Appendix 10

JOINT RUSSIAN – NORWEGIAN SCIENTIFIC RESEARCH PROGRAM ON LIVING MARINE RESOURCES IN 2017

Contents

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

This appendix contains the program for investigations to be carried out in 2017 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.

Norwegian and Russian scientists and specialists will meet in Murmansk, 20-24 March 2017 to discuss joint research programs, results from surveys and investigations in 2016/2017 and to coordinate survey plans for the rest of 2017. The meeting of the ICES working group WGIBAR will be held back to back with the March meeting. The cruise plans listed below are preliminary and may change. 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.

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

A preliminary program for the planned surveys and cooperation for 2017 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 species. 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 – 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		

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" R.V. "Kristine Bonnevie"
Target species:	Saithe, coastal cod, 0-group herring	Secondary species:	Haddock, *Sebastes norvegicus*
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, ICES AFWG		

Russian surveys

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-2-01		
Organization:	PINRO		
Time period:	October-December	Vessel:	R.V. "Fridtjof Nansen" R.V. "Vilnius"
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		

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. "G.O. Sars" 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		

Nation:	Russia/Norway	Survey title:	International ecosystem survey in the Nordic Seas
Reference No.:	J-2-02		
Organization:	PINRO, IMR		
Time period:	May – June	Vessel:	R. V. "Fridtjof Nansen" R.V. "G.O.Sars", 3 research vessels
Target species:	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, marine mammal distribution and quantity. Acoustic survey of the stocks, oceanography, plankton.
Reported to:	PINRO, IMR survey reports, International report, ICES WGWIDE, ICES WGIPS

Nation:	Norway/Russia	Survey title:	Joint Russian-Norwegian ecosystem survey (BESS).
Reference No.:	J-2-03		
Organization:	IMR, PINRO		
Time period:	August-October	Vessel:	R. V. "Vilnius" R.V. "G.O.Sars", R.V. "Johan Hjort" R.V. "Helmer Hanssen"
Target species:	Cod, haddock, saithe, catfishes , redfishes, Greenland halibut, plaice, herring, capelin, polar cod, shrimp, snow crab.	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, snow crab, Greenland halibut juveniles, marine mammal and sea birds distribution and quantity. Oceanography, plankton, species interactions, sampling for determining pollution levels.		
Reported to:	Joint IMR/PINRO Report Series, ICES ACOM, ICES WGHARP, NAMMCO, ICES 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 WIDEEPS, earlier 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 and August 2016. The next survey is planned for 2019 and to be re-conducted every three years. Results contribute directly to the ICES groups WGIDEEPS and AFWG.

A multi annual survey plan for monitoring of deep sea species is in action for Norwegian surveys. In 2017 the northern deepwater slope is the area to be surveyed with redfish and Greenland halibut as main target species. In 2016 the southern deepwater slope was the area surveyed with Greater argentine, Greenland halibut and beaked redfish as main target species.

In ICES Benchmark in 2015 two new survey indices for Greenland halibut were derived from the Joint Ecosystem Survey, and precursor survey. In this context it is important that coverage of the nursery area in northern Barents Sea and northern Kara Sea is sustained in the survey.

According to this the following surveys are applied for in 2017:

Norwegian surveys

Nation:	Norway	Survey title:	Northern Deepwater Slope Survey (Egga-Nor)
Reference No.:	N-3-01		
Organization:		IMR	
Time period:	September	Vessel:	rented vessel
Target species:	Redfish, Greenland halibut	Secondary species:	Other Deep water species and elasmobranches
Area:		Ecosystem along the Norway to Bear Island 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, ICES WGEF, ICES WGDEEP. ICES WIDEEPS		

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 2016 and the research plans for 2017.

The parties agreed that some of the questions of biology, stock assessment and fishery of crabs require further research. The parties confirmed their intention to continue the study, noted in a five-year joint research program. The program 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.).

Scientists from Russia and Norway 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. Development of a better sampling device for snow crab will be considered. Details on investigations of the snow crab stock in its distribution will be discussed at the March meeting.

Information will be exchanged between scientists and the results will be presented in survey reports, and publications. The programme will be terminated in 2017 and will be reported at the 47th session of the Joint commission.

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.

As part of the Centre for Research-based Innovation (CRISP) activity, a photographic system that automatically identifies species and sizes of individuals passing through a trawl has been tested during several research cruises. The system will be further developed and tested in 2017. 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. A system for real time trawl catch regulation during fishing operations has been tested by several Norwegian trawlers in commercial fishing for codfish in the Barents Sea. Further development and testing will be carried out in 2017. A system for catch control is also being developed for Danish Seines.

Scientists from IMR and PINRO will continue the development of survey trawls to improve and ensure

adequate survey sampling techniques.

