

Miljømessig bærekraft



FISKERIDIREKTORATET

Erik Vikingstad

FHF Havbrukssamling - 12.10.2016



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Akvakulturloven

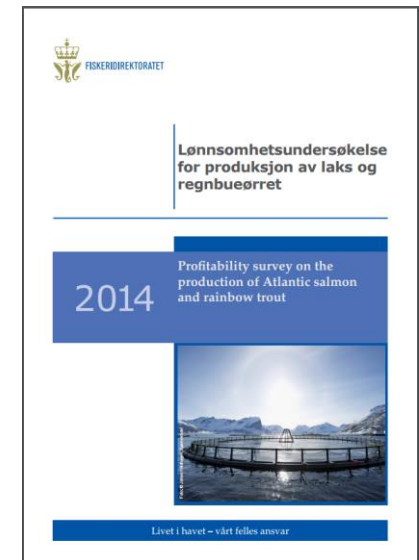
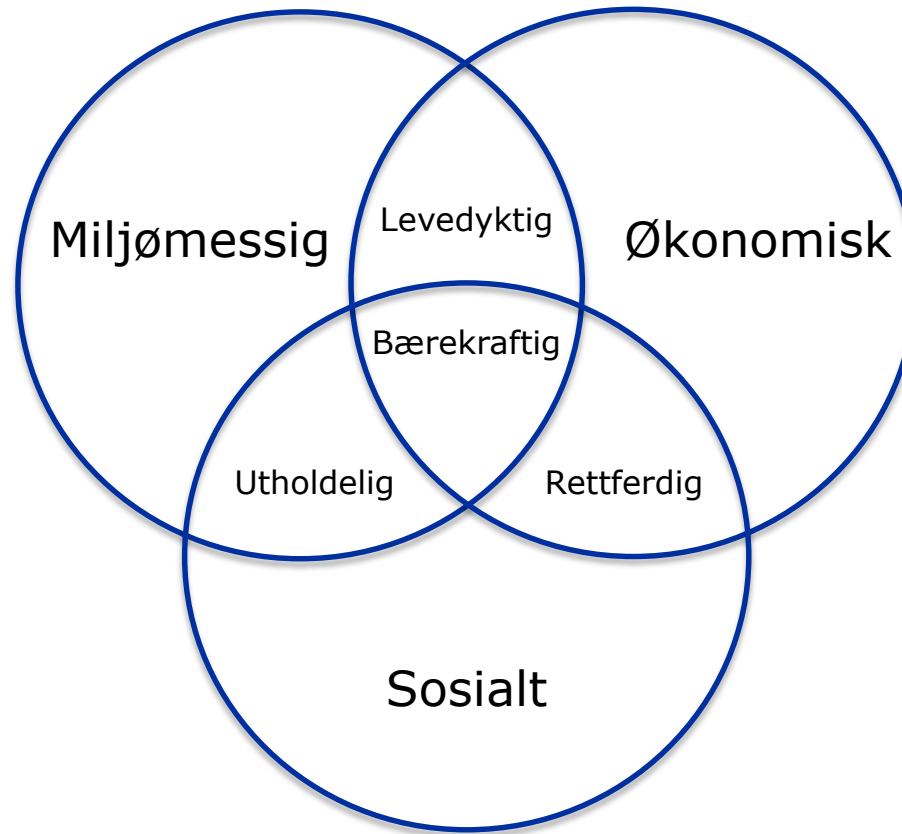
§1 Formål

Loven skal fremme akvakulturnæringens lønnsomhet og konkurransekraft innenfor rammene av en bærekraftig utvikling, og bidra til verdiskaping på kysten.

