

Climate Change, Aquaculture and Conflicts of Interests in Northern Norway: Research Results and Comparative Methodologies

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Paper objectives

- How will climate change affect stakeholders in Northern Norway (focus on marine ecosystem services)?
 - But this morphed into: How will the increase in aquaculture affect other stakeholders?
 - Just a few «special interests» affected
- Compare results of different methodologies & sources
 - Reliability check

Why this paper came to be about aquaculture ...

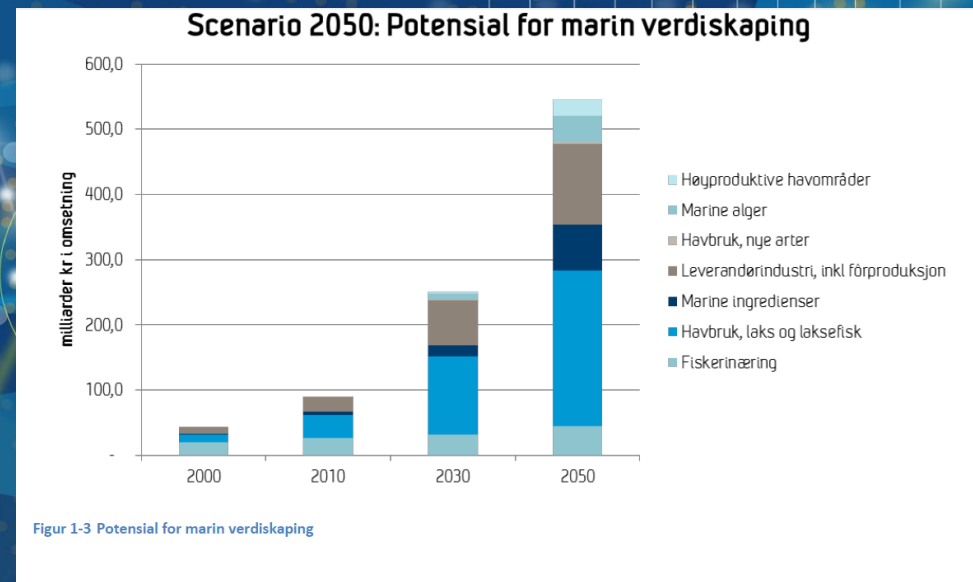
- Broad assumption by many that climate change will encourage movement of industry north
 - Expansion in north, and decline in south
 - So, shift of whole industry northwards
 - Note: longer time frame
- Government policy is to encourage strong expansion of aquaculture,
 - Atlantic Salmon and trout dominate
 - Northern Norway is likely to be area of greatest expansion – general expectation

The vision

- A 5x increase
In aquaculture

Much is likely to be in
North

Verdiskaping basert på produktive hav i 2050



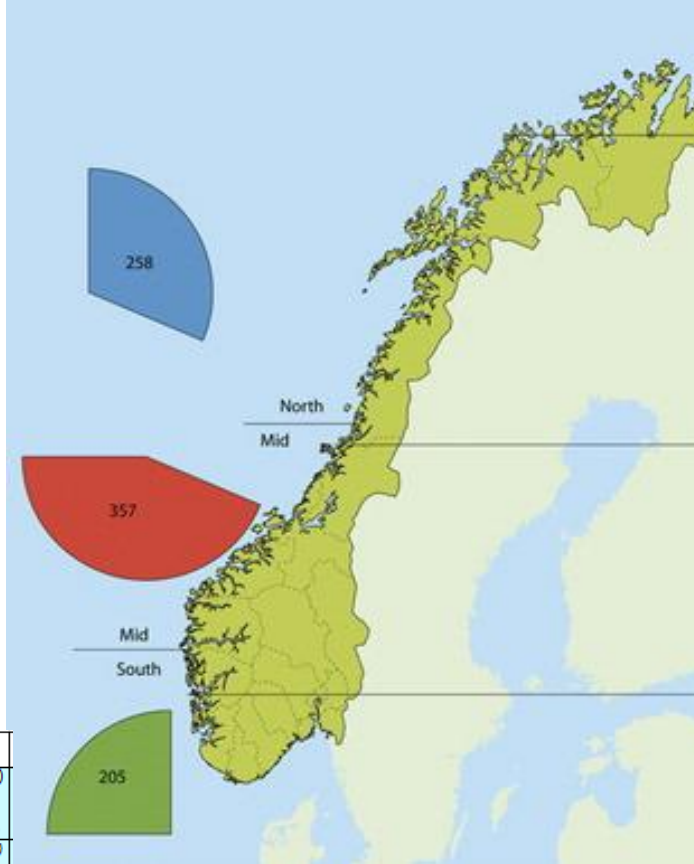
2012

Rapport fra en arbeidsgruppe oppnevnt av
Det Kongelige Norske Videnskabers Selskab (DKNVS)
og Norges Tekniske Vitenskapsakademi (NTVA)

