Monitoring and population changes of Red-throated Divers in Iceland

Aevar Petersen, Guðmundur Ö. Benediktsson & Ib K. Petersen

Issues

- Protection
- RTD data base
- Breeding distribution
- Population estimates
- Monitoring results
- Population changes
- Factors affecting distribution and numbers

Protection

- Legislation:
  - Fully protected since 1953
  - Not on Icelandic Redlist (from 2001)
  - No habitat protection except few freshwater sites, one Ramsar site (Mývatn)
- International conventions Iceland is parti to
    - CITES, BERN and OSPAR – not included
    - AEWA - included; Iceland became member 2013

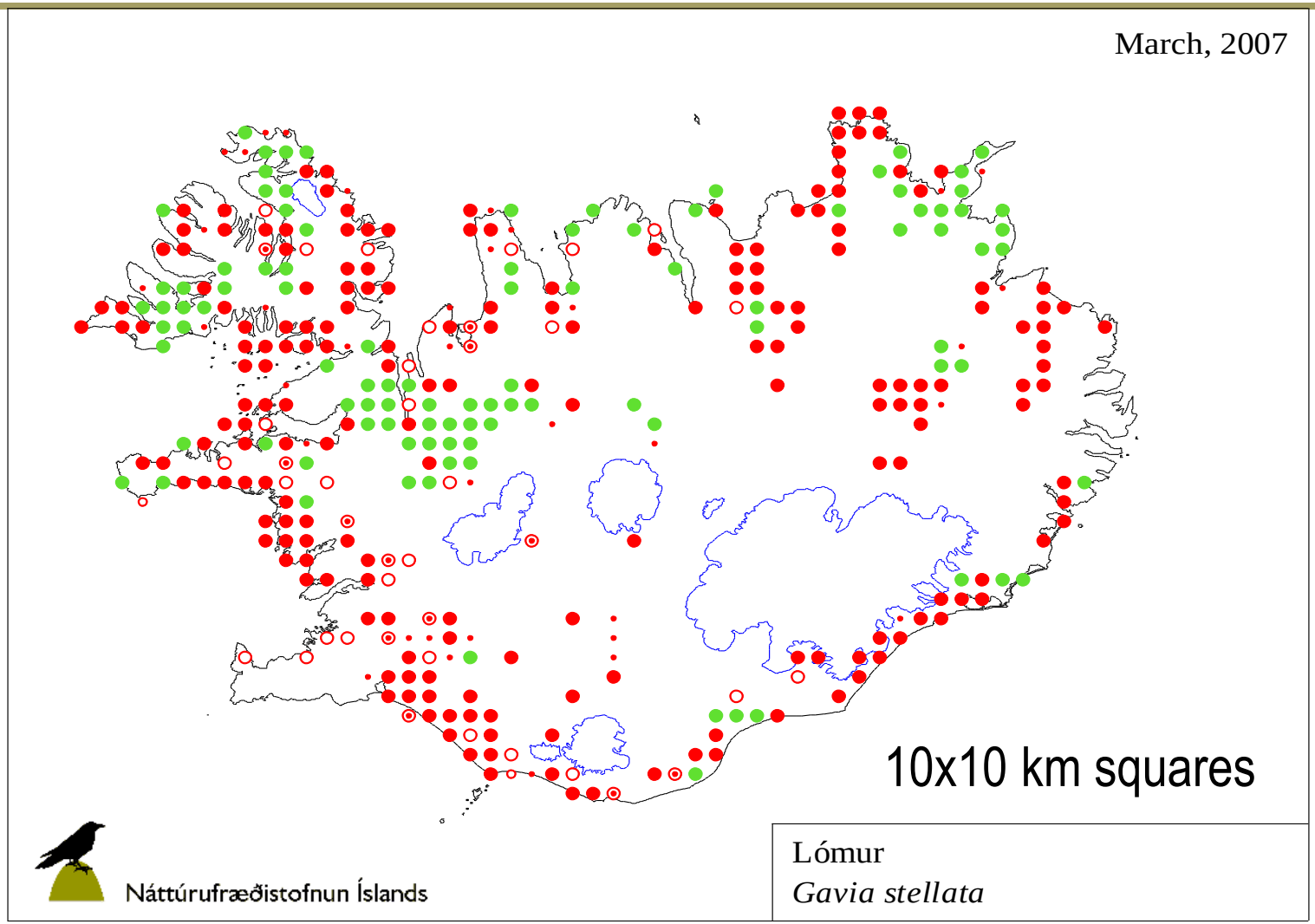
Breeding site database

- Started in 2006
- Site, date, observation (adults, eggs, young), observer, incubation stage, estimated chick age, 1. egg laying date (calculated if not known), height of site a.s.l., reference.
- Now 5000 records; 800 in 2007

