

We don't need a better rat trap: Reconceptualizing municipal rat management



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Territorial Acknowledgement

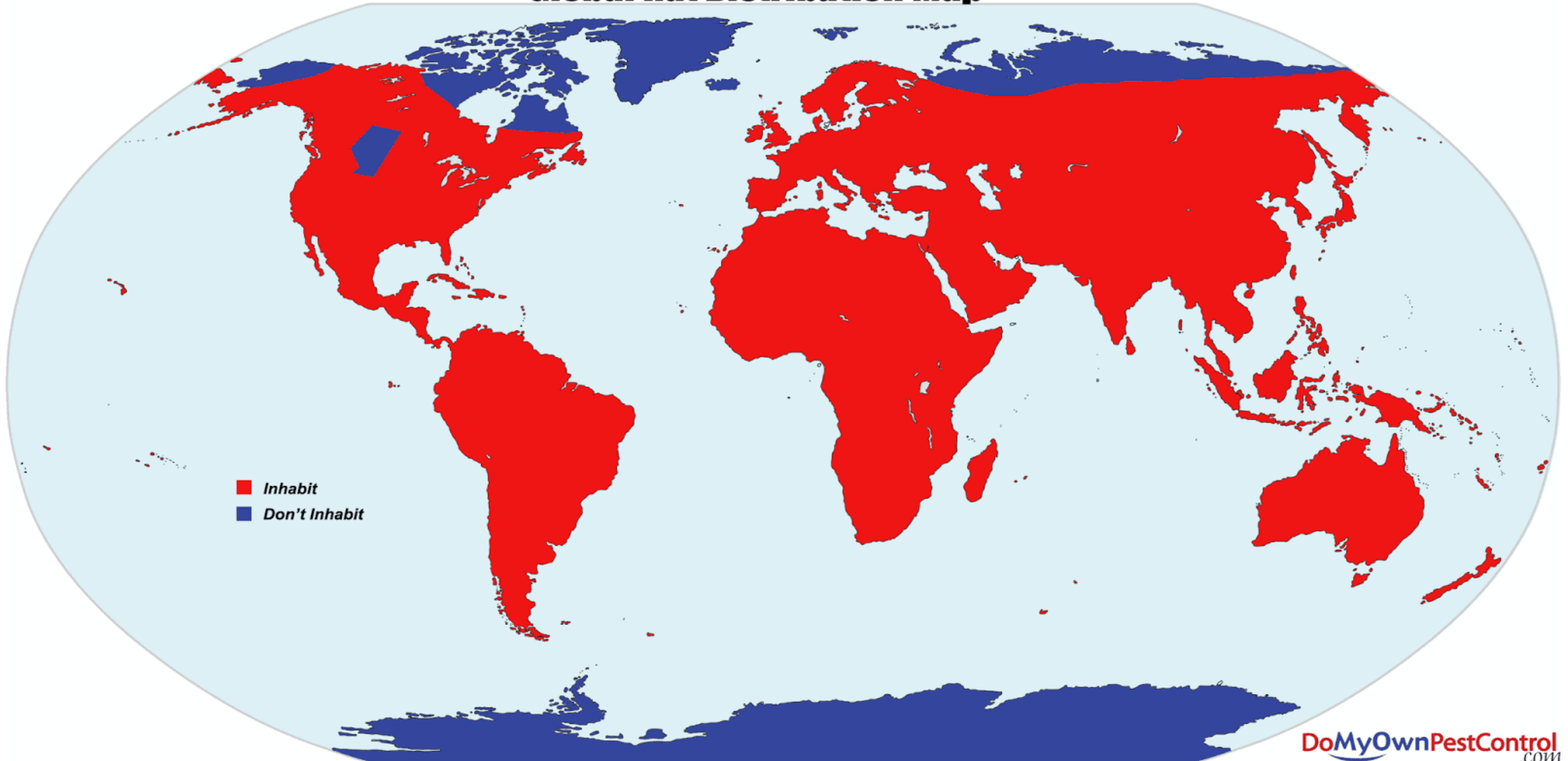
I gratefully acknowledge that I live and work on the traditional and unceded territory of the Katzie First Nation.





Why Municipal Rat Problems?

Global Rat Distribution Map





Why Municipal Rat Problems?

- Zoonotic pathogens

The plague

- *Yersinia pestis*
- Killed 25% of the 14th century European population





Why Municipal Rat Problems?

- Zoonotic pathogens

Vancouver's Downtown Eastside:

- **Bartonella spp.**





Why Municipal Rat Problems?

➤ Zoonotic pathogens

Vancouver's Downtown Eastside:

- *Bartonella* spp.
- *Leptospira* spp.



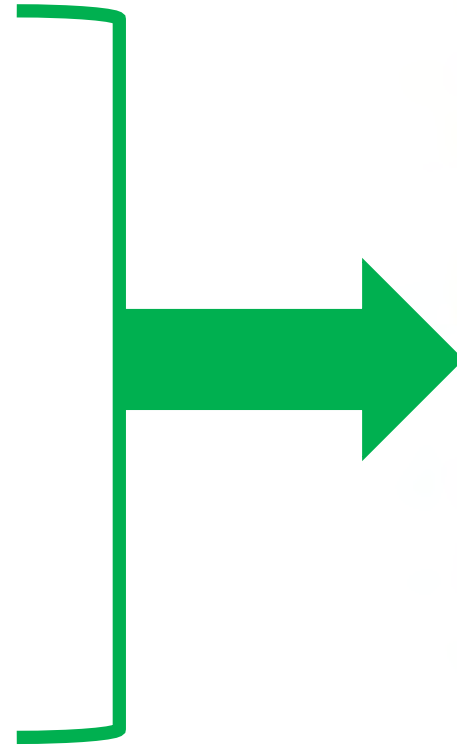


Why Municipal Rat Problems?

➤ Rats are a pathogen sponge

Vancouver's Downtown Eastside:

- *Bartonella* spp.
- *Leptospira* spp.
- MRSA & MRSP
- Antibiotic resistant *E. coli*
- *Salmonella* spp.
- *C. difficile*
- Hepatitis E virus





Why Municipal Rat Problems?

- Zoonotic pathogens
- Indoor allergens / asthma morbidity
- Adversely affect mental health
- Property / infrastructure damages
- Decrease utilization of public spaces
- Damage business reputations
- Contaminate foodstuffs





An ancient problem

For as long as we've lived in cities, we've been trying to control rats

- **Brown rats spread globally with humans in the 800-1800s**
- **Evidence of rat-proof granary in 13 BC Rome**

Rat catcher early 1900s Europe





Municipal rat management

- Urban management is not new
- Despite ongoing management, rats appear to be thriving

A screenshot of an Orkin press room announcement. The Orkin logo is in the top left. Navigation links include Pest Control, Termite Control, Prevent & Protect, Pest Library, Orkin Difference, and Join the Orkin Pros. The main headline reads: "RATS! CHICAGO TOPS ORKIN'S RATTIEST CITIES LIST FOR SIXTH CONSECUTIVE TIME".

ORKIN

Pest Control Termite Control Prevent & Protect Pest Library Orkin Difference Join the Orkin Pros

