Water diversion in Brazil threatens biodiversity

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Water diversion in Brazil threatens biodiversity: Potential problems and alternatives

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Water diversion in Brazil threatens biodiversity: Potential problems and alternatives

Abstract

Construction of water diversions is a common response to the increasing demands for freshwater, often resulting in benefits to communities but with the risk of multiple environmental, economic and social impacts. Water-diversion projects can favor massive introductions and accelerate biotic homogenization. This study provides empirical evidence on the consequences of a Proposed Law intended to divert water from two large and historically isolated river basins in Brazil: Tocantins to São Francisco. Compositional similarity (*CS*) and β-diversity were quantified encompassing aquatic organisms: mollusks, zooplankton, crustaceans, insects, fishes, amphibians, reptiles, mammals and plants. For *CS* we *i*) considered only native species, and *ii*) simulated the introduction of non-natives and assumed the extinction of threatened species due to this water-diversion project. We highlight the environmental risks of such large-scale projects, which are expected to cause impacts on biodiversity linked to bioinvasion and homogenization, and we recommend alternatives in order to solve water-demand conflicts.

Keywords

Animal conservation; Biological conservation; Biological invasions; Biotic interchange; Environmental impacts; Inter-basin water transfer

INTRODUCTION

Human demand for water for domestic consumption, agriculture, and navigation development has historically led nations to propose actions that can prove unsustainable over long periods (Bagla 2014; Brito and Magalhães 2017). Construction of water-diversion schemes is a common response to the increasing demand for freshwater (Liu et al. 2015; Zhang et al. 2015). This ancient human practice connects one river basin to another through artificial canals, often resulting in positive benefits to communities, but with generally ignored risks to the environmental, economic and social spheres in both the short and the long term (Moreira-Filho and Buckup 2005; Zhang et al. 2018). Water diversions can cause significant hydrological deficits and major changes in the dynamics of the river flow in the donor basin, in addition to habitat destruction, collapse of fisheries, spread of parasites, transmission of diseases, loss of genetic variability between populations, biological invasions, species extinction, and water pollution (Liang et al. 2012; Vitule et al. 2015; Merciai et al. 2017; Qin et al. 2018). Here, together with habitat alteration caused by water-diversion projects, another major ecological effect was highlighted, the concomitant indiscriminate and unplanned biotic interchange between basins. Artificial canals allow the dispersal of isolated taxa or populations between historically separated basins, resulting in multiple introductions of different organisms that otherwise would only very rarely overcome geological barriers (Zhan et al. 2015; Gallardo and Aldridge 2018).

38 Major water-diversion projects have been implemented around the world, such as China's South-to-North diversion and South Africa's Orange-Fish-Sundays project (Woodford et al. 2013; Zhan et al. 2015). In addition to water diversions that are already in operation, there are plans to connect countless other river basins worldwide. For

example, in North America around 30 water-diversion projects are planned (Shumilova et al. 2018).

Similarly, water-diversion projects in Brazil have been developed in various regions of the country without appropriate consideration of environmental issues, the importance of which are not recognized owing to a lack of political motivation (Andrade et al. 2011; Vitule et al. 2015). Negative impacts resulting from the interchange of water between river basins are already apparent, with the introduction of non-native species (notably fishes) one of the most evident impacts (e.g. Moreira-Filho and Buckup 2005; Ramos et al. 2018). More astonishingly, novel large-scale projects are still being undertaken (Andrade et al. 2011; Shumilova et al. 2018), disregarding mechanisms for preventing biological invasions and ignoring policies that could preserve biodiversity and riverine ecosystem services for future generations.

An old and controversial project is currently being advanced in Brazil with the aim of connecting the Tocantins and São Francisco River basins. The purpose of this large-scale project is to allow navigation between the basins and to increase the water supply in Brazil’s semi-arid Northeast region. The Tocantins-São Francisco water-diversion project (hereafter TO-SF-WDP) has been opposed by local people in the donor basin and has been questioned by a number of politicians, even including those who are not usually sympathetic about environmental protection measures (Online Reference 1 – Supplementary Material). Here we provide empirical evidence showing that the TO-SF-WDP would constitute a serious setback for environmental policies in Brazil. It would jeopardize aquatic ecosystems in the Amazon and Tocantins River basins, as well as cause additional damage to the São Francisco River (Brazil’s third largest river basin), which is one of the most threatened rivers in South America, mostly due to the diversion of its waters that is already underway (Moreira-Filho and Buckup 2005; Brito and Magalhães 2017).

PROPOSED LAW (PL) 6569/2013

The proposed law (PL) 6569/2013 is intended to divert water from the Tocantins River (Amazon River basin) to the Preto River (São Francisco River basin) (Fig. 1). The TO-SF-WDP would create a waterway for navigation between the basins and deliver water to the already-diverted São Francisco River (Online Reference 2 – Supplementary Material). The project includes plans for constructing ~200 km of canals in a network totaling 733 km that would cross several “conservation units” (protected areas), mostly in the states of Tocantins and Bahia. The proposed law was initiated under previous presidential administrations; it was approved in November 2017 by the Chamber of Deputies and was tabled in June 2018 by the Senate (Online Reference 3 – Supplementary Material). The archiving was mainly motived by the absence of studies and technical support justifying the supposition that the TO-SF-WDP would preserve the donor basin. However, the archiving does not guarantee that this PL will be forgotten or that new water-diversion projects will not be proposed, given that politicians are ignoring this decision and promising that the transposition project will be carried out (e.g. Online References 4 and 5 – Supplementary Material).

PUTTING BIODIVERSITY AT RISK

The main impact expected from the proposed TO-SF-WDP is the introduction of non-native organisms from one basin to another and the many potential negative effects that the introduced species can have on the receiving basin's biota and ecosystem services. Organisms may be carried passively by river flow from the Tocantins to the São Francisco basin (aquatic invertebrates, eggs and juvenile of fish, aquatic plants, and algae), or they may disperse actively in both directions (crustaceans, fishes and reptiles). Displacement of aquatic plants (floating mats or plant fragments) through the network may also play a fundamental role dispersing many organisms that colonize these plants (Marsden and Ladago 2017).

Additionally, because part of the rationale for the TO-SF-WDP is to ensure navigation between the basins, encrusted aquatic organisms may be carried by boats and barges, as is commonly reported in other cases of biological invasion (Table S1). The Amazon River basin has a long history of international navigation, and ballast water may enhance introductions, as occurred with the invasive Asian clam *Corbicula fluminea* (Müller, 1774) (Table S1), and an Asian midge (Chironomidae) species (Amora et al. 2015).

Globally, introduction of non-native species is considered to be one of the primary causes of species extinction (Clavero and Garcia-Berthou 2005; Sax and Gaines 2008; Bellard et al. 2016), as well as ecosystem disruption (Lövei et al. 2012). Species introductions represent an important phenomenon that needs to be studied and prevented, in particula because of the large catalogue of negative impacts (Simberloff and Vitule 2014). Biological invasions are of paramount concern for conservationists and a huge challenge in megadiverse countries, where introductions of non-native species and environmental degradation of rivers are accelerating the biotic homogenization process (e.g. Lövei et al. 2012; Winemiller et al. 2016). The outcome of biotic homogenization is a consistent decrease over time in the genetic, taxonomic, or functional distinctiveness of biotas, which occurs across a variety of ecosystems and taxonomic groups (Olden et al. 2004). Connecting distinct drainage basins through large-scale projects greatly facilitates biotic homogenization, as is the case of the planned Nicaragua Canal, which would certainly cause a biotic upheaval in the freshwater fish fauna of the affected basins, whose current compositional similarity is only one-third (Härer et al. 2017).

The Tocantins River is a tributary of the Amazon River basin and hosts valuable biodiversity, corresponding to an important area of endemism, particularly for fish: around 400 species are present, of which 50% are endemic to the basin – the highest percentage among all Amazonian tributaries (Winemiller et al. 2016). As a consequence, the Tocantins River shares only a few species with the São Francisco River (see Methods section and Table S2 – Supplementary Material), with a low compositional similarity (*CS*) for native assemblages of mollusks, zooplankton, crustaceans, aquatic insects, freshwater fishes, amphibians, reptiles, aquatic mammals and aquatic plants (Fig. 2 – values in black).

Furthermore, the likely introduction of non-native species and extinction of all currently threatened species owing to the construction of the TO-SF-WDP (Fig. 2 – values in red), will cause the *CS* for all taxonomic groups between these basins to increase even more. This scenario will be significantly more catastrophic for aquatic mammals (Fig. 2h), since all species recorded are threatened with extinction. In addition, the βdiversities (Sørensen dissimilarity index - βsor) of mollusks (βsor = 0.86), zooplankton (βsor = 0.71), crustaceans (βsor = 0.65), aquatic insects (βsor = 0.92), freshwater fishes (βsor = 0.99), amphibians (βsor = 0.94), reptiles (βsor = 0.60), and aquatic plants (βsor = 0.79) show strong species turnover between basins (see details on Methods – Supporting Information). These results indicate that taxonomic homogenization is an anticipated outcome, leading to the loss of a long history of evolution across each taxonomic group by vicariance.

The Tocantins River currently has few non-native aquatic species, in contrast to the São Francisco River, which has a long history of non-native species introductions and invasions (Table S2 – Supplementary Material) because of intense environmental degradation driven by anthropogenic activities. Additionally, the Tocantins and São Francisco Rivers run through different biomes, physiographic regions, and climate zones (Tocantins: *Cerrado* and rainforest; São Francisco: *Cerrado* and *Caatinga* semi-arid vegetation). Thus, it is not possible to envisage which basin or ecoregion will be more affected by the biological invasions and their negative impacts or socioeconomic consequences for human populations. Information about some freshwater groups (e.g. aquatic insects and aquatic plants) is still scarce and difficult to assess, which makes the TO-SF-WDP even riskier.

Although the Tocantins River still has many endemic species, both river basins are extensively impacted by multiple disturbances, especially changes in land cover and river hydrology (e.g. construction of many dams), along with habitat conversion and degradation (Winemiller et al. 2016; Pelicice et al. 2017). Social conflicts are expected as a result of the water diversion, given that hydropower and agribusiness activities have developed significantly in the Tocantins River basin while water availability is limited (i.e. highly seasonal, with six dry months). Furthermore, lack of effective wildlife-management strategies, lead to illegal hunting (Kemenes and Pezzuti 2007). This is the case of trade traffic of *Podocnemis* spp. turtles (Pantoja-Lima et al. 2014), which is expected to expand in the TO-SF-WDP network because these species are highly appreciated for human consumption in Amazonia and other regions of the country. The sum of these factors indicates that the TO-SF-WDP would cause profound changes in both basins, including irreversible impacts affecting biodiversity patterns, ecosystem functioning, and the provision of ecosystem services that are important for conservation of aquatic resources, water supply, food production, and public health (Moreira-Filho and Buckup 2005; Vitule et al. 2015; Brito and Magalhães 2017).

In summary, projects such as the TO-SF-WDP represent a huge challenge at a time when biodiversity in megadiverse nations is increasingly threatened and in need to strong conservation measures (Scarano et al. 2012; Frehse et al. 2016; Pelicice et al. 2017; Alves et al. 2018; Bockmann et al. 2018; Azevedo-Santos et al. 2019). This is a good example of sharing the multiple and complex costs associated with misguided policies and large-scale degradation (i.e. the São Francisco River) with a distinct and moderately disturbed neighbor (i.e. the Tocantins River), leading to negative consequences for both.

BETTER POTENTIAL ALTERNATIVES

In view of the high environmental risk associated with water diversions (Zhang et al. 2018) and the lack of adequate information to guide conservation strategies and monitoring programs, authorities should consider other alternatives. The most important recommendation is avoiding the construction of new water-diversion projects whenever possible, however if it is unavoidable, at least the construction of barriers to movement (e.g. acoustic, electrical or physical) should be also proposed, aiming to contain the spread of aquatic organisms between basins (Clarkson 2004; Rahel 2013; Rahel and Smith 2018). In the case of the TO-SF-WDP, transport functions can be served by improvement of rail connections, and, if the demand is sufficient (Matera 2012), improved air transport infrastructure can also be justified. Railways offer a still impacting alternative, but likely less than water-diversion projects. This can either be done through improvement of existing railways (e.g. EF-151, Online Reference 6 – Supplementary Material) or through the construction of new lines (*sensu* Laurance and Balmford 2013), providing transportation for both passengers and freight. As with all projects, railway construction or improvement should be preceded by multidisciplinary assessments that include explicit and honest consideration of negative impacts on biodiversity.

Water scarcity in Northeast Brazil is an important rationale for the TO-SF-WDP, as is frequently the case for water diversions worldwide. One alternative rather than water diversion projects is water reuse (Hespanhol 2002), a practice already adopted in many countries (Miller 2006). For this practice, there are methods available for treating reused water for human consumption (Warsinger et al. 2018). In addition, innovative methods have been implanted in some semi-arid regions of the world, such as water harvesting from thin air, which has low cost and maintenance (Davtalab et al. 2013; Online Reference 7 – Supplementary Material). Another alternative is rainwater harvesting, where water is captured (often from rooftops) and stored in cisterns (e.g. Gomes and Heller 2016). Rainwater harvesting systems are already in use in Brazil’s Northeast region; however, they could be further implemented in the area that would receive water from the diversion project if the federal or state governments were to provide subsidies for massive application of this method. The combination of rainwater harvesting and water reuse could supply much of the demand for water for domestic use in the area served by the proposed water-diversion project.

FINAL REMARKS

Decisions on inter-basin water diversion are being made without sufficient reference to expected environmental and social impacts related to biodiversity and biological invasions. Warnings from the scientific community are being circumvented to allow implementation of questionable economic-development projects (Vitule et al. 2015; Brito and Magalhães 2017). PL 6569/2013 is not an isolated case in Brazil (Table 1). Several large-scale projects have been developed or planned in the last decade, as is the case of the São Francisco River water diversion mentioned previously: a problematic project characterized by environmental problems and delays (Brito and Magalhães 2017). Severe water scarcity in the city of São Paulo has also led local authorities to propose diversions (Vitule et al. 2015) to bring water from several other basins (Paraíba do Sul, Ribeira de Iguape, and Itapanhaú), and recently even the transposition of the Amazon River has been suggested by politicians (Online Reference 9 – Supplementary Material). Water diversions are well accepted by Brazilian authorities because they are striking and have popular appeal. Consequently, new water diversions will appear as water demands increase.

It is also important to remember that Brazil is signatory to the Convention on Biological Diversity in which Aichi Biodiversity Target No. 9 specifies that "*By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment*" (Online Reference 10 – Supplementary Material). We recommend that Brazil's leaders heed warnings from the local and international scientific communities questioning PL 6569/2013 and other harmful projects with high environmental risks and costs. Authorities must always treat such projects with complete transparency, discussing both positive and negative impacts with all sectors of society, including academia. Decision makers must recognize the value of biodiversity and give more credit to science based knowledge (Azevedo-Santos et al. 2017) before formulating policy largely based on populism and particular interests. Construction of water diversions is an environmentally and economically risky activity, as our research has shown. The entire region's natural and cultural heritage may be decimated, and freshwater ecosystems that humans and other aquatic organisms alike rely on can be compromised, certainly resulting in a global impact for humanity.

