## EMBRACE THE FLOOD

Introducing a Symbiotic Lifestyle: Designing Resilient and Livable Landscapes in Winnipeg by Integrating Nature-Based Solutions into the Urban Water System

P5 Chang Sun 5573491 29.6.2023 Urban Ecology Lab First Mentor: Nico Tillie Second Mentor: Kristel Aalbers



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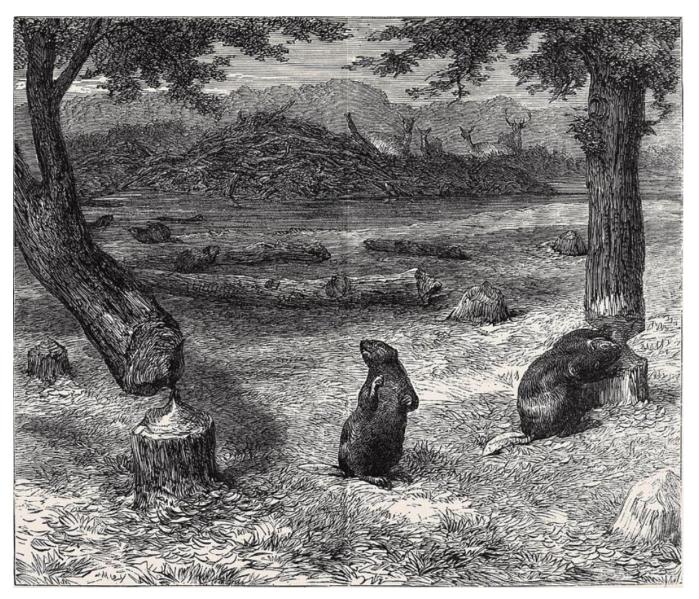
Problem



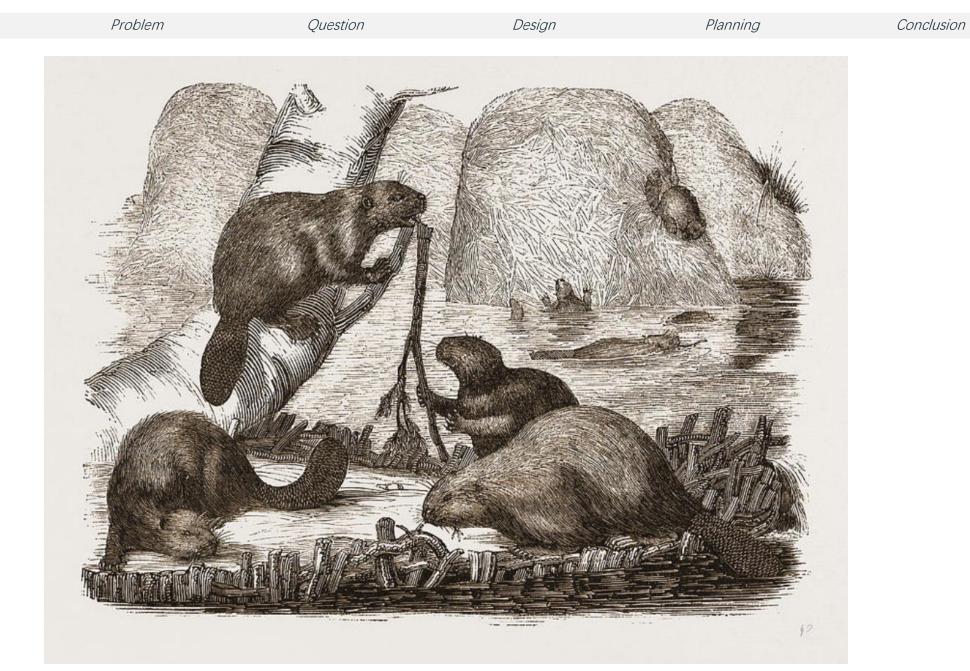
Design

Planning

Conclusion



Beavers Cutting Down Trees Source: English School

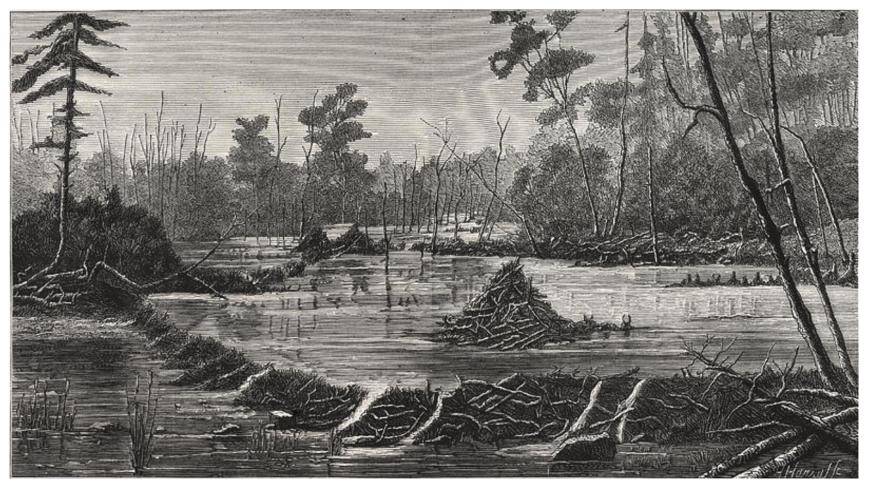


*Beavers With Their Huts And A Dam* Source: Litz Collection

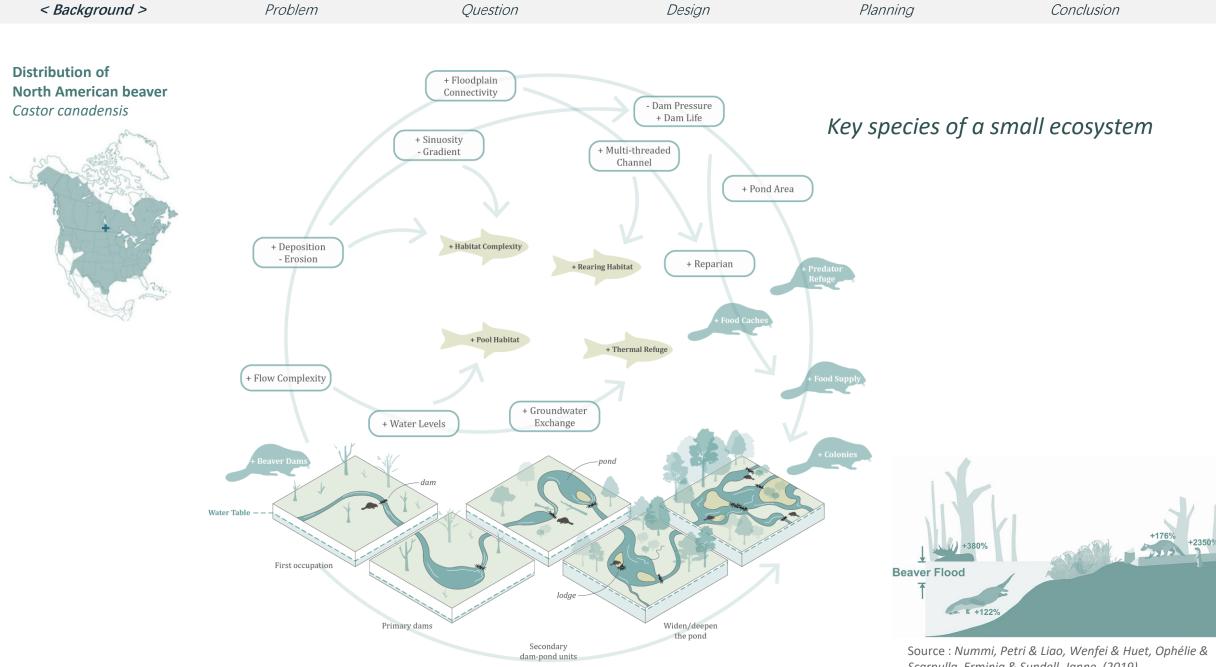
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Conclusion



Beaver Dams and the Pond Source: English School



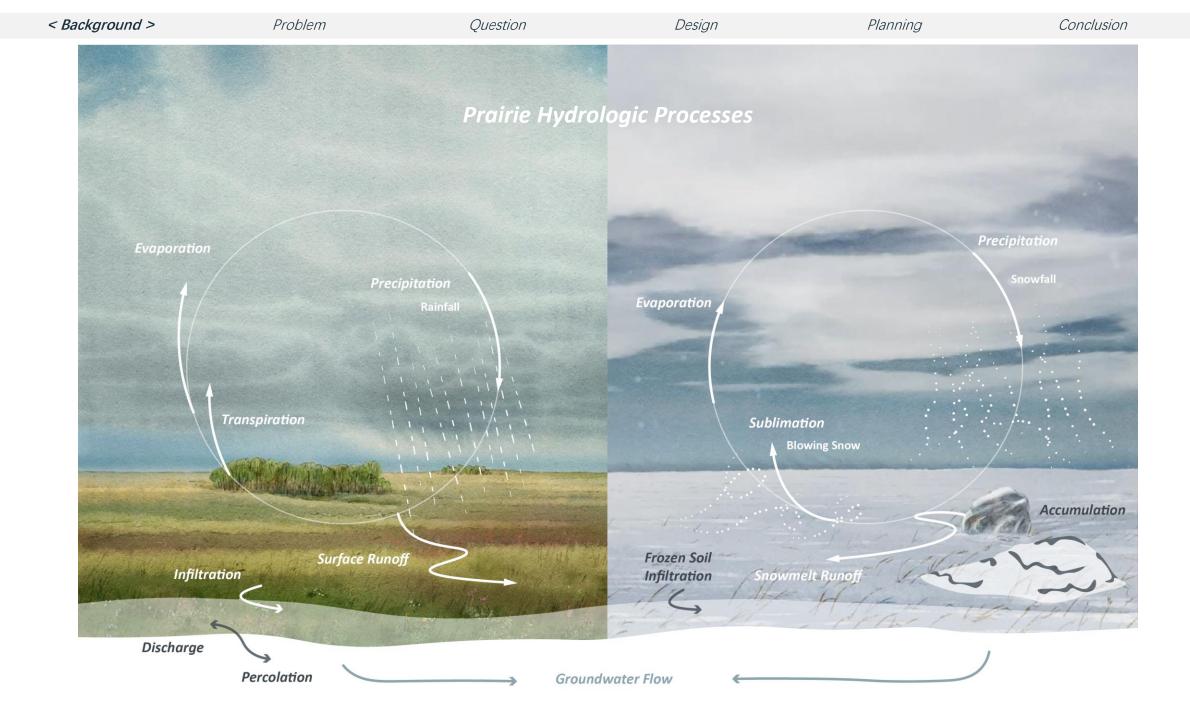
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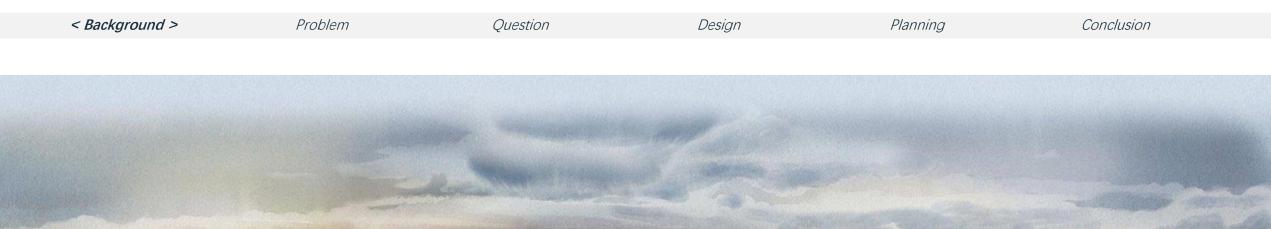
< Background >	Problem	Question	Design	Planning	Conclusion

