CONSERVATION OF THE NATTERJACK TOAD IN ESTONIA

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INTRODUCTION

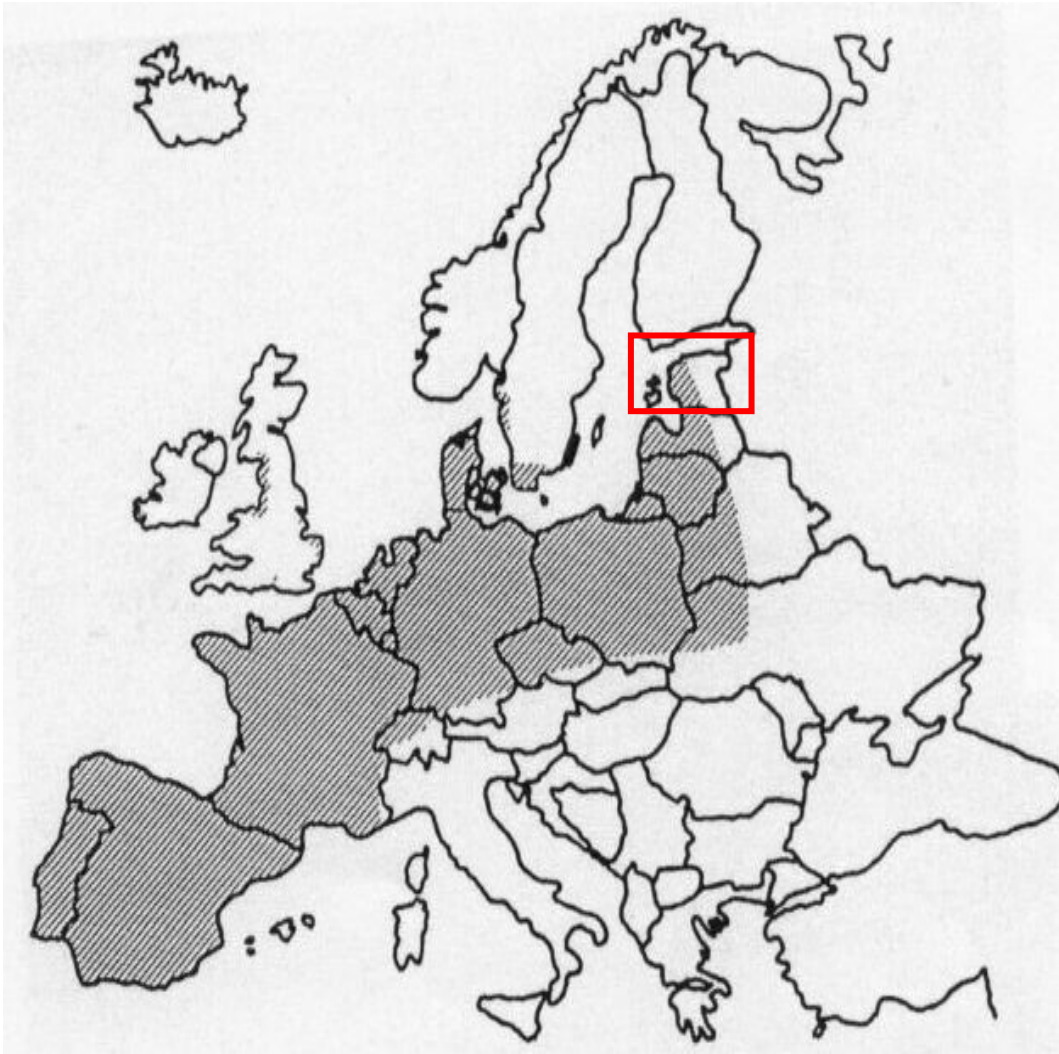
- *Bufo calamita* is at its northern range edge in Estonia.

- Severely declined in the northern part of its range (Beebee, 2002).

For effective conservation management:

✓detect causes of the decline.

