

DEVELOPMENT OF BARK BEETLE OUTBREAKS IN SLOVAKIA FROM 1960 TO 2020

Andrej Kunca, Jozef Vakula, Christo Nikolov,
Andrej Gubka, Milan Zúbrik, Juraj Galko, Michal Lalík, Roman Leontovyč, Slavomír Rell

FORESTS' FUTURE 2021

Consequences of Bark Beetle Calamity for the Future of Forestry in
Central Europe

Two days on-line meeting March 23rd – 24th



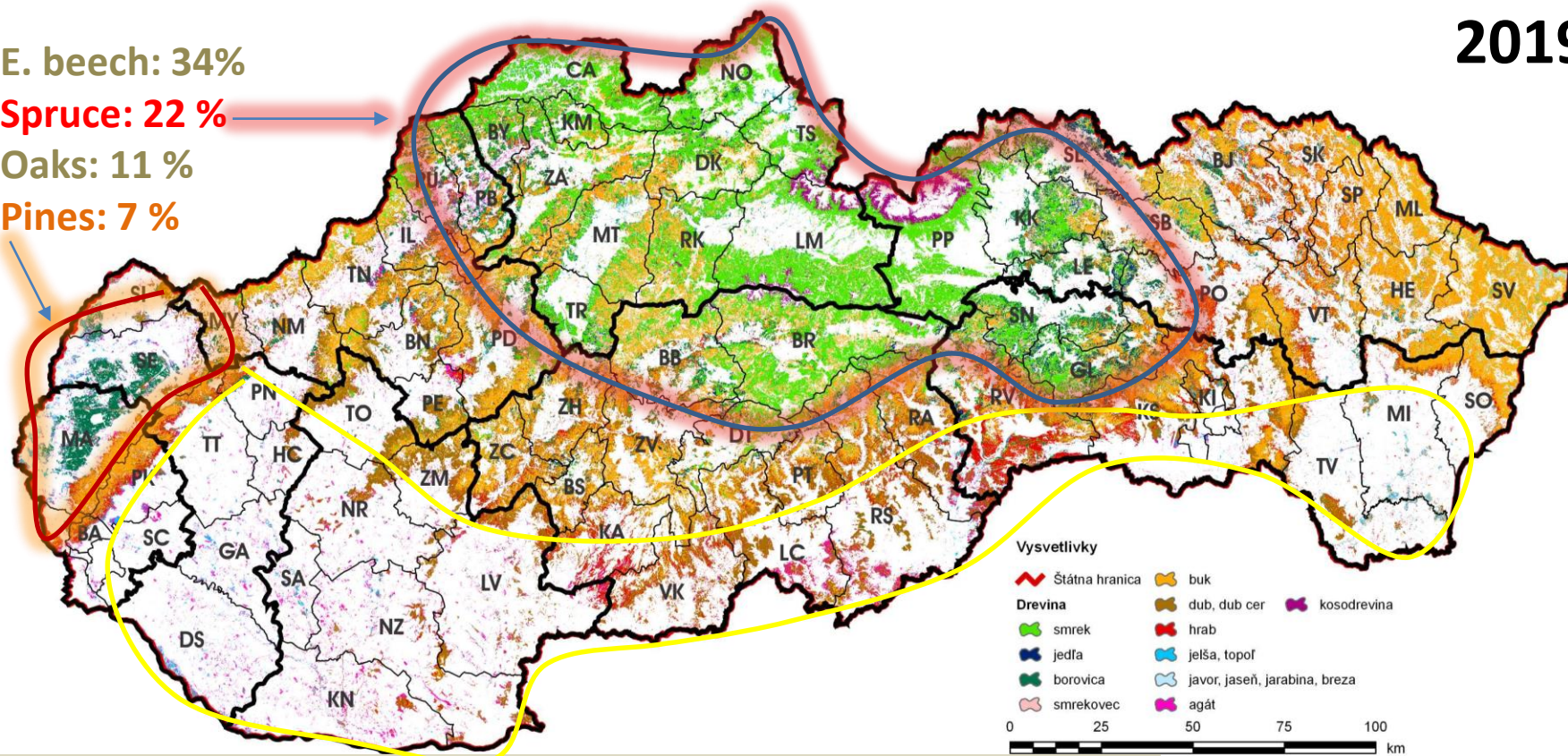
2019

E. beech: 34%

Spruce: 22 %

Oaks: 11 %

Pines: 7 %

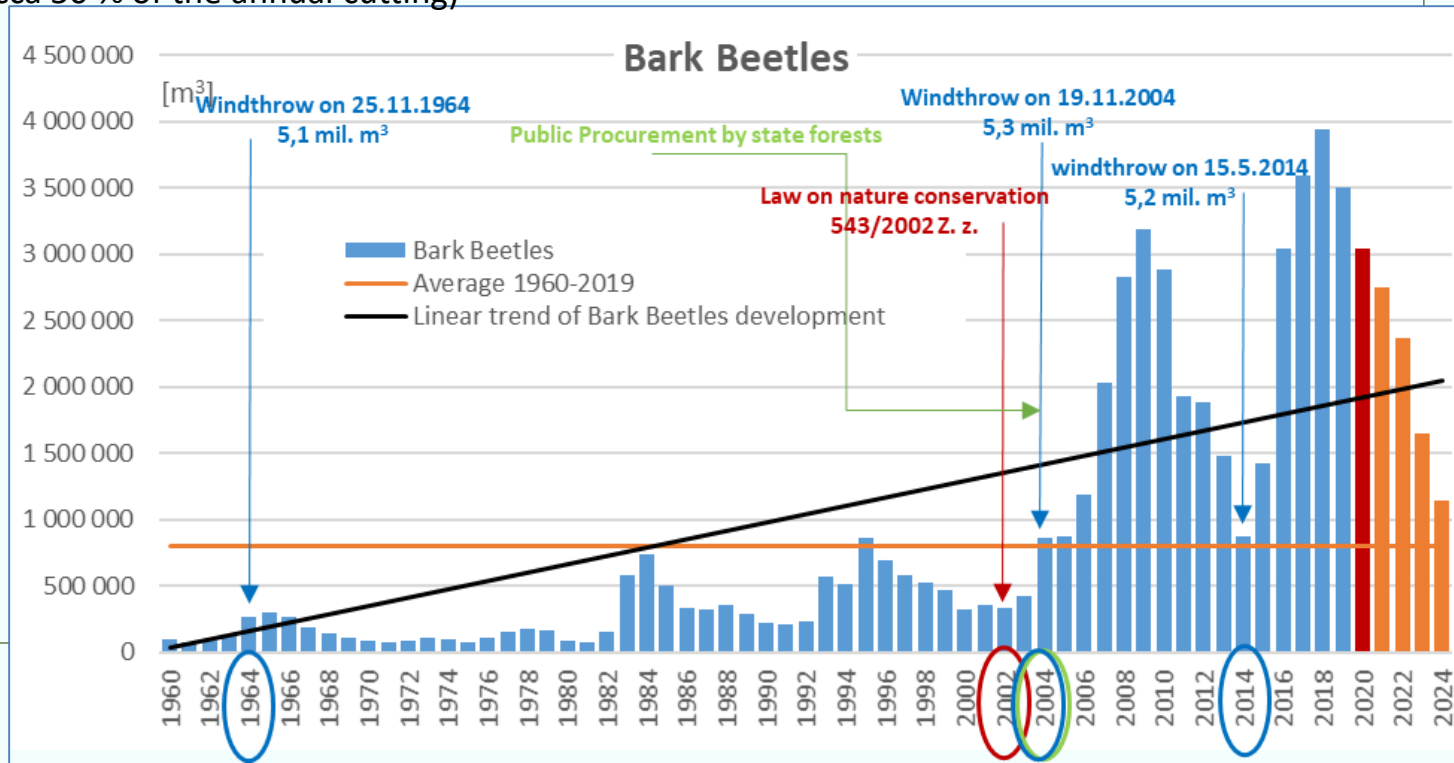


- Area: 4,9 mil. ha
- Forest Coverage: 2 mil. ha (40 %)
- Wood Stock: 450 mil. m³ (225 m³/ha)
- Annual Felling Volume: 4.0-10.2mil. m³
- Sanitary Felling: 0.4-6.3 mil. m³



Predisposing factors

- 2002: Law on Nature Conservation – increasing administration, many obligations and obstacles
- 2003: Drought (later 2012, 1015, 2018)
- 2004: Public procurement – increasing administration
- 2004: Windthrow „Alžbeta“ on November 19, 2004
 - 5.3 mil. m³ (cca 50 % of the annual cutting)
- 2010: High total annual precipitation in western Slovakia – sanitary felling was not processed in stands with Pines
- 2014: Windthrow „Žofia“ on May 15, 2014
 - 5.2 mil. m³ (cca 50 % of the annual cutting)