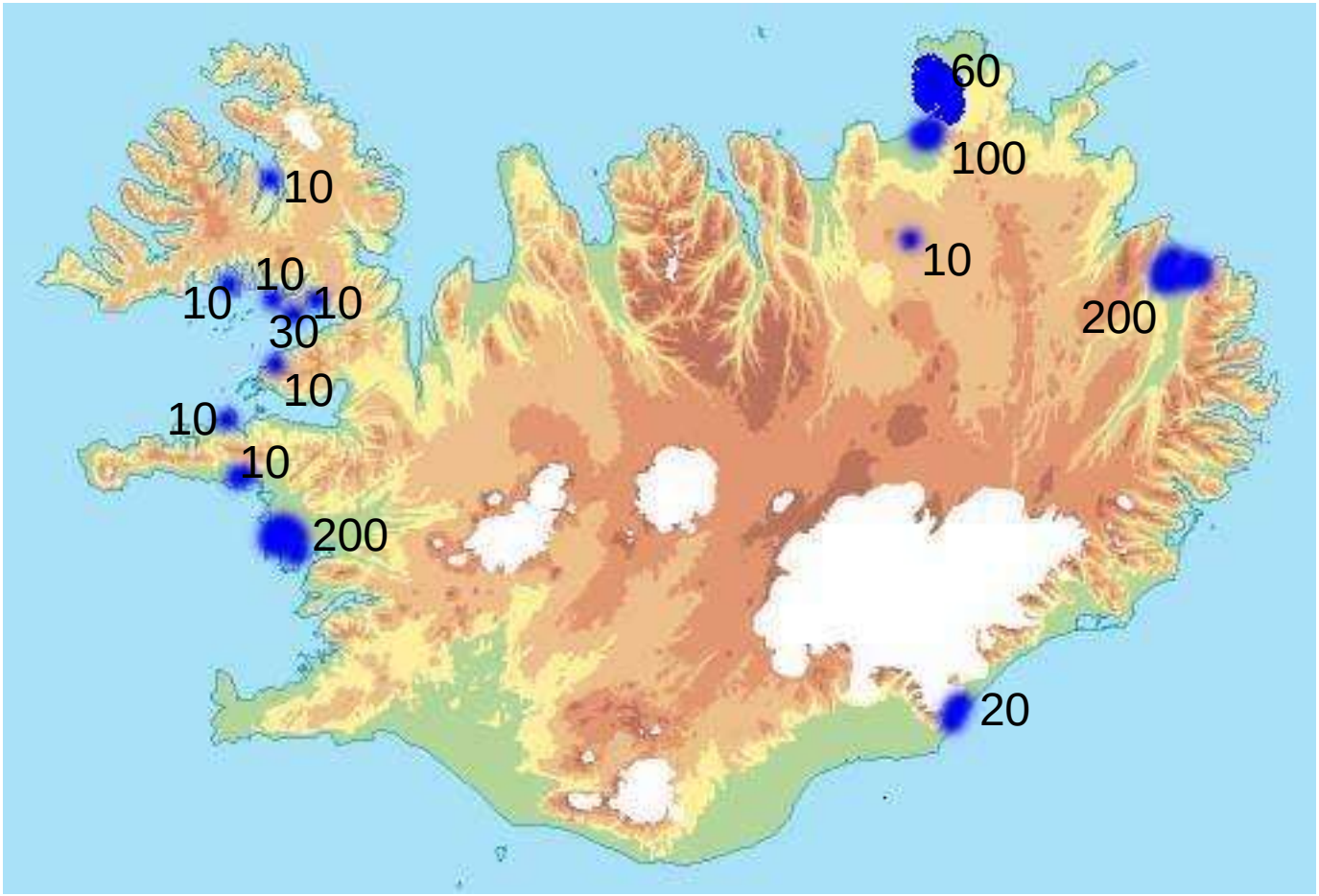
Breeding habitat

- Country-wide on ponds or lakes, mainly small.
- Sometimes on small pools of just the size to take off and land
- Lowland species – mainly <200m
- Rarely >200m

