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ACIAR Launch Fund Summary Report

International Conference on River Connectivity
(Fish Passage 2018) and First Symposium
on Hydropower and Fish Management

Report prepared for the Australian Centre
for International Agricultural Research

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Background and purpose

The International Conference on River Connectivity (Fish Passage 2018) was held in conjunction with the First Symposium on Hydropower and Fish Management, in Albury, NSW, from 10–14 December, 2018. The two meetings (collectively referred to as ‘the conference’ in this report) brought together 359 fish passage researchers and practitioners from over 30 countries to share knowledge and experiences relating to river connectivity issues for fish. A total of 232 presentations were given, which covered a number of major themes, including:

- Fish passage challenges in developing countries
- Benefits of managed flows
- The importance of reconnecting with floodplains and wetlands
- Diversion screening technology to protect native fish from being removed from rivers
- Citizen science and its role in fish passage restoration.

The goals of the conference were to:

- share findings and expertise on fish passage issues
- build connections between fisheries researchers and practitioners, to better utilise both skillsets to address fish passage concerns throughout the world.

Conference sponsorship

The conference attracted 25 sponsors, which included universities, government agencies, water authorities and engineering companies from around the world (Table 1). Four of these organisations were hosts, one was a platinum sponsor (i.e. contributed > \$20,000); and the remainder were gold or silver sponsors, or supporters (i.e. contributed < \$10,000).

Conference exhibitors

There were 11 exhibitors at the conference (Table 2). The exhibitors were comprised of a mixture of Australian and international companies specialising in fish tracking technologies, water engineering solutions, video camera technologies, flow meters and fish capture netting.

Table 1. List of sponsors for the Fish Passage 2018 conference.

Organisation	Sponsorship
Institute for Land, Water and Society, Charles Sturt University https://www.csu.edu.au/	Host
New South Wales Government, Department of Primary Industries https://www.dpi.nsw.gov.au/	Host
The Bioengineering Section of the American Fisheries Society https://bes.fisheries.org/	Host
The Environmental & Water Resources Institute of the American Society of Civil Engineers https://www.asce.org/environmental-and-water-resources-engineering/envir...	Host
Australian Centre for International Agricultural Research (ACIAR) https://www.aciar.gov.au/	Platinum
Hydro Tasmania https://www.hydro.com.au/clean-energy	Gold
New South Wales Government, Office of Environment & Heritage https://www.environment.nsw.gov.au/	Gold
Fisheries Research and Development Corporation	Gold

Organisation	Sponsorship
http://frdc.com.au/	
Oregon RFID	Silver
https://www.oregonrfid.com/	
Victoria State Government Department of Environment, Land, Water and Planning	Silver
https://www2.delwp.vic.gov.au/	
Jacobs	Silver
http://www.jacobs.com/	
New South Wales Government, Local Land Services	Supporter
https://western.lls.nsw.gov.au/	
Great Lakes Fishery Commission	Supporter
http://www.glfc.org/	
Australian Society for Fish Biology	Supporter
http://www.asfb.org.au/	
New South Wales Government	Supporter
http://www.chiefscientist.nsw.gov.au/	
Hunter Water	Supporter
https://www.hunterwater.com.au/	
HDR	Supporter
https://www.hdrinc.com/	
Melbourne Water	Supporter
https://www.melbournewater.com.au/	
La Trobe University	Supporter
https://www.latrobe.edu.au/	
North East Catchment Management Authority	Supporter
http://www.necma.vic.gov.au/	
ANDRITZ	Supporter
https://www.andritz.com/group-en	
Arthur Rylah Institute	Supporter
https://www.ari.vic.gov.au/	
Australian Renewable Energy Agency (ARENA)	Supporter
https://arena.gov.au/	
IEA Hydropower	Supporter
https://www.ieahydro.org/	
Murray–Darling Basin Authority	Supporter
https://www.mdba.gov.au/	

Table 2. List of exhibitors at the Fish Passage 2018 conference.

