

ABSTRAK

Rozi Mahmuda, NIM 3211131003 Pemetaan Zonasi Risiko Longsor Dan Jalur Evakuasi Berbasis *Network Analysis* Di Kabupaten Karo, Jurusan Pendidikan Geografi, Fakultas Ilmu Sosial, Universitas Negeri Medan, Tahun 2025

Kabupaten Karo memiliki tingkat risiko longsor yang tinggi berdasarkan data IRBI Indeks Risiko Bencana Indonesia (2023) dengan skor 17.05, tingginya risiko longsor belum didukung adanya peta evakuasi berbasis *Network Analysis*. Penelitian ini bertujuan untuk memetakan zonasi risiko longsor dan merancang jalur evakuasi yang optimal di wilayah tersebut. Metode kuantitatif berbasis Sistem Informasi Geografis (SIG) digunakan dengan menganalisis lima parameter (curah hujan, kemiringan lereng, jenis tanah, geologi, dan penggunaan lahan) melalui teknik overlay berbobot. Jalur evakuasi ditentukan menggunakan *Network Analysis* untuk menemukan rute teraman dan tercepat. Hasil analisis menunjukkan bahwa zona risiko sedang (849,2 ha) dan tinggi (774 ha), dengan sebaran risiko sedang berada di bagian Kecamatan Merdeka, Kecamatan Barusjahe, Kecamatan Tigapanah, Kecamatan Kabanjahe, Kecamatan Berastagi, dan Kecamatan Dolanrayat sedangkan sebaran risiko tinggi berada di Kecamatan Mardinding, Kecamatan Lubaleng, Kecamatan Tiga Binanga, Kecamatan Payung, Kecamatan Kutabuluh, dan Kecamatan Tiganderket. Jalur evakuasi yang berhasil dirancang terdiri dari lima jalur evakuasi utama yang saling terhubung serta empat titik kumpul yang dinilai aman dan strategis. Peta jalur evakuasi dilengkapi dengan penamaan jalan untuk memudahkan navigasi saat keadaan darurat. Peta yang dihasilkan menjadi acuan penting bagi pemerintah daerah dan masyarakat untuk meningkatkan kesiapsiagaan dan menyusun kebijakan mitigasi bencana longsor yang lebih efektif.



ABSTRACT

Rozi Mahmuda, Student ID 3211131003 Mapping of Landslide Risk Zones and Evacuation Routes Based on Network Analysis in Karo Regency, Department of Geography Education, Faculty of Social Sciences, State University of Medan, 2025

Karo Regency has a high landslide risk level based on data from the Indonesian Disaster Risk Index (IRBI) (2023) with a score of 17.05. However, the high landslide risk is not supported by the existence of an evacuation map based on Network Analysis. This study aims to map landslide risk zoning and design optimal evacuation routes in the region. A quantitative method based on Geographic Information System (GIS) was used by analyzing five parameters (rainfall, slope, soil type, geology, and land use) through weighted overlay techniques. Evacuation routes were determined using Network Analysis to find the safest and fastest routes. The analysis results show that the moderate risk zone (849.2 ha) and highrisk zone (774 ha) with moderate risk distribution located in Merdeka District, Barusjahe District, Tigapanah District, Kabanjahe District, Berastagi District, and Dolanrayat District, while high risk distribution was located in Mardinding District, Lubaleng District, Tiga Binanga District, Payung District, Kutabuluh District, and Tiganderket District. The evacuation routes that have been successfully designed consist of five main interconnected evacuation routes and four gathering points that are considered safe and strategic. The evacuation route map is equipped with road names to facilitate navigation during emergencies. The resulting map is an important reference for local governments and communities to improve preparedness and develop more effective landslide mitigation policies.

