

Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 14, 3rd edition). A 4th edition of the Handbook is in preparation and will be available in 2009.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

October, 2013

3. Country:

Brazil

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Guaporé Biological Reserve (Reserva Biológica do Guaporé)

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

a) **Designation of a new Ramsar site** ; or

b) **Updated information on an existing Ramsar site**

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6. For RIS updates only, changes to the site since its designation or earlier update:

7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a hard copy (required for inclusion of site in the Ramsar List): ;
- ii) an electronic format (e.g. a JPEG or ArcView image) ;
- iii) a GIS file providing geo-referenced site boundary vectors and attribute tables .

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundaries of the Ramsar site coincide with the Guapore Biological Reserve, described in its legal instrument of creation (Federal Decree No. 87587 of September 20, 1982). To the north, the site is bounded by the São Miguel River, by the Preta Lagoon, by the Indigenous Land of Rio Branco and by the Igarapé (stream) Sete Galhos, to the east by Igarapé Consuelo and the Colorado River; to the south by the Extractive Reserve Pedras Negras, a farm called Pau D'Óleo and the Guaporé river (the Brazilian international border with Republic of Bolivia); and to the West, by the São Miguel river (Brasil, 1984).

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate center of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

12° 10' S and 62° 10' W

9. General location:

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Guapore Biological Reserve is located in the middle of the Guapore River valley, State of Rondônia, southwestern region of the Brazilian Amazon. Its located in the municipalities of São Francisco do Guapore and Alta Floresta D' Oeste (which correspond to 84% and 16% of the total area of the reserve, respectively), about 400 km from the state capital, Porto Velho, which has 428,527 inhabitants and about 70 km from the city of Costa Marques (where the headquarters of the reserve are located), with 13,678 inhabitants [distances in a straight line, the population of the municipalities are according to the IBGE census 2010]. Guapore Biological Reserve is located on a border region between Brazil and Bolivia.

10. Elevation: (in meters: average and/or maximum & minimum)

In the floodplains of the Guapore Biological the minimum elevation is 0 and the maximum elevation inside the Reserve is 495 meters above sea.

11. Area: (in hectares)

600.000,00 ha.

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12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Guapore Biological Reserve is a federal conservation unit with integral protection, considered of extremely high importance for the conservation of biological diversity in the Amazon (MMA, 2007) and highly effective in terms of protection, since it has kept more than 99 % of its forest coverage intact. It is characterized by comprising a remarkable heterogeneity of habitats resulting from its location, a transition region between the Amazon Forest and the Cerrado, with a predominance of aquatic ecosystems (“Áreas Úmidas do Rio Guaporé” - wetlands of Guaporé river, according to Junk (Junk *et al.*, 2013); represented by wetlands and extensive floodplains from rivers of clear water, lakes/lagoons, canals, bays and creeks. The Reserve encompasses a diverse flora, mainly herbaceous formations (grasslands) and forests (“igapó” forests and gallery) seasonally flooded, including wide “buritizais” and flooded savannas. It hosts a rich and diverse fauna, including endangered species.

Floodplains are important for the conservation of fish stocks, in addition to sheltering numerous threatened turtle populations along its beaches. We highlight the significant presence of herbivorous fish in the rivers of the Reserve as a result of the strong influence exerted by floodplain forests, as these are areas that have large quantities of food in the form of fruits and seeds, intensely utilized by most herbivores, particularly during the flooding period. Lakes and ponds also have determinant functions, since a considerable amount of commercial fish species, at some stage of their life cycle, occupy these environments. Another important feature of the Reserve is the fact that it includes part of the Guapore river, a river plain that presents certain stretches dark water and others with crystalline waters, that allow the visualization of sand banks of great aesthetic beauty (Abe,2007).

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13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the Explanatory Notes and Guidelines for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	•	2	•	3	•	4	•	5	•	6	•	7	•	8	•	9
x		x		x		x		<input type="checkbox"/>		<input type="checkbox"/>		x		x		x

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14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1: Guapore Biological Reserve constitutes one of the most unique and largest protected areas in Brazil (600,000 ha) comprising representative samples of forests (igapós) seasonally flooded by rivers of clear water and flooded grasslands, both types of wetlands poorly known and preserved in the Brazilian Amazon. These samples of forests are very representative for the Amazon region and also comprises gallery forests, marshy areas and “buritizais”, besides natural portions of flooded savannas (“cerradão” or forested savanna). The complex and diverse hydrologic/vegetation mosaic observed in the reserve includes samples of different types of wetlands peculiar to the plains

and swamps of the Guapore river valley. The southern boundary of the Guapore Biological Reserve is adjacent to the newly decreed Ramsar Site, the Blanco (Llanos de Mojos, Bolivia), and both are embedded in the complex regional wetlands of Mamore/Guapore/Beni (Junk *et al.*, 2011, Junk *et al.*, 2013).

