



RED LIST ASSESSMENT OF MADAGASCAR'S FRESHWATER FISHES

August 2004

This work has been completed with funding provided by Conservation International and is based on previous work by the IUCN/SSC Conservation Breeding Specialist Group (CBSG)

Assessment of the Threatened Status (2001 IUCN Red List Categories & Criteria) of the Endemic Freshwater Fishes of Madagascar

Project Background

Current activities of the Conservation International programme in Madagascar are focused on the identification of Key Biodiversity Areas (KBAs) for use in conservation planning. One of the main criteria for identifying KBAs is the presence of threatened species assessed according to the IUCN Red List Categories and Criteria. Assessments of the threatened status of Malagasy freshwater fishes had not been completed and those few species listed on the 2003 IUCN Red List of Threatened Species are based on assessments completed in 1996 and needed to be re-assessed.

The process of Red Listing all of Madagascar's endemic freshwater fishes was initiated in May 2001 when the IUCN/SSC Conservation Breeding Specialist Group (CBSG) ran a workshop in Madagascar to assess the conservation status of lemurs, other mammals, reptiles, amphibians and freshwater fishes. One major output of the workshop was the assessment of species threatened status according to the 2001 IUCN Red List Categories and Criteria. However, to complete the process it was required that each assessment also be evaluated by two people who are independent of the original assessors. These evaluations aim to ensure that the Categories and Criteria have been applied correctly and that the full range of relevant information has been sourced and applied in making the assessments. The Red List assessments made of 98 endemic freshwater fish taxa were not able to be evaluated at that time. Information on the threatened status of freshwater fishes in Madagascar currently remains insufficient to identify KBAs to safeguard these taxa.

This project aimed to update the species assessments made in 2001 and to then evaluate the assessments and submit them for inclusion in the IUCN 2004 Global Red List of Threatened Species.

Methods

Evaluation of these assessments is required to provide the rigorous quality control required before an assessment can be included in the IUCN Global Red List of Threatened Species. For the evaluations, it is required that at least two (named) people evaluate each assessment and the accompanying documentation and inform the IUCN Red List if each is an acceptable listing according to the 2001 IUCN Red List Category and Criteria rule set (see <http://www.iucn.org/themes/ssc/redlists/RLcats2001booklet.htm>) and also if the documentation reflects the current state of knowledge about each taxon. (Annex 3 of the Red List Categories booklet, specifies what documentation should accompany each listing). In this case Drs Stiassny and Sparks of the American Museum of Natural History have worked to ensure the information and documentation used in the assessments is complete and current. This work was conducted in close consultation with the main expert involved in the original assessments, Dr Loiselle. Dr Darwall has worked to ensure that the 2001 IUCN Red List Category and Criteria rule set have been applied correctly and in accordance with the information provided.

Results

This project has evaluated and updated the Red List assessments for 98 endemic fish species most of which were previously assessed during the 2001 workshop (CBSG). All assessments have been submitted for inclusion in the IUCN 2004 Red List of Threatened Species (<http://www.redlist.org/>) which is expected to be launched in October 2004. An

additional four taxa could not yet be evaluated as they are currently undescribed species for which there are no known voucher specimens.

The threatened status of the 98 endemic fish taxa assessed is presented in the report below and is summarised in figure 1. A summary of the five criteria used to evaluate if a species belongs in a category of threat is provided in Appendix 1.

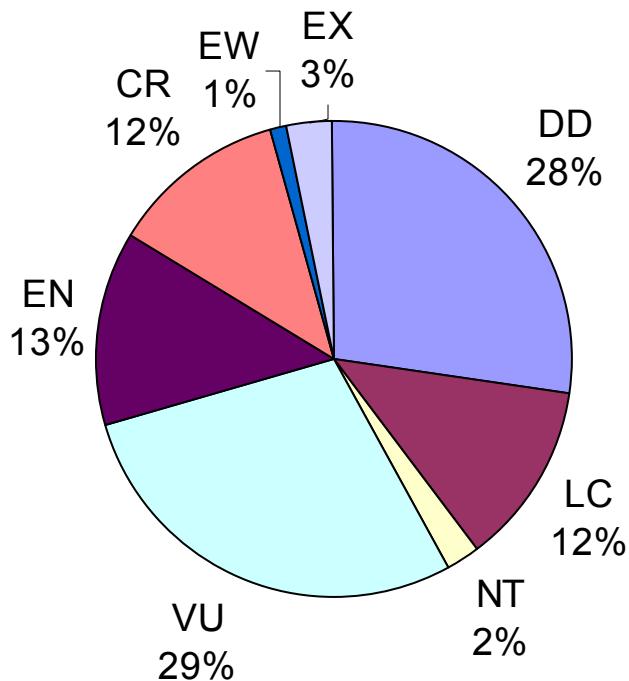


Figure 1. Proportion of species assessed within each of the categories. Threatened species are those in categories CR, EN and VU.

This level of threat (54% threatened and 4% already extinct) is considered extremely high when compared with the global levels known for other groups such as the birds (12% threatened) and mammals (24% threatened).

The main threats to the Madagascar fishes were identified as:

- i) Deforestation of associated catchments. This activity has led to increased sedimentation of river habitats, particularly spawning beds, erosion of river banks leading to alterations in water flow, and loss of nutrient input.
- ii) Introduced exotic fish species. A number of non-native freshwater fish species have been introduced for fishery and aquaculture purposes. These species will often present a major threat to the endemic species through predation and competition for resources.
- iii) Conversion of wetland habitats for farming, particularly for rice fields. A number of taxa (e.g. *Pantanodon* spp.) are dependant upon wetland habitats such as marshlands. The loss of these habitats has had a clearly negative impact on these reliant taxa.

Distribution maps

The distribution maps have been updated from the original assessments made during the CAMP workshop through consultation with Dr Loiselle. This process took note of the new information provided in the rational in the Red List assessment for each taxon. To maximise the utility of this information in the conservation planning process the maps were

digitised using GIS software by staff at the IUCN Freshwater Biodiversity Assessment Programme in Cambridge, UK.

