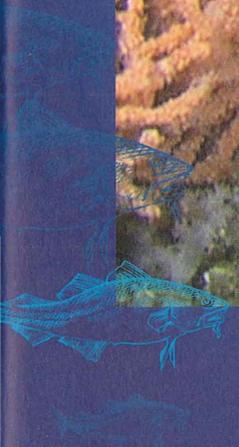


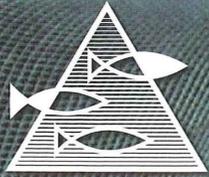
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2008



INSTITUTE OF MARINE RESEARCH  
HAVFORSKNINGSINSTITUTTET





## VISION

**Knowledge and advice for rich and clean seas and coastal areas.**

## AMBITION

**To be a leading international player in the field of marine research and management advice.**

## VALUES

**All of our work shall be based on integrity, creativity, cooperation and respect.**

Photo: Harald E. Tønnessen

FISHERIES  
B. OTTE

## ABOUT THE INSTITUTE OF MARINE RESEARCH

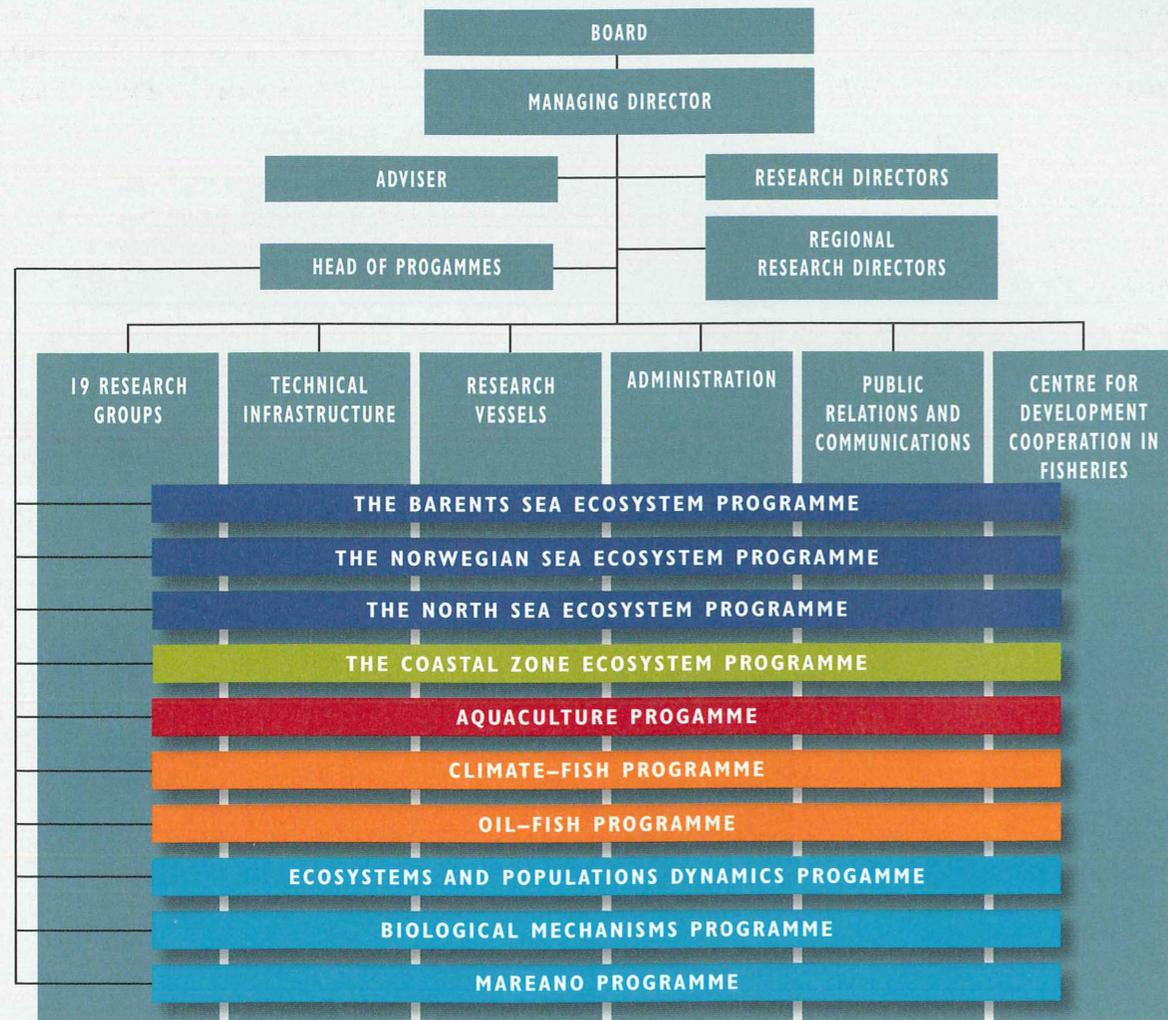
With more than 700 employees, the Institute of Marine Research (IMR) is the largest marine science community in Norway. Our main task is providing advice to the Norwegian authorities on aquaculture and on the ecosystems of the Barents Sea, Norwegian Sea, North Sea and the Norwegian coastal zone. Around half of our activities are therefore funded by the Ministry of Fisheries and Coastal Affairs.

