Aplicações IBI: histórico & exemplos

Prof. Marcos Callisto & Dra. Déborah Regina O. Silva

Boas Práticas em Colaboração Científica

Bad coauthors: how to avoid them and what to do when you have one

14

Posted on August 22, 2017 by Jeremy Fox

Note from Jeremy : this is a guest post by Abe Miller-Rushing and Richard B. Primack. Richard was Abe's PhD advisor, and they continue to collaborate on many projects.

Jeremy Fox
Blog https://dynamicecology.wordpress.com/2017

Boas Práticas em Colaboração Científica

- Ciência interessante (**boa ciência**!)
- **Liderança** efetiva (capaz de dividir créditos!)
- **Comprometimento** com as boas práticas na ciência
- **Respeito** às necessidades & interesses de todos os participantes
- **Oportunidades** regulares para discussão & discordância
- **Confiança** em cada um e uns com os outros
- **Justiça** ao reconhecer contribuições individuais

- Deve-se **evitar** a todo custo: má comunicação & expectativas não explícitas!

Primack et al. 2014 – Biol Conserv
Parker & Kingori (2016) – Plos One

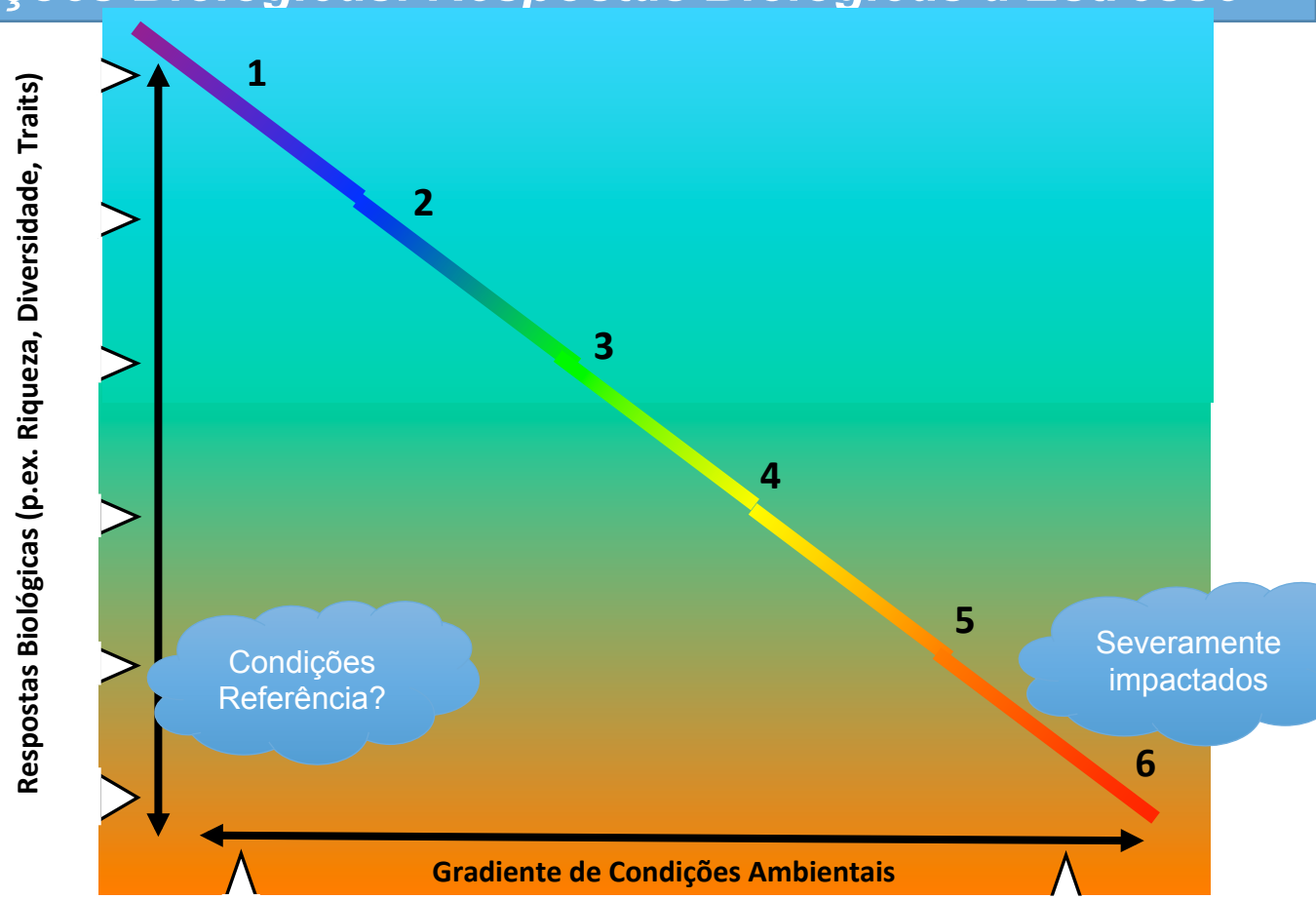
Gradiente de Condições Biológicas: Respostas Biológicas a Estresse

- Riachos de cabeceira em condições pristinas

- Menos alterados

- Riachos em Áreas Protegidas particulares (RPPNs)

- Riachos em Parques Nacionais



Bacia, habitat, vazão, química da água em condições naturais

Química da água, habitat, e/ou vazão severamente alteradas

(Davies & Jackson, 2006 - Ecological Applications)

- A seleção de áreas de referência deve considerar a variabilidade ambiental existente dentro de uma bacia hidrográfica

Áreas isentas ou com reduzidas influências antrópicas, que representem o estado ecológico imperturbado, ou o melhor possível disponível em uma região.

Condições de Referência em riachos de cabeceira

Condições Menos Perturbadas (Conjunto com as melhores condições biológicas, químicas , físicas e de habitat, considerando o estado atual da paisagem)

Melhor Condição Atingível (Equivalente à condição ecológica esperada em locais onde a melhor prática possível de gestão for aplicada)

Condições Minimamente Perturbadas (Aqueles que apesar de não serem prístinos estão bem próximo a isso)

Condição Histórica (antes da perturbação humana)

"Integridade Biótica"

Clean Water Act, 1972

FEDERAL WATER POLLUTION CONTROL ACT

(33 U.S.C. 1251 et seq.)

AN ACT To provide for water pollution control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—RESEARCH AND RELATED PROGRAMS

SEC. 101. (a) The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act—

(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

(3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;

(4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment

"Integridade Biótica"

- The Integrity of Water, 1975

the ecosystem and can be defined as "the capability of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." A

Frey, 1977; Karr & Dudley, 1981

"Integridade Biótica"

Capacidade de manutenção e suporte de comunidades **biológicas** preservando sua composição, diversidade e estrutura funcional de forma comparável às características **naturais** da região (Frey, 1977; Karr & Dudley, 1981).

- **Karr, 1981** – Índice de Integridade Biótica (*Index of Biotic Integrity*, IBI), índice multimétrico (***Multimetric Index***, **MMI**).

- **MMI**: síntese de atributos ou métricas biológicas capazes de refletir distúrbios antrópicos

ASSESSMENT OF BIOTIC INTEGRITY USING FISH COMMUNITIES

James R. Karr

ABSTRACT

Man's activities have had profound, and usually negative, influences on freshwater fishes from the smallest streams to the largest rivers. Some negative effects are due to contaminants, while others are associated with changes in watershed hydrology, habitat modifications, and alteration of energy sources upon which the aquatic biota depends. Regrettably, past efforts to evaluate effects of man's activities on fishes have attempted to use water quality as a surrogate for more comprehensive biotic assessment. A more refined biotic assessment program is required for effective protection of freshwater fish resources. An assessment system proposed here uses a series of fish community attributes related to species composition and ecological structure to evaluate the quality of an aquatic biota. In preliminary trials this system accurately reflected the status of fish communities and the environment supporting them.

James R. Karr

- Assembleias de peixes
- Métricas taxonômicas e ecológicas

Table 2. Parameters used in assessment of fish communities. ***(See text for discussion.)***

Species Composition and Richness
- Number of Species
- Presence of Intolerant Species
- Species Richness and Composition of Darters
- Species Richness and Composition of Suckers
- Species Richness and Composition of Sunfish (except Green Sunfish)
- Proportion of Green Sunfish
- Proportion of Hybrid Individuals

Ecological Factors
- Number of Individuals in Sample
- Proportion of Omnivores (Individuals)
- Proportion of Insectivorous Cyprinids
- Proportion of Top Carnivores
- Proportion with Disease, Tumors, Fin Damage, and Other Anomalies

Class	*Index Number*
Excellent (E)	57–60
E–G	53–56
Good (G)	48–52
G–F	45–47
Fair (F)	39–44
F–P	36–38
Poor (P)	28–35
P–VP	24–27
Very Poor (VP)	≤ 23

MMIs:

PRIMARY RESEARCH PAPER

A multimetric diatom index to assess the ecological status of coastal Galician rivers (NW Spain)

Cristina Delgado · Isabel Pardo · Liliana García

Development of a Bird Integrity Index: Using Bird Assemblages as Indicators of Riparian Condition

