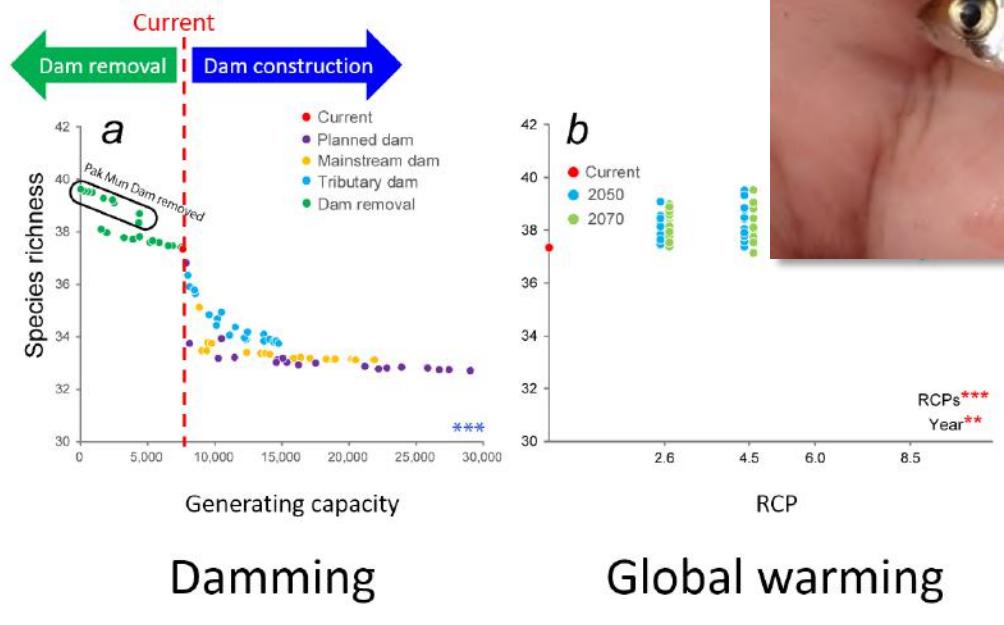
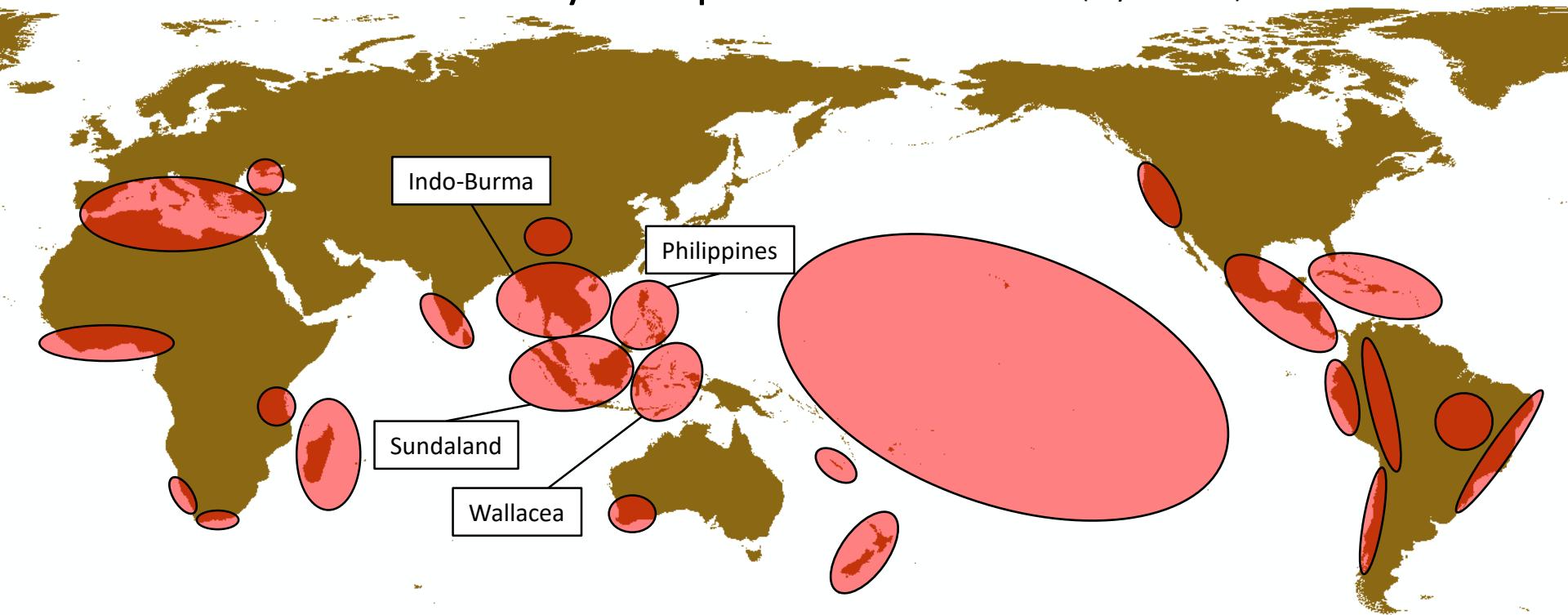


Anticipating the impacts of hydropower dams in the Mekong River by a freshwater fish observation network



Biodiversity Hotspots of the World (Myers 2000)

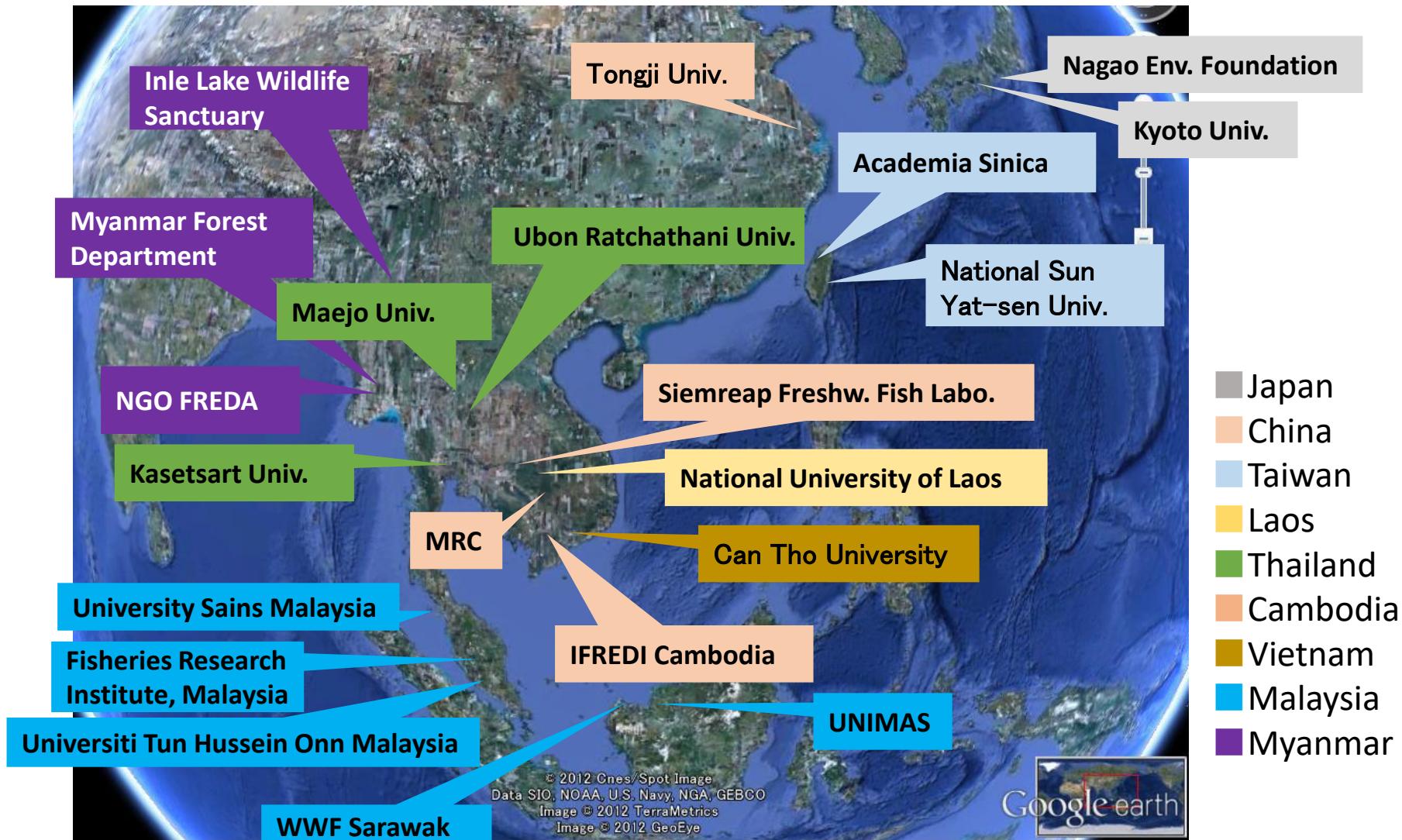


Whole area of Southeast Asia is included as “Hotspot”



	Area	Freshwater fish species
All the World	100%	100% (12,000 species)
SE Asia	4%	20% (3,000 species)

Our freshwater fish observation network in Asia



21 institutions, mainly in SE Asia



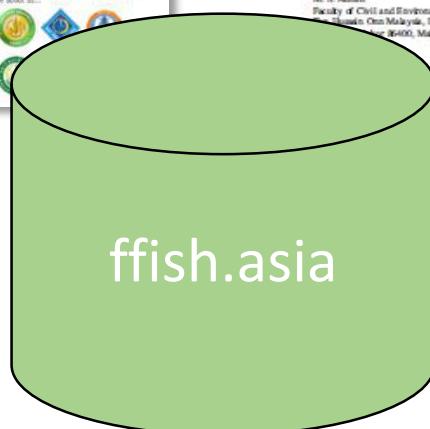
- Data sharing
- Collaborative researches
- Mutual assistances in the field works

