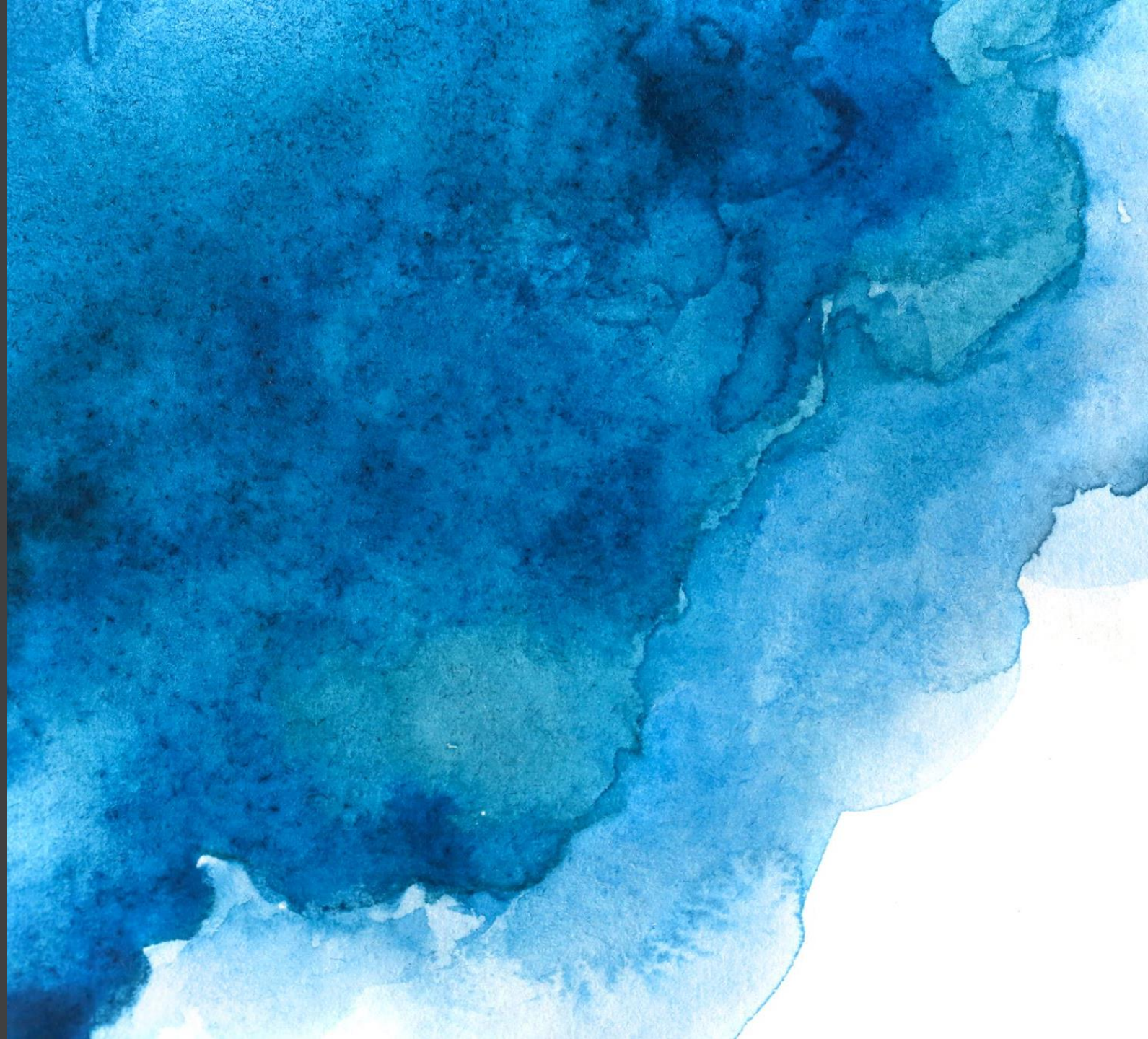


Urban Riverscapes: Policy, Science, and Storytelling

Dr. Brian Murphy
SUSE 6
May 31, 2023



Urban riverscapes

- Stream channels, floodplains, biotic communities, and **anthropogenic features**
- **Complex systems** – social-ecological, hydrogeomorphic, and physicochemical
- Local communities often maintain **strong social interconnections** with urban riverscapes

