

Montenegro Model

Erosion research reveals
worldwide applications



Will Mahoney

Dr. Velibor Spalevic, a specialist in soil erosion and conservation with the biotechnical faculty at the University of Montenegro, scheduled a seminar in Podgorica, Montenegro. He and I spoke at the seminar along with Dr. Budimir Fustic, a soil scientist with the biotechnical faculty, and Klaas Annys, a geography graduate student at Ghent University in Belgium. At the seminar, Spalevic presented research he had conducted with Fustic titled, “Soil Erosion in Montenegro with Special Reference to the Problem of Erosion in the Polimlje Region.”

Erosion Control Modeling

As part of his doctoral thesis, Spalevic had developed a computer model that he named IntErO (an acronym for “intensity of erosion and outflow”). This program predicts maximum (peak) runoff from 5-, 10-, 20-, 25-, 50- and 100-year storms for a stream basin and the intensity of soil erosion in the basin. The inputs that go into the program can be summarized as follows:

- Climate factors (including temperature and rainfall);
- Geological and soil features;
- Type of vegetative cover and its condition; and
- Physical and geometric parameters of each watercourse and river basin.

To demonstrate the model, it was applied to 57 sub-basins of the north-easterly flowing River Lim, including a region of 830 sq miles in northeastern Montenegro. Slightly more than 50% of drainage from Montenegro flows north to the Danube River and ultimately to the Black Sea; the remainder flows south to the Adriatic Sea. The results for the 57 sub-basins predicted soil erosion ranging from 3,400 cu ft per sq mile per year to 27,193 cu ft per

sq mile per year. Thus, predicted soil erosion in the latter basin was eight times that of the former.

Applications & Opportunities

I can envision several practical applications for this model. Land management officials can use these results to prioritize efforts to control soil erosion by working with local farmers where predicted erosion is the most serious. I could imagine a government program focusing on reduction of soil erosion in the nine Lim sub-basins out of the 57 where predicted erosion exceeds 200 cu meter per sq km per year. Such a program would concentrate efforts where they are most needed and would preserve valuable topsoil, improve downstream fisheries and reduce sedimentation behind hydroelectric dams to the north.

I suspect that part of the problem in these nine sub-basins is poor agricultural practices; however, there may be other culprits as well, such as failure to revegetate highway cuts and fills in the mountainous terrain; mining scars; forest clear-cutting; mountain recreational development and/or commercial or industrial projects.

This computer model, or another similar modeling program, would be useful in controlling erosion not just in Montenegro, but all over the world. Using a modeling program can help to prioritize soil stabilization efforts and focus funds to be applied where they count the most. **SWS**

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