

Population dynamics and conservation biology of the Red-throated Diver in Finland

Kalevi Eklöf & Pertti Koskimies



Jari Heikkinen



Contents:

- ***The Red-throated Diver in Finland: population size and changes***
- ***Breeding success: South Finland vs. North Finland***
- ***Colour-rings: site and mate fidelity, age of first breeding***
- ***Artificial nesting rafts: positive and negative effects***
- ***Conservation and further research***



Pertti Koskimies

Data and methods

- Collected by Kalevi Eklöf with assistants.
- **Main study areas: 639 nestings**
 - Kanta-Häme 1976–2013
 - South Savo 1998–2013
- **Other intensively studied areas (northern Finland): 586 nestings**
 - Martimoaapa 1993–2013 (Veli-Matti Korpimäki)
 - Taivalkoski 1998–2013 (Jani Suua)
- **Additional data from all over Finland.**
- All nest-sites and suitable ponds **visited 2–3 times** during the nesting season:
 - No. of local individuals and breeding pairs
 - Breeding success, causes of losses
 - Quality of nest-sites etc.

Main study areas



-Martimoaapa / Taivalkoski

-Kanta-Häme / South Savo



Ringing

Main ringers in Finland

- Kalevi Eklöf 1976–2013 (ca. 560 ind.)
- Jari Salonen 1989–1999
- Jani Suua 1999–2013 (Taivalkoski)
- Tuula Kyllönen 2011–2013 (South Savo)

Total in Finland 1913–2012

- Ringed 1367
- Found 93

Colour-ringed (2005–2013)

- 430 (ad. + pull.) / Controlled 12 (+ 10 unidentified individuals with metal rings).

Special metal ring type (GS) and colour-rings





Pertti Koskimies

Measurements

Full-grown birds

- Wing length
- Bill length and height
- Tarsus diameter
- Weight

Young

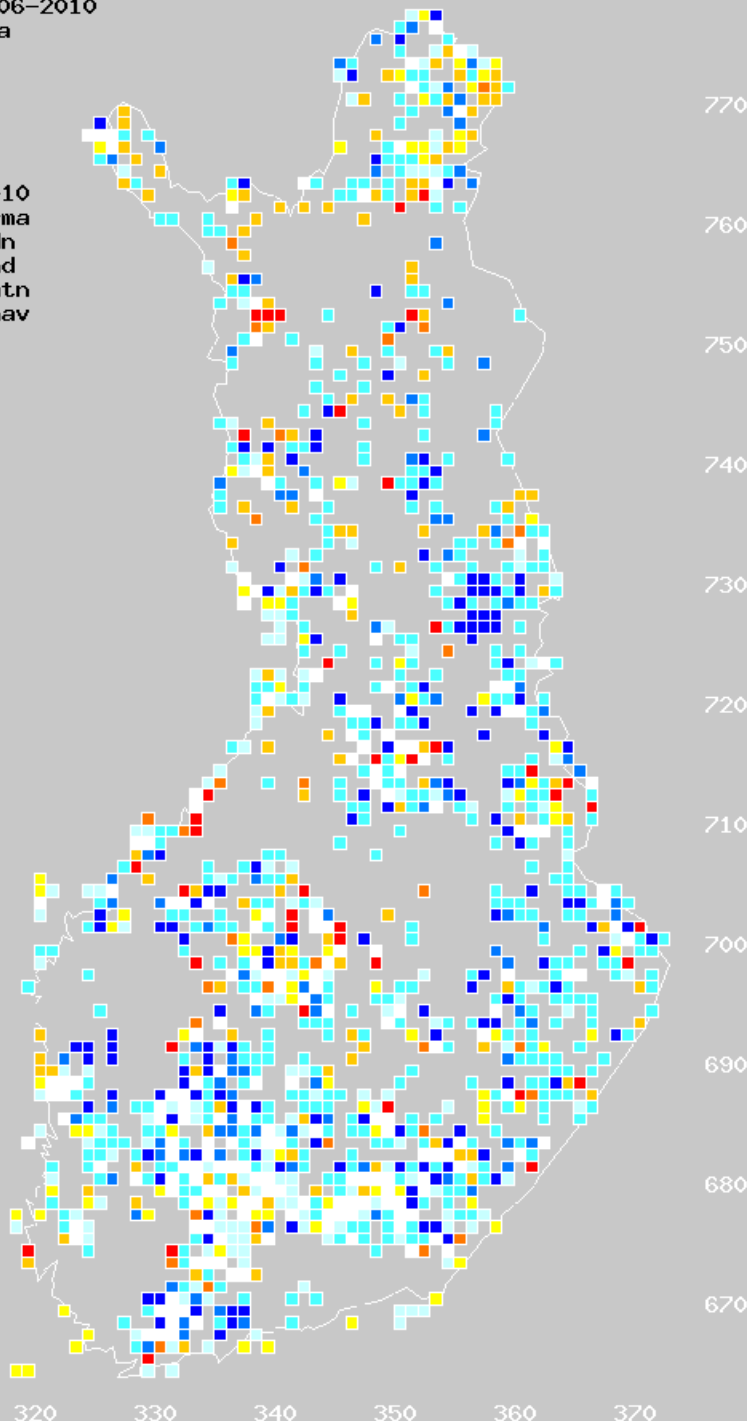
- Wing length
- Weight



Samples

- Photographs
- Feathers
- Eggshells

MUUTOS 2006–10
■ 4 Varma
■ 3 Todn
■ 2 Mahd
■ 1 Epätn
■ 0 Eihav
0 1 2 3 4
1974–89



Breeding range in Finland in 2006–2010

10kmx10km squares

- Confirmed breeding 357 / 9.2%
- Probable breeding 157 / 4.1%
- Possible breeding 529 / 13.7%
- Total 1043 / 27%

Atlas unsuitable for estimating population size because

- Long breeding season; birds clever at hiding; visit several squares daily.
- Hundreds of observers with variable skills in interpreting their records.
- Non-breeding birds summed as breeders.
- The same birds visiting several squares counted as different breeding pairs.
- One pair moving to breed at another square within atlas period (5-y) counted as two or more pairs.



