Leibniz-Institute of
Freshwater Ecology and Inland Fisheries
Forschungsverbund Berlin e.V.

IGB

Annual Report

2013

Research for the future of our freshwaters

We are...

... personal

... innovative

... curious

... interdisciplinary

... interconnected

... committed

The IGB continues to set the standard

Esteemed readers,
dear friends and supporters of the IGB,

I'm very pleased to present to you our annual report for 2013, in which we share the outstanding performance and many achievements of our institute in the past year. For the first time, this annual report is also being published in English, in order to inform our international partners about the latest developments at the IGB.

We are well on the way towards becoming a leading international research institute in the field of freshwater ecology and inland fisheries. What conditions are needed to ensure the long-term success of a research institute? It's simple: highly talented and motivated employees, sufficient resources, professional management, and an inclusive organizational structure. A successful institution has a clear strategy for quality management, uses and promotes synergies, practices good governance, and has an international orientation.

We continuously work to ensure the necessary conditions for the long-term success and expansion of the Institute. Our international fellowship program is an example of this spirit. With it we have established a global network of outstanding scientists and researchers, and in doing so connected their research institutes to the IGB. In the last five years, nearly 40 fellows from 20 different countries have performed a research stay at the IGB for a period from six months up to two years. A stay at the IGB supports the career development of fellows, and at the same time stimulates our own research.

We also actively promote collaboration across departmental boundaries, especially with our partners in the Berlin area. In 2013, the IGB was a co-founder of the Berlin-Brandenburg Institute of Advanced Biodiversity Research (BBIB). The Institute has its headquarters at the Freie Universität Berlin, and steps are currently being undertaken to establish a BBIB research building on the campus of the FU Berlin. The BBIB will act to focus the diverse expertise in biodiversity that is already present in the region.

Our new LakeLab is a globally unique experimental research facility. Scientists from every department are studying the effects of environmental changes on the ecosystem level at LakeLab. It is also involved in a number of international research projects and initiatives, serving as a nucleus for cross-institutional and global collaborations. Projects within the institute are particularly supported by the Leibniz Joint Initiative for Research and Innovation program. The IGB was once again successful in this competition in 2013, for the fifth consecutive year. This time, the MycoLink project (linking diversity, physiology, and ecology of aquatic fungi) was funded. The project will be run in close cooperation with the DSZM (German Collection of Microorganisms and Cell Cultures), the Leibniz Center for Agricultural Landscape Research (ZALF), and the Leibniz Institute for Zoo and Wildlife Research (IZW). MycoLink will examine the functions of aquatic fungi; an important group of organisms to which little attention has been paid in the past. The LakeLab and MycoLink projects are examples that demonstrate how synergies at the Institute can be leveraged to play a leading role in international research.

It needs highly talented and motivated employees, sufficient resources, professional management, and an inclusive organizational structure.

Quality assurance and development have a particularly high priority at the IGB. We support the development of our doctoral students through a structured graduate program. Graduates from the IGB are in high demand internationally as researchers, as well as in practical application positions.
Scientific publications remain the main outcome of a research institution, and at IGB we vigorously pursue a strategy to increase the quality, rather than the quantity, of our publications.

Photo: Andy Küchenmeister

In addition, our internationally high-level scientific advisory board provides constructive guidance and oversight for our long-term research strategy.

A good mix of both long-term research programs and individually funded projects is needed. The IGB sets international standards in both research and practice through projects like "Loss of the Night", "Tomatofish", "swarm intelligence", MONERIS (modeling of nutrient emissions into surface water), the "fish stocking project", the Global Atlas of Freshwater Biodiversity, and the reintroduction of the European sturgeon. Take for example the sturgeon research program: It will take many years, and perhaps decades, to reintroduce this unique umbrella species of large rivers to its home. The IGB has the stamina and perseverance necessary to accomplish such projects, particularly in research. Last year, the sturgeon reintroduction project was designated an example project of the UN Decade on Biodiversity, a tribute to the staying power of the project. Many of our projects are of great social importance, and have achieved widespread public recognition. At the IGB we recognize that the interface between science and policy is a critical point, which may hinder two-way information exchange. For this reason, we have an institution wide strategy to ensure that valuable scientific results find their way into political and public discussion, and lead to improvements in decision-making. We pursue our work with two aims: to perform innovative, excellent research, and to simultaneously make an important contribution to the solution of pressing social challenges. To achieve these goals, the IGB welcomes your support and cooperation.

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I would like to take this opportunity to thank all of the national and international partners of the IGB, the universities with which we are closely connected, the members of the scientific advisory board, and our colleagues in the Leibniz Association and the Forschungsverbund Berlin for your mutual trust and fruitful collaboration. A special thanks belongs to our funding bodies, the Berlin Senate and the German Federal Ministry of Education and Research (BMBF). The IGB is the biggest aquatic research institute in Germany, and without a solid funding base, the IGB could neither maintain its infrastructure and long-term research programs, nor could we pursue such innovative research at such a high level of quality. I reserve my greatest thanks for the staff at the IGB: their motivation and effort are the greatest asset of our Institute. Together, we will lead the IGB in the coming decades to do full justice to its mission, "Research for the future of our freshwaters".

I wish all of you enjoyable reading of the annual IGB research report for 2013.

Highlights

We asked our employees and collaborators about the IGB's successes in 2013:

How can the quality and management of the threatened water resources of Mongolia be improved? I have been working with a team of German and Mongolian scientists on this issue since 2006. It was a great honor to receive the award in April, 2013, and it provides a strong motivation for our future work

Dr. Jürgen Hofmann (IGB) on being awarded the most prestigious medal given by the Mongolian province of Darkhan for the MOMO project

I am very pleased that the doctoral candidates' presentations (which are now part of the IGB Colloquia) draw such a big audience, and stimulate so many interesting discussions. I am also proud of the high quality of the doctoral presentations, including those at the IGB science day. We have many great doctoral candidates, and it is a pleasure to work with them!

Dr. Kirsten Pohlmann (IGB), Doctoral Program Coordinator

More information about career development at our Institute is provided from page 30.

My personal highlight was the ASLO 2013 meeting in New Orleans. As one of the four coordinators heading the scientific and local organizing committees, I was able to coordinate all social and scientific meetings aside from selection of the scientific topics and proposals.

Prof. Hans-Peter Grossart (IGB) on the ASLO 2013 meeting

Additional information about our meetings and conferences is provided on page 28.

Through both the Leibniz Network on Biodiversity and the Berlin Brandenburg Institute of Advanced Biodiversity Research (BBIB), the IGB is one of the most important partners of the Museum für Naturkunde – Leibniz-Institut für Evolutions- und Biodiversitätsforschung (MfN). The IGB and MfN not only complement each other due to our common research priorities, we also partner for purposes of public relations and political consulting.

Prof. Johannes Vogel, Director of the Museum für Naturkunde

More information about the Leibniz Network on Biodiversity and BBIB is available on page 25.

It was such a fantastic moment when we were awarded the grant for the 'Sectoral Exploitation' project! Now we can intensify our activities in the field of knowledge and technology transfer. It is a great chance to put our scientific results into applied practice, and in doing so also increase the public visibility of the IGB.

Johannes Graupner (IGB) on "Knowledge and Technology Transfer"

See page 11 for more information.

For 30 years the sturgeon was absent from German waters; now it is reintroduced. This unique anadromous migratory fish is returning home, and is once again inhabiting our rivers and seas. Sturgeons are living fossils, and should be preserved for future generations to be cherished as a living part of the evolutionary chain.

Dr. Elsa Nickel, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), on the project to reintroduce the sturgeons in Germany and Europe

During the past years, IGB has established itself as a leading freshwater research institute in Europe, and an important partner for international collaboration. IGB's research sets new standards in science and application. For example, MONERIS (Modeling Nutrient Emissions in River Systems) is already used in more than 450 catchments worldwide. IGB's research on the effects of artificial light at night on ecosystems and biodiversity is novel, and of pivotal societal relevance.

Prof. Dr. Janet Hering, head of the scientific advisory board

The Arendsee-Workshop for lake restoration has shown that scientists and practitioners are now better able to communicate with with each other than in the past, and furthermore, that we can learn from each other. We are very motivated by the recognition that many new challenges and practical questions in water protection urgently need the contribution of researchers. Management measures are scientifically very interesting as large scale experiments, and provide key understanding of processes at the ecosystem level.

Dr. Michael Hupfer (IGB) on the Arendsee-Workshop

The IGB is an outstanding partner of the Freie Universität in the field of biodiversity research, and we have benefitted from its scientific excellence in a number of joint projects. The establishment of BBIB promises to take this successful collaboration to the next level.

Prof. Dr. Peter-André Alt, President of the Freie Universität Berlin, on collaboration with IGB and the founding of BBIB

More information about our networks is provided on page 25.

Photos: David Ausserhofer (3), private (2), MfN/Carola Radtke (1), Andy Küchenmeister (1), FU Berlin (1)

innovative.

The future of Aquaponics:

The "Tomatofish" jumps into international waters

The IGB landed a big one: The Institute takes the lead in a nearly six million Euro project that combines fish and vegetable farming, and paves the way for practical application.

Four large demonstration aquaponic systems will be modeled and then built during the four-year INAPRO project ("Innovative model & demonstration based water management for resource efficiency in integrated multitrophic agriculture and aquaculture systems"). The 500 square meter systems will be installed in Germany, Spain, Belgium, and China. "We are extremely excited about this new project" exclaims the project coordinator Dr. Georg Staaks. "Together with 18 partners from 8 different countries, we are taking a decisive step forward in the field of aquaponics."

Fish and plant production under a single roof

The portmanteau "aquaponic" comes from the terms aquaculture (fish farming) and hydroponics (soil-free farming). The technique employs a dual use of water, nutrients, energy and space. Treated waste water from the fish tanks serves as fertilizer for the plants. The EU project builds upon the existing aquaponic research experiences from the IGB. The ASTAF-PRO (Aquaponic-system for (nearly) emission-free tomato and fish production in greenhouses) project, also known as "Tomatofish" was financed by the German Federal Ministry of Education and Research. The system consists of a closed greenhouse in which a dual aquaculture and hydroponics circuit is installed.

Prof. Dr. Werner Kloas, head of the Ecophysiology and Aquaculture department and one of the Tomatofish inventors explains: "The specific technique regulates the liquid flow between the two regions of the system, allowing the optimal growth conditions to be maintained in each individual system."

New market opportunities in Europe and beyond

The INAPRO project will demonstrate both the technical and economic feasibility of ASTAF-PRO on a large scale, and will promote and implement aquaponics in food production. "Together with our partners from research and industry, we want to inform and excite politics, business, and consumers about this innovative technology" says Staaks. "INAPRO opens up entirely new market opportunities for manufacturers and users of aquaponic systems both within and outside of Europe."

Kloas believes the project has global relevance: "The world's population is growing rapidly, and with it, a hunger for resources. Non-sustainable agriculture and climate change exacerbate the situation, so we urgently need new approaches to food production and water management. Our technology can make an important contribution to food security in the 21st century."

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Further Information:
Homepage: www.inapro-project.eu
Facebook: www.facebook.com/inaproproject
Twitter: INAPRO – @INAPRO_EU

The 18 partners of the consortium getting together at the kickoff collaboration meeting in Brussels.

Photo: IGB

The Atlas was presented as part of the "Water Lives Symposium" in Brussels, where scientists and policy makers discussed conservation strategies for freshwater biodiversity.

Freshwater ecosystems are among the most species-rich habitats worldwide. The biodiversity in lakes, rivers, and wetlands is much higher than in the sea or on land. Policymakers therefore have a difficult task in reconciling the need to conserve inland water ecosystems with increasing water demand for the energy, agriculture, and sanitation sectors.

The first online biodiversity atlas for lakes, rivers, and wetlands was published in January 2014, in order to provide reliable and empirical data in support of responsible decision-making. "The Atlas demonstrates the incredible importance of having a solid foundation for setting management priorities for freshwater use and protection of its biodiversity. The global boom in hydropower development, for example, urgently requires reliable data to develop ecologically and socially sound solutions for water use", explains Professor Klement Tockner, director of the IGB and coordinator of the BioFresh research project.

The Atlas was developed in collaboration in collaboration with 12 international research institutions and numerous NGOs under the leadership of the IGB. It aims to support all relevant stakeholders in the protection and management of inland waters. Interested parties from policy, management, and research are now able to access the online, open-access, and interactive Atlas. It provides regional and global maps of aquatic biodiversity, as well as background geographical information on habitats, stressors, climate scenarios, and management options.

For ease of use, the online Atlas was created to have a book-like structure, with four chapters: "Freshwater Biodiversity", "Freshwater Resources and Ecosystems", "Freshwater Pressures", and "Freshwater Conservation and Management". All of the maps are supplemented with an explanatory article, and background information. The interactive map interface makes it easy to switch between chapters and maps, as well as to navigate, zoom, and find additional information. A major advantage of the online Atlas is that it can easily be expanded and updated as new information and maps become available.

Open to worldwide contributions

The Atlas was developed by the IGB-coordinated BioFresh project. This European Union funded project collects all available data about freshwater life in order to find sustainable solutions for the protection and management of freshwater biodiversity. The scientists involved in the creation of the Atlas were actively supported by a number of international organizations, including the GEO Biodiversity Observation Network (GEO BON), DIVERSITAS, the International Union for Conservation of Nature (IUCN), the Global Water System Project (GWSP), Conservation International (CI), Wetlands International, the Nature Conservancy, and the World Wildlife Fund (WWF).

International interest in the Atlas was considerable, right from the first month of its publication. Within the first months the Atlas has been accessed by users from 117 countries worldwide, most frequently from the USA, Germany, France, Japan, and Brazil.

