

Lice R&D

Status and strategy going forward

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MH Group

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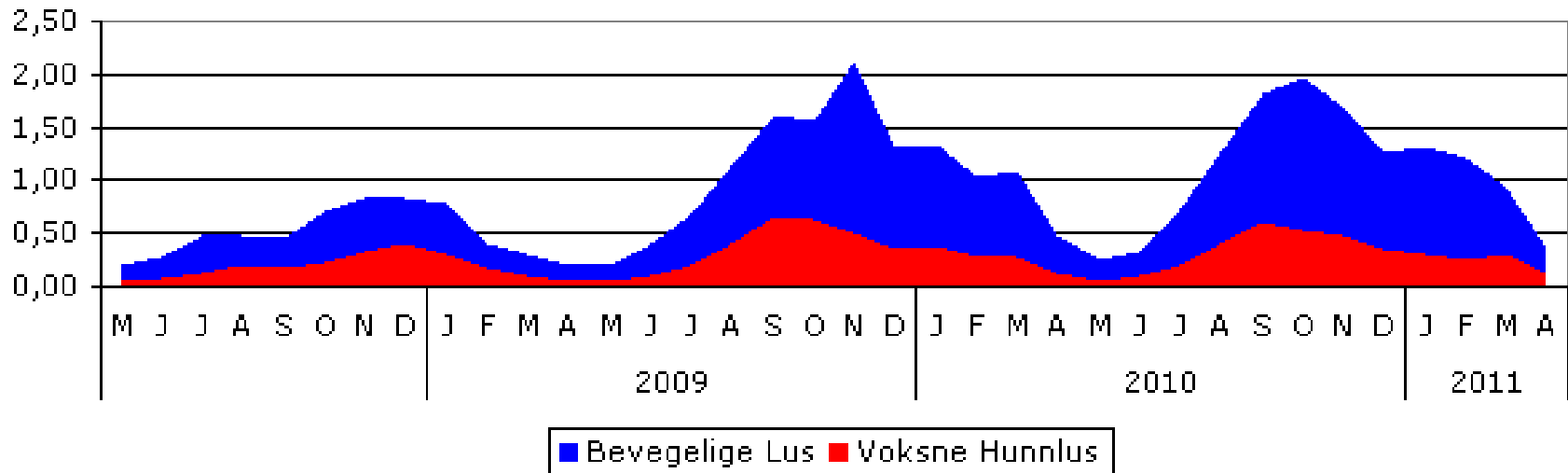
marine harvest
excellence in seafood

Headlights

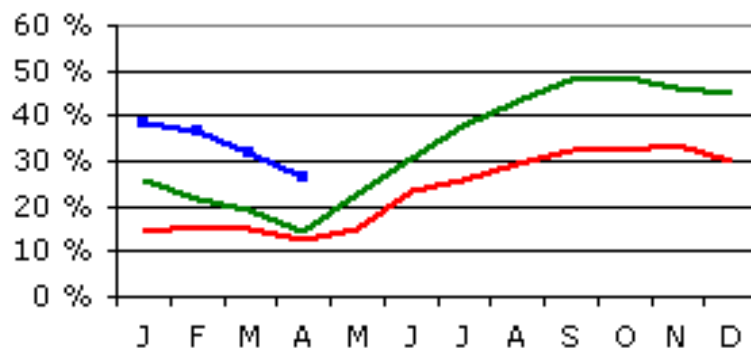
- Sealice levels in 2010 and into 2011
 - What did we learn from 2010?
 - R&D needs going forward
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Low levels in spring – high through fall and winter 2009-2010