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 2017 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. Furthermore, boat based surveys to estimate abundance will be carried out in Norwegian coastal areas both for harbour seals and grey seals. Biopsy sampling of tissue form harbour seal pups (for studies of stock structure based on DNA analyses) will be conducted in southern Norway. Comprehensive line transect sighting surveys for minke whales (and other whales) will be conducted in the Barents Sea (including the Russian EEZ) in 2017. 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 2017. Samples to assess hunting methods, diets and life history parameters will be obtained from the commercial minke whale hunt.

If possible in 2017, Russia plans to carry out 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 method will be applied. Besides and if possible, complex dedicated aerial surveys are planned to study other marine mammal species distribution and numbers, and also information about environmental 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 will be obtained from research vessels and, if possible, from research aircraft. Scientific observers will collect data on marine mammal distribution on board 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:	Monitoring of hunting methods, harp seals
Reference No.:	N-6-01		
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-6-02		
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-6-03		
Organization:	IMR		
Time period:	June	Vessel:	Rented 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 harbour seal abundance
Reference No.:	N-6-04		
Organization:	IMR		
Time period:	August-September	Vessel:	Rented vessel
Target species:	Harbour seals	Secondary species:	
Area:	Southwest Norwegian coast		
Purpose:	Estimation of the total number of harbour seals by visual observations and use of drones.		
Reported to:	NAMMCO, ICES		

Nation:	Norway	Survey title:	Boat based survey of grey seal abundance
Reference No.:	N-6-05		
Organization:	IMR		
Time period:	November	Vessel:	Rented vessel
Target species:	Grey seals	Secondary species:	
Area:	Rogaland and Hordaland		
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:	Studies, ecology and hunting methods of minke whales
Reference No.:	N-6-07		
Organization:	IMR		
Time period:	May-July	Vessel:	Whalers
Target species:	Minke whales	Secondary species:	
Area:	Norwegian coast - Barents Sea - Spitsbergen		
Purpose:	Collection of material from whales taken in commercial hunt, material to assess hunting methods, diet and life history parameters.		
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:	Rented vessel
Target species:	Minke whales	Secondary species:	Other large whales
Area:	Barents Sea (subarea EB)		
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 patches
Reference No.:	R-6-01		
Organization:	PINRO		
Time period:	March	Vessel:	Research aircraft
Target species:	Harp seal	Secondary species:	White whale, walrus 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 abundance (by estimation of number of pups in the whelping patches) of the White Sea harp seal population, study of harp seal ecology and their influence on fish species as top predators.		
Reported to:	PINRO survey report, ICES, 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:	Research aircrat
Target species:	Minke whale, fin whale, humpback whale, white whale, white-beaked	Secondary species:	Hooded seal, and other species of marine mammal, seabirds, fish schools, oceanographic and hydrobiological parameters

	dolphin, harp, ringed, grey, common, and bearded seals, walrus
Area:	The Barents and Kara Seas
Purpose:	Study of marine mammal distribution and abundance in relation to environmental conditions, fish species and other marine organisms' distribution for better understanding of the effect of marine mammals on the main commercial fishes and for use in ecosystem models for management of commercial living marine resources
Reported to:	PINRO survey report, ICES, JRNFC, NAMMCO

Nation:	Russia	Survey title:	Marine mammal coastal research and observations including collection of biological samples
Reference No.:	R-6-03		
Organization:	PINRO		
Time period:	March-September	Vessel:	Coastal expedition with the use of available transport and different types of boats
Target species:	Harp seal, minke whale, fin whale, humpback whale white whale, ringed, grey, common, 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 mammal 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, JRNFC, NAMMCO		

Joint surveys

Nation:	Russia/Norway	Survey title:	Harp seal tagging in the White Sea in the frames of marine mammal 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 mammal 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 are usually held every second year.

The Norwegian staff that read age of capelin has changed, so the joint work between PINRO and IMR specialists should be renewed. The next meeting for cod and haddock will be held in Bergen in 2017.

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 continues to be differences in opinion between PINRO and IMR regarding age reading methods for these species. An international workshop on validation on aging of Greenland halibut is carried out by ICES (WGBIOP) in 2016.

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.

Russian and Norwegian colloquies continue to develop new databases and software to make stock size estimates in a consistent, common, and quality assured way. The program "StoX" has replaced the "Beam" program used for acoustic estimation and the "Survey" program currently used to assess stocks by bottom trawl (swept area) methods. A workshop was arranged in April 2016 in Murmansk, where the StoX program was tested by experts from both institutions and applied to calculate indices based on survey data. Further discussions on the development and implementation of the StoX software will be undertaken at the March meeting.

