

**JOINT RUSSIAN – NORWEGIAN SCIENTIFIC RESEARCH PROGRAM ON LIVING MARINE
RESOURCES IN 2016**

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

This appendix contains the program for investigations to be carried out in 2016 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 Bergen, 14-18 March 2016 to discuss joint research programs, results from surveys and investigations in 2015/2016 and to coordinate survey plans for the rest of 2016. 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 2016 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"
Target species:	Saithe, coastal cod, 0-group herring	Secondary species:	Haddock, <i>Sebastes norvegicus</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, ICES AFWG		

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. "PINRO-1"
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		

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:	Two Research Vessels.
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. "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		

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 other 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. Acoustic survey of the stocks, oceanography, plankton.		
Reported to:	PINRO, IMR survey reports, International report, ICES WGWISE, 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:	1 research vessel, R.V. "Johan Hjort", R.V. "Helmer Hanssen", R.V. "Fridtjof Nansen", Research aircraft
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		

Purpose:	Norway, international waters, Exclusive Economic Zone of the Russian Federation, and territorial waters of the Russian Federation. The Kara Sea. 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. 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. Next survey is planned for 2016. For the future, this survey should be carried out every three years. Results contribute directly to the ICES WGDEEP and AFWG.

A multi annual survey plan for monitoring of deep sea species is in action for Norwegian surveys. In 2016 the southern deepwater slope is the area to be surveyed with redfish, greater silver smelt and Greenland halibut main target species. In 2015 the northern deepwater slope was the area surveyed with 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 2016:

Norwegian surveys

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:	Redfish, Greater silver smelt Greenland halibut	Secondary species:	Other Deep water species and elasmobranches
Area:	Ecosystem along the Norway to Bear Island slope from 62 to 75 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		

Joint surveys

Nation:	Russia/Norway	Survey title:	Norwegian Sea Deep Pelagic Ecosystem survey
Reference No.:	J-3-01	Organization:	PINRO, IMR
Time period:	August-September	Vessel:	3 research vessels
Target species:	Beaked redfish,	Secondary species:	Other mesopelagic species and elasmobranches
Area:	Norwegian Sea.		

<p>Purpose: Primary objective: To assess the stock of <i>Sebastes mentella</i> in the Norwegian Sea. To collect data in support to integrated ecosystem in the Norwegian Sea, as part of the international deep pelagic ecosystem surveys (ICES-WGIDEEPS)</p> <p>Reported to: IMR/ICES-WGDEEPS survey report, ICES AFWG, ICES WGEF, ICES WGDEEP.</p>
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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 2015 and the research plans for 2016.

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 programs. 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.

Information will be exchanged between scientists and the 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.

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 2016. 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 2016. 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.

On passive gears, a new project aimed at developing an environmental friendly bait for commercial longline fisheries has been initiated. The bait will be based on resources not used for human consumption (synthetic chemicals or surplus products). The work on improved pot designs for commercial cod fisheries has focused on testing the effect of artificial light, and a new large pot design for fishing in the near-field of aquaculture plants.

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 2016 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. Comprehensive line transect sighting surveys for minke whales (and other whales) will be conducted in the Norwegian Sea and Jan Mayen areas in 2016. 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 2016. Aerial surveys aimed to assess the abundance of harbour porpoises will be conducted in Norwegian coastal waters (to evaluate sustainability of substantial by-catches of the species in gill-net fisheries). Furthermore, boat based surveys to estimate abundance 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.

If possible in 2016, 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. Besides and if possible, 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 will be obtained from research vessels and, if possible, from Russian 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:	Boat based survey of harbour seal abundance
Reference No.:	N-6-03		
Organization:	IMR		
Time period:	August	Vessel:	Rented vessel
Target species:	Harbour seals	Secondary species:	
Area:	South Norwegian coast		
Purpose:	Estimation of the total number of harbour seals by visual observations.		
Reported to:	NAMMCO, ICES		

Nation:	Norway	Survey title:	Boat based survey of grey seal abundance
Reference No.:	N-6-04		
Organization:	IMR		
Time period:	September-October	Vessel:	Rented vessel
Target species:	Grey seals	Secondary species:	
Area:	Norwegian coast (Troms)		
Purpose:	Estimation of grey seal pup production.		
Reported to:	NAMMCO, ICES		

Nation:	Norway	Survey title:	Telemetric tagging of minke whales
Reference No.:	N-6-05		
Organization:	IMR		
Time period:	November	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-6-06		
Organization:	IMR		
Time period:	July - August	Vessel:	Rented vessel
Target species:	Minke whales	Secondary species:	Other large whales
Area:	Norwegian Sea (subarea EW) and 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 2015/2016.		