Population size and trend in Finland

2010 nation-wide inventory by BirdLife Finland (Eklöf ym. 2011)

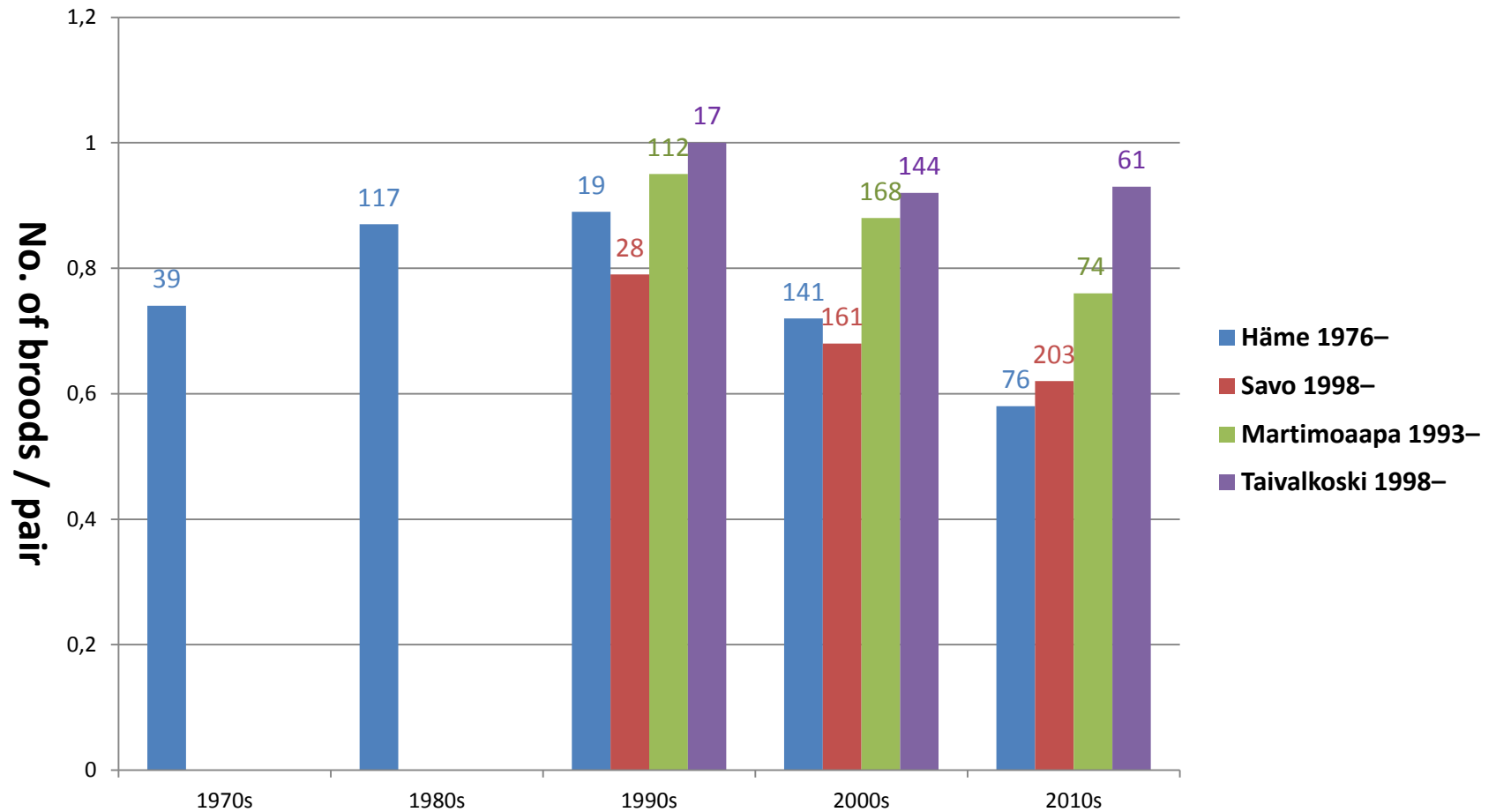
- Confirmed breeding pairs: 462
- Total sum of regional estimates : 740 pairs
- Estimated population: 600–750 pairs (probably ca. 650)

• 1984: 600–800 pairs (Pakarinen & Järvinen 1984)