✓ identify critical habitat conditions.



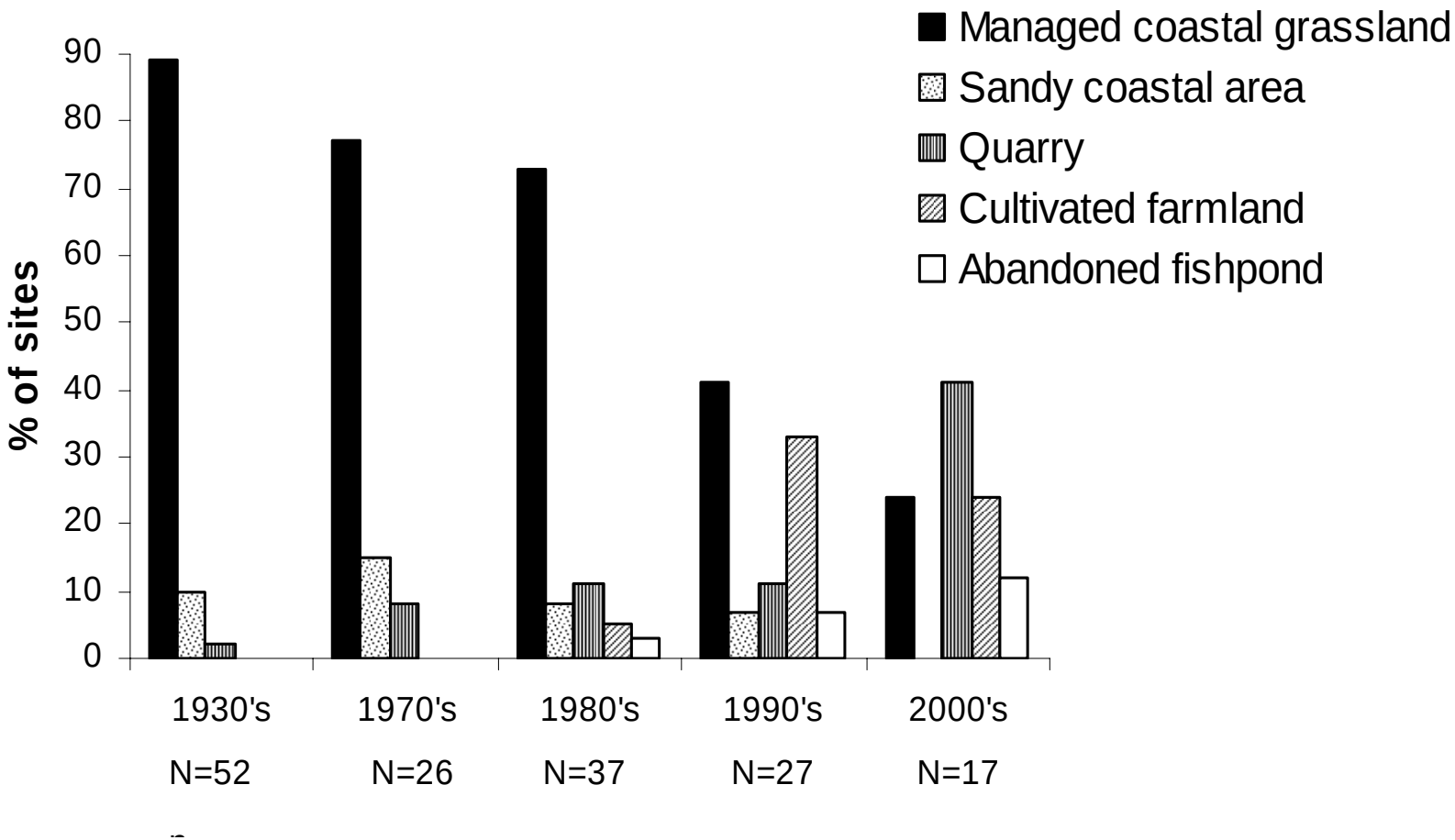
B.calamita distribution in Europe (Sinsch, 1998)

