

## AGRICULTURAL SCIENCES

### CONDITION OF RECREATIONAL AND HEALTH-IMPROVING FORESTS IN LEFT-BANK UKRAINE

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The role of forests in maintaining the biosphere sustainability is now widely recognized. Only forests, among other natural complexes, have the maximum stabilizing effect on the environment. Therefore, they are considered as one of the essential factors for vitality of society and an important link in the sustainable development of ecosystems.

Ukrainian forests, according to purpose and location, perform mainly ecological functions, such as water conservation, soil protection and health improvement. The forests have limited commercial value [2].

Recreational and health-improving forests include forest areas that perform recreational, sanitary-hygienic and health-improving functions and are used for tourism, sports, and health resort treatment [1, p. 72]. They are located:

- within cities, villages and other settlements (forests of settlements);
- within the sanitary protection districts of health-improving and recreational territories and resorts (forests of the first, second and third buffer zones within sanitary protection districts of health-improving and recreational territories);
- within the sanitary protection zones of water bodies in forests (forests of the first and second belts within sanitary protection zones of water-supply sources);
- within green belts around settlements (forest-park part of green belt forests);
- outside the green belt forests (commercial part of green belt forests) [3].

The calculations were based on the data of the last forest inventory. In total, over 143 thousand survey plots classified as recreational and health-

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improving forests were analyzed within Left-Bank Ukraine. The area of the studied stands was 483,208 ha.

The study covered forest stands in 84 state forestry enterprises within 11 administrative regions, namely Dnipropetrovsk, Donetsk, Zaporizhzhya, Kyiv, Luhansk, Poltava, Sumy, Kharkiv, Kherson, Cherkasy and Chernihiv Regions.

Territorially Dnipropetrovsk, Donetsk, Zaporizhzhya, and Luhansk Regions, as well as parts of Kharkiv and Kherson Regions, are referred to Left-Bank Steppe. Poltava Region and parts of Kyiv, Sumy, Kharkiv, Cherkasy and Chernihiv Regions were assigned to Left-Bank Forest-Steppe and parts of Kyiv, Sumy and Chernihiv Regions, to Left-Bank Polissya, i. e., Ukrainian forest zone.

The results of the study show that in Left-Bank Ukraine, the area of recreational and health-improving forests is 483,208 ha or 30.8% of the total forest area. In Left-Bank Steppe, the recreational and health-improving forests occupy the largest part of the total forest area, making 38.1%. The forests' proportion in Left-Bank Forest-Steppe is slightly smaller, 34.2%. The smallest area of recreational and health-improving forests – 15.5% – was found in Left-Bank Polissya. This is primarily due to the smaller population and predominantly small towns in the region, which is essential for the classification of such forests.

The smallest part of the total area of recreational and health-improving forests, 12.8% or 61,944 ha, is concentrated in Left-Bank Polissya, while 43.3% (209,302 ha) of the area falls on Left-Bank Forest-Steppe and 43.9% (211,962 ha) on Left-Bank Steppe. There is a tendency to decrease the proportion of recreational and health-improving forests when moving from the south (Steppe zone) to the north (Polissya zone). In the Steppe zone, forests perform various ecological functions, while in the Polissya zone, they intended mainly for timber harvesting in the main-use felling of mature forest.

In Left-Bank Ukraine, the largest areas of recreational and health-improving forests are concentrated in commercial and forest-park parts. Their proportions are 99.8%, 96.5%, and 64.6% of the total area in the Polissya, Forest-Steppe, and Steppe zones, respectively. Forests of settlements, which occupy a special place in the community landscape system, cover only 0.2%, 2.5%, and 17.7%, respectively. The forests of other categories cover much smaller areas (Table 1). The stands' distribution by stock is similar to that by area in all categories of recreational and health-improving forests.

Table 1

**Distribution of recreational and health-improving forests  
by categories in terms of natural areas within Left-Bank Ukraine**