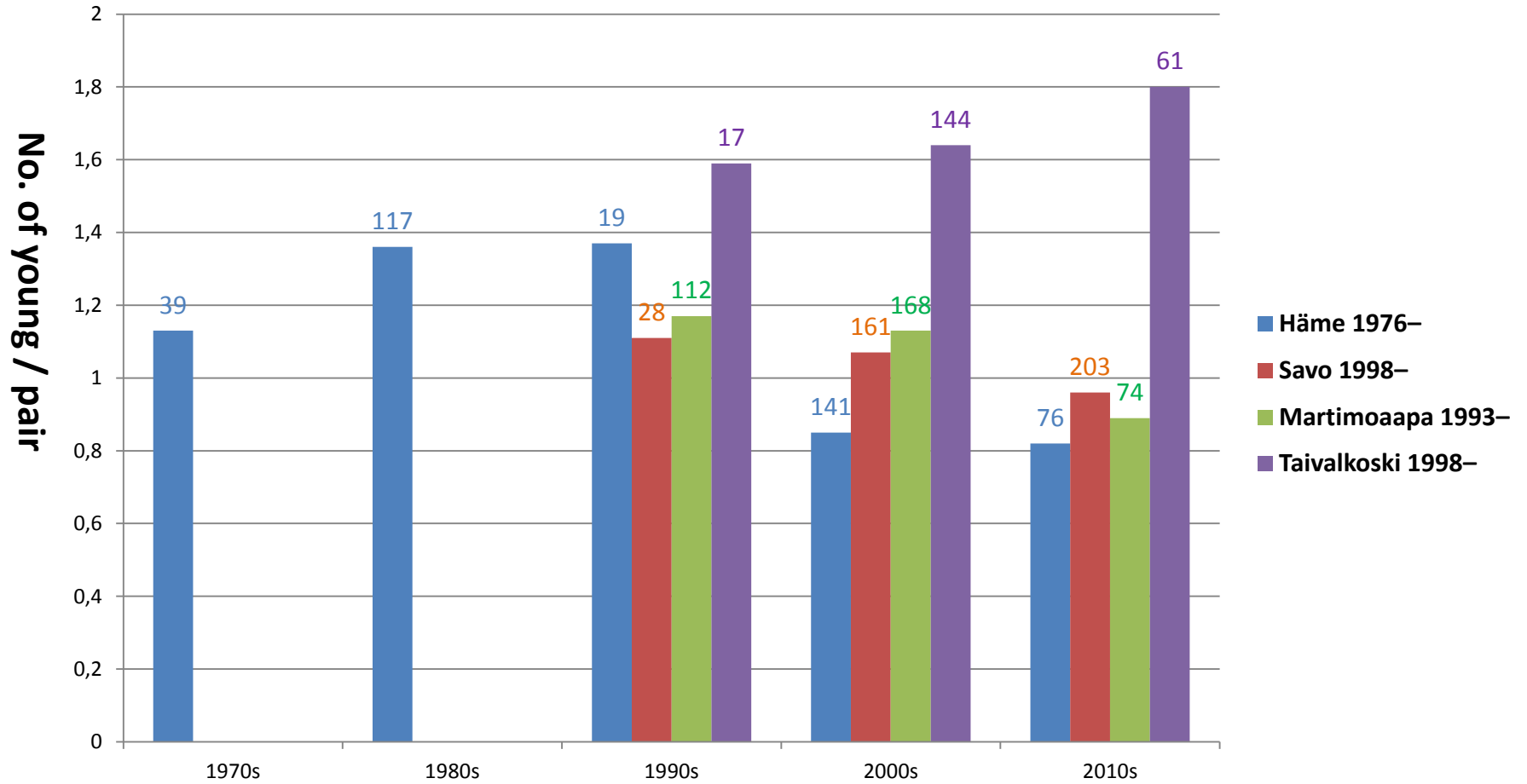
Probably declined in numbers in the 1900s

Near Threatened (NT)

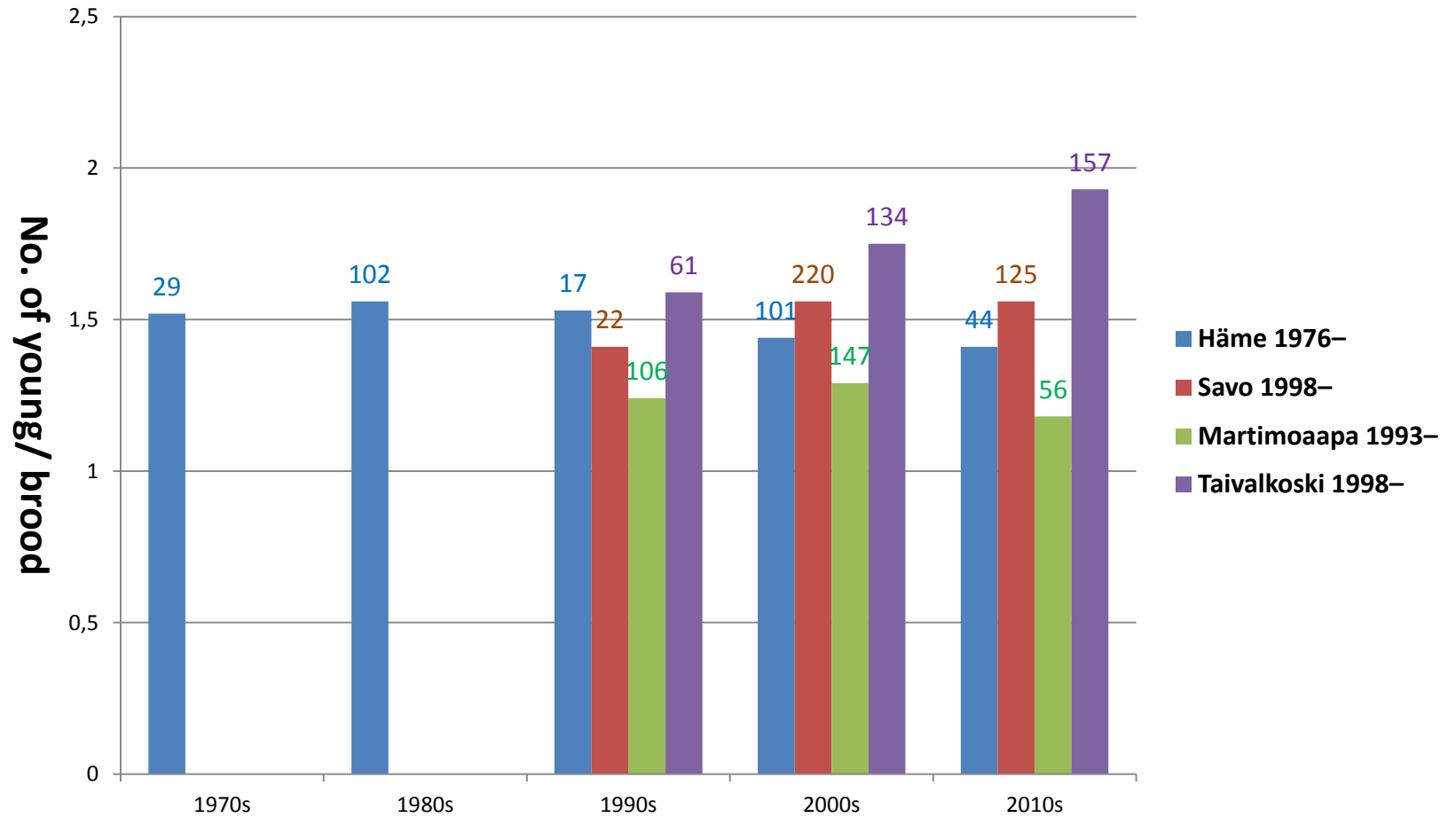
Breeding success: percentage of successful pairs