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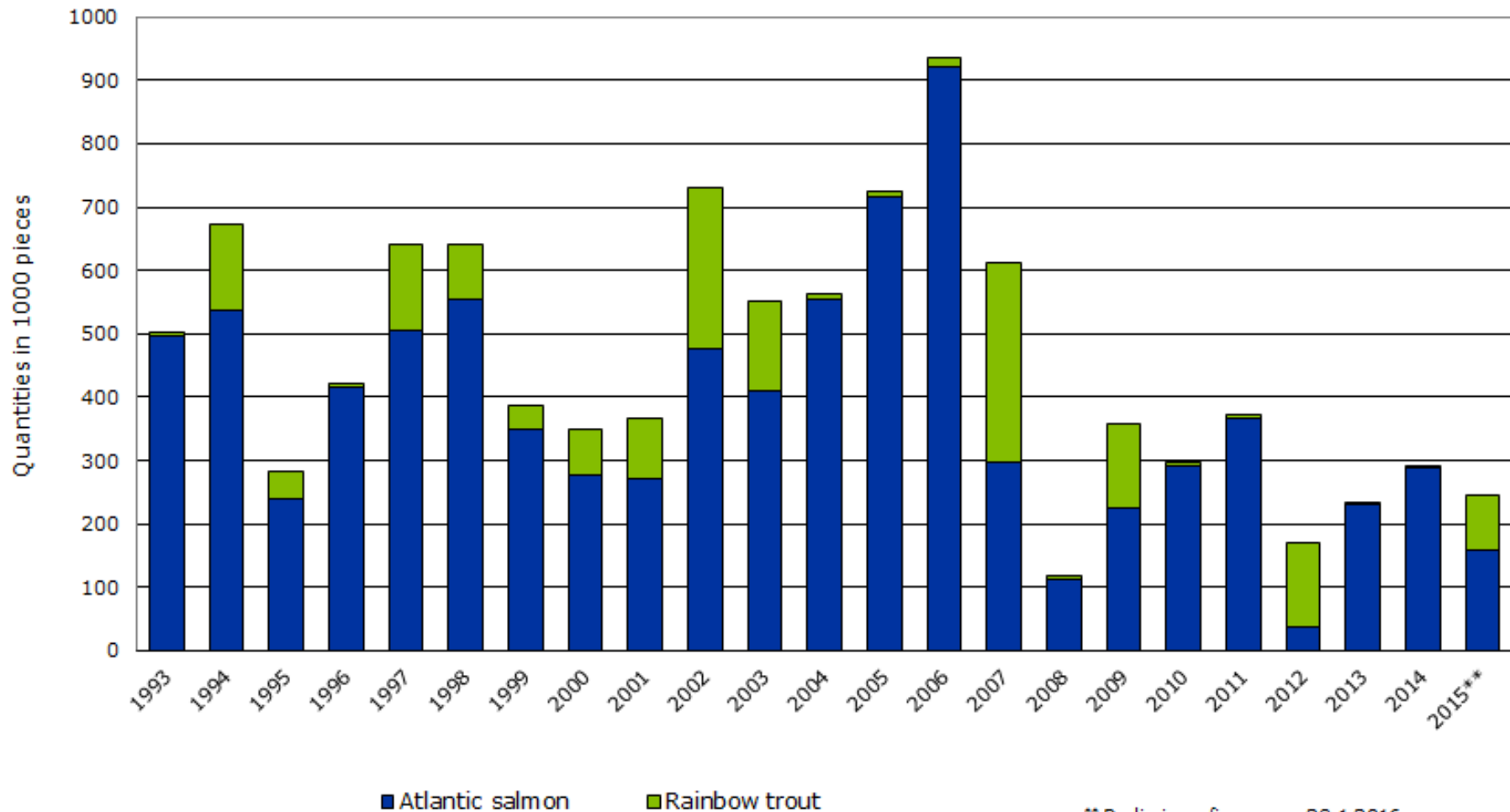


- Rømming og genetisk påvirkning
- Utslipp av partikulære og løste stoffer fra matfiskanlegg
- Dødelighetsstatistikk for lakseproduksjon
- Legemidler og fremmedstoff
- Bruk av rensefisk i matfiskeoppdrett