DECLINE OF *B.CALAMITA*

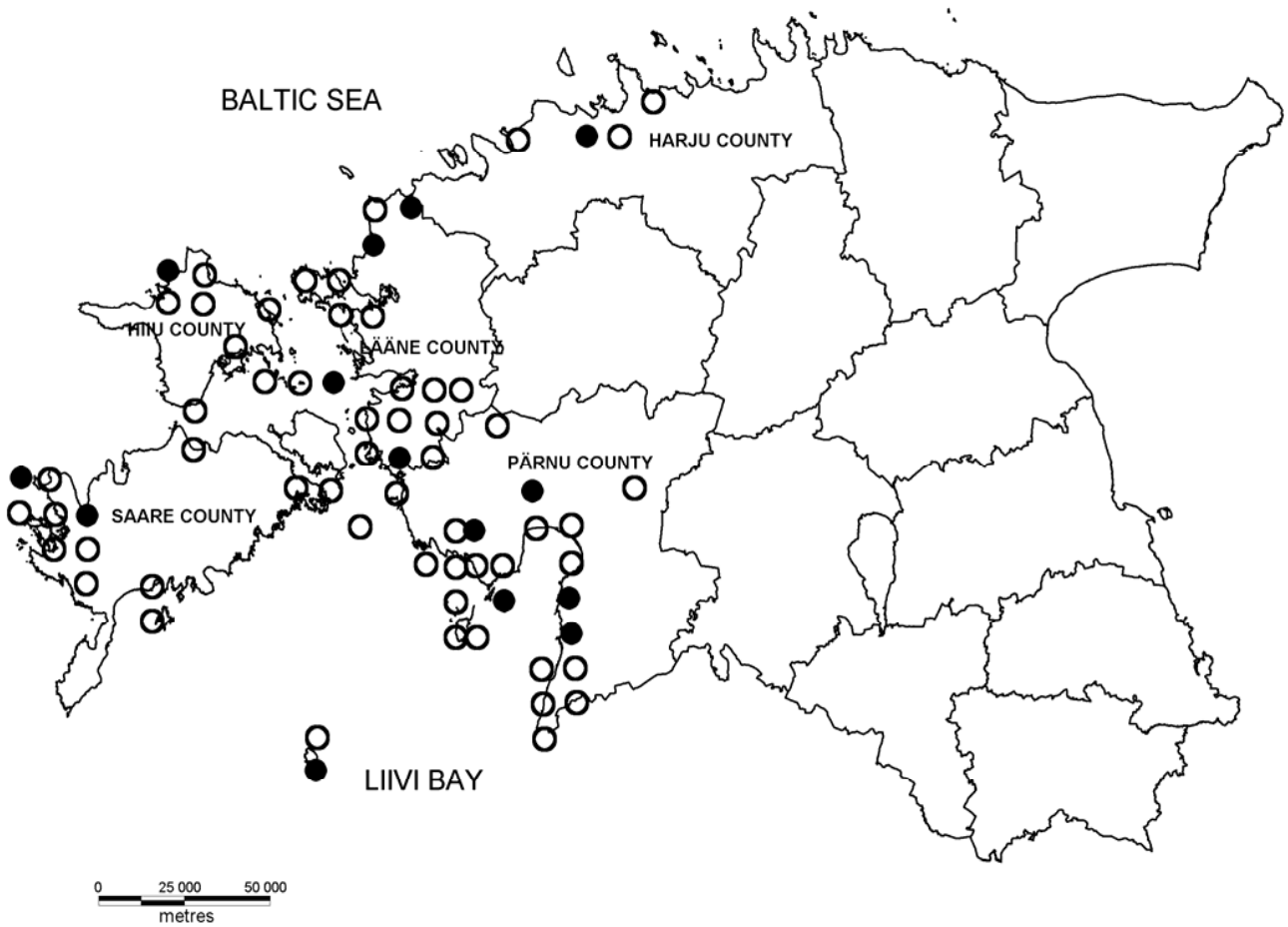
B.calamita is associated with open, early successional habitats.

