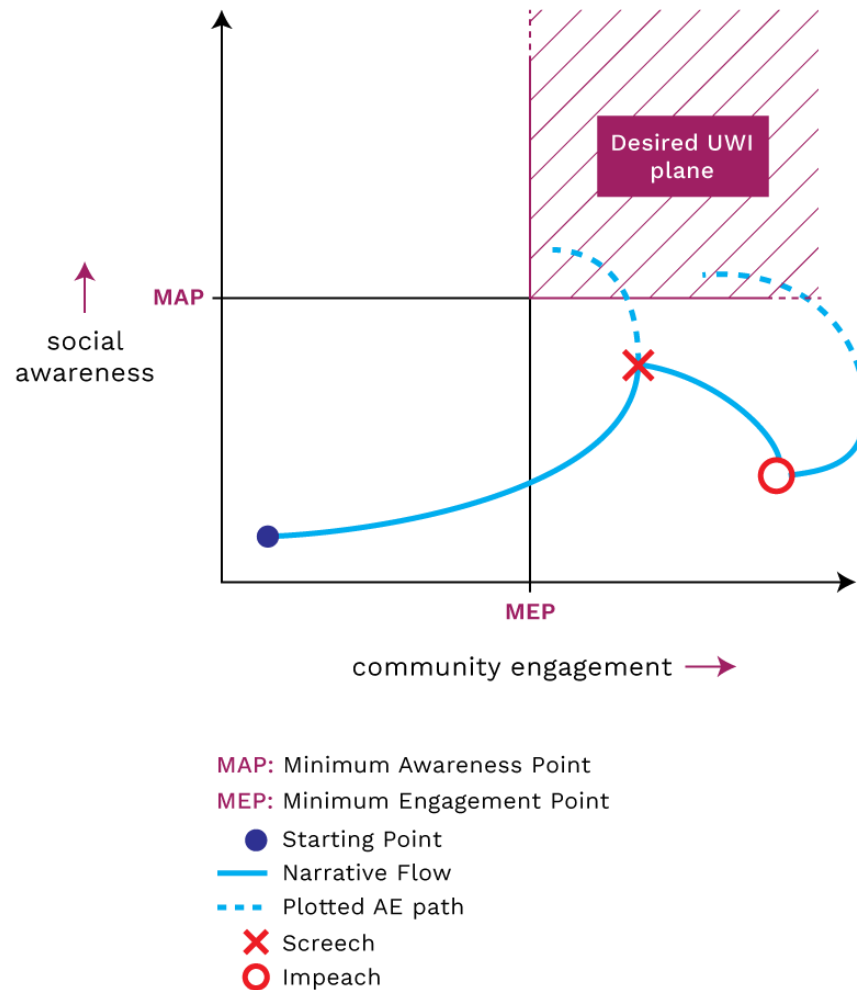


Figure 11: Screech & Impeach on AE graph

4.4.1 Screech

Screech is an unplanned event which disrupts the narrative flow. Screech events can be good or bad. For examples: a celebrity tweets about a raccoon. This would be an accidental jolt to the planned narrative flow. Depending on what they have tweeted, it could be good or bad. It could either give a major boost to the narrative in the desired direction, or it can totally crash it.

Screech can be segregated into good screech and bad screech, depending on how higher or lower it moves the AE point on the awareness axis. Whether it is good or bad, screech would drive the AE point far right on the engagement axis, giving it an unplanned boost in public engagement. These engagement boosts are usually short-lived, but they can be utilized for the cause.

4.4.2 Impeach

Impeach is when after a screech event, the narrative-builder tries to get a hold of the narrative flow again and guide it to the desired AE path towards the UWI plane.

The intensity of impeach should be at least proportional to the intensity of the screech. Sometimes, a bad screech can also prove helpful, if followed up with a strategic impeach.

The Rob Ford-Opossum incident is an interesting case for this. In 2015, the late Rob Ford, then mayor of Toronto, publicly waged a war against opossums, calling them gross, vicious and, dangerous (Peat, 2015). This caused a massive backlash from biologists, naturalists and, scientists, who came to the rescue of opossum, and publicly refuted the misinformed claims, creating some social awareness about opossums in the process (Humphreys, 2015; Lakey, 2020).

It is noteworthy that screech is unplanned, but not unexpected. By the very nature of how things work, sooner or later a screech will happen. A strategic response would be to use the sudden surge in public engagement, and direct it in the desired direction with the help of facts and narratives – impeach the screech.¹⁰

A continuously occurring phenomenon is not a screech. Social accounts putting forth dangerous misinformation and narratives are not screech events. (Example: Social media accounts of “Juniper fox” and “Tito the raccoon”). They are harmful narrative flows. This is because they are continuous and not something one did not anticipate happening. They have similar effects on the desired narrative as pre-existing harmful narrative flows.

Screech events are sudden gusts of uncontrollable energy in the narrative, making it loose control. They happen out of the blue and they get over quickly – like a bolt of lightning. The community engagement surge from a screech would be temporary and would typically wane in a couple of weeks.

On the other hand, harmful narratives are like continuously flowing counter-direction winds, making it difficult for the narrative flow to maintain its direction on the AE path. The community engagement gained from continuous harmful narratives is gradual, stronger

¹⁰ Another interesting study for screech-impeach is the famous Emmanuel the emu getting sick, followed by the owner kissing the flu infected emu on the mouth – which started a surge of impeach by the scientific and wildlife rehabilitation communities, hopefully driving the public awareness higher.

and, steadily increases in the wrong direction. For example: stereotyped and ingrained misinformed narratives about snakes, or a social media account which continuously pushes harmful narratives.

Screech events can also be manufactured. This would be something akin to getting an engaging story published to get everyone's attention, anything which puts the animal in the limelight for a while. Planned screech events are a tricky territory. It could very quickly get complex to handle the burst of energy in the narrative flow, even when planned.

The recent campaign to stop rattlesnakes roundups¹¹ in Sweetwater (Texas), where hundreds of kids sent hand-written letters to residents urging them to stop killing snakes, is a great example of a planned screech event (Advocates for Snake Preservation, 2023; Addison, 2023).

4.4.3 Seize the memes of production

A lot of the communication explained through the sections 4.2 to 4.4 will happen in a virtual world. The role of memes and positive humour is an important one here. Humour allows one to connect with their audience, foster trust and compel them to consider your perspective (Abrahams, 2020).

In his book, Grant Kien (2021) hails memetic communication as the emerging phenomenon of this century. In a short amount of time, memes have become tools that can put pressure on organisations. It influences not only what people think, but also how the thoughts spread (Górka, 2014). Humour can be a powerful tool for social inclusion, given that it is utilized with restraint, so as not to undermine the credibility of the communication (Pinto et al., 2015).

4.5 Interventions without community support

A lot of well-intended communication about urban wildlife management keeps failing, because it starts directly at the "Walk" stage. When the communication starts directly at stage three, instead of talking to people, it ends up talking at people.