Criterion 2: The high heterogeneity of habitats occurring in the Guapore Biological Reserve, predominantly represented by wetlands, enables the existence of communities rich in species and the maintenance of viable populations of several endangered species. The water bodies of the Reserve (rivers, bays, lakes/ponds, streams) support important populations of threatened species: *Pteronura brasiliensis* (otter; 'Vulnerable' Brazil, 2003; 'Endangered' IUCN, 2012; listed in Appendix I of CITES), *Colossoma macropomum* (tambaqui; 'Threatened of overexploitation in Brazil, 2004) and *Podocnemis sunifilis* (tracajá 'Vulnerable' IUCN, 2012), and *Lontra longicaudis* (Otter; 'Near Threatened' Biodiversitas 2005; Near Threatened in IUCN Red List; listed in Appendix I of CITES), *Inia geoffrensis boliviensis* (red dolphin; 'Near Threatened' Biodiversitas 2005; listed in appendix II of CMS), *Podocnemis expansa* ("tartaruga-da-amazônia", listed as Least Concern in IUCN Red List, 2012; listed in appendices I and II of CMS) and *Melanosuchus niger* ("jacaré-açu" ; listed as Least Concern in IUCN Red List and appendix II of CITES). In seasonally flooded forest formations ("igapó" forests, gallery forests and "cerrado") there is the occurrence of *Ateles chamek* (black-face spider monkey, 'Endangered' IUCN, 2012), *Tapirus terrestris* (tapir; 'Vulnerable IUCN 2012 and listed in appendix II of CITES), *Panthera onca* (jaguar; 'Vulnerable' Brazil 2003; Near Threatened in IUCN Red List; listed in Appendix I of CITES) and *Myrmecophaga tridactyla* (giant anteater; 'Vulnerable' Brazil 2003 and IUCN 2012 and listed in appendix II of CITES). Such environments in the reserve play a crucial role in maintaining nearly threatened or poorly known species as the *Tayassu pecari* ("queixada", Vulnerable IUCN 2012), *Saimiri ustus* ("macaco de cheiro"; 'Near Threatened' IUCN, 2012), *Alouatta puruensis* ("guariba", 'Data Deficient' Biodiversitas, 2005), *Atelocynus microtis* ("cachorro-do-mato-de-orelha-curta"; 'Data Deficient' Biodiversitas, 2005; 'Near Threatened' IUCN, 2012), *Harpia harpyja* ("gavião real"; 'Near Threatened' IUCN, Biodiversitas 2005 and 2012; and listed in Appendix I of CITES) and *Morphnus guianensis* ("uiracu-falso"; 'Near Threatened' IUCN, Biodiversitas 2005 and 2012, Gomes e Sanaiotti, 2015). Also, the floodplains of the Guapore Biological Reserve shelter one of the most important Amazonian populations of *Blastocerus dichotomus* ("cervo-do-Pantanal"; 'Vulnerable' Brazil, 2003 and IUCN, 2012; and listed in Appendix I of CITES), Duarte *et al.*, 2012, Tomas e Tiepolo, 2007).

Regarding the vegetation of the reserve, we observe a massive floristic diversity resulting from the ecotone between the Amazon and Cerrado (forest and savanna formations, respectively) biomes, combined with the physiographic peculiarities of the region (Dinerstein *et al.*, 1995). In the floodplain forests of the reserve there is an occurrence of endangered and legally protected species such as the "castanha do Pará" *Bertholletia excelsa* (listed as Vulnerable by the IUCN Red List), *Hevea brasiliensis* (rubber tree) and *Virola spp.* There is also copaiba, *Copaifera langsdorfii*, *Swietenia macrophylla* – Mahogany (Leite e Lleras, 1993).

Criterion 3: According to the Biological Diversity National Program (PRONABIO - MMA, 2007) the region in the middle reaches of the Guapore river, where the Guapore Biological Reserve is located, is classified as an "Area of Extreme Biological Importance," and among the priority areas for biodiversity conservation in Brazil. PRONABIO also highlights that the reserve has priority "A" ("Conservation Unit of Extreme Importance") and considers it as "extremely important" for the conservation of birds, reptiles and amphibians and of "Very High Importance" for the conservation of aquatic biota and mammals, being its main recommended goal, protection (Brasil, 2001, Brasil, 2007a, Brasil, 2007b). For mammals there are examples of Didelphimorphia: *Didelphis marsupialis*; Cingulata: *Dasyopus sp.*; Pilosa: *Bradypus variegatus*, *Tamandua tetradactyla*; Primates: *Alouatta caraya*, *Alouatta puruensis*, *Aotus nigriceps*, *Ateles chamek*, *Callicebus sp.*, *Sapajus apella*,

Pithecia irrorata irrorata, Saguinus fuscicollis weddelli, Saimiri ustus; Carnivora: Eira barbara, Cerdocyon thous, Lontra longicaudis, Nasua nasua, Panthera onca, Potos flavus, Pteronura brasiliensis; Perissodactyla: Tapirus terrestris; Artiodactyla: Blastocerus dichotomus, Tayassu pecari; Cetacea: Inia boliviensis; Rodentia: Coendou prehensilis, Cuniculus paca, Dasyprocta punctata, Hydrochoeris hydrochaeris, Isothrix bistrata, Neacomys spinosus, Urosciurus spadiceus (Alves et al, 2012).