- sun-exposed;
- low or bare vegetation;
- shallow temporary ponds;
- soils that can be easily dug by the toad.

In Estonia these requirements have been met in sand dunes and coastal meadows.



B.calamita habitats in Estonia 1930's-2000's (Rannap *et al.*, 2007)



Distribution of *B.calamita* in 1930s and 2000s in Estonia (Rannap *et al*., 2009)

1930s–2000s 67% of *B.calamita* populations were lost in Estonia.

The number of coastal meadow populations declined 91%.

GEOGRAPHIC VARIATION OF HABITAT QUALITIES

Identification of critical habitat conditions forms a basis for effective management.

Wide-ranging species may exhibit substantial geographic variation in habitat requirements (Collins, 1983; Constible *et al*., 2009).

Habitat components critical for a species in one part of its range may be less important or even avoided in another area (Parody and Parker, 2002; Väli *et al*., 2004).

At high latitudes *B.calamita* have to cope with strong environmental stress:

- later onset of breeding;
- shorter season for larvae to develop.

The comparison between Danish (A) and Estonian (B) *B.calamita* populations revealed:

- Despite a 12-day difference in the onset of breeding, tadpoles metamorphosed at the same time in both countries.
- In Denmark breeding ponds were larger and deeper than in Estonia.
- In Estonia the toads selected shallower ponds with higher temperature and oxygen concentration.

- The water temperature in the breeding ponds did not vary between the countries.

Habitat qualities critical for the growth and development of tadpoles varied geographically.

CONSERVATION OF *B.CALAMITA* IN ESTONIA

Large-scale conservation activities started in 2000:

- DANCEE project.
- LIFE coastal meadow project.

Conservation goals:

1. Securing existing populations of *B.calamita.*
   - ✓ Habitat management and restoration.
   - ✓ Breeding site restoration/creation.
   - ✓ *S*upportive breeding.

2. Increasing the number of individuals in each population.
   - ✓ Habitat enlargement.

3. Establishing reserve populations in historical *B.calamita* sites on coastal meadows.
   - ✓ Restoration of coastal meadow habitat complex.
   - ✓ Rearing of eggs and tadpoles.
   - ✓ Re-introduction of tadpoles to the restored coastal meadows.

MAINTAINING AND RESTORING HABITATS

On coastal meadows grazing was re-initiated or intensified.

- purchase of cattle/sheep for local farmers.
- subsidies for farmers to maintain/restore semi-natural habitats.

Natural depressions/shallow pools were restored/created for breeding.

Sand pits were cleared from bushes and sand dunes from pine plantations to open and enlarge the habitats.

SUPPORTIVE BREEDING

In addition to habitat management and restoration, supportive breeding was used in very small or declining populations securing annual breeding success.

- ✓ Carried out since 2004 for 8 populations.
- ✓ Part of each egg-string found was reared and released after metamorphosis.

A reserve population of Manilaid toads was establish at Copenhagen Zoo.

By 2013 breeding station will be established at Matsalu NP.

RESULTS OF CONSERVATION ACTIONS

The state of Estonian *B.calamita* populations after 11 years of conservation:

- Conservation actions have been carried out in 12 localities (out of 15).
- 33% of all populations are stable (N = 5).
- 27% of populations are increasing (N = 4) – all in sand dunes.
- 27% of populations are still in decline (N = 4) – all on coastal meadows.
- One successful re-introduction on restored coastal meadow.
- 1 population possibly extinct.
- 1 population unknown.

LESSONS LEARNT

- Large areas of critical habitat components are essential for the survival of *B.calamita*.
- Grazing is crucial on coastal meadows.
- Predation – bigger risk than expected.

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