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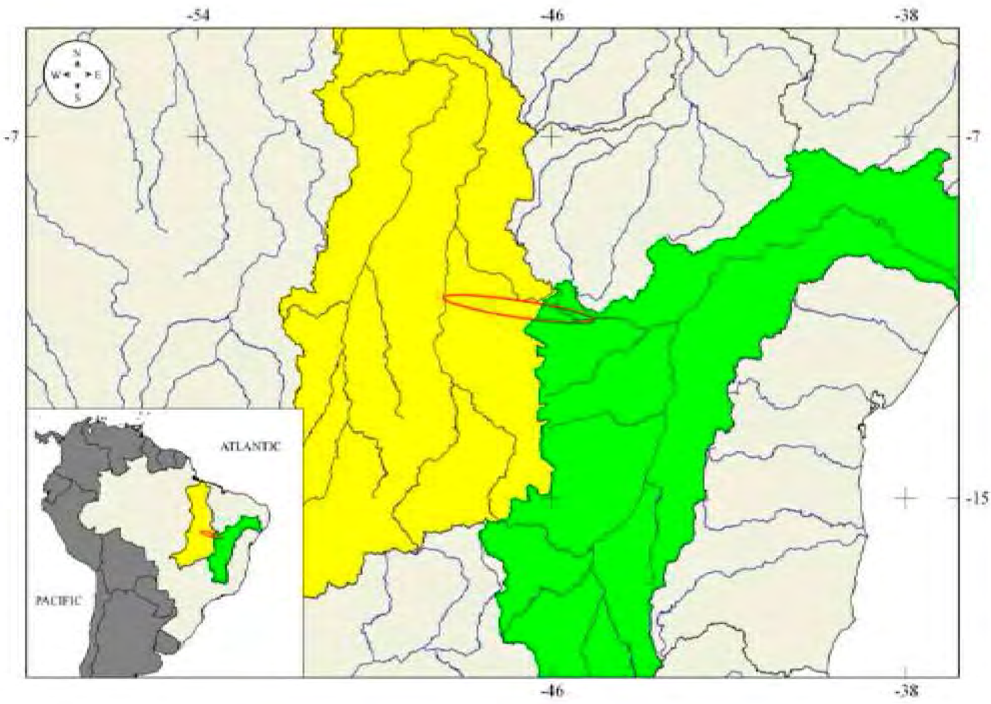
FIGURE CAPTIONS

Fig. 1 Tocantins River basin (yellow) and São Francisco River basin (green), which are planned to be connected by a water-diversion project.

Fig. 2 Number of native species recorded in the Tocantins River basin (yellow circle) and São Francisco River basin (green circle), and the compositional similarity (*CS* - blue intersection): *i*) considering only native assemblages (values in black), and *ii*) taking into account the introduction of non-native species and assumes that all currently threatened species will become extinct due to the construction of the TO-SF-WDP (values in red), for each taxonomic group: **A** Mollusks, **B** Zooplankton, **C** Crustaceans, **D** Aquatic insects (genus level), **E** Freshwater fishes, **F** Amphibians, **G** Reptiles, **H** Aquatic mammals, **I** Aquatic plants (genus level). Data sources and methods are given in the Supplementary Material.

Table 1 Examples of water diversion in Brazil. Situation: *C* concluded, *P* planned (under evaluation), *U* unknown

Water diversions	Reason	Situation	References
Piumhi River (Grande River basin) to Sujo River (São Francisco basin)	Dam	*C*	Moreira-Filho and Buckup 2005
Paraíba do Sul River (Paraíba do Sul basin) to Guandu River (Guandu River basin)	Water supply	*C*	Castro and Ferreirinha 2012; Acselrad et al. 2015
Itapanhaú River (Itapanhaú River basin) to Biritiba reservoir (Tietê River basin)	Water supply	*P*	LabSid 2015
Capivari stream (Capivari basin) to Piancó stream (Piacó basin)	Water supply	*C*	Morgantini 2017
Claro River (Claro River basin) to Saudade stream (Uberaba River basin)	Water supply	*C*	Santos and Naves 2016
Capivari River (Capivari River basin) to Cachoeira River (Cachoeira River basin)	Dam	*C*	Branco 2008
São Francisco River (São Francisco River basin) to Paraíba do Norte River (Paraíba River basin)	Water supply	*C*	Ramos et al. 2018
São Francisco River (São Francisco River basin) to Piranhas-Açu River (Piranhas-Açu River basin)	Water supply	*C*	Andrade et al. 2011
São Francisco River (São Francisco River basin) to Apodi River (Apodi River basin)	Water supply	*C*	Andrade et al. 2011
São Francisco River (São Francisco River basin) to Jaguaribe River (Jaguaribe River basin)	Water supply	*C*	Andrade et al. 2011
Doce River (Doce River basin) to Riacho River (Riacho River basin)	Water supply	*C*	Coelho 2006
Paraíba do Sul to Cantareira	Water supply	*U*	Andrade et al. 2011; Vitule et al. 2015
Tocantins to São Francisco	Navigation, Water supply	*P*	this study
Piracicaba River (Piracicaba River basin) to upper Tietê River (upper Tietê River basin)	Water supply	*C*	Andrade et al. 2011
Cravo River (Cravo river basin) to Ligeirinho reservoir (Ligeirinho River basin)	Water supply	*U*	Bernardi 2014
Caí River (Caí river basin) to Sinos River (Sinos River basin)	Water supply	*C*	Online Reference 8 – Supplementary Material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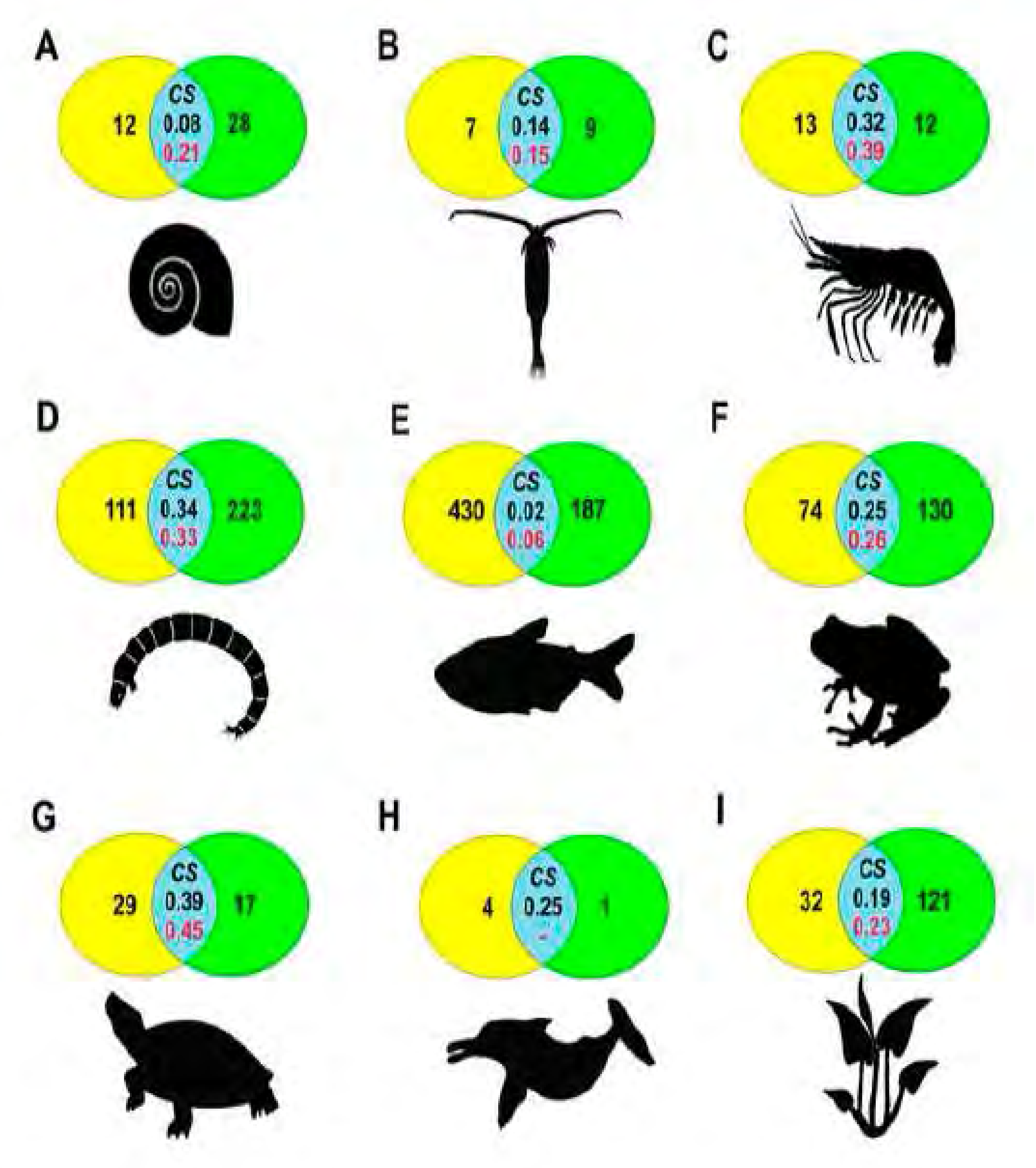
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SUPPORTING INFORMATION

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Table S1 Examples of species introduced via boats and vessels in aquatic environments around the world.

Group	Species	Native region	Introduced region	References
Zooplankton	*Kellicottia bostoniensis* (Rousselet, 1908)	North America	Iguaçu and Paraná rivers basins (Brazil)	1/2/3
Zooplankton	*Skistodiaptomus pallidus* (Herrick, 1879)	North America	New Zealand and Germany	4
Mollusks	*Dreissena polymorpha* (Pallas, 1771)	Black, Caspian, and Azov Seas	Lake St. Clair, Big St. Germain Lake, Lake Gogebic (USA), Europe and New Zealand	5/6
Mollusks	*Limnoperna fortunei* (Dunker, 1857)	Asia	São Francisco, Paraná and Uruguay rivers basins (Brazil)	7/8/9
Mollusks	*Corbicula fluminea* (Müller, 1774)	Asia	Brazil - spread all over the rivers basins	9/10
Mollusks	*Corbicula largillierti* (Philippi, 1844)	Asia	Atlantic, Paraná and Uruguay rivers basins (Brazil)	9
Mollusks	*Corbicula fluminalis* (Müller, 1774)	Asia	Uruguay river Basin (Brazil)	9
Annelids	*Hypania invalida* (Grube, 1960)	Ponto-Caspian region	Elbe River (Czech Republic)	11
Crustacea	*Palaemon macrodactylus* Rathbun 1902	Asia	La Plata Basin (Argentina)	12/13
Fish	*Butis koilomatodon* (Bleeker, 1849)	Indo-Pacific	Panama Canal	14

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METHODS

Data compilation and analyses

The datasets from the Tocantins and São Francisco Rivers basins (FEOW, 2015; Figure 1), were constructed based on multiple sources. The map in the Figure 1 was constructed using shapfiles provided by the National Water Agency (ANA, 2018) and the Ministry of Environment (MMA, 2018), through the QGIS program (Sherman et al., 2012).

The multiassemblage dataset encompassed mollusks, zooplankton, crustaceans, aquatic insects, freshwater fishes, amphibians, reptiles, aquatic mammals and aquatic plants. Data on mollusks were compiled from museum data collections and supplemented with available literature. The data on zooplankton, crustaceans, aquatic insects, amphibians, aquatic mammals and aquatic plants were obtained from available literature. The data on freshwater fish and reptiles were compiled from databases (Eschmeyer et al., 2018; Froese & Pauly, 2018; Uetz et al., 2018), and supplemented with available literature.

Based on species records for the Tocantins and São Francisco Rivers basins, the species list was constructed to indicate the most probable and parsimonious representation of the assemblages for each river basin. Native species corresponded to indigenous species occurring in each river basin as a result of natural processes, while non-native species were considered as those introduced as result of the species translocations (extra-limit introductions from other freshwater ecoregions within the Neotropical region) or introduced from other zoogeographic regions. Threatened species were considered as the most likely candidates to become extinct in the future, and are those listed as Critically Endangered (CR), Endangered (EN), Near Threatened (NT), and Vulnerable (VU), according to the IUCN Red List of Threatened Species (IUCN Red List, 2017). In addition, the list of threatened species was supplemented for aquatic insects (MMA, 2014a; ICMBio, 2016, 2018), freshwater fishes (MMA, 2014a; ICMBio, 2016, 2018), amphibians (MMA, 2014b; ICMBio, 2018), reptiles

(Testudines) (MMA, 2014b; ICNS/SSC, 2018), and aquatic mammals (MMA, 2014b; ICMBio, 2018), by including information from specific lists. This approach was considered to be the most conservative, since the data contained in the IUCN Red List of Threatened Species are incomplete for the Neotropical region (Vitule et al., 2017).

Species presence/absence data were considered to quantify the compositional similarity between river basins. Matrices were created separately for each taxonomic group, considering: *i*) only native species, and *ii*) introduction of non-native species and extinction of threatened species. Zooplankton and aquatic insects faunas did not have non-native species, while aquatic mammals comprehended only threatened species. For aquatic insects and aquatic plants the analyses were carried out at the genus level. Similarity matrices were calculated separately for *i* and *ii*, using Jaccard's coefficient of similarity. This analysis was performed in R software (R Core Team, 2016), using the '*vegan*' package (Oksanen et al., 2013). Jaccard similarity matrices were created by calculating one minus the dissimilarity matrix provided in "*vegdist*" function. Partitioning of taxonomic dissimilarities was used to quantify variations in β-diversity for each taxonomic group between the two river basins (Baselga & Orme, 2012). For this analysis we used the functions '*beta.multi*' and '*beta.pair*' in the '*betapart*' package (Baselga et al., 2018) in R software (R Core Team, 2016), based on the Sørensen dissimilarity matrix.

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Table S2 List of species/genera for the Tocantins (TO) and São Francisco (SF) Rivers basins. Status: N (native species for each respective river basin), and I (non-native species translocated or from other zoogeographic region). Threatened species were marked with an asterisk.

