



# **Levels and trends in the population of Red-throated Diver in Sweden**

**DIVER Workshop, Hamburg, 24-25 November 2016**  
**Mats O.G. Eriksson**  
**[eriksson.tommered@telia.com](mailto:eriksson.tommered@telia.com)**

# **Levels and trends in the population of Red-throated Diver in Sweden (+ Finland)**

- 1. What is Projekt LOM**
- 2. Population levels and breeding range**
- 3. Ecological differences between Red-throated Diver and Black-throated Diver on breeding grounds**
- 4. Trends in population size and breeding performance**
- 5. Ringing – migration – annual mortality**
- 6. Red-throated Divers and onshore windfarms**

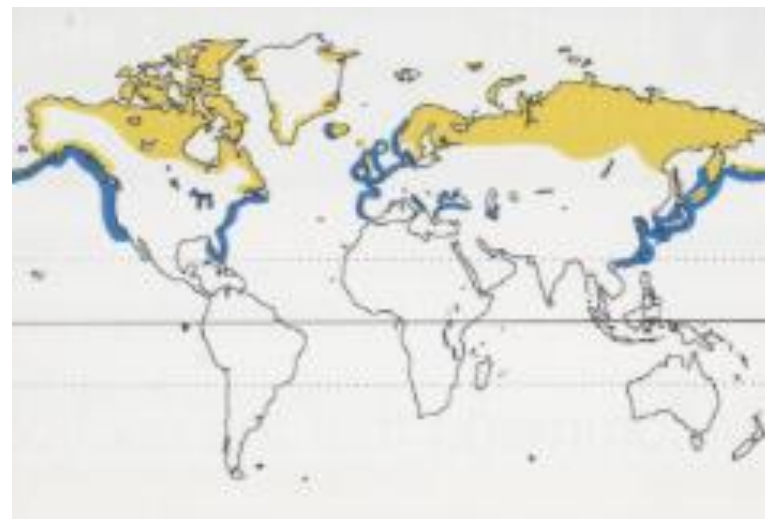


# **Projekt LOM**

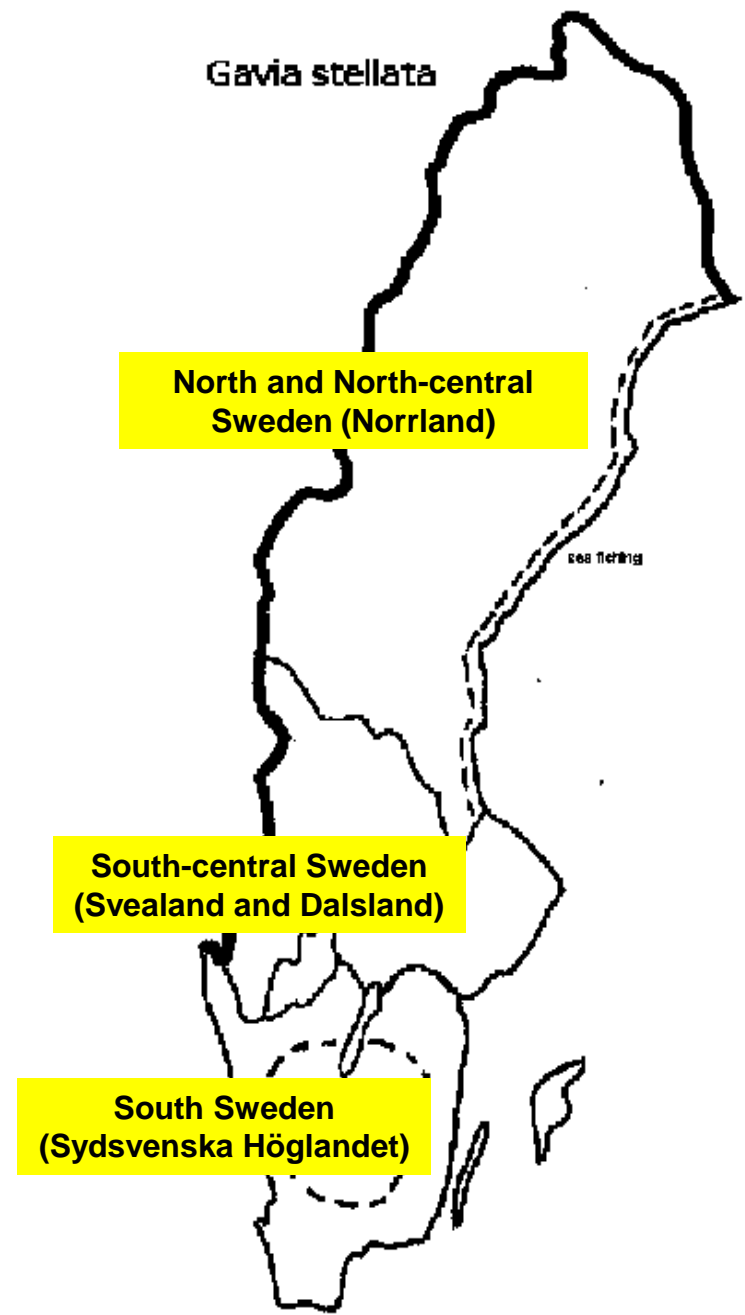
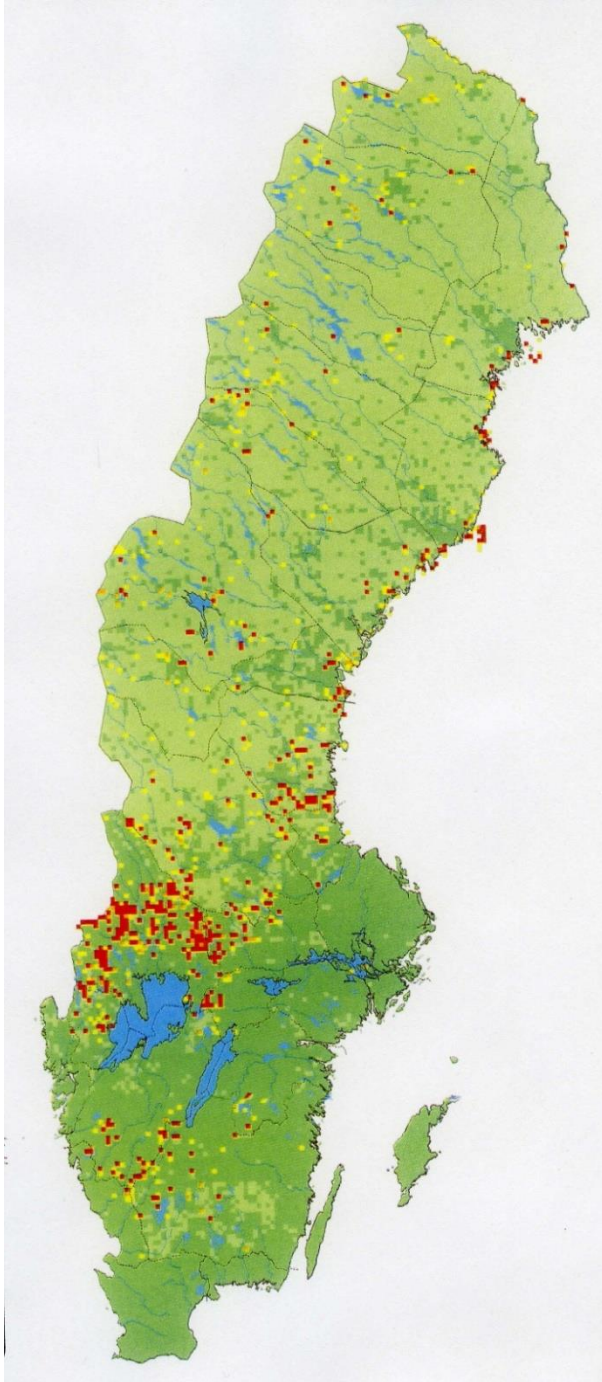
**<http://birdlife.se/sveriges-ornitologiska-forening/fagelskydd/artprojekt/projekt-lom/>**

