

SAVING FRESHWATER FISHES AND HABITATS

Newsletter of the IUCN SSC/WI Freshwater Fish Specialist Group

Issue 14 • October 2017



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- Charismatic megafauna
- Tigerfish monitoring
- Exotic vs native species conservation
- Alliance for Freshwater Life
- And Much More!!!



Wetlands
INTERNATIONAL

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Ian Harrison

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Front cover image:
The clanwilliam redbin,
Pseudobarbus calidus.
Photo credit: Jeremy
Shelton, provided by
Olaf Weyl

FFSG UPDATE

Message from the FFSG Global Chair

Dr. Richard Sneider



Hello FFSG members. This year seems to be going past so quickly, and we have had a great deal of general administration to deal with as part of the new 2017-2020 Quadrennium. I know that some of you are still waiting to get confirmed through the IUCN SSC registration process as members of SSC and FFSG. Please do not worry – we will get you into the system, and you will stay on our internal mailing list while we are doing this. As you can imagine, IUCN’s Global Species Programme staff based at IUCN headquarters in Switzerland and at the IUCN offices in England have an enormous amount of work at the start of the Quadrennium, when they have to process tens of thousands of members and deal with new strategic plans. This is a challenge when there are few staff to work on this. Claire Santer, Rachel Hoffmann, and their colleagues are dealing with this as efficiently as possible. They provide us with outstanding support and advice throughout the Quadrennium, so now is our opportunity to show our gratitude; so please join me in giving them our patience while they work with this. Ian Harrison is working closely with them to ensure you are all integrated into the system and he will keep you informed of all news (page 5).

Ian has also been working with colleagues in IUCN’s Global Species Programme, IUCN Water, and WWF-US to advance the plan for an *IUCN One Programme Strategy for Freshwater Biodiversity Conservation* as discussed in the May 2017 newsletter. This will be an important platform for the FFSG and for the other IUCN Commission Specialists groups and Subcommittees with which several of us are also involved. Ian gives a report on recent developments on pages 38-39 of this newsletter.

We have some great opportunities coming up. Michael Cooperman reports on discussions on the conservation and sustainable management of inland fisheries, that involved several FFSG members at the American Fisheries Society meetings this year in Florida (page 31-32). Michael is also working with Ian Harrison and others on producing a Supplementary Issue of the journal *Aquatic Conservation: Marine and Freshwater Ecosystems*, that will be focused on the Conservation of Freshwater ecosystems in the Anthropocene. Olaf Weyl, our regional Chair for Southern Africa, will be leading on the development of a special issue of the *Journal of Fish Biology*, that will be focused on the Biology and Ecology of African Freshwater Fishes (pages 36-37). Several FFSG members also took part in a meeting earlier this month, hosted by the Leibniz-Institute for Freshwater Ecology and Inland Fisheries (IGB), in Berlin, to discuss the *Blueprint for Freshwater Life* project (pages 33-35) that we discussed at the sessions at the IUCN World Conservation Congress in Hawaii, and reported in previous issues of this newsletter (Issues 10 and 12). We have provided important feedback to the Rainforest Trust on regions that will be important for development as freshwater protected areas, including sites in Africa (page 14). We have offered collaboration to a new freshwater focused aquarium in Switzerland – the Aquatis Aquarium – by identifying FFSG members who can help provide advice on key species that they will be displaying. And our FFSG members have assisted in submitting Red List assessments for several freshwater fish species in Africa and South America.

I had a very enjoyable expedition this year to the Okavango, as part of National Geographic's [Okavango Wilderness Project](#). Former FFSG Regional Chair Paul Skelton is the Science Director for the project, and the lead ichthyologist (see his report on pages 21-24). This was the first time I had met Paul, and had a wonderful time working with him in the field. I also attended an extremely interesting and enjoyable meeting of [IUCN's Patrons of Nature](#), hosted by HSH Prince Albert II of Monaco. Freshwater ecosystems and biodiversity represented an important part of the discussions at that meeting, with many people there recognizing the importance of IUCN's work on freshwater biodiversity, and the need to develop this further.

There is a lot that is ongoing – and we are not even through the first year of this new Quadrennium, so I feel confident that we have many more exciting projects ahead.

Best wishes,

A handwritten signature in black ink, appearing to read 'RS', with a long, sweeping flourish extending to the right.

Richard Sneider
FFSG Global Chair

News on SSC Membership

Richard Sneider

FFSG Global Chair

As many of you know, we have had a delay in getting some of the new members registered into SSC and hence formally part of FFSG. This is simply because of the enormous amount of work that has been required of the small IUCN Secretariat team that coordinate the thousands of SSC members. I want to assure those of you who have not yet had a message formally integrating you into the system that you should not worry; you will be added to the system and, in the interim, we have you on our own internal list of FFSG members so you will receive any emails that we send out to the group. As I mentioned in my opening letter to this Newsletter, our IUCN Secretariat staff work extremely hard to support us. Below you will find an update we received from the Global Species Programme.

Managing Commission Group Membership

First of all, apologies for the delay in getting back to you about the final push on registration of SSC members. We had planned to send each group a list of registered and pending members to action, but, having piloted this with 9 groups have found that the resulting increase in registration does not justify the time and resources required to apply to the remaining 100 or so Specialist Groups.

Consequently, we have started the conception of a tool that will be integrated to the Union Portal to deal with Membership invitation and listing. This tool is being developed in the Union Portal where it will be available to group leaders in addition to the email all members function. We are expecting the first tests of this new solution to happen in the next 3-4 weeks with again pilot commission groups.

Commission Group Communication – looking ahead

The use of Union Portal should increase in the next year as we are all moving together towards becoming compliant with the new EU General Data Protection Regulation (GDPR) which comes into force on 25 May 2018. The new GDPR which applies to organisations located within the EU as well as to organisations located outside of the EU who process personal data from EU residents, relates to the processing of personal data; meaning any information that can be used to directly or indirectly identify a person (e.g. but not only, a name, a photo, an email address, religion, a computer IP address).

IUCN is developing a data protection policy to provide guidance regarding the processing of personal data. You will be made aware of this policy as soon as it is finalized.

Regional Chairs, Special Advisors, Steering Committee members, and representatives of other IUCN Commission Groups

Richard Sneider

FFSG Global Chair

In the May 2017 Newsletter we gave an update on the list of FFSG Regional Chairs, Special Advisors, Steering Committee members, and representatives of other IUCN Commission Groups for the 2017-2020 Quadrennium. Since then we have had a couple of new additions, and we are correcting a couple of errors in the previous list. All updates are marked in blue text below.

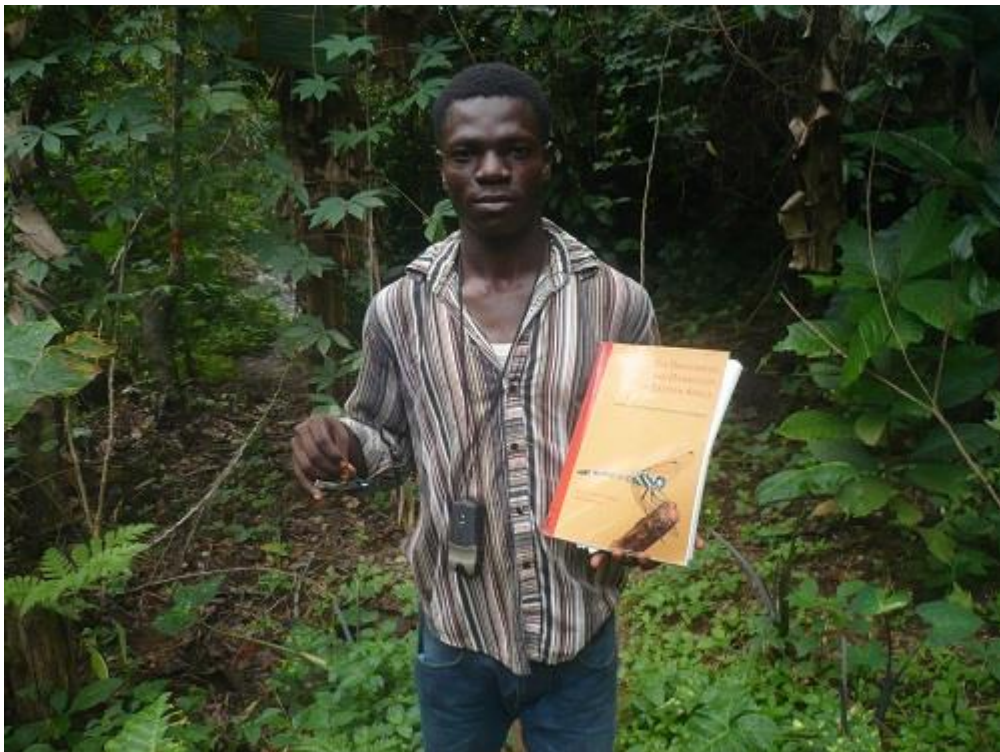
Global Chair	Dr. Richard Sneider (One World Star Holdings International Ltd)
Regional Chairs	
Western Palearctic	Dr Jörg Freyhof (Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany)
Eastern Palearctic	Dr. Dmitry Lajus (Department of Ichthyology and Hydrobiology, Saint Petersburg State University, Russia)
Central Asia	Dr. Bakhtiyor Karimov & Dr. Bakhtiyar Kamilov (Uzbekistan Academy of Sciences, Uzbekistan)
Southern Asia	Dr Rajeev Raghavan (Kerala University of Fisheries and Ocean Studies, India); Dr. Vishwanath Waikhom (Manipur University, India)
China	Professor Junxing Yang (Kunming Institute of Zoology, China)
Japan	Dr Katsutoshi Watanabe (Department of Zoology, Kyoto University, Japan); Dr. Yoshinori Taniguchi (Meijo University, Japan)
Mainland and Peninsular Southeast Asia	Dr Chavalit Vidthayanon (Environment Division, Mekong River Commission, Lao PDR); Dr. Amirrudin Ahmad (University of Malaysia-Terengganu)
Sundaland/Philippines	Dr. Tan Heok Hui (Lee Kong Chian Natural History Museum, National University of Singapore)
New Guinea and Timor-Leste	Dr. Michael Hammer (Museum and Art Gallery of the Northern Territory, Australia)
Australia/ New Zealand	Dr. Gerry Closs (University of Otago, New Zealand); Dr. Nicholas Ling (University of Waikato, New Zealand)
Oceania	Dr. David Taniveke Boseto (Ecological Solutions, Solomon Islands)
North America	Dr. Stephen Walsh (USGS, Gainesville, Florida, USA)
Mesoamerica	Professor Topis Contreras-MacBeath (University of Morelos, Mexico)
South America	Dr. Roberto Reis (Catholic Pontifical University of Rio Grande do Sul, Brazil)
Northern Africa	Dr. Abebe Getahun (Addis Ababa University, Ethiopia)
Western Africa	Dr Mamaa Entsua-Mensah (Council for Scientific and