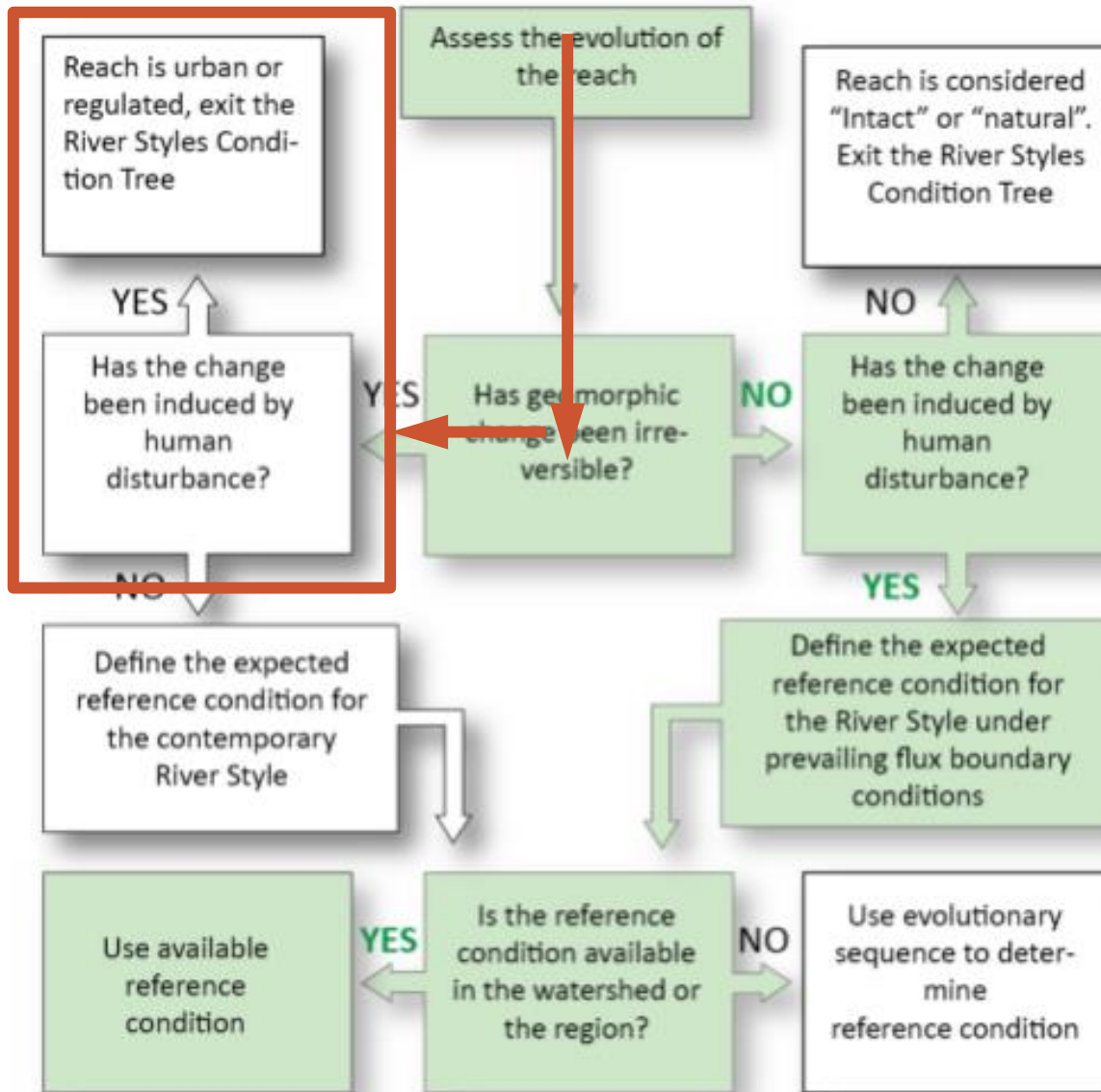


Riverscape Lens

- **Four facets**
- **Interconnections**
- **Human Connections & Values**



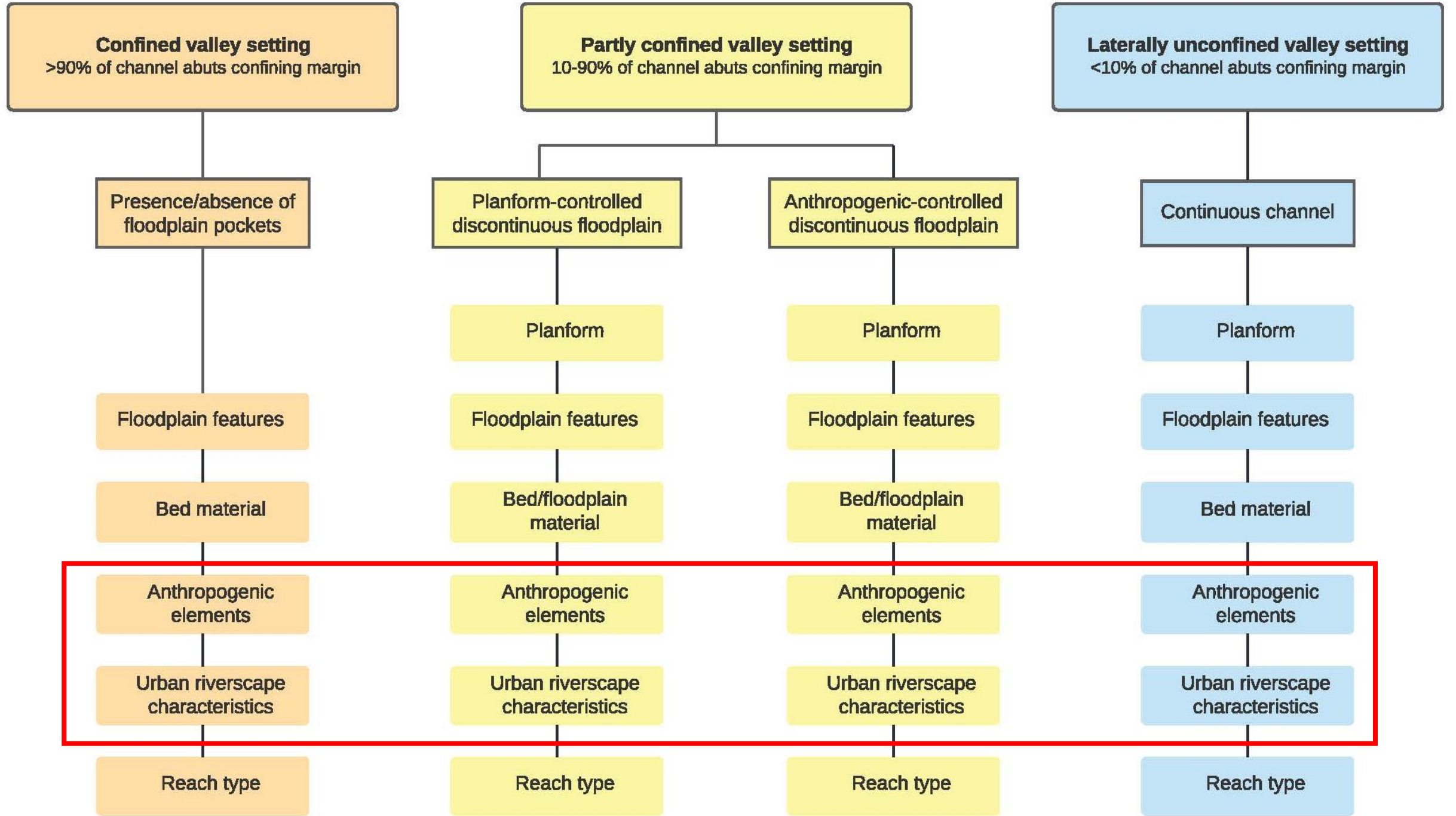
River Styles®



Brierley and Fryirs 2005

Four fundamental principles:

1. Respect stream diversity
2. Work with stream dynamics and change
3. Work with linkages to biophysical processes
4. Use geomorphology as an integrative physical template for river management activities