Reported to:	IWC, NAMMCO
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Nation:	Norway	Survey title:	Aerial survey of harbour porpoises
Reference No.:	N-6-07		
Organization:	IMR		
Time period:	July	Vessel:	Rented plane
Target species:	Harbor porpoises	Secondary species:	
Area:	Norwegian coast from 62°N to Lofoten/Vesterålen		
Purpose:	Sighting surveys to assess abundance of harbour porpoises, important due to substantial by-catches of the species in the area. Cooperation with the international SCANS sighting survey which covers the entire North Sea south of 62°N in 2016 and has harbour porpoise as target species.		
Reported to:	IWC, ICES, 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 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 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:	Research 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:	March-September	Vessel:	Coastal expedition with the use of available

Target species:	Harp seal, minke whale, ringed, grey and bearded seals	Secondary species:	transport and different types of boats 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 are usually held every second year. Meetings for cod and haddock were held in Murmansk in 2015 while capelin was postponed until spring 2016.

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, haddock and capelin 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 continue to be differences in opinion between PINRO and IMR regarding age reading methods for these species. An age readers meeting was conducted for redfish in 2013, and though a hands-on workshop with age readers' meeting was planned for both species in Tromsø in 2015, this was not accomplished. An international workshop on validation on aging of Greenland halibut is being proposed by ICES (WGBIOP) for 2016. 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). There could be a new ageing workshop in 2016 or 2017."

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” 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. A first operational version was released in September 2014 at IMR, including only the acoustic estimation part. This program has been applied on various stocks both in the North Sea and in the Norwegian Sea during 2015, and was tested alongside with “Beam” for calculation of the capelin stock estimate in September 2015. A second version of “StoX”, including calculation of both acoustics and trawl indices will be available in October 2015. The parties agreed that a workshop should be arranged in 2016, preferably combined with a meeting after the autumn Ecosystem Survey, where this program is tested by experts from both institutions and applied to calculate indices based on that survey. Participation and details for such a meeting will be discussed during the 2016 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. There is no ready solution for this problem at hand. Scientists will discuss surveys strategy during the March meeting 2016 and implement an appropriate multi-year survey plan for 2017.

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 2016.

Discussions regarding a multi-year ecosystem survey plan including winter and summer-fall surveys and expeditions will continue at the March 2016 meeting. The discussion will address spatial coverage and temporal coverage and priorities between investigations and surveys.

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 2017 and a duration of six years. The details will be presented and discussed during March meeting 2016.

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, in particular shape of trawl opening varied with depth, 0-group fish clogging in the trawl meshes, especially for capelin. Scientists agreed that these limitations may be solved by development of a new pelagic trawl. This trawl should meet the following criteria: 1) Easy to operate 2) the distance between vessel and trawl should be minimum 100 m at surface, 3) The trawl must maintain a constant geometry at all depths 4) The trawl must have a well-defined catch area, and 5) avoid clogging or loss of organisms. A new pelagic trawl should be optimal for capturing for target species.

The new results of PINRO and IMR testing of a modified design for the cod-end and a ruffled small mesh blinder of the "Harstad" trawl will be discussed during the 2016 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. 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.

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 biomass models to explore in particular the effect of high catches in the 1960s and 1970s.

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.

During the March 2016 meeting, IMR and PINRO will discuss the continuation of the standardized identification of benthic species identification of historical PINRO grab samples and the participation of Russian benthic experts onboard Norwegian vessels for 2016.

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.

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 2015-2016 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.

14. 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, sediment and fish will be collected and analysed for organic pollutants and heavy metals.

Scientists plan to discuss and will exchange their research findings at a meeting of scientists in March 2016 and will report to the relevant organizations according to appropriate plans and programs.

15. Russian-Norwegian Fisheries Science Symposia

The 17th Russian-Norwegian symposium “Long term sustainable management of living marine resources in the Barents and Norwegian Seas” has been postponed and will be held in Bergen, Norway in March 16-17, 2016.

A symposium program committee has been appointed: Bjarte Bogstad, 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: Evaluating long-term management plans

Theme 2: Harvest Control Rules in theory and in practice

Theme 3: Sustainable and optimal management

The symposium language is English, and Proceedings/publications of the symposium will be published in the IMR/PINRO Joint Report Series.

16. Exchange program of scientific personal

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 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;
- 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.

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 2016” 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 2016:

- 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 2016” 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