	Industrial Research, Ghana)
Eastern and Central Africa	Dr Jos Snoeks (Biology Department, Royal Museum for Central Africa, Belgium)
Southern Africa	Dr. Olaf Weyl (South African Institute for Aquatic Biodiversity, South Africa)
Madagascar	Dr. Ravelomanana Tsilavina Illitch (Department de Biologie Animale, Faculte des Sciences, Antananarivo, Madagascar); Dr. Paul Loiselle (Wildlife Conservation Society)
Red List Authority Coordinators (for freshwater fishes)	Dr Jörg Freyhof (Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany); Dr Rajeev Raghavan (Conservation Research Group, St. Albert's College, Kochi, India)
Sub-Group Chairs	
Home Aquarium Fish Sub-group	Scott Dowd (New England Aquarium, USA)
Special Advisors	
Biodiversity	Michele Thieme (WWF USA)
Communications	Professor Topis Contreras-MacBeath (University of Morelos, Mexico)
Cryobiology	Professor Krishen Rana (University of Stirling, UK)
Development	Dr. Tony Whitten (Fauna and Flora International, UK)
FishBase	Dr. Rainer Froese (FishBase)
Freshwater representative to the IUCN Red List Committee	Dr Rajeev Raghavan (Conservation Research Group, St. Albert's College, Kochi, India)
Fundraising	Dr. Ian Harrison (Conservation International)
Gene banking	No advisor assigned
Geographic databases	Kevin Smith (IUCN Freshwater Biodiversity Unit)
Impacts of dams and canals on biodiversity	No advisor assigned
Migratory species	Dr. Zeb Hogan (University of Nevada-Reno, USA) and Dr. Claudio Baigún (Wetlands International, Argentina)
Fisheries	Dr. Ian Cowx (University of Hull)
Re-introduction and ex-situ conservation	No advisor assigned
Subterranean fishes	Graham Proudlove (University of Manchester, UK)
Sustainable trade in ornamental fishes	Scott Dowd (New England Aquarium, USA)
Taxonomy	No advisor assigned
Steering Committee (affiliations as above, if not noted below)	
Amirrudin Ahmad; Claudio Baigún; David Boseto ; Gerry Closs; Topiltzin Contreras MacBeath; William Darwall (IUCN Freshwater Biodiversity Unit, UK); Scott Dowd; Mamaa Entsua-Mensah; Jörg Freyhof; Abebe Getahun ; Matthew Gollock (Zoological Society of London, UK); Michael Hammer ; Ian Harrison; Tan Heok Hui; Zeb Hogan; Bakhtiyar Kamilov; Bakhtiyor Karimov; Dmitry Lajus; Nicholas Ling; Paul Loiselle; Taej Mundkur (Wetlands International, The Netherlands); Rajeev Raghavan; Pete Rand (Prince William Sound Science Center, Alaska, USA); Roberto E. Reis; Richard Sneider; Jos Snoeks; Yoshinori Taniguchi; Chavalit Vidthayanon; Michele Thieme; Ravelomanana Tsilavina Illitch; Vishwanath Waikhom; Stephen Walsh; Katsutoshi Watanabe; Olaf Weyl; Tony Whitten; Junxing Yang.	
FFSG members with positions on other IUCN Commission Groups	
SSC Freshwater Conservation Subcommittee	Professor Topis Contreras-MacBeath, Chair (University of Morelos, Mexico), Chair; Dr. Ian Harrison, Co-Chair (Conservation International)

SSC Salmon Specialist Group	Dr. Pete Rand, Chair (Prince William Sound Science center, Alaska, USA)
SSC Anguillid Eel Specialist Group	Dr. Matthew Gollock, Chair (Zoological Society of London, UK)
CEM Wetlands Ecosystems Thematic Group	Dr. Claudio Baigún, Chair (Wetlands International, Argentina)
WCPA Freshwater Specialist Group	Harmony Patricio, Co-Chair (Griffith University); Dr. Ian Harrison, co-Chair (Conservation International)

FFSG Member Issah Seidu receives MBZ funding

Congratulations to Issah Seidu (Department of Wildlife and Range Management, Faculty of Renewable Natural Resources, Kwame Nkrumah University of Science and Technology [KNUST], Ghana for making a successful application to the Mohamed bin Zayed Species Conservation Fund, for support for a project to study the Ecology and Conservation of the endangered endemic *Chrysichthys walkeri* in the Pra Basin, Ghana.



Issah Seidu

FFSG Subgroup Chair Scott Dowd Nominated for 2018 Indianapolis Prize for Work with Beneficial Aquarium Fisheries

Information supplied by **Deb Joyce**
Project Piaba

Congratulations to Scott Dowd, Chair of the Home Aquarium Fish Subgroup of FFSG, for being nominated for the [2018 Indianapolis Prize](#) for his work with Amazon fisheries.

The Indianapolis Prize is regarded as the world's leading animal conservation award and recognizes and rewards conservationists who have achieved major victories in advancing the sustainability of an animal species or group of species. Winners receive the Lilly Medal and an unrestricted \$250,000 award. Remaining Finalists each receive \$10,000. The Indianapolis Prize has received support from the Eli Lilly and Company Foundation since its inception. Scott is among 32 leaders from around the world nominated for the prize.

"I'm so honored that our work with fishing communities can be nominated and highlight such a worthy cause," said Dowd. "The sustainable use of high-value aquarium fish enables people residing in areas of critical biological importance to thrive in a way that makes it essential to preserve tropical forests and waterways."

Scott has spent many years conducting research on Amazon fisheries, which heavily forms Project Piaba's work to maximize the economic benefits to Amazonian fishing communities through management and sustainability. His work has appeared in several publications and journals, including *Connect Magazine*, *OFI Journal* and *Zoo Biology*. His work is also featured in a recently published book by author, Sy Montgomery, titled *Amazon Adventures, How Tiny Fish are Saving the World's Biggest Rainforest*. Scott also manages and cares for 12,000 fish at New England Aquarium in Boston, Mass. He is special advisor to the Association of Zoos and Aquariums on the home aquarium industry and FFTAG Steering Committee.



Scott Dowd

FFSG at the 2017 European Union of Aquarium Curators – kindly supported by New England Aquarium

Ian Harrison

FFSG Technical Officer

In July of this year, Dr. Kira Mileham (IUCN SSC Director of Strategic Partnerships) and I submitted a proposal for a presentation at the European Union of Aquarium Curators (EUAC) meeting in Arnhem, Netherlands, during October 23-27.

<https://www.burgerszoo.com/euac2017>

The title of the presentation is *Swimming Upstream: Aquariums Working to Save Freshwater Species*. The presentation gives insight into the state of freshwater species, and it discusses opportunities where European aquarium staff can help secure the conservation of these species. It shows how aquarium staff and IUCN members and SSC Specialist Groups can work together to achieve these goals and raise awareness of freshwater species and habitats.