New Atlas contributions are already in the pipeline, including maps of global diversity of freshwater shrimp and turtles, the diversity of dragonflies in Africa, and the key biodiversity areas in Europe. As an open and collaborative project, suggestions and contributions of new maps for the Atlas are very welcome.

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Additional Information
www.freshwaterbiodiversity.eu

Photo: Ria Mishaal

Water exploration by a robot

In 2013 the IGB was joined by a non-human yet very lively staff member, the underwater robot VideoRay Pro4. The remotely operated vehicle (ROV) is used in the LakeLab, the EU-funded project LACUNA, and other projects.

The specialty of the VideoRay Pro4 robot is distance diving. The vehicle weights less than 14 pounds, and is able to navigate under the water surface up to a radius of 300 m. The robot can be used in a wide range of scientific and technical tasks in small lakes and rivers. In the basic configuration, the IGB robot is equipped with eyes (a high resolution camera), an ear (scanning sonar), an arm (remote-controlled manipulator), and three legs (two horizontal and one vertical propeller). The vehicle is easily enhanced with other probes and instruments.

Collecting data in the Arctic

The newcomer has passed its early tests with flying colors. It dove in Lake Stechlin in the Lake ESP measurement station, and performed underwater surveys in the LakeLab and Lake Arend. The vehicle is being prepared for its first scientific mission in the cold of the high Arctic in 2014. As part of the EU-funded LACUNA field project, the VideoRay Pro4 will visit polar Lake Kilpisjärvi, in order to install measurement instruments on the underside of ice. The information gained by the IGB robot about the structure of hydrodynamic fields in the boundary between ice and water should enable quantification of the processes that control the formation and melting of ice in natural freshwater bodies.

The summer season for the underwater robot will open with the start of large enclosure experiments in LakeLab. The little diver will explore the properties of the sediments in the 24 artificial lakes.

The robot can follow descending zooplankton

Other innovative research uses of the VideoRay Pro4 are currently being prepared. The robot is able to stay for long periods at water depths where small aquatic organisms concentrate. This provides the opportunity to observe directly the aggregation and sinking of small organic particles in water – the unique chance to unravel the enigma of the particle-bound organic flux in aquatic environments.

Another exciting task for the robot will be to track schools of fish underwater using sonar, and explore their behavior in the natural environment. To gain insight into the life of the smallest aquatic organisms, VideoRay Pro4 will dive to the hot spots of microbial activity on the lake bottom, and obtain water and sediment samples.

The robot lacks only one thing: a good nickname. It will certainly gain one during its future operations.

Dr. Georgiy Kirillin | kirillin@igb-berlin.de

The new underwater robot VideoRay Pro4 exploring Lake Stechlin.

Photo: Georgiy Kirillin

Counting Fish 2.0

How are fish stocks and assemblages changing in European rivers? Researchers from the IGB collaborate with Norwegian and Swedish project partners on a forecasting model to assist in identifing appropriate management measures.

Rivers are unique in that they are the only hierarchically branched, linear ecosystems on the planet. The diversity of freshwater fish species inhabiting rivers depends on multiple factors. The goal of FISHCON is to predict how riverine fish diversity will change in response to changes in water and land use, resource management, longitudinal connectivity, and the dispersal abilities of species. This collaborative European project is a part of the European Research Area – NET BiodivERsA network for research into biodiversity in Europe.

The FISHCON project team is dedicated to the following goals: developing large-scale fish dispersal models, providing dispersal and biodiversity scenarios based on models of climate and land use change, verifying results by applying mechanistic models for selected river segments, identifying strategies to improve the connectivity of river networks, and predicting how such strategies would affect future fish diversity.

IGB's contribution to further development of the FIDIMO dispersion model

Models for fish dispersal are developed and calibrated at the IGB. Migration barriers, such as weirs, particularly affect communities in riverine ecosystems. For this reason, predicting the environmental impact of such barriers is extremely important.

A first model considering the dispersal abilities of 62 fish species – FIDIMO – has already been developed as part of the IMPACT project, which was coordinated by the IGB. FIDIMO models fish dispersal in river networks considering also existing sets of migration barriers. Subsequently, the actual distributions of species that might act as source populations are identified, the suitability of available habitats as well as climatic and land use changes are determined and integrated into the model.

Supporting local biodiversity management

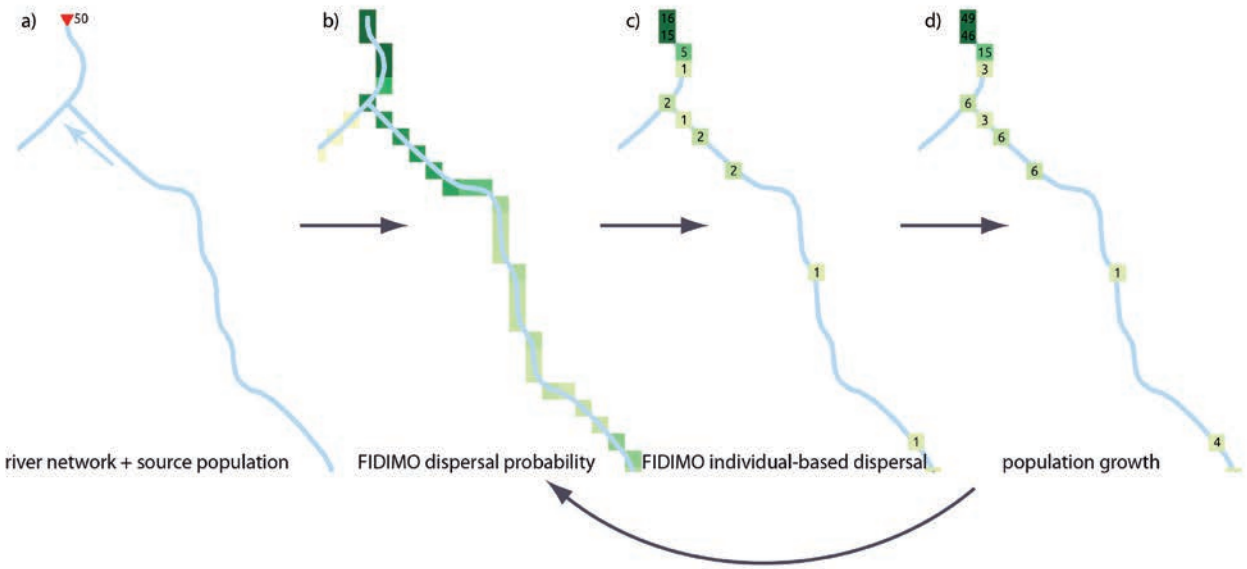
In a next step, various models of species distributions and species dispersal are combined to make predictions of the potential future development of species diversity at different spatial scales for the main European river basins, as well as for relevant sub-basins. The predictions of fish dispersal and distribution are performed for selected case studies, and used to validate the models.

FISHCON also aims to account for ecological and evolutionary processes in local biodiversity management. For this reason, further development and adaptation of FIDIMO is planned to allow simulation of the interactions between individuals, reproduction, and population dynamics.

The contribution of IGB is funded through the German Ministry of Education and Research (BMBF).

Johannes Radinger | jradinger@igb-berlin.de

Overview of a FIDIMO simulation: Starting from an initial source population (a), species-specific dispersal probability (b) and individual-based dispersal (c) are modeled, and (d) coupled with a population growth model in a further step.
For iteratively modeling longer time periods, the predicted model results can be used as initial source populations for the next simulation.



Putting Science into Practice:

Knowledge and Technology Transfer at the IGB

Another form of knowledge transfer: Project coordinator Johannes Graupner uses the aquaponic system ASTAF-PRO to explain to a young visitor how sustainable farming works.

The body of knowledge possessed by humankind increases continuously through research. This knowledge is sometimes of great value for solving practical problems or developing new products. Scientists, however, often lack the time and resources to "transfer" newly gained knowledge into practical applications. The "Sectoral Exploitation" program of the German Federal Ministry of Education and Research (BMBF) aims to enable research institutions to support "Knowledge and Technology Transfer" (KTT). In July 2013, the first such three-year project started at the IGB.

The goal is to devise concepts for new KTT structures, and to encourage KTT to take root within the entire Institute. The Institute's research will be continuously screened for ideas, insights, inventions, and technologies that have the potential for practical application. Through this means, both the quantity and quality of such transfers should be increased throughout the IGB.

"The project's aim is not to economize science, however, and it will not affect research freedom at the IGB" says project coordinator Johannes Graupner. "Value is not always measured in money: we aim to keep all stakeholders in mind, for example policy makers, public administration and also the general public. Indeed, the transfer of knowledge to such stakeholders is extremely important because our research fulfills a social responsibility.

One should also never forget that research is funded by our society, and the public is for good reason therefore interested in knowing to what use public research funds were put."

An Expanded Research Scope

Expanding the financial scope of individual research projects is a parallel objective of the project. The possibility of obtaining future IGB funding through patenting, licensing, collaborations, consultancy, spin-offs or even technology sales will be examined, with the help of external management support provided in the BMBF program. The IGB will work in cooperation with "engage AG", who have assisted research institutes throughout Germany and will provide complimentary expertise and additional capacity.

"The goal of the project is to encourage the organic growth of a culture of transfer at the IGB, not to establish a rigid top-down structure" explains project leader Prof. Dr. Werner Kloas. "Our aim is to establish this practice piece by piece at the IGB through the demonstrated success of individual and favorable transfer examples." Sub-projects that have already been assisted include ASTAF-PRO, XENOCALL, and MONERIS.

Johannes Graupner, Project coordinator |
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Photo: IGB

On the trail of the methane paradox

In the AquaMeth project, IGB researchers seek to better understand the production of greenhouse gases, in order to enable a reliable prediction of the worldwide methane production. The DFG funded project started in November 2013, and will run for three years.

Methane is a highly potent greenhouse gas. The global methane budget is currently unclear, because there are too many unknown sources and sinks. For example, greenhouse gas release from stratified water bodies depends strongly on environmental conditions. Sediments are an important methane source, because they are an ideal habitat for methane-producing Archaea (a kingdom of single-celled organism different from bacteria). The amount of methane accumulation in the water column depends upon complex interactions between methanogenic Archaea and bacteria that oxidize it. It turns out that methane is not only produced in oxygen-free environments. The so-called "methane paradox" states that the oxygenated surface water of lakes and oceans is often supersaturated with methane.
This means that these waters can act as a methane source, contradicting our current understanding that methane cannot be formed in oxygen rich water.

Methane production in the upper, oxygenated water of Lake Stechlin

In the nutrient-poor Lake Stechlin, IGB researchers have observed recurring methane supersaturation in the epilimnion (the upper water layer). They were able to demonstrate that the methane does not originate from the lake sediments, but is rather actively produced in the oxygen-rich water column.
The methane production seems to be coupled to the primary production of green algae and cyanobacteria. Since there are no methane-degrading bacteria in the epilimnion, the methane is not oxidized. So what is the source?
The IGB researchers suggest that the methane producing Archaea make use of hydrogen from the photosynthesis of green algae and/or nitrogen fixation (i.e. binding of dissolved nitrogen by the nitrogenase enzyme and incorporation into organic matter).

Studies in LakeLab

The seasonal development of epilimnic methane will be examined in the AquaMeth project with concurrent examination of the primary producers (photoautotroph) and stratification in Lake Stechlin. The LakeLab will be used to study methane profiles experienced with varied stratification and autotrophic communities. The link between methanogenic Archaea and the photoautotrophs will be studied in incubation experiments. Methane-depleting (methanotrophic) bacteria will be quantified, and photoinhibition of methane oxidation will also be measured in incubation experiments.

The methanogenic Archaea will be enriched and cultivated in laboratory experiments. IGB researchers will undertake physiological studies by using these enrichments or pure cultures to determine the underlying molecular mechanisms of methane formation. Finally, field and laboratory experiments will uncover the key to the methane paradox, and characterize and quantify the methane sources in surface water. The project aims to improve our understanding of the global methane cycle, thereby ensuring more realistic predictions of methane gas production in the future.

Prof. Hans-Peter Grossart | hgrossart@igb-berlin.de

The "Methane Team" at the shores of Lake Stechlin in the summer, 2013. (Georgiy Kirillin, Hans-Peter Grossart, Dan McGinnis and Kam Tang).

Photo: IGB

curious.

Department 1 – Ecohydrology

The research goal of the department of ecohydrology is to understand basic physical and biogeochemical mechanisms, and to quantify their interaction with ecological processes. This will improve our understanding of aquatic ecosystems, and will also spur new possibilities for improved management of freshwaters. Our studies usually involve disciplinary methods and goals, but interdisciplinary approaches are often used as well. We pay particular attention to processes that take place at border zones within water bodies, as well as at the transition from water to land. Such boundaries can include for example the interface between surface and groundwater, the river and its bed, the lake and its sediment, the interaction between plants and wetlands, as well as transition zones internal to layered lakes. Because these aquatic border zones are characterized by sharp physical and geochemical gradients, we assume they are highly reactive or environmentally sensitive areas.

Our research teams

Lake physics
(Christof Engelhardt/Georgiy Kirillin)

Ecohydraulics
(Alexander Sukhodolov)

Groundwater-surface water interactions
(Gunnar Nützmann/Jörg Lewandowski)

Light pollution and ecophysiology
(Franz Hölker)

Nutrient balances in river basins
(Markus Venohr)

Ecology of stream ecosystems
(Gabriel Singer)

Contact:
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Selected projects

Aqualink (2012-1015): Aquatic boundaries and linkages in a changing environment: an international graduate school (Leibniz Competition; Gunnar Nützmann, Michael Hupfer).

ELaN (2011-2014): Development of an integrated land management system through sustainable water and nutrient use in northeast Germany: Water and Nutrients Berlin (BMBF; Gunnar Nützmann).

Interfaces (2014-2017): Ecohydrological interfaces as critical hot spots for fluxes and transformations of water, energy and solutes (EU; Jörg Lewandowski, Gunnar Nützmann).

