



**Northwest
Pacific
Action Plan**

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Northwest Pacific Action Plan
Pollution Monitoring Regional Activity Centre

The Seventeenth NOWPAP POMRAC Focal Points Meeting
Vladivostok, Russian Federation, October, 2020

**Report on the activities of NOWPAP Pollution Monitoring Regional
Activity Center (POMRAC) in 2018-2020**

1. Introduction

1) Pollution Monitoring Regional Activity Center (POMRAC) of UNEP Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) was established according to the decision of the 4th NOWPAP Intergovernmental Meeting (Beijing, China, 6-7 April 1999) on the basis of the Pacific Geographical Institute of the Far Eastern Branch of the Russian Academy of Sciences (Vladivostok, Russia).

2) The overall goal of POMRAC is the coordination of activities and establishment of regional cooperation in monitoring of marine and coastal environment of the Northwest Pacific region within the UNEP NOWPAP framework. Following the results of discussions at the First NOWPAP/3 Coordinating Committee Meeting (Beijing, 21-22 May 2001), the 7th NOWPAP Intergovernmental Meeting (Vladivostok, 20-22 March 2002) made a decision on sharing the responsibilities and activities between CEARAC and POMRAC as presented in document UNEP/NOWPAP IG.7/8. POMRAC is fully responsible for two working groups: WG 1 “Atmospheric Deposition of contaminants to the marine and coastal environment” and WG 2 “River and Direct Inputs of contaminants to the marine and coastal environment”.

3) In 2007 it was decided also that POMRAC might later consider focusing on activities related to Integrated Coastal and River Basin Management, which includes land-based sources of pollution. All activities related to land-based sources of pollution were expected to be implemented in close collaboration with all NOWPAP RACs and with the UNEP/GPA.

4) In the 2018-2019 biennium, part of the financing of several POMRAC activities related to the payment of the work of national experts and the organization of events outside of Russia was allocated through the additional DINRAC budget (80,000 US \$).

5) The 22th Intergovernmental Meeting approved the budget of US\$ 114,250 for 2018-2019 biennium for POMRAC activities (including US\$ 9,250 for RAP MALI implementation).

2. Organization and staff

1. The POMRAC Secretariat is hosted by Pacific Geographical Institute of the Far Eastern Branch of the Russian Academy of Sciences (PGI FEB RAS). Day-to-day work is being done by 3 assigned researchers and technicians from the Pacific Geographical Institute working as volunteers:

Dr. Anatolii Kachur	Director (kachur@tig.dvo.ru)
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3. Report of POMRAC activities carried out after the 22th NOWPAP IGM Main activities in 2018-2019

2. In accordance with decisions of the 22nd NOWPAP IGM with the budget approved at this meeting, and with the main lines of POMRAC activities on fields of WG 1, WG 2 and WG ICARM as well as with the directions of the Draft NOWPAP MTS 2018-2023, the following activities were scheduled 2018-2019:

- Joint Activity for WG1, WG2 and ICARM WG with cooperation with RACs, RCU and relevant organizations (PEMSEA, YSLME and others): Development of regional NOWPAP EcoQO targets aligned with SDG indicators (Phase 1) with regional workshop in 2019.

- Microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian coastal waters.

- Joint Activity for WG1, WG2 and ICARM WG with cooperation with RACs: the Assessment of trends in river and direct Inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade.

3. The following POMRAC activities are suggested for the 2018-2019 biennium:

- to organize the 15th and 16th Focal Points Meetings;

- to organize Regional Workshop “Development of regional NOWPAP EcoQO targets aligned with SDG indicators (Phase 1)” (in cooperation with RCU, RACs and other relevant organizations);

- Development of the Regional Overview “Development of regional NOWPAP EcoQO targets aligned with SDG indicators (Phase 1)”;

- Development of Report: Microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian coastal waters.

- Development of the Regional Overview the Assessment of trends in river and direct Inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade.

Meetings.

3.1.1 The 15th POMRAC Focal Points Meetings

4. The 15th NOWPAP POMRAC Focal Points Meeting was held during 4-5 July, 2018 in Vladivostok, Russian Federation (Fig.1)



Figure 1. 15 FPM in Vladivostok 2018.