Exhibitor
Riverwatcher Fish Counter http://www.riverwatcher.is/
VEMCO http://vemco.com/
Biomark https://www.biomark.com/
Lotek http://www.lotek.com/
AWMA Water Control Solutions https://www.awmawatercontrol.com.au/
InQuik Bridging Systems http://inquik.com.au/
Advanced Telemetry Systems https://atstrack.com/
Simsonar http://simsonar.com/
RBH Mechanical Services http://www.rbhmechanical.com.au/turret.html
Whooshh Innovations https://www.whooshh.com/
Xylem http://xylem-analytics.com.au/
Pacific Netting Products http://www.pacificnettingproducts.com/



Photo 1. Dr Zeb Hogan from the National Geographic program, *Monster Fish*, giving a guest seminar to the conference delegates and other fish enthusiasts from the wider community (source: Katie Doyle).

How ACIAR-funded research was demonstrated

The Australian Centre for International Agricultural Research (ACIAR) was a major sponsor of the conference, and a large proportion of the conference presentations were related to the findings of ACIAR-funded research projects. Twenty-two delegates associated with ACIAR-funded projects attended the conference, with four from Myanmar, nine from Lao PDR and nine from Australia (Appendix I). The list of delegates included high level government managers (from Myanmar and Lao PDR), research scientists (from Lao PDR and Australia), and economists (from Australia). The delegates demonstrated ACIAR-funded research via a number of pathways:

- Sixteen presentations were given on the findings from current and pipeline ACIAR-funded projects in Laos and Indonesia (Appendix II).
- One poster/infographic was presented on the Lao PDR fishway project (Quantifying biophysical and community impacts of improved fish passage in Lao PDR and Myanmar FIS/2014/041) (Appendix II).
- An ACIAR information booth was set up during the conference, with brochures and other information handouts highlighting all relevant ACIAR-funded projects. Various ACIAR-funded project staff helped with manning the booth throughout the conference to provide delegates with the opportunity to ask questions about their projects (Photo 3).
- The Lao PDR fishway project received the Distinguished Project Award from a panel of international judges at the conference, for being a best-practice exemplar of research in development (Photo 4).
- The success of the ACIAR-funded Lao PDR fishway project was highlighted in several conference-related media stories (Appendix II), including Charles Sturt University News.
- Two publications, based on the Lao PDR fishway project, were submitted to the special conference editions of *Aquaculture and Fisheries* and *Journal of Ecohydrology* (Appendix II).



Photo 2. Dr Lee Baumgartner giving the opening address on day one of the conference (source: Katie Doyle).



Photo 3. Dr Ann Fleming talking to a conference delegate, whilst working in the ACIAR information booth (source: Simone Engdahl).



Photo 4. Team members of the ACIAR-funded Lao PDR fishway project (Quantifying biophysical and community impacts of improved fish passage in Lao PDR and Myanmar FIS/2014/041) receiving the Distinguished Project Award at the conference (source: Nikki Scott).

Personal or professional development outcomes

The project leader of the ACIAR-funded Lao PDR fishway and Xayaburi Dam projects gained experience in organising and hosting a large international conference, and promoting the conference through various media channels. Also, team members working on these ACIAR-funded projects gained:

- Knowledge in various aspects of fish passage science and technology at the pre-conference training courses (Photo 5).
- Experience in presenting their research findings at an international conference (Photo 6; Appendix II).
- Professional development in writing scientific publications for special edition international journals (Appendix II).
- A better understanding of major fisheries issues and management options in Australia, from undertaking the post-conference field tours (Photo 7). Some of the Lao PDR ACIAR-funded team members had never been outside of their home country prior to this conference, and therefore the conference provided an opportunity for personal development in addition to professional development.



Photo 5. Conference delegates participating in a pre-workshop workshop focusing on the relevance of the SDG's to global fisheries. The pre-conference workshops were held at Charles Sturt University, Albury (source: Simone Engdahl).

