Fire management as habitat restoration and maintenance mechanism – experience of successes and challenges from Belarus

Dr. Alexander Kozulin,
Scientific and Practical Centre for Bio-Resources

One of the main threats to the fen mire ecosystem is accumulation of old vegetation:

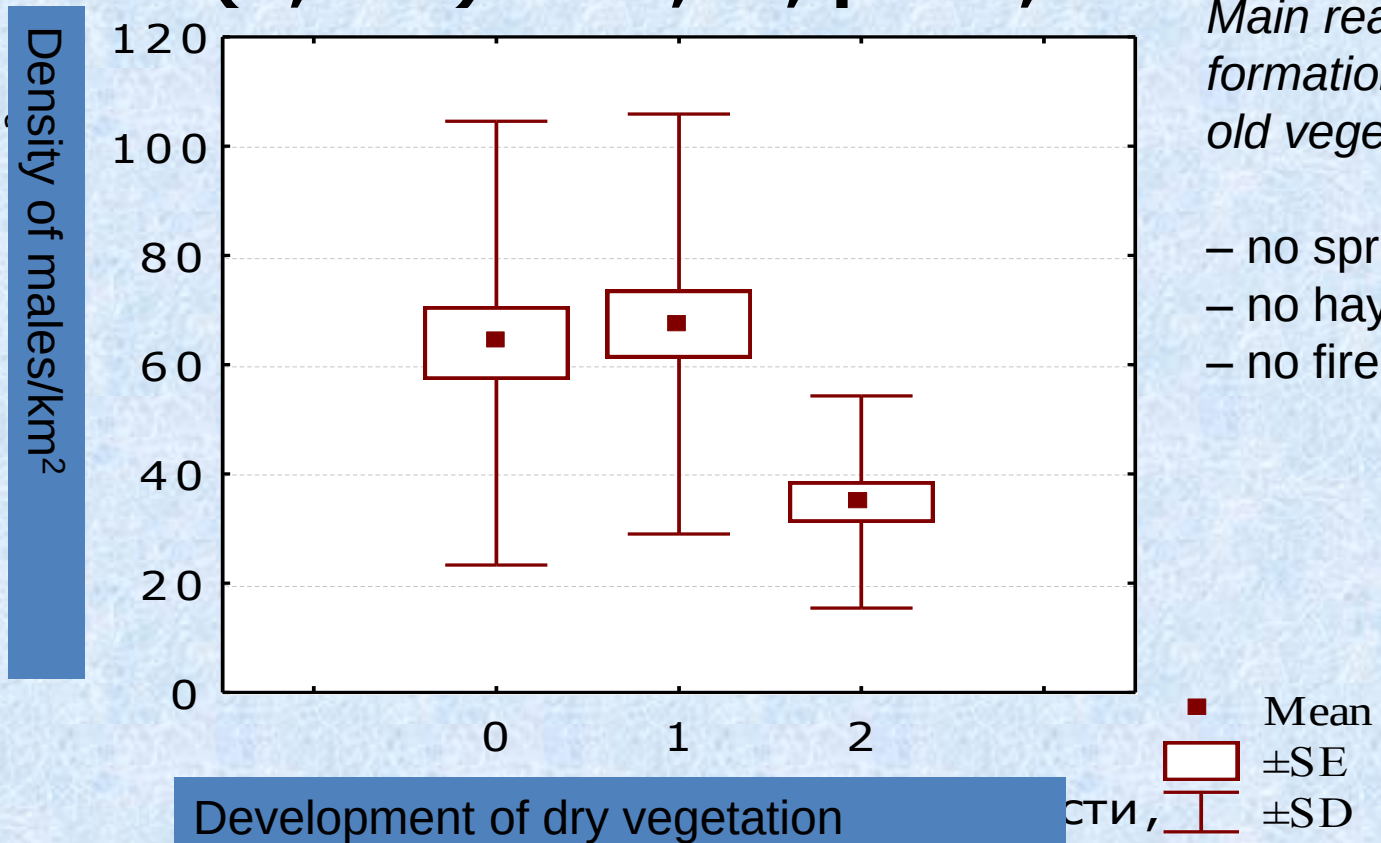
- **Decline of vegetation productivity;**
- **Decline of density of Aquatic Warbler;**
- **Decline of biomass of insects**

Conditions that contribute to the accumulation of old vegetation:

- Absence of spring floods and burning of vegetation during two or more years.

