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# EXECUTIVE SUMMARY

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The concept of biodiversity has enjoyed prolonged exposure in the environmental debate forum for quite some time now and has evolved significantly along the way. From identifying elevated species extinction rates we have progressed to understanding the interconnected relationships between biotic organisms and their environment; and how these collective interactions drive ecosystem function (ICLEI, 2010). Alongside the progression of research, biodiversity has also been addressed in an international policy context. The Convention on Biological Diversity (CBD) component of the 1992 Rio Conference put forth three main goals: (1) biodiversity conservation, (2) sustainable use of that diversity and (3) fair access to results and benefits of genetic resources. The CBD acted as a template from which national strategies for biodiversity conservation could be adapted, and much academic research followed suit focusing on broad strategies. As such, much of biodiversity research has focused on regional conservation methods, while the urban context has been largely overlooked. As human populations increasingly congregate in urban areas, understanding how human pressures affect and control biodiversity levels will become increasingly important.

With increasing urbanization human populations have come to dominate Earth's ecosystems. It is due to this dominance that humans must be integrated into ecological models for complete understanding of ecosystems. This idea extends towards planning for urban ecosystems as well. If human populations truly dominate the ecosystems they interact with, then the tools that are used to control the health of ecosystems, such as zoning, official plans (OPs), site plan control among others, are of importance especially at an urban scale. However, although policy-makers have recognized the role ecosystems play in maintaining health and well-being, most policies are directed at removing or mitigating negative influences; while policies that are considered proactive are largely overlooked. Generally this is the result of environmental factors having to compete with other socio-economic issues within political discourse. While this may be the typical explanation, current research promotes the idea that biodiversity is shaped through the social and cultural context in which it operates. This suggests that all components, socio-economic, cultural and ecosystem health can be addressed through the planning process in order to achieve the overarching goal of biodiversity conservation.

## CONTEXT

Municipal planning exerts significant pressure on the formation and diversity of urban ecosystems through the various tools it employs. Specifically, many municipalities undertake initiatives to implement land management plans that seek to balance infrastructure development and preservation of natural land with conservation of ecosystem. The Integrated Community Sustainable Planning (ICSP) approach represents the current trend in planning for sustainability in mid-sized Ontario municipalities. This approach attempts to formalize various sustainability principles (see: Gibson, 2006; Hodge, 2004; Dalal-Clayton & Sadler, 2005) within upper-level municipal policy and planning documents while supporting vertically and horizontally integrated approaches to municipal planning. Vertically aligned approaches focus on the differing spatial scales of planning (local, regional, provincial) while horizontally aligned approaches are interested in the coordination of planning efforts across different sectors or departments (Planning, Public Works, Community Services, etc.).

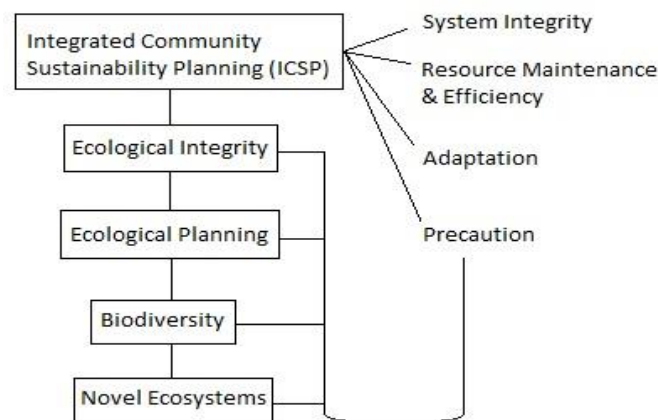
The Integrated Community Sustainable Planning framework represents a purposeful approach to sustainability planning and has received significant support from various governmental agencies and programs. Most notable, it has received monetary backing through the Federal Gas Tax program which provides municipalities with federal funds to support infrastructure projects which promote a number of sustainable objectives. This represents a significant opportunity for Ontario municipalities to develop plans specific to their location that will utilize sustainability principles to ensure smart development and a planning process that is integrative. Because the ICSP method is meant to be utilized in various locales, the development process is quite flexible in order to allow plans to reflect the inherent uniqueness of individual communities.

Novel ecosystems are human built, modified or engineered systems that tend to lack natural analogues. These novel systems contain new combinations of species that are the result of anthropogenic action, environmental change and the deliberate or inadvertent introduction of exotic species. In general, when an ecosystem endures a pressure it can either stay at or near its historic state, adapt into a hybrid system, or be altered so dramatically that little historic context remains and is now consider novel). Because the functionality of these systems may not be immediately apparent it is easy to overlook the impact they may be having on the biodiversity of an area.

## SCOPE

This research was undertaken within the bounds of four mid-sized Ontario municipalities: City of Kingston, Town of Markham, City of Burlington, and City of London, and will contribute to a larger SSHRC project *“Examining Integrated Community Sustainability Planning from an organizational learning perspective: A comparative case study of four mid-sized municipalities in Ontario”*. Specifically, this study assesses how three specific principles of sustainability (ecological integrity, resource management, and precaution/adaptation) are formalized within the Integrated Sustainable Community Planning process. Further, the principle of precaution is explicitly examined to ascertain how its utilization within the planning structure may be impacting urban biodiversity and how this may be tied to the formation of novel systems.

*Finalized Conceptual Framework.*



## CONCLUSIONS

The quantitative analysis of the passive observation criteria revealed discernable patterns of varying system composition with the municipalities analysed. Although a study of species diversity would be required to definitively prove the existence of novel systems within an urban context, the passive observation approach provides a simpler and faster way to determine if the compositions of natural areas vary. If the elements incorporated into the passive observation approach are predictors of system diversity, then an analysis of biodiversity involving biotic sampling may ultimately prove unnecessary.

This is advantageous as any program seeking to inventory all natural areas would need to utilize community monitoring initiatives

Through the analysis of policies relating to ecological principles several strategies emerged as being possible triggers for novel system formation. While none of the policy uncovered directly mentions novel systems or speculated on their existence within urban areas, there were certain policies which could be considered to promote the conditions from which novel systems emerge. This overview suggests that the fragmentation impact is the most prominent influence when linking policy with novel systems.

Many of the policies seem to stem from a focus on utilizing ecological systems for the benefit of human populations. While this does represent a fairly pro-active integrative approach to sustainability, municipalities should be cautioned from making the human element the primary focus of these initiatives. Finding a balance between provision of human services and the protection and enhancement of ecological integrity will be paramount in ensuring ICSPs and other municipal planning documents are successful in promoting sustainable communities.

## RECOMMENDATIONS

**Recommendation 1:** The concept of novel ecosystems should be recognized within urban sustainability planning and linked to initiatives relating to biodiversity and ecosystem integrity.

**Recommendation 2:** Biodiversity conservation and enhancement programmes must be considerate of the existing state of targeted systems.

**Recommendation 3:** Municipal Impact Assessments should consider including passive observation criteria for use in comparative analyses of urban ecosystem composition.

**Recommendation 4:** Risk management strategies should incorporate provisions which measure risk in a broader context other than natural hazards and development impact.

**Recommendation 5:** Municipalities should design passive observation criteria unique to their location in order to ascertain the level of habitat diversity inherent in urban ecosystems.