

FIRST ANNOUNCEMENT AND CALL FOR PAPERS

(REVISED)

SEVENTH INTERNATIONAL SYMPOSIUM ON GIS/SPATIAL ANALYSES IN FISHERY AND AQUATIC SCIENCES

HAKODATE, HOKKAIDO, JAPAN
AUGUST 21 (MON) - 25(FRI), 2017



Spectacular view from Mt Hakodate: One of three major night-views of the world
<http://www.hakodate.travel/en>



[ORGANIZER]

INTERNATIONAL FISHERY GIS SOCIETY

[LOCAL CO-ORGANIZER]

HAKODATE RESEARCH CENTER FOR FISHERIES AND OCEANS

Deadline for the registration and submission of abstracts is **May 30, 2017**

*Please distribute this announcement to your colleagues or friends
who might be interested in participating in this Symposium.*

(March, 2017) (Rev_3)

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(*) GIS/SPATIAL ANALYSES IN FISHERY AND AQUATIC SCIENCES (VOLUME 7)

DEAR COLLEAGUES,

We are pleased to circulate the 1st announcement on the “Seventh International Symposium on GIS/ Spatial Analyses in Fishery and Aquatic Sciences”. Its general theme is the same as in the past six Symposia, i.e., to emphasize GIS as a tool for conducting spatial analyses in fishery and aquatic sciences, which encompasses the ecosystem approach to fisheries management and the interrelationships among inland + marine fisheries, aquaculture and the aquatic + terrestrial environments, in which the activities take place.

[BACKGROUNDS]

Applications of spatial analyses using GIS in fishery and aquatic sciences have lagged behind those used in terrestrial sciences. However, from the last decade of the 20th century to the present, GIS in fishery and aquatic sciences has rapidly become a powerful tool for spatial analyses in aquatic environments, as evidenced by the papers presented in the past six Symposia.

There have also been local, regional and national GIS workshops and meetings on various topics in fishery and aquatic sciences including: fisheries oceanography, aquaculture, satellite remote sensing, inland fisheries, fisheries management, spatial numerical analyses, habitats, site selection and etc.

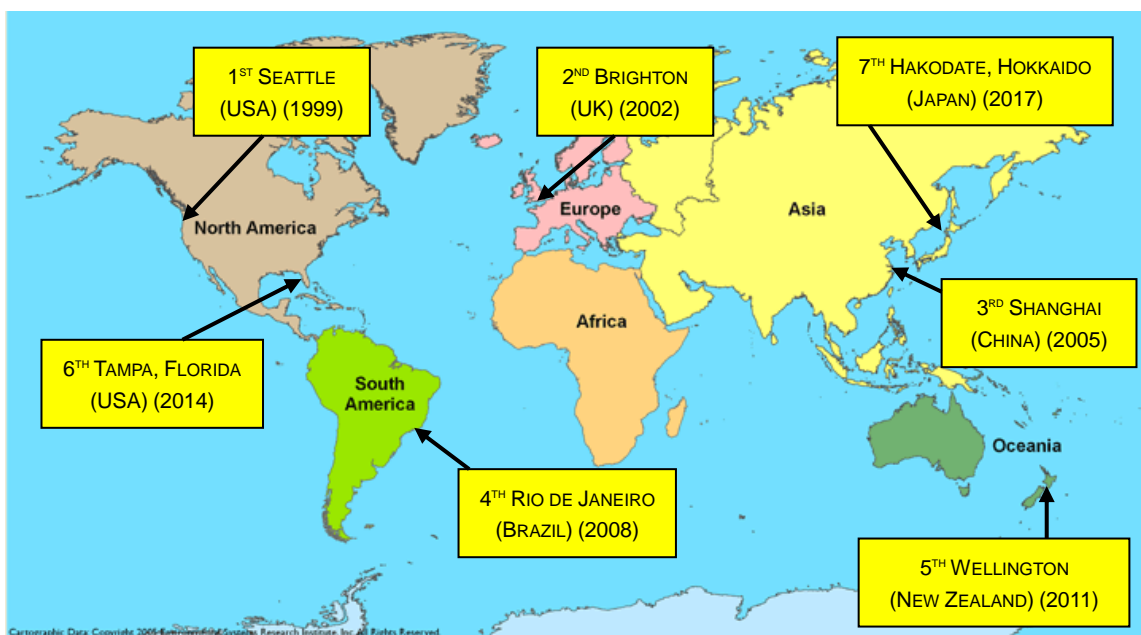


However, the opportunity to share experiences in these developments and applications at a global level has been limited. For this reason, we initiated 'First International Symposium on GIS in Fishery Science' in Seattle, Washington, USA in 1999. Afterwards, we completed six symposia (Map 1) and have been achieving our goals successfully. **Appendix A** outlined these six symposia.

[FIRST ANNOUNCEMENT: SEVENTH SYMPOSIUM (2017)]

These six global fishery and aquatic sciences GIS conferences have generated interest world-wide and there has subsequently been strong interest in demonstrating new and further developments. In the three years since the sixth Symposium, it is apparent that there has been significant progress in GIS/spatial analyses in fishery and aquatic sciences. Hence, we encourage your participation in the seventh Symposium to present new ideas or to share updates on your spatial research using GIS or on other GIS-related issues such as software development, computer hardware, education and reviews.

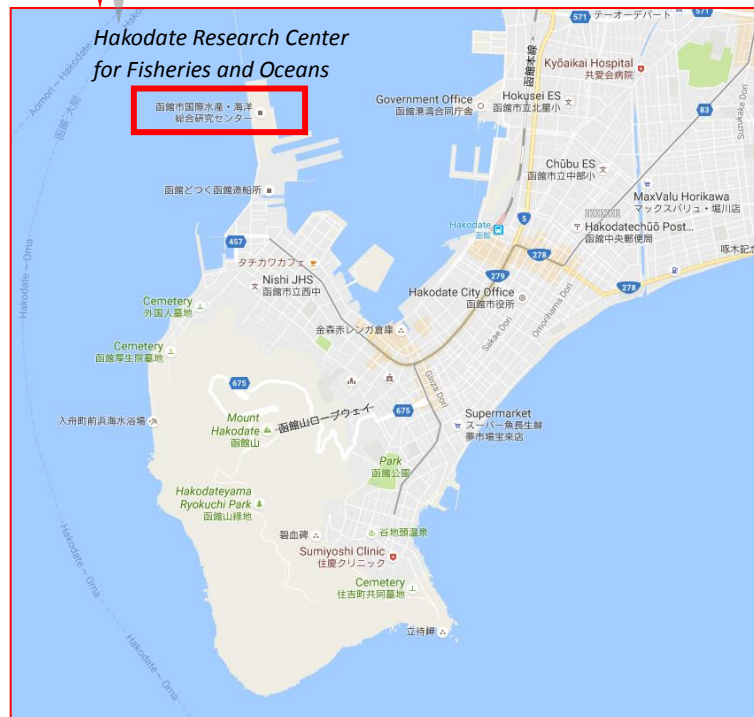
This is the 'FIRST ANNOUNCEMENT AND CALL FOR PAPERS' for the 'Seventh International Symposium on GIS/Spatial Analyses in Fishery and Aquatic Sciences (August 21-25, 2017)'. The 'International Fishery GIS Society' will again be the main organizer and the venue and the local co-organizer will be Hakodate Research Center for Fisheries and Oceans, Hakodate (<http://www.hakodate.travel/en>), Hokkaido, Japan.