LakeShift (2014-2016): Regime shifts in lake ecosystems: Testing theory with long-term observational data, large scale experiments and modeling approaches (DFG, Georgiy Kirillin, Rita Adrian)

INNOVATE (2013-2016): The interaction of aquatic and terrestrial systems (BMBF, Markus Venohr).

Selected publications

Nützmann, G., Levers, C., Lewandowski, J. (2013): Coupled groundwater flow and heat transport simulation for estimating transient aquifer-stream exchange at the lowland River Spree (Germany). Hydrological Processes, doi: 10.1002/hyp.9227.

Brand, A., Lewandowski, J., Hamann, E., Nützmann, G. (2013): Advection around ventilated U-shaped burrows: A model study. Water Resources Research 49: 2907-2917.

Lewandowski, J., Meinikmann, K., Ruhtz, T., Pöschke, F., Kirillin, G. (2013): Localization of lacustrine groundwater discharge (LGD) by airborne measurement of thermal infrared radiation. Remote Sensing of Environment 138: 119-125.

Kirillin, G., Phillip, W., Engelhardt, C. and Nützmann, G. (2013): Net groundwater inflow in an enclosed lake: from synoptic variations to climatic projections. Hydrological Processes, 27: 347-359.

Hirt, U., Mahnkopf, J., Gadegast, M., Czudowski, L., Mischke, U., Heidecke C., Schwernewski, G., Venohr, M. (2013): Reference conditions for rivers of the German Baltic Sea catchment - Reconstruction of nutrient regime with the Model MONERIS. Regional Environmental Change, doi: 10.1007/s10113-013-0559-7.

Photo: Andy Küchenmeister

Selected projects

LimnoTip (2012-1015): Biodiversity dynamics and tipping points in our future ecosystems (EU Biodiversa; Rita Adrian, Alena Gsell).

NetLake (2012-2015): Networking lake observatories in Europe (EU Cost Action; Rita Adrian).

LakeShift (2014-2016): Regime shifts in lake ecosystems: testing theory with long-term observational data (DFG; Georgiy Kirillin, Rita Adrian, Tom Shatwell).

Refresh (2011-2014): Adaptive strategies to mitigate the impacts of climate change on European freshwater ecosystems. (EU; Rita Adrian, Ulrike Scharfenberger, Aldoushy Mahdy).

LandScales (2012-2015): Connecting processes and structures driving the Landscape carbon dynamics over Scales (Leibniz Competition; Sabine Hilt, Jan Köhler, Garabet Kazanjian).

Selected publications

Baselga, A., Fujisawa, T., Crampton-Platt, A., Bergsten, J., Foster, P. G., Monaghan, M. T., Vogler, A. P. (2013): Whole-community DNA barcoding reveals a spatiotemporal continuum of biodiversity at species and genetic levels. Nature Communications 4: art. 1892.

Blanckaert, K., Garcia, X.-F., Ricardo, A.-M. Chen, Q., Pusch, M. T. (2013): The role of turbulence in the hydraulic environment of benthic invertebrates. Ecohydrology 6: 700-712.

Brothers, S., Hilt, S., Attermeyer, K., Grossart, H. P., Kosten, S., Mehner, T., Meyer, N., Scharnweber, K., Köhler, J. (2013): A regime shift from macrophyte to phytoplankton dominance enhances carbon burial in a shallow, eutrophic lake. Ecosphere 4: art. 137.

Hilt, S., Adrian, R., Köhler, J., Monaghan, M.T. & Sayer, C. (2013): Clear, crashing, turbid and back – long-term changes of macrophyte assemblages in a shallow lake. Freshwater Biology 58: 2027-2036.

Solomon C. T., Bruesewitz D. A., Richardson DC, ...Adrian R. et al. (2013): Ecosystem respiration: Drivers of daily variability and background respiration in lakes around the globe. Limnology and Oceanography 58: 849-866.

Department 2 – Ecosystem Research

Our department makes use of an ecosystem approach to understand the structure and function of lake and river ecosystems in the context of environmental change such as global climate change and changes in nutrient conditions as modified by the surrounding catchments. These studies integrate both abiotic and biotic levels of organization in ecosystems, including physical limnology, primary production, nutrient cycling, long-term development of plankton, macrophytes, and biodiversity along with the evolution and ecology of aquatic macroinvertebrates. These studies are embedded in our climate impact research of lakes and rivers, for which the focus is on the non-linear long-term behavior and bistability in ecosystems. Our studies range in scale from molecular biology and laboratory work, to in-situ and whole lake experiments. We acquire long-term data and perform statistical and deterministic modeling. Our main goals are to develop new methods, develop and test new theoretical concepts, and to continue improving ecosystem management strategies.

Our research teams

Photosynthesis and growth of phytoplankton and macrophytes
(Jan Köhler)

Molecular ecology – evolution and biodiversity in freshwater
(Michael T. Monaghan)

Ecology of macrophytes – aquatic-terrestrial coupling
(Sabine Hilt)

Functional ecology and management of rivers and lakeshores
(Martin Pusch)

Long-term development of lakes and climate impact research
(Rita Adrian)

Photo: David Ausserhofer

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Department 3 – Experimental Limnology

The Department of Experimental Limnology is located directly on the shore of Lake Stechlin. Its research centers on the impacts of global environmental change on lake ecosystems and biodiversity. Most of the investigations focus on microorganisms and the processes driven by their activities. This includes not only bacteria and algae, but also zooplankton, fungi and viruses, as well as the multiple interactions between these organisms. Our main approaches are field experiments and analyses of long-term time series. A globally unique facility, the IGB-LakeLab in Lake Stechlin, serves as a versatile platform for large-scale experiments to assess impacts of environmental change on lakes and its biodiversity under realistic conditions. Based on the findings of our studies, we develop concepts and methods for the sustainable management of lake ecosystems in the future.

Our research teams

Ecosystem processes
(Mark Gessner)

Biodiversity and aquatic microbial ecology
(Hans-Peter Grossart)

Microbial ecology of sediments
(Peter Casper)

Systematics and ecology of phytoplankton
(Lothar Krienitz)

Water management and zooplankton ecology
(Peter Kasprzak)

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Prof. Dr. Mark Gessner

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Selected projects

LakeLab (2013-2016): An experimental platform for climate impact research in lakes (German Research Council; Mark Gessner).

TemBi (2011-2014): Climate driven changes in the biodiversity of microbiota (Leibniz Competition; Peter Casper, Hans-Peter Grossart).

Seven Lakes (2008-2014): Long-term development of trophic state and the sustainability of restoration measures in seven lakes of Mecklenburg-Vorpommern (Ministry of Agriculture, Environment and Consumer Protection of Mecklenburg-Vorpommern, Schwerin; Peter Kasprzak, Peter Casper).

FREDI (2011-2014): Ecological role of limnetic ultra-microbacteria - FREDI (ESF-Eurocores; Hans-Peter Grossart).

Inka-BB (2009-2014): Sustainable management strategies for glacial lakes in Brandenburg under climate change – Innovation Network Climate Adaptation Berlin/Brandenburg (BMBF; Peter Kasprzak).

Selected publications

Hines, J., Hammrich, A., Steiner, D., Gessner, M. O. (2013): A field facility to simulate climate warming and increased nutrient supply in shallow aquatic ecosystems. Oecologia 173: 1169-1178.

Dumont, M. G., Pommerenke, B., Casper, P. (2013): Using stable isotope probing to obtain a targeted metatranscriptome of aerobic methanotrophs in lake sediment. Environm. Microbiol. Rep. 5: 757-764.

Kirillin, G., Shatwell, T., Kasprzak, P. (2013): Consequences of thermal pollution from a nuclear power plant on lake temperature and mixing regime. J. Hydrol. 496: 47-56.

Walsh, D. A., Lafontaine, J., Grossart, H. P. (2013): On the eco-evolutionary relationships of fresh and salt water bacteria and the role of gene transfer in their adaptation. In U. Gophna (ed.), Lateral gene transfer in evolution. Springer Science+Business Media, New York: 55-77.

Bock, C., Luo, W., Kusber, W.-H., Hegewald, E., Pažoutová, M., Krienitz, L. (2013): Classification of crucigenoid algae: Phylogenetic position of the reinstated genus *Lemmermannia, Tetrastrum* spp. *Crucigenia tetrapedia*, and *C. lauterbornii* (Trebouxiophyceae, Chlorophyta). J. Phycol. 49: 329-339.

Photo: David Ausserhofer

Selected projects

B-types (2013-2016): Ecological consequences of fish behavioural types (SAW, Pakt; Max Wolf, Robert Arlinghaus, Jens Krause, Thomas Mehner, Georg Staaks).

INAPRO (2014-2017): Innovative model and demonstration based water management for resource efficiency in integrated multitrophic agriculture and aquaculture systems (EU FP7 CP GA: 619137; Georg Staaks, Daniela Baganz, cooperation with department 5).

Besatzfisch (2009-2014): Protection of aquatic biodiversity based upon the example of fish stocking (Robert Arlinghaus).

IMPACT (2010-2013): Developing an integrated model to predict abiotic habitat conditions and biota of rivers for application in climate change research and water management, IWRM.NET (BMBF 02WM1134; Christian Wolter, Jochem Kail).

REFORM (2011-2015): REstoring rivers FOR effective catchment Management, FP 7, EU (grant 282656; Christian Wolter).

Selected publications

Krause, J., Krause, S., Psorakis, Y., Roberts, S., Arlinghaus, R., Rutz, C. (2013): Reality mining of social systems. Trends in Ecology & Evolution 28: 541-551.

Wolf, M., Kurvers, R. H. J. M., Ward, A. J. W., Krause, S., Krause, J. (2013): Accurate decisions in an uncertain world: collective cognition increases true positives while decreasing false positives. Proceedings of the Royal Society of London, Series B 280: art. 20122777.

Klefoth, T., Pieterek, T., Arlinghaus, R. (2013): Impacts of domestication on angling vulnerability of common carp, *Cyprinus carpio*: the role of learning, foraging behaviour and food preferences. Fisheries Management and Ecology 20: 174-186.

Scharnweber, K., Watanabe, K., Syvaranta, J., Wanke, T., Monaghan, M. T. , Mehner, T. (2013): Effects of predation pressure and resource use on morphological divergence in omnivorous prey fish. BMC Evolutionary Biology 13: art. 132.

Markovic, D., Scharfenberger, U., Pletterbauer, F., Schmutz, S., Wolter, C. (2013): Variability and alterations of water temperatures across the Elbe and Danube River Basins. Climatic Change 119: 375-389.

Gessner, J., Jaric, I., Rochard, E., Pourkazemi, M. (2013): Sturgeon and paddlefish research focuses on low risk species and largely disregards endangered species. Endangered Species Research 22: 95–97.

Department 4 – Biology and Ecology of Fishes

The goal of our department is to understand the ecological and evolutionary processes that structure populations and communities of freshwater fish and affect how they function. Stakeholders, such as administrative bodies and public associations, can use this information to protect wild fish and improve management. Freshwater fish are not only ideal model systems for performing basic research into ecological and evolutionary questions, they also provide a number of important "ecosystem services" (e.g. fishing yields and bioindicators of the ecosystem's state). Our investigations into ecosystem services focus on the interactions between natural and anthropogenic environmental factors, and their effects on fish populations. Our methods include hypothesis-driven laboratory research and mesocosm experiments, direct manipulation of lakes, comparative field studies, theoretical studies, and population models.

Our research teams

Recreational fisheries, fish ecology, fish behavior
(Robert Arlinghaus)

Reintroduction of the European and Baltic sturgeon to Germany
(Jörn Geßner)

Collective behavior and social networks
(Jens Krause)

Evolutionary ecology of fish, fish communities and trophic interactions in lakes; linkage of aquatic and terrestric ecosystems
(Thomas Mehner)

Integrated measurement and analysis of behavioral and physiological parameters of fish
(Georg Staaks)

Causes and consequences of behavioral types, collective intelligence
(Max Wolf)

Structure and dynamics of fish assemblages in large rivers and waterways; river revitalization
(Christian Wolter)

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Photo: Andy Küchenmeister

Department 5– Ecophysiology and Aquaculture

In the department of ecophysiology and aquaculture, we investigate how natural and anthropogenic environmental factors affect the physiology of aquatic vertebrates (mainly fish and amphibians); we also develop a scientific basis for the practice of sustainable aquaculture. Aquatic vertebrates are exposed to biotic and abiotic factors in both the case of anthropogenically-polluted waters and in aquaculture. We aim to understand the mechanisms by which such factors stress different bodily functions. Our investigations cover many different levels, ranging from genetics and gene expression, to biochemical and physiological parameters of cell and organ cultures, up to histopathology and behavior. In this way, we can determine the effects that various environmental factors have upon reproduction, stress, development, growth, and the behavior of aquatic vertebrates.

Our research teams

Environmental effects of endocrine disruptors
(Ilka Lutz/Werner Kloas)

Ecotoxicology in fish – disinfection in aquaculture
(Thomas Meinelt)

Parasitology and the immune system of fish
(Klaus Knopf)

Genetics and phylogeography of fish
(Klaus Kohlmann)

Fish reproduction and nutrition
(Sven Würtz)

Sturgeon reintroduction
(Jörn Geßner)

Aquaponics
(Werner Kloas/Sven Würtz)

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Selected projects

Zander Gamete Quality (2013-2016): Influence of seasonally independent reproduction on the quality of gametes and early life stages of zander (*Sander lucioperca*) (DFG, KL 745/6-1; Sven Würtz, Werner Kloas).

INAPRO (2014-2017): Innovative model and demonstration based water management for resource efficiency in integrated multitrophic aquaculture and horti-culture systems (EU; Georg Staaks/Werner Kloas).