The City of Toronto recently conducted a "stop feeding wildlife" campaign, where they used a photo of a raccoon in a bowtie. The campaign was met with resistance and mockery by the locals (Landau, 2023; Waberi, 2023). Along with the poster campaign, the city also

¹¹ CW: cruelty. Rattlesnake roundups is a cultural festive event, where thousands of people get together and slaughter tens of thousands of rattlesnakes live for the purpose of entertainment. A Texan tradition. This is an unregulated and unmonitored event. These rattlesnakes are taken from the wild, usually by pouring gasoline over their winter dens, polluting surrounding land and water and impacting around 350 other species (Advocates for Snake Preservation, 2023) As of 2023, these events are still successfully organized every year.

passed bylaws, prohibiting people from feeding wildlife, punishable by a heavy fine (City of Toronto, 2023).

This is an example of a social intervention for protective physical exclusion, for an animal with high engagement and low awareness. The awareness is not high enough to support the policy intervention adequately. It seems logical that this much-welcome policy intervention would have been a lot more impactful, if the reasons behind this intervention were communicated more effectively to the people.

According to the proposed framework, for this particular intervention to have a lasting impact, more effective communication for social awareness is required.

4.6 examples of excellent wildlife inclusion communication work

These are some of the people and organisations, with their twitter handles, who are doing amazing communication work for wildlife inclusion. Their communication is in alignment with the framework, which focuses on both community engagement *and* social awareness, while being strictly factual. This helps it reach a wider audience and be positively impactful.

Organisations: Oklahoma Department of Wildlife Conservation ([@OKWildlifeDept](#)), National Park Service ([@NatlParkService](#)), U.S. Fish and Wildlife services ([@USFWS](#)).

Social accounts: Emily Taylor ([@snakeymama](#)), Jess Andersen ([@Jess_inthewild](#)).

4.7 Pitfalls of symbols growing too powerful

The story of the Giant pandas (*Ailuropoda melanoleuca*) is an interesting one. Promoted as a huge conservation success story, a mascot for endangered species and, the very face of the World Wildlife Fund (WWF), panda conservation efforts continue to rake outrageous amounts of money.

Instead of leading to a more holistic approach to conservation and stopping the habitat destruction which led the pandas to the brink of extinction, their fame has led to aggressive captivity-breeding programs for the pandas (He, 2013). It also took the limelight away from other endangered species (Briggs, 2020). Sadly, the rest of the planet's wildlife continued to deteriorate while disproportionate time and efforts were being spent on saving pandas (Jones, 2015).

There are of course a lot bigger and far more complicated factors at play in this particular example, but the key takeaway is not to focus solely on one species, but on the ecosystem as a whole, and once again, to be vigilant of the corporate appropriation.

Reaching the desired UWI plane of one species is just one cog in the massive ecosystem. It would not be effective without other species also reaching their respective UWI planes.

The objective is to include every species which live in the area and walk collectively towards the goal of a balanced ecosystem.

It is noteworthy that the work doesn't stop once the UWI planes have been reached, because the AE points are dynamic. The very nature of inclusion is dynamic. It is never completed. It has to constantly evolve and adapt with the systemic changes around it.

4.8 The anthropocentric route to the ecocentric UWI

The earlier stages of the communication model start with a distinct anthropocentric orientation. Later, as it progresses, the model gradually takes an ecocentric turn, and in its final stage, it becomes almost entirely ecocentric.

Many of the suggested communication strategies actively rub shoulders with the harmful anthropocentric narratives, ideals and, emotions. This is done as an attempt to diffuse the novel idea (Rogers, 2003) of urban wildlife inclusion in our deeply anthropocentric societies more effectively.

The anthropocentrism is so deep-rooted that, conservation efforts for human-looking animals or cute animals or animals which apparently have emotions closer to that of human emotions succeed more than the ones which don't fit this category (Urquiza-Haas & Kotrschal, 2015). To bridge this gap of unfamiliarity, which seems to lead to indifference, the stepping stones has to be made of a familiar shape and size. Especially, when it comes to the animals who don't fit the "pretty", "intelligent", or "feels-emotions-just-like-us" category.

Since, the desired destination, is a significantly unfamiliar one, we need to start with something familiar, or at the least, something which has a resemblance of familiarity. If one starts with a hard turn towards an ecocentric model of inclusion, it is not difficult to imagine that it will likely be met with acute resistance.

For this reason, the model and the framework are designed to facilitate a careful diffusion of the idea, so that it has an increased and lasting impact. One still has to work within certain confines of the system, even if the end goal is to break away from it.

4.9 Future adaptations and iterations

This framework has been designed with the context of creating socially inclusive spaces for urban wildlife. The core idea is to gain the necessary level of community engagement and social awareness for the cause, and then to maintain it. The researcher speculates, without having enough data to assert, that the framework could prove a useful tool for designing and sustaining advocacy campaigns for other matters of social inclusion, as well.

5.0 The Opossum Project

5.1 Why opossums?

5.2 Opossum Project. Stage Zero: Stock

5.3 Preliminary narratives

5.3.1 The Newcomer

5.3.2 The Anxious Opossum

5.4 Structural intervention

5.4.1 Prototyping

5.4.2 Community participants

5.5 Opossum Project. Stage 01: Knock. Examples

5.6 Opossum Project. Stage 02: Talk. Examples

5.7 Future plans

5.8 A note on co-designing with animals

5.0 _____

The Opossum Project came into being as a result of discussions about the urban wildlife inclusion framework with Dr Suzanne MacDonald. Dr MacDonald is an animal behaviour researcher and a psychology professor at York University (Ontario, Canada). She has been studying how animals think and how humans and wildlife interact since over 30 years now. One of her special areas of interest is finding ways for urban wildlife (especially raccoons and opossums) and humans to co-exist peacefully.

Through this project we aimed to put the framework in practice in order to practically evaluate it. Toronto was selected as the location for the project due to the ease of on ground access for the researchers. As one of the major North American cities and the most diverse city of the world (Harford et al., 2016, 4:11) Toronto also happens to be a remarkable location for testing the framework.

Once the location was decided, next order of work was to finalize the species. Out of many worthy contenders who live in urban Toronto, Virginia opossum (*Didelphis virginiana*) seemed to fit the bill marvellously.

5.1 Why opossums?

Regarded as nature's clean-up crew, opossums are a scavenger species, and as such they are an important part of the ecosystem. They are the only marsupials found in the United States and Canada, and are also the northern most marsupial in the world (Vezina, 2014; Omondi, 2019).

Opossums are fairly new to Toronto. Initial sightings can be tracked back to 1980s (Hudson, 2014). Many experts believe that their migration to north is the result of the ongoing climate change crisis and alterations of their landscape due to agriculture and urbanization (Walsh & Tucker, 2017; McCabe, 2021). They don't have the natural resistance or access to necessary shelter to navigate Ontario's harsh winter months, and many unfortunately do not make it out alive (CBC news, 2014).

Toronto Wildlife Centre, a wildlife rescue organization, annually receives around 100 calls for injured opossums (Hudson, 2014). Numbers compiled from Toronto Animals Services shows a dire picture. In 2015, the city picked up 172 sick or injured opossums, along with 362 dead ones. By 2018, the sick/injured number had grown to 261, while dead opossums totalled 808 (Lakey, 2020).

Our preliminary observations showed that opossums have been present in Toronto's social landscape since the past two decades. Unfortunately, there are still a lot of misconceptions and fears about them, and very little awareness.