DOI: 10.1007/s00267-002-2702-y

SANDRA A. BRYCE*
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PHILIP R. KAUFMANN
U.S. Environmental Protection Agency
200 SW 35th St.
Corvallis, Oregon 97333, USA

land cover, road density, riparian cover, and stream channel and substrate conditions. In addition, we eliminated imprecise and highly correlated (redundant) metrics, leaving 13 metrics for the final index. Individual metric scores ranged continuously from 0 to 10, and index scores were weighted to range from 0 to 100. Scores were calibrated using historical species information to set expectations for the number of species expected under minimally disturbed conditions. Site scores varied from 82 for the least disturbed

Wetland habitat disturbance best predicts metrics of an amphibian index of biotic integrity

Martin A. Stapanian[a,*], Mick Micacchion[b], Jean V. Adams[c]

A Proposed Aquatic Plant Community Biotic Index for Wisconsin Lakes

STANLEY NICHOLS*
Wisconsin Geological and Natural History Survey
3817 Mineral Point Rd.
Madison, Wisconsin 53705, USA

STEVEN WEBER
1605 Lake Las Vegas Parkway
Henderson, Nevada 89011, USA

BYRON SHAW
College of Natural Resources
University of Wisconsin-Stevens Point
Stevens Point, Wisconsin 54481, USA

merged, sensitive, and exotic species, and taxa number. Each parameter was scaled based on data distributions from a statewide database, and scaled values were totaled for the AMCI value. AMCI values were grouped and tested by ecoregion and lake type (natural lakes and impoundments) to define quality on a regional basis. This analysis suggested that aquatic plant communities are divided into four groups: (1) Northern Lakes and Forests lakes and impoundments, (2) North-Central Hardwood Forests lakes and impoundments, (3) Southeastern Wisconsin Till Plains lakes, and (4) Southeastern Wisconsin Till Plains impoundments, Driftless Area Lakes, and Mississippi River Backwater lakes. AMCI values

A BENTHIC INDEX OF BIOTIC INTEGRITY (B-IBI) FOR RIVERS OF THE TENNESSEE VALLEY[1]

B. L. KERANS[2] AND JAMES R. KARR
Institute for Environmental Studies, Engineering Annex FM-12, University of Washington, Seattle, Washington 98195 USA

MMIs

- Adaptado para outras assembleias
- Tipos de ecossistemas (p.ex. lagos, rios, áreas alagadas)

Seleção de métricas biológicas
Padronização de metodologias
Características geográficas
Influência variação natural
Seleção de áreas de referência
Desenho amostral

Ecological Indicators 29 (2013) 105–110

Contents lists available at SciVerse ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

MMIs em números!

A scientometric assessment of 30 years of the Index of Biotic Integrity in aquatic ecosystems: Applications and main flaws

Renata Ruaro[a,*], Éder André Gubiani[a,b,1]

[a] Graduate Program in Conservation and Management of Natural Resources, Western Paraná State University, Rua Universitária, 2069, Bairro Universitário, Cascavel, Paraná, Brazil
[b] Research Group in Fisheries and Limnology (Gerpel), Western Paraná State University, Rua da Faculdade, 645, Toledo, Paraná 85903-000, Brazil

- Artigos que citaram Karr (1981)

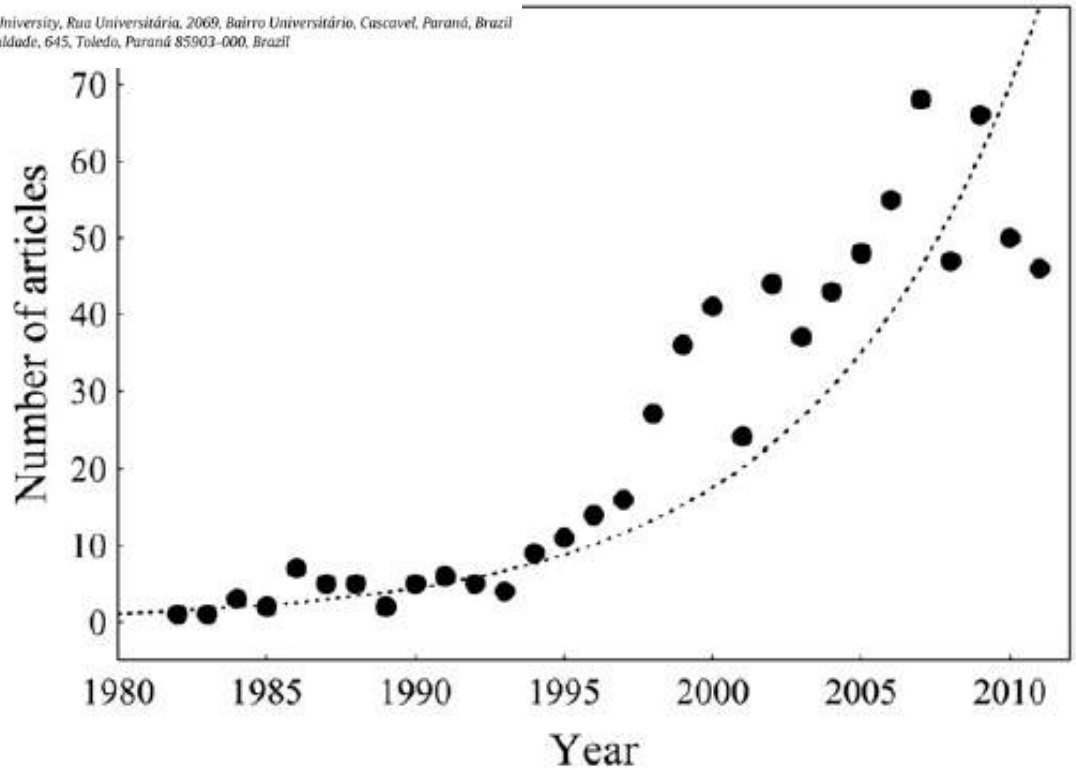


Fig. 2. Temporal trend in the number of papers that cited 'Karr, 1981'.

- MMIs em números...

***MMIs* em números!**

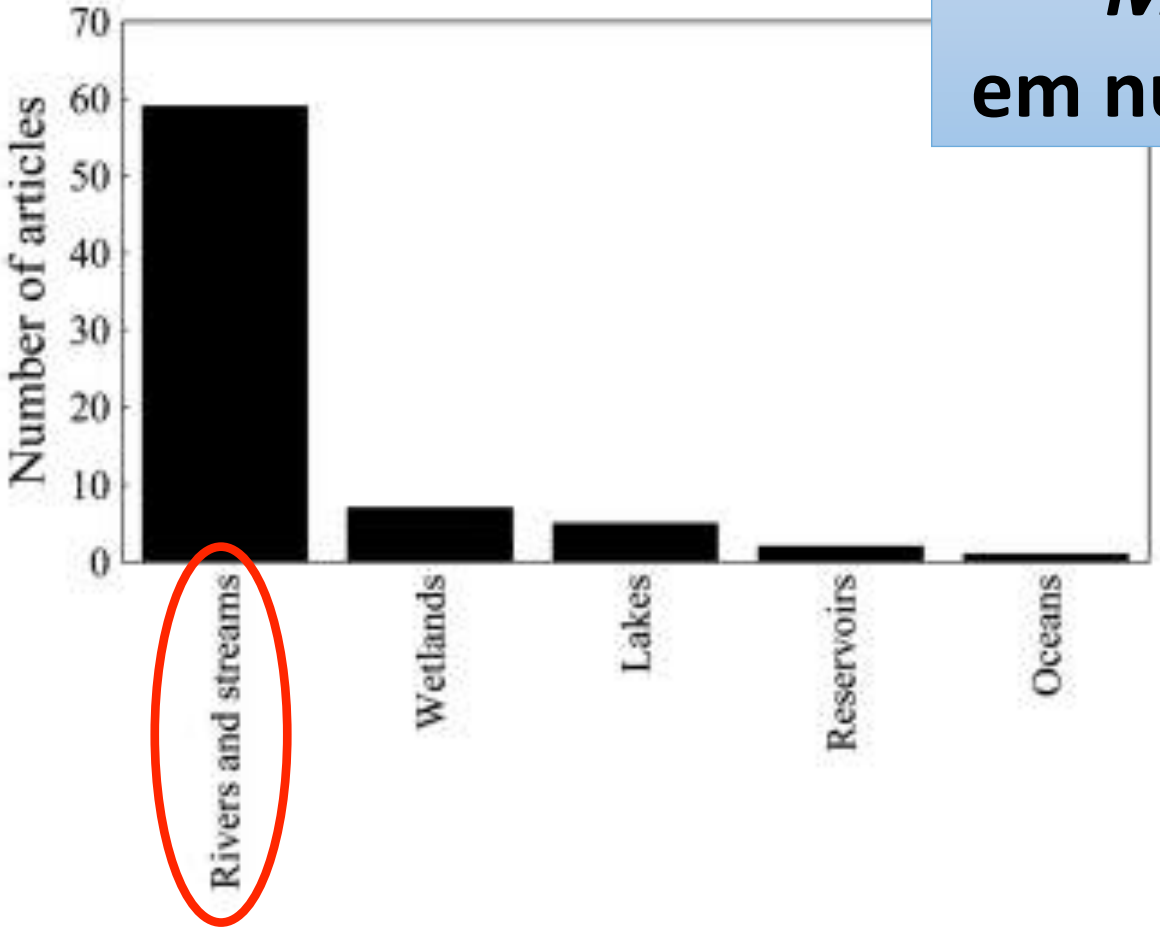


Fig. 4. Number of papers that cited 'Karr, 1981' per type of aquatic environment.

Ruaro & Gubiani, 2013

- MMIs em números...