ORKIN / PRESS ROOM

**RATS! CHICAGO TOPS ORKIN'S
RATTIEST CITIES LIST FOR
SIXTH CONSECUTIVE TIME**



Municipal rat management

Urban management is not new

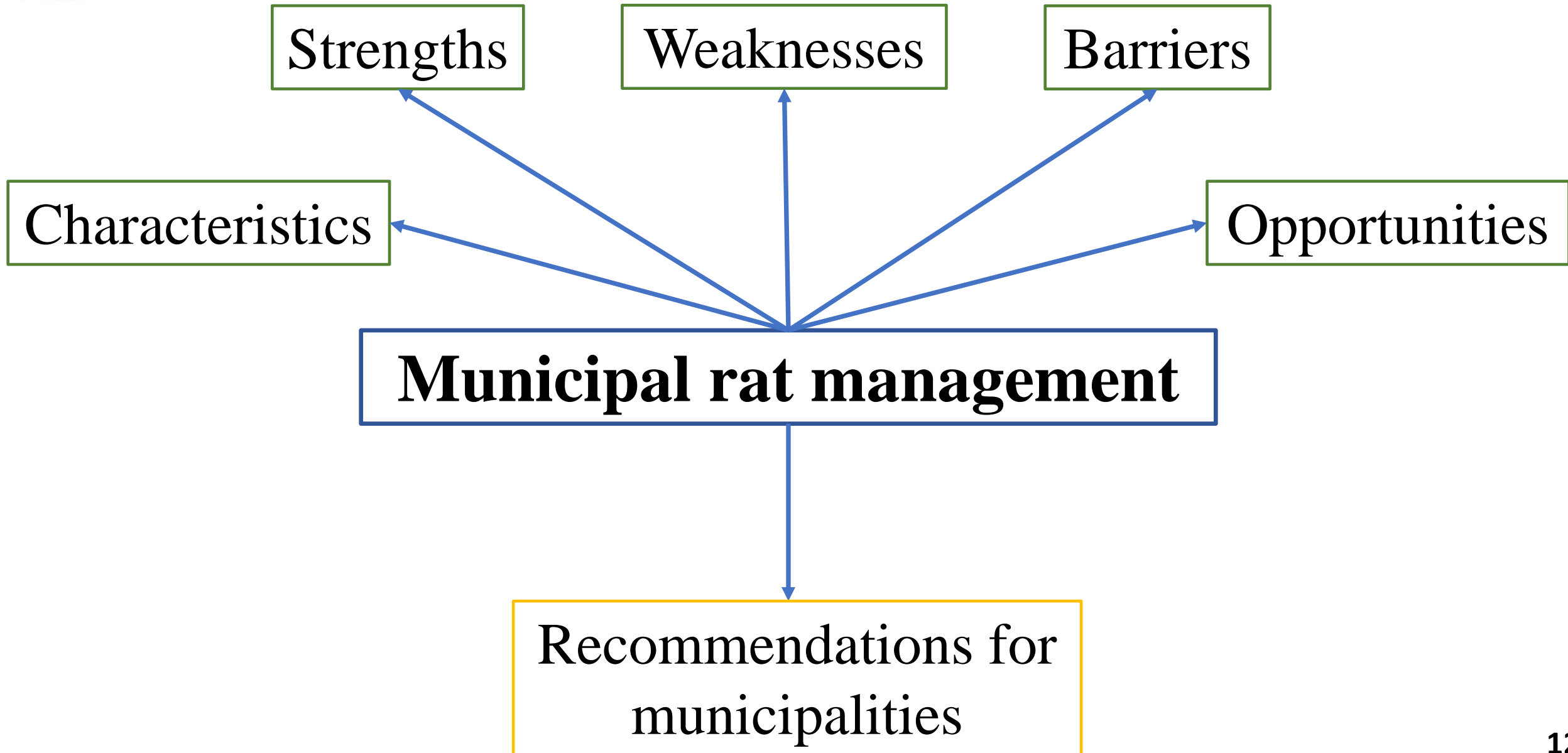
Despite management, rats appear to be thriving

➤ **Limited understanding of why, how, or if management fails**





Research question





Triangulation of RQ

**Municipal Rat
Management Literature**



**Municipal Rat
Management Stakeholder
Perceptions**

**Established Municipal Rat
Management Programs
and Regulations**



Presentation Organization via Triangulation

Step 1. Qualitatively analyze data from each source

Step 2. Compare key themes across data sources

Step 3. Explore and describe emergent ideas and themes that arose from comparing across data sources

Step 4. Draw conclusions and make recommendations relevant to the research question





Step 1.

Qualitatively analyze data from each source





Stakeholder perspectives on the development and implementation of approaches to municipal rat management

Michael J. Lee ^{1,2,*} Kaylee A. Byers ^{1,2} Susan M. Cox,^{1,3} Craig Stephen,^{1,4,5} David M. Patrick^{1,6} and Chelsea G. Himsworth^{1,2,7}





Stakeholder perspectives on the development and implementation of approaches to municipal rat management

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Key Finding

- **Municipal rat management is an essential service**
- **Highly complicated and no one has an ultimate solution**





Municipal urban rat management policies and programming in seven cities in the United States of America

Michael J. Lee ^{a,b}, Kaylee A. Byers ^{a,b}, Susan M. Cox^a, Craig Stephen^{a,c}, David M. Patrick^{a,d}, Robert Corrigan^e, and Chelsea G. Himsworth^{a,b,f}

LET'S
WORK
TOGETHER
FOR A
RAT-FREE
City 5



Municipal urban rat management policies and programming in seven cities in the United States of America

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Key Finding

- **Designed to reduce rats across as large a scale as possible**
- **Programs served as the ‘brain’ and regulations served as the scaffold**

LET'S
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Reconsidering the “War on Rats”: What We Know From Over a Century of Research Into Municipal Rat Management

Michael J. Lee^{1,2}, Kaylee A. Byers^{1,2}, Craig Stephen^{1,3}, David M. Patrick^{1,4},
Robert Corrigan⁵, Stefan Iwasawa⁶ and Chelsea G. Himsworth^{1,2,7}*



Reconsidering the “War on Rats”: What We Know From Over a Century of Research Into Municipal Rat Management

Michael J. Lee^{1,2}, Kaylee A. Byers^{1,2}, Craig Stephen^{1,3}, David M. Patrick^{1,4},
Robert Corrigan⁵, Stefan Iwasawa⁶ and Chelsea G. Himsworth^{1,2,7}*

Key Finding

- Little change since the early 1900s
- Few to no examples of cities successfully meeting rat reduction objectives



Step 2:

Compare key themes

across data sources



An entrenched “War-on-Rats” paradigm

1. Paradigmatic view of management

- Reduce rats at as large a scale and for as long as possible

2. Associated methods

- Widespread IPM

“The goal should be eradication.”
- Stakeholder 3, Private PMP





Limited evidence supporting the effectiveness of the War

Lack of quantitative evidence

- No success stories in >100 years of literature

“Perhaps one of the most disappointing aspects of rodent control over the last thirty years is the failure of ... governments to address such a collective problem in a collective way” –Meyer 1999





Low prioritization of the war

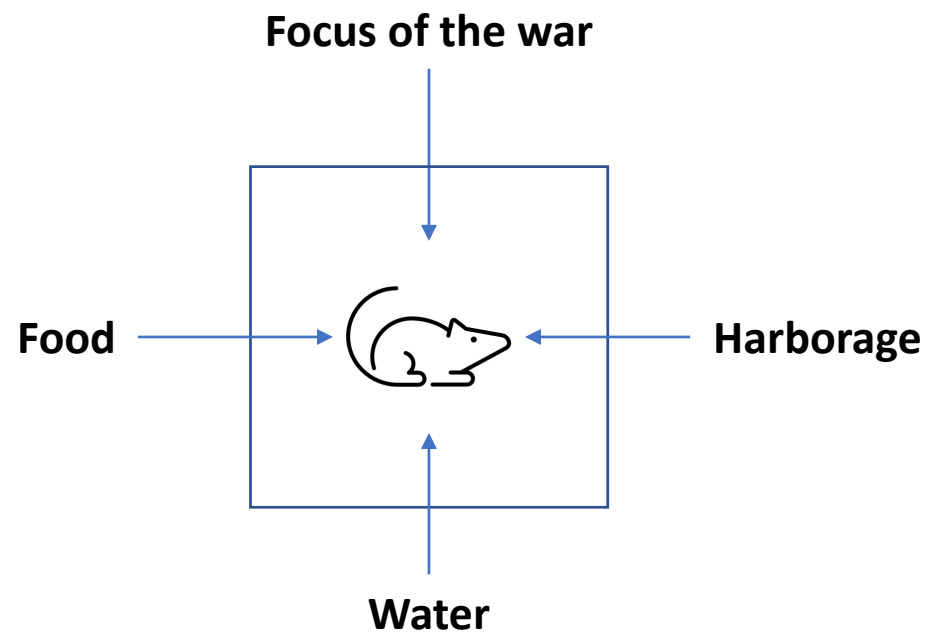
➤ Low priority problem = Low resource investment

“it's [rat management] not gunna be on the highest priority for us. Making sure that roads are paved and making sure that people have the infrastructure they need to live their day-to-day life is always going to be higher priority for streets, sanitation, trash collection things like this.”