It also doesn't help that, traditionally speaking, opossums would probably not be described as aesthetically pleasing. They have a narrow, tapered snout and a long naked tail, giving

them a rat-like appearance. Opossums being nocturnal and, having a lot of teeth also imaginably fuels the fear of the people who are not familiar with them. "People want to kill them and it's partly due to their physical appearance. It breaks my heart." says professor William Krause (Krause & Krause, 2006), who claims opossums to be the most underrated and misunderstood creatures of the continent. Their reputation as a garbage eater also does not win them many points with people.

All things considered, one might contend that opossums unfairly suffer due to our activities (resulting in change of their environment), our lack of awareness, our pre-conceptions and, even our human-centric notions of beauty.

We selected opossums for this study, hoping that while applying/testing this framework, perhaps we can bring some social awareness about them and maybe alleviate some of their human-caused suffering.

5.2 Opossum Project. Stage Zero: Stock

Going with the proposed framework, any good wildlife inclusion project should start with learning about the existing community knowledge and building the live data repository.

To learn about existing scientific knowledge about the species, literature on them from biological and zoological outlook was reviewed. Among others, the book "Opossums: An Adaptive Radiation of New World Marsupials" – a first of its kind, comprehensive text on opossums, written by Robert Voss and Sharon Jansa (2021) was a particularly helpful resource.

To learn about existing social and cultural knowledges, a variety of sources were reviewed. Newspaper and magazine articles, iNaturalist entries, research articles, opossum's presence and the way people interact with opossum content on social media and entertainment websites (Twitter, TikTok, Reddit, Instagram, YouTube, Facebook), were among the useful resources. Toronto-specific content was given priority such as Toronto-centred social media outlets, news outlets, magazines (BlogTO, CTV Toronto, Narcity Toronto, Urban Toronto, Daily Hive Toronto, Toronto Life, Spacing Toronto etc.) and, subreddits about Toronto (r/Toronto, r/askTO, r/TorontoArt, etc.). This helped in further understanding the existing narratives about opossum and where it stands in the socio-cultural landscape of the city.

To get a sense of opossum's positionality in children's literature, 64 books on animals, with a focus on urban animals in Toronto, were reviewed. Publication dates of these books ranged from 1956 to 2022. All of these books were accessed from Toronto's public library system (TPL). (A comprehensive list of these books is attached in the appendix B).

A study on opossum merchandise in online space was undertaken to gain insights on existing narratives. Following is the table with the results, categorized with the patterns which presented themselves as the study progressed.

Table 1: Opossum merchandise survey

Opossum merchandise survey		
Categories/Themes	Number of occurrences	Percentage
Mental Health (anxiety leads this category)	26	17.3%
Screaming	19	12.6%
Elaborate illustration / Painting	16	10.6%
Anti-authority mascot	14	9.3%
Cute simple illustration	13	8.6%
Anger / Defiance	11	7.3%
Trash	10	6.6%
Queer mascot	10	6.6%
Faking death	07	4.6%
Existential dread	05	3.3%
Swinging by tail	05	3.3%
Mama opossum with babies	05	3.3%
Playing banjo	05	3.3%
Other	04	2.6%
	150	

(Note: the category screaming here does not denote the illustration of screaming, but it denotes that the merchandise is talking specifically about screaming).

To understand this better with help of juxtaposition, a similar study was done for merchandise on raccoons – Toronto’s unofficial mascot¹².

¹² It is also important to keep in mind that compared to raccoon, opossum is a relatively new animal in the merchandise sphere.

Table 2: Raccoon merchandise survey

Raccoon merchandise survey		
Categories/Themes	Number of occurrences	Percentage
Elaborate illustration / Painting	29	19.3%
Trash	24	16.0%
Actual Photograph	16	10.6%
Food	15	10.0%
Miscellaneous	13	8.6%
Cute simple illustration	11	7.3%
Crime	10	6.6%
Fight	07	4.6%
Mental Health	06	4.0%
City mascot (Toronto)	06	4.0%
Anti-authority mascot	06	4.0%
Queer mascot	04	2.6%
Brake for critters	03	2.0%
	150	

The study would suggest that opossum “playing dead” and “screaming” are the idiosyncrasies which has struck a chord with people. This has probably led to opossum being used as a symbol to depict mental health struggles and anti-authority sentiments. These are valuable insights which can be helpful while building a narrative in the later stages.

With the help of available open data and, personal observations in both physical and online world, and Dr MacDonald’s extensive experience with the subject matter, social awareness and public engagement for opossum and raccoons in Toronto were charted on the AE graph.

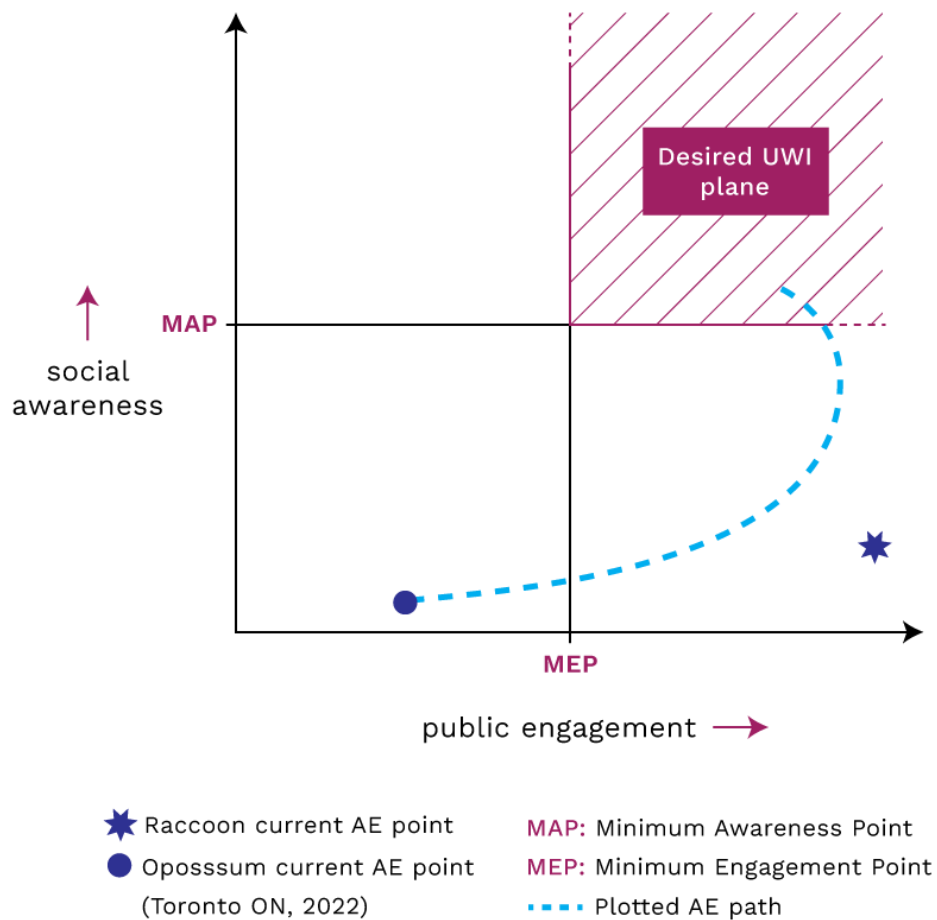


Figure 12: Raccoon and Opossum on AE graph (Toronto)

This is a provisional graph to get a sense of where we stand, and what route we'd like to take to reach the UWI plane. It will very likely change and get more accurate as we collect more data and more social and cultural knowledges.