The proposal was accepted by EUAC, and is one of only 34 that were accepted from over 60 submissions. We asked Scott Dowd if he could present the talk, given his combined roles as an aquarium curator and a conservation practitioner for freshwater fishes and their habitats. The New England Aquarium very kindly agreed to support Scott for attending the meeting and making the presentation, representing the interests of New England Aquarium, and FFSG. This is also an excellent opportunity to promote the World Fish Migration Day 2018 to European zoos and aquariums, to explore whether they are interested in holding special events on World Fish Migration Day.

We will ask Scott to make a short report back to us; and we express our deepest thanks to New England Aquarium for helping us make our contribution to the meeting possible.

Red List Assessments – and ‘Inferring Extinctions’

Ian Harrison

FFSG Technical Officer

This year we saw several new and revised Red List assessments for freshwater fishes processed by our colleagues (FFSG members and others) in Southern Africa. Many thanks to Dewidine Van Der Colff (South African National Biodiversity Assessment) for coordinating this, and to Jörg Freyhof and Rajeev Raghavan (Red List Authority Coordinators for freshwater fishes) for assisting in the review. Also, Federico Kacolis (CONICET; FCNyM, UNLP; and Museo de La Plata) prepared a much-needed update on the Red List assessment of the naked characin, *Gymnocharacinus bergii*.

Earlier this year three papers were published that outlined a process for inferring extinctions, and the challenges of deciding when a species should be listed as extinct, possibly extinct, or critically endangered. The first paper in this ‘extinction trilogy’ (Keith *et al.*, 2017) provides a method for assessing information on threats to species, identifying reasons, evidence and data sources in support of a claim that a species has gone extinct, as well as objections, evidence and sources as to why the claim may not be true. The method addresses: i) whether identified threats are sufficiently severe and prolonged to cause local extinction; and ii) whether such threats are sufficiently extensive to eliminate all occurrences. Assessment of the likelihood of extinction is also dependent on adequate surveys and searches for the species, which in turn requires some measure of reliability of those observation data. The second paper in the extinction trilogy (Thompson *et al.*, 2017) describes a new method for estimating the probability that a taxon is extinct based on different kinds of both record and survey data, and accounting for data quality. Hence, these two papers provide a potential mechanism for assessing the risk of extinction of any species based on a quantification of the reliability of the available data. Finally, the third paper in the trilogy (Akçakaya *et al.*, 2017) reviews the potential costs and benefits of classifying extinct and extant species as extinct, possibly extinct, and extant.

It would be very interesting to test these methods further on the 491 species of freshwater fishes that are listed as EX or CR in the IUCN Red List. It would take a reasonable amount of work to compile the necessary information for all those species, but a regional subset of them would be more manageable.

References

- Keith, D.A., Butchart, S.H.M., Regan, H.M., Harrison, I., Akçakaya, H.R., Solow, A.R., & Burgman, M.A. (2017). Inferring extinctions I: A structured method using information on threats. *Biological Conservation* **214**, 320–327
- Thompson, C.J., Koshkina, V., Burgman, M.A., Butchart, S.H.M., & Stone, L. (2017) Inferring extinctions II: A practical, iterative model based on records and surveys. *Biological Conservation* **214**, 328–335
- Akçakaya, H.R., Keith, D.A., Burgman, M., Butchart, S.H.M., Hoffmann, M., Regan, H.M., Harrison, I., & Boakes, E. (2017). Inferring extinctions III: A cost-benefit framework for listing extinct species. *Biological Conservation* **214**, 336–342

Charismatic Freshwater Megafauna

Will Darwall

Head, Freshwater Biodiversity Unit, Global Species Programme

A multi-institutional team, involving staff from the Freshwater Biodiversity Unit, FFSG, and the Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin have just published two papers (Carrizo *et al.* 2017; He *et al.*, 2017) looking at freshwater megafauna and, in particular, how these species are threatened and represented in the IUCN Red List, what the main threats are that they face, and how their distribution overlaps with other threatened species of fishes, and with existing protected areas. It is hypothesized that we can use these threatened megafauna as flagships for the conservation of freshwater ecosystems and the species found within them. The references to the two papers are given below. In addition, three different blogs/news pieces were written about the papers – by IUCN, Conservation International, and by the Freshwater Blog – set up by the BioFresh project subsequently taken on by the MARS project:

- <https://www.iucn.org/news/species/201710/hippos-crocodiles-and-other-freshwater-megafauna-threatened-and-ignored>
- <https://blog.conservation.org/2017/10/why-are-freshwater-species-in-trouble-bad-p-r-for-one>
- <https://freshwaterblog.net/2017/10/10/freshwater-megafauna-as-conservation-flagships/>

As noted in the blog by Conservation International, FFSG member Zeb Hogan is already doing an enormous amount of work to promote public awareness of freshwater megafauna. To see some of his work, follow the two web links below:

- <https://www.youtube.com/watch?v=GV59Rlc9QDE>
- <https://www.unr.edu/science/zeb-hogan> - this gives some good links to an exhibit and a TedX talk by Zeb Hogan on monster fishes.



The goonch, *Bagarius yarrelli*, is a large predatory catfish that can grow to 600 pounds and 10 feet long. (Courtesy of Zeb Hogan / USAID Wonders of the Mekong).

References

- Carrizo, S.F., Jähnig, S.C., Bremerich, V., Freyhof, J., Harrison, I., He, F., Langhans, S.D., Tockner, K. Zarfl, C., & Darwall, W. (2017). Freshwater Megafauna: Flagships for Freshwater Biodiversity under Threat. *BioScience* **67** (10), 919-927.
- He, F., Zarfl, C., Bremerich, V., Henshaw, A., Darwall, W., Tockner, K., & Jähnig, S.J. (2017) Disappearing giants: a review of threats to freshwater megafauna. *WIREs Water* 2017, **4**:e1208. doi: 10.1002/wat2.1208.

Areas of Connectivity Conservation Guidelines

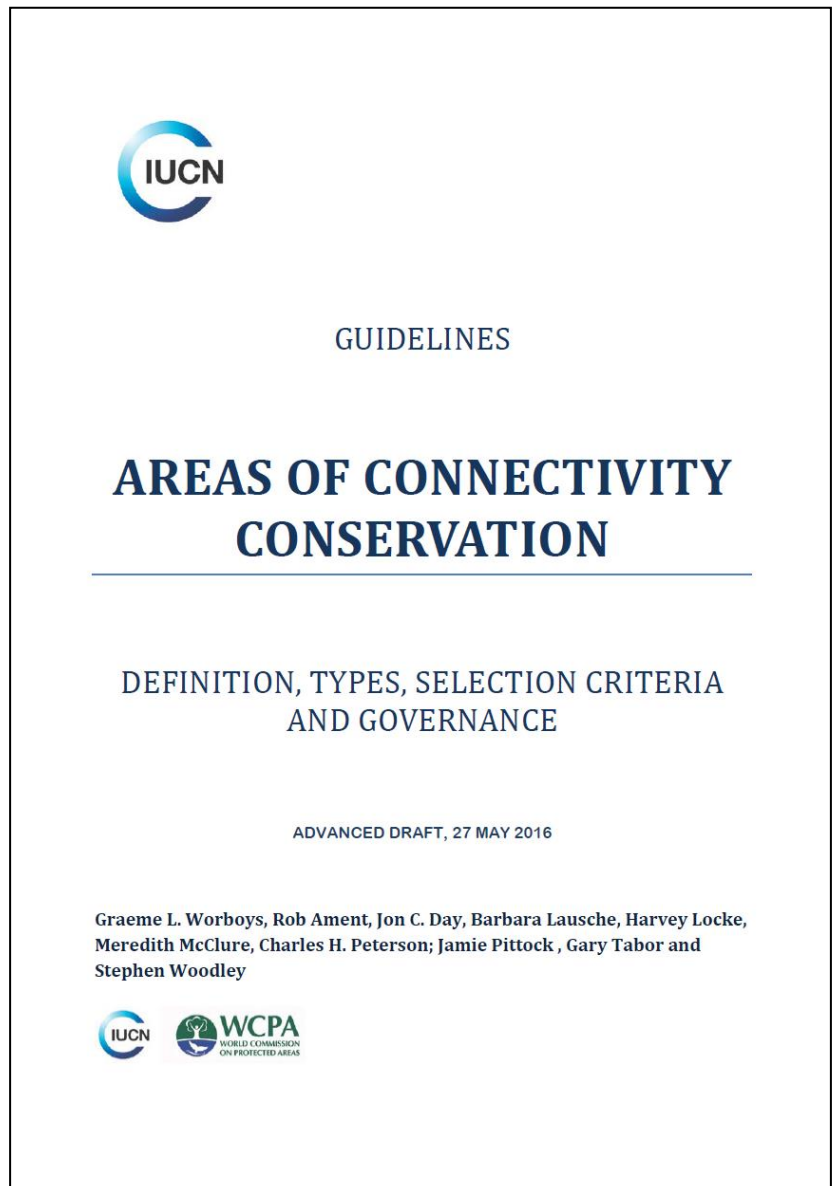
Ian Harrison

FFSG Technical Officer

Last year the [IUCN WCPA Connectivity Conservation Specialist Group](#) gave an open call for comments on their draft “Areas of Connectivity Conservation” (ACC) Guidelines. They were particularly interested in any input from IUCN Specialist Groups focused on freshwater. I requested comments from FFSG, the SSC Freshwater Conservation Subcommittee, and the WCPA Freshwater Specialist Group.

