Pengembangan model asesmen kesehatan Daerah Aliran Sungai (DAS) sebagai dasar perencanaan pengelolaan DAS: studi kasus di Das Provinsi Lampung = The development of the watershed health assessment modelling for the basis of the watershed management planning: the case study of the watershed in Lampung Province

Eva Rolia, author

Abstrak

Kesehatan DAS (KesDAS) adalah ukuran struktur dan fungsi ekosistem yang ditandai dengan kelimpahan dan keragaman spesies, sumber anorganik dan organik, serta atribut fisik (termasuk kompleksitas habitat). Beberapa negara mulai mengembangkan instrumen penilaian kesehatan DAS, sebagai dasar untuk menentukan langkah pengelolaan DAS yang menjadi prioritas. Pendekatan sistem untuk penilaian dan perlindungan DAS yang sehat didasarkan pada evaluasi terpadu menurut US-EPA (2012) adalah kondisi lanskap, habitat, hidrologi, geomorfologi, kualitas air, dan kondisi biologis. Dan di Indonesia berdasarkan Peraturan Menteri Kehutanan RI No. 60 tahun 2014, klasifikasi DAS dihitung dengan kriteria kondisi lahan, kualitas, kuantitas, dan kontinuitas air, sosial ekonomi dan kelembagaan, investasi bangunan air, pemanfaatan ruang wilayah.
Tujuan penelitian ini adalah menghitung kesehatan DAS di Provinsi Lampung, mengembangkan model penilaian kesehatan DAS dengan gabungan variabel Permnehut 60/2014 dan US-EPA 2012, serta membuat aplikasi untuk menghitung kesehatan DAS berdasarkan persamaan hasil pemodelan. Penelitian dilakukan di 28 lokasi yang tersebar di 5 DAS Provinsi Lampung. Data primer yang digunakan yaitu data kualitas air, data kondisi habitat, dan kondisi biotilik. Pembobotan dan skor variabel yang digunakan mengikuti aturan Permenhut 60/ 2014, untuk kualitas air memakai standar WQI, untuk habitat dan biotilik sesuai dengan panduan dari Ecoton 2011.
Hasil yang didapatkan dalam penelitian ini menunjukkan bahwa 18% (3 sub- DAS) dalam kondisi dipulihkan daya dukungnya berdasarkan perhitungan Klasifikasi Permenhut 60/2014. Penilaian kesehatan DAS dengan variabel US-EPA 2012 memiliki nilai bervariasi sesuai dengan kriteria yang ditinjau. Berdasarkan kondisi lanskap, hanya 5,8% (1 sub-DAS) yang dikategorikan sehat, dan berdasarkan kondisi geomorfologinya ada 2 sub-DAS dikategorikan tidak sehat. Hasil pemodelan diperoleh persamaan KesDAS dan biotilik dengan nilai R2 masing-masing sebesar 0,998 dan 0,946.
Untuk memudahkan dalam menghitung nilai kesehatan DAS dan menentukan upaya pengelolaan DAS berdasarkan skala prioritas, maka berdasarkan persamaan model yang diperoleh dibuatlah aplikasi perhitungan yang diberi nama DYTERasDAS (Dwita, Yasman, Titin, Eva, Retno, assesmen Daerah Aliran Sungai) menggunakan bahasa program PHP, jQuery, bootstrap, dan css yang berbasis web.
.....The watershed health (KesDAS) is a measure of the ecosystem structure and function characterized by the abundance of species diversities, organic and inorganic resources, and physical attributes (including the habitat complexity). Several countries have been established to develop the instrument for the assessment of the watershed health as the basis to justify procedures to set a priority in the watershed management. The system approach to the assessment and protection of a healthy watershed is based on the integrated evaluation by the United States-Environmental Protection Agency/US-EPA (2012) namely landscape

condition, habitat, geomorphology, water quality, and biological condition. Furthermore, in Indonesia, the assessment refers to the regulation of the Ministry of Forestry Number 60 in 2014 (Permenhut 60/2014). In this standard, the watershed classification is justified by the criteria of the land condition, the water quantity, quality, and continuity, the socioeconomic and institutions, the investment on the water infrastructures, and the spatial utilization.

This research aims to estimate the watershed health in Lampung Province and to develop the assessment modelling of the estimation. The model combines the variables coming from the Permenhut 60/2014 as well as the US-EPA 2012. Besides, the application based on the results of the assessment modelling is also developed in this study. Furthermore, the data collection was conducted in 28 locations that are scattered in Lampung Province. The primary data used in this research includes the water quality, the habitat condition, and the macro invertebrate living on the riverbed. The variable scoring and weighing method applied in this study follows the Permenhut 60/2014 while the Water Quality Index (WQI) is used to justify the water quality. In the case of the habitat condition and the existence of the macro invertebrate, the analysis refers to the guidance of the Ecoton 2011.

The estimation based on the Permenhut 60/2014 shows that 18% (3 sub-watersheds) are categorized as ‘to be recovered’. Meanwhile, the calculation based on the US-EPA resulted in various categorizations in accordance with the assessed criteria. According to the criteria of the landscape condition, only 5.8% (1 sub-watershed) can be categorized as the healthy watershed. On the other hand, 2 sub-watersheds are categorized as unhealthy watersheds based on the criteria of the geomorphology. Besides, the value of the R2 resulted from the watershed health equation and bio-monitoring on the macro invertebrate are respectively 0.998 and 0.946.

Eventually, the results gained from the assessment modelling are continued with the development of the computational application that is called as DYTERasDAS. The DYTERasDAS stands for Dwita, Yasman, Titin, Eva, Retno, asesmen Daerah Aliran Sungai). This application uses the computer programming languages such as PHP, jQuery, bootstrap, and css that are on the web basis.