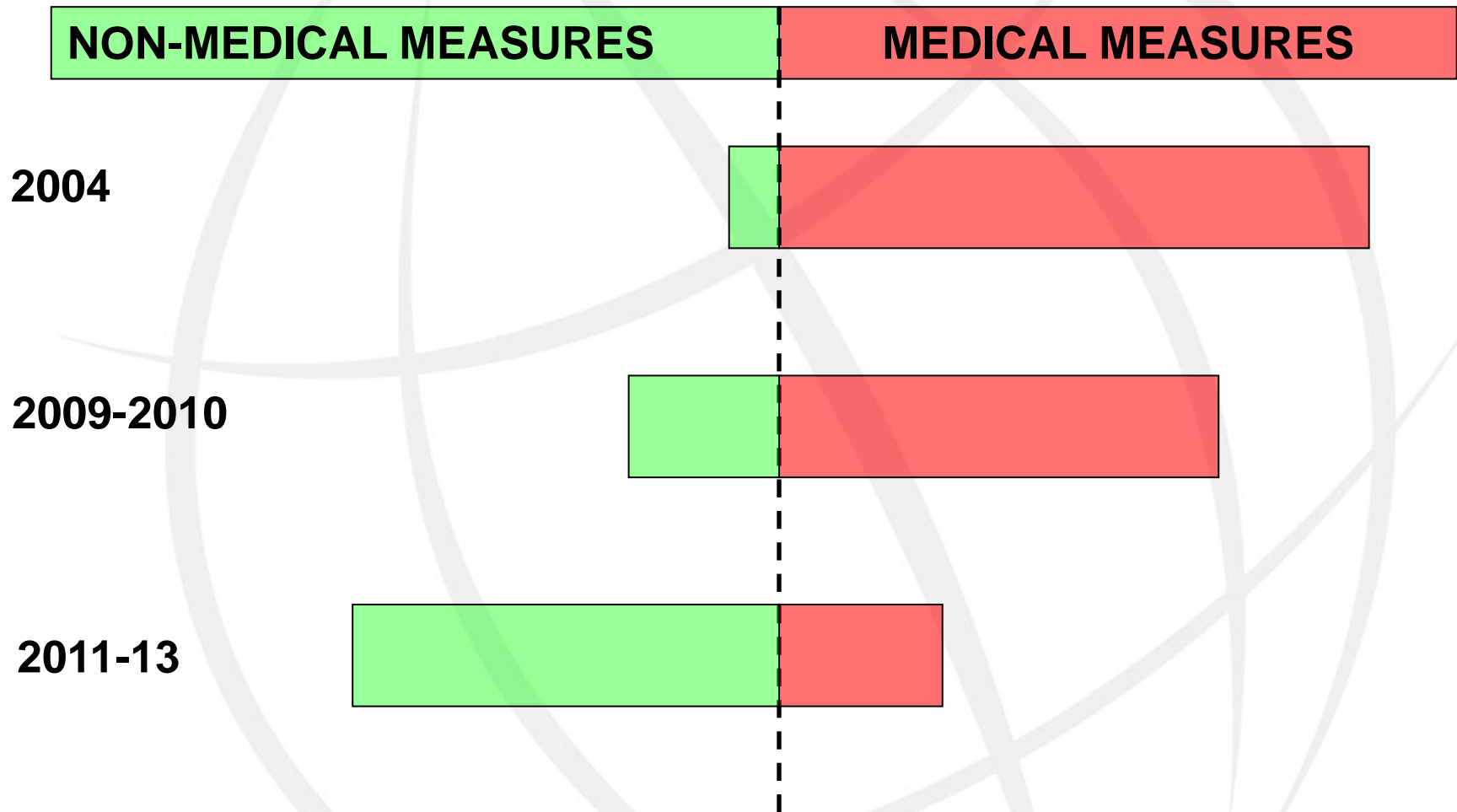
Utvikling de siste år



Andel med leppefisk



Strategic objective



Contingency must become less dependent on pharmaceuticals

Strategic goals in sealice strategy

- **support future cost-effective lice control**
- **widen control options and tools**
- **avoid further loss of medicines (due to resistance)**
- **develop and (re) develop non-medicinal approaches**