Rømming og genetisk påvirkning



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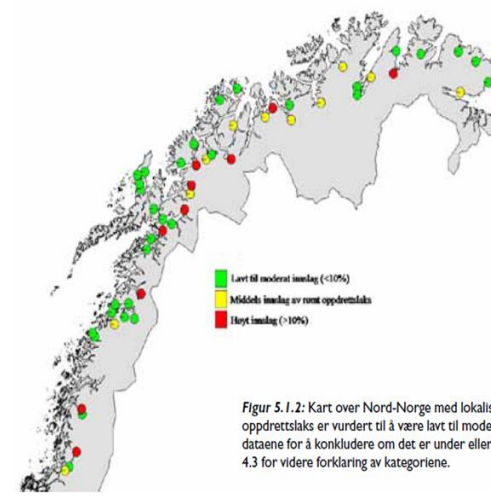
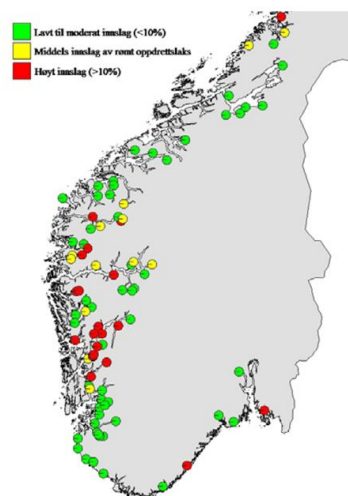
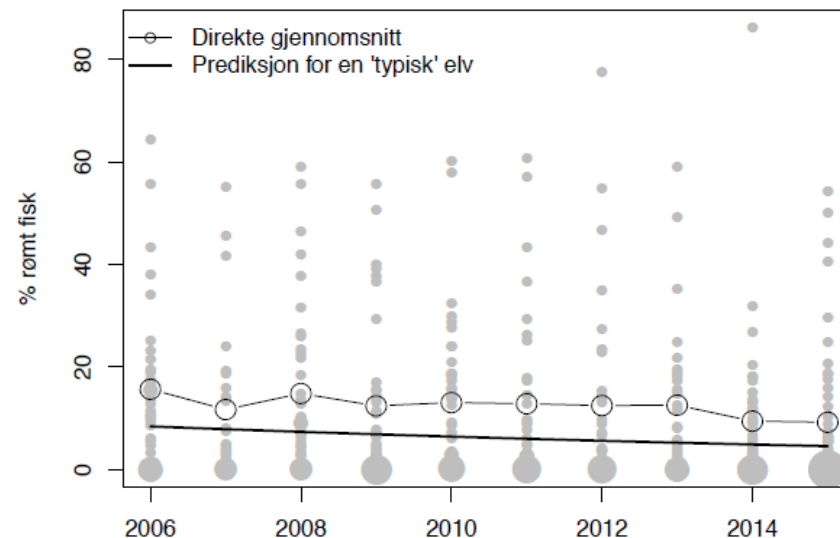


** Preliminary figures per 29.1.2016

Rømming og genetisk påvirkning



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Figur 5.1.2: Kart over Nord-Norge med lokalisering av elvene der innslaget av rømt oppdrettslaks er vurdert til å være lavt til moderat (<10 %), middels (for dårlig presisjon i dataene for å konkludere om det er under eller over 10 %) eller høyt (>10 %). Se kapittel 4.3 for videre forklaring av kategoriene.

Rømming og genetisk påvirkning



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The collage features several documents related to aquaculture and environmental impact. At the top left is a report titled 'Rømt oppdrettslaks - RAPPORT FRA OVERVÅKING'. Below it is a 'NINA Rapport' titled 'Rømt oppdrettslaks i 2004'. To the right is a 'NINA Rapport 1062' titled 'Tiltaksrettet oppdrettslaks og tilslutning'. At the bottom right is the cover of the 'ICES Journal of Marine Science' with the article 'Using simulated escape events and destinies of escaped farmed Atlantic salmon from farm sites in Norway'. The NINA logo is visible in the bottom right of the collage.

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AQUACULTURE ENVIRONMENT INTERACTIONS
Aqua-Environ Interact

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OPEN ACCESS

Use of fatty acid profiles to monitor the escape history of farmed Atlantic salmon

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ABSTRACT: Farmed Atlantic salmon can escape from fish farms at various stages of their life, from juveniles to large mature fish. Escapes that enter rivers to spawn pose a threat to the genetic integrity of wild populations. Knowledge about the timing of these escapes can provide important information for wildlife management and the aquaculture industry, enabling them to prevent or mitigate the negative impacts of escapes. Farmed salmon food has a high content of terrestrial lipids; thus, we used fatty acid (FA) profiling to monitor the escape history of farmed salmon. Escaped salmon captured in rivers ($n = 251$) presented a wide range of FA profiles that we used to classify the fish as (1) early-escaped wild-like fish that were assumed to have escaped at smolt or early post-smolt stage (24%), (2) recently escaped fish with high levels of FAs typically found in commercial salmon food (61%) and (3) intermediate escapes whose FA profiles lay between those 2 groups (15%). To estimate the size of escape of the intermediate escapes, we performed a feeding experiment that monitored the development of FA profiles after a shift in diet from terrestrial to marine lipids. Most intermediate escapes appeared to have escaped when they were <3 kg, and ranged from 3 to 11 kg when recaptured in rivers. We conclude that FA profiling is a promising tool to monitor escape histories, and that the proportion of post-smolt escapes in this study was high compared to official escape statistics which include very few reports of young fish escaping.

