

NATIONAL FOREST INVENTORY OF LITHUANIA FOR FOREST STATISTICS AND FORESTRY EFFICIENCY CONTROL. COUNTRY REPORT

Andrius Kuliešis, Gintaras Kulbokas
State forest survey service

The main characteristics of Lithuanian NFI

Tasks for 2008-2012

NFI results 2003-2007

Forestry efficiency control



Lithuanian NFI was started in 1998

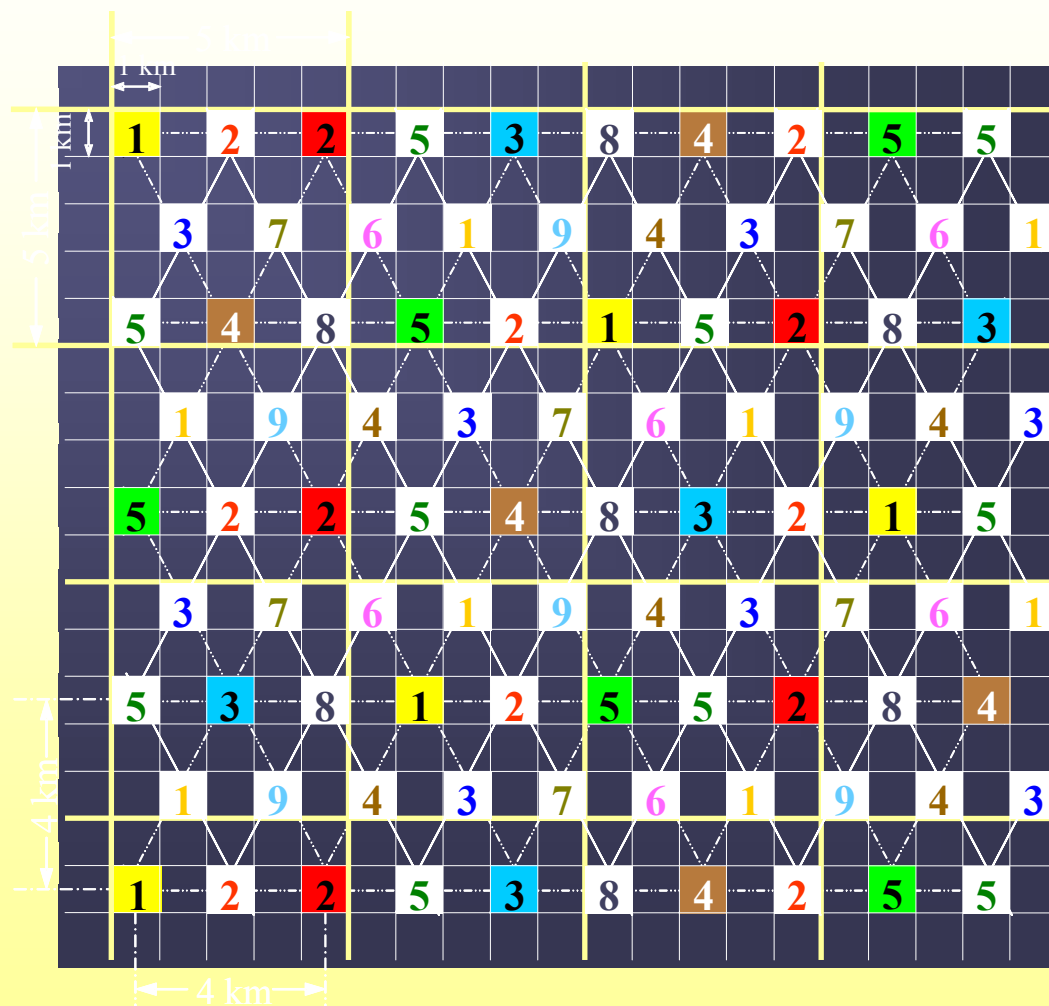
NFI is based on the method of continuous, systematic sampling and GIS technology.

Permanent and temporary plots by ratio 3:1 are used.

4 plots per permanent and 8 per temporary tract are used in the grid 4×4 and 2×2 km.



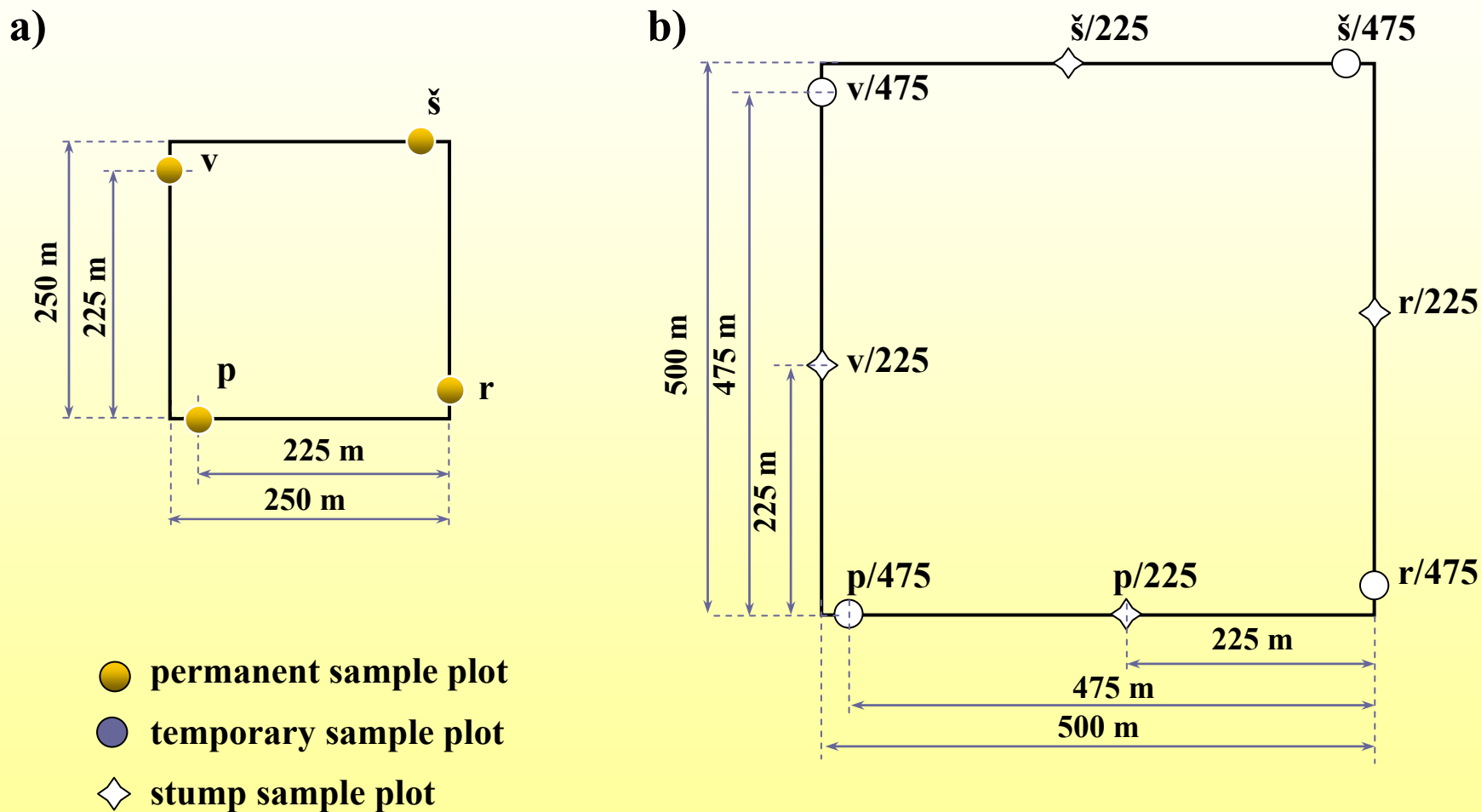
DISTRIBUTION OF PERMANENT PLOT TRACTS BY YEARS AND TEMPORARY PLOT TRACTS BY 5 YEARS



