

**JOINT RUSSIAN – NORWEGIAN SCIENTIFIC RESEARCH PROGRAM ON LIVING MARINE
RESOURCES IN 2015**

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

This program contains the investigations to be carried out in 2015 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 Murmansk, 16-20 March 2015 to discuss joint research programs, results from surveys and investigations in 2014/2015 and to coordinate survey plans for the rest of 2015. 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 2014, no reports have been issued in the Joint IMR-PINRO report series during 2014. In 2013, 4 reports in this series were published.

In the future work it is very important to take into account experiences from recent developments in the ecosystem such as environmental factors, distribution and stock sizes of commercial species.

PINRO and IMR scientists are contributing to the Joint Russian-Norwegian Environmental commission and the resulting Ocean3 report (to be completed in December 2014). Better co-ordination of efforts between the two commissions is clearly needed to avoid duplications of efforts and increase synergies.

A preliminary program for the planned surveys and cooperation for 2015 is presented below. The outlined plans should be considered a draft and will be shared when final plans are available.

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 surveys

Nation:	Norway	Survey title:	Cod spawning stock
Reference No.:	N-2-01		
Organization:	IMR		
Time period:	March	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 2015		

Nation:	Norway	Survey title:	Fjord and coastal ecosystem survey
Reference No.:	N-2-02		
Organization:	IMR		
Time period:	October-November October-November	Vessel:	R.V. "Johan Hjort"

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 surveys

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", R.V. "PINRO-1" 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 by-catches 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 2015 and 2016		

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. "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 2015		

Nation:	Russia	Survey title:	Exploration of the resource potential for the long-line fishery in the Barents Sea and adjacent water. Data collection on biology and distribution of commercial fish species in relation with the oceanographic parameters
Reference No.:	R-2-04		
Organization:	VNIRO, PINRO,		
Time period:	January-December	Vessel:	1 hired long-liners
Target species:	Cod and haddock	Secondary species:	Greenland halibut, catfishes
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 data on CPUE, biological data on species, sex and age composition of cod and haddock catches. Study of spatial and temporal distribution of concentrations; study of seasonal dynamics of catches.		
Reported to:	VNIRO survey report, PINRO survey report, ICES AFWG in 2015 and 2016		

Joint surveys

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"
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 year classes, abundance and biomass cod and haddock, other demersal species, collection of biological samples, oceanography.		
Reported to:	Joint IMR/PINRO Report Series, ICES AFWG in 2015		

Nation:	Norway/Russia	Survey title:	International trawl-acoustic survey for blue whiting in the spawning areas west of the British
Reference No.:	J-2-02		

Organization:	IMR, PINRO		Isles
Time period:	March-May	Vessel:	Hired vessels, R.V. "Fridtjof Nansen"
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 WGWIDE, ICES WGIPS in 2015		

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" R.V. "G.O.Sars", 3 other RVs
Target species:	May Herring, blue whiting	Secondary species:	Other pelagic species
Area:	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		
Purpose:	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.		
Reported to:	PINRO, IMR survey reports, International report, ICES WGWIDE, ICES WGIPS in 2015		

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. "Vilnjus" 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-October	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,	Secondary species:	Other pelagic and demersal species, benthic organisms, sea mammals and birds, oceanographic and hydrobiological

	Greenland halibut, parameters plaice, herring, capelin, polar cod, shrimp
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 2015, ACOM in autumn 2015, WGHARP, NAMMCO, WGIBAR

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. Next survey is planned for in 2016. 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 2015 the northern deepwater slope is the area to be surveyed and both Greenland halibut and redfish are target species. In 2014 the southern deepwater slope was the area surveyed and Greater Argentine, the two redfish species and to some extent Greenland halibut were all target species. According to this the following surveys are applied for in 2015:

Norwegian surveys

Nation:	Norway	Survey title:	Northern Deepwater Slope Survey (Egga-Nord)
Reference No.:	N-3-01		
Organization:		IMR	
Time period:	September-October	Vessel:	R.V. "G.O.Sars"
Target species:	Greenland halibut, Redfish,	Secondary species:	Other Deep water species and elasmobranches
Area:		Ecosystem along the Norway, Bear Island and Svalbard slope from 68 to 80 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 slope. Part of IMR's multiannual survey strategy for deepwater species.		
Reported to:	IMR survey report, ICES: AFWG 2016, WGEF 2016, WGDEEP 2016.		