***MMIs* em números!**

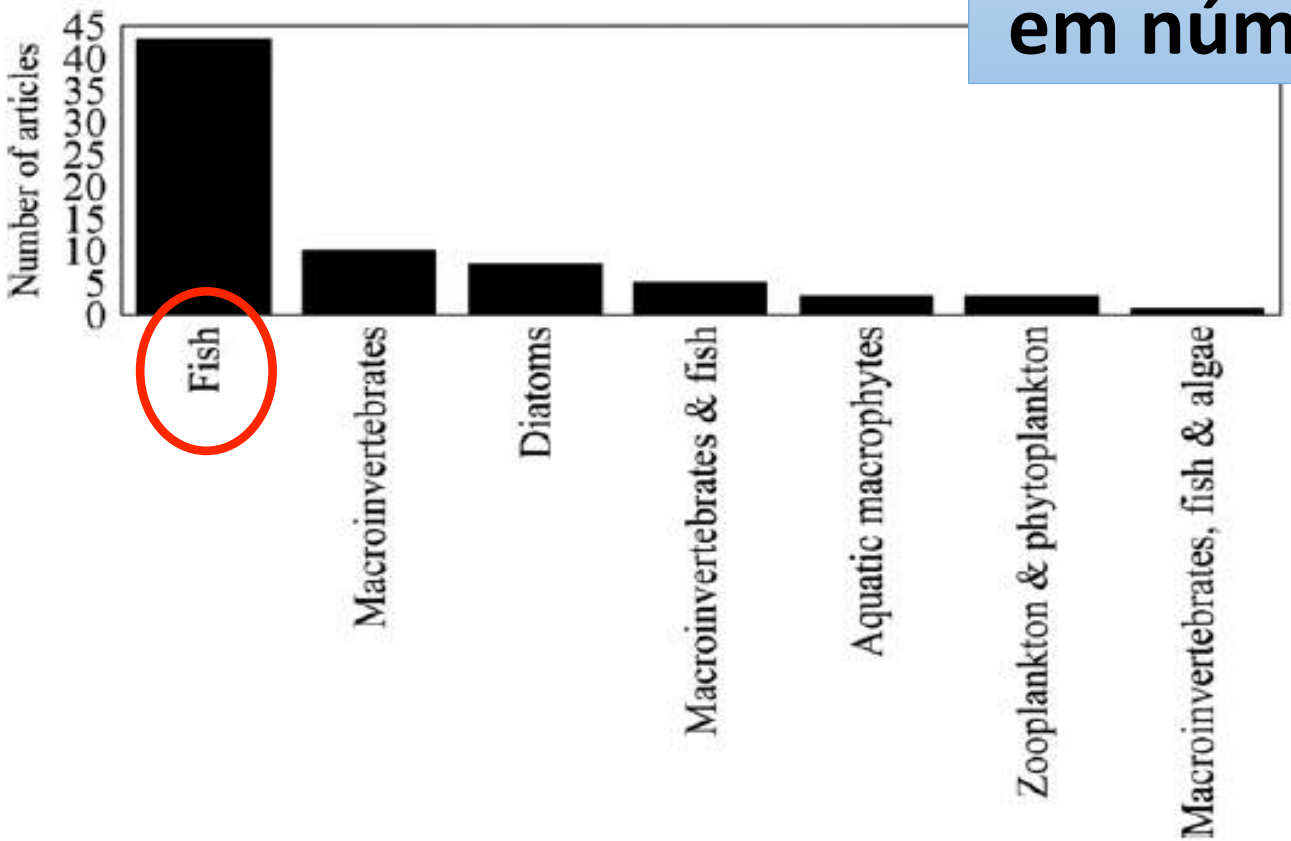


Fig. 5. Number of papers that cited 'Karr, 1981' per aquatic assemblage.

Ruaro & Gubiani, 2013

- MMIs em números...

***MMIs* em números!**

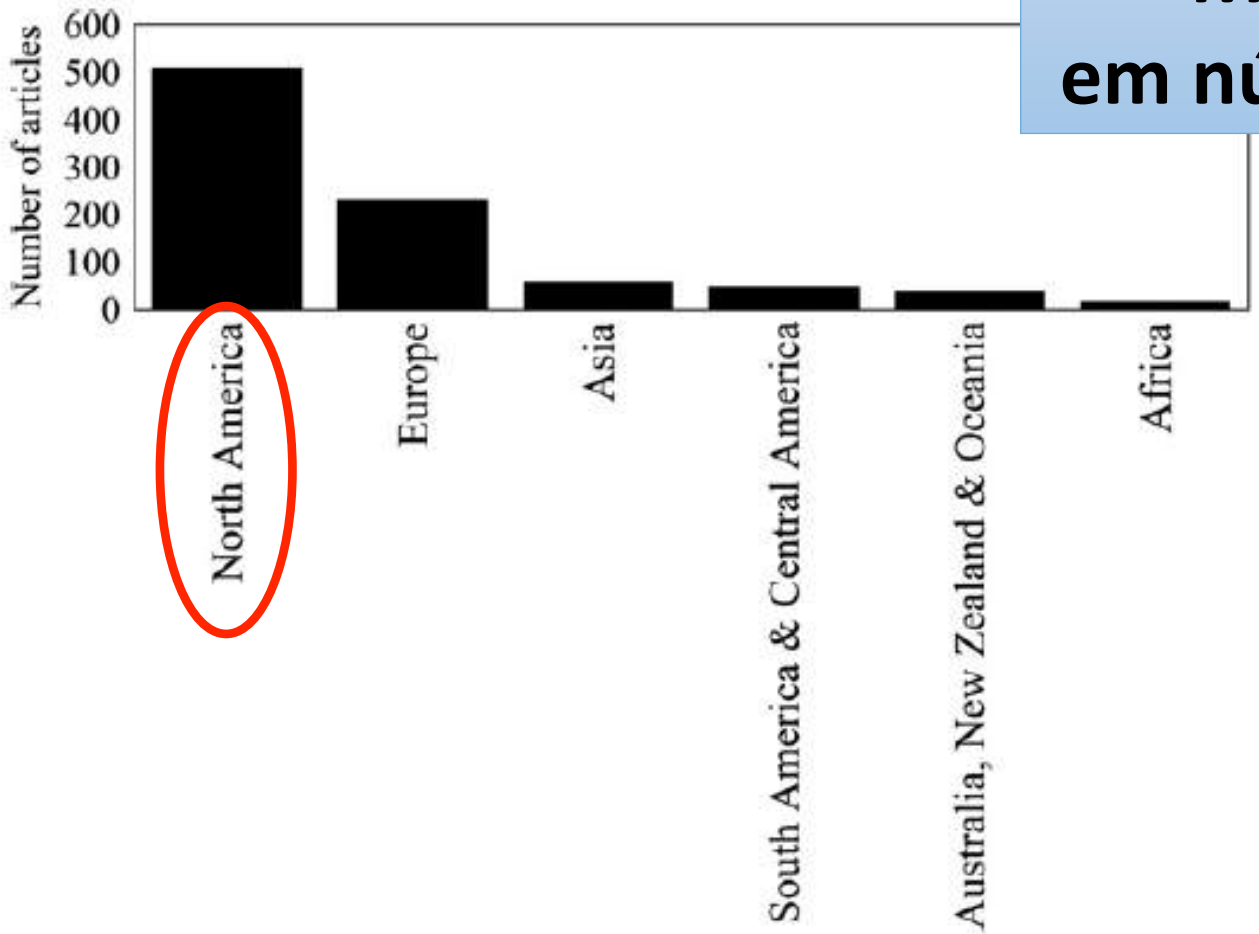


Fig. 3. Number of papers that cited 'Karr, 1981' per continent.

Ruaro & Gubiani, 2013

MMI no Brasil

- Maioria para assembleias de peixes
- Ecoregião (biomas): Amazonia, Mata Atlântica, Cerrado
- Legislação específica (EUA, Europa)
- Falta padronização de metodologias
- N amostral baixo, área amostrada pequena
- Falta de apoio financeiro
- Dificuldade de encontrar áreas de referência

Dificulta comparações, integração de resultados.

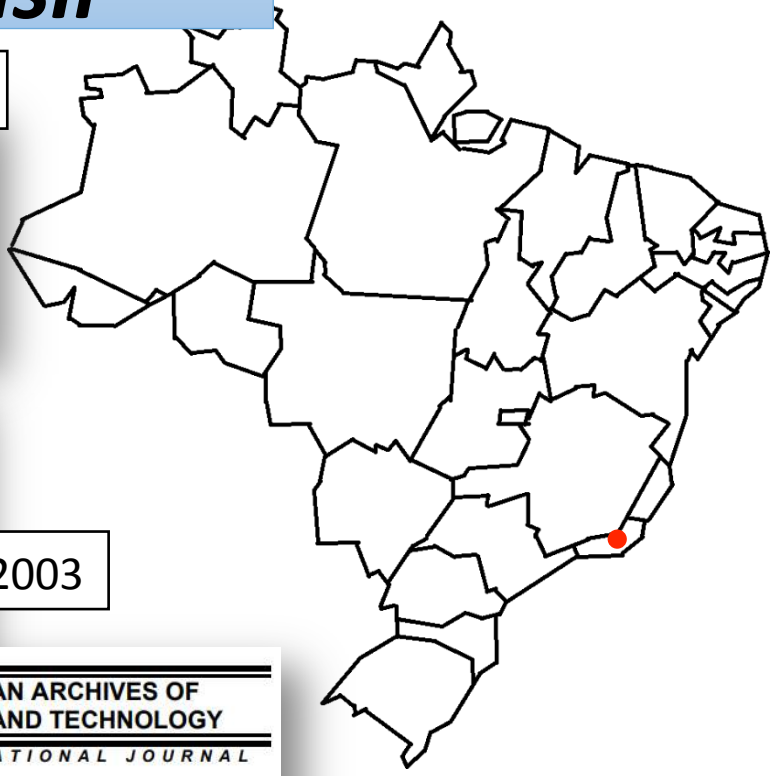
- Mas...