The maps produced for this report show the point locations where the species have been recorded and highlight the river basins that are associated with those point locations. It should not be inferred that the species necessarily occurs throughout the whole river basin but this is assumed until further information is obtained to prove otherwise.

Taxonomic changes

There have been 4 taxonomic updates to species listed in the original CAMP report and the subsequent Red List Assessment (May 2004). Also on recommendation by Dr Loiselle the names of 8 undescribed species have been changed.

Taxonomic updates

<i>Paratilapia typus</i> (Bleeker 1878)	= <i>Paratilapia</i> sp. Fony
<i>Ptychochromoides itasy</i> Sparks 2004	= <i>Ptychochromoides</i> sp. Lac Itasy
<i>Sicyopterus punctissimus</i> Sparks & Nelson 2004	= <i>Sicyopterus</i> sp. "Masoala"
<i>Awaous macrorhynchus</i> (Bleeker 1867)	= <i>Chonophorus macrorhynchus</i>

Changes to undescribed taxa

New name

<i>Bedotia</i> sp. "Ankavia-Ankavanana "
<i>Bedotia</i> sp. "Garassa"
<i>Bedotia</i> sp. "Namorona"
<i>Pachypanchax</i> sp. "Varatraza"
<i>Paratilapia</i> sp. "Vevembe"
<i>Paretroplus</i> sp. "Giant Lamena"
<i>Paretroplus</i> sp. "Giant Lamena"
<i>Ptychochromoides</i> sp. "Green Garaka"

Previous name

= <i>Bedotia</i> sp. "Antalaha"
= <i>Bedotia</i> sp. "Ankarefo"
= <i>Bedotia</i> sp. "Ranomafana"
= <i>Pachypanchax</i> sp. "Menambery"
= <i>Paratilapia</i> sp. "Vondrozo"
= <i>Paretroplus</i> sp. "Ankafarantsika"
= <i>Paretroplus</i> sp. "Mahajamba"
= <i>Ptychochromoides</i> sp. "Tcipoy vert"

Red List Assessments and Species Distributions

Assessors: Loiselle, P. & participants of the CBSG/ANGAP CAMP "Faune de Madagascar", Mantasoa, Madagascar 2001.

Evaluators: Stiassny, Sparks & Darwall

Distribution maps: Loiselle, P.

Order: Atheriniformes
Family: Atherinidae

Teramulus kierneri Smith 1965

Category
DD

Rationale

It is unclear whether this species is distinct from the other (single or multiple) species of *Atherinomorus* known from Madagascar. It is assessed as DD.

Data sources (Reference Numbers)
85



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

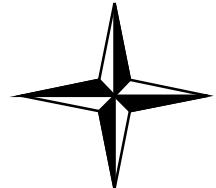


River basin



Associated river basin

N



Teramulus waterloti (Pellegrin 1932)

Category

EN

Criteria

B1ab(i,iii)+2ab(i,iii)

Rationale

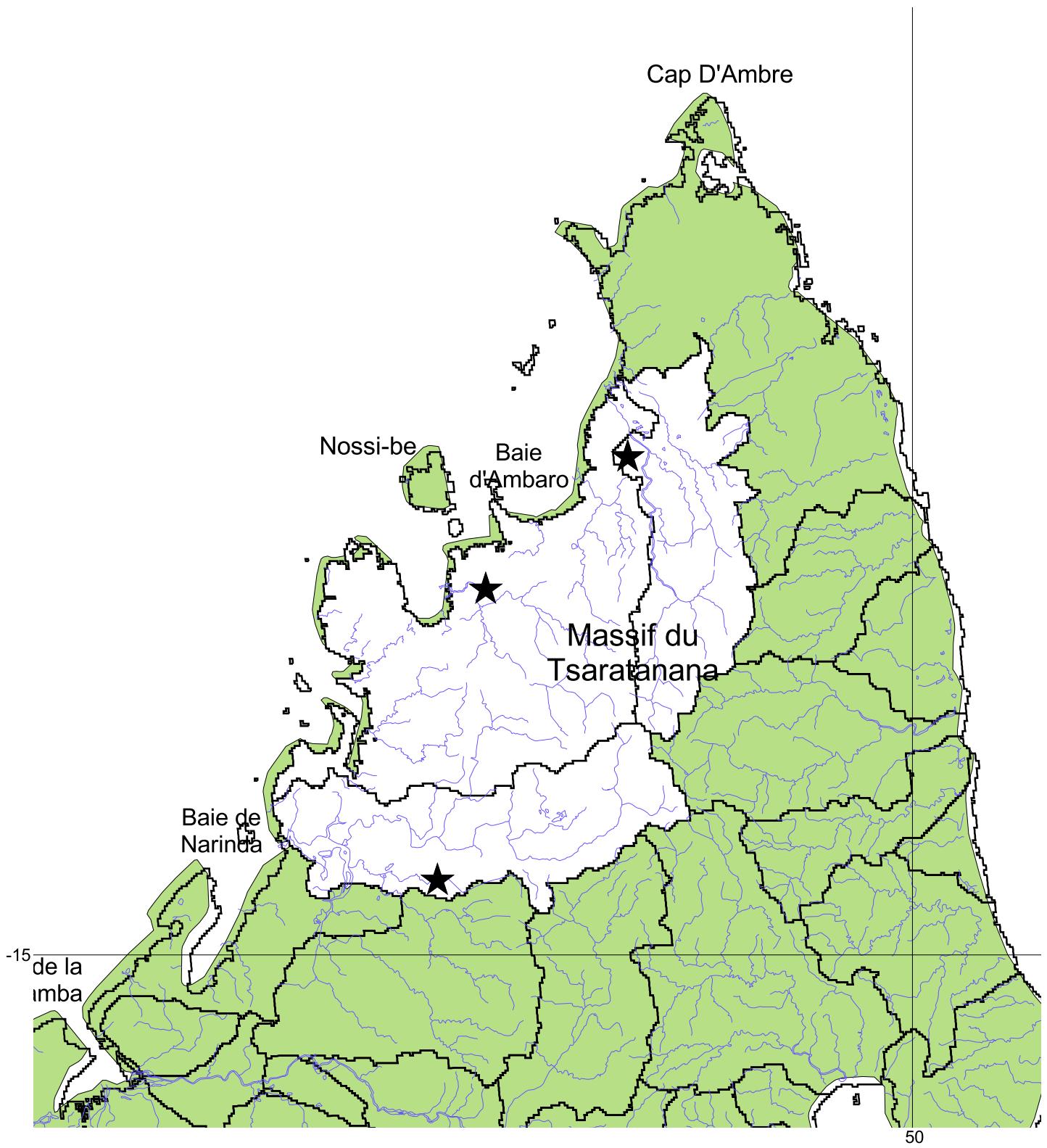
The reported range of this species extends from the Ifasy River southwards to the Anjingo River. Prior to the mid 1990s this species had not been recorded from collections in decades. It is very patchily distributed over this region (EOO and AOO are <5,000km² and <500km², respectively). While the Anjingo populations have to deal with both habitat degradation as well as exotic competitors and predators, the more northerly sub-populations currently do not. Despite the apparent lack of immediate threats to the sub-populations from basins to the north of the Anjingo River, the restricted EOO and number of known locations for this species, combined with the high degree of habitat degradation in the region, justifies its classification as EN.