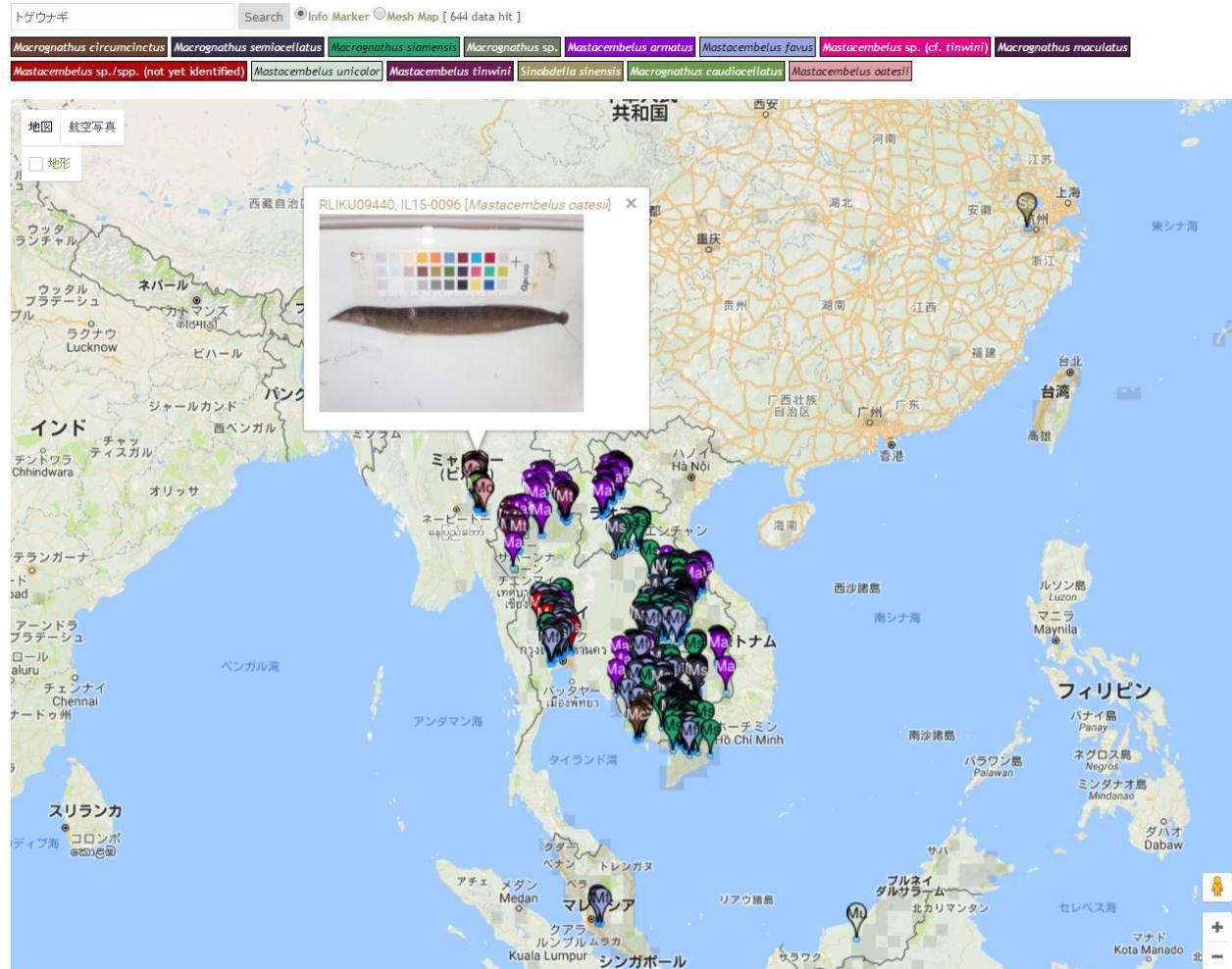


From 2013~

The screenshot shows the ffish.asia website. The homepage features a large image of a fish and navigation links for FINSEA, MAP, SPECIMENS/DATA, TAXONOMY, LITERATURE, FORUM, and ABOUT. Below this is a section titled 'Fishes of Mainland Southeast Asia' with a sub-section 'Explore the freshwater fish diversity in the mainland Southeast Asia'. A search bar and a species list are also visible. To the right, a detailed article page is shown with a header 'An online database on freshwater fish diversity and distribution in Mainland Southeast Asia', authors (Yoshihi Kano, Mohan Shalabhuddin Adnan, Chintawat Grapapan, Jaranjigit Grapapan, Wichian Magison, Prachya Monkotakham, Yoshikazu Noser, Sudin Othman, Boonlukh Prayapongsath, Konosuma Phongsu, Acharyara Rangsiengji, Koichi Shibukawa, Yukihiko Shimantani, Naom So, Apinan Suvannakudta, Phanara Thida, Phuong Nguyen Thanh, Dao Dinh Tuan, Keonc Ueng, Tomomi Yamashita), and publication details (Received: 28 April 2013; Revised: 10 May 2013; Accepted: 12 May 2013; Published online: 21 June 2013). The article discusses the biodiversity of freshwater fish in Mainland Southeast Asia, mentioning challenges like taxonomic studies and species distribution.

Object: freshwater fish
Scale: Monsoon Asia
Contents: distribution,
photo images, 3D
models, literatures
>30000 data

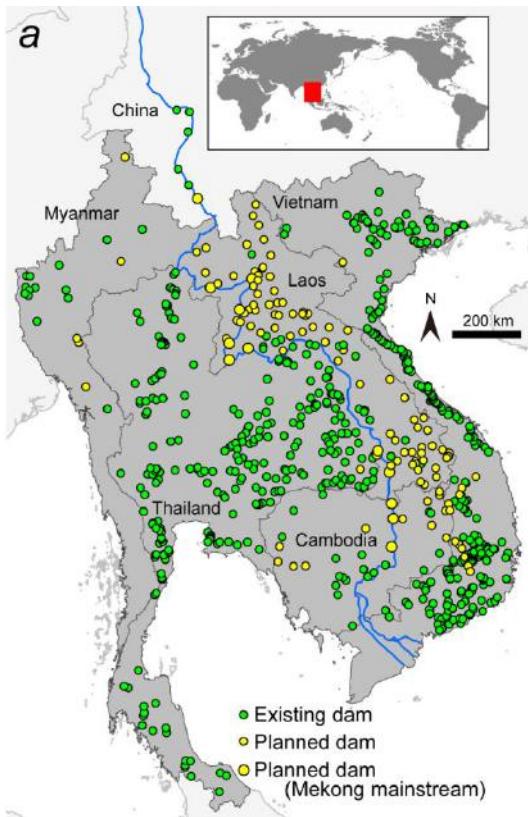




e.g. Search result for “spiny eel”

The most significant concern for freshwater fishes in Indo-Burma

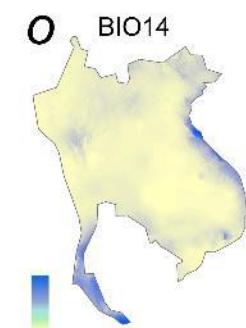
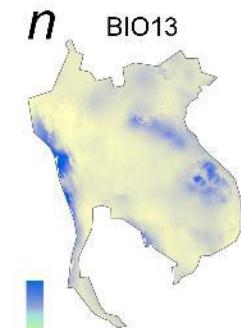
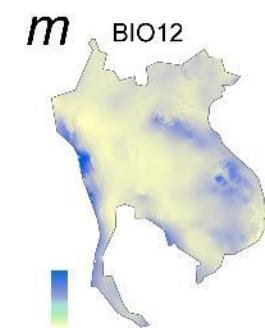
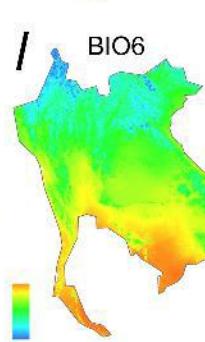
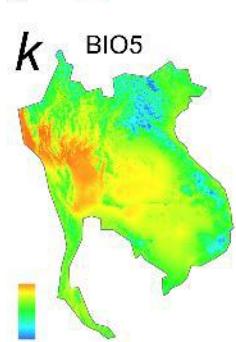
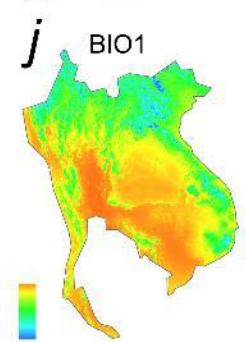
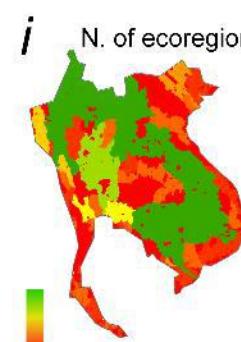
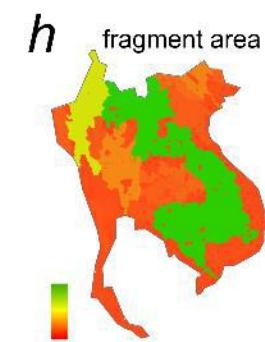
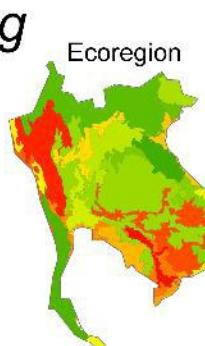
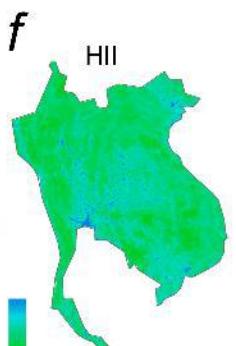
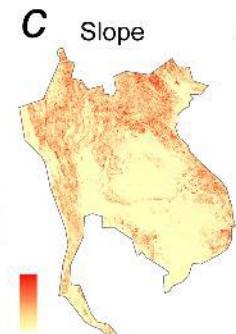
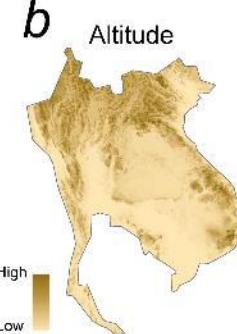
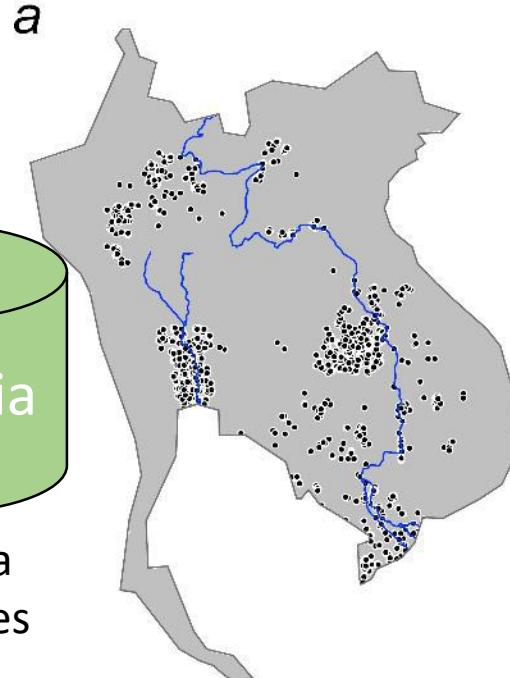
Hydropower dams