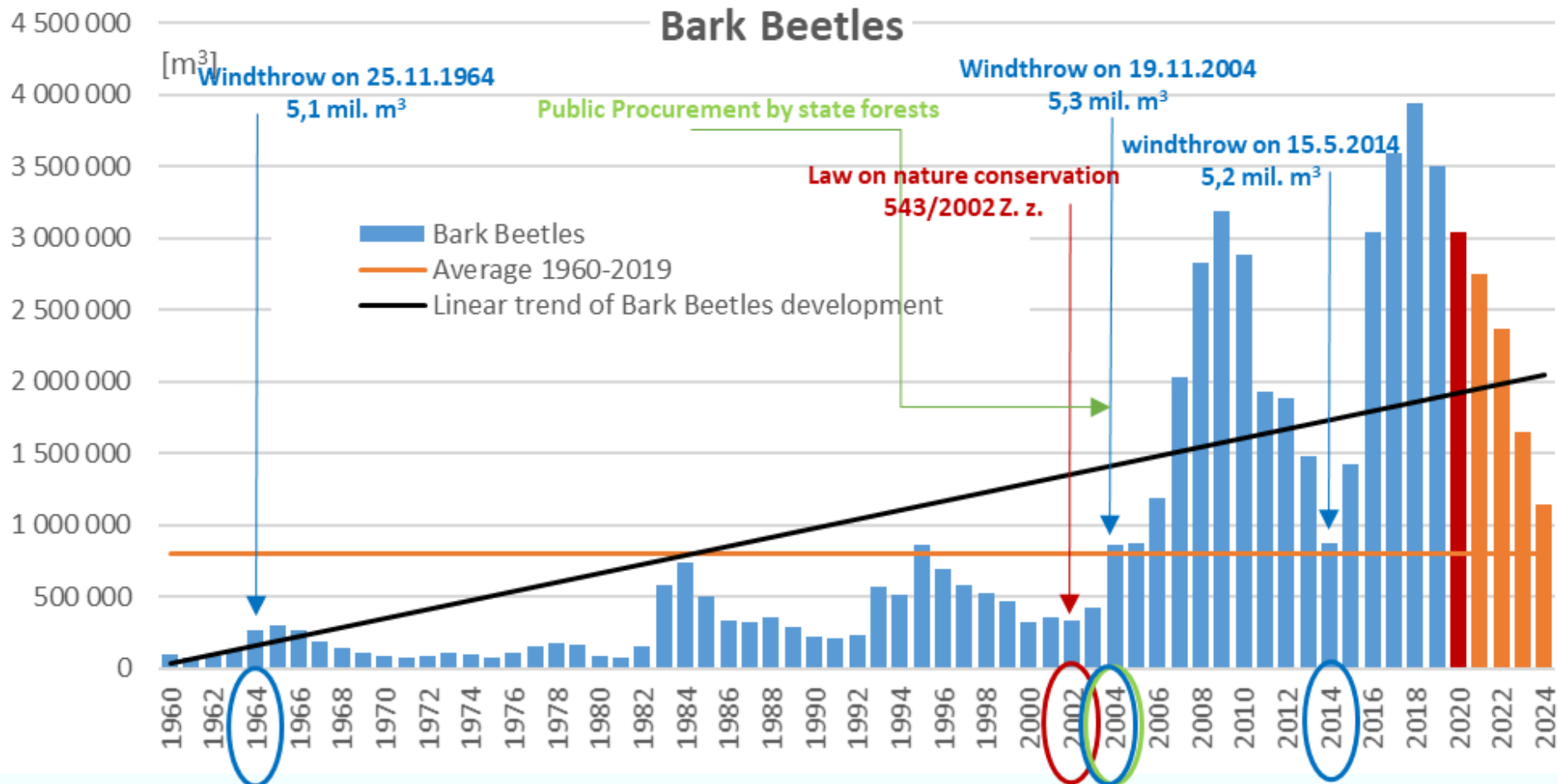
Bark Beetles Outbreak - Culmination

2004 Nov. → **2009** (culmination of BB outbreak in the 5th year after Windthrow Alžbeta)

2009: BB felling – 3.2 mil. m³

2014 May → **2018** (culmination of BB outbreak in the 4th year after windthrow Žofia)

2018: BB felling – 3.9 mil. m³



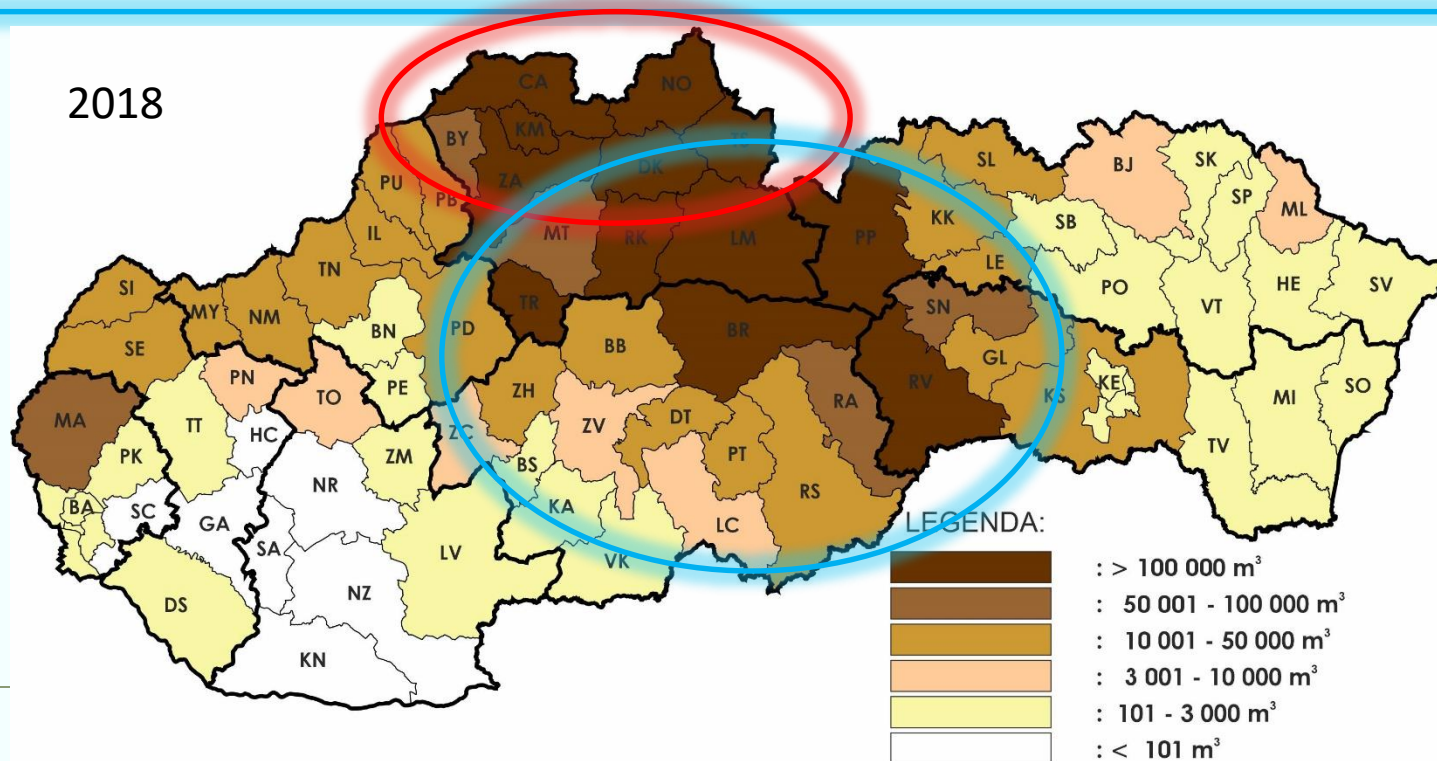
Sanitary felling of Spruce per 1 ha