The Reserve also constitutes one of the most important protected areas that comprise the Ecological Binational Corridor Bolivia-Brazil, called 'Ecological Corridor Guaporé-Itenez/Mamoré' (Bisaggio, 2011). The biological diversity in the Reserve is characterized by the existence of communities rich in species and representative of the biogeographic region in which it is inserted. Specifically, in relation to the wetlands of the reserve, some notable peculiarities are observed. The flooded forests (igapó) shelters eight species of primates, a similar species richness that is found in the upland forests of the Reserve, and the highest total biomass of primates among all vegetation types (414.9 kg/km²) (Alves, 2006, Alves, 2009, Alves e Santos Junior, 2010, Alves *et al*, 2012, Alves, 2013).

The flooded forests (igapó) of the Guapore Biological Reserve are also responsible for sustaining one of the highest population densities ever recorded in the Amazon of the threatened black-face spider monkey (*Ateles chamek*, 26.6 individuals/km²) and the highest biomass of this species throughout the reserve (249.5 kg/km²) (Alves, 2013). The rivers and lagoons of the Reserve are unique to the maintenance of residual populations of the endangered species; however, one of the most notable features of the Guapore Biological Reserve is the role that their flooded grasslands play for the maintenance and survival of those who are considered the last relictual populations (and one of the greatest concentrations) of threatened species *Blastocerus dichotomus* (cervo-do-Pantanal) in the western Amazonia (Damasceno, 2007, Tomas e Tiepolo, 2007, Duarte *et al*, 2012). The flooded grasslands of the Guapore Biological Reserve enshrine those who are considered the last relictual populations of *Blastocerus dichotomus* (cervo-do-Pantanal) in the western Amazonia (Brasil, 1984, Tomas e Tiepolo, 2007, Bisaggio, 2011, Duarte *et al*, 2012).

Criterion 4: Marginal lakes and ponds of the Guapore river are particularly favorable sites for sheltering and providing food resources to the populations of alligators *Melanosuchus niger*, during the dry season. The numerous sandbars and beaches formed during the dry season in the Guapore Biological Reserve play a critically important role for species of migratory aquatic birds and turtles. Regarding birds, for example, the “águia-pescadora” *Pandion Haliaetus* is observed in the Reserve during the reproductive rest of the species, for example, when it is winter in the northern hemisphere and individuals perform migrations to the southern hemisphere. The same is true for species of sandpipers of the genus *Calidris spp.* that migrate during the Arctic winter to the south, and the Guapore Biological Reserve is one of these sites which shelters groups of species during such periods. As for turtles, during the river floods, the species *Podocnemis expansa* and *P. unifilis* occupy different wetlands of the reserve, such as bays, lakes, flooded forests and rivers. However, each year, from the month of June, during the early breeding season, males and females of both species begin migrating out of these environments looking for beaches, especially along the Guapore river, to spawn collectively (Brasil, 1984, Fachin-Terán *et al*, 1995; Fachin-Terán e Vogt, 2004, Schneider *et al*, 2011).

Criterion 7: The fish fauna of the Guapore Biological Reserve presents a remarkable diversity, both in terms of number of species, as in regards to the lifestyle and reproductive/behavioral strategies of these species; being representative of the basins that drain to the valley of the Guapore river and adjacent systems (e.g. Mamore River). Preliminary sampling performed in Guapore River and its main tributaries identified more than 170 species of fish (Doria *et al*, 2004, Doria *et al*, 2008) Species representing different groups with different ecological characteristics are observed occupying the main types of wetlands in the Reserve. This includes species that live in open areas

of the rivers (*Pellona spp.*), species that are typically of lakes, streams and riverbanks (*Schizodon spp.* And *Leporinus spp.*), habitat-specific species that occur in rivers of clear water (*Brycon spp.* and *Myleus spp.*) and species that live at the bottom of lakes and rivers (*Oxydoras niger*, *Liposarcus pardalis*).

Criterion 8: Sand banks, usually situated on the margins or even forming islands mainly along the Guapore River, are important since they shelter highly adapted species, as some representatives of the Hemiodontidae family (*Hemiodus spp.*), that use these environments to obtain food resources. Very different ecological characteristics are observed in relation to the trophic structure of fish communities in the Reserve, with the occurrence of piscivorous (57%), carnivores (24%), herbivores (11%), omnivores (5%) and iliophagous (3%) species.

The flooded grasslands serve as breeding ground for fish populations, which depend on the hydrological cycle of the basin; having fewer predators than in the river channel, the young fish use these areas as a refuge. The fish spawning usually occurs during the flooding of the rivers. Thus, the eggs produced are carried by the current, usually conducted to lakes/lagoons and bays, or even portions of rivers further downstream, where they develop. Other species observed in the Reserve have special types of spawning, such as those that leave gonadal products in floating nests (*Hoplosternum spp.*, Callichthyidae), in holes dug in the bottom or riverbanks (*Liposarcus pardalis*, Loricariidae) and on hard substrates (*Cichla spp.*, Cichlidae). Rivers, streams and lakes of the Reserve provide protection and guarantee the survival of migrant fish species occurring in the Guapore River and its tributaries, once breeders move to places where the environmental conditions are more appropriate for the success of their offspring. This means environments where there is less probability of predation and increased food supply.

The rivers and floodplain forests environments of the Guapore Biological Reserve have fundamental importance for the threatened species *Colossoma macropomum* ('Threatened overexploitation': Brazil, 2004). This species undertakes upward migration through the water channels of the reserve, especially the Guapore river during the ebb and dry (May to October), and occupies the flooded forests of river banks and lakes, where there is greater availability of food during the flood (November to April).