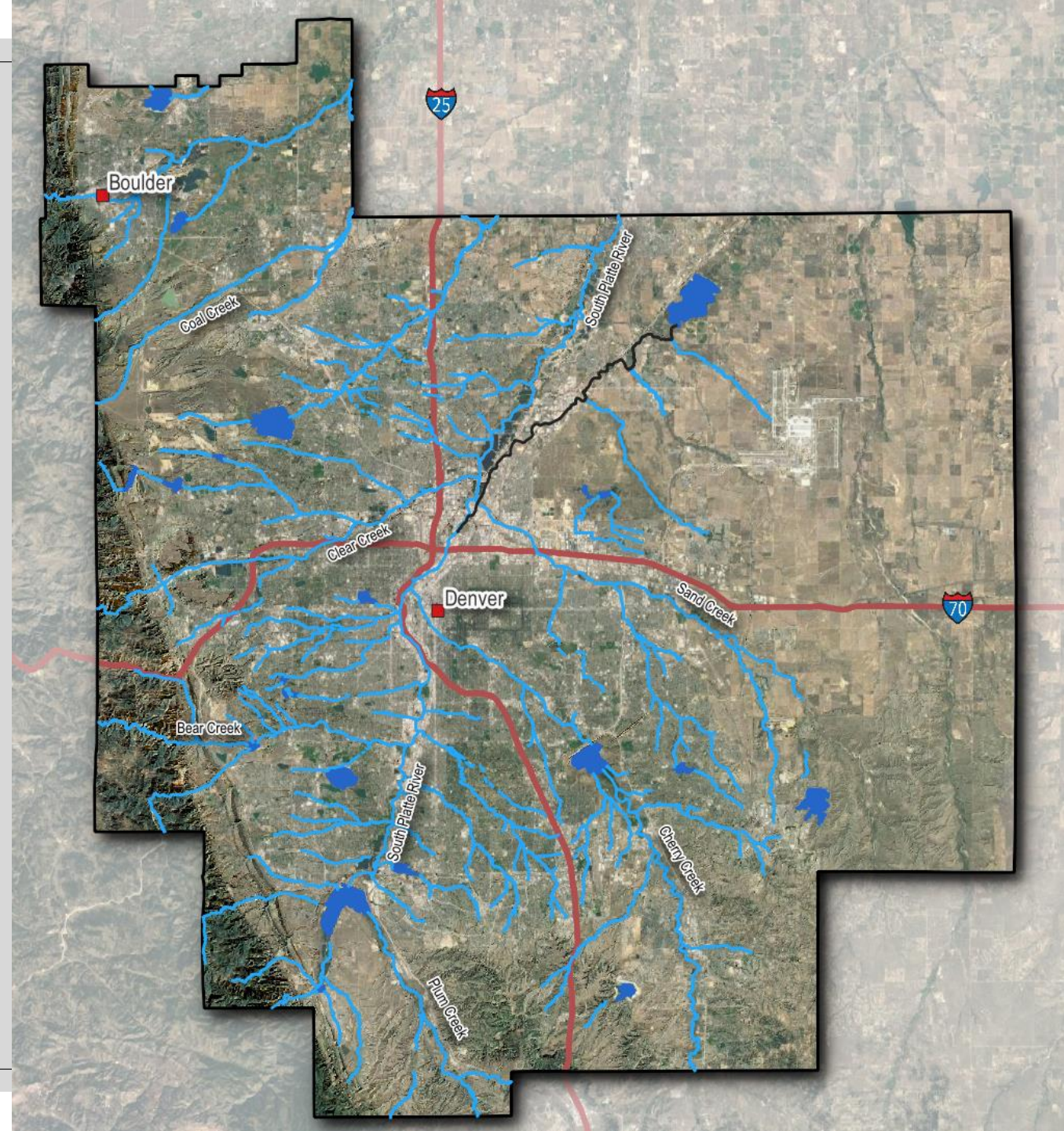


Urban Characteristics

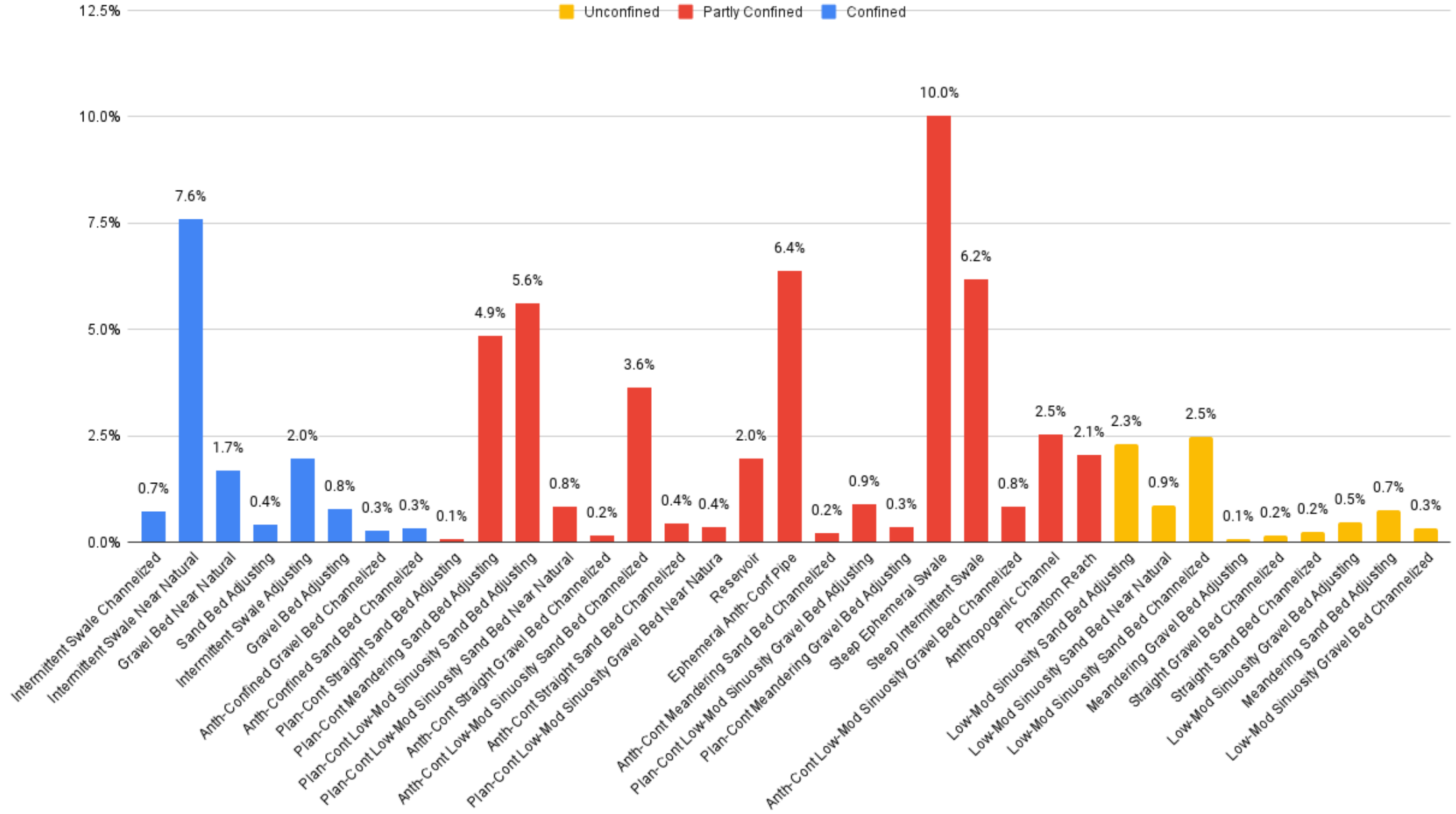
| Urban reach type naming conventions | Management strategy |
|--|--|
| 1 Near Natural | Conservation reach |
| 2 Adjusting but could recover naturally | Strategic reach or connected reach with high recovery potential |
| 3 Adjusting – unable to recover naturally | Strategic reach or connected reach with high recovery potential |
| 4 Channelized – channel altered | Moderate priority reach with moderate recovery potential or isolated reach with high recovery potential |
| 5 Channelized – channel partially engineered | Moderate priority reach with moderate recovery potential |
| 6 Channelized – channel completely engineered | Low priority with poor recovery potential |
| 7 Channelized - enclosed | Low priority with poor recovery potential |

Denver, CO USA

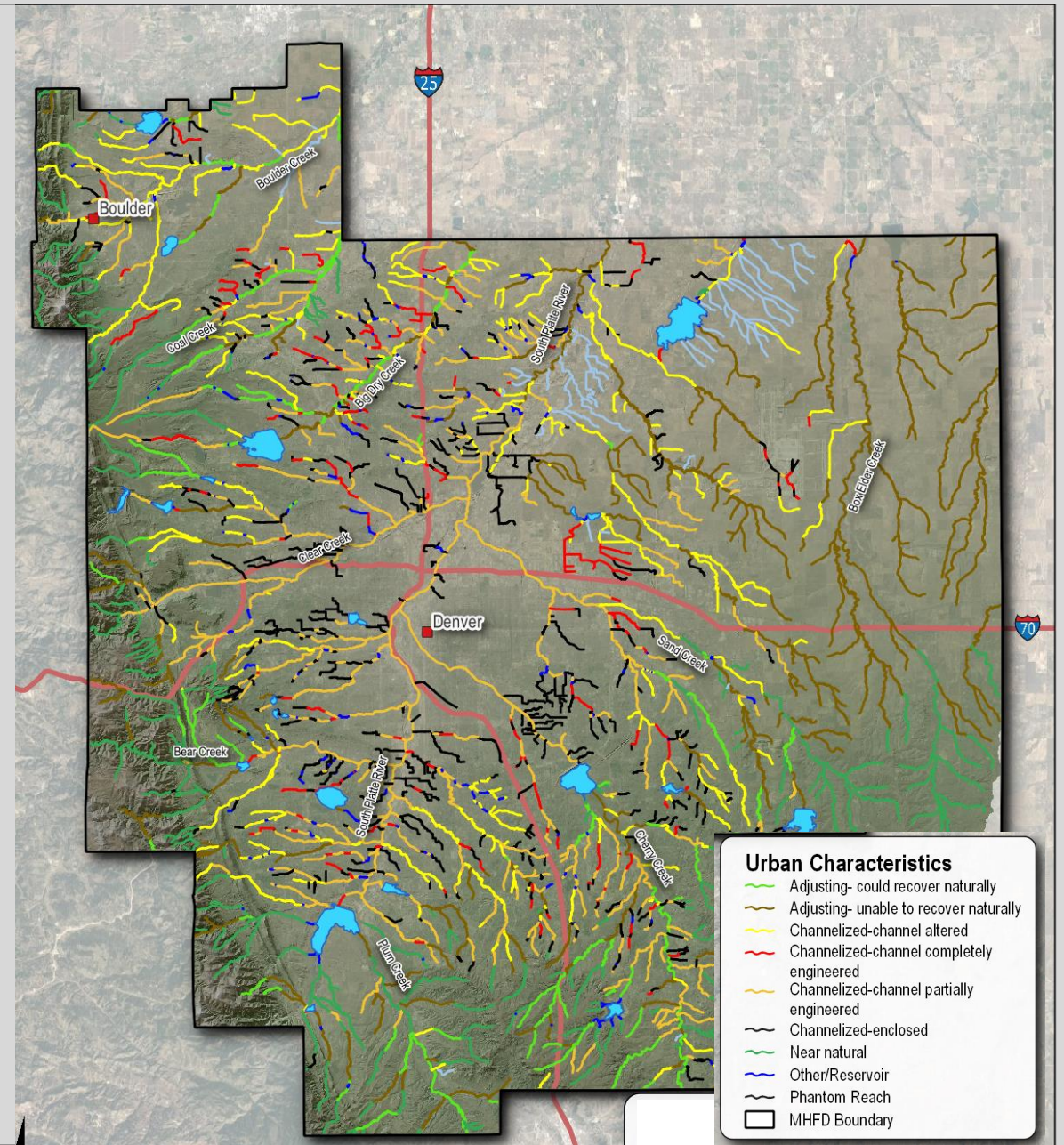
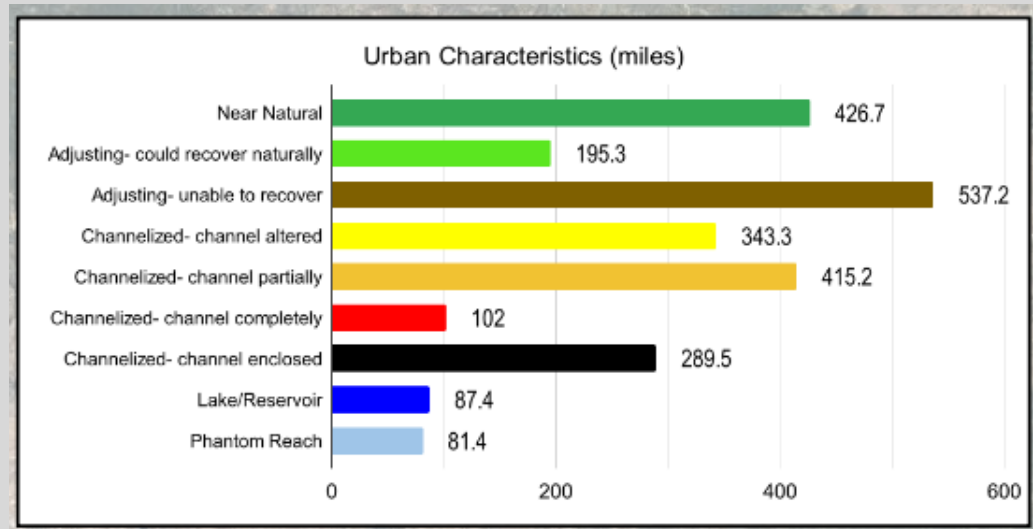
- **Population of Denver is 2,931,000 (2023)**
- **Mile High Flood District**
 - 6 surrounding counties
 - 33 incorporated cities and towns
- **1600 square miles (4,150 sq km)**