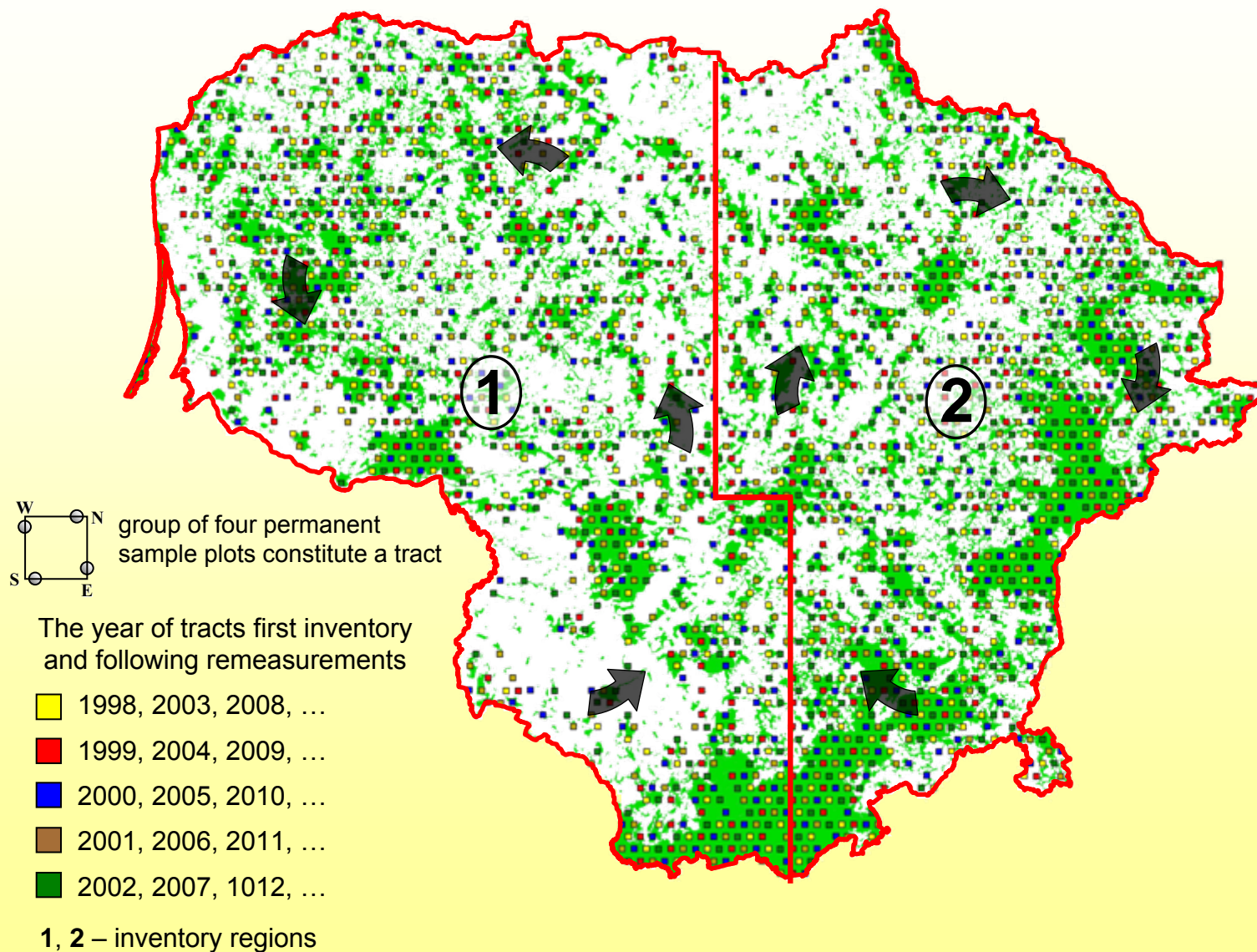
- 1** group of permanent sample plots in the 1x1 km size square
- 1** = 1998, 2003, ...
 - 2** = 1999, 2004, ...
 - 3** = 2000, 2005, ...
 - 4** = 2001, 2006, ...
 - 5** = 2002, 2007, ...

- 1** group of temporary sample plots in the 1x1 km size square
- 1** = 2003 – 2007, ...
 - 2** = 2008 – 2012, ...
 - 3** = 2013 – 2017, ...
 - ...
 - 9** = 2043 – 2047, ...