GROUP	SPECIES/GENERA	RIVER BASIN		REFERENCES
		TO	SF	
Mollusks	**BIVALVIA**			
	Anodontites moricandii (Lea, 1860)		N	1/2/3
	Anodontites obtusus (Spix, 1927)		N	1/4
	Anodontites tenebricosus (Lea, 1834)		N	4/5/6
	Anodontites trapesialis (Lamarck, 1819)		N	1/2/3/4
	Anodontites trapezeus (Spix, 1827)		N	2/3/4/7
	Castalia ambigua Lamarck, 1819	N	N	1/5/8
	Corbicula fluminea (Müller, 1774)	I	I	9/10/11
	Corbicula largillierti (Philippi, 1844)	I	I	11/12/13
	Diplodon ellipticus (Wagner, 1827)		N	1/3
	Diplodon rhombeus (Spix & Wagner, 1827)		N	1/4
	Diplodon rhuacoicus (d'Orbigny, 1835)		N	14
	Diplodon rotundus (Spix & Wagner, 1827)		N	3/4/5/7/15
	Diplodon suavidicus (Lea, 1856)		N	1
	Eupera bahiensis (Spix & Wagner, 1827)		N	1
	Leila bleinvilleana (Lea, 1835)	N		3/5
	Limnoperna fortunei (Dunker, 1857)		I	16/17
	Monocondylaea franciscana (Moricand, 1837)		N	3/4/5/18
	Monocondylaea paraguayana d'Orbigny, 1835		N	1
	Mycetopoda siliquosa (Spix, 1827)		N	1/2
	Mytilopsis lopesi Alvarenga & Ricci, 1989	N		1
	Pisidium pulchellum (d'Orbigny, 1835)		N	1
	Prisodon obliquus Schumacher, 1817	N		4
	Prisodon syrmatophorus (Gmelin, 1791)		N	19

	Triplodon corrugatus (Lamarck, 1819)	N	N	2/3/5/20
	GASTROPODA			
	Asolene spixii (d'Orbigny, 1838)		N	2
	Aylacostoma bicincta (Reeve, 1860)		N	2
	Aylacostoma brasiliensis (Moricand, 1939)	N	N	1
	Aylacostoma edwardsi (Lea, 1852)	N		1
	Aylacostoma tenuilabris (Reeve, 1860)		N	1
	Aylacostoma tuberculata (Wagner, 1827)		N	1/2
	Biomphalaria glabrata (Say, 1818)		N	21
	Biomphalaria kuhniana (Clessin, 1883)	N		1
	Biomphalaria straminea (Dunker, 1848)		N	21
	Biomphalaria tenagophila (d'Orbigny, 1835)		N	21
	Doryssa annulata (Haltenorth & Jaeckel, 1941)	N		1
	Doryssa millepunctata (Tryon, 1865)	N		1
	Idiopyrgus rudolphi (Haas, 1938)		N	1
	Melanoides tuberculata (O.F. Müller, 1774)	I	I	2/22
	Physella acuta (Draparnaud, 1805)	I		11
	Planorbella duryi (Wetherby, 1879)	I		11
	Pomacea maculata Perry, 1810	N		23
	Pomacea meta Ihering, 1915		N	1
	Pomacea nobilis Reeve, 1856	N		1
Zooplankton	**COPEPODA: CALANOIDA: DIAPTOMIDAE**			
	Argyrodiaptomus azevedoi (Wright, 1935)		N	1
	Argyrodiaptomus neglectus (Wright, 1938)		N	1
	Argyrodiaptomus paggii Previattelli & Santos-Silva, 2007	N		1
	Dasydiaptomus coronatus (Sars, 1901)	N	N	1
	Notodiaptomus cearensis (Wright, 1936)		N	1
	Notodiaptomus deitersi (Poppe, 1891)	N		1
	Notodiaptomus henseni (Dahl, 1894)	N		1

	Notodiaptomus iheringi (Wright, 1935)		N	1
	Notodiaptomus isabelae (Wright, 1936)		N	1
	Notodiaptomus jatobensis (Wright, 1936)		N	1
	Notodiaptomus maracaibensis Kiefer, 1954 *	N		1
	Notodiaptomus paraensis Dussart & Robertson, 1984	N		1
	Notodiaptomus spinuliferus Dussart, 1986	N	N	1
	Scolodiaptomus corderoi (Wright, 1936)		N	1
Crustaceans	**DECAPODA**			
	Infraorder Brachyura			
	Goyazana castelnaui (H. Milne Edwards, 1853)	N	N	1/2/3/15
	Kingsleya gustavoi Magalhães, 2004	N		4/15
	Sylviocarcinus devillei H. Milne-Edwards, 1853	N		1/5/15
	Sylviocarcinus pictus (H. Milne-Edwards 1853)	N		1/5/15
	Infraorder Caridea			
	Atya scabra (Leach, 1816) *		N	1/6/15
	Macrobrachium acanthurus (Wiegmann, 1836)		N	1/7/8/9/10/15
	Macrobrachium amazonicum (Heller, 1862)	N	N	1/7/8/9/10/15
	Macrobrachium brasiliense (Heller, 1862	N	N	1/7/8/9/10/15
	Macrobrachium carcinus (Linnaeus, 1758)	N	N	1/7/8/9/10/15
	Macrobrachium denticulatum Ostrovski, Da Fonseca & Da Silva-Ferreira, 1996 *		N	1/11/15
	Macrobrachium heterochirus (Wiegmann, 1836)		N	1/7/8/9/10/15
	Macrobrachium jelskii (Miers, 1877)	N	N	1/7/8/9/10/15
	Macrobrachium nattereri (Heller, 1862)	N		1/7/8/9/10/15
	Macrobrachium olfersi (Wiegmann, 1836)		N	1/7/8/9/10/15
	Macrobrachium rosenbergii (De Man, 1879)	I		9
	Macrobrachium surinamicum Holthuis, 1948	N		1/7/8/9/10/15
	Palaemon carteri (Gordon, 1935)	N		1/9/10/12/13/15
	Potimirim potimirim (Müller, 1881)		N	1/14/15
	Suborder Dendrobranchiata			

	Acetes marinus Omori, 1975	N		1/9/10/15
	Acetes paraguayensis Hansen, 1919	N	N	1/9/10/15
Aquatic Insects	**EPHEMEROPTERA**			
	Baetidae			
	Americabaetis	N	N	1/2/3/4/5/6/7/8/9/10
	Apobaetis		N	1/2/3/5/6/7/8/9/10
	Aturbina		N	1/2/3/5/6/7/11
	Baetis		N	12/13
	Baetodes *	N	N	1/2/3/5/6/7/8/12/13/14/15
	Callibaetis		N	1/2/3/4/5/6/7/10
	Camelobaetidius *	N	N	1/2/3/5/6/7/8/9/10/14/15
	Cloeodes	N	N	1/2/3/4/5/6/7/8/9/10/12/13/14/15/16
	Cryptonympha		N	2/3/5/6/7/8
	Harpagobaetis	N		9/10
	Moribaetis		N	1
	Paracloeodes		N	1/2/3/5/6/7/8
	Prebaetodes	N		14/15
	Spiritiops		N	2/3/6/7
	Tupiara		N	5/8
	Waltzoyphius	N	N	1/2/3/5/6/7/8/9/10
	Zelusia	N	N	2/3/5/6/7/8/9/10
	Caenidae			
	Brasilocaenis	N	N	11
	Caenis	N	N	1/2/3/4/6/7/13/14
	Latineosus		N	2/3/6/7
	Leptophlebiidae			
	Askola		N	1/2/3/6/7
	Farrodes	N	N	1/2/3/5/6/7/8/12/13/14/15

Fittkaulus	N		9/10
Hagenulopsis	N	N	2/3/5/6/7/8/14/15
Hagenulus		N	1
Hermanella *	N	N	1/2/3/5/6/7/12/13/14/15
Homothraulus		N	1/12
Hydrosmilodon		N	2/3/6/7
Hylister		N	5/8/12
Leentvaaria	N		14/15
Massartela		N	2/3/5/6/7/12/13
Massartellopsis		N	13
Miroculis	N	N	1/2/3/5/6/7/8/16
Needhamella	N	N	1/2/3/6/7/14/15
Nousia		N	1/13
Paramaka		N	2/3/6/7
Simothraulopsis		N	2/3/6/7/10
Terpides	N	N	1/2/3/6/7/9/10
Thraulodes	N	N	1/2/3/5/6/7/8/11/14/15
Traverella *	N		14/15
Ulmeritoides	N	N	2/3/6/7/14
Leptohyphidae			
Leptohyphes	N	N	1/2/3/5/6/7/8/14/15/16
Leptohyphodes	N		14/15
Traverhyphes	N	N	2/3/4/5/6/7/8/10/13
Tricorythodes	N	N	1/2/3/6/7/14/15
Tricorythopsis	N	N	2/3/5/6/7/8/13/14/15
Euthyplociidae			
Campylocia	N	N	2/3/6/7/14
Ephemeridae			
Hexagenia		N	2/3/5/6/7

Polymirtacyidae			
Asthenopus		N	2/3/6/7
Campsurus	N	N	2/3/6/7/14/15/17/46
PLECOPTERA			
Perlidae			
Anacroneuria	N	N	2/3/5/6/8/13/14/15/18
Enderleina		N	13
Kempnyia		N	5/8/13
Macrogynoplax		N	2/3/5/6/8/13
Gripopterygidae			
Gripopteryx		N	2/3/6
Paragripopteryx		N	5/13
Tupiperla		N	5/13
TRICHOPTERA			
Hydropsychidae			
Leptonema	N	N	2/3/5/6/8/13/14/15/18/19/20
Macronema	N	N	2/3/5/6/14/15/19/20
Macrostemum	N	N	2/3/5/6/19/20
Smicridea	N	N	2/3/5/6/8/12/13/14/15/18/19/20
Synoestropsis	N		14/15/20
Leptoceridae			
Amphoropsyche		N	5
Atanatolica	N	N	5/20
Grumichella	N		20
Nectopsyche	N	N	2/3/5/6/8/13/14/19/20
Oecetis	N	N	2/3/5/6/13/14/15/16/19/20
Setodes	N		18/20
Triaenodes	N		18
Triplectides	N	N	2/3/6/13/19/20

Odontoceridae			
Marilia	N	N	2/3/5/6/8/13/20
Barypenthus	N	N	5/8/19/20
Calamoceratidae			
Phylloicus	N	N	2/3/5/6/8/13/14/16/18/19/20/47
Ecnomidae			
Austrotinodes	N	N	2/3/6/19/20
Sericostomatidae			
Grumicha		N	5/8
Helicopsychidae			
Helicopsyche	N	N	2/3/5/6/12/13/14/15/16/19/20
Hydrobiosidae			
Atopsyche	N	N	2/3/5/6/8/13/14/15/20
Polycentropodidae			
Cernotina	N	N	13/20
Cyrnellus	N	N	2/3/5/6/8/13/14/15/16/18/19/20
Polycentropus	N	N	2/3/6/18/20
Polyplectropus	N	N	2/3/5/6/8/13/14/19/20
Glossosomatidae			
Mexitrichia		N	5
Mortoniella	N	N	2/3/6/19
Protoptila	N	N	2/3/6/13/14/15/20
Philopotamidae			
Chimarra	N	N	2/3/5/6/13/14/15/18/19/20
Dolophilodes	N		18/19/20
Wormaldia	N	N	2/3/6/13/19
Hydroptilidae			
Alisotrichia		N	2/3/6
Anchitrichia	N	N	2/3/6/20

Dicaminus	N		14/15/20
Hydroptila	N	N	2/3/5/6/13/14/15/19/20
Metrichia	N	N	2/3/6/19/21
Neotrichia	N	N	2/3/6/13/18/19/20
Ochrotrichia	N	N	2/3/6/12/13/20
Oxyethira	N	N	2/3/6/12/13/14/15/16/19/20/22
Taraxitrichia		N	2/3/6
Zumatrichia	N		20
Xiphocentronidae			
Xiphocentron	N		20
ODONATA			
Suborder Zygoptera			
Coenagrionidae			
Acanthagrion		N	13
Amphiagrion		N	13
Argia	N	N	13/16/18
Chromagrion		N	13
Enallagma		N	13
Leptobasis		N	13
Nehalenia		N	13
Calopterigidae			
Hetaerina	N	N	13/16
Mnesarete	N		16
Suborder Anisoptera			
Corduliidae			
Macromia	N		18
Libellulidae			
Dasythemis		N	13
Dythemis	N		16

Erythemes		N	13
Ladona		N	13
Libellula		N	13
Orthemis		N	13
Perithemes	N	N	13/18
Gomphidae			
Agrigomphus		N	13
Arigomphus		N	13
Epigomphus		N	13
Erpetogomphus	N		18
Gomphus		N	13
Hagenius		N	13
Neogomphus		N	13
Praeviogomphus		N	13
Octogomphus		N	13
Phylogomphoides		N	13
Progomphus		N	13
Zonophora		N	13
Aeshnidae			
Aeshna		N	13
Anax		N	13
Coryphaeschna	N		18
Gomphaeshna		N	13
Gyanacantha		N	13
HEMIPTERA			
Suborder Heteroptera			
Pleidae			
Neoplea	N	N	18/23
Naucoridae			

Ambrysus	N	N	18/23/24
Carvalhoiella		N	24
Cryphocricos		N	23/24
Ctenipocoris		N	23
Limnocoris	N	N	18/23/24
Pelocoris		N	23
Notonectidae			
Buenoa		N	13/23/24
Enithares		N	24
Martarega		N	23/24
Notonecta	N	N	13/16/23
Ochteridae			
Ochterus		N	23/24
Gelastocoridae			
Gelastocoris		N	23/24
Montandonius		N	24
Nerthra		N	23
Gerridae			
Brachymetra		N	23
Cylindrostethus		N	23
Halobatopsis		N	23/24
Limnogonus		N	23
Metrobates		N	23
Neogerris		N	13/23
Rheumatobates		N	23
Tachygerris		N	24
Veliidae			
Microvelia		N	13/23/24
Paravelia		N	23/24

Platyvelia		N	23
Rhagovelia		N	13/23/24
Stridulivelia		N	23
Mesoveliidae			
Mesovelia		N	23
Hydrometridae			
Hydrometra		N	23
Nepidae			
Curicta		N	23
Ranatra		N	13/23/24
Helotrephidae			
Neotrephes		N	24
Hebridae			
Hebrus		N	24
Lipogomphus		N	23
Corixidae			
Centrocorisa		N	23
Heterocorixa		N	23
Sigara		N	23
Tenagobia		N	23/24
Belostomatidae			
Belostoma		N	13/23/24
Lethocerus		N	23
MEGALOPTERA			
Corydalidae			
Corydalus	N	N	13/18/25
DIPTERA			
Chaoboridae			
Chaoborus		N	26/27/28/29/30