UltraVac (2011-2014): Ultrasound vaccination for improved fish health (BMWi; Klaus Knopf).

Fish health and peracetic acid (2013-2015): The use of peracetic acid for disinfection in sustainable aquaculture (DBU, Thomas Meinelt).

Gene marker analysis in carp (2013-2015): Performance testing of four groups of Spiegelkarpfen with identification of origin via gene marker analysis (LULG; Klaus Kohlmann).

XENOCALL (2013-2015): Identification of endocrine action using the calling behavior of male Xenopus (*Xenopus laevis*) (UBA; Frauke Hoffmann).

Selected publications

Lakeh, A., Kloas, W., Jung, R., Knopf, K. (2013): Low frequency ultrasound and UV-C for elimination of pathogens in recirculating aquaculture systems. Ultrasonics Sonochemistry 20: 1211-1216.

Zikova, A., Lorenz, C., Lutz, I., Pflugmacher, S., Kloas, W. (2013): Physiological responses of *Xenopus laevis* tadpoles exposed to cyanobacterial biomass containing microcystin-LR. Aquatic Toxicology 128: 25-33.

Kohlmann, K., Kersten, P. (2013): Deeper insight into the origin and spread of European common carp *(Cyprinus carpio carpio)* based on mitochondrial D-loop sequence polymorphisms. Aquaculture 376: 97-104.

Farmer, B., Straus, D., Beck, B., Mitchell, A., Freeman, D., Meinelt, T. (2013): Effectiveness of copper sulphate, potassium permanganate and peracetic acid to reduce mortality and infestation of *Ichthyobodo necator* in channel catfish *Ictalurus punctatus* (Rafinesque 1818). Aquaculture Research 44: 1103-1109.

Wuertz, S., Schulze, S., Eberhardt, U., Schulz, C., Schroeder, J. (2013): Acute and chronic nitrite toxicity in juvenile pike-perch *(Sander lucioperca)* and its compensation by chloride. Comparative Biochemistry and Physiology C – Toxicology and Pharmacology 157: 352-360.

Photo: Andy Küchenmeister

Department 6 – Analytical Chemistry and Biogeochemistry

Our research concerns fundamental and applied research questions regarding (1) the biogeochemical nutrient cycling processes in aquatic boundaries, (2) the carbon flux between terrestrial and aquatic ecosystems, (3) the emission of greenhouse gases from inland waters and (4) the development and use of in-situ techniques for measuring matter flows in high temporal and/or spatial resolution. This includes work at various spatial and temporal scales from laboratory microcosms to large-scale field sampling campaigns in lakes, peatlands and river networks. On this basis we are able to derive scientific principles for understanding the implications and optimizing measures and to support water authorities and landscape managers in environmental decision making.

In addition to our own research activities, we fulfill service tasks for a significant part of the IGB. In particular, we conduct chemical analyses for other departments and perform long-term measurement studies for lakes, rivers, and marshes. These activities include advising doctoral students in the development and execution of analytical work in both laboratory and field experiments. Our existing instrumentation (including AAS, ICP-OES, HPLC, HPLC-MS, GC-MS, LC-OCD-OND, IR, Fluorimeter, Laser spectrometer) facilitates concentration measurements for nutrients, metals, various organic carbon compounds, as well as stable isotopes in water, biota, sediment, and organic soil.

Selected projects

TOC-Aqua (2013-2016): Transformation of organic carbon in the terrestrial-aquatic interface (DFG; Michael Mutz (BTU), Katrin Premke (IGB)).

INNOVATE (2012-2016): Interplay among multiple uses of water reservoirs via innovative coupling of substance cycles in Aquatic and Terrestrial Ecosystems, Project: Importance of sediments for water quality, and implications for sustainable management strategy (BMBF; Michael Hupfer).

LandScales (2012-2015): Connecting processes and structures driving the Landscape carbon dynamics over Scales (Leibniz Competition together with ZALF; PI: Kartrin Premke)

Wetland protection in Germany (2011-2014): Developing basic principles for optimizing wetland management with regard to protection of biodiversity, the climate, and water and nutrient balance (BfN; Jörg Gelbrecht (IGB: partner 9)).

Selected publications

Kleeberg, A., Herzog, C., Hupfer, M. (2013): Redox sensitivity of iron in phosphorus binding does not impede lake restoration. Water Research 47: 1491-1502.

Daniela D., Frindte, K., Krüger, A., Wurzbacher, C. (2013): Preconditioning of leaves by solar radiation and anoxia affects microbial colonisation and rate of leaf mass loss in an intermittent stream. Freshwater Biology 58: 1918-1931.

Riedel, T., Zak, D., Biester, H. and Dittmar, T. (2013): Iron traps terrestrial dissolved organic matter at redox interfaces. Proceedings of the National Academy of Sciences of the United States of America 110: 10101-10105.

Cabezas, A., Gelbrecht, J., and Zak, D. (2013): The effect of rewetting drained fens with nitrate polluted water on dissolved organic carbon and phosphorus release. Ecological Engineering 53: 79-88.

Shatwell, T. , Jordan, S., Ackermann, G., Dokulil, M., Rücker, J., Scharf, W., Wagner, A., Kasprzak, P. (2013): Langzeitbeobachtungen zum Einfluss von Klimawandel und Eutrophierung auf Seen und Talsperren in Deutschland. KW Korrespondenz Wasserwirtschaft 612: 729-736.

Photo: David Ausserhofer

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interdisciplinary.

Selected projects

MycoLink (2014-2017): Linking aquatic fungal diversity to ecosystem function (Leibniz Competition; Michael T. Monaghan, Hans-Peter Grossart, Katrin Premke).

AquaMeth (2013-2015): Examination of the methane paradox in lakes (Hans-Peter Grossart).

MikrOMIK (2014-2017): The role of microplastics as carriers of microbial populations in Baltic Sea ecosystems (Leibniz Competition; PI: Matthias Labrenz, IOW).

Selected publications

Glaeser, S., Kämpfer, P., Bolte, K., Grossart, H. P., Busse, H.J., Glaeser, J. (2013): *Novosphingobium aquaticum* sp. nov., isolated from the humic-matter-rich bog lake Grosse Fuchskuhle. International Journal of Systematic and Evolutionary Microbiology 63: 2630-2636.

Tada, Y., Grossart, H. P. (2014): Community shifts of actively growing lake bacteria after N-acetylglucosamine addition: improving the BrdU-FACS method. ISME Journal 8:441-454.

Pinto, F., Larsen, S., Casper, P. (2013): Viriobenthos in aquatic sediments: Variability in abundance and production and impact on C-cycle. Aquatic Sciences 75: 571-579.

Kanaparthi, D., Pommerenke, B., Casper, P., Dumont, M.G. (2013): Chemolithotrophic nitrate-dependent Fe(II)-oxidizing nature of actinobacterial subdivision lineage TM3. ISME Journal 7: 1582-1594.

Baselga, A., Fujisawa, T., Crampton-Platt, A. Bergsten, J., Foster, P. G., Monaghan, M. T., Vogler, A. P. (2013): Whole-community DNA barcoding reveals a spatiotemporal continuum of biodiversity at species and genetic levels. Nature Communications 4: art. 1892.

Research Domain 1 – Aquatic Biodiversity

The primary goals of the program area are: 1) examining biodiversity (genetic and species) on different spatial and temporal scales, 2) examining the environmental factors that determine biodiversity and population structures, and 3) improving our understanding of the underlying control mechanisms and the relationship between biodiversity and ecosystem function. We include all groups of organisms from limnic systems in our studies. The lessons we learn provide a basis for managing communities of aquatic organisms in our rapidly changing world. One of our long-term goals is undertaking a socioeconomic analysis of the ecosystem services that are provided and secured by aquatic biodiversity. Our program area plays an active role in the "Leibniz Network on Biodiversity", and collaborates with a number of other Leibniz institutes in Germany.

Our research themes

Understanding structural and functional biodiversity in different habitats

Impacts of anthropogenic stressors (e.g. global warming, invasive species, land use, etc.) on biodiversity, and their evolutionary and ecological consequences (including ecosystem services)

Evaluation of the evolutionary processes that lead to changes in biodiversity

Development of innovative biodiversity assessment and management strategies, particularly of domesticated, novel ecosystems

Work in our research domain is based upon field studies, experimental approaches (e.g. the LakeLab in Lake Stechlin or experimental lakes), genetics, genomics and bioinformatics, documentation and evaluation of long-term changes in biodiversity (e.g. IGB time-series at Lakes Stechlin and Müggelsee, as well as the Tagliamento and Spree rivers), and the modeling of these data.

Photo: Martina Bauchrowitz

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Research Domain 2 – Aquatic Boundaries and Linkages

In the "Aquatic Boundaries and Linkages" research domain, scientists from four departments explore the mechanisms controlling the state of aquatic ecosystems and their role in the matter fluxes in the landscape. The research on boundary zones as highly reactive compartments is focused on wetlands and ponds, the transition zone between ground and surface water, the littoral of lakes, and the sediment-water interface.
We work on scientific questions and projects related to nutrient and carbon balance that require the cooperation of multiple disciplines (such as hydrology, limnophysics, geochemistry, and biology). Process studies with novel experimental methods under lab and field conditions are staged, in order to allow model-based transfer to the ecosystem level and for simulations. The basic research is indispensable for solving acute water problems, to predict the long-term behavior of aquatic ecosystems, and to develop sustainable management concepts. Interdisciplinary thinking is taught to young scientists during their training in the International Graduate School AQUALINK, which was founded by the research domain.

Our research themes

The importance of groundwater and the hyporheic zone for the nutrient loads of surface water

The role of inland waters for the landscape carbon balance

The importance of physical structure and climate for lake-internal mattercycle Biotic and abiotic interactions in the littoral

Role of riparian wetlands for water and nutrient balance in the landscape

Development of sustainable management strategies and scientific monitoring of measures as large scale experiments

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Selected projects

Aqualink (2012-2016): Aquatic boundaries and linkages in a changing environment, International Leibniz Graduate School (Leibniz Competition; Gunnar Nützmann, Michael Hupfer).

Landscale (2012-2015): Connecting processes and structures driving the Landscape carbon dynamics over Scales (Leibniz Competition; Katrin Premke (IGB), Arthur Gessler (ZALF)).

Nitrolimit (2010-2013): Nitrogen limitation in freshwaters: Is nitrogen reduction ecologically meaningful and economically feasible? (BMBF; PI at IGB: Jan Köhler).

RedoxPhos (2011-2016): How do physical and biogeochemical conditions in pelagic boundaries control vertical transport and generation of phosphorus species? (application package together with Universität Koblenz-Landau and UFZ Magdeburg, DFG (HU 740/5-1); Michael Hupfer, Andreas Kleeberg).

Interfaces (2013-2017): Ecohydrological interfaces as critical hotspots for transformations of ecosystem exchange fluxes and biogeochemical cycling (EU Marie Curie Initial Training Network; PI at IGB: Jörg Lewandowski, Gunnar Nützmann).

Selected publications

Lewandowski, J., Meinikmann, K., Ruhtz, T., Pöschke, F., Kirillin, G. (2013): Localization of lacustrine groundwater discharge (LGD) by airborne measurement of thermal infrared radiation. Remote Sensing of Environment 138: 119-125.

Zerbe, S., Steffenhagen, P., Parakenings, K., Timmermann, T., Frick, A., Gelbrecht, J., Zak, D. (2013): Restoration success regarding ecosystem services after 10 years of rewetting peatlands in NE Germany. Environmental Management 51: 1194-1209.

Kleeberg, A., Hupfer, M., Gust, G., Salka, I., Pohlmann, K., Grossart, H.-P. (2013): Intermittetnt riverine resuspension: Effects on phosphorus transformations and heterotrophic bacteria. Limnology & Oceanography 58: 635-652.

Brothers, S. M., Hilt, S., Attermeyer, K., Grossart, H.-P., Kosten, S., Mehner,T., Meyer, N., Scharnweber, K., Köhler, J. (2013): A regime shift from macrophyte to phytoplankton dominance enhances carbon burial in a shallow, eutrophic lake. Ecosphere 4: art. 137.

Kirillin, G., Shatwell, T., Kasprzak, P. (2013): Consequences of thermal pollution from a nuclear plant on lake temperature and mixing regime. Journal of Hydrology 496: 47-56.

Photo: David Ausserhofer

Selected projects

Besatzfisch (2010-2014): Sustainable fisheries management exemplified on fish stocking (BMBF, SÖF-Programm; Robert Arlinghaus).

REFORM (2011-2015): Restoring rivers for effective catchment management (EU, FP7; Christian Wolter).

DONCOPRA (2011-2014): Dissolved Organic Nitrogen Composition and Processing in Agricultural Catchments (DFG; Martin Pusch).

FISHCON (2013-2015): Migration barriers for fish (BMBF; Franz Hölker, Christian Wolter).

AESHNA (2012-2015): Ecological lakeshore assessment using AESHNA (Umweltbundesamt; Martin Pusch).

Selected publications

Johnston, F. D., Arlinghaus, R., Dieckmann, U. (2013): Life history, angler behaviour, and optimal management of recreational fisheries. Fish and Fisheries 14: 554-579.

Arlinghaus, R., Krause, J. (2013): Wisdom of the crowd and natural resource management. Trends in Ecology and Evolution 28: 9-11.

Arlinghaus, R., Cooke, S. J., Potts, W. (2013): Towards resilient recreational fisheries on a global scale through improved understanding of fish and fisher behaviour. Fisheries Management and Ecology 20: 91-98.

Kail, J., Wolter, C. (2013): Pressures at larger spatial scales strongly influence the ecological status of heavily modified river water bodies in Germany. Science of the Total Environment 454-455: 40-50.