Northern Norway

The three northernmost counties

Aquaculture is already well established



Hermansen & Heen 2012,
Aquaculture Economics and
Management 16:3

	2016			2015		
	Matfisk	Stamfisk	FoU ¹⁾	Matfisk	Stamfisk	FoU ¹⁾
County	No.	No.	No.	No.	No.	No.
	Grow out	Brood stock	R & D ¹⁾	Grow out	Brood stock	R & D ¹⁾
Fylke	Antall	Antall	Antall	Antall	Antall	Antall
Nordland	168	8	20	168	7	18
Hordaland	164	6	15	157	6	15
Møre og Romsdal	114	6	7	114	6	9
Troms/Romsa	103	2	6	96	1	8
Sør-Trøndelag	96	7	5	96	7	5
Finnmark/Finnmárku	92	0	4	91	0	2
Sogn og Fjordane	87	3	4	87	3	1
Nord-Trøndelag	71	2	11	71	2	11
Rogaland	59	5	15	58	4	12
Øvrige fylker	17	2	3	16	2	5
Vest-Agder	16	0	0	16	0	0
Aust-Agder	3	1	0	4	1	0
Totalt/Total	990	42	90	974	39	86

Source: SSB

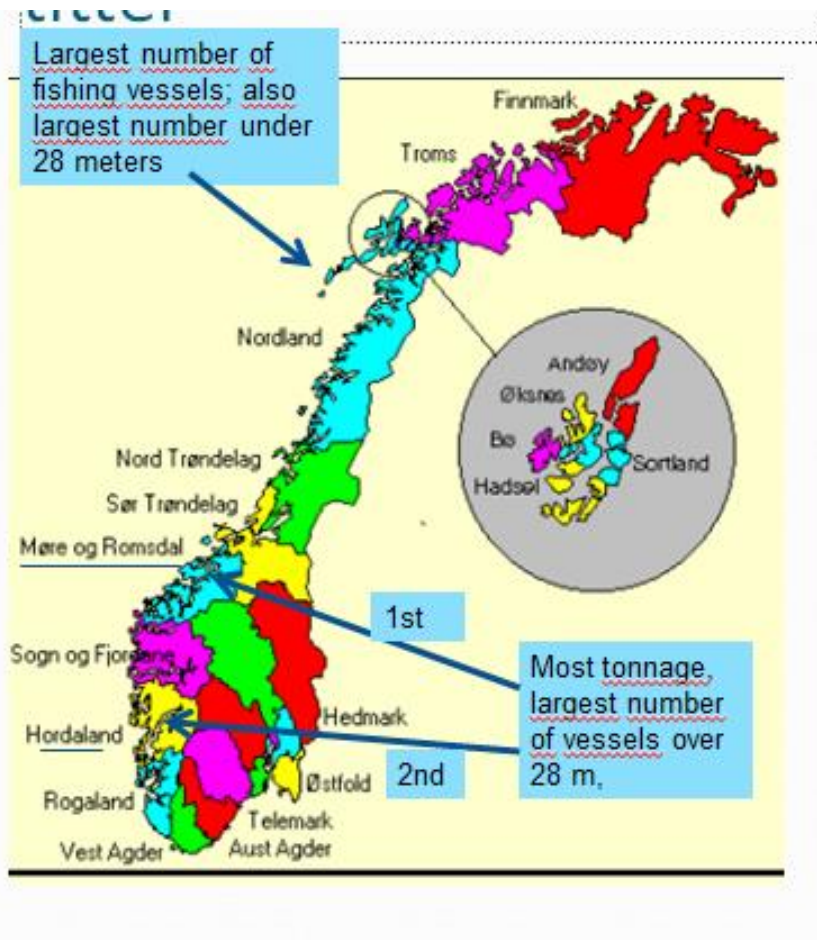
Prediction: Assuming SST warming and «Liberalized Management»

TABLE 4 Changes in Licences Scenario 3, Warming and Liberalized Management

Region	County	# Licences 2007	Change in Licences					# Licences 2030
			2012	2017	2022	2027	2030	
North	Finnmark	83	-20	-12	-5	4	9	59
	Troms	86	1	11	18	23	24	162
	Nordland	144	40	48	48	43	34	357
Mid	Nord-Trøndelag	64	17	18	13	7	-1	119
	Sør-Trøndelag	83	17	13	4	-6	-15	95
	Møre og Romsdal	103	8	-2	-14	-24	-21	50
South	Sogn og Fjordane	83	-14	-20	-17	-13	-9	10
	Hordaland	150	-26	-35	-31	-24	-16	18
	Rogaland	62	-17	-16	-12	-8	-5	4
	Agder/Østlandet	18	-6	-5	-3	-2	-1	1

