Herding the Coastal Commons. Or How to Manage Cod as Livestock.

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Introduction[1]

During the last 20 years explicit management of marine fish stocks has become ubiquitous for fisheries nations across the world. Fisheries management is concerned with the transformation of scientific advice on optimum sustainable yield into functional policy through direct control of harvesting intensity and pattern. Stock enhancement is a logical extension of this idea. Here one tries to increase the output of a given stock by supplementing reared juveniles when natural recruitment is low, or by channelling more of the energy flow through desired species. In this paper I will discuss institutional and organizational problems that must be solved if the enhancement is going to be transformed from an interesting idea to practical reality.

At least five events in the mid and late 1980's ignited the interest in sea-ranching in Norway. The *ban on the salmon drift gill-net fishery* in 1986 hit five coastal municipalities particularly hard[2]. The Fishermen's Association was engaged, and the government's response was to promise an investigation of the possibilities for future sea-ranching operations (Parliamentary Bill No. 136, 1988-89). The 1989-90 *cod*[3] *stock crisis* reinforced these promises. Even if the stock decreased, the catch proportion of the stock biomass increased (Figure 1). *Breakthroughs on the field of cod fry production* eliminated the largest technical obstacles to the old idea of increasing the yield of the cod stocks through supplementing the natural recruitment. Traditional industrial adaptations at the coast were already challenged by the

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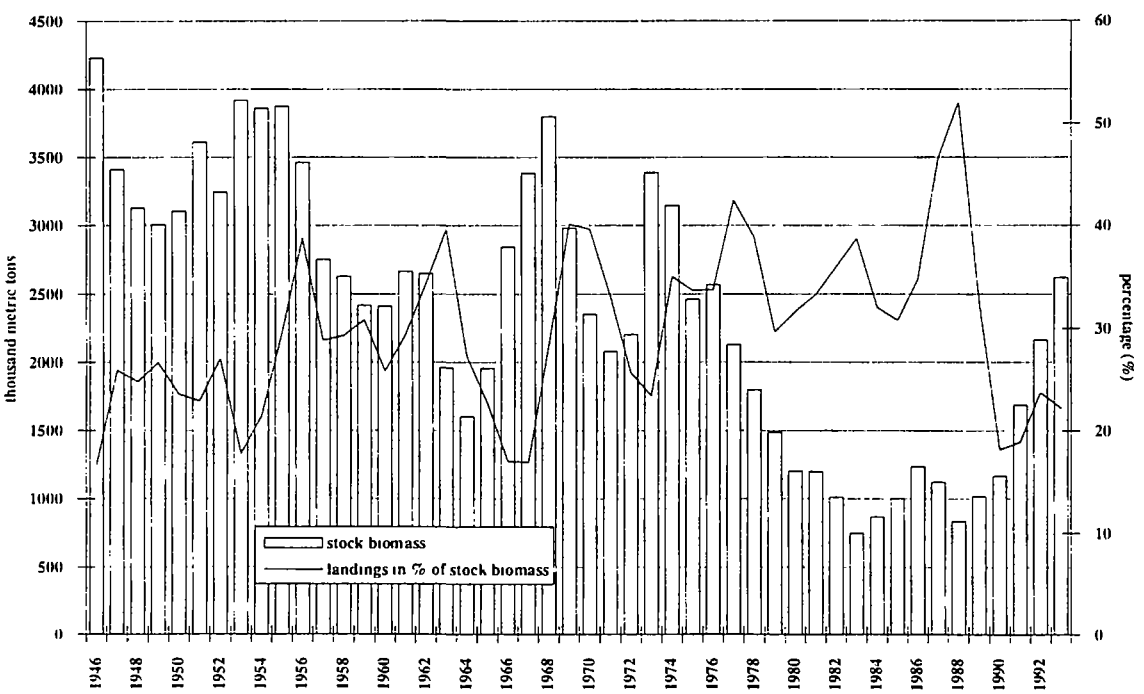
2 Frøya, Vikna, Træna, Røst, Vega.

3 Gadus Morhua

success of the salmon aquaculture industry. Salmon aquaculture supplied new technology, new knowledge, and, not least of all, a new way of thinking about the use of marine resources. *Changes in a rather rigid institutional system* attracted new interest groups, and drew the attention towards new production systems.

Sea-ranching is defined as the recapture of previously cultured and released organisms (Parliamentary Report No. 65, 1986-87). The organisms utilize the primary production of the marine environment. The behavioral pattern of the organisms is used to recognize and recapture them. The concept of sea-ranching rests on an idea of suboptimal production of valuable species due either to low recruitment, unwanted species composition, inhibited growth, or overexploitation. Releases of juveniles assumes the existence of a particular organization to rear the fish. The organization must control certain technical skills and have access to sufficient funding. In addition, the release programs assume the existence of an economic surplus of the operation, which is expressed by the sale of the recaptured fish.

FIGURE 1: Total stock biomass and landings in % of the stock biomass of Northeast Arctic cod. The figures are corrected for deviation from mean weights.



SOURCE: ICES (1995).

The largest remaining problem in the sea-ranching of cod, then, is human ability to control released fish, and here I focus on two fundamental questions: (1) Will an institutional limitation be *biologically effective*? (2) Will it be *politically possible*? These questions will be discussed with reference to the *interference problem*. The problem is of biological origin and concerns how animals interact. Depending on the amount of human interests engaged in the animal stocks involved, social interference occurs. This again creates a managerial problem to be solved. Free riding is a managerial problem which deserves particular attention. Free riding is defined here as harvesting without contribution. Free riding will eventually lead to collapse of the system if not dealt with properly.

The two core questions above focused on whether an institutional coastal enclave will be biologically effective and politically feasible. The *first* question concerns the behavior of the fish; is it possible to adequately define territorially distinct cod stocks which are open to enhancement? The *latter* question concerns the robustness of the State's hegemony in the management of the cod resource, the ability of the coastal residents to express their "first right" to the cod resource, and a further clarification of the concept of two different cod stocks by the infusion of scientific knowledge.