### Experience the Prairie Landscape



Source: Living Prairie Museum





#### THE BEAVER

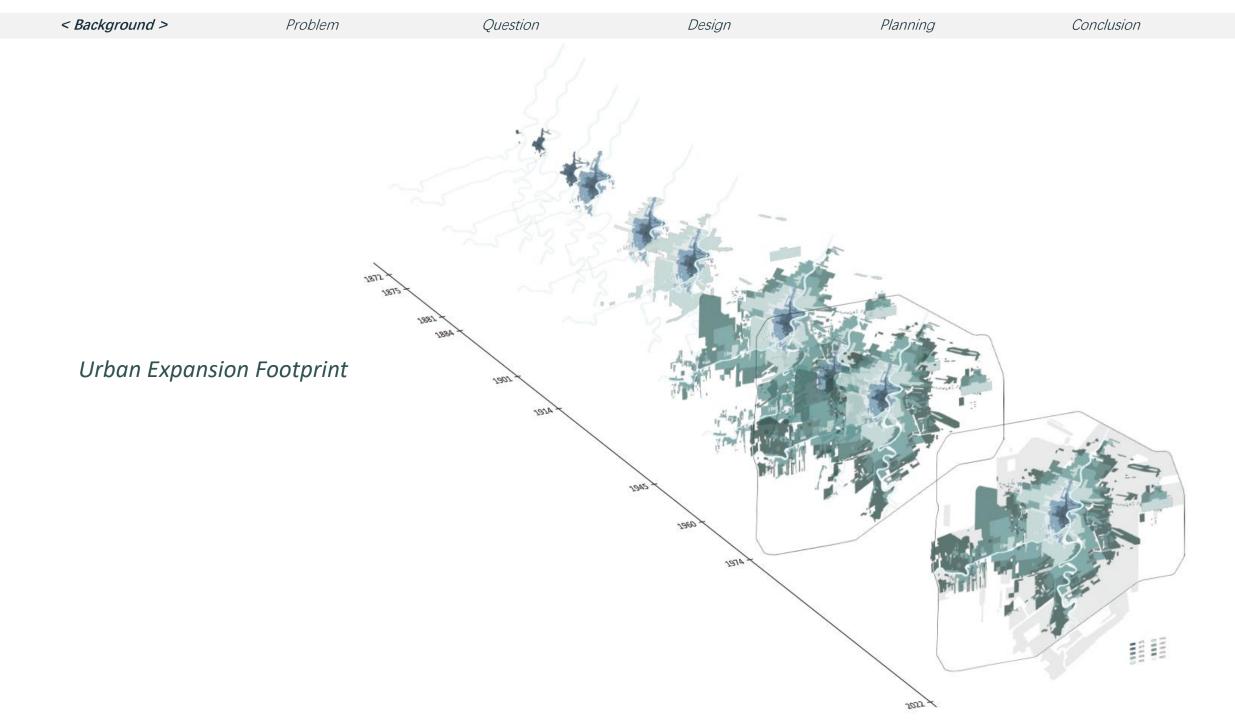
The beaver are gone.

And those who saw the beaver are gone. Those who saw the beaver by hundreds and how they live with the water their great head down Those who saw the beaver are gone And the beaver are gone.

Zack Flett



< Background >	Problem	Question	Design	Planning	Conclusion
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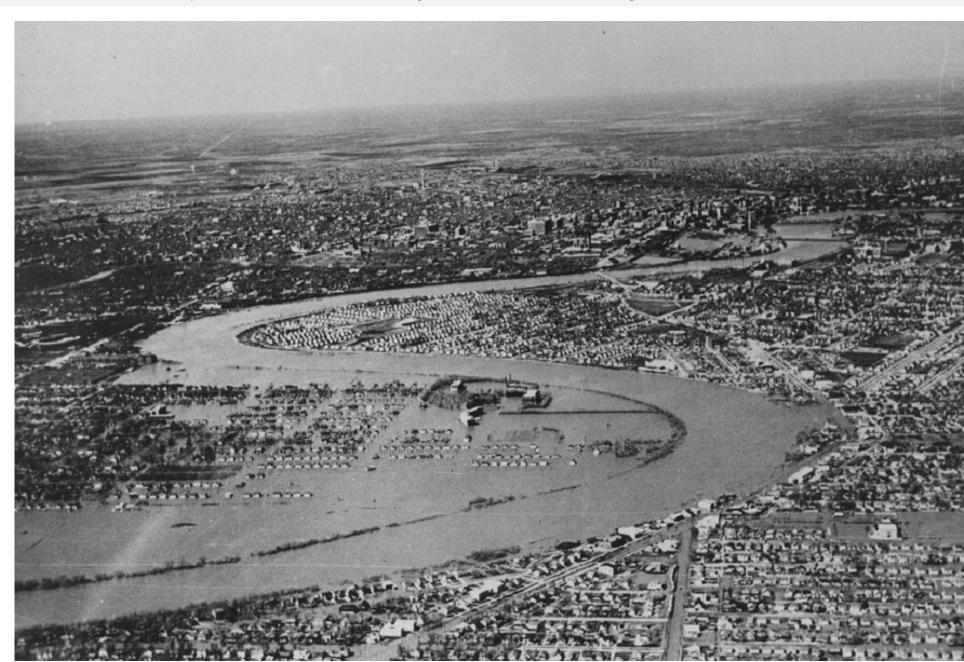
< Problem >