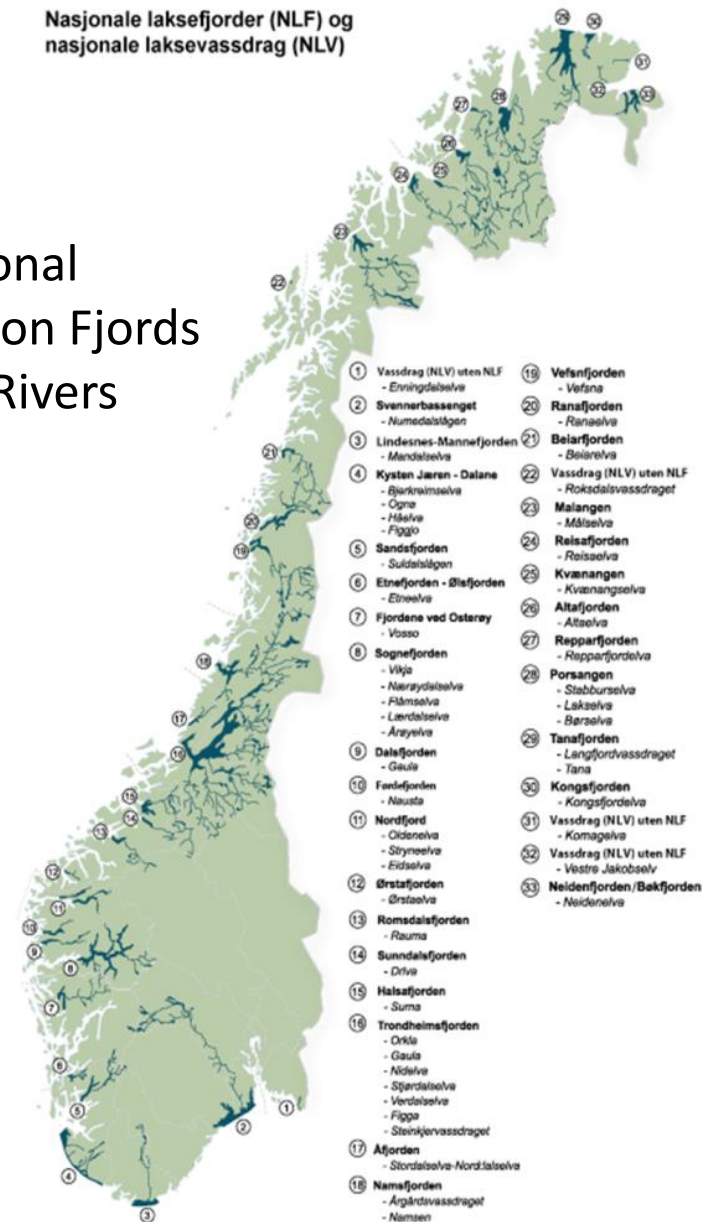
Source: Hermansen & Heen, 2012,
Aquaculture Economics & Management

Other key marine resource users



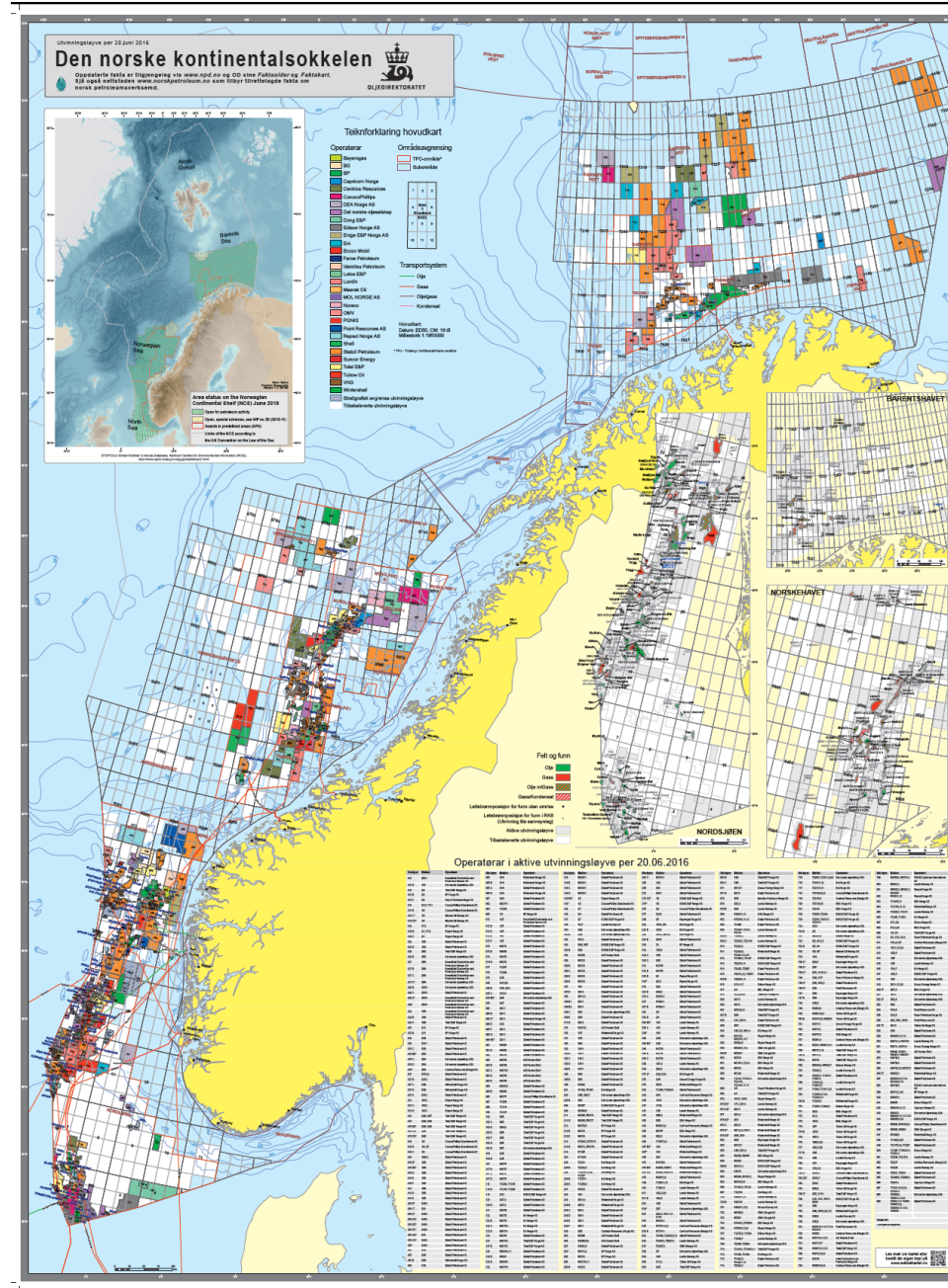
Nasjonale laksefjorder (NLF) og nasjonale laksevassdrag (NLV)