MMI no Brasil

1998

ADAPTAÇÃO DO ÍNDICE DE INTEGRIDADE BIÓTICA USANDO A COMUNIDADE DE PEIXES PARA O RIO PARAÍBA DO SUL

ARAÚJO, F. G.



2003

DOI: 10.1007/s00267-003-3003-9

A Preliminary Index of Biotic Integrity for Monitoring the Condition of the Rio Paraiba do Sul, Southeast Brazil

FRANCISCO GERSON ARAUJO*
ILANA FICHBERG
BENJAMIN CARVALHO TEIXEIRA PINT
MAGNA GALVAO PEIXOTO

blage was conducted from October 1998 to September 1999

2007

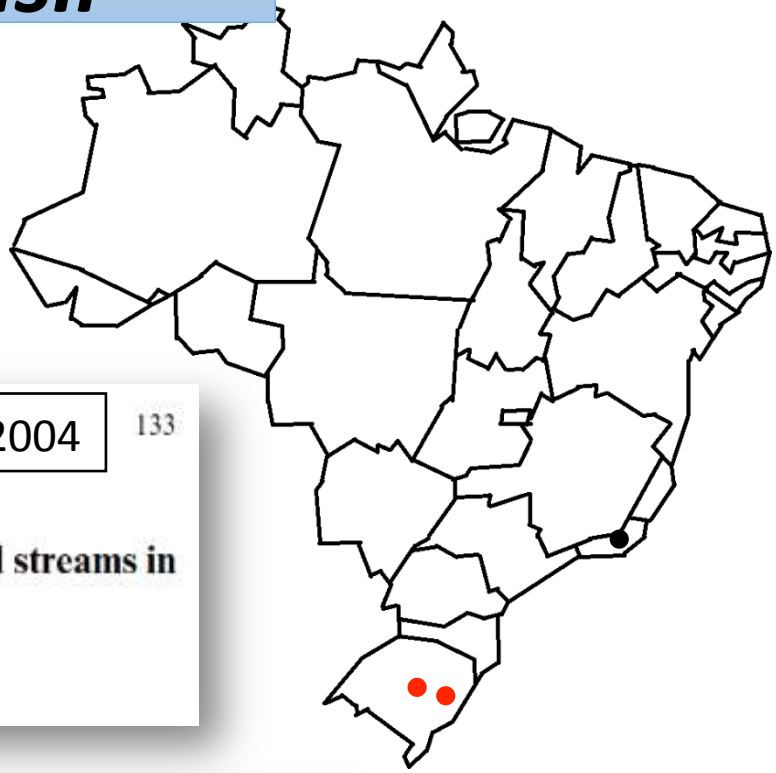
Vol.50, n. 3 : pp.489-502 May 2007
ISSN 1516-8913 Printed in Brazil

BRAZILIAN ARCHIVES OF BIOLOGY AND TECHNOLOGY
AN INTERNATIONAL JOURNAL

Assessing of Biotic Integrity of the Fish Community in a Heavily Impacted Segment of a Tropical River in Brazil

Benjamin Carvalho Teixeira Pinto and Francisco Gerson Araújo*
Laboratório de Ecologia de Peixes; Universidade Federal Rural do Rio de Janeiro; Antiga Rodovia Rio-SP Km 47; benjamin@ufrrj.br; gerson@ufrrj.br; 23.851-970; Seropédica - RJ - Brasil

MMI no Brasil



Hydrobiologia **529:** 133–144, 2004.
© 2004 *Kluwer Academic Publishers. Printed in the Netherlands.*

2004

An index of biotic integrity based on fish assemblages for subtropical streams in southern Brazil

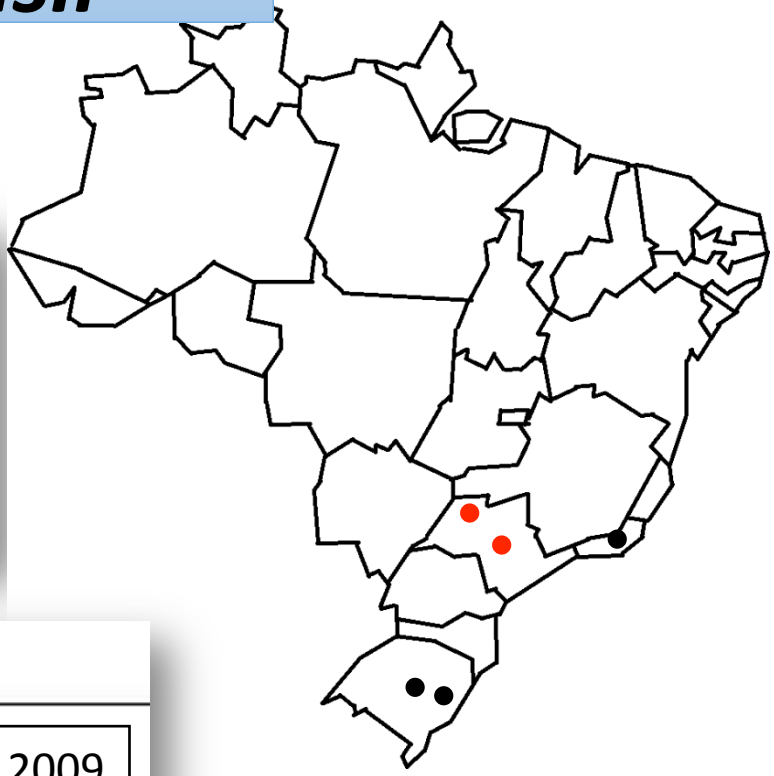
Márcia Bozzetti & Uwe H. Schulz*

The fish community as an indicator of biotic integrity of the streams in the Sinos River basin, Brazil

Costa, PF. and Schulz, UH.**

2010

MMI no Brasil



RIVER RESEARCH AND APPLICATIONS
River. Res. Applic. **23**: 595–612 (2007)
Published online 22 February 2007 in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/rra.1001

2007

ADAPTATION OF THE RESERVOIR FISH ASSEMBLAGE INDEX (RFAI) FOR ASSESSING THE BARRA BONITA RESERVOIR (SÃO PAULO, BRAZIL)

M. L. PETESSE ,[a] M. PETRERE JR. [a*] and R. J. SPIGOLON [b]
[a] *UNESP- Departamento de Ecologia, CP 199, 13506-900—Rio Claro (SP), Brazil*
[b] *APTA—Agência Paulista de Tecnologia e Agronegócios, Avenida Pedro Ometto, 874, 17340-000—Barra Bonita (SP), Brazil*

Hydrobiologia (2009) 623:173–189
DOI 10.1007/s10750-008-9656-x

PRIMARY RESEARCH PAPER

2009

A fish-based biotic integrity index for assessment of lowland streams in southeastern Brazil

Lilian Casatti · Cristiane P. Ferreira · Francisco Langeani

MMI no Brasil

Hydrobiologia (2007) 575:83–94
DOI 10.1007/s10750-006-0286-x

2007

PRIMARY RESEARCH PAPER

A multimetric index based on benthic macroinvertebrates for evaluation of Atlantic Forest streams at Rio de Janeiro State, Brazil

Darcilio F. Baptista · Daniel F. Buss · Mariana Egler · Alexandre Giovanelli · Mariana P. Silveira · Jorge L. Nessimian

Ecological Indicators 11 (2011) 1584–1593

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

2011

Towards rapid bioassessment of wadeable streams in Brazil: Development of the Guapiaçu-Macau Multimetric Index (GMMI) based on benthic macroinvertebrates

Renata B.S. Oliveira[a,b,*], Darcilio F. Baptista[b], Riccardo Mugnai[b,c], Carolina M. Castro[b], Robert M. Hughes[d,e]

[a] Programa de Pós-Graduação em Ecologia, Universidade Federal do Rio de Janeiro, Cidade Universitária, CCS bloco A s/a 1-08 Ilha do Fundão, 21941-540 Rio de Janeiro, RJ, Brazil
[b] Environmental Health Evaluation and Promotion Group, LAPSA/IOC/FIOCRUZ, Av. Brasil 4365, Manguinhos, Pav. Lauro Travassos, 21045-900 Rio de Janeiro, RJ, Brazil
[c] Programa de Pós-graduação em Ensino em Biociências, FIOCRUZ, Av. Brasil 4365, Manguinhos, 21045-900 Rio de Janeiro, RJ, Brazil
[d] Department of Fisheries and Wildlife, Oregon State University and Amnis Opes Institute, 200 SW35th Street, Corvallis, OR 97333 USA
[e] Programa de Pós-Graduação em Ecologia Aplicada, Departamento de Biologia, Universidade Federal de Lavras, Lavras, MG, Brazil

MMI no Brasil

Development of a benthic multimetric index for the Serra da Bocaina bioregion in Southeast Brazil