Breeding success: no. of young / pair



Brood size: no. of young/ successful pair



Colour-ringing: aims

- Nest-site and mate fidelity
- Age of first breeding, longevity, mortality, causes of death
- Migration routes, wintering areas



Controls of colour-ringed individuals

Gender

● *Male* (7)

● *Female* (5)

B2, 148km

B6, 32km

94, 25km

L6, 0km

89, 0km

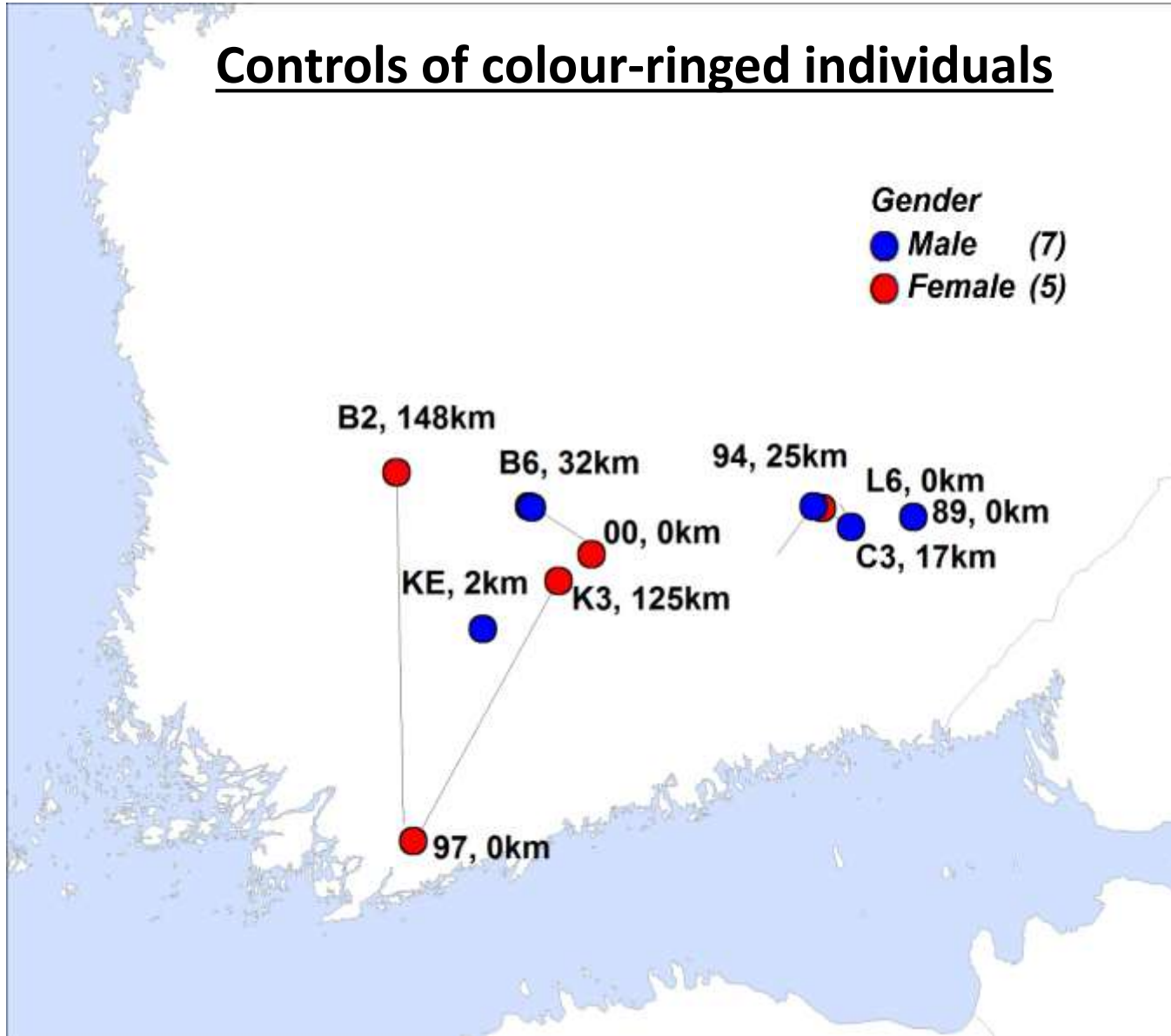
00, 0km

C3, 17km

KE, 2km

K3, 125km

97, 0km



Controls by individual

Males

<u>Age</u>	<u>Ringed</u>	<u>Controlled</u>	<u>Distance km</u>
KE/Pull.	2004	2013/2 p.	10
B6/Pull.	2007	2011/nb.	33
		2013/0 p.	32
F4/Pull.	2008	2012/nb.	0
		2013 / 0 p.	0
C3/Pull.	2008	2011/nb.	17
		2012/nb.	17
21/Pull.	2010	2013 /nb.	10
94/Ad.	2011	2012 nb.	25
		2013/0 p.	0
89/Ad.	2011	2012 / b.	0
		2013/ b.	0