National Salmon Fjords and Rivers



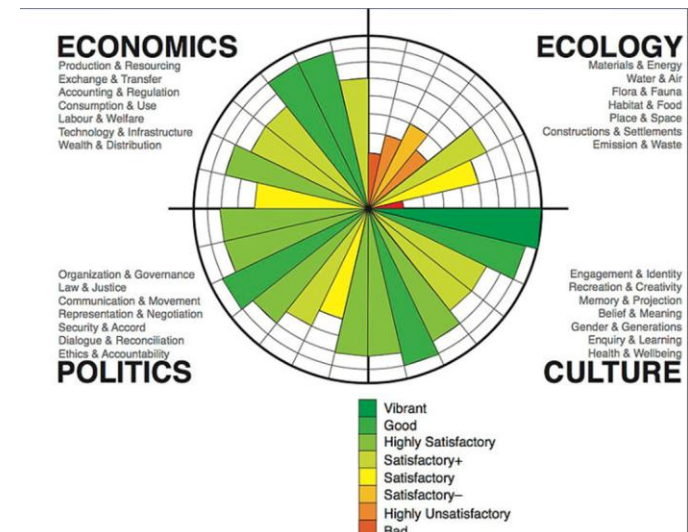
Kilde: Direktoratet for naturforvaltning, 2010
www.miljostatus.no

- But not users of marine ecosystem services
- Note area around Lofoten
- Other potential users: maritime transport, military, off-shore wind, etc.



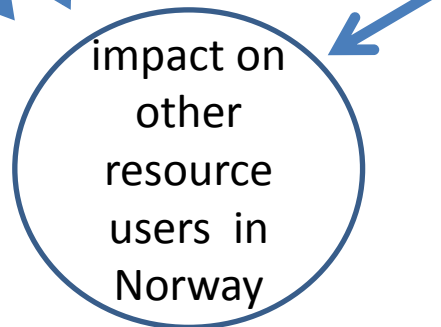
Main focus

- Aquaculture & impact on fisheries and tourism
- **But** open to other impacts on others actors ...
 - Sustainability & four potential areas of impact
- Circles of sustainability
 - Economics
 - Ecological
 - Culture
 - Politics/governance



Possible issues and impacts from Expert Rpts. + theoretical lit. (I)

- Ecology
 - Damage to wild salmon because of lice/parasites, disease, escapes, emissions/effluents/ discharges
 - Impacts on other commercial species
 - Generalized environmental impact from emissions, etc
 - Biodiversity
 - Fish feed
- Economic (firm profitability and economic impacts beyond)
 - Loss of fish in pens/production loss;
 - Economic growth, jobs -- on local community
 - Effective use of area
 - Impact on markets and demand for seafood
 - Competition for area
 - Reduce seafood deficit (national)
 - Reputation of industry



Possible issues & impacts II

- Culture
 - Fish health & welfare (public health& ethics)
 - Increase world food supply
 - Identity (regional, cutlural, professional, group, etc)
 - Local knowledge (LEK)
 - loss Impacts on community (kind of community)
 - Employment conditions, worker rights, etc
 - Rights to the coast
 - Value of nature
- Politics and governance
 - National strategy
 - Political trust and social capital
 - Trust of the industry
 - Management capacity issues
 - Distributional issues
 - Mix of small and large firms
 - Who benefits? (where does the money go?)
 - Local vs non-local ownership
 - International treaty obligations

If broad notion of sustainability, then many, many, potential stakeholders

- National government ministries
 - Industry, Trade and Coast
 - Climate & Environment
 - Defense
 - Foreign Affairs
 - Health
 - Labor and social affairs
 - Transport & Communications
 - Etc.
- Others
 - Subnational gov units – county governors, country municipalities & local muniip.
 - Aquaculture & related industries
 - Associated industries
 - Fishing
 - Tourism (sports fishing etc)
 - River bank owners
 - ENGOs (the Lorax)
 - Spiritual & cultural actors
 - Research organization
 - Universities and academic

The Methodologies & Sources

- «Media mining» –
 - Searching newspapers for reports of resource user conflicts /articles about aquaculture
 - 2 studies
- Workshops held for Ocean Certain (6)
 - Systems thinking and Bayesian Belief Networks
 - Stakeholders as experts on their own socio-ecological systems
- Content analysis of document produced by major stakeholder groups
 - Hearing on government's proposal for «predictable and sustainable» aquaculture growth – responses -preliminary
 - Documents – input to establishment of national salmon rivers and fjords
- Public opinion polls/surveys
 - Pretty limited, but some points of interest