- Stakeholder 4, City Operations



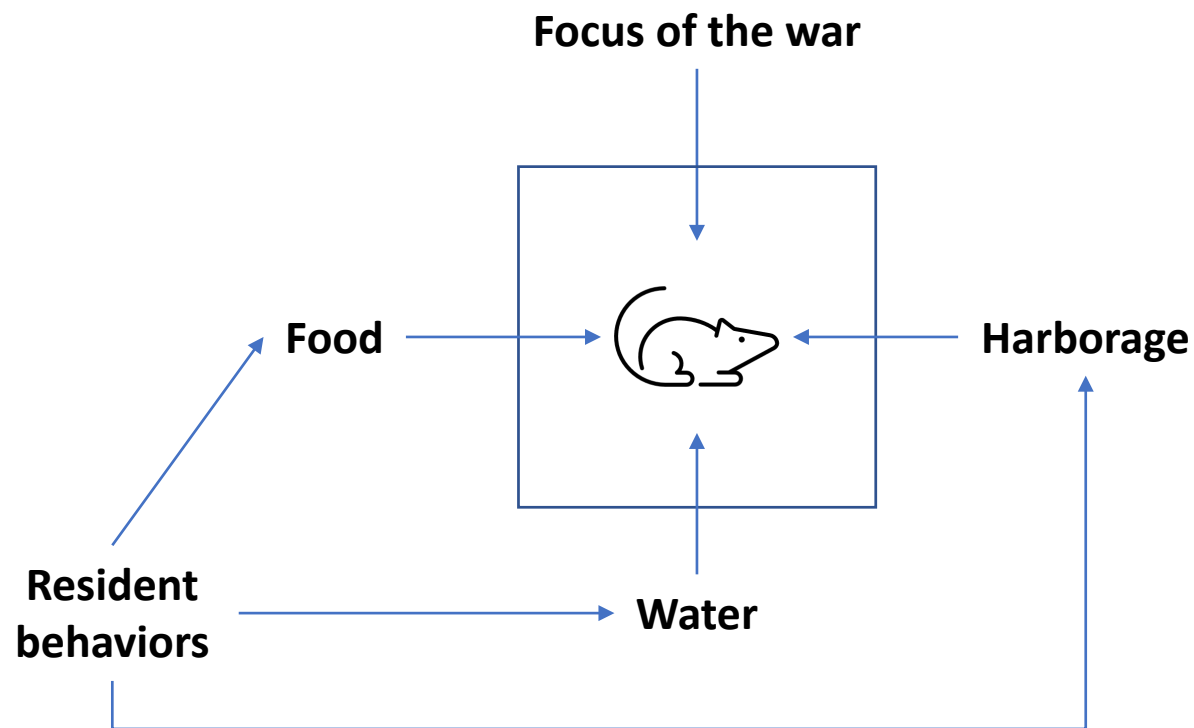
The war only addresses one component of a more complex system





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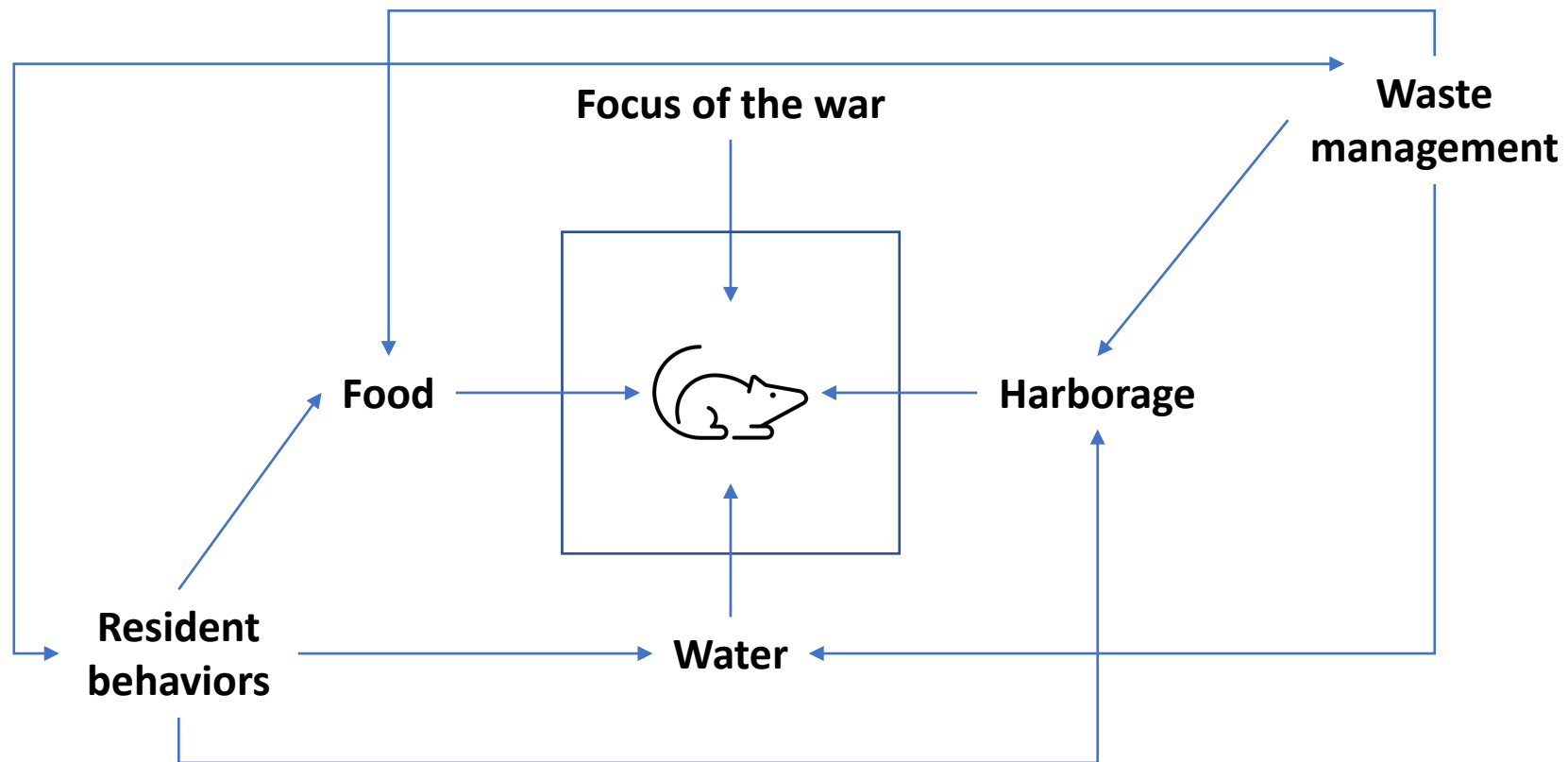
- Inhibited by barriers outside the rat focus