The Institute of Marine Research has headquarters located in Bergen, but important aspects of our work are done at our department in Tromsø, at our research stations in Matre, Austevoll and Flødevigen and on board our research vessels, which spend a total of nearly 2000 days at sea each year.

The institute is also heavily engaged in international development work through the Centre for Development Cooperation in Fisheries.

The aim of our research and advice is to help ensure that Norway's marine resources are harvested in a sustainable way.

# ORGANISATION



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## MAN-LABOUR YEARS<sup>1</sup>

	Bergen	Tromsø	Flødevigen	Matre	Austevoll	CDCF	Research Vessels Dept.	Total
Scientists	122,0	18,6	12,0	5,9	12,0	7,3		177,8
Technicians	136,3	11,5	12,9	14,1	17,3	6,7	29,5	228,3
Administrative Personell	62,8	3,7	3,0	1,5	2,0		3,7	76,7
Crew							107	107,0
<b>Total</b>	<b>321,1</b>	<b>33,8</b>	<b>27,9</b>	<b>21,5</b>	<b>31,3</b>	<b>14,0</b>	<b>140,2</b>	<b>589,8</b>

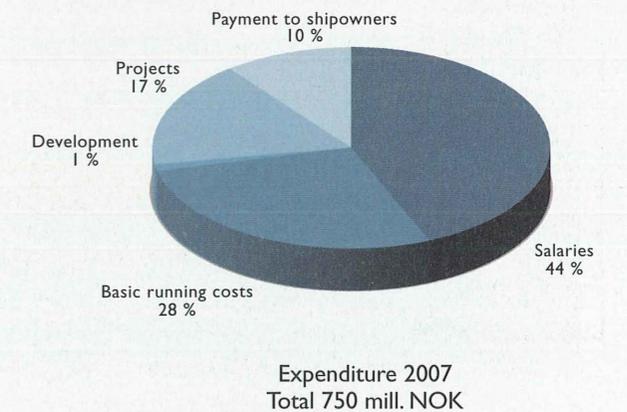
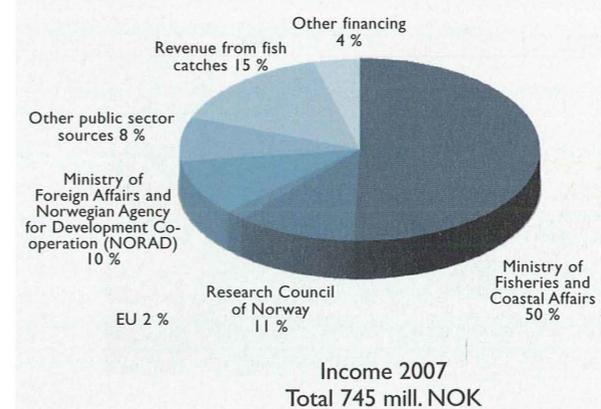
## Other positions

Research Students	26,9
Post-doctoral Scientists	18,8
Associate Chief Scientists	2,0
Cleaning Personell	5,5
Apprentices	4,4
<b>Total</b>	<b>57,6</b>

1) Man-labour years at 31.12.2007

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## ECONOMY



## RESEARCH

### » Advisory programmes

The advisory programmes deliver research-based management advice within aquaculture and marine resources and environment in Norwegian seas and coastal areas. For the different areas this implies:

#### THE BARENTS SEA

Head of Programme: **Ingolf Røttingen**

- Monitoring of fish stocks and management advice
- The Management Plan for the Barents Sea
- Cooperation with Russia
- Environmental monitoring, including environmental contaminants and radioactivity
- Contribution to the development of an ecosystem approach in management advice, including adjustments to advice in accordance with the new Marine Resources Act

#### THE NORWEGIAN SEA

Head of Programme: **Harald Loeng**

- Monitoring of and research on pelagic fish stocks, deep-sea resources, seals and whales
- Management advice based on studies of stock structure, recruitment, migration and species interaction
- Reduction of uncertainty in stock assessments by improving monitoring methodology
- Monitoring and improved understanding of the variations in environmental conditions and ocean climate
- Monitoring of phyto and zoo plankton and improved understanding of their role in the ecosystem