Data sources (Reference Numbers)

62, 85



Teramulus waterloti



20 0 20 40 60 80 Kilometers



Rivers

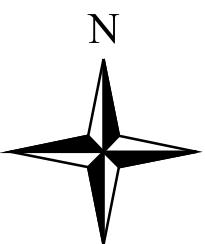


Recorded point location



River basin

Associated river basin



Order: Atheriniformes**Family: Bedotiidae**

Bedotia geayi Pellegrin 1907

Category

VU

Criteria

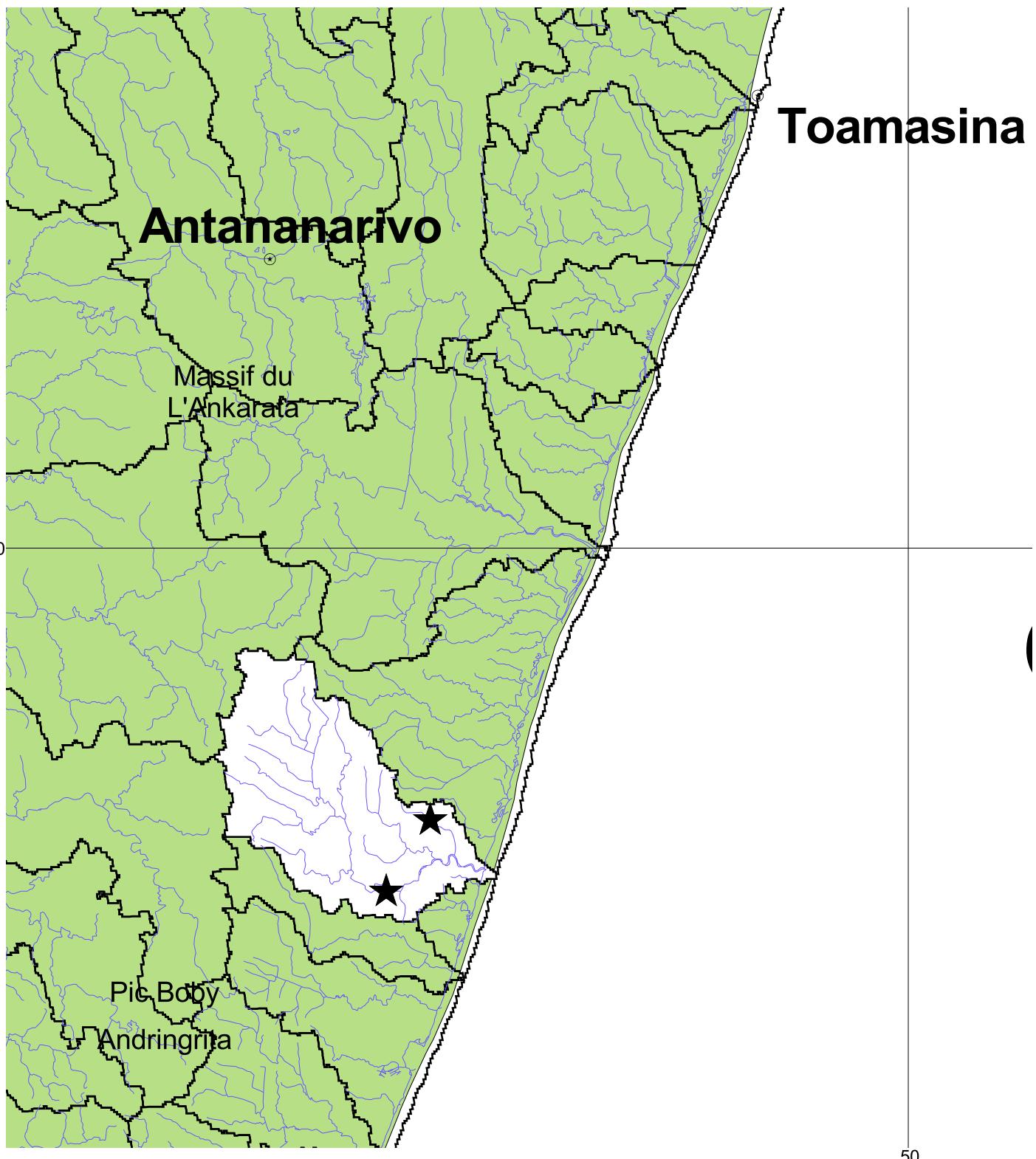
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

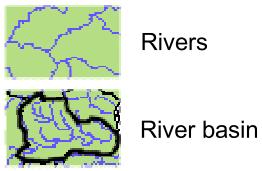
Known only from the Mananjary drainage. Its presence in rivers to the north remains a possibility but needs confirmation. In the adjacent Namorona drainage to the south the species is replaced by *Bedotia* sp. Ranomafana. Habitat degradation and pressure from exotic predators (*Gambusia holbrookii*) and competitors (*Xiphophorus* spp.) have eliminated *B. geayi* from low altitude (<100 m a.s.l) habitats, but it remains abundant in the middle and upper reaches of the Mananjary. Pending major shifts in land use in the basin, this species is assessed as VU on the basis of its EOO and AOO being <20,000km² and <2,000km², respectively, and a continuing decline in distribution due to the above mentioned pressures.