Breeding distribution



Main breeding regions



Estimated nos of breeding pairs, but exact location of nest sites often unknown

Breeding distribution

- Magnus Enquist (1983): Estimated max. distance RTDs could fly from breeding site to forage was 10 km.
- Nos of breeding sites in database (n= 679):
  - < 10 km inland - 556 (82%)
  - > 10 km inland - 123 (18%)
- Nos of breeding prs (est.) in database (n= 633):
  - < 10 km inland - 1 pr 427 (82%); 2+ prs 94 (18%)
  - > 10 km inland - 1 pr 108 (96%); 2+ prs 4 (4%)

Breeding distribution

- Regions differently surveyed, fewer highland areas but hardly any breeding pairs >200m
- Some known breeding sites now deserted, e.g. have dried up, drained, pairs moved
- Some sites used annually, others intermittently, e.g. in dry summers
- Up to 17 pairs recorded on same lake (“semi-colonies”)
- Hardly any semi-colonies inland, e.g. in all 4 cases large rivers nearby

Population estimates

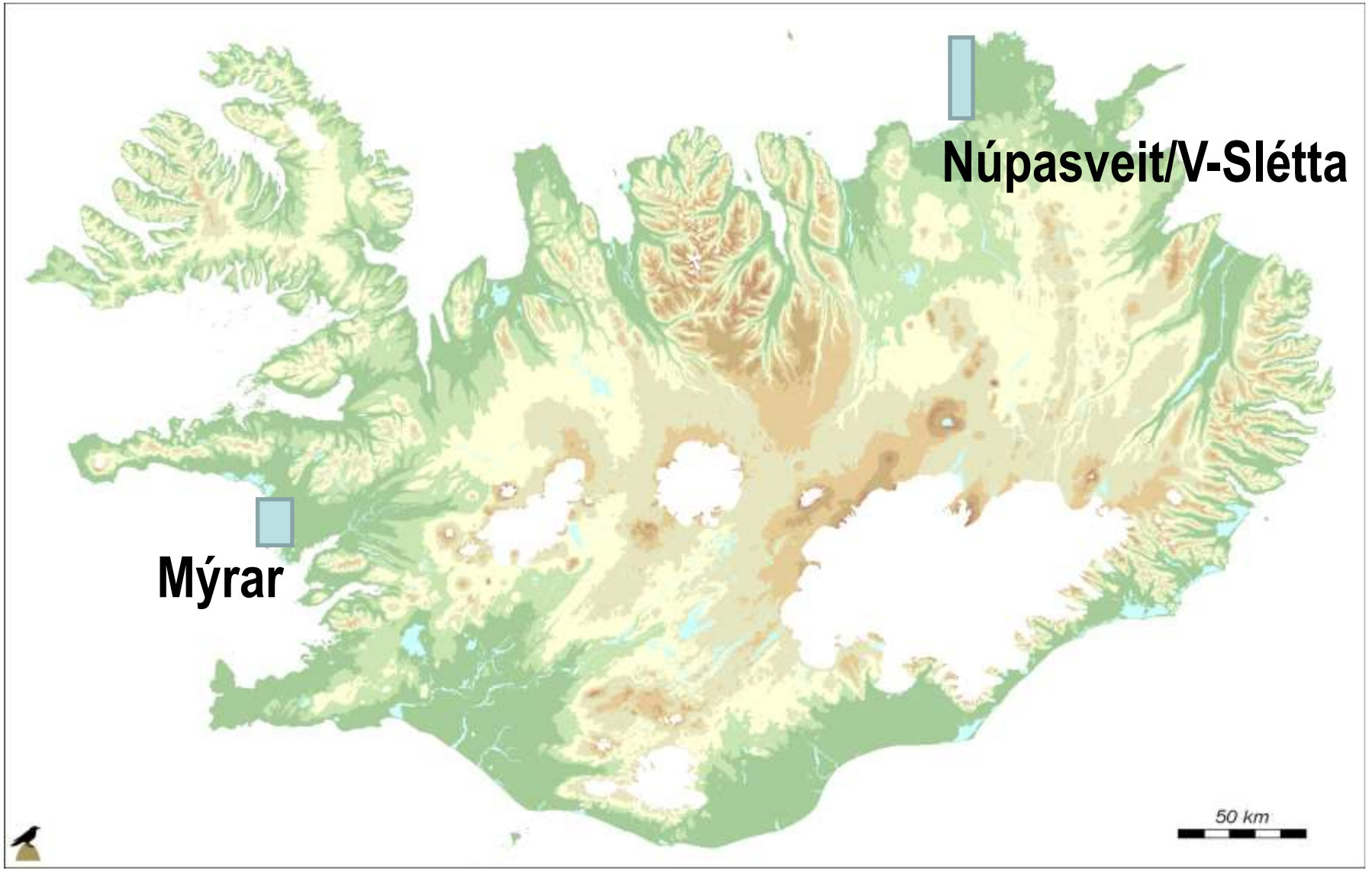
- 1975: >1000 pairs (Gardarsson 1975). First estimate.
- 1994: 1000-2000 (Asbirk *et al.* 1997, Burfield & van Bommel 2004)
- 2007: 1500 (AP, unpubl. estimate)