The war only addresses one component of a more complex system

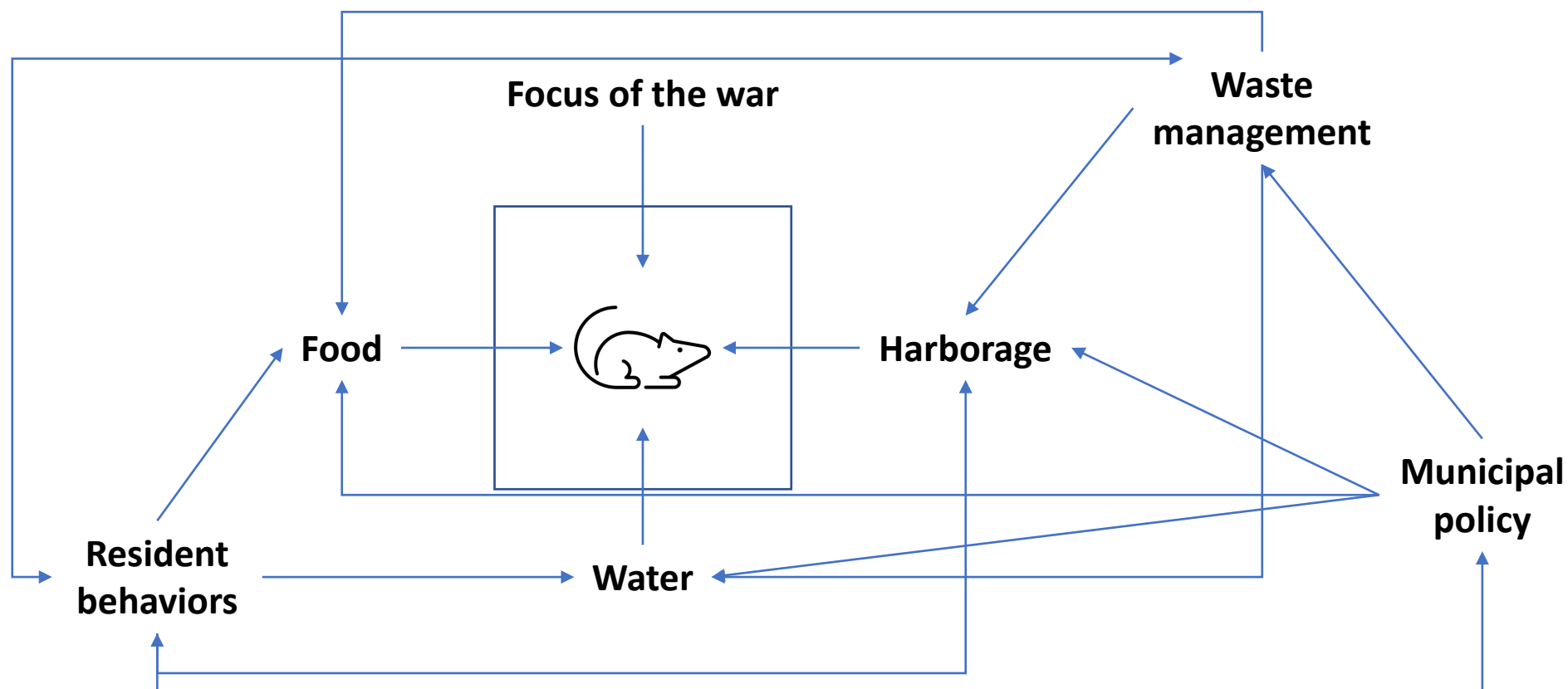
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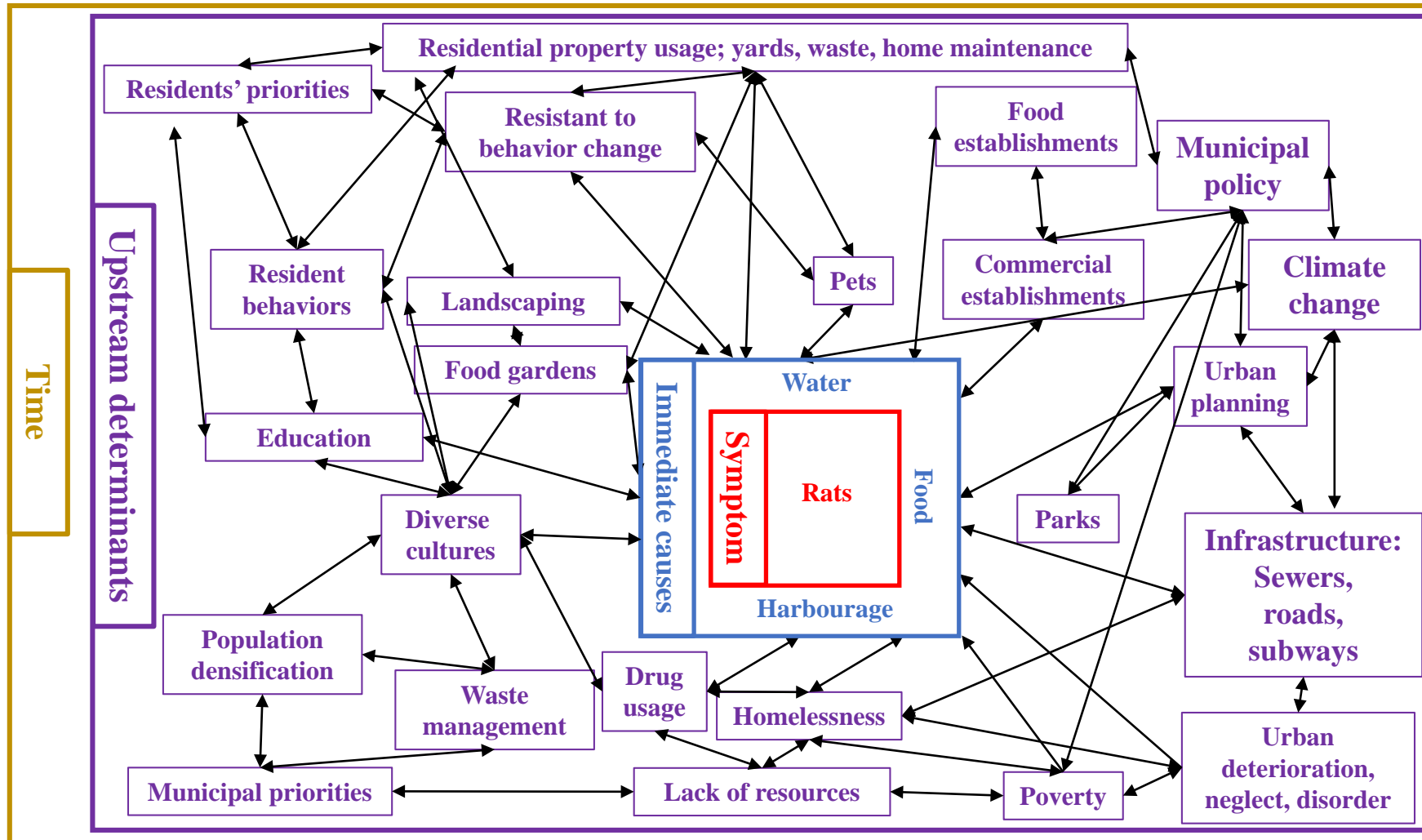
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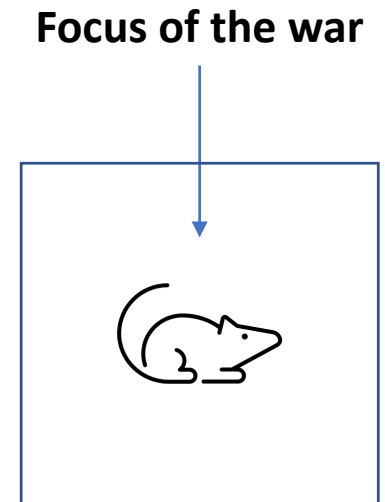
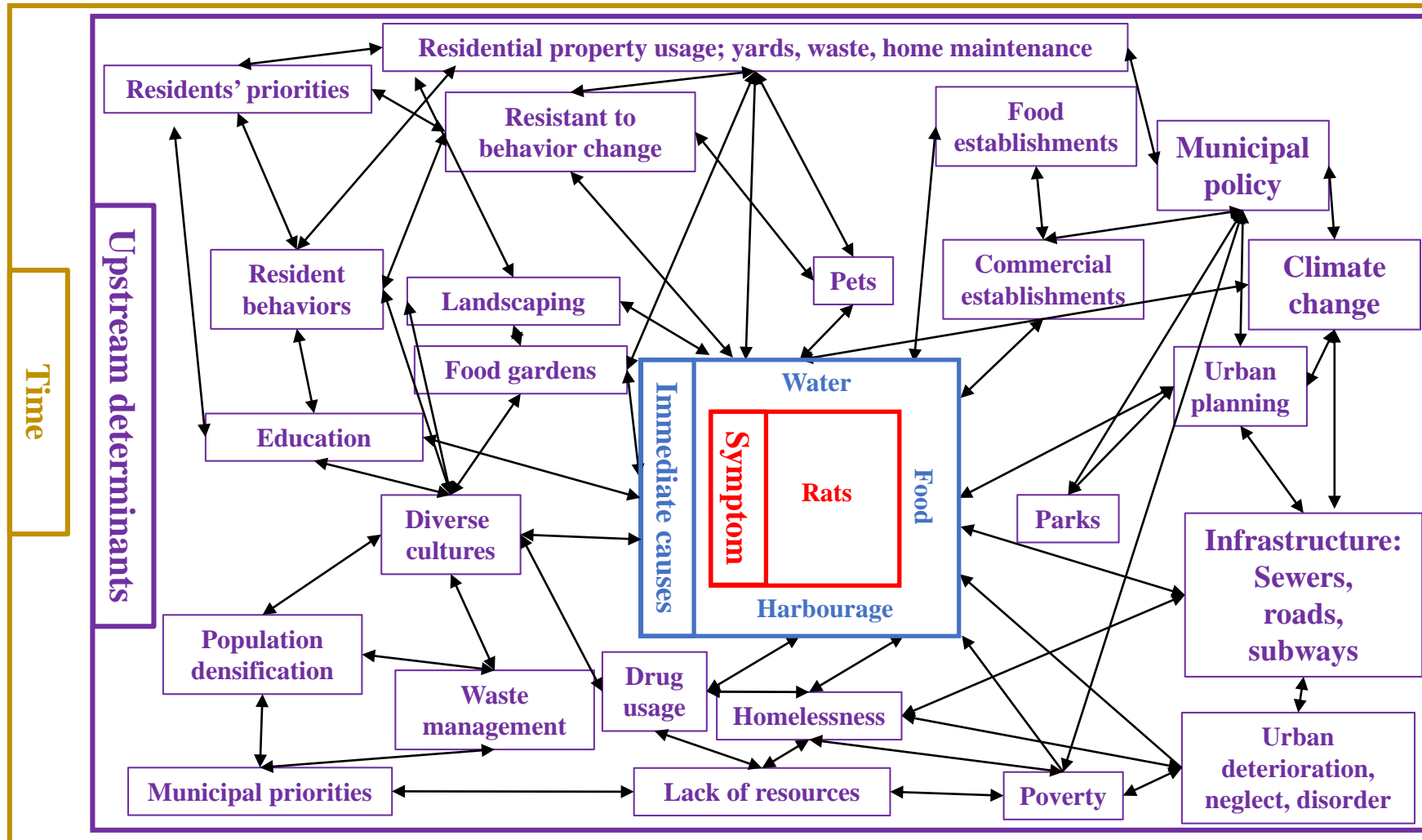


