

Influence of protected areas on fish assemblages and fisheries in a large tropical river

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TABLE S1 Number of individuals of each fish species dissected for diet analysis, with numbers included from literature when <10 individuals were analysed in this study.

Taxon	No. of fish analysed	No. of fish included from literature	Reference
Potamotrygonidae			
<i>Potamotrygon</i> aff. <i>hystrix</i>	0	102	Vasconcellos & Oliveira, 2011
Engraulidae			
<i>Lycengraulis batesii</i>	2	0	
Pristigasteridae			
<i>Pellona castelnaeana</i>	3	8	González & Vispo, 2003
Erythrinidae			
<i>Hoplias malabaricus</i>	3	49	Mérona & Rankin-de-Mérona, 2004
Ctenoluciidae			
<i>Boulengerella cuvieri</i>	7	8	Sá-Oliveira et al., 2014
<i>Boulengerella maculata</i>	24	0	
Chilodontidae			
<i>Caenotropus labyrinthicus</i>	3	6	Godoi, 2008
Hemiodontidae			
<i>Hemiodus argenteus</i>	7	183	Silva et al., 2008a
<i>Hemiodus goeldii</i>	63	0	
<i>Hemiodus</i> cf. <i>gracilis</i>	18	0	
<i>Hemiodus immaculatus</i>	38	0	
<i>Hemiodus microlepis</i>	1	13	Mérona & Rankin-de-Mérona, 2004
<i>Hemiodus unimaculatus</i>	21	0	
<i>Anodus orinocensis</i>	4	11	González & Vispo, 2003
<i>Anodus</i> sp.1	2	11	González & Vispo, 2003
<i>Argonectes robertsi</i>	6	0	
<i>Micromischodus sugillatus</i>	4	1	Freitas, 2007

Taxon	No. of fish analysed	No. of fish included from literature	Reference
Curimatidae			
<i>Curimatella alburna</i>	4	4	Mérona et al., 2001
<i>Curimata inornata</i>	0	8	Sá-Oliveira et al., 2014
<i>Curimata</i> cf. <i>ocellata</i>	1	1	Blanco-Parra & Bejarano-Rodríguez, 2006
<i>Curimata vittata</i>	7	12	Hawlitcshek et al., 2013
<i>Cyphocharax abramoides</i>	17	0	
<i>Potamorhina latior</i>	0	1	Mérona & Rankin-de-Mérona, 2004
Prochilodontidae			
<i>Semaprochilodus insignis</i>	2	23	Hawlitcshek et al., 2013
Anostomidae			
<i>Leporinus affinis</i>	1	70	Mérona et al., 2001
<i>Leporinus fasciatus</i>	7	0	
<i>Schizodon fasciatus</i>	0	100	Mérona & Rankin-de-Mérona, 2004
<i>Schizodon vittatus</i>	0	39	Mérona et al., 2001
<i>Laemolyta proxima</i>	6	4	Silva, 2006
Acestrorhynchidae			
<i>Acestrorhynchus falcistrostris</i>	16	0	
<i>Acestrorhynchus microlepis</i>	13	0	
Serrasalminidae			
<i>Serrasalmus elongatus</i>	0	47	Mérona & Rankin-de-Mérona, 2004
<i>Serrasalmus spilopleura</i>	5	94	Mérona & Rankin-de-Mérona, 2004
<i>Serrasalmus</i> sp.1	0	94	Mérona & Rankin-de-Mérona, 2004
<i>Serrasalmus</i> sp.2	0	94	Mérona & Rankin-de-Mérona, 2004
<i>Colossoma macropomum</i>	1	151	Mérona & Rankin-de-Mérona, 2004

