

Third Ecosystem Status Report Implementation Plan, IP-NPESR Revised June 20, 2016

Study Group on North Pacific Ecosystem Status Report, SG-NPESR
North Pacific Marine Science Organization, PICES
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Abstract

Introduction

The Study Group on North Pacific Ecosystem Status Report, SG-NPESR, was initiated following PICES 2014 (Yeosu) to continue work initiated under FUTURE SOFE at PICES 2011 (Khabarovsk). The advice provided by SOFE in 2011 was reviewed and revised at the FUTURE workshop held in conjunction with ISB 2012 (Busan), and also at ISB 2013 (St Petersburg). A formal proposal for the third NPESR was presented to the Standing Committees and SB 2013 (Nanaimo). Unusual circumstances at SB 2013 and subsequent events, including the retirement of SOFE in the reorganization of FUTURE, led to the establishment of SG-NPESR in early 2015 to move the NPESR proposal forward.

Purpose

The IP-NPESR presents the schedule of tasks and the estimated budget necessary to build the foundation of environmental time series observations, ETSOs, for the third NPESR and all subsequent editions by PICES 2016. Please note that although tasks are identified, the details of how the tasks are to be accomplished are necessarily left for the participants to define according to available resources.

Outline of Tasks and Responsibilities with Target Dates

The tasks to be performed as scheduled during 2016 and 2017 and the responsible parties are shown in Table 1. Definitions of the tasks follow the table.

Table 1 follows.

Table 1. Schedule of tasks and responsibilities for producing NPESR

Task		2016												2017											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1. ETSO System Development	Data Management Contractor																								
2. ETSO Maintenance	Data Management Contractor																								
3. ETSO Nominations	BIO_FIS_MEQ_POC_TCODE_MONITOR																								
4. ETSO Submissions	Authors																								
5. Interim Workshop on NPESR Time Series	SG-NPESR et al.																								
6. Ed Board Review & Adds Nominations	NPESR Editorial Board																								
7. Establish NPESR Synthesis Expert Group	Governing Council																								
8. Invitations & Confirmations to Authors	NPESR Editorial Board																								
9. Present selections to PICES 2016	SG-NPESR																								
10. Synthesis	NPESR SWG																								
11. North Pacific Synthesis Workshop	NPESR SWG et al.																								
12. Editing	NPESR SWG, NPESR Editorial Board																								
13. Formatting NPESR	Data Management Contractor																								
14. Review and Adoption NPESR	NPESR Editorial Board																								

Budget

The personnel and material resources necessary to produce the third NPESR are shown in Table 2. Plans call for a data management contractor to adapt an existing data management system that currently functions to receive text and data input by authors (see Attachment A) according to a standard template (see Attachment B) via web interface for storage into a database. Each submission by an author is known as an environmental time series observation, ETSO. Basic summary reports and lists of the ETSOs in the database are to be produced by algorithms executed in a language of contractor's choice. A document called the North Pacific Ecosystem Status Report Third Edition would be extracted from the ETSO data base and formatted by the contractor at the direction of the NPESR Synthesis Working Group and the Editorial Board.

Contractor is to note that resources that have already been committed for these purposes by all PICES' member nations, and by PICES may be relevant to the project. For example PICES already supports a server devoted to metadata and data exchange (PICES TCODE GeoNetwork).

Table 2. Budget for producing third edition of NPESR

NPESR Production Budget		
Activity	2016	2017
1. ETSO System Development	\$35,000	
2. ETSO Maintenance	\$10,000	\$24,000
3. ETSO Nominations		
4. ETSO Submissions		
5. Interim Workshop on NPESR Time Series	\$18,000	
6. Review & Addition of Nominations		
7. Establish NPESR Synthesis Working Group		
8. Invitations & Confirmations to Authors		
9. Present selections to PICES 2016		
10. Synthesis		
11. North Pacific Synthesis Workshop		\$20,000
12. Editing		
13. Formatting NPESR		\$24,000
14. Review and Adoption NPESR		
	\$63,000	\$68,000

Definitions

1. ETSO System Development Jul '16 - Dec '16

Data management contractor to adapt an existing data management system that currently functions to receive text and data input by authors (see Attachment A) according to a standard template (see Attachment B) via web user interface for storage into a database. Each submission by an author is known as an environmental time series observation, ETSO. Basic summary reports and lists of the ETSOs in the database are to be produced by algorithms executed in a language of contractor's choice.

2. ETSO Maintenance Aug '16 - Dec '17 and forward

Data management contractor is to maintain the web based system for generating the third and future editions of NPESR.