Miler, O., Port, G., McGoff, E., Pilotto, F., Donohue, L., Jurca, T., Solimini, A., Sandin, L., Irvine, K., Aroviita, J., Clarke, R., Pusch, M. (2013): Morphological alterations of lake shores in Europe – a multimetric ecological assessment approach using benthic macroinvertebrates. Ecological Indicators 34: 398-410.

Research Domain 3 – Human-Aquatic Ecosystem Interactions

Human beings increasingly use nearly all ecosystems directly or indirectly; some have already been used for thousands of years.
The anthropogenic influence on water bodies is especially pronounced, due to historical and cultural development along rivers and lakes.
Aquatic systems fulfill a number of basic socio-economic functions such as providing drinking water, flood control, irrigation, navigation, fishing, and recreational use. Due to the benefits it provides, anthropogenic reshaping of aquatic systems is understood to be largely irreversible: waters are part of our cultural landscape. However, our use of waters can affect ecological functions that are not well understood, and whose economic importance is underestimated.
For this reason, we examine the (social)-environmental impacts of different types of waters' use. Due to the complex interactions between humans and the aquatic environment, research from both natural and social sciences is needed in order to develop well-founded sustainable management strategies for rivers and lakes. In the cultural landscape, people and water form a coupled social-ecological system with humans as the key species. Our research domain undertakes fundamental research into the many direct and indirect effects and feedbacks between humans and aquatic systems, in order to produce management recommendations and to conduct scientific experiments on the results of their implementation.

Our research themes

Potential impacts of recreational fishing and fish stocking on water systems and fish assemblages

Effects of urbanization on aquatic communities

Improvement of ecological integrity and options for revitalizing aquatic systems

Migration barriers for fish

Reintroduction of sturgeon to Germany

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Foto: Andy Küchenmeister

interconnected.

Networking in teaching, research, and practice

Our network is also expanded through our participation in many professional conferences, such as the „Water Lives Symposium“ in Brussels.

The IGB currently takes part in a total of 70 national and international collaborations, with partners from research, teaching, and practice.

We closely cooperate with universities and other research institutes, but are also highly valued as partners in the development of management concepts. Regionally, we are involved in the management of the Spree River, the restoration of lakes, and the rewetting of peatlands. Internationally, we take part in many research programs, e.g. on managing drinking water in Mongolia, or on the sustainable reservoir management in Brasil.

New Research Collaborations

We have entered into many new research collaborations, with partners such as the Catalan Water Research Center (ICRA) in Girona, the University of Agricultural Sciences in Vienna (BOKU), the Dunărea de Jos din Galaţi in Romania, the University of South Bohemia in České Budějovice in the Czech Republic, and Assiut University in Egypt. In 2013, we signed seven new collaboration agreements, including with the University of Duisburg-Essen, the Australian Rivers Institute, the State University of Makassar, Indonesia and within the INAPRO project. Through the IGB Fellowship Program, we continuously expand our global network.

BBIB, LakeLab and Company

Our networking is also expanded through our research infrastructure, such as the LakeLab in Lake Stechlin, and the Berlin-Brandenburg Institute of Advanced Biodiversity Research (BBIB). The BBIB was founded in 2013 with key involvement from IGB. This consortium of universities and Leibniz institutes in Berlin and Brandenburg will strengthen biodiversity research in Germany. The Institute will transcend the traditional boundaries between research areas, scales, and ecosystems. Changes in biodiversity due to climate change and land use will be investigated through large-scale experiments and long-term research programs.

In 2013, the consortium agreement of the Leibniz Network on Biodiversity (LVB) was signed, providing a solid foundation for the consortium's activities on conserving biodiversity. The network unites 22 research museums and institutes of the Leibniz Association, from environmental sciences, life sciences, social sciences, economics, and spatial research, as well as from mathematics, natural sciences and engineering. Together, we search for innovative solutions to conserve biological diversity, from genetic up to habitat diversity, ensuring the long-term health of nature and humankind.

Joint Teaching

Our institute members are closely connected to the universities of Berlin and Brandenburg through joint professorships. We support the education of young scientists, and are involved with the development of graduate programs. Contractual cooperation for academic teaching are made via S-Chairs at the Freie Universität Berlin, the Humboldt Universität zu Berlin, the Technische Universität Berlin, and the University of Potsdam. Eight IGB scientists hold joint professorships at the moment. A search for a W1 Professorship in "Computational Metagenomics" jointly held between the Freie Universität Berlin and the IGB, is currently underway. A W1 S-Chair of "Environmental Proteomics" with the Freie Universität is also planned, with both professorships integrated into BBIB. In addition, we look forward to close cooperation with two other joint academics at BBIB: a Heisenberg Professorship in "Ecological Novelty", and a professorship in "Aquatic Evolutionary Ecology". Highly talented professors should be appointed to these posts in 2014.

Photo: Ria Mishaal

2nd International Conference on Biodiversity and the UN Millennium Development Goals

The Millennium Development Goals primarily address peacekeeping, environmental protection, and reducing poverty. Although three of the eight goals are directly related to health, the connection between human health and biodiversity has so far been neglected.
For this reason, in partnership with France's Institut Ecologie et Environnement-Centre National de la Recherche Scientifique (CNRS), the Leibniz Network on Biodiversity hosted the 2nd International Conference on Biodiversity and the UN Millennium Development Goals from April 16-18, 2013.

The conference participants in the Museum für Naturkunde in Berlin.

Photo: Matthias Premke-Kraus

Medicinal agents are often obtained from nature, but bacteria, plants, and other organisms are more than just mere pharmaceutical ingredients. Biodiversity and human health are interconnected at many levels. How important is urban biodiversity for our well-being? Why are regions with unstable ecosystems the epicenters for disease outbreaks and epidemics? Approximately 150 international experts examined such questions at the meeting in Berlin.

A bridge between research in biodiversity and human health

"The goal of the conference was to build a bridge between research in biodiversity and human health, and to identify open questions at the interface of the two disciplines" explains Professor Klement Tockner, Director of the IGB and co-founder of the conference. "We also aimed to build networks between research organizations, such as Leopoldina and CNRS from France, and with our partners from universities and the Helmholtz Association."

The conference focused on five themes: biodiversity and infectious diseases, biodiversity and natural products, invasive species and healthy ecosystems, urban biodiversity and public health, and landscape structures and the spread of pathogens. Research gaps were identified during the conference, and new approaches for the management of ecosystems and biodiversity were developed. Professor Tockner explains the importance of close collaboration among disciplines: "Both interdisciplinary and transdisciplinary research is needed to identify the measures that need to be taken to improve the quality of life for the world's human population in the future. I firmly believe that the difficult challenges facing our society can be overcome. Our success will be built by pooling the diverse resources and talents of our research institutions, and by focusing these joint efforts on the most challenging questions. Germany has developed several complementary biodiversity research networks, including the Biodiversity and Climate Research Centre (BiK-F), German Center for Integrative Biodiversity (iDiv), and the Berlin-Brandenburg Institute of Advanced Biodiversity Research (BBIB). This provides an opportunity for Germany to establish itself as the world leader in biodiversity research."

Real-time Ecohydrology Workshop

Recent technological developments have made it possible to conduct measurements at temporal and spatial scales that would have been impossible in the past. In March, 2013, an internal IGB workshop was conducted to explore the potential applications and gains that "Real-time Ecohydrology" makes possible. Participants included IGB members as well as scientists from Berlin universities. A subject of significant discussion was the question of which issues in water ecology can be best addressed best by using real-time ecohydrology. Examples included weather forecasts and flood prediction, management of drinking water reservoirs, and the use of high-resolution temporal and spatial data to improve management recommendations.

3rd Workshop of the Hyporheic Network

The Hyporheic zone that links surface and groundwater, is of major importance for ecology. Understanding of hyporheic processes has been hindered due to their complexity, as well as to their temporal and spatial heterogeneity. The Hyporheic Network was initiated by the IGB in order to allow the close cooperation necessary to improve understanding of hyporheic processes, while also ensuring a swift transfer of academic knowledge into practice. Thirty people took part in the 3rd workshop, which took place from October 7-9, 2013 at the UFZ in Leipzig. One particularly successful element of this workshop was a guided instruction session, in which participants had a chance to learn the different measurement methods from each other.

ALAN Conference

The first international conference on Artificial Light at Night

Researchers, city planners, and representatives of the lighting industry discuss the impacts of artificial light at night during the ALAN conference.

Over 120 researchers, city planners, designers, and representatives from industry and environmental protection from 5 continents gathered in Berlin to discuss the importance and impacts of artificial light on society and nature.

The Verlust der Nacht (Loss of the Night) research network in cooperation with the International Dark-Sky Association organized a new conference series devoted to "Artificial Light at Night". It was held during October 27-30, 2013.

The widespread use of artificial light at night is widely viewed as a triumph, and is associated with prosperity, security, and modernity. Despite this, since it's very inception hundreds of years ago, critical voices have debated the negative social and biological effects of this environmental change. Recent years have seen a sharp increase in such discussions, due to deeper understanding of the side effects of artificial light, such as the disturbance of sleep, loss of star-filled skies, and the deaths of migratory birds in collisions with lit buildings. These concerns must be balanced against the clear benefits of artificial light for a 24-hour society that is no longer bound to the natural day/night rhythm.

The Verlust der Nacht project, which is sponsored by the Federal Ministry of Education and Research (BMBF) and the Berlin Senate, examines the causes and consequences (environmental, health, cultural, and socio-economic) of increasing levels of illumination at night. "Light pollution is a global social-ecological problem which is not well understood. Improved lighting concepts will be most effective if they are based on an understanding of the processes through which light affects organisms and systems" explains project leader Franz Hölker. The results of the research project will be used to develop sustainable solutions and concepts for modern nighttime lighting.

A "stakeholder workshop" was held during the conference to consider how scientific issues interact with politics and players from industry. The trans-disciplinary nature of the conference was reflected in the selection of the conference's plenary speakers, which included a representative of France's Ministry of the Environment, the BMBF and Berlin Senate, and representatives from the lighting industry. The conference is expected to repeat yearly. ALAN II will take place in Leicester, England, in September, 2014.

PD Dr. Franz Hölker | hoelker@igb-berlin.de

Photo: ALAN/Verlust der Nacht

The "pulse" of freshwater

The global "Budapest Water Summit" was held in Budapest during October 8-11, 2013.

The Secretary General of the United Nations, Ban Ki-moon, and the President of Hungary, János Áder, opened this unique Forum: For three days, high-level representatives from research, politics, business, and non-governmental organizations discussed the sustainable use of water resources.

The focus of the summit was the question of how current developments in the water sector could be better reflected in the Millennium Development Goals of the United Nations. The participants presented "SMART" solutions (SMART= Specific, Measureable, Attainable, Realistic, and Timely) for sustainable water management, based on the results of UN programs, initiatives, and the World Water Forum.

Freshwater as a valuable habitat

The director of the IGB, Klement Tockner, sat on the high-level international panel discussing "Water Quality and Sustainable Development Goals". Tockner emphasized that "freshwater is not only a basic resource needed by humans, it is also one of the most valuable habitats on the planet. Any discussion of the water-energy-food nexus must therefore also consider ecology and biodiversity. The loss of biodiversity is probably the biggest challenge humanity faces. The precautionary principle requires that economic development must not come at the expense of biological diversity."

A "Dow Jones Index" for the environment

In order to evaluate the condition of the environment, we need robust indicators that can both track changes and at the same time demonstrate their underlying causes; a sort of Dow Jones index for the ecosystems. "High quality scientific data are essential for achieving this goal," explains Tockner. "The 'pulse' of ecosystems can only be measured through long term research and monitoring. Such research provides an 'early warning signal that should be the basis for priority setting in environmental management."

A resolution entitled „A sustainable world is a water-secure world" was adopted at the end of the summit. Meetings like the "Budapest Water Summit" strengthen the collaboration among different stakeholders, and bring us closer to the goal of a sustainable economy.

Ban Ki-moon, Secretary General of the United Nations, opening the "Budapest Water Summit".

Photo: AFP Photo

Water Research Horizon Conference

The "Water Research Horizon Conference" enables the exchange of scientific expertise in the field of water research. German and international experts meet annually to discuss current research topics and future challenges. At the 4th Water Horizon Conference, which took place on June 25 and 26, 2013, the IGB led a workshop themed "Quality is scarcity", and a session on "What is the good status of temporary rivers and how can it be met?".

Annual meeting of the German Society of Limnology

The annual meeting of the German Society of Limnology (DGL) and the Ecological Society of Germany, Austria and Switzerland (DGL) was held in Potsdam-Griebnitzsee from September 9-13, 2013. With the motto "Bridging of scientific disciplines", the scientists discussed how to put limnological topics into a broader ecological context, particularly where terrestrial issues are concerned. The University of Potsdam and the IGB jointly organized the conference. More information is available at: www.dgl2013.de

ASLO Annual Aquatic Sciences Meeting

The annual aquatic sciences meeting of the Association for the Sciences of Limnology and Oceanography (ASLO) took place from February 17-22, 2013 in New Orleans, USA. The meeting's motto was "Learning for the future", and aimed particularly at strengthening the links between science, education, and society. To this end, the meeting included activities such as scientists visiting schools, exhibitions on the research vessel "Pelican", and a teacher forum. The IGB scientist Hans-Peter Grossart was one of the meeting organizers.

committed.

Careers in Science

Advancing the careers of young researchers is central to the mission of IGB; about 60 doctoral students, 40 master's and bachelor's students, and six trainees work at the institute. Dr. Christiane Zarfl is responsible for coordinating their activities.

Dr. Zarfl, approximately 25 IGB scientists also have teaching agreements at four universities. Could you please explain how such an arrangement is possible?

The IGB currently has a total of eight so-called "Sonderprofessuren". This means these IGB scientists have joint appointments at universities in Berlin or Potsdam with independent teaching responsibilities. Other researchers teach university courses and supervise students during internships or their Master's or Bachelor's degree. This allows the students to benefit from the collective expertise of IGB in subjects like aquatic ecosystems, fish ecology, and microbiology. We are also responsible for running the international program in "Fishery Science and Aquaculture" at the Humboldt-Universität zu Berlin.

