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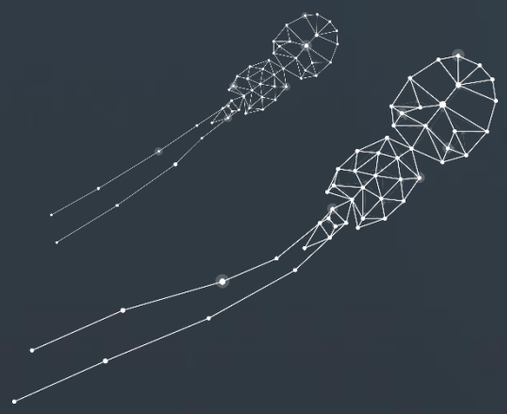
PREVENT INFECTION. REDUCE RISK.



Management of PD free zones in Norway

TriNation - Aberdeen
October 12-13th 2016

Tore Hovland

Senior Project Manager

PatoGen Analyse AS

TARGETS FOR PD-CONTROL

Prevent further spread north

Infection within the endemic zones must be turned back

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SOME CHALLENGES IN COMBATING PD

- Different perceptions of the importance of PD
- Disagreement of measures
- Imposing restrictions upon detection
- Combating in endemic areas with high infection pressure requires major changes in production structure
- Missing consensus whether to eradicate or live with PD
- Sufficient knowledge exists about PD to implement unified combating programs

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How early can PDV be detected with screening?

- SAV is detected on average 52 days before diagnosis
- Individual farmers experience an average of 90 days before diagnosis
- Virus has been detected up to 11 months before diagnosis
- The infection generally runs faster in the summer months

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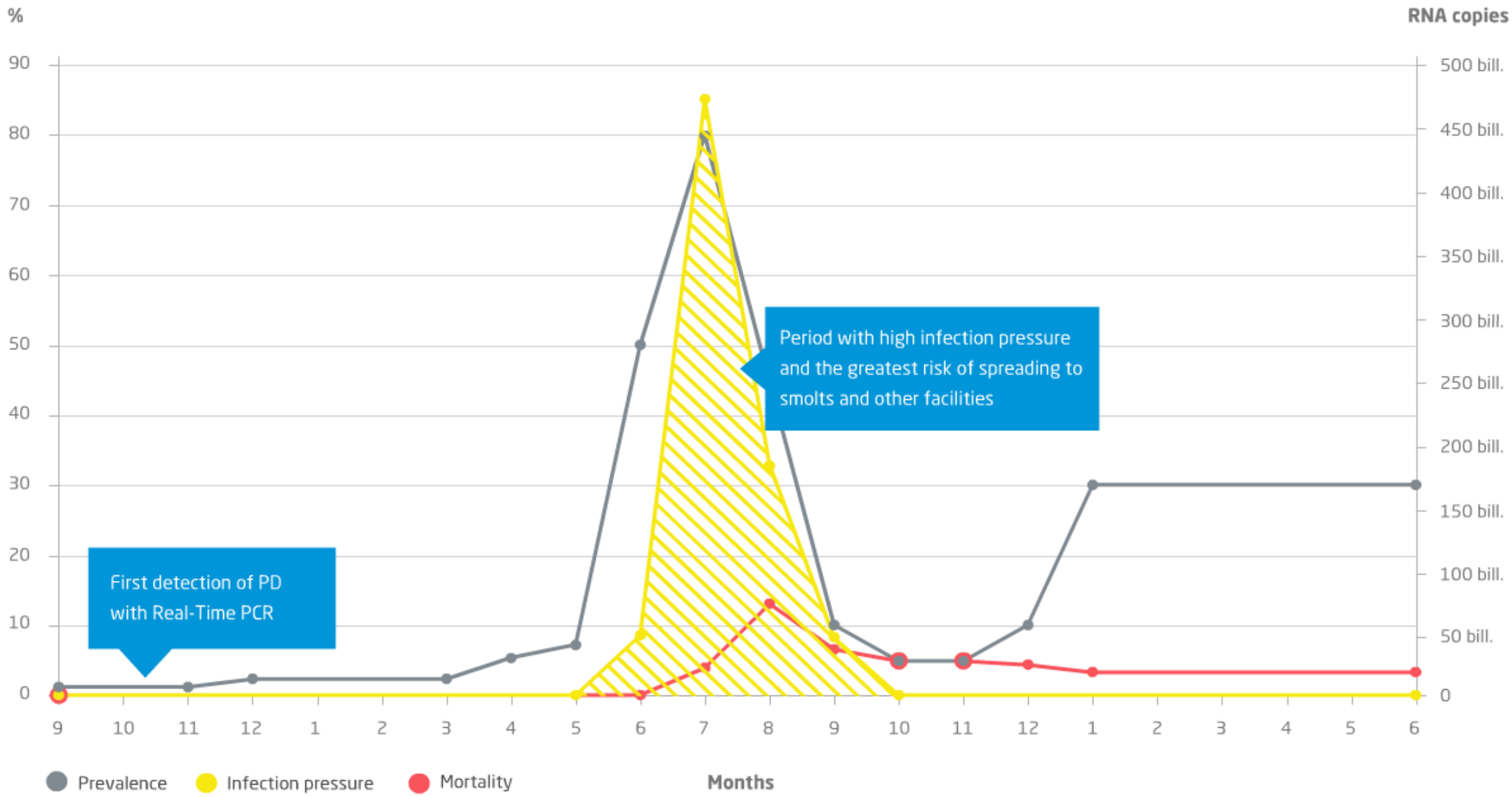
PD – development of infection



Time for action

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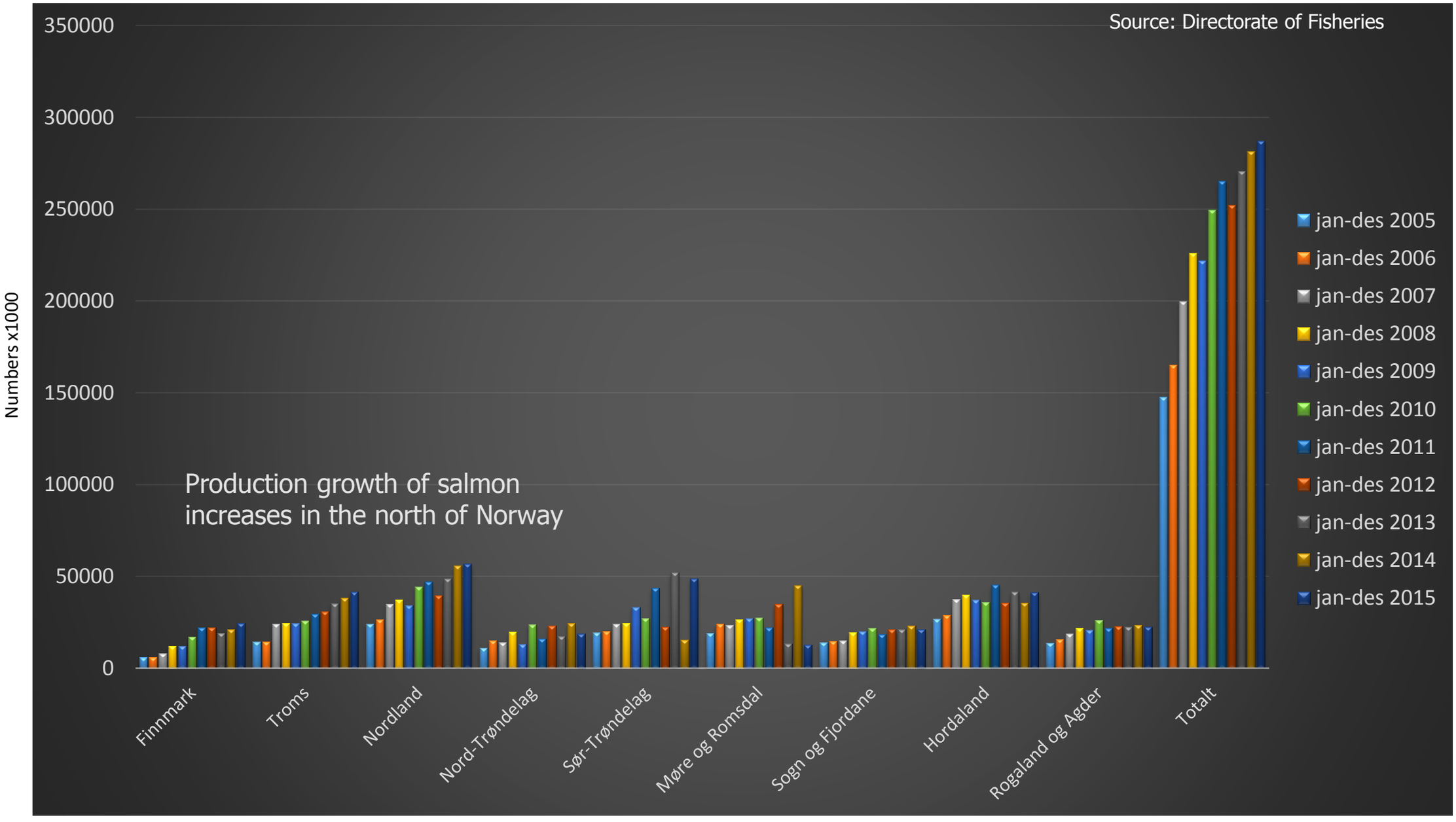
Sea transfer of salmon 2005-2015