The major objectives of this meeting were as follows:

- Overview of the progress made in the intersessional period after the 14th NOWPAP POMRAC Focal Points Meeting
- Discussion and adoption of the Workplan and budget for the activity “Development of regional NOWPAP EcoQO targets aligned with SDG indicators. Phase 1”
- Discussion and adoption of the Workplan and budget for the activity “Assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade”
- Discussion and adoption of the Workplan and budget for the activity ‘Microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian part of NOWPAP area’
- The progress in the implementation of abovementioned POMRAC activities was presented and discussed. Nomination of the experts for the preparation of national inputs and elaboration of the structure of the inputs are the main intermediate results.
- Workplan and budget of POMRAC activities for the 2018-2019 biennium
- Other matters:
 - Development of RAP BIO: the Role of POMRAC
 - NOWPAP follow up and review of SDG 14.1

3.1.2 The 16th POMRAC Focal Points Meetings

5. The 16th NOWPAP POMRAC Focal Points Meeting was held during 30 October - 1 November 2019 in Beijing, China (Fig.3)



Figure 2. 15 FPM in Beijing 30 October - 1 November 2019

The major objectives of 16th Focal Points meeting were as follows:

- Overview of the progress made in the intersessional period after the 15th NOWPAP POMRAC Focal Points Meeting

- Discussion of the results of work on key POMRAC activities:

- “Microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian part of NOWPAP area”

- “Development of regional NOWPAP EcoQO targets aligned with SDG indicators, phase 1”

- “Assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade”

- The results of developments of abovementioned POMRAC activities were presented and discussed.

After the discussion, the meeting agreed with the results of those activities.

- Workplan and budget of POMRAC activities for the 2020-2021 biennium

After the discussion, the meeting agreed workplan and budget of POMRAC for 2020-2021.

3.1.3 Joint Activity for WG1, WG2 and ICARM WG in collaboration with other RACs, RCU and relevant organizations.

Activity 1. Development of regional NOWPAP EcoQO targets aligned with SDG indicators. Phase 1

6. The 22nd NOWPAP Intergovernmental Meeting (IGM) has approved the Programme of Work for 2018-2019 biennium, including the POMRAC activity: "Development of regional EcoQO targets aligned (where possible) with SDG indicators, phase 1". During the implementation of EcoQOs activity in 2016-2017, national experts agreed that the following six NOWPAP EcoQO indicators could be applied in their countries:

- Nutrients concentration in the water column (possible SDG indicator 14.1.1)
- Nutrient ratios (silica, nitrogen and phosphorus)
- Chlorophyll a concentration in the water column (possible SDG indicator 14.1.1)
- Harmful algal blooms (HABs)
- Concentration of the contaminants in sediments, water and organisms
- Trends in the amount and composition of litter washed ashore (possible SDG indicator 14.1.1)

7. **Goal** of this activity was to analyze the national numerical targets (where they exist) on the abovementioned NOWPAP EcoQO indicators and suggest (and then discuss) possible regional EcoQO targets aligned to the extent possible with the above mentioned SDGs indicators.

Tasks: In accordance with signed MoUs, nominated experts from all NOWPAP countries had to analyze the availability of information and implementation prospective for each indicators taking into account the following aspects:

- Scientific background including analysis of advantages and limitations of indicator, based on experience within the NOWPAP region and international knowledge;
- Availability of relevant information, including international and national official sources;
- Assessment of possibility of applying each indicator based on the existing national legislation.

8. The template of National Inputs was prepared by POMRAC Secretariat. The National Inputs were circulated among POMRAC Focal points, and after notable amendment in accordance with comments provided, have been submitted to the international consultant for the analysis and compilation as a regional synthesis.

9. The preparation of National Inputs with information on above mentioned 3 aspects for each of the above mentioned SDG indicators will be a core of this project.