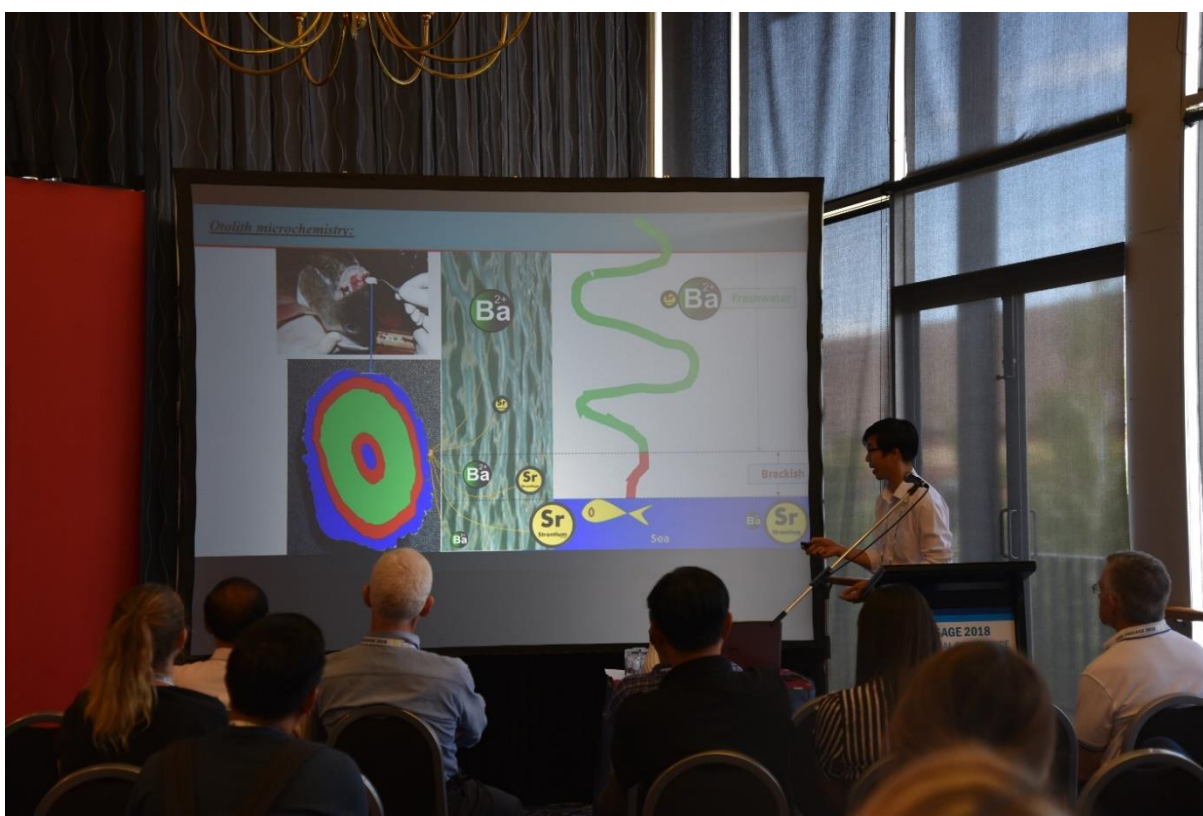


Photo 6. An Vu presenting preliminary findings from his PhD project on fish migration patterns in the Mekong River system (source: Katie Doyle).



Photo 7. Fish passage 2018 delegates inspecting an echidna that they came across during one of the post-conference field tours (source: Lee Baumgartner).

Networks for future collaboration

The conference effectively facilitated networking among ACIAR-funded project staff members, as well as between the ACIAR-funded project staff and staff associated with other organisations. Some of the major opportunities for future partnerships include collaboration between:

- The ACIAR project leader, Dr Lee Baumgartner and Dr Gordon O'Brien (University of Mpumalanga, South Africa), on fisheries issues in Africa. This has led to new work developing projects in South Africa in February 2019.
- ACIAR-funded project team members (Lee Baumgartner, Wayne Robinson, Craig Boys) and leading fisheries researchers from Germany (Juergen Geist and his team at Technical University of Munich). The Australian scientists will be undertaking a research exchange program with the German scientists on fish passage issues over two years.
- the Lao PDR fishway team and WorldFish in relation to a 'Darwin Initiative' project on Hilsa shad in Myanmar. Hilsa shad is an important economic anadromous species in Myanmar that is currently threatened by the increase in tidal sluices inhibiting their migration patterns.
- team members of the ACIAR-funded Lao PDR fishway and Xayaburi Dam projects. The team members met during the conference for a planning meeting to discuss project tasks for 2019.
- senior international fish passage researchers and practitioners. A workshop was held linking SDG's with irrigation and fisheries (Photo 8). The workshop has led to the preparation of a publication and journal special issue on sustainable irrigation. It has also led to two research opportunities with the Asia Development Bank (partnering with eWater and Griffith University) and the FAO (partnering with organisations in Indonesia and Myanmar).