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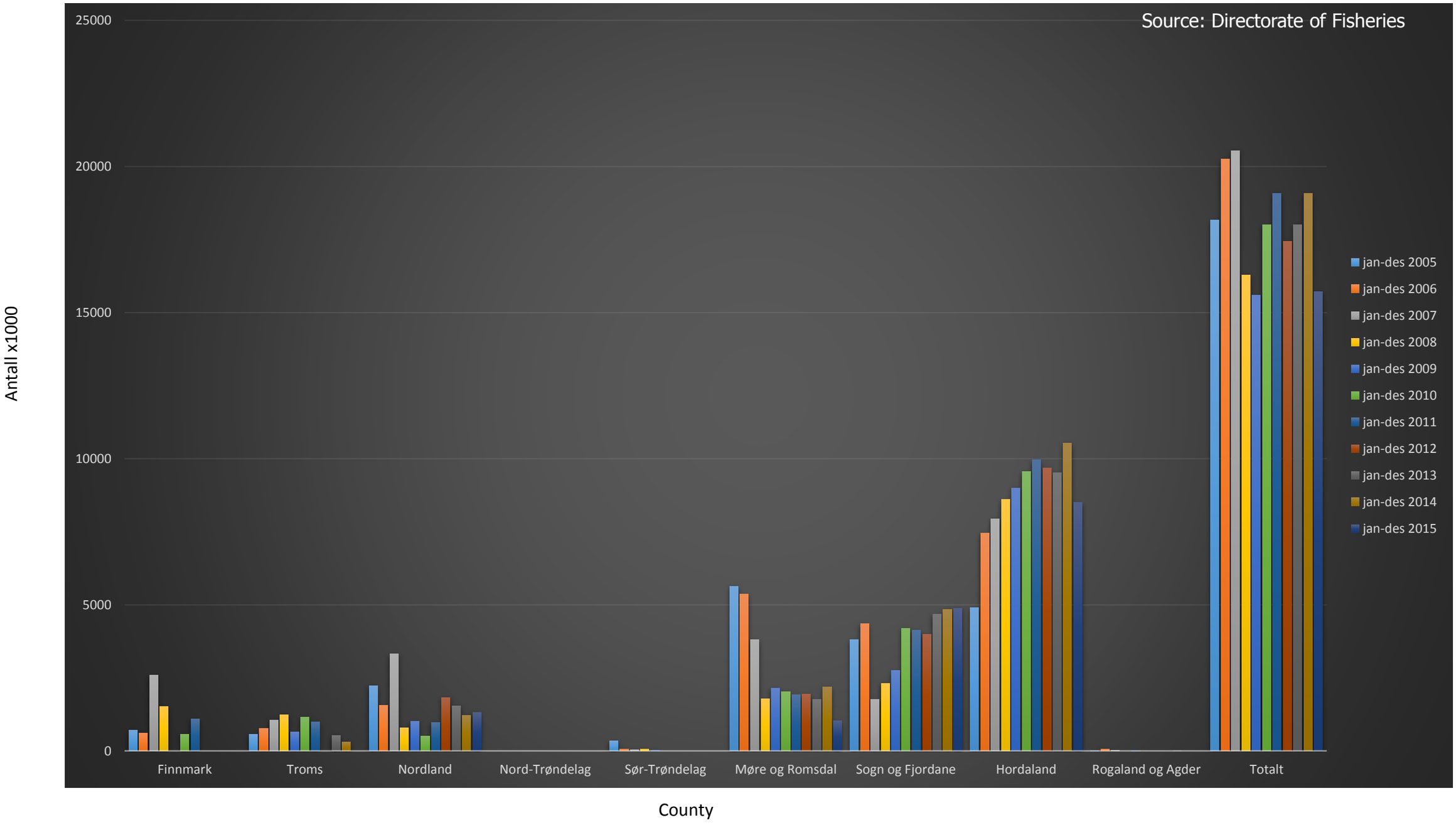
Sea transfer of rainbow trout 2005-2015



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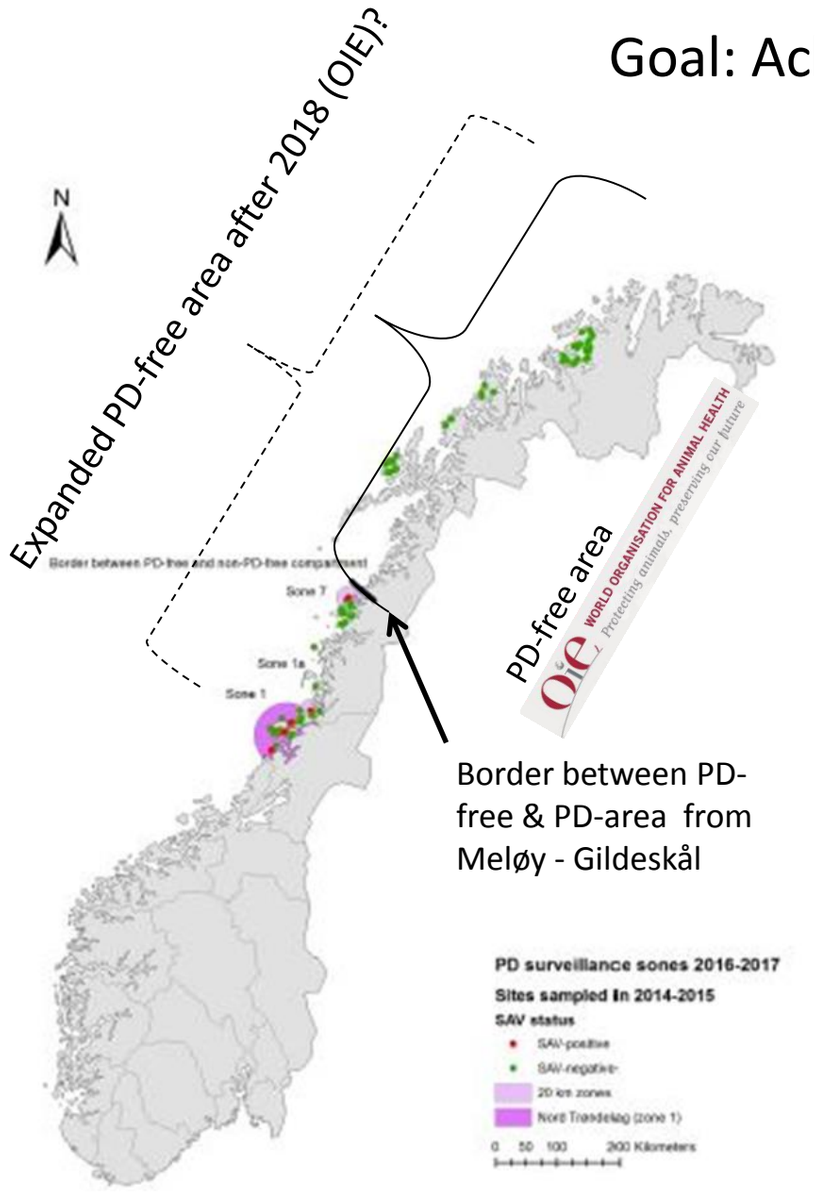
PD-surveillance program in the northern counties of Norway; Nord-Trøndelag, Nordland, Troms & Finnmark – 2014-2015

Goal: Achieve PD-free status in the region



Border between PD-free & PD-area from Meløy - Gildeskål

Figure 3. Map of sites sampled and investigated for SAV in the 2014-2015 surveillance programme for PD, suggested border for PD-free compartment and surveillance zones in the 2016-2017 surveillance program.

Table 1. Fish samples investigated for SAV in the surveillance programme in 2014. The samples are grouped according to species.

	Atlantic salmon	Rainbow trout	Total
No. sites	71	0	71
No. samples investigated	3942	0	3942
No. positive sites	2	0	2

Gjevre AG and Jansen MD. The surveillance programme for pancreas disease (PD) in Norway 2014. *Surveillance programmes for terrestial and aquatic animals in Norway, Annual report 2014*. Oslo: Norwegian Veterinary Institute 2015.

2014:
2 SAV2 detections in Nordland
(+3 SAV2 detected in Nord-Trøndelag outside the surveillance program)

Table 1. Number of samples from fish investigated for SAV in the surveillance programme in 2015. The samples are grouped according to species.