ALLOCATION OF PLOTS IN PERMANENT (a) AND TEMPORARY (b) TRACTS



ORGANIZATION OF LITHUANIAN NFI



- 1998-2002** 5600 permanent plots were established
- 2003-2007** All permanent plots were remeasured
137 new permanent plots were established
1903 temporary plots were measured
442 felling plots were measured
- 2008** second remeasurement started

NFI QUALITY CONTROL SYSTEM

- ❖ Forest growth, development and fellings on the permanent plots are controlled by the measurements on the temporary plots
- ❖ 1/20 part of all plots are remeasured every month by control team
- ❖ Regular audits are made by independent measurers
- ❖ Forest resources data obtained by standwise, prefelling and other inventories are regularly compared and analysed

DEVELOPMENT OF NFI

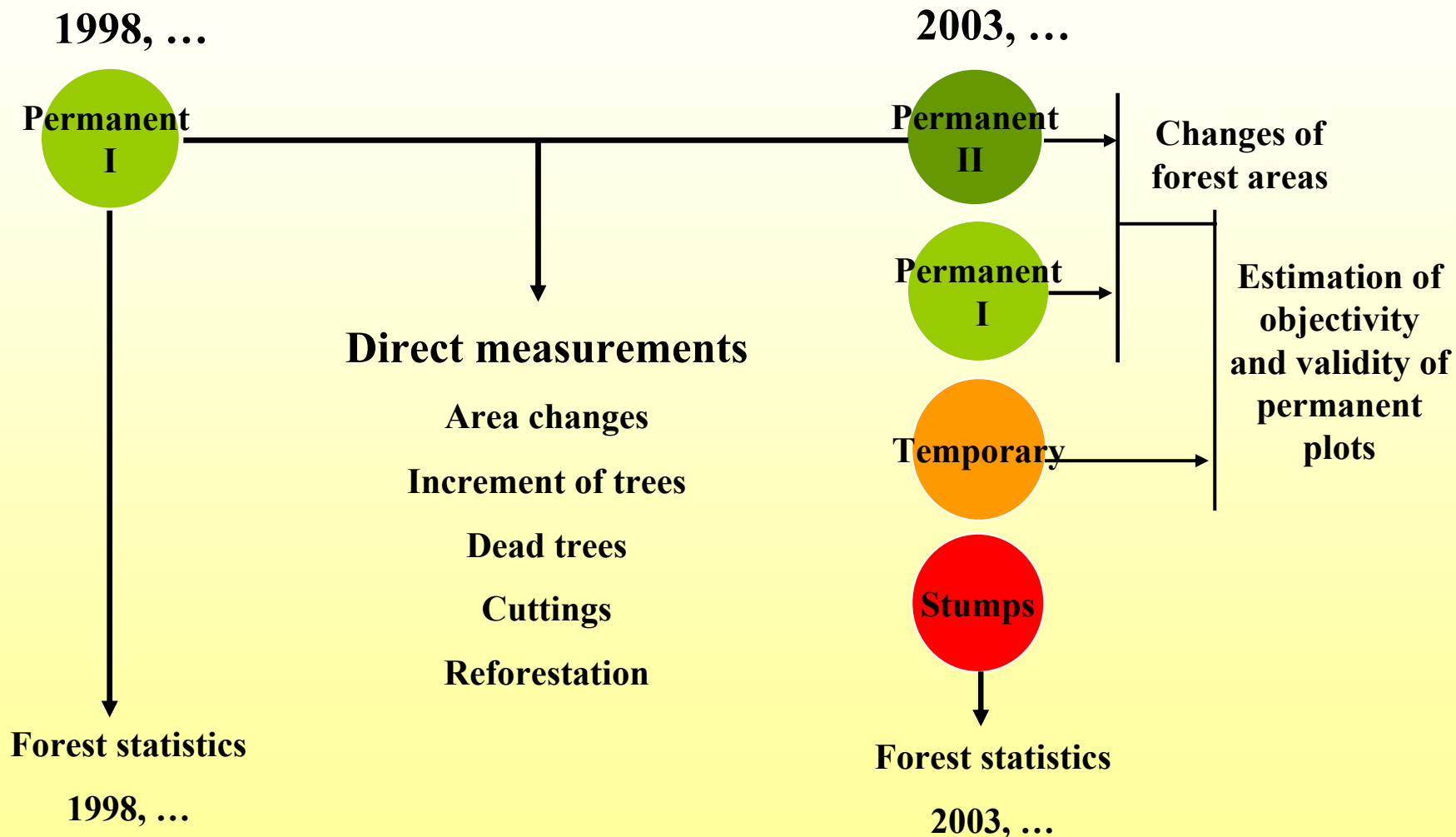
- ❖ Elaborated and introduced field measurement control on the permanent plots using field computers (2006)
- ❖ Data processing system, models for volume and increment, as well as for commercial wood and its structure estimation are under regular improvement
 - borings of sample trees were used for gross annual increment estimation – 1998-2002
 - borings of sample and trees remeasurements were combined for gross annual increment estimation – since 2003
 - gross annual increment budget started to analyze – since 2003
- ❖ Improved height functions allowed to improve results associated with height estimation by 1%.

DEVELOPMENT OF NFI

Starting from 2008

- ❖ Monitoring of dead trees up to complete decaying of stem wood has been started
- ❖ Registration and measurement of stemwood pieces on the felling areas has been started
- ❖ National network of FHM was integrated into the NFI plots