MAP 1 LOCATIONS OF VENUES IN THE PAST 6 SYMPOSIA AND THE 7TH SYMPOSIUM



Information on Hakodate
<http://www.hakodate.travel/en>





[MAJOR OBJECTIVES]

The primary objectives of the Seventh Symposium are the same as in the past i.e.,

- To highlight developments and applications of GIS/Spatial analyses in Fishery and Aquatic Sciences;
- To exchange ideas and information; and
- To suggest further improvements, techniques and applications of GIS/Spatial analyses in Fishery and Aquatic Sciences.

[THEMES FOR 7TH SYMPOSIUM]

Number of proposals was received. Amongst them, following three important and hot themes were selected. Presenters are encouraged to work on these themes. However, other topics are certainly welcome to present. For your information, please refer to Appendix B on themes in the past six symposia.

Theme 1: Ecosystem Approach to Fisheries and Aquaculture

By now, fisheries managers in many countries and International organizations adopted GIS-based systems, along with GPS, VMS, satellites, electronic log books and other devices. This has been the important topic world-wide for a long time in both fisheries and aquaculture since FAO adopted “Ecosystem Approach to Fisheries (EAF)” and “Ecosystem Approach to Aquaculture (EAA)”.

This work will be conducted integrating various geo-technologies such as GIS soft/hardware, Remote Sensing (RS), Global Positioning System (GPS), Vessel Monitoring Systems (VMS). Relevant topics are, “Marine Spatial Planning”, “Marine Protected Areas (MPA)”, “Global Warming”, “Biodiversity”, “Spatial Conservation and Management” and “Dynamic management of Fisheries (e.g., closures following real-time mapping of key habitat such as nurseries for optimal fish stock management)”.

They are likely to have a huge effect on (marine) spatial analyses in the coming years. This topic will be extremely useful for Government officials, IT engineers, GIS system developers and scientists.

Theme 2: Spatial data analyses for Unmanned Systems

Brand new topic. Unmanned Systems such as drone (air) and ROV (sea) are now hot issues. Spatial data analyses for Unmanned Systems are challenging works (for example, Coral Reef Mapping, fine-scale dynamic management for MPA etc.). Participants are expected to see real application.

Theme 3: Integration of GIS with other disciplines or digital tools

We suspect that most GIS work carried out world-wide will simply download required data into a database management system and then use this data in a proprietary GIS. But there are huge opportunities to link the data and GIS to other forms of software, or to integrate GIS into other disciplines. Participants deserves to see examples of the success and variety of such linkages described as below:

- *Network & communication systems with web-, mobile-GIS, ICT & other Technology (ICT: Information and Communication Technology)*
- *Real-time monitoring systems using Remote Sensing, data-loggers and above mentioned systems.*
- *Socio-economics (benefit) concerned systems: fishing ground prediction, site selections for mariculture and aquaculture.*

[PARTICIPATION]

Participation from a broad audience representing GIS/Spatial analyses in Fishery and Aquatic Sciences is encouraged, i.e., scientists, students, computer experts (developers or engineers), managers (government officials), administrators, educators and others.

[PRESENTATION OF PAPERS]

For participants who wish to present their work, there are three ways, i.e., by **oral presentation**, **poster presentation** or **PC based demonstration** of GIS software, hardware and related systems. Duration of oral presentations will depend on number of presenters, but we tentatively set them for **20 minutes** (15 minutes for presentation and 5 minutes for questions and answers) (*subject to change by number of participants*). For poster presentations and PC demonstrations, particular sessions will be set up. The final duration of oral presentations and details of poster and PC demonstrations will be stated in the final announcement to be circulated by April, 2014.

[KEYNOTE SPEAKERS AND MODERATORS]

Keynote speakers and moderators for each session will be selected and announced at the later date.

[LANGUAGE]

We use only English for communications, presentations, abstracts, formal papers and all the other relevant matters on the Symposium. Presenters: please **speak slowly and clearly** as more than 50% of past participants were non-native English speakers.

[SUBJECTS COVERED]

The Symposium will cover spatial analyses using GIS or GIS related topics in Fishery and Aquatic Sciences. Within this there are three main categories:

- [A] Marine related subjects;
- [B] Freshwater, Inland or Brackish-water related subjects; and
- [C] Other subjects.

Each of these three main categories may include a variety of sub-topics as follows:

[A] MARINE RELATED SUBJECTS

- (1) Habitats
- (2) Fisheries
- (3) Fishery Oceanography
- (4) Marine Ecosystems and Ecosystem Approaches
- (5) Remote Sensing and/or Acoustic Survey
- (6) Marine Resources Analysis and Management
- (7) Geostatistics, Forecasting and Modeling
- (8) Mariculture
- (9) Artificial Reefs
- (10) Marine Protected Areas (MPA's) and Marine Reserves
- (11) EBSAs (Ecologically or Biologically Significant Areas) and VMEs (Vulnerable Marine Ecosystems)
- (12) Marine Spatial Planning and Ecoregion Planning
- (13) Others (specify for registration)

[B] FRESHWATER, INLAND OR BLACKISH-WATER RELATED SUBJECTS (INCLUDING WATERSHED AND ESTUARY)

- (1) Habitats
- (2) Fisheries
- (3) Estuarine, Lacustrine and Riverine Ecosystems
- (4) Ecosystem approach
- (5) Remote Sensing and/or Acoustic Survey
- (6) Resources Analysis and Management
- (7) Forecasting, Geostatistics or Modeling
- (8) Aquaculture
- (9) Others (specify for registration)

[C] OTHERS

- (1) Theory, Concepts or General Topics
- (2) Demonstration of GIS related Software, Database, Hardware or Systems using Computers
- (3) Education
- (4) Reviews
- (5) Others (specify for registration)

[OUTLINE OF THE SYMPOSIUM PROGRAM] (*)

Table 2. Outline of the 7th symposium schedule.