2012

Baptista, DF.[a], Henriques-Oliveira AL.[a,b], Oliveira, RBS.[a], Mugnai, R.[a], Nessimian, JL.[b] and Buss, DF.[a]*

[a]Laboratório de Avaliação e Promoção da Saúde Ambiental - LAPSA, IOC/FIOCRUZ. Av. Brasil 4365, CEP 21045-900 Manguinhos, RJ, Brazil
[b]Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, CCS, UFRJ, Ilha do Fundão, CP 68044, CEP 21970-944 Rio de Janeiro, RJ, Brazil
**e-mail: darcilio@ioc.fiocruz.br*

Received June 19, 2012 – Accepted July 30, 2012 – Distributed August 31, 2013
(With 4 figures)

Ecological Indicators 34 (2013) 136–148

Contents lists available at SciVerse ScienceDirect

Ecological Indicators

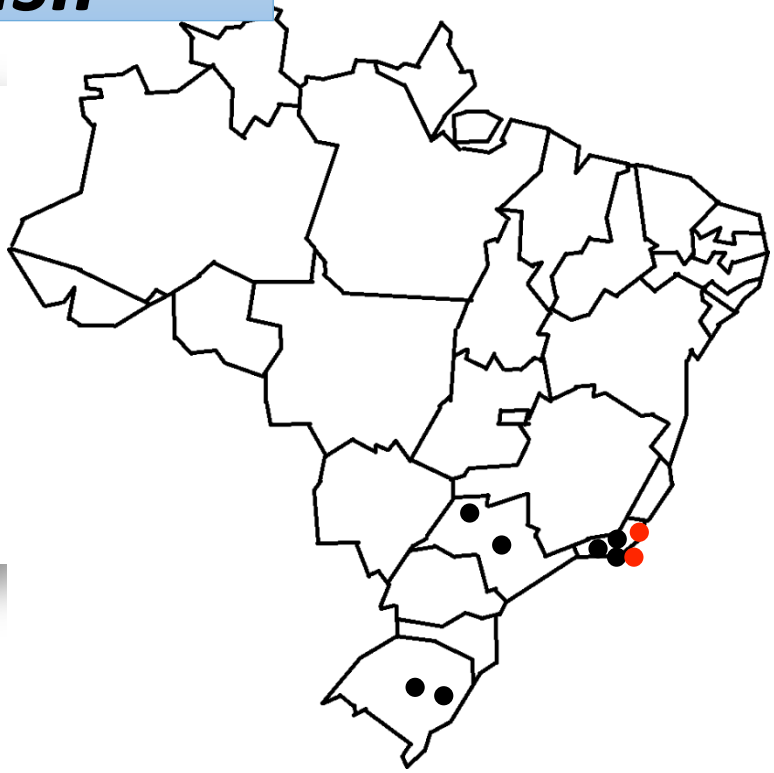
journal homepage: www.elsevier.com/locate/ecolind

2013

Assessment of biotic condition of Atlantic Rain Forest streams: A fish-based multimetric approach

Bianca de Freitas Terra[a,*], Robert M. Hughes[b], Marcio Rocha Francelino[c], Francisco Gerson Araújo[a]

[a] Laboratório de Ecologia de Peixes, Departamento de Biologia Animal, Instituto de Biologia, Universidade Federal Rural do Rio de Janeiro, Rodovia 465, km 7, CEP 23897-000, Seropédica, Rio de Janeiro, Brazil
[b] Amnis Opes Institute and Department of Fisheries & Wildlife, Oregon State University, 200 SW 35th Street, Corvallis, OR 97333, USA
[c] Laboratório de Geoprocessamento Ambiental, Departamento de Silvicultura, Instituto de Florestas, Universidade Federal Rural do Rio de Janeiro, Rodovia 465, km 7, CEP 23897-000, Seropédica, Rio de Janeiro, Brazil



MMI no Brasil

Ecological Indicators 18 (2012) 118–125

Contents lists available at SciVerse ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

2012

A macroinvertebrate multimetric index to evaluate the biological cond streams in the Central Amazon region of Brazil

S.R.M. Couceiro[a,b,*], N. Hamada[b], B.R. Forsberg[c], T.P. Pimentel[c], S.L.B. Luz[d]

Acta Limnologica Brasiliensia

Publication of the Brazilian Association of Limnology

Original Article

Acta Limnologica Brasiliensia, 2016, vol. 28, e22

http://dx.doi.org/10.1590/S2179-975X1216

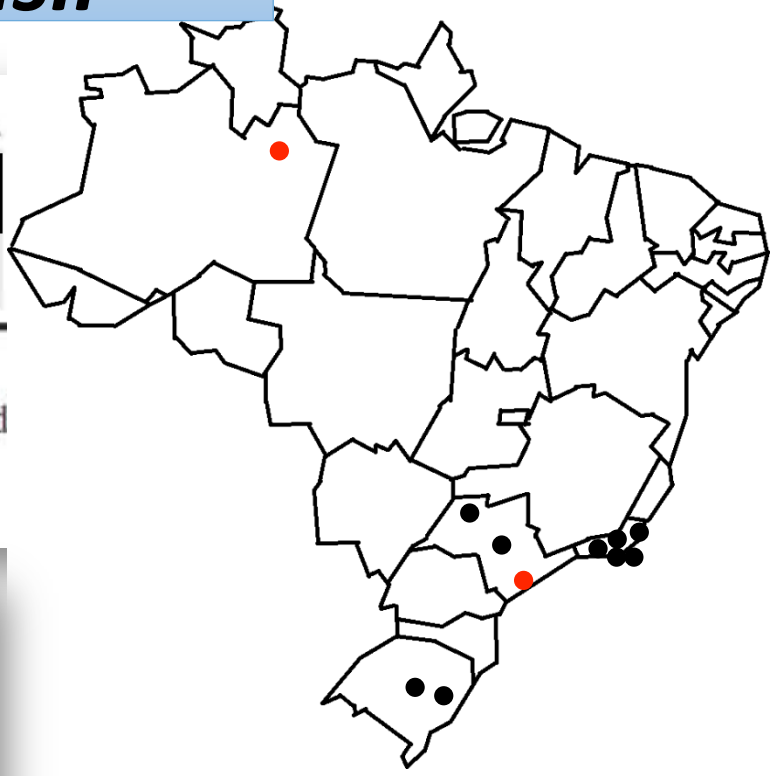
ISSN 0102-6712

2016

Fish-based Index of Biotic Integrity for wadeable streams from Atlantic Forest of south São Paulo State, Brazil

Índice de Integridade Biótica utilizando a comunidade de peixes para riachos de cabeceira que cruzam a Mata Atlântica do sul do estado de São Paulo, Brasil

Mauricio Cetra[1*] and Fabio Cop Ferreira[2]



MMI no Brasil

Ecological Indicators 69 (2016) 606–616

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Incorporating natural variability in the bioassessment of stream condition in the Atlantic Forest biome, Brazil

Priscilla S. Pereira[a], Natália F. Souza[a], Darcilio F. Baptista[a], Jaime L.M. Oliveira[b], Daniel F. Buss[a,*]

2016

Ecological Indicators 64 (2016) 132–141

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Development of a benthic macroinvertebrate multimetric index (MMI) for Neotropical Savanna headwater streams

Diego R. Macedo[a,*], Robert M. Hughes[b], Wander R. Ferreira[a], Kele R. Firmiano[a], Deborah R.O. Silva[a], Raphael Ligeiro[c], Philip R. Kaufmann[d], Marcos Callisto[a]

2016

MMI no Brasil

Ecological Engineering 97 (2016) 535–544

Contents lists available at ScienceDirect

Ecological Engineering

journal homepage: www.elsevier.com/locate/ecoleng

Selection of reference lakes and adaptation of a fish multimetric index of biotic integrity to six amazon floodplain lakes

Maria Letizia Petesse[a,*], Flávia Kelly Siqueira-Souza[b], Carlos Edwar de Carvalho Freitas[b], Miguel Petrere Jr.[c,d]

2016

Ecological Indicators 77 (2017) 386–396

Contents lists available at ScienceDirect

Ecological Indicators

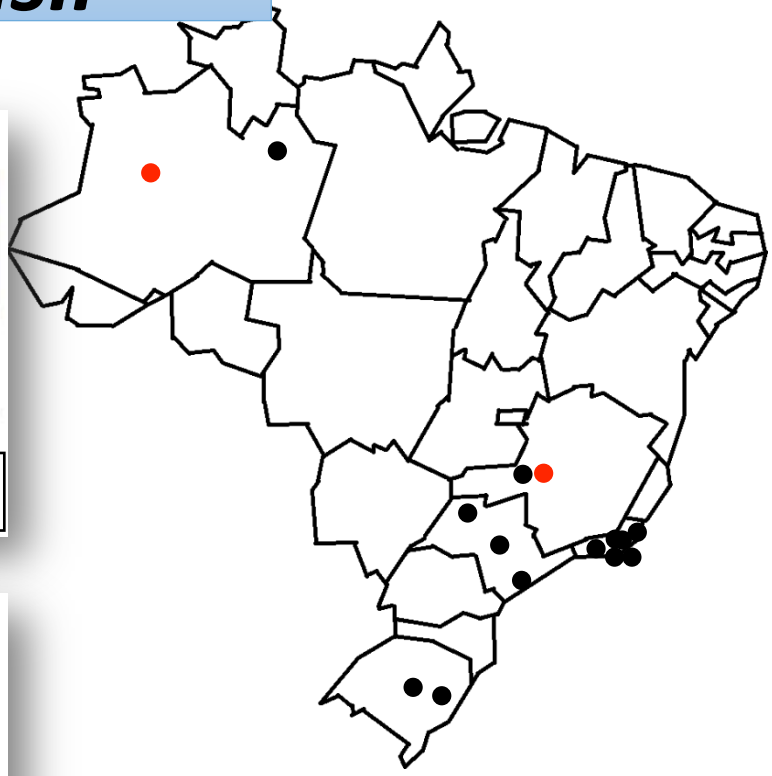
journal homepage: www.elsevier.com/locate/ecolind

