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**Ecosystem assessment - Technical guideline for terrestrial
ecosystem asset accounting**

生态系统评估 陆地生态资产核算技术指南

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3 Terms and definitions

3 The following terms and definitions apply to this document.

3.1 ecosystem type: An ecosystem unit that, at a given scale, is consistent in the composition of its biological community, in its structure and functional processes, in its succession features and in its outward appearance. The source given is GB/T 42340-2023, 3.3.

3.2 ecosystem asset: A continuous space of a particular ecosystem characterized by its biotic and abiotic components and their interaction.

3.3 biophysical quantity of ecosystem asset: The physical quantity of an ecosystem asset expressed in natural or physical units of measurement. A note adds that it is characterized by the two dimensions of ecosystem asset quantity and ecosystem asset quality.

3.4 ecosystem asset quantity: The area of each kind of ecosystem within a given period of time and spatial extent.

3.5 ecosystem asset quality: The degree of goodness of the different ecosystem assets within a given period of time and spatial extent.

3.6 gain and loss of biophysical quantity of ecosystem asset: The decrease or increase in the quantity of ecosystem assets of different types, or of different quality grades within one type, caused by different factors.

3.7 final ecosystem service value: The monetized expression of the various benefits supplied by an ecosystem and used by an economic unit such as a business, a government or a household.

3.8 ecosystem asset value: The final ecosystem service value that an ecosystem asset will produce over a future expected period of time.

3.9 typologic index of ecosystem asset: A composite indicator measuring the quantity features and the quality features of a specific ecosystem asset within a given period of time and spatial extent. A note adds that it characterizes the overall state of that specific asset type in the region.

3.10 integrated index of ecosystem asset: A composite indicator measuring the quantity features and the quality features of the ecosystem assets within a given period of time and spatial extent. A note adds that it characterizes the overall state of the ecosystem assets of the region.

4 Accounting content and process

4.1.1 Biophysical quantity of ecosystem assets. Taking the ecosystem assets of different types within a land unit as the object, the spatial distribution data of the ecosystem types in the accounting area can be obtained on the basis of the ecosystem classification system given in Annex A; the quantity of the forest, shrubland, grassland, wetland, farmland and other ecosystem assets is then accounted; the quality grade of each asset type is assessed and the area and distribution of the assets of each quality grade obtained; and a table for accounting the biophysical quantity of the regional ecosystem assets is drawn up, an example being given in Annex B. If the features of the change in the biophysical quantity between different periods are to be made clearer, accounting of the gain and loss of the biophysical quantity may be carried out on the basis of the change in quantity and quality of the ecosystem assets of that region over a given period of time, an example being given in Annex C.

4.1.2 Value of ecosystem assets. For a single ecosystem asset type in the accounting area, such as forest, shrubland, grassland, wetland or farmland, the final ecosystem service value produced by that type of asset over a given period, usually one year, is accounted, including the value of material supply, of regulating services and of cultural services; the value of that type of ecosystem asset is then accounted by the benefit restoration method; and the value of the ecosystem assets of the region is accounted from the value of each asset type in the accounting area.

4.1.3 Ecosystem asset index. From the quantity of the ecosystem assets of one type in the accounting area and from the quality features of that type, the quantity index and the quality index of that type are accounted and from them the typologic index of that type; from the typologic indexes of the different asset types in the accounting area, that is forest,

shrubland, grassland, wetland, farmland and so on, the integrated index of ecosystem assets is accounted.

4.2.1 Steps of the accounting process. The ecosystem asset accounting process is divided into four steps, shown in Figure 1: determining the scope of the ecosystem asset accounting, obtaining the type, distribution and area of the ecosystem assets, carrying out the ecosystem asset accounting, and analysing the results of the accounting.

4.2.2 Determining the scope of the accounting. The spatial extent of the accounting area is determined and the boundary of the accounting is made clear. The accounting scope may be an administrative unit such as a province, a city or a county, or a natural geographic unit such as a river basin.