- Start in 1994, working group linked to the national BirdLife partner since 2015.**
- More than 500 volunteers have contributed with reports during at least one year since start.**
- During recent years ca 140 persons have been active in the volunteer network**
- In addition, check against the national bird reporting database, Artportalen.**

# Red-throated Diver (*Gavia stellata*)



		Trend
World population North America	100 000 – 300 000 pairs ca 40 000 pairs	0 / - = Europe, Asia 0 = North America
Europe (excl. Russia)	7 100 – 13 000 pairs	0 / +
Sweden, Finland, Norway	4 100 – 8 400 pairs – 62 %	0 / +
Sweden	1 300 – 1 900 pairs – 16 %	+ = North and Central Sweden - = South Sweden







**Photo: Jan Schützer**



**Photo: Bosse Haglund**



**Photo: Jan Andersson**

**Photo: Mats Eriksson**







**Photo: Janos Jurka/N**

**Photo: Anna Peman**







**Photo: Mats Eriksson**



**Photo: Mats Eriksson**



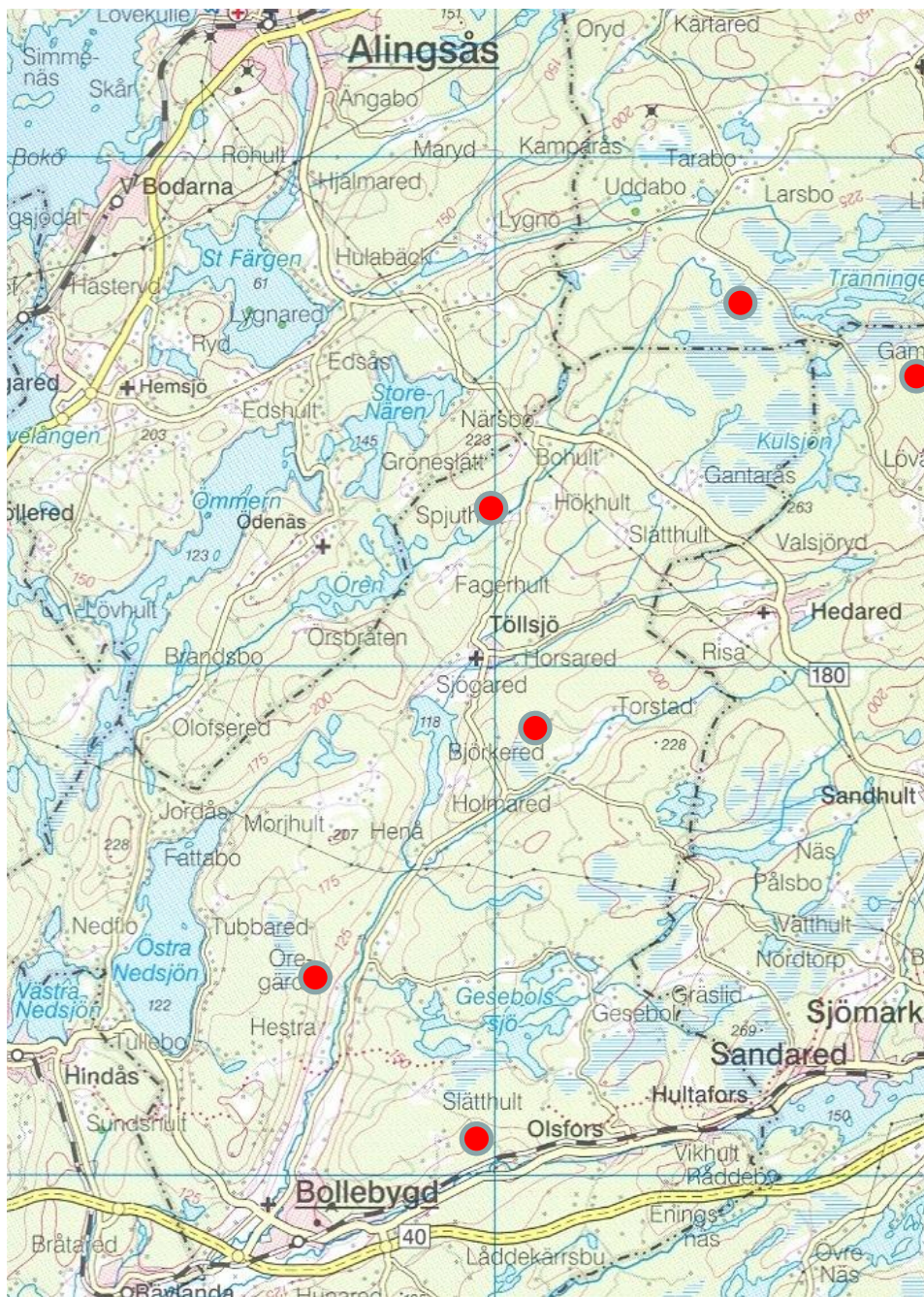




Photo: Mats Eriksson

# Black-throated Diver / Red-throated Diver



<b>Breeding lakes</b>	<b>Large nutrient-poor lakes</b>	<b>Small ponds, often devoid of fish</b>
<b>Food to chicks</b>	<b>Primarily fish</b> <b>– also aquatic insects</b> <b>Prey primarily taken in breeding lake</b>	<b>Fish prey brought from larger lakes or sea</b> <b>– upto ca 10 km distance (rarely more).</b>
<b>Fish stocks i foraging waters</b>	 <b>Perch is OK</b>	 <b>Small-sized salmonid or cyprinid fish</b>
<b>Water transparency</b>	<b>Moderate-high</b>	<b>Not equally important as for BTD</b>
<b>Water chemistry</b>	<b>Moderately acidic</b> <b>Mostly good alkalinity</b>	<b>pH and alcanity lower than in BTD lakes</b>



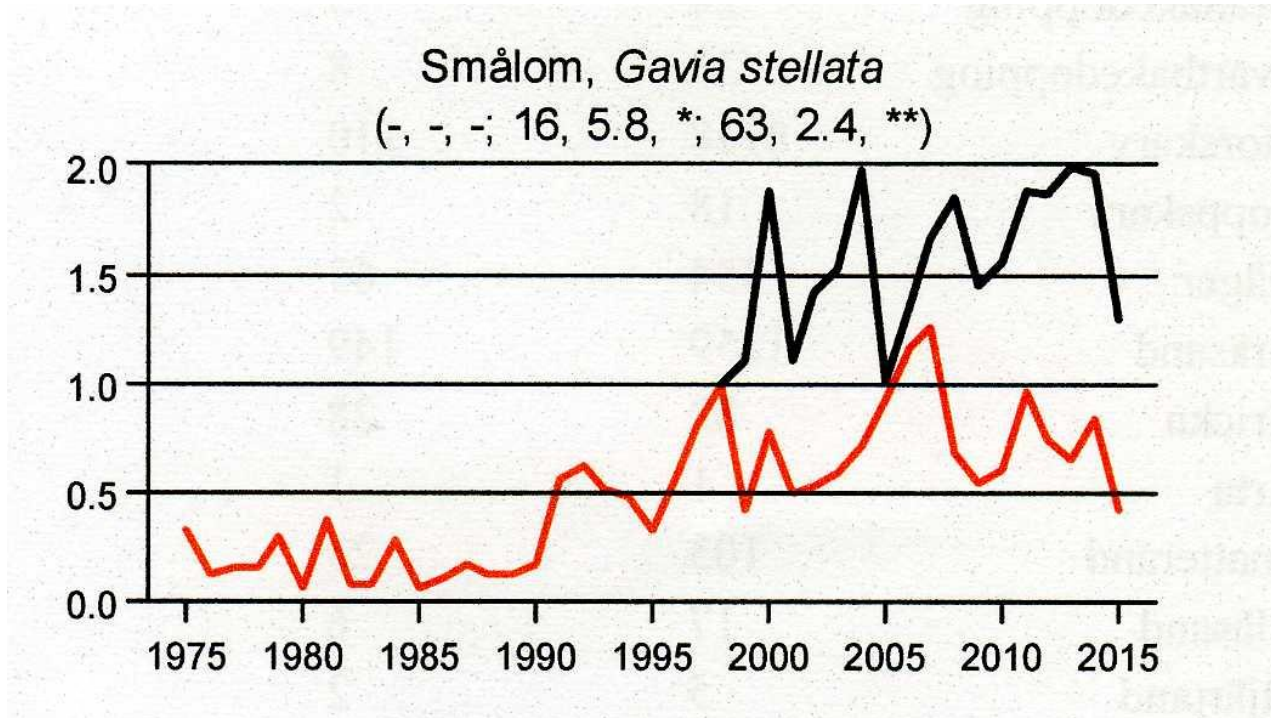
# Population trends - Breeding performance