#### THE NORTH SEA

Head of Programme: **Else Torstensen**

- Monitoring of marine resources and management advice for important stocks
- Environmental monitoring, including environmental contaminants, radioactivity, plankton and nutrients
- Better knowledge of recruitment in North Sea fish stocks
- Contribution to the development of ecosystem-based management

#### THE COASTAL ZONE

Head of Programme: **Einar Dahl**

- Monitoring of marine resources and management advice for coastal stocks
- The marine environment on the coast and in the fjords
- Marine biodiversity and tolerance
- Marine protected areas as a management tool
- Introduced species

#### AQUACULTURE

Head of Programme: **Karin Boxaspen**

- Carrying capacity – ecological effects of aquaculture
- Escaped fish – effects and measures
- Fish welfare and fish welfare indicators
- Disease and disease dispersal
- Broodstocks and early life stages

#### SHALLOW AND DEEP SEAS

The Barents Sea and North Sea are what we call shelf seas, which means that they are relatively shallow. Parts of the Barents Sea are less than 50 metres deep. The Norwegian Sea is a basin, with trenches up to 3800 metres deep.

Photo: Merete Fonn

## » Research programmes

The research programmes, which were established in 2007, coordinate research in areas that we believe represent important challenges to society.

### ECOSYSTEMS AND POPULATION DYNAMICS

**Head of Programme: Geir Huse**

The Ecosystems and Population Dynamics programme is responsible for improving our understanding of variations in marine ecosystems, particularly in relation to fish stocks. Knowledge about the dynamics of ecosystems is a prerequisite for understanding, evaluating and explaining how changes in climate and fishing activities affect marine ecosystems. Being able to distinguish between natural variation and human impacts is particularly important. Assessments of, and advice on, marine stocks are currently almost entirely based on commercial catch data and the use of trawl and acoustic data from research missions. One of the programme's important tasks is to improve this methodology in order to meet the challenges inherent in ecosystem based resource management.

### CLIMATE-FISH

**Head of Programme: Svein Sundby**

This programme is responsible for the IMR's research into the impact of the marine climate on the reproduction, distribution and behaviour of marine organisms. This will provide a basis for predicting effects of climate variation on fish stocks and for developing scenarios for the impacts of human-induced climate change on marine ecosystems and farmed organisms. The programme is focusing on developing and using numerical models, studying the connection between global and regional climate variations and developing methods for producing regional climate forecasts. Much of the programme's activities involve close cooperation with the Bjerknes Centre for Climate Research.

### MAREANO

**Head of Programme: Lene Buhl-Mortensen**

This programme aims to help cover gaps in our knowledge about the distribution of vulnerable benthic organisms and habitats, and to offer advice on their sustainable management. The programme's main activity is the mapping project MAREANO, which over the period 2005–2010 is focusing on the northern regions. Through a cross-disciplinary collaboration with the Geological Survey of Norway and the Norwegian Hydrographic Service, a general study is being performed of the physical, biological and chemical environment of the seabed. The findings of the project are available in a map database for Norwegian seas and coastal areas at [www.mareano.no](http://www.mareano.no).

### BIOLOGICAL MECHANISMS IN MARINE ECOSYSTEMS AND AQUACULTURE

**Head of Programme: Ole J. Torrissen**

This programme aims to improve our understanding of biological processes, and to create a strategic knowledge platform for sustainable exploitation of marine resources and aquaculture. The interaction of environmental factors and physiological responses is an important aspect of this. The emphasis is on developing experimental models and new research methodologies. The programme does a lot of work on genomics and genetics, the metabolism of marine organisms, growth and production, developmental biology, behaviour and stress biology, immunology and contagious organisms. It also uses a combination of field data and experimental methodologies and models to investigate important biological mechanisms in marine ecosystems. We work closely with both Norwegian and foreign universities, and one of the programme's key tasks is training PhD students.

### OIL-FISH

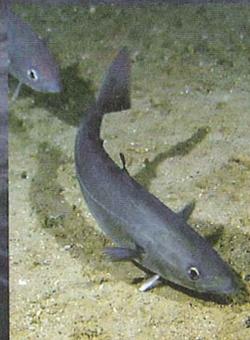
**Head of Programme: Erik Olsen**

The Oil and Fish programme is responsible for research and advice on pollution and the impact on marine life of petroleum components and human generated noise. Its main role is to provide advice on the consequences of pollution and the activities of the petroleum industry in Norwegian waters. One of the programme's tasks is to monitor the presence of radioactive substances, environmental contaminants and heavy metals in water, fish and sediment. It also carries out studies on the effects of oil on herring and cod and of seismic and low frequency sound on fish and sea mammals. The programme plays an important advisory role during the consultation phase of petroleum projects, the granting of emission licenses and applications for seismic surveys. There has been a particularly strong increase in enquiries about seismic surveys over the past year – in 2007 the IMR was consulted about 60 applications for seismic surveys on the Norwegian continental shelf.