Species	Sampled sites	Number of samples	Positive sites
Atlantic salmon	54	3 712	1
Rainbow trout	0	0	0
Total	54	3 712	1

Gjevre AG, Modahl I and Bang Jensen B. The surveillance programme for pancreas disease (PD) in Norway 2015. *Surveillance programmes for terrestrial and aquatic animals in Norway. Annual report 2015*. Oslo: Norwegian Veterinary Institute; 2016.

2015:
1 SAV2 detection in Nord-Trøndelag

Since PD has been detected in two areas in Nordland south of the border the surveillance program should continue in two surveilance zones around the sites with virus detected during 2016-2017.

In addition, two more detections registered in Nord Trøndelag in 2016

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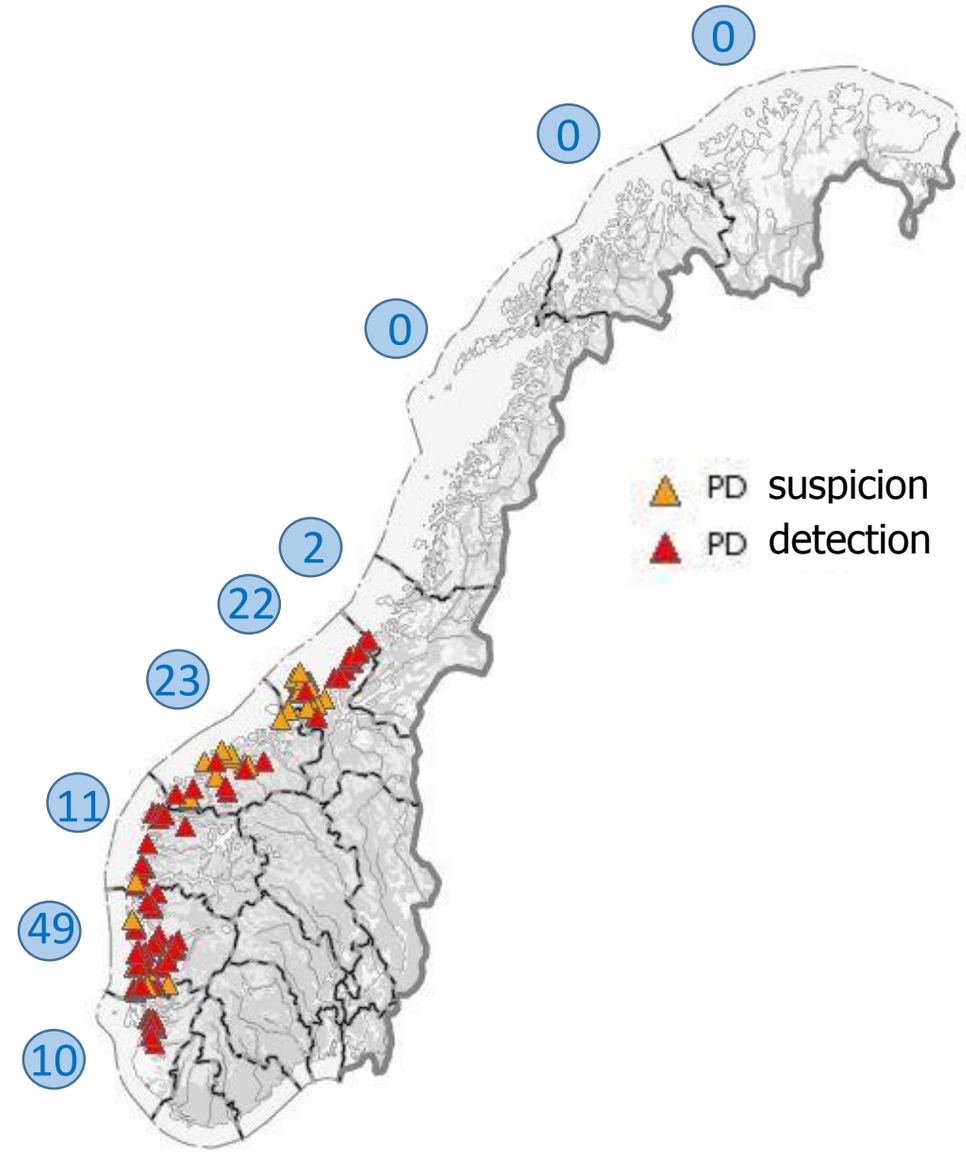
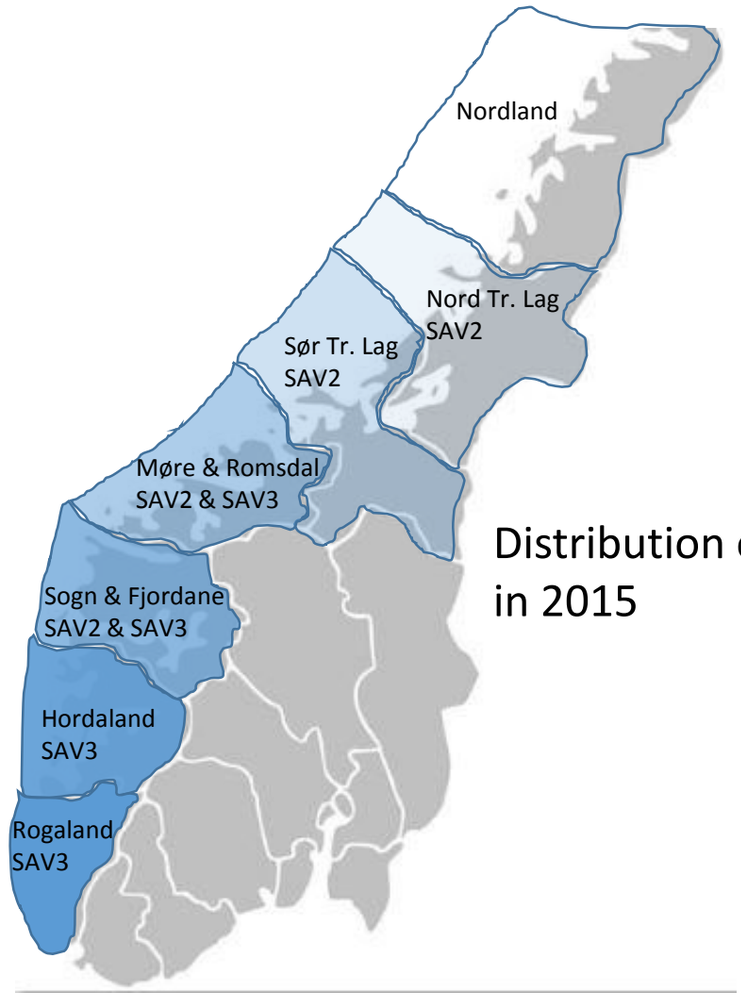
PD detections SAV2 & SAV3 in 2015

Sources: Directorate of Fisheries, Norwegian Veterinary Institute

Distribution of PD cases by county in Norway per September 2016





Distribution of SAV in 2015

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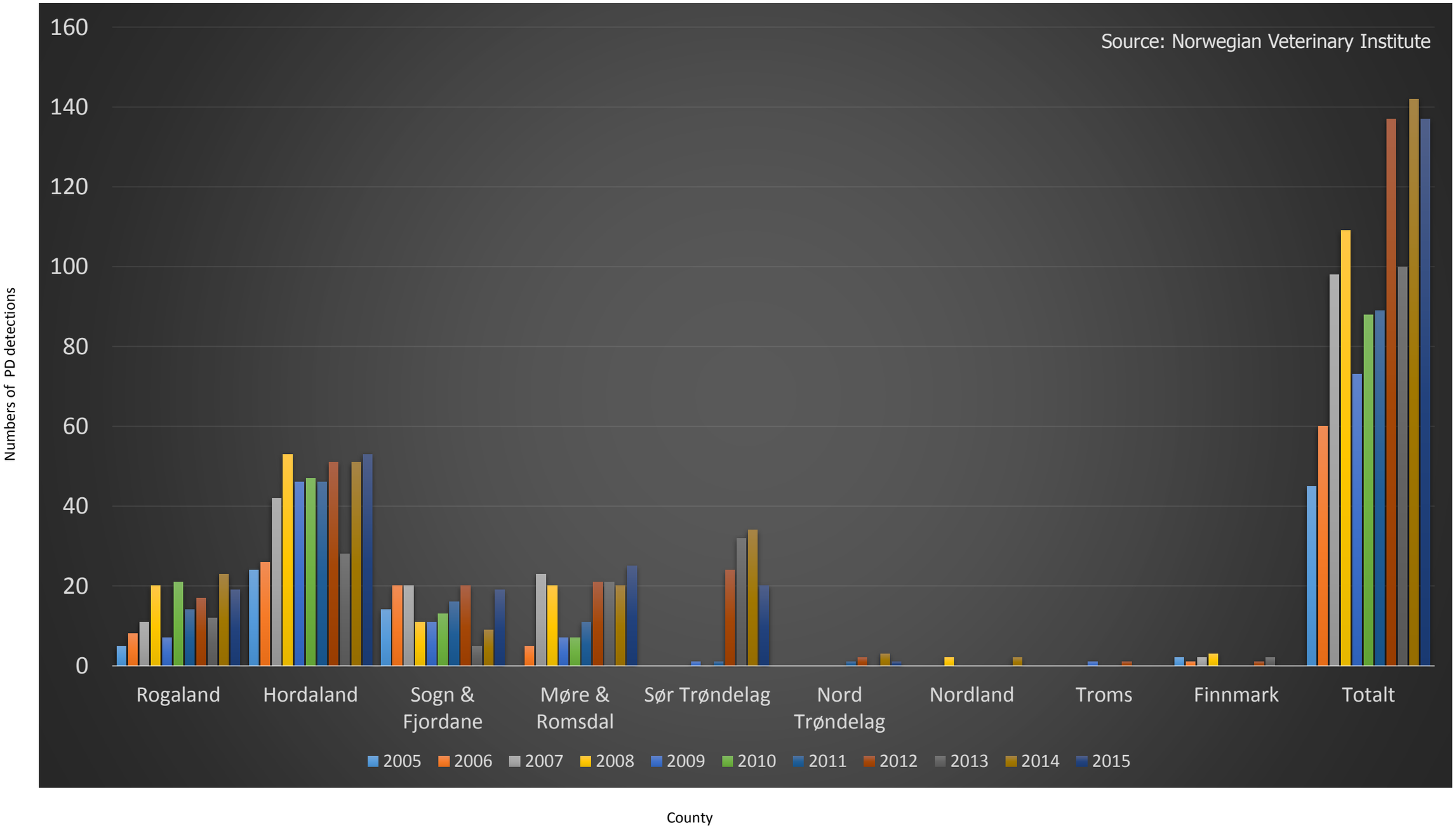
PD-detections 2005 - 2015