The next step in "Stock" is involvement of community participants.

In cultural sphere, it would mean learning about the stories, anecdotes and, symbolization about opossums in various cultures, such as the Cherokee legends about the opossum's bare tail (Mooney, 1992) and tales about why it plays dead (Judson, 1913).

In the social sphere, this would take the form of learning through discussions and consultations with nature & conservation societies, community participants, park services, animal control services, and directly through public surveys.

This will help in gaining a comprehensive understanding about opossum's cultural significance and social presence. This, along with the scientific knowledge would serve as an evolving repository of data, to utilize for communication through the later stages.

5.3 Preliminary narratives

From the current knowledge we have in the data repository, these are a couple of examples of what the narrative may look like.

5.3.1 The Newcomer

Toronto is considered the world's most diverse city (Harford et al., 2016, 4:11). According to national survey over half of the population of Toronto is made up of people who were not born in Canada (Singer, 2021).

Opossum being a newcomer in the city could make for an engaging narrative. There are a bunch of "similarities" opossum share with newcomers in Toronto. Among them is having struggles coping with the winter. Unlike some animals, opossums can't hibernate, and akin to a newcomer employed in a gig economy, they need to go out in cold winter to "do their job" so that they can eat. Opossums have a can-do attitude when it comes to food and shelter, and are okay with sharing their accommodation with other animals (Voss & Jansa, 2021).

Opossums also famously don't build their own shelters, but would often just stay in other animals' shelters (Rossit, 2019). However, they would get their own nesting when moving in a shelter. Opossums don't stay in a place for a long time and like to keep moving (Link, 2005).

There are multiple "similarities" which can be drawn to the newcomer experience.

This narrative could prove engaging but it brings several challenging political and cultural associations with it. And in addition to that, the amount of anthropomorphising could also be a matter of concern. (Refer section 4.2.3 for possible downsides of anthropomorphising).

Overall, this could be a fun narrative which can be touched upon in passing, but it has too much risk attached to it, to be the principle narrative.

5.3.2 The Anxious Opossum

Whether it is children's stories, old legends, online merchandise or prevalent social narratives, "Playing Possum" undoubtedly seems an opossum trait which is the most appealing to humans. It is relatively easier to build on the narratives which are already firmly rooted.

Building a narrative about "The Anxious Opossum" also has a couple of other benefits. It is fact-rooted and it can spread the message that opossums are not "playing" dead but are actually experiencing an involuntary physical reaction (Adams, 2016). It also aligns itself with the ongoing important movements about mental health awareness.

There's something inherently formidable about the animal "having anxiety" and going into catatonic state, but still "screaming" and "holding its ground", and in the end, surviving in an uncaring, unwelcoming world, in a climate not designed for it. It is a powerful image.

It's also comparatively easier to navigate the downsides of anthropomorphising with this narrative. It almost makes sense not to encroach on the boundaries of an animal who is known to be "anxious". It is easier to navigate people wanting to pet the opossum or actually wanting it as a pet. Other important facts about opossums, like they can bite and it's best for everyone not to provoke them and maintain respectful distance, can also be dissipated while sticking to this narrative.

This narrative is a work-in-progress, nevertheless a promising one, given the data we currently have.

This is how preliminary narratives may look like. They will gain more content and grounding as we learn more about opossum from multiple perspectives and as we proceed further in "Knock" and "Talk" stages.

5.4 Structural intervention

In section 4.0 it is mentioned how the "Stock" stage is also a great place to start thinking and prototyping possible structural interventions.

Opossums are gentle, shy and, nocturnal animals (Krause & Krause, 2006). They are usually non-aggressive and tend to avoid humans. They don't particularly pose any danger to people or pets (Weinberger, 2022). Yery (2020) notes, when confronted, their primary defence strategy is to run away and take cover. When that's not ideal, they will show their teeth and growl, and when that doesn't work, they "play dead"¹³. If cornered, they can bite too, but such instances are rare and unlikely (Dueck, 2022; Weinberger, 2022).

Since their bodies are not adequately adapted to the cold, opossums have a tough time in winter. Their fur is not thick enough to protect them in the cold and, their naked (furless) ears and tails and paws are very susceptible to frostbites (Miller, 2021). Bryan Harding (2023), a mammalogist remarks, "If you find an opossum in your house, it will most likely be on its own. Unlike other animals that share their nests during the winter to keep themselves warm, opossums focus on staying solo, which can be dangerous because of the lack of food and the construction of their nests".

Opossum's life span in the wild is roughly about 2 years (Walker, 2008). They are scavengers, and are excellent at rodent and insect control. "A neighbourhood with opossums tends to be considerably cleaner than one without them" affirms Erika Yery (2020), a wildlife rehabilitator.

¹³ Author's note: Opossums have also been recorded to defecate on their attackers to discourage them (Harding, 2023). Iconic.

Opossum researcher, Lisa Walsh in University of Michigan's news article (2018) points out that their eating habits "makes them right at home in dense urban environments, where there are plenty of food options". Nathalie Karvonen, executive director of Toronto Wildlife Centre and a wildlife biologist, in Duggan (2015), points out that they don't dig holes or chew on anything or cause any harm to property.

They are highly unlikely to carry rabies (Barr, 1963; Beaty, 2017), possibly due to their low blood temperature. They are also solitary animals and don't shelter for a long time at any one place. They are non-territorial and like to keep moving¹⁴ (Link, 2005; Rossit, 2019).

These are some of the reasons, Dr MacDonald and I currently think a small-scale (35-40 location) structural inclusion approach in the difficult winter months, could be a suitable urban wildlife inclusion practice for opossums in Toronto. This would mean providing them temporary winter shelters to help them survive the cold. These could be installed at parks, other green areas, university campuses or backyards.

A small-scale inclusion project like this also has a potential to boost public engagement and social awareness for this relatively obscure critter. It sets a good example for active urban wildlife inclusion and for looking at urban wildlife with an empathetic and inclusive lens.

While we gather more data and ascertain the pros and cons of this direction¹⁵, Dr MacDonald and I started prototyping a make-shift winter shelter for opossums.

5.4.1 Prototyping

Prototyping started with an in-depth study of the species, their habits, their preferences and their natural environment. Following are some of the major factors which were considered while building the prototype shelter. All of this data was collected from various books, papers, articles and anecdotes on Virginia opossums.

01. Natural Nesting Habits.

- mostly lives alone. Male and female only come together for mating.
- do not stay for long in one location (especially males).
- natural shelter: up in the tree or hollow logs on the ground.
- small opening of den to make sure larger predators do not get in.
- may have multiple active dens to avoid predators.
- do not usually build shelter themselves, prefer moving into abandoned dens of other animals, such as foxes, groundhog, squirrels etc.
- other potential shelter sites: woodpiles, rock crevices, barns, drain pipes, under the porch / house, storage shed, abandoned car etc. - anywhere which is dry, safe and sheltered.

¹⁴ In a study by the Washington Department of Fish and Wildlife, one Opossum visited 19 different dens in 5 months (Link, 2005).

¹⁵ Knowledges from various sources and a lot of research would be needed to understand the consequences this project can have on the ecosystem and, to the socio-cultural sphere of the city, before actually rolling it out.