#### HIBERNATOR

The sand eel lives on sandy seabeds. At night and on dark days it burrows down into the sand using its sharp nose, and throughout the winter it hibernates on the seabed.

## » Research groups



### DEMERSAL FISH

Head of Research Group: Harald Gjørseter

Research into and monitoring of the most important benthic species such as cod, haddock and saithe. The main aim of the group is to gain knowledge that can be used for stock assessments and management advice.



### BENTHIC HABITATS AND SHELLFISH

Head of Research Group: Ole Jørgen Lønne

Research into benthic habitats and biotopes in coastal areas and at sea, and their importance to the environment and biodiversity. Benthic organisms and the harvesting of shrimp, king crab and other crustaceans. Sea ranching of shellfish, crustaceans and various types of scallop.



### ANIMAL WELFARE

Head of Research Group: Tore Kristiansen

The welfare of aquatic organisms. Stress, stress factors and coping, and monitoring fish welfare in the fishing and aquaculture industries.



### DEEP-WATER SPECIES

Head of Research Group: Ole Thomas Albert

Monitoring, surveying and harvesting of deep-water species such as deep-water sharks, Greenland halibut, tusk, ling, blue ling, redfish, greater Argentine and roundnose grenadier.



### FISH CAPTURE

Head of Research Group: Arill Engås

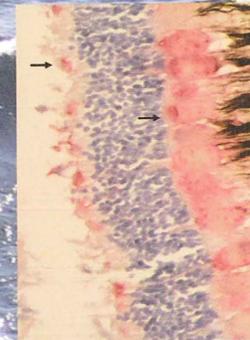
Developing and adapting energy efficient, environmentally friendly and resource efficient fishing techniques based on an understanding of fish behaviour and equipment technology. Developing better ways of sampling marine organisms.



### FISHERIES DYNAMICS

Head of Research Group: Kjell Nedreaas

Capture rates, effort and fleet development in commercial and tourist fisheries. Cooperation with the reference fleet and monitoring services, including the Norwegian Coast Guard. Collecting fishery dependent data and estimating uncertainties (e.g. reporting inaccuracies, discards and illegal sales).



### HEALTH

Head of Research Group: Øivind Bergh

Disease interaction between farmed and wild populations. Bacterial and viral diseases and parasites in fish and shellfish, with a particular focus on the dispersal ecology and biology of salmon lice and other parasites. Preventive measures to avoid disease, deformities and side-effects of medication.



### MARINE ENVIRONMENT QUALITY

Head of Research Group: Jarle Klungsøyr

Foreign substances in sea water, sediment and fauna. Short and long term impacts on marine organisms of organic contaminants, emissions from the petroleum industry and radioactive and chemical contamination.



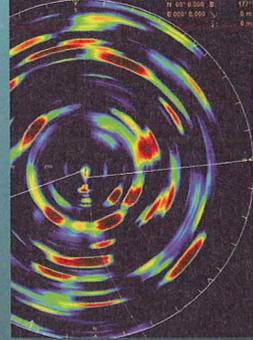
### NORWEGIAN MARINE DATA CENTRE

Head of Research Group: Helge Sagen

National data centre responsible for the processing and long-term storage of data on the marine environment and fisheries, as well as generating various data products.

### COLD BLOODED

The Arctic cod can survive in temperatures down to -1.5 degrees centigrade, as it has a molecule to prevent the formation of ice crystals in its bodily fluids.



### OBSERVATION METHODOLOGY

Head of Research Group: Olav Rune Gods

Methods and models for collecting data on marine ecosystems and resources using acoustics, optics and fishing gear.



### PELAGIC FISH

Head of Research Group: Aril Slotte

Research into, and monitoring of, pelagic species such as herring, mackerel, horse mackerel, blue whiting, capelin, sprat, tuna and marine salmon. The main goal is to gain knowledge that will improve stock assessments and management advice.



### PLANKTON

Head of Research Group: Webjørn Melle

Research into, and monitoring of, phytoplankton, zooplankton and fish eggs and larvae. Reproduction conditions, biodiversity, harmful algae and introduced micro-organisms.



### REPRODUCTION AND GROWTH

Head of Research Group: Geir Lasse Taranger

Research into sexual maturation, egg production and growth processes in farmed and wild populations, with a focus on fish welfare, aquaculture conditions, broodstocking, recruitment processes and estimates of breeding populations.



### EARLY LIFE STAGES

Head of Research Group: Anders Mangor-Jensen

Environmental effects on early stages of fish and shellfish, including environmental contaminants. Intensive culture of early stages. Research into and production of sterile individual fish for use in aquaculture, biomass estimates of 0-group wild populations.