Taxon	No. of fish analysed	No. of fish included from literature	Reference
<i>Myleus torquatus</i>	0	1	Mérona et al., 2001
<i>Metynnis lippincottianus</i>	1	8	Sá-Oliveira et al., 2014
<i>Catopirion mento</i>	0	24	Silva, 2006
Triportheidae			
<i>Agoniates halecinus</i>	3	46	Silva, 2006
<i>Triportheus auritus</i>	1	6	Sá-Oliveira et al., 2014
<i>Triportheus rotundatus</i>	0	169	Mérona et al., 2001
Iguanodectidae			
<i>Bryconops alburnoides</i>	6	322	Silva et al., 2008b
<i>Bryconops caudomaculatus</i>	1	23	Silva, 2006
<i>Bryconops giacopinii</i>	0	34	Melo et al., 2004
<i>Bryconops melanurus</i>	0	22	Melo et al., 2004
Bryconidae			
<i>Brycon</i> cf. <i>pesu</i>	13	0	
Pimelodidae			
<i>Pseudoplatystoma tigrinum</i>	1	1	Mérona et al., 2001
<i>Leiarius marmoratus</i>	0	5	Layman et al., 2005
<i>Hypophthalmus marginatus</i>	3	2	Mérona & Rankin-de-Mérona, 2004
Callichthyidae			
<i>Hoplosternum littorale</i>	3	7	Mérona & Rankin-de-Mérona, 2004
Loricariidae			
<i>Ancistrus</i> sp.	0	0	Trophic position adapted from FishBase (close relatives): Froese & Pauly (eds), 2014
<i>Limatulichthys griseus</i>	0	0	Trophic position adapted from FishBase (close relatives): Froese & Pauly (eds), 2014
<i>Loricariichthys acutus</i>	22	0	
Loricariidae sp.	0	0	Trophic position adapted from FishBase (close relatives): Froese

Taxon	No. of fish analysed	No. of fish included from literature	Reference
			& Pauly (eds), 2014
Doradidae			
Doradidae sp.	0	0	Trophic position adapted from FishBase (close relatives): Froese & Pauly (eds), 2014
Gymnotidae			
<i>Electrophorus electricus</i>	0	5	Mérona & Rankin-de-Mérona, 2004
Cichlidae			
<i>Acarichthys heckelii</i>	40	0	
<i>Cichla monoculus</i>	1	34	Mérona & Rankin-de-Mérona, 2004
<i>Cichla pinima</i>	39	0	
<i>Crenicichla marmorata</i>	0	0	Trophic position adapted from FishBase (close relatives): Froese & Pauly (eds), 2014
<i>Geophagus surinamensis</i>	21	0	
<i>Mesonauta festivus</i>	6	4	Mérona et al., 2001
<i>Satanoperca acuticeps</i>	28	0	
<i>Satanoperca jurupari</i>	28	0	
<i>Uaru amphiacanthoides</i>	11	0	
Sciaenidae			
<i>Plagioscion squamosissimus</i>	0	90	Mérona & Rankin-de-Mérona, 2004

TABLE S2 Species that individually accounted for at least 1% of the total biomass caught (18,241 kg) in 2,013 fish landings in the Tapajós River, in the Brazilian Amazon (Fig. 1), with their common name, frequency of occurrence, number of individuals caught, total mass, and origin.

Taxon	Common name	Frequency of occurrence (%)	No. of individuals	Total mass (kg)	Origin	
					Lakes (%)	Main river (%)
<i>Geophagus surinamensis</i>	Chaperema, acaratinga	20	9,411	868.93	33.13	66.87
Anostomidae	Aracu	20	8,319	1,922.61	50.81	49.19
Curimatidae	Branquinha, jaraquirana, jaraqui branco	7	1,948	209.05	54.48	45.52
<i>Brachyplatystoma rousseauxii</i>	Dourada	3	393	776.15	1.69	98.31
<i>Brachyplatystoma filamentosum</i>	Filhote	6	351	934.3	0	100
<i>Semaprochilodus insignis</i>	Jaraqui	18	12,349	3,050.83	56.84	43.16
<i>Hypophthalmus</i> spp.	Mapará	9	2,048	633.76	9.44	90.56
<i>Brycon falcatus</i>	Matrinchã, jatuarana	1	422	155.4	52.38	47.62
<i>Myloplus</i> spp., <i>Mylossoma</i> spp., <i>Metynnis</i> spp.	Pacu	7	1,609	232.97	53.79	46.21
<i>Plagioscion squamosissimus</i>	Pescada	25	8,838	1,926.2	11.71	88.29
Hemiodontidae	Charuto, piraruiira	11	21,772	1,626.1	30.98	69.02
<i>Pellona</i> spp.	Sarda	10	1,721	689	13.94	86.06
<i>Cichla</i> spp.	Tucunaré	15	1,156	925.59	41.9	58.1

TABLE S3 Fish species sampled in floodplain lakes of two protected areas (National Forest of Tapajós; Extractive Reserve of Tapajós–Arapuins) and an unprotected area in the lower Tapajós River (Fig. 1), with their index of relative importance for fisheries, trophic level, mean standard length, and abundance in each area in the high- and low-water seasons.