Spruce coverage in 2019: **23% = 460 th. ha**

Sanitary felling of spruce due to bark beetles in 2020 (exp.): **6,5 m³/ha**

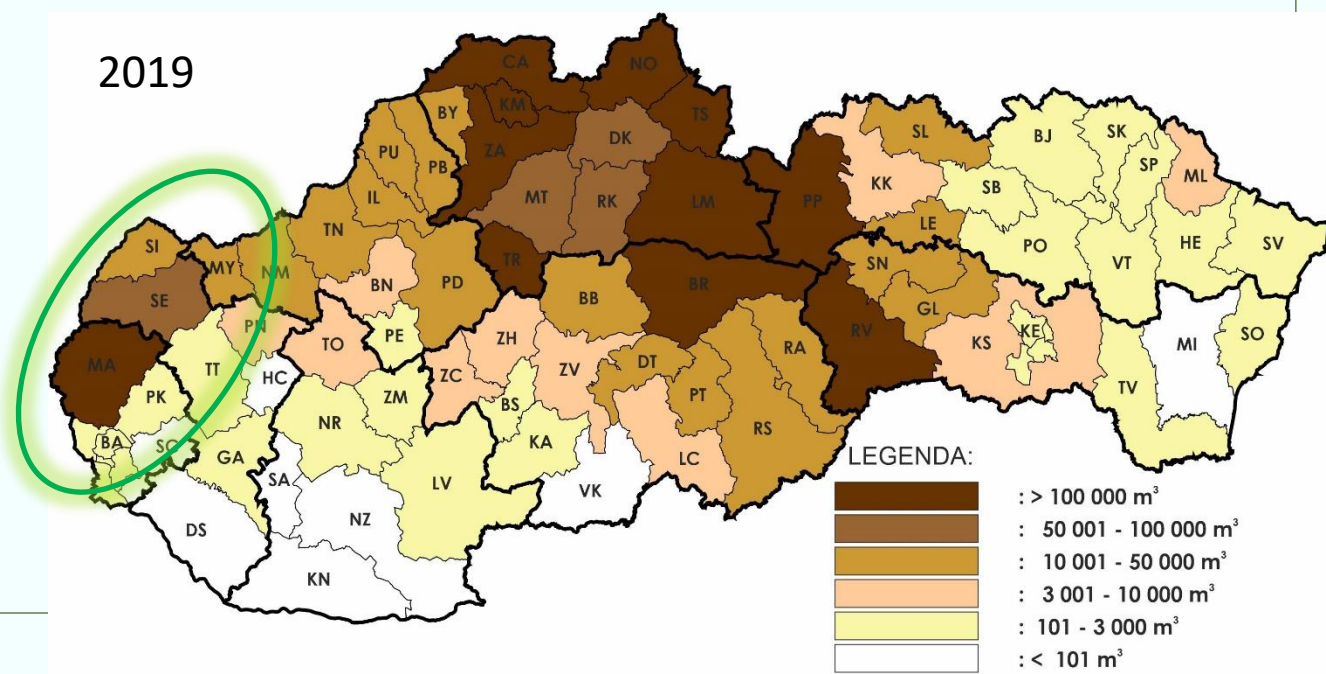
Two models:

- 1. Physiological stress (drought, immissions) + *Armillaria* spp. → bark beetles outbreak – northern Slovakia - 90s of the 20th. century
- 2. Windstorms → bark beetles outbreak – Central Slovakia with granit (mother rock), after 2004