### MARINE MAMMALS

Head of Research Group: Tore Haug

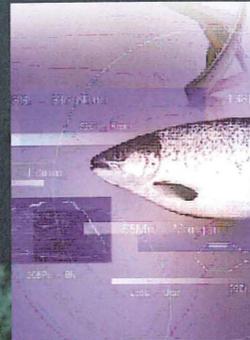
Research into, and monitoring of, harp seals, hooded seals, harbour seals, grey seals, minke whales and other marine mammals (by-catch). Population analyses, nutrition ecology and exploitation and conservation strategies.



### DISTRIBUTION AND TROPHIC INTERACTIONS

Head of Research Group: Kathrine Michalsen

Distribution and migration describing the spatial and temporal overlap between species, with a particular focus on predator-prey relationships. Research into non-commercial species and indicators for ecosystem-based management.



### POPULATION GENETICS AND ECOLOGY

Head of Research Group: Terje Svåsand

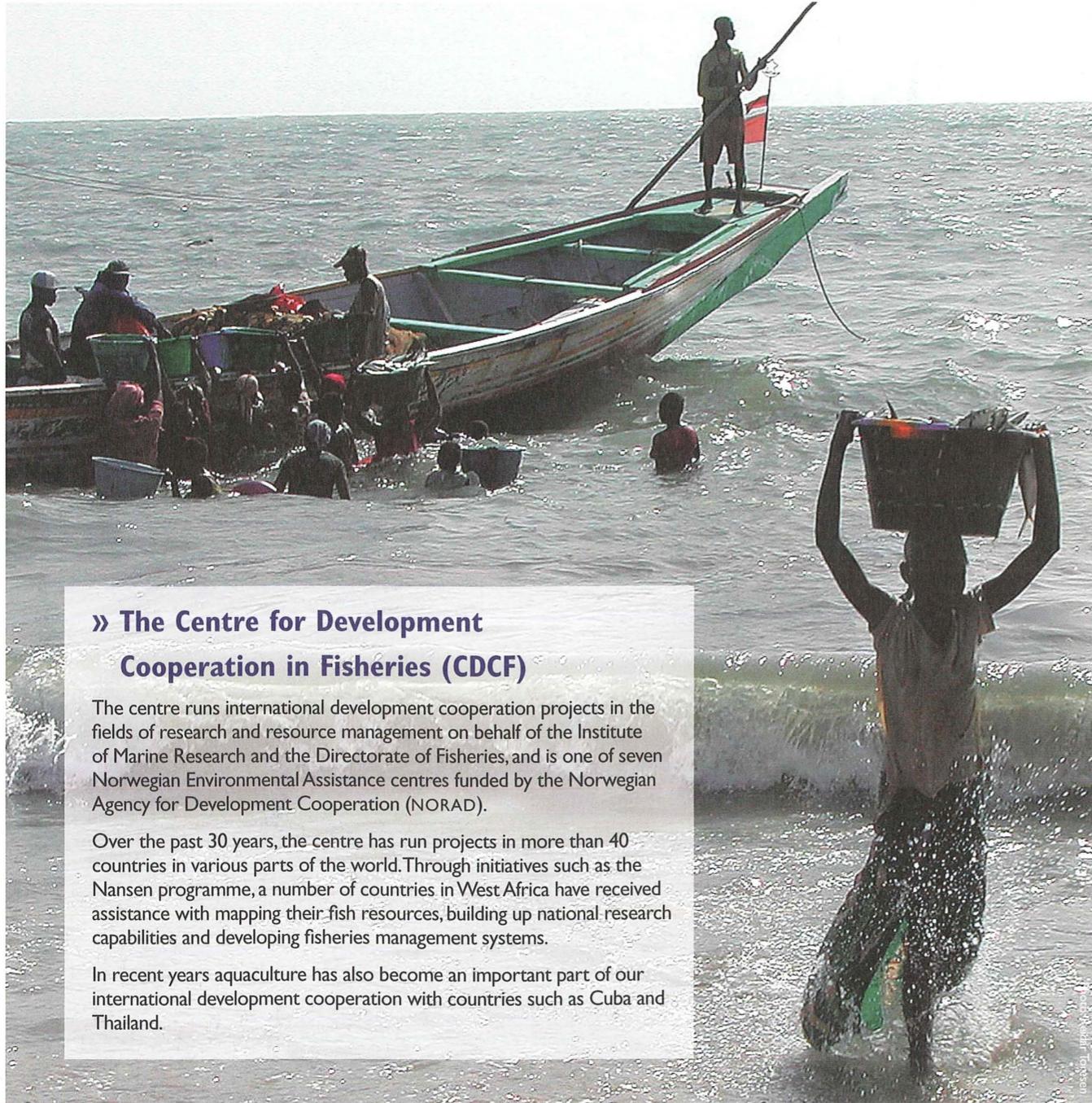
Structure and function of DNA in marine species. Use of genetic methods for studying ecological processes. Genetic characterisation of wild stocks and farmed species, including methods for tracing escaped fish. Behaviour, distribution and survival of escaped farmed organisms. Evolutionary effects of fishing.