Simulate the impact using the our data

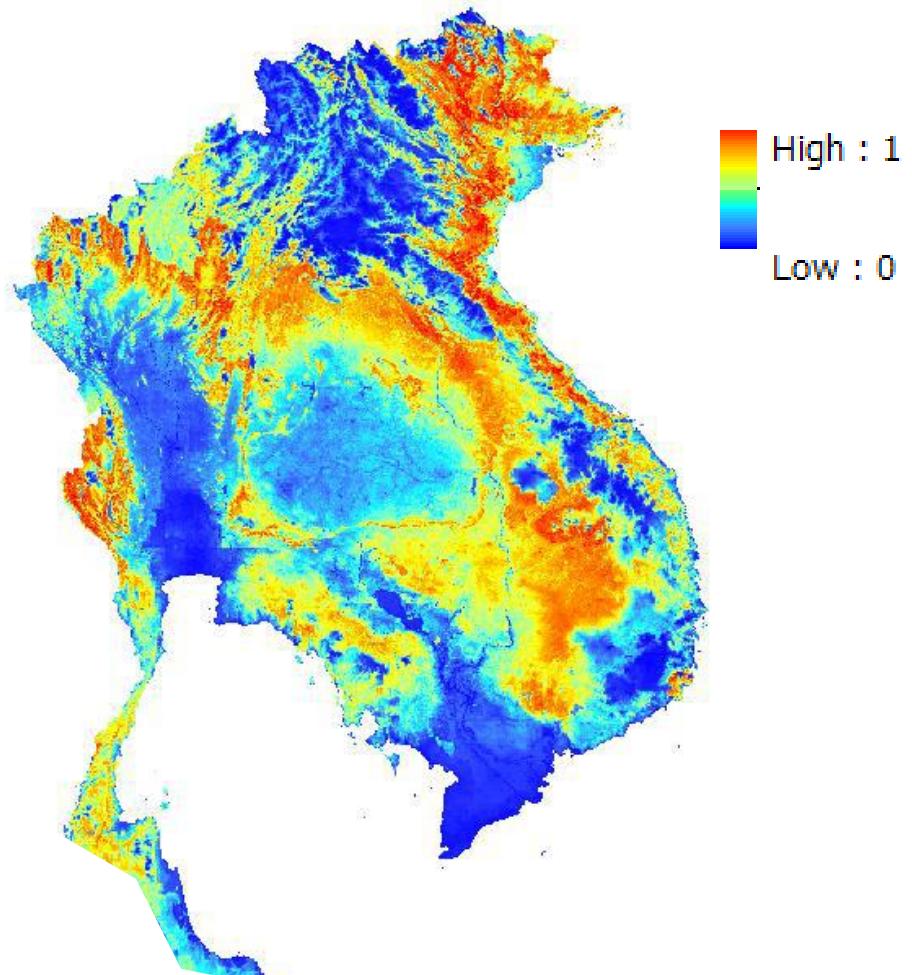
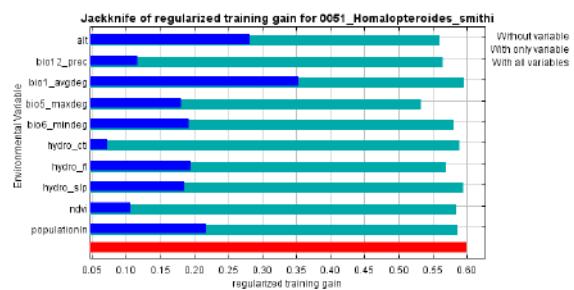


15000 data
366 species



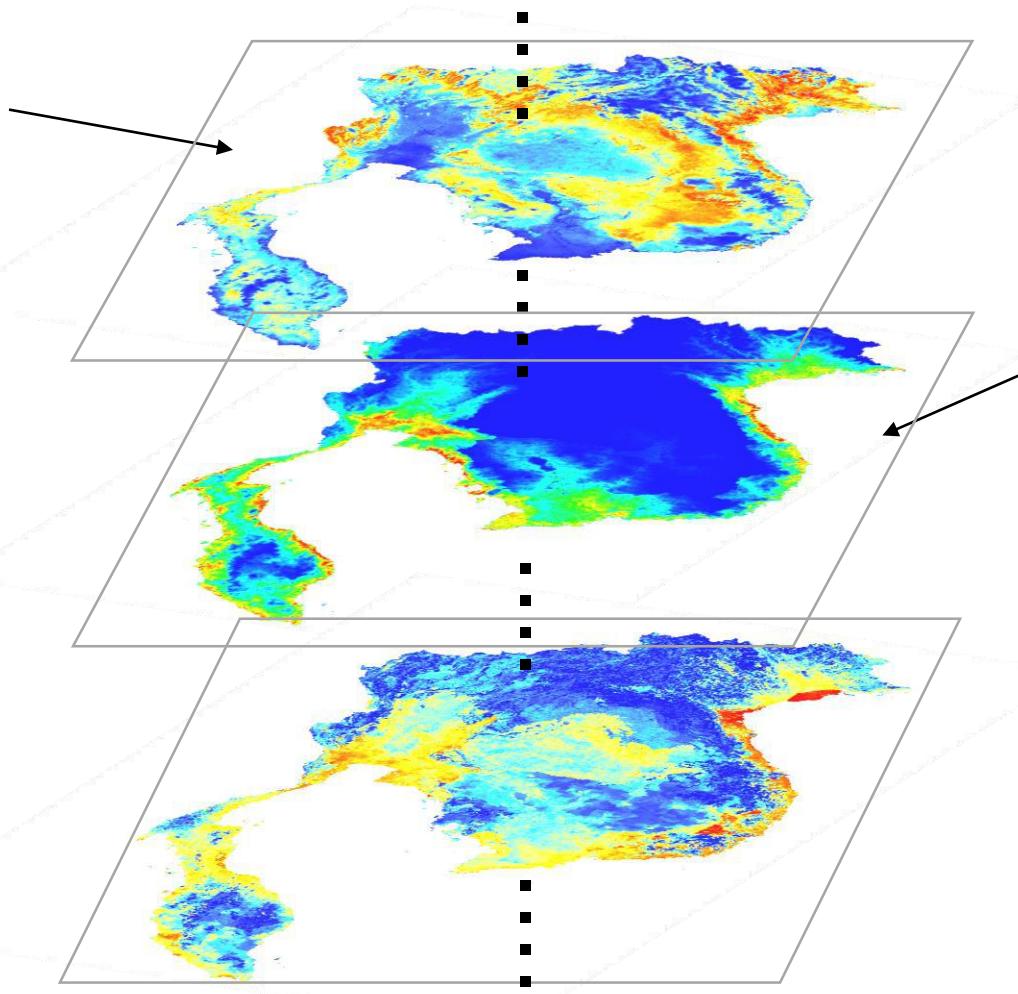
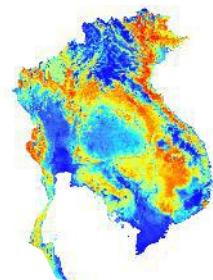
Maxent for each species

Homalopteroides smithi



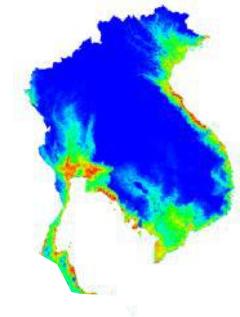
e.g.

Homalopterooides smithi



e.g.

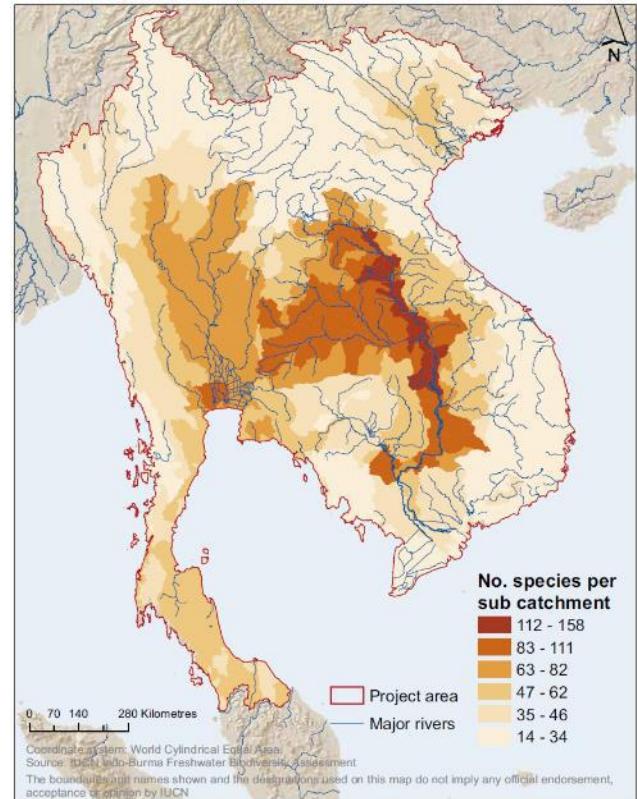
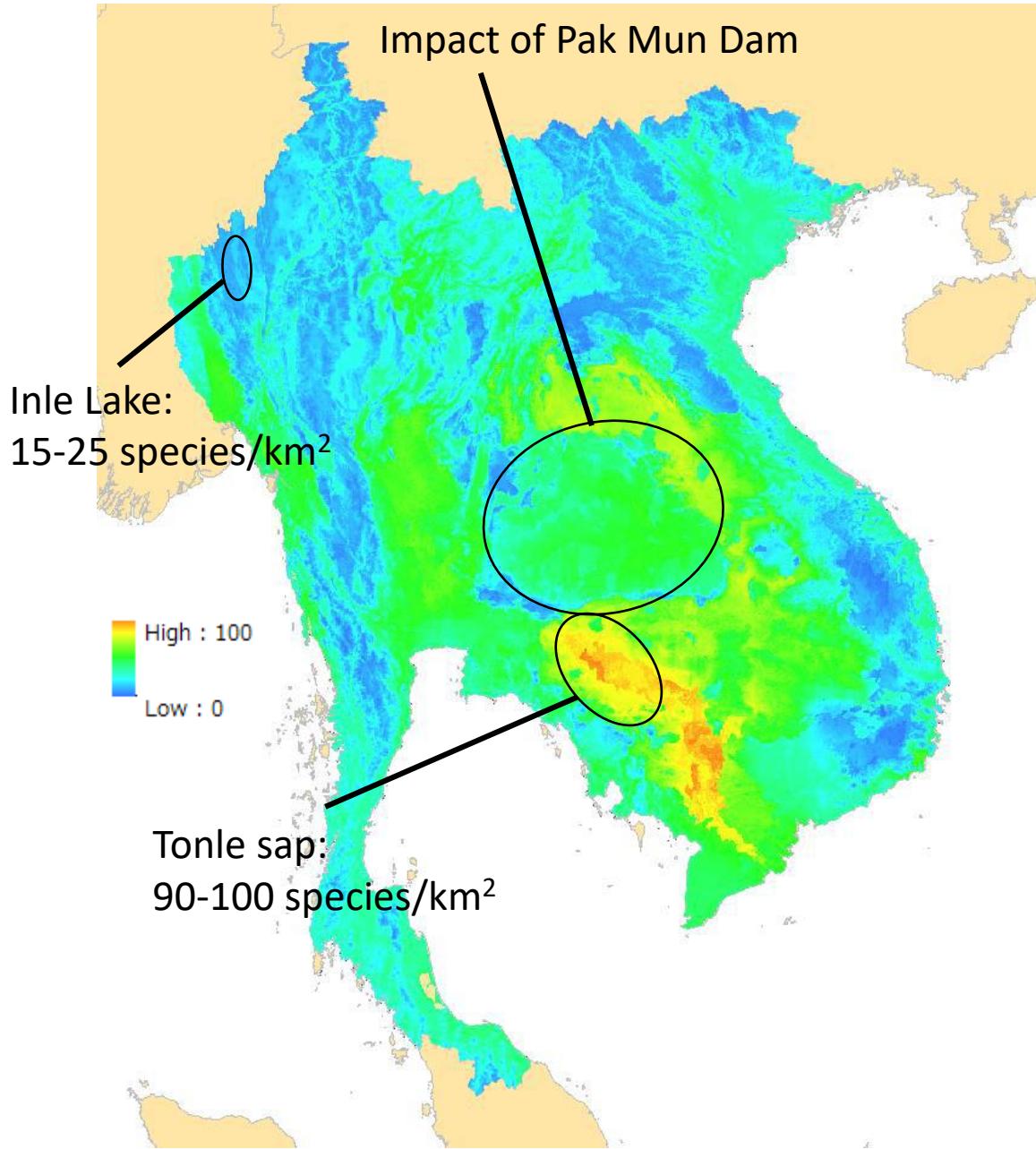
Apocheilus panchax