## *Indicators*

- **Population trend indices**
  - Data from national bird monitoring scheme
- **Breeding performance**
  - Mean number of large chicks per territory holding pair
- **Breeding success (Mayfield method)**
  - Hatching success
  - Brood rearing success (rearing at least one large chick)
- **Chick survival**
  - % of broods with two large chicks

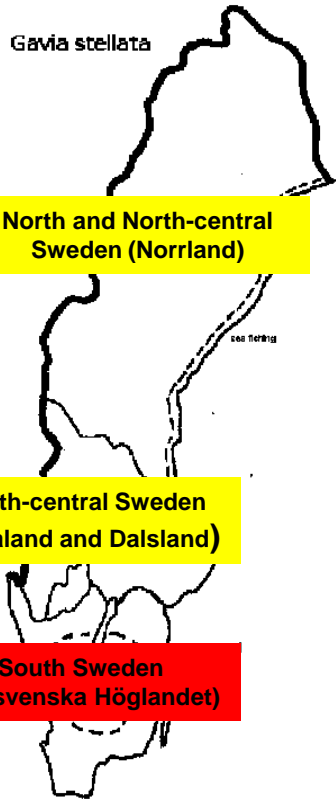
# Red-throated Diver (*Gavia arctica*)

## Population trend in Sweden (Swedish Bird Survey)

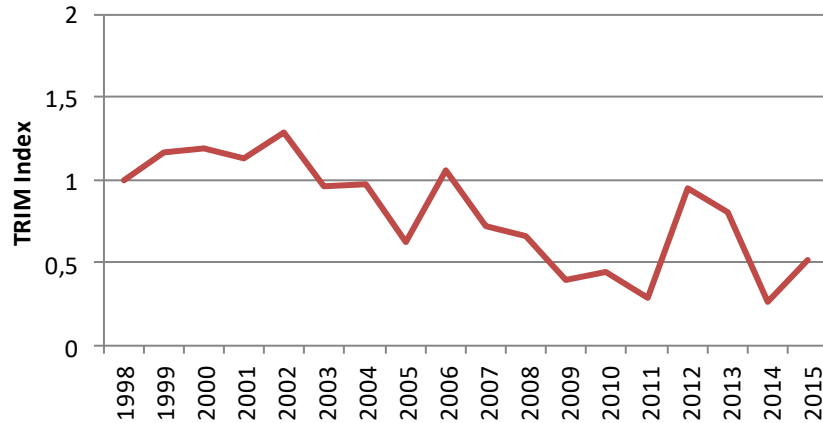


- Increase since mid-1970s, related to North and Central Sweden
- Historical decline – current status = depleted
- Recent decline in South Sweden