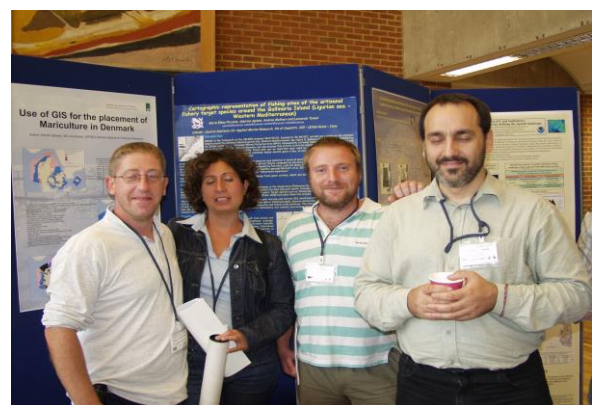
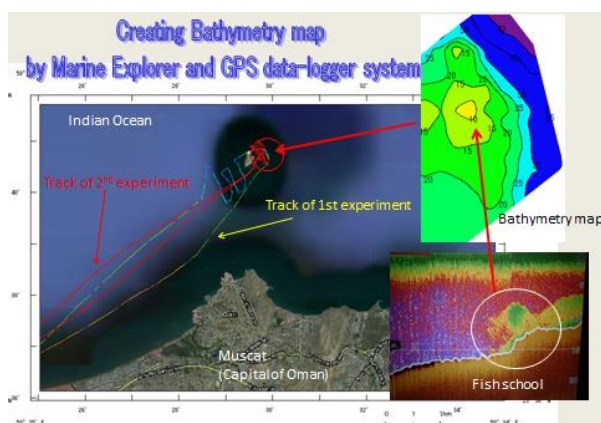
August, 2017	Events and Activities	Social events	Registration (**)
21 (Mon)	<ul style="list-style-type: none"> ● Openings and key note speeches ● Oral presentations (GIS system, concept and education) 	ice-breaking party	Registration at the reception desk in the entrance hall
22 (Tue)	<ul style="list-style-type: none"> ● Presentations (Major topics will be covered by Orals, Posters and demonstrations of GIS software, system with PCs) 	Group photo	
23 (Wed)		Symposium dinner	
24 (Thu)			Secretariat room (8:30-17:00)
25 (Fri)	<ul style="list-style-type: none"> ● Sum-up Session (Panel discussion) ● Closings 		Daily

[Note (*)]

For those who don't have time to stay for 5 days, we suggest that you attend for 3 days from Aug. 22-24 as major papers will be presented in these 3 days.

[Note (**)] Registration at the reception desk

All the participants (normal, late and walk-in registrants) should FIRST go to the reception desk in the Entrance Hall. You will get one envelop including the program, the abstract proceedings, your name card and other information. Walk-in registrants need to register and pay the late registration fee. The reception desk will open 8:30-17:00 every day (Aug 21-25, 2017).



[SUBMISSION OF ABSTRACTS]

All presenters MUST submit an abstract by May 30, 2017. Abstracts submitted after this date will not be accepted due to the strict time constraint for producing the Symposium Program and the Abstract Proceedings. The Guidelines for submission of the abstract are stated in Box 1 (below). An Abstract Proceedings will be prepared and one copy will be provided to each participant at the registration desk at the Symposium. If you are interested in obtaining the Abstract Proceedings from the last four Symposia, please refer to the web site at <http://www.esl.co.jp/Sympo/publication.pdf>

BOX 1

Guideline for Abstract Submission

(1) Format

Each abstract will be printed on a sheet of standard A4 paper. The abstract should not exceed 350 words. In the abstract, please include objectives, methods (including the GIS software name if applicable) and results. One color GIS Map or Figure can be also submitted (optional). Example of the abstract format is specified as follows:

(Format of the Abstract)

(Title) Guidelines for the Symposium on GIS in Fishery Sciences

(Authors) Yoko ONO ^{1/} and John Lennon ^{2/}

1/ Professor, GIS Research Institute, Univ. of Hot Springs, Kyoto,
424-0091, Japan (yoko.ono@hot_spring.edu.jp)

2/ GIS expert, University of GIS, .P.O. Box 99999, EC1Y 8SY, London,
UK (John_Lennon@GIS.ac.uk)

(Key words) List by the alphabetical order, Maximum 8 key words

(Text) Not more than 350 words

(2) Submission

Abstracts should be submitted by E-mail to the Secretariat of the International Fishery GIS Society at fish-gis@smile.odn.ne.jp by May 30, 2017. Use MS-WORD file with one optional color GIS map.

[HELP PUBLICIZE THE SYMPOSIUM]

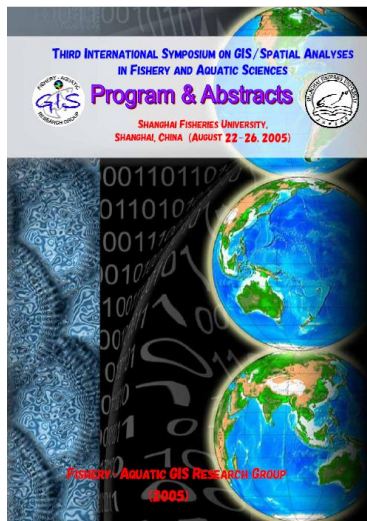
Please help to put this announcement in free listings, e.g. 'Fishing International', 'various GIS publications', etc. and/or to put it in the bulletin boards of research institutions, universities and other relevant outlets. Please also help to distribute this announcement to your colleagues or friends who might be interested in participating in this Symposium. We very much appreciate your kind help and cooperation in this.