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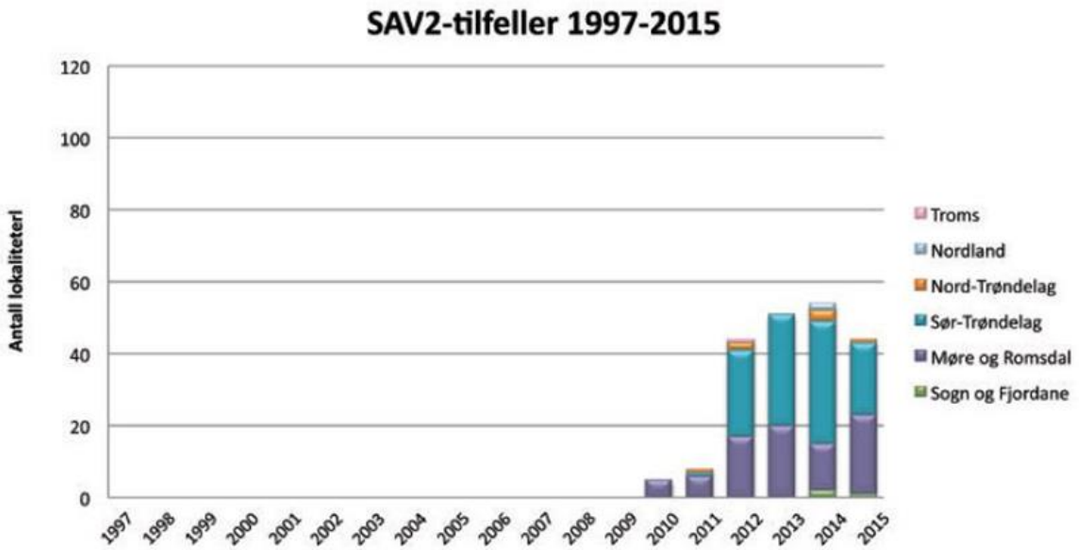
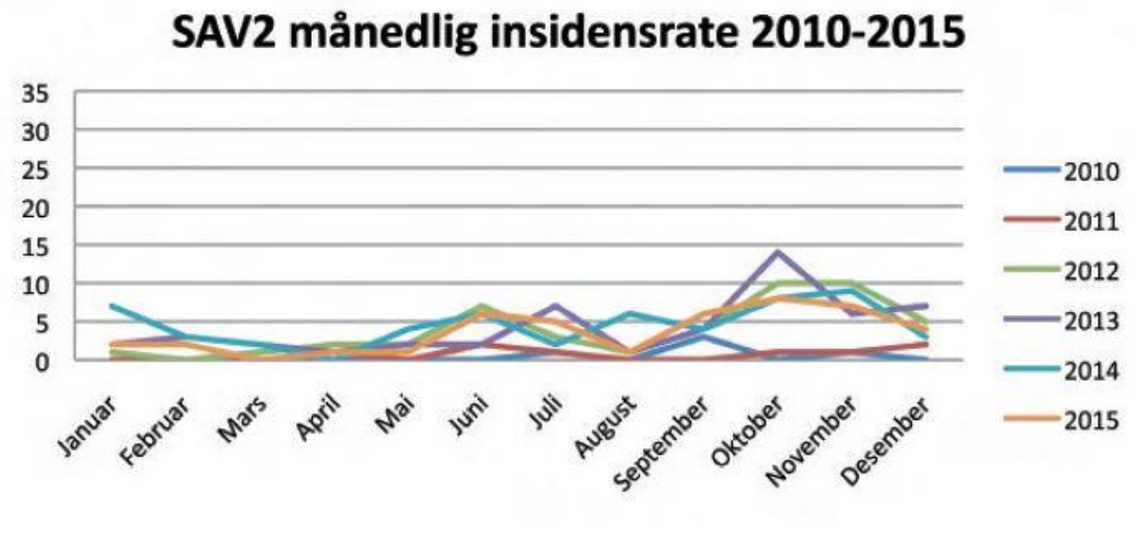
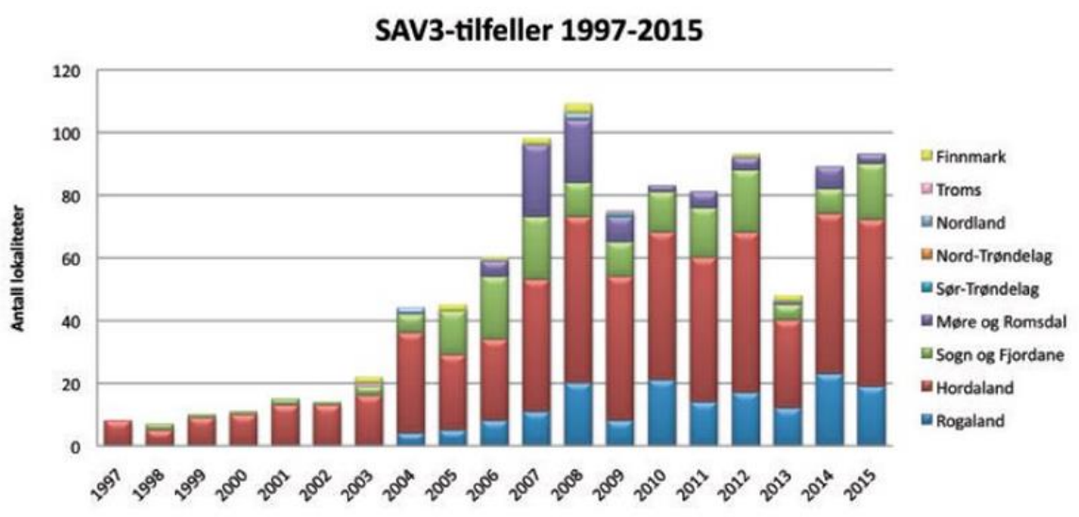
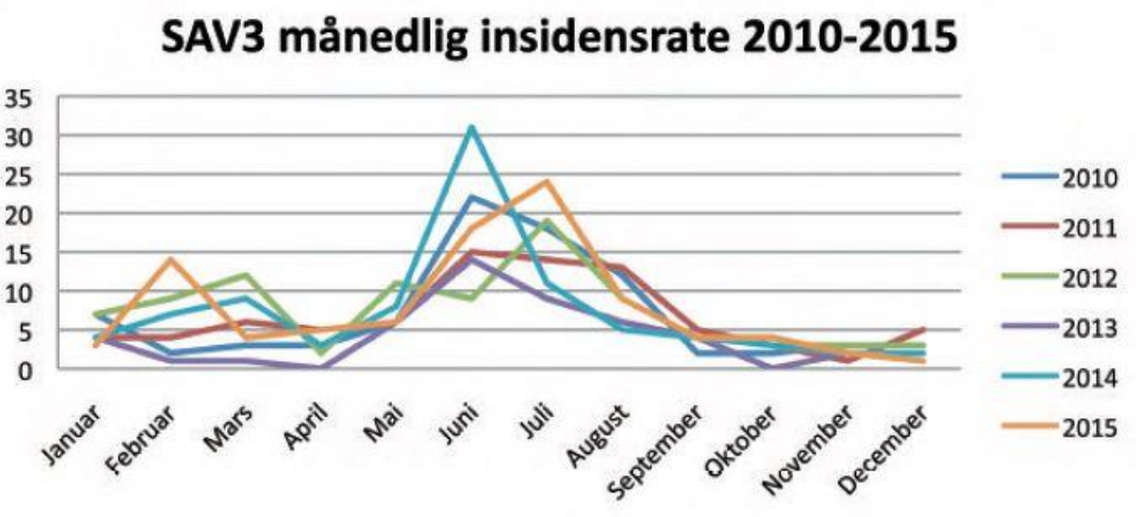
Detection & incidence rate of SAV2 & SAV3 in Norway

Source: Fish Health Report 2015, VI









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Norway is divided in relation to PD....

