

**JOINT RUSSIAN – NORWEGIAN SCIENTIFIC RESEARCH PROGRAM ON LIVING
MARINE RESOURCES IN 2014**

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1. Planning and coordination of investigations and submitting of results.

This program contains the investigations to be carried out in 2014 by Norway and Russia within the frames of the bilateral cooperation between the Norwegian and Russian Parties. The program is in accordance with the national research programs.

Planning coordination and exchange of specialists will be settled between the institutes involved.

PINRO, VNIRO and IMR will exchange results and data from joint investigations.

Scientists and specialists from PINRO, VNIRO and IMR will meet in Tromsø, Norway 10-14 March 2014 to discuss joint research programs, results from surveys and investigations in 2013/2014 and to coordinate survey plans for the rest of 2014. Missing names of vessels and time periods for surveys in this report will be agreed by correspondence, latest by the March meeting. Future plans for surveys and methodology for preparing biological and acoustic data will be discussed and coordinated. Urgent information according to surveys carried out before the meeting in March will be exchanged by correspondence.

By October 2013, 3 reports have been issued in the Joint IMR-PINRO report series during 2013. In 2012, 2 reports in this series were published.

The work of IMR and PINRO on the joint Program for estimation of optimal long-term harvest in the Barents Sea Ecosystem adopted at the 33rd session of the Commission is still ongoing.

In the future work it is very important to take into account experiences from recent developments in the ecosystem such as:

- Water temperatures above average and reduced ice cover recorded last years,
- Extreme northern/eastern geographical distributions of several important stocks,
- A record high cod spawning stock.

A preliminary program for the planned surveys and cooperation for 2014 is presented below.

2. Investigations on fish and shrimp stocks, including stock size, structure and distribution.

IMR and PINRO will continue the co-operation on the monitoring of the most important commercial fish and shrimp stocks according to the Program listed below. The work will also include continued co-operative research on by-catch of juvenile fish in the shrimp fishery. The parties will exchange primary information during joint investigations according to agreed formats.

Norwegian investigations

Nation:	Norway	Survey title:	Cod spawning stock
Reference No.:	N-2-01		
Organization:	IMR		
Time period:	March-April	Vessel:	R.V. "Johan Hjort"
Target species:	Cod	Secondary species:	Haddock, saithe
Area:	Spawning areas Troms – Lofoten		
Purpose:	Acoustic survey of the North East Arctic Cod spawning stock. Investigations on maturity, fecundity and egg abundance.		
Reported to:	IMR survey report, ICES AFWG 2014		

Nation:	Norway	Survey title:	Fjord and coastal ecosystem survey
Reference No.:	N-2-02		
Organization:	IMR		
Time period:	October-November	Vessel:	R.V. "Johan Hjort"
	October-November		R.V. "Helmer Hanssen"
Target species:	Saithe, coastal cod, 0-group herring	Secondary species:	Haddock, <i>Sebastes marinus</i>
Area:	Norwegian fjords and coastal areas		
Purpose:	Acoustic and trawl abundance estimation of saithe, coastal cod and other groundfish species. Acoustic abundance estimation of 0-group herring. Environmental investigations.		
Reported to:	IMR survey report, ICES WGWIDE 2015, ICES AFWG 2015		

Russian investigations

Nation:	Russia	Survey title:	Marine resource investigations of demersal fish for the collection of information characterizing fishery and its effects on marine species in order to develop measures aimed at conservation and comprehensive utilization of marine biological resources. Evaluation of resources for long-line fishery.
Reference No.:	R-2-01		
Organization:	PINRO		
Time period:	January-December	Vessel:	R.V. "Vilnius", 1 hired trawlers and 1 hired long liners
Target species:	Cod, haddock, saithe, Greenland halibut	Secondary species:	Catfishes, long rough dab, redfishes and other species
Area:	The Barents Sea and adjacent waters, Spitsbergen area, Exclusive Economic Zone of Norway, international waters, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation		
Purpose:	Collection of biological materials for stock assessment by mathematical methods, collection of fisheries and biological data, estimation of discards and unreported catch, collection of CPUE data and materials on feeding, estimation of bycatches of undersized fish, development of recommendations on the protection of juveniles, collection of oceanographic data, studies of "environment-organism" relations, marine pollution control, studies of spatial and temporal distribution of fish aggregations, studies of time, duration and distances of migrations. Tagging, collection of oceanographic data, estimation of anthropogenic impact on marine species and their environment.		
Reported to:	PINRO survey report, ICES AFWG in 2014 and 2015		

Nation:	Russia	Survey title:	Multispecies trawl-acoustic survey for estimation of juveniles and stock assessment of demersal fish in the Barents Sea and adjacent waters
Reference No.:	R-2-02		
Organization:	PINRO		
Time period:	October-December	Vessel:	R.V. "Fridtjof Nansen" R. V. "Vilnjus"
Target species:	Cod, haddock, saithe, redfishes, Greenland halibut	Secondary species:	Northern wolffish, spotted catfish, , plaice, long rough dab and others
Area:	The Barents Sea and adjacent waters, Spitsbergen area, Exclusive Economic Zone of Norway, international waters, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation.		
Purpose:	Evaluation of strength of yearclasses of cod and haddock at the stage of bottom juveniles, redfishes and other demersal fish; assessment of total and fishable stocks of Greenland halibut, cod, haddock, redfishes, catfishes, long rough dab and other fish species; estimation of zooplankton biomass; parasitologic and faunistic studies, study of "predator-prey" relations; oceanography; euphausiids.		