Recreational and health-improving forest category	Area		Stock volume		
	ha	%	thousand m <sup>3</sup>	%	per 1 ha, m <sup>3</sup>
Left-Bank Polissya					
Forests of settlements	146	0.2	33,9	0.2	232
Commercial part of green belt forests	37,589	60.7	11,574.6	61.7	308
Forest-park part of green belt forests	24,209	39.1	7,138.6	38.1	295
Total for the natural area	61,944	100	18,747.1	100	303
Left-Bank Forest-Steppe					
Forests of the first, second and third buffer zones within sanitary protection districts of health-improving and recreational territories	128	0.1	26.9	<0.1	210
Forests of the first and second belts within sanitary protection zones of water-supply sources	1,791	0.9	491.9	0.9	275
Forests of settlements	5,180	2.5	1,317.3	2.4	254
Commercial part of green belt forests	95,452	45.6	26,229.0	47.3	275
Forest-park part of green belt forests	106,751	50.9	27,363.0	49.4	256
Total for the natural area	209,302	100	55,428.1	100	265
Left-Bank Steppe					
Forests of the first and second belts within sanitary protection zones of water-supply sources	37,506	17.7	7,224.3	19.2	193
Forests of settlements	37,542	17.7	5,217.2	13.9	139
Commercial part of green belt forests	78,552	37.1	16,110.8	42.8	205
Forest-park part of green belt forests	58,361	27.5	9,072.4	24.1	155
Total for the natural area	211,962	100	37,624.7	100	178
<b>Total for recreational and health-improving forests</b>	<b>483,208</b>	<b>–</b>	<b>111,799.9</b>	<b>–</b>	<b>231</b>

The species composition of the recreational and health-improving forests in Left-Bank Ukraine is quite diverse. However, the composition can be described as impoverished in terms of natural areas, as it is represented by 35 tree species in Polissya, 59 species in Forest-Steppe, and 85 species in Steppe. In total, according to forest inventory data, Ukrainian forests contain more than 300 tree species.

Pine stands are the most widespread in Left-Bank Polissya. They occupy 75.7% of the total area; their stock is 15.7 million m<sup>3</sup>. The remaining species cover much smaller areas and have much lower stocks (Table 2).

Table 2

**Distribution of recreational and health-improving forests  
by predominant tree species in terms of natural areas  
within Left-Bank Ukraine**

Tree species	Area		Stock volume		
	ha	%	thou- sand m <sup>3</sup>	%	per 1 ha, m <sup>3</sup>
Left-Bank Polissya					
<i>Pinus sylvestris</i> L.	46,875	75.7	15,749.4	84.0	336
<i>Betula pendula</i> Roth.	4,395	7.1	831.8	4.4	189
<i>Alnus glutinosa</i> L. Gaerth.	3,942	6.4	791.1	4.2	201
<i>Quercus robur</i> L.	3,439	5.6	831.7	4.4	242
Other species	3,293	5.2	543.1	3.0	165
Total for the natural area	61,944	100	18,747.1	100	303
Left-Bank Forest-Steppe					
<i>Quercus robur</i> L.	109,660	52.4	27,335.7	49.3	249
<i>Pinus sylvestris</i> L.	66,485	31.8	21,202.5	38.3	319
<i>Alnus glutinosa</i> L. Gaerth.	6,350	3.0	1,202.3	2.2	189
<i>Fraxinus excelsior</i> L.	5,483	2.6	1,579.9	2.9	288
Other species	21,325	10.2	4,107.8	7.3	193
Total for the natural area	209,302	100	55,428.2	100	265
Left-Bank Steppe					
<i>Pinus sylvestris</i> L.	78,403	37.0	18,580.9	49.4	237
<i>Quercus robur</i> L.	73,075	34.5	11,075.6	29.4	152
<i>Robinia pseudoacacia</i> L.	15,895	7.5	1,535.6	4.1	97
<i>Fraxinus excelsior</i> L.	8,097	3.8	1,663.0	4.4	205
Other species	36,492	17.2	4,769.5	12.7	131
Total for the natural area	211,962	100	37,624.6	100	178
<b>Total for recreational and health-improving forests</b>	<b>483,208</b>	<b>–</b>	<b>111,799.9</b>	<b>–</b>	<b>231</b>

In Left-Bank Forest-Steppe, oak stands are the most widespread. They occupy 52.4% of the total area, and their stock is 27.3 million m<sup>3</sup>. Pine stands grow on a large area of 66,485 ha, making 31.8% of the total area. Other species covered much smaller areas and have considerably lower stock volumes.

Pine and oak stands occupy almost the same parts of the area in Left Bank Steppe (37.0% and 34.5%, respectively). However, pine stands significantly predominate in stock: their stock volume is 18.6 million m<sup>3</sup>, while oak stands' stock is about 11.1 million m<sup>3</sup>.

The most productive pine stands were found in the Left-Bank Polissya (336 m<sup>3</sup> per ha), while the least productive ones, in the Left-Bank Steppe (237 m<sup>3</sup> per ha). Oak stands showed the highest productivity, 249 m<sup>3</sup> per ha, in Left-Bank Forest-Steppe and the lowest, 152 m<sup>3</sup> per ha, in Left-Bank Steppe.

Recreational and health-improving forests within Left-Bank Ukraine are both unique and diverse as they grow under the constant anthropogenic impact. Therefore, their management should correspond to their main purposes, namely, to improve the microclimate and recreation conditions for the population.

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