Chironomidae			
Subfamily Tanypodinae			
Ablabesmyia	N	N	13/17/21/26/28/29/30/31/32/33/34/35/36/37
Alotanypus	N	N	27/28/29/30/35
Clinotanypus		N	13/17/21
Coelotanypus		N	13/21/27/28/29/30/32/33/34/36/37/48
Djalmabatista	N	N	13/17/21/26/27/29/30/32/33/35/37/48
Fittkauimyia	N		35
Labrundinia	N	N	13/17/21/27/29/30/32/33/35/37
Larsia		N	13/32/34
Macropelopia		N	13
Monopelopia		N	13
Pentaneura	N	N	26/35
Procladius		N	13/27/29/30/32/33/34
Tanypus		N	13/27/29/30/32/33/34/37
Zavrelimyia		N	13
Subfamily Orthocladiinae			
Corynoneura	N	N	13/25/35
Cricotopus	N	N	13/17/21/26/32/35/48
Ichthyocladius		N	38
Lopescladius		N	21/26
Nanocladius	N	N	13/17/35
Oliveriella		N	32
Onconeura		N	21
Orthocladius	N	N	13/32/35
Paracladius	N		35
Parakiefferiella	N		35
Parametriocnemus	N		35
Thienemanniella	N	N	13/21/26/32/35

Subfamily Chironominae			
Aedokritus		N	21/27/28/29/30/33/34
Apedilum	N	N	13/34/35
Asheum		N	34/37
Axarus		N	21/32/37
Beardius	N	N	13/27/29/30/32/33/35
Caladomyia	N	N	21/26/27/35/37
Cladopelma		N	13/26/27/29/30/32/33/34
Cladotanytarsus		N	29/30
Chironomus	N	N	13/17/21/26/27/28/29/30/31/32/33/34/35/36/37/39/48
Cryptochironomus	N	N	13/21/26/27/29/30/31/32/33/35/37
Demycryptochironomus		N	13/21
Dicrotendipes		N	13/21/27/29/30/32/33/34/36/37
Endotribelus	N	N	13/26/35
Fissimentum		N	13/17/21/27/28/29/30/31/33/34/37
Goeldichironomus		N	13/17/21/26/27/29/30/32/33/34/36/37
Lauterborniella		N	27/29/30/33/34/37
Manoa		N	27/29/30/33
Microchironomus		N	21
Nilothauma	N	N	13/21/26/27/29/30/32/35/37
Nimbocera		N	27/29/30
Tanytarsus	N	N	13/17/21/26/27/28/29/30/32/33/34/35/36/37
Tribelos		N	13/32
Complexo *Harnischia*		N	13/21/26/27/28/29/30
Procladius		N	27/28/29
Rheotanytarsus	N	N	21/26/35
Riethia		N	37
Robackia		N	21
Parachironomus	N	N	13/17/21/26/27/28/29/30/32/35/37

Paralauterboniella		N	13/27/29/30/33
Paratanytarsus		N	37
Paratendipes	N	N	26/34/35/37
Phaenopsectra		N	13/32
Pelomus		N	27/29/30/33/37
Polypedilum	N	N	13/17/21/26/27/29/30/31/32/33/34/35/36/37/48
Pseudochironomus	N	N	27/29/30/33/35/37
Saetheria		N	34
Stempellinella	N		35
Stenochironomus		N	13/27/29/30/32/33
Xenochironomus		N	32
Xestochironomus	N	N	26/35
Zavreliella		N	27/29/30/37
Simullidae			
Simulium	N	N	40/41/42/43/44/45
COLEOPTERA			
Suborder Hydrophiloidea			
Hydrophilidae			
Tropisternus	N		16
Elmidae			
Heterelmis	N	N	13/16
Hexacylloepus	N		16
Macrelmis	N	N	13/18
Ordobrevia		N	13
Phanocerus		N	13
Psephenidae			
Psephenus		N	13
Gyrinidae			
Gyretes	N		16

	Gyrinus	N		16
	Dytiscidae			
	Hydaticus		N	13
	Hydrovatus		N	13
Freshwater Fish	**MYLIOBATIFORMES**			
	Paratrygon aiereba (Müller & Henle, 1841) *	N		1/2
	Potamotrygon garmani Fontenelle & Carvalho, 2017	N		3
	Potamotrygon henlei (Castelnau, 1855)	N		4
	Potamotrygon rex Carvalho, 2016	N		5
	Potamotrygon scobina Garman, 1913	N		3
	CLUPEIFORMES			
	Anchoviella jamesi (Jordan & Seale, 1926)	N		4
	Anchoviella juruasanga Loeb, 2012	N		6
	Lycengraulis batesii (Günther, 1868)	N		1/4/7/8/9/10/11/12
	Pellona castelnaeana Valenciennes, 1847	N		1/4/7/9/10
	CHARACIFORMES			
	Acestrocephalus acutus Menezes, 2006	N		13
	Acestrocephalus maculosus Menezes, 2006	N		14
	Acestrocephalus stigmatus Menezes, 2006	N		4/13
	Acestrorhynchus britskii Menezes, 1969		N	15
	Acestrorhynchus falcatus (Bloch, 1794)	N		4/13
	Acestrorhynchus lacustris (Lütken, 1875)		N	13
	Acestrorhynchus microlepis (Jardine, 1841)	N		1/4/7/8/11
	Acinocheirodon melanogramma Malabarba & Weitzman, 1999		N	
	Acnodon Normani Gosline, 1951	N		4/13/16
	Agoniates halecinus Müller & Troschel, 1845	N		1/4/9/10/11
	Anodus orinocensis (Steindachner, 1887)	N		1/4
	Anostomoides laticeps (Eigenmann, 1912)	N		1/7/12/17/18

Anostomus ternetzi Fernández-Yépez, 1949	N		17
Apareiodon argenteus Pavanelli & Britski, 2003	N		14/16/19
Apareiodon cavalcante Pavanelli & Britski, 2003	N		14/19
Apareiodon ibitiensis Amaral Campos, 1944		N	
Apareiodon machrisi Travassos, 1957	N		1/19/20/21/22/23
Apareiodon piracicabae (Eigenmann, 1907)		N	
Apareiodon tigrinus Pavanelli & Britski, 2003	N		19
Argonectes robertsi Langeani, 1999	N		1/4/24/25/26/27
Astyanax argyrimarginatus Garutti, 1999	N		28
Astyanax courensis Bertaco, Carvalho & Jerep, 2010	N		23/29
Astyanax elachylepis Bertaco & Lucinda, 2005	N		30/31
Astyanax fasciatus (Cuvier, 1819)		N	13
Astyanax goyacensis Eigenmann, 1908	N		4/29/31/32
Astyanax goyanensis (Miranda Ribeiro, 1944)	N		29/30
Astyanax joaovitori Oliveira, Pavanelli & Bertaco, 2017	N		
Astyanax lacustris (Lütken, 1875)		N	
Astyanax multidens Eigenmann, 1908	N		33
Astyanax novae Eigenmann, 1911	N		13
Astyanax rivularis (Lütken, 1875)		N	
Astyanax unitaeniatus Garutti, 1998	N		14
Astyanax xavante Garutti & Venere, 2009	N		34
Bivibranchia fowleri (Steindachner, 1908)	N		1/4/16/27
Bivibranchia notata Vari & Goulding, 1985	N		4
Bivibranchia velox (Eigenmann & Myers, 1927)	N		1/4/16/27
Boulengerella cuvieri (Spix & Agassiz, 1829)	N		4/9/10/11/13/35
Boulengerella maculata (Valenciennes, 1850)	N		
Brachychalcinus parnaibae Reis, 1989	N		
Brycon cf. *pesu* Müller & Troschel, 1845	N		1/9/10/24/36
Brycon falcatus Müller & Troschel, 1844	N		1/9/10/24/25/35/37/38

Brycon gouldingi Lima, 2004	N	I	1/4/25/37/38/39
Brycon nattereri Günther, 1864 *	N	N	
Brycon orthotaenia Günther, 1864 *		N	
Bryconamericus novae Eigenmann & Henn, 1914	N		
Bryconops alburnoides Kner, 1858	N		1/4/7/9
Bryconops melanurus (Bloch, 1794)	N		4/31
Bryconops tocantinenses Guedes, Oliveira & Lucinda, 2016	N		40
Caenotropus labyrinthicus (Kner, 1858)	N		4/7
Caiapobrycon tucurui Malabarba & Vari, 2000	N		13
Chalceus macrolepidotus Cuvier, 1818	N		4/35
Characidium bahiense Almeida, 1971		I	13/41
Characidium lagosantense Travassos, 1947		N	41
Characidium satoi Melo & Oyakawa, 2015		N	
Characidium stigmosum Melo & Buckup, 2002	N		41/42
Characidium xanthopterum Silveira, Langeani, da Graça, Pavanelli & Buckup, 2008	N		43
Charax leticiae Lucena, 1987	N		7
Colossoma macropomum (Cuvier, 1816)	I	I	4/25/39/44
Compsura heterura Eigenmann, 1915		N	
Creagrutus atrisignum Myers, 1927	N		14/23/45
Creagrutus britskii Vari & Harold, 2001	N		13/16/31
Creagrutus figueiredoi Vari & Harold, 2001	N		
Creagrutus menezesi Vari & Harold, 2001	N		1
Creagrutus molinus Vari & Harold, 2001	N		
Creagrutus mucipu Vari & Harold, 2001	N		
Creagrutus saxatilis Vari & Harold, 2001	N		13
Creagrutus seductus Vari & Harold, 2001	N		
Ctenocheirodon pristis Malabarba & Jerep, 2012	N		
Curimata acutirostris Vari & Reis, 1995	N		1/4/7/25
Curimata cyprinoides (Linnaeus, 1766)	N		7/9/10/12/25/35

Curimata inornata Vari, 1989	N		1/4/12/25
Curimatella alburnos (Müller & Troschel, 1844)	N		
Curimatella dorsalis (Eigenmann & Eigenmann, 1889)	N		1/4
Curimatella immaculata (Fernández-Yépez, 1948)	N		1/7/16
Curimatella lepidura (Eigenmann & Eigenmann, 1889)		N	15
Cynopotamus gouldingi Menezes, 1987	N		
Cynopotamus tocantinenses Menezes, 1987	N		
Cyphocharax boiadeiro Melo, 2017	N		46
Cyphocharax gouldingi Vari, 1992	N		1/4
Cyphocharax leucostictus (Eigenmann & Eigenmann, 1889)	N		1/4
Cyphocharax notatus (Steindachner, 1908)	N		1/4
Cyphocharax plumbeus (Eigenmann & Eigenmann, 1889)	N		1/4/16
Cyphocharax stilbolepis Vari, 1992	N		1/4
Exodon paradoxus Müller & Troschel, 1844	N		1/4/16
Galeocharax gulo (Cope, 1870)	N		4/47/51
Hasemania crenuchoides Zarske & Géry, 1999 *	N		23
Hasemania kalunga Bertaco & Carvalho, 2010	N		48
Hasemania nana (Lütken, 1875)		N	13
Hemibrycon surinamensis Géry, 1962	N		49
Hemigrammus ataktos Marinho, Dagosta & Birindelli, 2014	N		50
Hemigrammus brevis Ellis, 1911		N	13
Hemigrammus marginatus Ellis, 1911		N	13
Hemigrammus ora Zarske, Le Bail & Géry, 2006	N		52
Hemigrammus tocantinsi Carvalho, Bertaco & Jerep, 2010	N		53
Hemiodus microlepis Kner, 1858	N		1/4/7/9/10/24/26/27
Hemiodus ternetzi Myers, 1927	N		13/20/21/27
Hemiodus tocantinenses Langeani, 1999	N		4
Hemiodus unimaculatus (Bloch, 1794)	N		1/4/8/9/10/12/13/16/26/27/35/37
Hoplerythrinus unitaeniatus (Spix & Agassiz, 1829)	N	N	13/43

Hoplias aimara (Valenciennes, 1847)	N		13
Hoplias curupira Oyakawa & Mattox, 2009	N		4/54
Hoplias intermedius (Günther, 1864)		N	
Hoplias lacerdae Miranda Ribeiro, 1908		I	39
Hoplias malabaricus (Bloch, 1794)	N		1/13/20/22/54/55/56
Hoplias microcephalus (Agassiz, 1829)		N	
Hydrolycus armatus (Jardine, 1841)	N		1/4/9/10/11/12/24/25/26/35/37/57
Hydrolycus tatauaia Toledo-Piza, Menezes & Santos, 1999	N		1/4/9/10/13/25/35/57
Hyphessobrycon amandae Géry & Uj, 1987	N		
Hyphessobrycon diastatos Dagosta, Marinho & Camelier, 2014	N	N	58
Hyphessobrycon eilyos Lima & Moreira, 2003 *	N		59/60
Hyphessobrycon hamatus Bertaco & Malabarba, 2005	N		14/60
Hyphessobrycon haraldschultzi Travassos, 1960	N		60
Hyphessobrycon langeanii Lima & Moreira, 2003	N		58/60
Hyphessobrycon loweae Costa & Géry, 1994	N		61
Hyphessobrycon micropterus (Eigenmann, 1915)		N	13/58
Hyphessobrycon moniliger Moreira, Lima & Costa, 2002	N		60
Hyphessobrycon santae (Eigenmann, 1907)		N	
Hyphessobrycon stegemanni Géry, 1961	N		13/60
Hyphessobrycon weitzmanorum Lima & Moreira, 2003	N		59/60
Hysteronotus megalostomus Eigenmann, 1911 *		N	
Iguanodectes spilurus (Günther, 1864)	N		1/4/51
Jupiaba acanthogaster (Eigenmann, 1911)	N		1/4
Jupiaba apenima Zanata, 1997	N		31/62
Jupiaba elassonaktis Pereira & Lucinda, 2007	N		63
Jupiaba polylepis (Günther, 1864)	N		1/4/16/51
Knodus breviceps (Eigenmann, 1908)	N		
Knodus figueiredoi Esguícero & Castro, 2014	N		64
Knodus savannensis Géry, 1961	N		13

Kolpotocheirodon theloura Malabarba & Weitzman, 2000 *		N	
Laemolyta fernandezi Myers, 1950	N		1/4/9/10/17/18/26/65
Laemolyta taeniata (Kner, 1859)	N		1/9/10/17/18
Lepidocharax burnsi Ferreira, Menezes & Quagio-Grassiotto, 2011		N	
Leporellus pictus (Kner, 1858)		N	
Leporellus vittatus Valenciennes, 1849	N	N	1/4/17/20/26/37/65
Leporinus affinis Günther, 1864	N		1/4/7/8/9/10/17/18/26/35/37
Leporinus bimaculatus Castelnau, 1855	N		
Leporinus bistriatus Britski, 1997 *	N		13
Leporinus desmotes Fowler, 1914	N		1/4/9/10/17/37
Leporinus elongatus Valenciennes, 1850		I	43
Leporinus friderici Bloch, 1794	N		1/4/7/8/9/10/17/18/26/35/37/44/51/62
Leporinus geminis Garavello & Santos, 2009	N		1/26/67
Leporinus maculatus Müller & Troschel, 1844	N		4/67
Leporinus marcgravii Lütken, 1875		N	
Leporinus multimaculatus Birindelli, Teixeira & Britski, 2016	N		
Leporinus piau Fowler, 1941		I	13
Leporinus santosi Britski & Birindelli, 2013	N		68
Leporinus taeniatus Lütken, 1875		N	13
Leporinus taeniofasciatus Britski, 1997 *	N		14/69
Leporinus tigrinus Borodin, 1929	N		4/13/17/26/35/37
Leporinus tristriatus Birindelli & Britski, 2013	N		
Leporinus unitaeniatus Garavello & Santos, 2009	N		1/4/7/26/67
Leporinus venerei Britski & Birindelli, 2008	N		16/70
Megaleporinus obtusidens (Valenciennes, 1837)		N	
Megaleporinus reinhardti (Lütken, 1875)		N	15/39
Megaleporinus trifasciatus (Steindachner, 1876)	N		7/17/18/37/71
Melanocharacidium auroradiatum Costa & Vicente, 1994	N		1
Metynnis maculatus (Kner, 1858)	N	I	1/15/39/44