Reported to: PINRO survey report, ICES AFWG in 2015

Nation:	Russia	Survey title:	Trawl-Acoustic survey for spawning stock of capelin
Reference No.:	R-2-03		
Organization:	PINRO		
Time period:	January - April	Vessel:	R.V. "Fridtjof Nansen" or R. V. "Vilnjus"
Target species:	Capelin	Secondary species:	Herring, polar cod
Area:	The Barents Sea and adjacent waters, Spitsbergen area, Exclusive Economic Zone of Norway, international waters, Russian Exclusive Economic Zone, internal sea waters and territorial sea of the Russian Federation.		
Purpose:	Spawning biomass and abundance estimating, oceanography		
Reported to:	PINRO survey report, JRNFC, ICES AFWG in 2013		

Joint investigations

Nation:	Norway/Russia	Survey title:	Joint Russian-Norwegian multispecies trawl-acoustic survey for demersal fish stock assessment (Winter Survey)
Reference No.:	J-2-01		
Organization:	IMR, PINRO		
Time period:	January-March	Vessel:	R.V. "Helmer Hanssen" R.V. "Johan Hjort" R.V. "Fridtjof Nansen" or R.V. "Vilnjus"
Target species:	Cod, haddock, Greenland halibut, catfishes, saithe, redfishes	Secondary species:	Other demersal and pelagic species
Area:	The Barents Sea and adjacent waters, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation, Exclusive Economic Zone of Norway, Spitsbergen area		
Purpose:	Assessment of the yearclasses, abundance and biomass cod and haddock, other demersal species, collection of biological samples, oceanography.		
Reported to:	Joint IMR/PINRO Report Series, ICES AFWG in 2014		

Nation:	Norway/Russia	Survey title:	International trawl-acoustic survey for blue whiting in the spawning areas west of the British Isles
Reference No.:	J-2-02		
Organization:	IMR, PINRO		
Time period:	March-May	Vessel:	Hired vessels, R.V. "Fridtjof Nansen" or R.V. "Vilnjus"
Target species:	Blue whiting	Secondary species:	herring, mackerel
Area:	North-East Atlantic, Norwegian Sea, international waters, Exclusive Economic Zone of Norway, Faroese, UK and Ireland fishery zones, Rockall area		
Purpose:	Estimation of yearclasses, abundance, biomass and distribution of blue whiting, oceanography, plankton survey, oceanography.		
Reported to:	Joint IMR/PINRO survey report, ICES WGWISE, ICES WGIPS in 2014		

Nation:	Russia/Norway	Survey title:	International ecosystem survey in the Nordic Seas
Reference No.:	J-2-03		
Organization:	PINRO, IMR		
Time period:	May – June	Vessel:	R. V. "Fridtjof Nansen" or R.V."Vilnjus",

Target species:	May	R.V. "G.O.Sars", 3 other RVs
Area:	Herring, blue whiting	Secondary species: Other pelagic species
Purpose:	The Norwegian Sea, fishing zone of the Faeroe Islands, international waters, Exclusive Economic Zone of Norway, UK fishery zone, The Barents Sea and adjacent waters, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation	
Reported to:	Estimation of yearclass strength, abundance and biomass of herring and blue whiting, studies of their distribution and behaviour. Acoustic survey of the stocks, oceanography, plankton.	
	PINRO, IMR survey reports, International report, ICES WGWIDE, ICES WGIPS in 2014	

Nation:	Norway/Russia	Survey title:	Multispecies trawl-acoustic survey for pelagic species in the Nordic Seas (Ecosystem survey)
Reference No.:	J-2-04		
Organization:	IMR, PINRO		
Time period:	July - August	Vessel:	2 vessels chartered by IMR, R. V. "Fridtjof Nansen" or 1 hired trawler by PINRO, 2 other RVs
Target species:	Mackerel, Herring, blue whiting,	Secondary species:	Other pelagic fishes, marine mammals, seabirds, chlorophyll, zooplankton, oceanographic parameters
Area:	North-East Atlantic, Faroese fishery zone, international waters of the Norwegian Sea, Spitsbergen area, Exclusive Economic Zone of Norway.		
Purpose:	Herring. Blue whiting and mackerel abundance and biomass assessment, studies of their distribution and behaviour, oceanography and plankton surveys.		
Reported to:	Joint IMR/PINRO survey report, ICES, NEAFC		

Nation:	Norway/Russia	Survey title:	Joint Russian-Norwegian ecosystem survey.
Reference No.:	J-2-05		
Organization:	IMR, PINRO		
Time period:	August-September	Vessel:	R.V. "G.O Sars", R.V. "Johan Hjort", R.V. "Helmer Hanssen", R.V. "Fridtjof Nansen" or R.V. "Vilnjus", Research aircraft
Target species:	Cod, haddock, saithe, catfishes, redfishes, Greenland halibut, plaice, herring, capelin, polar cod, shrimp	Secondary species:	Other pelagic and demersal species, benthic organisms, sea mammals and birds, oceanographic and hydrobiological parameters
Area:	The Barents and adjacent waters, Spitsbergen area, Exclusive Economic Zone of Norway, international waters, Exclusive Economic Zone of the Russian Federation, and territorial waters of the Russian Federation. The Kara Sea.		
Purpose:	Investigations of distribution and abundance of 0-group of different species, estimation of abundance and biomass of pelagic species, demersal species, shrimp, Greenland halibut juveniles. Oceanography, plankton, marine mammals, seabirds, species interactions, sampling for determining pollution levels.		
Reported to:	Joint IMR/PINRO Report Series, ICES in 2014, ACOM in autumn 2014, WGHARP, NAMMCO		

3. Research program on deep sea fishes

To assess the stock of *Sebastes mentella* in the open Norwegian Sea, an internationally coordinated redfish survey has been established (ICES-WGRS). This survey is a collaborative effort between Norway, Russia and the Faroes, coordinated by ICES. It is also supported by the Data Collection Framework of the EU. This survey was run as a coordinated effort by Norway, Russia and the Faroes in 2009. It was not conducted in 2010-2012, but was run by Norway in September 2013. For the future, this survey should be carried out every three years. Results contribute directly to the ICES assessment groups WGDEEP and AFWG.