3. ETSO Nominations Feb '16 - Jul '16

Standing committees will nominate six or more time series that are deemed representative of ecosystem status. At least one time series for each member nation is to be nominated. Please see the most recently published [NPESR](#) for examples. Note that not all observations that describe ecosystem status are necessarily continuous time series. In some cases observations in a locality may be separated by multiple years. The ability to compare observations from one time frame to another is essential.

4. ETSO Submission Jul '16 - Feb '17

Individual authors are responsible for submissions input to the fields of the template displayed on the web user interface provided by the data management contractor (Attachment B). See Table 3 below. Data management contractor will advise PICES Secretariat, SG-NPESR, and the Editorial Board of the URL containing the user interface as soon as possible but no later than August 31, 2016.

5. Interim Workshop on NPESR Time Series Jun '16

The Workshop on Time Series for Detecting Changes in Ecosystem Status in a Changing Climate will bring together experts to consider the questions surrounding how to define a collection of physical and biological time series observations that are suited to characterize ecosystem status for PICES North Pacific Ecosystem Status Report. The nominated time series will be critically reviewed and syntheses may be attempted. Time series from physics, chemistry and biology that have been contributed by PICES member nations to characterize ecosystem status will serve as the starting point on which to develop practical advice that may form the basis for a scholarly paper on criteria for selecting the time series that form the foundation for understanding and detecting ecosystem status during climate change.

6. Review & Addition of Nominations Jul '16 - Dec '16

The chairs of standing committees sitting as the NPESR Editorial Board, chaired by the Deputy Executive Secretary of PICES, will communicate about nominations and coordinate the selection of ETSOs. As outstanding or particularly appropriate sets of observations are

discovered, the Editorial Board may invite additional authors to submit. The Editorial Board may enlist the services of peer reviewers when necessary to determine the suitability of the nominated time series for the purposes of NPESR, or to recommend alternatives or additional time series.

7. Establish NPESR Synthesis Working Group May '16

A working group to conduct the synthesis of the foundational ETSOs was established approved at Interim Science Board 2016. The working group will coordinate and communicate with the SG-NPESR to effect an orderly transition of duties as the SG is concluded in November 2016.

8. Invitations & Confirmations to Authors Jul '16 - Dec '16

As vetted by the interim workshop and as confirmed by the Editorial Board in consultation with the NPESR SWG, authors to be included in the synthesis will be so informed by the secretariat.

9. Present selections to PICES 2016 Nov '16

The SG-NPESR will present a summary of the successful nominees in plenary at PICES 2016.

10. Synthesis Oct '16 - Dec '17

As led by the NPESR SWG, the authors of the NPESR will analyze and make inferences regarding trends in properties of the individual North Pacific ecosystems.

11. North Pacific Synthesis Workshop Apr or May '17

The NPESR SWG and the authors will come together to develop an overarching synthesis of North Pacific Ecosystems.

12. Editing Dec '16 - Aug '17

The NPESR SWG and the Editorial Board (or its designees) will edit sections of the NPESR as they are produced.

13. Formatting NPESR Jan '17 - Dec '17

The data management contractor will format tables and graphics and lay them out with corresponding text suitable for printing or web publication at the direction of the NPESR WG and Editorial Board.

14. Review and Adoption NPESR Nov '17 - Dec '17

The Editorial Board will conduct a final review prior to accepting the NPESR on behalf of PICES.

Attachment A. Example of typical content for an ETSO submission.

Note: Example has not been submitted in the format of the template (Attachment B). Data have not been appended to this example.

The human impact on the mercury accumulation in modern sediments of Amur Bay, the Japan/East Sea

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It is important to study the processes of the distribution and migration of mercury in the environment because of its high toxicity. Since the onset of the industrial period anthropogenic emissions of mercury have increased and its global cycling have been significantly altered (Fitzgerald et al., 2007; Schuster et al., 2002). The Amur Bay has been being exposed to the intense anthropogenic influence since the middle of the 20th century. The sources of pollutants are the industrial discharges of the enterprises located in the Razdol'naya River basin and on the Murav'ev-Amurskii Peninsula (Vladivostok city). This study investigates the reconstruction of mercury accumulation in bottom sediments of Amur Bay.