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 2014 and the research plans for 2015.

The parties stated that the main objectives of the research program of crabs in the period 2010-2012, has mainly been achieved, and a report from the research program was submitted to the Commission. The results of this research are reflected in a number of publications both on the national and international levels. However, the parties agreed that some of the questions of biology, stock assessment and fishery of crabs require further research. Therefore, the scientists suggested a new 5

years joint program on the red king crab and the snow crab (2014-2018), at the March meeting in 2014. The program should include the following themes:

- Ecological role of the red king crab and the snow crab in the Barents Sea;
- Main life history parameters of these two crab species introduced into the Barents Sea;
- New methods for crab stock assessments and monitoring (sampling gears; survey area etc.).

The Parties recalled that the Russian-Norwegian Workshop on red king crab and snow crab was held in Tromsø in March 2014, and was reported at the March-meeting. A joint report from the workshop is available in the IMR- report series (No 18/2014).

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: to assess distribution, abundance, size/sex composition and biological characteristics of the crabs, in addition to tagging experiments. Some investigations should focus on red king crab by-catches in the trawl fishery for demersal fish aiming to search of means for minimization of the red king crab by-catches in fisheries for cod and haddock.

Information will be exchanged between IMR, PINRO and VNIRO and results will be presented in survey reports, and publications.

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. It was initiated in 2012 and is continued.

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.

During the March meeting in 2014 the scientists agreed to improve and ensure adequate survey sampling techniques. A "Harstad" trawl is a standard trawl covering the pelagic layer of 0-50m. Pelagic catches is basic for estimation of year class strength and biomass of jellyfish and krill in the Barents Sea, and also have been used in stock assessment for capelin, young herring and polar cod. The group discussed modification of standard trawl: further development of trawl should be continued by IMR and PINRO.

Russian surveys

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-May	Vessel:	R.V. "Vilnius"
Target species:	Cod, haddock, Greenland halibut northern wolffish, spotted catfish,	Secondary species:	Saithe, plaice, long rough dab, red fishes, crabs, wolfish
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. 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 2015 include sampling of biological material from harp seals during commercial sealing in the Greenland Sea to assess the efficiency and animal welfare issues related to the hunting methods applied in the Norwegian commercial sealing. Furthermore, to assess their reproductive and nutritive status, sampling of biological material from harp seals will be conducted during commercial sealing in the south eastern Barents Sea (the East Ice). Analyses of biological material from harp and hooded seals, collected during research surveys in the Greenland Sea, and reanalyses of historical biological material from harp seals continues. Testing of UAVs (Unmanned Aerial Vehicles) to perform aerial photographic surveys of harp and hooded seal whelping patches on the drift ice in the West Ice area in the Greenland Sea will continue. Comprehensive line transect sighting surveys for minke whales (and other whales) will be conducted in the Norwegian Sea and Jan Mayen areas in 2015. These surveys are included in a six-year cycle (2014-2019) of sighting surveys which 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 during winter in 2015. 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 2015, Russia plans to carry out multispectral aerial surveys of harp seals of the White Sea/Barents Sea population on their traditional whelping patches in the White Sea as well as in non-traditional areas in the northern and south-eastern parts of the Barents Sea using a specially equipped Russian aircraft. Standard multispectral methods will be applied. Later, in April, it is the plan to carry similar aerial surveys of harp seals of the White Sea/Barents Sea 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 aircraft. Scientific observers will collect data on marine mammal distribution on board of commercial vessels. 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 surveys

Nation:	Norway	Survey title:	Abundance estimation of harp and hooded seals
Reference No.:	N-6-01		
Organization:	IMR		
Time period:	March-April	Vessel:	Rented vessel ("Helmer Hanssen")
Target species:	Harp seals	Secondary species:	Hooded seals
Area:	Greenland Sea (West Ice)		
Purpose:	Testing estimation of harp and, if possible, hooded seal pup production using UAVs (Unmanned Aerial Vehicles)		
Reported to:	IMR survey report, NAMMCO, ICES, JNRFC		