A multi annual survey plan for monitoring of deep sea species is in action for Norwegian surveys. In 2013 the northern deepwater slope is the area was surveyed and both Greenland halibut and redfish were target species. In 2014 the southern deepwater slope is the area to be surveyed and Greater Argentine, the two redfish species and to some extent Greenland halibut are all target species. According to this the following surveys are applied for in 2014:

Norwegian survey

Nation:	Norway	Survey title:	Southern Deepwater Slope Survey (Egga-Sør)
Reference No.:	N-3-01		
Organization:		IMR	
Time period:	March-April	Vessel:	R.V. "G.O.Sars"
Target species:	Greater Argentine, Redfish, Greenland halibut	Secondary species:	Other Deep water species and elasmobranches
Area:		Ecosystem along the Norwegian slope from 62 to 73 degrees north.	
Purpose:	Primary objective: to assess the state of commercial deepwater fish stocks. Secondary objective: to monitor the state of deepwater ecosystem along the Norwegian slope. Part of IMR's multiannual survey strategy for Deep water species species.		
Reported to:	IMR survey report, ICES: AFWG 2014/2015, WGEF 2014/2015, WGDEEP 2014/2015.		

4. Red king crab (*Paralithodes camtschaticus*) and Snow crab (*Chionoecetes opilio*)

Both Parties exchanged information about the ongoing national Red king crab and snow crab research and fishery in 2013 and the research plans for 2014.

The parties stated that the main objectives of the research program of crabs in the period 2010-2012 mainly been achieved. The results of such research are reflected in a number of publications both on the national and international levels. However, the parties have agreed that some of the questions of biology, stock assessment and fishery of crabs require further research. Given that, at a meeting of scientists from Russia and Norway in March 2013 were developed general goals of the new five-year research program of king crab and opilio snow crab in the Barents Sea for years 2014-2018:

- Ecological role of the red king and the snow crab in the Barents Sea
 - Impact on benthic ecosystem
 - Exploring the significance of the new species at their tropic level and their niche in the Barents Sea ecosystems
- Study main life history parameter of the two crab species adapted to the Barents Sea
 - Growth and reproduction
 - Larvae ecology
 - Spreading behavior
- Development of new sampling devices for surveying the crab stocks
 - Use of UTV to collect data
 - Fishing vessel logbooks

- Effect of fishery on the crab stocks
- Crab mortality in the trap fishery
- Crab mortality due to trawling operations.

The Parties recalled that Russian-Norwegian Workshop on Red king crab and Snow crab was to be held in Tromsø in summer 2013. The Workshop has been postponed, but will be held during March meeting 2014.

Scientists from IMR, VNIRO and PINRO will conduct a number of national surveys on the red king crab and snow crab in the Barents Sea. The objectives of these surveys are: assessment distribution, abundance, size/sex composition, biological characteristics of crabs, tagging experiments and so on. Some of investigations should be focused on red king crab by-catches in the trawl fishery for demersal fish with a view to search of means for minimization of the red king crab by-catches in fisheries for cod and haddock.

The results will be presented in survey reports, articles and exchange between IMR, PINRO and VNIRO.

5. Fishing technology and selectivity of fishing gears

Research activity in these fields is carried out with the aim to develop:

- Fishing gears that are more species and size selective and that have less negative impact on fish that escape the gear, and have less negative ecosystem effects in general.
- Improved survey gears and methodology.

A Centre for Research-based Innovation (CRISP) has been established at the Institute of Marine Research in 2011. The Centre is a cooperation between industry partners and IMR and is funded by the Research Council of Norway. The research will focus on developing sustainable trawl and purse seine fisheries. The Centre will establish cooperation with international research institutes, including PINRO, working on similar topics.

As part of the CRISP activity, a photographic system that automatically identifies species and sizes of individuals passing through a trawl is under development in Norway. Another line of development aims at developing a semipelagic trawling technique that reduces impact on bottom habitats including, trawl doors that can be remotely maneuvered vertically and horizontally during trawl operations. The development of methods for real time trawl catch regulation during fishing operations is in progress, and six Norwegian trawlers are presently licensed to test this system in commercial fishing for codfish in the Barents Sea.

Other research activities include a project aimed to separate cod and haddock while trawling in the Barents Sea initiated in 2012 and are continued in 2013 and 2014.

On passive gears, new designs for pot fisheries are being developed on the basis of comparisons between the Norwegian “Two-chamber Pot” and the Canadian “New Foundland Pot” in order to develop an improved pot design for commercial cod fisheries, and a new large pot design termed “Lofotteina” is being developed for fishing in the near-field of aquaculture plants and is also being tested on commercial fishing grounds unaffected by aquacultural activities.

A standard pelagic survey trawl (Mulpelt 832) was developed jointly between researchers and trawl producers in Norway, Iceland and the Faroe Islands which are now used for swept area estimates of the mackerel resources and for identification of acoustic recordings during surveys.

Russian investigations

Nation:	Russia	Survey title:	Investigations of selectivity of gear and sorting systems as well as development new gears and sorting systems.
Reference No.:	R-5-01		
Organization:	PINRO		
Time period:	April-July	Vessel:	R.V. "Vilnius"
Target species:	Cod, haddock, Greenland halibut northern wolffish, spotted catfish,	Secondary species:	Saithe, plaice, long rough dab, red fishes, crabs , wolffish
Area:	The Barents Sea and adjacent waters, Spitsbergen area, Exclusive Economic Zone of Norway, international waters, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation		
Purpose:	Estimation of results from the use of current technical regulations in the trawl fishery for demersal species, improvement of measures to ensure rational harvesting of biological resources, development of substantiation for optimal technical regulations, estimation of efficiency of new selection systems, estimation of pelagic trawl selectivity in the fishery as well pelagic trawl for cod and haddock		
Reported to:	PINRO survey report, JRNFC		

6. Monitoring of pollution levels in the Barents Sea

PINRO and IMR will continue to monitor pollution levels in accordance with national programs.