Photo 8. Senior international fish passage researchers and practitioners taking part in a pre-conference SDG and fisheries workshop at Charles Sturt University (Albury) on the current state of global fish passage research and technology (source: Simone Engdahl).

Overall success of the conference

This conference achieved its objectives of (1) fostering the exchange of findings and expertise among researchers and practitioners on fish passage issues; and (2) building connections between researchers and practitioners, to better utilize both skillsets to address global fish passage concerns.

Short courses and workshops offered at Charles Sturt University were hugely successful. Each morning during the conference several keynote speakers gave their great perspectives on worldwide fish passage and fish migrations/river connectivity concerns. One keynote speaker included Associate Professor Aline Cotel of the Department of Civil and Environmental Engineering at the University of Michigan. Aline has an education in Aerospace Engineering so she was very well qualified to provide “A Fluid perspective on fish passage design and performance”. Another notable keynote speaker was Phil Duncan, a member of the Gomeroi Nation, and the Aboriginal Cultural Training Coordinator at Macquarie University. Phil gave a very meaningful and insightful talk about indigenous engagement and inclusion in fish passageway initiatives while focusing on his ancestral territories.

The Fish Passage Conference provided the opportunity to connect with existing and new colleagues from around the world who have a shared interest in the advancement of technical and nature-like fishways, hydropower, stream restoration, and dam removal projects. The conference location, within the Murray–Darling Basin, embodied a diverse range of fish passage works and is home to an array of innovative solutions which delegates were able to see first-hand.

Delegates noted that bringing together experts of diverse backgrounds was beneficial and that the venue was accommodating and well resourced. Albury’s thriving arts culture, nightlife, and surrounding natural resources were enjoyed by many and all were happy to experience the exceptional and unique Australian hospitality.

Dissemination of findings

All presentations delivered during the conference were made available to delegates after the conference via a link on the conference website. All pre-conference workshop materials, including syllabus and presentations were distributed electronically to participants. Key papers were published in two journal special editions, one in *Marine and Freshwater Research* and the other in *Aquaculture and Fisheries*. A third journal special edition is being produced for the *Journal of Ecohydrology*. Across all three journal special issues, over 50 papers will be published on fish passage.

Appendix I: Delegates associated with ACIAR projects that attended the conference.

Country	Delegate	Organisation	Position
Myanmar			
	U. Khin Maung Maw	DOF	Director General
	U. Nyunt Win	DOF	Director International Partnerships
	U. Maung Lwin	DOF	Director; Kachin Province
	U. Kyi Wai	Irrigation and Water Management Department	Deputy Director
Lao PDR			
	Madame Dongdavanh Sibounthong	Department of Livestock and Fisheries	
	Dr. Vanthong Phengvichit	NAFRI	Deputy Director
	Dr. Kaviphone Phouthavong	LARReC	Head
	Mr. Douangkham Singhanouvong	LARReC	Deputy Director, Fish Way project manager
	Mrs. Khampheng Homsombath	LARReC	Head of Capture Fisheries Research Division (LARReC), Fish Way project manager assistance
	Dr. Oudom Phonekhampheng	NUOL	Vice president of NUOL, Fish Way project manager
	Mr. Khamhou Phanthavong	Planning Division of Department of Irrigation	Deputy Director
	Mr. Davon Thammavong	Pak Peung villager	
	Mr. Garry Thorncraft	NUOL	Research scientist
Australia			
	Dr. Lee Baumgartner	CSU	Research scientist
	Dr. Wayne Robinson	CSU	Research scientist
	Dr. John Conallin	CSU	Research scientist
	Mr. Tim Marsden	CSU	Research scientist
	Mr. Jarrod McPherson	CSU	Research scientist
	Dr. Nathan Ning	CSU	Research scientist
	Dr. Craig Boys	NSW DPI Fisheries	Research scientist
	Dr. Lin Crase	University of South Australia	Economist
	Dr. Bethany Cooper	University of South Australia	Economist