KEY WORDS: Escaped farmed salmon · Fatty acids · Triacylglycerols · Lipids · Aquaculture · Environmental impacts

INTRODUCTION

Atlantic salmon *Salmo salar* L. farming is a growing aquaculture industry, with a total global production of 1.426 million t in 2010 (FAO 2012). Escapes of farmed fish have raised concerns regarding their potential impacts on the environment. Escaped salmonids may spread diseases (Johansen et al. 2011) and parasites such as salmon lice (Heuch & Mo 2001, Skilbrei 2012). If they enter rivers to spawn (Sægrov et al. 1997), they may compromise the genetic integrity of local wild salmon populations (Crozier 1993, Clifford et al. 1998, Skjælaas et al. 2006, Glover et al. 2013). Young farmed salmon that escape from pens in the sea as smolts or post-smolts during spring and summer migrate rapidly towards the feeding areas of wild salmon in the open sea, returning after 1 to 3 yr to spawn (Skilbrei 2010a,b). The spawning behaviour and success of these escapes are believed to be similar to those of wild salmon, in contrast to the less optimal behaviour of adult fish that escape from the pens just prior to their entry into the river (Fleming et al. 1996, 1997).

Do escaped smolts represent a high proportion of the escaped salmon that enter in rivers to spawn, or have most of the escapes escaped recently from net pens as adults? According to Norwegian escape statistics, <4% of escapes escaped as smolts between

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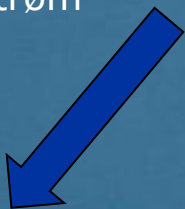
Miljødata fra anlegg- overgangssone.



