

Genomic Analysis Reveals Low Genetic Diversity and No Continuous Reintroduction of Piscine Myocarditis Virus (PMCV) in Faroese Farmed Salmon

Maria Marjunardóttir Dahl



MOWI[®]

Andras Strøm

SpF Aquamed.fo

Cardiomyopathy Syndrome (CMS)

CMS is a severe heart disease in farmed Atlantic salmon.

It causes severe inflammation in the inner layer of the salmon heart.

Often affects large salmon and CMS outbreaks therefore have major financial consequences.

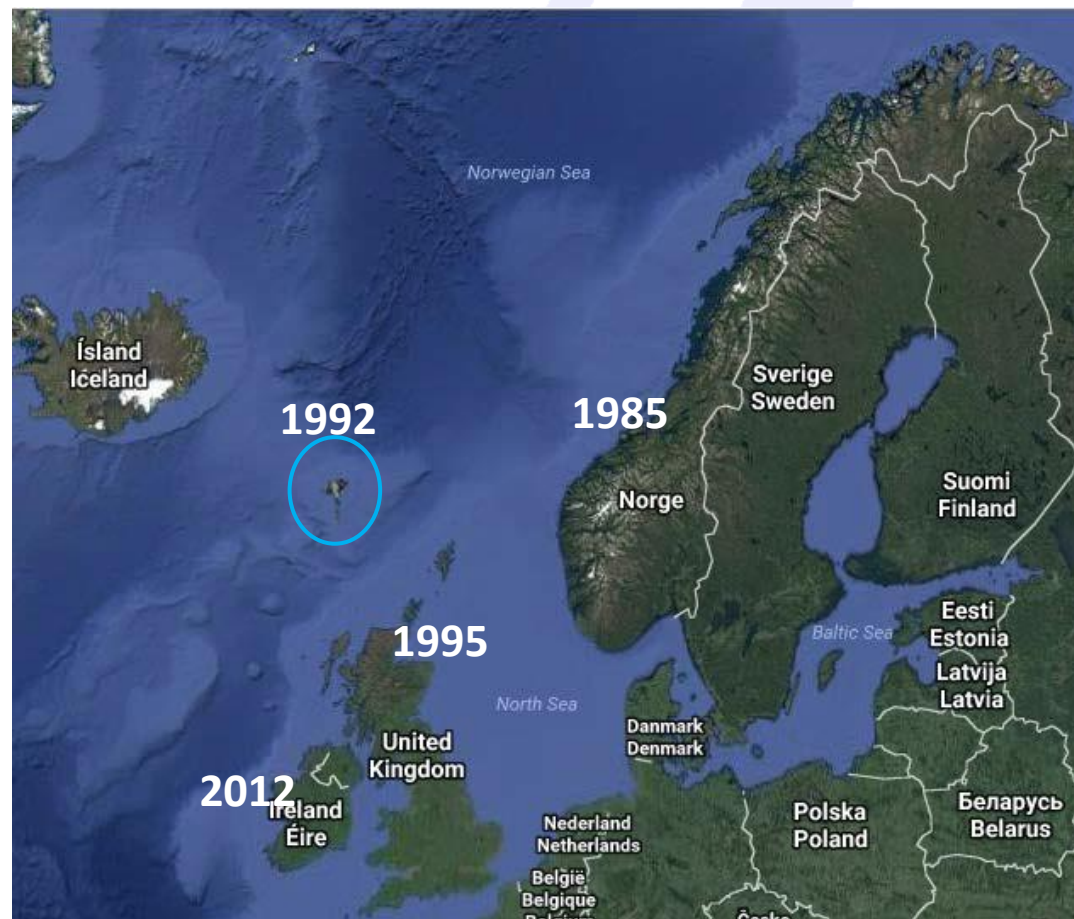
First reports of **CMS**:

Norway in 1985

The Faroe Islands in 1992

Scotland in 1995

Ireland in 2012



Piscine myocarditis virus (PMCV)

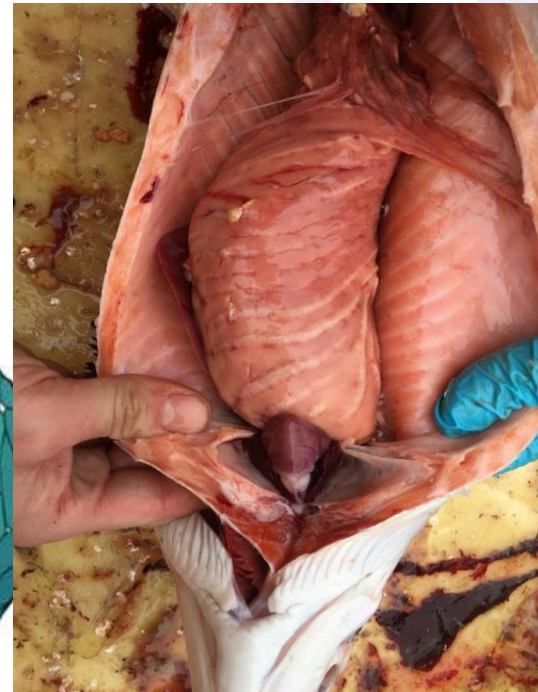
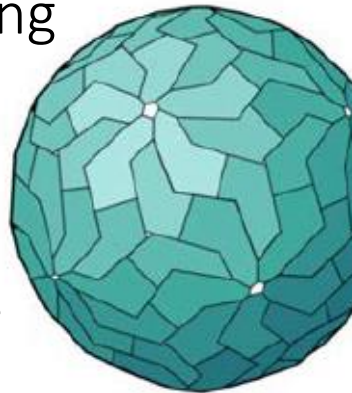
In 2010 the causative agent for CMS was found to be an RNA virus:

Piscine myocarditis virus

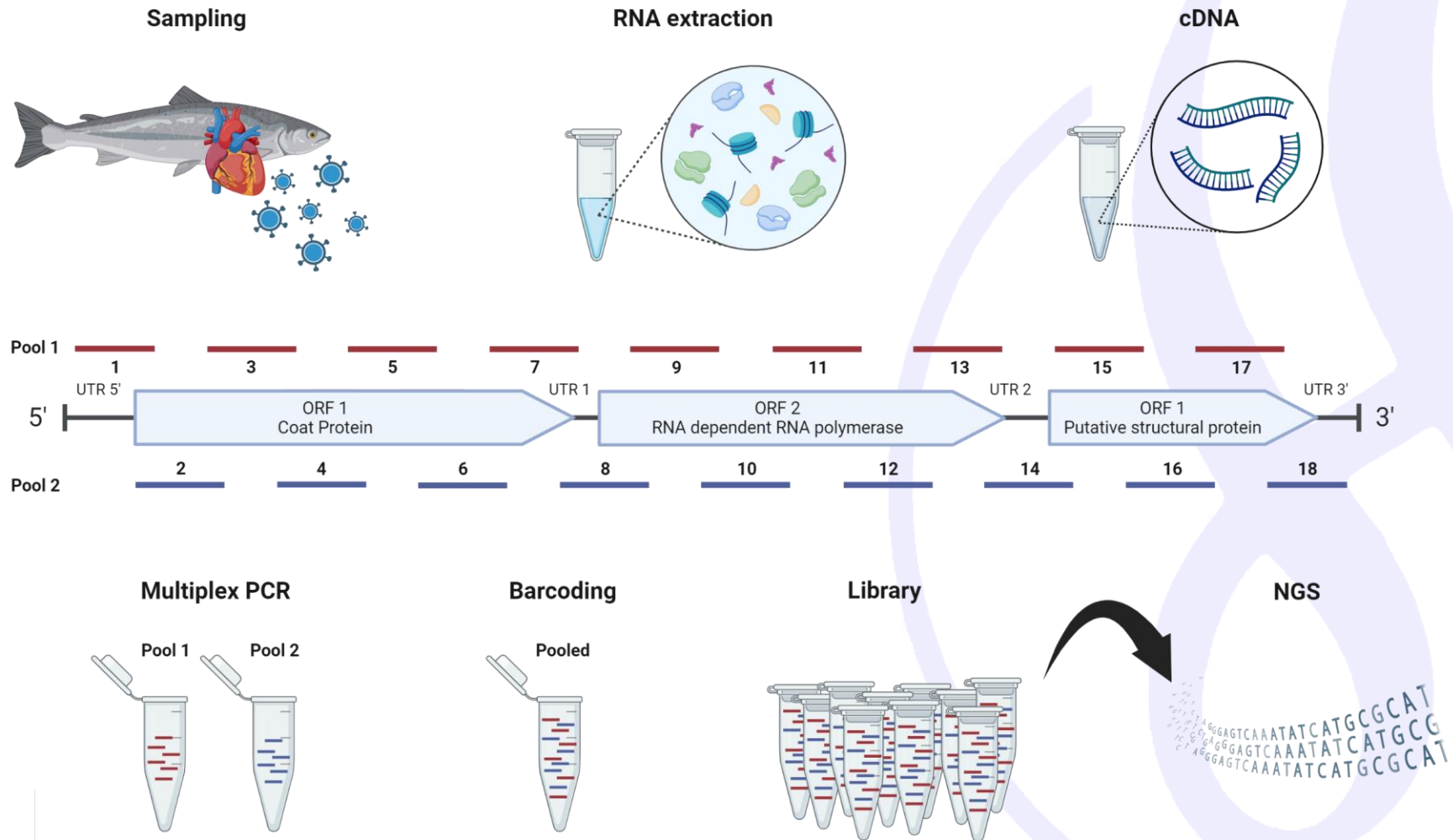
Only one published genome (AL V-708)

No current method of culturing

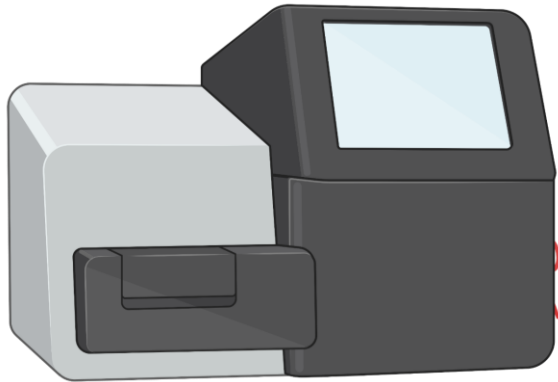
- lack of characterization
- transmission pathways
- possible virulence markers