The war likely cannot be won





The war likely cannot be won

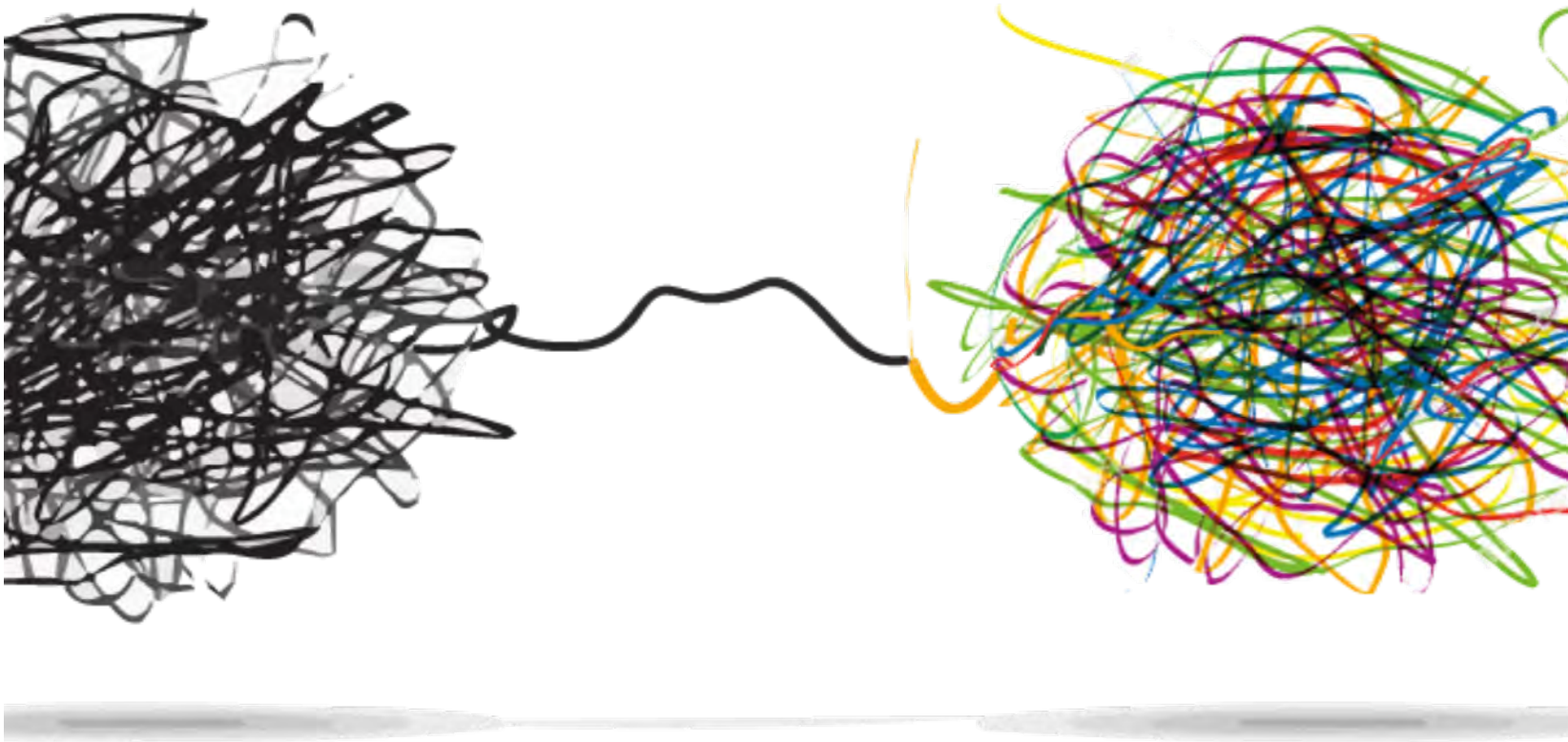




Step 3:
**Explore and describe
emergent ideas and themes
that arose from comparing
across sources**