Data sources (Reference Numbers)

41, 56

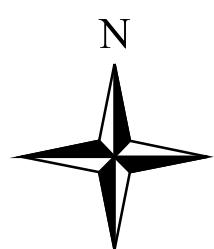


20 0 20 40 60 80 Kilometers



Recorded point location

Associated river basin



Bedotia longianalis Pellegrin 1907

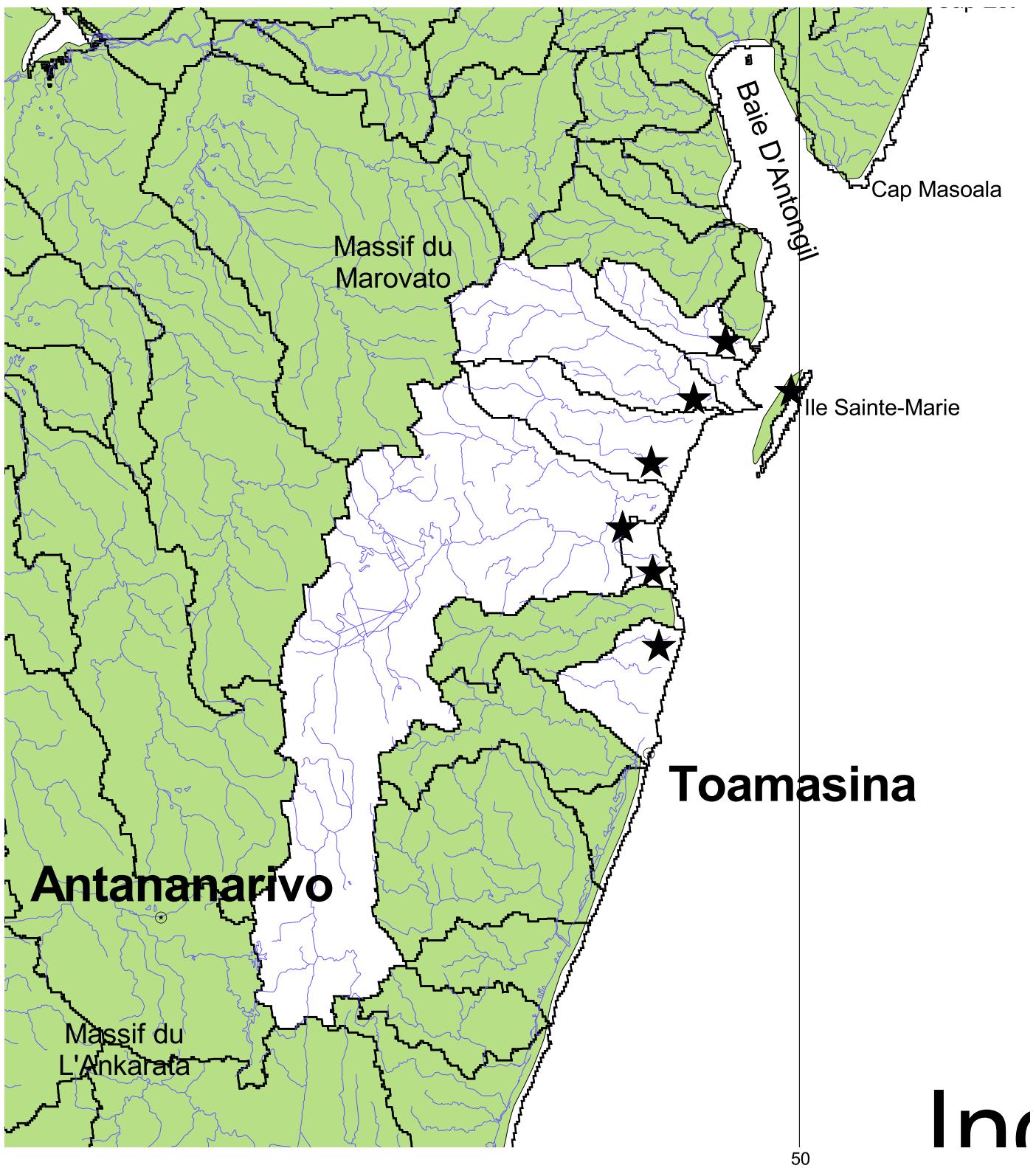
Category
LC

Rationale

Mainland and Ile St. Marie populations remain strong and widespread with no known widespread major threats. But the situation could change rapidly with the introduction/spread of the snakehead (Channidae spp.) into its habitat. It is recommended that this species be monitored closely.

Data sources (Reference Numbers)

28, 41



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

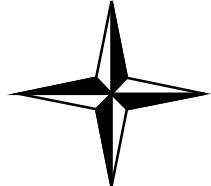


River basin



Associated river basin

N



Bedotia madagascariensis (Regan 1903)