[PUBLICATION OF PROCEEDINGS]

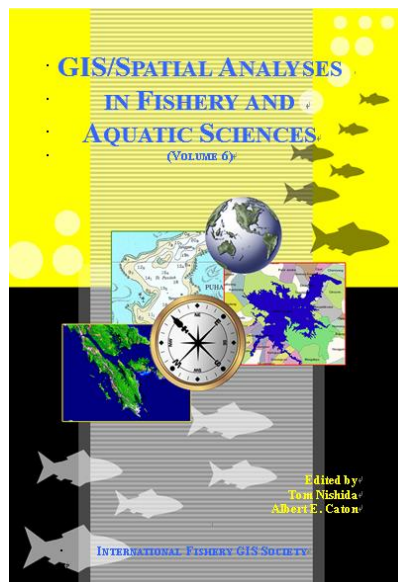
Those who make a presentation (oral, poster or PC demonstration) and who wish to submit a full paper for the Symposium Proceedings, to be published by the International Fishery GIS Society as **"GIS/SPATIAL ANALYSES IN FISHERY AND AQUATIC SCIENCES (VOLUME 7)"**, should send a full paper to the Secretariat of the International Fishery GIS Society at fish-gis@smile.odn.ne.jp by **October 31, 2017**.

Papers will be peer reviewed by two referees. If the paper is then accepted, it will be checked by professional editors before formal publication. The Proceedings will be published in 2018 or later. **"Guidelines" for the formal papers are available at** http://www.esl.co.jp/Sympo/7th/Guidelines_2017.pdf

If you are interested in the Proceedings of the past Symposia and other publication, please refer to the web site at <http://www.esl.co.jp/Sympo/publication.pdf>



ABSTRACT (3RD SYMPOSIUM)



PROCEEDINGS (6TH SYMPOSIUM)



ABSTRACT (4TH SYMPOSIUM)

[CALL FOR ADVERTISEMENTS]

If GIS related firms such as software and hardware developers are interested in placing their advertisements in our publications and E-mail circulations, please contact the Secretariat of the International Fishery GIS Society by E-mail at fish-gis@smile.odn.ne.jp. We can then discuss details including the design, the cost etc. Please note we have more than 10,000 E-mail members in more than 50 countries and 10 international organizations.

[EXCURSION]

No excursions are planned. However, it is easily possible for visitors to book onto excursions through webs (for example, <http://www.hakodate.travel/en>) and/or local travel agencies.



[REGISTRATION]

If you wish to participate in the 7th Symposium, send the following information by E-mail to the Secretariat of the International Fishery GIS Society at fish-gis@smile.odn.ne.jp. **Please make one registration per one person attending.**

- (a) Full name (first, middle and last: LAST NAME IN CAPITAL LETTERS);
- (b) Name of the organization that you belong to;
- (c) Your Post, and Position or Title;
- (d) Postal (mailing) address;
- (e) E-mail address;
- (f) Telephone number including country code;
- (g) FAX number including country code; and

If you intend to present a paper (including poster, exhibition and demonstration using PC or other devices), please provide us with the following additional information. **(If you are making more than one presentation, please provide information for each separately).**

- (h) Title of your paper;
- (i) Names of the author and co-authors;
- (j) Subject of the paper: Select one from category specified in [SUBJECTS] (page 13), for example, [B]-(3);
- (k) Name of the presenter; and
- (l) Specify the method of presentation, i.e., [Oral], [Poster], or [PC demo] (software/hardware demonstration with PC).

After you send the registration form by E-mail, you will get the registration number from the Secretariat. If you don't get the number within one week, please let us know by E-mail at fish-gis@smile.odn.ne.jp.



[REGISTRATION FEES]

Please pay your registration fee once you get your registration number. When you send the registration fee, please indicate your registration number. Table 3 shows a schedule of the registration fees.

Table 3. Summary of registration fees

Type	Payment Period	registration fees	Payment Method (See next page for details)
Normal registration fee	By May 30, 2017	US \$ 300	Credit cards
Late registration fee	After June 1, 2017	US \$ 500	
On-site (walk-in) registration fee	Aug. 21-25, 2017 (during the Symposium)		Cash or credit cards

[NOTE]

- (1) Registration fees will be used for administrative expenses, costs of the facilities, the wages of the part time assistants, printing costs for the abstract proceedings, the Symposium Proceedings and other necessary expenses.
- (2) There are a limited number of the helper jobs during the Symposium such as the time keepers, microphone distributors, coffee-break helpers etc. If you are interested in, please let us know when you register. Then registration fees will be waived only if you register (by May 30, 2017) and selected. The priority for these positions will be for students and participants from developing countries.



Methods of Payment by credit card

Visa, Master Card, American Express or JCB are accepted

(1) Secured online payment

This will be informed to those completed the formal registration.

Or

(2) Payment via e-mail or FAX

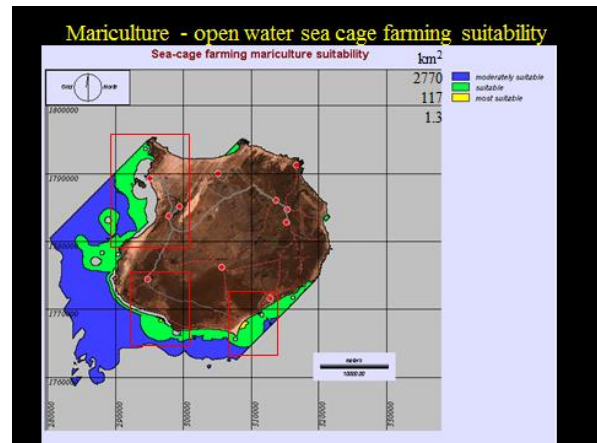
Please inform us of your credit card name, its number and expiration year/month. For security reasons, please send your CR information by splitting it into a few separate e-mails to (fish-gis@smile.odn.ne.jp) or by FAX 81 (Japan)-49-241-2442 (international) or 049-241-2442 (in Japan) for Secretariat of the International Fishery GIS Society. You do not have to re-send your CR information if you have given it to us in the past, unless the information has changed (e.g., new expiry date).

Important note

As Agencies of these credit card companies are based in Japan, they will use Japanese currency for the settlements. This means that you might pay less than in the registration schedule (price list if you pay for publication listed page 27) or vice versa depending upon the exchange rates between two dates, i.e., the date when the credit card Agencies pay (settle with) the International Fishery GIS Society and the later date when these Agencies charge (settle with) the payees(you).

[CANCELLATION POLICY]

If you wish to cancel your attendance after completing the registration, you should inform the Secretariat by E-mail, then 50% of your registration fee will be returned.