# Red-throated Diver - South Sweden

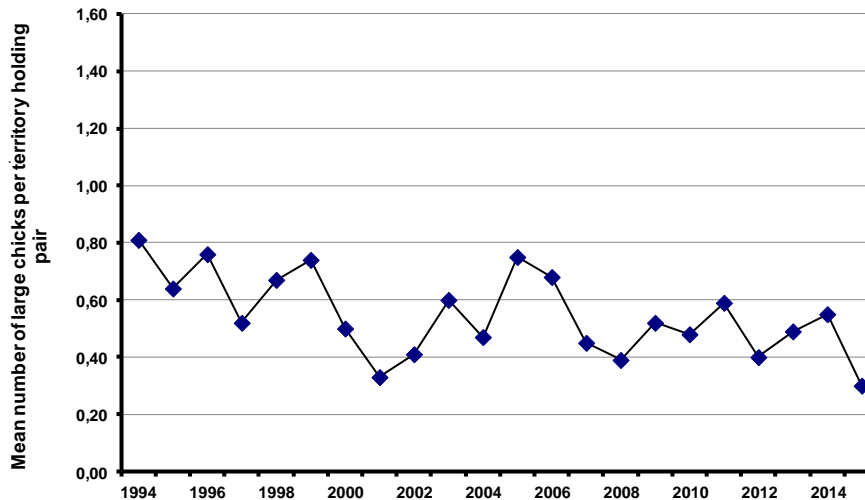


## Population trend



**Decline**  
**-6.4 %/year\*\*\***

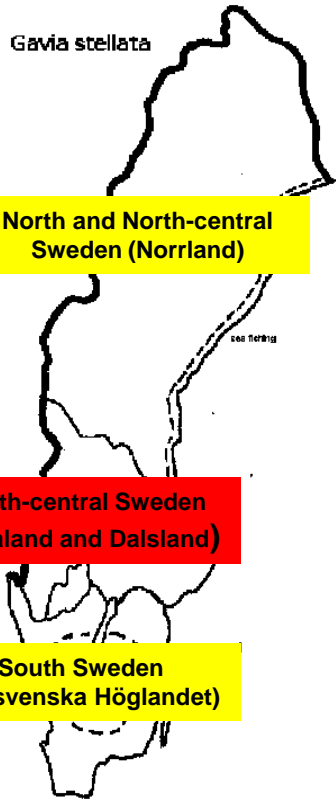
## Breeding performance



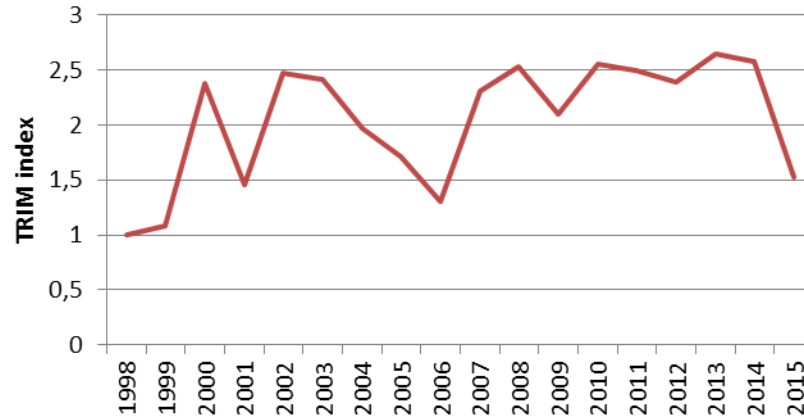
**0.55 per year**  
**Decline\***  
**12-37 pairs**