Criterion 9: It is estimated that flooded grasslands occurring in the Guapore Biological Reserve and in some surroundings areas, shelter a population of $3,733 \pm 582$ individuals of *Blastocerus dichotomus* (cervo-do-Pantanal), with a density of 0.45 ± 0.07 individuals per km² (Tomas & Tiepolo, 2007). These estimates indicate that the Guapore Biological Reserve shelters regularly a percentage of >1% of the total population of this species, currently estimated at 25,000 mature individuals in Brazil (Duarte *et al.*, 2012).

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalization system that has been applied.

a) biogeographic region: Neotropical

b) biogeographic regionalization scheme (include reference citation):

Bioregion Amazon - rainforest ecoregion of Rondônia/Mato Grosso (Dinerstein *et al.*, 1995).

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The climate type according to Koppen Geiger Climate Classification System is Aw. The area of the Guapore Biological Reserve lies on the sediments of geomorphological units called "Guapore depression" and "Plains and Wetlands of Medium and High Guapore", which are characterized by an extensive flatland surface of uniform topography (altitudes less than 200 meters), with the occurrence of areas of permanent water accumulation and areas subject to periodic flooding, with greater influence of the Guapore, São Miguel and Branco rivers. The Reserve lies almost entirely covered by sediments of the Guapore River, designated Cenozoic Coverages, containing terrains with ages ranging from the Upper Precambrian to Quaternary. In the Reserve, various types of mineral soils occur, predominantly Oxisols, Plinthosols, Cambisols, Espodosols and Gleysols. In addition to these units, patches of Neosols still occur in small areas, consisting of mineral material or slightly thicker organic material (RADAM Brasil,1979).

The average annual rainfall ranges from 1500-1660 mm, with two markedly distinct seasons: dry (May to October) and rainy (November to April). The rainy season accounts for about 70% of the annual precipitation, with the first quarter of the year having the highest rainfall. The average rainfall for the driest months of the year are less than 50 mm/month. The relative humidity is less than 80%. The annual average temperature is of 25°C, being 33°C the mean maximum in the warmest quarter (August to October) and 15 °C the average minimum in the coldest quarter (May to July).

Chemical conditions of the water and soil of the Guapore river floodplains are variable. Analysis indicate that the Guapore river has a pH of 6.8 to 7.8 and; due to its good state of preservation it shows a moderate state of eutrophication (oligotrophic to mesotrophic). During the flood, the Guapore river has an average amplitude of flood pulse of 2.75 meters. All major rivers of the Guapore Biological Reserve are classified as rivers of clear water, with intermediate fertility between white water rivers and black water rivers (high and low fertility, respectively); average water temperature is 25.7 ° C and average electrical conductivity is 92.7 m S cm-1. Carries low amounts of suspended material, except during the rainy season (Abe,2007).

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The drainage basin of the Guapore river has a wide network made up mostly of mid-sized rivers and numerous streams, springs and lakes, in general, have major floods during the flooding season, which resembles a swampy area causing the occurrence of peculiar flora and fauna.

The basins of major rivers in the state of Rondônia, Brazil, that drain the Guapore river basin are the Cabixi, Pimenteiras, Corumbiara, Verde, Mequéns, Massaco, São Simão, Branco, Sao Miguel, Cautarinho, São Domingos and Cautário rivers. These rivers originate, in most cases, in the Chapada (Sierra) of Parecis and flow in the north-south direction, extending not more than 100 km, except São Miguel and Cautário exceeding 160 km from its origin through the mouth of the Guapore river. Part of the drainage area is outside the State of Rondônia, comprising areas of Bolivia and the Brazilian state of Mato Grosso. The main river basin, the Guapore river is born in the southern foothills of the 'Chapada do Parecis', at altitudes of approximately 650 m. Most of its route acts as a dividing line between Brazil and Bolivia.

The basin of the Guapore river has a surface area of 266,460 km², with an average slope of 0.790 m/km, total annual runoff of 27,865 hm³/year and average runoff coefficient of 0.28. The basin is inserted into three geomorphological units: “Planalto dos Parecis”, “Depressão do Guaporé” e “Planícies e Pantanaís do Médio e Alto Guaporé” consisting of plain surfaces created by processes of bi-plaination, by landscapes of flat tops, with different orders of magnitude and drainage depths, separated by valleys, and flattened areas resulting from periodically and permanently flooding accumulations. The region has a hot and humid climate, Equatorial type.

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18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The area of the Guapore Biological Reserve consists predominantly of extensive floodplains, of fundamental and great value to the ecology of the region, contributing directly

One of the main services provided by the wetlands of the Guapore Biological Reserve is the periodic water storage and its slow return to the streams and connected rivers, thereby reducing the fluctuations of the water level and the risk of catastrophic floods and droughts. Among other benefits to the natural environment and the population of the middle reaches of the Guapore river, are: the recharge of aquifers and groundwater, water purification, microclimate regulation and the maintenance of aquatic biodiversity and intra- and transcontinental migration processes.