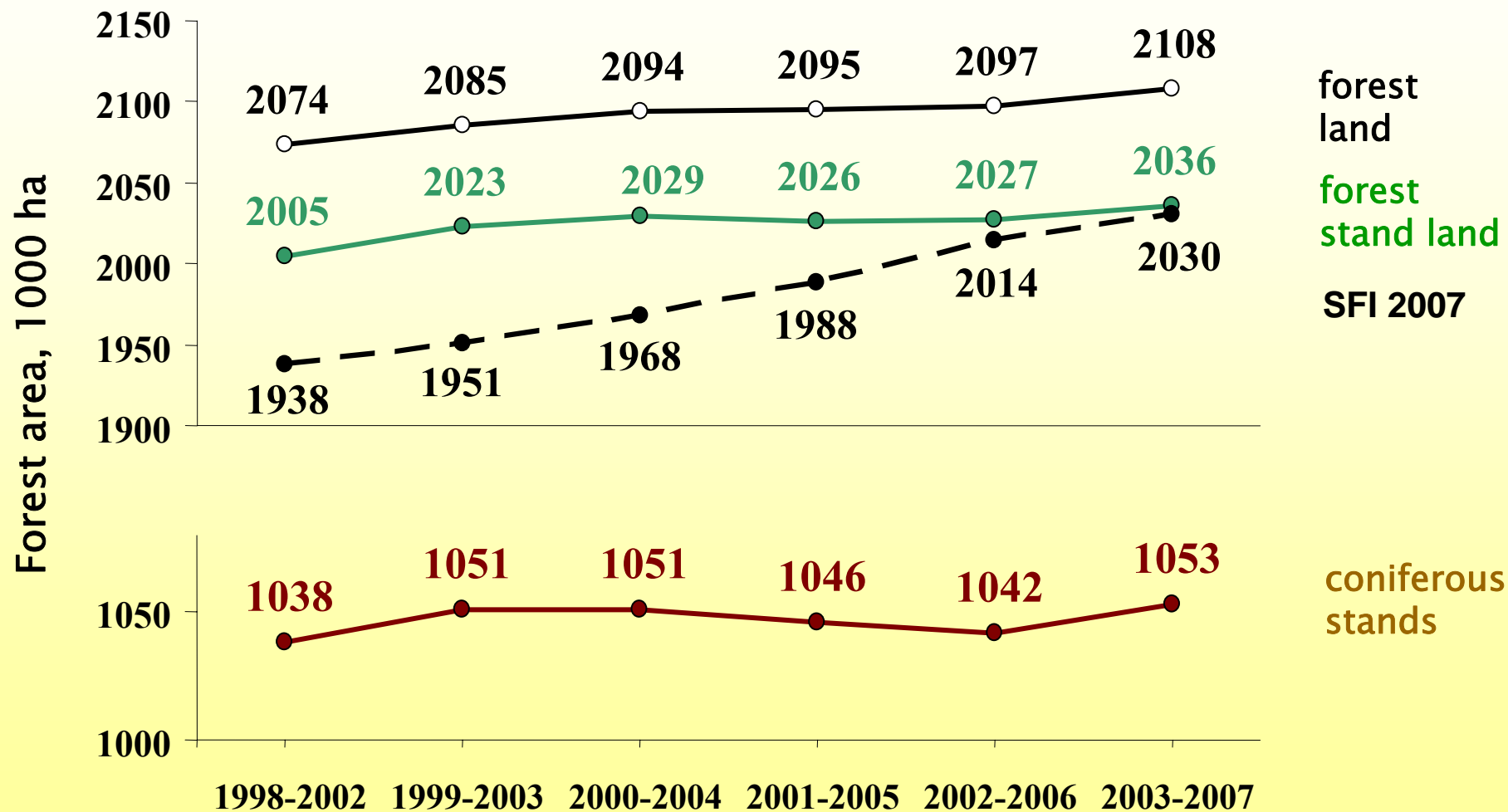
ESTIMATION OF CURRENT STATISTICS AND ITS CHANGES USING REMEASUREMENTS OF PERMANENT PLOTS