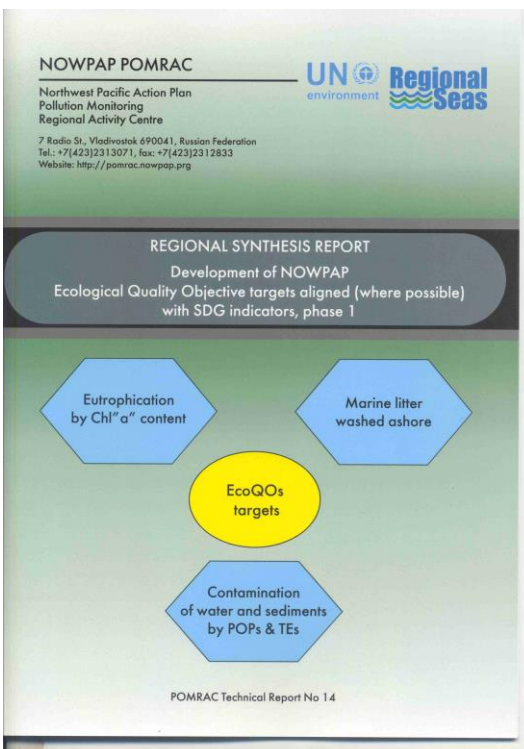
10. Progress on the activity was discussed during **POMRAC Workshop in Vladivostok March 20-21, 2019** (fig. 3)

During the workshop, National Inputs were presented by the nominated experts

from NOWPAP member states. Then, experts discussed in detail the suggested targets related to six EcoQO indicators agreed upon earlier. Experts have suggested several designated areas within their respective countries where preliminary EcoQO targets could be tested during the second phase of POMRAC activity “Development of regional EcoQO targets aligned (where possible) with SDG indicators”. In some cases, experts have decided that setting targets on certain EcoQO indicators would be premature or unnecessary.



Figure 3. Workshop “Development of regional NOWPAP EcoQO targets aligned with SDG indicators. Phase 1”



11. Expected outcomes and future direction: The regional synthesis prepared after an analysis of these National Inputs (and preferably after a regional workshop) will be the main output of this project. This synthesis report will be reviewed by NOWPAP RACs, RCU, NFPs, and then published and circulated between relevant stakeholders.

12. Final version of the Regional Synthesis (UNEP/NOWPAP/POMRAC/FPM 16/Inf.4) has been uploaded at the NOWPAP POMRAC website as technical report and was published and distributed.

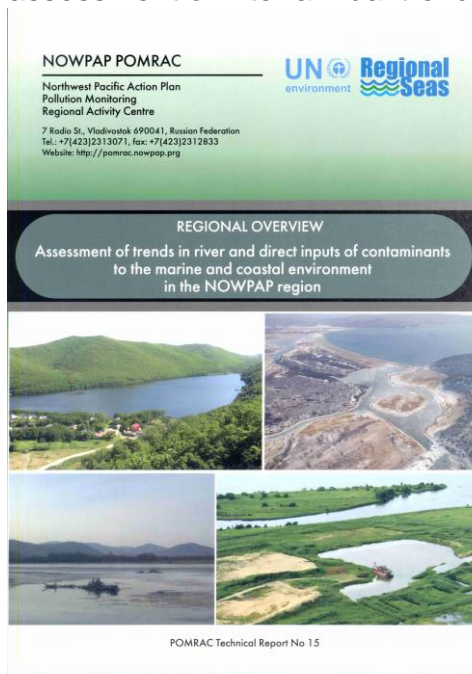
3.1.3 Activity 2. Assessment of trends in river and direct Inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade

13. Regular assessment of the state of the marine environment is one of the major goals of UNEP NOWPAP as a whole, and NOWPAP POMRAC in particular. Proposed new NOWPAP Medium-term Strategy (MTS 2018-2023) also include regular assessments as a key activity. River and direct inputs of chemical substances are very important factors related to many environmental problems in marine and coastal areas. This is the reason why preparation of the Regional Overview on River and Direct Inputs of Contaminants into the Marine and Coastal Environment in the NOWPAP Region (hereinafter RDI RO) was one of the initial activities of POMRAC. That RDI RO has been published in 2006 and was based on the data of 2002-2004. The necessity to update this information is obvious, especially taking into account the effects of global changes. This was a reason of the proposal to prepare new assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region during the last decade. Proposal was suggested at the 14th POMRAC FPM, and approved by 21 IGM in 2017.

14. **Goal** of this project was to compile present (up-to-date) information on the river inputs and direct inputs of chemical substances and to estimate the trends during the last decade. This goal is closely connected with analysis of existing monitoring schemes and methods used in the NOWPAP countries. Comparison of the monitoring schemes and methods, including the environmental standards (used now and those used before 2004) was a second major goal of this project.

15. **Tasks.** Project should be implemented through the National Inputs prepared by experts nominated by POMRAC FPs in accordance with the structure presented at and approved by the 15th POMRAC FPM. Regional overview should be prepared by compilation and synthesis of these National Inputs with the same overall structure.