Scientists plan to discuss and will exchange their research findings at a meeting of scientists in March 2014 and will report to the relevant organizations according to appropriate plans and programs.

7. Investigations on age determination of fish

The exchange of age reading specialists and material for cod, haddock, redfish, Greenland halibut and capelin will continue. Meetings between age readers are held every second year. Meetings for cod, haddock and redfish were held in Norway in 2013. The next meetings will be held in Murmansk in 2015.

8. Marine mammals

The effect of various marine mammal species, in particular harp seals, on biological resources of the Barents and Norwegian Seas is considerable. Besides, harp, hooded, grey and harbour seals and minke whales have traditionally been target species for hunt operations. Other species, such as white whales, ringed and bearded seals, may also be of potential future interest for hunting. There is therefore a need for joint research on marine mammals, including boat based and airborne surveys, in offshore as well as coastal areas. The joint Russian-Norwegian research should be aimed at assessments of distribution and abundance of the most important species, and their trophic linkages with other marine resources, with particular emphasis on fish species. The low population size of hooded seals in the Greenland Sea and apparent decrease in harp seal pup production in the White Sea in recent years is a matter of concern which requires increased research and monitoring effort.

Norwegian activities in 2014 include sampling of biological material from harp seals during commercial sealing in the Greenland Sea, both to assess the reproductive and nutritive status of the animals, and to assess the efficiency and animal welfare issues related to the hunting methods applied in the Norwegian commercial sealing. Analyses of biological material from hooded seals, collected during research surveys in the Greenland Sea, and reanalyses of historical biological material from harp seals continues. Comprehensive line transect sighting surveys for minke whales (and other whales) will be conducted in the Svalbard area in 2014. This is the first survey in a new six-year cycle (2014-2019) of sighting surveys and will result in new, updated whale estimates for the Northeast Atlantic area in 2020. Satellite tags will be deployed on minke whales and other whale species on the coast of North Norway (winter) and in Svalbard (autumn) 2014. Furthermore, boat based surveys to estimate abundance and stock structure will be carried out in Norwegian coastal areas both for harbour seals and grey seals. Studies of grey seal ecology using telemetric tagging of seals in North Norway continue.

In 2014, the Russian Party plan to carry out multispectral aerial surveys of harp seals of the White/Barents Seas population on their traditional whelping patches in the White Sea as well as in non-traditional areas in the northern and south-eastern (Pechora Sea) parts of the Barents Sea using a specially equipped Russian aircraft. Later, in April, it is the plan to carry out multispectral aerial surveys of harp seals of the White/Barents Seas population during moult. Besides, complex dedicated aerial surveys are planned to study other marine mammal species distribution and numbers, and also information about environment conditions and the distribution of fish species and other marine organisms. During the annual ecosystem surveys in the Barents and Norwegian Seas, sightings of marine mammals from research vessels and specially equipped aircraft will be conducted. Observations of marine mammal from commercial fisheries vessels in the Barents and Norwegian Seas will be carried out as well. In addition, traditional annual coastal and boat surveys with the purpose to observe marine mammal species and to collect biological material will be carried out. Sampling of biological material will occur during the commercial harp seal catch.

As part of the Joint Norwegian-Russian Research Program on Harp Seal Ecology, telemetric investigations of harp seals will be carried out in the White Sea in a joint Norwegian-Russian project. This activity will be given priority over other planned research of harp seals of the White/Barents Seas population. Joint observations of marine mammals on the ecosystem surveys will continue.

Norwegian investigations

Nation:	Norway	Survey title:	Monitoring of biological parameters and hunting methods, harp seals
Reference No.:	N-8-01		
Organization:	IMR		
Time period:	March-May	Vessel:	1 sealer
Target species:	Harp seal	Secondary species:	
Area:	Greenland Sea		
Purpose:	Collection of biological material from harp seals during commercial sealing.		
Reported to:	ICES, NAMMCO, JNRFC		

Nation:	Norway	Survey title:	Monitoring of harbour seal stock structure
Reference No.:	N-8-02		
Organization:	IMR		
Time period:	June	Vessel:	Hired vessel
Target species:	Harbour seals	Secondary species:	
Area:	West Norwegian coast		
Purpose:	Biopsy based collection of tissue from harbour seal pups for genetic studies aimed to assess stock structure.		

Reported to: NAMMCO, ICES

Nation: Norway Survey title: Boat based survey of grey seals
Reference No.: N-8-03
Organization: IMR
Time period: September- October Vessel: Hired vessel
Target species: Grey seals Secondary species:
Area: Norwegian coast (Nordland and Trøndelag)
Purpose: Estimation of grey seal pup production.
Reported to: NAMMCO, ICES

Nation: Norway Survey title: Line transect surveys of minke whales
Reference No.: N-8-04
Organization: IMR
Time period: July - August Vessel: Håkon Mosby; Johan Hjort
Target species: Minke whales Secondary species: Other large whales
Area: Svalbard (subarea ES)
Purpose: Sighting surveys to assess abundance of minke whales, and abundance, distribution and species composition of other marine mammals.
Reported to: IWC, NAMMCO

Nation: Norway Survey title: Telemetric tagging of minke whales
Reference No.: N-8-05
Organization: IMR
Time period: January Vessel: Rented vessel
Target species: Minke whales Secondary species: Humpback whales, fin whales
Area: Coast of North Norway
Purpose: Telemetric tagging of minke whales.
Reported to: IWC, NAMMCO