Targeted amplicon sequencing



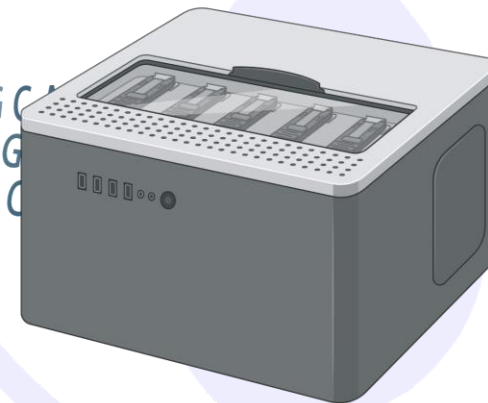
Sequencing platforms



CGGAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG

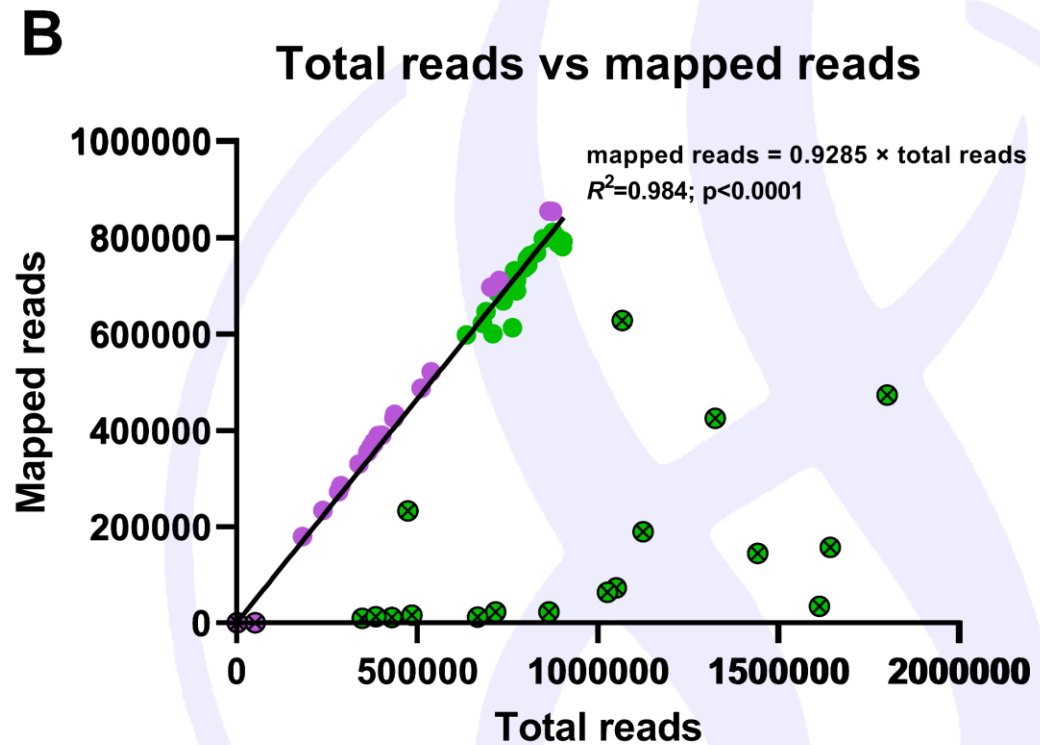
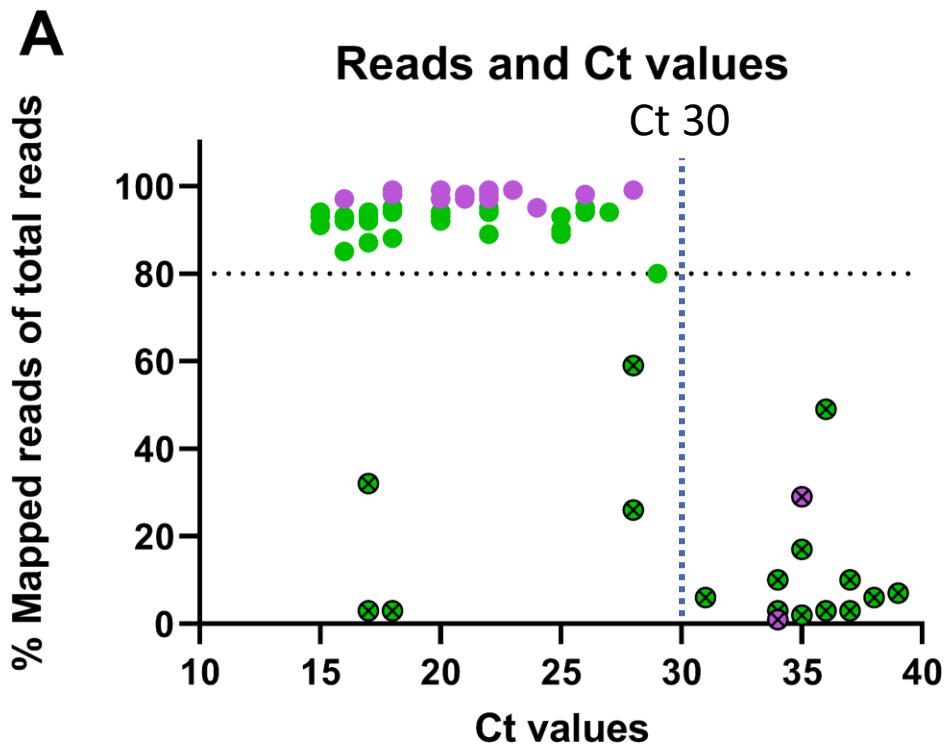
Illumina MiSeq