Impact of Dry Vegetation Accumulation on AW Population Density

KW-H(2,102) = 13,63, p < 0,01



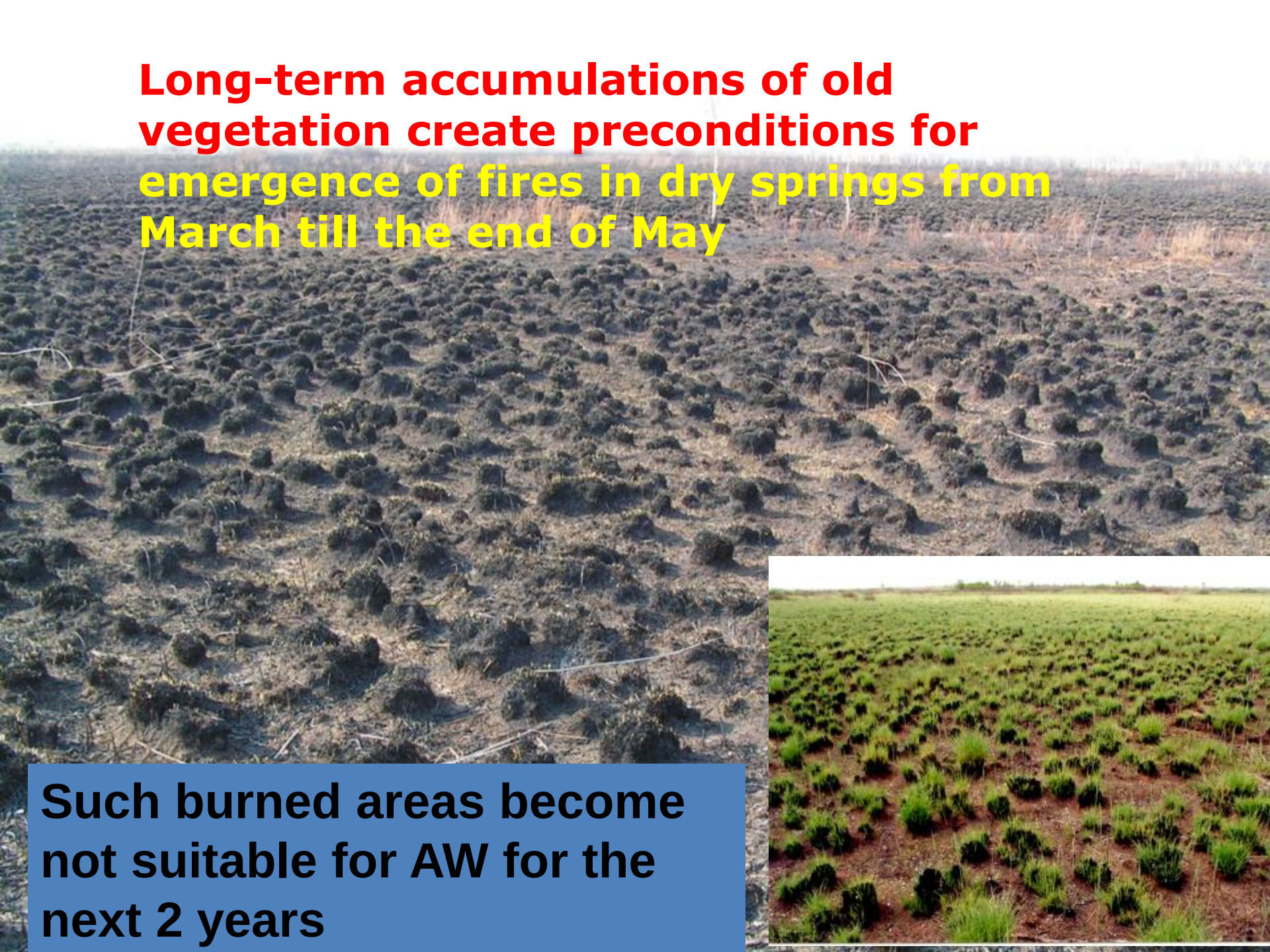
Development of dry vegetation

Main reasons of the formation of a thick layer of old vegetation:

– no spring floods;
– no haymaking;
– no fire.