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19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the Explanatory Notes & Guidelines.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • **Zk(a)**

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •

Vt • W • Xf • Xp • Y • Zg • **Zk(b)**

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • **Zk(c)**

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Ts (ca. 21% of the total area of the Reserve) 126,000 ha

Xf (ca. 20%): 120,000 ha

M

Tp

O

N

Y

Non-wetlands: upland forests and ground elevations (ca. 26% of the total area of the reserve).
156,000 ha

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20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Three main types of habitats can be observed in the Guapore Biological Reserve: the flooded terrain, the terrain not subject to flooding and the aquatic habitat. The flooded terrain environments are constituted by flooded forests (igapó), the grasslands, by the “Cerradão” and gallery forests; the non-flooded environments by the upland forests, the savanna formations (“campo cerrado”) of the Serra João Antunes and Serra Colorado; and the aquatic environments by the Guapore, São Miguel, Branco, São Simão, Massaco and Colorado rivers, by the Preta Lagoon (with an area > 500 ha) and by streams, springs and lakes/lagoons.

The area of the Reserve encompasses diverse plant formations, including areas periodically and/or permanently flooded, that present a peculiar physiognomic identity (Brasil,1984). As for the floodplain forests, two types of permanently flooded forests are observed in the Guapore Biological Reserve based on vegetation structure:

- i. Open floodplain forest: corresponds to about 17% of the total area, occurs in the north-central region of the Reserve, adjacent to upland forests and subject to seasonal flooding of São Miguel and Branco rivers for 5-6 months per year, with a flood pulse amplitude from 0.3 to 1.0 meter high. It is characterized physiognomically by the strong presence the palm genera *Euterpe* (acai), *Mauritia* (Buriti), *Iriarteia* (paxiúba) and *Astrocaryum* (murumuru), besides presenting great diversity of species of Leguminosae.
- ii. Dense floodplain forest: corresponds to about 3% of the total area, occurring on the south of the Reserve, is interspersed with bays and lagoons and influenced by the seasonal flooding of the Guapore River during 6-7 months per year, with a flood pulse width of 0.8 to 3.0 meters high.

The gallery forests, located in the seasonal floodplains of the San Miguel river margins, are restricted to narrow forested strips of width ranging from 50 to 1500 meters, surrounded by open vegetation, non-forest vegetation (grasslands), with a flood pulse amplitude from 0.3 to 1.2 meters high. Moreover, the southern boundary of the Reserve has unique portions of floodplain grasslands (“cerradão” or forested savanna), with a micro-topography characterized by small elevations of the terrain that are not subjected to flooding, arranged on a plain seasonally flooded by the Guapore river. Regarding flooded grasslands, they occur in distinct stages, as co-dominant in the landscape of the reserve, mainly in the Midwest region between the rivers of São Miguel and Branco, but also in the southeast portions of the Reserve. They are constituted by formations of herbaceous gramminoid and of ‘buritizais’, integrated to clogged ponds or that are under clogging, surrounded by ‘açáís” (*Euterpe*) and trees wrapped by lianas. The ‘buritizais’, with predominance of the palm *Mauritia* spp. (‘Buriti’), are established on land with semi-impeded drainage, which maintains a water slide for a long time or even throughout the year. Composing the general landscape of the Guapore Biological Reserve, there are stretches of the Guapore River as well as in some of its tributaries, substantial distributions of aquatic plants consisting of “aguapés” (*Eichhornia*) and robust grasses (*Echinochloa*), which develop forming extensive and compact colonies that can even obstruct large portions of these tributaries.

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21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.

Samples of flooded grasslands in the Guapore Biological Reserve limits constitute one of the last remaining representations of this type of vegetation around the Guapore river valley.

In the forests of the Reserve, both in flooded forests (igapó) as on the upland forests on dry land, there is the occurrence of species with significant economic importance and social value, both for wood supply and for non-timber products (fiber, medicinal plants, fruits, etc.), such as: *Sclerobium melanocarpum* (taxi-vermelho), *Vochysia guianensis* (quaruba), *Mezilaurus itauba* (itaúba), *Tetragastris altissima* (breu-manga), *Luehe aspeciosa* (açoita-cavalo), *Apuleia molaris* (amarelão), *Brosimum utile* (janitá), *Erismauncinatum* (cedrinho), *Aspidosperma album* (araracanga), *A. macrocarpon* (peroba), *Cedre laodorata* (cedro), *Manilka rahuberi* (maçaranduba), *Hymenolobium excelsum* (angelim), *Inga alba* (ingá), *Tabebuia sp.* (ipê), *Virola sp.* (ucúuba), *Xylopia sp.* (envira), *Orbignya sp.* (palmeira de babaçu) (Planoforo, 2006, Bentes-Gama *et al.*, 2007).

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22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.

In the floodplain forests (igapó) and in the gallery forests there are populations of *Alouatta caraya* ('bugio-preto'), whose observations on the Guapore Biological Reserve constitute the first records of the occurrence of this species in the state of Rondônia, since it is a typical animal in areas of Central Brazil. Still in relation to primates, it is evident that the number of species observed in the Reserve (=10 species) is higher than the average of communities of neotropical primates (6.0 ± 3.6 species) and similar to assemblies rich in species (10 -14 species) of the western Amazon (Alves, 2006, Alves 2006b). Considering only the southwestern Amazon, the study area is home to a greater number of species of primates, particularly in comparison to sites in the state of Rondônia (Brazil) and Bolivia, where the assemblies are constituted, on average, of 5-9 species.