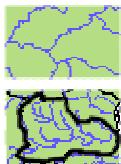
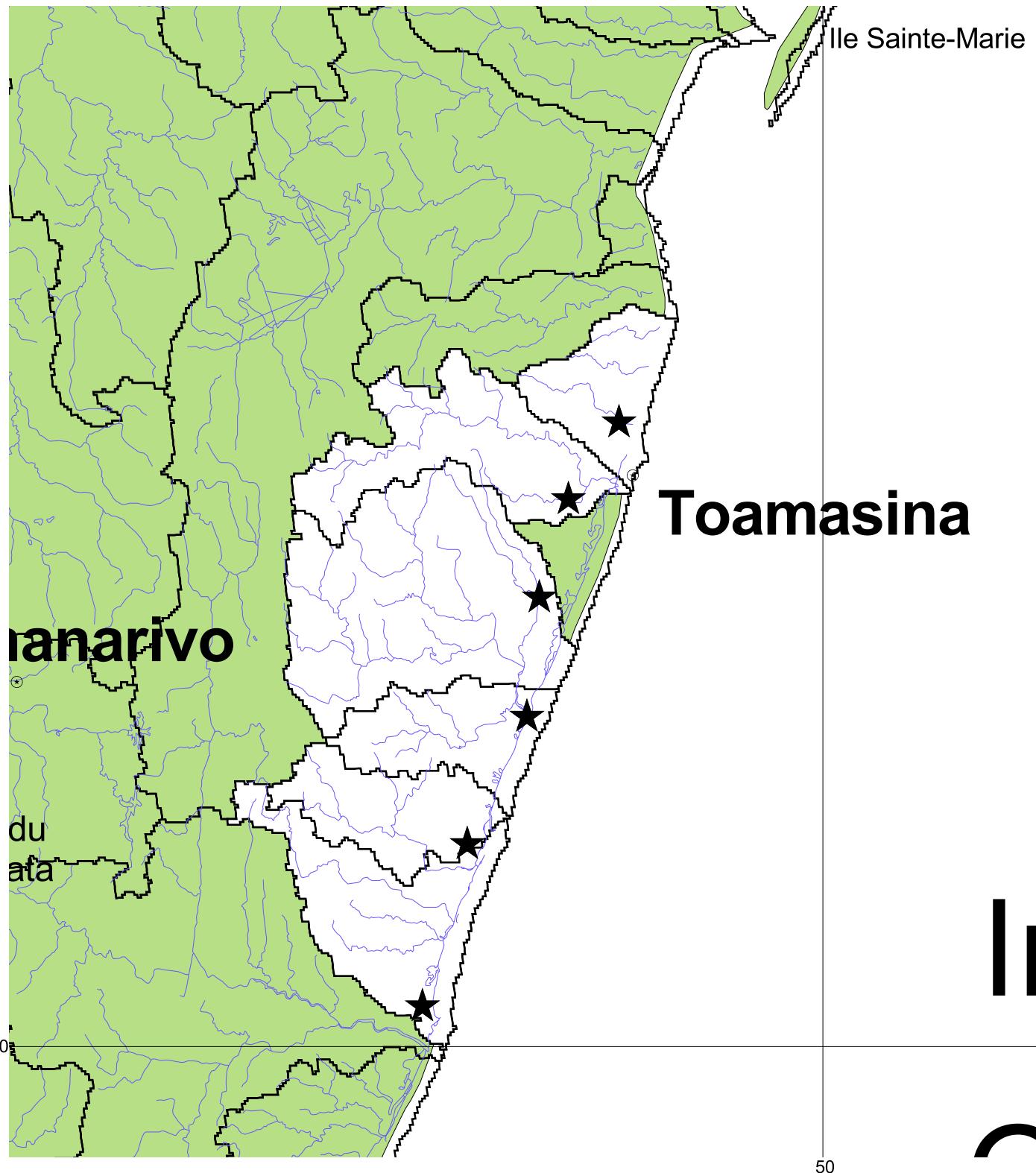
Category
NT

Rationale

Assessed as Near Threatened because it almost qualifies as VU B1ab(i,ii,iii)+2ab(i,ii,iii). It only fails as it is found in marginally more locations (recorded at 11 locations) than the maximum of 10 required to qualify. It is known from a number of Madagascar's east coast rivers and lakes in the region between Ivoloina and Mangoro. The habitat is fragmented and continues to be heavily impacted by siltation and flow changes due to deforestation.

Data sources (Reference Numbers)