The draft version of the guidelines tended to overlook some of the complexities of freshwater systems, and did not adequately reference the extensive literature on the topic of freshwater connectivity and protected areas. One of the important points that the draft version of the Guidelines missed was a discussion of connectivity of water flowing through the freshwater ecosystems, as much as connectivity of the species present. For these reason, well-planned connectivity of freshwater ecosystems is essential to ensure that downstream species benefit from well protected upstream catchments.

Several comments coming from Specialist Groups and, in particular, the WCPA Specialist group (which also includes members of FFSG), were compiled on the draft document and submitted to the Connectivity Conservation Specialist group in September. These comments will be incorporated into the next draft of the Guidelines.



Rainforest Trust – Freshwater sites for protected areas

Ian Harrison

FFSG Technical Officer

At the IUCN World Conservation Congress last year, in Hawaii, the Rainforest Trust launched their SAVES Challenge – a commitment to invest \$100 million in the creation of new protected areas before 2020. The program is targeting the most important sites for ‘Critically Endangered’ and ‘Endangered’ species. The Rainforest Trust had sought the advice of the FFSG, IUCN-SSC Freshwater Conservation Subcommittee, and IUCN-WCPA Freshwater Specialist group for suggestions for freshwater sites that could ensure the protection of threatened and endemic freshwater species.

Many thanks to those of you in FFSG who provided initial suggestions on several different projects and regions. Your input was especially helpful and, as a result, the Rainforest Trust have signed a funding agreement to provide a grant to Cameroon Wildlife Conservation Society to ascertain the feasibility of Protected Area establishment for the region of Barombi Mbo crater lake, within the Western Equatorial Crater Lakes ecoregion.

<http://www.feow.org/ecoregions/details/519>

In the IUCN analysis of the distribution and status of freshwater biodiversity in Central Africa, this ecoregion was noted as having high numbers of threatened species for many of the taxonomic groups assessed.

The Trust is now also looking at developing agreements for some other freshwater regions in eastern Africa, though these are still under review.

This is an excellent indication for where the freshwater expertise contained within the Specialist Groups of SSC and WCPA is having a direct and important contribution to advancing freshwater ecosystem conservation.

NEWS FROM AROUND THE WORLD

Tigerfish monitoring in the Kavango River, Namibia

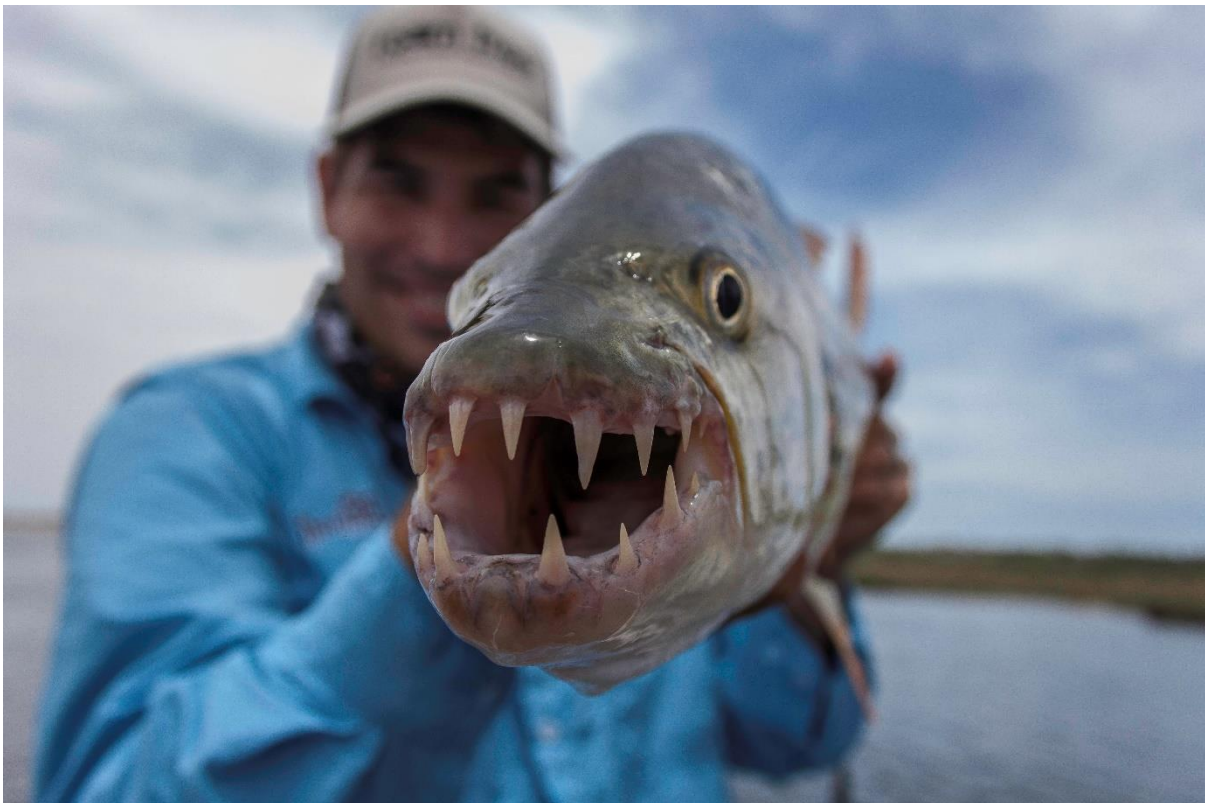
Francois Jacobs

Senior Fisheries Biologist

Kamutjonga Inland Fisheries Institute

Ministry of Fisheries and Marine Resources

Photo credits: Francois and Renate Jacobs



Scientists from the Ministry of Fisheries and Marine Resources (MFMR) of Namibia in collaboration with freshwater fish specialists from the Norwegian Institute for Nature Research (NINA), South African Institute of Aquatic Biodiversity (SAIAB), University of Namibia, and the University of KwaZulu-Natal are investigating the viability of freshwater protected areas (FPA's) as a management tool for the African tigerfish *Hydrocynus vittatus*.

In Namibia, tigerfish occur mainly in the Zambezi, Kwando, Chobe, Kavango and associated rivers. These rivers are associated with large grassland floodplains and a seasonal cycle of flooding. These floodplain rivers are considered to have complex food webs in which tigerfish are the apex predators and are an important contributor to the transfer of energy from the floodplain into the main river. Tigerfish are also an important component of artisanal fisheries where they contribute to food security and rural livelihoods, and they are a popular target fish for recreational anglers. Recreational angling in northeast Namibia is responsible for up to 70% of the revenue received by tourist lodges. Situated mostly in remote areas, these lodges are often the only source of paid employment for local communities and provide an important economic contribution to these areas.

Because of the ecological and economic importance of tigerfish in the region, there is a need for managing exploitation of this species to ensure that its social and economic contributions are sustained. This is particularly pertinent as anglers have reported declines in catch rates of tigerfish in northern Namibia. Declining catch rates of the commercially important large cichlids (e.g., *Oreochromis andersonii*, *O. macrochir* and *Coptodon rendalli*) are documented and have been attributed to excessive fishing effort and the use of environmentally destructive and unsustainable fishing methods.

As a result, governments, scientists and managers must constantly find alternative management techniques that protect, conserve and promote sustainable utilization of freshwater fisheries resources. Although not as well documented as marine protected areas (MPA's), freshwater protected areas (FPA's) are possibly a useful tool to reach these management goals. Freshwater protected areas are often criticised as not being relevant for migratory species of fishes, having the inability to control some threats (e.g. pollution), and they do not always reflect the importance of ecosystem connectivity. Nevertheless, they have been shown to be an effective management tool. In an effort to improve the sustainable management of Namibia's tigerfish stocks, the MFMR established a radio telemetry study to investigate the effectiveness of FPA's in the Kavango River.

Radio telemetry

The study is being carried out mainly in the Mahangu Game Park (Namibia) which is the only FPA currently existing in the Kavango River within Namibia and is restricted to fishing activities. In total 49 wild tigerfish (n = 49) were caught during June to August (austral winter) 2016 in the FPA. The tigerfish were caught using rods, reels, line and a range of lures. All fish were captured from a boat and held in a dip-net after which they were placed in a 50L water-filled container where 2-phenoxy-ethanol (0.3 ml/L) had been added to achieve anaesthesia. Water replacement was immediately initiated after the anaesthetized state was reached to start recovery. Radio transmitters weighed 16 g in the air and were 55x20x11 mm in size (Model F2120 Advanced Telemetry Systems, Inc., Isanti, MN, USA). Stainless steel hypodermic needles were inserted through the musculature, 2 cm below the dorsal fin. The needles were spaced according to the width of the tag. Orthopaedic wire (0.65 mm diameter) was used to firmly secure the tag by twisting and locking the ends of the wire against a plastic back-plate. After tagging, fork length (mm) and total weight (g) of the fish were recorded. All fish were released at the capture site.