Oxford Nanopore GridION



CGGAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG
GAGTCAAATATCATGCG

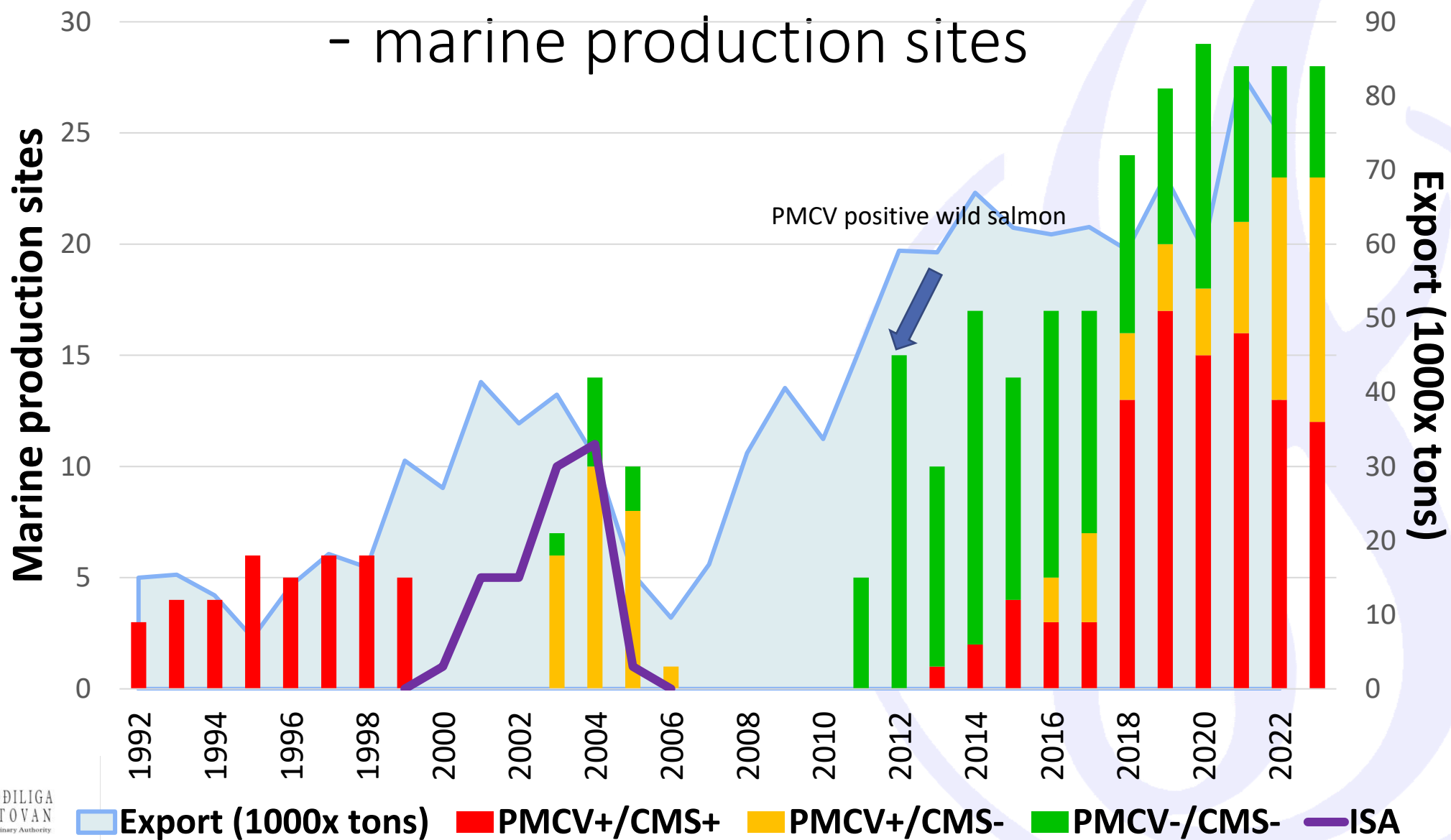
Limitation of method

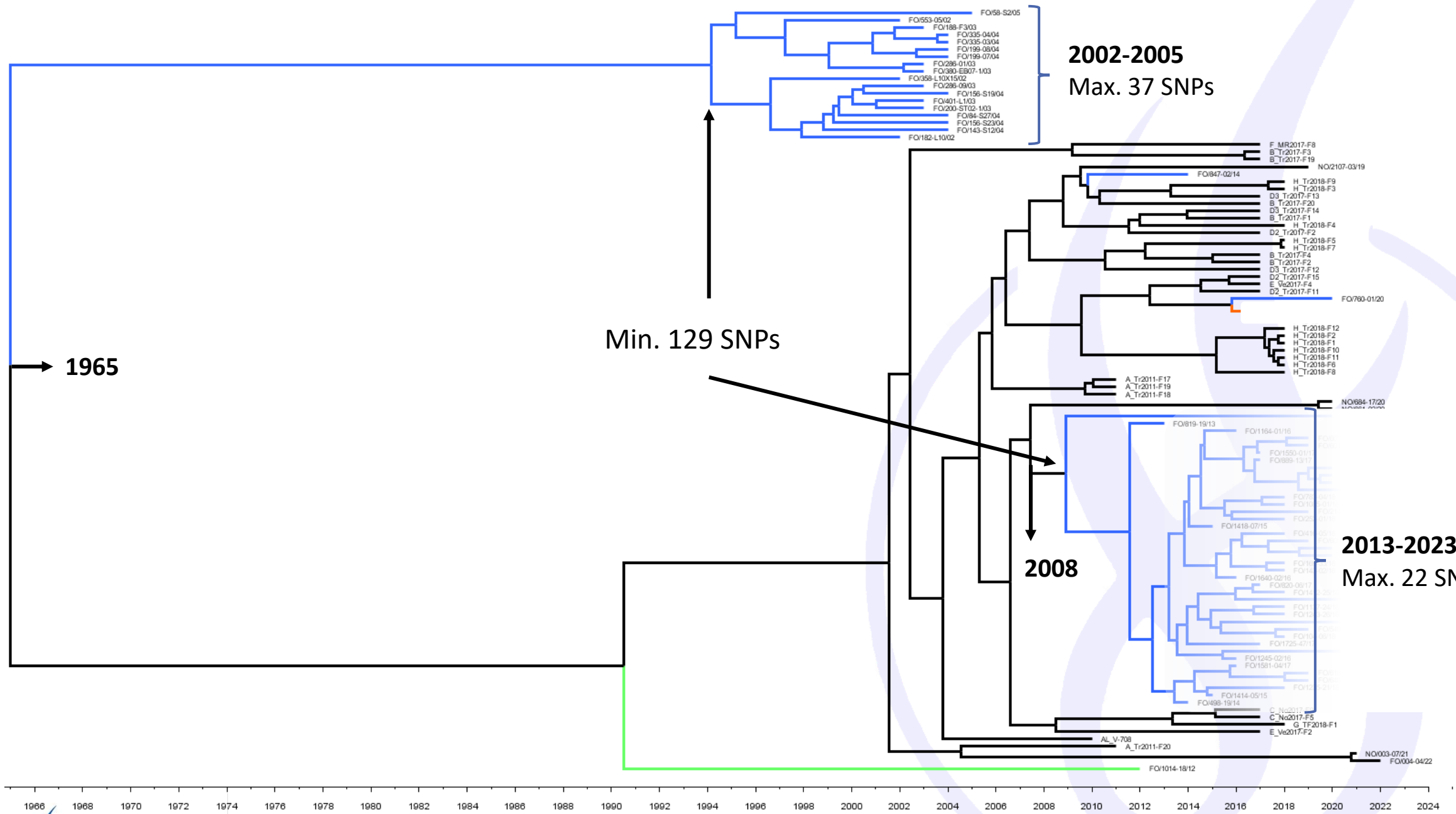