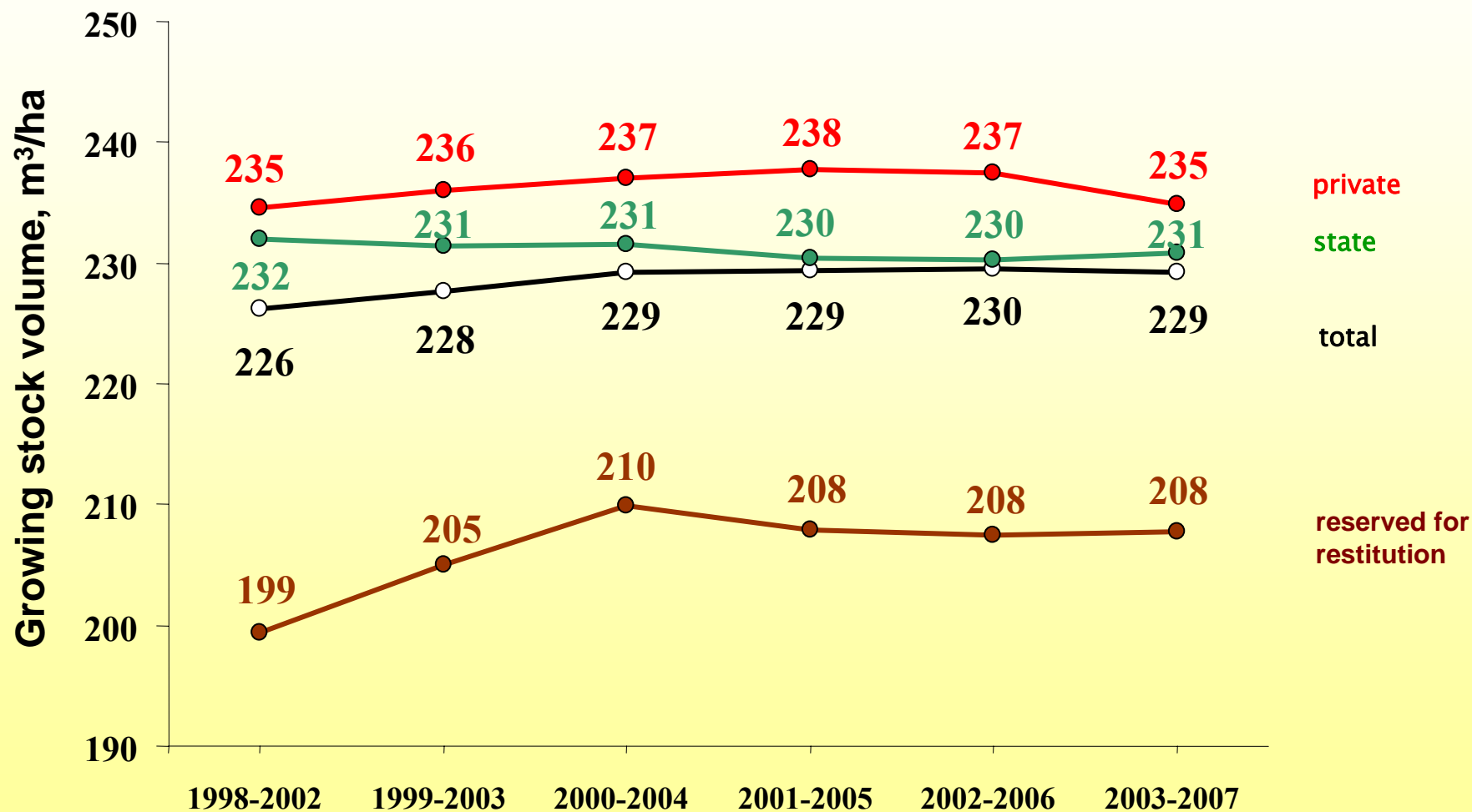
THE MAIN TENDENCIES IN LITHUANIAN FORESTS BY NFI 1998-2007 DATA



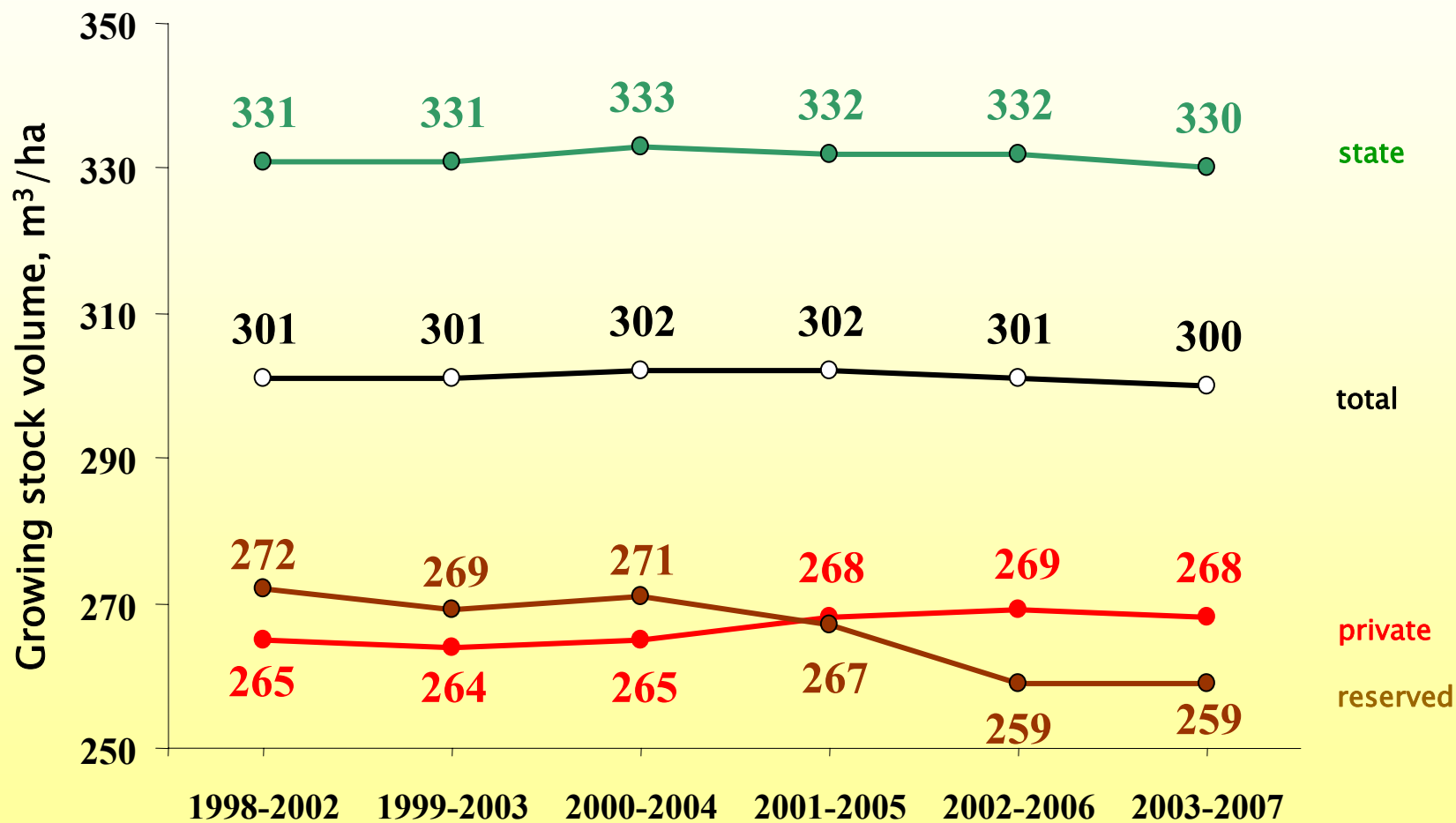
FOREST AREA INCREASES ANNUALLY BY 0.3% MAINLY DUE TO INCREASING OF BROADLEAVES AREAS



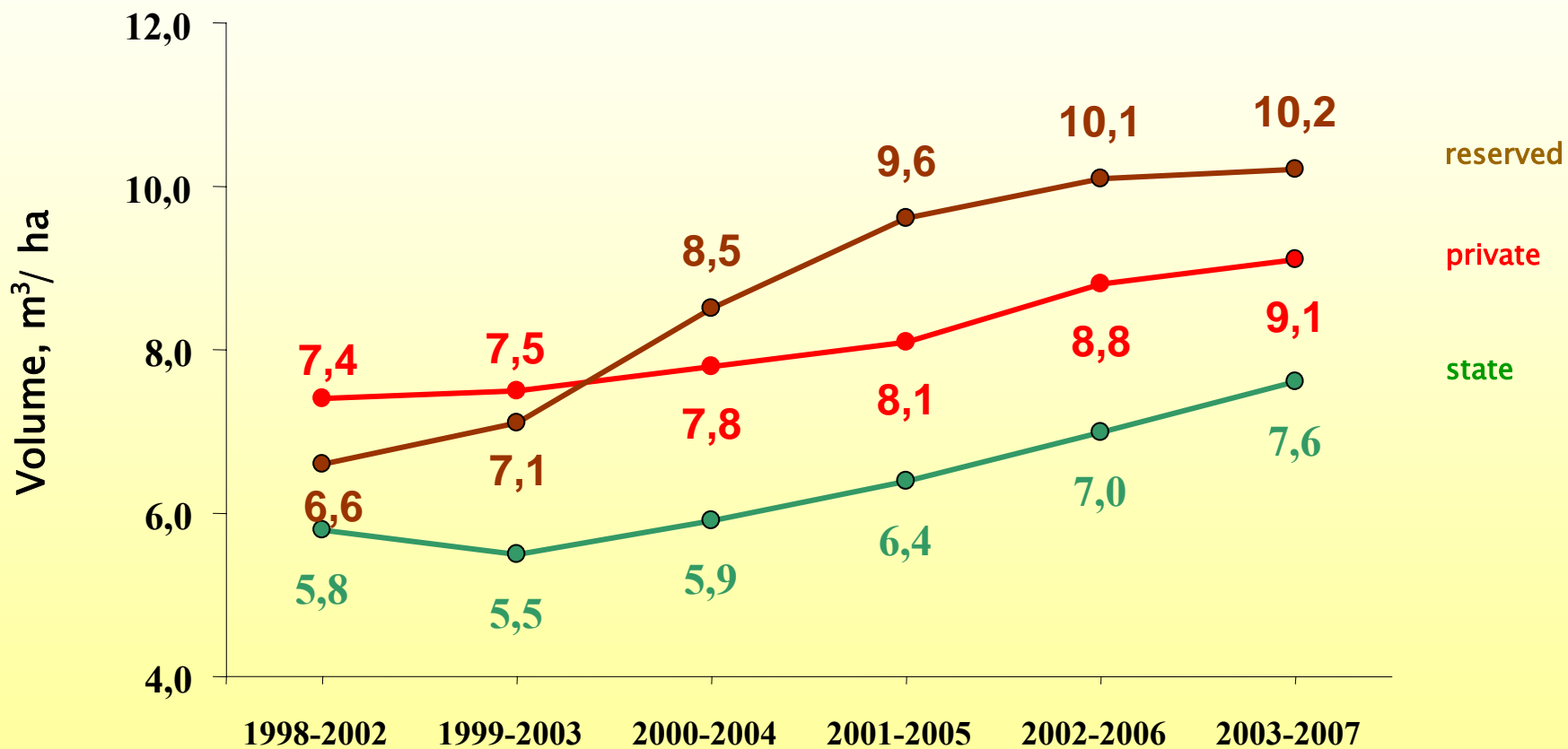
MEAN GROWING STOCK VOLUME IS STABLE, WHAT SHOWS BALANCE BETWEEN GROWTH AND FELLINGS