Tigerfish were tracked using a portable receiver connected to a 4-element Yagi antenna mounted in a boat, and one aerial survey was conducted using an ultralight aircraft. Tagged tigerfish were located using signal strength triangulation with a precision of minimum ± 10 m. Tracking and positioning were mostly performed covering the same 33 km stretch of the Kavango River from Popa Falls Game Park to the lower end of the FPA. To estimate total river distance use, and determine fates of fish that left the FPA, four tracking surveys were conducted from the Cuito and an additional two tracking surveys were carried out from Katwitwi border post to the end of the FPA. Two tracking surveys were also conducted downstream from the FPA to the border of Moremi Game Reserve in the Okavango Delta, Botswana.



Preliminary results

In total, fourteen of the tagged tigerfish had to be excluded from the movement analyses. Eleven tigerfish had less than 10 fixes (unknown fate) during the study period which might be due to tag failure, or the fish being removed from the river or moved out of the study area. One tigerfish was caught by a crocodile two days after it was released (witnessed attack and tag retrieved) and two more tigerfish were recaptured after being tagged, which might influence movement behaviour.

Two behavioural patterns have been identified thus far in this study. Some tigerfish displayed sedentary periods with limited home ranges and high site fidelity, whereas other tigerfish migrated over long distances. In addition, approximately eighteen (51.4%) of the 35 tagged tigerfish stayed within the FPA 50% of the time, whereas eleven (31.4%) were never recorded outside the FPA during the monitored period. Preliminary results may suggest that the FPA contained all the necessary life-stage habitats such as spawning, nursery areas, and feeding zones to protect at least a portion of the tigerfish population. It seems plausible that FPA's may be a useful tool for the management of tigerfish, which is mostly considered a migratory species. Fish also showed largescale movement both upstream (max 416 km) and downstream (max 116 km) in the Kavango River system which encompassed three countries (Angola, Botswana, and Namibia), underscoring the need for interjurisdictional management especially, when structures may obstruct fish movements.



The way forward

This study runs to the end of December 2017 whereby information obtained will hopefully lead to new FPA's formed in the Kavango River system. The responsibility to ensure conservation, restoration, protection, and sustainable utilization of all inland fisheries resources within Namibia falls within the strategic objectives of the Ministry of Fisheries and Marine Resources.



The National Geographic Okavango Wilderness Project – An adventurous trail of discovery

Paul Skelton

Science Director, NG Okavango Wilderness project

The rivers of Angola were out of bounds for scientific discovery during the years of civil conflict and war from the 1970s till after 2000. The Okavango basin in Angola includes the ‘watertower’ catchments embracing the Cuito-Cuanavale and Cubango mainstreams. The natural wet and dry flood pulse of this African savannah system is key to all life it supports and therefore its conservation. This is especially critical as it is an endorheic system ending in the Magadigadi pans of the Kalahari in Botswana. The Okavango Delta in Botswana is a World Heritage site of major importance bringing tourists and foreign exchange of significant proportion to the country. Any threat to the rivers in Angola and Namibia is a threat to the Delta in Botswana.

Concerns about the future water to the Delta have long been raised by conservationists in Botswana and a tri-national transboundary commission has been engaged with these concerns for decades. Recently the Okavango Wilderness Project, managed by the Wildbird Trust and sponsored by the National Geographic Society and other groups has explored the poorly studied and little understood wilderness areas of the Okavango catchment in Angola. Scientific knowledge is a key element in devising an appropriate conservation strategy and action plan for the system. In 2015 I was engaged to investigate the freshwater fishes from the Project, having already a good knowledge of the fauna downstream from studies made since the early 1980s.

The Core study area of the project is a vast tract embracing the headwaters of the Cuito-Cuanavale as well as the upper reaches of the Cuando and the Zambezi systems (Figure 1). In 2017 we visited the upper Cubango River in order to provide fresh collections and understanding of that major branch of the system as previous studies including historical explorations indicated a very different fauna there due to both ecological and biogeographical reasons.



Figure 1. The outlet from Lake Cuito. (Photo credit: Paul Skelton)

NGOWP expeditions are interesting affairs as they combine the very latest technologies with fundamentally basic riverine logistics – namely travel along the river by mekorras or dugout canoes. In this way, entire transects of the major tributaries have been explored – and the first transect in 2015 travelled from the source of the Cuito to the very terminal point Lake Xau in the Magadigadi pans! Land based support parties are also involved and, with the remoteness of the areas being explored, helicopters are used to connect with the party for re-supply and change or evacuation of party members.

We discovered that the source zone of the core study area was a fairly unique and very different environment from what we had previously encountered in the system. Based on deep Kalahari sands and dense Miombo forests, the grassy drainages are in fact rivers arising in peat bogs that, when blocked by bank slumps become lakes with peat bog margins. The waters are crystal clear but poor in nutrients and the fish fauna is very different to that of the rivers and floodplains lower down in the system and in the Delta. This fauna is also different to the species encountered in the western Cubango branch of the system. Not surprisingly several undescribed species are present, and deciphering their status has been both difficult, as there is little known from the immediate interconnected drainages of the Congo, and exciting because that is what drives systematic discovery. Some of the fishes, like an elongate clariid without pelvic fins, are peat-bog specialists with locomotory adaptations and air-breathing abilities. Other newly discovered species betray geographical connections with adjacent catchments e.g. the striking *Enteromius chicapaensis* (Figure 2) with the Congo, and *Clypeobarbus bellcrossi* with the Zambezi. These records are the first to my knowledge of these species beyond their type localities! Such discoveries naturally raise the conservation profile of the area.



**Figure 2. *Enteromius chicapaensis* – a pretty minnow discovered in the Okavango system for the first time.
(Photo credit: Paul Skelton)**

The explorations have become increasingly sophisticated with the team using SCUBA and underwater video photography to explore the lakes for the first time in 2017 (Figure 3). These investigations have shown a largely undisturbed and almost eerie environment, possibly due to the absence of megafaunal elements like elephants, buffalo and hippo that normally and naturally would keep the bogs open and unsettle the sediments. Crocodiles are present but do not seem to be very large. Restoration of natural elements may well restore a more natural environment? Indigenous fishing is present but completely sustainable as, so far, we have not seen modern gear being employed in these most remote areas. Elsewhere, lower down in the system, the destructive use of monofilament gillnets is rapidly depleting the fish resources.

Each new locality brings with it new discoveries and the area proves to be a scientific treasure chest. The Okavango Wilderness Project is also bringing together scientists from a range of disciplines from fungi and plants to higher vertebrates, hydrologists and landscape ecologists. The creative mix of minds is raising interdisciplinary potentials and creative opportunities, especially when new technology is added.



Figure 3. Richard Sneider diving the Okavango source lakes in Angola (Photo credit: Rainer Von Brandis.)

Finally, on a more personal note, we were joined on the Core area phase of the 2017 expedition by the FFSG Global Chair, Richard Sneider (Figure 3), one of the NG funders of the project. It was our first meeting, and made the expedition a special one for me, seeing Richard clearly in his dynamic element, exploring both underwater and above, and enjoying it tremendously.

Exotic vs. native species conservation: an old dilemma at the south of the world

Claudio Baigún

Wetlands International/Fundación Humedales; UNSAM-CONICET

The Santa Cruz River is considered as the last largest uninterrupted river of Patagonia. This river, that exhibits a mean annual flow of 700 m³/s with summer peaks of almost 1400 m³/s, originates in the Argentino Lake, and flows for 385 km across the Patagonian steppe before draining into the Atlantic Ocean (Figure 1). The river has an historical value as it was explored by Charles Darwin as part of the Beagle voyage in 1834 and much of the arid landscape he observed is still easy to spot (Figure 2).