Original articles

A fish-based multimetric index for Brazilian savanna streams

Débora Reis de Carvalho[a,*], Cecília Gontijo Leal[a,b], Nara Tadini Junqueira[a], Míriam Aparecida de Castro[a], Daniela Cristina Fagundes[a], Carlos Bernardo Mascarenhas Alves[c], Robert M. Hughes[d], Paulo Santos Pompeu[a]

2017



MMI no Brasil

Ecological Indicators 78 (2017) 48–61

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

A multi-assemblage, multi-metric biological condition index for eastern Amazonia streams

Kai Chen[a,b], Robert M. Hughes[c,*], Janaina G. Brito[d], Cecilia G. Leal[e,f,g], Rafael P. Leitão[d,h], José M.B. de Oliveira-Júnior[i], Vívian C. de Oliveira[d], Karina Dias-Silva[d], Silvio F.B. Ferraz[j], Joice Ferreira[k], Neusa Hamada[d], Leandro Juen[l], Jorge Nessimian[m], Paulo S. Pompeu[e], Jansen Zuanon[d]

2017

Ecological Indicators 81 (2017) 514–525

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

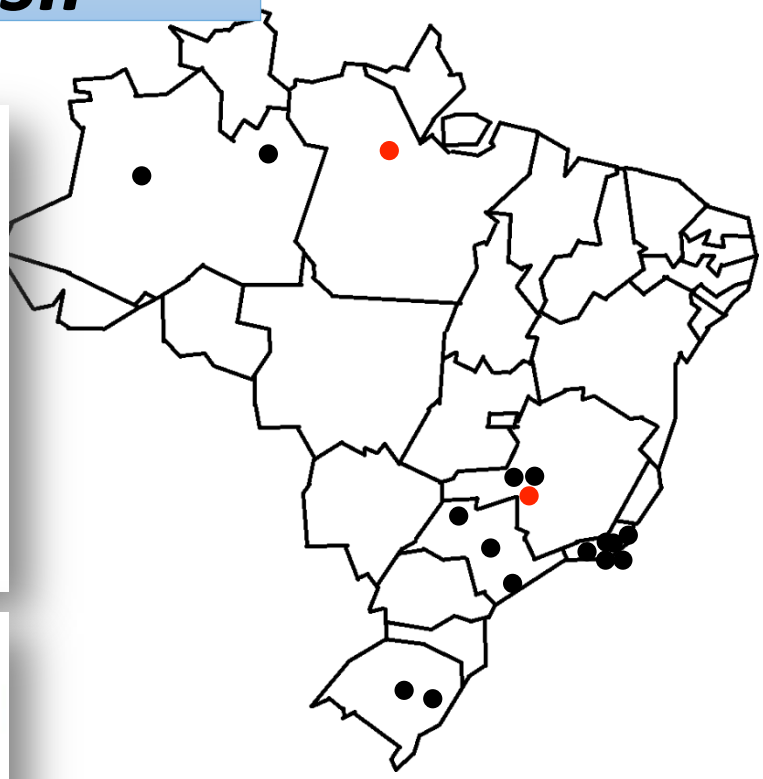
Original Articles

An improved macroinvertebrate multimetric index for the assessment of wadeable streams in the neotropical savanna

Déborah R.O. Silva[a,*], Alan T. Herlihy[b], Robert M. Hughes[c], Marcos Callisto[a]

[a] Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas, Departamento de Biologia Geral, Laboratório de Ecologia de Bentos, Av. Antônio Carlos 6627, CP 486, CEP 30161-970, Belo Horizonte, Minas Gerais, Brazil
[b] Oregon State University, Department of Fisheries & Wildlife, 104 Nash Hall 97331-3803, Corvallis, OR, USA
[c] Amnis Opes Institute and Oregon State University, Department of Fisheries & Wildlife, 104 Nash Hall 97331-3803, Corvallis, OR, USA

2017



- *Lacunas em outros biomas!*
- *MG na vanguarda*
- *(RJ + SP + RS)*

MMI no Brasil

Grandes avanços e sucesso no desenvolvimentos de índices!

Desafios:

- Caráter institucional
- padronização de métodos (em nível nacional, mundial)
- limitação quanto a aplicabilidade
- **Desenvolvimento de novos índices x aplicação de índices já publicados??**

Integridade Biótica e as contribuições do GT-487

Desenvolvimentos de Índices Multimétricos:

Ecological Indicators 64 (2016) 132–141

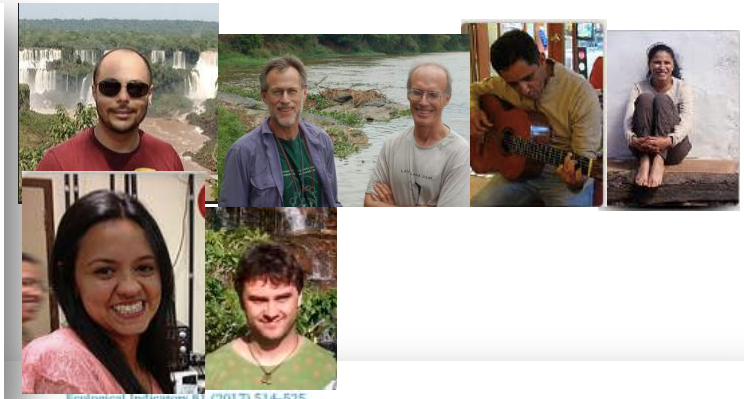
Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Development of a benthic macroinvertebrate multimetric index (MMI) for Neotropical Savanna headwater streams

Diego R. Macedo[a,*], Robert M. Hughes[b], Wander R. Ferreira[a], Kele R. Firmiano[a], Deborah R.O. Silva[a], Raphael Ligeiro[c], Philip R. Kaufmann[d], Marcos Callisto[a]



Ecological Indicators 81 (2017) 514–525

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Original Articles

An improved macroinvertebrate multimetric index for the assessment of wadeable streams in the neotropical savanna

Déborah R.O. Silva[a,*], Alan T. Herlihy[b], Robert M. Hughes[c], Marcos Callisto[a]

[a] Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas, Departamento de Biologia Geral, Laboratório de Ecologia de Bentos, Av. Antônio Carlos 6627, CP 486, CEP 30161-970, Belo Horizonte, Minas Gerais, Brazil

[b] Oregon State University, Department of Fisheries & Wildlife, 104 Nash Hall 97331-3803, Corvallis, OR, USA

[c] Amnis Opes Institute and Oregon State University, Department of Fisheries & Wildlife, 104 Nash Hall 97331-3803, Corvallis, OR, USA

Integridade Biótica e as contribuições do GT-487

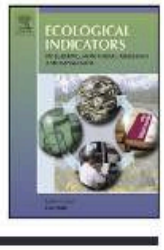
Definição de áreas de referência:

Contents lists available at SciVerse ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

2013



Original Articles

Defining quantitative stream disturbance gradients and the additive role of habitat variation to explain macroinvertebrate taxa richness

Raphael Ligeiro[a,*], Robert M. Hughes[b], Philip R. Kaufmann[c], Diego R. Macedo[a,d], Kele R. Firmiano[a], Wander R. Ferreira[a], Déborah Oliveira[a], Adriano S. Melo[e], Marcos Callisto[a]

- Informações regionais: Usos do solo nas bacias de drenagem (% agricultura, % pasto, % urbano)
- Informações locais: Evidências de alterações humanas em leitos de riachos e em suas zonas ripárias (presença de lixo, estradas, pasto, canos esgotos, etc)

Integridade Biótica e as contribuições do GT-487

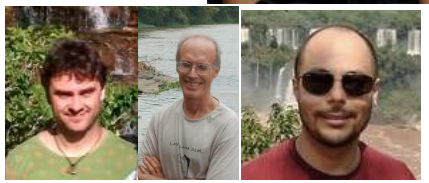
Definição de áreas de referência:

Marine and Freshwater Research
https://doi.org/10.1071/MF16381

2017

Regionalisation is key to establishing reference conditions for neotropical savanna streams

Isabela Martins[A,E], *Raphael Ligeiro*[B], *Robert M. Hughes*[C], *Diego R. Macedo*[D] *and Marcos Callisto*[A]



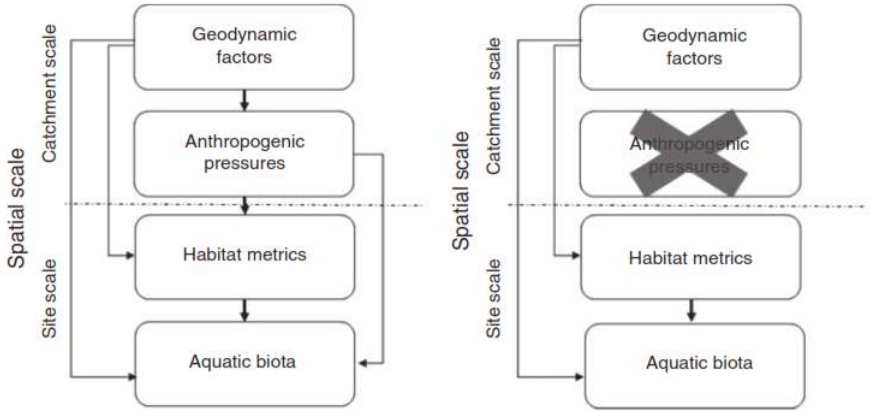
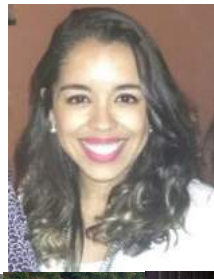


Fig. 1. In the absence of anthropic pressures, the geodynamic factors directly influence the metrics of local habitat, which is reflected in the structure and composition of the aquatic biota (adapted from Macedo *et al.* 2014).