Females

<u>Age</u>	<u>Ringed</u>	<u>Controlled</u>	<u>Distance km</u>
K3/Pull.	2007	2013 /2 p.	125
B2/Pull.	2007	2010 /nb.	148
		2011 /nb.	148
		2012 /nb.	148
		2013 /0 p.	148
L6/Ad.	2008	2009 /0 p.	0
		2010 /0 p.	0
		2011 /0 p.	0
		2012 /0 p.	0
		2013 /1 p.	0
00/Ad.	2010	2011 /b.	0
		2012 /b.	0
		2013 /1 p.	0
97/Ad.	2011	2012 / b.	0
		2013 /1 p.	0

Legend: nb.=non-breeding, b=breeding
 0 p./1 p./2 p.=no. of young



Female / Yellow 00

- Ringed as breeding adult in 2010.
- Controlled in 2011–2013 at the same nest-site; bred successfully every year.

Examples of non-breeding individuals

Jari Heikkinen photographed a breeding pair on the same nest-site from year to year. Several other individuals visit the same pond during the breeding season, either breeding or non-breeding birds from the neighbourhood.



C3 was born in 2008. It visited the same pond, 17 km from its birth place, in 2011 and 2012. Not seen in 2013, when possibly started to breed on another pond.



21 was born in 2010. It visited the same pond, 10 km from its birth place, in 2013.



A bird photographer took by accident one shot of a flying RT diver at his summer cottage during Mid-Summer weekend – yellow B6.

B2 controlled as a non-breeding (5-years old) female in 2012 by a nature photographer, 148 km from the birth place. The same bird was controlled on the same site also in 2010 (3-y), 2011, and 2013 (first breeding attempt, unsuccessful).





Two colour-ringed birds have been photographed on the Atlantic during their first winter, further west than previously known by ring recoveries.



Spain – 2803 km from birth place.

© *Maiki Ikaza*



France – 2404 km from birth place.

The same bird in France, photographed several times in two different areas widely separated and from each other. It was found dead in the Netherlands during the next spring – 1494 km from the birth place.





Nest-sites in Häme, 1976–2010

Black= deserted, formerly regular nest-site

Red = new regular nest-site

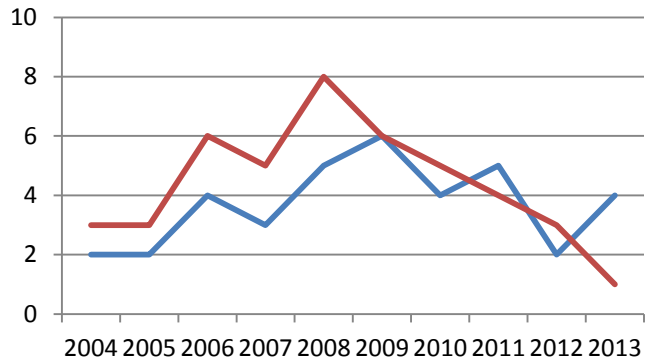
Nesting in loose groups

- Other pairs nesting close-by indicate the quality of the area?
- Birds get information on predators and fishing lakes from each other?
- Group display and choosing of mates more effective?

Habitat selection

- Nesting sites are forest or mire ponds with peatbog shores in larger forest-dominated areas.
- Suitable lakes for fishing usually within 5–20 km.

Pälkäne

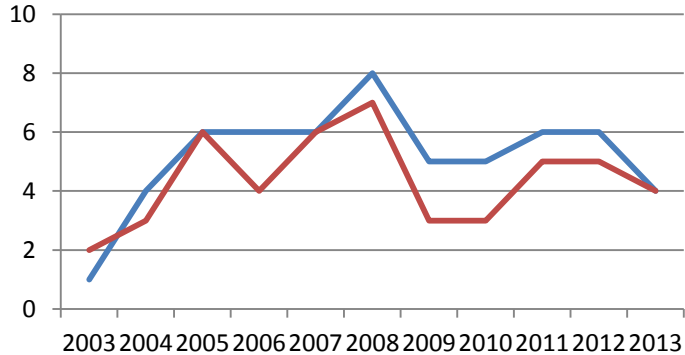


Sub-areas in Häme

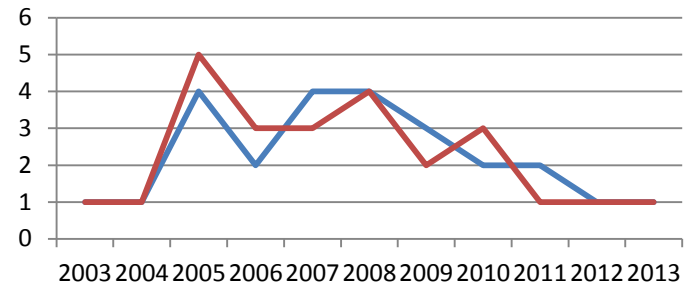
Trends in the no. of pairs and breeding success vary from group to another within tens of kilometres.