### TRANSEXUAL

Shrimps are born male, and change sex when they reach a certain age. In the Barents Sea this happens when they reach the age of five.

### OLD FISH

Most capelin die after spawning, and it is rare for them to survive past the age of five. The redfish doesn't reach sexual maturity until it is 12-15 years old, and can live to over 60!



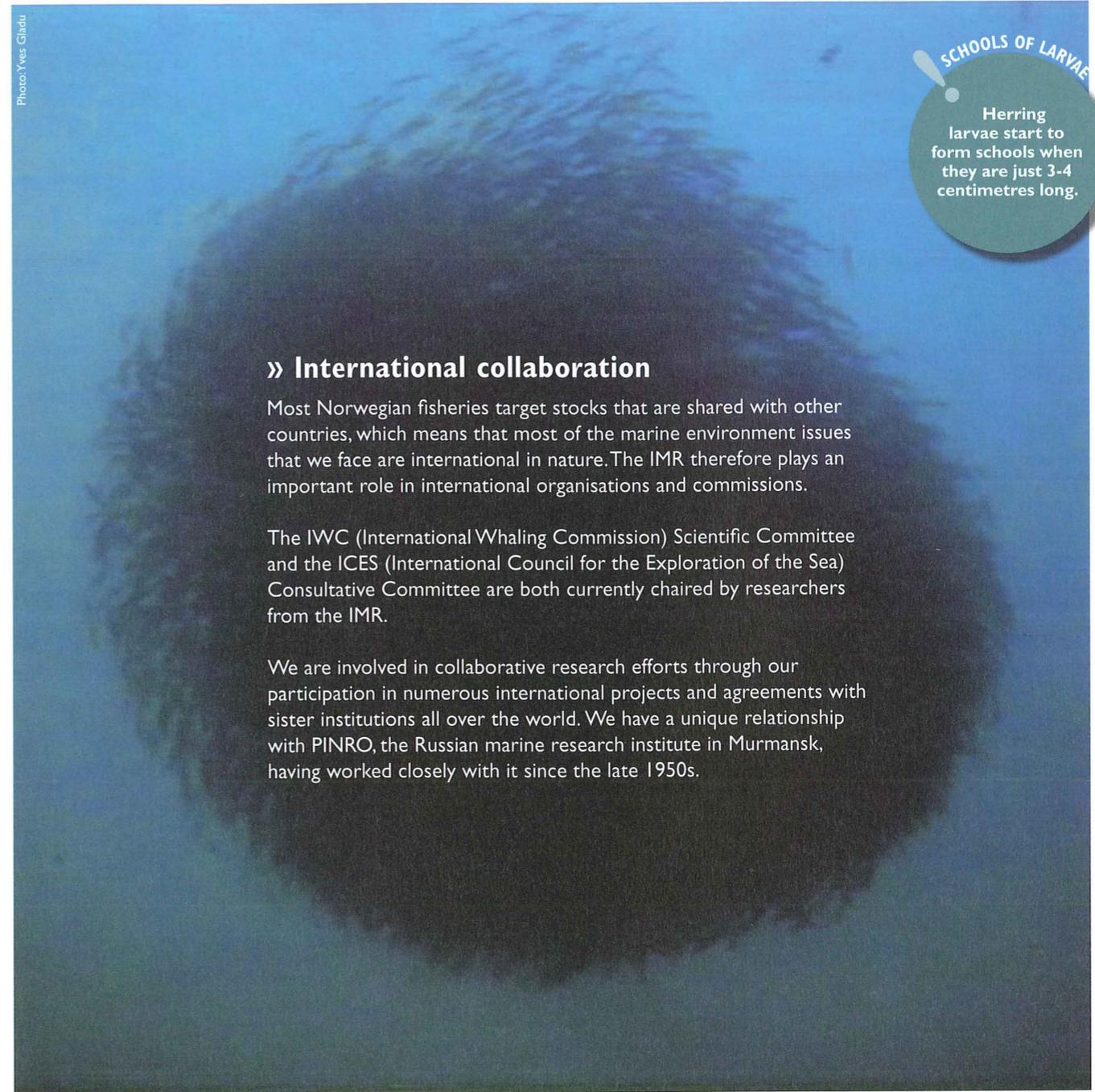
### » The Centre for Development Cooperation in Fisheries (CDCF)

The centre runs international development cooperation projects in the fields of research and resource management on behalf of the Institute of Marine Research and the Directorate of Fisheries, and is one of seven Norwegian Environmental Assistance centres funded by the Norwegian Agency for Development Cooperation (NORAD).