Apart from teaching, how does IGB support young researchers in their academic careers?

We offer a structured doctoral program, with excellent working and learning conditions in both of our graduate schools. In 2012, we launched an international graduate school called "Aqualink", which we continue to coordinate.
We also lead the "Erasmus Mundus Joint Doctorate Programme" SMART (Science for Management of Rivers and their Tidal Systems), together with the Freie Universität Berlin. The program integrates expertise in the fields of hydrology, geomorphology and ecology, and focuses on open questions in the processes of aquatic systems as well as the management of water supplies. At the moment, eight SMART doctoral candidates work at IGB, from Italy, England, Switzerland, Serbia, Indonesia, India, and Brazil.

Such a diverse group of countries! How important are international connections to IGB?

International networks are essential. We support the advancement of these networks by offering our own Fellowship Program. Doctoral students, postdoctoral scholars, and senior scientists are invited to apply for paid research stays at IGB.

How do you support the development of young scientists based directly at IGB?

The IGB encourages our postdocs and researchers to take part in an internally organized leadership program. In addition, young scientists have the opportunity to present their own work and interact with international guests during our weekly colloquia, the IGB Scientists Retreat, and further events that promote the exchange of scientific ideas.

Dr. Christiane Zarfl | zarfl@igb-berlin.de

You can find an overview of our lectures and colloquia on page 38.

Our colloquia series is highly appreciated by researchers and doctoral students.

Doctoral program news

2013 was an exciting and productive year for our doctoral students. Fifteen students completed their dissertations, the highest number in the last decade.

Since a matching 15 students began doctoral research projects, the total number of students stayed constant at 62. Five of our bachelor students and 13 master students also completed their degrees in 2013.

The IGB doctoral program offered a total of 12 courses in 2013, each of which was rated as "excellent" by the participants. The contribution of graduate students to IGB research is dearly valued, and we promote their work at the IGB Research Day and in our colloquia series.

Four new PhD student representatives were elected in 2013. They maintain close contact to the Institute's leadership, meet with the scientific advisory board, and give valuable input on numerous issues.

Dr. Kirsten Pohlmann | kpohlmann@igb-berlin.de

Photos: David Ausserhofer

Waterfalls, jungle trails, and mangrove forests

High school students from Aurich join IGB scientists on a journey of discovery.

We're most used to seeing guppies in aquariums, but their real home is in the tropics. In order to observe them in their natural habitat, IGB scientist Jens Krause and his team set off for Trinidad and Tobago. There, the researchers spent four weeks investigating the schooling behavior of the small fishes. The party was joined by two high school students from the ULRICIANUM Gymnasium in Aurich.

A conversation with Professor Jens Krause, head of the IGB Department of Biology and Ecology of Fishes:

Professor Krause, taking school students on such an adventure sounds pretty unorthodox. Who's idea was it?

The organizers of Aurich's "Research Day" asked me whether it would be possible for a school student to join a research trip to Trinidad. I have to say that at first I was skeptical. I didn't know if they could make a contribution, and I was concerned that they would lose interest during the month-long journey.

What other obstacles needed to be overcome?

I also had concerns for the student's safety, of course. What would happen if they didn't follow our rules of conduct, and accidentally hurt themselves?

These concerns were quickly laid to ground by the organizers from Aurich. They have been sending matching students to expeditions in remote parts of the Earth for years. They have a very good understanding of how to prepare for such journeys, and most importantly, which students have the necessary passion and maturity.

Once you got to Trinidad, how did you involve the students in the work?

The students were assigned exactly the same tasks as the rest of the team members. Every day started with a one-hour hike upriver to our destination in the mountain rain forest. At a series of small, natural ponds, we investigated the social networks of fish, and their response to environmental changes. After a training phase, the students were able to take over a large part of the data acquisition and data management. I must say, I was extremely impressed by the exceptional motivation of the students, their perseverance, and the speed with which they were able to learn new concepts.

What research results were obtained by the trip to Trinidad und Tobago?

We have gained many important insights into the social structure of guppies. For example, it seems that every social network has a set of properties that it shares with all others, but there are other properties that make each network unique. We found that both types of these properties were preserved through environment disturbances, for example when the current or water level changed. This means that there is some kind of social self-organization, which persists under a variety of environmental conditions.

2nd workshop of the Aqualink graduate school

For the second time, the young scientists involved in the Aqualink project met together with their supervisors for a workshop. In 2013, the meeting took place at the University of Aberdeen. This location allowed the participants to benefit from the tutelage of internationally renowned scientists at the Aberdeen Summer School, which directly followed the workshop. At the workshop, the doctoral students presented their preliminary results, and they also developed concrete plans for future collaborations within the project teams and with the external partners. The workshop also laid the ground for future publication of collaborative work in special issues of international journals.

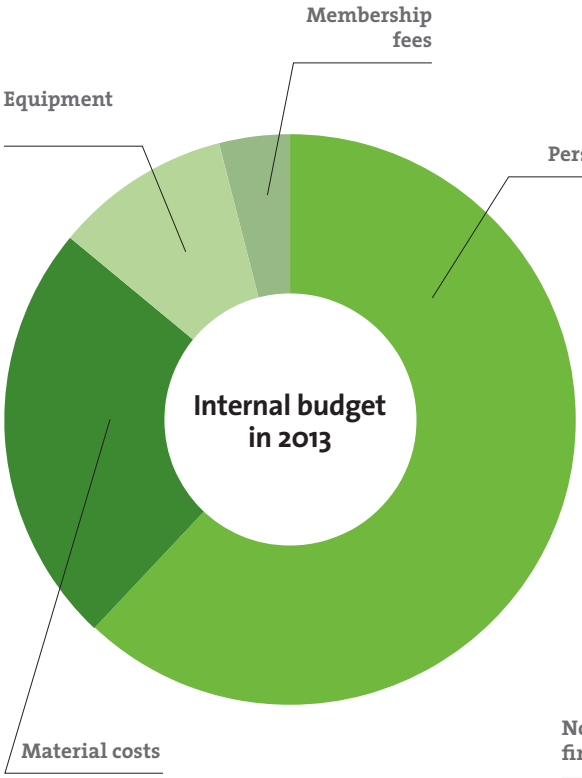
Prof. Gunnar Nützmann | nuetzmann@igb-berlin.de
Dr. Michael Hupfer | hupfer@igb-berlin.de

Photos: Romain Clement (1), Andy Küchenmeister (1)

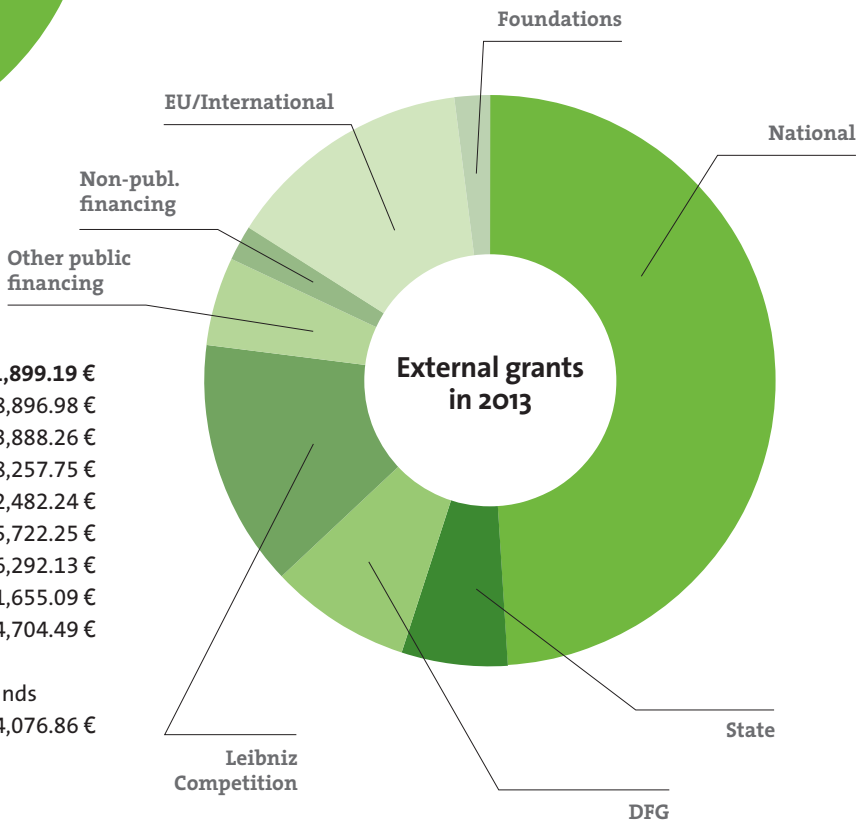
Annex

Finances

Status as of December 31, 2013



Total	**12,316,332.53 €**
Personnel	7,417,311.45 €
Material costs	3,016,577.20 €
Equipment	1,370,166.98 €
Membership fees	512,276.90 €

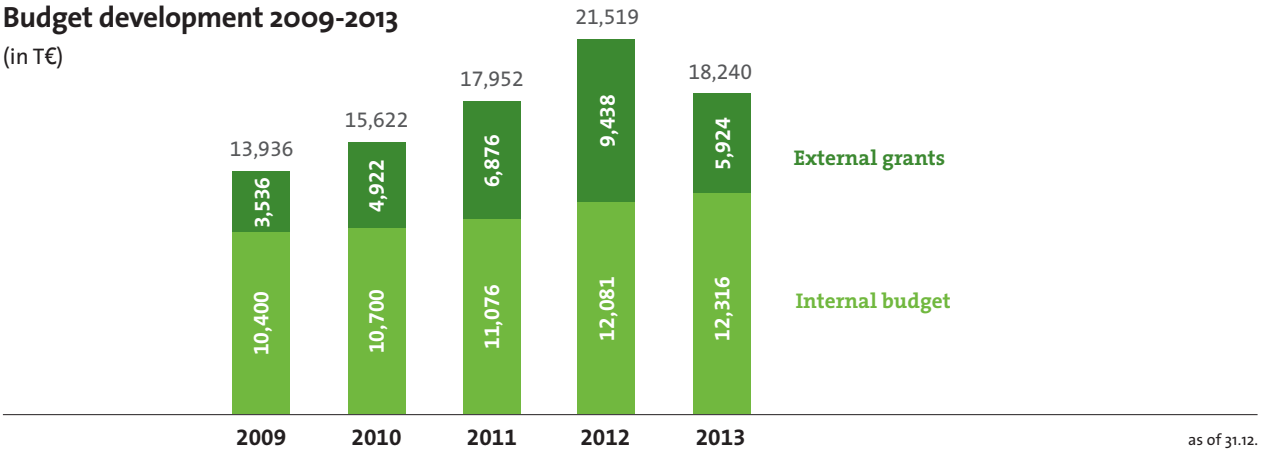


Total	**5,671,899.19 €**
National	2,748,896.98 €
State	343,888.26 €
DFG	478,257.75 €
Leibniz Competition	822,482.24 €
Other public financing	305,722.25 €
Non-public financing	76,292.13 €
EU/international	821,655.09 €
Foundations (Stiftungen)	74,704.49 €

External grants, including externally managed funds ..... 5,924,076.86 €

Budget development 2009-2013

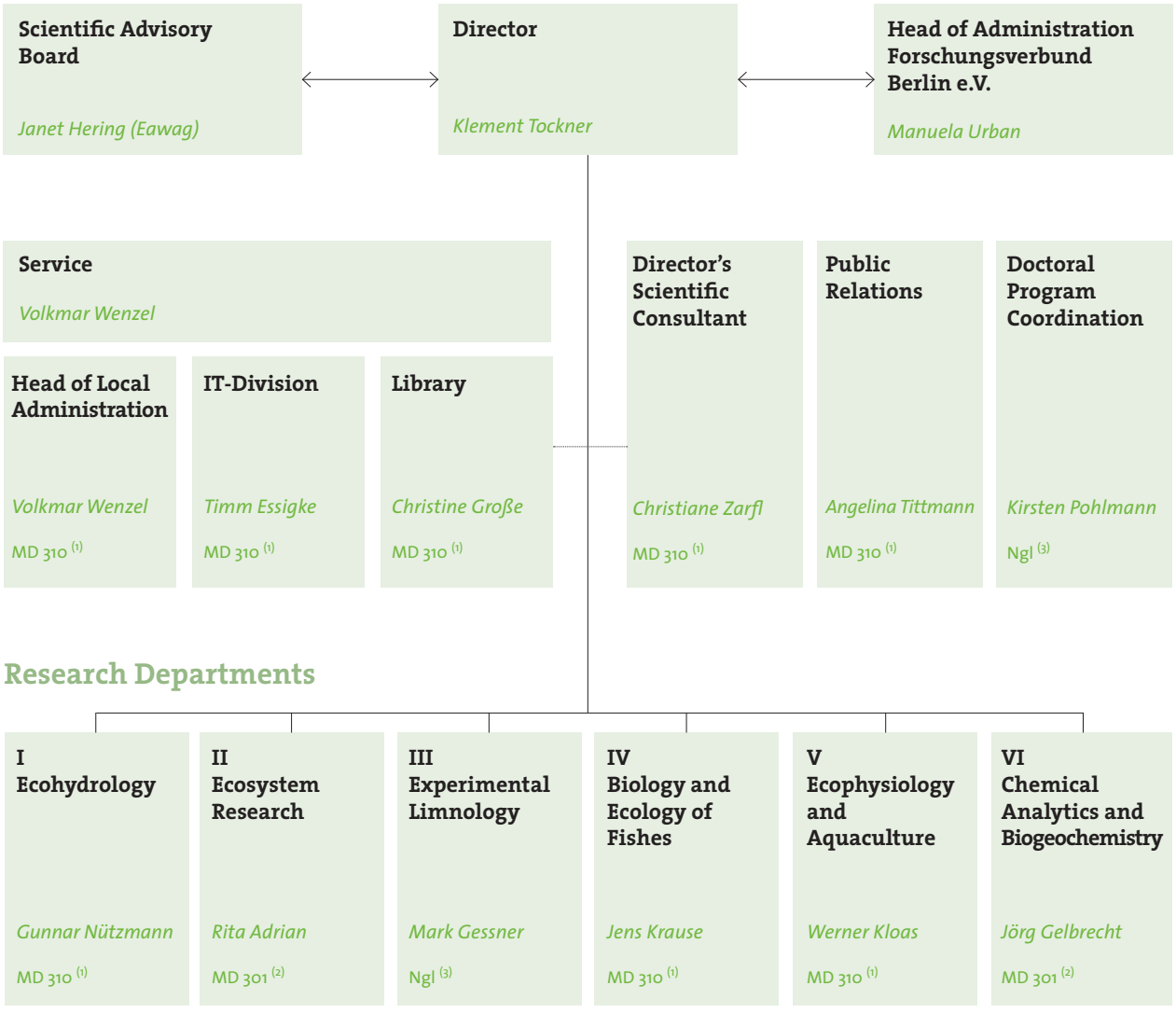
(in T€)



as of 31.12.