Overview of measures decided Nov 2009

marineharvest
excellence in seafood

1. Short term actions to slow down negative development

1. Rotation of therapeutics to slow down further development of resistance
 1. Optimise existing treatments methods
 2. Identify and implement new therapeutics or combinations of therapeutics
2. Reduce number of infective sealice
 1. Fortified efforts in farming wrasse
 2. Co-ordinated delousing between farms
 3. Emergency harvest when lack of control
 4. Contained transport (or filtration) and no waiting cages when resistance is present or with emergency harvest
 5. Lice filter at all processing plants

2. Actions to secure future sustainable production and growth of Norwegian farming

1. Zone based production model
2. Contained transport and no use of waiting cages (resistant sealice)
3. Non-medical sealice contingency as main strategy

What did we learn from 2010?

- General industry strategy is basis
 - From general to targeted contingency
 - Season
 - Reproductive lice
 - S1 second year in sea
 - Regional infection pressure -> regional strategy
 - Area specific action levels
 - Planning of resources and measures is key
 - Higher action Sep 1- Dec 31 does not do industry good
 - Need non-medical measures to handle sealice cage by cage
 - We need to move faster
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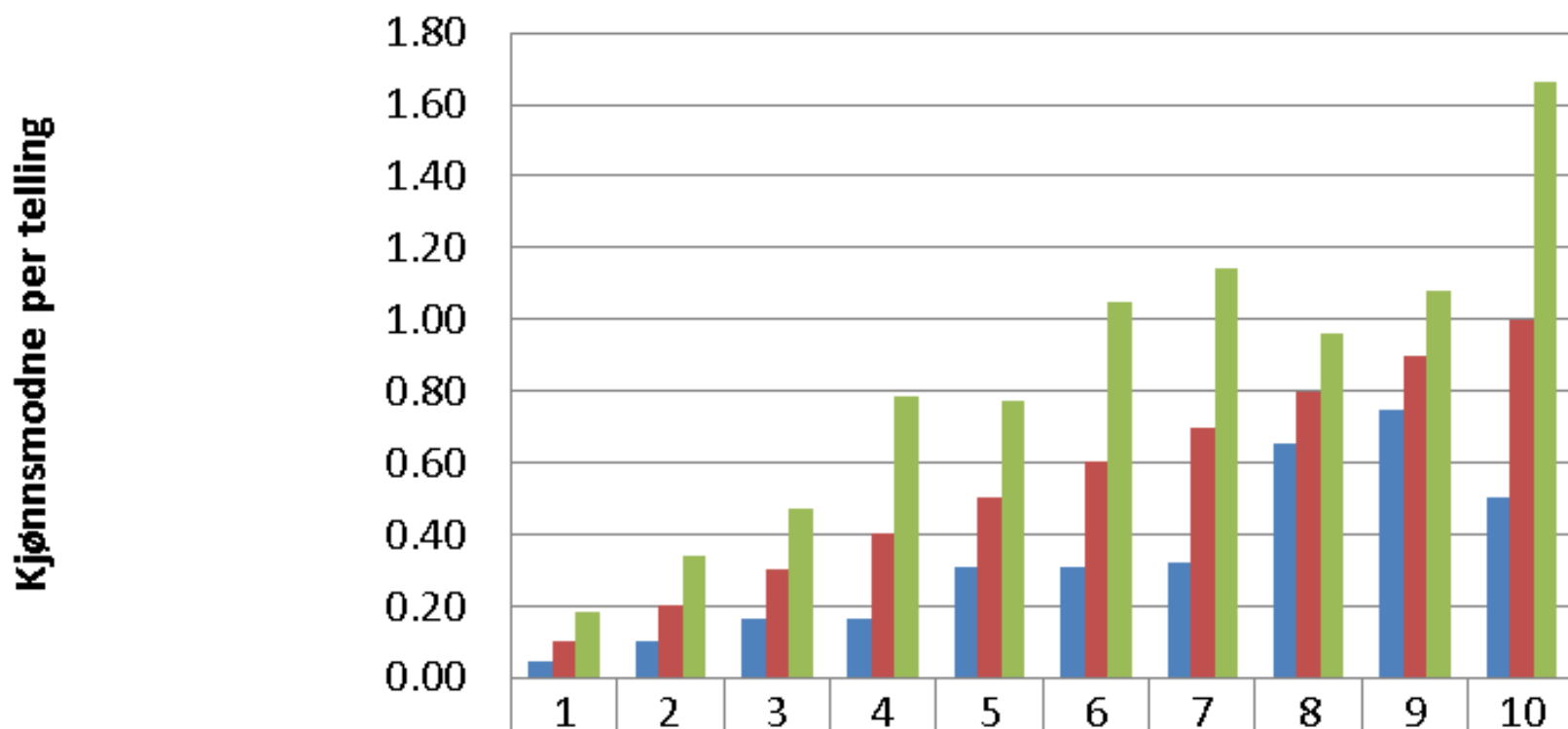