# Red-throated Diver – South-central Sweden

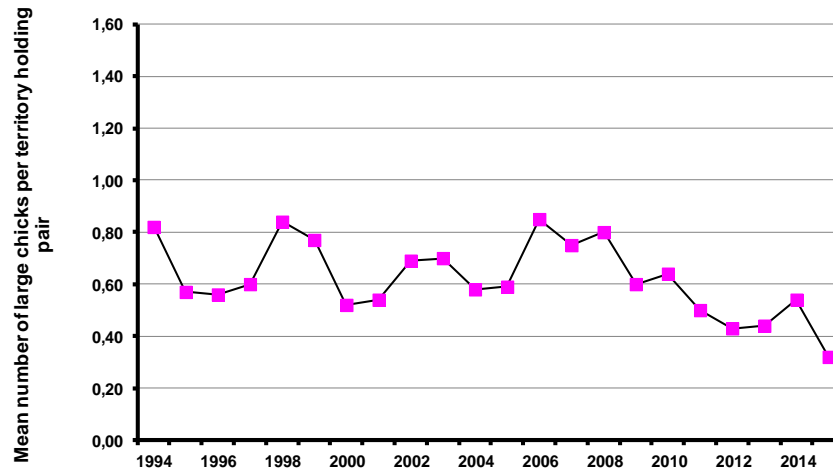


## Population trend



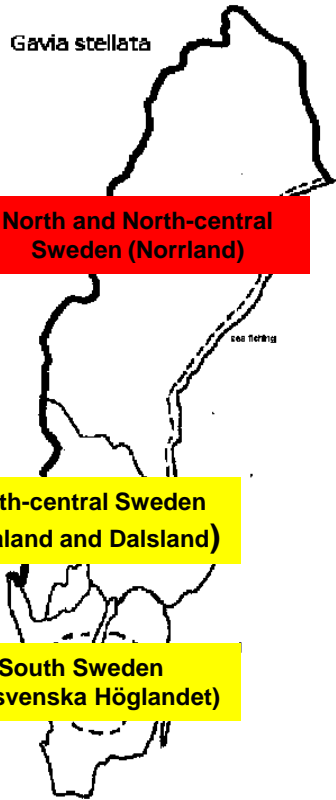
**Increase  
+3.1 %/year\***

## Breeding performance

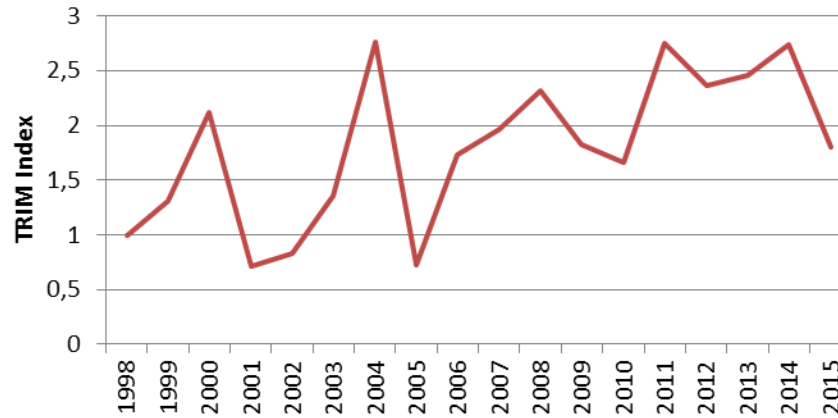


**0.62 per year  
Decline\*  
74-159 pairs**

# Red-throated Diver – North and North-central Sweden

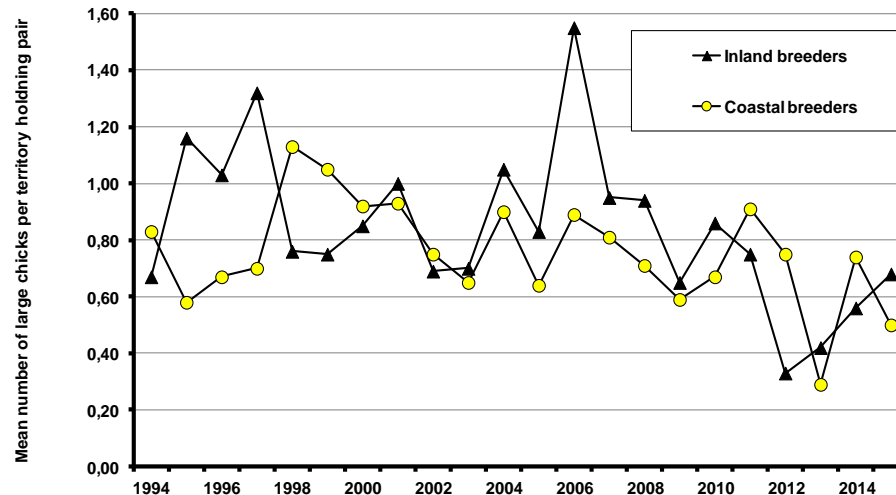


## Population trend



**Increase  
+5.3 %/year\*\*\***

## Breeding performance



***Inland breeders***  
**0.84 per year**  
**Decline\***  
**3-50 pairs**

***Coastal breeders***  
**0.76 per year**  
**No trend**  
**12-57 pairs**

# Breeding performance 1994-2015



	Number of large chicks, mean per pair and year	Trend	% of broods with 2 large chicks, mean per year	Trend
South Sweden	0,55	-*	36%	0
South-central Sweden	0,62	-*	31%	0
North-central & North Sweden <i>Inland</i>	0,84	-*	42%	0
North-central & North Sweden <i>Coast</i>	0,76	0	53%	0



# Breeding success 1994-2015



Photo: Leif Strandberg

	Hatching success, mean per year	Trend	Brood rearing success, mean per year	Trend	Breeding success, mean per year	Trend