- Illumina Miseq
- Oxford Nanopore

PMCV/CMS prevalence

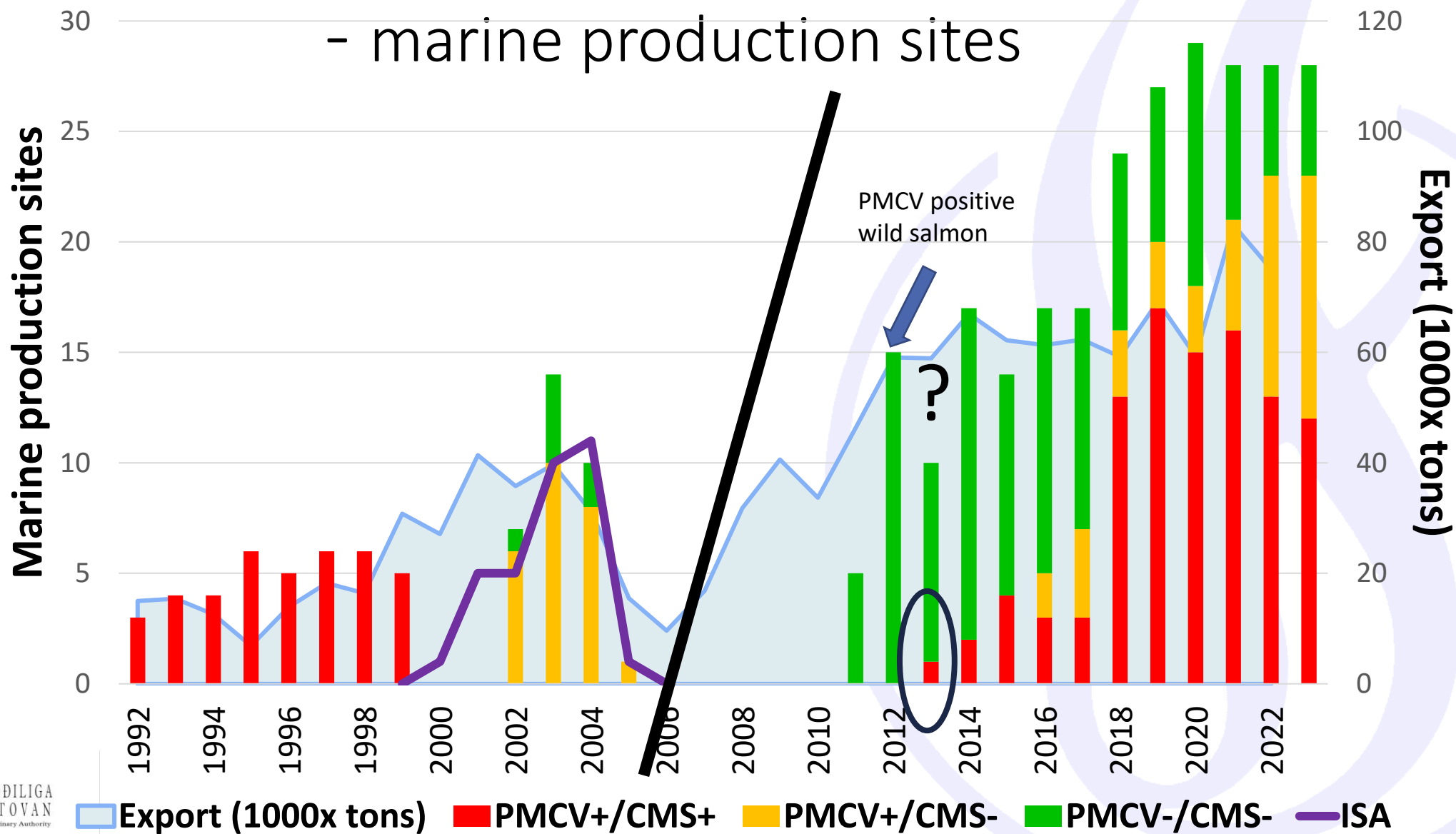
- marine production sites





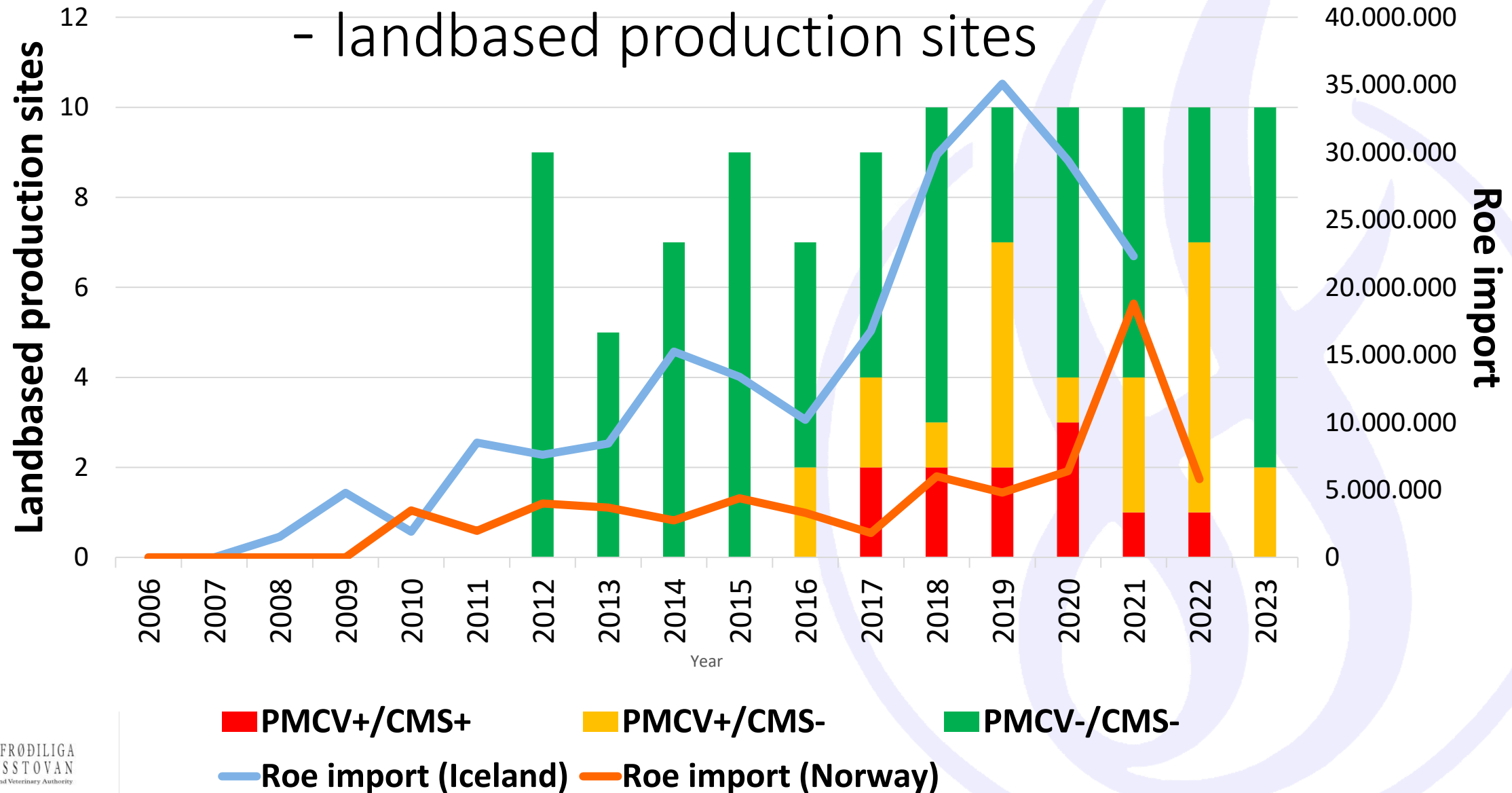
PMCV/CMS prevalence

- marine production sites