Methodology features and differences in the river water quality monitoring in all NOWPAP countries have to be reflected in the Regional Overview along with the assessment of inter annual trends in river runoff of contaminants.



Direct inputs of contaminants and data on the wastewaters generation and discharge are assessed in the NOWPAP countries by different methods and formats. These features have to be presented in National Inputs, and to be reflected in Regional Overview.

16. Draft Regional Overview has been compiled by Russian POMRAC FP and was circulated among other POMRAC focal points and experts for the review and comments.

After that, amended Regional Overview was discussed at the 16th POMRAC FPM (UNEP/NOWPAP/POMRAC/FPM 16/Inf.5), and

circulated among other RACs and National FPs for the comments. After finalization Regional Overview was published as a POMRAC technical report and distributed.

3.1.4 Activity 3. 'Microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian part of NOWPAP area'

17. POMRAC activity 'Microplastics abundance in river runoff and coastal waters of the NOWPAP region' was approved by the 21 IGM in 2017 as part of the activities on WG2 – River and Direct inputs of contaminants into the marine environment of the NOWPAP region. Its basic idea is to assess inflow of microplastic particles with rivers discharging into the marine area of NOWPAP and finding relations with plastic contamination in the adjoining coastal waters.

18. **Goal** of this activity is to obtain background information on the distribution of different kinds of microplastics in the some major rivers within Russian part of the NOWPAP region, and to trace possible impact of river runoff on microplastics quantity and composition in the coastal waters within the Russian part of the NOWPAP region.

19. **Tasks:** The following steps were supposed to achieve the objective of this activity:

- To obtain data on the concentrations of microplastics in the rivers of the Russian part of the NOWPAP region and try to assess the microplastics input to the sea with river runoff. Collecting similar existing data from other NOWPAP countries might allow to estimate the role of river runoff in the microplastics transport.

- To assess and analyze current methods of sampling microplastics in the seawater and fresh water and the sample treatment protocols applied in NOWPAP countries, considering possible development of general guidelines/recommendations for microplastic monitoring in NOWPAP;

- To compare existing data on microplastics quantity and composition in the coastal water within the NOWPAP region, including further collection of the background information on the quantity and composition of plastic particles in the coastal water of the Russian part of the NOWPAP region.

- To assess the possible impacts of river discharge, urban areas, landfills, tourism, fishery, etc. on contamination of marine ecosystems with microplastics; to share national data and to carry out related survey in the Russian part of NOWPAP.

20. **Activities:**

Rivers and coastal areas within Peter the Great area have been chosen for the study in this project due to maximal anthropogenic press compare with other NOWPAP areas within Russia. 8 typical rivers, including transboundary Tumen R. and Razdolnaya (Suifen) R. were studied.

Seasonal samplings (spring, summer, autumn) have been carried out in rivers in 2018-2019 (fig. 4), and results of the previous studies 2016-2017 were used as well. Methods using plankton net with 0.1 mm mesh size were effective enough though additional works are needed for the intercalibration purpose.