Vantage Points and Caveats

- A kind of «Triangulation»
 - Different indicators
- Different sources can capture different aspects
- Much is perception based, no attempt here to evaluate validity
- Stakeholders treated as experts in navigating their owns socio-ecological systems
- Comparison can be used to examine usefulness of each methodology
- Caveats? Lots!
- The sources (except one) were not designed for this purpose
- All methodologies have disadvantages
- Time discrepancy (climate change vs. government policy)
- Assessment incomplete, skewed against aquaculture

Ocean Center Workshops

- 6 workshops, mostly sector-specific (fishing, aquaculture, tourism, aquaculture supply, fisheries & aquaculture management authorities, + 1 mixed)
 - (first round, subsequent rounds will have choice games and questionnaires)
- Selected participants (not random samples)
«Snowballing»
- Stakeholders allowed to determine where discussion went
- Was specifically about effects of climate change
- Sometimes difficulties in getting participants
- Varying numbers from 2 to 9

Stakeholders: Commercial Fishermen

Stakeholder1	25.0
Stakeholder2	25.0
Stakeholder3	25.0
Stakeholder4	25.0

New species or Migratory Paths

Gives access to new fisheries	30.3
No new access	69.7

Market

Large enough	46.6
Too small	53.4

Capital

Enough	39.4
not enough	60.6

Management

Updated	36.2
Not updated	63.7

Fishing Industry

Power to influence	50.0
No influential power	50.0

Researchers

Humble not arrogant	50.0
Not humble	50.0

Meat Production

Lower than today	50.0
Higher than today	50.0

The Customers Economy

Good	50.0
Bad	50.0

Money

Available	50.0
Not available	50.0

Ability to Communicate Well

Good	50.0
Bad	50.0

Reputation of fishing industry

Good	50.0
Bad	50.0

Competence

Good	50.0
Bad	50.0

Marketing

Must hit the sweet spot	50.0
Does not hit the mark	50.0

Workshop findings

- In **mixed group**: theme was aguaculture again everyone else
 - Aesthetic problem, problem for tourism
 - Fish attracted to pens, creates problem
 - Will hurt water quality
 - Increased sea lice etc
- But: positive effects too
 - Economic growth
 - Tourists might be interested in touring facilities
 - If fish are attracted to pens, could create opportunities for tourist fishing
 - Aquaculture might move off-shore
- But in BBN session – legitimacy of coastal zone management was key to making it work

Findings (2), Sector groups

- Fishers: mostly complaints that authorities favored aquaculture interests & are especially bad for small boats

But: Key factors for success: Availability of new species to fish & permission to fish them + capital to buy quotas
- Tourism industry: more concerned about conditions for viewing Northern Lights
 - But negative views of aquaculture & view that it is out of control;
 - Wild salmon contribute to «nature» perception of tourists
 - Missing: River bank owners

Key factor for success:

- Good transportation to area – political will to provide it

Findings (3): Sector groups, cont.

- Aquaculture support industry
 - Agree that lice, escapes will come
 - Insist fisheries & aquaculture equally important
 - Aquaculture will lead to larger vessels, less income
 - But, aquaculture under appreciated
 - Will create more business for support industry – which will make up for decline in sales to fishing
 - Increased need for workers
 - Management capacity issue (will be more bureaucratic and slower)
 - Assume offshore production of aquaculture
- Key factor for success: Survival of local community – resource base + local support critical

Findings (4): Sector groups

- Fisheries and aquaculture managers
 - Assume increase in aquaculture will led to stakeholder conflicts
 - Change in fishing grounds
 - No local foundation for increase
 - Cabin owners will protest
 - Sea lice is a big challenge
 - Local municipalities were not getting their share of revenue (At least in past)
 - Recognize democratic deficit in management
 - Increased aquaculture will hurt biodiversity
 - Aquaculture industry is placing pressure on managers
 - Large companies will be favored
 - Will impact tourist fishing
- Key factor for managers' success: Coastal zone management that minimizes conflict (their working conditions and management framework are in turn key)

Findings (5) Sector groups, cont.

- Aquaculture
 - Resentment about other users & media
 - Oil workers spend free time lobbying against the industry
 - Coastal zone planning does not appreciate ripple effects of industry
 - Clash with other users leads to removal of area from aquaculture, NEED MORE AREA
 - Media sets agenda
 - » People think aquaculture kills everything
 - Management capacity issues
 - Acknowledge problem with escapes (lice not mentioned!)