0: no dry vegetation (0-49%);
1: last-year vegetation has partially survived (50-99%);
2: a thick layer of old vegetation, remaining from last year and the year before last year (100% and more)

Long-term accumulations of old vegetation create preconditions for emergence of fires in dry springs from March till the end of May



Such burned areas become not suitable for AW for the next 2 years

Legislation foundations for fire management implementation

Article 17 of the Law of the Republic of Belarus "About the wildlife":

«Scientifically justified works on burning of old vegetation and its rests, reeds, and other stands of wild plants could be allowed in order to improve habitats of wild animal species, listed in the Red Data Book of the Republic of Belarus and species protected under international agreements valid for the Republic of Belarus. Such works could be conducted in legally protected areas and in habitats of wild animal Red Data Book species, when these habitats were transferred for protection to land user or water object user, if it does not contradict the established protection and use regime of these territories».

Measures 3.3. of the Management Plans for the Protection Areas «Sporovsky» and «Zvanets»:

«Implementation of the controlled burning of grass vegetation once per three years during winter time under the necessary conditions (the mire surface is covered with ice or snow, and fire could not spread to adjacent areas)».

The list of documents necessary for legal fire management (the experience of implementation of actions in the Zvanets Reserve)

- Scientific justification of the necessity of fire management.
- The agreement with the regional department of the Ministry of Emergency on holding the duty during the implementation of burning.
- The letter of approval of the controlled burning with parties concerned.
- Instruction for the implementation of controlled burning.
- Decree of the Director of the State Nature Conservation Agency «About implementation of the controlled burning of dry vegetation».

Control of the fire management by the Ministry of Emergency. The duty was carried till the end of the burning implementation.

INSTRUCTION

To implementation of the controlled burning of dry vegetation and its rests, reeds and other stands of wild plants.

The instruction includes rules, indications and guides, defining the order and method of implementation of the fire management.

The main provisions

Fire management should be implemented on lands, not included in the forestry fund, after agreement with land users.

Fire management should be conducted out of the fire hazard season, during the autumn-winter period from November till March, after soil freezing; the optimal terms are defined considering weather conditions and the state of vegetation cover.

The director of the State Nature Conservation Agency should assign the leader and form the working group for implementation of fire management.

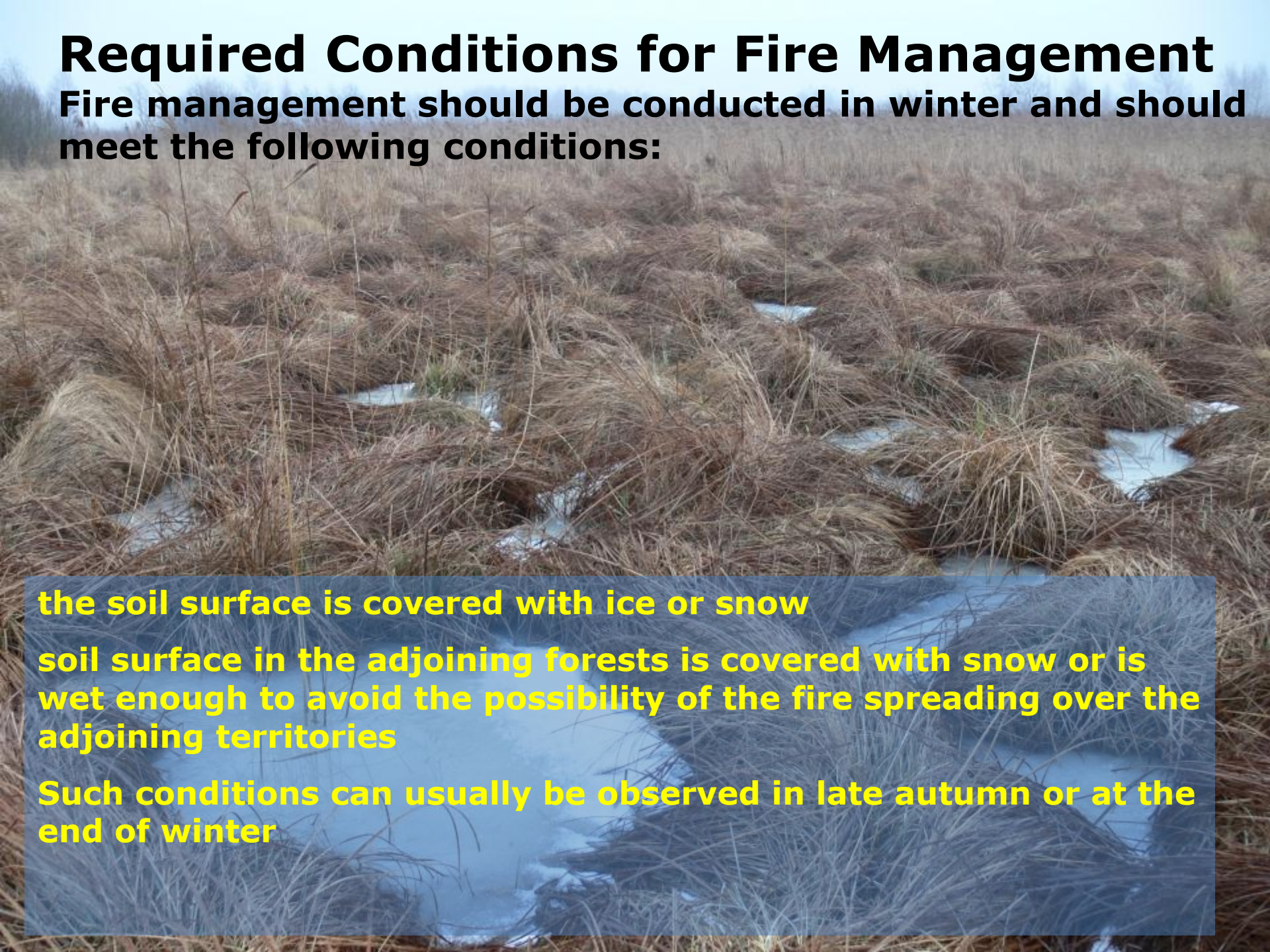
The implementation of the fire management