MEAN GROWING STOCK VOLUME OF MATURE STANDS IS VERY STABLE, WHAT SHOWS LIMITED WOOD INCREMENT ACCUMULATION FOR FINAL FELLINGS



VOLUME OF DEAD WOOD IN LITHUANIAN FORESTS DURING 5 YEAR INCREASED 1.3-1.5 TIMES, ANNUAL MORTALITY INCREASED FROM 2.9 UP TO 3.4 MILL. M³ OF STEMWOOD



FORESTRY EFFICIENCY CONTROL ACCORDING TO FOREST AREA AND WOOD GROWTH BALANCES

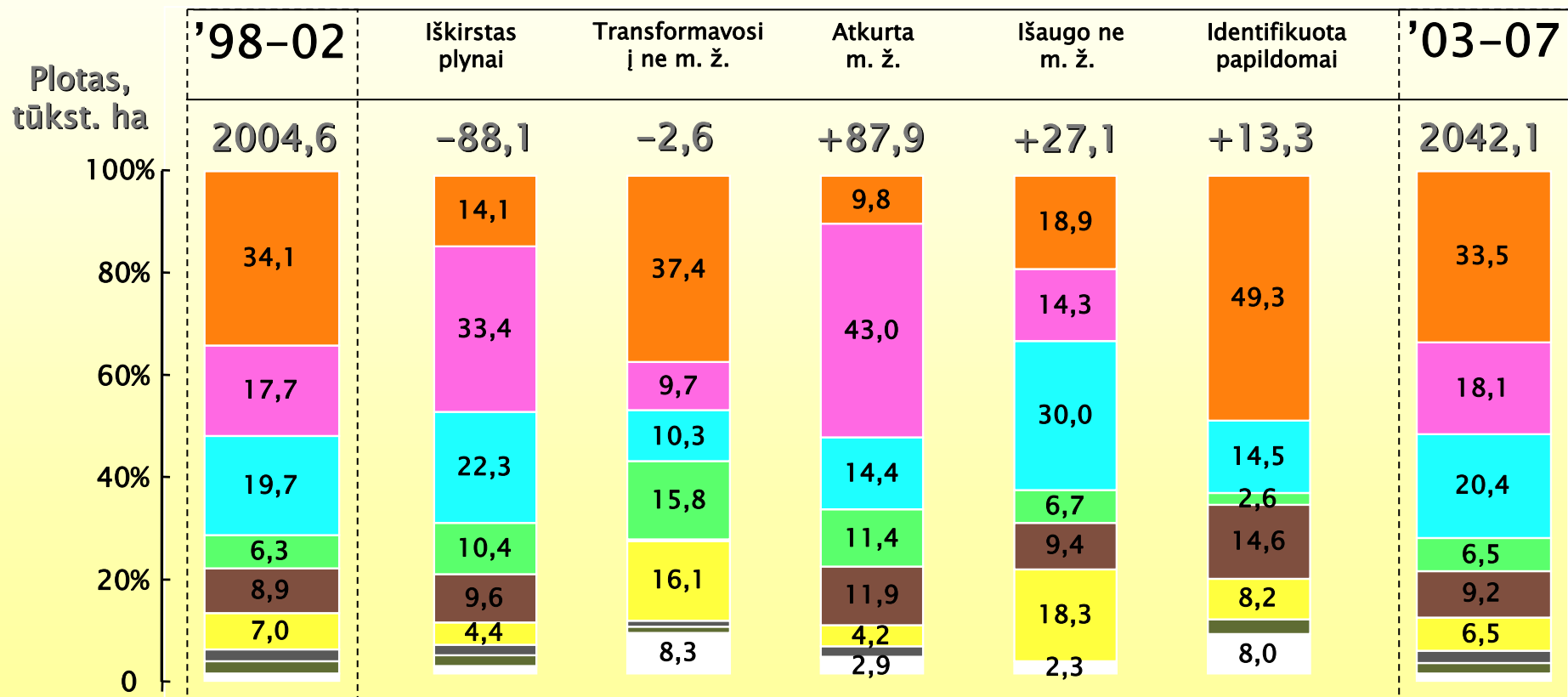


FOREST AREA BALANCE

All clear felled areas during 2003-2007 were regenerated.

Due forest regeneration, afforestation and deforestation forest stand area increased by 0.4%.

Share of pine, white alder stands has been decreased and share of spruce, birch and others broadleaves stands gave been increased.