Sum whole 366 species



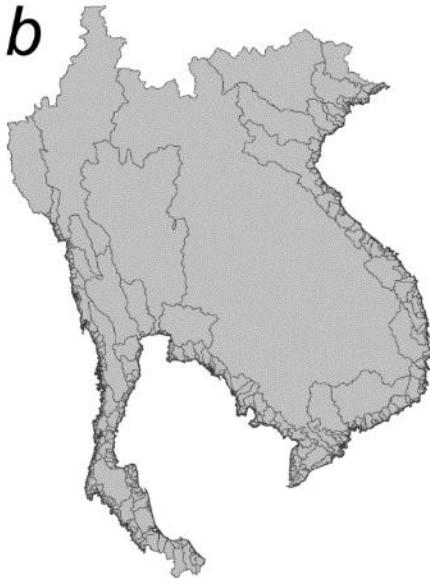
Current species richness



Allen 2012

Layers concerning dam (=⚡ electric generating capacity)

b



c



Mainstream dam scenarios: 20
Tributary dams scenario: 20
Mixed dam scenarios: 20



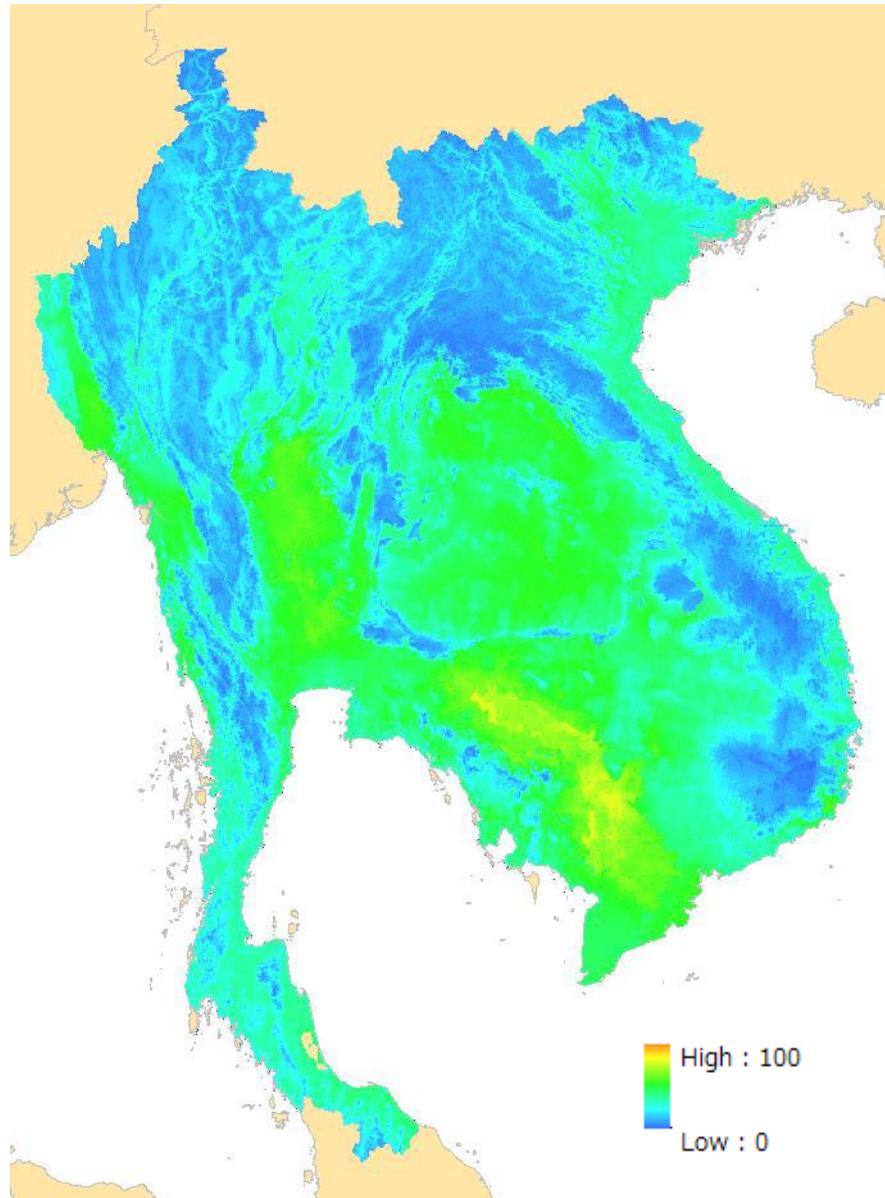
0%: 0 MW

$$MW = f(\text{watershed, slope})$$

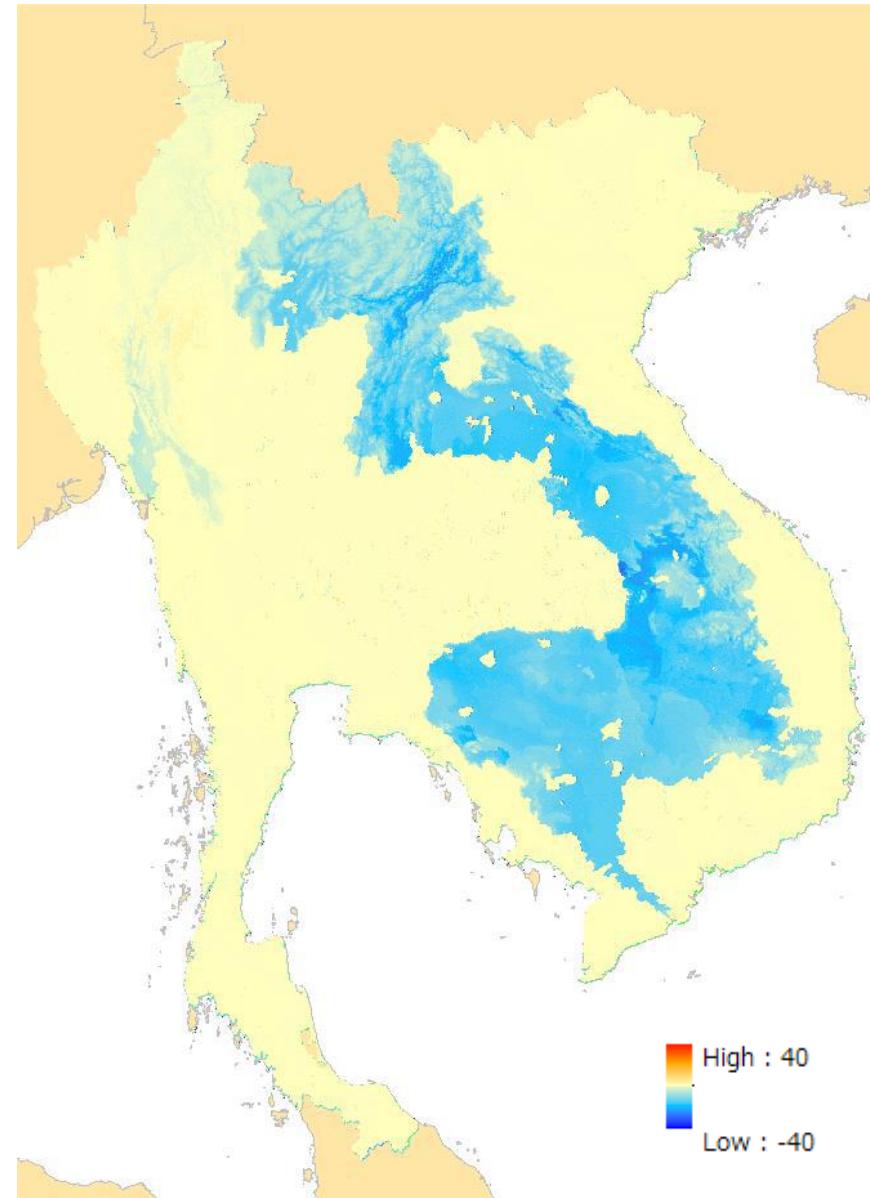


100%: 30,000 MW

80 % planned dam scenario

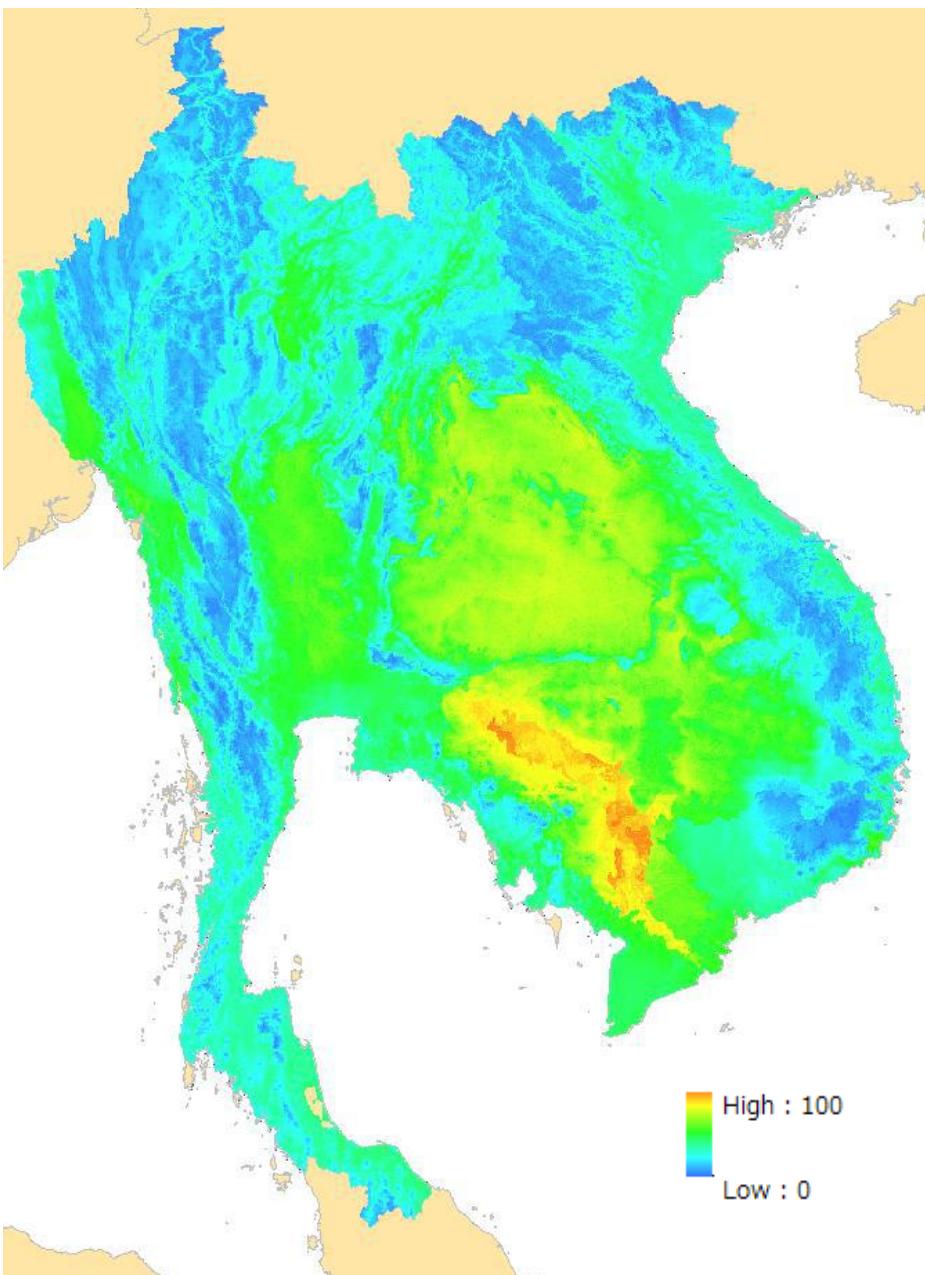


Species richness

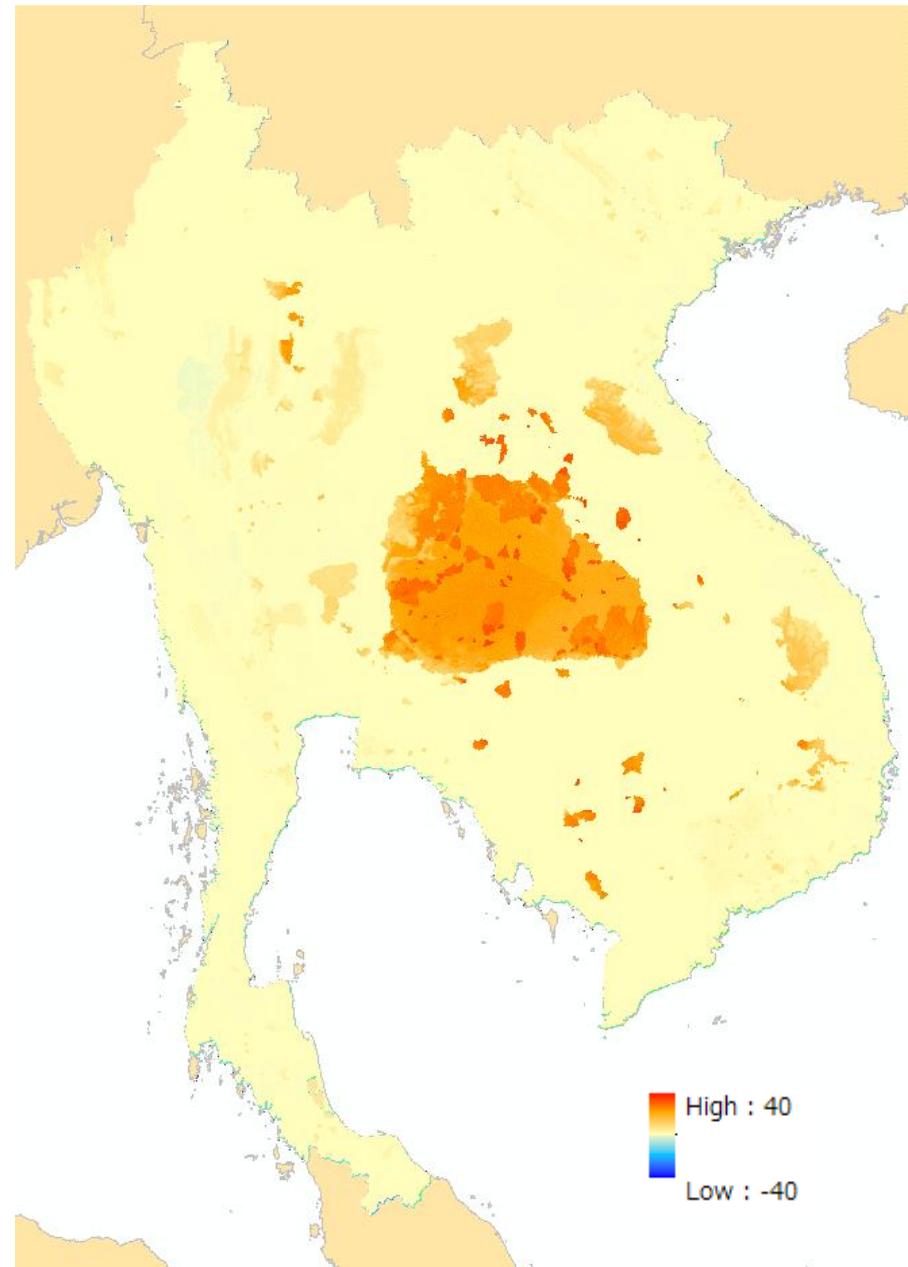


△ Current species richness

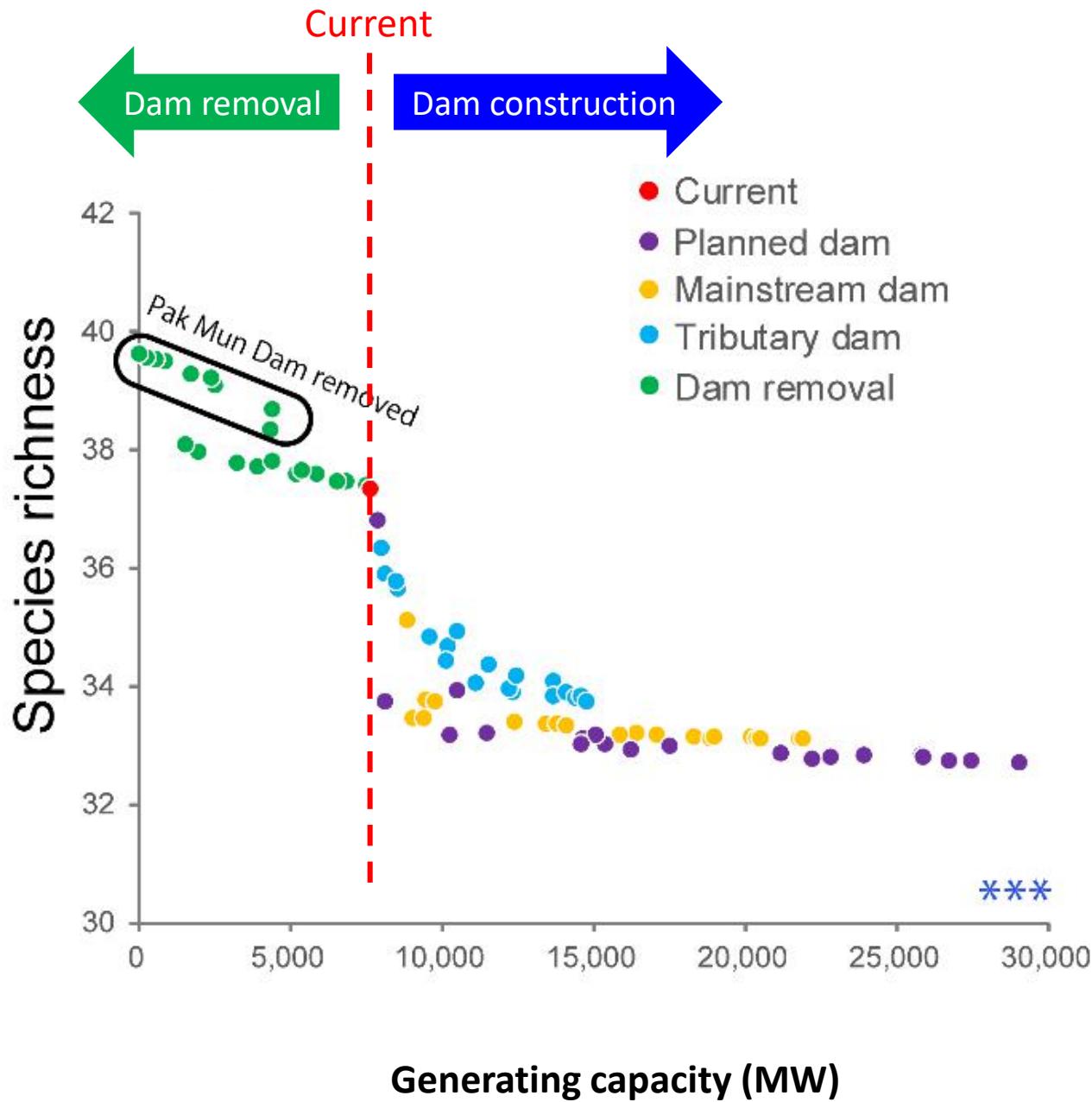
0 % dam (dam removal) scenario



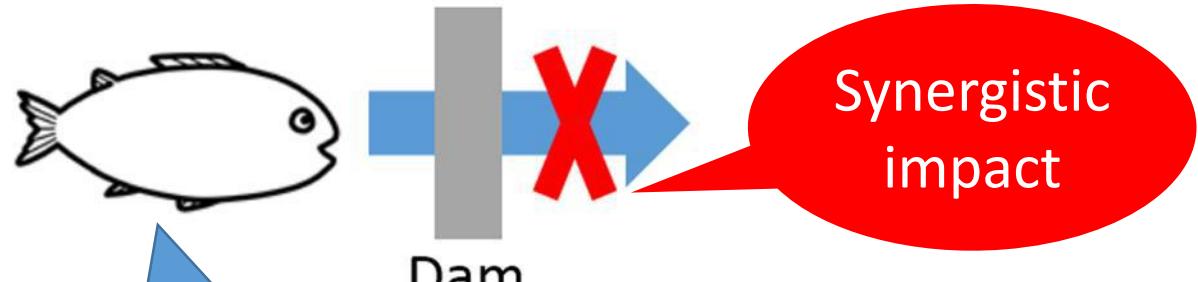
Species richness



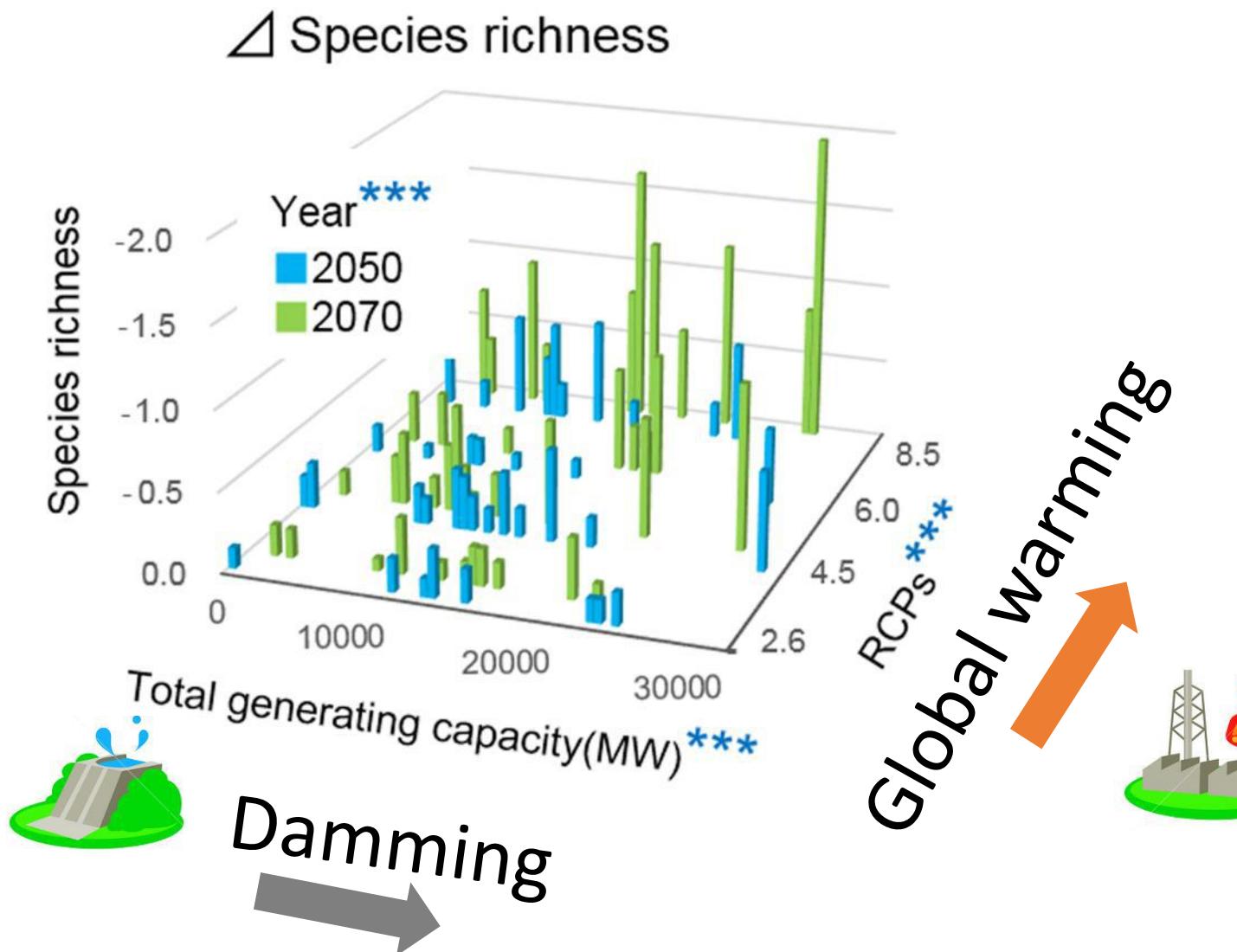
△ Current species richness



Global warming is also a potential driver



Synergistic impact



Publication

Kano et al. (with 19 coauthors) 2016. Impact of dams.....Indo-Burma Hotspot

The screenshot shows the PLOS ONE website interface. At the top, there is a navigation bar with links for plos.org, create account, sign in, Publish, About, Browse, Search, and advanced search. The main content area features the PLOS ONE logo. Below it, the article information is displayed: OPEN ACCESS, PEER-REVIEWED, RESEARCH ARTICLE, title "Impacts of Dams and Global Warming on Fish Biodiversity in the Indo-Burma Hotspot", authors (Yuichi Kano, David Dudgeon, So Nam, Hiromitsu Samejima, Katsutoshi Watanabe, Chaiwut Grudpan, Jarungjit Grudpan, Wichan Magtoon, Prachya Musikasinthom, Phuong Thanh Nguyen, Bounthob Praxaysonbath, Tomoyuki Sato, Koichi Shibukawa, Kenzo Utsugi), and a link to view all authors. To the right, there are metrics: 2 Save, 0 Citation, 1,567 View, and 35 Share. Below the article summary, there are tabs for Article, Authors, Metrics, Comments, and Related Content. On the right side, there are buttons for Download PDF, Print, Share, CrossMark, and Subject Areas (Global warming, Biodiversity, Freshwater fish, Species diversity).

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RESEARCH ARTICLE

Impacts of Dams and Global Warming on Fish Biodiversity in the Indo-Burma Hotspot

Yuichi Kano, David Dudgeon, So Nam, Hiromitsu Samejima, Katsutoshi Watanabe, Chaiwut Grudpan, Jarungjit Grudpan, Wichan Magtoon, Prachya Musikasinthom, Phuong Thanh Nguyen, Bounthob Praxaysonbath, Tomoyuki Sato, Koichi Shibukawa, Kenzo Utsugi [view all]