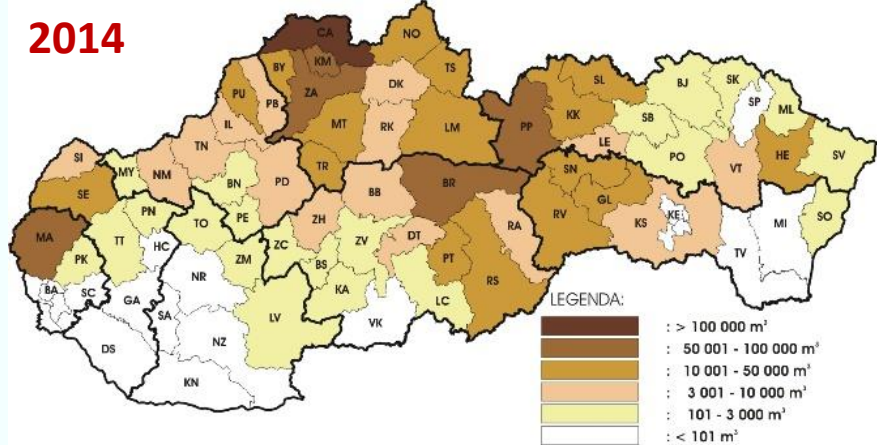


Sanitary felling of Pines – western Slovakia

- Affected: *Pinus sylvestris*
- Bark beetles: *Ips acuminatus*, *Ips sexdentatus*, less common *Phaenops cyanea*, *Orthotomicus longicollis*, *Tomicus* spp.
- Predisposing factors:
 - sandy soils
 - drop of underground water
 - High temperature
 - Low precipitations
- Foliage defoliation
- Mistletoe *Viscum album* very common
- Dying pines often without bark beetles, just with black fungi (*Ophiostoma* spp. etc.)
- Sanitary felling ascribed to bark beetles:
 - 2017: **75 tis. m³**
 - 2019: **220 tis. m³**.

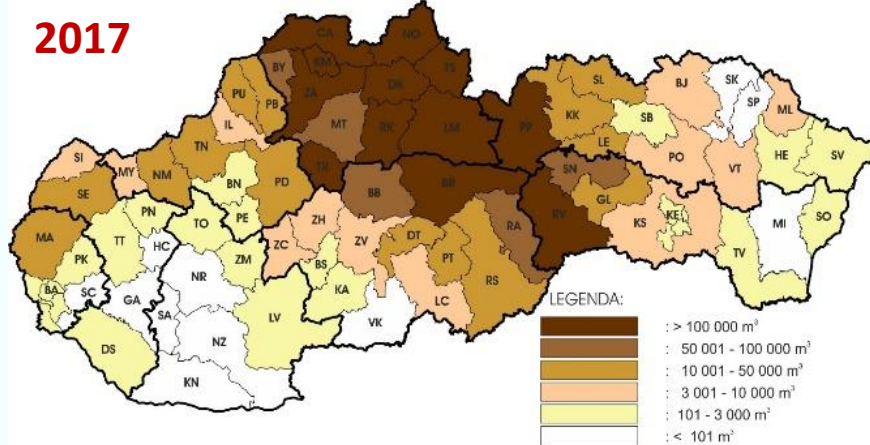


2014



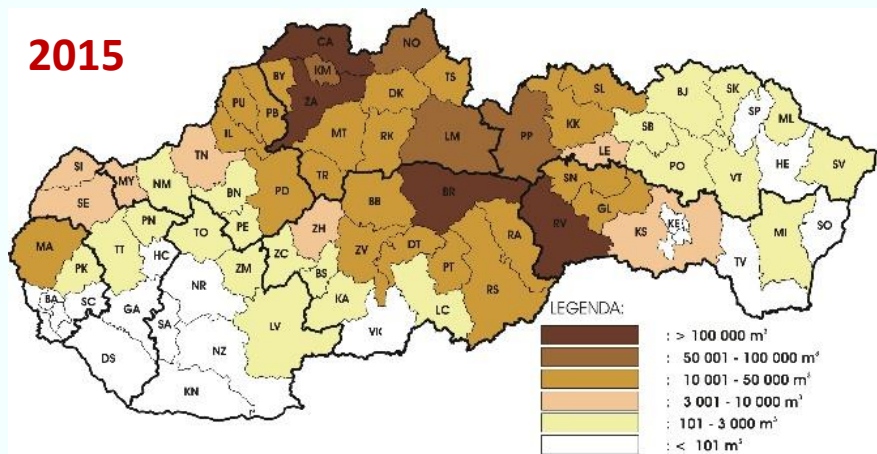
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2017



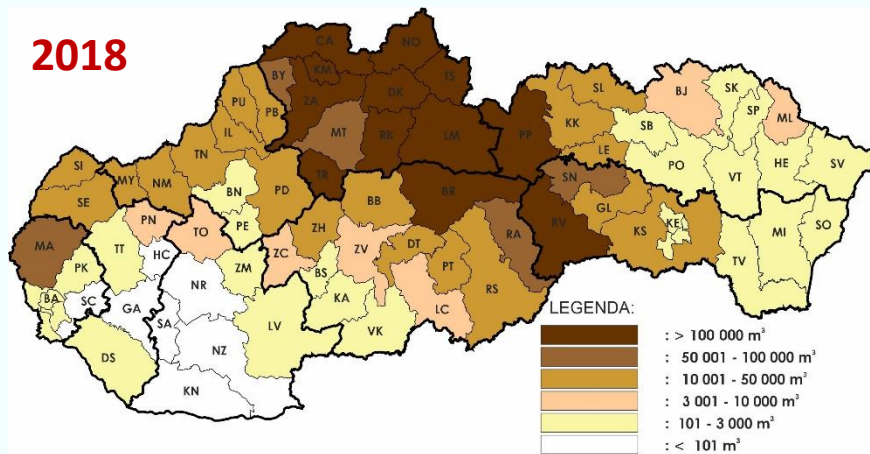
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2015



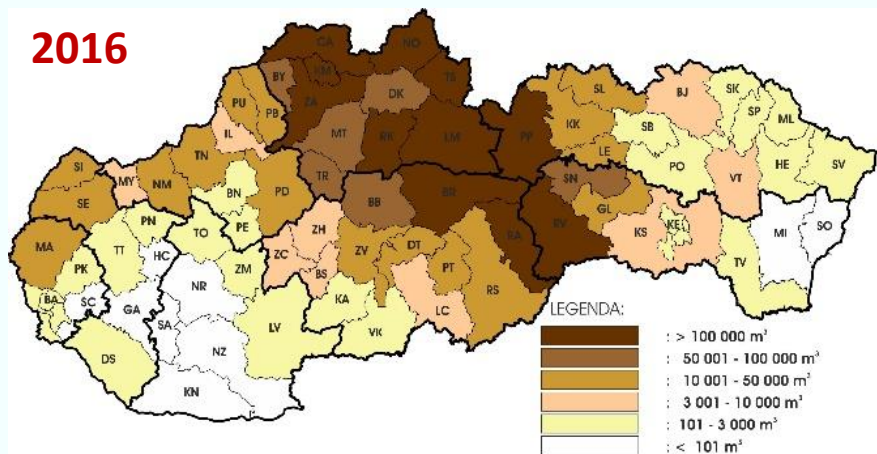
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2018