Blue = no. of pairs; *red* = no. of young

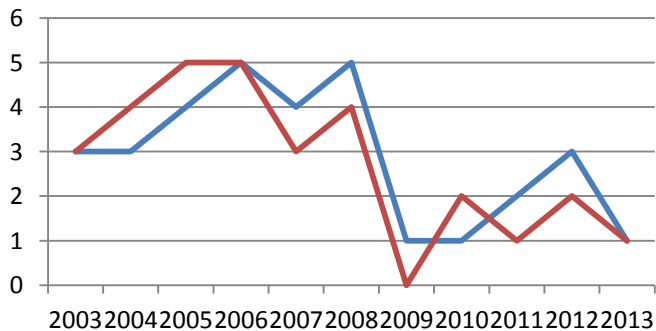
Hattula–Renko



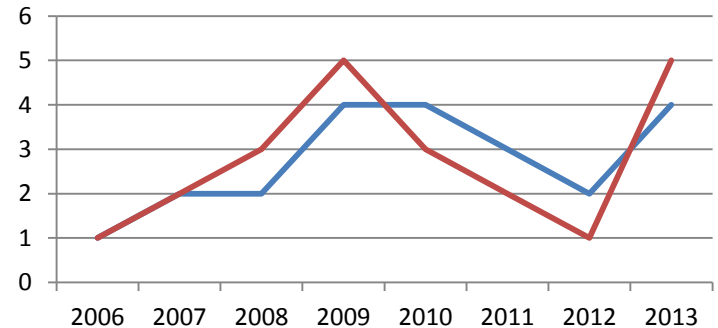
Hauho–Tuulos



Kytäjä



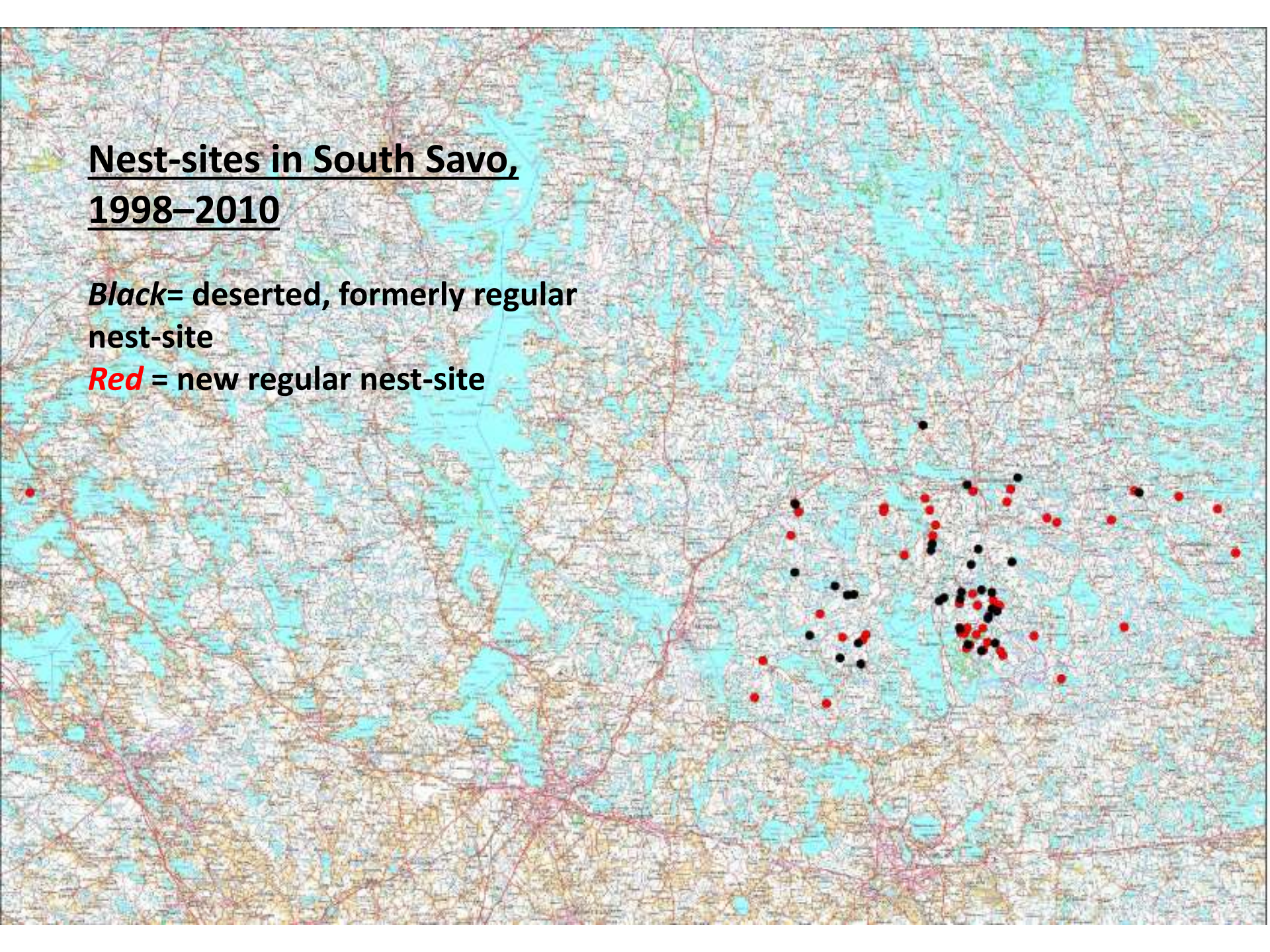
Lammi



Nest-sites in South Savo,
1998–2010

Black= deserted, formerly regular
nest-site

Red = new regular nest-site



Artificial nesting rafts

- The most important conservation measure in Finland (min. 500 rafts built so far).
- Mammalian *predators* are not willing to swim to rafts in the middle of a pond; nests further away from shores more secure from visiting people causing *disturbance*.
- Breeding success on rafts higher in many regions compared to natural nest-sites on a shore (e.g. Lokki & Eklöf 1984, Töttö 2007).