Taxa*	Index of relative importance	Trophic level	Mean standard length, cm (range)	High-water season			Low-water season		
				National Forest	Extractive Reserve	Unprotected	National Forest	Extractive Reserve	Unprotected
Pristigasteridae									
<i>Pellona castelnaeana</i>	0.7	3.8	40.93 (31.5–56.5)	2	1	2	1	0	0
Erythrinidae									
<i>Hoplias malabaricus</i>	0	3.9	25.56 (20.5–36.2)	0	0	0	0	4	2
Ctenoluciidae									
<i>Boulengerella cuvieri</i>	0	4	24.71 (22.5–28.7)	3	0	0	3	0	2
<i>Boulengerella maculata</i>	0	3.9	24.98 (17.4–28.5)	0	0	5	8	19	8
Hemiodontidae									
<i>Hemiodus argenteus</i>	4.69	2	15.39 (11.6–18.6)	0	3	2	1	0	5

Taxa*	Index of relative importance	Trophic level	Mean standard length, cm (range)	High-water season			Low-water season		
				National Forest	Extractive Reserve	Unprotected	National Forest	Extractive Reserve	Unprotected
<i>Hemiodus goeldii</i>	4.69	2	12.85 (8.5–17.5)	27	0	0	68	0	28
<i>Hemiodus cf. gracilis</i>	4.69	2	12.53 (11.2–14.3)	0	0	30	0	0	3
<i>Hemiodus immaculatus</i>	4.69	2.5	13.44 (11.3–19.1)	7	2	82	4	0	9
<i>Hemiodus unimaculatus</i>	4.69	2	13.56 (10.4–19.7)	7	16	7	1	0	1
<i>Argonectes robertsi</i>	4.69	2.6	19.38 (11.8–27.5)	4	4	0	0	1	0
Curimatidae									
<i>Cyphocharax abramoides</i>	0.27	2	11.72 (9–17.6)	0	0	0	3	7	11
Prochilodontidae									
<i>Semaprochilodus insignis</i>	6.68	2	21.26 (19.5–23.3)	1	1	0	0	0	1
Anostomidae									
<i>Laemolyta proxima</i>	4.83	2	14.58 (12.3–18.8)	0	0	0	10	6	0

Taxa*	Index of relative importance	Trophic level	Mean standard length, cm (range)	High-water season			Low-water season		
				National Forest	Extractive Reserve	Unprotected	National Forest	Extractive Reserve	Unprotected
Acestrorhynchidae									
<i>Acestrorhynchus falcirostris</i>	0	4	20.54 (8–28)	0	0	0	15	15	1
<i>Acestrorhynchus microlepis</i>	0	4	18.44 (9–35.5)	1	0	0	0	14	14
Serrasalminidae									
<i>Serrasalmus spilopleura</i>	0.01	3.2	15.9 (11.5–19)	0	0	0	1	6	0
Pimelodidae									
<i>Hypophthalmus marginatus</i>	0.61	3	43.63 (41.5–45)	0	1	3	0	0	0
Loricariidae									
<i>Loricariichthys acutus</i>	0	2.4	21.06 (17.5–24)	0	0	0	0	26	2
Gymnotidae									

Taxa*	Index of relative importance	Trophic level	Mean standard length, cm (range)	High-water season			Low-water season		
				National Forest	Extractive Reserve	Unprotected	National Forest	Extractive Reserve	Unprotected
<i>Electrophorus electricus</i>	0	3.4	110	1	0	0	0	0	0
Cichlidae									
<i>Acarichthys heckelii</i>	0	2.8	9.62 (6.1–14.1)	8	3	1	21	13	10
<i>Cichla monoculus</i>	1.14	3.8	27.25 (22.5–32)	0	0	0	0	2	0
<i>Cichla pinima</i>	1.14	3.9	15.33 (7.3–57)	8	13	19	2	9	9
<i>Geophagus surinamensis</i>	3.86	2.6	12.51 (6.8–20)	3	3	4	1	1	14
<i>Satanoperca acuticeps</i>	0	2.9	10.02 (6.8–13.6)	0	0	0	3	34	1
<i>Satanoperca jurupari</i>	0	3	18.68 (11.8–24.5)	8	0	0	22	8	0
<i>Uaru amphiacanthoides</i>	0.01	2.1	17.75 (15.5–22)	5	0	0	8	0	0

*Only taxa that comprised at least 1% of the total biomass sampled are included.