Published: August 17, 2016 • <http://dx.doi.org/10.1371/journal.pone.0160151>

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Abstract				

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Subject Areas

Global warming

Biodiversity

Freshwater fish

Species diversity

Summary

Freshwater fish observation network



Database



Distribution data

A	B	C
1	species	x
2	Acanthoco	99.66258
3	Acanthoco	98.36644
4	Acanthoco	98.37061
5	Acanthoco	99.47934
6	Acanthoco	99.48483
7	Acanthoco	99.50324
8	Acanthoco	99.45561
9	Acanthoco	100.4084
10	Acanthops	104.0988
11	Acanthops	99.98547
12	Acanthops	106.9807
13	Acanthops	104.9923
14	Acanthops	105.0176
15	Acanthops	105.4225
16	Acanthops	104.4034
17	Acanthops	104.1582
18	Acanthops	104.0025
19	Acanthops	104.14557

PLOS ONE

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RESEARCH ARTICLE

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Yoshi Kano, David Dudgeon, So Nam, Hiromitsu Semenja, Katsutoshi Watanabe, Chawut Grudpan, Jaarungit Grudpan, Wehan Magton, Prasnya Muskasitham, Phuong Thanh Nguyen, Bounthob Pravayabandh, Tomoyuki Sato, Koichi Shibukawa, Kenzo Utsugi

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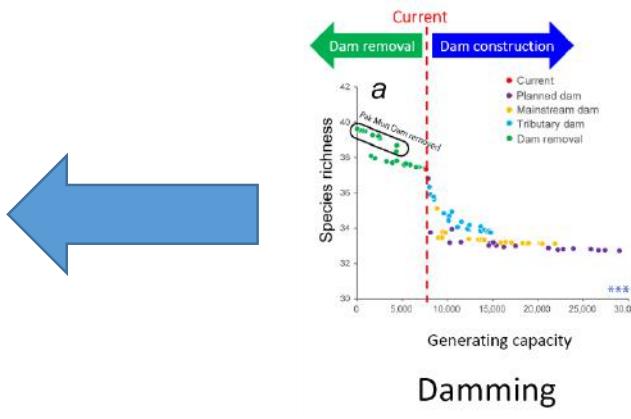
Abstract Introduction Materials and Methods Results Discussion Supporting Information Acknowledgments Author Contributions

Abstract

Both hydropower dams and global warming pose threats to freshwater fish diversity. While the extent of global warming may be reduced by a shift towards energy generation by large dams in order to reduce fossil-fuel use, such dams profoundly modify riverine ecosystems. We used a spatially explicit model to predict the combined effects of dams for example, dams constrain range adjustments by fishes that might compensate for warming temperatures. Evaluation of their combined or synergistic effects is thus essential for adequate assessment of the consequences of planned water-resource developments. We made comparisons of the responses of 563 fish species across the Indo-Burma hotspot under different climate change scenarios and damming scenarios. We found that the number of species with predicted declines in suitable habitat increased with both increasing dam density and increasing global warming. The number of species with declines was higher under projected climate change scenarios than