[SCHEDULE: DEADLINES AND IMPORTANT DATES]

Dates	Deadlines and important dates
December 31, 2016	Deadline of call for themes
May 30, 2017	Deadline for the normal registration Deadline for the abstract submission <i>Those who will present papers (including oral, posters and PC demonstration) MUST register and send the registration fee & ABSTRACT by MAY 30, 2017, otherwise, presentations will not be accepted.</i>
June 1-Aug. 25, 2017	Period of late or on-site (walk-in) registration
Aug. 21-25, 2017	7 th Symposium
October 31, 2017	Deadline for the formal papers for the Proceedings (GIS/Spatial analyses in Fishery and Aquatic Sciences) (Volume 7)
2018	Publication of the Proceedings (GIS/Spatial analyses in Fishery and Aquatic Sciences) (Volume 7)

[ACCOMMODATION (HOTEL RESERVATION) IMPORTANT]

It is strongly recommended to make reservations your hotel by yourself as early as possible by March 2017. This is because August is the peak tourist season in Hakodate and it will be impossible to find rooms in the Hakodate area if you book after April. We also recommend to book rooms near the Hakodate JR (Japan Railway) Station as we will provide the shuttle bus between the meeting venue and the Hakodate JR Station. To make bookings, please use the internet services such as Booking.com, Hotels.com, hotels-scanner.com, trivago.com and etc.

Please find the hotel information in our home page
at <http://www.esl.co.jp/Sympo/7th/index.htm>

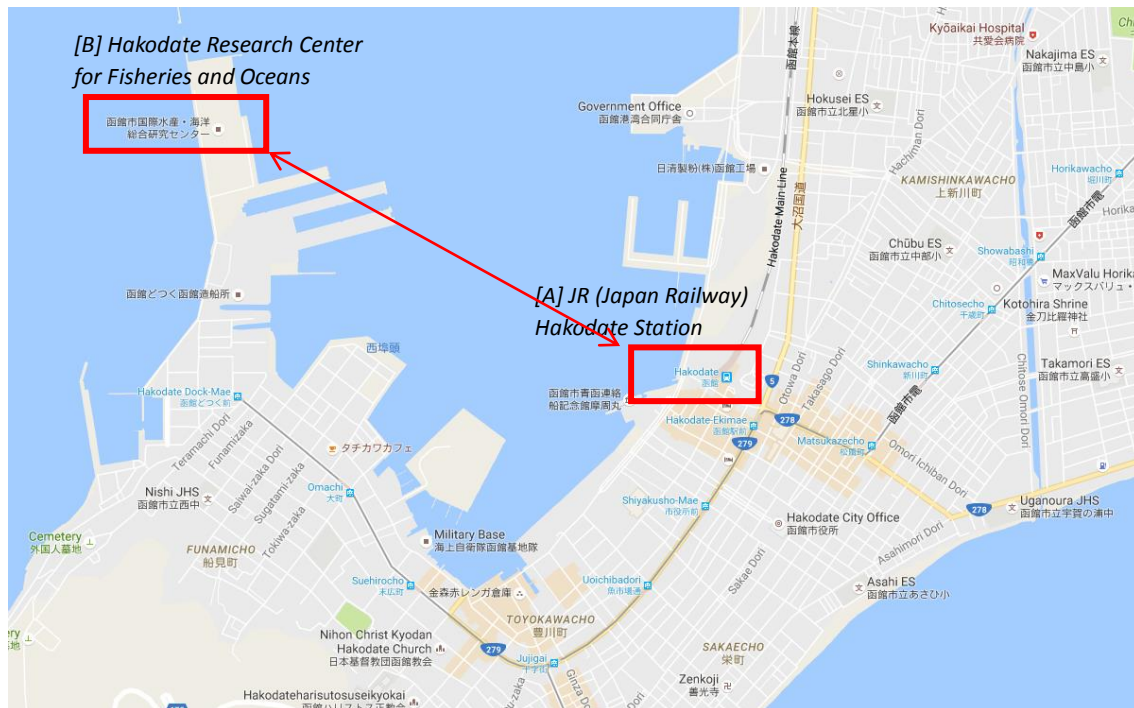
[GENERAL INFORMATION ON HAKODATE]

- Official guide www.hakodate.travel/en/ Available in 11 languages

English 繁體字 简体字 한국어 Bahasa Melayu Bahasa Indonesia ภาษาไทย Русский Français Deutsch 日本語

- <http://attjapan.sakura.ne.jp/modules/tinyd3/content/pdf/hakodate.pdf>
- <http://www.hakodate.travel/en/basic-information/guide-book/img/hakodate-city-walking-map.pdf>
- <http://hakodate-kankou.com/en/>

[SHUTTLE BUS SERVICES]



During the symposium, FREE shuttle bus services (one each before and after the meeting everyday) are available between [A] Hokodate JR station and [B] the meeting venue (Hakodate Research Center for Fisheries and Oceans). Hence we recommend to make reservation hotel rooms by yourself near the the Hokdate JR station.

It is strongly recommended to make reservations as early as possible by March 2017 as the symposium period (August) is the peak tourist season and it will be impossible to find rooms in the Hakodate area if you book after April

[ELECTRICITY]

The voltage in Japan is 100 Volt, which is different from North America (120V), Central Europe (230V) and most other regions of the world. Japanese electrical plugs have two, non-polarized pins, as shown below. They fit into North American outlets.



[VISA INFORMATION]

Please check through internets or Japanese Embassy (Consulate) in your country.

[ORGANIZERS AND CONVENERS]

International Fishery GIS Society

Representatives and Conveners: Dr Tom Nishida and Dr Kiyoshi Itoh

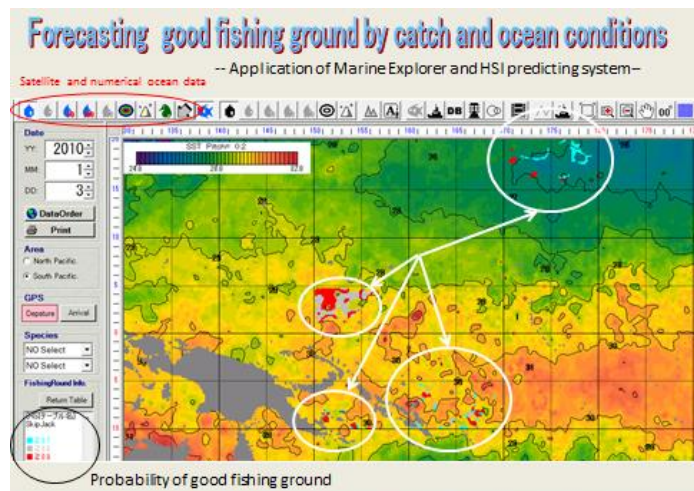
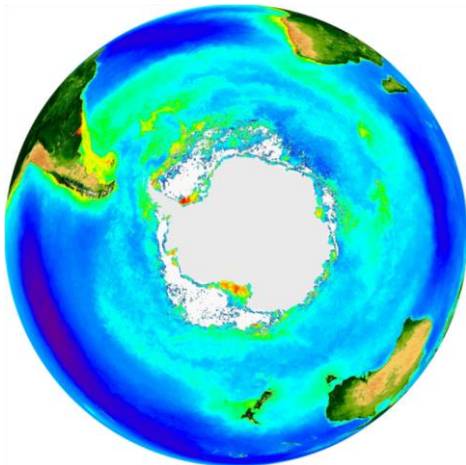
C/o Environmental Simulation Laboratory

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Homepage (M-GIS) : <http://arch.her.hcmr.gr/>

Other voluntary supporting members are welcome. Please contact the Convener.