Nation: Norway Survey title: Telemetric tagging of minke whales
Reference No.: N-8-06
Organization: IMR
Time period: August- September Vessel: Hired vessel
Target species: Minke whales Secondary species: Humpback whales, fin whales
Area: Svalbard
Purpose: Telemetric tagging of minke whales.
Reported to: IWC, NAMMCO

Russian investigations

Nation: Russia Survey title: Multispectral aerial research of the White/Barents Seas harp seal population in whelping and moulting patches
Reference No.: R-8-01
Organization: PINRO
Time period: March-April Vessel: Special equipped aircraft
Target species: Harp seal Secondary species: White whale and other species of marine mammals

Area:	The White Sea and the Barents Sea, Exclusive Economic Zone of the Russian Federation, internal sea waters and territorial sea of the Russian Federation		
Purpose:	Study of distribution and estimation of number of the White Sea harp seal on whelping and moulting patches for estimation of pup production aiming at stock abundance assessment, study of harp seal ecology and their influence on fish species as top predators.		
Reported to:	PINRO survey report, ICES WGHARP, ICES AFWG, ICES WGMME, JRNFC, NAMMCO		

Nation:	Russia	Survey title:	Comprehensive aerial research surveys of marine mammals in the, Barents Sea, Kara Sea and Laptev Sea
Reference No.:	R-8-02		
Organization:	PINRO		
Time period:	July-September	Vessel:	Special equipped aircraft
Target species:	Minke whale, harp seal, ringed seal, grey seal, common seal, bearded seal, walrus	Secondary species:	Hooded seal, and other species of marine mammal, seabirds, fish schools, oceanographic and hydrobiological parameters
Area:	The Barents Sea, Kara Sea and Laptev Sea		
Purpose:	Study of marine mammals and seabirds distribution and abundance with taking into account of environment conditions and fish species and other marine organisms distribution for understanding of the effect of marine mammals and seabirds on the main commercial fishes for further use in ecosystem models for management of commercial living marine resources		
Reported to:	PINRO survey report, ICES AFWG, ICES WGMME, NAMMCO		

Nation:	Russia	Survey title:	Marine mammals coastal research and observations including collection of biological samples
Reference No.:	R-8-03		
Organization:	PINRO		
Time period:	February-October	Vessel:	Coastal expedition with the use of available transport and different types of boats
Target species:	Harp seal, minke whale, ringed, grey and bearded seals	Secondary species:	Other species of marine mammals and fishes
Area:	Coast of the Barents Sea, White Sea, Kara Sea and Laptev Sea		
Purpose:	Collection of biological data, study of distribution and migration routes, estimation of numbers, marine mammals monitoring, assessment of marine mammals influence on fishes species, assessment of climatic changes and human activities on marine mammals, data for ecosystem modelling		
Reported to:	Internal PINRO survey report, ICES WGHARP, ICES AFWG, ICES WGMME, JRNFC, NAMMCO		

Joint investigations

Nation:	Russia/Norway	Survey title:	Harp seal tagging in the White Sea in the frames of marine mammals coastal research
Reference No.:	J-8-01		
Organization:	PINRO, IMR		
Time period:	February-May	Vessel:	1 helicopter, vessel, boats
Target species:	Harp seal	Secondary species:	Other seal species, whales
Area:	The White Sea area		
Purpose:	Study of the harp seal biology and ecology using satellite telemetry. Part of the Norwegian Russian Research Program on Harp Seal Ecology initiated by JNRFC. Marine mammals monitoring, assessment of marine mammals influence on fish species, assessment of climatic changes and human activities on marine mammals		
Reported to:	Joint IMR/PINRO survey report, JNRFC, ICES WGHARP, ICES AFWG, ICES WGMME, NAMMCO		

9. Investigations on survey methodology, index calculations and assessment methods.

PINRO and IMR hold on to the ideas of developing a joint program on methods and procedures for assessment and quota advice of important fish stocks in the northern areas. This program should include methods for surveys, methods for calculations of survey indexes and methods for improving assessment tools, including the multispecies and ecosystem models.

According to this intention discussions have been held during the March meeting in 2011, a special meeting regarding this topic at PINRO in February 2012, and during the March meeting 2012. During these occasions, researchers and IT personnel from IMR and PINRO met to discuss common challenges in the field of data infrastructure. A joint working group has been established, to follow up development in this field at both institutes. The aim of this work is to develop new databases and software to make stock size estimates in a consistent, common, and quality assured way. Work is ongoing at both institutes, but has been hampered by lack of programmers.

During the symposium on methodology arranged in Sochi in September 2013, several papers were presented and discussed dealing with various aspects of this topic. A proceeding from the symposium is planned, and some of the papers have been selected for submission to an international peer-reviewed journal.

Coordination of Ecosystem surveys in the Barents Sea

The monitoring program aimed to monitor status of and changes in the Barents Sea Ecosystem should include surveys conducted in different seasons, reflecting the main processes (important oceanographic and biological processes). A Joint IMR-PINRO report on the future monitoring program is now completed. An adequate temporal and spatial resolution is important for detecting changes and monitor key processes and status of important ecosystem components. Therefore, the monitoring of the Barents Sea should include all seasons.

In autumn IMR and PINRO already has a joint Ecosystem survey (BES). During the March meeting in 2013 the scientists agreed to continue BES and to improve and ensure adequate survey design, sampling techniques, participation and data treatment. The scientists agreed to continue the development of identification (manuals and atlas) and quantification methods for species which have not been identified or quantified yet. Scientists have agreed that all collected data should be available as spatial data and as relative indices or estimates for most of species and groups, and estimation of uncertainties for all indices and estimates may provide better input for an assessment, ecological models and estimation of the total production for the Barents Sea.