Na ausência de pressão antrópica, fatores geodinâmicos influenciam diretamente métricas de habitat e a biota aquática

Integridade Biótica e as contribuições do GT-487

Avaliações de condições ecológicas em *reservatórios*:



J. Limnol., 2017; 76(2): 240-252
DOI: 10.4081/jlimnol.2016.1547
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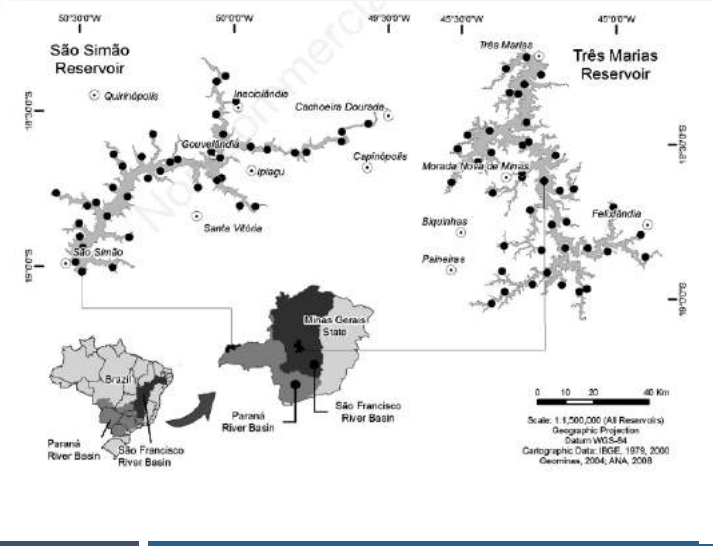
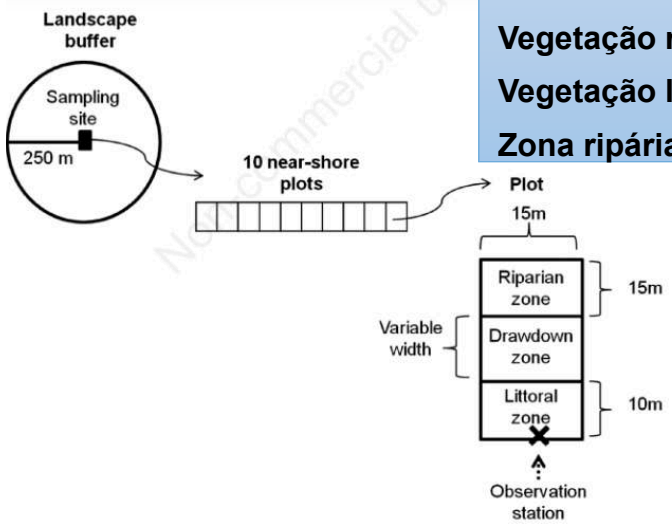
ORIGINAL ARTICLE

2017

Assessment of disturbance at three spatial scales in two large tropical reservoirs

Letícia de MORAIS,[1] Bárbara de OLIVEIRA SANCHES,[2] Gilmar B. SANTOS,[2] Philip R. KAUFMANN,[3] Robert M. HUGHES,[4] Joseline MOLOZZI,[5] Marcos CALLISTO[1]





Distúrbio humano (RDis_IX)

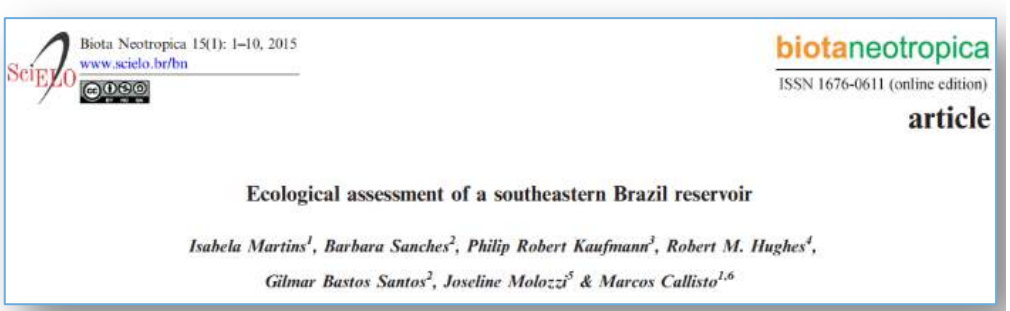
Vegetação ripária (RVegQ)

Vegetação litorânea (LitCvrQ)

Zona ripária + zona litorânea (LitRipCvQ)

Integridade Biótica e as contribuições do GT-487

Avaliações de condições ecológicas em *reservatórios:*



Biota Neotropica 15(1): 1–10, 2015
www.scielo.br/bn
biotaneotropica
ISSN 1676-0611 (online edition)
article

Ecological assessment of a southeastern Brazil reservoir

Isabela Martins[1], Barbara Sanches[2], Philip Robert Kaufmann[3], Robert M. Hughes[4], Gilmar Bastos Santos[2], Joseline Molozzi[5] & Marcos Callisto[1,6]

Gradiente Disturbio Integrado UHE Nova Ponte

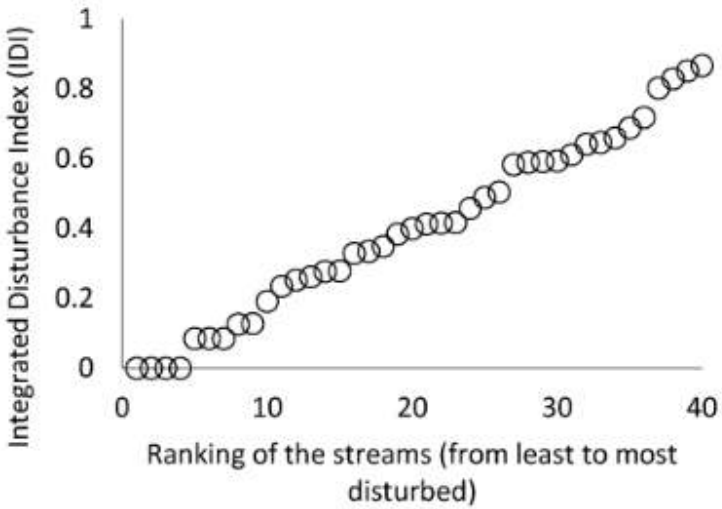


Table 1. Metrics used to calculate the LDI (Local Disturbance Index), calculated based on Ligeiro, et al. (2013).

Metric	Description	Min	Med	Max
Pdraw	Ratio of horizontal drawdown distance divided by the field plot size (15m).	0.4	0.8	1.0
rviWoody	Summed coverage of woody vegetation in the canopy, understory and ground cover.	0.0	0.7	0.9
rvfcCanBig	Mean proportional areal cover of large diameter trees averaged over the 10 plots.	0.0	0.0	0.0
rvfcGrdBare	Mean proportional areal cover of bare ground (soil) averaged over the 10 plots.	0.0	1.0	1.0
hifpAnyCirca	Proportion of plots with at least one type of human activity.	0.0	0.3	0.7
hiiAg	Proportion of plots with agricultural activities.	0.0	0.1	0.3
hiiNonAg	Proportion of plots with non-agricultural activities.	0.0	0.3	0.9
hiiAll	Sum of the proportions of plots with agricultural and non-agricultural activities.	0.0	0.3	1.0
hiiAllCirca	Proportion between agricultural and non-agricultural activities.	0.2	0.9	1.0

Métricas LDI

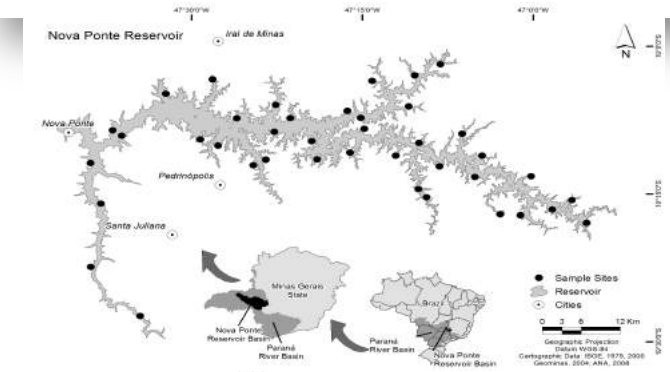
Integridade Biótica e as contribuições do GT-487