(A natural nest-site.) Pertti Koskimies

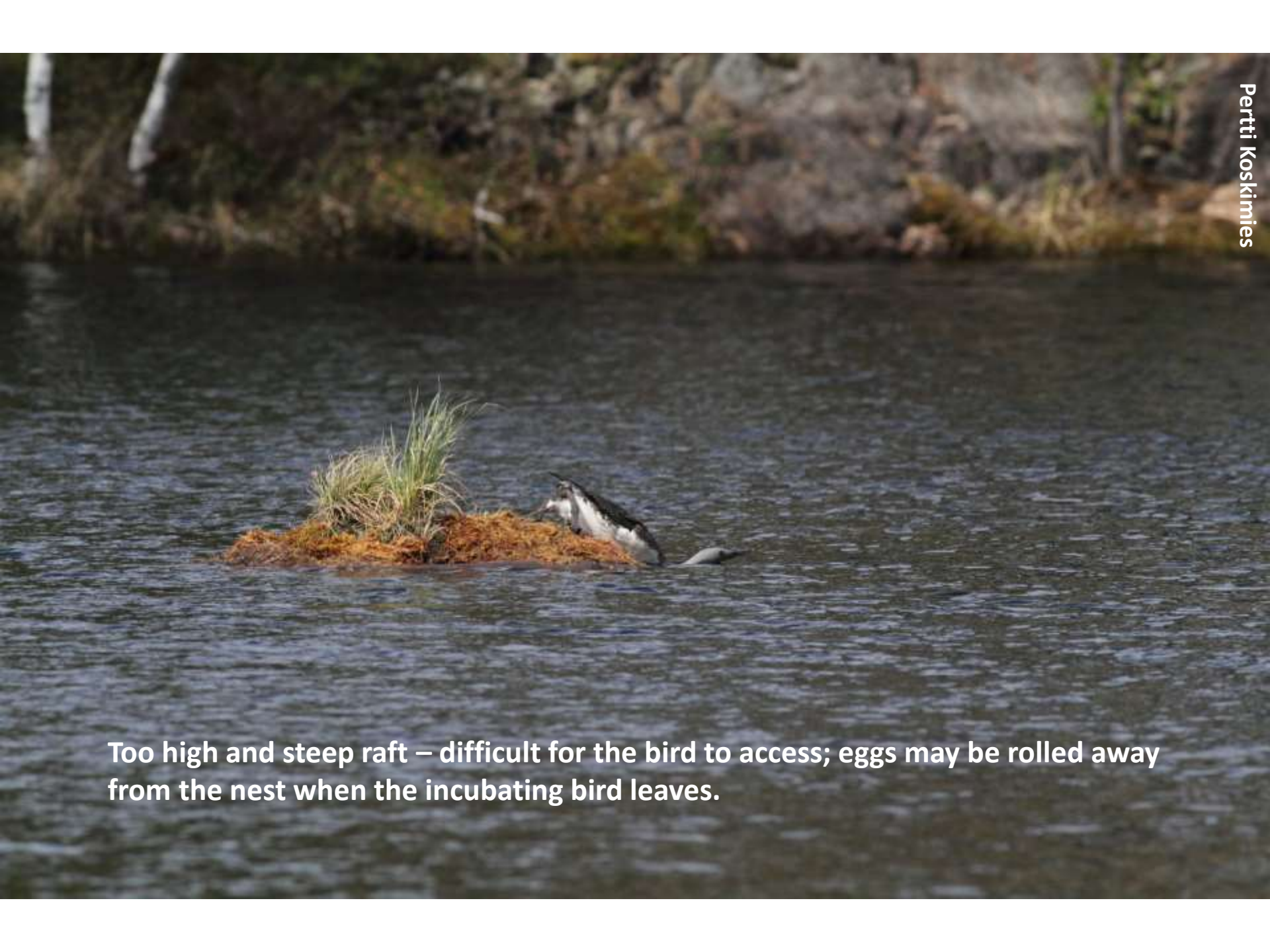
Suitable nesting raft

- Diameter ca. 120 cm; easily accessible; covered by sphagnum-moss; no bushes or shrubs.
- Securely floating and anchored (against wind and ice-breaking in spring).
- Further away from shore; preferably hidden from human eyes and close to southern forested shore where shadowed at mid-day).
- On present or abandoned nesting ponds if they have remained suitable.
- Especially important in disturbed regions in southern Finland; in the north nesting success high enough in natural nest-sites.
- Building and care-taking by experts, after careful planning and coordination.



Artificial nesting rafts in wrong sites and without care-taking have caused negative effects on nesting success especially in the 2000s.

- No care-taking: too much bushes, shrub and grass; no sphagnum-moss for the young.
- Breeding and non-breeding Whooper Swans, Common Cranes, Common Gulls and Common Terns like rafts and expel divers from nesting.
- Nests on rafts in open water more easy to see by curious people (e.g. hikers, photographers, bird-watchers) which may lead to the bird leaving the eggs; uncovered eggs or small young are rapidly robbed by crows or raptors, or destroyed by hot sunshine or heavy rain.

A photograph showing a bird, likely a grebe, perched on a small, steeply sloped raft of brown seaweed or algae in a body of water. The raft is topped with a clump of green grass. The bird is facing left, and its reflection is visible in the water. The background consists of a rocky shoreline with some vegetation.