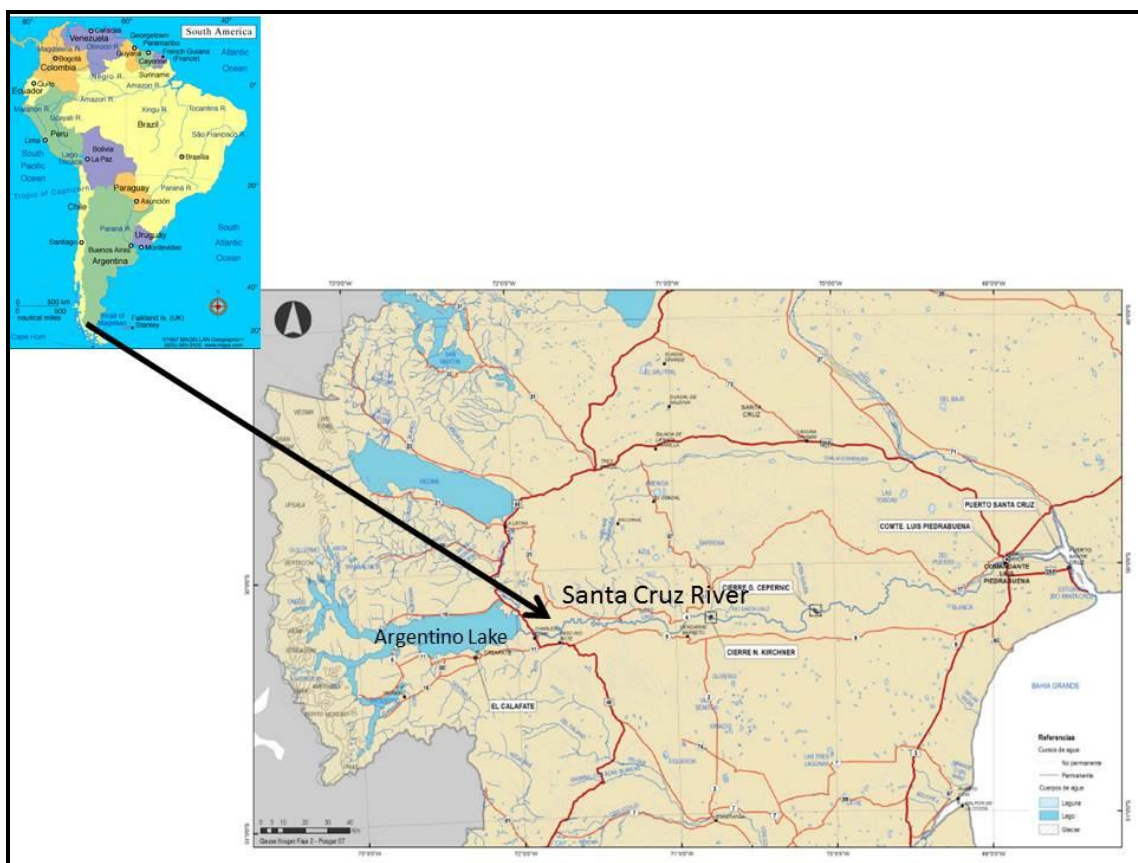


Figure 1: The Santa Cruz River basin in south Patagonia



Figure 2: The Santa Cruz riverscape acts as a corridor for anadromous native and exotic species and corresponds to that of large rivers crossing Patagonia from the Andes mountains to the Atlantic Ocean (Photo Credit: Claudio Baigún)

Fish richness in this river is rather poor, as expected for all Patagonian rivers (Baigún & Ferriz, 2003), comprising native species such as *Percichthys trucha* (perca), *Galaxias maculatus* (puyen), *Geotria australis* (pouched lamprey), and several exotic salmonids such as *Oncorhynchus mykiss* (rainbow trout), *Oncorhynchus tshawytscha* (Chinook salmon), *Salmo trutta* (brown trout) and *Salvelinus namaycush* (lake trout). As in other South American rivers, salmonids are all exotic species which have been introduced in Argentina since the beginning of the 19th century, and now are intensively stocked in almost all Patagonian waterbodies (Baigún & Quiros, 1985).

A surprising feature of this river is the presence of the anadromous form of the rainbow trout (called steelhead trout). This distinguishes the Santa Cruz from all other rivers of South America that have salmonids. Thus, the Santa Cruz River is the one of the rare examples outside the species' native range where introduced rainbow trout are known to have recreated a polymorphic behavior, displaying both anadromous—ocean migrating—and non-anadromous lifestyles (resident rainbow trout) (Pascual *et al.*, 2001).

The river, however, may undergo an important transformation in the coming years because two, large hydroelectric dams are being planned that will result in almost 50% of the mainstem being modified into two linked reservoirs. River fragmentation will pose a large challenge for maintaining migratory species. This has re-opened the debate about the need for preserving salmonids as the basis of the main fishing activity in Patagonia, but also for providing livelihoods related to tourism, outfitters, fishing guides, gastronomy and hotels services. Specifically, in the Santa Cruz River, a well-developed steelhead recreational fishery exists in the lower sector (below the planned dams) including an annual national tournament that is unique in South America (Figure 3). In addition, the entrance of chinook, very common in the Chilean Patagonian rivers but still rare in Argentina, provides a selective fishery in two small rivers located in the upper Santa Cruz basin.

On the other hand, increasing studies in Patagonia have shown the impact of salmonids on the native fish fauna based on direct predation and overlapping diet (e.g., Macchi *et al.*, 1999). This is comparable to copying similar results in other temperate Southern hemisphere countries where salmonids were introduced (e.g., Cadwallader, 1996; McIntosh *et al.*, 2010).



Figure 3: Anglers at the shore of the Santa Cruz River catching steelhead during the upstream migration (Photo Credit: Claudio Baigún)

There are different opinions on what must be done to maintain the connectivity of the Santa Cruz River in relation to preserving native and exotic migratory species. The installation of fishways would be effective to mitigate the blocking of steelhead migratory movements, assuming that it can reproduce upstream of the reservoirs as well as the chinook. But these systems would not be efficient for the pouched lamprey which apparently spawn in the upper basin, thus requiring their own specific fishway designs. Certainly, conservation of native Patagonian fishes should be envisioned as a priority, in view of their low species richness and the potential impacts of habitat deterioration as well as salmonid introduction. Conservationists and NGOs could reasonably argue that efforts to maintain migratory species should be directed only towards native species, recognizing that the dams are a unique opportunity to remove this exotic anadromous form, regardless of the socio-economic importance. On the other hand, other stakeholders argue that the steelhead stock needs to be preserved as it is unique at a continent scale, and that even avoiding installing fishways will not eliminate the impacts by resident rainbow trout and other salmonid species inhabiting the basin and most other Patagonian lakes and rivers.

A sound debate is still merited on how exotic salmonids need to be managed according to their socio-economic importance under an ecosystem approach (Cussac *et al.*, 2016), also taking into account stakeholder interests and scales of analysis (Pascual *et al.*, 2009). Salmonids have been introduced everywhere in Patagonia, but their impact on native species has not been similar in all environments and,

therefore, should be evaluated relevant to the context of each region, considering a wide array of factors related to environmental and socio-economic dimensions.

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Fish taxonomy training in Bhutan

Rajeev Raghavan

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D.B. Gurung

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The South Asia Office of the Freshwater Fish Specialist Group (FFSG) in collaboration with the College of Natural Resources (CNR), Royal University of Bhutan, Lobesa, Bhutan, and with support from the WWF-Bhutan through the Living Himalayas Program organized a five day hands-on 'capacity building workshop on freshwater biotaxa taxonomy' at the CNR Seminar Hall from 22nd to 26th May 2017. The aim of the workshop was to create an awareness on the importance of taxonomy as a critical aspect of freshwater biodiversity conservation in Bhutan, improve understanding of the basic concepts and principles of taxonomy and systematics, assist in the field identification of important groups of fishes of the Himalayan region, and develop skills in writing taxonomic papers. Around 30 participants including 15 teaching and research staff from CNR, 10 research staff from the government departments of forestry and fisheries and five undergraduate students from CNR Lobesa attended the workshop and received training in taxonomy and systematics of freshwater fishes of Indian subcontinent, use of taxonomic databases and writing taxonomic papers.



A World Bank Project on Sustainable Hydropower Development in the Kingdom of Bhutan

Rajeev Raghavan

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Rajeev Raghavan, South Asia Coordinator served as the Regional Aquatic Biodiversity Specialist for the World Bank on a project related to Sustainable Hydropower Development in the Kingdom of Bhutan during January to June 2017. As part of the project, Rajeev worked with key stakeholders in the government, academia and civil society and carried out a comprehensive inventory and audit of published data and information relevant to aquatic biodiversity of Bhutan.

Summary of the American Fisheries Society Symposium on Inland Fisheries

Michael Cooperman

Research Scientist, Conservation International

During the 147th Annual Meeting of the American Fisheries Society (AFS), held on August 20-24 this year, in Tampa Florida, Dr. Sui Chian Phang, a post-doctoral fellow at The Ohio State University chaired a two-day symposium titled, “**Linking Inland Fisheries to Global Policies in Sustainable Development.**” The symposium was hosted by the International Fisheries Section of AFS and included 15 invited oral presentations and a closing five-member panel discussion. Along with Dr. Pang, the organizing committee included T. Douglas Beard Jr., Julie Claussen, Steven Cooke, Ian. G. Cowx, Abigail J. Lynch, Ashley Steel, and William W. Taylor. I was involved via both an oral presentation and as a member of the discussion panel. An exhaustive listing of all the presenters and their respective topics is beyond the bounds of this summary, but I can highlight some of the principle points and more interesting tid-bits.