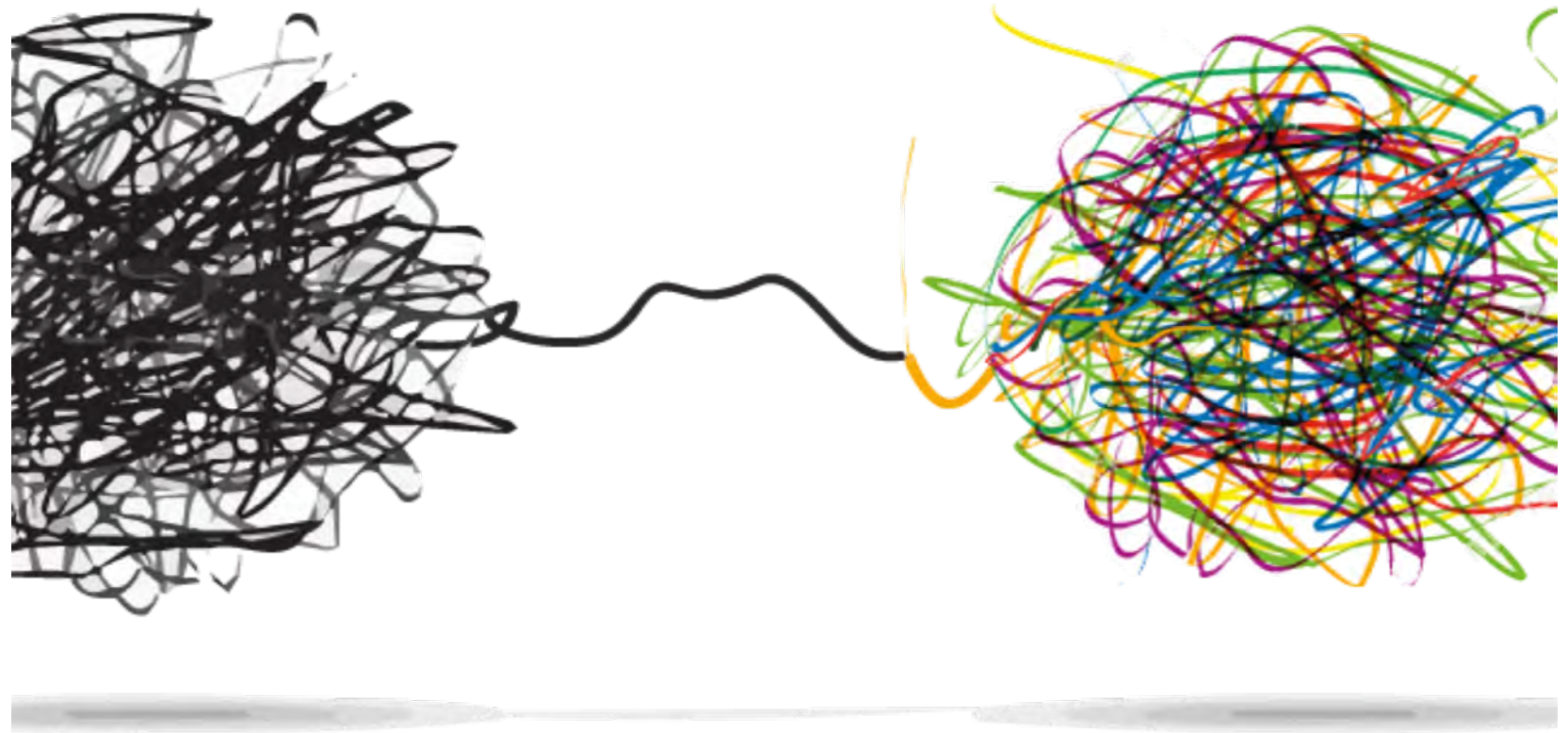
Wicked Problems





Wicked Problems

Rittel & Webber 1973

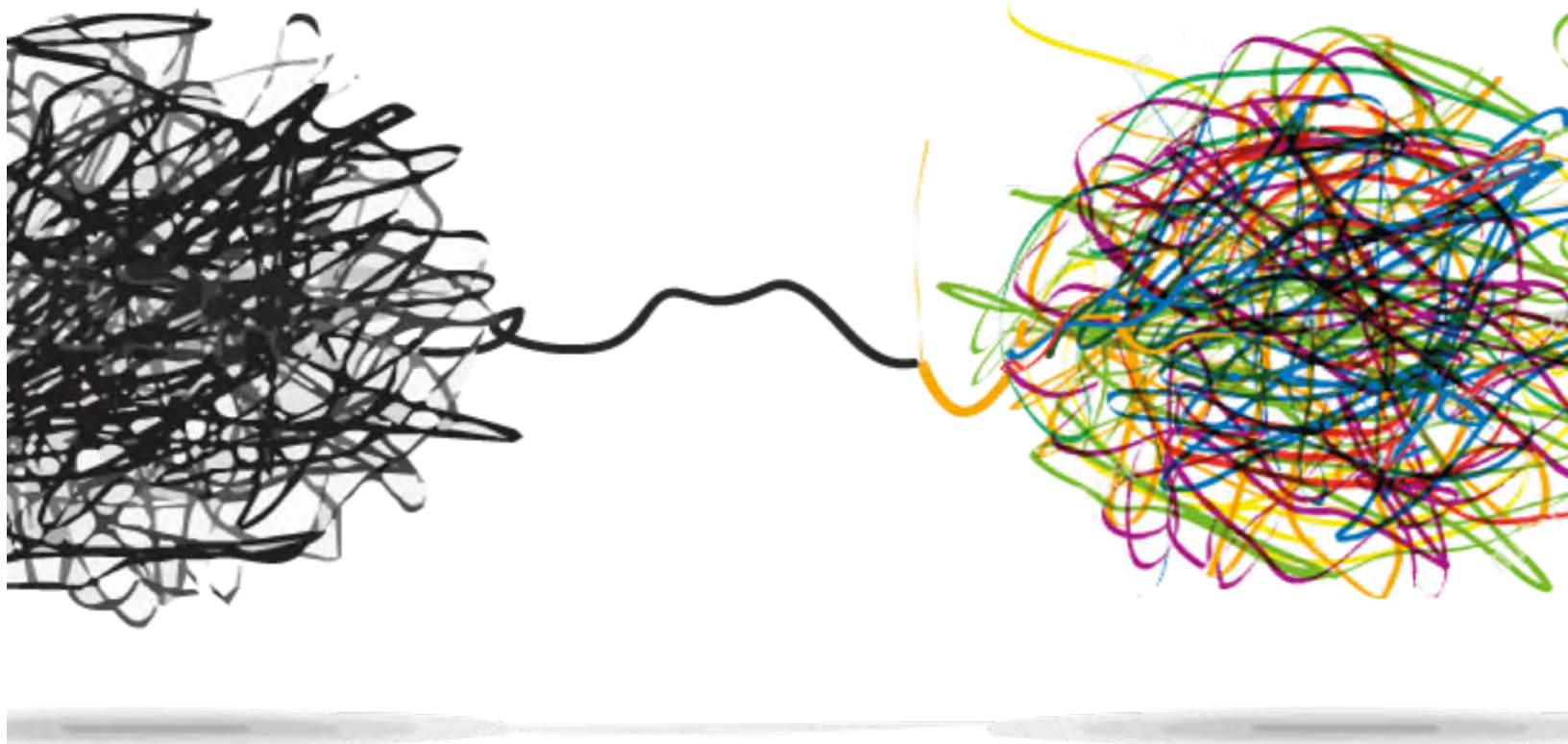




Wicked Problems

Rittel & Webber 1973

- 10 criteria that make these problems intractable





Rat Management is a Wicked Problem

✓ Solutions are not right or wrong but good or bad

Good



Bad



Very Bad

EMERGING INFECTIOUS DISEASES®

EID Journal > Volume 24 > Number 2—February 2018 > Main Article

Volume 24, Number 2—February 2018

Dispatch

Effects of Culling on *Leptospira interrogans* Carriage by Rats

Michael J. Lee, Kaylee A. Byers, Christina M. Donovan, Julie J. Bidulka, Craig Stephen, David M. Patrick, and Chelsea G. Himsworth

Author affiliations: The University of British Columbia, Vancouver, British Columbia, Canada (M.J. Lee, K.A. Byers, C.M. Donovan, D.M. Patrick, C.G. Himsworth); Canadian Wildlife Health Cooperative, Abbotsford, British Columbia, Canada (M.J. Lee, K.A. Byers, C. Stephen, C.G. Himsworth); British Columbia Ministry of Agriculture, Abbotsford (J.J. Bidulka, C.G. Himsworth); University of Saskatchewan, Saskatoon, Saskatchewan, Canada (C. Stephen); British Columbia Centre for Disease Control, Vancouver (D.M. Patrick)



Rat Management is a Wicked Problem

- ✓ Solutions are not right or wrong but good or bad
- ✓ No stopping rule
- ✓ No definitive formulation
- ✓ Every wicked problem is essentially unique
- ✓ Every wicked problem is the symptom of another problem
- ✓ No immediate or ultimate test of a solution to a wicked problem
- ✓ Manager has no right to be wrong
- ✓ Every solution is a one shot operation, no opportunity to learn by trial and error
- ✓ Every discrepancy representing a wicked problem can be defined numerous ways and the choice of definition determines the nature of the solution and the choice depends upon worldview of the problem
- ✓ No definable set of potential solutions or well defined set of permissible operations



Reconceptualizing municipal rats as wicked

1. No single definition of a 'municipal rat problem'





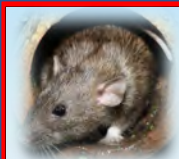
Reconceptualizing municipal rats as wicked

1. No single definition of a 'municipal rat problem'
2. No ultimate solution that addresses the problem for all stakeholders



Differing contexts
in which people
interact with rats





**Step 4:
Draw conclusions and make recommendations
relevant to the research question**

**SO
WHAT NOW?**



Shift the perspective

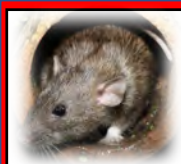
War-on-rats approach

1) **A single problem**

Wicked approach

1) **Many problem definitions**





Shift the perspective

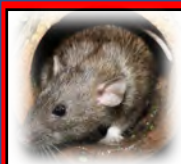
War-on-rats approach

- 1) A single problem
- 2) **The problem is solvable**



Wicked approach

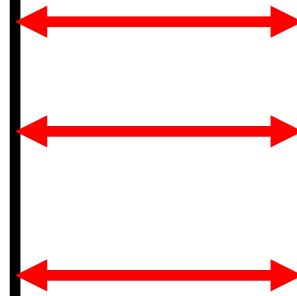
- 1) Many problem definitions
- 2) **No ultimate solution**



Shift the perspective

War-on-rats approach

- 1) A single problem
- 2) The problem is solvable
- 3) Complexity can be addressed by solving each FWAH cause**



Wicked approach

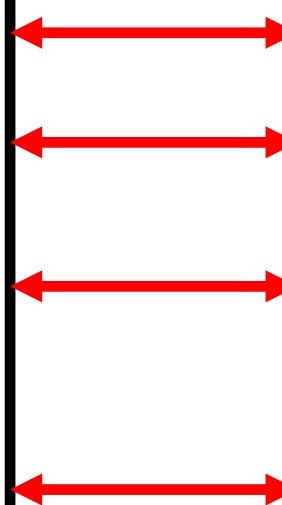
- 1) Many problem definitions
- 2) No ultimate solution
- 3) Comprised of a complex open system**



Shift the perspective

War-on-rats approach

- 1) A single problem
- 2) The problem is solvable
- 3) Complexity can be addressed by solving each FWAH cause
- 4) **Does not account for varying perspectives of the problem**



Wicked approach

- 1) Many problem definitions
- 2) No ultimate solution
- 3) Comprised of a complex open system
- 4) **Perspectives & priorities shift with position in system**



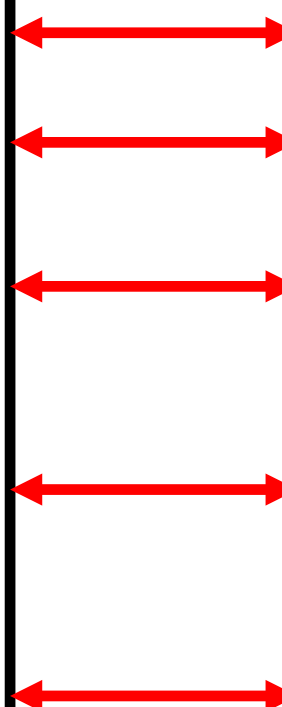
Shift the perspective

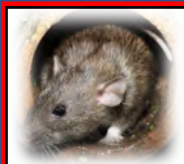
War-on-rats approach

- 1) A single problem
- 2) The problem is solvable
- 3) Complexity can be addressed by solving each FWAH cause
- 4) Does not account for varying perspectives of the problem
- 5) **Low priority = Low resources**