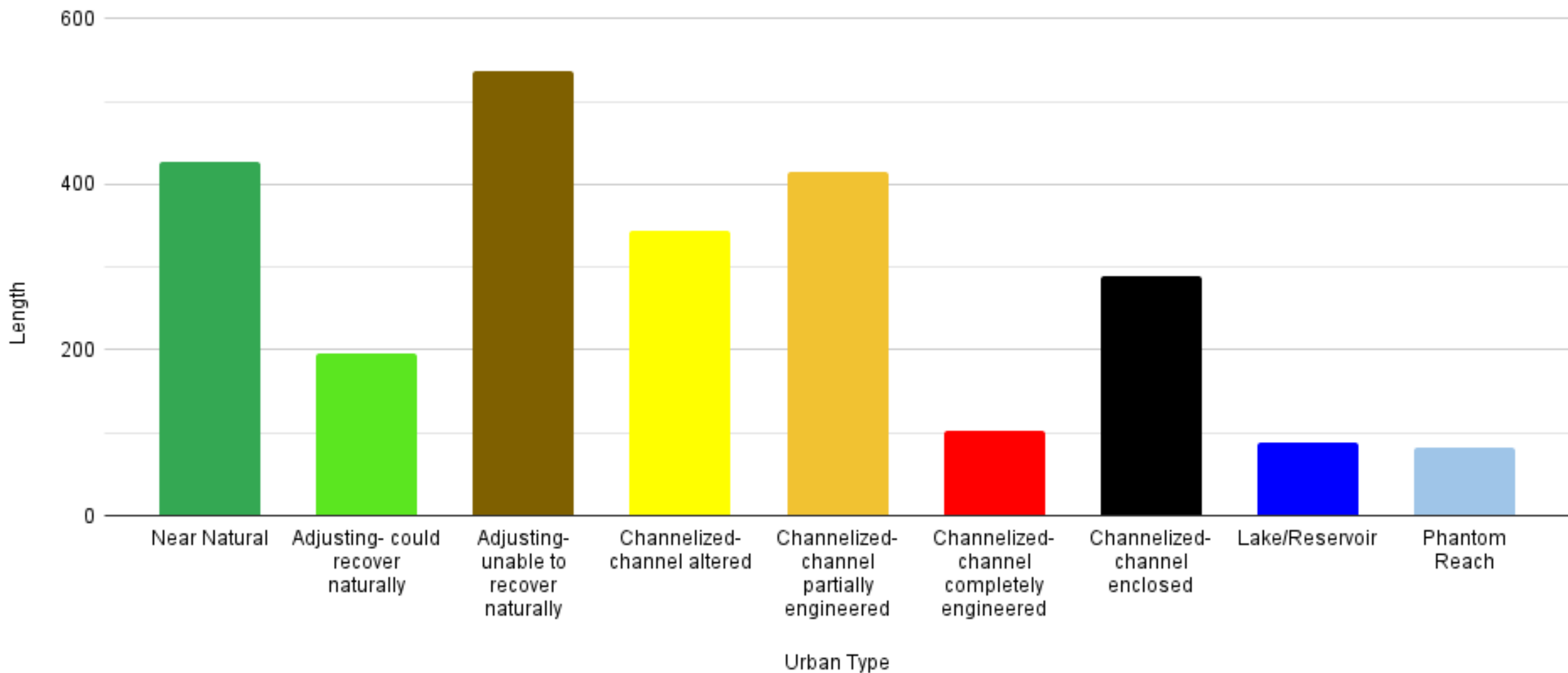
Percent of Entire Network



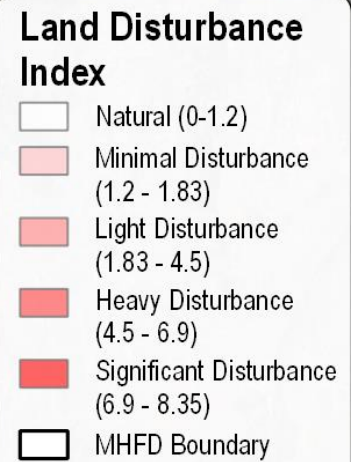
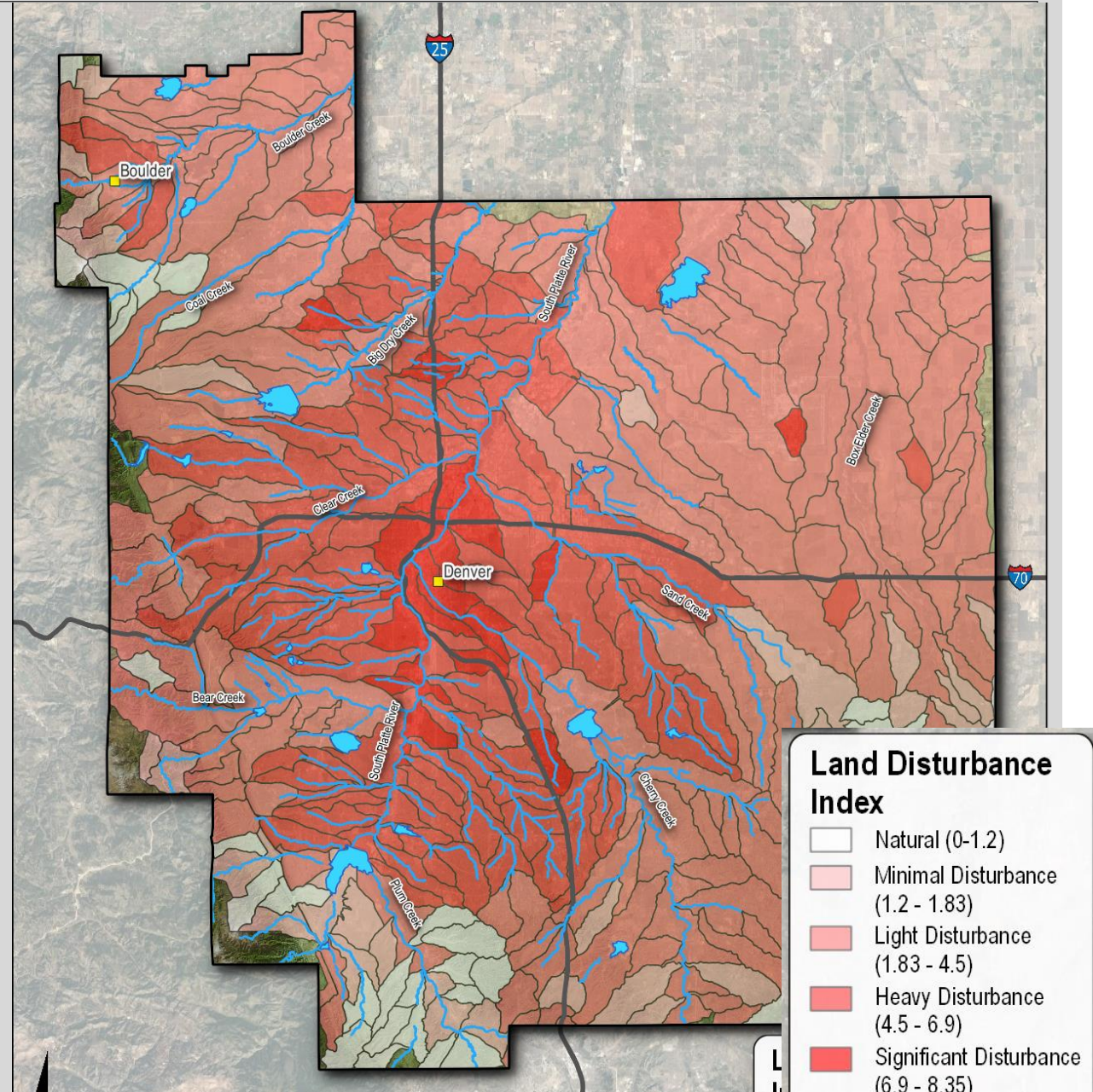
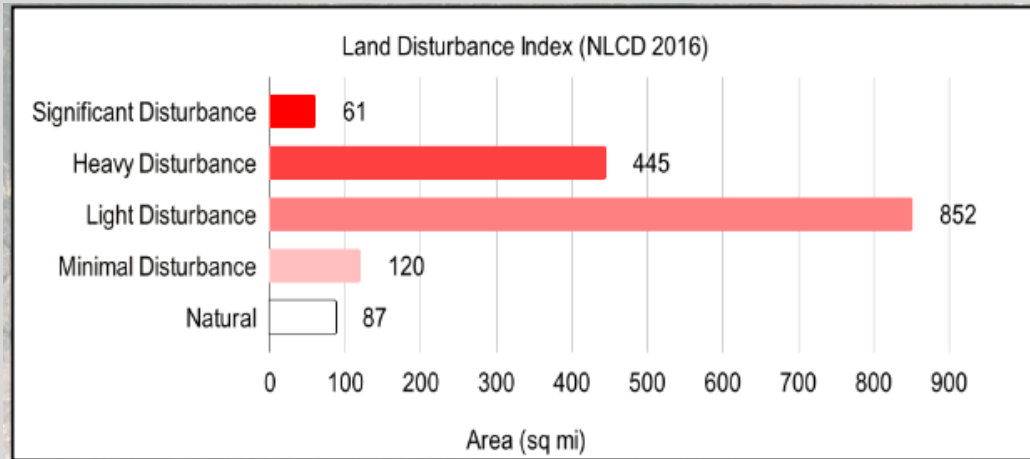
Urban Stream Characteristics