Coordination of joint surveys in the Barents Sea

Russian and Norwegian institutions see the need to continue the optimization of survey strategies, given the limited access to resources, both in terms of experts, ships and financial supporting for such activities. This issue remains one of the most difficult and requires very careful consideration. Many different aspects such as assessment needs, finance, prioritization of work, time period, etc. need be taken into account. Scientists will discuss survey strategies and implementation of an appropriate multi-year survey plan during the March meeting.

The Svanhovd expert group in 2014 recommended combining Norwegian-Russian winter survey, a Norwegian Lofoten survey, and a Russian ground fish survey into one joint survey in winter with step-wise implementation starting in 2015. For some reasons, it was not fully implemented. However, it should come back to this issue in the 2017.

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 about the development of a new Norwegian Barents Sea research program "Arven etter Nansen" (Nansen Legacy) that is currently under development with a potential field sampling start in 2018 and a duration of six years. The details will be presented and discussed during March meeting 2017.

Sampling gears and standardizations of surveys

IMR and PINRO scientists discussed the results from trials, which were conducted by R/V *Johan Hjort* during the BESS 2014. The ruffled fine-meshed inner nets in the back part of the Harstad trawl were used to prevent snagging and escape of organisms during towing of the Harstad trawl.

The scientists agreed that the Harstad trawl is not optimal and has limitations. A new pelagic sampling trawl was tested on surveys in 2015 and -16, and the results will be discussed at the March meeting in 2017.

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. The Inter Benchmark Process on Greenland Halibut in ICES areas I and II (IBPHALI) was set up to follow up the benchmark process for this stock and was completed by correspondence in August 2015. A Gadget model (age-length-structured, tuned only on length data) is used for assessment of this stock, without use of age data since there still are disagreements on age reading methodology. The second workshop on age reading of Greenland halibut (ICES WKARGH2) was held in Reykjavik in august 2016, and will report to ICES soon.

In September 2015 ICES provided catch advice for Greenland halibut for 2016 and 2017. During this period, further work is planned to monitor and revise what is a new assessment methodology, and establish reference points, harvest control rules and a methodology for estimation of appropriate fishing mortality level. Such work will include both extension of the Gadget model back to the early 1980s as well as using additional biomass models to explore in particular the effect of high catches in the 1960s and 1970s.

In the report from the ICES Inter Benchmark Process on Greenland Halibut in ICES areas I and II (IBPHALI-2015) it is stated that "Work should continue on trying to obtain an agreed ageing methodology for this stock. The lack of age data in the model has had limited impact on the assessed biomass, but does negatively impact on modeling recruitment (and hence the ability to produce forecasts). This issue will be discussed further at the March meeting.

10. Research and long term monitoring on benthic organisms

Long term monitoring on benthic organisms 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.

Russian and Norwegian scientists will continue to contribute to collaborative and international projects within the Joint Russian-Norwegian Environmental Commission, as well as Arctic Council efforts.

Detailed discussions on future sampling programmes for benthic organisms will be undertaken at the March meeting.

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 for demersal fish.

A joint investigation will be carried out in 2016 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 2017-2018 and include sampling for farmed salmon escapees in coastal areas and in rivers. The aim of sampling for farmed salmon escapees in rivers is to provide data for quantifying genetic introgression of farmed fish into wild Atlantic salmon populations.

Russian and Norwegian scientists 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. Monitoring of pollution levels in the Barents Sea

PINRO and IMR will continue to monitor pollution levels in accordance with national programs. Monitoring pollutants is an important task to understand potential impacts on the Barents Sea food web and related food safety. Samples of seawater, sediments and fish will be collected and analysed for organic pollutants and heavy metals.

14. Russian-Norwegian Fisheries Science Symposia

The 18th Russian-Norwegian symposium will be held in Russia in spring of 2018.
It was agreed to propose joint symposium for the Commission as follow:

Title: **Influence of ecosystem changes on harvestable resources in high latitudes**

Potential themes:

- Oceanography
- Plankton composition, distribution and abundance
- Benthic distribution and production
- Fish communities on the move – food or competitors?
- Top predators

The symposium themes and conveners will be discussed and proposed at the March meeting in 2017.
The symposium language is English, and Proceedings of the symposium will be published in the IMR/PINRO Joint Report Series. We will aim for a special issue of a scientific journal for publication of good contributions.

15. Exchange program of scientific personell

It has been agreed that the program for exchange of scientific personal between Russia and Norway 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 2016.

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. Scientists will also be invited to take part in surveys onboard research vessels from both institutes.

16. 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;
- field data on temperature and salinity in the Barents Sea with 1 m depth interval from oceanographic stations.
- 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 plankton and benthic fauna;
- scales and tissue samples collected for further development of joint genetic database for Atlantic salmon;
- 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. Oceanographic data obtained during surveys need to be exchanged during the survey. If some post processing is required data should be exchanged as soon as possible.

17. 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 2017" 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 2017:

- 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 2017" 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 2016" 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