SAV free area

SAV2

SAV3

Different PD strategies in Norway

- **Agder to Hustadvika** – reduce the loss and infection due to SAV3
- **Hustadvika to Sør Trøndelag** – reduce the loss and infection due to SAV2, slaughtering - SAV3
- **Nord Trøndelag** – statutory monitoring and slaughtering
- **Nordland – Finnmark** – slaughtering if detected

PD-measures at area level

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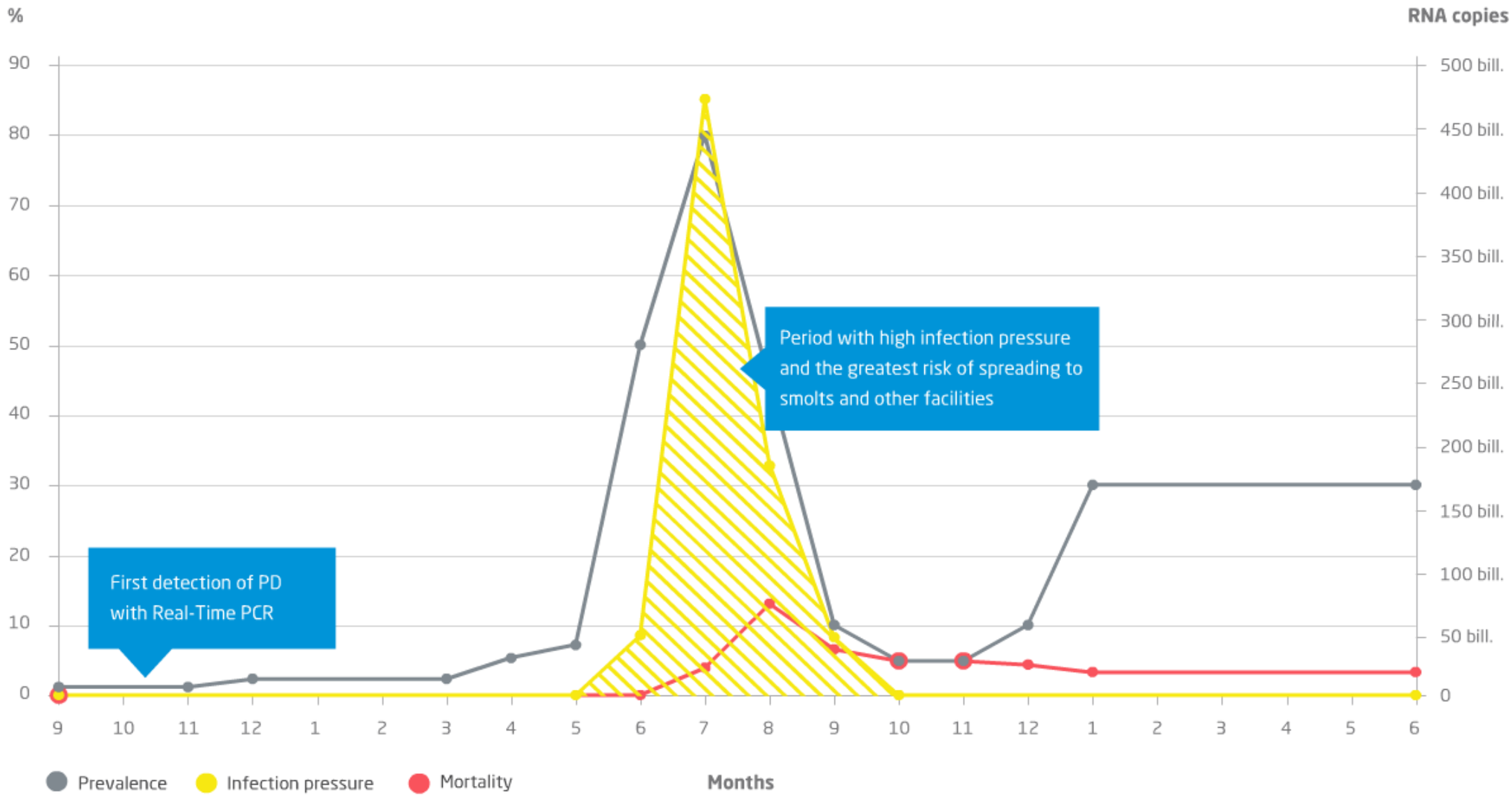
Project: «Stop the spread of PD to Mid-Norway»

- Surveillance and active combating of PD 2007-2012
- 100-150 sites in operation during this period
- Huge savings due to avoiding introduction of PD at an earlier stage
- Area still free of SAV3 – will the situation persist?

The spread of SAV2 in Norway 2007 - 2015

PD – development of infection



Room for action

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PD-measures at zone level

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Measures outside the zone

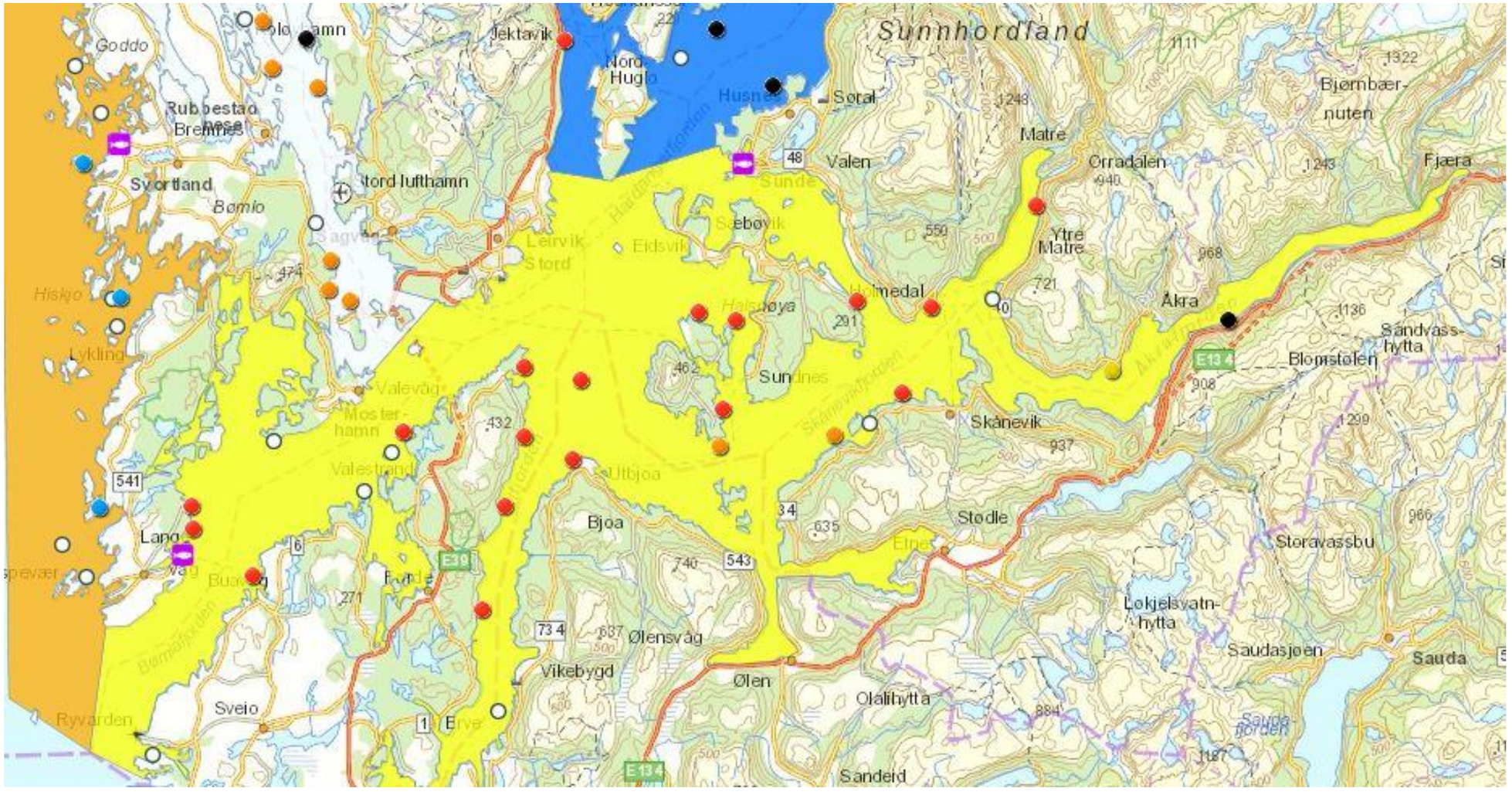
- Restrictive to transport of fish from endemic areas
- Screening program for early detection of infection
- Immediate removal of fish when detection is confirmed