Nation:	Norway	Survey title:	Monitoring of hunting methods, harp seals
Reference No.:	N-6-02		
Organization:	IMR		
Time period:	April-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 biological parameters, harp seals
Reference No.:	N-6-03		
Organization:	IMR		
Time period:	March-May	Vessel:	1 sealer
Target species:	Harp seal	Secondary species:	
Area:	Southeastern Barents 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-6-04		
Organization:	IMR		
Time period:	June	Vessel:	Rented vessel
Target species:	Harbour seals	Secondary species:	
Area:	North Norwegian coast (Troms / Finnmark)		

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 seal abundance
Reference No.:	N-6-05		
Organization:	IMR		
Time period:	September-October	Vessel:	Rented vessel
Target species:	Grey seals	Secondary species:	
Area:	Norwegian coast (Nordland north)		
Purpose:	Estimation of grey seal pup production.		
Reported to:	NAMMCO, ICES		

Nation:	Norway	Survey title:	Telemetric tagging of minke whales
Reference No.:	N-6-06		
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:	Line transect surveys of minke whales
Reference No.:	N-6-07		
Organization:	IMR		
Time period:	July - August	Vessel:	Rented vessel
Target species:	Minke whales	Secondary species:	Other large whales
Area:	Jan Mayen (subarea CM)		
Purpose:	Sighting surveys to assess abundance of minke whales, and abundance, distribution and species composition of other marine mammals, part of TNASS 2015.		
Reported to:	IWC, NAMMCO		

Nation:	Norway	Survey title:	Line transect surveys of minke whales
Reference No.:	N-6-08		
Organization:	IMR		
Time period:	July - August	Vessel:	Håkon Mosby; Johan Hjort; rented vessel
Target species:	Minke whales	Secondary species:	Other large whales
Area:	Norwegian Sea (subarea EW)		
Purpose:	Sighting surveys to assess abundance of minke whales, and abundance, distribution and species composition of other marine mammals.		
Reported to:	IWC, NAMMCO		

Russian surveys

Nation:	Russia	Survey title:	Multispectral aerial surveys of harp seal whelping and moulting patches
Reference No.:	R-6-01		

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 and Kara Seas
Reference No.:	R-6-02		
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 and Kara Seas		
Purpose:	Study of marine mammals 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 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-6-03		
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, White and Kara Seas		
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 surveys

Nation:	Russia/Norway	Survey title:	Harp seal tagging in the White Sea in the frames of marine mammals coastal research
Reference No.:	J-6-01		
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

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. Twice every year otoliths are exchanged between the institutes and meetings between age readers usually are held every second year. Meetings for cod, haddock and redfish were held in Norway in 2013, while capelin was excluded due to very high agreement between the two institutes. The next meeting for cod, haddock and capelin will be held in Murmansk in 2015.

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. Age readers meeting was conducted for redfish in October 2013. A hands-on workshop with age readers' meeting is being planned for both species in Tromsø in 2015.

8. 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 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.

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 program developers. A first operational version of a new stock size estimation program "StoX" was released in September 2014 at IMR. This program is intended to replace the "Beam" program currently used for acoustic estimation and the "Survey" program currently used to assess stocks by bottom trawl swept area methods. The first version of "StoX" only includes methods for acoustic estimation procedures.

Both institutions see the need for a review of past and present survey strategies, given the limited access to resources, both in terms of experts, ships and money for such activity. The needs of optimizations and development of surveys in the Barents Sea was discussed at a special meeting at Svanhovd in 2014. In addition, a review is also essential to ensure that survey strategies are optimal with regards to methodologies, coordination, timing and effort. During the March meeting 2014 the scientists agreed to establish a group, to continue the work and suggest a joint survey strategy with increased integration of Russian and Norwegian surveys.