Regarding sea-ranching with cod, these issues raise fundamental practical problems:

(1) Cod is present everywhere along the Norwegian coast, and released cod will mingle freely with wild cod. Cod is also an important target species for commercial fishermen. Can wild and released cod be separated?

(2) Within the present Norwegian regulatory regime, cod is defined as a unitary stock. What is the possibility of changing this definition so as to accommodate cod sea-ranching operations?

(3) If the regulatory regime is changed so as to allow cod sea-ranching, how should harvesting rights to enhanced stocks be distributed?

These questions, in the grey zone between science and politics, will be addressed in the rest of this paper. The two main dimensions of the cod fisheries will be presented, then the cod's biology and the fishing fleets structure and capacity will be discussed. Third, the concept of Coastal cod in contrast to Northeast Arctic cod is presented, followed by a presentation of the administrative system, infused with a particular concept of cod. Fifth, there is a discussion of possible models, followed by discussion of the possibilities of cod sea-ranching.

But first of all the potential of the interference problem will be presented.

Interference Problems

Proper organization of cost and benefit streams is the core of the managerial problem, but how to accomplish this organization is a matter of either avoiding or resolving interference problems. The interference problem is a function of the interference between species where human interests are engaged in more than one. Examples will be provided to illustrate the core of this issue (Figure 2).

The capelin fishery provides an example of use of a resource where only one interest group is present, the capelin fishermen (A). There are no biological interference, no social interference, and thus no user conflict.

The level of complexity increases with biological interference, but conflict does not necessarily occur. In the cod fishery for instance, a 10-15% haddock bycatch is usual (C), and conflict is rare because cod and haddock fishermen are the same, or their interests are congruent.

The level of complexity escalates when human interests are connected to more than one species. Then biological interference is transformed into social interference. This problem is related to the general bycatch problem in fisheries management, as in the American tuna fishery, where dolphins are killed as a function of the fishery (D). The behavioral dependency

between these species puts the dolphins in jeopardy. Here the biological interference leads to social interference between dolphin protectors and tuna fishermen. Protectors build up a political pressure against the fishermen, and as a result, rules for tuna fishing which protect the dolphins were imposed on the fishermen.

Conflict might occur, though, without biological interference, if more than one type of interest are engaged in the target species. An example here is minke whaling (B). Whalers kill minke whale, but are opposed by whale protectors. Political means are used, and the outcome is reduced hunt and limited market access.

Releases of reared animals in the commons introduce new potential conflicts. Conflicts may be avoided, though, as reindeer herding by the Sami in Finnmark illustrates (E). Since the nearest wild reindeers are found 2000 km south of this area, no biological interference takes place when "private" animals are released. Here property rights are used to organize costs and benefits. The previous Norwegian-Faraoese salmon controversy illustrates this organization as well. Juveniles released in Norway "vanished" in the Faraoese salmon fishery. The capture took place in Faraoese waters, and was thus legal according to international law. The response to this problem was a program to buy back quota by the Norwegian government. Order was restored by state level intervention.

The sheep-bear controversy in the Norwegian commons provides an example where releases of reared animals interfere with wild animals, and conflict occurs because there are human interests connected to the sheep as well as to the bear (F). In contrast to the tuna-dolphin example, sheep are released, domesticated creatures, and bears are protected, wild creatures. The outcome of the social interference between sheep owners and bear protectors is a regulated hunt on individual bears known to have killed sheep, and a standardized government compensation to the sheep owners. The wild-enhanced controversy in the Alaska salmon fishery illustrates a related, but particular biological problem. Wild salmon stocks may become threatened because they mix with enhanced stocks, as in Alaskan salmon sea-ranching

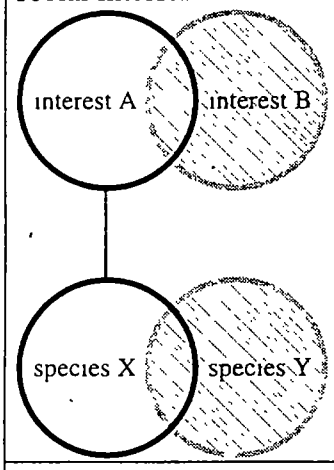
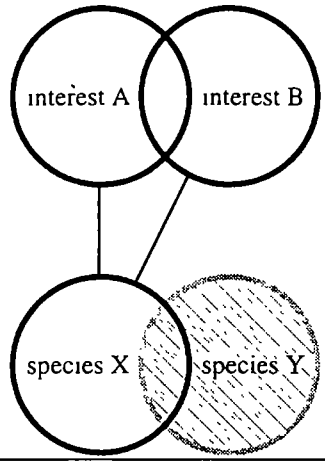
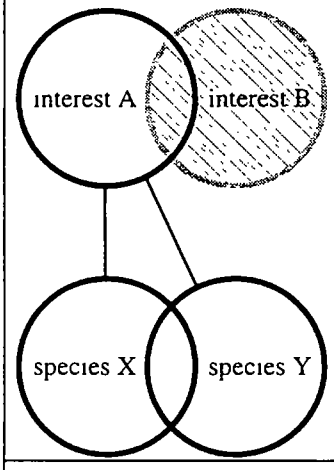
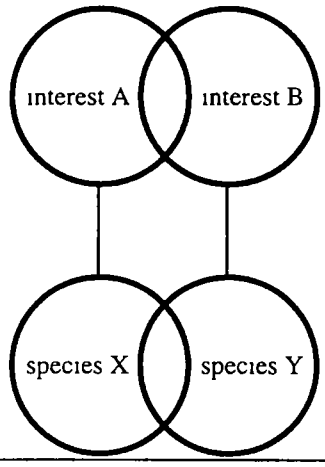
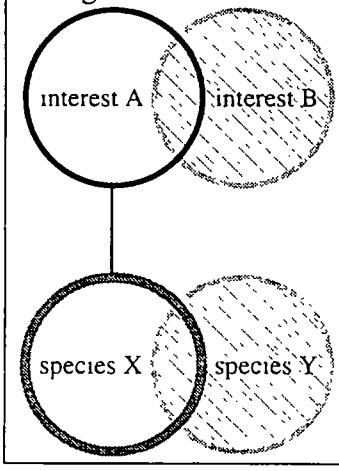
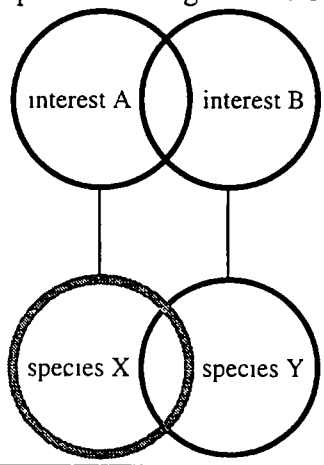
operations. The capture intensity is based on the size of the enhanced stock, and increased bycatches in the mixed fishery puts wild stocks in jeopardy (Mathisen, 1991).