Measures within the PD zones (SAV2 & SAV3)

- Assessment of stress-related operations – sorting, delousing, relocation…
- Accelerated harvest of PD infected fish
- Ensure stricter biosecurity in relation to traffic to/from infected sites; operational boats, wellboats, equipment…
- Adapted feeding regime
- Safe handling of dead fish
- Coordinated fallowing period prior to sea transfer of new fish generation

Fallowing zone in Hordaland county - SAV3 area

Source: AkvaGIS



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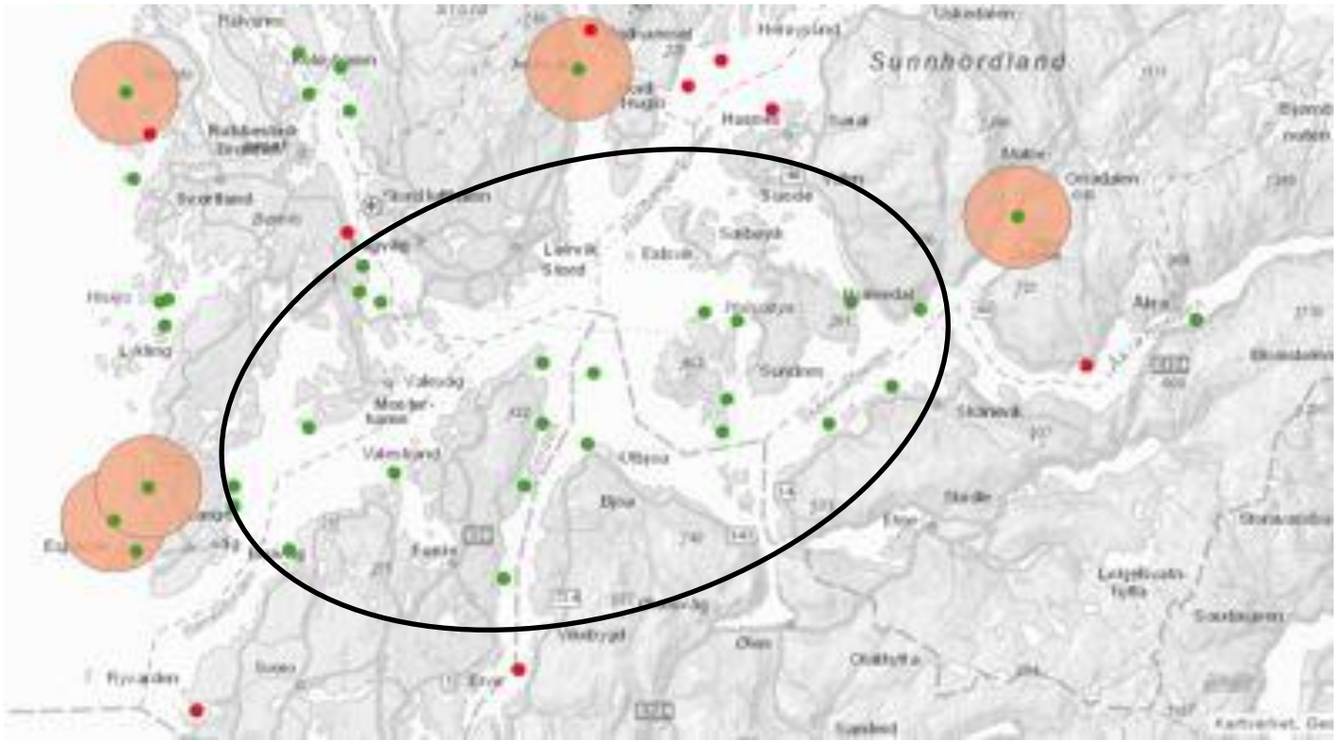
Resist PD in SAV3-endemic area