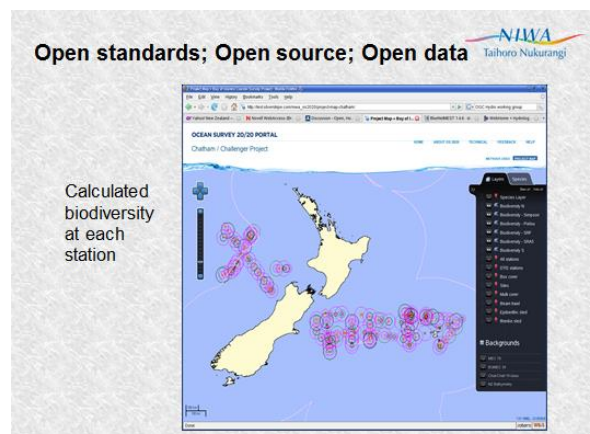
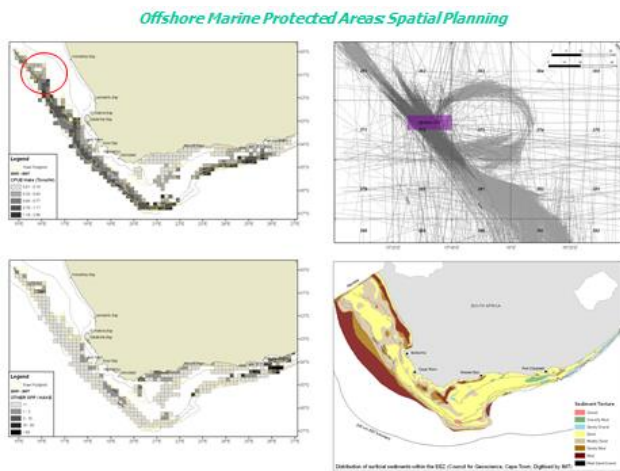
Roles of the supporting members are to promote the Symposium, to assist preparation of the Symposium, to assist various matters during the Symposium and other related matters.

[FUTURE SYMPOSIUM]

The International Fishery GIS Society organizes this type of Symposium every three years. The eighth Symposium will therefore be held in 2020.

[LIST OF PUBLICATIONS]

Abstract Proceedings and Proceedings of the past Symposia (GIS/Spatial analyses in Fishery and Aquatic Sciences Volumes 1-6) are available. For details, refer to the web site: <http://www.esl.co.jp/Sympo/publication.pdf> or next page.



PUBLICATIONS FOR SALE (MAY, 2016)

Item	(a) Abstract (Book)	(b) Proceedings(*) (Book)	(c) PowerPoints (DVD)	(d) Pictures (DVD)	(e) (special offer) ALL:(a)-(d) (Books + DVD)	(f) (special offer) ALL :(a)-(d) (DVD)
Price (US\$/item)	\$20	\$50	\$20	\$20	\$80	\$80
Symposium (co-organizer) (venue) (year)	Order codes					
	Order example (1) : (3a)(\$20) + (5f)(\$80) + Sea (surface) mail fee (\$0) (**) = Total (\$100)					
	Order example (2) : (2c)(\$20) + (4e)(\$80) + Air mail fee (\$30) (***) = Total (\$130)					
(1) First Symposium (National Marine Fisheries Service) (Seattle, USA) (1999)	(1a)	(1b)	/	(1d)	/	/
(2) Second Symposium (Canterbury Christ Church University) (Brighton, UK) (2002)	(2a)	(2b)	(2c)	(2d)	(2e)	(2f)
(3) Third Symposium (Shanghai Fisheries University) (Shanghai, China) (2005)	(3a)	(3b)	(3c)	(3d)	(3e)	(3f)
(4) Fourth Symposium (Universidade Santa Úrsula) (Rio de Janeiro, Brazil) (2008)	(4a)	(4b)	(4c)	(4d)	(4e)	(4f)
(5) Fifth Symposium (NIWA and SilverStripe) (Wellington, New Zealand) (2011)	(5a)	(5b)	(5c)	(5d)	(5e)	(5f)
(6) Sixth Symposium (University of Florida) (Tampa, Florida, USA) (2014)	(6a)	(6b) (Available in June, 2016)	(6c)	(6d)	(6e) (Available in June, 2016)	(6f) (Available in June, 2016)
Special issue (2005)	(g) Application of GIS and Remote Sensing Technologies in Inland Fisheries Management and Planning in Asia					(\$30)

(*) GIS/Spatial analyses in Fishery and Aquatic Sciences (Vol. 1-6)

(**) For any purchase, the cost of Surface/Sea mail & handling fees is included.

(***) For air mail (including the handling fee): add US\$ 30 for any amount the purchases.

- For surface/sea mail, it will take for 1-3 months to deliver and 1-2 weeks by air mail depending on the destination and the situations.
- For the contents of Abstracts and Proceedings, please refer to <http://www.esl.co.jp/Sympo/cofpast/index.htm>
- For book (Proceedings) reviews, please refer to <http://www.esl.co.jp/Sympo/bookrev/index.htm>

APPENDIX A: OUTLINE OF THE PAST SYMPOSIA

For this reason, the inaugural '**First International Symposium** on GIS in Fishery Science' was held in Seattle, Washington, USA in 1999. It was co-organized by Dr Loh-Lee Low (National Marine Fisheries Service, Seattle, USA) and the 'Fishery GIS Research Group (Saitama, Japan)' (*) and it was quite successful, with 230 presentations (131 orals, 89 posters and 10 GIS software demonstrations).