Metynnis lippincottianus (Cope, 1870)		I	72
Moenkhausia alesis Petrolli & Benine, 2015	N		
Moenkhausia aurantia Bertaco, Jerep & Carvalho, 2011	N		23/73
Moenkhausia costae (Steindachner, 1907)		N	15
Moenkhausia dasalmas Bertaco, Jerep & Carvalho, 2011	N		74
Moenkhausia hysterosticta Lucinda, Malabarba & Benine, 2007	N		75
Moenkhausia loweae Géry, 1992	N		15/76
Moenkhausia pankilopteryx Bertaco & Lucinda, 2006	N		31/76
Moenkhausia pyrophthalma Costa, 1994	N		1/76
Moenkhausia sanctaefilomenae (Steindachner, 1907)	N	N	13/16
Moenkhausia tergimacula Lucena & Lucena, 1999	N		4/13/14/76
Moenkhausia venerei Petrolli, Azevedo-Santos & Benine, 2016	N		
Mylesinus paucisquamatus Jégu & Santos, 1988 *	N		4/13/20/21/77/78
Myleus altipinnis (Valenciennes, 1850)		N	
Myleus micans (Lütken, 1875)		N	
Myleus setiger Müller & Troschel, 1844	N		1/4/26/35
Myloplus arnoldi Ahl, 1936	N		1
Myloplus torquatus (Kner, 1858)	N		1/4/9/10/11/13/16/24/25/35/37
Mylossoma duriventre (Cuvier, 1818)	N		1/35/37/44
Orthospinus franciscensis (Eigenmann, 1914)		N	13
Parodon hilarii Reinhardt, 1867		N	
Phenacogaster franciscoensis Eigenmann, 1911		N	13
Piabarchus stramineus (Eigenmann, 1908)		N	
Piabina argentea Reinhardt, 1867		N	
Piaractus brachypomus (Cuvier, 1818)	N		1/4/8/25/26/37
Piaractus mesopotamicus (Holmberg, 1887)	I	I	25/39/44
Poptella compressa (Günther, 1864)	N		1/4
Poptella longipinnis (Popta, 1901)	N		7/51
Prochilodus argenteus Spix & Agassiz, 1829		N	

Prochilodus brevis Steindachner, 1875		N	
Prochilodus costatus Valenciennes, 1850		N	
Prochilodus nigricans Spix & Agassiz, 1829	N		1/4/7/9/10/16/24/25/26/35/37/79
Psectrogaster amazônica Eigenmann & Eigenmann, 1889	N		1/4/7/12/24/25
Psellogrammus kennedyi (Eigenmann, 1903)		N	
Pygocentrus nattereri Kner, 1858	N	I	1/9/10/11/43
Pygocentrus piraya (Cuvier, 1819)		N	
Rhaphiodon vulpinus Spix & Agassiz, 1829	N		1/4/7/9/10/11/24/25/35/37/80/81
Rhinopetitia myersi Géry, 1964	N		
Roeboexodon geryi Myers, 1960	N		1
Roeboexodon guyanensis (Puyo, 1948)	N		4/12
Roeboides affinis (Günther, 1868)	N		1/4/7/16/82/83
Roeboides xenodon (Reinhardt, 1851)		N	
Roestes Itupiranga Menezes & Lucena, 1998 *	N		
Salminus franciscanus Lima & Britski, 2007 *		N	
Salminus hilarii Valenciennes, 1850	N		25
Sartor tucuruiense Santos & Jégu,1987 *	N		17
Schizodon knerii (Steindachner, 1875)		N	
Schizodon vittatus (Valenciennes, 1850)	N		1/4/7/9/10/12/17/18/26/35
Semaprochilodus brama (Valenciennes, 1850)	N		1/7/9/10/12/24/25/37
Serrapinnus aster Malabarba & Jerep, 2014	N		84
Serrapinnus heterodon (Eigenmann, 1915)		N	
Serrapinnus lucindai Jerep & Malabarba, 2014	N		84
Serrapinnus piaba (Lütken, 1875)		N	13
Serrapinnus sterbai Zarske, 2012	N		84
Serrapinnus tocantinenses Malabarba & Jerep, 2014	N		84
Serrasalmus brandtii Lütken, 1875		N	15
Serrasalmus geryi Jégu & Santos, 1988	N		1/7/9/10
Serrasalmus gibbus Castelnau, 1855	N		1/4/7/9/10/12

Serrasalmus rhombeus (Linnaeus, 1766)	N		4/7/9/10/11/12/24/26/35/37
Steindachnerina amazônica (Steindachner, 1911)	N		4/31/35
Steindachnerina gracilis Vari & Williams Vari, 1989	N		1/16
Steindachnerina notograptos Lucinda & Vari, 2009	N		85
Stygichthys typhlops Brittan & Böhlke, 1965 *		N	
Tetragonopterus akamai Araujo & Lucinda, 2014	N		86
Tetragonopterus anostomus Silva & Benine, 2011	N		87
Tetragonopterus araguaiensis Silva, Melo, Oliveira & Benine, 2013	N		88
Tetragonopterus argenteus Cuvier, 1816	N		4/9/10/16/51/62/88
Tetragonopterus chalceus Spix & Agassiz, 1829	N	N	1/4/10/15/26/39/88
Tetragonopterus denticulatus Silva, Melo, Oliveira & Benine, 2013	N		88
Tetragonopterus franciscoensis Silva, Melo, Oliveira & Benine, 2016		N	
Thayeria boehlkei Weitzman, 1957	N		1/51
Thoracocharax stellatus (Kner, 1858)	N		6/50/89/90
Tometes ancylorhynchus Andrade, Jégu & Giarrizzo, 2016	N		91
Tometes siderocarajensis Andrade, Machado, Jégu, Farias & Giarrizzo, 2017	N		91
Triportheus albus Cope, 1872	N		1/4/8/9/10/35
Triportheus angulatus (Spix & Agassiz, 1829)	N		7/44
Triportheus guentheri (Garman, 1890)		N	15
Triportheus trifurcatus (Castelnau, 1855)	N		1/4/9/10/16/24/26/37/92
Xenurobrycon coracoralinae Moreira, 2005	N		93
GYMNOTIFORMES			
Apteronotus camposdapazi de Santana & Lehmann, 2006	N		94
Archolaemus blax Korringa, 1970	N		13/95
Brachyhypopomus menezesi Crampton, de Santana, Waddell & Lovejoy, 2017		N	
Brachyhypopomus regani Crampton, de Santana, Waddell & Lovejoy, 2017	N		96
Eigenmannia besouro Peixoto & Wosiacki, 2016		N	
Eigenmannia microstoma (Reinhardt, 1852)		N	
Eigenmannia vicentespelaea Triques, 1996 *	N		97

Electrophorus electricus (Linnaeus, 1766)	N		4
Gymnorhamphichthys petiti Géry & Vu, 1964	N		1
Gymnotus carapo Linnaeus, 1758	N		1/4/20/21/31/98
Rhamphichthys marmoratus Castelnau, 1855	N		1
Sternarchorhynchus axelrodi de Santana & Vari, 2010 *	N		
Sternarchorhynchus mesensis Campos-da-Paz, 2000	N		14
Sternarchorhynchus schwassmanni de Santana & Vari, 2010	N		
Sternarchorhynchus starksi de Santana & Vari, 2010	N		
Sternopygus macrurus (Bloch & Schneider, 1801)	N	N	1/13/20/21/31/35/62
Sternopygus Xingu Albert & Fink, 1996	N		
SILURIFORMES			
Acanthicus adônis Isbrücker & Nijssen, 1988	N		99
Acanthicus hystrix Spix & Agassiz, 1829	N		99
Ageneiosus inermis (Linnaeus, 1766)	N		1/4/9/10
Ageneiosus ucayalensis Castelnau, 1855	N		1/4
Aguarunichthys tocantinsensis Zuanon, Rapp Py-Daniel & Jégu, 1993 *	N		13/78
Ammoglanis diaphanus Costa, 1994	N		
Ancistomus micrommatos (Cardoso & Lucinda, 2003)	N		
Ancistomus spilomma (Cardoso & Lucinda, 2003)	N		100
Ancistomus spinosissimus (Cardoso & Lucinda, 2003)	N		100
Ancistrus aguaboensis Fisch-Muller, Mazzoni & Weber, 2001	N		14/20/21/23
Ancistrus cryptophthalmus Reis, 1987 *	N		101/102/103
Ancistrus jataiensis Fisch-Muller, Cardoso, da Silva & Bertaco, 2005	N		14/104
Ancistrus karajas de Oliveira, Rapp Py-Daniel, Zawadzki & Zuanon, 2016	N		105
Ancistrus minutus Fisch-Muller, Mazzoni & Weber, 2001 *	N		14/20/21/22
Ancistrus ranunculus Muller, Rapp Py-Daniel & Zuanon, 1994 *	N		
Ancistrus reisi Fisch-Muller, Cardoso, da Silva & Bertaco, 2005	N		104
Ancistrus stigmaticus Eigenmann & Eigenmann, 1889	N		
Aspidoras albater Nijssen & Isbrücker, 1976	N		14/107/108

Aspidoras belenos Britto, 1998	N		
Aspidoras brunneus Nijssen & Isbrücker, 1976	N		
Aspidoras eurycephalus Nijssen & Isbrücker, 1976	N		14/23
Aspidoras gabrieli Wosiacki, Graças Pereira & Reis, 2014	N		109
Aspidoras mephisto Tencatt & Bichuette, 2017	N		110
Aspidoras pauciradiatus (Weitzman & Nijssen, 1970)	N		
Aspidoras poecilus Nijssen & Isbrücker, 1976	N		31
Aspidoras velites Britto, Lima & Moreira, 2002	N		106
Auchenipterichthys coracoideus (Eigenmann & Allen, 1942)	N		4/9/10
Auchenipterus nuchalis (Spix & Agassiz, 1829)	N		1/4/7/8/9/10/24/35/111
Auchenipterus osteomystax (Miranda Ribeiro, 1918)	N		4/111
Bagropsis reinhardti Lütken, 1874 *		N	
Baryancistrus longipinnis (Kindle, 1895) *	N		
Baryancistrus niveatus (Castelnau, 1855) *	N		1/4/35/37
Bergiaria westermanni (Lütken, 1874)		N	
Bunocephalus minerim Carvalho, Cardoso, Friel & Reis, 2015		N	
Centromochlus bockmanni (Sarmento-Soares & Buckup, 2005)		N	
Centromochlus ferrarisi Birindelli, Sarmento-Soares & Lima, 2015	N		112
Centromochlus schultzi Rössel, 1962	N		4/112
Cephalosilurus fowleri Haseman, 1911		N	13
Cetopsis arcana Vari, Ferraris & de Pinna, 2005	N		113
Cetopsis caiapo Vari, Ferraris & de Pinna, 2005	N		14/113
Cetopsis coecutiens (Lichtenstein, 1819)	N		4/14/113
Cetopsis gobioides Kner, 1858		N	
Cetopsis sarcodes Vari, Ferraris & de Pinna, 2005	N		14/113
Cetopsorhamdia iheringi Schubart & Gomes, 1959		N	13
Cetopsorhamdia molinae Miles, 1943	N		20/21
Clarias gariepinus (Burchell, 1822)		I	39/114/115
Conorhynchos conirostris (Valenciennes, 1840) *		N	

Corumbataia tocantinenses Britski, 1997	N		20/21/23
Corumbataia veadeiros Carvalho, 2008	N		116
Corydoras araguaiaensis Sands, 1990	N		117
Corydoras cochui Myers & Weitzman, 1954	N		
Corydoras costai Ottoni, Barbosa & Katz, 2016		N	
Corydoras difluviatilis Britto & Castro, 2002		N	
Corydoras eversi Tencatt & Britto, 2016	N		117
Corydoras garbei Ihering, 1911		N	
Corydoras lymnades Tencatt, Vera-Alcaraz, Britto & Pavanelli, 2013		N	
Corydoras maculifer Nijssen & Isbrücker, 1971	N		117
Corydoras multimaculatus Steindachner, 1907		N	13
Curculionichthys sagarana Roxo, Silva, Ochoa & Oliveira, 2015		N	
Curculionichthys tucana Roxo, Dias, Silva & Oliveira, 2017	N		118
Denticetopsis epa Vari, Ferraris & de Pinna, 2005	N		113
Doras zuanoni Sabaj Pérez & Birindelli, 2008	N		1/119
Duopalatinus emarginatus (Valenciennes, 1840)		N	
Farlowella amazonum (Günther, 1864)	N		1/51
Farlowella henriquei Miranda Ribeiro, 1918	N		4
Franciscodoras marmoratus (Lütken, 1874)		N	
Gelanoglanis varii Calegari & Reis, 2016	N		120
Gymnotocinclus anosteos Carvalho, Lehmann & Reis, 2008	N		14/121
Gymnotocinclus canoeiro Roxo, Silva, Ochoa & Zawadzki, 2017	N		122
Harttia duriventris Rapp Py-Daniel & Oliveira, 2001	N		
Harttia leiopleura Oyakawa, 1993		N	
Harttia longipinna Langeani, Oyakawa & Montoya-Burgos, 2001		N	
Harttia novalimensis Oyakawa, 1993		N	
Harttia punctata Rapp Py-Daniel & Oliveira, 2001	N		4/13/20/21/22/23
Harttia torrenticola Oyakawa, 1993		N	
Hassar wilderi Kindle, 1895	N		4/9/10/11/61/123