02. Species Needs and Characteristics (in regards to shelter preference)

- quiet and gentle, non-territorial, nocturnal animals.
- not adaptable to cold weather. no fur on ears or tail.
- prefer dry, small and cosy places to keep warm.
- excellent night vision, smell and, hearing.
- semi arboreal - good climbers.
- good swimmers, can swim underwater as well.

03. Dimension

- around the size and weight of an average house cat.
- length: about 30 inches (with tail). tail wraps around the body. Weight: 3-5 kg.
- not over 5 inches diameter for the shelter opening (this needs more discussion/research).

04. Material

Outer body.

- insulating. water resistant. meant to protect from Ontario winters.
- strong: opossum will move around and arrange things inside.
- natural colours, colours which do not stick out.
- easy to obtain, easy to reproduce and replicate, easy to DIY, economic.
- plastic, styrofoam, durofoam, plastic tote, cardboard, large PVC pipe.

Inner body (bedding).

- warm, dry, heat trapping, comfortable materials.
- straw (hay is not ideal), dry leaves and twigs (natural), crumbled newspaper, clothes, heat reflective material foil.

05. Few points to keep an eye on, for the next iteration of shelter.

- would they prefer the shelter to have two entrances?
- would they prefer to have two shelters in close proximity?
- what would be the location they prefer? (variations: on the ground, under the ground, slightly lifted from the ground, in a bush.)
- how close could it be to human activity?

Prototype

- 18 x 18 inches plastic container, 24 inches length. 5 inches opening for entry. minimum dimensions to ensure other larger animals do not claim the den.
- opening is 3 inches off the ground to ensure snow/sludge doesn't easily get into it.
- bottom is filled with heavy material to make the den stable.
- at this stage the first variable we are testing is size of the shelter.

This is the diagram of the prototype.

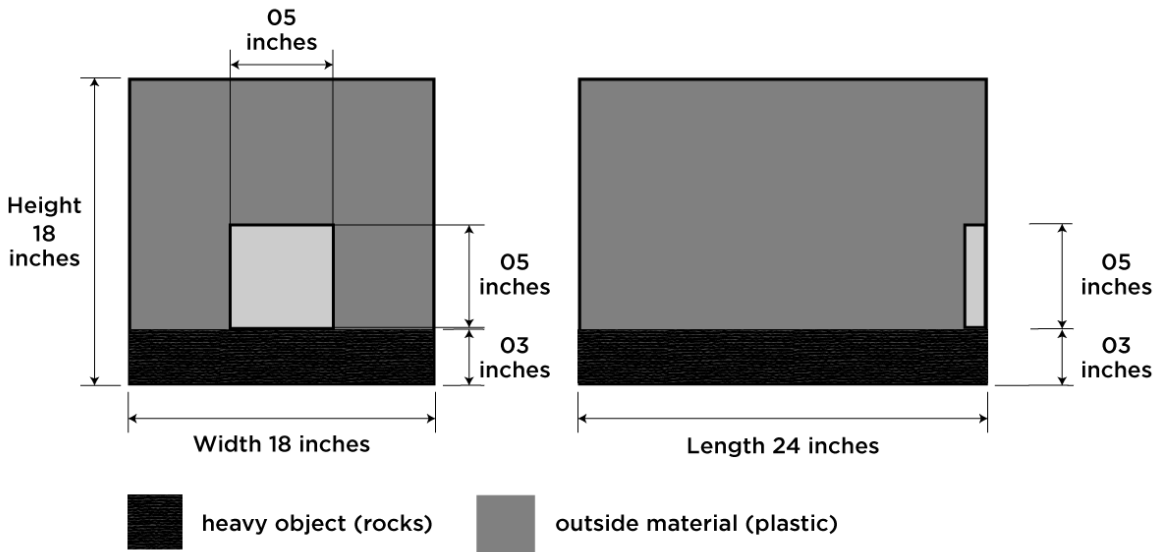


Figure 13: Prototype for Opossum winter shelter

For this prototype, we decided to go with plastic as a water resistant, durable and, economic outer material. We made a 5x5 inches square opening on it to deter larger animals from using it. Two prototypes were made, the only variation was size. Dimensions for the larger one was 28x19x15 (28 inches Length x 19 inches Width x 15 inches Height) and for the smaller one was 24x16x13 (24 inches Length x 16 inches Width x 13 inches Height).

We lined the shelters with insulating durofoam sheets on the inside, and then further covered those sheets with heat-reflecting insulation, which would reflect opossum’s body heat and keep them warm during the cold winter nights, which could go below -25° C. We also put down some hay and dried leaves on the bottom and around the shelter.



Figure 14: Making opossum winter shelter



Figure 15: Opossum winter shelter in the field

5.4.2 Community participants

For testing out potential sites for winter shelters we recruited five participants from personal network. We installed motion activated cameras in their backyards, to check if there is an opossum who visits the property. All the locations were selected at different neighbourhoods of Toronto. Following is the map of Toronto with all of them marked.

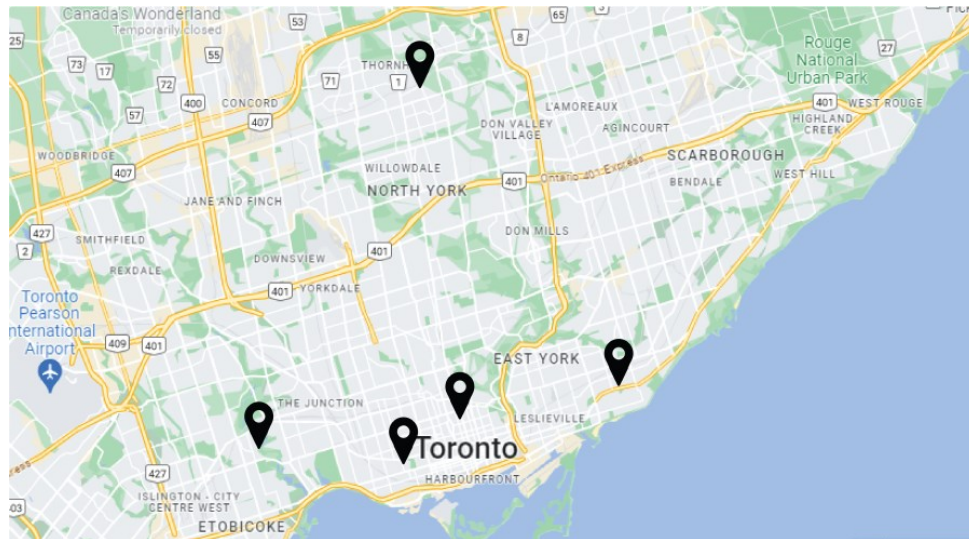


Figure 16: participant locations (Toronto).

We found opossum presence at 2 of them. Two shelters were then installed at one of these locations to learn how opossums and other urban wildlife interacts with them.

During the observation period of 10 weeks, we found out that urban wildlife (squirrels, rabbits, skunks, fox and, of course the curious raccoons), and domestic cats did interact with them, but without a sustained interest. We speculate that this is because either the opening of the shelter was not ideal in size for them or the shelter itself was not of the ideal kind for these animals. There was one animal which inspected it with a sustained interest, which also was the only animal in 10 weeks which went inside the shelter for a closer assessment. An opossum!

Due to the scope of this project and the length of winter, this was only how far the structural part of the opossums project could go this year. We plan to continue further testing and prototyping of structural intervention in the next winter, with the continued help of our human and opossum participants.