The aquatic environments of the Reserve facilitate the maintenance of populations of the endangered *Colossoma macropomum* (tambaqui), considered one the most important fish, both among the fishing industry, as for fish farming throughout the Amazon region. It also shelters other fish species considered to have significant commercial importance in the Amazon, especially in fish markets in the Guapore river valley: *Phractocephalus hemiliopterus* ('pirarara'), *Cichla spp.* (peacock bass), *Serrassalmus spp.* ('piranha'), *Piaractus brachypomus* (pirapitinga), *Pseudoplatystoma fasciatum* ('pintado', "surubim") and *P. tigrinum* ('caparari'). These environments are also unique habitats for the conservation of other species intrinsically associated with these wetlands, for example, the Amazonian turtles, which in the Reserve are represented by five species: *Podocnemis unifilis* (tracajá), *P. expansa* (tartaruga-da-Amazônia), *Phrynops geoffroanus* (cangapara), *P. raniceps* (tartaruga-de-igapó) and *Chelusfm briatus* (matá-matá) [Fachín-Terán *et al.*, 1995]. The same applies to the crocodilians, mammals and aquatic birds, all of them with singular species in the Guapore Biological Reserve (see criterion 4).

Exotic Invasive Fauna: In 1950 a total of 66 buffalos (*Bubalus bubalis*) of the breeds denominated 'carabao' (swamp buffalo) and 'Jaffarabadi' (river buffalo) were introduced in areas adjacent to the Guapore Biological Reserve. Because of its easy adaptation to local conditions and the lack of adequate structures for their containment, the buffalo population grew out of control and significantly extended its area into the Reserve, and currently occupies part of the floodplain grasslands (Bisaggio, 2011, Ramos e Townsend,2012).

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The Guapore Biological Reserve has, directly and indirectly, various economic, social and cultural functions and values. The public visiting with educational purposes is legally permitted and encouraged. scientific research activities are also encouraged and held with prior permission, especially those aimed at the generation of scientific knowledge about the processes and ecological characteristics of the wetlands in the Reserve.

Approximately 65 % of the total area of the Guapore Biological Reserve is overlapped with the Indigenous Land of the Massaco, home of isolated indigenous groups (uncontacted). This overlap portion is located in the eastern part of the Reserve and includes the Serra João Antunes, where there are numerous headsprings of rivers and streams, as well as part of the Branco, São Simão, Massaco and Colorado rivers. In this area there are still flooded grasslands and forests (igapó). Thus, it can be assumed that there is a significant association of these isolated indigenous people with the wetlands mentioned above. The northern portion of the Reserve is contiguous with the Indigenous land of Rio Branco, of about 240,000 ha, where indigenous people of the Makurap, Tupari and five other groups, maintain historical link with the area of the Reserve, since their villages are distributed along the riverbanks of the Branco river, which connects the two protected areas. Indigenous people use the extension of the Branco river, inserted in the Reserve, as a mean of transportation to the Guapore river.

In the Guapore Biological Reserve, archaeological sites of extreme importance and, historical and cultural relevance, for the Guapore river valley region, can be found. Two housing-sites, with the remains of pottery, are located on the right bank of the Guapore river (sites 'Limeira' and 'Espírito Santo'), with dimensions of 800x150 and 500x200 meters, respectively. In the central region of the Reserve, on an island in the Branco River, lies a housing-site with the occurrence of fluvial gastropod sambaquis (deposits resulting from human activities consisting of shells of gastropod mollusks), denominated 'Monte Castelo' site, it has approximately 100 meters in diameter. Two other archeological sites are observed in areas surrounding of the Reserve, adjacent to its boundaries (sites 'Pau D'Oleo' and 'Baía Rica').

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional

knowledge and methods of management and use that maintain the ecological character of the wetland:

- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

a) within the Ramsar site:

The whole area of the Guapore Biological Reserve is considered the property of the Federal Government of Brazil and no titles are issued to private owners. However, a community of about 20 families of 'Quilombolas' (ethnic group consisting of African - Brazilian descendants of slaves) occupy about 7,000ha of the reserve (1% of total area), on the banks of the Guapore river. Currently, there is an ongoing process for the regularization and issuance of titles to the members of this community. The management and administration of the Guapore Biological Reserve is the responsibility of ICMBio (Chico Mendes Institute for Biodiversity Conservation), linked to the Brazilian Ministry of the Environment (MMA).

b) in the surrounding area:

The surroundings of the Guapore Biological Reserve consist predominantly of other categories of protected areas (indigenous lands, Brazilian state conservation units and Bolivian conservation units) and by large and small private properties. At the riverbanks of the São Miguel River, at the boundary of the Reserve, there is a small rural settlement of collective ownership, with approximately 100 inhabitants (village of 'Porto Murtinho').