Hemiancistrus cerrado de Souza, Melo, Chamon & Armbruster, 2008	N		124
Hemisorubim platyrhynchos (Valenciennes, 1840)	N		1/4/7/9/10/25/35
Henonemus intermedius (Eigenmann & Eigenmann, 1889)	N		
Hisonotus bocaiuva Roxo, Silva, Oliveira & Zawadzki, 2013		N	
Hisonotus vespuccii Roxo, Silva & Oliveira, 2015		N	
Hypophthalmus marginatus Valenciennes, 1840	N		4
Hypoptopoma muzuspi Aquino & Schaefer, 2010	N		
Hypostomus alatus Castelnau, 1855		N	
Hypostomus asperatus Castelnau, 1855	N		
Hypostomus atropinnis (Eigenmann & Eigenmann, 1890)	N		
Hypostomus delimai Zawadzki, de Oliveira & Debona, 2013	N		4/125
Hypostomus ericae Hollanda Carvalho & Weber, 2005	N		4/14/21
Hypostomus faveolus Zawadzki, Birindelli & Lima, 2008	N		4/126
Hypostomus francisci (Lütken, 1874)		N	
Hypostomus garmani (Regan, 1904)		N	
Hypostomus goyazensis (Regan, 1908)	N		
Hypostomus lima (Lütken, 1874)		N	
Hypostomus vaillanti (Steindachner, 1877)		N	
Hypostomus velhochico Zawadzki, Oyakawa & Britski, 2017		N	
Imparfinis borodini Mees & Cala, 1989	N	N	20/21/22/23
Imparfinis minutus (Lütken, 1874)		N	
Imparfinis mirini Haseman, 1911	N		
Ituglanis bambui Bichuette & Trajano, 2004 *	N		14/107/127
Ituglanis boticário Rizzato & Bichuette, 2015	N		107/127
Ituglanis epikarsticus Bichuette & Trajano, 2004 *	N		107/127
Ituglanis goya Datovo, Aquino & Langeani, 2016	N		127
Ituglanis ina Wosiacki, Dutra & Mendonça, 2012	N		127/128
Ituglanis macunaima Datovo & Landim, 2005 *	N		127/129
Ituglanis mambai Bichuette & Trajano, 2008 *	N		14/107/127/130

Ituglanis passensis Fernández & Bichuette, 2002 *	N		107/127
Ituglanis ramiroi Bichuette & Trajano, 2004 *	N		107/127
Lamontichthys avacanoeiro de Carvalho Paixão & Toledo-Piza, 2009 *	N		14/131
*Lamontichthys parakana*de Carvalho Paixão & Toledo-Piza, 2009 *	N		131
Leporacanthicus galaxias Isbrücker & Nijssen, 1989	N		1
Leptorhamdia essequibensis (Eigenmann, 1912)	N		
Limatulichthys griséus (Eigenmann, 1909)	N		4
Lophiosilurus alexandri Steindachner, 1876 *		N	
Loricaria lata Eigenmann & Eigenmann, 1889	N		
Loricaria pumila Thomas & Rapp Py-Daniel, 2008	N		132
Loricaria cataphracta Linnaeus, 1758	N		4
Loricariichthys nudirostris (Kner, 1853)	N		4
Megalancistrus barrae (Steindachner, 1910)		N	
Megalodoras uranoscopus (Eigenmann & Eigenmann, 1888)	N		4
Microglanis leptostriatus Mori & Shibatta, 2006		N	
Microglanis maculatus Shibatta, 2014	N		133
Microglanis oliveirai Ruiz & Shibatta, 2011	N		134
Microglanis reikoae Ruiz, 2016		N	
Microglanis robustus Ruiz & Shibatta, 2010 *	N		
Microglanis xerente Ruiz, 2016	N		135
Microglanis xylographicus Ruiz & Shibatta, 2011	N		134
Micromyzon akamai Friel & Lundberg, 1996	N		
Microlepidogaster discontenta Calegari, Silva & Reis, 2014		N	
Microlepidogaster negomata Martins, Cherobim, Andrade & Langeani, 2017		N	
Microplecostomus forestii Silva, Roxo, Ochoa & Oliveira, 2016	N		136
Nannoplecostomus eleonorae Ribeira, Lima & Pereira, 2012	N		137
Neoplecostomus franciscoensis Langeani, 1990		N	
Otocinclus hasemani Steindachner, 1915	N		31
Otocinclus tapirape Britto & Moreira, 2002	N		51

Otocinclus vittatus Regan, 1904	N		
Otocinclus xakriaba Schaefer, 1997		N	
Oxydoras niger (Valenciennes, 1821)	N	N	1/4/11/24/25/26/35/37/39
Panaque nigrolineatus (Peters, 1877)	N		1/4/7/24/35/37
Parancistrus aurantiacus (Castelnau, 1855) *	N		1/4
Pareiorhina cepta Roxo, Silva, Mehanna & Oliveira, 2012		N	
Pareiorhina rosai Silva, Roxo & Oyakawa, 2016		N	
Parotocinclus prata Ribeiro, Melo & Pereira, 2002		N	
Parotocinclus robustus Lehmann & Reis, 2012		N	
Peckoltia oligospila (Günther, 1864)	N		
Phractocephalus hemioliopterus (Bloch & Schneider, 1801)	N		4/7
Pimelodella laurenti Fowler, 1941		N	
Pimelodella spelaea Trajano, Reis & Bichuette, 2004 *	N		14/138/139
Pimelodella robinsoni (Fowler, 1941)		N	
Pimelodella vittata (Lütken, 1874)		N	
Pimelodina flavipinnis Steindachner, 1876	N		1/4/12
Pimelodus blochii Valenciennes, 1840	N		1/4/7/8/9/10/16/24/25/35/37/62
Pimelodus fur (Lütken, 1874)		N	
Pimelodus halisodous Ribeiro, Lucena & Lucinda, 2008 *	N		140
Pimelodus joannis Ribeiro, Lucena & Lucinda, 2008 *	N		140
Pimelodus luciae Rocha & Ribeiro, 2010	N		141
Pimelodus maculatus Lacepède, 1803		N	
Pimelodus quadratus Lucinda, Ribeiro & Lucena, 2016	N		
Pimelodus pohli Ribeiro & Lucena, 2006		N	
Pimelodus stewarti Ribeiro, Lucena & Lucinda, 2008 *	N		140
Pimelodus tetramerus Ribeiro & Lucena, 2006	N		142
Pinirampus pirinampu (Spix & Agassiz, 1829)	N		1/4/8/9/10/11/25/35
Platydoras costatus (Linnaeus, 1758)	N		4/143
Plesioptopoma curvidens Reis, Pereira & Lehmann, 2012 *		N	

Propimelodus araguayae Rocha, de Oliveira & Rapp Py-Daniel, 2007	N		
Pseudacanthicus pitanga Chamon, 2015	N		
Pseudauchenipterus flavescens (Eigenmann & Eigenmann, 1888)		N	
Pseudopimelodus charus (Valenciennes, 1840)		N	
Pseudoplatystoma corruscans (Spix & Agassiz, 1829)		N	
Pseudoplatystoma fasciatum (Linnaeus, 1766)	N		4/7/9/10/24/25/26/37/44
Pseudotatia parva Mees, 1974		N	
Pterodoras granulosus (Valenciennes, 1821)	N		1/25/35/44/144/145
Pterygoplichthys etentaculatus (Spix & Agassiz, 1829)		N	
Pterygoplichthys joselimaianus (Weber, 1991)	N		4/12/100
Rhamdia enfurnada Bichuette & Trajano, 2005		N	
Rhamdia foina (Müller & Troschel, 1849)	N		
Rhamdia itacaiunas Silfvergrip, 1996	N		
Rhamdia poeyi Eigenmann & Eigenmann, 1888	N		
Rhamdia quelen (Quoy & Gaimard, 1824)		N	
Rhamdiopsis microcephala (Lütken, 1874) *		N	
Rhinelepis aspera Spix & Agassiz, 1829 *		N	
Rhinolekos capetinga Roxo, Ochoa, Silva & Oliveira, 2015	N		146
Rhynchodoras xingui Klausewitz & Rössel, 1961 *	N		
Rineloricaria hasemani Isbrücker & Nijssen, 1979	N		
Rineloricaria osvaldoi Fichberg & Chamon, 2008	N		147
Scobinancistrus pariolispos Isbrücker & Nijssen, 1989 *	N		4
Scoloplax distolothrix Schaefer, Weitzman & Britski, 1989	N		
Sorubim lima (Bloch & Schneider, 1801)	N		1/4/7/8/9/10/11/24/25/26/37/62
Spatuloricaria nudiventris (Valenciennes, 1840)		N	
Spectracanthicus javae Chamon, Pereira, Mendonça & Akama, 2018	N		
Spectracanthicus tocantinensis Chamon & Rapp Py-Daniel, 2014	N		148
Squaliforma emarginata (Valenciennes, 1840)	N		1/9/10/22
Stegophilus insidiosus Reinhardt, 1859		N	

Sturisoma rostratum (Spix & Agassiz, 1829)	N		4/9/10
Tatia intermedia (Steindachner, 1877)	N		55/149
Tocantinsia piresi (Miranda Ribeiro, 1920) *	N		1
Trachelyopterus leopardinus (Borodin, 1927)		N	
Trichomycterus brasiliensis Lütken, 1874		N	
Trichomycterus concolor Costa, 1992		N	
Trichomycterus macrotrichopterus Barbosa & Costa, 2010		N	
Trichomycterus novalimensis Barbosa & Costa, 2010 *		N	
Trichomycterus punctatissimus Castelnau, 1855	N		
Trichomycterus reinhardti (Eigenmann, 1917)		N	
Trichomycterus rubbioli Bichuette & Rizzato, 2012 *		N	
Trichomycterus rubiginosus Barbosa & Costa, 2010		N	
Tridentopsis tocantinsi La Monte, 1939	N		
Trichomycterus trefauti Wosiacki, 2004		N	
Trichomycterus variegatus Costa, 1992		N	
Typhlobelus macromycterus Costa & Bockmann, 1994	N		
Xyliphius anachoretes Figueiredo & Britto, 2010	N		150
Zungaro zungaro (Humboldt, 1821)	N		4/9/10/11/25/26/37
BATRACHOIDIFORMES			
Potamobatrachus trispinosus Collette, 1995 *	N		
CYPRINIFORMES			
Ctenopharyngodon idella (Valenciennes, 1844)		I	39/151
Cyprinus carpio (Linnaeus, 1758)		I	39/151
Hypophthalmichthys nobilis (Richardson, 1845)		I	151
Hypophthalmichthys molitrix (Valenciennes, 1844)		I	151
CYPRINODONTIFORMES			
Anablepsoides tocantinenses (Costa, 2010)	N		152
Cnesterodon septentrionalis Rosa & Costa, 1993 *	N		
Cynolebias altus Costa, 2001		N	

Cynolebias attenuatus Costa, 2001		N	
Cynolebias elegans Costa, 2017		N	
Cynolebias gibbus Costa, 2001		N	
Cynolebias gilbertoi Costa, 1998		N	
Cynolebias gorutuba Costa, 2017		N	
Cynolebias griseus Costa, Lacerda & Brasil, 1990 *	N		14
Cynolebias leptocephalus Costa & Brasil, 1993 *		N	
Cynolebias obscurus Costa, 2014		N	
Cynolebias ochraceus Costa, 2014		N	
Cynolebias oticus Costa, 2014		N	
Cynolebias parietalis Costa, 2014		N	
Cynolebias perforatus Costa & Brasil, 1991		N	
Cynolebias porosus Steindachner, 1876		N	
Cynolebias rectiventer Costa, 2014		N	
Cynolebias roseus Costa, 2014		N	
Hypsolebias adornatus (Costa, 2000) *		N	
Hypsolebias alternatus (Costa & Brasil, 1994) *		N	
Hypsolebias auratus (Costa & Nielsen, 2000) *		N	
Hypsolebias brunoi (Costa, 2003) *	N	N	153
Hypsolebias carlettoi (Costa & Nielsen, 2004) *		N	
Hypsolebias delucai (Costa, 2003)		N	
Hypsolebias faouri Britzke, Nielsen & Oliveira, 2016		N	
Hypsolebias fasciatus (Costa & Brasil, 2006) *		N	
Hypsolebias flammeus (Costa, 1989) *	N		153
Hypsolebias flavicaudatus (Costa & Brasil, 1990) *		N	
Hypsolebias fulminantis (Costa & Brasil, 1993) *		N	
Hypsolebias ghisolfii (Costa, Cyrino & Nielsen, 1996) *		N	
Hypsolebias gibberatus (Costa & Brasil, 2006) *		N	
Hypsolebias gilbertobrasili Costa, 2012 *		N	

Hypsolebias guanambi Costa & Amorim, 2011 *		N	
Hypsolebias harmonicus (Costa, 2010) *		N	
Hypsolebias hellneri (Berkenkamp, 1993) *		N	
Hypsolebias igneus (Costa, 2000) *		N	
Hypsolebias lopesi (Nielsen, Shibatta, Suzart & Martín, 2010) *		N	
Hypsolebias macaubensis (Costa & Suzart, 2006) *		N	
Hypsolebias marginatus (Costa & Brasil, 1996) *	N		153
Hypsolebias mediopapillatus (Costa, 2006) *		N	
Hypsolebias multiradiatus (Costa & Brasil, 1994) *	N		153
Hypsolebias nielseni (Costa, 2005) *		N	
Hypsolebias nitens Costa, 2012		N	
Hypsolebias notatus (Costa, Lacerda & Brasil, 1990) *	N		
Hypsolebias picturatus (Costa, 2000) *		N	
Hypsolebias pterophyllus Costa, 2012		N	
Hypsolebias radiseriatus Costa, 2012		N	
Hypsolebias radiosus (Costa & Brasil, 2004)	N		
Hypsolebias rufus (Costa, Nielsen & de Luca, 2001) *		N	
Hypsolebias sertanejo Costa, 2012		N	
Hypsolebias similis (Costa & Hellner, 1999) *		N	
Hypsolebias stellatus (Costa & Brasil, 1994) *		N	
Hypsolebias tocantinenses Nielsen, Cruz & Junior, 2012 *	N		153
Hypsolebias trifasciatus Nielsen, Martins, de Araujo, de Lira & Faour, 2014		N	
Hypsolebias trilineatus (Costa & Brasil, 1994) *		N	
Hypsolebias virgulatus (Costa & Brasil, 2006) *		N	
Maratecoara formosa Costa & Brasil, 1995 *	N		
Maratecoara lacortei (Lazara, 1991)	N		
Maratecoara splendida Costa, 2007 *	N		
Melanorivulus imperatrizensis Nielsen & Pinto, 2015	N		
Melanorivulus crixas (Costa, 2007) *	N		154