Coordination of joint Norwegian-Russian Ecosystem surveys in the Barents Sea

The experts group identified an "ideal" survey time for monitoring of the main commercial species with regards to stock assessment (Svanhovd 2014). The group suggested to 1) extend the joint Ecosystem survey in autumn by increasing the effort on deepwater resources (mainly Greenland halibut) on the western slopes; 2) improve the joint trawl-acoustic survey in February/March (winter survey) by increasing effort to give better indices for cod, haddock, and possibly other groundfish, regarding numbers-at-age and maturity-at-age; and 3) redistribute effort from the Russian survey in late autumn and channel the resources into increased ground-gear effort to an extended Ecosystem survey, and increased participation in a modified February/March survey.

The new ICES Working Group on Integrated Assessment of the Barents Sea (WGIBAR) was established in 2014. This multidisciplinary working group focuses on analysing data from all monitoring surveys to obtain an annual status report for the Barents Sea, summarizing information from these surveys. The group will report annually the status of the Barents Sea, and identify knowledge gaps and weaknesses with monitoring (survey design, sampling, estimations methods, data flow and products). The monitoring program focusing on 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).

In late autumn and winter IMR and PINRO already conduct a Norwegian-Russian winter survey, a Norwegian Lofoten survey, and a Russian ground fish survey, with main aim to estimate the stocks sizes of commercially important bottom fishes, as well as collect data of interspecies interaction and other ecosystem components. The Svanhovd expert group recommended combining these surveys into one joint survey in winter with step-wise implementation starting in 2015.

In autumn, IMR and PINRO already conduct a joint Ecosystem survey (BESS). During the March meeting in 2014 the scientists agreed to continue BESS and to improve and ensure adequate survey design, sampling techniques, participation and data treatment. The scientists discussed the results from testing of a modified pelagic trawl, and agreed to further development of the trawl by IMR and PINRO.

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

Improving the knowledge of the winter distribution of juvenile fish of commercially and ecologically important species (cod, haddock, capelin and herring) will give a better understanding of ecosystem processes during winter. Monitoring of by-catches of juvenile cod, haddock, capelin and herring, could be conducted during the capelin fisheries on board both Norwegian and Russian vessels. This initiative will be discussed during the March 2015 meeting.

Research in the Arctic Ocean

The Arctic Ocean is experiencing major transformations. The 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 (SI-Arctic, TIBIA) on Arctic Ocean ecosystem and trophic interactions in the northern Barents Sea. 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 in the 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. During the 2014 Ecosystem survey on board G.O.Sars trawl geometry measurements with different rigging of standard survey trawls (pelagic “Harstad” and macro plankton) were investigated.

PINRO and IMR tested a new design for the cod-end of the “Harstad” trawl. In addition, a ruffled small mesh blinder was mounted inside “Harstad” trawl in order to prevent clogging and escapement of small organisms through the meshes. The results will be discussed during the 2015 March Meeting.

9. Revision of Greenland halibut assessment methodology

Arctic fisheries working group (AFWG) over several years recognized the need to facilitate work toward accepted analytical assessment for Greenland halibut. The assessment of the NEA Greenland halibut stock is uncertain due to age-reading problems and lack of contrast in the data. At the WKBT (ICES benchmark) meeting 2013 considerable progress was made to implement analytical assessment models that are less age dependent. Still, due to data problems the benchmark could not be finalized. One WKBT recommendation was, to further pursue both assessment model approaches (GADGET and a Bayesian surplus model).

An ICES data workshop (WKNGHD) between Norwegian and Russian scientists is planned in November 2014. The data workshop should go through all relevant data for population models to be used for Greenland halibut, ensure that the data series and models are properly documented, and advise on which parts of the data (years, areas, length groups etc.) are suitable for use in the various models. Data from all relevant time series should be exchanged in advance of the workshop at an aggregation level that is needed to run the models. The workshop should answer questions on data discrepancies.

Selection of model(s) to be used in stock assessment and for determining reference points should be completed before the ICES AFWG in April 2015, preferably by the time of the scientists' meeting in March 2015. After the model selection, it can be submitted to ICES for a benchmark.

10. Research and long term monitoring on benthic organisms

Sampling and processing of megafauna from "Campelen" trawl was made in accordance to plans developed at the March 2014 meeting in Murmansk for PINRO. This included:

- Identification of each species to lowest possible taxon.
- Number of individuals per taxon.
- Biomass per taxon.