There are two ways to solve the social interference problem. *First*, when the species interfering are separable by behavior, capture rules can be implemented which takes this separation into account. Proper management to solve the problem caused by the biological interaction can be implemented by redesign of the social system, as in the tuna-dolphin interference. *Secondly*, when the biological interference is unresolvable, the social interference may still be solved by internal negotiation to restore balance between involved interests. The solution mechanisms may be rejection, compensation, or cost division. The sheep-bear controversy is an example here. Sheep will be killed as long as there are bears around.

In the previous examples distributional conflicts are resolved by institutional design in a rational context. There is still another problem in this field, and that is the feasibility of implementation of the proposed solutions. Distribution is resource sharing, and interest groups may want to influence the distribution process. Their success depends on the respective amount of political power in the hands of such interest groups and their counterparts. Implementation of institutional solutions requires political support. The collective best solution may be unattainable because the proposed solution is suboptimal to a few influential participants.

On the background of these principle interference problems, I discuss the biological and social circumstances for manipulating cod stocks in the following section.

FIGURE 2: Models for biological and social interference.

NO CONFLICT	CONFLICT
A. One interest, one species. No biological or social interference. 	B. Two interests, one species. Social interference without biological interference. 
C. One interest, two species. Biological interference without social interference. 	D. Two interests, two species. Biological and social interference. 
E. One interest, one released species. No biological or social interference. 	F. Two interests, one released and one wild species. Biological and social interference. 

Clarifying Dimensions

Released cod will interfere with wild cod, and wild cod is target species in one of the most important Norwegian fisheries. The circumstances under which the cod fisheries are conducted are thus important for future sea-ranching operations. The cod fisheries are made up of a biological and a managerial dimension. The management regime is dependent on the biological dimension in the sense that a particular definition of cod as a species is inherently part of the regime. The concept of cod as a single, widely distributed species has been challenged over the last sixty years, thus "Coastal cod" as a specific entity has a diffuse character. A discussion of these dimensions is necessary to solve the problems: who will pay and who will participate in cod sea-ranching. These questions draw attention to the organization of the cost and benefit streams, which are the most controversial and challenging aspects of sea-ranching compared to ordinary capture fishery.

TABLE 1: Dimensions of the cod fishery.

		Fisheries Management Regimes	
		National Regime	*Local Regime*
Cod Stock Characteristics	*Unitary Migratory*	NECESSARY	IMPOSSIBLE
	Stationary Separate	UNNECESSARY	PREFERABLE

Both the biological and the managerial dimensions are to be understood as continuums; from a unitary stock towards several stocks, and from a national towards a local regime, respectively. In table 1, the upper left corner represents the current position of the cod fisheries, but recent social as well as biological challenges are increasing continually the window of opportunities in this sector. *National Regime* is the current perspective on how to manage a national marine resource, based on territorial equity and formal justice, functional criteria, and enforced by bureaucratic and central institutions. *Local Regime* represents different contemporary challenges to the state hegemony. Common to the challengers is a

wish for increased territorial influence. *Unitary Migratory* cod stocks represents the common conception of cod as a free moving organism, composed of a single, very dispersed stock. The concept of *Stationary Separate* cod stocks is supported by an increasing amount of research. How many stocks exists, and the degree of interaction between these is, however, unresolved.

A cod sea-ranching operation, then, is depending on the opportunities spawned by the interaction of cod biology and the management regime of the cod fisheries. In the following section I present comments on these interactions.

The notion of the cod resources as a national property, and fisheries management as a national responsibility, leads to a management regime where no particular territorial claim has to be met. Combined with the concept of cod as belonging to one single unitary stock, this gives the state the opportunity to intervene in coastal territory. Expropriation is unnecessary; common property is considered the property of no one and thus the responsibility of the state (Norwegian Public Report No. 10, 1994). Models that encompass this perspective are based on the State's sovereign authority to reallocate use rights in coastal territory. If, on the other hand, the cod is considered as belonging to two or more separate stationary stocks, a national regime is less significant. A local stock may be in jeopardy even if the total stock estimates are high. Assuming that we still have state sovereignty, a regime that takes into account the potential and well being of the local stock is acquired. Mapping of stock recruitment, migration patterns, and feeding behavior is essential here. In the case of the existence of local stocks, it will nevertheless be easier and more preferable to designate authority to a local regime. A local superstructure which has designated authority over the local resource pool, and which permits a limited pool of users exclusive rights, will make sea-ranching operations more reliable. It will generate interest in support of the local stock, and increase the probability for implementation of ventures to cultivate and rebuild the local stock on its own conditions.