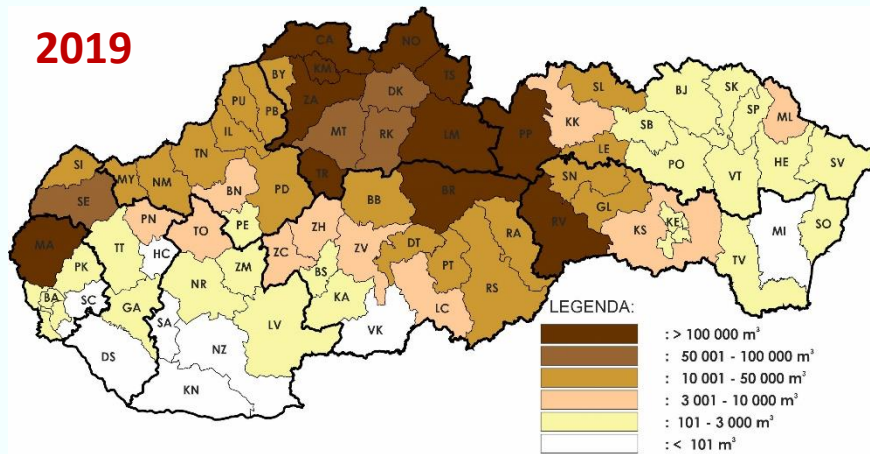
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2016



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2019



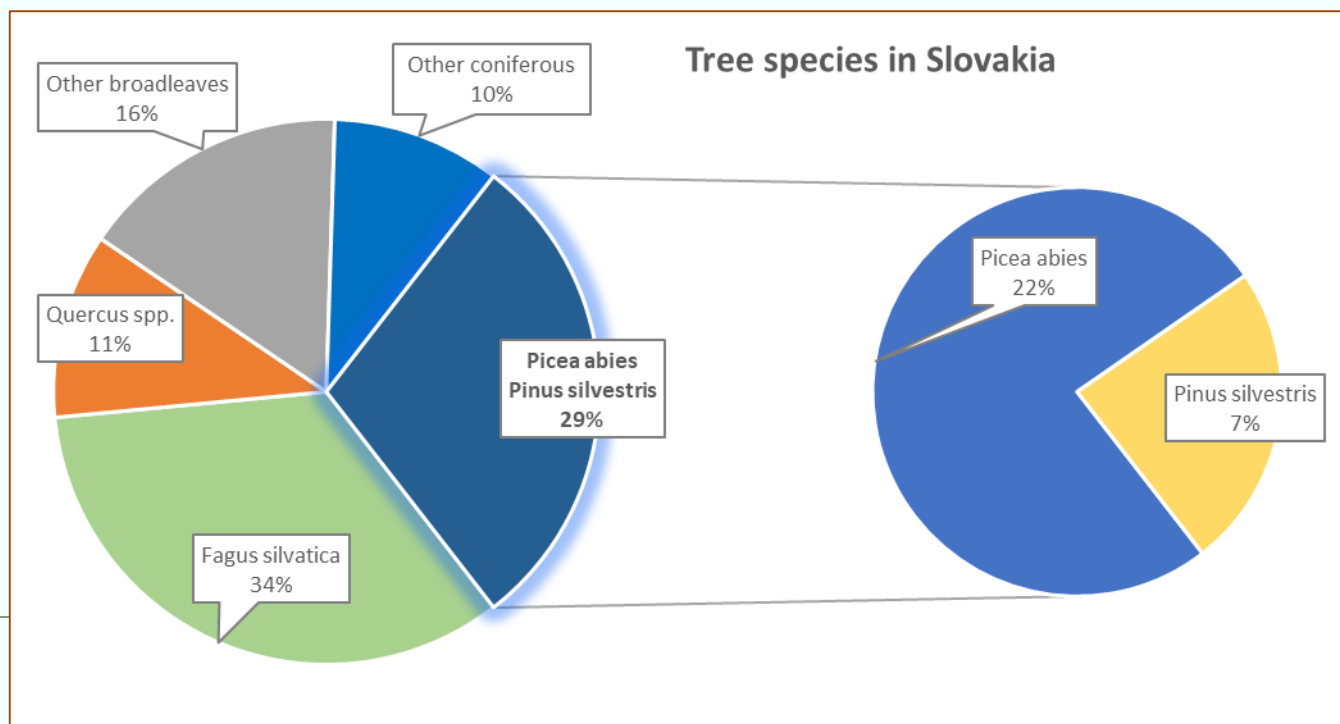
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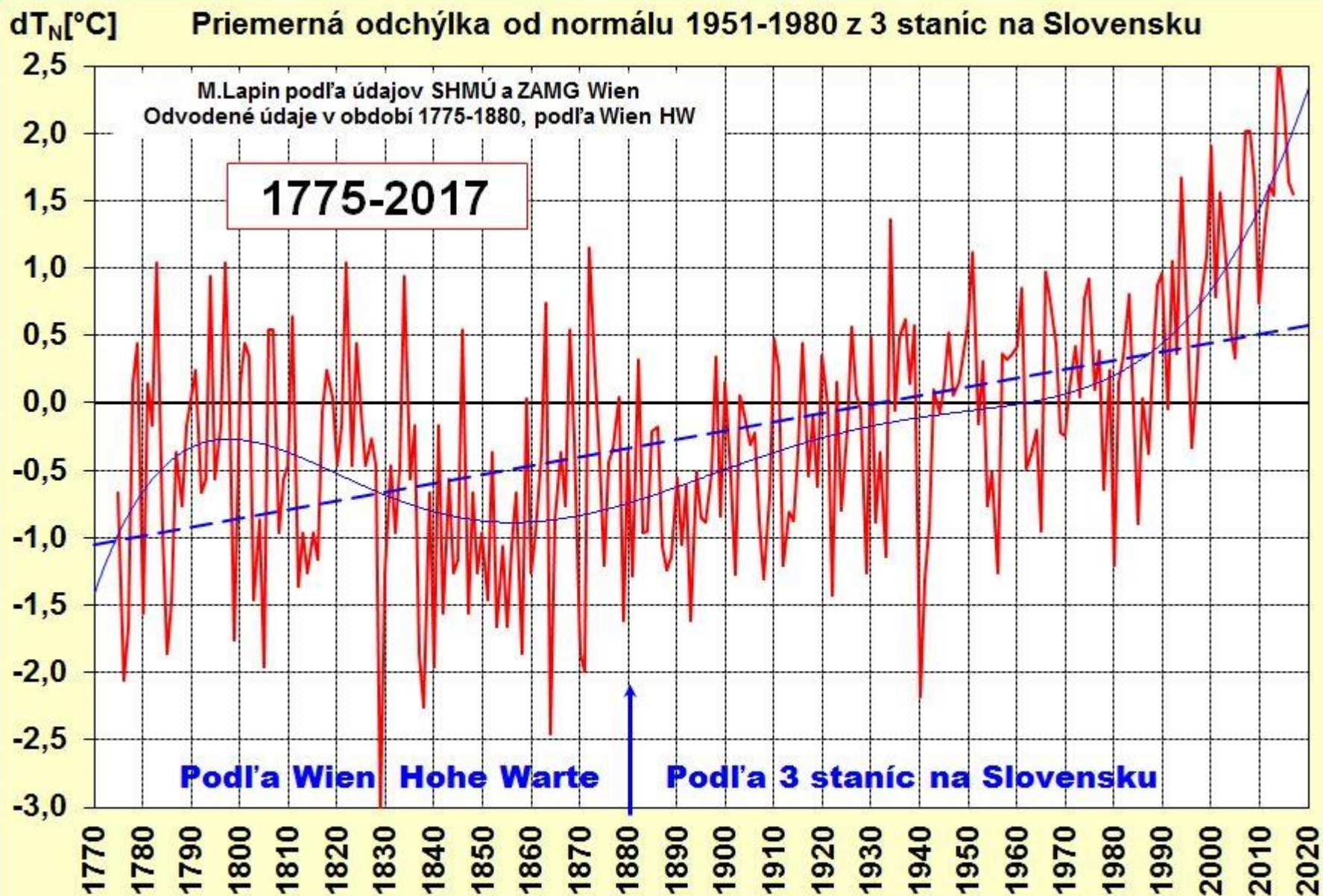
Tree composition change