Design

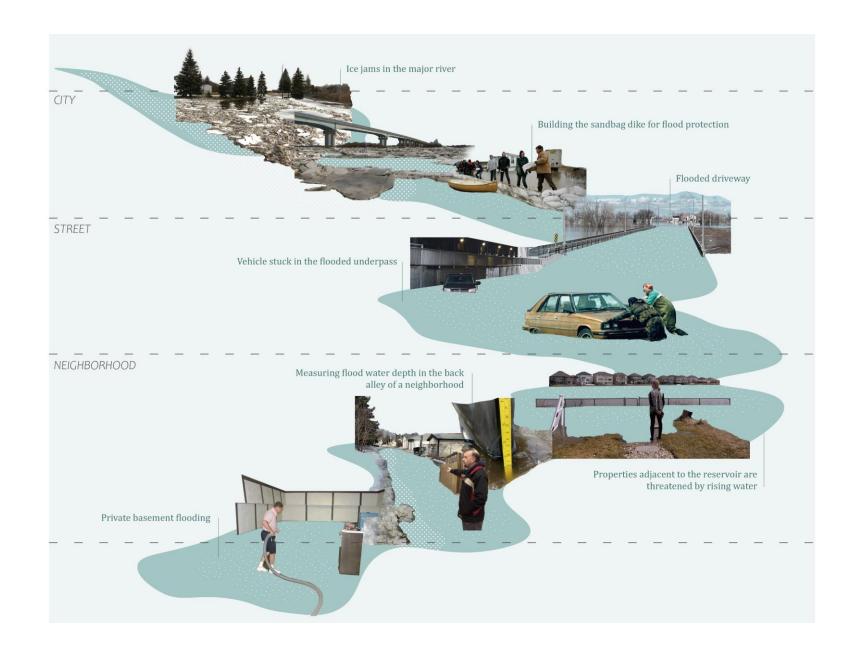
Planning

Conclusion



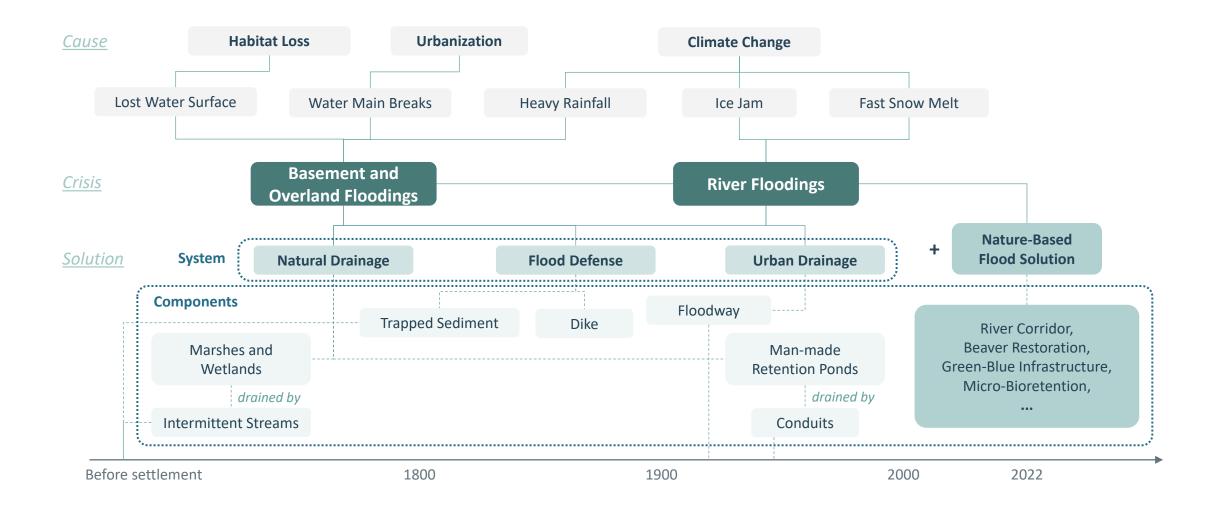
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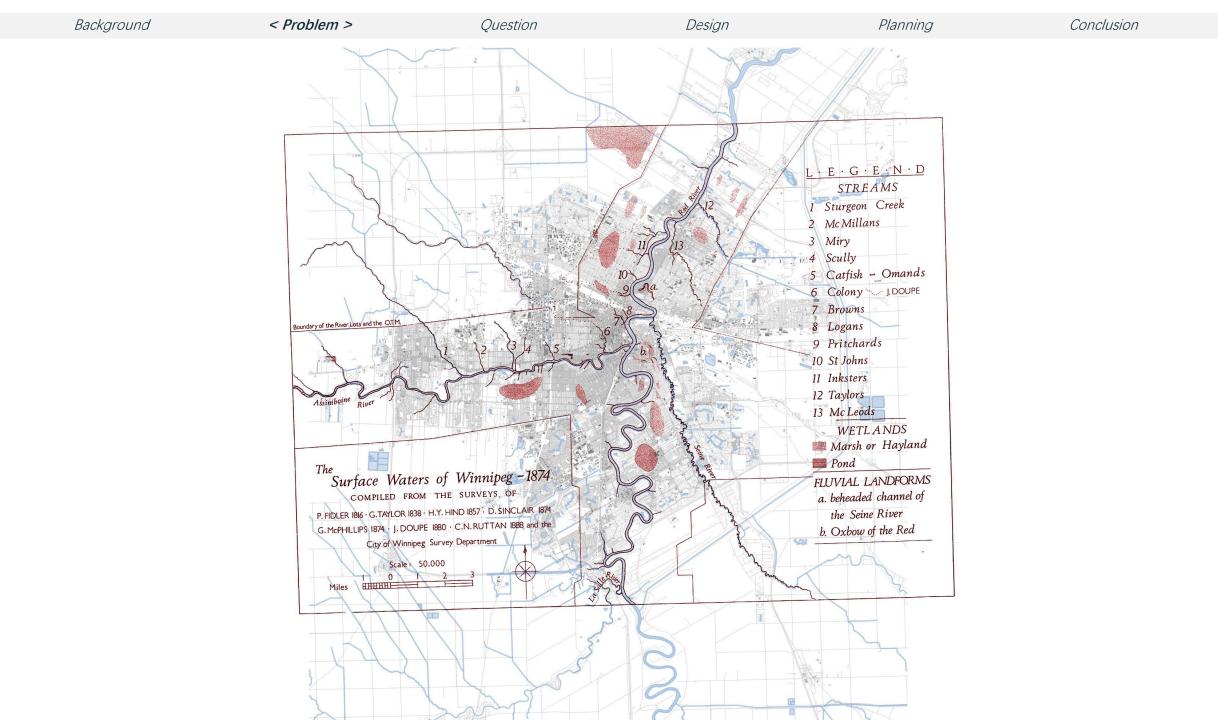
Source: City of Winnipeg, 1950



Background	< Problem >	Question	Design	Planning	Conclusion

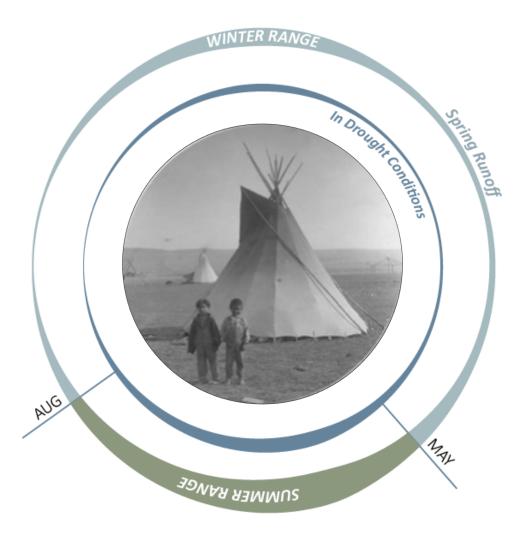
#### Understanding the Urban Hydrologic System





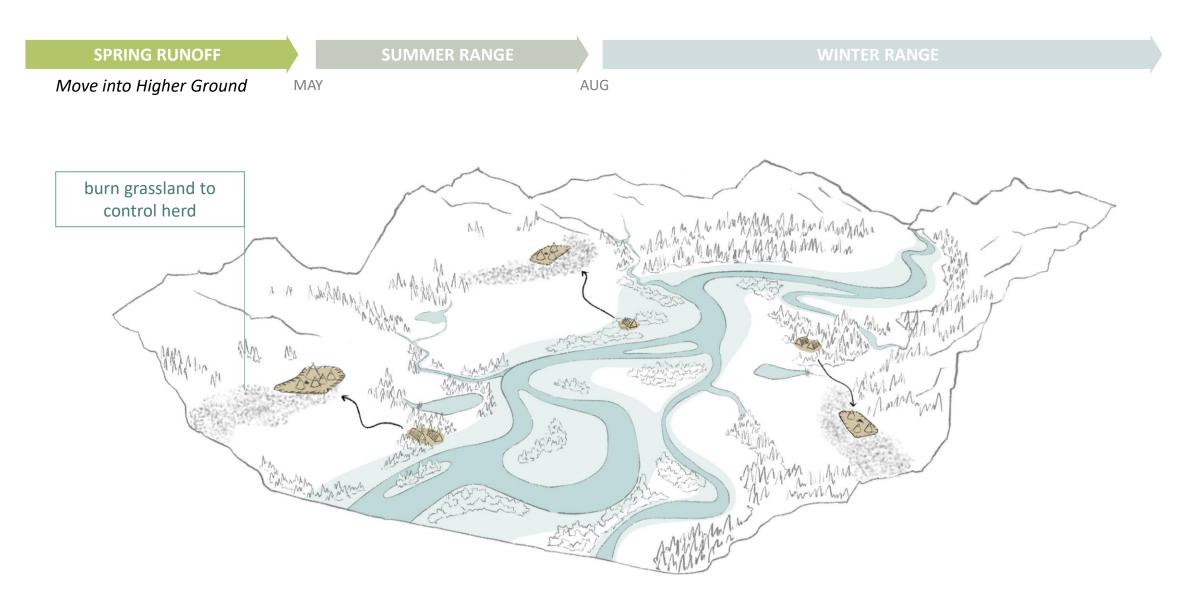
Background	< Problem >	Question	Design	Planning	Conclusion

Indigenous Living Pattern on the Prairie



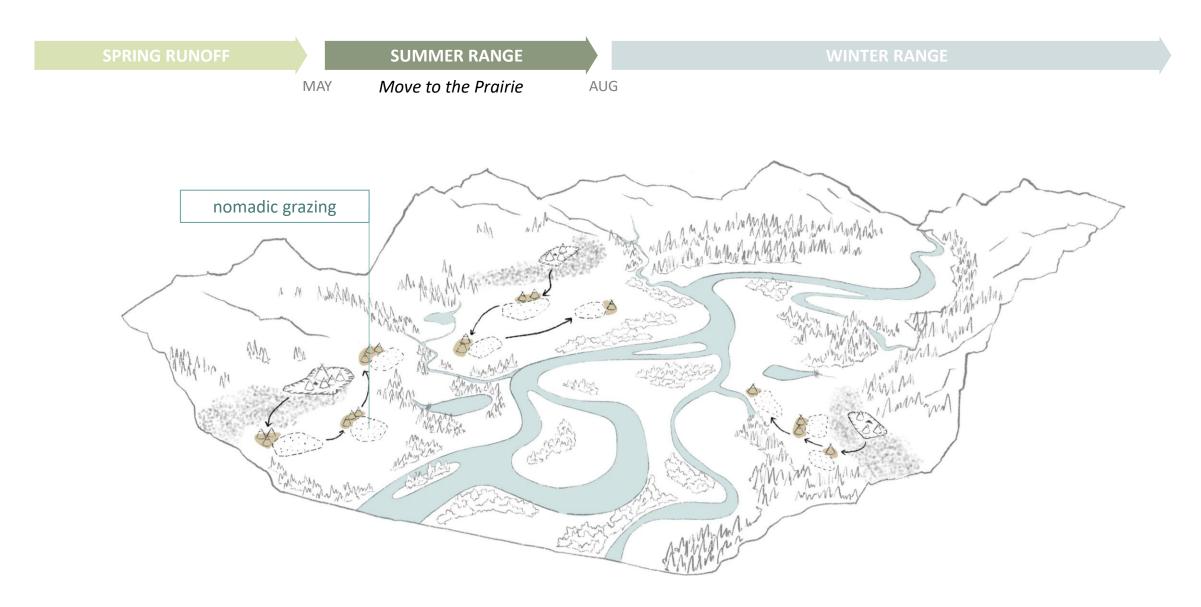
Background	< Problem >	Question	Design	Planning	Conclusion

#### Indigenous People Migration Pattern on the Prairie



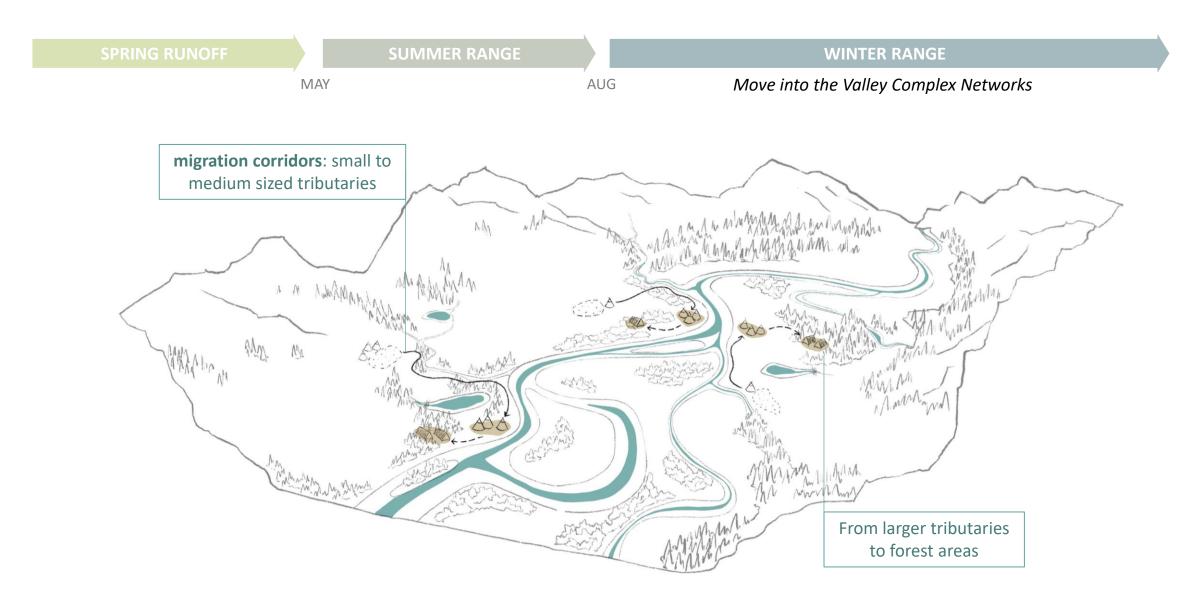
Background	< Problem >	Question	Design	Planning	Conclusion