South Sweden	0.634	***	0.946	0	0.602	***
South-central Sweden	0,602	*	0.900	0	0.543	0
North-central & North Sweden <i>Inland</i>	0.662	(-)	0.958	-	0.636	(-)
North-central & North Sweden <i>Coast</i>	0.678	*	0.973	+	0.658	0

# Breeding performance - to summarize

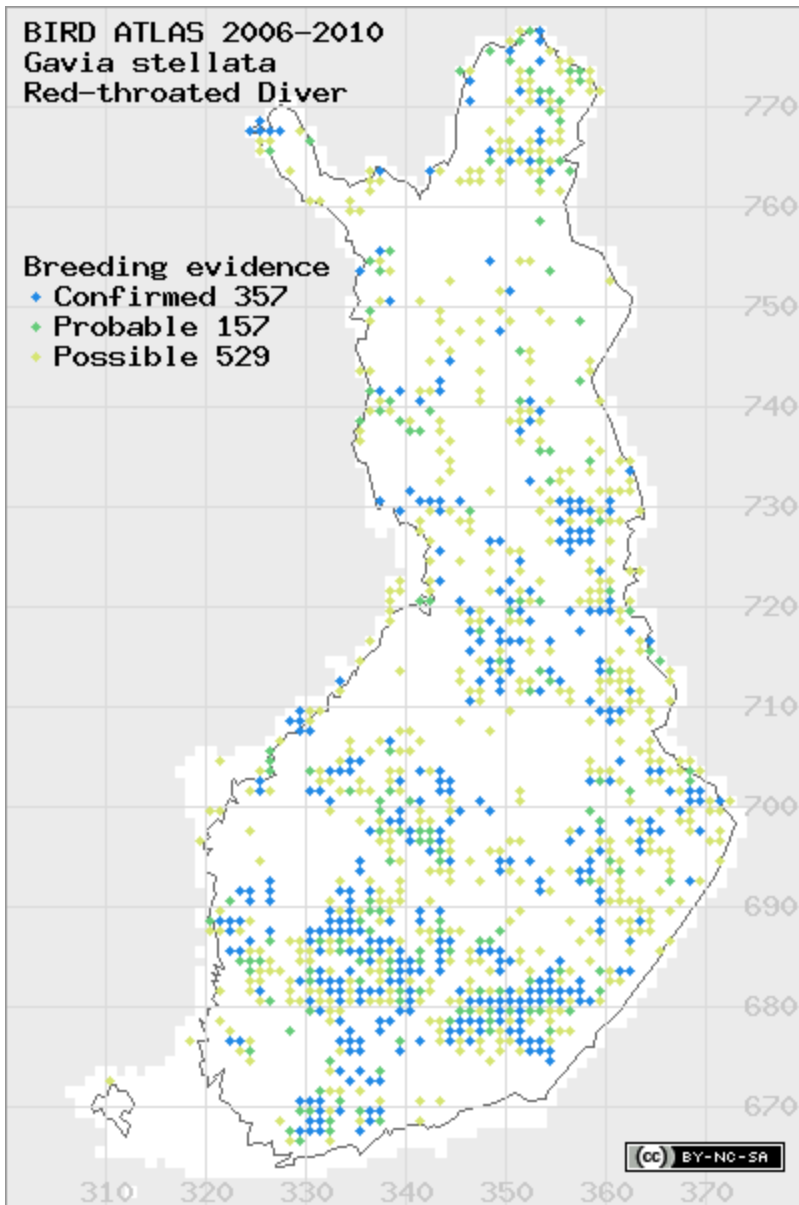
- Higher in North and North-central Sweden, linked to higher chick survival → **better foraging conditions?**
- Presumably too low to compensate for annual mortality in South and South-central Sweden
- Declining trend in whole Sweden (except for coastal breeders)
- Linked to declining trend in hatching success → **increased nest predation pressure?**

# Is this the culprit?



Photo: Christer Brostam

- ***Records of nest predation by some species under recent increase***
  - Crane
  - Whooper Swan
  - Marsh Harrier



# FINLAND

## *National survey in 2010*

- **750-1500 pairs**, re-assessment rather than real changes ref previous estimates
- **Historical decline**, recent trends stable or slight **increase** (although regional declines)
- **Good breeding performance**, 1.13 chicks per pair, 2010.