2000 → 2019 **spruce** occurrence decreased from 26.8 to 22.5 %
in 20 years by 4.3 %

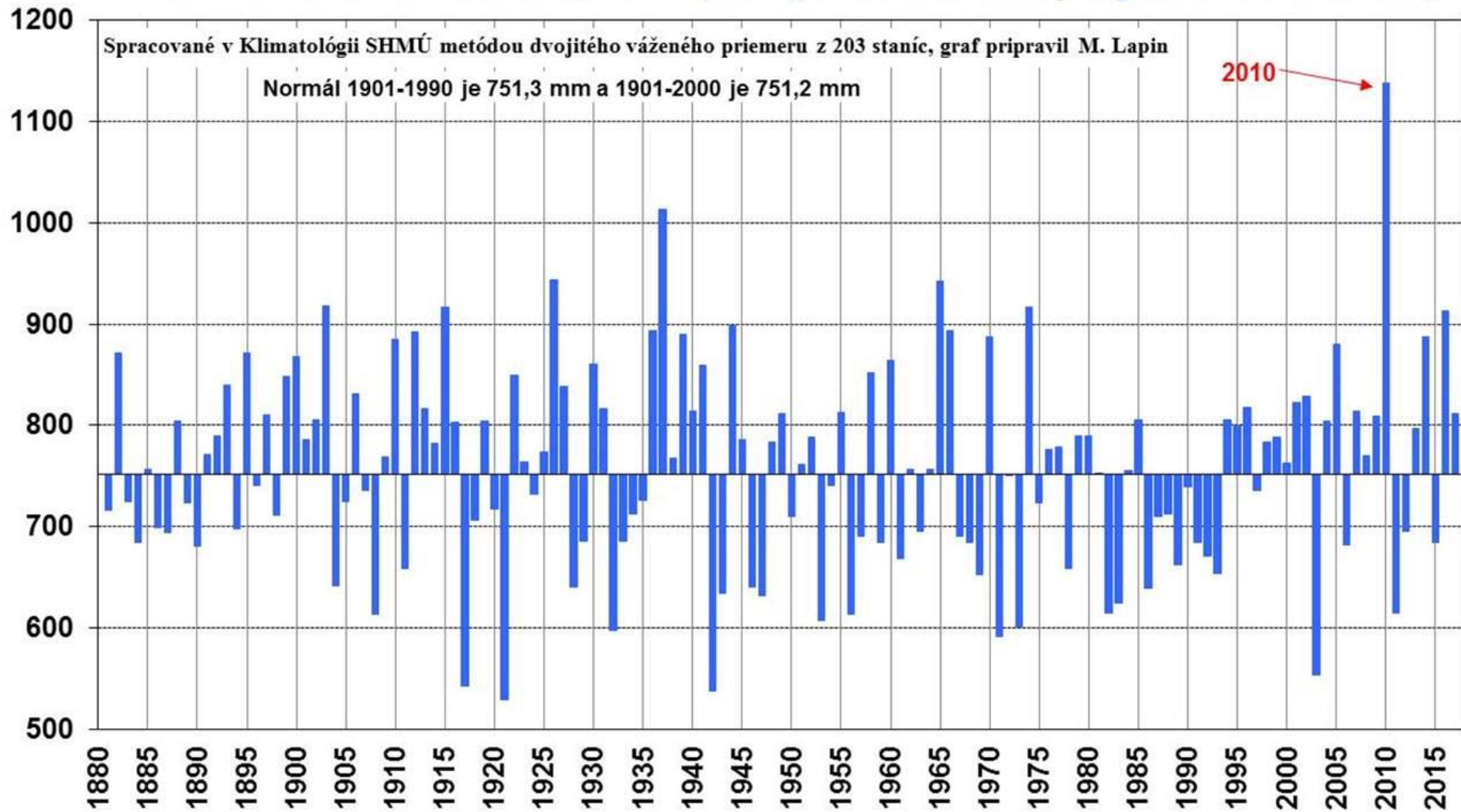
2000 → 2019 **pine** occurrence decreased from 10 to 7 %
In 20 years by 3 %