PMCV/CMS prevalence

- landbased production sites



PMCV 2013 - 2023

48 new PMCV genomes

Faroese	Norwegian
43x	5x

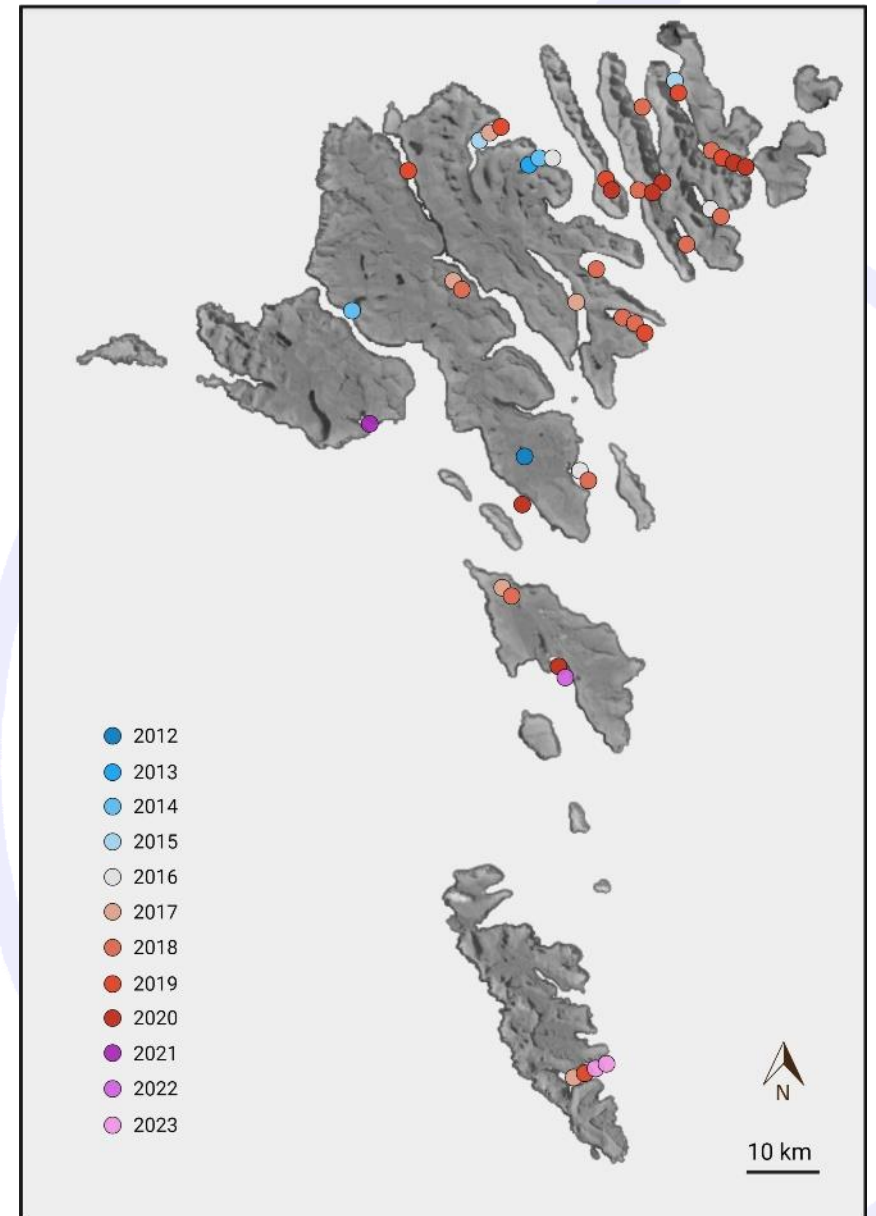
23 production sites