Wicked approach

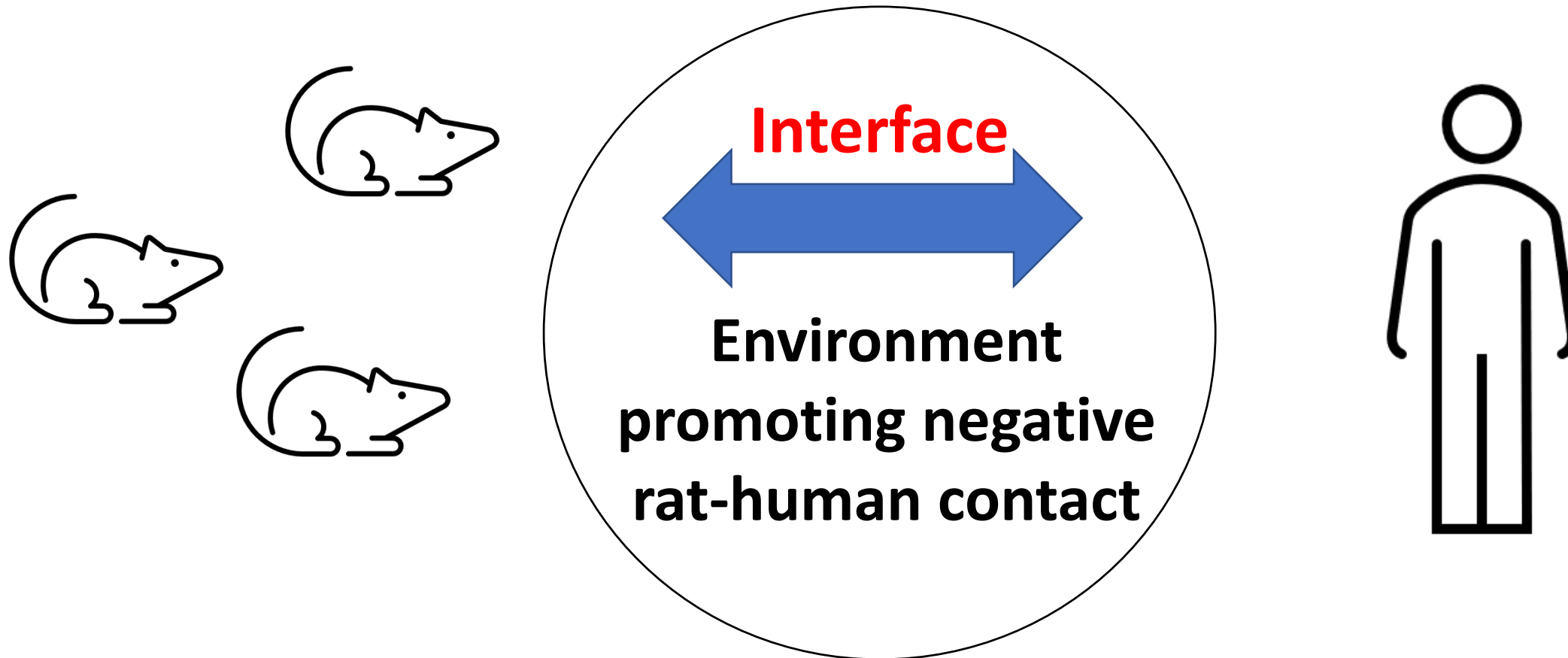
- 1) Many problem definitions
- 2) No ultimate solution
- 3) Comprised of a complex open system
- 4) Perspectives & priorities shift with position in system
- 5) **Must account for stakeholder priorities**

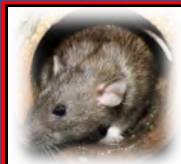




Reconceptualize the problem

Refocus on interfaces





Reconceptualize the problem

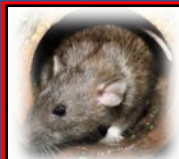
Refocus on interfaces

Sewer Rats



War-on-rats approach

1. Rats in sewers are a problem
2. Hang rodenticide



Reconceptualize the problem

Refocus on interfaces

Sewer Rats

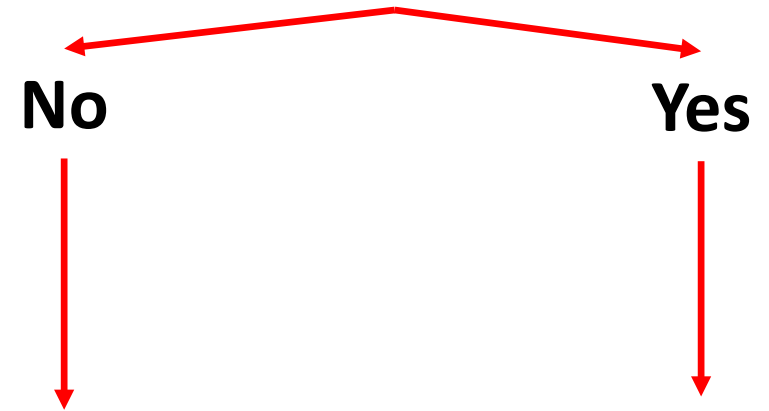


War-on-rats approach

1. Rats in sewers are a problem
2. Hang rodenticide

An interface approach

1. Is there an interface with people?



A. Presence is acceptable

- A. How?
- B. Where?
- C. Modify interface








The Vancouver Rat Project is doing this work.

Urban Ecosystems

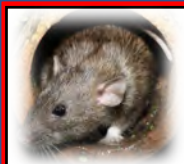
<https://doi.org/10.1007/s11252-022-01255-2>



Characteristics of the urban sewer system and rat presence in Seattle

Xiacong Guo¹  · Michael J. Lee^{1,2}  · Kaylee A. Byers^{1,2}  · Leah Helms³ · Kate R. Weinberger¹  ·
Chelsea G. Himsworth^{1,2,4} 

Accepted: 7 June 2022

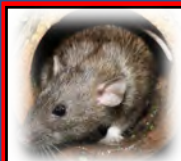


Address interfaces in the context of a wicked problem

Wicked bad paralysis

(figuratively speaking)



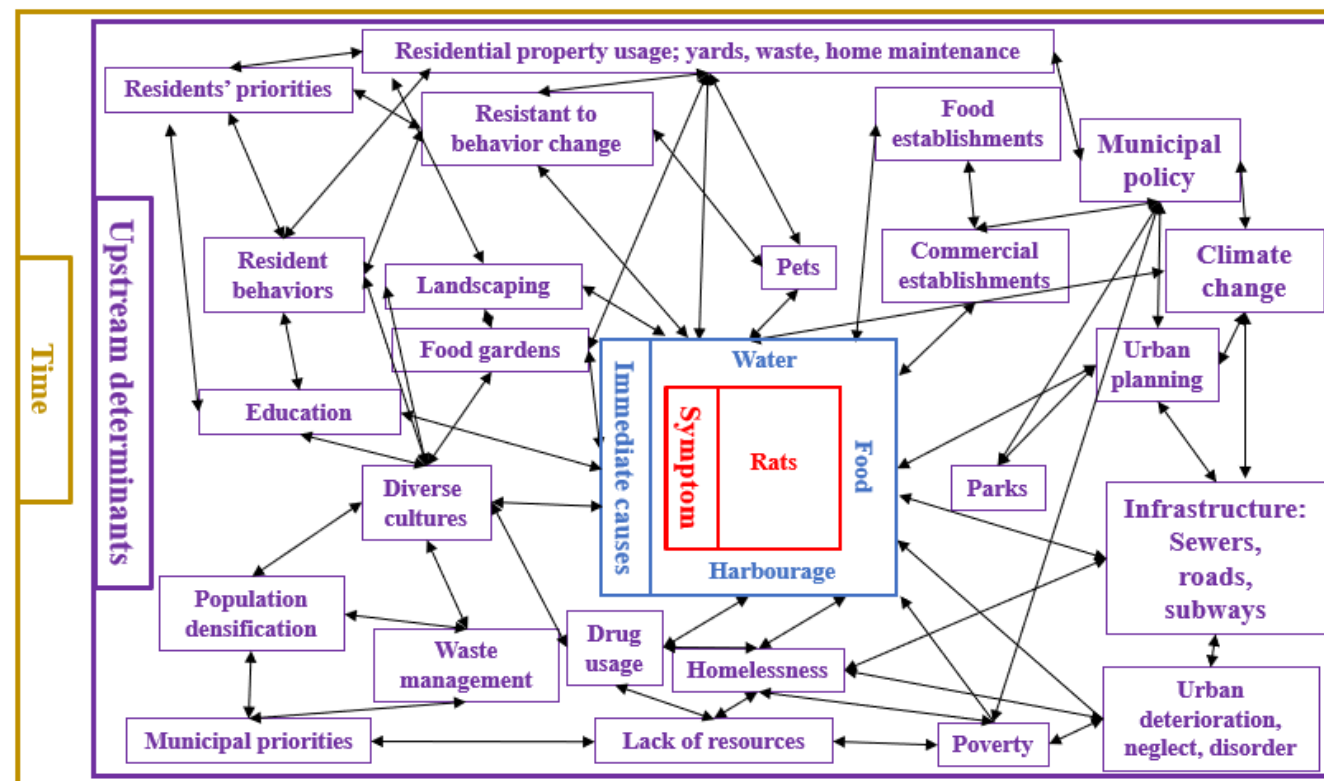


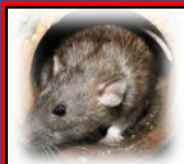
Address interfaces in the context of a wicked problem