41, 70



Rivers



Recorded point location



River basin



Associated river basin

Bedotia marojejy Stiassny & Harrison 1999

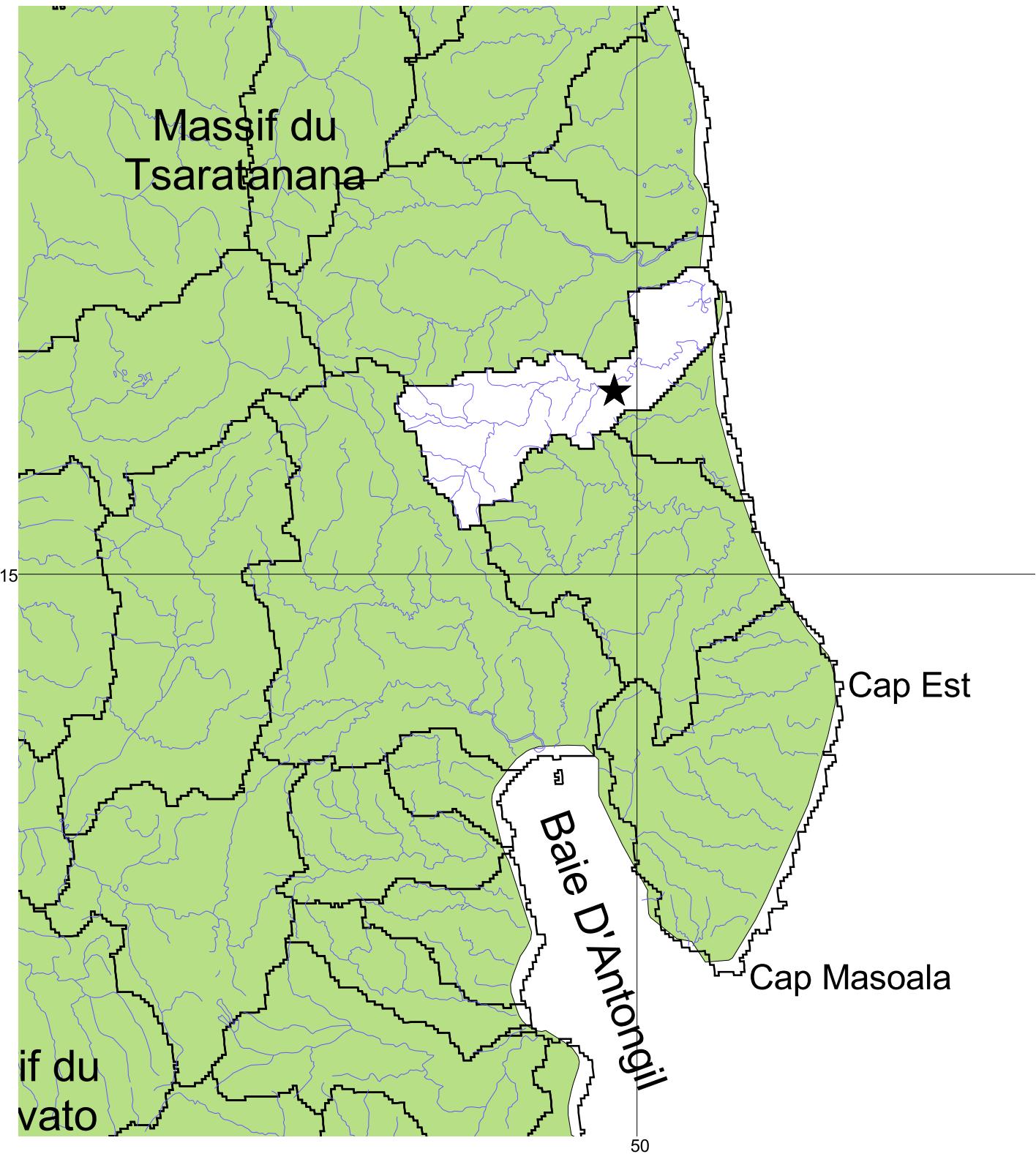
Category
VU

Criteria
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale
This species is abundant in the mid-reaches of the Lokoho river basin. Its range extends into Marojejy National Park and the park serves to protect limnological integrity of the upper and middle Lokoho by preserving the basin's forested watershed. However, due to its restricted range (EOO and AOO <20,000km² and 2,000km², respectively) and continuing decline in habitat due to deforestation outside the park a VU ranking is appropriate.

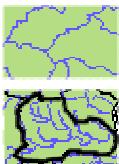
Data sources (Reference Numbers)

41, 99



20 0 20 40 60 80 Kilometers

N



Rivers

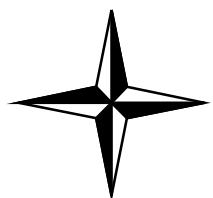


Recorded point location



River basin

Associated river basin



Bedotia masoala Reinthal 2001

Category
VU

Criteria
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

This species is known from the mid-reaches of the Lokoho river basin. Its range extends into Marojejy National Park and the park serves to protect limnological integrity of the upper and middle Lokoho by preserving the basin's forested watershed. However, due to its restricted range (EOO and AOO <20,000km² and 2,000km², respectively) and continuing decline in habitat due to deforestation outside the park a VU ranking is appropriate.

Data sources (Reference Numbers)

41, 78



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

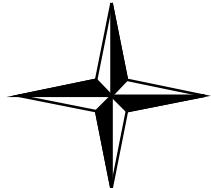


River basin



Associated river basin

N



***Bedotia* sp. "Garassa" Undescribed**

Previously referred to as *Bedotia* sp. "Ankarefo" (Change proposed by Loiselle, P.)

Category

DD

Rationale

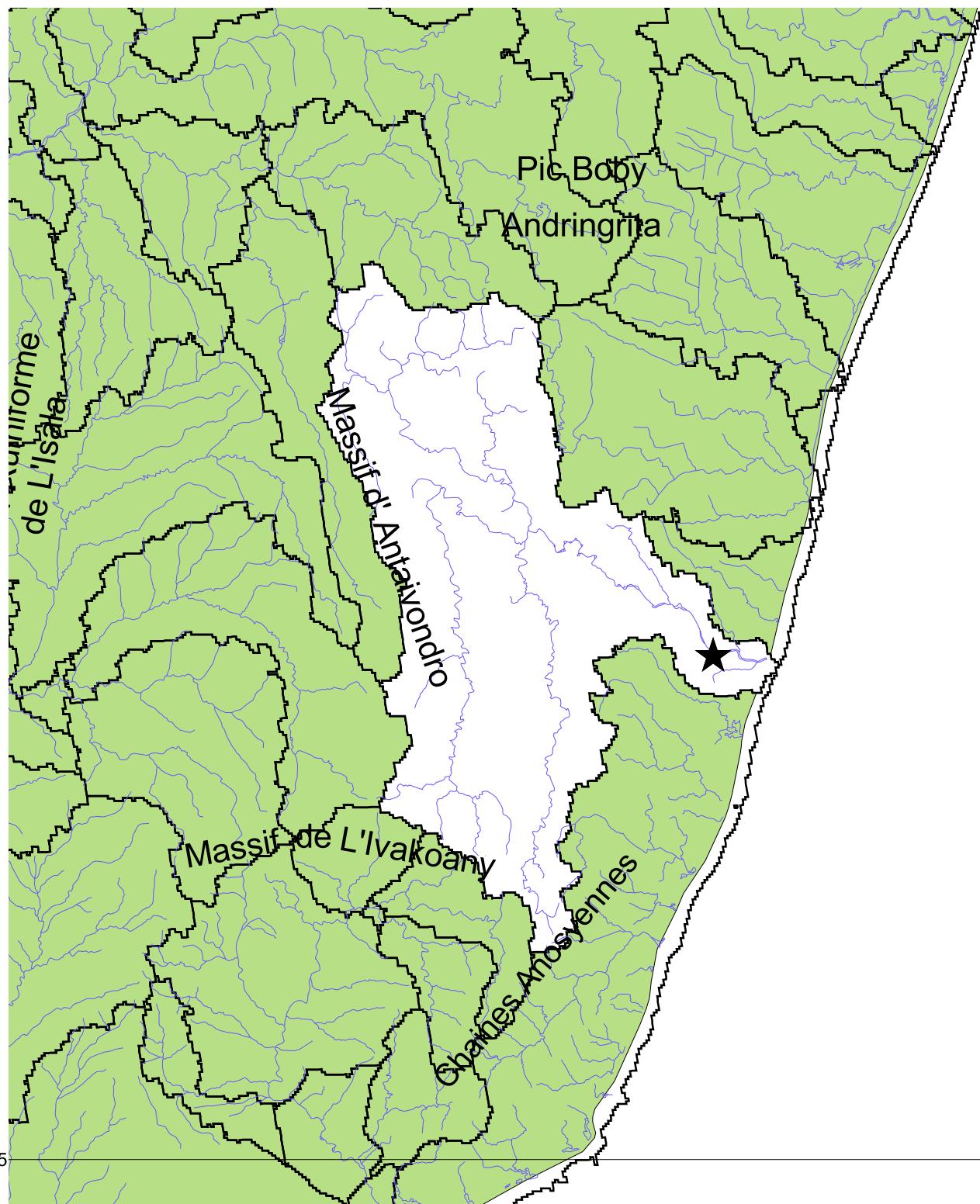
The range limits for this species are unknown. It is abundant at the three localities sampled but estimates of population size are not available. Lack of data on the extent of remaining forest cover in the Masihanaka river basin prohibits a more detailed assessment. Therefore, the species is classified as DD.