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25. Current land (including water) use:

a) within the Ramsar site:

Members of the 'Quilombola' community (item 24a) residing within the Guapore Biological Reserve practice small-scale activities which basically comprises subsistence agriculture (*Manihot sp.* for flour production) and artisanal fishing, mostly performed in bays of the Guapore river. The stretch of the Guapore river constituting the boundaries of the Reserve (ca. 60 km) is used as the only means of navigation for the localities situated on both of the river margins (Brazil and Bolivia). Through it, sail from small canoes to large fishing and tourism boats occur, on the boundaries of the Reserve, when only education and research activities are permitted. The stretch of the São Miguel River, that also composes the boundaries of the Reserve (ca. 120 km), is used as the main access to the Guapore river by riverside communities. Scientific research activities are developed in the major aquatic environments of the reserve (water bodies and floodplain forests), especially in its western portion, between São Miguel and Branco rivers. Enforcement actions to curb the practice of environmental offenses within the Reserve are frequently carried out by agents of the agency responsible for its management.

b) in the surroundings/catchment:

In the surroundings of the Guapore Biological Reserve, areas for protection and nature conservation (protected areas), large private properties (farms) for agriculture and extensive cattle ranching, and small farms and settlements practicing farming and fishing livelihoods, can be observed. Small municipalities (<50,000 inhabitants) located in areas downstream of the Guapore River and its tributaries are directly benefited by the Reserve that provides the protection for the fish stocks and maintains the water quality.

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26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

The direct and/or indirect actions of the population of exotic invading buffaloes are impacting the local ecosystem in the Guapore Biological Reserve, with noticeable deleterious effects on the native biota in the area, in addition to disturbances in soil and hydrological flow. Studies conducted in the area of occupancy of the buffalo indicate major damages caused by these animals to the natural environment of the reserve, namely: soil compaction up to 10 cm deep, resulting from excessive grazing and trampling of animals; changing of the chemical composition of the soil (through pH reduction, reduction of organic matter and nutrient leaching); formation of large channels, which cause land drainage in areas covered by flooded grasslands; diversions of watercourses; formation of large muddy puddles (pits) during the dry season; collapse of the margins of the lagoons and small streams; suppression of the sub-wood in forested areas; death of several palm trees (eg, *Mauritia flexuosa*, *Mauritiella armata*, *Euterpe precatoria* and *Maximiliana maripa*) with low or no recruitment of new individuals of these species; changes in the development of some plant species (fitogenia) in grasslands (Bisaggio, 2011).

Furthermore, there are several indications of impact of buffaloes on the natural fauna of the reserve. 'Maguaris' (*Ciconia maguari*), for example, are birds that nest in the stems of aquatic plants, just above the water level. In the Guapore Biological Reserve, the flooded grasslands are ideal for these birds to nest, but the presence of buffaloes in this type of vegetation induced a reduction in the number of nests of the species in central portions of the fields and an increased abundance in the peripheral areas. The flooded grasslands also serve as breeding ground for fish populations; with the trampling of the buffaloes in these areas, drainage channels are formed and end up draining the water into the rivers before the minnows reach a larger size, becoming more susceptible to predators.

Annually, during the dry season, especially in August to October, the Guapore Biological Reserve is affected by constant fire outbreaks. A total of 95% of these outbreaks occur in areas covered by grasslands that during the dry season accumulate considerable amount of flammable material (dry vegetation). It can be inferred that there are various causes for fire within the Reserve, such as agricultural activities, criminal fires and even of natural origin, such as lightings.

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Another adverse factor is related to amateur and/or professional fishing that, although forbidden, because is a Biological Reserve where only activities related with educational purpose and researches are permitted, it occurs with some frequency within the Reserve, mainly in São Miguel River. This activity, when performed in an excessive and selective way, causes direct impacts on the fisheries resources of the Reserve. Besides hindering the reproduction of various species of fish and turtles, fires often occur because of the fishing camps along the rivers (Doria *et al*, 2004).

With regard to land use by the resident 'Quilombola' community within the Reserve, mainly

livelihood activities are developed, which does not cause a major damage to the environment, they grow in small spaces, using fire safely, after opening firebreaks. There is no deforestation for planting in new areas, because rotation is performed annually in already deforested areas.

b) in the surrounding area:

The surroundings of the Guapore Biological Reserve are in a rapid and disorderly process of human occupation, with a high population increase. The areas of higher pressure have high rates of deforestation and are characterized by intensive agriculture and logging, and during the 1990s illegal logging was frequent within the reserve. Despite not having official data, these disturbed areas also have a strong hunting pressure, since this activity, although forbidden, is often associated with the everyday countrified way of life in this Amazon region. The progressive expansion of the road networks through the establishment of several local secondary roads, known as "lines", some of them reaching the limits of the Reserve, increases greatly the negative impacts of the surrounding areas on the Guapore Biological Reserve. These pathways ultimately provide access for fishermen, hunters and loggers in areas around, and inside the Reserve.

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27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The site constitutes a conservation unit of integral protection, classified as 'Biological Reserve'. According to the Brazilian Conservation Units System (SNUC), this category aims at the full preservation of the biota and other existing natural attributes within its limits, without direct human interference or environmental changes. The Guapore Biological Reserve was established in 1982 by Federal Decree No. 87587 of September 20, 1982, with an area of approximately 600,000 hectares.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?