Appendix II

Presentations based on ACIAR-funded projects and related research

FIS/2014/041

1. Baumgartner, L. (2018) Reducing slope improves small fish passage through a Denil fishway.
2. Baumgartner, L., Thorncraft, G., Phonekhampheng, O., Boys, C., Navarro, A., Robinson, W., Brown, R., Deng, Z. D. Understanding mortality mechanisms in hydro power plants: implications for Mekong hydropower development.
3. Baumgartner, L.J., Grieve, B., Robinson, W., Silva, L.G.M., Pomorin, K., Thorncraft, G., Ning, N. (2018) Evaluating the placement of PIT tags in tropical river fishes: a case study involving two Mekong River species.
4. Baumgartner, L., Boys, C., Marsden, T., McPherson, J., Ning, N., Phonekhampheng, O., Robinson, W., Singhanouvong, D., Stuart, I., Thorncraft, G. A cautionary tale about the inhibitory effects of gated culverts on fish passage restoration efforts.
5. Conallin, J., Lunn, Z., Baumgartner, L.J., Thein, H., Chan, N. The importance of determining and maintaining migration corridors for the Hilsa Shad fishery in Myanmar Inland Rivers.
6. Cooper, B., Crase, L. The ecosystem service values of fish ladders in poor counties: Who should pay?
7. Homsombath, K., Baumgartner, L., Robinson, W. Householder catch and use of fish before and after a wetland fishway at Pak Peung, Laos PDR.
8. Millar, J., Baumgartner, L., Robinson, W., Homsombath, K. Listening to local knowledge to inform fish passage and fisheries management.
9. Phonekhampheng, O., Singhanouvong, D., Baumgartner, L., Marsden, T., Thorncraft, G. Development of a comprehensive fish passage approach for floodplains of the lower Mekong basin.
10. Singhanouvong, D., Baumgartner, L., Robinson, W., Thorncraft, G. Wetland fish communities above stream regulators with and without fish passage in Lao PDR.
11. VuVi A., Baumgartner, L., Cowx, I., Mallen-Cooper, M., Howitt, J., Robinson, W. Using otoliths to quantify diadromy in the Lower Mekong Basin.

Xayaburi Dam project (FIS/2016/017)

1. Raeder, M., Thanakunvorase, N. The Xayaburi fishpass system – design concept and development.
2. Poomchaivej, T., Supachokepanich, J. Modification of Navigation Locks for upstream fish migration.

Fish passage research in Indonesia (Pipeline project)

1. Wibowo, A., Antony, R., Adiansyah, V., Baumgartner, L. Assessing the effectiveness of first fish passage facility to enhance sustainability of inland fishery resources in Indonesian River: a case study in Komering River, South Sumatera, Indonesia.
2. Baumgartner, L., Wibowo, A. Fish Passage Challenges and Opportunities in Indonesia.

Publications based on ACIAR-funded projects

1. Baumgartner, L., Boys, C., Marsden, T., McPherson, J., Ning, N., Phonekhampheng, O., Robinson, W., Singhanouvong, D., Stuart, I., Thorncraft, G. (2018) A cautionary tale about the inhibitory effects of gated culverts on fish passage restoration efforts. Submitted to the special

Fish Passage 2018 conference edition for *Journal of Ecohydrology* in December 2018 (currently under review).

2. Baumgartner LJ, Barlow C, Mallen-Cooper M, Boys C, Marsden T, Thorncraft G, Phonekhampheng O, Singhanvouvong D, Rice W, Roy M, Crase L, Cooper B. (2019). Achieving fish passage outcomes at irrigation infrastructure; a case study from the Lower Mekong Basin. *Aquaculture and Fisheries*. <https://doi.org/10.1016/j.aaf.2018.12.008>

3. Infographic/poster on the Lao PDR fishway project presented at the poster session at Fish Passage 2018 (organised by ACIAR).



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