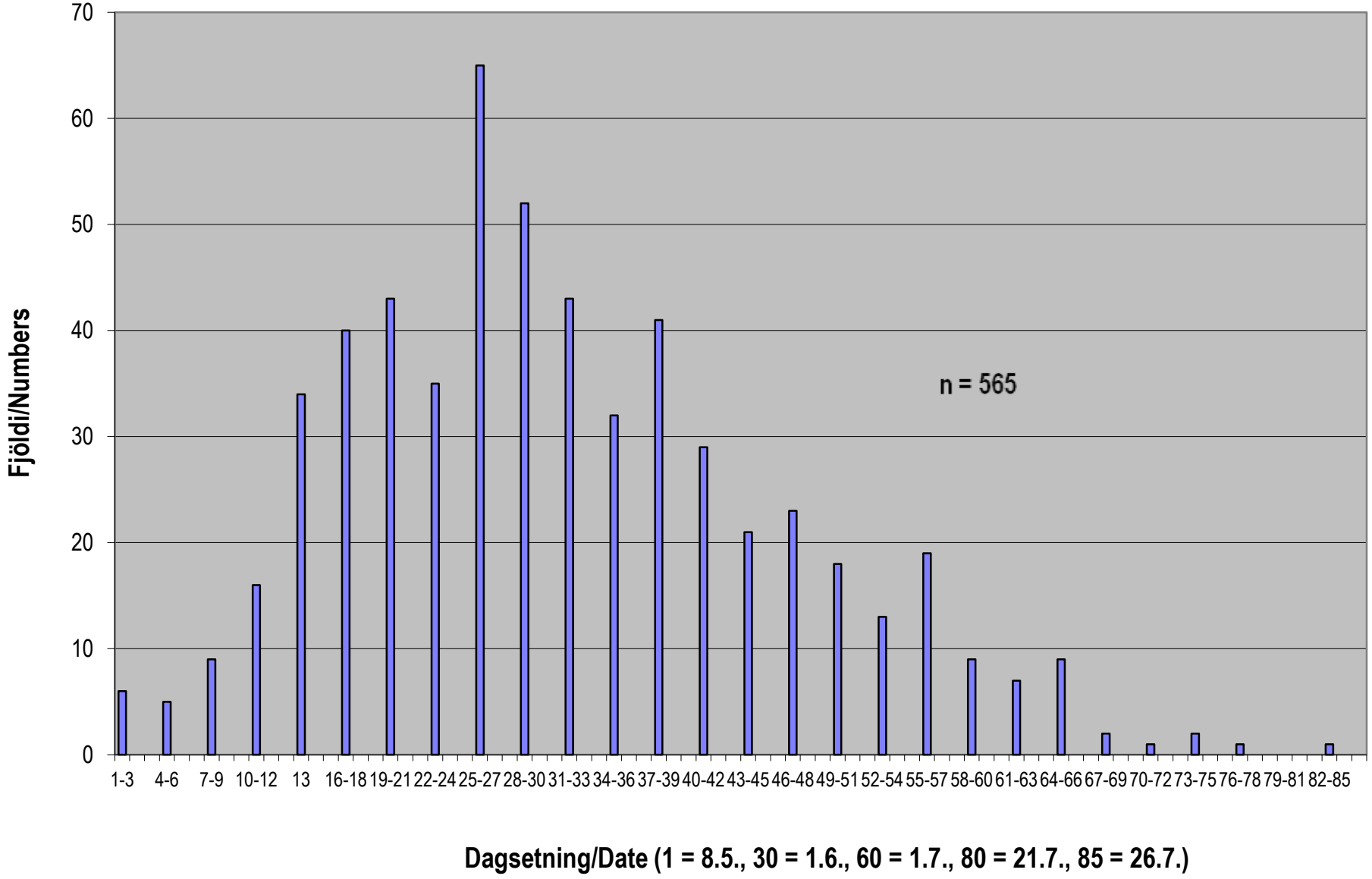
Population estimate 2013

- 2013: 1500-2000 (gestimate)
- Now ca 1300 known sites or estimated breeding pairs
    - Main breeding areas ca 700 pairs
    - Ca 600 single breeding sites
- Insufficient detailed data on distribution and numbers
- Many regions poorly surveyed, or not at all