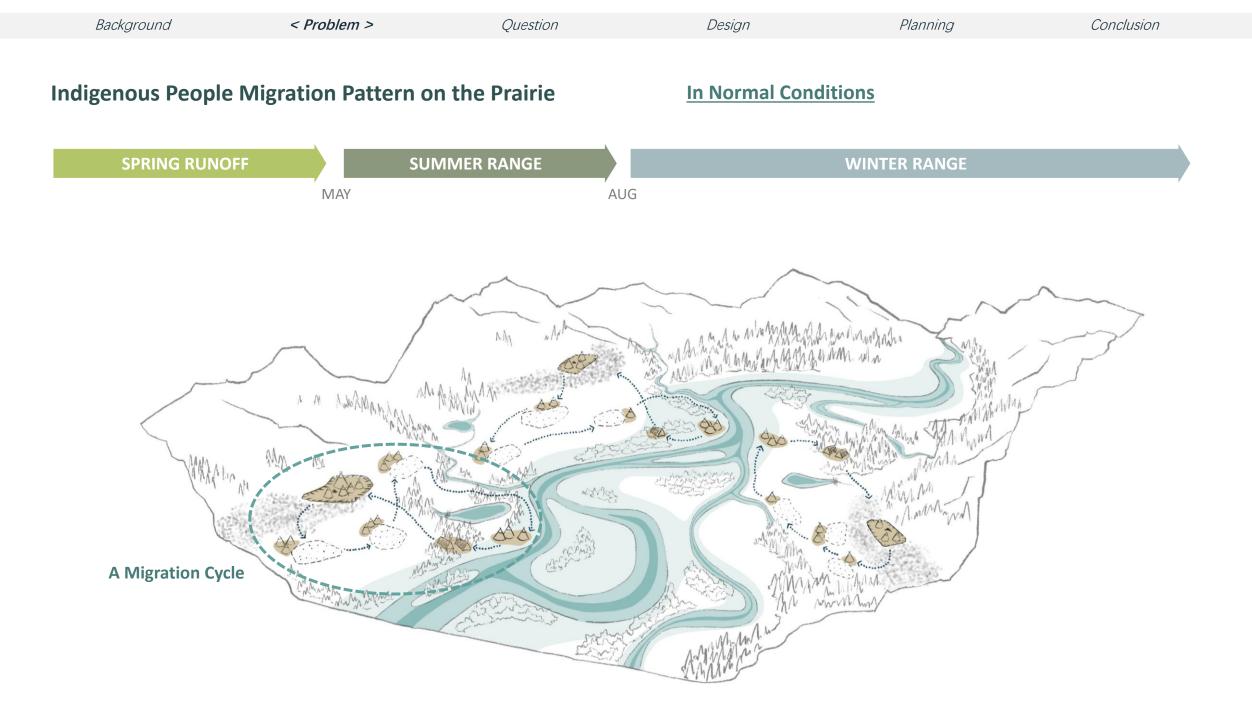
#### Indigenous People Migration Pattern on the Prairie

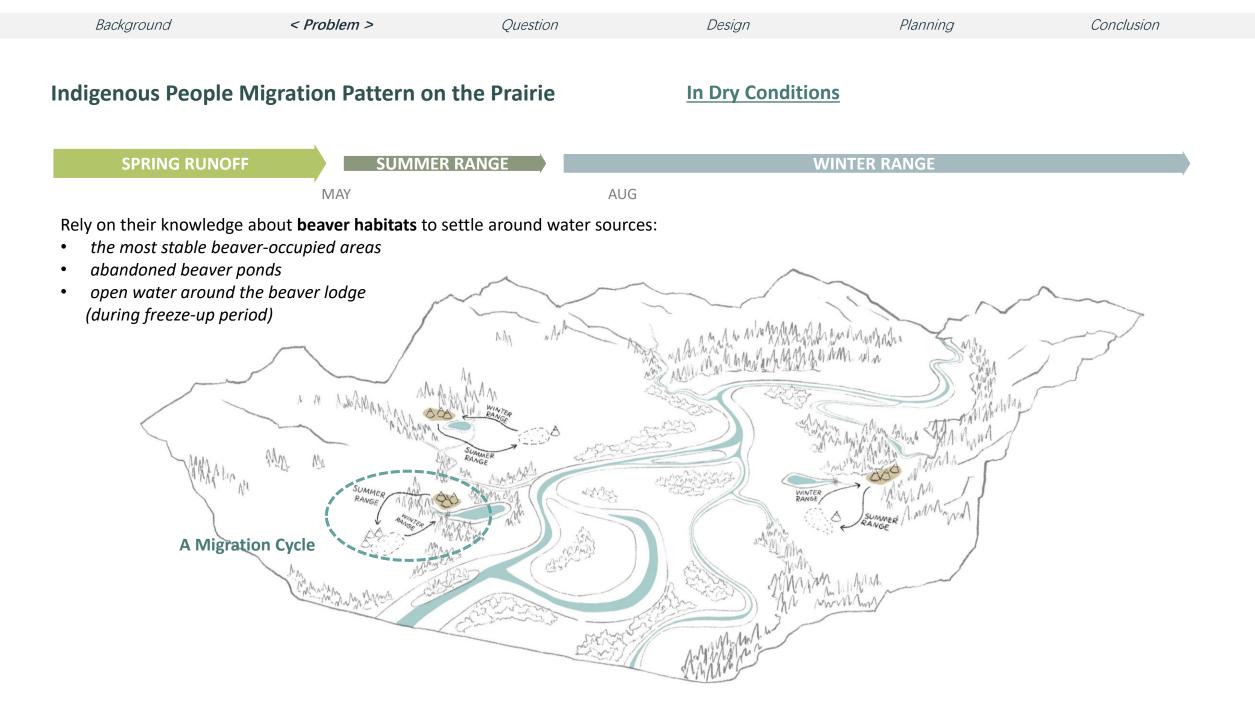


Background	< Problem >	Question	Design	Planning	Conclusion

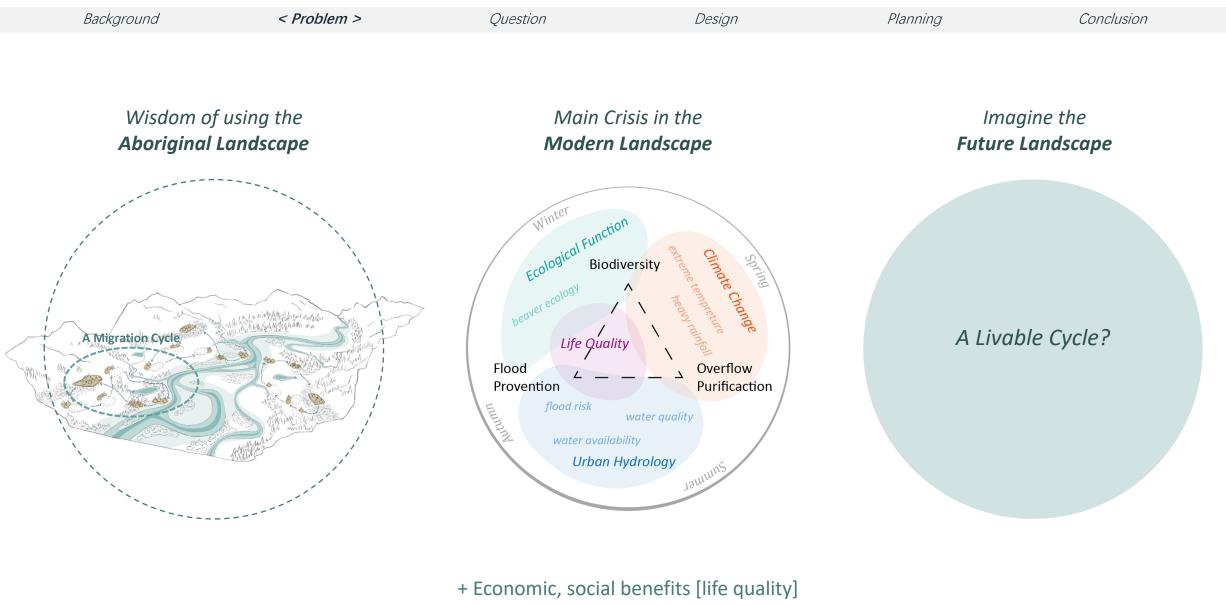
#### Indigenous People Migration Pattern on the Prairie







Background	< Problem >	Question	Design	Planning	Conclusion
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+ Environmental benefits [local biodiversity]

## **RESEARCH QUESTION**

How to design a **resilient spatial framework** for Winnipeg in response to the flood challenge and integrate nature-based principles to achieve **long-term coexistence between man and wildlife** in a cohesive neighborhood design?

1. How can we increase **stormwater storage** through ecological rehabilitation based on the current fragmented open space structure?

2. How to incorporate Winnipeg's **urban hydrologic system and ecosystem** into the solution response to threatening floods? 3. In what way can we use **beaver ecology** as a cost-effective strategy to secure and stabilize water flows in the urban system?

4. Can the deep connection of **human settlements and local ecosystem** in the indigenous insight be revitalized in the urban dwelling environment?

Keywords: Flood Resilience, Urban Water System, Nature-based Solution, Green-blue Infrastructure, Livable Cities, Urban Ecology, Beaver Recolonization

Background	
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# EMBRACE THE FLOOD

Solving the Uncertainty?

Background	
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# EMBRACE THE FLOOD

*To Live with the Uncertainty!* 

Background	Problem	< Question >	Design	Planning	Conclusion
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Imagine

A Landscape Evolving with

**Collaboration of** 

**HUMAN and WILDLIFE** 

#### Problem < Question > Background Design Planning Conclusion Carel Ann Wanner Manitoba Birding - Bird & Wildlife Photography - 2024 April 200 Manifolds Birding - Bird & Wildlife Photography - BLA Lorne Volk --- Chertel Kozody Meby Meb 111 101 101 7221 B A Beaver on the Lasake fliver south of Winnipeg. Level the late alternoon light. 11/10/2021 The durn's beaver this evening. So bury! Diving down, picking up much and packing his dam. One of our two Cenedian National Animals, the Beaver enzying some back at the Sene River in Gorgeous evening for photography on 4/7/2020. In Fort Garry, Winnineg, 1 discovered Cooper's https://tion.int.org/active/strangeous/when it started to rain feathers. The in Insouthuly calm for the Goldan Eyes and heaven. can sex is this beaver was \$10 South Winnerge, Thilly, built in gliad shas not no megitorou. Cur other National Animal withe Canadian Horse and contrary to popular ballet, we have no fun a snuck. **金融**報告 National Bird. 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When she stopped and 查看報(S stared across the river I realized this beaver was busy harvesting fresh sablings from the side of 00 11 White an extent of the first submeasures in the control of the second sec 0 9 Beaver, Wey Corol Ann Vermeer Manticha Birding - Bird & Wild Periotography - (BA) Sum 1 Surris this morning mixed has . Never cohing and a Musical Lade Carth Witne Deeps Geschiere are you sure this warrit a musical ? Beaver and Canada Geese, doesn't get much more Canadian than this. Sturgeon Creek, Winnipeg Child O was at Like Reply Shore 24 .....