under current conditions. The number of species with declines was also higher under projected damming scenarios than under current conditions. The number of species with declines was highest under the scenario with the highest dam density and the highest projected temperature increase. Our results indicate that the combined effects of dams and global warming will have significant impacts on fish biodiversity in the Indo-Burma hotspot.

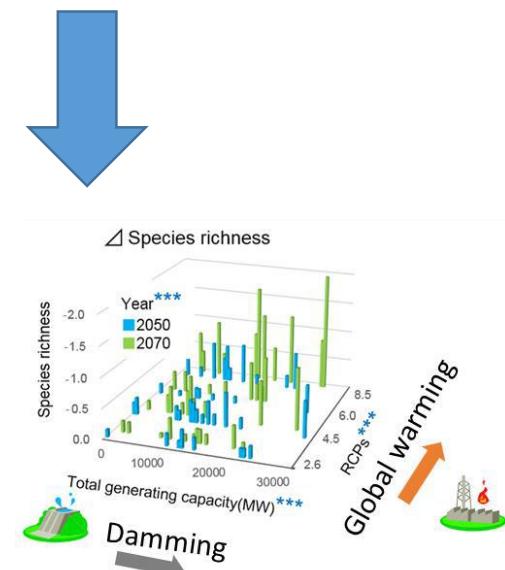
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CrossMark Subject Areas Global warming Biodiversity Freshwater fish Species diversity



Publication of scientific paper

Simulate impacts of dams and global warmings



Thank you!



Ladies in SE Asia fish markets

One of a typical contribution of a local database

Thailand



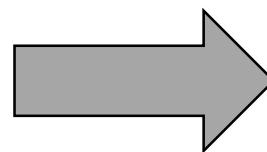
Laos



Cambodia



Vietnam



OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

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Yuichi Kano, David Dudgeon, So Nam, Hiromitsu Samejima, Katsutoshi Wetanabe, Chaiwut Grudpan, Jarungjit Grudpan, Wichan Magtoon, Prachya Musikasinthorn, Phuong Thanh Nguyen, Bounthob Praxaysonbath, Tomoyuki Sato, Koichi Shibukawa, [...], Kenzo Utsugi, [view all]

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Article	Authors	Metrics	Comments	Related Content
View		2 Save 1,567 View	0 Citation 35 Share	

Abstract

Introduction
Materials and Methods
Results
Discussion
Supporting Information
Acknowledgments
Author Contributions

Abstract

Both hydropower dams and global warming pose threats to freshwater fish diversity. While the extent of global warming may be reduced by a shift towards energy generation by large dams in order to reduce fossil-fuel use, such dams profoundly modify riverine habitats. Furthermore, the threats posed by dams and global warming will interact; for example, dams constrain range adjustments by fishes that might compensate for warming temperatures. Evaluation of their combined or synergistic effects is thus essential for adequate assessment of the consequences of planned water-resource developments. We made connections of the responses of 767 fish species within the

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Subject Areas

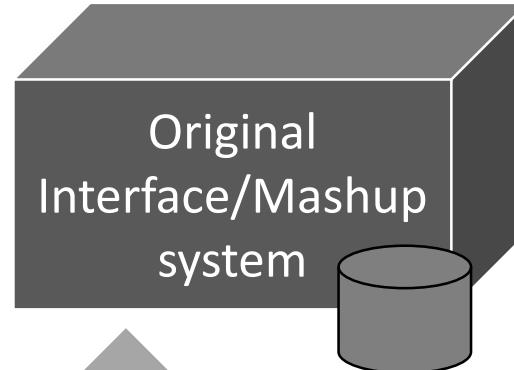
Global warming
Biodiversity
Freshwater fish
Species diversity