The PINRO project of grab sampling of macrozoobenthos along the Kola section was continued. Long term monitoring on both Russian and Norwegian side of the Barents Sea should be continued. This includes the scientific exchange program between PINRO and IMR in order to standardise processing of trawl samples, species identification and exchange of young scientists.

The trawl megabenthic data are used in the HAV-2, 3 and 5 of the Joint Russian-Norwegian environmental commission projects, as well as in the Arctic Council (Circumpolar Arctic Flora and Fauna – Circumpolar Biodiversity Monitoring Plan CAFF-CBMP-benthos), the AACA-C/AMAP report and the Norwegian Management plan.

11. 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.

Russia and Norway will continue their investigations on establishing accurate conversion factors for products of cod and haddock in 2015.

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

A joint investigation will be carried out in 2015 in accordance with point 4.2 in the Protocol of the Permanent Russian-Norwegian committee for management and control issues.

In order to determine conversion factors, Russian and Norwegian scientists will collect data onboard commercial vessels. Survey reports will be available for appropriate authorities in Russia and Norway.

12. Development of genetic database for fish species

The further development of joint PINRO/IMR genetic database for Atlantic salmon populations will continue in 2015-2016 and include sampling for farmed salmon escapees in coastal areas and in rivers.

IMR, VNIRO, and PINRO will continue 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 years. The basis for sampling is the surveys conducted by both sides.

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.

13. Investigations of cartilaginous fishes in the Barents Sea

Russian and Norwegian scientists have previously noted the importance of cartilaginous fishes (sharks, skates, ratfishes) in the Barents Sea ecosystem and their vulnerability to fisheries, as well as lacking scientific knowledge with respect to those species. 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.

14. Monitoring of pollution levels in the Barents Sea

PINRO and IMR will continue to monitor pollution levels in accordance with national programs and will report to the relevant organizations according to appropriate plans and programs.

Monitoring pollutants including organic pollutants and radionuclides is an important task to understand potential impacts on the Barents Sea food web and related food safety. Both PINRO and IMR will continue to conduct joint investigations to monitor the status of the marine environment and will produce joint reports focusing on their joint efforts. One joint report based on findings of 2014 activities is scheduled for publication end of 2015.

IMRs and PINROs monitoring of pollution levels will focus on the Barents Sea in 2015. Samples of seawater, sediment and fish will be collected and analysed for organic pollutants and radionuclides. PINRO and IMR scientists will respond to new potential hazards caused by vessel accidents.

15. Russian-Norwegian Fisheries Science Symposia

The proceedings from the 16th symposium 2013 have not been published yet.

The 17th Russian-Norwegian symposium “Long term sustainable management of living marine resources in the Barents and Norwegian Seas” will be held in Bergen, Norway in September 8-10, 2015.

A symposium program committee has been appointed: Harald Gjørseter, Katja Enberg and Rolf Gradinger from IMR, Norway, and Konstantin Drevetnyak, Evgeny Shamray and Yuri Kovalev from PINRO, Russia.

The symposium will include three theme sessions:

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/publications of the symposium will be edited by the symposium program committee, and published in the IMR/PINRO Joint Report Series.

A draft document describing details regarding themes and invited speakers will be prepared by the committee and discussed at the joint PINRO-IMR March meeting 2015. Invitations will be sent out, both to colleagues at IMR and PINRO and to colleagues at other relevant institutions in Norway and Russia after the March meeting. By that time the symposium will be announced via the websites of IMR and PINRO.

16. 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. It will be applied for new projects (NRC, MNFA) to continue the exchange program beyond 2015.

A plan for next year will be developed and considered prior to 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, but will also include database and long-term modelling.

17. Data exchange

It was agreed to exchange data collected in joint and national scientific surveys and 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; needs for higher vertical resolution of the temperature and salinity profiles will be discussed during the March 2015 meeting.
- mean length and weight at age as well 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 will be updated during the 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 2015” 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 2015:

- 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

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 2015” 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

Under “The Joint Russian – Norwegian Scientific Research Program on Living Marine Resources in 2015” 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