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Background

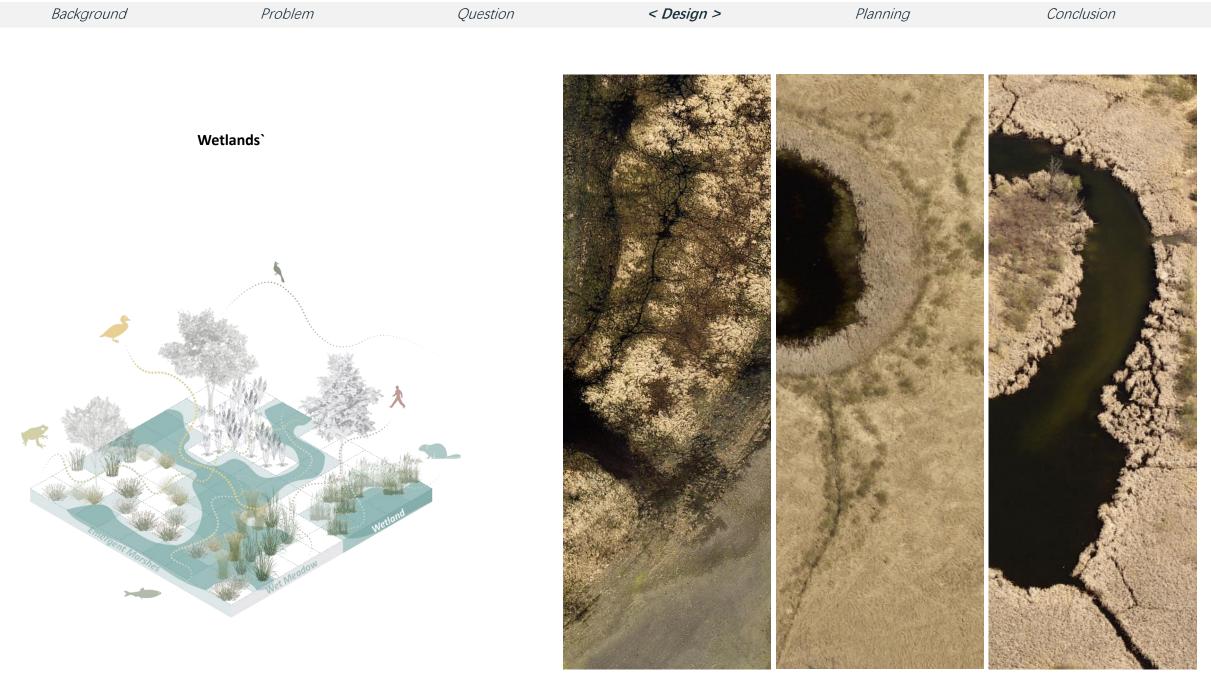
Conclusion

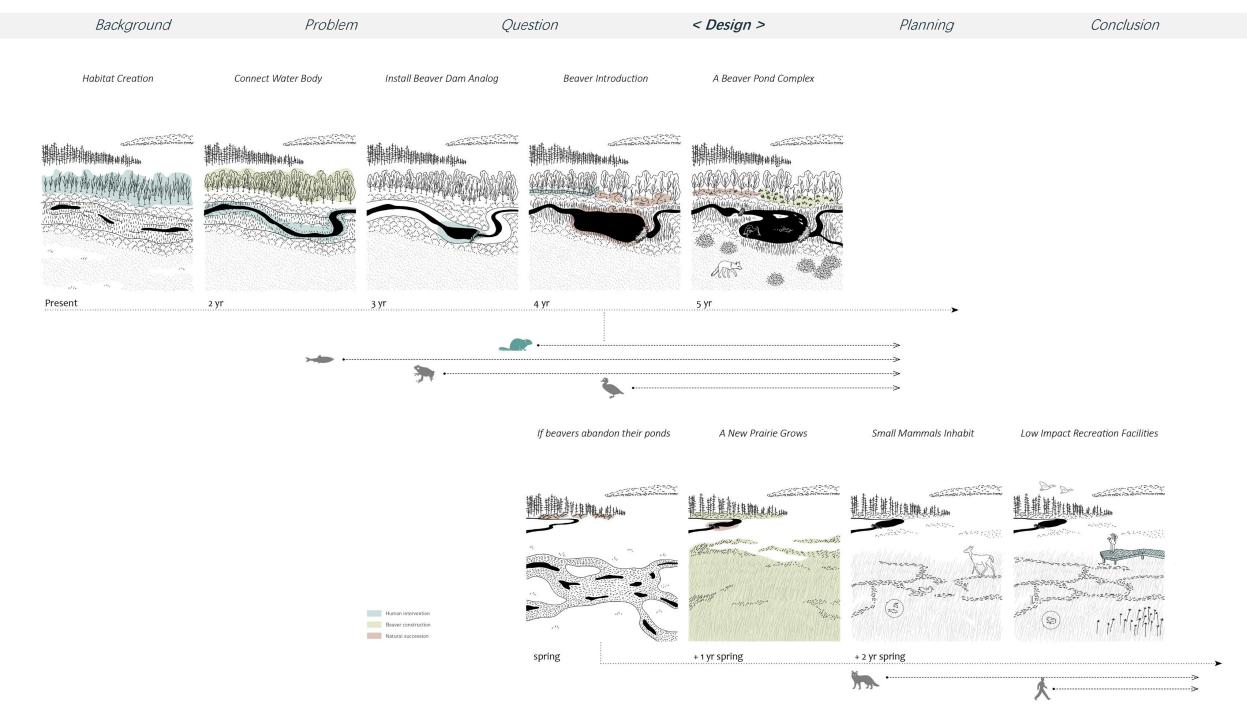
Reviving The Native Habitats

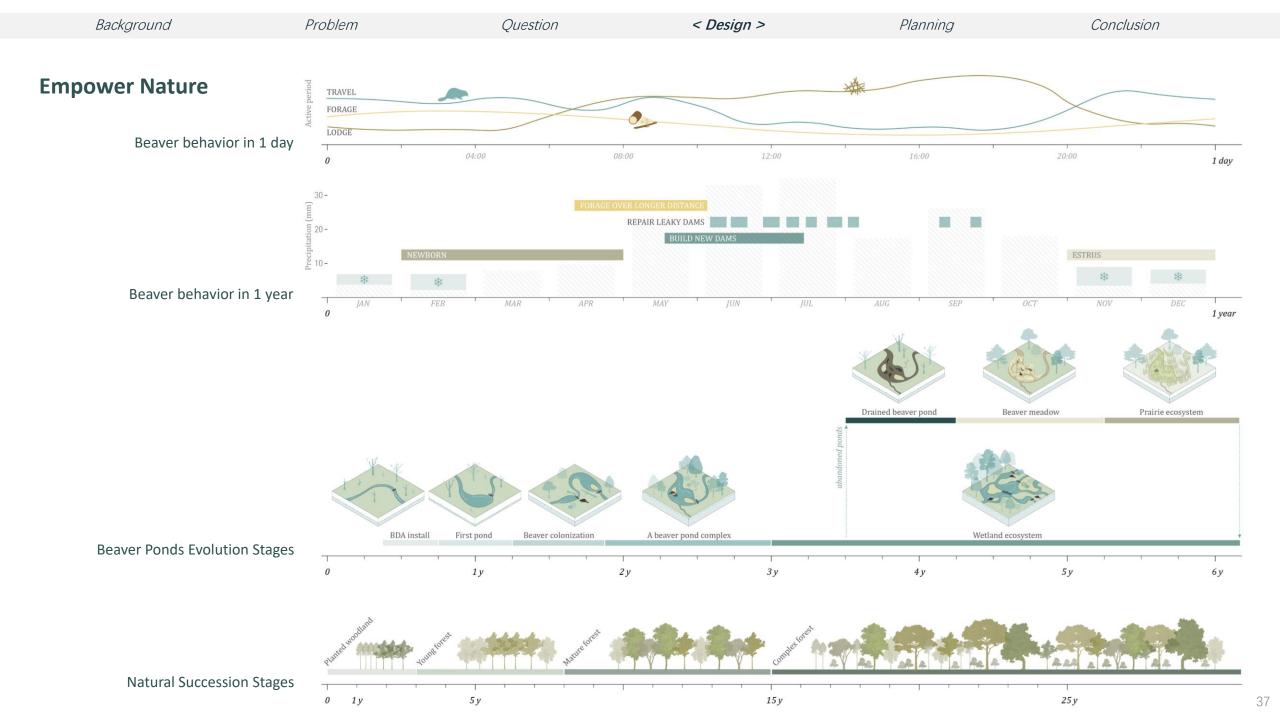




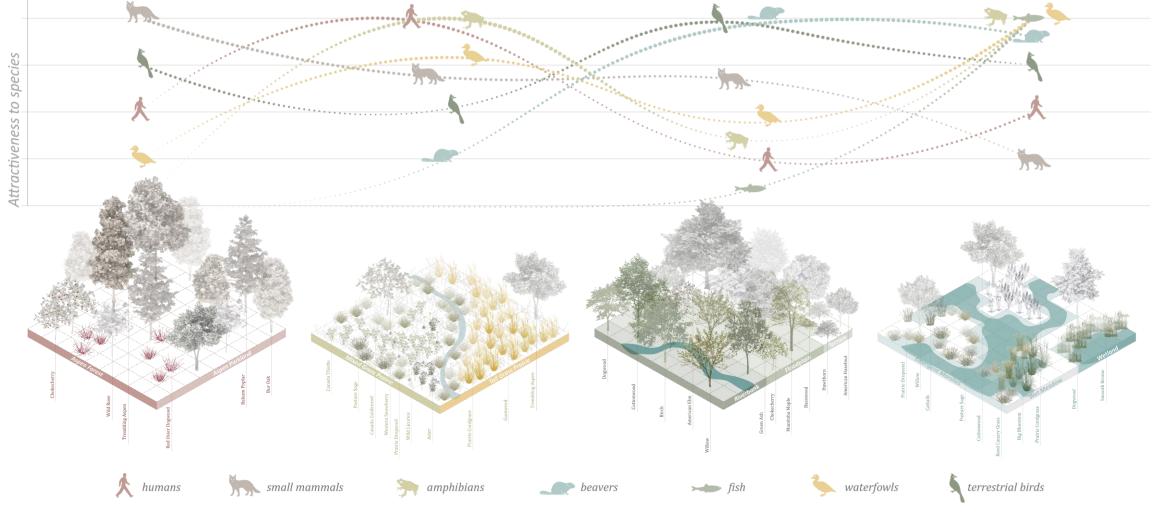






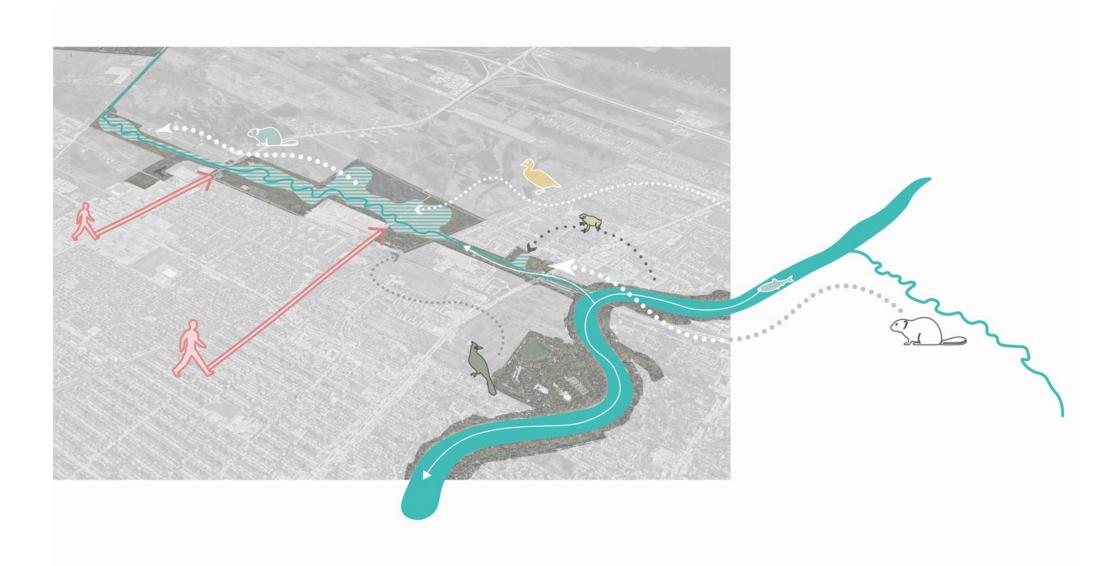


Back	ground	Problem	Question	< Design >	Planning	Conclusion
Suitable	Habitats for Di	fferent Wildlife				
	Aspen Forest		Prairie	<b>Riverbottom Fores</b>		Wetlands`
		Т	all Grass & Mixed Grass	Riverbank, Floodplain, Terrace		Bogs, Marshes, Swamps, Wet Meadow