Conditions necessary for possibility of fire management implementation:

- the definite humidity of the dry vegetation should be reached, so that the dry vegetation could ignite (for example, during the period January-February there were only 4 such days);
- presence of moderate wind of necessary direction to ensure the control over the fire;
- presence of dry sedge mass under the reeds;
- water or ice in mire should be at the level of tussocks' surface.

Required Conditions for Fire Management

Fire management should be conducted in winter and should meet the following conditions:

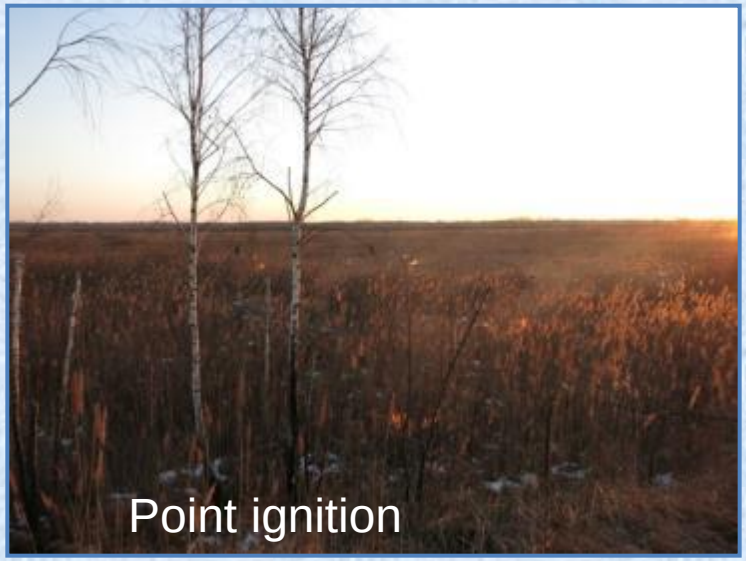


the soil surface is covered with ice or snow

soil surface in the adjoining forests is covered with snow or is wet enough to avoid the possibility of the fire spreading over the adjoining territories

Such conditions can usually be observed in late autumn or at the end of winter

It is optimal to conduct burning of vegetation by means of formation of the fire front



Scheme of the formation of the fire wall

The fire is formed due to presence of sedges. Reeds do not burn without sedges in this period.

Reeds start to burn only in case of strong wind or presence of sedges.