Challenges to the national regime along the lines of local/regional solutions without a follow-up of a concept of local resources are meaningless. The acceptance of distinct, stationary cod stocks is a necessary, but not sufficient, precondition for a local regime. The demand for a local regime, on the other hand, is impossible without a follow up of a concept of local stocks. The options of a national regime based on a unitary cod concept, or of a local regime based on the concept of coastal resources are thus the most stable combinations among these choices. Challenges along both axis, then, will be labile if not occurring simultaneously.

Cod as a Species

Release of cod juveniles rests on the idea that constraints to increased yield lie in limited recruitment rather than limited food resources. Considerable research effort has been directed towards the rearing of juvenile cod. As of today, it is possible to produce huge amounts of juveniles of the appropriate size for release. The production, however, requires considerable investments, biological knowledge, and technical skills, which again requires a professional organization.

An underlying assumption of the idea of artificial cod recruitment, is the concept of a separate Coastal (CO) cod stock. This concept introduces the option of cod as a stationary organism, available to cultivation, as opposed to the Northeast Arctic (NA) cod stock, which migrates along the coast following a seasonal cycle. If CO cod is a separate biological entity, and if this stock is stationary, there is a possibility of establishing institutional limitations to the stock.

The NA cod stock spawns along the coast of northern Norway, with the highest concentration of spawning fish in the Vestfjorden area in the northern part of Nordland county (Figure 3). The larvae are taken to the Barents Sea by the coastal current. As the cod matures, it migrates back to the northern Norwegian coast to spawn. CO cod differs from NA cod with respect to growth pattern, migration, spawning areas, and age and size at maturity (Løken *et al.*, 1994). The assertion of a CO cod stock genetically distinct from NA cod is gaining broad support (ICES, 1995). Rollefsen (1933) launched the hypothesis of a CO cod stock, separate from NA

cod based on differences in otolith structure. The present definition of CO cod used by ICES[4] assumes that all cod caught between 62°N and 67°N (extended north to 70°N last half of the year) is CO cod. This definition excludes CO cod north of 70°N, in spite recent research that indicates otherwise (ICES, 1994). The amount of interference of CO cod with the NA cod, increases with the distance off shore. The degree of motility of CO cod stocks is unclear and probably varies with topography, seasonal influx of food species (herring, capelin) and NA cod, ocean currents, and temperature. Influx of NA cod is seasonal, but the strength and location of the influx varies. Biological evidence which confirm the year-round presence of a CO cod stock, is consistent with the observation of the coastal residents. Lately, researchers have proposed the existence of distinct fjord cod-stocks as well (Eliassen *et al.*, 1993; Eliassen *et al.*, 1994). Further research may reveal the degree of stationarity. Experiments with released, hatchery-reared juveniles demonstrate that the introduced cod exhibit the same stationarity as the wild population (Blaxter, 1994). As a stationary stock, the CO cod is dependent on the local fjord ecosystem.

CO cod has only recently been surveyed as a solitary stock. Since the introduction of an international quota scheme in 1975, Norway and the Soviet Union were each allocated an annual 40 thousand ton coastal quota (ICES, 1994). The Norwegian CO cod quota, though, is not based on a coastal TAC[5], but on the average coastal catches south of Vestfjorden in the 1960's and early 1970's. In 1992 a team of biologists conducted a three year survey to investigate the fishery resources off northern Norway. The first survey south to southern Troms county covered the area to the 12 n. mile limit (Eliassen *et al.*, 1993). In the second survey to southern Nordland county, the outer border was the 900 meter isoline (Eliassen *et al.*, 1994). Otoliths were used to determine stock affinity. The CO cod survey conducted in the NA cod's spawning area (Vestfjorden) was conducted when this stock was assumed to be absent. The estimated total CO cod stock biomass due to the two first surveys were 178 thousand tonnes (Figure 4), which is in the range of 10% of the NA cod stock biomass.

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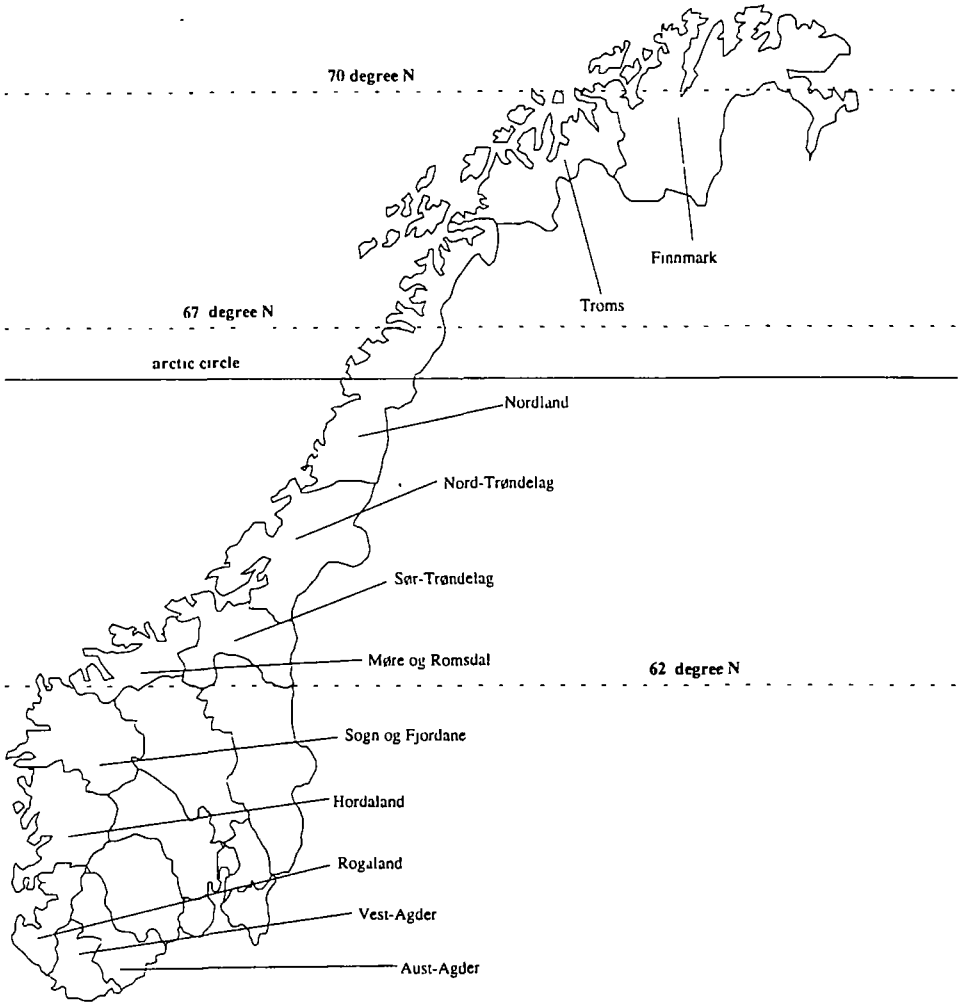
4 ICES International Council for the Exploration of the Sea