Wicked bad paralysis

(figuratively speaking)

- Overwhelming number of interfaces



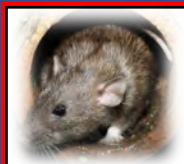


Address wicked bad paralysis

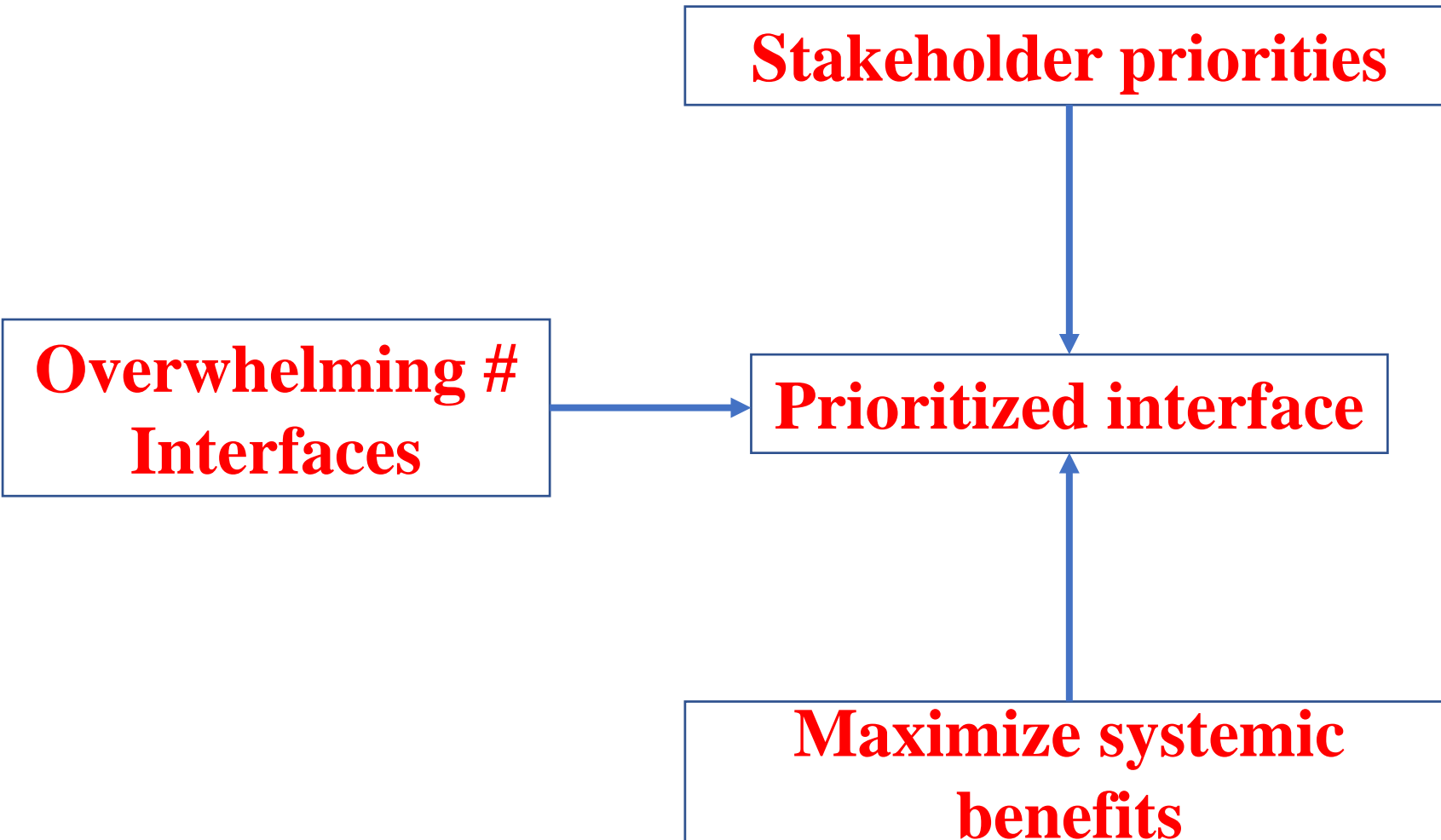
**Overwhelming #
Interfaces**



Prioritized interface

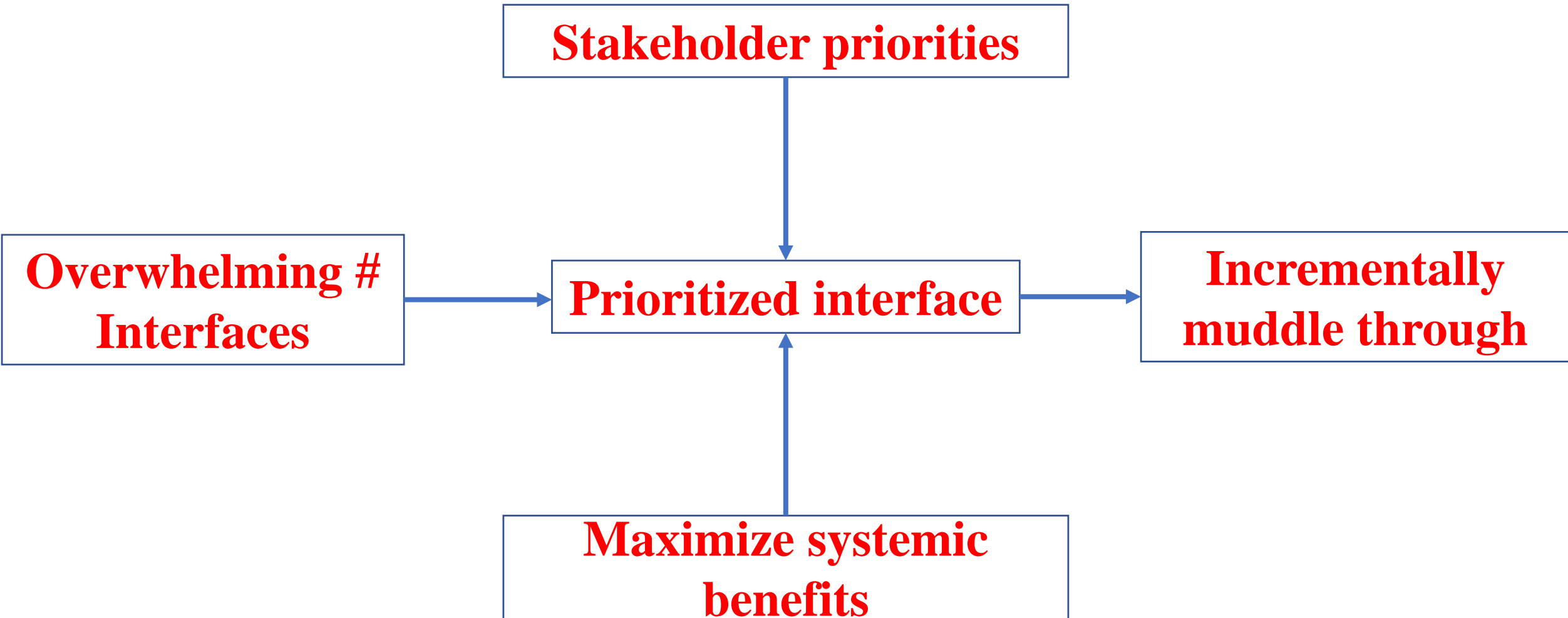


Address wicked bad paralysis





Address wicked bad paralysis



Address wicked bad paralysis



Stakeholder priorities

**Overwhelming #
Interfaces**

Prioritized interface

**Incrementally
muddle through**

**Maximize systemic
benefits**



Summary & Conclusions

- **Urban rats need to be managed**



Summary & Conclusions

- Urban rats need to be managed
- **Current approach is not working**



Summary & Conclusions

- Urban rats need to be managed
- Current approach is not working
- Current approach is too myopic



Summary & Conclusions

- Urban rats need to be managed
- Current approach is not working
- Current approach is too myopic
- **Must recognize that municipal rat problems are unsolvable because they are part of complex systems**



Summary & Conclusions

- Urban rats need to be managed
- Current approach is not working
- Current approach is too myopic
- Must recognize that municipal rat problems are unsolvable because they are part of complex systems
- **Only by NOT trying to solve ‘the problem’ can we start to make progress**

Questions ...

The research team

Kaylee Byers

Chelsea Himsworth

Craig Stephen

Susan Cox

David Patrick

Robert Corrigan