March 2015

Vegetation dynamics after implementation of fire management in the Zvanets mire

(burning of vegetation was conducted in February 2015 on the area about 9000 ha)

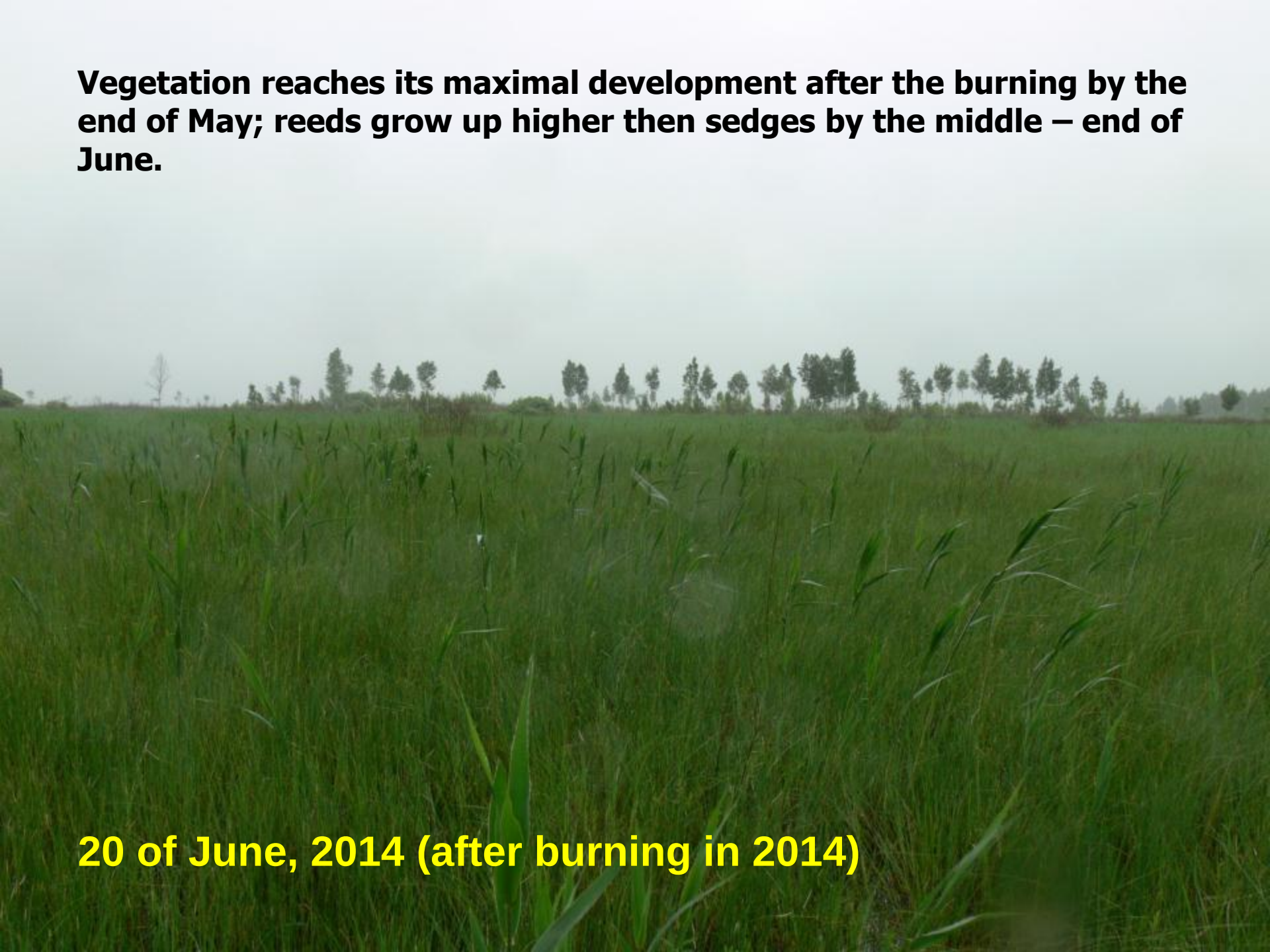
In the mid-April sedges reached 10 cm height, reeds did not appear.


1 of May


14 of May
In the mid-May the height of sedges was about 30 cm (50% of the normal height), reeds did not grow.


Zvanets, 15 may 2015

Vegetation reaches its maximal development after the burning by the end of May; reeds grow up higher then sedges by the middle – end of June.



20 of June, 2014 (after burning in 2014)

Zvanets

May 15 after fire

May 15 no fire

The state of the Zvanets mire before the burning of vegetation that was conducted in February 2015

After the burning. May, 2015

As well as old vegetation, fire also destroys willow shrubs and young birch trees

Young shoots arise from the shrub's bottom. These could be destroyed by burning in the next year.

The main skill which helps the aquatic warbler to adapt to fires with the absence of old vegetation for disguising its nests is the ability to build them in original ways.