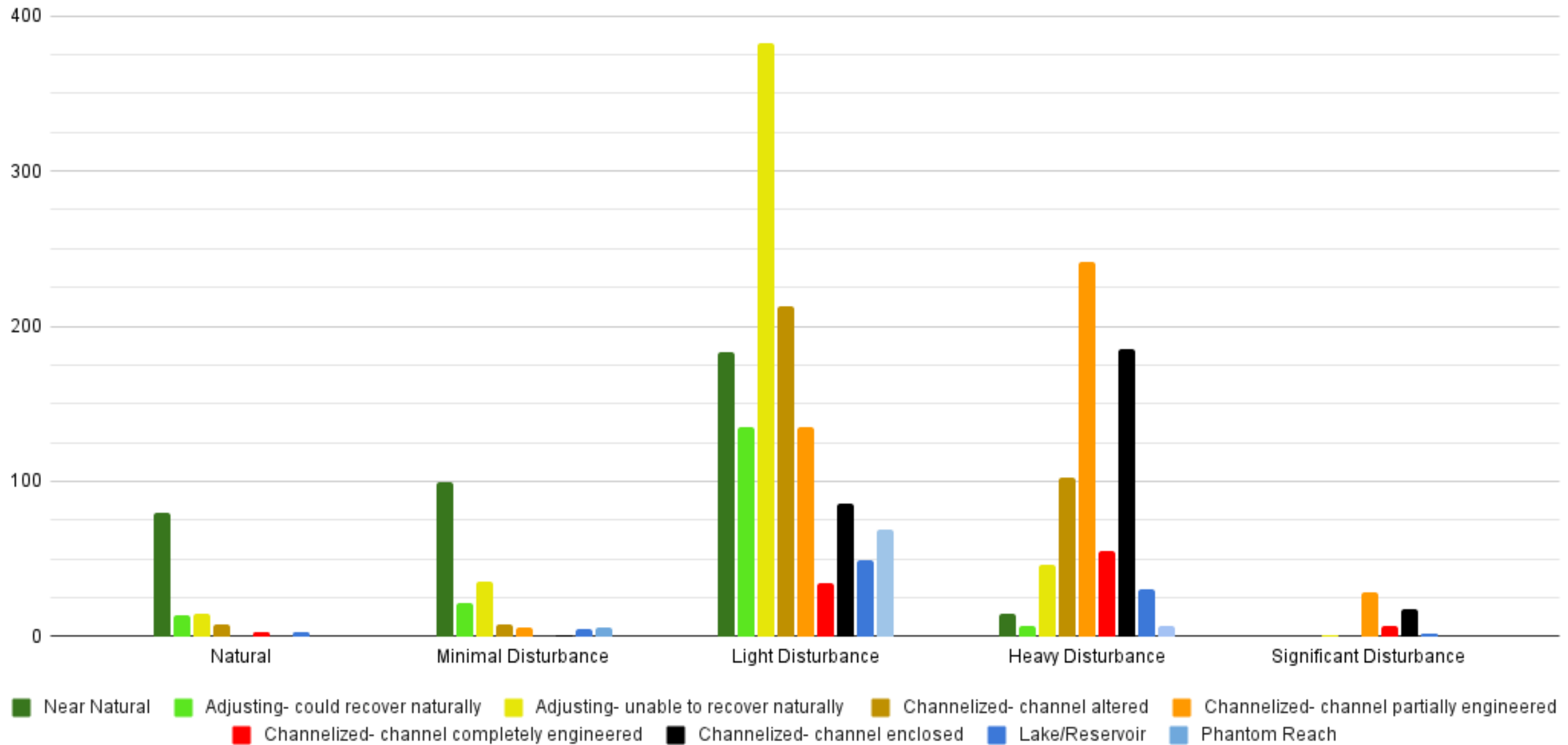
Urban Stream Characteristics (Stream Miles)



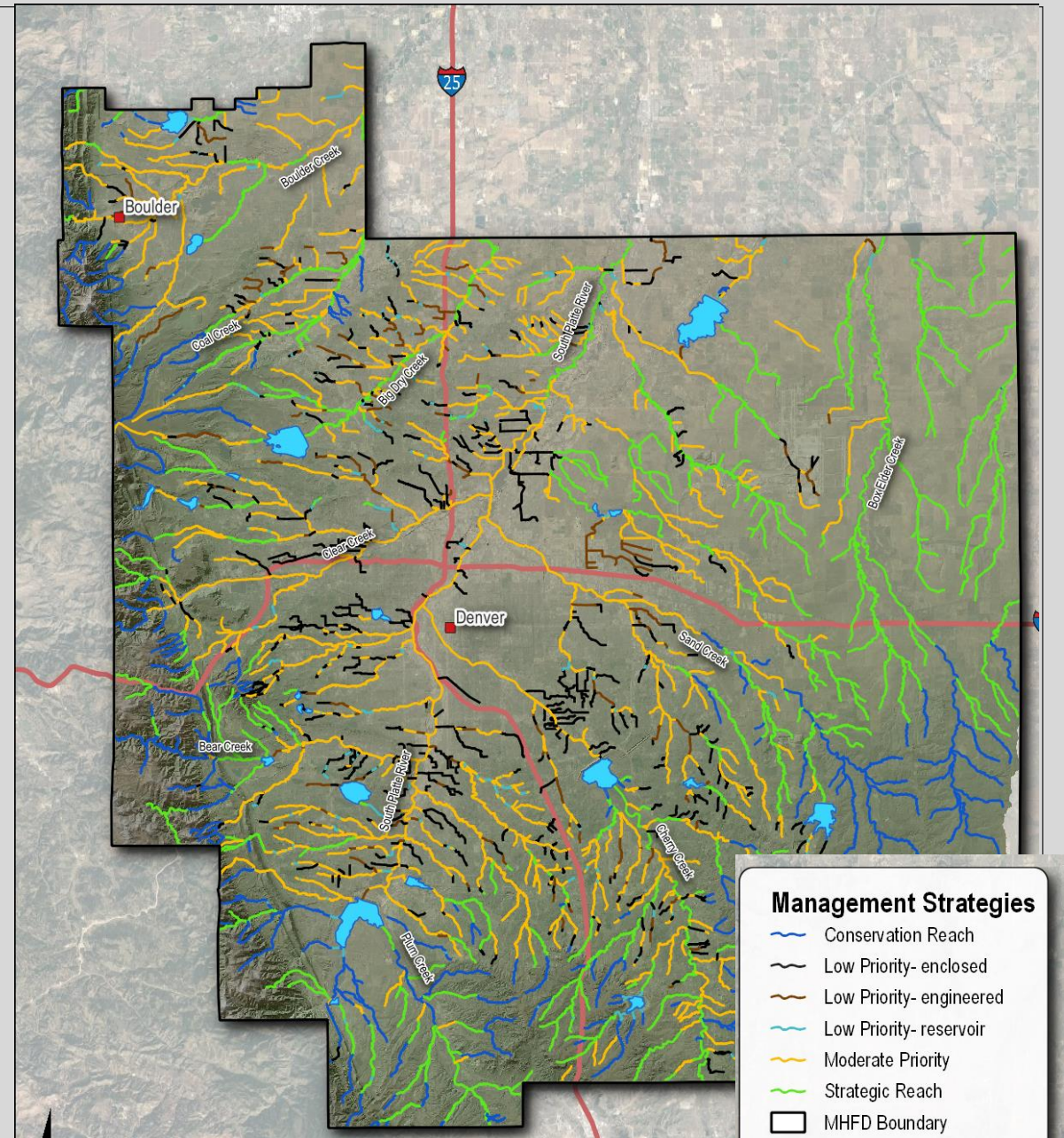
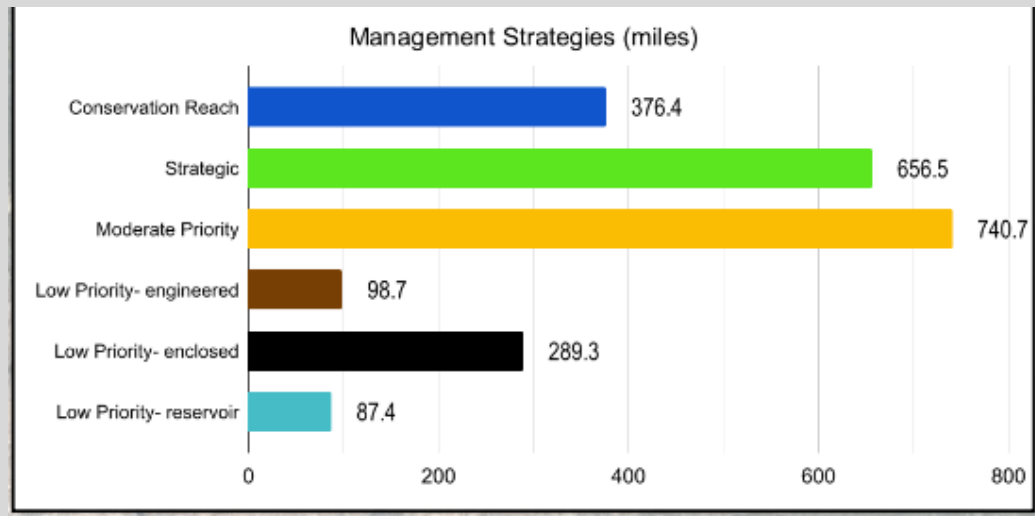
LAND DEVELOPMENT INTENSITY (LDI) INDEX