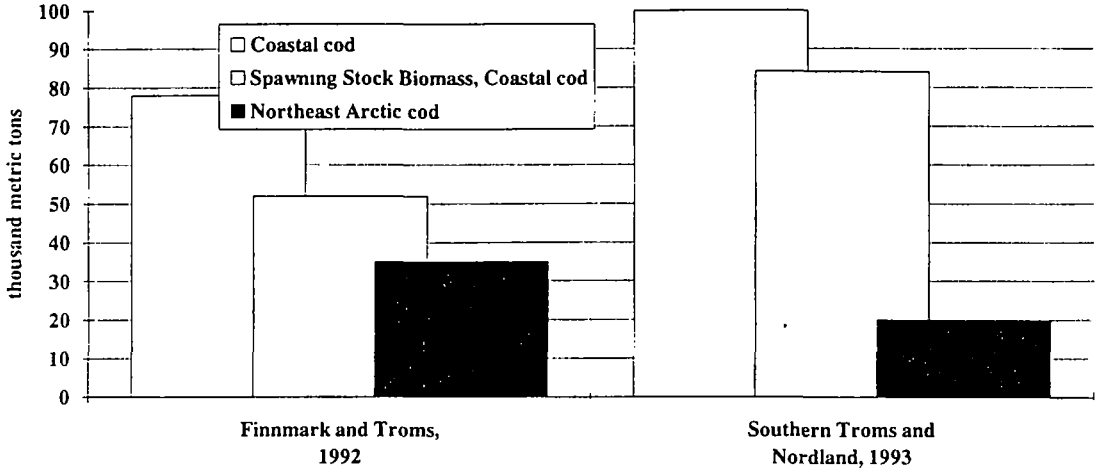
5 TAC: Total Allowable Catch.

FIGURE 3: Norwegian counties.



In summary, available scientific knowledge defines CO cod as a distinct resource. TAC and migration patterns require further research. A local stock is present year-round, and released cod will thus mingle with local fish. The degree of stationarity, though, is still difficult to predict, and in addition, there is a seasonal interference between CO and NA cod. Released cod seems to remain close to the release site. The main challenge in the management of the cod fisheries has been to encompass the migratory patterns and the production yield of the fish with the social dispersion and technological efficiency of the fishermen. Cod sea-ranching, then, presupposes changes in fishing practices. In the next section I discuss cod as a target for management decisions.

FIGURE 4: Coastal and Northeast Arctic cod in the coastal areas, due to the two first surveys.



SOURCE: Eliassen *et al.* (1993), Eliassen *et al.* (1994).

Cod as a Managed Species

The managerial dimension of the Norwegian cod fisheries is established as a monolithic, one state-owned species regime. Here the structure of this regime is presented. The status of the regime is an important part of the context for potential sea-ranching operations. The 200 n. mile EEZ[6] of 1977 defined vast fishery resources as common national property, and Norway received a shared responsibility for the NA cod with Russian (then Soviet Union) authorities. What used to be wild and available prey for the fishermen, became part of the national publicly managed capital. The EEZ nationalized a valuable resource and denounced foreign fishermen. Simultaneously, this created an openness where Norwegian fishermen were free to fish anywhere within this area, and no-one were assigned exclusive rights. The nationalization of the resource amplified government responsibility in Norwegian waters. The resource distribution was based mainly on functional criteria. The state became the main counterpart to the fishery interests, and unity among fishermen at large became important as a tool of power. The unity imperative oppressed conflicting perspectives among the fishermen. What used to be a struggle against foreign fishery interests, became a power balance between Norwegian fishermen and the Norwegian state.

6 EEZ Exclusive Economic Zone

Since 1972 the government has used quotas and licenses as entry limiting devices. The main objective of the government's fishery policy is to maintain rural settlements, conserve resources, secure safe employment, and increase the profitability of the fisheries (Parliamentary Report No. 93, 1982-83). The political context for limited entry actions is recognized by several sharply conflicting interests, centralization of decision making, and corporatist structures (Hoel *et al.*, 1995). Institutions help organize the field of management by supplying necessary resources, rules, and procedures.

The annual regulation process regarding cod is opened each year by recommendations on a TAC by ICES[7] (Parliamentary Report No. 58, 1991-92). A fixed TAC is decided by negotiations with involved nations, and the Director of Fisheries then proposes an allocation among the domestic fisheries. The Regulatory Council[8] decides upon the proposed allocation, and the Director of Fisheries informs the Ministry of Fisheries about the recommendations of the council. Finally, the regulations are decided by the Ministry of Fisheries. The core of the regulatory decisions is expressed by the following quote: "The policies implemented should then, be understood as a compromise between what can be defended biologically, legitimized politically and accepted on social and economic grounds." (Hoel *et al.*, 1995).