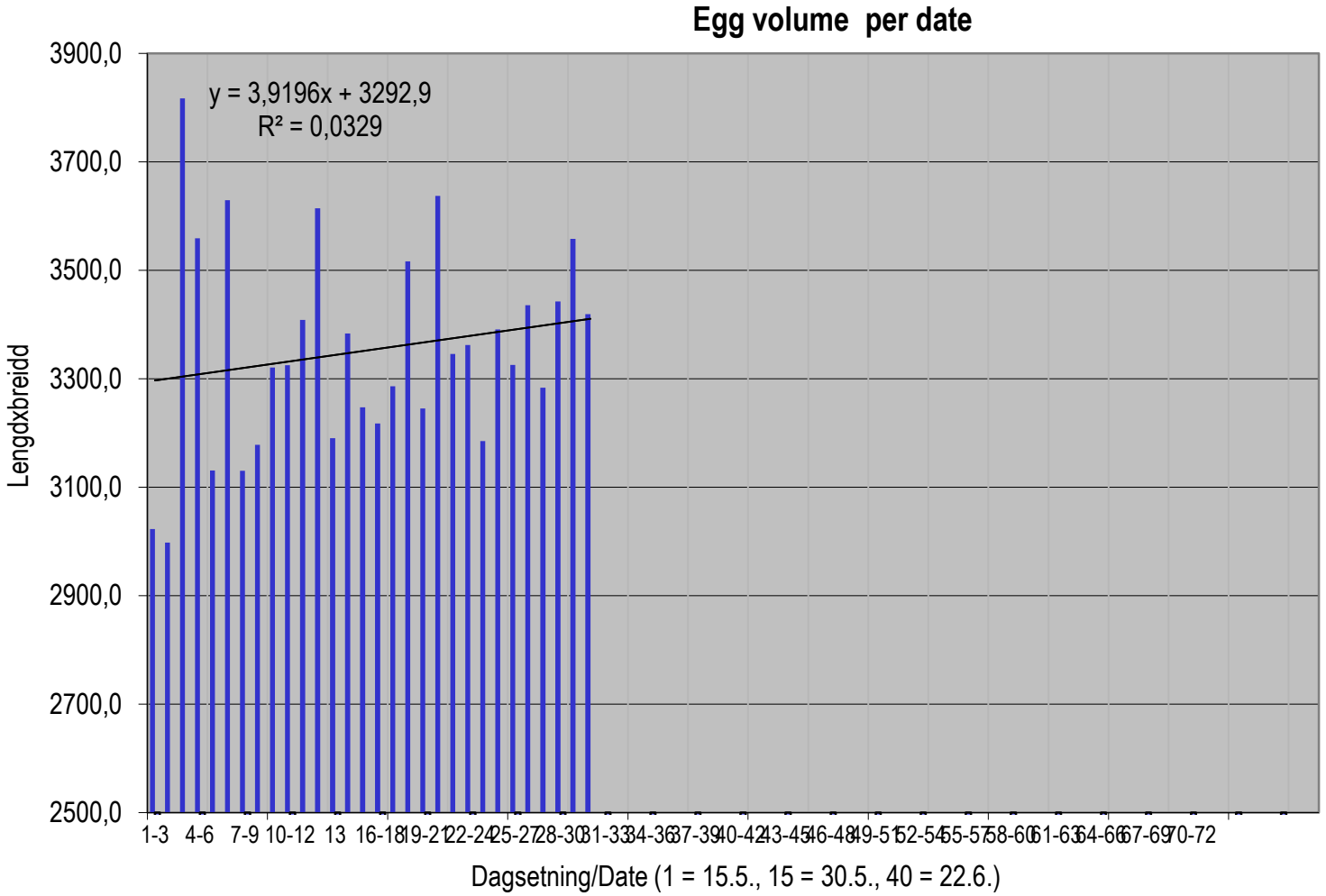
Monitoring results

- Monitoring efforts started in 2005
- Adult numbers (territorial pairs and other adults)
    - Breeding pairs vs non-breeding pairs
- Laying time (laying of 1-egg calculated, if not known)
- Productivity
    - Egg size vs date
    - Productivity
    - Mýrar vs Núpasveit/V-Slétta