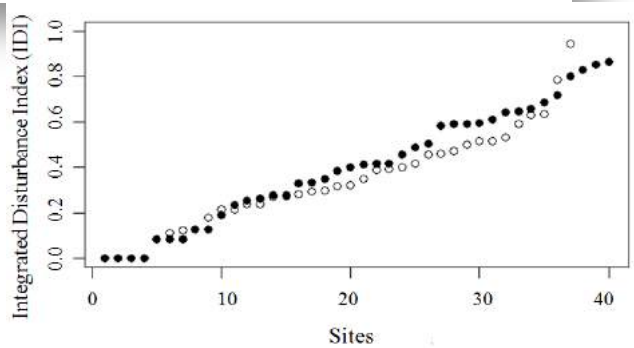
Avaliações de condições ecológicas em *reservatórios:*

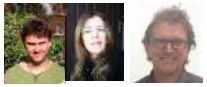
Effects of an atypical drought on the benthic macroinvertebrate community in a tropical reservoir

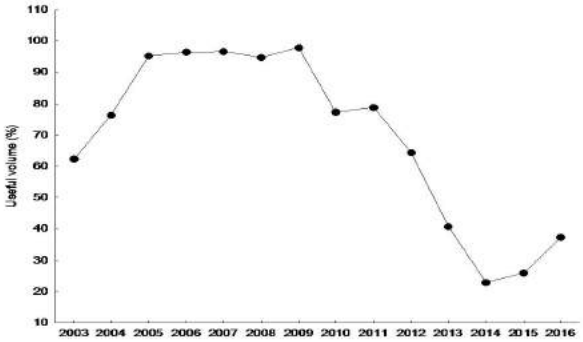
Maria José P. Anacléto[1*], Raphael Ligeiro[2], José Etham de L. Barbosa[3], Joseline Molozzi[4] & Marcos Callisto[1]

Biota Neotropica, *in press*









Variables	2010	2014	*t*
% Cobbles (64 - 250 mm)	16.42 ± 25.73	0.00 ± 0.00	4.036*
% Gravel (2 - 63 mm)	8.59 ± 15.38	1.98 ± 5.46	2.449*
% Fine sand (0.1 - 0.249 mm)	13.02 ± 8.83	18.89 ± 10.15	-2.594*
% Very Fine Sand (0.125 - 0.062 mm)	13.02 ± 8.83	43.65 ± 15.42	-3.933*
Secchi (m)	3.13 ± 1.45	1.47 ± 1.10	7.994*
pH	7.56 ± 0.19	7.94 ± 0.52	-3.683*
Conductivity (µS cm^{-1})	22.80 ± 4.21	2.77 ± 1.47	36.919*
Turbidity (UNT)	2.53 ± 1.47	33.27 ± 49.24	-3.947*
Chlorophyll *a* (µg L^{-1})	0.86 ± 0.43	1.37 ± 1.28	-2.233*
Total alkalinity (mEq L^{-1} CO_2)	155.35 ± 33.16	234.58 ± 83.74	-6.437*

Integridade Biótica e as contribuições do GT-487

Condições ecológicas em reservatórios: espécies exóticas

Ecological Indicators 75 (2017) 279–285

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Original Articles

Invasive bivalves increase benthic communities complexity in neotropical reservoirs

Marden Seabra Linares[a,*,1], Marcos Callisto[a,1], João Carlos Marques[b]

- Alterações de habitat físico (Engenheiros de ecossistema)
- Alterações na composição taxonômica assembléias bentônicas
- Alteração na estrutura energética (Eco-exergia)

Integridade Biótica e as contribuições do GT-487

Abordagem diversidade funcional

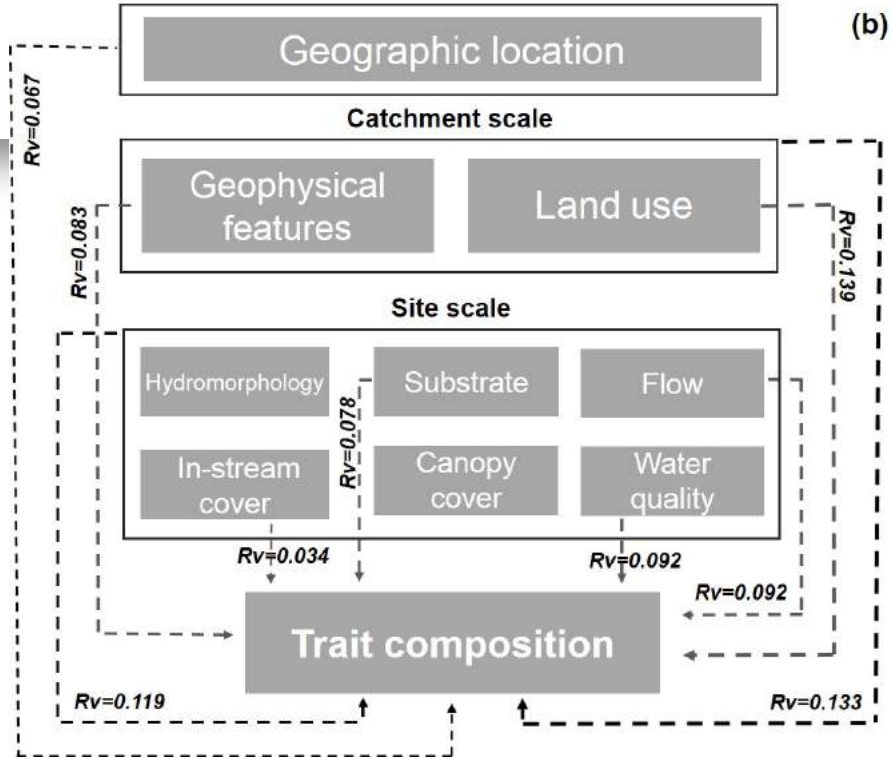
ORIGINAL ARTICLE

WILEY Freshwater Biology

Landscape variables influence taxonomic and trait composition of insect assemblages in Neotropical savanna streams

Diego M. P. de Castro[1] | Sylvain Dolédec[2] | Marcos Callisto[1]

Diferentes usos do solo influenciam a composição de traits



Integridade Biótica e as contribuições do GT-487

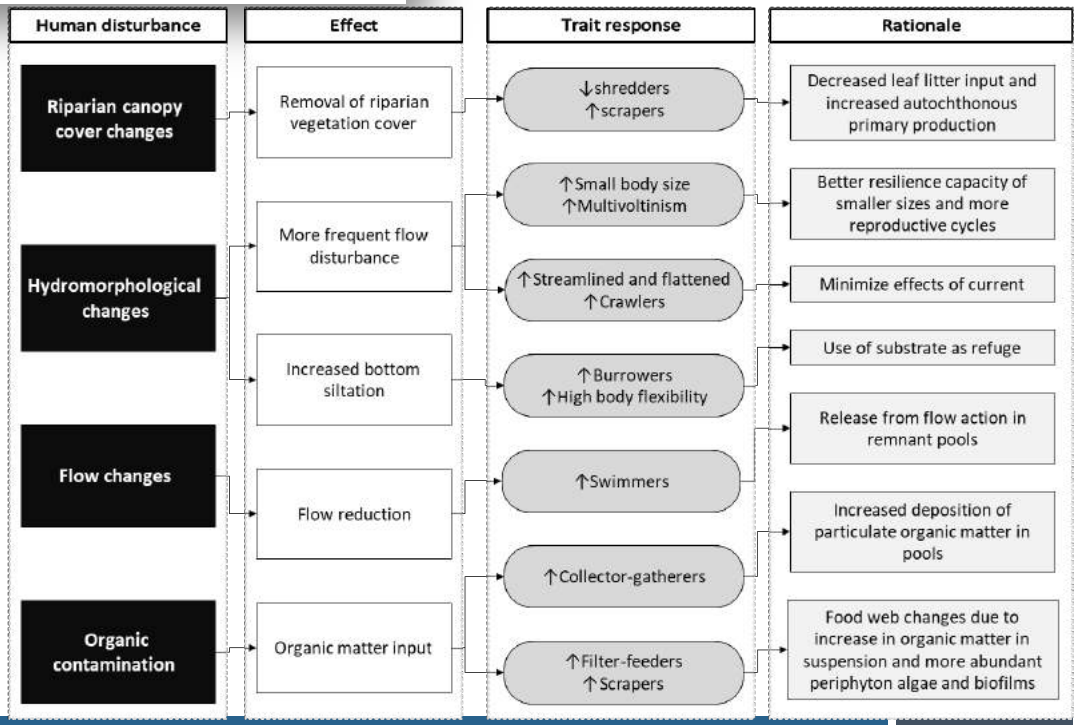
Abordagem diversidade funcional

Land cover disturbance homogenizes aquatic insect functional structure in Neotropical savanna streams

Diego M. Parreira de Castro[1*], Sylvain Dolédec[2], Marcos Callisto[1]

Ecological Indicators, *in press*

Uso antrópico do solo homogeniza comunidades de insetos aquáticos



"Take-home message"

MMI como ferramenta útil para:

1) avaliar e diagnosticar condições ecológicas;
2) detectar áreas potenciais para práticas de manejo e conservação;
3) identificar os principais estressores que alteram a integridade ecológica;
4) proporcionar uma base ecológica para a gestão de bacias hidrográficas.

base para o desenvolvimento de políticas e programas de monitoramento para melhor avaliar os recursos hídricos e subsidiar a gestão de bacias hidrográficas