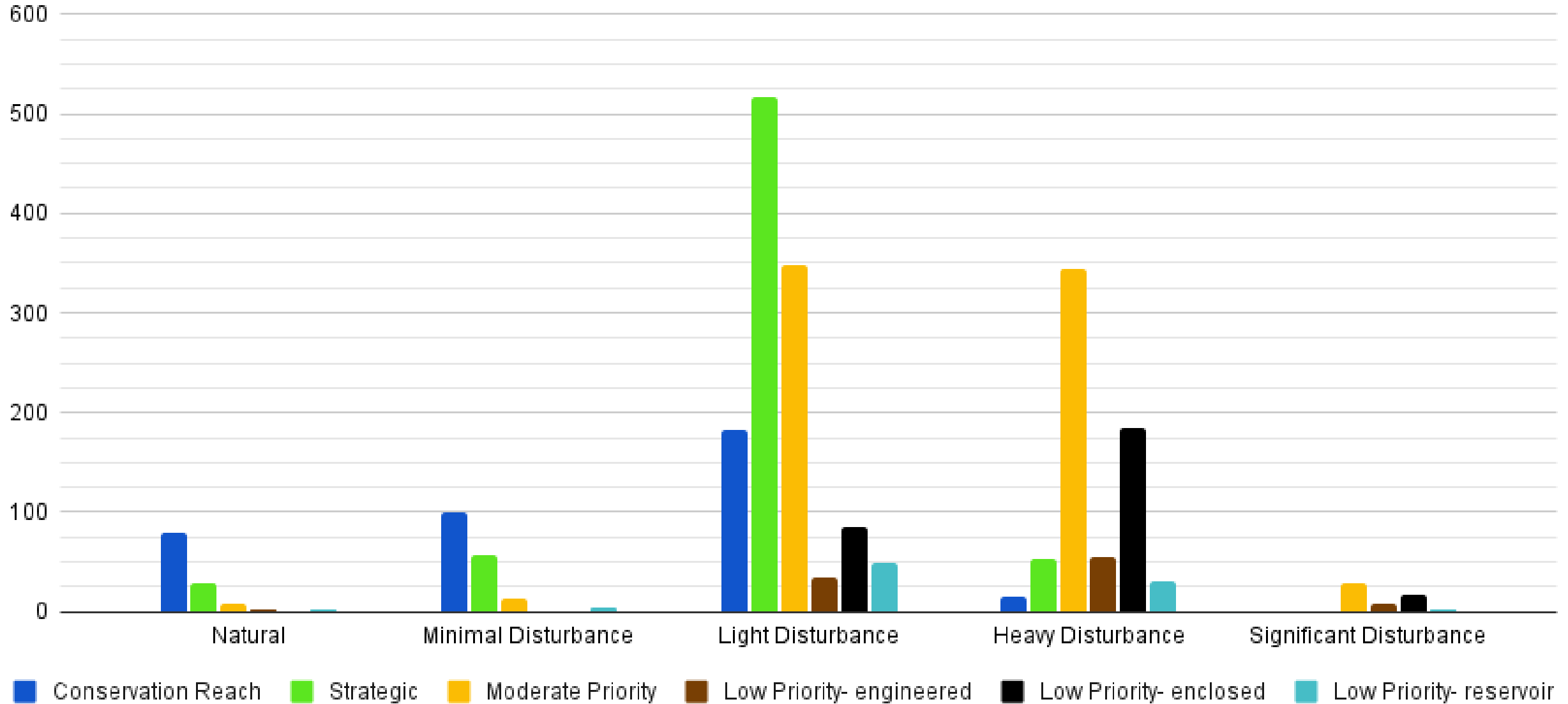
LDI Index (2016 NLCD) & Urban Characteristics (Stream Miles)



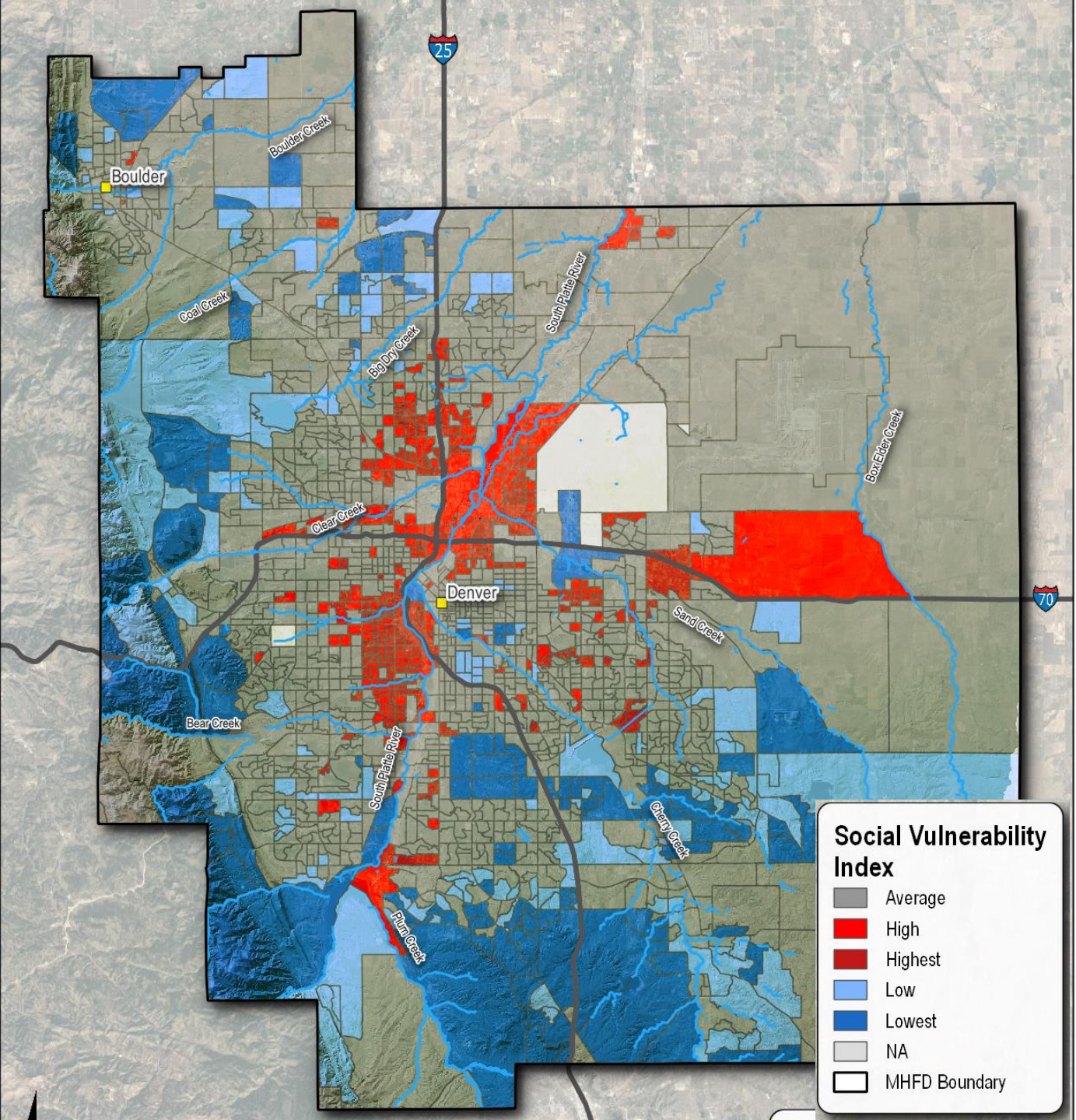
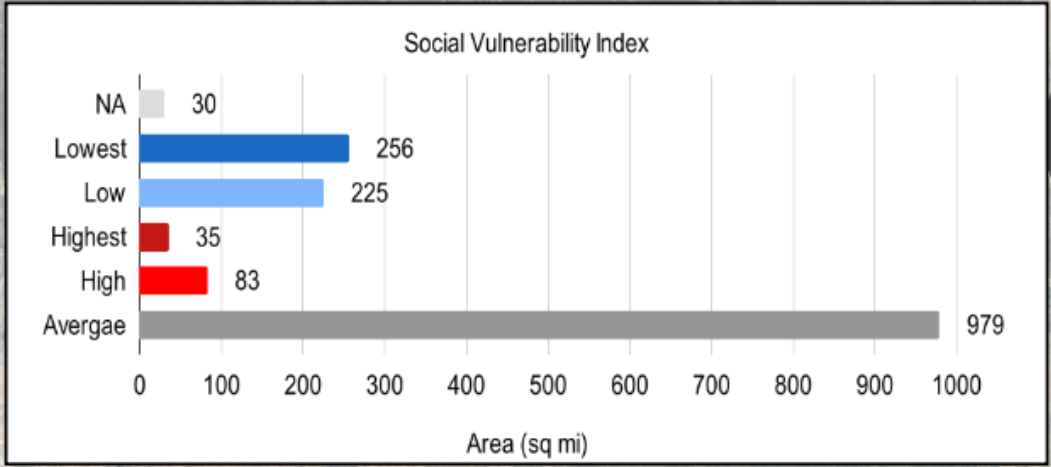
Management Strategies