4.2.3 Obtaining the type, distribution and area of the assets. The ecosystem assets within the accounting scope are classified, and the area and the spatial distribution information of the forest, shrubland, grassland, wetland, farmland and other ecosystem asset types are obtained.

4.2.4 Carrying out the accounting. The biophysical quantity of the ecosystem assets is accounted, covering the two items of asset quantity and asset quality; the value of the ecosystem assets is accounted, covering the two items of final ecosystem service value and ecosystem asset value; and the ecosystem asset index is accounted, covering the two items of typologic index and integrated index.

4.2.5 Analysing the results. The quantity and quality features of the ecosystem assets of each type in the accounting area, that is forest, shrubland, grassland, wetland, farmland and so on, are analysed; the contribution of the ecosystem assets to the economic and social development of the region is shown; the overall state of the ecosystem assets of the region is set out; where needed, the features of the change in the regional ecosystem assets are analysed; and countermeasures and suggestions for the management of the regional ecosystem assets are put forward.

5 Accounting indicators

5 The indicator system for ecosystem asset accounting holds 6 accounting indicators grouped under the three accounting items of biophysical quantity of ecosystem assets, value of ecosystem assets and ecosystem asset index, as given in Table 1.

5 Under the biophysical quantity of ecosystem assets, the indicator ecosystem asset quantity characterizes the composition of the area of the different types of ecosystem asset in the accounting area, such as forest, shrubland, grassland, wetland and farmland; the larger the quantity of a type in the accounting area, the larger its area. The indicator ecosystem asset quality characterizes the quality grade of the forest, shrubland, grassland, wetland, farmland and other assets; generally speaking, the better the quality of an ecosystem asset, the stronger its ability to supply ecosystem services and the greater its

contribution to economic and social development.

5 Under the value of ecosystem assets, the indicator final ecosystem service value characterizes the economic value produced by the material supply, the regulating services and the cultural services of the ecosystem assets when used by an economic unit; it is the concrete expression of the value of the ecosystem assets and shows their direct contribution to economic and social development. The indicator ecosystem asset value characterizes the ability of the ecosystem assets to support economic and social development, and that value is expressed through the final ecosystem service value.

5 Under the ecosystem asset index, the indicator typologic index of ecosystem asset reflects the state of quantity and quality of a single ecosystem asset type, that is forest, shrubland, grassland, wetland or farmland; generally speaking, the larger the typologic index of a type, the more plentiful or the better that type of asset. The indicator integrated index of ecosystem asset reflects the overall state of type, quantity and quality of the ecosystem assets of the region; generally speaking, the larger the integrated index, the better the ecosystem assets of that region. A note to Table 1 adds that accounting of the gain and loss of the biophysical quantity may be carried out when the change in the quantity of ecosystem assets of different quality grades within a given period and a given region has to be made clear.

6 Accounting methods

6.1.1 Content of the biophysical quantity accounting. Accounting the biophysical quantity of ecosystem assets includes accounting the ecosystem asset quantity and the ecosystem asset quality; where needed, accounting of the gain and loss of the biophysical quantity may also be carried out.

6.1.2 Ecosystem asset quantity. The calculation method is given as formula (1), which is printed as a displayed formula and is not reproduced here. In its legend, EAA is the ecosystem asset quantity of the accounting area, that is the total area of the ecosystem assets, in square kilometres (km²); n is the total number of ecosystem asset types in the accounting area; and EAA with subscript i is the quantity of the ecosystem asset of the i-th kind, in square kilometres (km²).

6.1.3 Ecosystem asset quality. The quality of ecosystem assets is to be assessed according to GB/T 42340, GB/T 28407 and the technical rules for the evaluation and grading of the eutrophication of lakes and reservoirs. The quality grading of the different types of ecosystem asset in the accounting area, that is forest, shrubland, grassland, wetland and farmland, is given in Table 2, which for each asset type states the quality characterization indicator, five quality grades named excellent, good, medium, poor and inferior, and the way the data is obtained.

6.1.3 In Table 2 the quality characterization indicator for forest is the relative biomass