Over the past 30 years, the centre has run projects in more than 40 countries in various parts of the world. Through initiatives such as the Nansen programme, a number of countries in West Africa have received assistance with mapping their fish resources, building up national research capabilities and developing fisheries management systems.

In recent years aquaculture has also become an important part of our international development cooperation with countries such as Cuba and Thailand.

Photo: Yves Glindu



### SCHOOLS OF LARVAE

Herring larvae start to form schools when they are just 3-4 centimetres long.

### » International collaboration

Most Norwegian fisheries target stocks that are shared with other countries, which means that most of the marine environment issues that we face are international in nature. The IMR therefore plays an important role in international organisations and commissions.

The IWC (International Whaling Commission) Scientific Committee and the ICES (International Council for the Exploration of the Sea) Consultative Committee are both currently chaired by researchers from the IMR.

We are involved in collaborative research efforts through our participation in numerous international projects and agreements with sister institutions all over the world. We have a unique relationship with PINRO, the Russian marine research institute in Murmansk, having worked closely with it since the late 1950s.

## FACILITIES

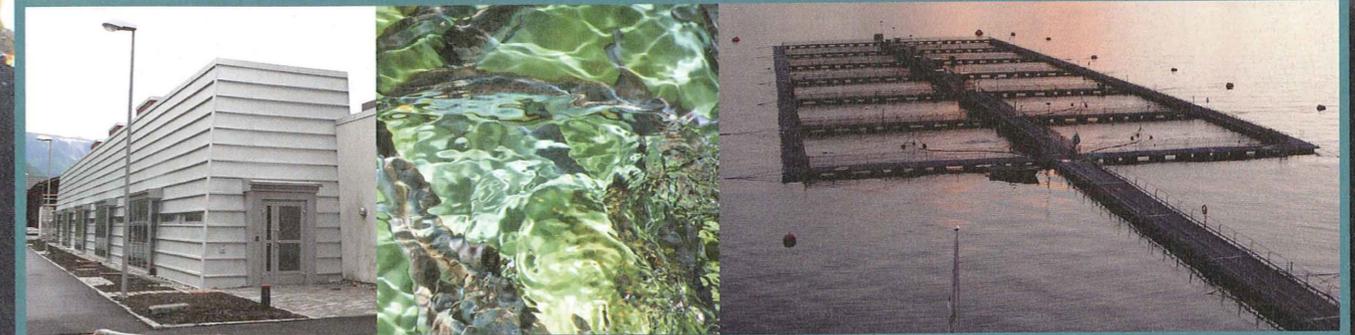
### » The research stations



The Austevoll Research Station was established in 1978, and has been a world-leading centre for research into halibut and cod farming.



The Flødevigen Research Station was established in 1882, making it one of the oldest in Europe. Our coastal zone research is led from this station.



At the **Matre Research Station** we have been performing research into salmon farming since 1971, ten years before salmon farming took off in Norway. Several of the methods developed here are now in use throughout the world.

Behavioural studies of fish have become an increasingly important aspect of the station's work. Researchers are investigating what factors affect the welfare of fish, make them stressed and reduce their appetite. New, cutting edge facilities make it possible to control a range of variables such as the exact temperature, salinity and oxygen content of the water, and to record the reaction of fish to changes in the environment.

These experiments can also be used to study the growth, sexual maturation and spawning of various species under a range of conditions, in order to improve our understanding of these mechanisms both in farmed and wild fish.



### FERTILE FISH

Young cod spawn fewer eggs than old ones. First-time spawners produce around 400 000 eggs, whereas the oldest females spawn up to 15 million eggs.