Melanorivulus ignescens Costa, 2017	N		155
Melanorivulus jalapensis (Costa, 2010)	N		156
Melanorivulus javahe (Costa, 2007)	N		154
Melanorivulus karaja (Costa, 2007) *	N		154
Melanorivulus kayapo (Costa, 2006) *	N		
Melanorivulus kunzei Costa, 2012 *	N		
Melanorivulus litteratus (Costa, 2005) *	N		157
Melanorivulus paracatuensis (Costa, 2003)		N	
Melanorivulus petrisecundi Costa, 2016	N		154
Melanorivulus pindorama Costa, 2012 *	N		158
Melanorivulus planaltinus (Costa & Brasil, 2008) *	N		159
Melanorivulus rubromarginatus (Costa, 2007) *	N		154
Melanorivulus salmonicaudus (Costa, 2007) *	N		154
Melanorivulus spixi Costa, 2016	N		154
Melanorivulus ubirajarai Costa, 2012 *	N		
Melanorivulus violaceus (Costa, 1991) *	N		
Melanorivulus wallacei Costa, 2016	N		154
Melanorivulus zygonectes (Myers, 1927)	N		13/154
Neofundulus acutirostratus Costa, 1992		N	
Pamphorichthys araguaiensis Costa, 1991	N		1
Pamphorichthys pertapeh Figueiredo, 2008 *		N	
Phalloceros leticiae Lucinda, 2008	N		160
Phalloceros uai Lucinda, 2008		N	
Pituna compacta (Myers, 1927)	N		161
Pituna obliquoseriata Costa, 2007	N		
Pituna poranga Costa, 1989	N		
Plesiolebias aruana (Lazara, 1991)	N		162
Plesiolebias canabravensis Costa & Nielsen, 2007 *	N		162
Plesiolebias filamentosus Costa & Brasil, 2007	N		162

Plesiolebias fragilis Costa, 2007	N		162
Plesiolebias lacerdai Costa, 1989	N		162
Plesiolebias xavantei (Costa, Lacerda & Tanizaki, 1988) *	N		162
Simpsonichthys cholopteryx Costa, Moreira & Lima, 2003 *	N		
Simpsonichthys punctulatus Costa & Brasil, 2007 *		N	
Simpsonichthys zonatus (Costa & Brasil, 1990) *		N	
Spectrolebias costai (Lazara, 1991)	N		
Spectrolebias inaequipinnatus (Costa & Brasil, 2008)	N		163
Spectrolebias semiocellatus Costa & Nielsen, 1997	N		
Trigonectes rubromarginatus Costa, 1990	N		4
Trigonectes strigabundus Myers, 1925 *	N		
TETRAODONTIFORMES			
Colomesus asellus (Müller & Troschel, 1849)	N		1/4/14/16
Colomesus tocantinenses Amaral, Brito, Silva & Carvalho, 2013	N		14
OSTEOGLOSSIFORMES			
Arapaima gigas (Schinz, 1822) *	N		164/165
PERCIFORMES			
Acarichthys heckelii (Müller & Troschel, 1849)	N		
Aequidens tetramerus (Heckel, 1840)	N		4/51
Apistogramma tucurui Staeck, 2003	N		
Astronotus ocellatus (Agassiz, 1831)	N	I	4/39/44/151
Australoheros mattosi Ottoni, 2012		N	
Cichla kelberi Kullander & Ferreira, 2006	N	I	1/4/44/145/166/167
Cichla mirianae Kullander & Ferreira, 2006	N		166
Cichla monoculus Spix & Agassiz, 1831	N		39/145/166
Cichla ocellaris Bloch & Schneider, 1801	N	I	35/44/166
Cichla pinima Kullander & Ferreira, 2006	N		166
Cichla piquiti Kullander & Ferreira, 2006	N	I	1/4/9/10/44/145/166/167/168
Cichlasoma araguaiense Kullander, 1983	N		13/20/21/31

	Cichlasoma sanctifranciscense Kullander, 1983		N	13
	Coptodon rendalli (Boulenger, 1897)		I	39
	Crenicichla cametana Steindachner, 1911	N		
	Crenicichla compressiceps Ploeg, 1986	N		
	Crenicichla cyclostoma Ploeg, 1986 *	N		4
	Crenicichla jegui Ploeg, 1986 *	N		4
	Crenicichla labrina (Spix & Agassiz, 1831)	N		1/4/31
	Crenicichla lugubris Heckel, 1840	N		1/9/10/11/26/62
	Crenicichla stocki Ploeg, 1991	N		
	Geophagus neambi Lucinda, Lucena & Assis, 2010	N		169
	Geophagus proximus (Castelnau, 1855)	N		167
	Geophagus surinamensis (Bloch, 1791)	N		35
	Geophagus sveni Lucinda, Lucena & Assis, 2010	N		169
	Laetacara araguaiae Ottoni & Costa, 2009	N		1/167
	Mesonauta acora (Castelnau, 1855)	N		1/4
	Microphilypnus ternetzi Myers, 1927	N		
	Oreochromis niloticus (Linnaeus, 1758)		I	39/151/170
	Pachyurus francisci (Cuvier, 1830) *		N	
	Pachyurus junki Soares & Casatti, 2000	N		4/12
	Pachyurus paucirastrus Aguilera, 1983 *	N		1
	Pachyurus schomburgkii Günther, 1860	N		1/35/171
	Plagioscion squamosissimus (Heckel, 1840)	N	I	1/4/9/10/11/15/24/39/44/79/170
	Retroculus acherontos Landim, Moreira & Figueiredo, 2015	N		
	Retroculus lapidifer (Castelnay, 1855)	N		1/4/9/10/13/16/20/21/35/51/62/167/172
	Rondonacara hoehnei (Miranda Ribeiro, 1918)	N		
	Satanoperca acuticeps (Heckel, 1840)	N		4/51
	Satanoperca jurupari (Heckel, 1840)	N		167
	Teleocichla cinderella Kullander, 1988 *	N		
Amphibians	**ANURA**			

Adelphobates galactonotus (Steindachner, 1864)	N		1/2
Adenomera bokermanni (Heyer, 1973)		N	3/4
Adenomera hylaedactyla (Cope, 1868)	N	N	2/4/5/6/7
Adenomera martinezi (Bokermann, 1956)	N		
Allobates goianus (Bokermann, 1975) *	N		1/8/9
Ameerega flavopicta (Lutz, 1925)	N	N	1/3/4/5/8/9
Aplastodiscus arildae (Cruz & Peixoto, 1987)		N	4/10
Aplastodiscus cavicola (Cruz & Peixoto, 1985) *		N	4
Barycholos ternetzi (Miranda-Ribeiro, 1937)	N	N	2/4/5/6/8/9/11
Boana albopunctata (Spix, 1824)	N	N	1/3/4/5/6/7/8/10
Boana boans (Linnaeus, 1758)	N		1/4
Boana botumirim (Caramaschi, Cruz & Nascimento, 2009)		N	4
Boana buriti (Caramaschi and Cruz, 1999)		N	4
Boana cipoensis (Lutz, 1968) *		N	3/4
Boana crepitans (Wied-Neuwied, 1824)	N	N	4/8/10/12
Boana faber (Wied-Neuwied, 1821)		N	3/4
Boana geographica (Spix, 1824)	N		1/2
Boana goiana (Lutz, 1968)		N	4
Boana lundii (Burmeister, 1856)	N	N	1/3/4/5/6
Boana multifasciata (Günther, 1859)	N		1/2/4/5/8
Boana paranaiba (Carvalho, Giaretta & Facure, 2010)	N		6
Boana pardalis (Spix, 1824)		N	4
Boana polytaenia (Cope, 1870)		N	4/10
Boana raniceps (Cope, 1862)	N	N	1/2/4/5/6/7/9/12/13
Boana wavrini (Parker, 1936)	N		2
Bokermannohyla alvarengai (Bokermann, 1956)		N	3/4
Bokermannohyla circumdata (Cope, 1871)		N	3/4/10

Bokermannohyla diamantina Napoli & Juncá, 2006		N	4
Bokermannohyla ibitiguara (Cardoso, 1983)		N	4
Bokermannohyla martinsi (Bokermann, 1964) *		N	4
Bokermannohyla nanuzae (Bokermann and Sazima, 1973)		N	3/4
Bokermannohyla pseudopseudis (Miranda-Ribeiro, 1937)	N		1
Bokermannohyla ravida (Caramaschi, Napoli, and Bernardes, 2001)		N	4
Bokermannohyla sagarana Leite, Pezzuti & Drummond, 2011 *		N	4
Bokermannohyla saxicola (Bokermann, 1964)		N	3/4
Bokermannohyla sazimai (Cardoso and Andrade, 1982)		N	4
Ceratophrys aurita (Raddi, 1823) *		N	4
Ceratophrys joazeirensis Mercadal de Barrio, 1986		N	4
Chiasmocleis albopunctata (Boettger, 1885)	N	N	1/4/5/6/8/9
Corythomantis greeningi Boulenger, 1896		N	4/12
Crossodactylus trachystomus (Reinhardt & Lütken, 1862)		N	4
Dendropsophus anataliasiasi (Bokermann, 1972)	N		1
Dendropsophus cruzi (Pombal and Bastos, 1998)	N	N	1/4/5/6/7/11
Dendropsophus decipiens (Lutz, 1925)		N	4
Dendropsophus elegans (Wied-Neuwied, 1824)		N	3/4
Dendropsophus jimi (Napoli & Caramaschi, 1999)		N	4
Dendropsophus leucophyllatus (Beireis, 1783)	N		1/2
Dendropsophus melanargyreus (Cope, 1887)	N	N	1/2/4/5/7/8
Dendropsophus microcephalus (Cope, 1886)	N		1/2/7/8/12
Dendropsophus minutus (Peters, 1872)	N	N	1/2/3/4/5/6/7/8/10
Dendropsophus nanus (Boulenger, 1889)	N	N	1/2/4/6
Dendropsophus rubicundulus (Reinhardt & Lütken, 1862)	N	N	1/2/4/6/7
Dendropsophus soaresi (Caramaschi & Jim, 1983) *	N	N	1/4/5/6/7/12/13
Dermatonotus muelleri (Boettger, 1885)	N	N	1/2/4/7/8/12/13

Elachistocleis cesarii (Miranda-Ribeiro, 1920)	N	N	4/7/14
Elachistocleis ovalis (Schneider, 1799)	N		1/2/3/5/8/9/10
Haddadus binotatus (Spix, 1824)		N	3/4
Hylodes babax Heyer, 1982		N	4
Hylodes otavioi Sazima & Bokermann, 1983		N	3/4
Ischnocnema izecksohni (Caramaschi & Kisteumacher, 1989)		N	4
Ischnocnema juipoca (Sazima & Cardoso, 1978)		N	3/4/10
Ischnocnema surda Canedo, Pimenta, Leite & Caramaschi, 2010		N	4
Itapotihyla langsdorffii (Duméril & Bibron, 1841)		N	4
Julianus pinimus (Bokermann & Sazima, 1973)		N	4
Leptodactylus caatingae Heyer & Juncá, 2003		N	4
Leptodactylus camaquara Sazima & Bokermann, 1978		N	3/4
Leptodactylus chaquensis Cei, 1950		N	4
Leptodactylus cunicularius Sazima & Bokermann, 1978		N	4/10
Leptodactylus furnarius Sazima & Bokermann, 1978	N	N	1/3/4/6/8
Leptodactylus fuscus (Schneider, 1799)	N	N	1/2/3/4/5/6/7/9/12/13
Leptodactylus jolyi Sazima & Bokermann, 1978		N	3/4
Leptodactylus labyrinthicus (Spix, 1824)	N	N	1/2/3/4/5/6/7/8/9/12/13
Leptodactylus latrans (Steffen, 1815)	N	N	1/2/3/4/5/6/7/8/9/10/12/13
Leptodactylus mystaceus (Spix, 1824)	N	N	1/2/4/5/6/8/9
Leptodactylus mystacinus (Burmeister, 1861)	N	N	1/4/5/6/8/9
Leptodactylus petersii (Steindachner, 1864)	N		1/8/9
Leptodactylus podicipinus (Cope, 1862)	N	N	1/2/4/5/6/8
Leptodactylus pustulatus (Peters, 1870)	N		1
Leptodactylus sertanejo Giaretta & Costa, 2007	N		7/11
Leptodactylus syphax Bokermann, 1969	N	N	1/4/5/6/7/8/9/12/13
Leptodactylus troglodytes Lutz, 1926	N	N	1/2/4/7/12/13

Leptodactylus vastus Lutz, 1930	N		2
Lithobates catesbeianus (Shaw, 1802)	I		14
Lithobates palmipes (Spix, 1824)	N		1/15
Lithodytes lineatus (Schneider, 1799)	N		1
Odontophrynus americanus (Duméril & Bibron, 1841)		N	3/4/10
Odontophrynus carvalhoi Savage & Cei, 1965		N	4
Odontophrynus cultripes Reinhardt & Lütken, 1862	N	N	1/4
Ololygon canastrensis (Cardoso & Haddad, 1982)		N	4
Ololygon flavoguttata (Lutz & Lutz, 1939)		N	4/10
Ololygon longilinea (Lutz, 1968)		N	4
Ololygon luizotavioi Caramaschi & Kisteumacher, 1989		N	4/10
Ololygon machadoi (Bokermann & Sazima, 1973)		N	3/4
Ololygon skaios (Pombal, Carvalho, Canelas & Bastos, 2010)		N	4
Oreobates remotus Teixeira, Amaro, Recoder, Sena & Rodrigues, 2012		N	4
Phasmahyla jandaia (Bokermann & Sazima, 1978) *		N	3/4
Phyllomedusa burmeisteri Boulenger, 1882		N	4
Physalaemus albifrons (Spix, 1824)		N	4
Physalaemus centralis Bokermann, 1962 *	N	N	1/2/4/6/7/8/9/12/13
Physalaemus cicada Bokermann, 1966		N	4
Physalaemus crombiei Heyer & Wolf, 1989		N	4
Physalaemus cuvieri Fitzinger, 1826	N	N	1/2/3/4/5/6/7/9/10/13
Physalaemus deimaticus Sazima & Caramaschi, 1988 *		N	3/4
Physalaemus evangelistai Bokermann, 1967		N	3/4
Physalaemus kroeyeri (Reinhardt & Lütken, 1862)		N	4
Physalaemus marmoratus (Reinhardt & Lütken, 1862)		N	4
Physalaemus maximus Feio, Pombal & Caramaschi, 1999 *		N	4
Physalaemus nattereri (Steindachner, 1863)	N	N	1/2/4/6/7/8/9/11