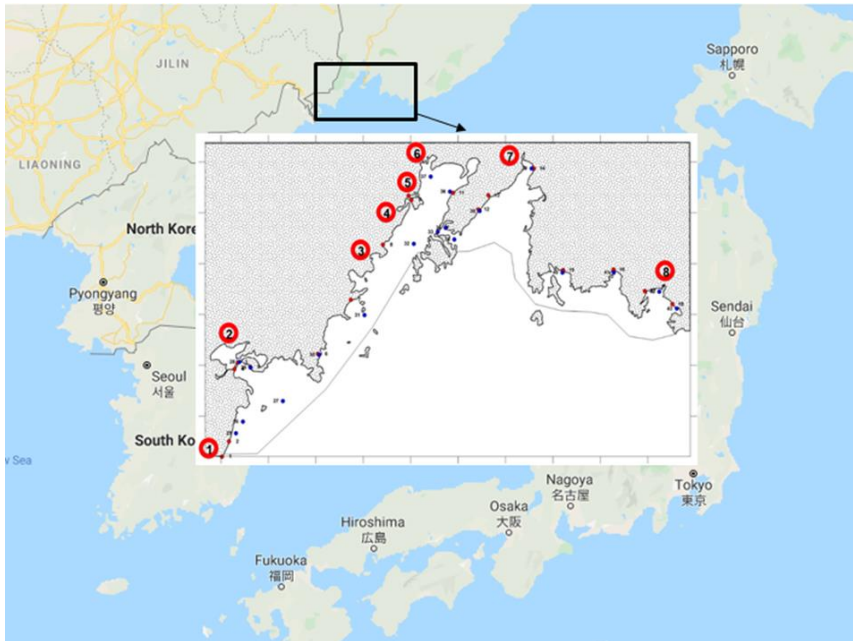


Fig. 4. Sampling sites in the Peter the Great Gulf. Red dots indicate sampling sites in the littoral water, blue dots correspond to samples from coastal water. Red circles with numbers correspond to the areas where selected rivers discharge. 1 – Tumen River, 2- Tsukanovka River, 3- Narva River, 4 – Barabashevka River, 5 – Amba River, 6 – Razdolnaya/Suifenhe River, 7 – Artemovka River, 8 – Partizanskaya River.

Transboundary Tumen R. and Razdolnaya (Suifen) R. showed maximal level of microplastic abundance one order higher than in other rivers (fig. 5). High water regimes in spring and summer are accompanied by the elevated concentration of microplastic. 2-3 times enrichment of surface layer of river waters compare with subsurface one is a next feature of the spatial-temporal variability of microplastic quantity within the river.



Figure 5. Suspected plastic particles in a sample from coastal water near Tumen River estuary prepared for spectra identification (4x magnification) (left) and suspected plastic particles in a sample from Razdolnaya/Suifenhe River prepared for spectra identification (4x magnification) (right).

Surveys show that river runoff of microplastics is evidently an important factor in the land-based pollution and can be calculated, however more data is required to make detailed comparison to impacts of other land-based sources due to a number of reasons.

Examples of the results of studies of the microplastic content in the waters of rivers of basin of Peter the Great Bay are shown in the figures 6 and 7.

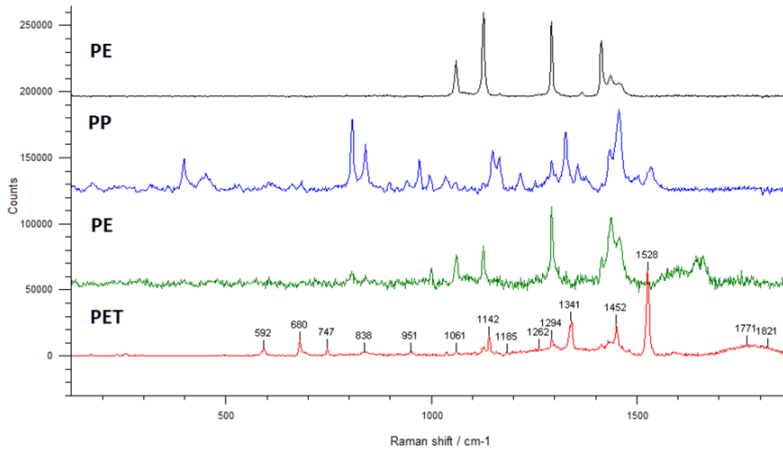


Fig. 6. Examples of Raman spectra used for identification of polymer types of suggested microplastics

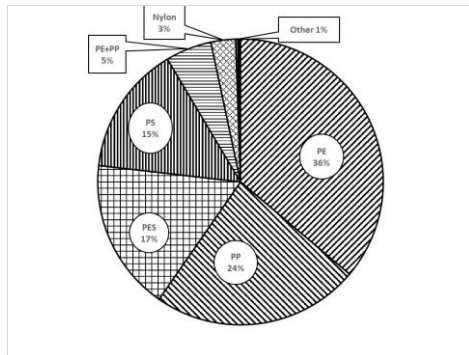

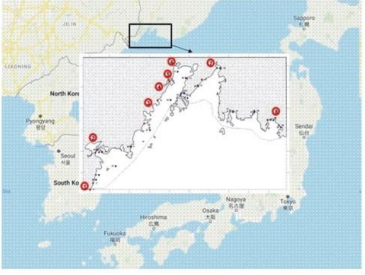


Fig. 7. Ratio of basic polymer types detected in all selected rivers


 United Nations Environment Programme
 Northwest Pacific Action Plan (NOWPAP)
 Pollution Monitoring Regional Activity Centre (POMRAC)

Microplastics abundance in river runoff and coastal waters of the Russian part of NOWPAP area



NOWPAP POMRAC, 2019

Outcomes. POMRAC secretariat will compile the draft version of the report before the 16th FPM and share it with Focal Points and experts for their consideration. After compilation the document was circulated among POMRAC experts and POMRAC FPs for the comments. After amendment the document was circulated among RACs and National Focal Points and uploaded to POMRAC web-site as a technical report.