Media Mining

- 2 studies: Osmundsen & Olsen, 2017
- Unpublished support work by Ocean Certain team (Eggereide)

Osmundsen & Olsen 2017

- Discourse analysis of debate contributions 2012-2014;
- 273 printed contribution, coded on 15 variables
- National study, not specifically N. Norway (but do include NN papers)
- They are looking for discursive frames, so mission is different
- But findings are useful for us

Osmundsen & Olsen 2017

Two alliances and «storylines» detected

Table 4.4.2			
The two alliances, storylines, and rhetorical concepts (Osmundsen and Olsen 2017: 139)			
Alliances	Actors	Storylines	Rhetorical concepts
'Environment- and conspiracy' alliance	Journalists, private individuals, sports anglers, NGOs, and a few political parties	'A billion dollar industry which by the aid of corrupt politicians is allowed to destroy our fjords'.	Sewage, poison, stinking hazardous waste, underwater prison, conspiracy
'Industry and food production' alliance	Ministers, industry and lawyers, most political parties, and the <u>largest environmental NGOs (Bellona and WWF)</u>	'Aquaculture saves the global population, and all human activity leaves a footprint. The government takes environmental challenges seriously'.	Hungry global population, local jobs, local communities, growth potential, an acceptable footprint, innovation, environmental challenges

Ocean Certain media mining effort

- Search of A-Tekst data base, local and national newspapers, special focus Northern Norway
- Three most recent years
- Search strings used, looking for conflict among marine resource users (adaptive capacity issue)
- Not limited to debate contributions, includes news stories
- Close reading of 200 articles

Ocean media mining findings

- Really aquaculture vs. everyone else
 - Pollution from cages
 - Decreased quality of game fish
 - Accusations of abuse of financial power
 - Claim shrimp are damaged by delousing chemicals
 - A sense that the industry is «out of control»
- Other conflict issues, mentioned
 - Fear of oil & gas industry,
 - Illegal net-fishing for salmon and sea trout
- Note: not designed to pick up positive comments

Analysis of documents submitted in connection with government hearings

- Objective: protect key salmon rivers
- Aastre & Vik, 2013 – documents from 1996-2008 in connection with designation of national salmon rivers and fjords
- Government objective: give protection to most important salmon stocks
- National study (not especially N. Norway)
- Total of 16 texts analyzed
- Two discursive frames detected
 - Four dimensions: rationality, territorial strategies, technical strategies and sense of urgency

Aastre & Vik, 2013

- Conservation Frame:
 - Instrumental rationality
 - Remove aquaculture from area (territory)
 - Technology useful, but removal much better
 - Situation for salmon is very urgent
- Technology frame
 - Instrumental rationality
 - Favors active protection over passive – solve threat rather than remove
 - Technology: long list of solutions
 - Yes, salmon are under stress, but situation not so urgent

Aastre & Vik (2013): The two coalitions

- Conservation frame:
 - Agencies & actors focused on nature & salmon
 - Directorate for nature management, Norwegian society for conservation of nature (ENGO), Norwegian Salmon Rivers (interest organization)
- Technology frame
 - Norwegian Seafood Federation (Fiskeri og havbruksnærings landsforening)

New, but incomplete assessment ...

«Predictable and environmentally sustainable growth in Norwegian salmon and trout aquaculture»

Deadline 10 Jan 2015

DEI KONGELIGE
NÆRINGS- OG FISKERIDEPARTEMENT

Meld. St. 16

(2014–2015)

Melding til Stortinget

Forutsigbar og miljømessig bærekraftig
vekst i norsk lakse- og ørretoppdrett



The responses

- 60 submissions
- Wide variety of contributors
- Focus here is on national + actors in Northern Norway
- Response to specific government proposals laying foundation for expansion of the industry
- Deadline for submissions: 10 January 2015
- Government has since responded to some of these
- Analysis of this incomplete

Findings:

- Pretty much in line with everyone else, but very preliminary analysis
- Group of ENGOs, Sports & leisure groups (eg. Hunter & fishers assn, Norwegian salmon rivers, etc) ... but also: Finnmark country governor, Fisheries directorate & others found gov't focus on lice too limited – much broader focus on nature needed
 - Many point to damage to wild salmon

Findings (preliminary)

- Norwegian coastal fishers association – will harm species other than salmon
- Will be damaged by increase in aquaculture –
 - Norwegian fishers association & coastal fishers assn
 - Troms county governor thinks they will, too
 - Specifically area conflicts: Coastal fishers, Norwegian Salmon rivers; Finnmark CM.

Findings, other issues (preliminary)

- Sustainability of feed issues – ENGOs
- Government proposal favors larger firms (Troms CG, Salmon Group)
- Ethical issues -- Nor. Salmon Rivers; Norsk industry, Fisheries directorate, Nor. Veterinarian association
- Politics & governance issues
 - Lack of trust in industry
 - Lack of tools and knowledge
 - Favors larger industries
 - Motivation of government questioned
 - Coastal rights threatened
 - Gov favors aquaculture over other interests
 - Need tax on area /resource use for local benefit
 - ENGOs + Sami Parliament + Nofirma + Troms CM + Nordlands CM + Network of Fjord and Coastal Municipalities

2 public opinion polls

- Very little information about these at the moment & scope seems very limited
- Hardly worth mentioning but
 - Both suggest opposition to aquaculture in Northern Norway may not be as strong as thought
 - 2015 survey in Finnmark finds less opposition by younger people
 - Adds age dimension (but still not a majority)
 - 2016 survey of 1000 Northerners:
 - Very critical of industry but still wanted more of it
 - Professor Margrethe Aanensen: “Northerners” want economic opportunity – even at expense of nature
 - More favorable in countryside than in cities

