

HJ

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**National Ecological Status Survey and Evaluation Technical
Specifications-Ecosystem Quality Evaluation**

全国生态状况调查评估技术规范——生态系统质量评估

(English Translation)

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1 Scope of application

This standard specifies the general principles, technical procedures, indicators and methods of regional natural ecosystem quality assessment, and ecosystem quality grading requirements.

begging.

This standard is mainly applicable to the quality assessment of vegetation-dominated natural ecosystems in the land areas of the national and provincial administrative regions. Other geographical areas may refer to this standard for implementation.

2 Normative references

This standard refers to the following documents or clauses thereof. For dated references, only the dated version applies to this standard.

For undated references, the latest edition (including all amendments) applies to this standard.

HJ 192 Technical Specification for Assessment of Ecological Environment Status

3 Terms and Definitions

The following terms and definitions apply to this standard.

ecosystem quality

It characterizes the pros and cons of the natural vegetation of the ecosystem, and reflects the overall condition of the vegetation in the ecosystem and the ecosystem.

assessment unit

According to the needs of the evaluation purpose and evaluation method, the geographic space unit for evaluation is divided.

leaf area index

The ratio of the total area of plant leaves to the land area per unit land area mainly represents the complexity of the vertical structure of vegetation.

gross primary productivity in unit time and unit area, the total amount of organic carbon fixed by green plants through photosynthesis mainly represents the photosynthetic energy of vegetation strength.

fractional vegetation cover the percentage of the vertical projected area of vegetation (including leaves, stems, and branches) on the ground to the total area of the statistical area, which mainly represents the horizontal structure of vegetation situation.

4 General

Ecosystem quality assessment should follow the principles of normativeness, operability, advancement, and economic and technical feasibility.

5 Technical process

Ecosystem quality assessment technical specification process. Based on remote sensing ecological parameters, carry out ecosystem quality assessment by region and ecosystem type estimate (Figure 1).

6 Ecosystem quality assessment indicators and methods

Ecosystem quality assessment takes remote sensing ecological parameters (vegetation coverage, leaf area index, total primary productivity) as indicators, three parameters See Appendix B for the calculation method. The ecosystem quality index is constructed by the method of selecting the reference value according to different types of ecosystems.

For the boundaries of 242 ecological function zones in the National Ecological Function Zoning, see Appendix A for ecosystem types. The specific process is as follows.

The maximum ecological parameters of the four types of vegetation ecosystems of forest, shrub, grassland and farmland in the functional area were used as reference values, and the scores were calculated in turn.

The ratio of the ecosystem parameter value of each vegetation type in the area to its

reference value, to obtain the relative density of the ecological parameter in the area, the relative density the closer to 1, the closer the ecological parameter of the pixel is to the reference value. The specific calculation method is according to formula (1).

According to this method, the relative density is calculated by selecting the reference value for the vegetation coverage, leaf area index, and total primary productivity by sub-category type.

The results are normalized to between 0 and 1, and the normalization method is as follows.

7 Ecosystem quality classification

According to the evaluation results of ecosystem quality, the ecosystem quality is divided into 5 grades, namely excellent, good, medium, low and poor. For details, please refer to HJ 192 for implementation, see Table 1.

Appendix B

(normative appendix) Calculation method of key ecological parameters of remote sensing
B.1 Leaf Area Index (LAI) the leaf area index (LAI) reflects the size of the leaf area per unit area in an ecosystem, and is a simulated terrestrial important parameters of ecosystems, hydrothermal cycles, and biogeochemical cycles. At present, the methods of obtaining leaf area index based on optical data mainly include.

There are two types, one is a statistical method, which is commonly used to establish an empirical or semi-empirical relationship between the leaf area index and the vegetation index; the other is based on radiation Remote sensing inversion methods for transport models.

(1) Statistical method the empirical model method is a commonly used statistical method. This method uses the vegetation index to estimate the leaf area index. The general process is to establish the vegetation index and the empirical relationship between the leaf area index and the observation data are used for fitting, and then the fitted model is used to estimate the leaf area index.

The empirical relationship between the area index and the vegetation index mainly has the following forms.

A, B, C and D - empirical parameters that vary with vegetation type.

(2) Canopy model

Canopy models can generally be divided into four categories. parametric models, geometric-optical models, mixed-media models, and computer simulation models. these models the model has been widely used in the estimation of canopy morphology and optical characteristics. At present, the estimation of leaf area index based on the canopy model often adopts the inversion optimization algorithm.

method, neural network technology, genetic algorithm, Bayesian network algorithm and look-up table method, etc., according to the evaluation area and the actual conditions.

Choose appropriate models and methods to estimate leaf area index.

B.2 Vegetation Coverage (FVC) Fractional vegetation cover (FVC) quantifies the density of vegetation and reflects the growth trend of vegetation.

It is an important basic data for describing ecosystems and is widely used in research fields such as hydrology, ecology, climate, and air pollution. remote sensing due to its Large-scale data acquisition and continuous observation capabilities have become the main technical means for estimating vegetation coverage. Estimation of Vegetation Coverage Based on Remote Sensing There are mainly the following methods.

(1) Regression (statistical) model method the regression (statistical) model method is based on a certain band or band combination of remote sensing data or the vegetation index calculated by using remote sensing data.

A regression analysis was carried out on the vegetation index, soil-adjusted vegetation index, etc. and the vegetation coverage, and an empirical estimation model was established. linear regression model the estimation model of the study area is obtained by linear regression between the vegetation coverage measured on the ground and the band or vegetation index of the remote sensing image; nonlinear the regression model method mainly obtains a nonlinear regression model by fitting the band or vegetation index of the remote sensing data with the vegetation coverage.

(2) Mixed pixel decomposition method each pixel in a remote sensing image is generally composed of multiple components, and each component contributes to the information observed by the sensor.

The pixel decomposition model is used to estimate the vegetation coverage. Hybrid pixel decomposition models mainly include linear models, probability models, geometric optical models, Stochastic geometric models and fuzzy analysis models, among which the linear decomposition model is the most widely used. The most commonly used linear pixel decomposition method is the pixel the dichotomous model refers to the assumption that the pixels are composed of vegetation and non-vegetation, and the spectral information is a linear combination of these two components. Calculated the proportion of pixels covered by vegetation is the vegetation coverage of the pixel, and the calculation method is as follows.

() ()soil veg soilFVC NDVI NDVI NDVI NDVI = - - (B.4) in the formula. FVC--pixel vegetation coverage;

NDVI--NDVI value of mixed pixels;

NDVIsoil--the NDVI value of a pixel covered by pure bare soil;

NDVIveg--NDVI value of pure vegetation cover pixels.