3.2 POMRAC activities related to Implementation of NOWPAP Regional Action Plan on Marine Litter (RAP MALI)

26. Undertake research on microplastics content and migration in the Peter the Great Gulf in support of the implementation of NOWPAP RAP MALI (Joint Activity with MSU (Marine State University) and NSCMB FEBRAS (National Science Center Marine Biology)).

During the 2018 summer season, were completed 5 sampling cruises, water samples were collected (Fig. 8). The 2019 season continues with sampling on the same stations.



Figure 8. Network of stations for monitoring the composition of microplastic in the coastal waters of Peter the Great Bay

Sampling for studying the distribution of microplastics in the coastal waters of Peter the Great Bay was carried out according to the following procedure, which corresponds to the guidelines for harmonization of microplastics monitoring methods on the sea surface (Y. Michida, S. Chavanich, C.A. Cózar, P. Hagmann, H. Hinata, A. Isobe, P. Kershaw, N. Kozlovskii, D. Li, A.L. Lusher, E. Martí, S.A. Mason, J. Mu, H. Saito, W.J. Shim, A.D. Syakti, H. Takada, R. Thompson, T. Tokai, K. Uchida, K. Vasilenko, J. Wang Guidelines for harmonizing ocean surface microplastic monitoring methods, 71 pp. Ministry of the Environment Japan).

Examples of the results of studies of the microplastic content in the waters of Peter the Great Bay are shown in the figures 9 and 10.

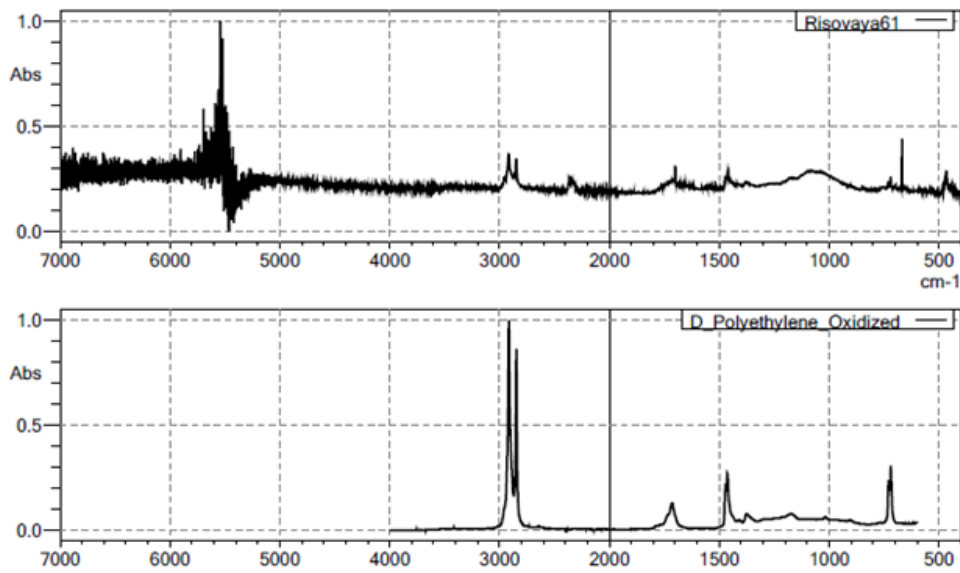


Figure 9. The spectrum of samples obtained in one of the bays of Peter the Great Bay in 2018 (fragment)