Structure

Leibniz-Institute of Freshwater Ecology and Inland Fisheries
Forschungsverbund Berlin e.V.



Research Departments

Cross-cutting Research Domains

I – Aquatic Biodiversity

Hans-Peter Grossart
Ngl (3)

II – Aquatic Boundaries and Linkages

Michael Hupfer
MD 301 (2)

III – Human-Aquatic Ecosystem Interactions

Christian Wolter
MD 310 (1)

(1) MD 310: Müggelseedamm 310, Berlin (2) MD 301: Müggelseedamm 301, Berlin (3) Ngl: Neuglobsow

Status: 30.04.2014

IGB Scientific Advisory Board

We are extremely thankful to the members of the IGB scientific advisory board, who have supported us with their advice and involvement.

Prof. Dr. Janet Hering
Head of the scientific advisory board
Eawag, Switzerland

Prof. Dr. Gudrun Brockmann
Department of Animal Sciences, Humboldt-Universität zu Berlin, Germany

Prof. Dr. Wolfgang Cramer
Mediterranean Institute of marine and terrestrial Biodiversity and Ecology (IMBE), France

Prof. Dr. Peter Grathwohl
Hydrogeochemistry, Universität Tübingen, Germany

Prof. Dr. Joseph Holden
School of Geography, University of Leeds, UK

Prof. Dr. Patrick Hostert
Geography Department/ Geomatics Lab, Humbold-Universität zu Berlin, Germany

Prof. Dr. Otomar Linhart
Department of Fish Genetics and Breeding, Research Institute of Fish Culture and Hydrobiology Vodnany, Czech Republic

Prof. Dr. Margaret Palmer
National Socio-Environmental Synthesis Center (SESYNC), USA

Prof. Dr. Roland Psenner
Institute of Ecology, Universität Innsbruck, Austria

Prof. Dr. Rüdiger Schulz
Department of Biology Endocrinology & Metabolism Section, Utrecht University, The Netherlands

Prof. Dr. Karen Wiltshire
Biol. Station Helgoland & Wadden Sea Station, Alfred-Wegener-Institute for Polar and Marine Research, Germany

IGB Employee Representatives

Worker's Council
Christof Engelhardt (Chair)
Marén Lentz (Vice-Chair)
Kerstin Schäricke
Georg Staaks
Thomas Hintze
Sascha Behrens
Stefan Lorenz

Ombudsmen
Michael Hupfer
Franz Hölker (deputy)

Equal Opportunity Commissioners
Angela Krüger
Stefanie Burkert

Doctoral Student Representatives
Fabian Schäfer
Pascal Bodmer
Jonas Keitel
Nina Ulrich

We would like to thank Elke Zwirnmann for her many years of commitment to our worker's council.

Status: 30.04.2014

Employees

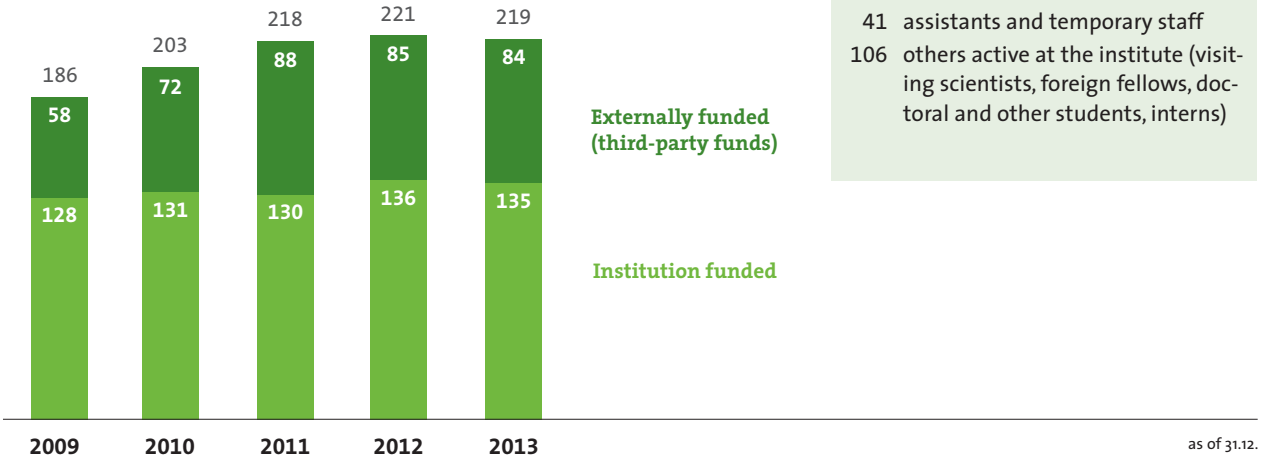
Employees 2013

Total: 219

85 researchers
42 docotoral students
87 non-scientific staff
5 apprentices

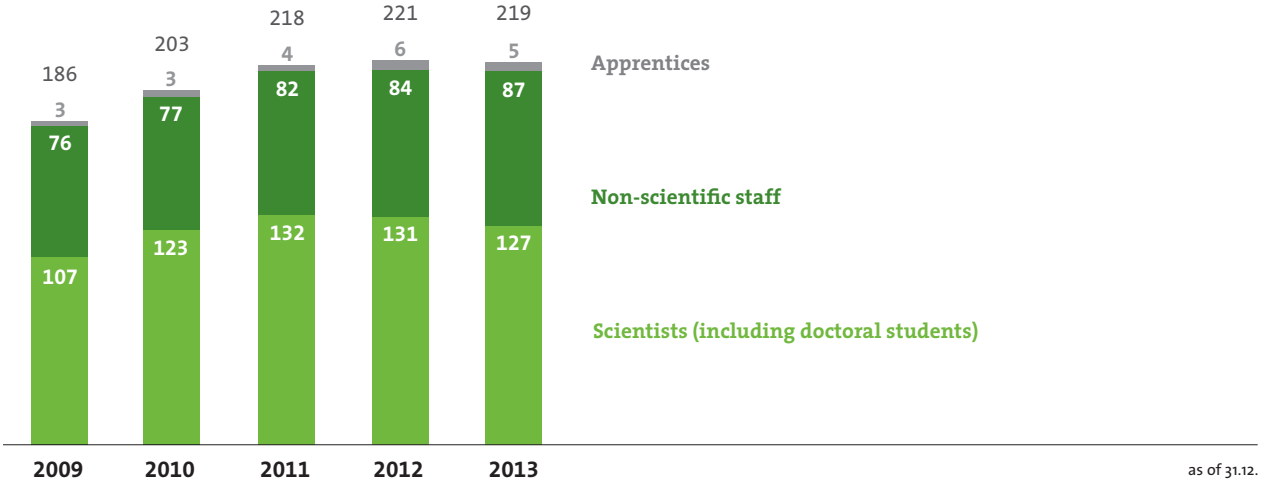
4 fellows
41 assistants and temporary staff
106 others active at the institute (visiting scientists, foreign fellows, doctoral and other students, interns)

Employee Development from 2009-2013



as of 31.12.

Assignment of employees 2009-2013



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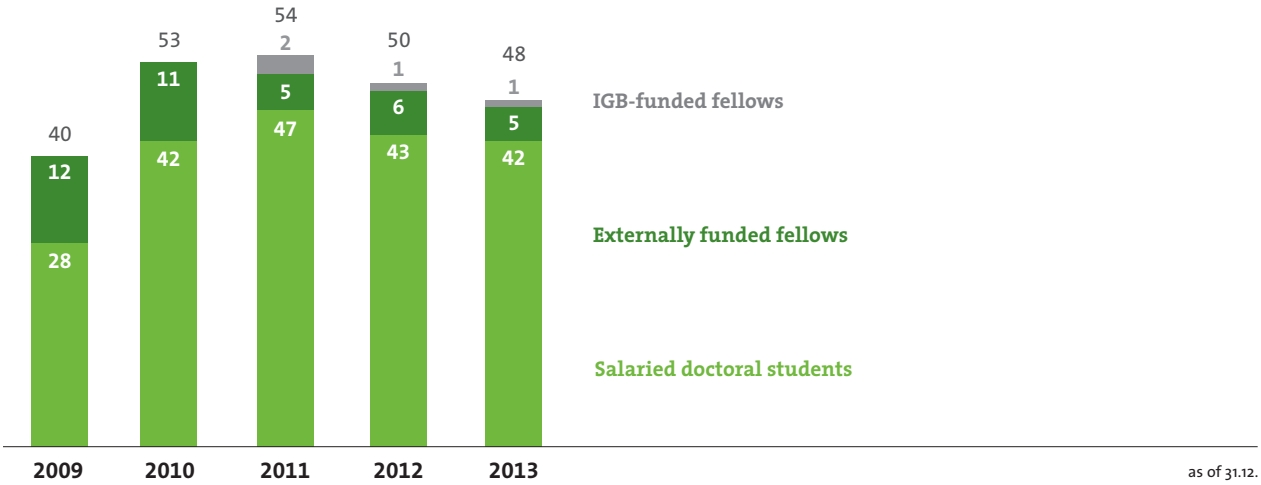
Doctoral training development 2009-2013



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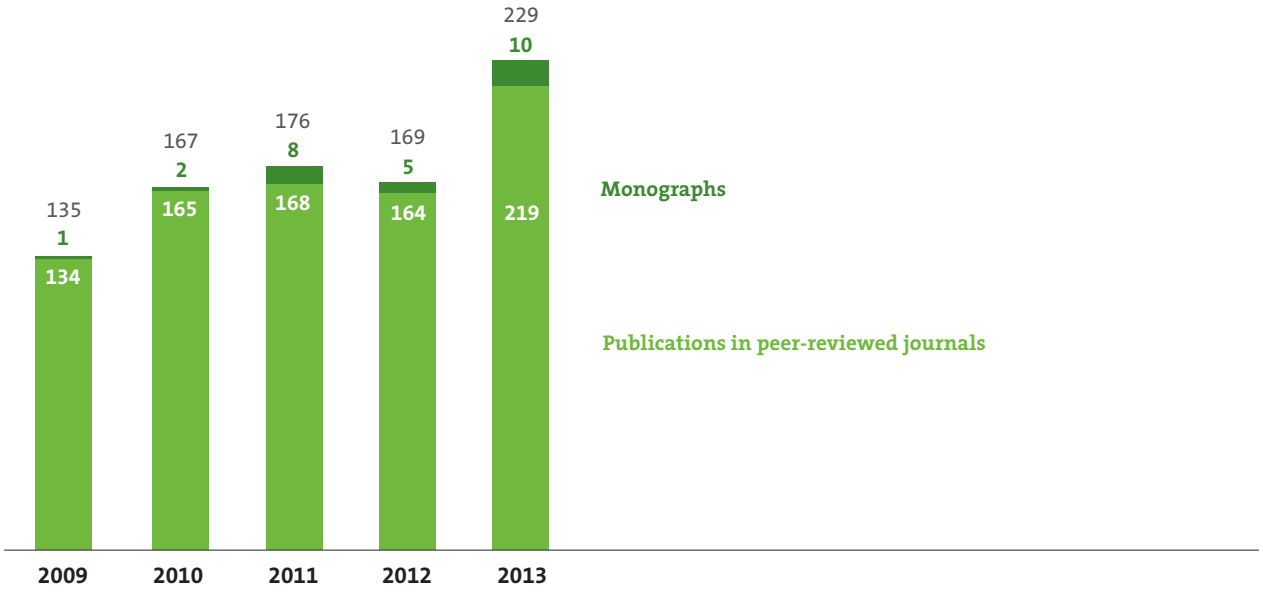
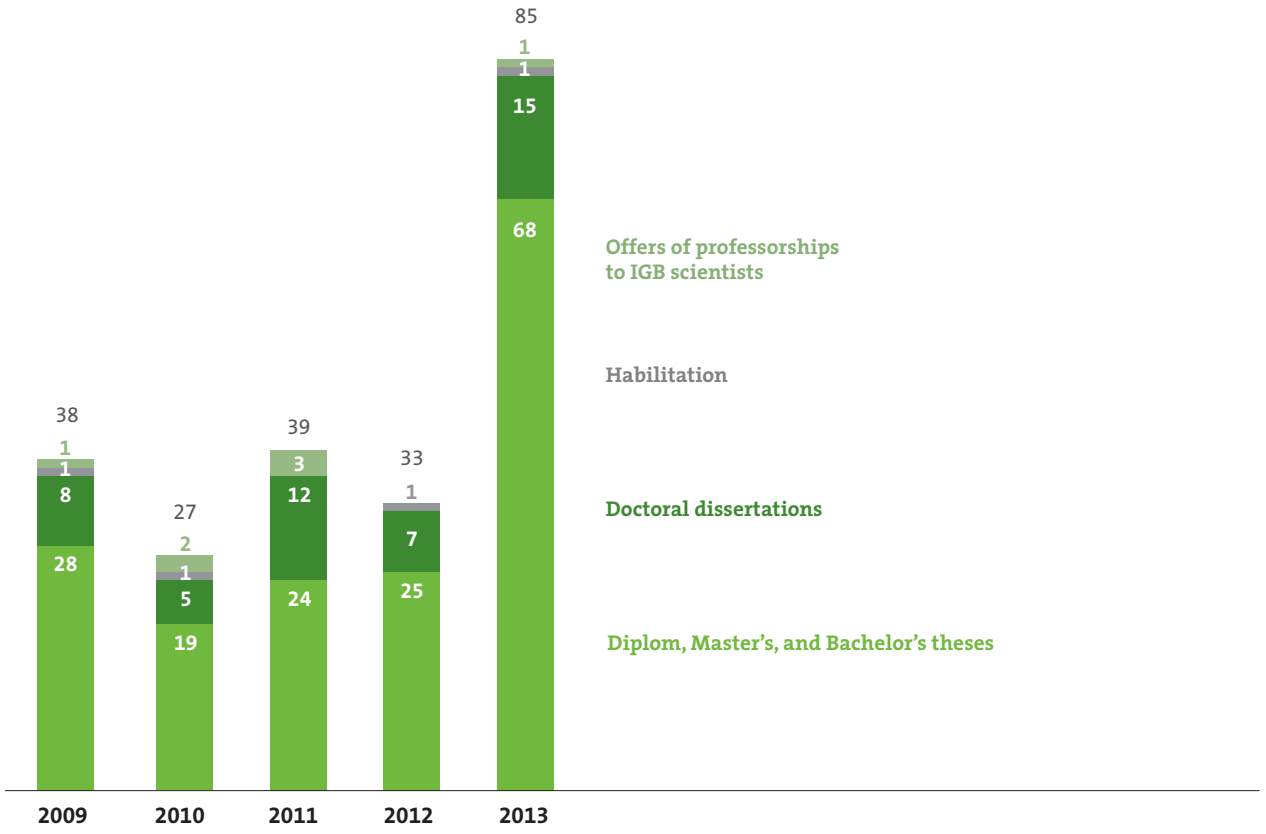
Activities