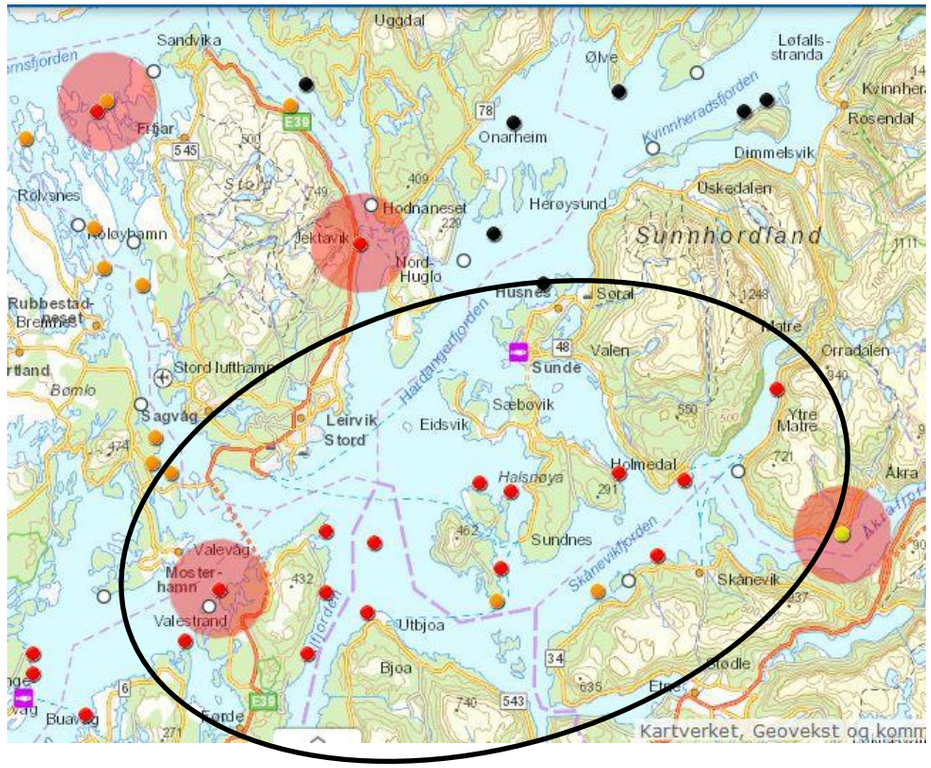
Source: AkvaGIS

Example from Hordaland county

March 2014:
-Area without PD

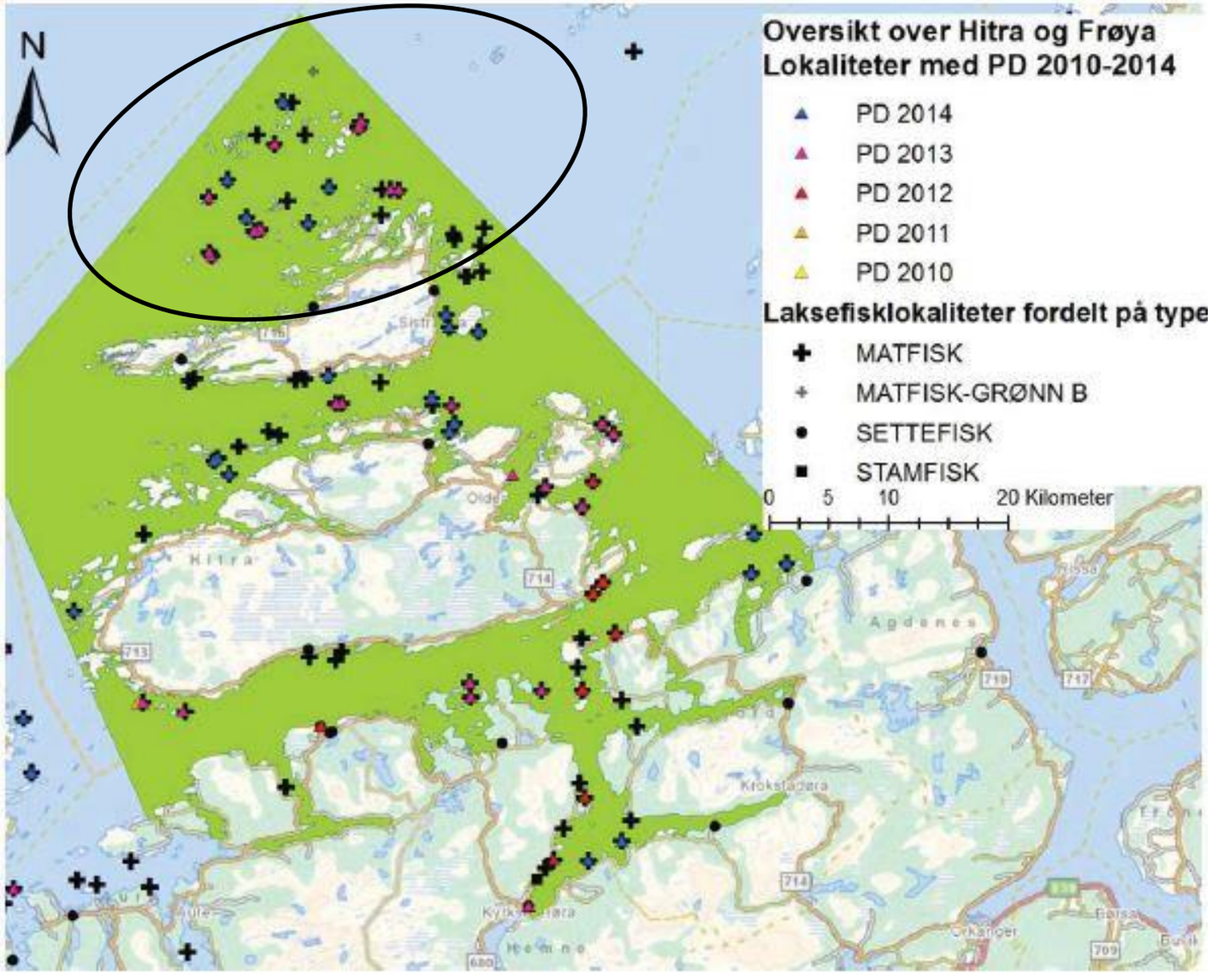


April 2016:
-Area contains mainly S1-2015
-Still only a few number of PD detections in the area



PD in Sør-Trøndelag county, Hitra-Frøya - SAV2 area 2010 - 2014

Source VI: Pankreassykdom hos laksefisk –review, del 2: Erfaring fra felt



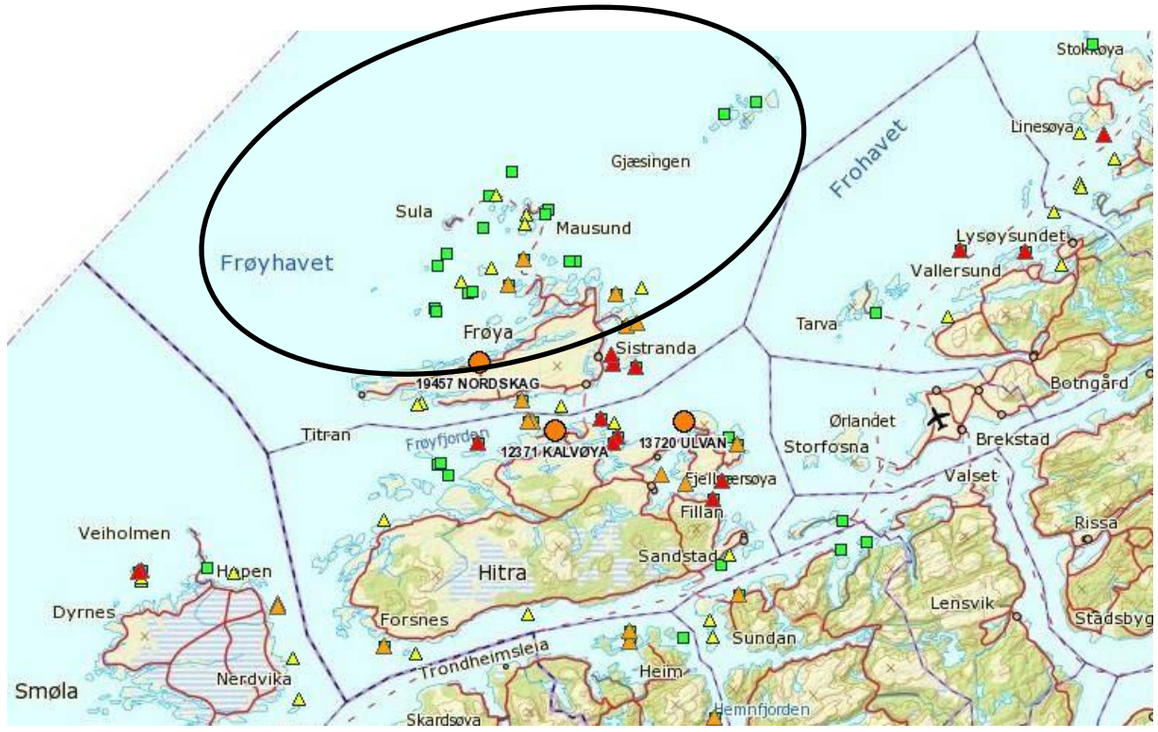
Combating PD in SAV2-endemic area

Source: Directorate of Fisheries

Example from Sør-Trøndelag

Frøya April 2016:

- No PD detections after the S1-2013 generation was harvested during October – November 2014 until February 2016
- The area was fallowed prior to the S1-2015 was sea transffered
- In April 2016 the area contains many sites with fish, but still only a few sites with PD

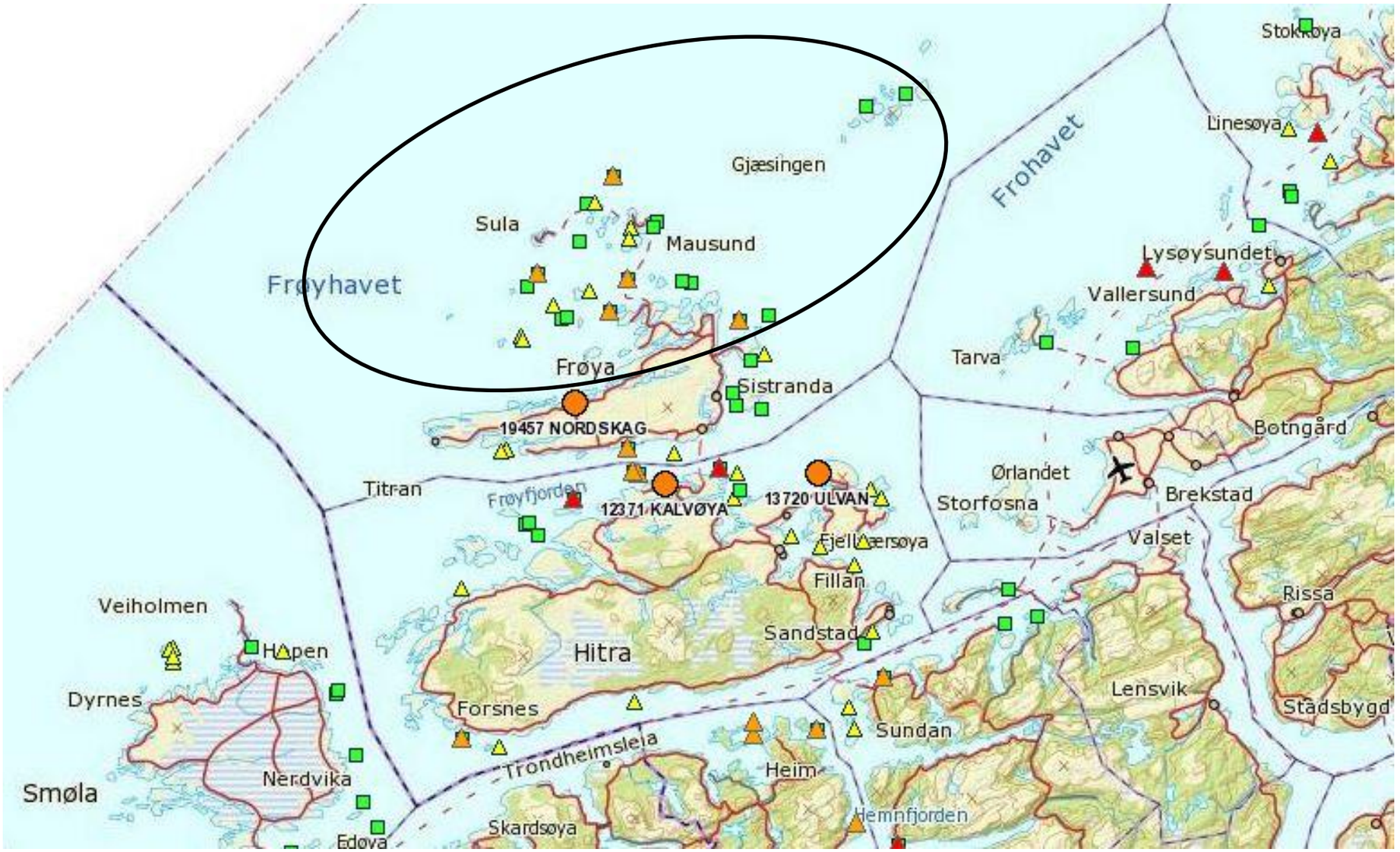


Combating PD in SAV2-endemic area

Source: Directorate of Fisheries

Frøya July 2016:

- 4 new PD detections in the area since April



PD-measures at site level

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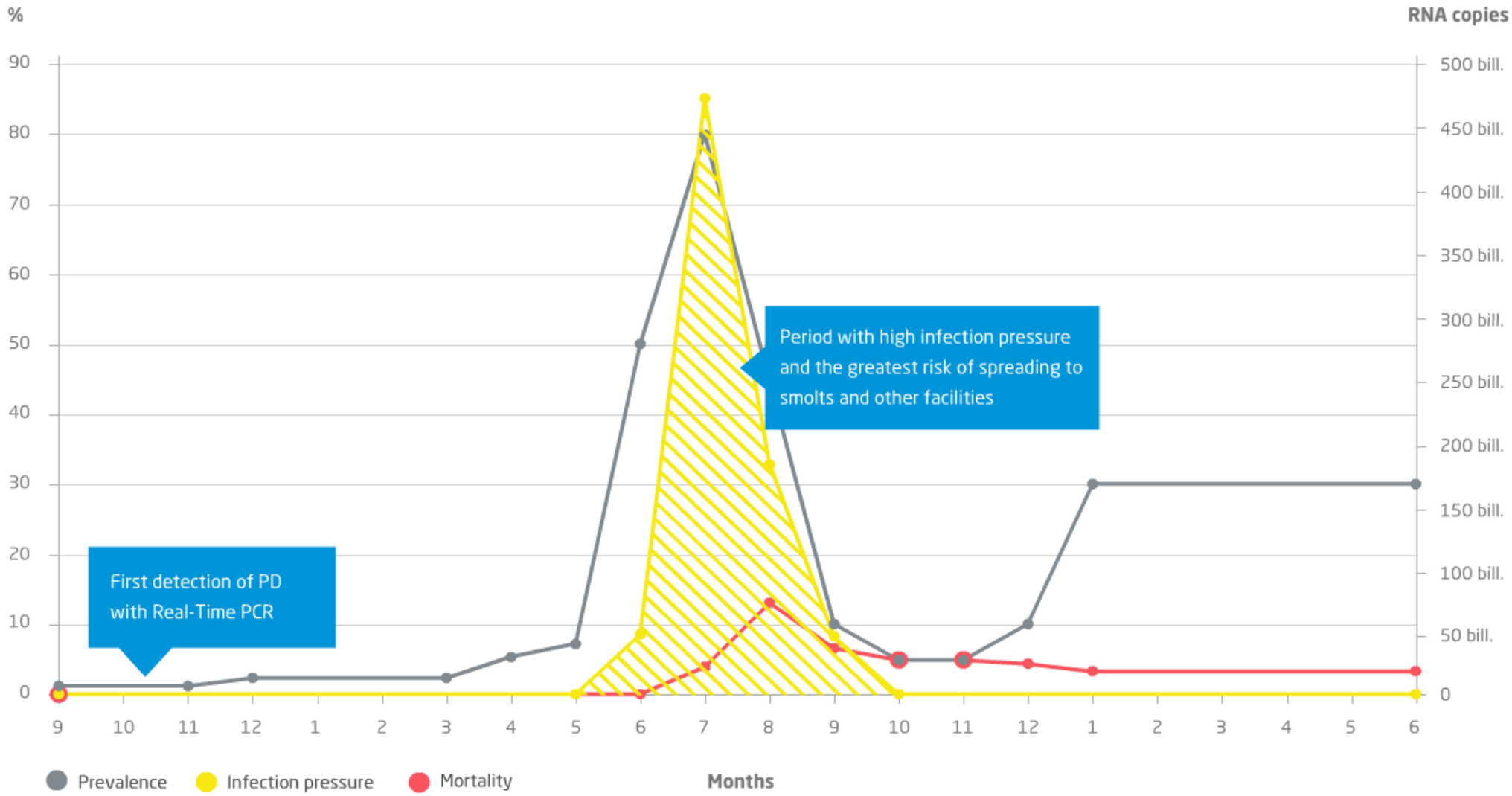
PD – development and harvest optimization

Illustrated infection dynamics in PD – infected population



Room for action

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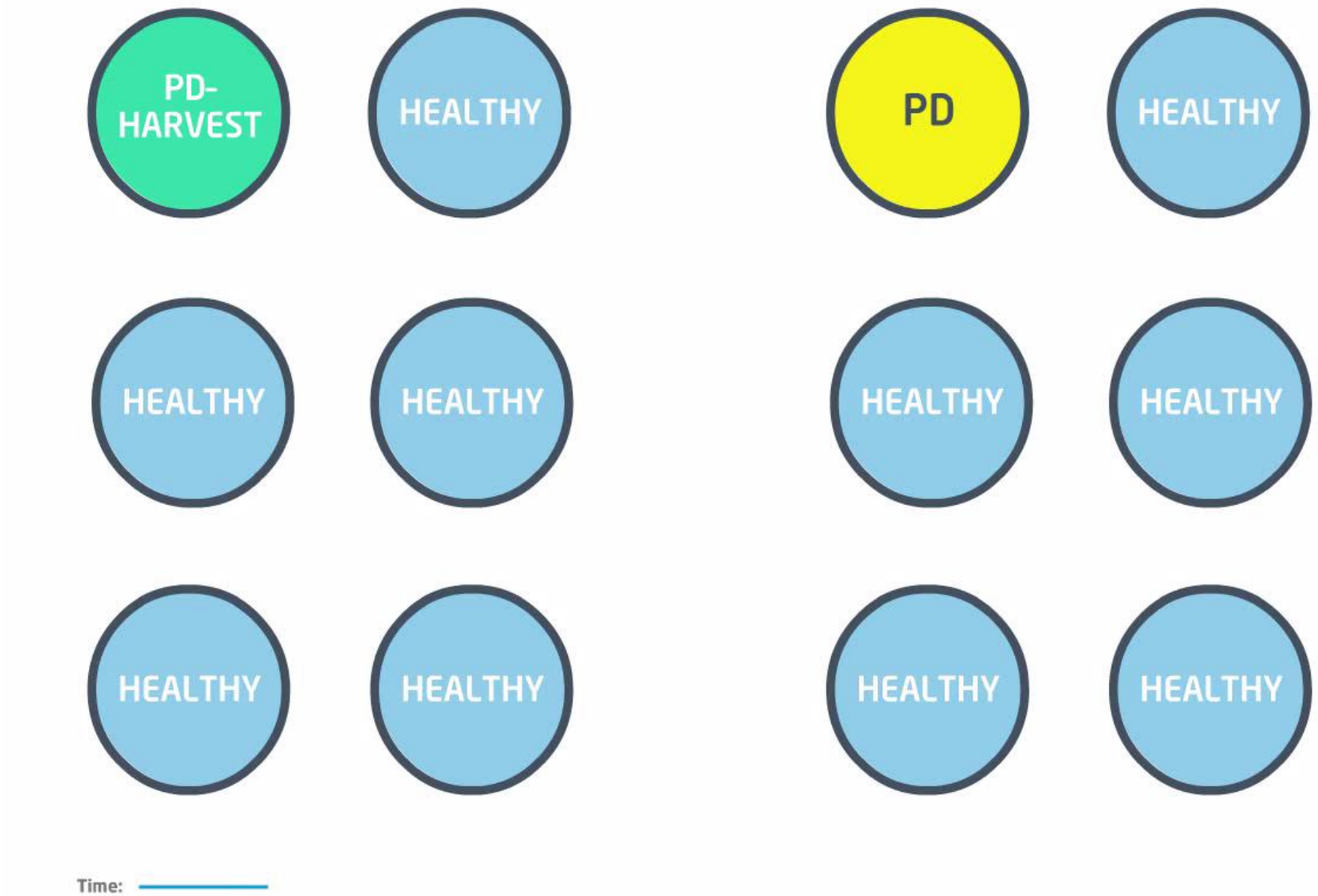
With harvest optimization Without necessary measures



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Future strategies for combating PD should include:

- Systematic monitoring of sea transferred fish groups
- Slaughter optimization
- Closed transport through infected areas
- Avoid transport from endemic area to non infected areas
- Closed holding pens
- Use of alternative production methods
- Generation-separated production
- Functional fallow areas
- Breeding, Vaccination, Feed

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PD SURVEILLANCE – ALLOWING TIME FOR ACTION

Systematic use of Patogen Real-Time PCR provides an early indication of infection status, more predictable production and improve profitability

Expertise and experience makes PatoGen a preferred partner to develop knowledge-based operational solutions

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Thank you !