Below the centralized national level there is conflict between the results of the rational regulatory process based on scientific data, and rights to the cod resource among the coastal residents. The government's rational approach is vulnerable to hard bargaining in the encounter with interest groups, often with an unexpected outcome. The main critique to the present management regime is the privileged position of functional groups at the expense of territorial interests (Jentoft and Mikalsen, 1994). The state follows a principle of open access, which is not regarded as a neutral principle, as it benefits "intruders" with active gear, and is thus seen favoring mobile fishing fleets over local, more stationary, fishermen.

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7 The recommendations are made by ACFM (Advisory Committee on Fisheries Managmenet), which ia ICES' advisory committee

8 A corporatist board with representatives from the industry, the government and the research community. Even an environmental organization has observer status

Historically, local adaptations of fisheries and agriculture were attacked along the line of technological development. The proposal made to meet these attacks was the closing of the fjords to certain types of gear, dividing the fjords among different gear categories or allocating time slots to different user groups (Jentoft and Mikalsen, 1994). This controversy on local regulations led to the foundation of the county level Regulatory Committee[9]. Two premises for handling regulatory demands were outlined: the implementation of local regulations were subject to the general fisheries legislation, and open access was presupposed to be the general rule. In essence, the fjord resources were still to be considered national common property, and local regulations were only considered when particular reasons were documented. The representation in the Regulatory Committee so far is based on functional criteria, excluding residents for whom harvesting local resources has been part of an integrated livelihood. Nevertheless, there are initiatives to include groups based on territorial interests. The core of these initiatives is to get the residents to recognize a "first right" to the fjord resources. This is not only a case of introduction of further local knowledge to the Regulatory Committee, but also rooted in the belief in exclusive rights by the residents (Jentoft and Mikalsen, 1994).

Regarding cod sea-ranching, the discussion of formal management regimes has two lessons to teach. The current government approach to cod fisheries management is infused with the perspective of cod as a unitary species, combined with a principle of equity which does not allow discrimination on particular territorial claims. There is also a county level commission set up to handle "local" claims, but this commission is still part of the traditional monolithic regime and adapts to the present national policy. Fishermen are not pure adopters to public policy. Sea-ranching challenges the set-up of the fisheries, and predictions on the viability of sea-ranching operations depend on insight into local organization among fishermen.

Institutions organize fishermen's behavior on the local level. These institutions are constituted and maintained by repeated actions. In addition to the prevailing view of rational decisions as

[9] Full name the Advisory Committee on Local Regulations.

outcome of interest conflicts, there are additional systems that organize the access and use of fishery resources. This organization is the result of historical realities, territorial claims, economical necessity, and cultural adaptations.

Totally open access to a resource does not exists, or, to the extent that it does, it is metaphorically, to serve the interests of industrial capitalism, in order to denounce rights which constrain access to economically valuable resources (Usher , 1993). In the Norwegian coastal context, official open access gave the fishermen room to maintain a particular organization of the fishery (Maurstad, 1994). Due to overfishing and depletion of the cod stock, individual quotas and an upper limit group quota were introduced in 1990. The fishermen have certain perceptions of rights to sea territory, and these rights are maintained by the fishermen through the act of continuos fishing in the same territory. These rights are based on rules developed among individual fishermen acting and interacting, and thus constituted by social norms and institutionalized. Access to the fishing *grounds* is decided by particular institutions. The community of fishermen have developed a concept of local versus visiting fishermen. Investigation confirmed that there are other fishermen in the area than the locals; in other words, a proportion of the fishermen were outsiders (Maurstad, 1995). The fishermen are categorized as "known" and "unknown" "locals", and "known" and "unknown" "outsiders", depending on their engagement in the local fishery and community. The local fishing grounds, then, are distributed between "known" "locals" and "known" "outsiders". Violations to this distribution are met by social sanctions. In addition, the access to the actual fishing *site* is regulated by social control. The "site" is the actual location which is best suited to set passive gear. The behavior of gillnet fishermen to leave the buoys and sinkers[10] at the site is seen as an expression of territorial property rights. Legal or not, the value of individual property rights to sites are accepted and confirmed by fellow fishermen by the act of

[10] "Buoys" is probably a wrong expression The Norwegian "ile" means the line between the buoy and the anchor which the fisher connects the gill net to "Ila" keeps the gill net on the site, and it has the function as a marker of the beginning and the end of the net set. "Score" or "sinker" might be the appropriate English expression

borrowing the buoys from the buoy owners. The Fishermen's Association gives support to a tendency towards accepting particular exclusive rights in the coastal commons.

> "Rights approaching exclusive rights may also be protected against exclusion without compensation. This will be the case if residents or a smaller group of fishermen have fished at a certain limited territory. Besides that the group of fishermen must be limited, the use must have taken place with a certain dimension and with a certain strength and firmness. The fishery must also have had economic implications for the group" (Mårvik *et. al*, 1989) [my translation].[11]

In summary, the cod fisheries are tied up in formal and informal institutions. The state organizes distributional processes based mainly on functional criteria. In addition, the fishermen have developed systems for organizing the access to the "grounds" and "sites". The two preceding sections give background for a discussion of possible models.

Sea-ranching Models

"Access" and "funding" are two fundamental design criteria for sea-ranching operations. The propagation must be funded by revenue of the catch, which implies an organization of cost and benefit streams which again requires institutions usually not accounted for in the ordinary fisheries. Investments depend on whether participants are able to gain revenue from their participation. Similarly, the yield has to be distributed fairly among the participants. The spectrum of possible models is wide. The lesson from the combinations of the biological and the managerial dimensions, was that the "unitary stock-national regime" and "local stock-local regime" were the most stable. In a discussion of particular organizational models, another distinction has to be introduced; delegation of authority versus decentralization (Table 2).