**G.O. SARS**  
 BUILT: 2003  
 4067 GRT  
 LOA: 77,5



**JOHAN HJORT**  
 BUILT: 1990  
 1828 GRT  
 LOA: 64,4



**G.M. DANNEVIG**  
 BUILT: 1979  
 171 GRT  
 LOA: 27,9



**HÅKON MOSBY**  
 BUILT: 1980  
 701 GRT  
 LOA: 47,2



**DR. FRIDTJOF NANSEN**  
 BUILT: 1993  
 1444 GRT  
 LOA: 56,8  
 OWNER: NORAD

» Research Vessels

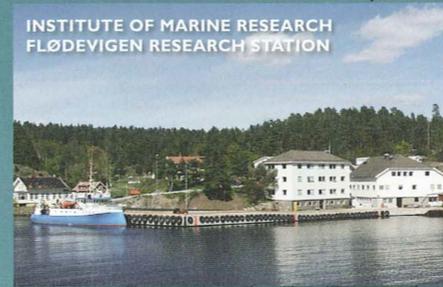
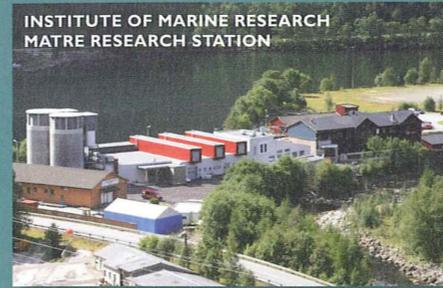
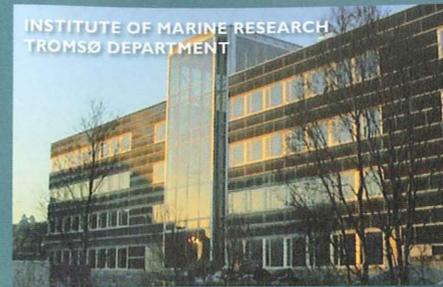
The Institute of Marine Research operates five large research vessels. These vessels are our most important tool for collecting data about marine resources and ecosystems.

CRUISE ACTIVITY

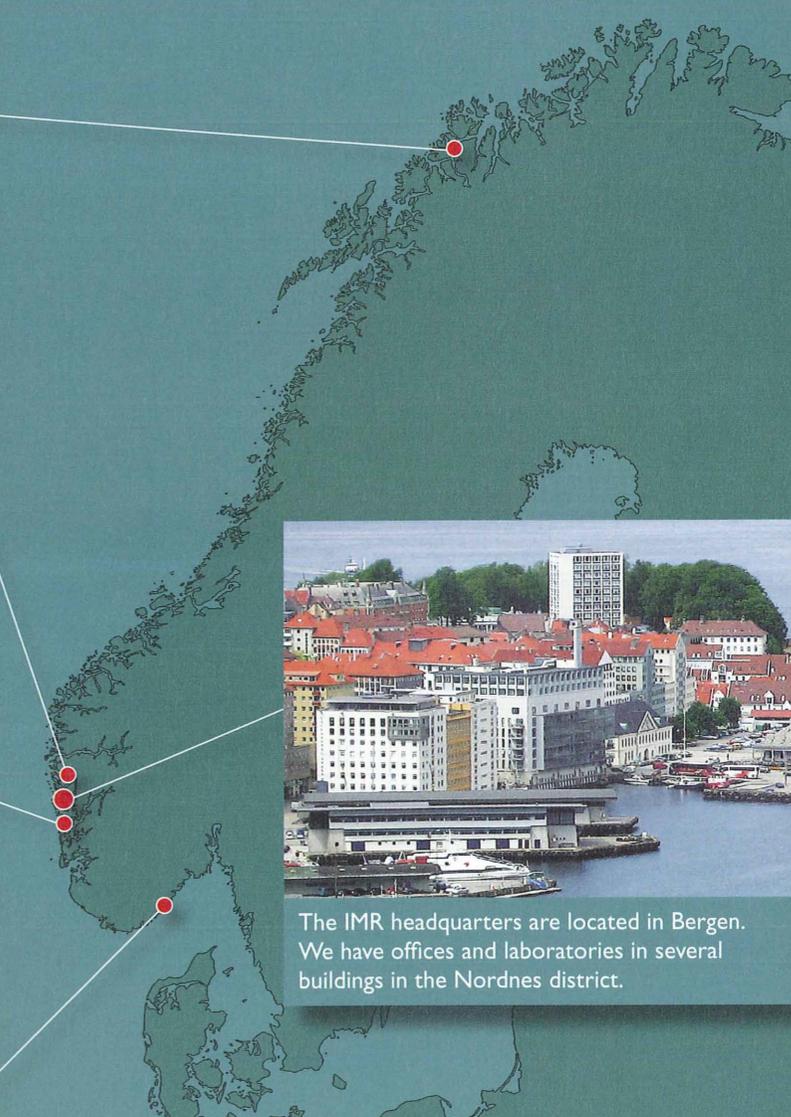
Vessel	Days at Sea
G.O. Sars	301
Johan Hjort	309
Håkon Mosby	304
G.M. Dannevig	195
Dr. Fridtjof Nansen	311
Fangst	188
Jan Mayen	71
Hans Brattström	231
Chartered vessels	999
<b>Total</b>	<b>2 909</b>

Photo: Harald E. Tørrisen

» Location



The IMR headquarters are located in Bergen. We have offices and laboratories in several buildings in the Nordnes district.



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Fiskeridirektoratet Biblioteket



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