We asked our participants about their experience of participation, in conversational, semi-structured phone interviews. All of them had a positive feedback about it and said they'd be happy to be a part of it next winter as well. An unintended consequence was that most of the participants read up about opossums and also talked about them in their social circles. This could be an important driving factors for an uptick in social awareness and potential community building.

5.5 Opossum Project. Stage 01: Knock. Examples

This stage is about exposure, familiarity, quick fun facts, and gaining more public engagement. Here are some examples created for this project, for the medium of social media (Instagram, Twitter). The primary target audience for these examples is Millennials and Gen Z¹⁶.



Figure 17: Opossum project: stage one example, Barbie meme.

¹⁶ Millennials: 1981-1996, Gen Z: 1997-2012 (Beresford Research, 2023).



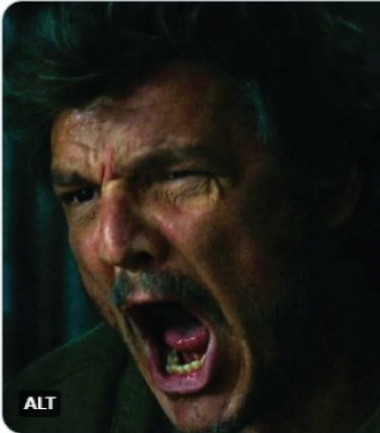
parth shah @TypeChronicles



Okay! Hear me out!

🐼 Pedro Pascal as Opossums! - a thread.

#PedroPascalAs #Opossum #PedroPascal



ALT



ALT

7:24 PM · Apr 10, 2023 · 459 Views



parth shah @TypeChronicles · Apr 10



Yes they like to swim!



ALT



ALT



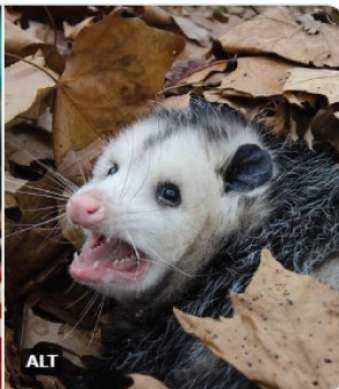
65



parth shah @TypeChronicles · Apr 10



ALT



ALT



1,023



parth shah @TypeChronicles · Apr 10



1 2 64

parth shah @TypeChronicles · Apr 10



1 44

parth shah @TypeChronicles · Apr 10



1 4 6 504

parth shah @TypeChronicles · Apr 10



1 1 66



Figure 18: Opossum project: stage one. Pedro Pascal As Opossum meme

Trends and memes¹⁷ are good at all three communicative stages, but especially in the “Knock” stage. More pictures, better it would be for familiarity and engagement. One also must be careful not to let go of the facts. Even with picture-heavy content, it’s still good to grab an opportunity to tell a little about species wherever one can. For instance, in this example signalling the facts that opossums can climb trees and are good swimmers. It is also discernible that the seeds of the “the anxious opossum” narrative are being subtly planted here.

Regardless of the stage, one should never pass on an opportunity to post a baby animal picture of the species!

¹⁷ In 2nd week of April 2023, “Barbie poster” and, “Pedro Pascal As” were trending topics/memes in North America.

5.6 Opossum Project. Stage 02: Talk. Examples

This is the most important stage in terms of communication. This is where the narrative building starts. We can start dissipating more information here on, although still keeping it fairly "snack size".

Following are some examples created for the project, for Instagram/twitter.

A series called "opossum notes", which in its initial stage is just a medium for "fun facts" about opossums. The intended primary target audience in this particular example is parents, kids (via parents), youth, nature-lovers, animals-lovers, and other outdoors people.

(note: these are the examples of carousel posts, one where you keep swiping right through the posts, the first has six images and the second has four).








<p>opossum or possum?</p> <p>+ where does the name opossum come from?</p> <p>opossum notes 01</p> 	<p>this is a possum.</p>  <p>common brushtail possum</p> <p>opossum notes 01</p> 
<p>this is an opossum.</p>  <p>virginia opossum</p> <p>opossum notes 01</p> 	<p>possums are a suborder of 70 tree-living marsupial species, found largely in Australia and New Zealand.</p> <p>opossums are marsupials found in the Western hemisphere, comprised of 93 species.</p> <p>You ask, why are their names so similar?! -></p> <p>opossum notes 01</p> 
<p>The word opossum dates back to 1610 and, originates from Algonquian word 'apossoun and opassom'. Which loosely translates to 'white dog' or 'white small animal'.</p> <p>opossum notes 01</p> 	<p>A British naturalist, Sir Joseph Banks, saw tree-dwelling critters in Australia and went "oh these are the same ones as back home". So... he just named them possums!</p> <p>excellent scientific work.</p> <p>opossum notes 01</p>

Figure 19: Opossum project: Stage Talk. example: opossum nomenclature



Figure 20: Opossum project: Stage Talk. example: opossum diet

These examples in particular have very “stuff you didn’t know/did you know” vibe to it, where it poses a question, gives you the answer in bite sized facts, and ends on a humorous note. The objective is still to gain more public engagement, but the tone is slightly more factual and serious than the one which would be used in the “Knock” stage. Along with engagement, here there is a distinct upward push towards the awareness. With the right planning and strategy, this can eventually lead to community building.

Note: none of these examples are the gold standards for communication. They are included as an attempt to further convey the ideology of these stages of the framework. There are multiple different approaches to reach the desired state of urban wildlife inclusion.

5.7 Future plans

Future plans for “the opossum project” involve continue collecting more data from various sources, making the repository more diverse and richer and, involving more community participants.

As for the communication part, the plans would be to keep progressing our way through the “Knock” and “Talk” stages, and finding more and more effective ways of communicating with the people of Toronto, with an objective to build a community around the cause.

5.8 A note on co-designing with animals

During this project, we consciously and carefully entered the space of structural intervention with a co-design mindset. This meant that we considered animals we are designing with as participants in the design process. Due to the nature of how designing anything for animals work, the design process does have a natural collaborative and iterative leaning to it. However, it is usually not approached with a co-design ideology.

A co-design mindset would mean that you are not designing for the animals, but you are designing with them. Where animals are not an entity for whom you are designing an apparatus, to make them behave in a certain way. But they are expert participants, with whom you are designing an intervention, with an objective that it would help both humans and the animals to co-exist with each other.

It is about respect and thoughtfulness. It is not designing a raccoon-proof trashcan so they can't get to trash and damage the property. But it is coming up with a better design for the trashcan “with them”, so that they don't eat harmful food and that they are respectfully excluded from getting into challenging situations, which can lead to conflict.

Both, the conventional and the co-design approach, to structural interventions have the same goal, of minimizing human-wildlife conflict. The conventional approach takes an anthropocentric route to that destination, while the co-design approach takes an ecocentric route to the same destination.

The co-design approach to structural intervention for wildlife acknowledges them as an equal life form, which has as much right to the space and to life, as humans do. It nurtures respect and empathy.

On the surface, this may look like merely a difference of phrasing and words, but then, words are a powerful thing. It changes the narrative. It changes how we perceive wildlife. And, maybe, hopefully, someday it will change how we treat wildlife.