LDI Index (NLCD 2016) & Management Strategies (Stream Miles)

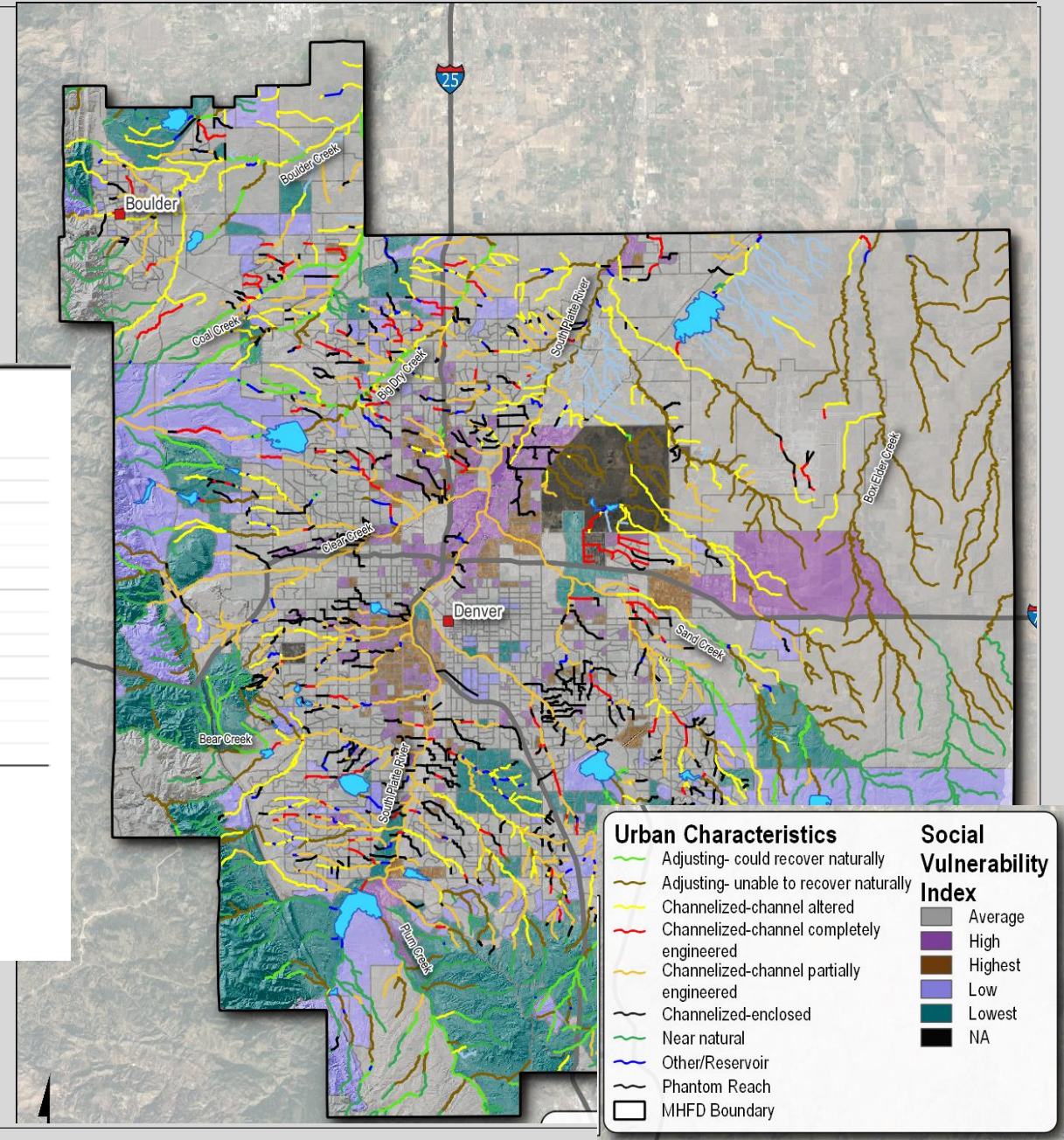
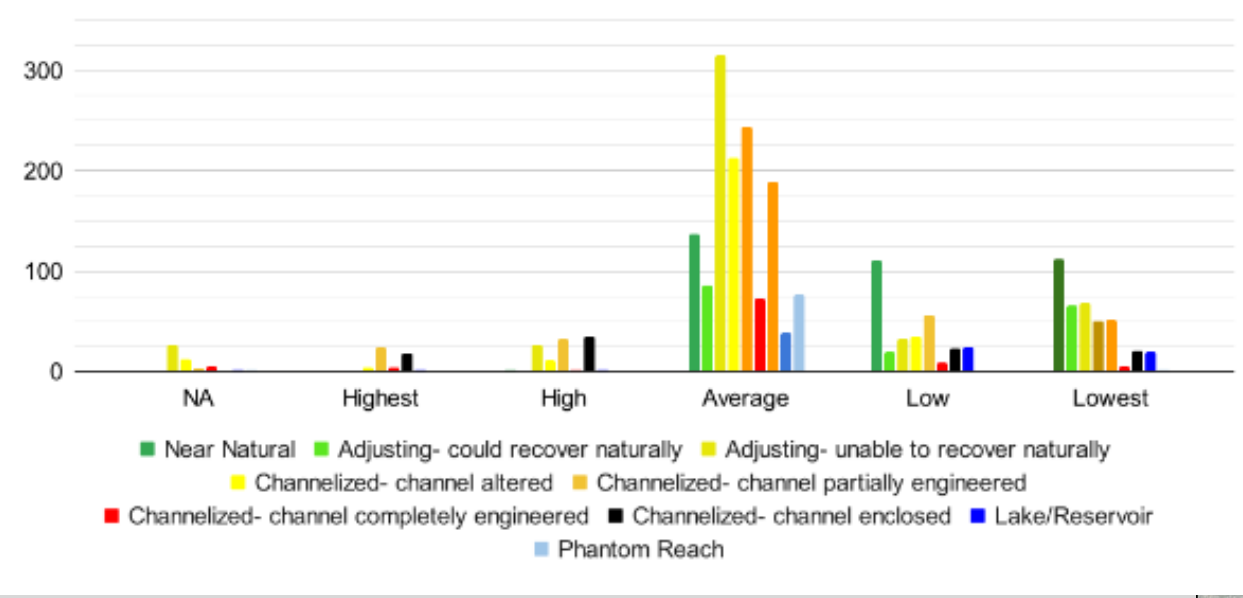


Social Vulnerability Index



Urban Characteristics & Social Vulnerability Index

Social Vulnerability Index & Urban Characteristics (Stream Miles)



Urban Characteristics

| Urban reach type naming conventions | Management strategy |
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REACTIONARY APPROACH

When in doubt, build it stout!