Findings: direct impacts on other marine resource users

- Agreement among most methodologies
 - Lice biggest issue – but for different reasons
 - Impact on wild salmon vs. Loss for industry
 - Escapes very, very important (mostly relating to wild salmon) (industry tends to dodge this)
 - Fear of broader environmental damage (diffuse)
 - Fear of harm to species other than wild salmon (fishers)
 - Area conflicts would seem to be important (BUT)
 - Fishers - tourism (depends) – cabin owners
 - Tourism – conflicting points (tends to be diffuse)

A common conclusion, too

- Aquaculture likely to bring economic growth & jobs

Findings: commonalities

- Issues of legitimacy, political trust and social capital – would to be seem important (BUT)
 - Lack of trust in management procedures, lack of trust in the industry
 - Industry: very concerned with reputation
 - User conflict is widely anticipated
- Capacity issues
 - Need for a variety of improvements (indicators, knowledge, etc)

Conclusions

- These sources turned up many of the same points
 - General impression: useful
 - Surveys were too limited, too little info (....BUT)
- But there differences: worth investigating further?
 - Generational issue (survey)
 - City vs. Countryside issue (survey)
 - Need for employees & creation of jobs BUT: need for foreign labor (workshops)
 - Fish welfare as an ethical concern (responses)
 - Rights to the coast (responses)
 - Some large v. small firm issues
 - Need for improvement in working conditions for managers (workshops)
 - More thorough analysis needed

Missing issues & actors

- Issues
 - Identity,
 - culture (Sami, for example),
 - Local Ecological Knowledge (LEK),
 - community character
 - cabin owners (unless these are folded into angling-interested groups)
- No input from military, coast guard, oil and gas industry

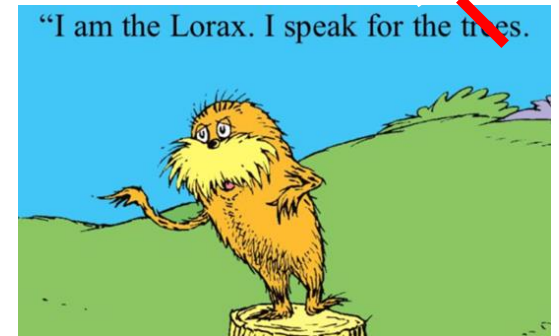
Concluding thoughts

- There *are* two broad coalitions, with some players scattered between the two poles
 - Middle: those who recognize many issues but see solutions
- *Very* skeptical of expansion (given today's problems)
 - ENGOs (but this need further investigation)
 - Ministry of Environment (and Nature Directorate),
 - Fishing and Hunting orgs
 - Norwegian salmon rivers org (& similar),
 - Fishers (Norges Fiskarlag + Norges Kystfiskarlag),
 - some scientists (wild salmon focus)
- So, no, not just a few «special interests»