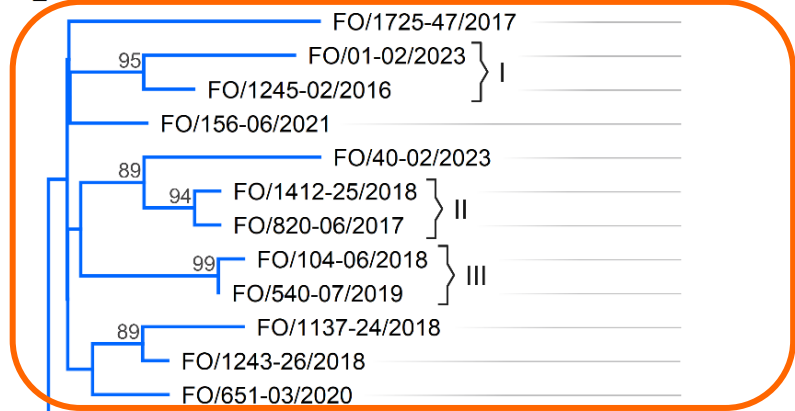
- 19x marine sites
- 4x landbased sites

1x from a returning wild salmon

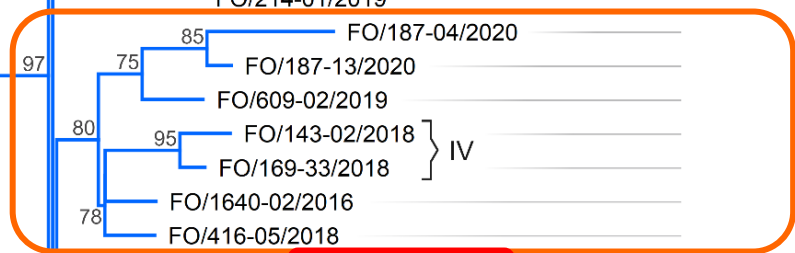
Representing ~30% of the total cases for each of the three producer:

- Roe origin
- Smolt origin
- Sampling site

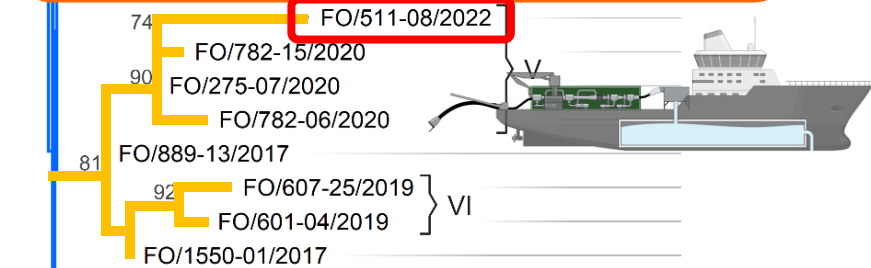




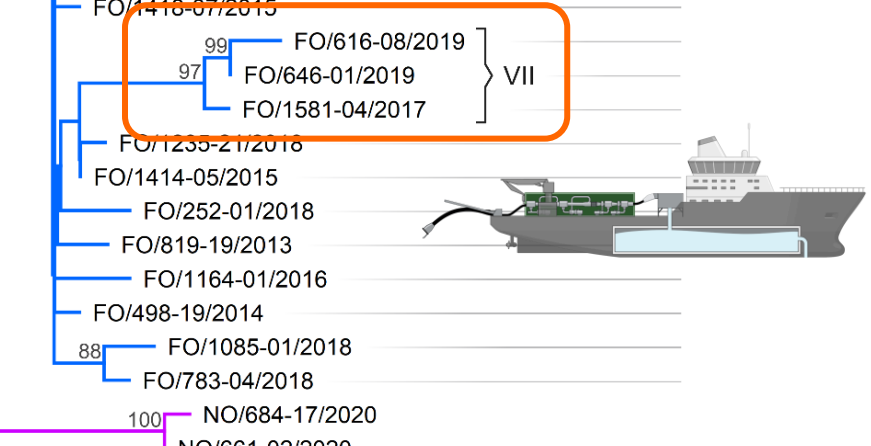
3x production companies
 4x roe origins
 4x smolt origins
 10x marine sites



1x production company
 3x roe origins
 3x smolt origins
 5x marine sites



2x production companies
 2x roe origins
 3x smolt origins
 2x marine sites



90

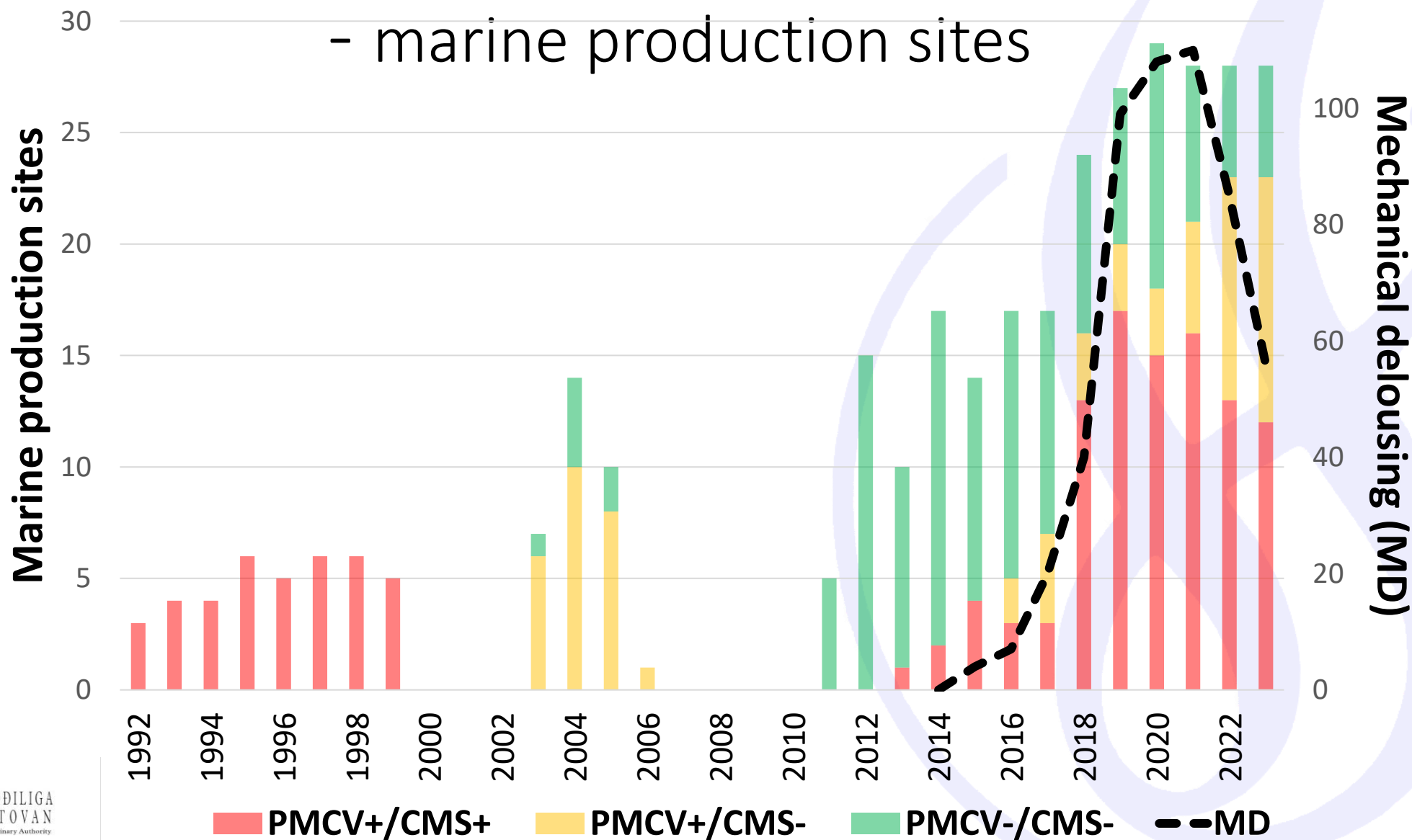
86

100

NO/684-17/2020
NO/661-02/2020

PMCV/CMS prevalence

- marine production sites



Thank you!