The overall theme of the symposium was to explore how to elevate the status of Inland Fisheries in the arena of international policy, and in particular in future iterations of the United Nation’s Sustainable Development Goals. As many FFSG members already know, while many of the SDG’s 17 “Global Goals” and the 169 “Targets” embedded within the goals are tangentially aligned with Inland Fisheries, such as in matters relating to poverty, hunger and human health concerns (e.g., linkage to Inland Fisheries via freshwater provision for direct consumption, sanitation concerns, food security and employment opportunity, etc.) and the protection of biodiversity found in both the ocean and on land, the SDGs lack an explicit goal or mention of Inland Fisheries. Similarly, Inland Fisheries are also wholly or largely absent from other notable multinational agreements such as the Ramsar Convention on Wetlands, the Convention on Biological Diversity, and the Convention on Climate Change. This omission consequently retards efforts to rally both political and economic support for the protection and sustainable management of freshwater ecosystems and the services they provide, including Inland Fisheries.

Clearly agreed upon was that the first need is to better communicate exactly how important Inland Fisheries are in regard to concerns such as food and employment security, and gender equality. Dr. Simon Funge-Smith of FAO (Rome) and Dr. Abigail Lynch of USGS set the stage with powerful articulations of the magnitude of freshwater fish harvest and the role of Inland Fisheries for the well-being of some of the world’s poorest people. For example, Inland Fisheries are estimated to feed approximately 37% of the global population, and most of these people are amongst the least empowered in the world. Meanwhile, in the developed world, recreational fisheries for freshwater species may represent over 100 billion USD yr⁻¹ to the global economy.

These statistics beg the question “if Inland Fisheries are so incredibly important to so many people, why are they so under-represented in policy?” The unfortunate answer, at least in part, is that much of the available

“data” are based on conjecture, estimates, or other forms of indirect or “non-empirical” determination. In short, there is a tremendous paucity of hard data on Inland Fisheries, particularly so for the fisheries of developing nations. Hence, if we want to better communicate the importance of Inland Fisheries to policy makers, we must concurrently work to generate and synthesize better data.

Dr. Vittoria Elliott of Conservation International used Cambodia as a case study to provide a strong illustration of how movement towards the sustainable management of Inland Fisheries could help signatory countries of the current SDGs meet their obligations and commitments to the SDGs. For example, as a signatory nation to the SDGs Cambodia has committed to the creation and sustainable management of new terrestrial protected areas. If these new protected areas were selected based on their importance for Inland Fisheries, i.e., source water protections and the protection of the floodplains that are central to the productivity of the lower Mekong system, Cambodia would meet its commitments, and its fisheries would benefit. In short, Inland Fisheries represent the low hanging fruit for a win-win solution. This message matched up very well with Dr. Sarah Glaser’s presentation on the Inland Fishery of Lake Victoria, as one of her key points was that it is critical to understand “National Development Plans” when attempting to place the sustainable management of Inland Fisheries in the context of honoring commitments to the SDGs. During the panel discussion, much attention was focused on the idea that a probable path for success in getting inland fisheries acknowledged in future SDGs was to focus effort on the upcoming reauthorization of the Convention on Biological Diversity. The thought here is that if Inland Fisheries are made explicit in the CBC, it greatly increases the probability that inland fisheries will also be picked up during reauthorization of the SDGs.

All told, the symposium was filled with outstanding presentations on the unique considerations of, and commonalities among, many diverse Inland Fisheries. For examples, the symposium included presentations of the Aral Sea and the Inland Fisheries of Mexico, Myanmar, the Great Lakes of the USA, Bulgaria, and Cameroon. Along with this geographic diversity was a diversity in topics, including fish disease monitoring and response, the restoration of lakes in east-central China, the positive feedback between climate warming on freshwater systems of central Europe and the rate of polar ice cap melting, and the potential impacts and synergies of freshwater aquaculture on wild harvest fisheries in Lake Victoria.

At the present time, symposium participants are drafting two manuscripts. The first is envisioned to address linking inland fisheries to global policies in sustainable development, and the second addressing how inland fisheries management is partner to aquatic biodiversity protection.

Readers interested in this article are also encouraged to read the article by Vivian M. Nguyen on *“To manage inland fisheries is to manage at the social-ecological watershed scale”* in Issue 13 (May 2017) of this newsletter

Summary of the *Alliance for Freshwater Life* meeting, Berlin, 9-11 October

Harmony Patricio

Co-Chair, IUCN WCPA Freshwater Specialist Group; Australian Rivers Institute

A core group of 18 participants recently met in Berlin to formalize and advance a key effort focused on freshwater biodiversity. The meeting grew from a concept (*The Blueprint of Freshwater Life*) that has been developing since 2010, initiated through discussions among IUCN-SSC members and the Freshwater Biodiversity Unit staff, among other colleagues. The meeting in Berlin was generously supported by the Leibniz-Institute for Freshwater Ecology and Inland Fisheries (IGB). A day of presentations at the IGB offices, also attended by several additional staff and students associated with IGB, was followed by two days of intense discussion and decision-making in central Berlin. There was some discussion over the name of the project, and a new name, the ***Alliance for Freshwater Life*** (AFL) was accepted as better. The newly created AFL has been formalized through this meeting. Several priority research products were selected and defined, and the steering committee structure was developed. Drafts versions of two documents, a Vision and Mission Statement, and a Governance document, were produced by the core team, and they are now under revision. The Governance document also outlines the terms of reference for interested non-governmental, governmental, and intergovernmental parties to join AFL.

The vision of the AFL is a world where freshwater biodiversity is understood, valued, and celebrated. The mission is to reduce and halt the loss of freshwater biodiversity through research, outreach and education, conservation, and policy intervention. A key driver of the initiative is the need to raise the profile of freshwater biodiversity on the global conservation and policy agenda, given the rapid loss of freshwater species. Public outreach and education is seen as a critical part of achieving this goal. The professional author Jessica Lee, whose recent book *'Turning: a swimming memoir'* documents her goal of swimming in 52 German lakes in 52 weeks, joined the meeting to contribute a diverse perspective on communications products that will help us achieve the aims of AFL. The steering committee is expected to be formalized within one year, including representatives from every major continent or biogeographic region. Three thematic groups were chosen and attendees at the meeting signed on to at least one: Research and data, Outreach and education, and Conservation and policy.

Several priority research and outreach activities were discussed as potential priorities. One of these included a theoretical analysis to identify locations currently lacking freshwater biodiversity data that would be most likely to host new species or areas of high richness. Another proposal was to conduct extensive sampling of water bodies globally in a specific season, and use eDNA metabarcoding to identify levels of macro-organism richness and diversity indices. These data can be used as baselines to assess future changes in richness and community composition. Sampling may be linked with other global initiatives, such as *World Fish Migration Day*. A brief communications document was drafted that will be used by Jessica Lee, to contact journalists to

pursue editorial commissioning of written pieces for popular news media. This document will also be essential for seeking funding for the AFL. A policy forum manuscript is also in development. Also, in the near future, we intend to create a website, along with Twitter and Instagram accounts.

The AFL is still in its early stages, but this meeting in Berlin has advanced our objectives significantly and given us a good plan on which we can develop a more detailed structure and seek funding. We are extremely grateful to IGB for their enthusiastic engagement in, and support for this project. We will keep FFSG members informed via the Newsletter, FFSG website, and Facebook site.



Participants at the meeting in central Berlin. Left to right: Eren Turak, Mark Gessner, Jonathan Jeschke, Lu Cai, Aaike De Wever, Will Darwall, Tony O'Dell, Vanessa Bremerich, Ian Harrison, Harmony Patricio, Simon Stuart, Aleksandra Lewandowska, Michael Monaghan, Michele Thieme, Sonja Jähnig, Jessica Lee, Olaf Weyl, Jörg Freyhof, Ken Irvine (Klement Tocker absent from photo)

Participant list with affiliations:

- Vanessa Bremerich – IGB, Germany
- Lu Cai – Beijing Forestry University, China; Freshwater BON
- Will Darwall, IUCN Freshwater Biodiversity Unit, UK
- Aaike De Wever, Royal Belgian Institute of Natural Sciences, Belgium
- Jörg Freyhof – IGB, Germany
- Mark Gessner – IGB, Germany
- Ian Harrison, Conservation International, USA; IUCN-SSC

- Ken Irvine, IHE Delft Institute for Water Education, Netherlands
- Sonja Jähnig – IGB, Germany
- Jonathan Jeschke – IGB, Germany
- Jessica Lee – author, Writer in residence at IGB, Germany
- Aleksandra Lewandowska – University of Oldenburg, Germany
- Michael Monaghan – IGB, Germany
- Tony O’Dell – National Great Rivers Research and Education Network, USA
- Harmon Patricio – IUCN WCPA Freshwater Specialist Group; Australian Rivers Institute
- Simon Stuart – Synchronicity Earth, UK
- Klement Tockner – Austrian Science Fund
- Michelle Thieme – WWF-US
- Eren Turak – Office of Environment and Heritage, Government of New South Wales, Australia
- Olaf Weyl, South African Institute for Aquatic Biodiversity

***Journal of Fish Biology* Special Issue on Biology and Ecology of African Freshwater Fishes**

Olaf Weyl

South African Institute for Aquatic Biodiversity

Ian Harrison

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The freshwater and estuarine ecosystems of Africa are rich in freshwater fishes and include many different habitats, such as underground systems, desert springs and pools, and rivers and lakes ranging from very small to very large and deep. African freshwater fishes range in size from some of the smallest species of fishes, to some of the largest. African freshwater fishes therefore represent a diverse and important component of the ecology and food webs of many different ecosystems. Moreover, the diverse fish assemblages of rivers, reservoirs and lakes are considered an important source of food security and livelihoods for many people on the African continent, and particularly for the rural poor (Welcomme, 2011). A report by UNEP (2010) noted that over 200 million of Africa's 1 billion people regularly consume fish, and nearly half of this is from inland fisheries. Darwall *et al.* (2011) also showed that the areas where there is greatest richness of freshwater biodiversity tend to coincide with areas of greatest concentration of rural poor who are likely to be most directly reliant on the services supplied by freshwater systems and their biodiversity.