*First symposium in Seattle, Washington, USA in 1999
(DoubleTree Hotel, Sea-Tac Airport)*

The **Second Symposium** was held at the University of Sussex in Brighton, England, U.K. in 2002, and was co-organized by the International Fishery GIS Society and Dr Geoff Meaden (keynote speaker of the First Symposium) (Fisheries GIS Unit, Department of Geography, Canterbury Christ Church University, Canterbury, UK). It was also successful, with 96 presentations (67 orals, 23 posters and 6 GIS system related demonstrations).



Group photo

(Second Symposium at the University of Sussex in Brighton, England, U.K. in 2002)

The **Third Symposium** took place in Asia at the Shanghai Fisheries University in China in 2005 and it was co-organized by the International Fishery GIS Society and Professor/Dean LiuXiong Xu (Department of Marine Fisheries Sciences and Technologies, Shanghai Fisheries University). It was fruitful with many Asian participants and with 70 presentations (47 orals, 15 posters and 8 GIS system related demonstrations).



*Group photo
(Third Symposium at the Shanghai Fisheries University, China in 2005)*

The **Fourth Symposium** took place in South America at the Universidade Santa Úrsula in Rio de Janeiro, Brazil with the local co-organizer, Dr Philip Conrad Scott, Instituto de Ciências Biológicas e Ambientais (Institute of Biological and Environmental Sciences). It was very productive, with many Brazilian participants and a total of 99 presentations (71 orals, 16 posters and 12 PC demos, i.e., GIS system related demonstrations).



*Group photo
(Fourth Symposium at the Universidade Santa Úrsula, Rio de Janeiro, Brazil in 2008)*

The **Fifth Symposium**, the first one in Oceania, took place in Wellington, New Zealand and the local co-organizer was Dr Brent Wood, National Institute of Water and Atmospheric Research (NIWA). We had fewer participants than in the past (39 presentations – 30 orals, 5 posters and 4 GIS system related demonstrations using PC), so that we could have more time for questions and answers. The resulting in-depth discussions were deemed very fruitful by all participants.



*Group photo
(Fifth Symposium at James Cook Hotel Grand Chancellor, Wellington, New Zealand in 2011)*

The **Sixth Symposium**, the second one in USA, took place in *Tampa Marriott Westshore Hotel*, Tampa, Florida, USA and the local co-organizer was Dr Bob Swett, Florida Sea Grant Extension Specialist and Associate Professor, Fisheries and Aquatic Sciences Program, University of Florida. We had 66 presentations – 41 orals, 19 posters and 6 GIS system related demonstrations using PC.



*Group photo
(Sixth Symposium at Tampa Marriott Westshore Hotel, Tampa, Florida, USA in 2014)*

APPENDIX B: THEMES IN THE PAST SYMPOSIA

At each Symposium, there have been themes in order to highlight and strengthen that area of fishery GIS as follows (Summary is available in Table 1, page 11):

1st Symposium

“GIS software” was the major theme of the First Symposium in 1999. GIS was becoming an essential tool for spatial analysis of fisheries data and various GIS software programs were either being developed or adapted for these analyses. The First Symposium provided a forum to showcase these GIS software applications.

2nd Symposium

Following the First Symposium, we observed the development of basic quantitative spatial analyses using GIS; however, quantitative GIS applications and linkages to stock assessment, resources management, population estimation, geostatistics, forecasting, contour estimation, etc., were not well established or developed. Thus, the theme at the Second Symposium in 2002 was **“Spatial Numerical Analyses”**.

3rd Symposium

Three themes were established for the Third Symposium in 2005. The first was **“Effective and Affordable GIS for Fishery and Aquatic Information,”** especially for the developing countries. Our intention was to encourage participation by people from developing countries and to demonstrate how GIS could be used by those in these countries.

The second theme was **“Spatial Fish Stock Assessment Modeling.”** At the First Symposium there were several papers on GIS (space) based production models and VPAs under development, which were exciting topics. Indeed, there have been many geostatistics-related papers in the past Symposia.

The third theme was **“Spatial Fisheries Resource Management.”** Fisheries managers, not only in the developed countries but also in the developing countries, are gradually adopting GIS-based systems, along with GPS, VMS, satellites, electronic log books, etc., and integrating these into their organizations to manage fisheries resources. As a result, this topic was extremely useful for government officials, engineers, GIS system developers, and scientists to help them learn about and exchange information on recent developments and technologies.

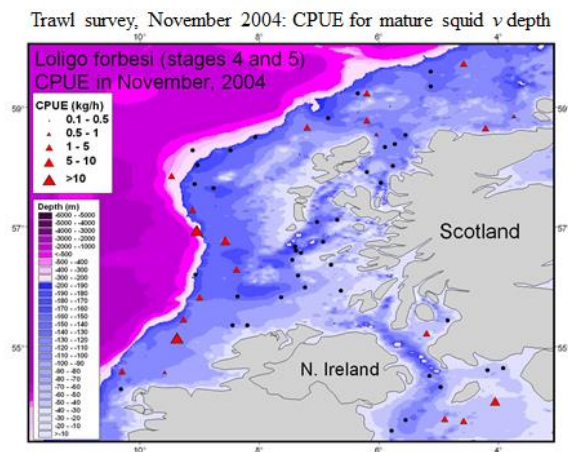
4th Symposium

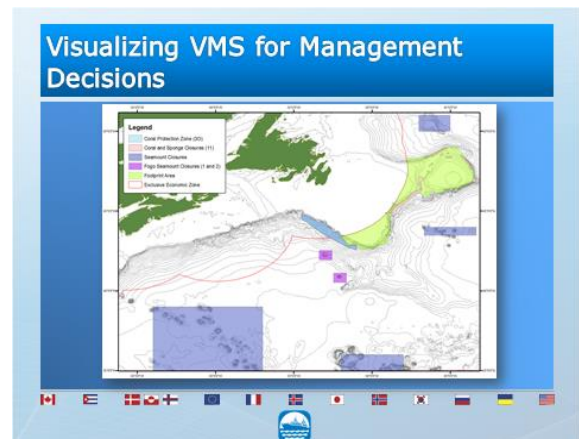
In the fourth symposium there were also three themes as follows:

Inland Water and Aquaculture GIS: In the previous three symposia a predominance of marine related presentations, including marine aquaculture was observed. In view of the importance of future food security from freshwater sources including aquaculture, the Third symposium's final suggestions included the promotion of this area in the Fourth Symposium.