Publications
Development 2009-2013



Professional Development
2009-2013



Lectures 2013

University	Scientist	Lecture
Beuth University of Applied Sciences	Oliver Miler; Ingo Schnauder	Natural hydraulic engineering*
Freie Universität Berlin	Michael T. Monaghan	Bioinformatics – Biodiversity and Evolution
Freie Universität Berlin	Klement Tockner; Rita Adrian; Michael T. Monaghan	Fundamentals of aquatic ecology*
Freie Universität Berlin	Klement Tockner; Rita Adrian; Michael T. Monaghan; Franz Hölker	Evolution and biodiversity (zoology): lectures, seminars, exercises*
Humboldt Universität zu Berlin	Robert Arlinghaus	Methods of fisheries science
Humboldt Universität zu Berlin	Peter Casper	Aquatic microbial ecology
Humboldt Universität zu Berlin	Sabine Hilt	Taxonomic-ecological internship*
Humboldt Universität zu Berlin	Klaus Knopf	Microbial diseases (Fish Pathology I)
Humboldt Universität zu Berlin	Thomas Mehner	Limnology I
Humboldt Universität zu Berlin	Gunnar Nützmann	Mathematics for geographers*
Humboldt Universität zu Berlin	Gunnar Nützmann	Physical geography of human-environment systems*
Humboldt Universität zu Berlin	Gunnar Nützmann	Ecohydrology of lowland waters*
Humboldt Universität zu Berlin	Matthias Stöck	Evolution by hybridization and polyploidy in animals
Humboldt Universität zu Berlin	Markus Venohr	Statistically conceptual modeling; Routing, cascade systems and calibration*
Humboldt Universität zu Berlin	Christian Wolter	Protection of endangered species
IGB Berlin	Thomas Mehner	Scientific writing
Technische Universität Berlin	Mark O. Gessner	Landscape ecology and methods of ecosystem analysis*
Technische Universität Berlin	Mark O. Gessner; Peter Kasprzak	Global environmental change and water quality; 2 week summer course in Neuglobsow*
Technische Universität Dresden	Peter Kasprzak; Peter Casper; Hans-Peter Grossart; Lothar Krienitz; Reingard Roßberg	Freshwater ecology field course (Limnology of lakes)*
Universität Osnabrück	Hans-Peter Grossart; Karl-Heinz Altendorf	Aquatic microbial ecology ; 2 week summer course in Neuglobsow
Universität Potsdam	Hans-Peter Grossart; Ursula Gaedke	Limnological course in Neuglobsow*
Universität Potsdam	Hans-Peter Grossart; Ursula Gaedke	Aquatic microbial ecology ; 2 week summer course
Universität Potsdam	Hans-Peter Grossart; Ursula Gaedke; Guntram Weithoff; Alexander Wacker	Lectures in applied limnology
Universität Potsdam	Martin Pusch	Aquatic ecology II – applied river ecology*
University Windhoek, Namibia	Peter Casper	Functional Biodiversity of Freshwater Ecosystems

* held in German

Colloquia 2013

Date	Speaker	Title
17.01.2013	Dr. Matthias Stöck IGB, Germany	Cryptic diversity: Evolution of two palearctic amphibian radiations with special attention on their sex chromosomes
24.01.2013	Valerio Ketmaier Universität Potsdam, Germany	Peri-Mediterranean biodiversity in space and time: a molecular perspective
31.01.2013	Dr. Simone Langhans IGB, Germany	Optimizing river rehabilitation planning: Heidi meets Crocodile Dundee
07.02.2013	Dr. Massimiliano Scalici Roma Tre University, Italy	Population structure and dynamics in freshwater species
21.02.2013	Dr. Andrew King Swansea University, UK	Doing stuff together: the organization of collective behaviour in social animals
07.03.2013	Dr. Kevin Laland St. Andrews University, UK	Public information use in sticklebacks: Tinbergen's four questions in one system
13.03.2013	Dr. Lars Flemming Pederson DTU AQUA National Institute of Aquatic Resources, Denmark	Fish pathogens in ARS
21.03.2013	Dr. Peter Staehr University of Aarhus, Denmark	The metabolism of aquatic ecosystems: History, applications, and future challenges
04.04.2013	Dr. Miklós Bálint Biodiversity and Climate Research Centre (BIK-F), Frankfurt, Germany	Cryptic communities in times of climate change: a metabarcoding approach
08.04.2013	Prof. Dr. David Bastviken Linköping University, Sweden	Aquatic methane - sources, fates, and implications for the global greenhouse gas balance
11.04.2013	Kristin Scharnweber IGB, Germany	The effect of structural complexity on ecological and evolutionary processes in shallow lake ecosystems
18.04.2013	Prof. Dr. Jana Petermann Freie Universität Berlin, Germany	Aquatic food webs in Costa Rican bromeliads as a model system for biodiversity research
25.04.2013	Dr. Christiane Zarfl IGB, Germany	How organic pollutants can reach every remote region of the world
02.05.2013	Dr. Lukas Kratochvil Charles University Prague, Czech Republic	Evolution of sex determination in amniotic vertebrates
30.05.2013	Dr. Kimmo Kahilainen University of Helsinki, Finland	Adaptive radiation of whitefish *(Coregonus lavaretus (L.))* and climate change in subarctic lakes
04.06.2013	Prof. Dr. Karl M. Wantzen University Francois-Rabelais, France	The Pantanal of Mato Grosso - ecology and sustainable management
06.06.2013	Prof. Dr. David M. Hannah School of Geography, Earth & Environmental Sciences, University of Birmingham, UK	Sensitivity of river temperature to climate and other drivers of change
10.06.2013	Dr. Alexander Forrest University of Tasmania, Australian Maritime College (AMC), Australia	From oceans to lakes – new tools for lake ecologyy
11.06.2013	Dr. Günther Grill McGill University, Canada	Global river hydrography and network routing: baseline data and new approaches to study the world's large river systems
20.06.2013	Dr. Daniel McGinnis IGB, Institute of Biology, University of Southern Denmark	Tidally driven sediment oxygen fluxes and biogeochemical cycling in the stratified North Sea

Date	Speaker	Title
08.07.2013	Prof. Dr. Emily Bernhardt Biology Department, Duke University, USA	Impacts of emerging contaminants in aquatic ecosystems, an understudied aspect of global change
09.07.2013	Dr. Robert Sterner University of Minnesota, USA	Slow changes in a large lake: Lake Superior as an Anti-Redfield Ecosystem
08.08.2013	Dr. Nele Schuwirth Eawag, Switzerland	Integrative modeling for river management: the mechanistic model „streambugs“
09.08.2013	Dr. Koen Blanckaert Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, China	Ecohydraulics in China – some examples
19.08.2013	Dr. Paul Jepson School of Geography and the Environment, University of Oxford, UK	Technological forces and conservation futures
22.08.2013	Dr. Bert Hidding Netherlands Institute of Ecology (NIOO), Netherlands	Vertebrate herbivores and interspecific plant competition interactively shape legacy effects in forests and lakes
05.09.2013	Dr. Miki Takeshi National Taiwan University, Japan	Linking microscale individual behaviors to macroscale power-law distribution of bacteria and sinking particles in dark oceans
19.09.2013	Prof. Dr. Bernhard Wehrli ETH (Eidgenössische Technische Hochschule) Zürich, Switzerland	Wetlands and big dams – the Zambezi River between integrated management and maximized hydropower
26.09.2013	Dr. Anja Westram Molecular Ecology Laboratory, Sheffield University, UK	Genetic basis and geographical patterns of adaptive divergence in an intertidal snail
17.10.2013	Dr. Shadi A. Amin School of Oceanography, University of Washington, USA	Multiple complex interactions between a toxigenic diatom and a mutualistic bacterium revealed using whole cell transcriptomics
24.10.2013	Prof. Dr. Maria Ogielska University of Wrocław, Poland	What can we learn from unusual water frogs?
25.10.2013	Prof. Dr. Qiuwen Chen Research Center for Eco-Environmental Sciences, Chinese Acadamy of Sciences, China	River habitat conservation and watershed modeling and management
31.10.2013	Prof. Dr. Peter K. Engesgaard University of Copenhagen, Denmark	Spatial and temporal heterogeneity in groundwater discharge to lakes and streams: Barriers to flow and implications for loading of nutrients
07.11.2013	Prof. Dr. Andrea Marion University of Padua, Italy	Interfacial mass retention and release by vegetation, surface biofilm and hyporheic zone in open channels
14.11.2013	Dr. Max Wolf IGB, Germany	Behavioural diversity within populations: causes and consequences
28.11.2013	Prof. Dr. Ralph Tiedemann Universität Potsdam, Germany	Evolution of Electric Organ Discharge (EOD) in African weakly electric fishes: Genomics and behavioral ecology of a magic trait
05.12.2013	Prof. Dr. Daniel Hering Universität Duisburg-Essen, Germany	Effects of river restoration on biodiversity: the role of scale, barriers and recolonisation potential
12.12.2013	Dr. Rainer Zah Quantis Switzerland/Germany	Life cycle assessment of biomass-based products
19.12.2013	Dr. Florian Leese Ruhr Universität Bochum, Germany	From genes to ecosystems - What is the benefit of integrating the level of genetic diversity to study freshwater ecosystems under stress?

Doctoral Degrees 2013

Surname	Firstname	Dept.	Subject	Date
Emmrich	Matthias	IV	Evaluating the ecological integrity of lakes using fish fauna*	05.02.2013
Lorenz	Stefan	II	Effects of climate change on the resilience of the ecological function of a lowland river (Spree) through recreational use*	05.03.2013
Perkin	Elizabeth	I	Influence of light pollution on aqautic ecosystems	08.04.2013
Busch	Susan	IV	Individual-based modeling of the diel vertical migration of fish*	29.05.2013
Dieter	Daniela	VI	Phosphorus and leaf litter turnover in temporary aquatic systems	03.06.2013
Eigemann	Falk	II	Allelopathic effects of submerged macrophytes on phytoplankton: in situ evidence, bacterial influences, and new mechanisms*	20.09.2013
Frindte	Katharina	III	Impact of internal waves on microbial habitats and activity at the water-sediment boundary layer of Lake Stechlin*	23.09.2013
Brothers	Soren Michael	II	Comparison of primary production of phytoplankton and of macrophyte dominated shallow lakes	08.10.2013
Gericke	Andreas	II	Modeling of nutrient inputs and loads in semiarid regions*	16.10.2013
Natho	Stephanie	II	Nutrient retention in wetlands, with a focus on flood plains*	17.10.2013
Scharnweber	Kristin	IV	Comparative analysis of secondary production and stable isotopes in two shallow lakes with different macrophyte colonies*	22.10.2013
Hermelink	Björn	V	Reproductive physiology of Zander*	28.10.2013
Salka	Ivette	III	Functional diversity of microbial communities because of specific changes in environmental factors*	06.12.2013
Shatwell	Thomas	II	Interactive effects of physical factors and nutrients on the growth of phytoplankton in polymictic lakes, taking into account the global climate change*	12.12.2013
Bernhardt	Juliane	I	Impact of internal waves on mass transfer at the water-sediment boundary layer of Lake Stechlin*	16.12.2013

* published solely in German

Publications 2013

Peer-reviewed publications 2013
with impact factor

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