Despite the diversity of fishes in Africa, and their ecological and socio-economic importance, our knowledge of them is relatively poor. Lundberg *et al.* (2000) noted that their estimate of 2850 species of freshwater fishes in Africa was certainly an underestimate, and currently FishBase (Froese & Pauly, 2017) lists 3367 species in the Ethiopian Zoogeographic realm (i.e., Africa excluding northern Africa but including the southern Arabian Peninsula and Madagascar). An assessment of the conservation status of 2836 African freshwater species, for IUCN's *Red List of Threatened Species* found that over 500 species (18% of those assessed) were Data Deficient, with insufficient information on their taxonomy, ecology, or distribution to assess whether they are threatened or not (Snoeks *et al.*, 2011).

Nevertheless, there is no doubt that freshwater fishes are significantly affected by many threats; in particular, habitat modification, pollution, overfishing, species invasions and climate change (Thieme *et al.*, 2010; Snoeks *et al.*, 2011). As societal concern about global biodiversity and food security increases, there is an urgent need to gain a better understanding of the biology, ecology, diversity and distribution of African freshwater fishes, before they and their habitats are compromised or completely lost.

The purpose of this Special Issue of the *Journal of Fish Biology* is to bring together new information on African freshwater fishes. The geographic scope of the issue covers all continental Africa, Madagascar, and other small islands around Africa. We will consider papers that discuss all aspects of the biology and ecology of African freshwater fishes. We will also consider papers on fishes in estuarine habitats, provided that these

papers are focused on fishes that spend part of their life cycle in freshwaters. We welcome papers that report new scientific research and fieldwork that supplies novel information on the biology, ecology and distribution of these species. Reports on new records of species may also be considered, but these records must be important in terms of representing a significant increase in the known range of the species, or must address new information on some other important aspect of the species' biology and ecology. We are also interested in review papers that synthesize existing knowledge on fish fauna and present them in a way that brings new insight to the topic. Papers that discuss the application of studies on fish biology to their conservation are also welcome. The studies of some species or populations will also be relevant to aquaculture or fisheries, but papers that focus primarily on fisheries management and aquaculture, rather than fish biology, do not fit the scope of the Special Issue.

Please consult the *Journal of Fish Biology* website, and check previous Special Issues to obtain more information about the expected scope and style of these issues. The Journal web site is at: [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1095-8649](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1095-8649).

At this time please do not submit manuscripts for this Special Issue to the Journal. Instead, please notify Olaf Weyl (O.Weyl@saiab.ac.za) and Ian Harrison (iharrison@conservation.org) of your interest in submitting a manuscript, supplying a title and short abstract.

Expected timeframe for production

July 2018

Deadline for submission of draft manuscripts

December 2018

Complete review of submitted manuscripts

July 2019

Expected publication date

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IUCN One Programme Strategy for Freshwater Biodiversity Conservation

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In Issue 12 (October 2016) of this newsletter we reported that several IUCN members collaborated on a motion, that was submitted at the 2016 IUCN World Conservation Congress, for an “*IUCN-wide strategy to raise the urgency of freshwater biodiversity conservation.*” The late motion was supported by several IUCN members at Congress. The Motions Working Group recommended that, instead of presenting the information as an IUCN motion, some summary text of the overall concept should be placed directly into the [2017-2020 Work Programme](#) of IUCN. In particular, the text below that was added:

Through the IUCN Programme 2017–2020, the Union will therefore work on supporting the achievement of SDG 6 on water security and the freshwater as well as the terrestrial elements of SDG 15, doing so across the Commissions, Secretariat and Members of the Union. This cross-cutting effort will be essential to draw together the water-related components of IUCN, identify the priorities for action, and make best use of opportunities of synergy and collaboration.

This has given us the platform on which we can develop an ***IUCN One Programme Strategy for Freshwater Biodiversity Conservation.***

IUCN One Programme Strategy for Freshwater Biodiversity Conservation

The *IUCN One Programme Strategy for Freshwater Biodiversity Conservation* will raise the urgency of freshwater biodiversity conservation and motivate coordinated action among Members, Commissions and Secretariat to address critical threats. Critical to this response will be the need to mobilize with the necessary speed and scale to reduce and eventually reverse the loss of freshwater biodiversity and degradation of freshwater ecosystems worldwide.

A workshop was held from September 20 to 22, 2017, at IUCN Headquarters, to develop a framework for the strategy. The workshop was attended by the following 19 people:

- Mark Smith, IUCN Water
- James Dalton, IUCN Water
- Rebecca Welling, IUCN Water
- Will Darwall, IUCN Global Species Programme
- Ian Harrison, IUCN-SSC/Conservation International
- Jane Smart, IUCN Biodiversity and Conservation Group

- Jean-Christophe Vié, IUCN Biodiversity and Conservation Group
- Stewart Maginnis, IUCN Nature-based solutions Group
- Trevor Sandwith, IUCN Global Protected Areas Programme
- Remco van Merm, IUCN World Heritage Programme
- Claudio Baigún, IUCN Commission on Ecosystem Management/Wetlands International
- Michael Acreman, Centre for Ecology and Hydrology
- Karin Krchnak, WWF-US
- Philip Leonard, WWF International
- Lifeng Li, Wetlands International
- Melanie Ryan, Luc Hoffman Institute
- Tobias Salathe, Ramsar Convention Secretariat
- Simon Stuart, Synchronicity Earth
- Merlin Veron, Synchronicity Earth

We identified four main outcomes that should be the focus of the *One Programme Strategy for Freshwater Biodiversity Conservation*.

1. Water and related laws and governance can enable freshwater biodiversity conservation
2. Water infrastructure impacts on freshwater biodiversity are avoided or minimized
3. Conservation and restoration of freshwater related habitats and biodiversity are scaled up and implemented more rapidly using biodiversity knowledge. (This includes a process of aligning the various global initiatives on water so that we can maximize the opportunities to share data and work towards common goals. We will look carefully at the various indicators for assessing freshwater biodiversity, and how we can improve on these and/or do a better job of applying them).
4. The impacts of major economic sectors on freshwater biodiversity are transformed. (It will be critical to develop and engage stronger expertise in the major economic sectors. We expect to look carefully at dams (not just hydropower, but also impoundments for water supply for agriculture and people), at agriculture, at the mining extractives industry, and aquaculture of non-native fish species. We will look at how we can contribute to and promote the [International Finance Corporation Performance Standard 6](#)).

Next steps

We will assimilate the information from the workshop and turn this into a Framework Strategy for the IUCN *One Programme for Freshwater Biodiversity*. An initial summary document will be presented to IUCN Council, and we intend to develop a more detailed document during 2018.

NOTICEBOARD

World Fish Migration Day, April 21 2018

www.worldfishmigrationday.com



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NOTICEBOARD

8th World Water Forum

March 18-23, Brazil

<http://www.worldwaterforum8.org>



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A list of upcoming, fish and fisheries related conferences has been circulated by our colleagues in the World Fish Migration Foundation (<http://www.worldfishmigrationfoundation.com>)

and can be downloaded from the IUCN FFSG website at:

<http://www.iucnffsg.org/ffsg-activities/latest-news/>



NEXT ISSUE OF 'SAVING FRESHWATER FISHES AND HABITATS'

Do you want to share news from your freshwater fish conservation project with a global audience? Are you doing fascinating research or organising an exciting event? Well, the FFSG Newsletter could be the perfect way to tell your story!

The deadline for submitting material for the next issue is 15th December 2017.

If you have any questions or if you want to submit material, please email info@iucnffsg.org

The Freshwater Fish Specialist Group is generously supported by IUCN's Species Survival Commission, Wetlands International, Project Piaba, and the Zoological Society of London.

Viewpoints expressed in this newsletter are those of the authors and do not necessarily reflect the official policy or position of any associated organizations.

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