- **WHY:** flood control and reducing risk
- **WHAT:** reactionary, one-off
- **HOW:** solutions focused on H&H



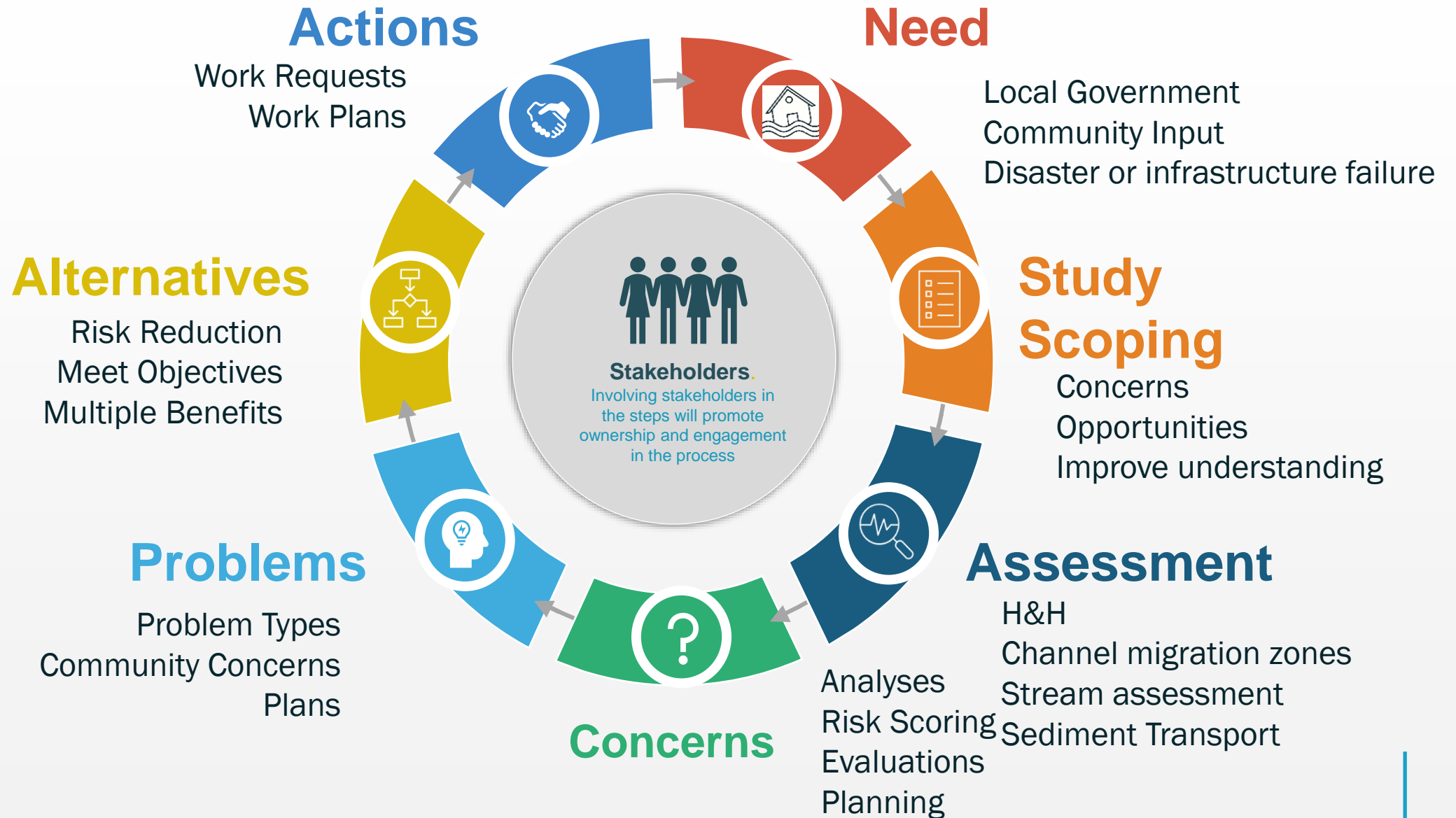
Anticipatory or Exploratory Approach

Understand, plan, and manage our urban streams

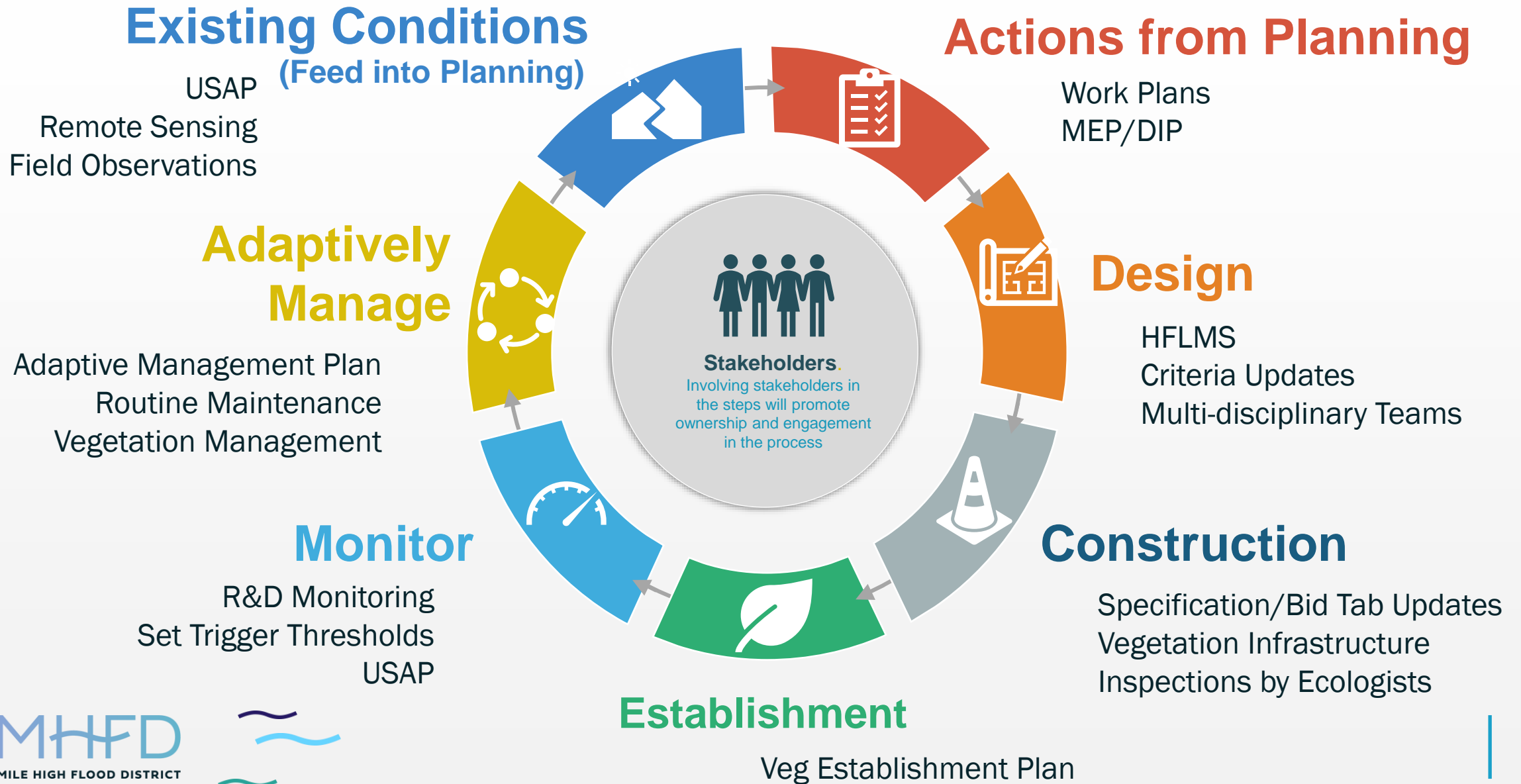
- **WHY:** embraces complexity and context to find multi-benefit solutions
- **WHAT:** Proactively plan and manage systems
- **HOW:** Data-driven decisions and values-based



Urban Riverscape Planning



Urban Riverscape Management



Takeaways

- Urban riverscapes are **novel physical and social-ecological systems**
 - Managing those systems is challenging, which requires rethinking the standard planning approaches
- Integrate **diverse perspectives and knowledge** into planning and management
 - Context and social-ecological values are considered alongside the physical, biological, and chemical processes
- Advocate for policies that support **anticipatory and exploratory approaches**, or a combination of these, that reduce reliance on **reactionary approaches**.

Thank you!

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