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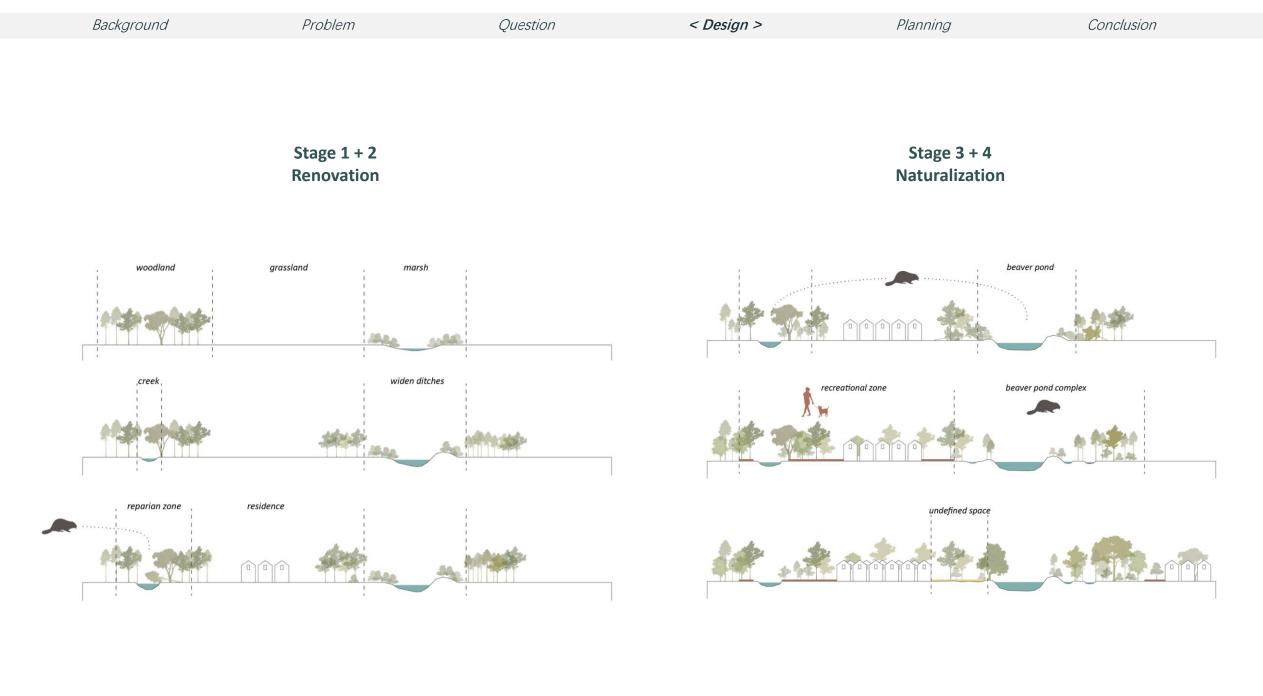


Background	Problem	Question	< Design >	Planning	Conclusion

## Introducing Route

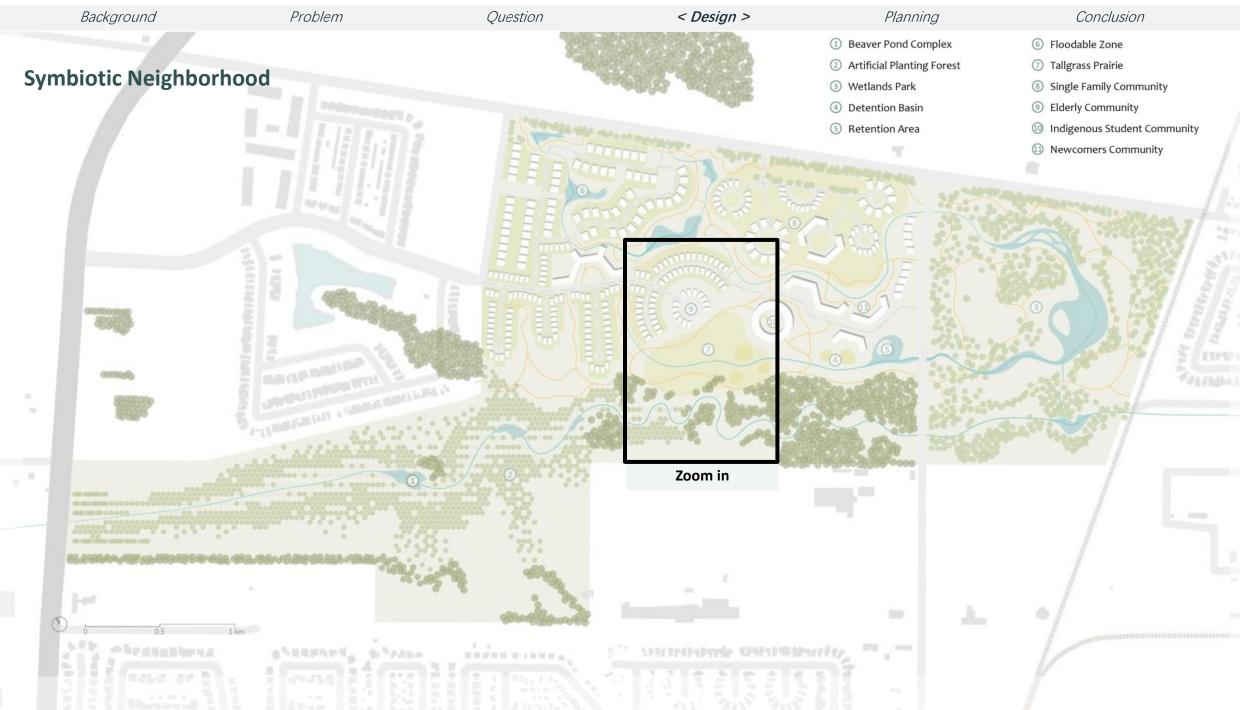














Riparian Zone

Transitional Zone

Residential Zone

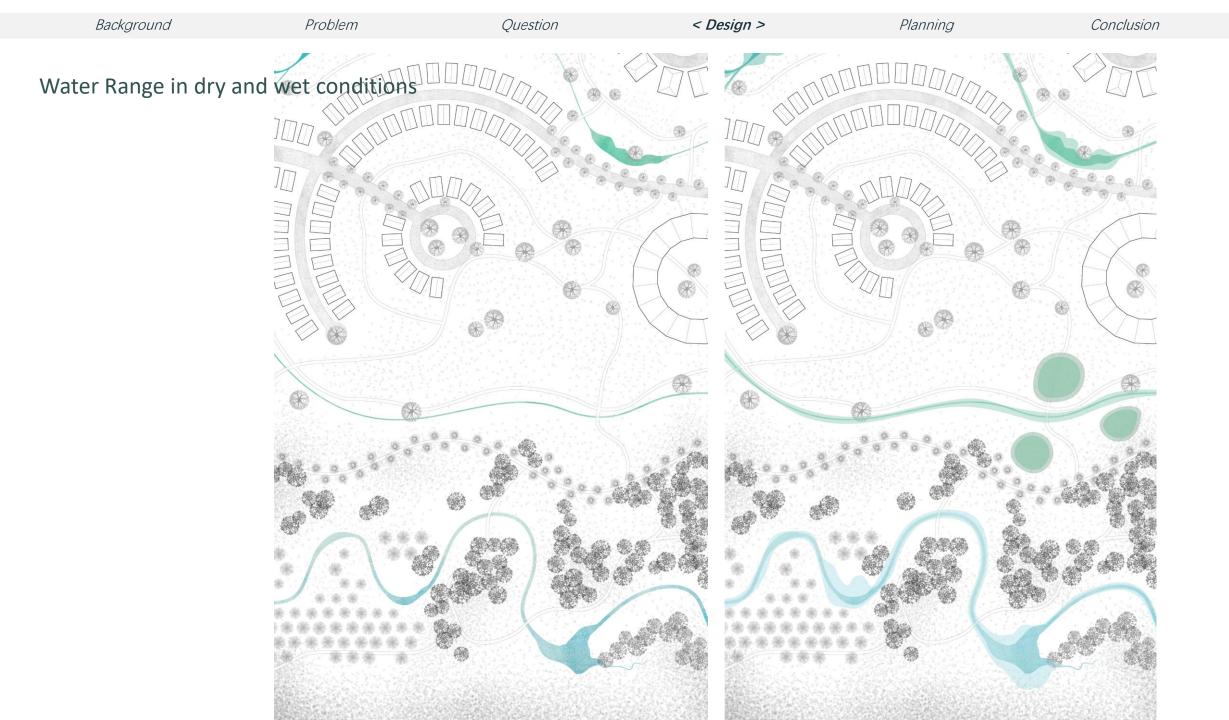


Beaver Active Zone

Public Activity Area

Background	Problem	Que	stion	< Design >	Planning	Conclusion
Planting Scheme						
Artificial planting without any interference						
Artificial planting with a stream through						
Artificial planting at a certain distance		••••	9999 9996			
Artificial planting linear and maintained		000-0000 0-000-00				