2019



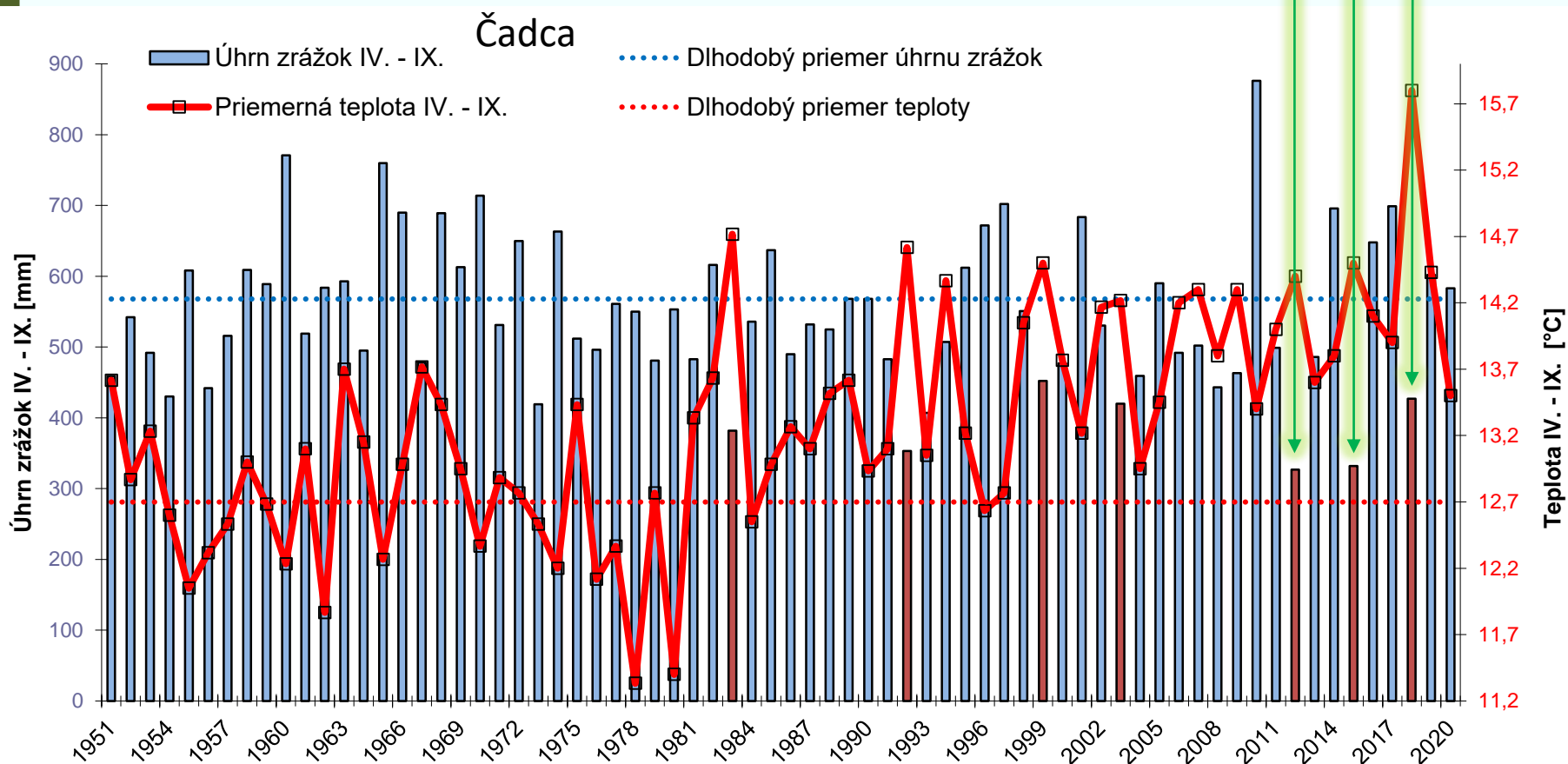


Územné priemery úhrnov zrážok z 203 staníc na Slovensku v porovnaní s priemerom 1901-1990
za 12 mesiacov I-XII v rokoch 1881 - 2017 (January to December mean precipitation totals in Slovakia)



Drought – vegetation season (April to September) – Northern SVK

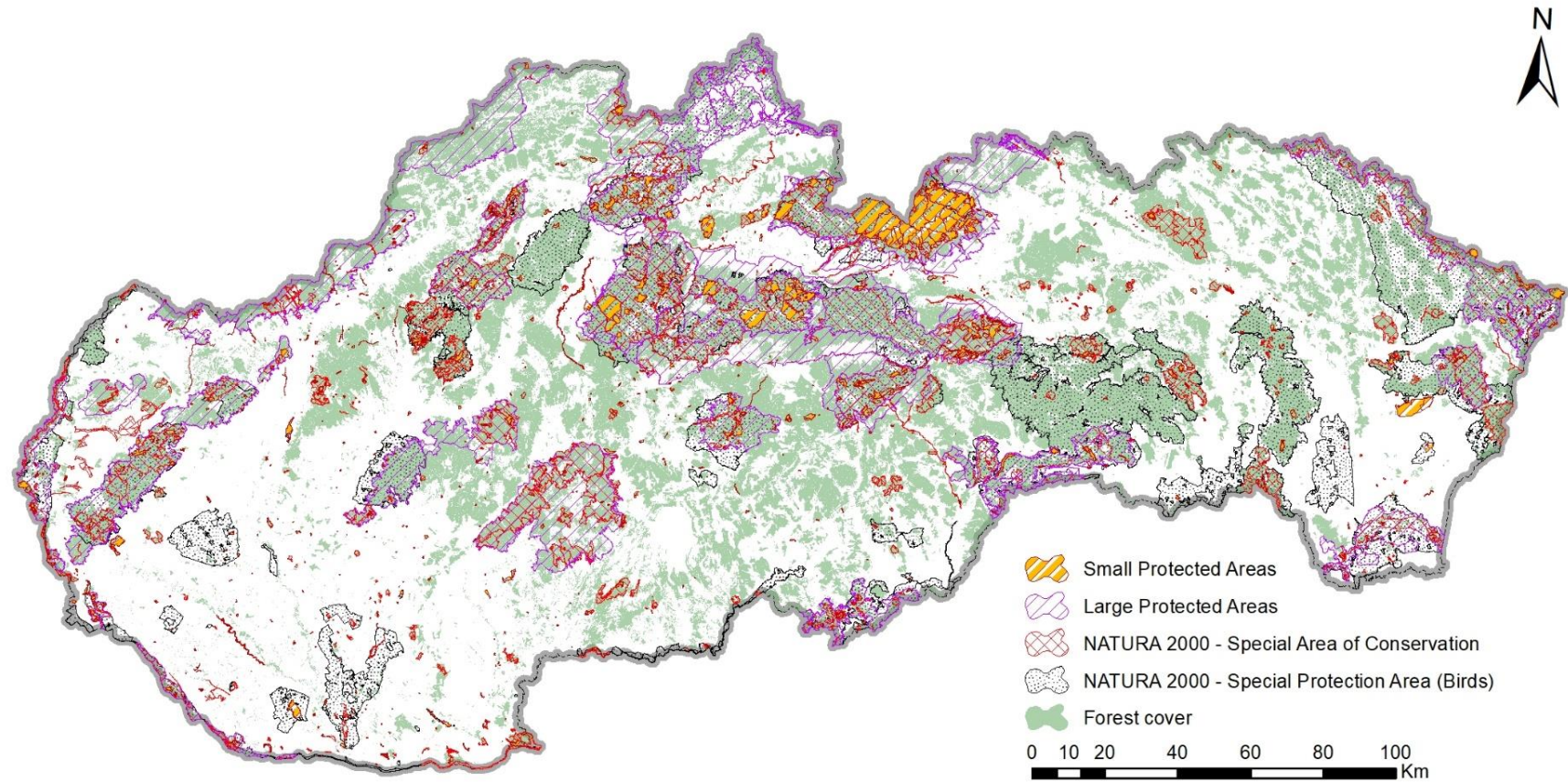
- 2012, 2015, 2018
- **2018** warmer by **3,1°C**, precipitation just **75 %** from longterm average
 - 1. physiological stress for trees
 - 2. accelarating the bark beetles development
- *Armillaria* spp. – longterm attacks