Ecosystem Management: This was 'the' hot topic world-wide in both fisheries and aquaculture. The effective implementation of environmental management using geo-technologies including GIS, Remote Sensing (RS), Global Positioning System (GPS), Vessel Monitoring Systems (VMS) was becoming a reality. FAO has developed an "Ecosystem Approach to Fisheries (EAF)" and currently was working on an "Ecosystem Approach to Aquaculture (EAA)". These and other relevant topics including "Spatial Planning", "Marine Protected Areas (MPA)", "Global Warming", "Biodiversity" and "Spatial Conservation and Management" were discussed in the Symposium.

Future GIS: This broad theme intended to offer symposium participants a chance to look at the current challenges and frontiers in GIS technologies including "Development of 3D and 4D applications", "Web-GIS (multi-user and multi-function information management systems)" and "GIS for all (GIS Education and Capacity Building)" as well as other relevant topics.





5th Symposium

In the fifth symposium there were five themes as follows:

Integrating fisheries or aquaculture into Inland or Marine Spatial Planning:

Many countries are now realizing that, as well as managing and planning their terrestrial areas, the use of their marine space and their lakes and rivers needs to be carefully managed if all the competing uses are to be sustained. So Marine Spatial Planning is being adopted. It will be essential that both fisheries and aquaculture activities fit into these plans; GIS is certain to be the main tool if plans are to be successful.

Introducing social or economic factors into Ecosystems Approaches to Fisheries or Aquaculture: Although the 4th Symposium looked at the topic of Ecosystems Management and Ecosystems Approaches to Fisheries (EAF) and to Aquaculture (EAA), it is increasingly clear that factors relating to social and to economic considerations of EAF or EAA are proving difficult to integrate, even with the help of GIS. We are therefore keen to see examples showing how these considerations may have been successfully adopted.

Climate Change effects on aquatic regimes, fisheries and aquaculture: People researching any aspects of Climate Change will be well aware that the warming associated with this is leading to shifts in the normal distributions of all biological species. Aquatic environments generally make species movements particularly easy to accomplish. Is GIS already being used to monitor existing fish regime changes and/or to predict likely future species distributions given certain predicted temperature changes?

The integration of GIS with other disciplines or digital tools to aid fisheries or aquaculture: We suspect that most GIS work carried out world-wide will simply download required data into a database management system and then use this data in a proprietary GIS. But there are huge opportunities to link the data and GIS to other forms of software, or to integrate GIS into other disciplines, and our audience deserves to see examples of the success and variety of such linkages.

Data access and data sharing in fisheries or aquaculture GIS projects: We are all well aware of the huge proliferation in digital data, and indeed for some of us this may be overwhelming in terms of quantity, sources and formats. It would be most useful to hear how GIS users have best coped with sourcing their data, and what have been the opportunities and advantages to sharing data.

6th Symposium

In the sixth symposium there were five themes as follows:

THEME (1) ECOSYSTEM APPROACH

- (1a) Ecosystem approaches to Fisheries and Aquaculture (EAF and EAA)
- (1b) Marine Spatial Planning (MSP) and Marine Protected Areas (MPA)
- (1c) Ecosystem based fishing operations and modelling
- (1d) Climate change effects
- (1e) Other relevant topics

THEME (2) HABITATS

- (2a) Habitat modelling (HSI, ENFA, MxENT and other spatial habitat models)
 - HSI* : *Habitat Suitability Index*
 - ENFA* : *Ecological Niche Factor Analysis*
 - MxENT* : *Maximum-entropy approach*
- (2b) Forecasting fishing and oceanographic conditions
- (2c) Other relevant topics

THEME (3) INTEGRATED SYSTEMS UNDER GIS PLATFORM

- (3a) Network & communication systems with web-, mobile-GIS, ICT & other Technology (*ICT: Information and Communication Technology*)
- (3b) Real-time monitoring systems using Remote Sensing, data-loggers and Theme (3a)
- (3c) Socio-economics (benefit) concerned systems: fishing ground prediction, site selections for mariculture and aquaculture and etc.
- (3d) Other relevant topics

THEME (4) GEOSTATISTICS

- (4a) Estimating abundance and distributions
- (4b) Space based stock assessments
- (4c) Other relevant topics

THEME (5) FUTURE GIS AND CHALLENGES

- (5a) GIS for ALL: Participatory GIS and GIS face books
- (5b) GIS/Spatial analyses in data poor situations
- (5c) Enhancing Theme (3): integrated system under GIS platform
- (5d) Where are our next directions after this symposium?
- (5e) Other relevant topics



1ST SYMPOSIUM (MARCH 2-4, 1999)
 VENUE: DOUBLE TREE HOTEL (SEATTLE/TACOMA AIRPORT)
 SEATTLE, WASHINGTON, USA
CO-ORGANIZER: DR LOH-LEE LOW, NATIONAL MARINE FISHERIES SERVICE (NMFS), NOAA (USA)



2ND SYMPOSIUM (SEPTEMBER 3-6, 2002)
 VENUE: UNIVERSITY OF SUSSEX
 BRIGHTON, UK
**CO-ORGANIZER: DR GEOFF MEADEN
 CANTERBURY CHRIST CHURCH UNIVERSITY (UK)**



3RD SYMPOSIUM (AUGUST 22-26, 2005)
 VENUE: SHANGHAI FISHERIES UNIVERSITY
 SHANGHAI, **CO-ORGANIZER: PROFESSOR LIU-XIONG XU (許柳雄教授), SHANGHAI FISHERIES UNIVERSITY (CHINA)**



4TH SYMPOSIUM (AUGUST 25-29, 2008)
 VENUE: UNIVERSIDADE SANTA ÚRSULA
 RIO DE JANEIRO, BRAZIL. **CO-ORGANIZER: DR PHILIP SCOTT, UNIVERSIDADE SANTA ÚRSULA (BRAZIL)**

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5TH SYMPOSIUM (AUGUST 22-25, 2011)
 VENUE: JAMES COOK HOTEL GRAND CHANCELLOR,
CO-ORGANIZER: MR BRENT WOOD AND Ms FRANCES NOLAN. NATIONAL INSTITUTE OF WATER AND ATMOSPHERIC RESEARCH (NIWA) (NEW ZEALAND)



6TH SYMPOSIUM (AUGUST 25-29, 2014)
 VENUE: TAMPA MARRIOTT WESTSHORE, TAMPA,
 FLORIDA, USA. **CO-ORGANIZER: DR BOB SWETT,
 FLORIDA SEA GRANT AND UNIVERSITY OF FLORIDA FISHERIES AND AQUATIC SCIENCES PROGRAM (USA)**