Núpasveit/V-Slétta
Mýrar
50 km


70
60
50
40
30
20
10
0
Fjöldi/Numbers
n = 565
1-3
4-6
7-9
10-12
13
16-18
19-21
22-24
25-27
28-30
31-33
34-36
37-39
40-42
43-45
46-48
49-51
52-54
55-57
58-60
61-63
64-66
67-69
70-72
73-75
76-78
79-81
82-85
Dagsetning/Date (1 = 8.5., 30 = 1.6., 60 = 1.7., 80 = 21.7., 85 = 26.7.)

Egg size vs date



Population trends

- Mýrar (W-Iceland) – intensive study area:
  - 1979 - 83 pairs (Magnus Enquist)
  - 2006-13 – 50-60 pairs
  - 42% decline since 1979
  - No real decline since 2006, nos have varied between yrs
- Núpasveit/V-Slétta (NE-Iceland):
  - 2008 – 45 pairs
  - 2012 – 63 pairs
  - 40% increase since 2008

Nos breeding/non-breeding pairs

	Mýrar		---	Núpasveit/V-Slétta	
	2008	2012		2008	2012
Br. nos.	31	24		41	56
Non-br. pairs	15	27		5	7
Changes (%)	33	53		11	11

Distribution changes

- Mýrar:
  - Skarphéðinsson (1995): Decline on mainland Mýrar, with increase on offshore islands
  - Distribution changes inland > coastal 1978-2006
  - Reasons? Arctic Fox
  - No distributional changes 2007-2012
- Núpasveit/V-Slétta:
  - No distributional changes 2008-2012

Population changes

- Possible reasons for decline of breeding pairs in study area at Mýrar (W-Iceland):
  - Genuine population decline – measure of changes in national population
  - Movements out of study area – distributional changes
  - Increased level of non-breeding – pairs may stay or move somewhere else

Reasons for population changes

- Drainage of wetlands
- Summer dryness
- Predation from Arctic Fox, Arctic Skua, and Great Black-backed Gull
- Competition with Great Northern Diver
- Food shortage
    - Sandeel deficiency

Effect of predation on productivity

- 2012:
  - Núpasveit/V-Slétta (NE): 1,2 chicks/pr - No fox predation
  - Mýrar (W): 0,3 chicks/pr - Heavy predation in some areas

- Estimated effect of fox predation: Assumed no predation if nest on islets and thick reed beds. Predation considered present when nesting on banks.
  - fox predation (n= 31 pairs): 0,1 chicks/pair
  - no fox predation (n= 19 pairs): 0,7 chicks/pair

Food

- Breeding distribution mostly coastal and fly to sea for feeding, despite breeding on lakes and ponds with plenty Sticklebacks and even salmonids
- Inland salmonids in large lakes and rivers
- Mýrar (W): primarily Sandeels
- Núpasveit/V-Slétta (NE): gadoids and Capelin

Methodological questions

- Non-breeding pairs – how good are data?
  - Non-breeding, non-territorial pairs stay on main body of water, not as stable as the territorial pair structure along the lake banks, in islets or reed beds
- Calculations of production
  - Only prs with chicks?
  - Or also failed breeders?

Some lessons learnt

- Numerical changes difficult to interpret due to many influencing factors
- Population changes closely related to distribution
- Impact by Arctic Foxes can be heavy on productivity and distribution. Also on population numbers if sustained, but RTD is a long-lived species
- Climate change influencing RTDs through the Sandeel food base?
- A representative monitoring scheme needs to be carefully designed with nos of modules in different parts of country

Some future issues

- Better distributional data & population figures, incl. main breeding areas and regions where no surveys exist
- Breeding performance, incl. effects of various factors such as fox predation
- Food and feeding trips - GPS
- Contaminants – no Icelandic study available
- A national monitoring program need to be implimented
- May help that Iceland ratified AEWA 2013


Photo Malcolm Stott

Red-throated Diver triplets with parent

Photo Aevar Petersen

The bird climbed on nest with photographer next to it. Photo taken with normal lens.

Photo Trausti Tryggvason

Adult feeding chick on Capelin

Photo Guðmundur Ö. Benediktsson


Nest 10 m from water´s edge
Photo Aevar Petersen

Thanks

Photo Aevar Petersen