Background	Problem	Question	< Design >	Planning	Conclusion
Planting Scheme					
Natural forest without any interference					
Natural forest with a stream through					
Forest clearing after beaver colonization					
Forest clearing after pond abandoned					



Background	
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< Design >

Conclusion

Riparian Zone

- Evolving Habitats -



Back	kground
Duoi	ground

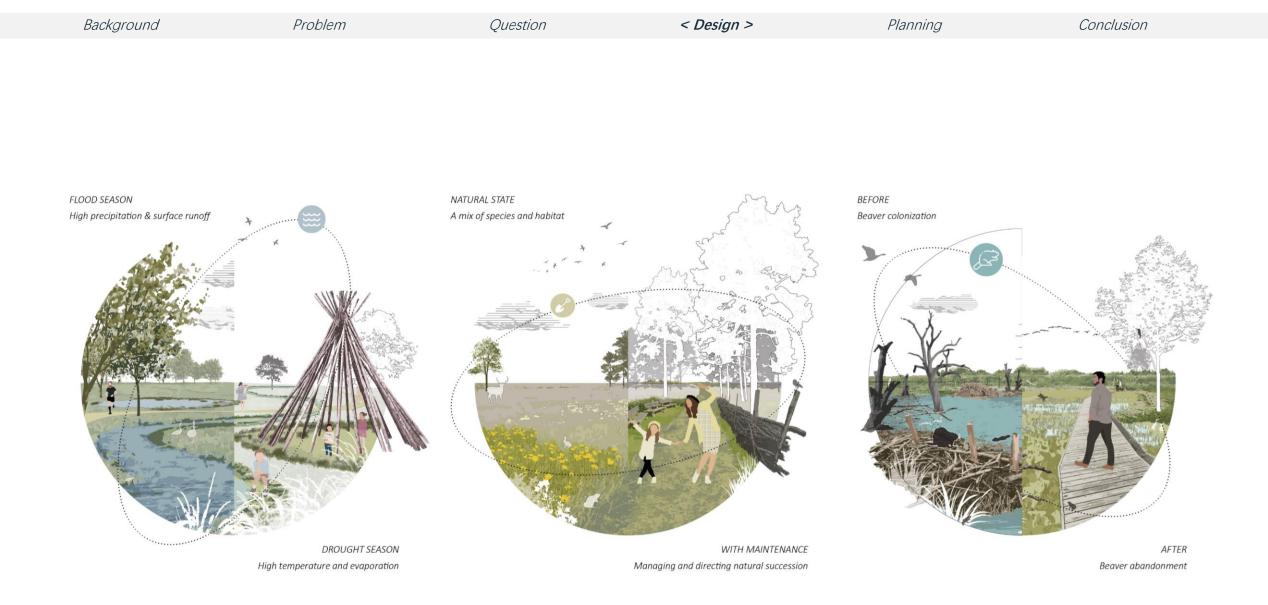
Conclusion

*Residential Zone* - Flood Managing & Activity Holding-









	Background	Problem	Question	< Design >	Planning	Conclusion
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Is this design good enough?

Background	
Dackground	

## **RESEARCH QUESTION**

How to design a **resilient spatial framework** for Winnipeg in response to the flood challenge and integrate nature-based principles to achieve **long-term coexistence between man and wildlife** in a cohesive neighborhood design?

Background	Problem	Question	< Design >	Planning	Conclusion
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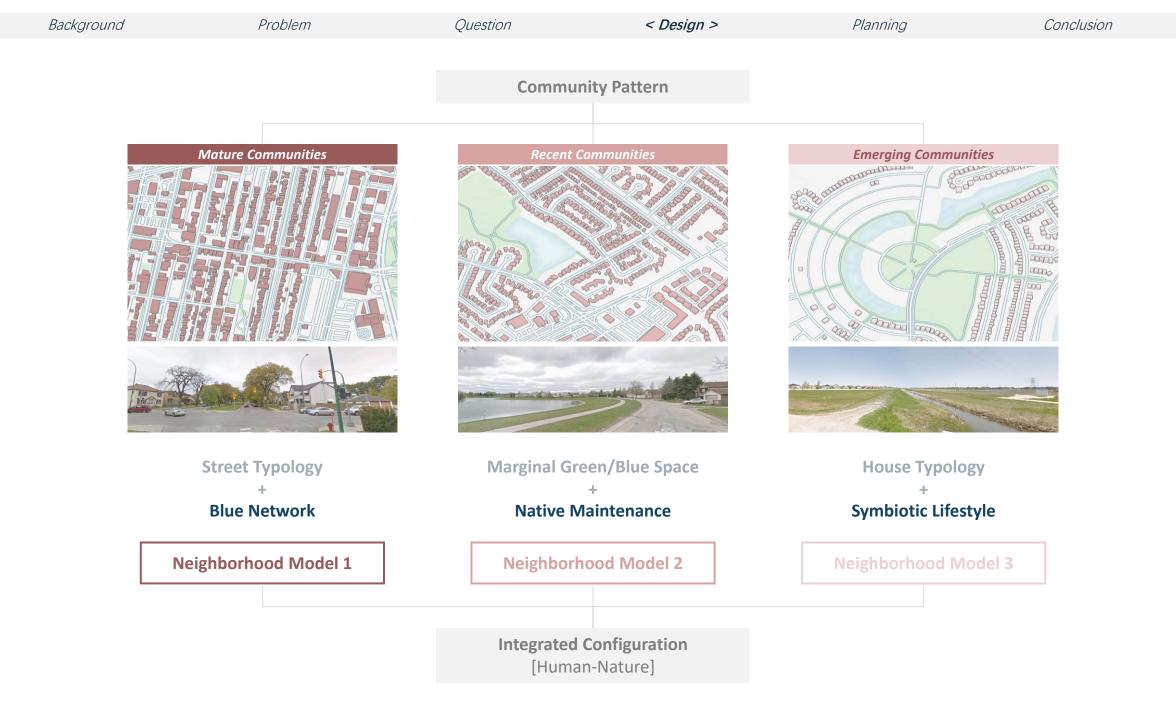
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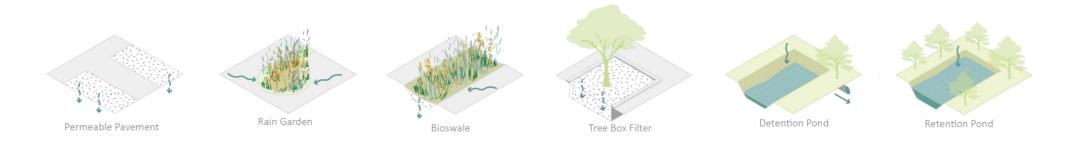
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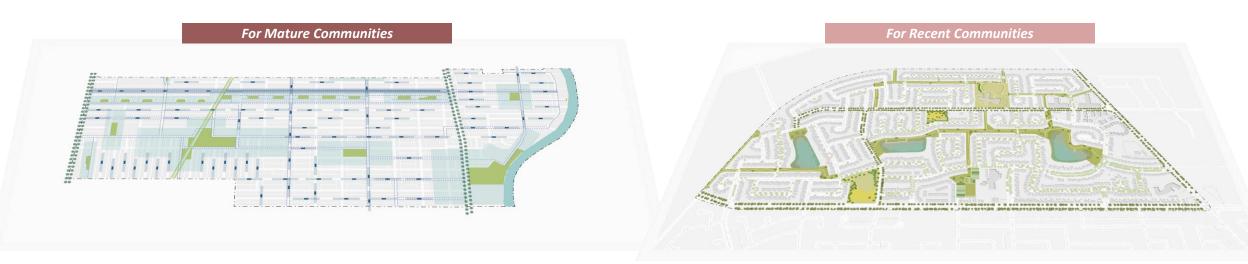
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Background	
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# 2 Applicable Models