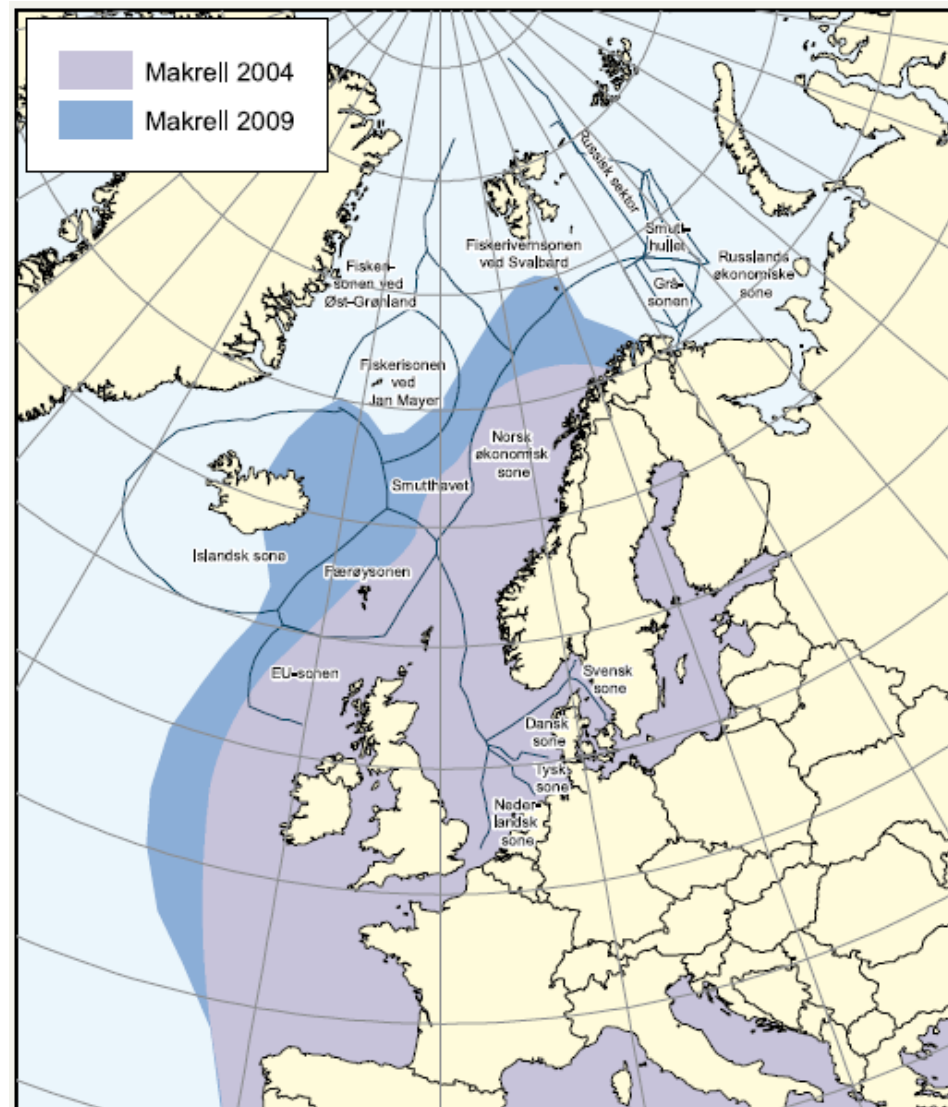
Actors and Interests

But a weak coalition

- Fishers
 - In past highly adaptable (Norwegian Study on adaptive capacity)
 - are mobile
 - Regulations stand in way of mobility – could change
 - Represent less export value than aquaculture
 - (climate change might result in larger catches)
 - Maybe generational
- ENGOs, scientist– Like the Lorax –
 - speak for nature, not powerful interests
- Salmon river bank owners
 - Locally important, not nationally (despite international treaty obligations)
 - Salmon already declining around North Atlantic rim & Norway



- Climate change
Will change
location of stocks
- Norway on the
whole will have a
net gain



Figur 1. Skjematisk oversikt over makrellutbredelse sommeren 2004 sammenlignet med 2009.

The other poll

The Aquaculture Industry and the political leadership

Economically
important,
consolidated

Priority industry for
government (role in
Norway's strategy)

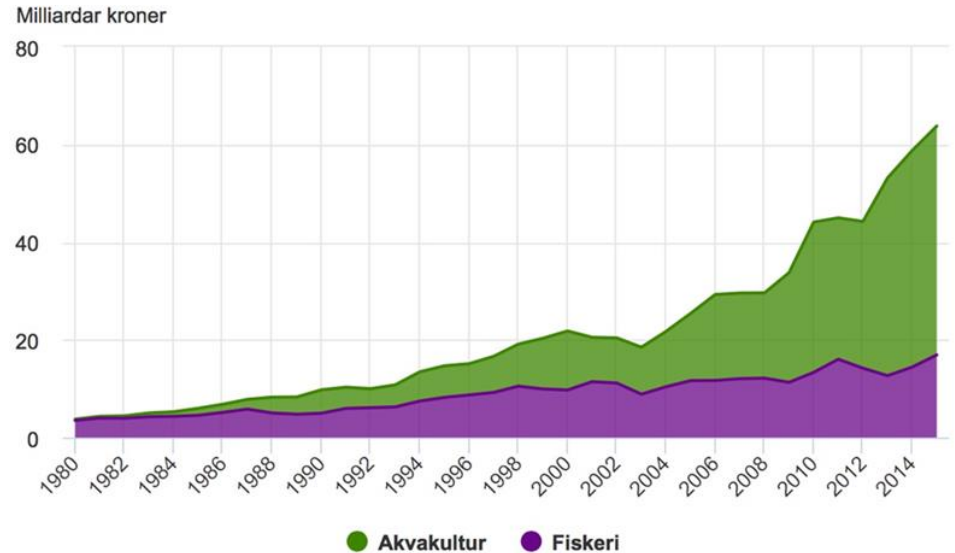
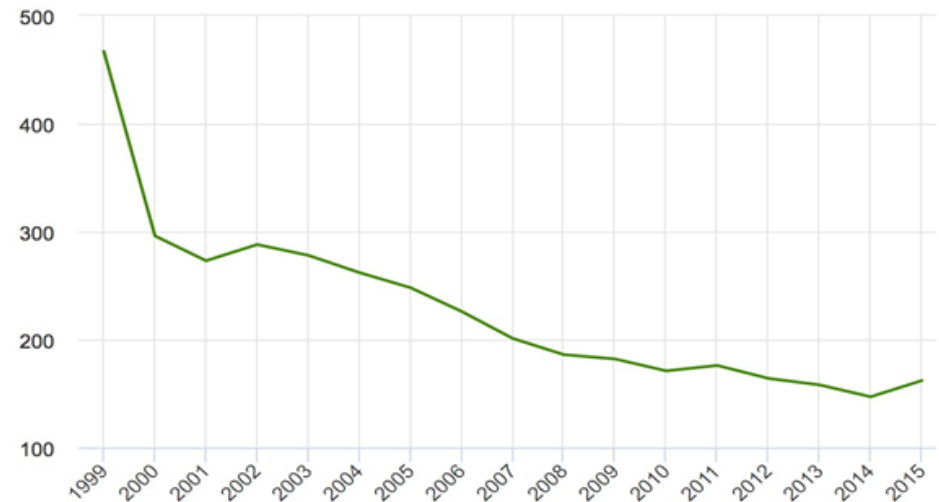


Fig. X. Number of companies in Norway producing salmon/trout for food, 1999-2015 (Steinset 2017)



Obligatory credits



Thanks!



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