6.0 Conclusion

6.1 Contributions to the field

6.2 Advocacy and future work

6.3 The road ahead

6.0 _____

This research started with scrutinizing the traditional urban wildlife management practices, establishing their lasting ill-effects on the ecosystem, and the need to seek out an alternative, sustainable approach for the same.

To gain a deeper understanding and comprehend the nested context, it inspected the integrated structure of systems where these practices stem from, and continue to be supported.

The paper then proposed employing an inclusive design ideology to urban wildlife management and the numerous advantages it would have for the ecosystem (including humans). In doing so, it also made a case for broadening the definition of inclusive design and extending its reach to include urban animals within it.

In order to support the proposed idea of social inclusion of urban wildlife, the researcher gathered and analysed both qualitative and quantitative data from a variety of sources and explored effective ways to gain and sustain community participation. This resulted in a framework for urban wildlife inclusion, along with a communication model as a tool for designing mass communication strategies for UWI.

Later, this framework and communication model were put in practice to better understand their practical consequences. This would help with the next iteration of the framework.

6.1 Contributions to the field

This research positions itself on the intersection of mass communication, urban wildlife management and, inclusive design. In doing so, it makes interdisciplinary connections between these fields, which are not often perceived in synergy.

The research discusses the gap in inclusive design literature and the discourse on wildlife management practices, and makes a case for expanding the sphere of inclusive design to bridge this gap, effectively creating a new area of inclusive design research that expands the system of inclusion beyond humans.

6.2 Advocacy and future work

Hadidian (2015) believes much of the future for urban wildlife will depend on government reforms, while also pointing out that much will depend on cultural changes that promote greater respect and understanding of wild animals.

Governmental reforms and granting personhood could be effective ways of wildlife inclusion. Rights for rivers in New Zealand (Roy, 2017) and India granting non-human personhood to Dolphins (Bertoni & Beisel, 2013) are great precedents for this.

However, the idea of “right to personhood” is driven by anthropocentric notions of what it means to be a person. Gray et al (2007) reports that animals that are perceived as experiencing “emotions”, and are considered “intelligent”, i.e. their behavior aligns with human notions of emotions and intelligence, are more likely to be attributed with moral rights. Species which look and behave like humans or are “beautiful” in appearance receive higher attention in conservation dialogue and policy making (Martín-Forés et al., 2013). Linking worthiness of protection with anthropomorphic features is even common in the field of animal ethics (Urquiza-Haas & Kotrschal, 2015; Würbel, 2009). In other words, a dolphin is more of a “person” than an opossum is, because they are “intelligent”, “beautiful”, “joyful”, they are “just like us”.

To overcome this bias, we need to steer ourselves towards an ecocentric system, understand that we are not the centre of the world, and cultivate more respect and care for more-than-human world.

The urban wildlife inclusion framework suggested here is an attempt to take the first step towards this much needed systemic change. The researcher hopes that the framework and model can be useful starting points for building further models of inclusion which can lead all of us to a sustainable ecocentric future.

6.3 The road ahead

Anthropocentrism encourages us to control and conquer nature, it makes us think that we are the superior species. A common thread in all systems of oppression is that they give their believer a false sense of superiority, giving them an entitlement to “manage” the inferior life forms.

Whether it manifests as “we will teach you how to become civilized” or as “we will tell you what you can or cannot do with your bodies”, they all have the same underlying ideology. These systems of oppression have led to devastation, violence and loss. They cannot lead us to a better future. Anthropocentrism cannot lead us to a better future.

A sustainable future can only be achieved through empathy, kindness and respect. We need to decentre ourselves when it comes to urban planning, diverge from our oppressive anthropocentric ways, acknowledge the autonomy of other species and focus on learning to co-habit with them. We need to work towards co-creating a space in which all three, humans, animals and, the land can thrive. The future is inclusive, if you want a good one.

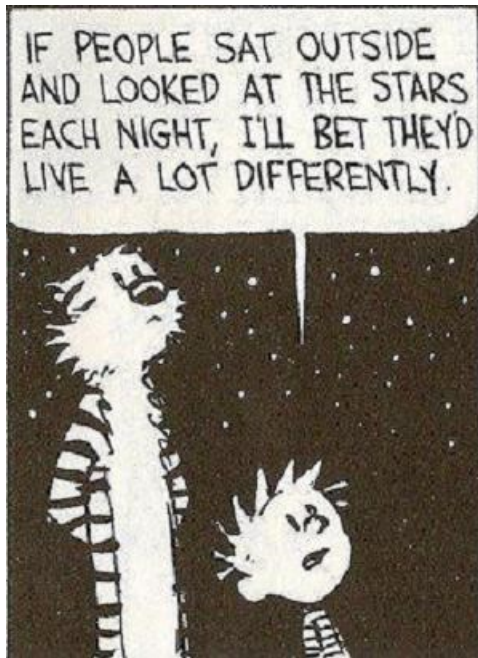


Figure 21: Calvin and Hobbes by Bill Waterson, for June 30, 1992.

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Appendices

Appendix A: Further reading, listening or watching.

A non-comprehensive list of references, listed here with a hope that it will give the readers fascinating information and nested context about the wildlife around us.

A.1 TV shows, Movies.

Brandon, M., Lanchester, A., Wheeler, M., Webb, R. (Producers). *Wild Metropolis* [TV Documentary-Series]. BBC, Tencent, PBS. [link to the reference](#)

National Geographic (Producer). (2008-2011). *Monkey Thieves* [TV Documentary-Series]. National Geographic Channel. [link to the reference](#)

National Geographic (Producer). (2014-present). *Snake City* [TV Documentary-Series]. National Geographic Channel. [link to the reference](#)

Optimum Productions (Producer). (2015). *The Lion Queens of India* [TV Documentary-Series]. Discovery Channel. [link to the reference](#)

Takahata R. (Director). (1994). *Heisei tanuki gassen ponpoko* [Film]. Studio Ghibli. [link to the reference](#)

A.2 Podcast episodes

Chillag, I. (Host). (2021, July 12). Why Is This Goose Out to Get Me? [Audio podcast episode]. In *Every Little Thing*. Gimlet. [link to the episode](#)

Davidson, A., McKay, A., Ward, R. (Hosts). (2016, March 22). Pigeons (No. 09) [Audio podcast episode]. In *Surprisingly Awesome*. Gimlet. [link to the episode](#)

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Lichtman, F. (Host). (2022, September 19). Why Goldfish Swam Into Our Living Rooms [Audio podcast episode]. In *Every Little Thing*. Gimlet. [link to the episode](#)

Mars, R. (Host). (2016, April 26). Unseen City: Wonders of the Urban Wilderness (No. 210) [Audio podcast episode]. In *99 percent invisible*. [link to the episode](#)

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- Ward, A. (Host). (2021, January 12). Urban Rodentology (SEWER RATS) with Bobby Corrigan [Audio podcast episode] In *Ologies*. [link to the episode](#)
- Ward, A. (Host). (2021, September 21). Opossumology (O/POSSUMS) with Lisa Walsh [Audio podcast episode]. In *Ologies*. [link to the episode](#)
- Ward, A. (Host). (2022, December 23). P-22: The Life & Death of an L.A. Cougar with Miguel Ordeñana & Beth Pratt [Audio podcast episode]. In *Ologies*. [link to the episode](#)

A.3 Books and Research Papers

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- Biehler, D. (2013). *Pests in the city: Flies, Bedbugs, cockroaches, and rats*. University of Washington Press. [link to the book](#).
- Bond, R. (1993). *Rain in the mountains - notes from the Himalayas*. Penguin Books. [link to the book](#).
- Brookshire, B. (2022). *Pests: How humans create animal villains*. Ecco. [link to the book](#).
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Orlean, S. (2021). *On animals*. Avid Reader Press, an imprint of Simon & Schuster, Inc. [link to the book](#).