Data sources (Reference Numbers)

41



Bedotia sp. "Garassa"



30 0 30 60 90 120 Kilometers



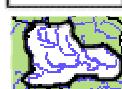
Rivers



Recorded point location

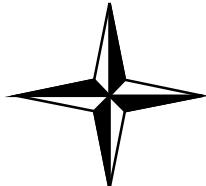


River basin



Associated river basin

N



Bedotia sp. "Bemarivo" Undescribed

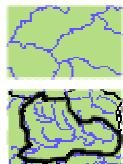
Category
VU

Criteria
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale
Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. Recent collecting by Loiselle has revealed that this species remains abundant in the middle and upper reaches of the Bemarivo river basin. Pressure from exotic predators and competitors have largely eliminated *Bedotia* sp. "Bemarivo" from its lower reaches. Pending major shifts in land use in the basin, this species is assessed as VU on the basis of its EOO and AOO being <20,000km² and <2,000km², respectively, and a continuing decline in distribution due to the above mentioned pressures.

Data sources (Reference Numbers)

41



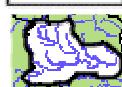
Rivers



Recorded point location

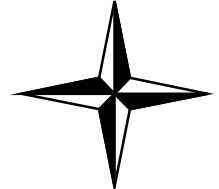


River basin



Associated river basin

N



Bedotia sp. "Betampona" Undescribed

Category
VU

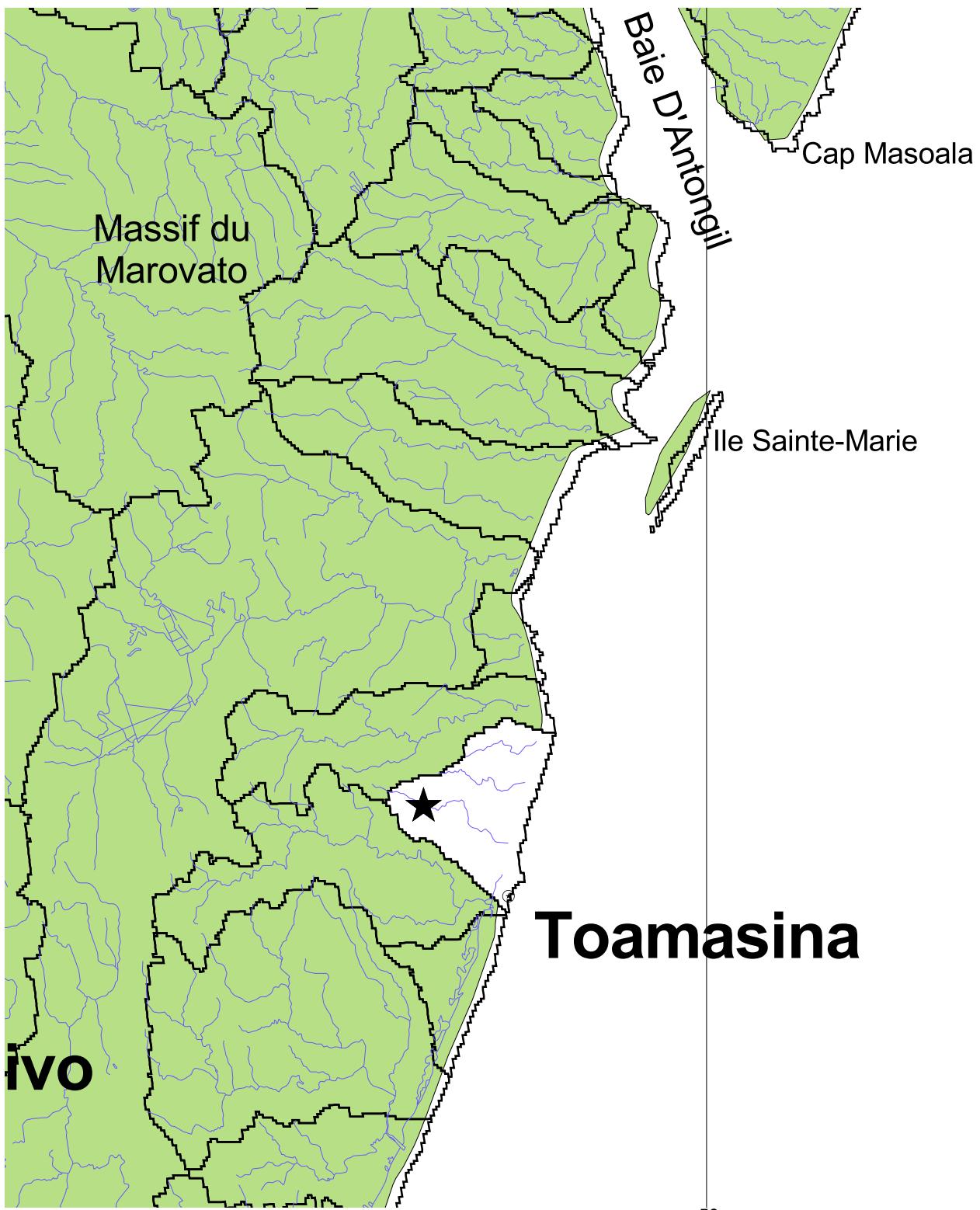
Criteria
B1ab(i,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species is abundant in the mid-reaches of the Ivoloina river basin. Its range extends into an area of protected forest which serves to protect limnological integrity of the upper and middle Ivoloina by preserving the basin's forested catchment. However, due to its restricted range (EOO and AOO <20,000km² and 2,000km², respectively) and continuing decline in habitat due to deforestation outside the forest reserve a VU ranking is appropriate.