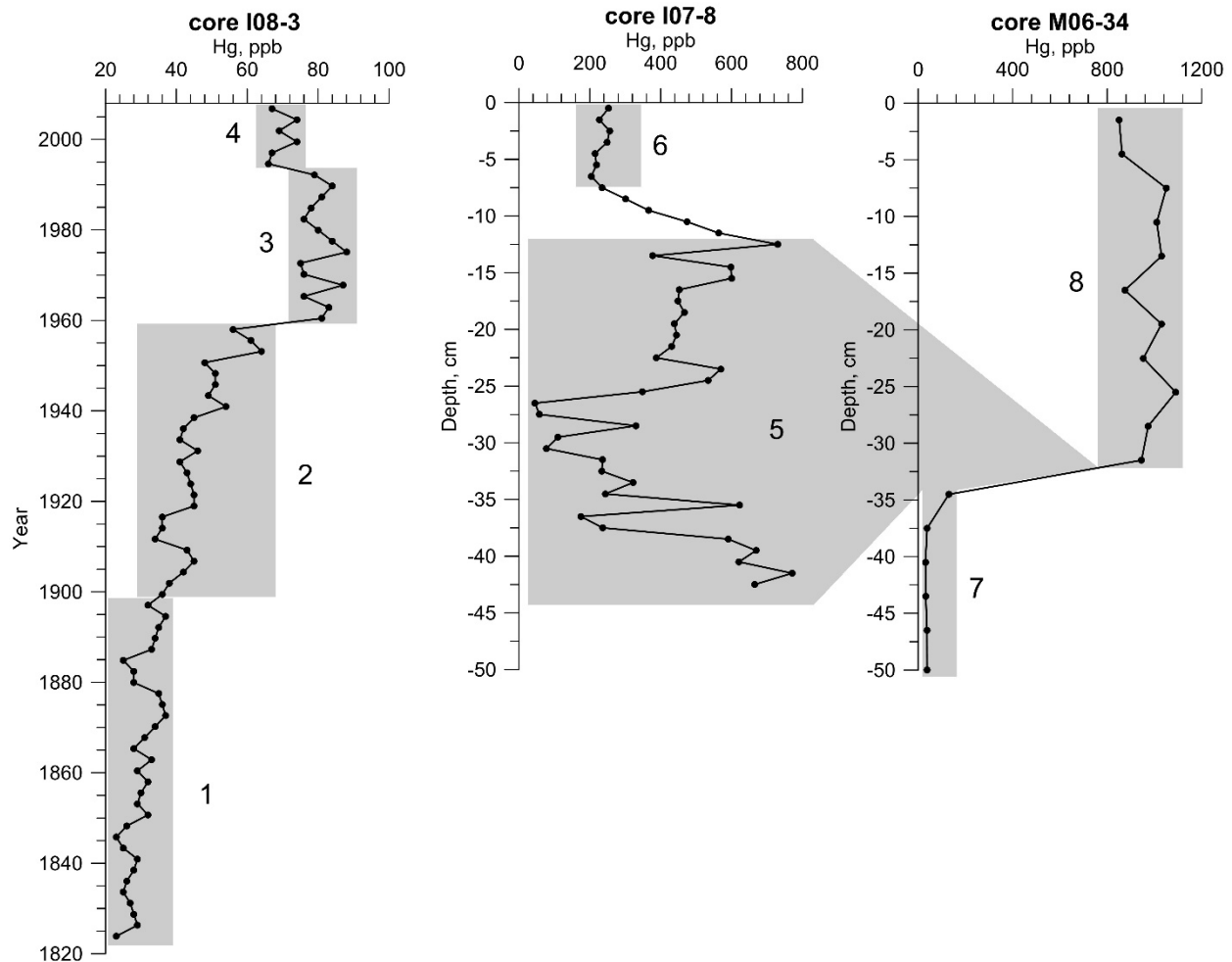


Figure 1. Vertical profiles of total mercury concentrations in the sediment cores from the Amur Bay (I08-3, I07-8) and the Zolotoi Rog Bay (M06-34). 1, 7 - background concentration; 2 - moderate impact, 3, 5 - intensive contamination; 4, 6, 8, - recent level.

Mercury in sediment coreThe sediment samples were collected by the small gravity core GOIN-1.5 in the northern part of Amur Bay and the Zolotoi Rog Bay (Vladivostok). Total mercury concentration in dried at 50 °C samples was determined by atomic absorption spectroscopy on an RA-915+ analyzer equipped with an RP-91C (Lumex Ltd., St. Petersburg, Russia) pyrolysis system. The accuracy of the method was tested using a Certified Reference Material Marine Sediments (MESS-3 and PACS-2) (Aksentov, 2013).

Mercury content in surficial sediments of the northern part Amur Bay ranged from 50 to 760 ppb with an average value of 120 ppb (Polyakov et al., 2008). The higher concentrations were found in Zolotoi Rog Bay (2500 ppb) (Aksentov, 2013).

The modern sedimentation rate of 4.1 mm/year was determined in the core I08-3 based on unsupported ^{210}Pb (Kalugin et al. 2015). Vertical mercury distribution shows the stages of its accumulation in sediments associated with the increase of the human impact (Fig. 1).