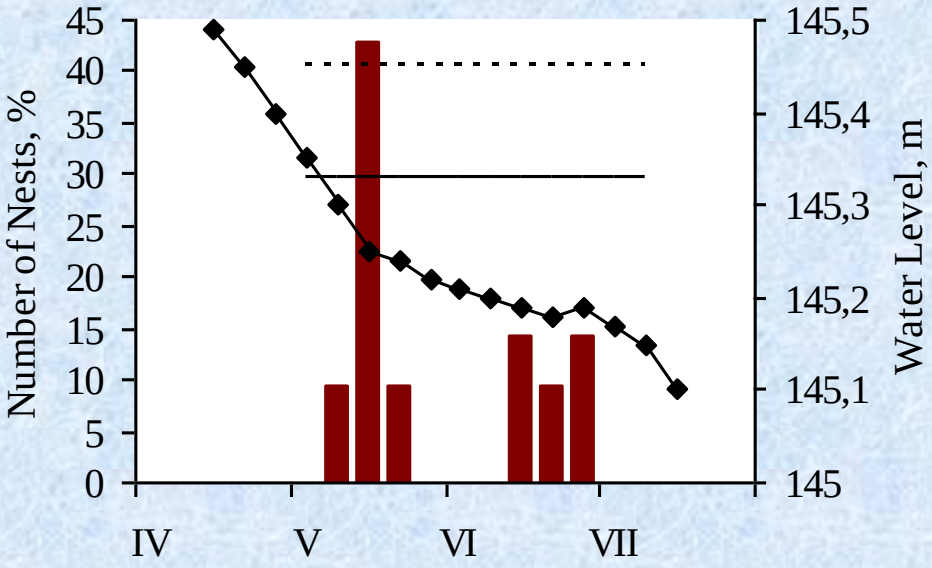
In a burnt-out tussock:
-no dry grass because of fire.

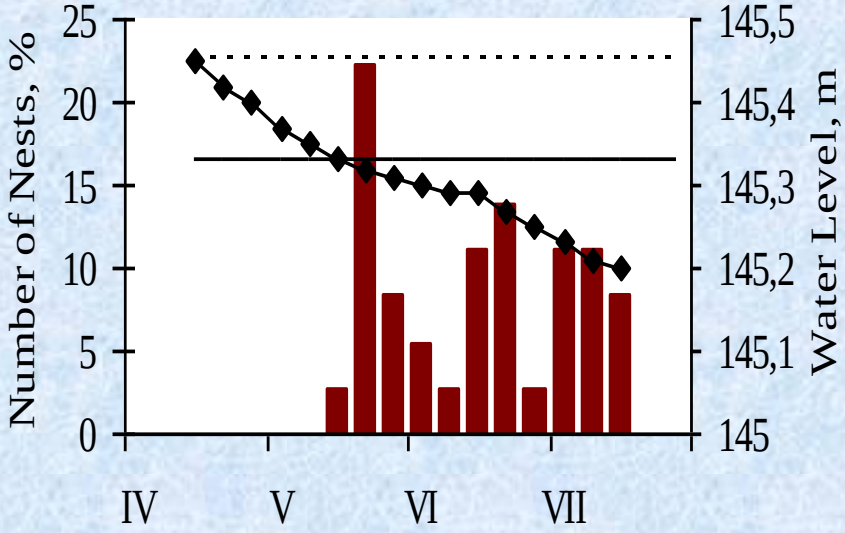
Under cover of green vegetation only:
-no dry grass because of fire.

Another adaptation to fires that the aquatic warbler has is the ability to bide its nesting time. With no old vegetation, a significant part of birds begin nesting only after green vegetation has fully developed and therefore can be used for disguise.

Favourable conditions:
2 peaks of nesting during the breeding season

Per year with vegetation burning:
nesting times are prolonged





Advantages of Fire Management:

- improvement of vegetation productivity
- increase in insect biomass
- good conditions for nesting due to partial preservation of old vegetation
- new habitats for species of open sedge fens are created by burning down of dense reed beds
- shrubs are prevented from spreading
- spring fire hazards, which are dangerous for man and ecosystems, posed by dry mires are eliminated

Planning

It is planned to study the influence of the fire management to the following:

- species composition and biomass of insects;
- state of vegetation communities;
- Aquatic Warbler density;
- bird species composition;
- climate.


Thank you for your
attention