At the March meeting in 2013 the scientists from IMR and PINRO considered that changing the current monitoring of bottom fish species carried out by four different surveys during autumn-winter (November-March) may seriously damage the quality of currents assessment for cod, haddock, Greenland halibut and redfishes, and therefore such changes of current monitoring to new optimized survey need to be analysed in detail and planned with caution. It is planned to meet in January 2014 to: 1) propose a possible optimal design and timing of surveys 2) analyse possible consequences of change of monitoring the bottom fish stocks on their assessments and 3) propose a transition plan for current surveys to new survey(s) if it will be deemed necessary.

The summer international ecosystem survey for the Nordic Seas, IESNS-summer, could also be extended into the Barents Sea.

To obtain continuous evaluation and development of surveys the ICES Working Group on Integrated Assessment of the Barents Sea (WGIBAR) has been established and will meet for the first time in 2014. This multidisciplinary working group, in the starting phase lead by two co-chairs (IMR and PINRO) may identify knowledge gaps, weaknesses with monitoring (survey design, sampling, estimations methods, data flow and products) and recommend changes to the monitoring committees mentioned above. This working group

focus on analysing data from all monitoring surveys to obtain an annual status report for the Barents Sea, summarizing information from these surveys.

Ecosystem monitoring of juvenile fish and effect of by-catch of juvenile fish during fishery in the Barents Sea

The aim of this work is to improve the knowledge of the winter distribution of juvenile fish of commercially and ecologically important species (cod, haddock, capelin and herring), prey/predator interaction, giving better understanding of ecosystem processes during winter. Additionally, the project will provide new insight into by-catch of juvenile fish during Norwegian and Russian capelin fishery in the Barents Sea and quantify the effect of the fishery on their abundance.

The work will focus on the mapping of geographical distribution by acoustic measurements and trawl catches during the winter survey (January-March). The observers will monitor catches during capelin fishery on board both Norwegian and Russian vessels. Thus, mortality of juvenile fish of commercially and ecologically important species (cod, haddock, capelin and herring) will be estimated under the Norwegian and Russian capelin fishery.

Research in the Arctic Ocean

The Arctic Ocean is experiencing major transformations. The dramatic reduction in the Arctic sea ice coverage has already made vast areas of the waters in the Arctic under Norwegian and Russian jurisdiction and beyond accessible for increased human activity. This development will increase pressures on vulnerable Arctic Ocean ecosystems, and impose new challenges for their sustainable management. Changes in this heat flow have profound implication for the marine environment and the living marine resources in the Arctic Ocean. Colonization of new regions by immigrating species is also more likely on this side of the Arctic compared to the Pacific side. In a pan-Arctic perspective, increasing the scientific knowledgebase and ecosystem understanding, exploring potential options for providing ecosystem-based advice, and establishing long-term monitoring programs in the Arctic Ocean are important both nationally and internationally.

IMR informed PINRO on two strategic initiatives on Arctic Ocean ecosystem and trophic interactions in the northern Barents Sea during the annual meeting between the two institutions during March 2013. Since then both initiatives have received funding from the Research Council of Norway, and PINRO has kindly accepted to take part in projects. The field observation will be carried out in connection with the ecosystem cruise in the Barents Sea.

Sampling gears and standardizations of surveys.

In order to achieve high accuracy of results from joint Russian and Norwegian surveys in the Barents Sea it is important to improve and standardize the sampling gears used on board the different vessels. The trawls used in the ecosystem survey are significantly different in the performance and this problem has been addressed in the last survey by allocating an extra period of gear evaluation.

It is the aim of both PINRO and IMR to evaluate all the sampling gears used at the surveys and to achieve a comparable performance of these gears at any time.

10. Russian-Norwegian Fisheries Science Symposia

The 16th Russian-Norwegian Symposium (“Assessments for management of living marine resources in the Barents Sea and adjacent waters - a focus on methodology”) was held in Sochi, Russia), during the period 10-12 September 2013. A total of 27 participants attended the

symposium which included 2 opening addresses, 2 keynote talks, 22 oral presentations and 3 posters. The symposium language was English, and production of Proceedings (edited by Knut Sunnanå, Harald Gjøsæter and Espen Johnsen from IMR, and Evgeny Shamray, Yury Kovalev and Andrey Dolgov from PINRO) is in progress – the Proceedings will be published in the IMR/PINRO Joint Report Series.

It was evident that several presentations had a content and quality that would merit more than merely printing in the traditional Proceedings, and 11 of these were selected for potential inclusion in a thematic issue of the journal Marine Biology Research (MBR). As agreed by the Parties, Knut Sunnanå (IMR) serves as the thematic issue coordinator and will assist in providing high-quality manuscripts. The 11 selected contributions will be checked with regard to language and be subjected to an internal review process and subsequent – if found acceptable – submitted to the MBR thematic issue. All selected manuscripts must of course undergo the usual review process of MBR.

The Parties has agreed that the title of the 17th Russian-Norwegian symposium should be “Long term sustainable management of living marine resources in the Barents and Norwegian Seas”.

A symposium program committee has been appointed: Harald Gjøsæter, Espen Johnsen and Knut Sunnanå from IMR, Norway, and Yuri Lepesevich, Evgeny Shamray and Yuri Kovalev from PINRO, Russia. The symposium will be held in Norway during September in 2015.