■ Pušis ■ Eglė ■ Beržas ■ Drebulė ■ Juodalksnis
■ Baltalksnis ■ Ažuolas ■ Uosis ■ Kitos

m. ž. - miško žemė



NATURAL FOREST GROWTH LOSSES, %

Main report TBFRA-2000, 153, 189-191 p.p.

Europe - 8.7

Finland - 2

Austria - 5

Sweden - 7

Norway - 7

France - 9

Germany - 9

Switzerland - 10

Lithuania - 20

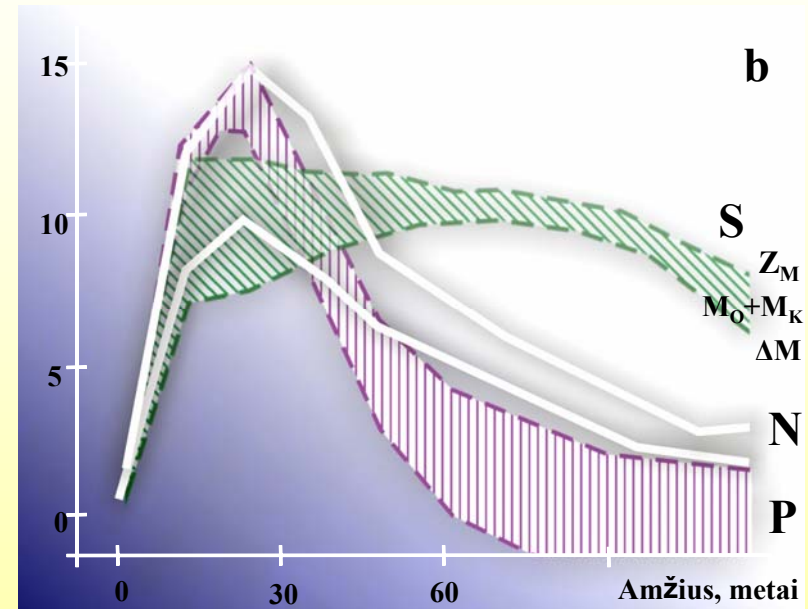
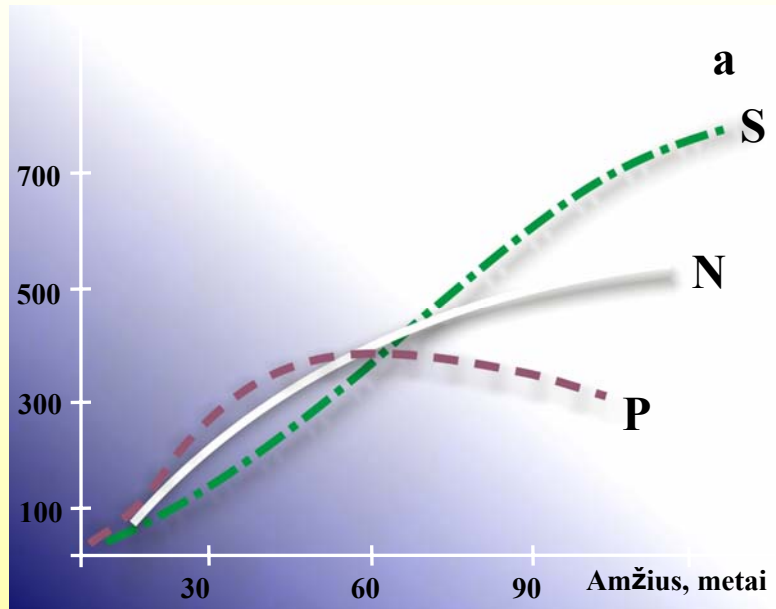
Latvia - 20

Estonia - 24

Russia - 27

Belorussia - 33

MODEL OF FOREST STAND GROWTH USING DIFFERENT TYPES OF STAND FORMATION



P - accelerated
N - normal
S - slowed

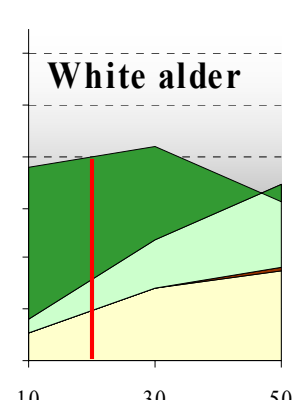
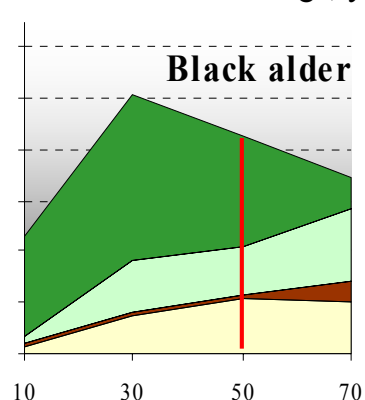
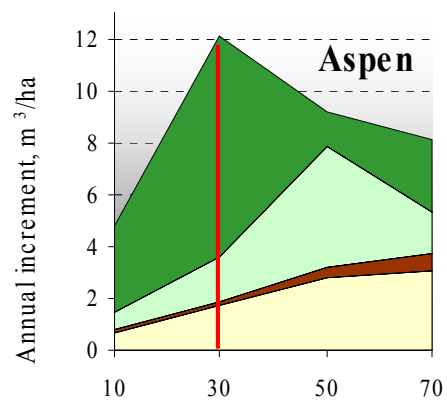
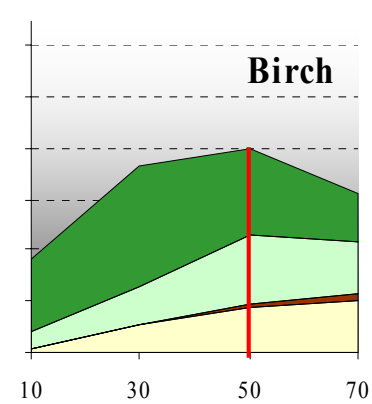
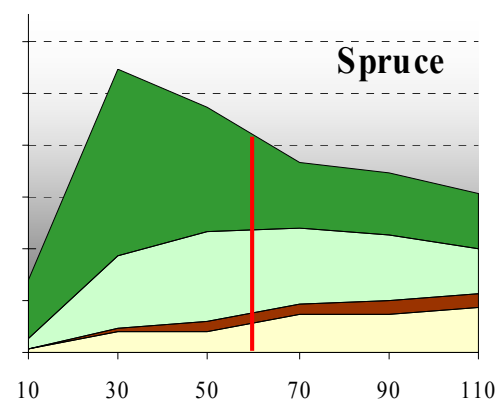
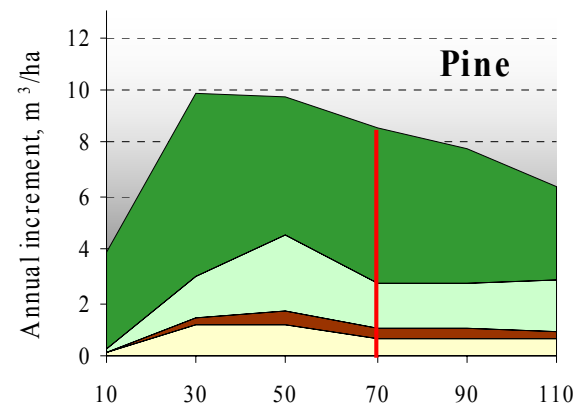
Z_M – gross increment
 M_O – mortality
 M_K – intermediate fellings
 Δ – accumulation to final fellings