Why cage by cage rather than sites?

- Studied max and min counts of sealice within farms at 0.1, 0.2, 0.3...up to 0.9
- Agder to Bodø

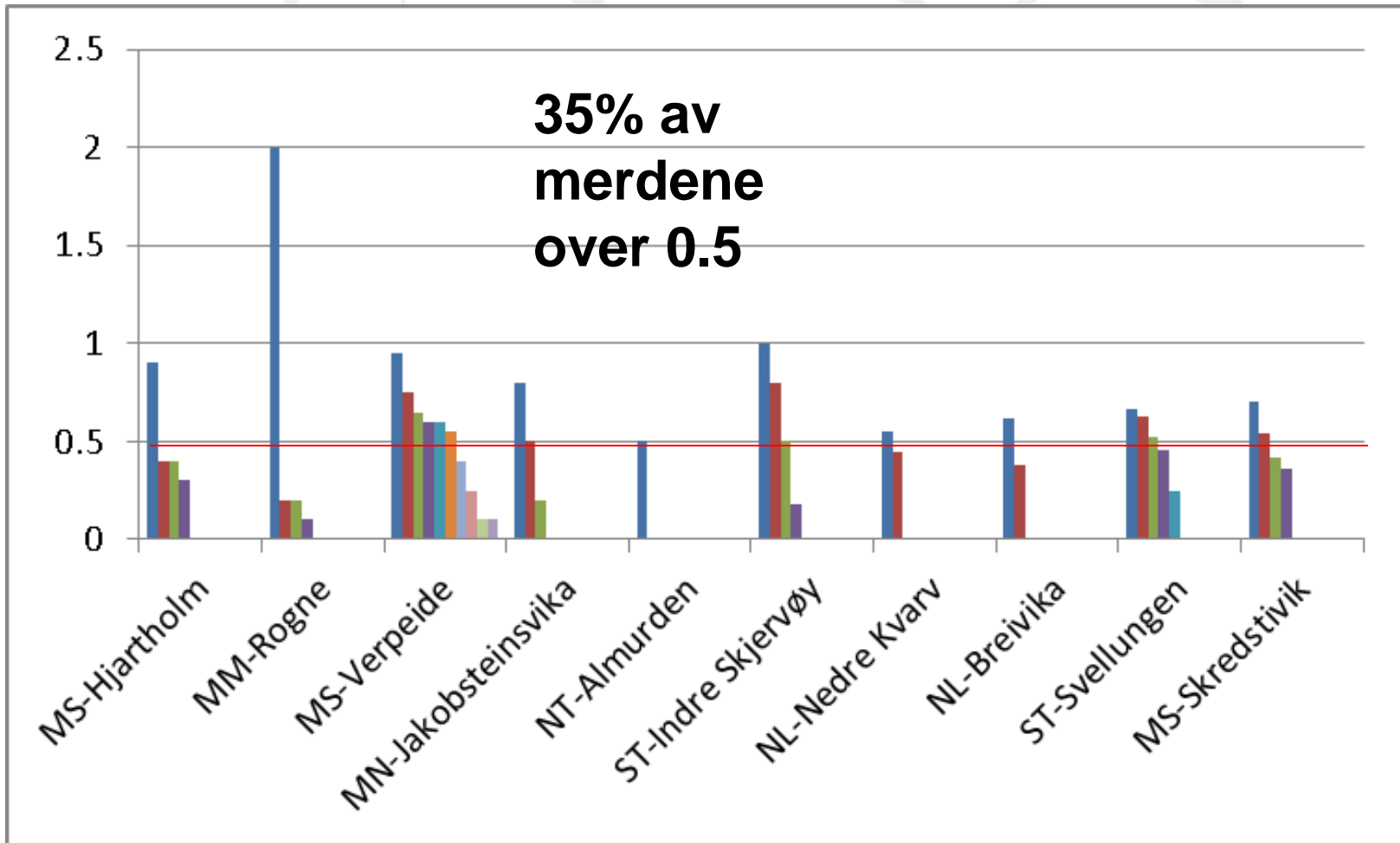
Snitt kjønnsmodne	Antall tellinger
0.1	73
0.2	48
0.3	29
0.4	25
0.5	17
0.6	13
0.7	8
0.8	11
0.9	8