All the stakeholders included as co-authors

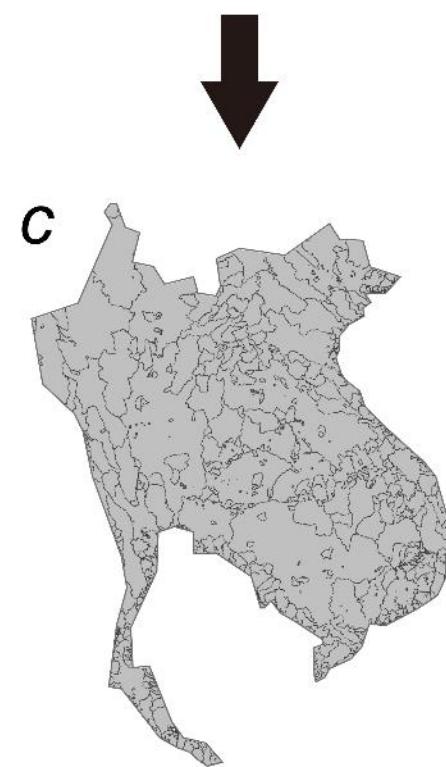
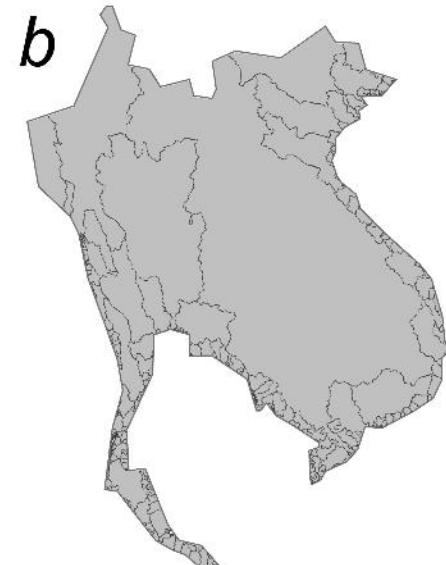
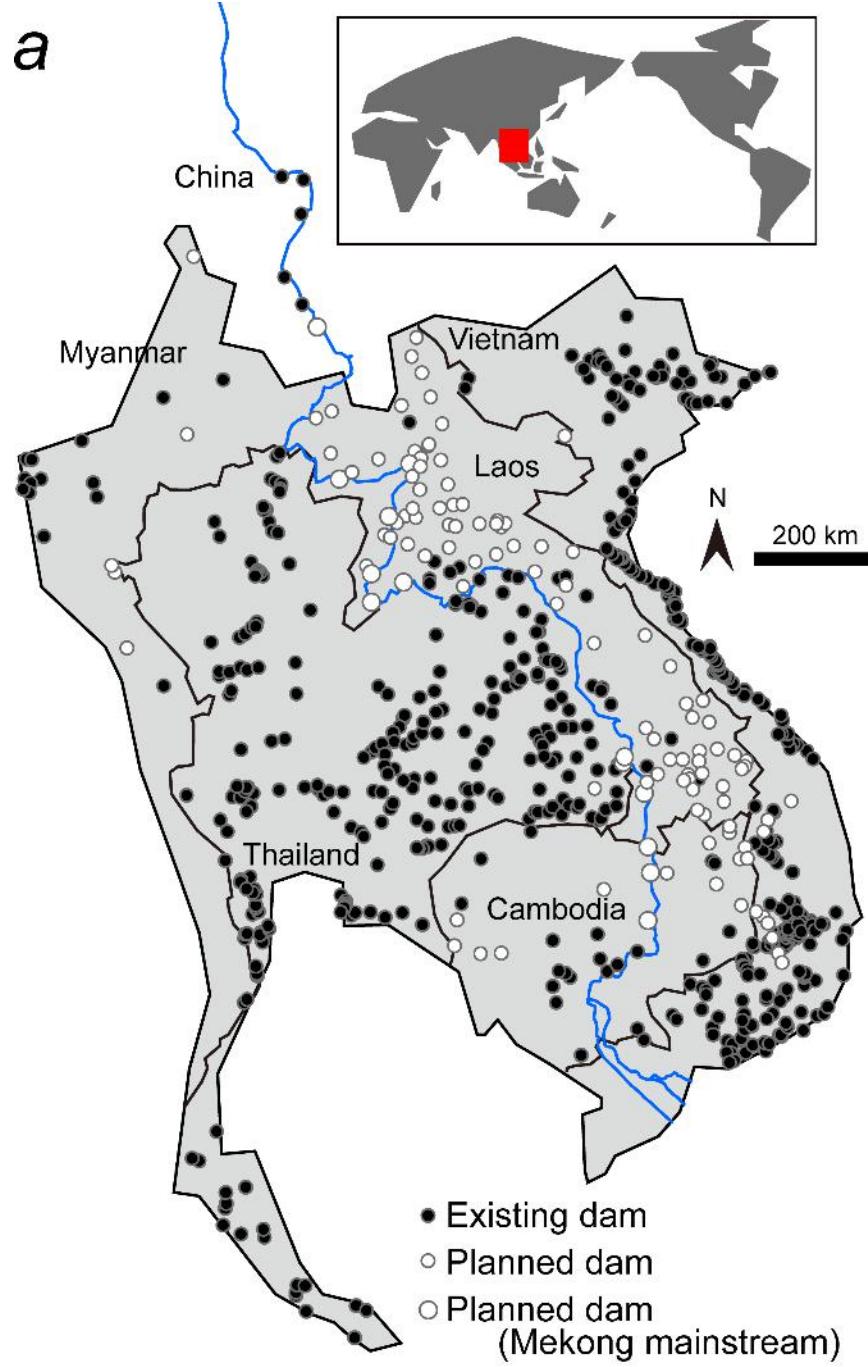


Citizen science!
Open science!

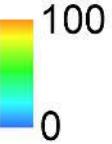
This is my role...



GBIF

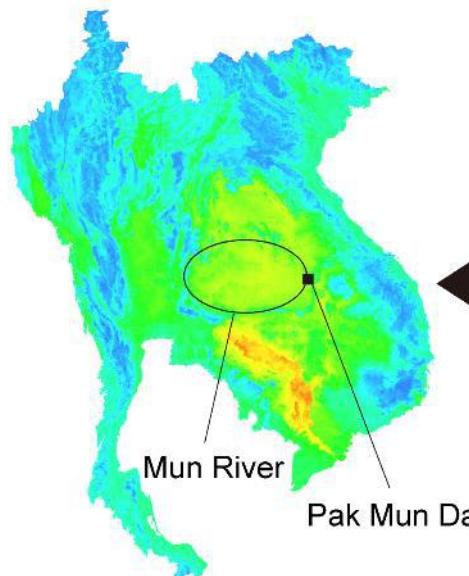


Species richness

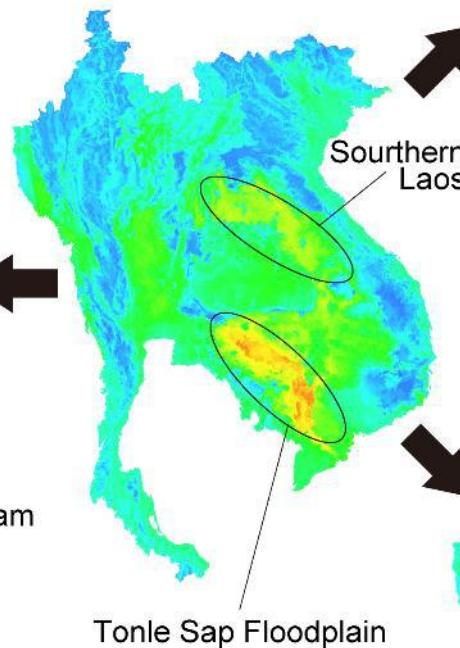


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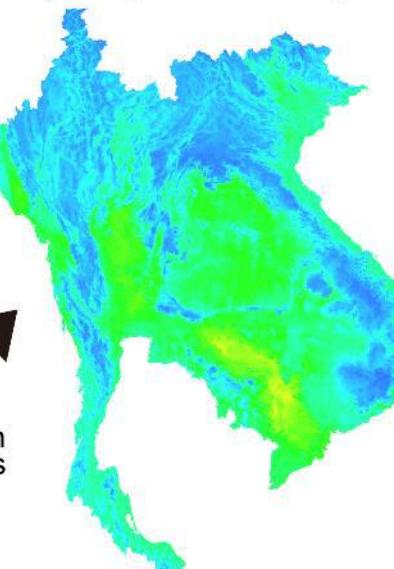
Pre-dam
(100% dam removal)



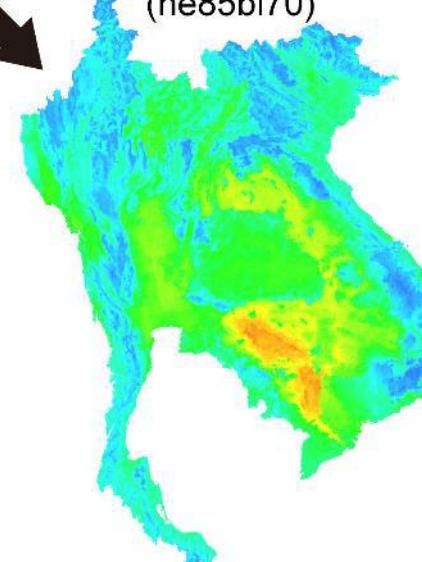
Current
(Current)