Pithecopus ayeaye Lutz, 1966 *		N	4
Pithecopus azureus (Cope, 1862)	N		1/5/6/7
Pithecopus hypochondrialis (Daudin, 1800)	N		2/8/13
Pithecopus megacephalus (Miranda-Ribeiro, 1926)		N	3/4
Pithecopus nordestinus (Caramaschi, 2006)		N	4
Pithecopus oreades (Brandão, 2002)		N	4
Pleurodema diplolister (Peters, 1870)	N	N	1/4/7/12/13
Pristimantis fenestratus (Steindachner, 1864)	N		1/2
Proceratophrys bagnoi Brandão, Caramaschi, Vaz-Silva & Campos, 2013	N		6
Proceratophrys boiei (Wied-Neuwied, 1824)		N	4
Proceratophrys concavitympanum Giaretta, Bernarde & Kokubum, 2000	N		1
Proceratophrys cristiceps (Müller, 1883)	N		1/5/9/13
Proceratophrys cururu Eterovick & Sazima, 1998		N	3/4
Proceratophrys goyana (Miranda-Ribeiro, 1937)	N	N	1/4/5/7/8/9/11
Proceratophrys vielliardi Martins & Giaretta, 2011		N	4
Proceratophyrs carranca Godinho, Moura, Lacerda & Feio, 2013		N	4
Pseudis bolbodactyla Lutz, 1925	N	N	1/4/6
Pseudis tocantins Caramaschi & Cruz, 1998	N		1/2
Pseudopaludicola giarettai Carvalho, 2012		N	4
Pseudopaludicola mineira Lobo, 1994		N	3/4
Pseudopaludicola murundu Toledo, Siqueira, Duarte, Veiga-Menoncello, Recco-Pimentel & Haddad, 2010		N	4
Pseudopaludicola mystacalis (Cope, 1887)	N	N	1/2/4/7
Pseudopaludicola saltica (Cope, 1887)	N	N	1/3/4/7/8
Pseudopaludicola ternetzi Miranda-Ribeiro, 1937		N	4
Rhaebo guttatus (Schneider, 1799)	N		1/7/8
Rhinella crucifer (Wied-Neuwied, 1821)		N	4
Rhinella granulosa (Spix, 1824)	N	N	1/2/4/5/6/7/8/9/12/13

Rhinella inopina Vaz-Silva, Valdujo & Pombal, 2012		N	4
Rhinella margaritifera (Laurenti, 1768)	N		1/2/5
Rhinella mirandaribeiroi (Gallardo, 1965)	N	N	4/6/7
Rhinella ocellata (Günther, 1858)	N		1/5/7/8/9
Rhinella rubescens (Lutz, 1925)		N	3/4/10
Rhinella schneideri (Werner, 1894)	N	N	1/2/3/4/5/6/7/8/9/10/12/13
Rhinella veredas (Brandão, Maciel & Sebben, 2007)		N	4
Scinax cabralensis Drummond, Baêta & Pires, 2007		N	4
Scinax camposseabrai (Bokermann, 1968)		N	4
Scinax constrictus Lima, Bastos & Giaretta, 2005	N		6/7
Scinax curicica Pugliese, Pombal & Sazima, 2004		N	4
Scinax fuscomarginatus (Lutz, 1925)	N	N	1/2/4/5/6/7
Scinax fuscovarius (Lutz, 1925)	N	N	1/2/3/4/5/6/7/8/9/10/12/13
Scinax maracaya (Cardoso & Sazima, 1980)		N	4
Scinax nebulosus (Spix, 1824)	N		1/2
Scinax pachycrus (Miranda-Ribeiro, 1937)		N	4/12
Scinax rogerioi Pugliese, Baêta & Pombal, 2009		N	4
Scinax similis (Cochran, 1952)		N	4
Scinax squalirostris (Lutz, 1925)		N	3/4/10
Scinax tigrinus Nunes, Carvalho & Pereira, 2010		N	4
Scinax x-signatus (Spix, 1824)	N	N	2/4/8/12/13
Thoropa megatympanum Caramaschi & Sazima, 1984		N	3/4
Trachycephalus mambaiensis Cintra, Silva, Silva, Garcia & Zaher, 2009		N	4
Trachycephalus nigromaculatus Tschudi, 1838		N	4
Trachycephalus typhonius (Linnaeus, 1758)	N	N	1/2/3/4/5/6/7
Vitreorana eurygnatha (Lutz, 1925)		N	4/10
Vitreorana franciscana Santana, Barros, Pontes & Feio, 2015		N	4

	GYMNOPHIONA			
	Caecilia gracilis Shaw, 1802	N		2
	Siphonops paulensis Boettger, 1892	N		1/2/13/12/16
Reptiles	**TESTUDINES**			
	Acanthochelys radiolata (Mikan, 1820)		N	1/2/3/4
	Acanthochelys spixii (Duméril & Bibron, 1835)	N	N	1/2/3/4
	Chelus fimbriata (Schneider, 1783)	N		1/2/3/4
	Hydromedusa tectifera Cope, 1870a		N	1/2/3/4
	Kinosternon scorpioides scorpioides (Linnaeus, 1766)	N	N	1/2/3/4
	Mesoclemmys perplexa Bour & Zaher, 2005	N		1/2/3/4
	Mesoclemmys tuberculata (Luederwaldt, 1926)		N	1/2/3/4
	Mesoclemmys vanderhaegei (Bour, 1973)	N	N	1/2/3/4
	Phrynops geoffroanus (Schweigger, 1812)	N	N	1/2/3/4
	Podocnemis expansa (Schweigger, 1812) *	N		1/2/3/4
	Podocnemis unifilis Troschel, 1848 *	N		1/2/3/4
	Rhinoclemmys punctularia (Daudin, 1801)	N		1/2/3/4
	Trachemys dorbigni (Duméril & Bibron, 1835)	I	I	1/2/3/4
	CROCODYLIA			
	Caiman crocodilus crocodilos (Linnaeus, 1758)	N	N	2/3/4/5
	Caiman latirostris (Daudin, 1801)	N	N	2/3/4/5
	Melanosuchus niger (Spix, 1825)	N		2/3/4/5
	Paleosuchus palpebrosus (Cuvier, 1807)	N	N	2/3/4/5
	SQUAMATA			
	Eunectes murinus (Linnaeus, 1758)	N	N	2/3/4/6
	Eunectes notaeus Cope, 1862	N		2/3/4/6
	Helicops angulatus (Linnaeus, 1758)	N	N	2/3/4/6
	Helicops apiaka Kawashita-Ribeiro, Ávila & Morais, 2013	N		2/3/4/6

	Helicops hagmanni Roux, 1910	N		2/3/4/6
	Helicops leopardinus (Schlegel, 1837)		N	2/3/4/6
	Helicops modestus Günther, 1861	N	N	2/3/4/6
	Helicops polylepis Günther, 1861	N		2/3/4/6
	Helicops tapajonicus Frota, 2005	N		2/3/4/6
	Helicops trivittatus (Gray, 1849)	N		2/3/4/6
	Hydrodynastes bicinctus (Herrmann, 1804)	N		2/3/4/6
	Hydrodynastes gigas (Duméril, Bibron & Duméril, 1854)	N		2/3/4/6
	Hydrodynastes melanogigas Franco, Fernandes & Bentin, 2007 *	N		2/3/4/6
	Hydrops martii (Wagler *in* Spix, 1824)	N		2/3/4/6
	Micrurus lemniscatus (Linnaeus, 1758)	N	N	2/3/4/6
	Pseudoeryx plicatilis (Linnaeus, 1758)	N	N	2/3/4/6
	Xenodon rabdocephalus rabdocephalus (Wied-Neuwied, 1824)	N	N	2/3/4/6
Aquatic Mammals	**ARTIODACTYLA**			
	Infraorder Cetacea			
	Inia araguaiaensis Hrbek, Da Silva, Dutra, Farias, 2014 *	N		1/2/3
	Sotalia fluviatilis (Gervais & Deville, 1853) *	N		4
	CARNIVORA			
	Pteronura brasiliensis (Gmelin, 1788) *	N		5
	Lontra longicaudis (Olfers, 1818) *	N	N	5
Aquatic Plants	**ALISMATALES**			
	Alismataceae			
	Echinodorus	N	N	1/2/3/4/5/6/7
	Hydrocleys		N	2/3/4/5/6/7
	Limnocharis	N	N	1/2
	Sagittaria	N	N	1/4/8

Asclepiadaceae			
Roulinia		N	2/3
Araceae			
Lemna	N	N	4/6/7
Montrichardia		N	6/7
Pistia	N	N	1/2/3/4/5/6/7
Urospatha	N		1
Wolffia		N	2/3
Wolffxxiella		N	4/6
Xanthosoma	N		1
Hydrocharitaceae			
Apalanthe	N		1
Egeria		N	2/3/4/5/7/8
Najas	N	N	1/2/4/7/9
Valisneria		N	2
Potamogetonaceae			
Potamogeton		N	4/8
ASPARAGALES			
Amaryllidaceae			
Crinum		N	6
APIALES			
Araliaceae			
Hydrocotyle	N		7
ARECALES			
Arecaceae			
Copernicia		N	6
Euterpe		N	6

Mikania		N	4/5/6/7/8
ASTERALES			
Asteraceae			
Eclipta	N	N	1/4/5/7
Egletes		N	4/8
Enydra		N	4/6/7/8
Lepidaploa		N	4/5/8
Pluchea		N	4/7/8
Menyanthaceae			
Nymphoides	N	N	1/2/4/5/6/7/8
BORAGINALES			
Boraginaceae			
Euploca		N	4/5/7/8
Heliotropium		N	4/5/7/8
BRASSICALES			
Capparaceae			
Tarenaya		N	2/4/5/6/7/8
Cleomaceae			
Cleome		N	3
CARYOPHYLLALES			
Aizoaceae			
Sesuvium		N	4/8
Amaranthaceae			
Alternanthera		N	2/4/8
Amaranthus		N	4/7/8
Chenopodium		N	4/5
Dysphania		N	8

Droseraceae			
Drosera		N	6
Molluginaceae			
Glinus		N	4/5/8
Mollugo		N	4/7/8
Polygonaceae			
Polygonum	N	N	1/2/3/4/5/7/8
CHARALES			
Characeae			
Chara	N	N	1/2/4/5
COMMELINALES			
Commelinaceae			
Callisia		N	4/7/8
Commelina	N	N	1/2/7
Tripogandra		N	4/5
Pontederiaceae			
Eichhornia	N	N	1/2/3/4/5/6/7/8/9
Heteranthera	N	N	1/4/5/6/7/8
Hydrothrix		N	4/8
Pontederia	N	N	1/6/9
CURCUBITALES			
Cucurbitaceae			
Cucumis		N	2/3/4
Luffxa		N	4/8
FABALES			
Fabaceae			
Aeschynomene		N	2/4

Indigofera	N	4/8
Lonchocarpus	N	6
Machaerium	N	6
Macroptilium	N	4/6/7
Mimosa	N	4/6/7/8
Mucuna	N	6
Neptunia	N	4/5/6/7/8
Tephrosia	N	4/5/8
Vachellia	N	4/5
Leguminosae		
Sesbania	N	4/8
Polygalaceae		
Asemeia	N	8
GENTIANALES		
Apocynaceae		
Funastrum	N	6
Gentianaceae		
Schultesia	N	4/5/6/7/8
Rubiaceae		
Borreria	N	6/7
Diodella	N	4/6/7/8
Genipa	N	6
Machaonia	N	6
Mitracarpus	N	4/8
LAMIALES		
Acanthaceae		
Avicennia	N	6

Bignoniaceae			
Bignonia		N	6
Lamiaceae			
Mesosphaerum		N	7/8
Lentibulariaceae			
Utricularia	N	N	1/2/3/4/6/7
Plantaginaceae			
Anamaria		N	4/8
Angelonia		N	4/5/7/8
Bacopa	N	N	1/2/3/4/5/6/7/8
Scoparia		N	4/5/7/8
Stemodia		N	4/5/7/8
Verbenaceae			
Stachytarpheta		N	4/7/8
MALPIGHIALES			
Euphorbiaceae			
Bernardia		N	4/8
Croton		N	2/3/7/8
Euphorbia		N	4/5/7/8
Rhizophoraceae			
Rhizophora		N	6
MALVALES			
Malvaceae			
Hibiscus		N	6
Melochia		N	2/3
Peltaea		N	6/7
Talipariti		N	6

MARCHANTIALES			
Ricciaceae			
Ricciocarpus		N	2/3/4
MYRTALES			
Combretaceae			
Combretum		N	6
Conocarpus		N	6
Laguncularia		N	6
Lythraceae			
Ammannia		N	4/7/8
Pleurophora		N	4/7/8
Rotala		N	2/7
Onagraceae			
Crenea		N	6
Ludwigia	N	N	1/2/3/4/5/6/7/8/9
NYMPHAEALES			
Cabombaceae			
Cabomba	N	N	1/2/3/4/7
Nymphaeaceae			
Nuphar		N	2
Nymphaea		N	2/3/4/5/6/7/8
POALES			
Cyperaceae			
Bulbostyles	N		1
Bulbostylis		N	4/7/8
Cyperus	N	N	1/2/3/4/5/7/8
Eleocharis	N	N	1/2/3/4/5/7/8/9

Fimbristylis		N	4/7/8
Fuirema	N		1/4/7
Oxycaryum	N	N	1/2/3/4/5/7/9
Rhynchospora	N	N	1/4/7/8
Poaceae			
Brachiaria	I		9
Echinochloa		N	4/7/8
Eleusine		N	6
Eragrostis		N	4/5/6/7/8
Hymenachne		N	2/3/4/5/7/8
Luziola		N	4/5/7/8
Megathyrsus		N	6/7
Panicum		N	7/8
Paspalum	N	N	1/2/3/4/6/7/9
Typhaceae			
Typha		N	2/3/4/6/7/8
POLYPODIALES			
Pteridaceae			
Ceratopteris		N	2/3/4/5/7
Thelypteridaceae			
Thelypteris		N	2/3/7
SALVINIALES			
Salviniaceae			
Azolla		N	2/3/4/5/7
Salvinia	N	N	1/2/3/4/5/7/8/9
Marsileaceae			
Marsilea		N	2/4/7

SOLANALES		
Convolvulaceae		
Evolvulus	N	4/7/8
Ipomoea	N	2/3/4/5/6/7/8
Hydroleaceae		
Hydrolea	N	2/3/4/5/6/7
Solanaceae		
Physalis	N	4/6/7/8
ZINGIBERALES		
Cannaceae		
Canna	N	6

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Table S3 Summary of compositional similarities for each taxonomic group in Tocantins and São Francisco Rivers basins, considering only native assemblage (*i*), and the introduction of non-native species and extinction of threatened species (*ii*). Data source and methods are given in the Methods section

GROUP	COMPOSITIONAL SIMILARITY	
Mollusks	only native	0.081
	non-native indroduced / threatened extinct	0.209
Zooplankton	only native	0.143
	threatened extinct	0.154
Crustaceans	only native	0.316
	non-native indroduced / threatened extinct	0.388
Aquatic Insects	only native	0.338
	threatened extinct	0.332
Freshwater Fish	only native	0.016
	non-native indroduced / threatened extinct	0.056
Amphibians	only native	0.251
	non-native indroduced / threatened extinct	0.263
Reptiles	only native	0.394
	non-native indroduced / threatened extinct	0.452
Aquatic Mammals	only native	0.25
	threatened extinct	-
Aquatic Plants	only native	0.188
	non-native indroduced	0.226