The Parties suggest that the symposium should include three theme sessions, all starting with an invited keynote speaker:

Theme 1: Population models and methods for Harvest Control Rule evaluation

Theme 2: Results of Harvest Control Rule evaluation related to precautionary approach and maximum sustainable yield

Theme 3: Sustainable and optimal management - including multispecies and ecosystem considerations

The symposium language is English, and Proceedings of the symposium will be edited by the symposium program committee, and published in the IMR/PINRO Joint Report Series. If a sufficient number of presentations has a content and quality that would merit more than merely printing in the traditional Proceedings, selected papers from the symposium will get the opportunity to be published in a peer reviewed scientific journal, for example in a thematic issue of the ICES Journal of Marine Science. Other journals may be considered.

It was agreed that a short scope for the symposium should be developed, and names of key note speakers decided, by correspondence among the symposium program committee. No later than 15 June 2014, invitations should be sent out, both to colleagues at IMR and PINRO and to colleagues at other relevant institutions in Norway and Russia. By that time the symposium should be visible at the web via the websites of IMR and PINRO.

11. Development of an exchange program of scientific personal

It has been agreed that the program for exchange of scientific personal between PINRO, VNIRO and IMR, on all levels (students – research technicians – senior scientists) will continue.

A plan for next year will be developed and considered during the annual March meeting. The exchange should have first focus on young scientists and scientists for coordination of research programs and methods between the institutions at their laboratories and at their research vessels during investigations.

12. Revision of Greenland halibut assessment methodology

Arctic fisheries working group (AFWG) recognized the need to facilitate work toward accepted analytical assessment for Greenland halibut. ICES benchmark meeting for Greenland halibut is planned for end of 2013. The assessment of the NEA Greenland halibut stock is uncertain due to age-reading problems and lack of contrast in the data, as also reflected in recent AFWG reports. In the preparation for the benchmark meeting there is a need for a joint effort by Russia and Norway to prepare and make available necessary data in good time in advance. This way it is possible to do exploratory analysis with a variety of methods using models which can be structured in various ways (by biomass/age/length/sex), and allow for exploration of the consequences of various assumptions about growth patterns. The data needed are:

- Catch in tons (by quarter);
- Sex compositions;
- Length distribution in the catch (preferably for each quarter, but one each year would do);
- Length distribution in the survey(s);
- Survey index from the survey(s);
- Length-weight relationships;
- Age-length keys prepared based on both methods of age reading (preferably for each year).

Data should be prepared in adequate spatial and temporal resolution.

Parties agreed to exchange data needed for benchmark meeting to the end of October.

In order to achieve the most accurate age estimates, ICES has recently recommended methods and best practice for age reading of both redfish and Greenland halibut. Still there continue to be differences in opinion between PINRO and IMR regarding age reading methods for these species. At the March meeting 2013 the parties recommended to start annual or bi-annual exchange of otoliths and age reading experts on these species in order to identify the differences in interpretation and to discuss possibilities for a common approach. The first age readers' meeting will be held in Tromsø in October 2013.

13. Research on benthic organisms

The program on investigations of benthic organisms is ongoing according to plans that were developed at the March meeting in 2013 in Murmansk. The parties agreed to continue the identification of the megabenthos from the demersal fish trawl on all vessels participating in the ecosystem survey. PINRO will also continue grab sampling of macro-zoobenthos in the Kola transect.

Some part of this work is conducted under the HAV-5 project of the Joint Russian-Norwegian environmental commission.

14. Determination of conversion factors

Accurate conversion factors are necessary in order to estimate the actual catches of the joint exploited stocks. Varying fishing and processing conditions, such as fishing areas and seasons, length-weight characteristics, fishing gear, technological parameters of raw fish processing including different ways of processing (machine or manual), processing equipment, ways of freezing, packing and storage require continuous investigations. It is necessary to obtain additional data on conversion factors for fish taking into account annual, biological variations and effects of fishing gear and technological processing equipment.

Scientific and research institutes of Russia and Norway continue investigations on establishing accurate conversion factors for products produced from cod and haddock.

The Joint Russian-Norwegian Fisheries Commission decided to start the research on conversion factors for products of Greenland halibut, which is jointly managed stock by Russia and Norway.

Joint investigations will be carried out with accordance Appendix 5 of the Protocol of the Permanent Russian-Norwegian committee for management and control issues in the fisheries sector (September 2013).

To conduct experimental and checking works, to determine conversion factors scientist will collect data onboard of the commercial vessels that operated in the Barents Sea and adjacent waters. Surveys reports will be available for appropriate authorities of Russia and Norway.

15. Development of genetic database for fish species

During the March Meeting in 2009 Russian and Norwegian scientists agreed to begin developing a joint genetic database for Atlantic salmon. The work was conducted in 2009-2010 (Pilot project) and in 2011-2013 (Kolarctic salmon project).

Samples collected from Norwegian rivers have been stored at NINA or IMR. Both samples and DNA have been made available for other laboratories for further analyses in the future. Samples collected in Russia have been divided in two where possible, and stored both at PINRO and IMR. The ownership of the samples and DNA remains with PINRO. Further use of the Russian samples and DNA must be made through agreement with PINRO.

In 2011 an EU project “Trilateral cooperation on our common resource; the Atlantic salmon in the Barents region” (Kolarctic Salmon) was started. The project funding consists of both EU-funding (Kolarctic ENPI CBC) and national funding from Norway, Russian Federation and Finland. In 2011 and 2012 the genetic baseline was expanded both in terms of spatial coverage and completeness, and it now contains genetic data from over 180 salmon populations in northern Norway, Finland and Russia. The number of genetic markers has been upgraded to 31 microsatellite loci. Over 17000 samples were collected from coastal fisheries in northern Norway and Russia in 2011 and 2012, and analyses of these samples are now underway. Preliminary assignment of a subset of these samples has already provided valuable information of the composition of the catches in time and space, and interesting patterns of coastal migration of different populations and sea age groups are beginning to emerge.

