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## **INTEGRATED WATERSHED MANAGEMENT AND HUMAN HEALTH AND WELLBEING: A STUDY OF LOW IMPACT DEVELOPMENT (LID) PRACTICES IN SOUTHERN ONTARIO, CANADA**

Manorika Ranasinghe

Faculty of Environmental Studies, York University, Toronto, Ontario, Canada

manorika7867@gmail.com

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### **ABSTRACT**

Human health and the environment are interrelated, and each affects the quality and functioning of the other. Extensive research has found connections between nature and the physical, social and mental wellbeing of humans. These benefits include temperature and climate regulation, improved attention and focusing, less stress, lower rates of respiratory illnesses and reduction of risk to natural disasters. As the population increases, development pressures, especially in large urban centers, have created a lot of stress on ecosystems, and the ecosystem functions and services that they provide. Issues such as loss of wetland and paving over pervious surfaces has led to increased runoff, low infiltration rates and degradation of the quality of source and non point source water. Roads, parking lots and other forms of impervious cover are the most significant contributors to stormwater runoff. Effective stormwater management is therefore a crucial point in such urbanized areas. Low Impact Development (LID) is an innovative stormwater management approach with a basic principle modeled after nature: to manage rainfall at the source using uniformly distributed, decentralized units. The main goal of LID is to mimic a site's pre-development hydrology by using design techniques that infiltrate, filter, store, evaporate and detain runoff close to the source. The term "Green Infrastructure" is also used when referring to LID. LID can be used individually or incorporated into conventional stormwater management systems to achieve maximum benefits. The ecosystem approach to health, or ecohealth research, is a field of study that examines how changes in the earth's ecosystems affect human health. This connects ideas of environmental and social determinants of health with ideas of ecology, systems thinking and resilience theory into a multidisciplinary framework that can be applied within the context of social and economic development. Human health and well-being are fundamentally dependent on the services provided by the ecosystems that surround us. The field of ecohealth attempts to make this connection and use it to improve public health, promote resilient communities, and create more sustainable environments. This project attempts to analyze the connections between 3 selected Low Impact Development and its effects on the ecosystem services that ultimately affect the health and wellbeing of humans in the Credit Valley watershed in Southern Ontario, Canada. Ecohealth theories developed by the Millennium Ecosystem Assessment (MEA) (2005; 2003) and the cascade model (Haines-Young & Potschin, 2010; Braat & de Groot, 2012; Potschin & Haines-Young, 2011) were used to help develop and illustrate the concepts and relationships being researched. In depth analysis confirmed that changes in landscape structure, such as implementing LID structures for stormwater management, instead of only using conventional stormwater management practices, can greatly increase ecosystem functions and the ecosystem services that are derived through them.

**Keywords:** Human Health and Wellbeing, Ecohealth, Ecosystems Approach to Health, Low Impact Development (LID), Millennium Ecosystem Assessment (MEA)