الجمهورية الجزائرية الديمقراطية الشعبية

ALGERIAN PEOPLE'S DEMOCRATIC REPUBLIC

MINISTRY OF HIGHER EDUCATION

AND SCIENTIFIC RESEARCH

N°……../SNV 2026

SETIF 1 UNIVERSITY - FERHAT ABBAS

Faculty of **NATURE AND LIFE SCIENCES**

Department of **ECOLOGY AND ENVIRONMENT**

MASTER'S THESIS

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DOMAIN: Nature and Life Sciences

SECTOR: Ecology and Environment

SPECIALITY: ecology

Theme

Peri-Urban Forest Degradation and Its Impacts on Ecosystem Functioning: A Case Study of Oued Bousselam (Larache)

Defended publicly on: 28/06/2026

In front of the Jury

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Academic year: 2025/2026

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الملخص

تمثل غابة الترفيه لاراش الواقعة على ضفاف وادي بوسلام بمدينة سطيف نظاماً بيئياً ذا أهمية استراتيجية، حيث تساهم في الحفاظ على التوازن الهيدرولوجي، وتعتبر خزاناً حيوياً للتنوع البيولوجي ومرفقاً ترفيهياً محلياً. غير أن موقعها المحاذي للنسيج العمراني جعلها عرضة لضغوط بيئية متزايدة تهدد سلامتها الإيكولوجية. تهدف هذه الدراسة إلى تقييم الآثار المباشرة للتدهور البيئي على الوظائف الأساسية لهذا الوسط. ولتحقيق هذا الهدف، اعتمدنا نهجاً تشخيصياً ميدانياً استند إلى إجراء جرد دقيق للغطاء النباتي والحيواني، مع تحديد وتوثيق مختلف أشكال الضغوط البشرية المؤثرة. أظهرت النتائج أن النظام البيئي يعاني من تدهور حاد نتيجة تراكم النفايات البلاستيكية، وتصريف مياه الصرف الصحي، وقطع الأشجار غير المنظم، والرعي الجائر. أدت هذه العوامل إلى تمزق الاتصال البيئي، وتضرر الطبقات النباتية الرائدة (مثل *Populus alba* L., *Salix alba* L., *Alnus glutinosa* (L.) Gaertn., *Fraxinus angustifolia* Vahl) ، بالإضافة إلى تهديد الأنواع الحيوانية المحمية في الجزائر (مثل : *Ciconia ciconia* L., *Falco peregrinus Tunstall, Dendrocopos major* L.) ، مما أدى إلى تراجع ملحوظ في قدرة النظام البيئي على التنظيم الذاتي. وبناءً على ما تقدم، توصي الدراسة بضرورة تفعيل إجراءات استعجالية للحفاظ على الموقع، ترتكز بشكل أساسي على استعادة الموائل الطبيعية على ضفاف الوادي وتفعيل برامج توعوية موجهة للفاعلين المحليين لضمان استدامة النظام البيئي.

الكلمات المفتاحية

سطيف، لاراش، التدهور البشري، النظام البيئي الضفافي (النهري)، المرونة الإيكولوجية، التشخيص الميداني.

ABSTRACT

Located along Oued Bousselam in Setif, the peri-urban forest of Larache constitutes a strategic ecosystem that bridges hydrobiological functions, biodiversity conservation, and urban recreational needs. However, its immediate proximity to urban development subjects it to severe ecological strain. This study focuses on evaluating the direct consequences of this forest's degradation on its overall ecosystem functioning. Developed through an intensive field-based ecological diagnosis, our methodological approach combined floral and faunal inventories with a detailed mapping of ongoing disturbances. The findings highlight an ecosystem in crisis, heavily impacted by plastic and sewage pollution, illicit logging, and intensive overgrazing. These overlapping pressures induce severe habitat fragmentation, structural breakdown within the dominant plant stratum (*Populus alba* L. ,*Salix alba* L. , *Alnus glutinosa* (L.) Gaertn. ,*Fraxinus angustifolia*), protected animal species in Algeria (*Ciconia ciconia* L., *Falco* peregrinus Tunstall, *Dendrocopos major* L.), and a general decline in ecological regulatory services. To prevent irreversible ecosystem collapse, this study emphasizes the critical need for immediate conservation actions, centering on riparian habitat restoration and enhanced local community engagement.

KEYWORDS:

Setif, Larache, anthropogenic degradation, riparian ecosystem, ecological resilience, field diagnosis

Introduction

Forests form the fundamental pillar of life on Earth, protecting biodiversity and managing the ecosystem that maintains the health of our planet. And according to Ollinger (2002): forest ecosystems represent one of the most vital terrestrial biomes on Earth, covering a large fraction of the land area and accounting for most of its terrestrial biological productivity. Functioning as a dynamic system, a forest ecosystem comprises interacting biotic and abiotic components that maintain ecological balance. Through these interactions, forests provide essential ecosystem services that human well-being completely depends upon, including climate regulation, biodiversity maintenance, and the provision of clean water (MA, 2005) The concept of the urban and peri-urban forest is defined as the sum of all woody and associated vegetation in and around urban areas. Functioning urban ecosystems help clean our air and water and to cool urban heat islands, providing vital opportunities for recreation and well-being (UNECE/FAO, 2021).

Forests cover approximately one-third of the Earth's land surface, yet they face continuous decline as a result of various pressures, whether natural (climate change, drought, desertification) or human-induced (urban expansion, overgrazing, fires, pollution) despite international efforts to conserve them and initiatives aimed at protecting them and rehabilitating degraded land.

Forest ecosystems in northern Algeria represent an important natural resource, but they are increasingly affected by anthropogenic pressures. These environments are exposed to a combination of traditional socio-agricultural practices and changes in rural dynamics. According to Meddour-Sahar et al. (2013), forest degradation in Algeria is strongly associated with unsustainable land-use changes and conflicts over resource use, which contribute to the fragmentation and alteration of forest cover. This situation is also reflected in peri-urban forests, including those of the Setif region, which are subject to similar pressures due to their proximity to human activities.

Given these considerations, it is therefore important to better understand the relationship between forest degradation and ecosystem functioning in the peri-urban forests of Setif. In this context, the main research question of this study is: To what extent does the degradation of peri-urban forests in the Setif region affect ecosystem functioning?

To answer this question, the general objective of this study is to evaluate the impact of peri-urban forest degradation on ecosystem functioning in the Setif region.

More specifically, this study aims to identify the main forms of degradation affecting the study area, analyze the different anthropogenic pressures acting on the peri-urban forest of Oued

Bousselam, assess the current state of vegetation and biodiversity, and evaluate the impacts of these disturbances on ecosystem functioning.

This study is based on the following hypotheses:

1. Forest degradation in the study area is mainly driven by human activities.
2. This degradation leads to a decline in plant biodiversity and changes in species composition.
3. These disturbances negatively affect ecosystem functioning and reduce the resilience of the forest ecosystem.

To present this research clearly, this dissertation is structured into three chapters. The first chapter presents the theoretical framework related to forest ecosystems, peri-urban forests, and forest degradation. The second chapter presents the study area of Oued Bousselam in the Setif region and describes the methodology used in this research. The third chapter presents and discusses the results regarding the impact of forest degradation on ecosystem functioning.