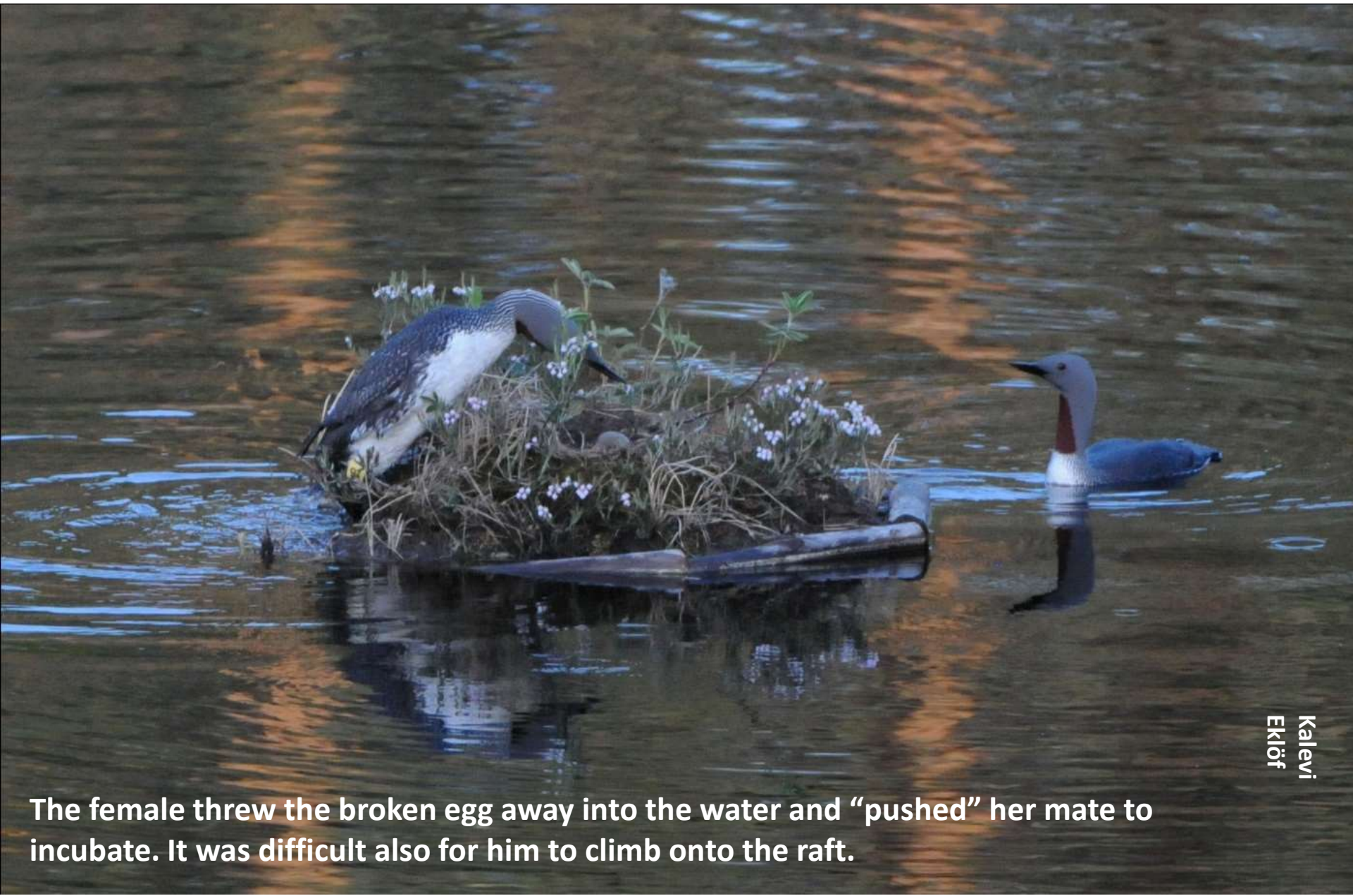
Too high and steep raft – difficult for the bird to access; eggs may be rolled away from the nest when the incubating bird leaves.



The female destroyed her egg with her bill by accident because of difficult access to the steep raft.

Korkeasta pesäsaaresta johtuen , emo on rikkonut nokallaan munan.





The female threw the broken egg away into the water and “pushed” her mate to incubate. It was difficult also for him to climb onto the raft.



The status of the Red-throated Diver in Finland?

Population size

- Declined locally in southern and western Finland, more or less stable in eastern and northern Finland.
- The number of adults arriving in spring seems to have declined in many regions; some signs of lack of birds in Taivalkoski, too.

Breeding success

- Locally declined in southern Finland; no trend in the north.
- Unintentional disturbance by human an increasing threat in recent times.
- Lays repeat clutches producing usually only one young; short time for preparing for migration.



Conservation

- In Finland, the *network of artificial nesting rafts should be renewed* with nation-wide planning, coordination and building expertise.
- *Education* to prevent unintentional disturbance.
- As an international co-operation, *coordinated research* with satellite transmitters and colour-rings to map migration routes, wintering areas, threats, causes of death etc.

Thank You on behalf of the Red-throated Divers!

- *Ringers*: Tuula Kyllönen (South Savo), Jani Suua (Taivalkoski)
- *Builders of artificial nesting rafts*, especially Mikko Heino (South Savo)
- *Population monitoring in Martimoaapa*: Veli-Matti Korpimäki
- *Photographers*: Jari Heikkinen, Hannu Kekkonen, Harri Laurila, Juha Leuhtonen, Alpo Roikola, Jouni Valkeeniemi
- *Satellite transmitter study colleagues*: Markus Ahola, Volker Dierscke, Axel Zinke
- *Excel calculation programme for the field data*: Heikki Lokki
- *Statistics of the colour-ringing scheme*: Seppo Niiranen, Jari Valkama
- *Versatile help in the field*: Pertti Virta
- *For patience, patience, patience when waiting summer after summer...*: Pirjo Eklöf