Waal, F. de. (2016). *Are we smart enough to know how smart animals are?* W.W. Norton & Company. [link to the book](#)

Wohlleben, P. (2015). *The Hidden Life of Trees: What They Feel, How They Communicate: Discoveries from a Secret World*. Greystone Books. [link to the book](#).

Zabludoff, M. (2005). *The insect class*. Cavendish Square. [link to the book](#).

A.4 Books catered towards younger audience*

*But enjoyable for all ages.

Black, R. J. (2020). *Playing possum*. Clarion Books. [link to the book](#).

Corrigan, S. (2020). *Not bad animals*. Frances Lincoln Children's Books. [link to the book](#).

Fox, M. (1983). *Possum magic*. Clarion Books. [link to the book](#)

Holler, S. F. (2022). *Finding moose*. Pajama Press. [link to the book](#)

Hunter, A. (1996). *Possum's harvest moon*. Clarion Books. [link to the book](#).

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Kaner, E. (2015). *Friend or foe: The truth about animals people love to hate*. Owlkids Books. [link to the book](#).

Kriek, E. (2016). *Mika: The bear who didn't want to sleep* (1st ed.). Flying Eye Books. [link to the book](#)

Penn, A. (1993). *The kissing hand*. Tanglewood. [link to the book](#).

Smallman, S. (2012). *My friend the weather monster*. QEB. [link to the book](#)

Whittingham, J. (2022). *Animals move*. Pajama Press. [link to the book](#)

Appendix B: List of the reviewed children's books.

Adamson, G. (2017). *Shark dog!* HarperCollins Publishers. [link to the book](#)

Auss, H. (2019). *Bald Eagles*. Children's Press. [link to the book](#)

Banyard, A. (2018). *City bugs* (1st ed.). Annick Press. [link to the book](#)

- Banyard, A. (2018). *City critters* (1st ed.). Annick Press. [link to the book](#)
- Bekkering, A. (2007). *Skunks*. Weigl Publications. [link to the book](#)
- Berne, E. C. (2014). *Opossums*. PowerKids Press. [link to the book](#)
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- Bradley, J. V. (2006). *The Canada goose*. Chelsea House. [link to the book](#)
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- Dewdney, A. (2005). *Llama Llama red pajama* (1st ed.). Viking. [link to the book](#)
- Durrell, G. (1956). *My Family & Other Animals* (1st ed.). Puffin Books. [link to the book](#)
- Earley, C. G. (2013). *Dragonflies: Catching, identifying, how and where they live*. Firefly Books. [link to the book](#)
- Fox, M. (1983). *Possum magic*. Clarion Books. [link to the book](#)
- Ganeri, A. (2012). *Sharks*. Kingfisher. [link to the book](#)
- Gordon, D. G. (2021). *Are you smarter than a shark?* becker&mayer Kids. [link to the book](#)
- Gravel, E. (2020). *Not me*. Scholastic Canada. [link to the book](#)
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- Higgins, M. (2019). *Brilliant beetles: A 4D book*. pebble books. [link to the book](#)
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- Kaner, E. (2015). *Friend or foe: The truth about animals people love to hate*. Owlkids Books. [link to the book](#).
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- Koren, E. (2003). *Very hairy harry*. Joanna Cotler Books. [link to the book](#)
- Kriek, E. (2016). *Mika: The bear who didn't want to sleep* (1st ed.). Flying Eye Books. [link to the book](#)
- Lang, A. (2008). *Baby Polar Bear*. Fitzhenry & Whiteside. [link to the book](#)
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- Lee, S. (1998). *Opossums*. The child's world. [link to the book](#)
- Marino, G. (2015). *Night animals*. Viking. [link to the book](#)
- Minarik, E. H. (1957). *Little bear*. Scholastic Book Services. [link to the book](#)
- Pearl, N. (2008). *Polar bears: Arctic hunters*. PowerKids Press. [link to the book](#)
- Penn, A. (1993). *The kissing hand*. Tanglewood. [link to the book](#).
- Rathburn, B. (2018). *Opossums*. Bellwether Media. [link to the book](#)
- Read, T. C. (2011). *Exploring the World Of Owls*. Firefly Books. [link to the book](#)
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- Ross, J. (1994). *Canada Goose* (1st ed.). Grolier Academic Reference. [link to the book](#)
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Appendix C: Image copyrights information.

Figure 2: Downloaded from, *Inclusive Design Research Centre*. [link to the reference](#).

Figure 6: Photo on the left downloaded from, *In Defense of Animals*. [link to the reference](#).
Photo on right downloaded from, *CHEEZburger*. [link to the reference](#).

Figure 16: Map downloaded from, *Google Maps*. [link to the reference](#).

Figure 17: Created on, *Barbie Selfie Generator*. Copyrights: Warner Bros. Entertainment Inc. [link to the reference](#).

Figure 18: In chronological order.

First comparison: Photo on left, downloaded from, *Screen Rant*. [link to the reference](#). Photo on the right, downloaded from, *CHEEZburger*. [link to the reference](#).

Second comparison: Photo on left, downloaded from, *Pinterest*. [link to the reference](#). Photo on the right, downloaded from, *How stuff works*. [link to the reference](#).

Third comparison: Photo on left, downloaded from, *The Chive*. [link to the reference](#). Photo on the right, downloaded from, *The Cut*. [link to the reference](#).

Fourth comparison: Photo on left, downloaded from, *Twitter*. [link to the reference](#). Photo on the right, downloaded from, *Forest Preserve District Will County*. [link to the reference](#).

Fifth comparison: Photo on left, downloaded from, *YouTube*. [link to the reference](#). Photo on the right, downloaded from, *CBC news*. [link to the reference](#).

Sixth comparison: Photo on left, downloaded from, *Desert News*. [link to the reference](#). Photo on the right, downloaded from, *Cottage Life*. [link to the reference](#).

Seventh comparison: Photo on left, downloaded from, *Twitter*. [link to the reference](#). Photo on the right, downloaded from, *Modern Sciences*. [link to the reference](#).

Eighth photo: downloaded from, *Pinterest*. [link to the reference](#).

Figure 19: The photo of possum in the 2nd post is downloaded from *Wikimedia Commons*. [link to the reference](#). and the photo of opossum in the 3rd post is downloaded from *The Canadian Encyclopaedia*. [link to the reference](#).

Figure 20: The photo of the opossum in the 2nd post is downloaded from, *U.S. Fish & Wildlife Services, Photo Credit Dmangus* [link to the reference](#) and, the photo in the last post is downloaded from *Wikimedia Commons*, [link to the reference](#).

Figure 21: Downloaded from, *GoComics*. [link to the reference](#).

Figure 22: Created on, *imgflip, meme generator*. [link to the reference](#).

All the images, illustrations and, graphs, not mentioned in this list are created by the researcher for this paper.

Appendix D: The paper condensed in one meme

TLDR:



Figure 22: The paper condensed in one meme.