Cleaning of the Zolotoi Rog Bay and dumping contaminated sediments in the Amur Bay is demonstrated mercury concentrations in cores I07-8 and M06-34 (Fig. 1).

Estimated from core horizons, deposited before the sediment was impacted by human activities, baseline level are 30 ppb.

There are also bottom sediments with high mercury content located near natural source. Sand in the wave-cut terrace along the abrasion bench in Cape Nizkii Popov Island contain mercury 1000-2500 ppb (Aksentov, 2015). At this point influenced by the deep Murav'ev fault. Nevertheless, it is not widespread.

It follows from the above reasoning that bottom sediments of Amur Bay are polluted different degrees. Development of the Southern Primorye has increased the accumulation of mercury in the bottom sediments.

Literature cited

Aksentov K.I., 2013. Mercury in bottom sediments of the Peter the Great Bay. Ph.D. Thesis, POI FEB RAS, Vladivostok, 140 p [In Russian].

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Fitzgerald W.F., Lamborg, C.H., Hammerschmidt, C.R., 2007. Marine biogeochemical cycling of mercury. *Chem. Rev.* 107, 641-62.

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Schuster P.F., Krabbenhoft D.P., Naftz D.L., Cecil L.D., Olson M.L., Dewild J.F., Susong D.D., Green J.R., Abbott M.L., 2002. Atmospheric mercury deposition during the last 270 years: a glacial ice core record of natural and anthropogenic sources. *Environ. Sci. Technol.* 36, 2303-10.

Polyakov D.M., Aksentov K.I., Ivanov M.V., 2008. Mercury in the bottom sediments of the marginal filter of the Razdol'naya River, Amur Bay. *Geochemistry Int.* 46, 614-621.

I08-3 131° 48,192´ 43° 10,743´ I07-8 131° 50,335´ 43° 05,373´

M06-34 131° 52,850´ 43° 06,105´

Attachment B. Template for Submission of ETSOs by Authors

Contribution content follow the following outline and definitons:

1. Title: In title case (nouns, verbs capitalized; articles lowercase)
 2. Contributed by: Authors of contribution
 3. Contact author: Name of author to contact with questions
 4. Contact information: Affiliation, mailing address, email address
 5. Last updated: Month, Year
 6. Body of contribution: 1 page of text and 1 or 2 figures and/or tables. If possible, the text of the contribution should incorporate the following
 - **Description of time series observation (ETSO):** a description of the ETSO including reference to methods, locating coordinates or polygon (decimal), and how the ETSO is useful for understanding climate change or its impacts.
 - **Status and trends:** the historical trends and current (2009 - 2013) status of the ETSO
 - **Factors influencing observed trends:** potential causes for observed trends and current status
 - **Implications:** Briefly answer these questions: What are the implications or impacts of the observed trends on the ecosystem or ecosystem components? What do the trends mean? Why are they important? How can this information be used to inform policy makers' decisions?
 7. Figure(s) and/or Table(s) that illustrate the index (indices). 1 or 2 figures and/or tables.
 - **Figures and Tables:** Send figures and tables as separate jpg, png, or pdf. You may also include them in the doc with the text, but they should also be sent separately in highest resolution possible. Format them as for journal publication; keep the final size in mind when considering readability of axis labels. Use Arial font, at least 12 point, suitable for aging eyes to read a print version.
 8. Literature Cited
- Each reference cited in text must be listed in the Citations section and vice versa. Double-check for spelling, dates, and other publication details.
9. Data contributions: You are requested to submit the data illustrated in the figures and tables, while also providing the metadata that allows another scientist to reproduce your results. If you are unable to submit the data please state that the data are not available.

Attachment C. Proposed Statement of Work for Data Management Contractor

According to the specifications and schedule of the NPESR3 Implementation Plan and attachments, the contractor develops a web based user interface to receive text, graphics and data input by authors, stores the data input by each author as a record containing the variables identified as fields in Attachment A, prepares reports and lists summarizing the content of the database, and extracts and formats records according to instructions received from PICES entities.

Basic summary reports and lists of the ETSOs in the database are to be produced by algorithms executed in a language of contractor's choice. A document called the North Pacific Ecosystem Status Report Third Edition is to be extracted from the ETSO data base and formatted by the contractor at the direction of the NPESR Synthesis Working Group and the Editorial Board.

Contractor is prepared to receive about 250 records where attachment B is an example of a typical record submitted without data. Data may be attached to any record at the authors discretion. The most likely formats for data attachments are Excel, csv, and netCDF. During formatting, contractor may be required to prepare additional graphic visualizations for those records having attached data.

Contractor is expected to adapt existing software to the purposes described above as well as to write original code as required to accomplish the tasks described in the Implementation Plan.