Average min and max values compared to reported average value



■ Min adult females	0.04	0.10	0.17	0.16	0.31	0.31	0.32	0.66	0.75	0.50
■ Average adult females	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
■ Max adult females	0.18	0.34	0.47	0.79	0.78	1.05	1.14	0.96	1.08	1.66

Count per cage at point of 0.5 mature average at site (10 random sites)



Discussion points

- Is current legislation and strategy too much leaning on a medical approach?
 - We need non-medical tools to treat single cages and thereby combat mature sealice
 - Do we possess sufficient knowledge to change strategy from area/site based delousing to single cage treatment?
 - If proven successful; - how does this imply to legislation?
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R&D needs going forward

Principle focus area





R&D efforts long & intermediate term

- We know the lice genome (as well as the salmon genome)
- SFI with 8 year focus on mid to long term solutions (vaccines, new drugs, anti lice diets..)
Industry involvement will ensure underway practical deliveries
- Supported by preventT

Conclusion: Solid basis for intermediate and long term biotechnology based research and solutions given additional industry funding ex. by “FHL Miljøpakke” (200 mill).

Practical r&D:

- Focus on topical treatment (Topilouse)
- FHF supports with 28 mill NOK to wrasse farming



Status r&D short term – efforts needed

- Best Practice population management, catch and husbandry of wrasse
- Optimization of H₂O₂ treatment, incl. treatment at higher temperatures
- Better use of existing pharmaceuticala products
- Possible combinations of existing pharma products
- Possible combinations of non-pharma methods with drugs



Status R&D short term – technology

- **Keep lice away from fish** (enclosed systems, skirts, various fences based on other principles → bubbles, electromagnetic pulses..)

or

- **Keep fish away from lice** (deep water feeding, submerged cages..)

- **Other technology** solutions
 - mechanical removal of lice (pumps..)
 - thermal treatment
 - physical devices

Key to short term succes

- OPENNESS AND CO-OPERATION BETWEEN INDUSTRY PLAYERS

Examples:

CREATE: (Innovation platform led by SINTEF) with Lerøy Group, Salmar and MH closely co-operating on technology solutions, also with involvement of SinkaBerg

- **Breeding** is long term, but a long lasting fundament

Botngård/SINTEF inviting industry

Initiativ fra Botngaard AS i samarbeid med SINTEF Fiskeri og havbruk, april 2011

Invitasjon til deltagelse i FoU-prosjekter:

1: Permaskjørt



2: Lukket duk-anlegg





**Thank you for the
attention!**