Summary

The recruitment of stands for felling is an important task in the context of forest resource management and sustainable forest management. The use of linear programming to optimize harvest volume has found application in many countries around the world. Forest management in Poland take into account technical maturity as the basis for determining the maturity of stands for felling. The age determining this maturity was used to determine the harvest volume and was the basis for regulating time order. In forests with predominant productive function, the stand should be cut at a time when the value of standing timber obtained from its sale will be the highest (maximum). The purpose of the work was to present a method for determining the harvest volume for three following 10-year planning periods using linear programming, taking into account the necessary restrictions on and regulations, among others: age, area and spatial location of stands. The optimization process also took into account the economic criterion based on the net present value of standing timber in the stand (NPV). A comparative analysis of the total value and volume of stands subject to cutting for four variants (scenarios) was also performed, including one presenting the determination of stands in accordance with the applicable Forest Management Manual (2012). An optimization case study was done for the Seredzice forest unit designated for clearcutting, consisting of pine stands or stands with a predominance of Scots pine growing on coniferous and mixed coniferous and partly mixed deciduous forests habitat types with a total area of 813.20 ha in the Marcule Forest District (C Poland). The obtained results indicate that in the adopted method of harvest optimization with the use of linear programming, each stand is treated individually, which allows to leave cutting stands with high production potential for the next planning period and earlier removal of stands with low growth, threatened by the breakdown and depreciation of wood raw material. The simultaneous determination of harvest volume for several management periods by analyzing the parameters of individual stands and selecting the optimum harvest period for them makes it possible to better exploit the production potential of the forest and increase both the volume and value of the harvested timber over a long time horizon.

key words: linear programming, harvest planning, net present value, standing timber value