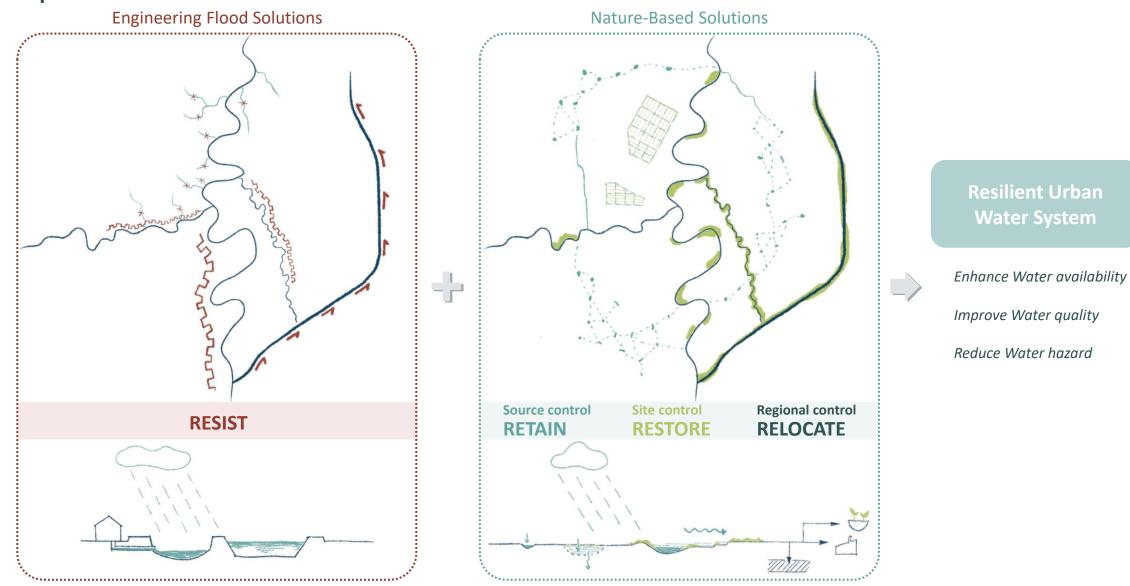




Question

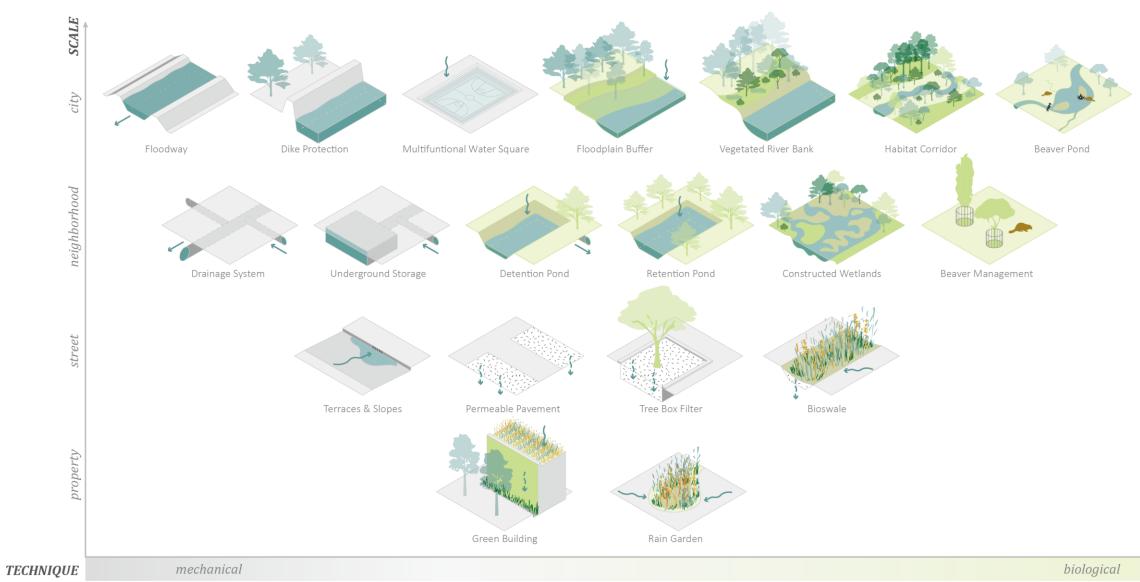
Design

#### Concept



Background	Problem	Question	Design	< Planning >	Conclusion

#### **Urban Flood Resilience Toolbox**



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Background	Problem	Question	Design	< Planning >	Conclusion

### **Urban Flood Resilience Scheme**

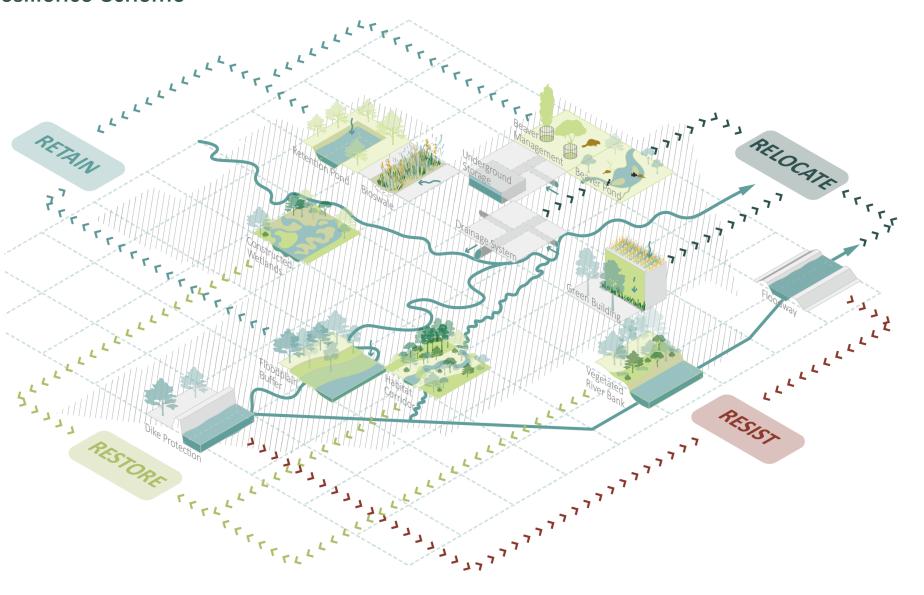
At Neighborhood Scale

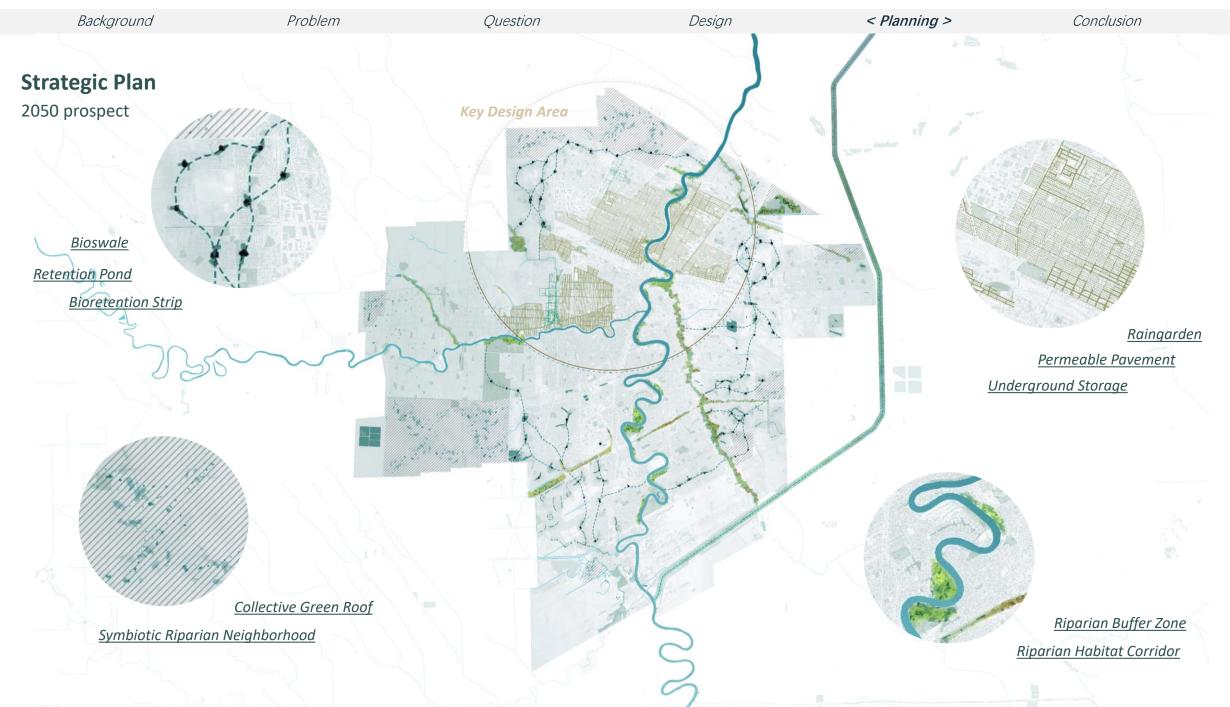


Background	Problem	Question	Design	< Planning >	Conclusion

### **Urban Flood Resilience Scheme**



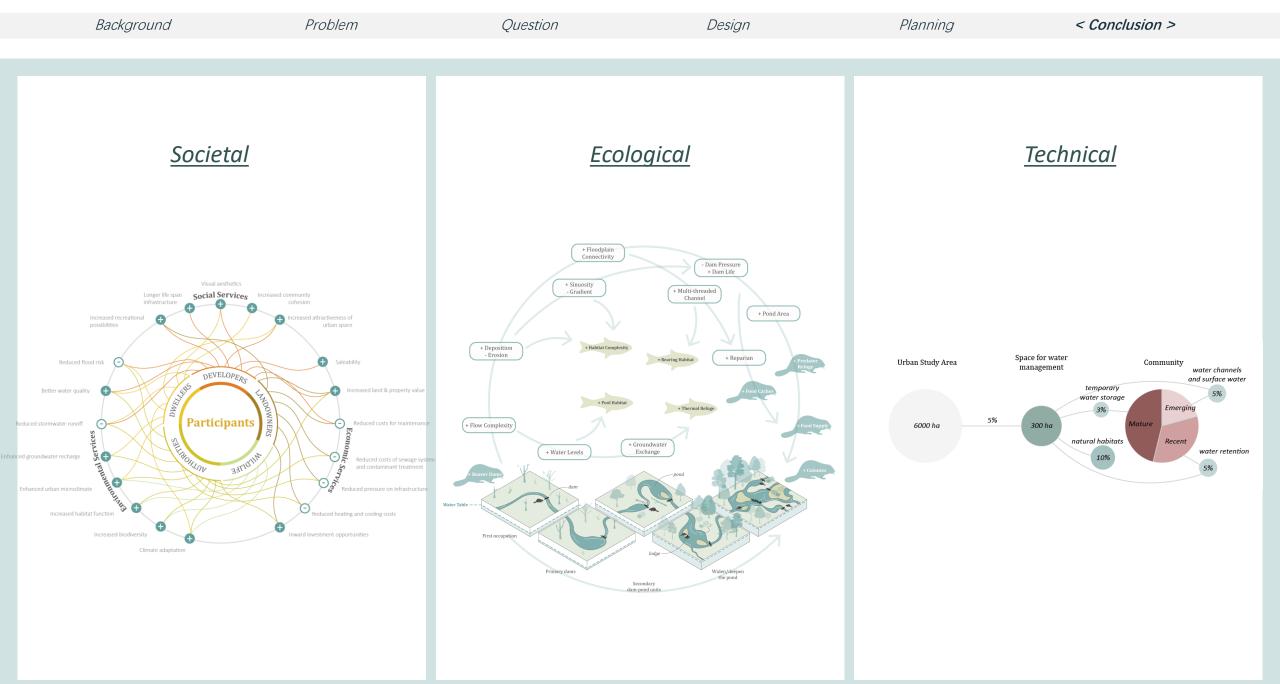




Background	Problem	Question	Design	< Planning >	Conclusion
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A Futureproof Spatial Framework



Background	Problem	Question	Design	Planning	< Conclusion >

### **EMBRACE THE FLOOD**

Nature-Based Solutions: Insights and a Future-Proof Framework

Modified Hydrological Cycle: Adapting to Real Environments

*Symbiotic Neighborhood Model: Blending Indigenous Culture and Living with Nature* 

Role of Beavers: Mimicking Beaver Ecosystems in Urban Environments

Adaptable Schemes: Embracing Unpredictability for Changing Landscapes and Flood Resilience

DIALOGUE BETWEEN HUMAN & NATURE BRIDGE FROM THE PAST tO THE FUTURE



Thank you for your attention!