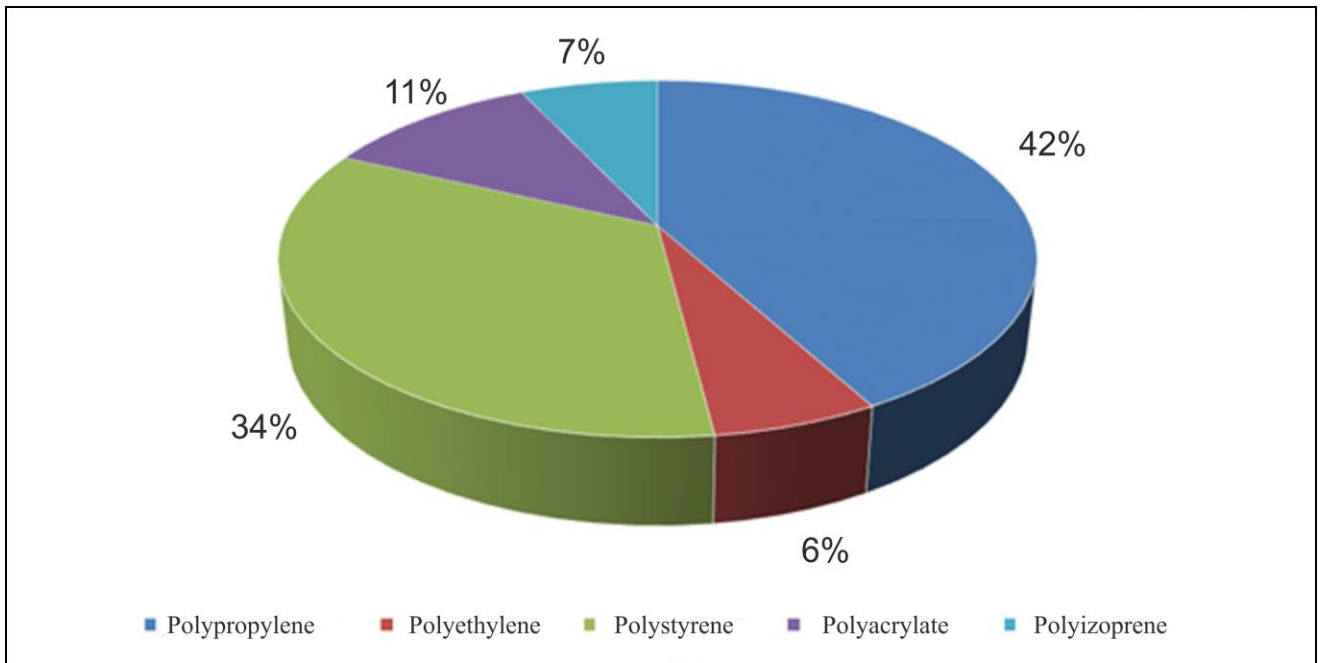


Figure 10. The ratio of polymers in the Amur Bay.

3.3 Other POMRAC activities in 2018-2019 after 23 IGM.

27. During 2018-2019, POMRAC staff members were actively involved in the meetings organized by NOWPAP RACs, WESTPAC, PICES and other organizations.

In addition, POMRAC employees participated in a number of scientific and other events with a presentation on the activities of NOWPAP:

- NOWPAP RCU and RACs Meeting, 1-2 April 2019, Busan, Dr. Shulkin V. Presentation of the possible structure of SOMER-3 prepared by POMRAC Secretariat along with the same prepared by NOWPAP RCU

- Regional Workshop NOWPAP POMRAC – March, 21, 2019, Vladivostok, Dr. Shulkin Presentation results of the implementation on the activity “Development of regional NOWPAP EcoQO targets aligned with SDG indicators”

- CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP Region – March, 22, 2019, Vladivostok, Dr. Shulkin Presentation results of eutrophication assessment in the Peter the Great Bay, Russia. Sign of eutrophication were observed in north parts of the Amursky and Usurysky Bays, areas close to the Tumen River and coastal areas adjoining to Vladivostok city.

- NOWPAP CEARAC FPM, September 9-10, 2019, Toyama, Dr. Shulkin Presentation on the probable scheme of collaboration between NOWPAP RACs at the preparation of SOMER-3

- United Nations Decade of Ocean Science for Sustainable Development (2021-2030) The conference “Marine specially protected natural territories of the World”, devoted to the 120th anniversary of the foundation of the Far Eastern Federal University (FEFU) September 26-30, 2019, Vladivostok, Russia. Dr Kachur. MARINE PROTECTED AREAS (AREAS) OF THE NORTH-WEST PACIFIC (current status, management plans and development strategies)

- The 1st Meeting of the Northeastern Asia Water Research Council (‘tentative’). 23-24 May 2019, Daejeon, Republic of Korea, Dr. Kachur “Problems of use of water resources of the Russian Far East”

- 1st Technical Workshop on the preparation of the Regional Seas Programme SDG 14 Outlook Report 25-27 November 2019, Helsinki, Finland, Dr. Kachur A as represented of NOWPAP.