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[11] In Norwegian: "Rettigheter som nærmer seg særretter kan også beskyttes mot utestengning uten erstatning I disse tilfellene vil det som regel være en lokalbefolkning eller mindre gruppe fiskere som har utøvet fiske på et avgrenset område Foruten at kretsen berettigede må være begrenset, må bruken ha foregått i et visst omfang og med en bestemt styrke og fasthet. Fisket må også ha hatt økonomiske betydning for gruppen "

TABLE 2: Possible organization models.

Decentralization \ Delegation	*no*	*yes*
no	MINISTRY OF FISHERIES REGULATORY COUNCIL	FISHERMAN'S ASSOCIATION
yes	REGIONAL FISHERIES ADMINISTRATION REGULATORY COMMITTEE	SALES ORGANIZATIONS NEW ORGANIZATIONS

SOURCE: Jentoft (1991).

State Hegemony

Last century G. M. Dannevig, G. O. Sars, and others were funded by the state to propagate the cod stocks (Gjøsæter, 1991). Here the state was the altruistic donor, concerned with enhancing the conditions for the coastal residents. The release program was terminated due to the lack of traceable results. The state may choose to cover its costs with an increased general taxation on the population, or an earmarked fee on all landings of cod.

That the management authority remains with the state does not imply, however, that the operations can not be under local control. The state may use its county level, Regulatory Committee's apparatus to organize regional release programs. A more probable option, however, is the allocation of licenses to private operators. The license specifications may impose limitations regarding time, species, territory, and technology on the operations. The entrepreneur has to be allocated rights for releases as well as to the capture of fish. As this system builds on the concept of a unitary cod stock, there is no reason to believe that the cod will remain close to the licensed area. The exclusive right to fish then will comply to all cod within the area (Norwegian Public Report No. 10, 1994). This exclusive right is a precondition for economic viability.

In this context, private use rights is a sub-variant of the state hegemony, because a precondition is that the state look upon itself as a legitimate manager of the resource, and

parcel out territories to private interests by licenses. It is controversial because it implies substantial reallocation of property rights and disturbance of established interactions among fishermen. Private companies are the core of the proposed model made by the state (Norwegian Public Report No. 10, 1994), and therefore deserves particular attention.

Delegation

The challenge is to bridge the discrepancy between the governments rational approach and the concept of rights to the cod resource among coastal residents, and co-management represents an institutional solution to the problem. Co-management implies a shift from a rational approach towards an approach combining the effort of fishery specialists with the fishermen and coastal residents (Jentoft and Mikalsen, 1994). Most importantly, the fishermen are given a real influence by the fact that their knowledge makes a difference in the decision making process. The benefit here is involvement of user groups, with a broader base of information and knowledge, more legitimate regulations, and increased approval of the decided management regime as outcome. User groups, whether based on functional or territorial criteria, are essential in the implementation of the co-management model.

Co-management implies delegation of management responsibility to another entity than the state level. Co-management is seen as an autonomous entity, which implies particular restrictions on participation. Co-management does not imply anything about territoriality. The Norwegian Fishery Management System may be seen as a co-management system with its involvement of interests, though some may reject that concept. A definition of co-management is a delegation of authority and responsibility to user groups (Jentoft and Kristoffersen, 1989). Despite these principle lines, co-management models encompass many different organizational models (Jentoft and Sandersen, 1993). One essential dimension is how both user groups and administration are the origin for the development of new, formal, institutions (Sagdahl, 1992; Ostrom, 1990; Berkes and Folke, 1994). In particular, the co-management model is suited to contribute to community-based development by protection of their resource base through enhancement (Pinkerton, 1989).

A true co-management enhancement operation is implemented in Alaska (Amend, 1989). Southern Southeast Aquaculture Association (SSRAA) is a non-profit organization of mainly commercial fishermen. The organization is delegated authority and responsibility for the management of salmon from the state of Alaska. The functional partition of the salmon-fishing fleet is based on drift gillnet, seine, and troll. The number of fishermen is limited by entry permits. The gear groups are roughly divided by seeking different fishing grounds and species. The SSRAA's operation is funded in two ways: by a cost recovery fishery on the surplus of the brood stock fishery, and by a mandatory tax put on the fishermen by themselves (2 or 3%). The board is composed of 21 members, 13 are fishermen[12]. These 13 appoint the remaining 8 members representing the public[13]. In spite of conflicts, the co-management model is an improving management system. The state respects the fishermen's increased knowledge, and the fishermen has a growing understanding of resource management problems.

Within the Norwegian cod fishery, there is a self regulation potential in the fjord system. Cod sea-ranching is probably more complex to organize than salmon. The enhanced stock is more difficult to recognize, the revenue harder to predict, and the juveniles more expensive to produce. My intention in presenting the Alaskan example is to illustrate how a delegation of authority and responsibility to the resource from the state, combined with inclusion of affected interests through organization, solves basic problems for sea-ranching operations. The power of regional co-management operations are their combination of formal authority and organizational inclusiveness.

Discussion

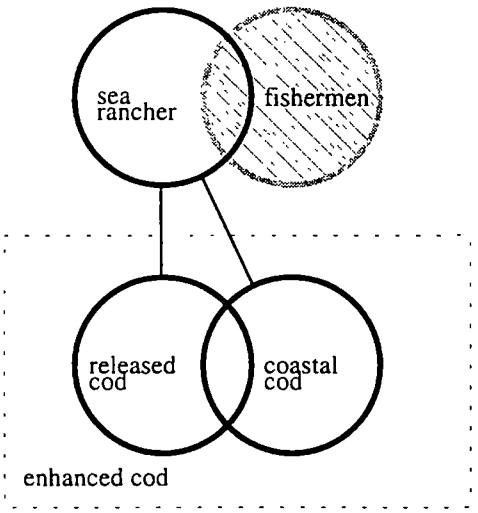
In order to be able to discuss the crucial questions of sea-ranching, there must be an agreement on *what* to accomplish. The general fishery policy is justified by maintaining rural settlements,

[12] 4 gillnetters, 4 seiners, 4 power trollers, and 1 hand troller

[13] One each of processors, sport fishermen, native corporations, Chamber of Commerce, municipalities, subsistence fishermen, two of the public at large

protecting resources, securing employment, and increasing profitability (Parliamentary Report No. 93, 1982-83). The ultimate design of the operation is highly dependent on species characteristics (Figure 5). Sea-ranching of cod implies extended control of the target species. A scheme in support of the coastal residents will thus not violate the main goals of the policy. Operations including cod obviously face different challenges than those including reindeer, salmon, or lobster.