The preliminary results of the Kolarctic Salmon Project show that from 20 to 70% of Atlantic salmon caught by coastal netmen in both Troms and Finnmark, Norway, are genetically originated from Russian rivers, including the most valuable big spring run female salmon from the rivers of the Kola Peninsula, Russia. Taking into account the fact of decreasing of the MWS return to the rivers of the Kola Peninsula (with no increasing the fishing pressure) last five years (PINRO research results) there is a problem of influence of the coastal netting for mixed stocks of Atlantic salmon migrating along the coast of both Troms and Finnmark.

Further use of the data outside the realm of the “Kolarctic-salmon” project will be possible after agreement with partners of the project. The data from the analysis will also be used by a relevant partner for constructing a national genetic baseline for Atlantic salmon populations.

In accordance with the decision of 40th Russian-Norwegian Joint Fish Commission, cooperation between Russian and Norwegian scientists (IMR, VNIRO, PINRO) started in 2012 to explore genetic polymorphism and to investigate population structure of several fish species in the Barents

Sea. The studies are focused on but not confined by the cod, capelin, polar cod and the redfish, with the DNA markers for these species to be identified within the next year. The basis for sampling is the surveys conducted by both sides, specially the joint ecosystem surveys. "

For skates and rays it was suggested that IMR and PINRO make a joint effort in collecting samples of all species in the Barents Sea.

16. Investigations of cartilaginous fishes in the Barents Sea

Russian and Norwegian scientists have previously noted the importance of cartilaginous fishes (sharks, skates, rattfishes) in the Barents Sea ecosystem and their vulnerability to fisheries, as well as lacking scientific knowledge with respect to those species. Plans for joint work was presented at the March meeting in 2011 in Murmansk and both IMR and PINRO have started increased sampling of skates on their surveys, including egg capsules, vertebrae and maturity. It is agreed to exchange information by correspondence and to seek to initialize joint projects and/or seminars to improve the knowledge of skate ecology in the Barents Sea. This issue is still pending and has been hampered by limited capacity on elasmobranch research.

17. Data exchange

It was agreed to exchange the following data collected in joint and national scientific surveys and data collected by observers on board of commercial vessels:

- all data collected in joint surveys relevant to stock assessments and environment conditions;
- filed data on temperature and salinity in the Barents Sea with 5 m depth interval from oceanographic stations;
- mean length and weight at age as far as maturity at age used in commercial stocks assessments;
- surveys abundance indexes and acoustic data used in commercial stocks assessments;
- stomach content of commercially important species;
- otoliths and scales collected under the program for age validation of bottom and pelagic fish;
- data on zooplankton and benthic fauna;
- data on the biology of seals of the White Sea population (mortality, maturation, size-at-age, feeding data, ice conditions in the White Sea and adjacent waters of the southeastern Barents Sea);
- fisheries statistics for key commercial fish species in ICES Sub-areas I, IIa, IIb needed for stock assessments of commercial fishes (catches, age composition of catches, mean weights at age in catch).

The above list of data exchange will be updated during March meeting.

18. Catch volumes needed for investigations of marine resources and monitoring of the most important commercial species, as well as management tasks

The catch volumes shall enable to carry out all tasks described in “Joint Norwegian – Russian Scientific Research Program on Living Marine Resources in 2014” including surveillance activities to provide recommendations on area closures/reopening as well as other decisions on management of fishing activities on living marine resources in ICES Subarea I and II including respective EEZs of Russia and Norway, international waters (“Loophole”) and Svalbard (Spitsbergen) area.

To solve these tasks the following catch quantities are decided and shall be available in equal parts

for both Parties in 2014:

- 14 000 tonnes of cod in addition to volumes mentioned in Appendix 3
- 8 000 tonnes of haddock in addition to volumes mentioned in Appendix 3
- 200 tonnes of capelin in addition to volumes mentioned in Appendix 3
- 1 500 tonnes of Greenland halibut in addition to volumes mentioned in Appendix 3
- 2 100 tonnes of other fish species in addition to volumes mentioned in Appendix 6, as follows:
 - Saithe - 400
 - Redfish *S. mentella* - 900
 - Redfish *S. marinus* - 60
 - Northern wolffish - 380
 - Spotted catfish - 240
 - Long rough dab - 240
 - Sea plaice - 500
 - Other species - 220

Both Parties will make all efforts to fulfil the program.

All catches taken for research and management purposes should be recorded in the catch statistics separately.

Under “The Joint Russian – Norwegian Scientific Research Program on Living Marine Resources in 2014” the Norwegian party will grant permission to fish and catch their living marine resources to vessels owned or hired by PINRO in the Norwegian Economic Zone and areas around Jan-Mayen in amounts not exceeding:

- 5 000 tonnes of cod
- 3 000 tonnes of haddock
- 100 tonnes of capelin
- 700 tonnes of Greenland halibut
- 750 tonnes of other fish species as follows:
 - Saithe - 100
 - Redfish *S. mentella* - 400
 - Redfish *S. marinus* - 20
 - Northern wolffish - 150
 - Spotted catfish - 80
 - Long rough dab - 50
 - Other species - 50

Under “The Joint Russian – Norwegian Scientific Research Program on Living Marine Resources in 2014” the Russian party will grant permission to fish and catch their living marine resources to vessels owned or hired by IMR and other Norwegian scientific institutions in the Exclusive Economic Zone of the Russian Federation in amounts not exceeding:

- 5 000 tonnes of cod
- 3 000 tonnes of haddock
- 100 tonnes of capelin
- 700 tonnes of Greenland halibut
- 515 tonnes of other fish species as follows:
 - Saithe - 50
 - Redfish *S. mentella* - 15
 - Redfish *S. marinus* - 5

- Northern wolffish	- 75
- Spotted catfish	- 50
- Long rough dab	- 70
- Sea plaice	- 200
- Other species	- 50