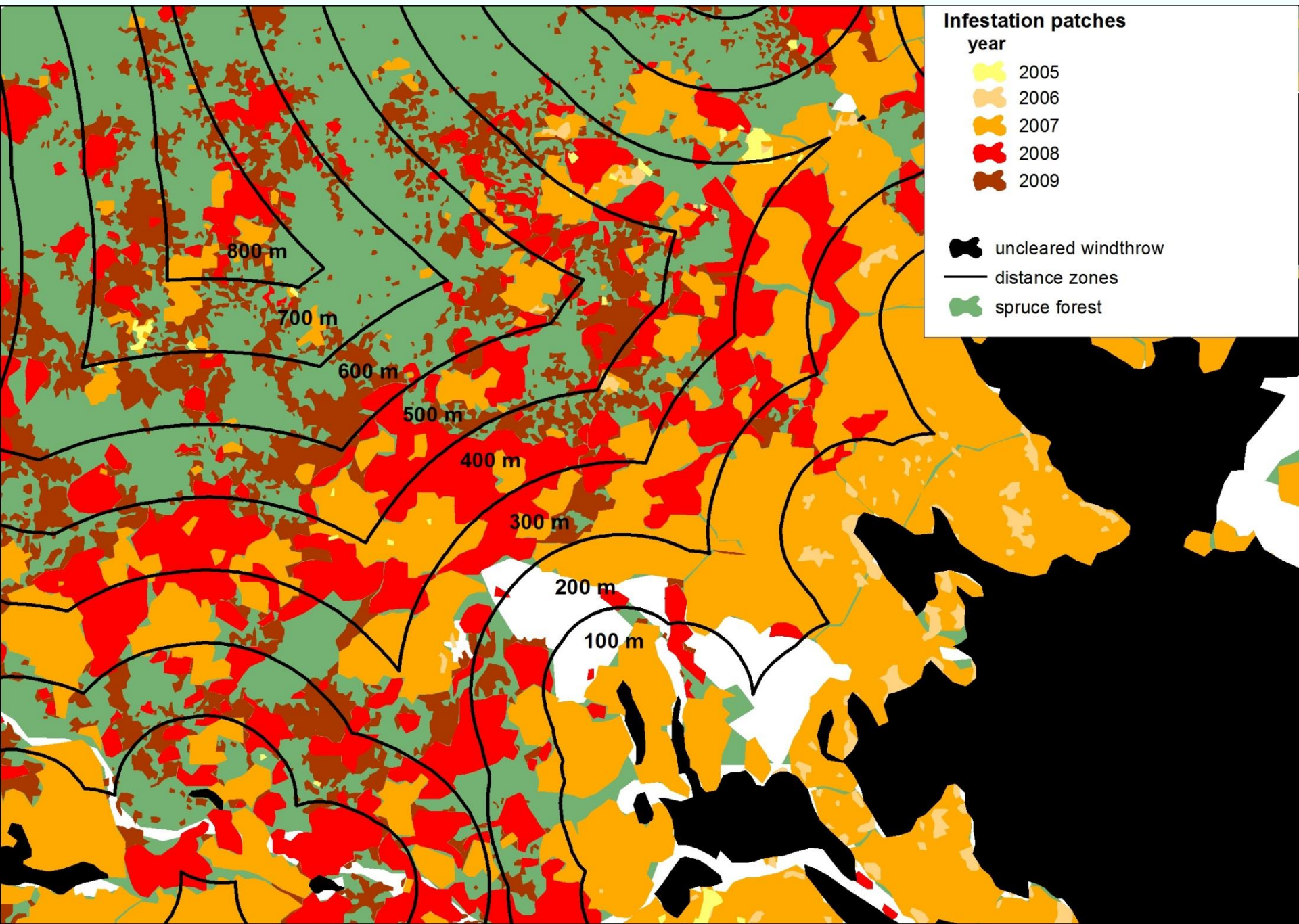


New obstacles in management

- **Public procurement** for state forests (for not state forests only if they realize project paid by state or EU)
- Forest **jobs** are financially not attractive
- **Low prices** of big amount of wood in the free market
- New **nature conservation areas** – primavel forests, *Tetrao urogallus* biotops, etc.
- Non state forest owners – **economic problems** to manage forests







Present and Future Management

Obstacles for:

- sanitary felling
- using pesticides

- State tends to pay for **Zero Management in Forests**
- **Ministry of the environment** wants to take the administration over forests presently managed by Ministry of agriculture



Conclusions

- Factors:
 - Drought, Heat
 - Nature conservation biotops
 - Market
 - Windthrow damages

- Processing wood (infested or attractive for infestation)
 - **in time** and
 - **completely** is **not a priority!**

The same applies to state as well as to non state forest owners



Pinus strobus



YouTube

LOS Banská Štiavnica
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YouTube SK

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ZORADIŤ PODĽA

<https://www.youtube.com/watch?v=HwdEDM1JEwQ&t=12s>

Bielovodská dolina (TANAP, Tatranská Javorina)

17 zhlíadnutí • pred 2 dňami

Listožravé druhy škodcov na Slovensku a premoženie...

26 zhlíadnutí • pred 3 dňami

Zadné Mečodoly (TANAP, Tatranská Javorina)

291 zhlíadnutí • pred 6 dňami

Kalamity a využitie rôznych mapových aplikácií / Impact...

25 zhlíadnutí • pred 1 týždňom

Skody námrazou v Štiavnických vrchoch / Fros...

14 zhlíadnutí • pred 2 týždňami

Lykožrút bukový / Taphrorychus bicolor

78 zhlíadnutí • pred 2 týždňami

https://www.youtube.com/watch?v=xHfwrx_GTIM

Lykožrútová kalamita na Slovensku/Spruce bark...

51 zhlíadnutí • pred 1 mesiacom

Cervotoč na kmeni smreka/Anobidae in the...

17 zhlíadnutí • pred 5 mesiacmi

Štiepkovanie zvyškov napadnutých...

33 zhlíadnutí • pred 6 mesiacmi

PASÍVNY vs. AKTÍVNY MANAŽMENT/PASSIVE vs....

16 zhlíadnutí • pred 6 mesiacmi

Semenná úroda smreka a jedle v roku 2020.

6 zhlíadnutí • pred 6 mesiacmi

PRIRODNÁ REZERVÁCIA SOKOLEC (5. stupeň ochrany...

14 zhlíadnutí • pred 6 mesiacmi

Imelovec európsky (Loranthus europaeus)

64 zhlíadnutí • pred 1 rokom

Letecké práce LOS, 2019

95 zhlíadnutí • pred 1 rokom

Bielovodská dolina, október 2019

35 zhlíadnutí • pred 1 rokom

Experimentálne ošetrovanie sadenic proti trvdňom...

9 zhlíadnutí • pred 1 rokom

Lymantria dispar, SK, 2019

177 zhlíadnutí • pred 1 rokom

Cryptostroma corticale, Slovakia (Trenčín) 2019

11 zhlíadnutí • pred 1 rokom

Acknowledgement

This work was financially supported by the Ministry of Defense of the Slovak Republic as a part of the project:

„Zvyšovanie úrovne ochrany kritickej infraštruktúry - výskum nových, ekologicky akceptovateľných metód boja so škodcami lesa na území v správe podniku Vojenské lesy a majetky SR, š. p.“



THANKS FOR THE ATTENTION!