Resipient

Referansestasjon

Spredningsstrøm



Overgangssone
C-undersøkelsen

Strømundersøkelser

C1

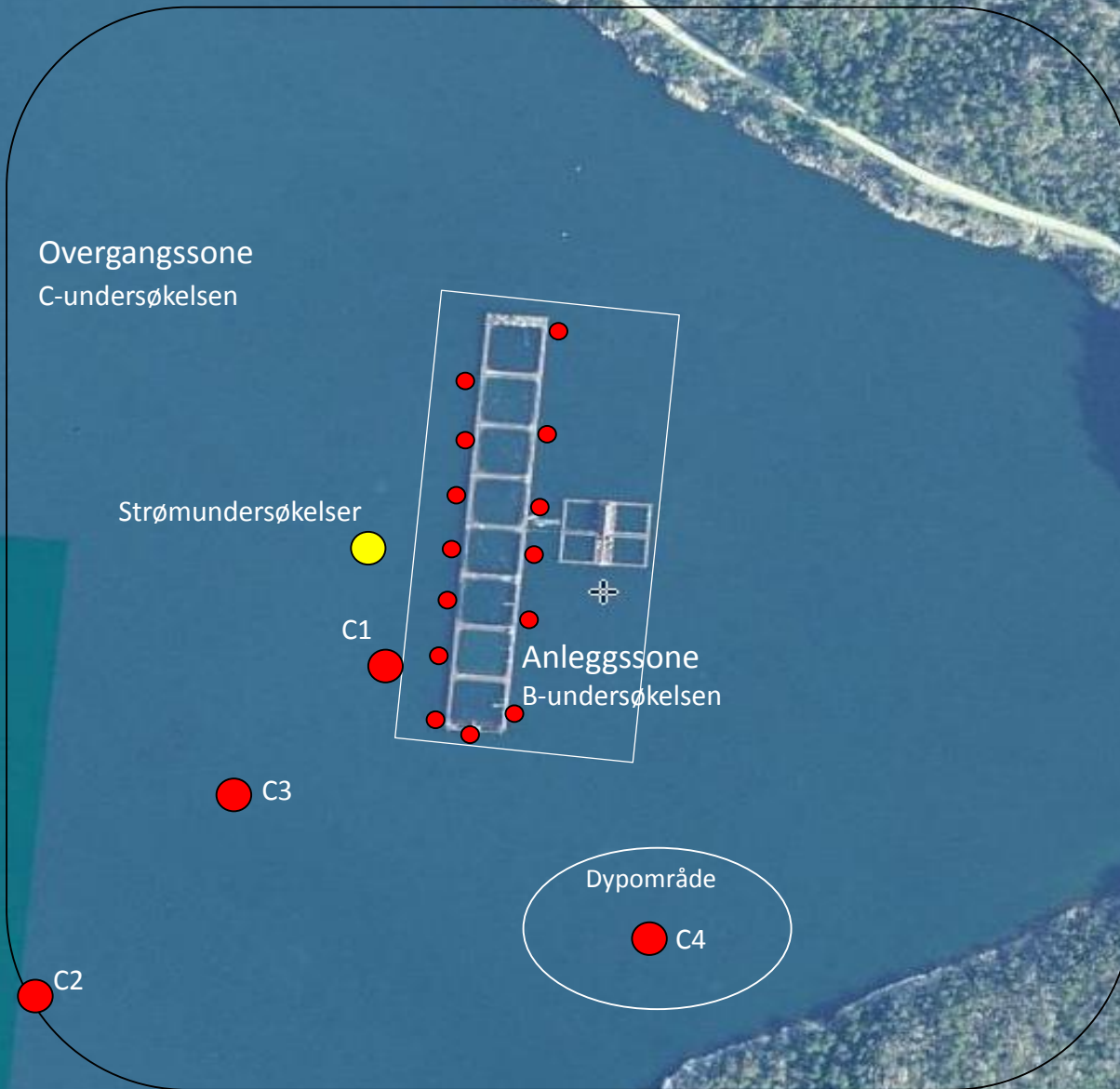
Anleggssone
B-undersøkelsen

C3

Dypområde

C4

C2



Utslipp av partikulære og løste stoffer fra matfiskanlegg



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B-undersøkelsen:

- Fauna, Kjemisk (pH/Eh) og sediment (sensorisk).
- Dybde

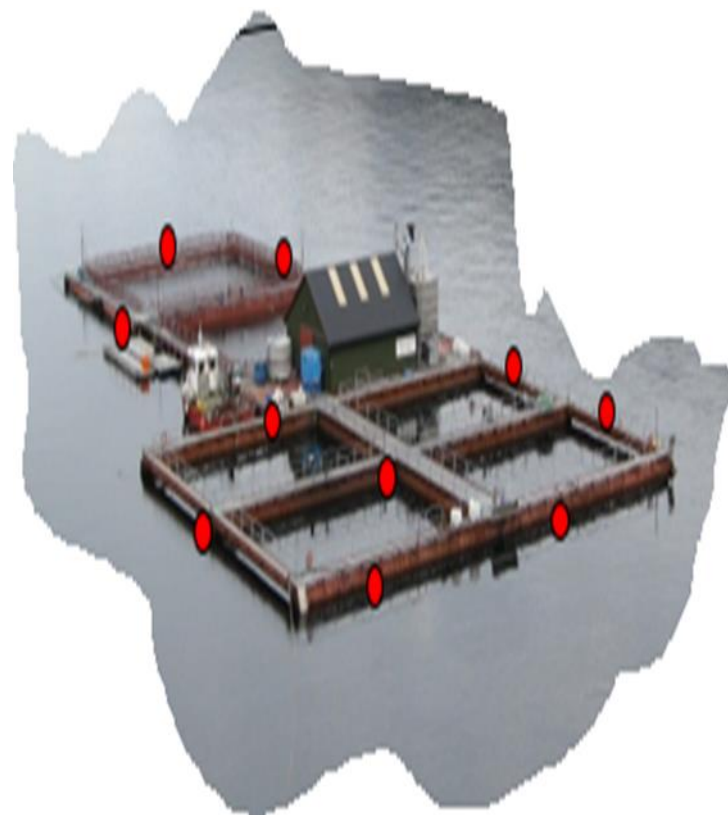
C-undersøkelsen:

- Full fauna analyse (artsliste)
- Dybde, kornfordeling (sediment), TOC
- Kjemi (Cu, Zn)
- Etc..

Strømmåling:

- Overflate-, vannutskiftning-, spredning- og bunnstrøm.

...I tillegg kommer NYTEK data



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