<http://atlas3.lintuatlas.fi/results/species/red-throated%20diver>



# Ringling of Red-throated Diver

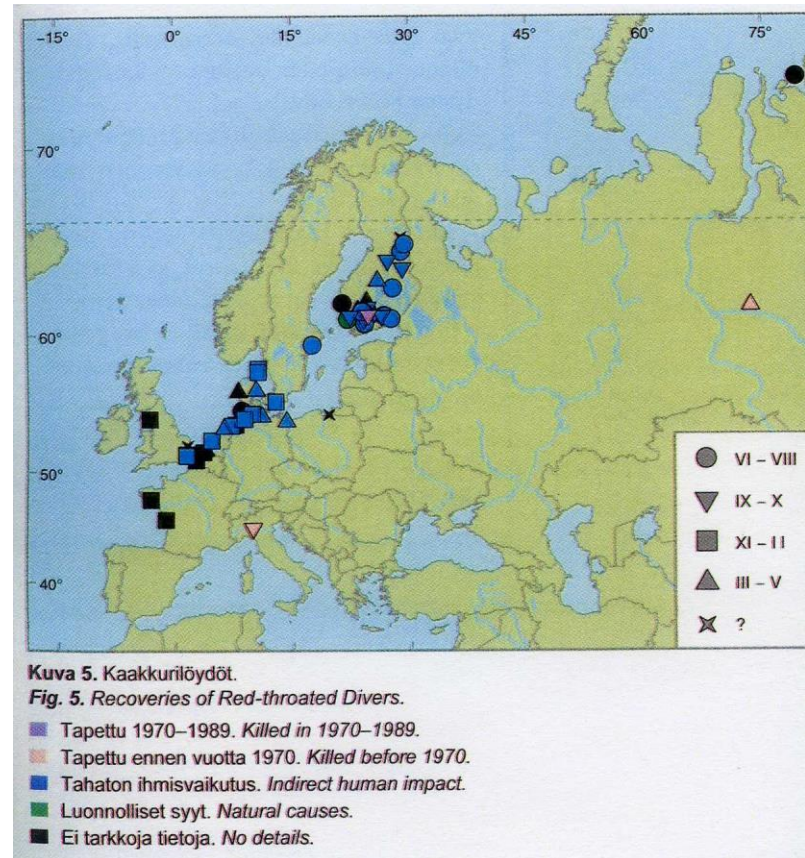
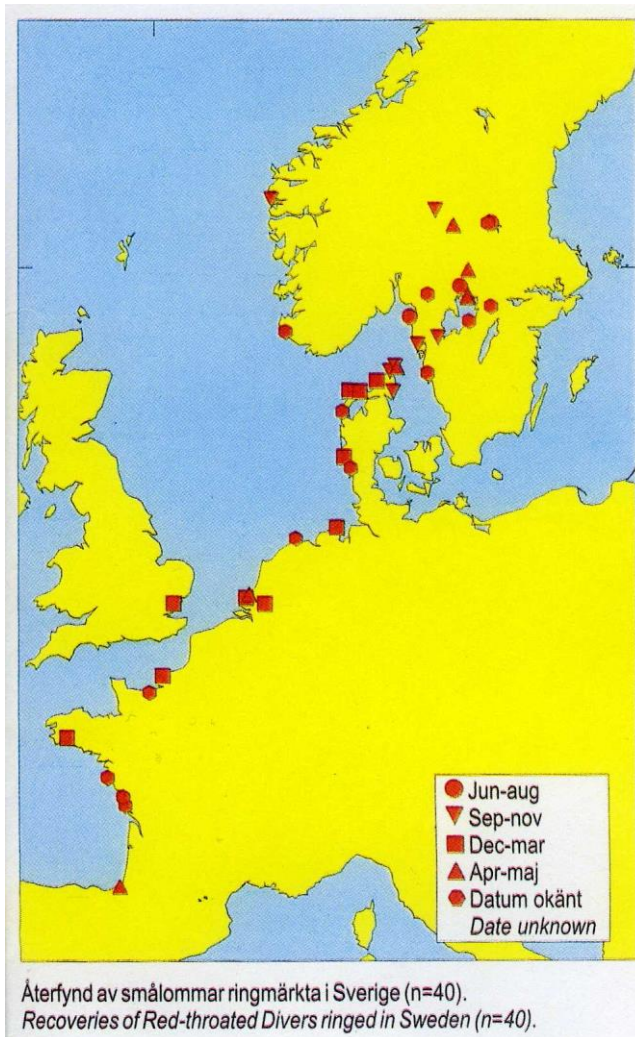
## **SWEDEN**

- 1186 ringed birds, 1911-2016
- 91 recoveries (7.7 %), 89 ringed as chicks

## **FINLAND**

- 987 ringed birds, 1974-2007, 1728 until 2016.
- 63 recoveries (6.4 %), 54 ringed as chicks (until 2007)

# Migration routes and wintering areas – traditional view



# Annual mortality

Age class	SWEDEN: Ringed before 1991		SWEDEN: Ringed 1991-2005		SWEDEN: All ringed before 2005		FINLAND: All ringed before 2003	
0-1	26,5%	50.0%	37.7%	62.2%	33.3%	57.4%	23.3%	51.2%
1-2	17.6%		15.1%		16.1%		16.3%	
2-3	5.9%		9.4%		8.0%		11.6%	
older	50.0%		37.8%		42.6%		48.8%	
Number of birds	34		53		87		43	