4. POMRAC Budget and Expenditure for 2018-2019

Table 1. Budget 2018-2019 from Trust fund of NOWPAP

Budget	
Results/Outputs	Total Cost (USD)
Activity 1 – Develop the regional overview of NOWPAP Ecological Quality Objectives (EcoQO) targets aligned with SDG indicators (Phase 1)	
Finalizing and printing of the National Inputs and Regional overview of the NOWPAP EcoQO targets aligned with SDG indicators (Phase 1)	4,000
Report of the regional workshop “Development of the Regional Overview “Development of regional NOWPAP EcoQO targets aligned with SDG indicators (Phase 1)”	18,000
Sub-total	22,000

Activity 2 – Prepare Assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region	
Finalizing and printing of the regional assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region	4,000
Sub-total	4,000
Activity 3 - Prepare the Regional Report on microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian coastal waters	
Regular sampling trips (surveys) to the selected sites of rivers downstream and sea coasts	7,200
Processing of samples for microplastic concentration	1,800
Analysis of quantity and quality of microplastics particles by FTIR, Raman SC and other methods	15,000
Preparation of the report on microplastic quality and abundance in the Russian rivers and coastal waters	9,000
Sub-total	33,000
Activity 4 - Strengthen regional capacity on pollution monitoring through knowledge and information sharing and capacity building	
Organization and participation in the 15 th and 16 th Focal Points Meetings	22,000
Preparation of meeting reports	6,000
Communication expenses	2,000
Inputs to NOWPAP RAC activities and technical reports, contributions to national, regional and global meetings and processes	10,000
Sub-total	40,000
Activity 5 - Update, maintain and enrich POMRAC website	
New design of the website	400
Maintenance and regular updates of the website	1,600
Sub-total	2,000
Activity 6 - Undertake research on microplastics content and migration in the Peter the Great Gulf in support of the implementation of NOWPAP RAP MALI (Joint Activity with MSU (Marine State University) and NSCMB FEBRAS (National Science Center Marine Biology)	
Sampling surveys at the selected coastal areas	4,000
Processing of samples	950
Analysis of microplastic by FTIR, Raman SC	7,500
Field report on the surveys on microplastics content and migration in the Peter the Great Gulf, Russia	800
Sub-total	13,250
Total Cost	114,250

Table 2. POMRAC Expenditure for 2018-2019

Activity	Original Budget (USD)	Expenditures in (2018) (USD)	Expenditures incurred in (2019) (USD)	Total Expenditures (USD)
Activity 1				
Joint activity of WG1, WG2, ICARM WG: Development of the Regional Overview “Targets and indicators for Ecological Quality Objectives used in NOWPAP member states”	22,000	2,000	8,000	22,000
The regional workshop “Development of the Regional Overview “Development of regional NOWPAP EcoQO targets aligned with SDG indicators (Phase 1)”			12,000	
Sub-total	22,000	2,000	20,000	22,000
Activity 2				
Prepare Assessment of trends in river and direct inputs of contaminants to the marine and coastal environment in the NOWPAP region	4,000	0	4,000	4,000
Sub-total	4,000	0	4,000	4,000
Activity 3				
Prepare the Regional Report on microplastics abundance in river runoff and coastal waters of the NOWPAP region with a case study in the Russian coastal waters	33,000	22,000	11,000	33,000
Sub-total	33,000	22,000	11,000	33,000
Activity 4				
Organization of 15 th and 16 th POMRAC Focal Points meetings	40,000	33,750	6,250	40,000
Sub-total	40,000	33,750	6,250	40,000
Activity 5				
Update, maintenance and enrichment of POMRAC Website	2,000	1,000	1,000	2,000
Sub-total	2,000	1,000	1,000	2,000
Activity 6				
Undertake research on microplastics content and migration in the Peter the Great	13,250	10,250	3,000	13,250

Gulf in support of the implementation of NOWPAP RAP MALI				
Sub-total	13,250	10,250	3,000	13,250
Total	114,250	69,000	44,250	114,250