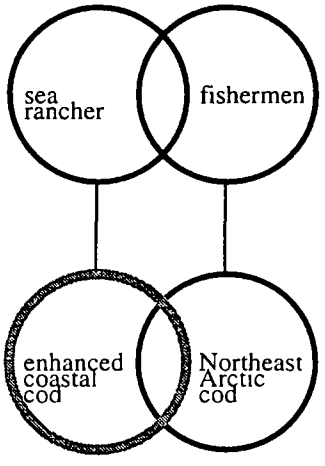
FIGURE 5: Co-management within authorized area.



Here I return to the initial questions, presented on page 3. *First*, will an institutional limitation be biologically effective? There are indications that the cod stock is made up of local units, and that released cod remain with the local fish. This implies that a particular institutional boundary might accurately reflect a biological unit, and thus it is biologically effective. Cod is present all along the coast, and a sea-ranching operation implies enhancement of a wild stock; the released fish will for all practical reasons mingle with the wild fish. There is an additional interference problem between the enhanced stock and the migratory NA cod. The NA cod fishermen may "intrude upon" the sea-ranching area in their pursuit of NA cod (Figure 6), and the released cod might "leak" into open waters under the influx of NA cod. Further investigation may reveal the rate of interference, and whether such "leakage" will disturb the commercial survival of a sea-ranching operation.

Second, will an institutional limitation be politically effective? This, for sure, is a controversial question, as the cod is a valuable, national, public resource. There are two contradictory perspectives here. The *banker* perspective argues for the state as a sole manager of this public capital. Decisions are increasingly based on scientific input and economic calculations. In compliance with this view it is argued that the corporatist influence ought to be reduced in the decision process. This reduction can take place by inclusion of broader representation in corporatist agencies which represents conflicting interests. For example fishermen and environmental organizations could both be represented in the Regulatory Council. Alternatively, straight forward exclusion of corporatist representation could be implemented, as the reduction of the authority of the Main Agreement, the sales organizations, and the export councils. The *rural* perspective argues for a decentralization of decision authority. The argument here is that regional problems and needs are best expressed by those who experience them. It is seen as a democratic reform to bring the regulatory institutions closer to the affected interest groups. Territorial diversity regarding biological, as well as cultural, industrial, and geographical aspects, speaks for decentralization.

FIGURE 6: Interference when influx of Northeast Arctic cod.



The issue at stake is how to solve the free rider problem if there are reasons to believe that the cod is biologically controllable. The reluctance to separate fishermen on territorial criteria, puts the concept of sea-ranching in jeopardy. The banker perspective argues for private or

state use rights, that is the state as the core authority and the state or a private actor as the operator. The proper state model would be a "free for all" fishery, with exclusive exploitation in enhanced areas as a possible outcome. Private operators might have particular rights and responsibilities tied to a specific concession. To the extent private operations break into established fishery organization, the legitimacy would be weak, and policing necessary. The rural perspective presupposes a delegation of authority to affected interests, where the regional level organization is in charge of both rights and responsibility to the resource.

Given an available fjord cod resource, and formal and informal institutions that permit necessary local regulation of the fishing grounds in the fjord system, there still has to be an organization that "makes the effort", collects the taxes, and, not least of all, obtains the fry. Even most of the advocates of the co-management model emphazise the combination of state and resident responsibility in the operation. Monitoring and control may be appropriate tasks for the state. But why would the state want to go into this kind of project at all? The "high seas" cod is the largest stock in the seasonal CO cod fishery, and thus important to the coastal fishermen.

Fisheries are not "arbitrary" activities, the right to fish must be established. The right is established by access to common knowledge. How to catch and where to go is information controlled and maintained by local fishermen. The right is also a function of repetition. If the outsider does not acquire the right to fish, the "known" fishermen use rejection mechanisms. In a prospective Norwegian cod sea-ranching operation, there is a problem of *social* interference. Even if it is possible to identify and enhance a local cod stock, social interference occurs when NA cod invades coastal waters and fishermen follow the NA cod into the enhanced area (Figure 6). The local perception of ownership and privileged access applies to fish stocks that reside in the fjord as well as to fish that migrate into the fjord (Jentoft and Mikalsen, 1994; Maurstad, 1995). This view is in opposition to the general view which is that the cod is not an exclusive asset of the local residents, but rather public property, and that the utilization of the resource is to the benefit of all. A local regime, then, has to be given

authority over the migratory stock to the extent it migrates within institutionally defined borders of the local organization's domain. Whether outsiders should be allowed to fish the migrating resource is a matter of negotiations and agreements. The main arguments for sea-ranching are the expectations of increased predictability, stability, and vitality of the local community due to self government and economic feedback.

First, coastal and high seas cod stocks fluctuate to varying parameters, which implies that there still may be a good CO cod fishery when the stock level of the high seas cod is low. *Second*, as a stationary stock, the CO cod may be a proper unit to manage for a limited set of fishermen, residents, and local authorities.

Sea-ranching may under particular circumstances be a useful component of regional fishery management. If the public management of the NA cod remains unpredictable, the process of acquiring a regional regime may achieve momentum.

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