**Increased pre-breeding mortality?**

? Real change

? Sampling artefact

# Red-throated Diver and offshore wind farms





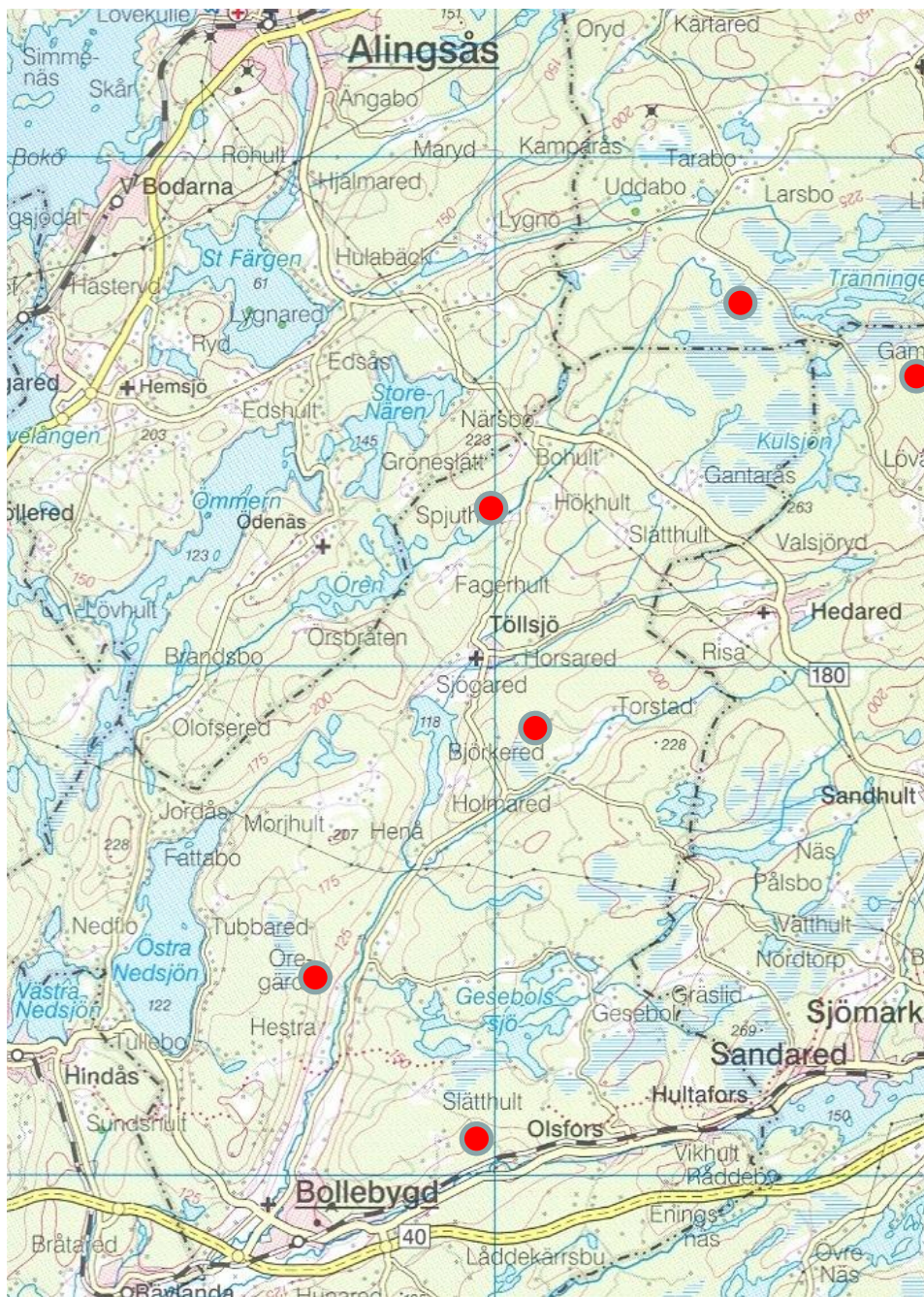


Photo: Mats Eriksson





## Red-throated Diver and offshore wind farms

- Very scanty information
- Single records of successful breeding close to turbines (< 1km)
- But also indications of disturbance / displacement / avoidance
- **More data needed**
  - More pairs
  - Longer follow-up periods



# Red-throated Diver and offshore wind farms

## *Field surveys and monitoring*

- **Very scanty information**
- Access of data
- Consistent methodology
- Quality of reports

## ***To summarise***

- Recent increase (except for South Sweden) after long-term historical decline = depleted
- Regional difference in breeding performance, lower in South and South-central Sweden  
..... where most likely too low to balance annual mortality
- Impaired hatching success – increased predation pressure...???
- Increased pre-breeding mortality...?????
- Very scanty information about breeding performance by pairs nesting close to wind turbines



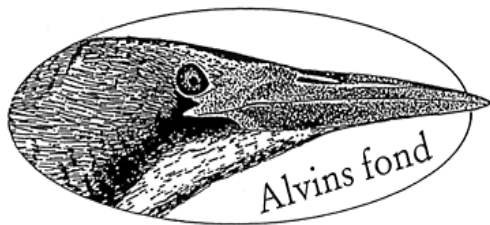
# ***To acknowledge***



## **Projekt LOM**

**To all volunteers – your field work is the basic prerequisite for our work**

<http://birdlife.se/sveriges-ornitologiska-forening/fagelskydd/artprojekt/projekt-lom>



## **The Alvin Foundation**

**For financial support to field work and participation in this workshop**

<http://www.naturvardsverket.se/Stod-i-miljoarbetet/Bidrag/Alvins-fond-for-fagelskydd/>



**Svensk  
Fågeltaxering**

## **The Swedish Bird Monitoring Program**

**For assistance with data**

<http://www.fageltaxering.lu.se/>



***THANK YOU***