WOOD GROWTH BALANCE DEPENDING ON FOREST STAND FORMATION TYPE

$$Z_M = \Delta + M_K + M_0$$

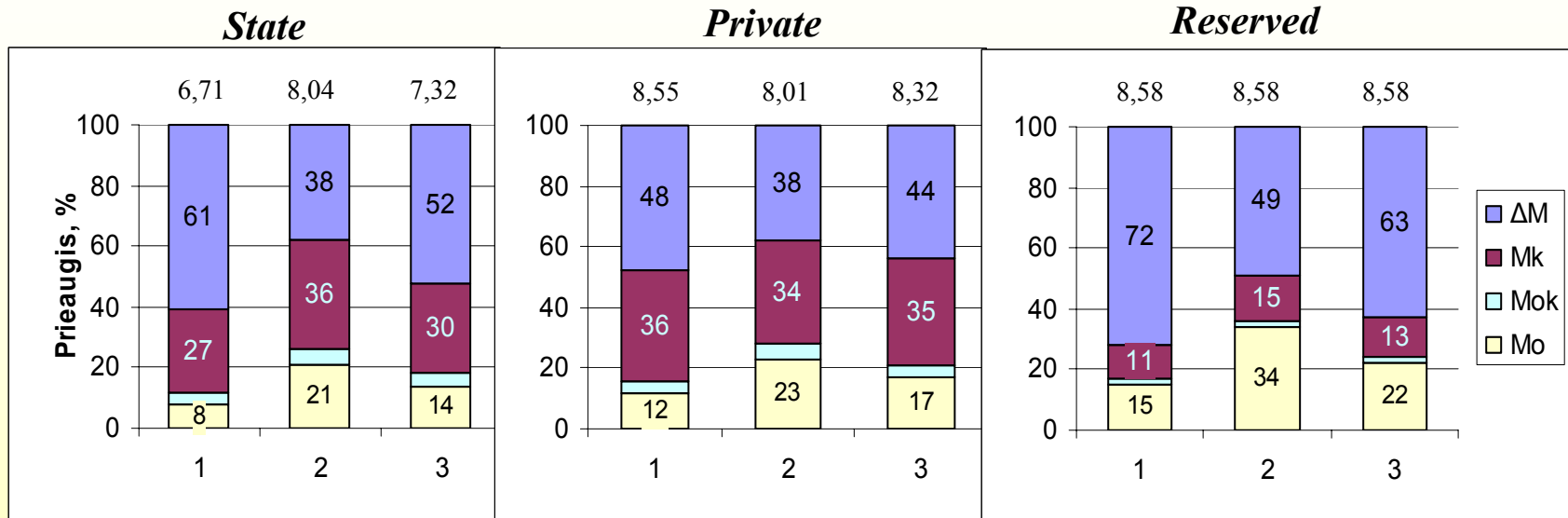
Accelerated	till 55	20-30	20-30
Normal	56-75	12-25	10-20
Slowed	76 and >	10-20	till 10

WOOD INCREMENT BALANCE IN COMMERCIAL FORESTS DEPENDING ON FOREST TYPE AND AGE



- Δm - increment accumulation
- M_k - intermediate fellings
- M_{ok} - dead wood fellings
- M_o - forest growth losses

WOOD INCREMENT BALANCE IN COMMERCIAL FORESTS DEPENDING ON OWNERSHIP AND AGE GROUP



$$Z_M = \Delta_M + M_K + M_{OK} + M_0$$

Δ_M – increment accumulation,

M_K – intermediate fellings of living trees

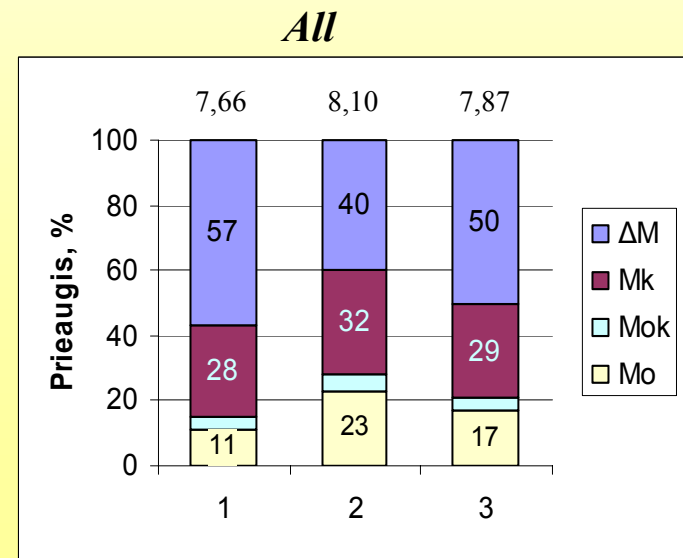
M_{OK} – intermediate fellings of dead trees,

M_0 – growing losses

1 – stands at the age of intermediate fellings

2 – stands older than age of intermediate fellings

3 – all stands



The possible reasons of high level of growth losses

- ❖ thinnings start too late
- ❖ the first thinnings are too low intensity, especially in broadleaves stands
- ❖ not enough intensity of precommercial thinnings, increasing intensity of intermediate fellings in older age shows commercial orientation of intermediate fellings what leads to the increasing of natural growth losses and decreasing of accumulation of increment for the final fellings

THANK YOU FOR ATTENTION