The Guapore Biological Reserve has a 'Management Plan' prepared in 1984 (Brazil, 1984) which is outdated and currently useless for the adequate management of the Reserve. It is planned, until 2019, the revision of this document and its proper implementation (item 28).

d) Describe any other current management practices:

Annually, a "Guapore Biological Reserve Protection Plan" is prepared, a document that summarizes all the issues related with the protection of the reserve, such as: identifying priority areas for the development of surveillance activities, planning routine surveillance practices, monitoring, etc.

Since 2006, an "Annual Operating Plan for the Prevention and Combat of Fire" is also produced containing a set of proposals to guide the actions that aim to prevent the occurrence of fire and/or act to counter this, if necessary.

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28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

-Recently, a management project was created to deal with the population of buffaloes that invaded the Guapore Biological Reserve, aiming at the eradication of these animals in the area (Ramos & Townsend, 2012). The beginning of its implementation is planned for the coming years.

-The process of reviewing the 'Management Plan' of the Reserve, and its consequent implementation is planned to be launched in the coming years.

-There is a proposition for the installation of observation towers at strategic points of the Reserve, to help monitor fires in forests and grasslands;

-Proposals are being developed to extend the boundaries of the reserve to cover at least three new not protected areas, which include floodplain forests and grasslands;

-In order to set milestone and signs around the perimeter of the reserve, a specialized company is being hired. In addition, funds are being raised for hiring a specialized company in order to conduct a survey on the situation of land tenure of the entire surroundings of the Reserve;

-Reforms and expansion of the Reserve headquarters, located on the banks of the Guapore River, is being planned, as is the installation of a basic and advanced surveillance structure by the São Miguel River, besides the construction of an advanced research and monitoring base in the São Miguel River.

-It was proposed an allocation of financial resources to assist the development of scientific research in the area, aiming the generation of knowledge to support management actions that need to be implemented.

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29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Since the year 2010, a project called 'Primates in protected areas of the Amazon, it is being prepared management plans and the assessment of the species conservation status' is being developed at the Guapore Biological Reserve, whose goal is to generate data on the occurrence of primates in protected areas of the Amazon, in order to support the management plans, action plans and the correct assessment of the species conservation status. The working group is formed by environmental analysts of the Chico Mendes Institute (ICMBio), linked to the National Research and Conservation Center for Amazonian Biodiversity (CEPAM), the National Research and Conservation Center for Brazilian Primates (CPB) and six federal conservation units, as well as researchers from the Goeldi's Museum (MPEG) and the Wildlife Conservation Society (WCS).

In the year 2012, the project 'Inventory of terrestrial mammals of medium and large size, as subsidies towards the management of less known Federal Conservation Units' began, seeking to obtain, through visual contact, vocalizations, evidence and records through camera traps, the richness of mammals of medium and large size in conservation units with gaps in knowledge, and also for those who need information to assist in further development of management actions due to human pressures (Beisiegel *et al.*, 2013). Besides the Guapore Biological Reserve, there are four other conservation units in the project, which is coordinated by the National Research and Conservation Centre for Carnivorous Mammals (CENAP).

Researchers members of the 'Expert Group on Brazilian Wetlands', linked to the National Institute of Science and Technology in Wetlands (INAU) conducted expeditions in the Guapore Biological Reserve and are currently in preparation of a detailed classification of the wetland areas of the Guapore river. The facilities available to support the development of researches include: a

headquarters within the reserve with accommodations (capacity for 20 people) and internet access, a base that supports up to five people and an administrative office with internet and phone. The reserve also has a system composed of thirteen (13) survey transects, with an average of 4 km in length each, set in four different forest vegetation types (upland forest, floodplain dense forest, open swamp forest and ‘Cerradão’).

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30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

Environmental education activities are conducted with students from public schools in neighboring counties, especially regarding the issue of forest fires and their causes, consequences, prevention and combat forms. Such activities are developed in a way to present the Reserve as an integral protection area, showing its importance in the conservation of flora and fauna, especially endangered species, thus highlighting the damage that fire can bring to the natural environments.

Every year, since 2001, the Reserve performs a training called ‘Curso de Formação de Brigadas para Prevenção e Combate aos Incêndios Florestais’ (Brigade Training Course for Prevention and Combat of Forest Fires), empowering thirty (30) participants on issues related to natural fires. Of this total, fourteen (14) participants are selected to be hired temporarily for a period of 6 months (July to December). Thus, they form a brigade to prevent and combat fires on the Reserve, whose main activity is the application of techniques to reduce the risk of fire outbreaks (e.g. preparation of firebreaks, clearing of trails) and also to combat fires *in loco* that affect the area.

In 2013 the advisory board of the Guapore Biological Reserve was created, with the function to contribute towards an effective implementation of the creation objectives and implementation of the management plan on the Reserve, among other duties. This council is composed of representatives of civil society and by federal, state and municipal agencies (Brasil, 2013).

In recent years, Master’s dissertations developed within the reserve, related to the ecology of primates (Alves, 2013), and the population of exotic buffalo’s invaders (Bisaggio, 2011) were completed.

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31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Recreation and tourism activities are not permitted in this category of protected area (Biological Reserve). The only activities permitted are the ones related with educational purpose and researches.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Chico Mendes Institute for Biodiversity Conservation - ICMBio – Coordenação Regional nº 1

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33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

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34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalization scheme applied (see 15 above), list full reference citation for the scheme.

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