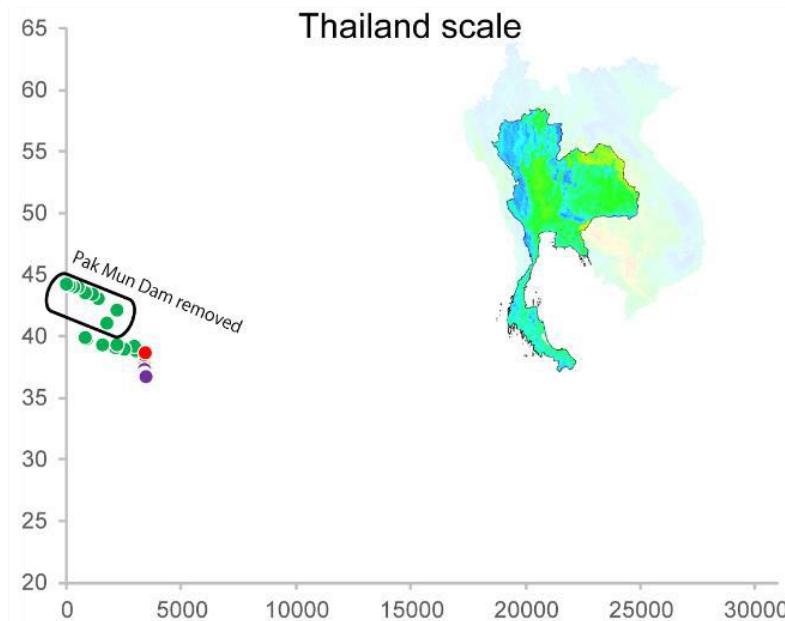
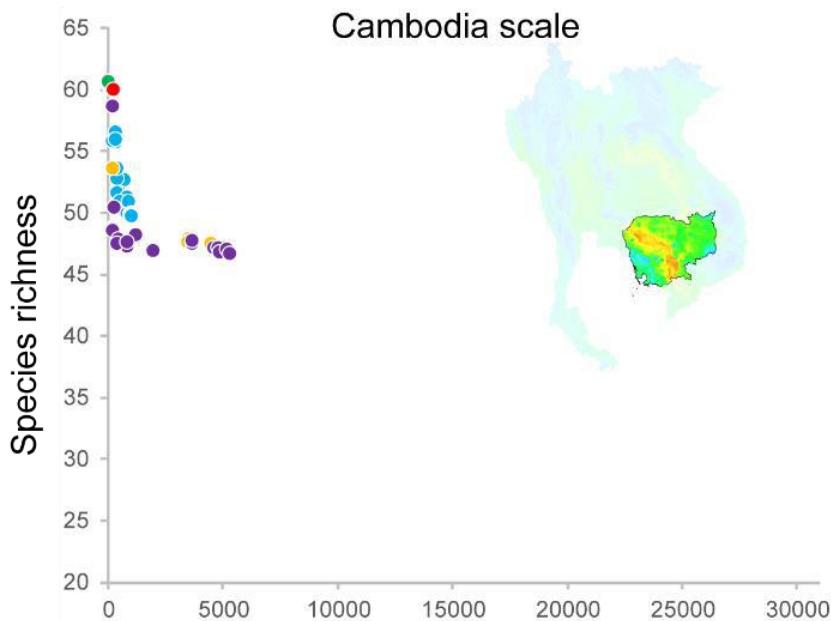
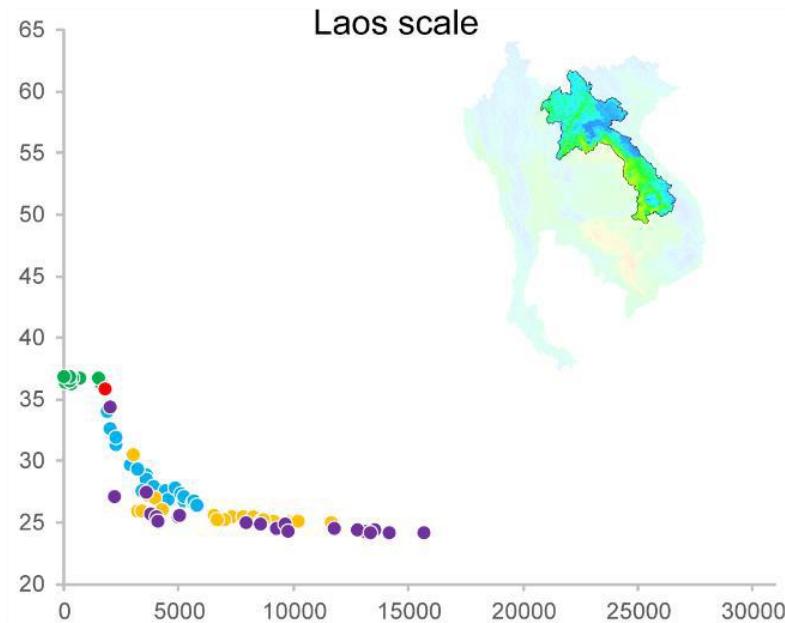
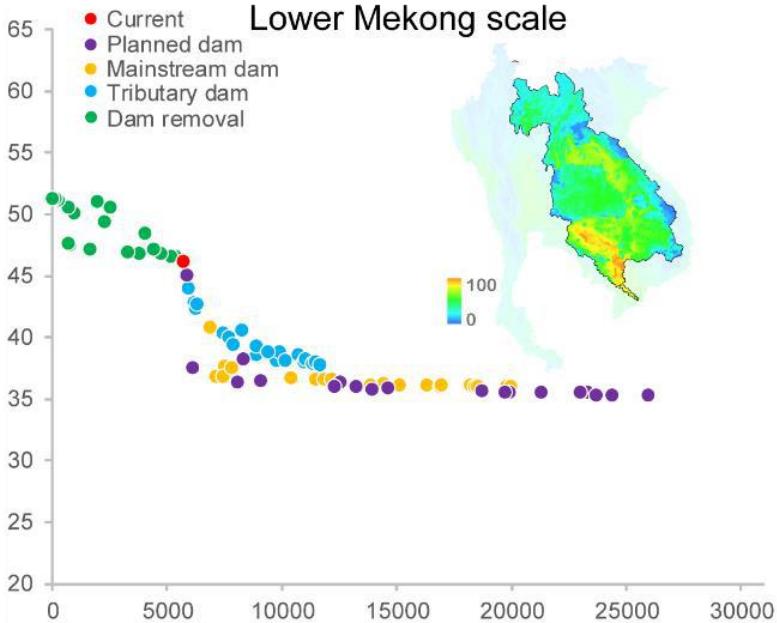


Dam
(80% planned dam)



Global warming
(he85bi70)

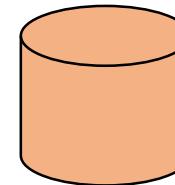
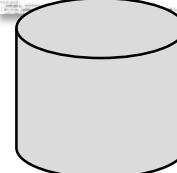
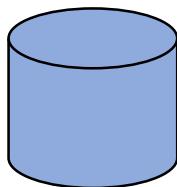
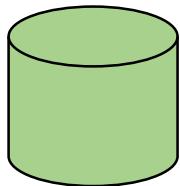




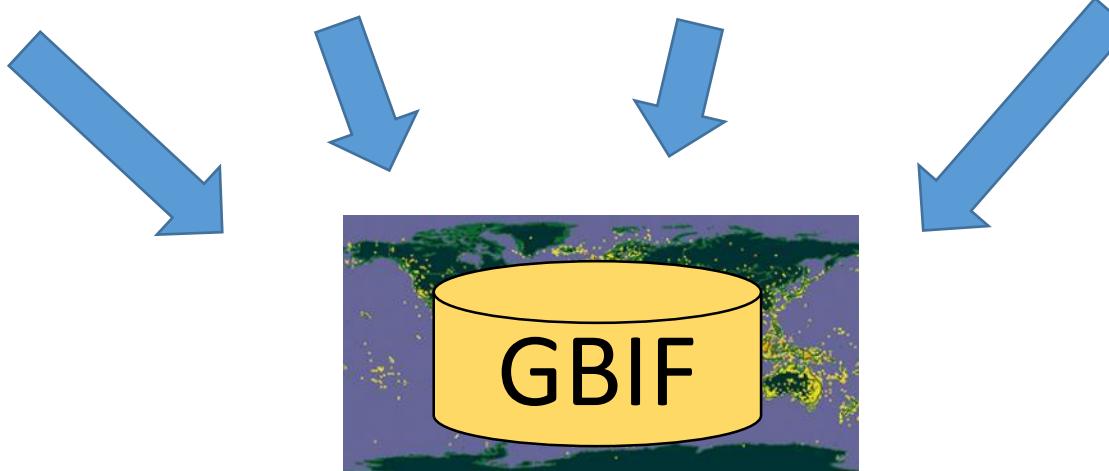
Generating capacity

The database system should be fundamentally remodeled

Firstly, I must register the data to GBIF.....



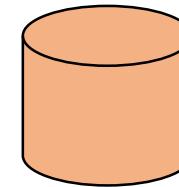
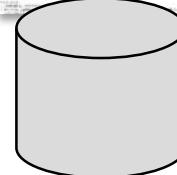
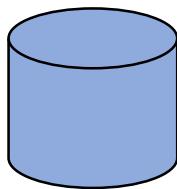
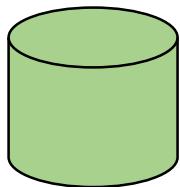
Other data
e.g. Yahara's plants



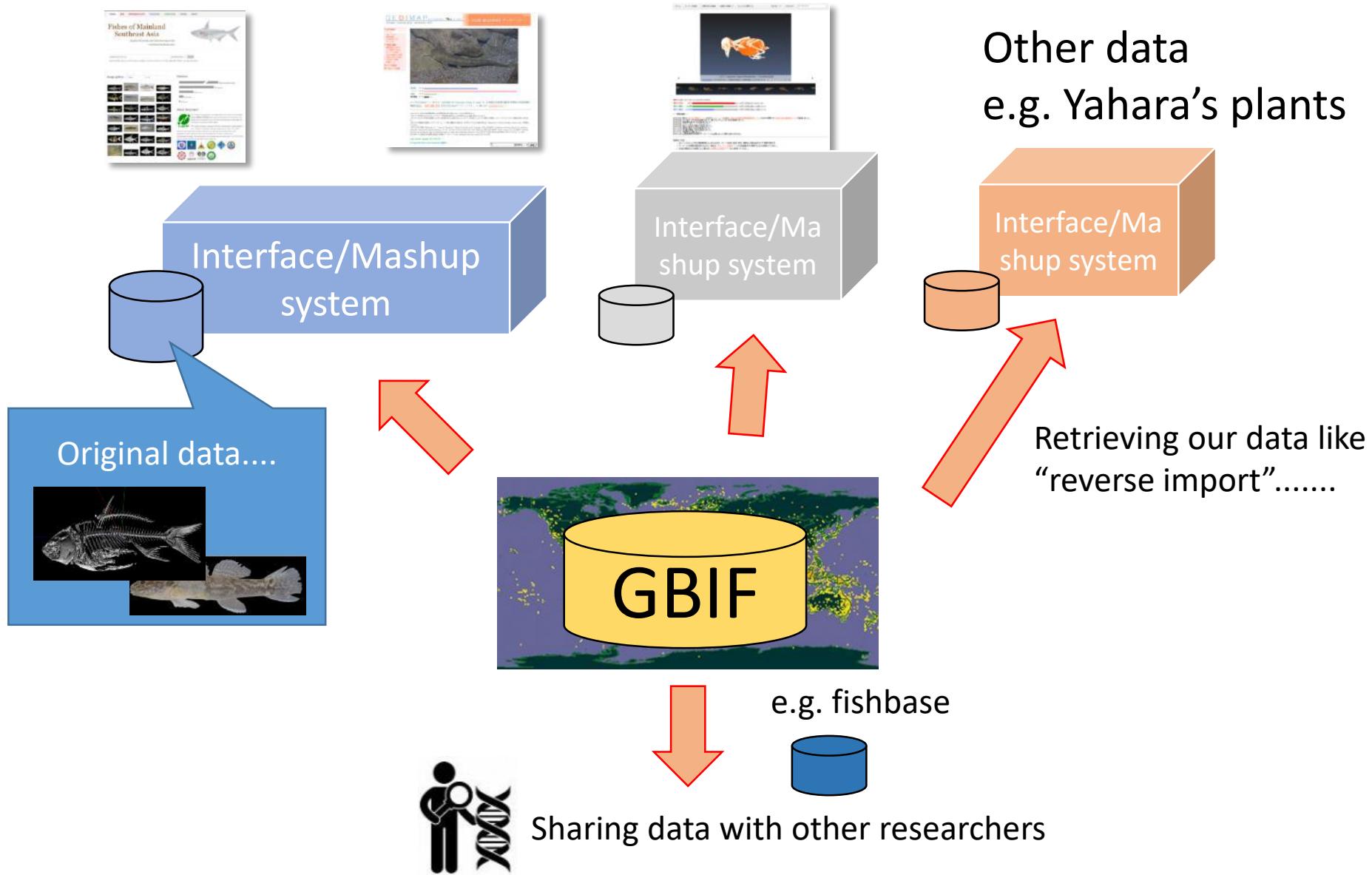
Retrieving our data like “reverse import”.....



Other data
e.g. Yahara's plants



Retain originality in each mashup system with local DB



Current species richness (native only)