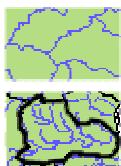
Data sources (Reference Numbers)

41



20 0 20 40 60 80 Kilometers

50



Rivers



Recorded point location

Associated river basin

N



Bedotia sp. "Lazana" Undescribed

Category

VU

Criteria

B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species remains abundant in the middle and upper reaches of the Iaroka-Rianila basin. It is replaced in low altitude (<100 m a.s.l) habitats by *B. madagascariensis*. Pending major shifts in land use in the basin, this species is assessed as VU on the basis of its EOO and AOO being <20,000km² and <2,000km², respectively, and a continuing decline in distribution due to the above mentioned pressures.

Data sources (Reference Numbers)

28, 41



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

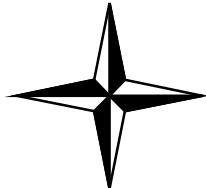


River basin



Associated river basin

N



Bedotia sp. "Mahanara" Undescribed

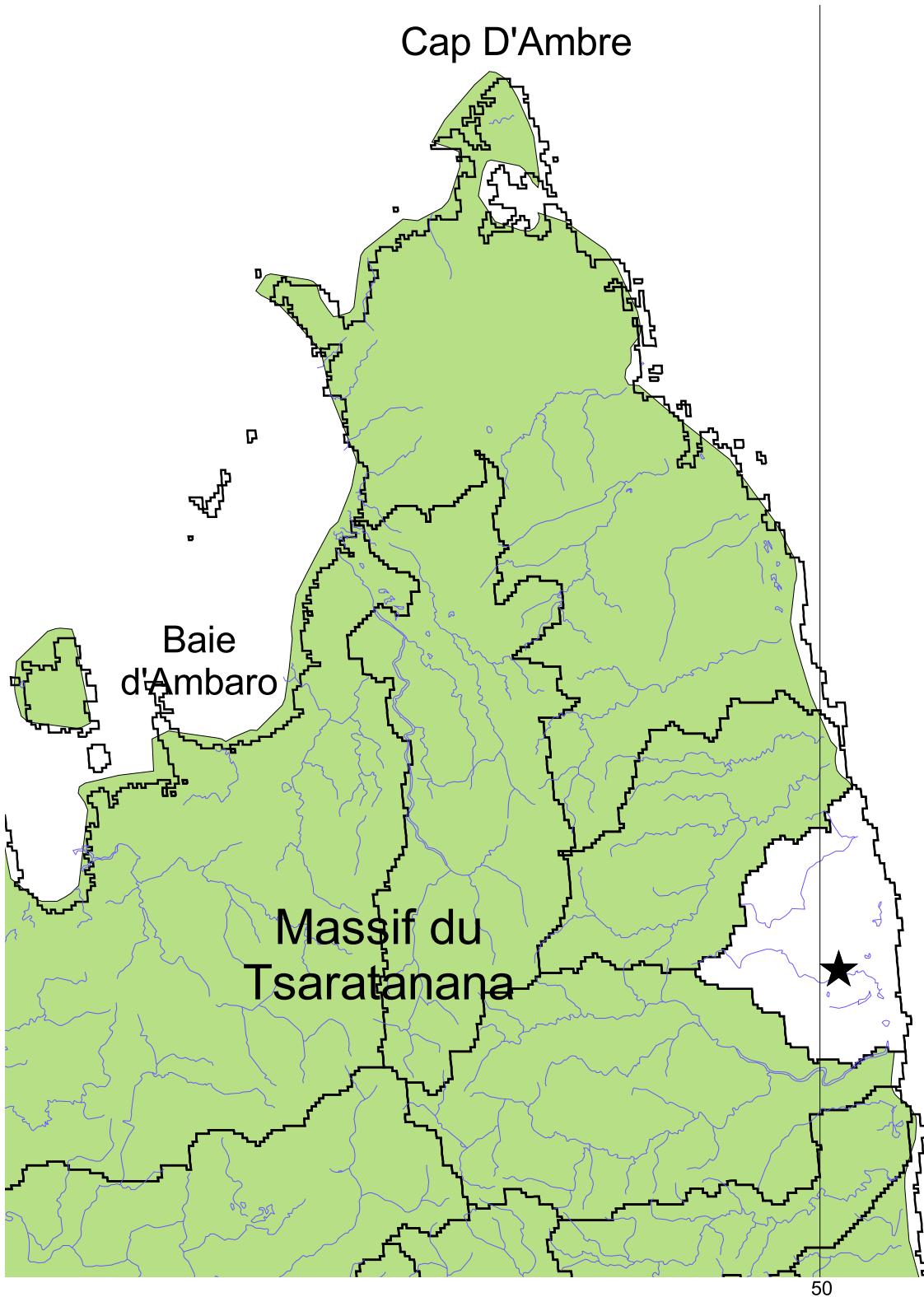
Category
VU

Criteria
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale
Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species remains widely distributed throughout the Mahanara river basin. Pending major shifts in land use in the basin, this species is assessed as VU on the basis of its EOO and AOO being <20,000km² and <2,000km², respectively, and a continuing decline in distribution due to the impact of introduced competing and predatory species.

Data sources (Reference Numbers)

41



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

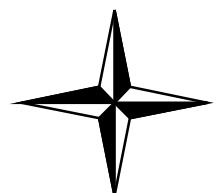


River basin



Associated river basin

N



Bedotia sp. "Manombo" Undescribed

Category

CR

Criteria

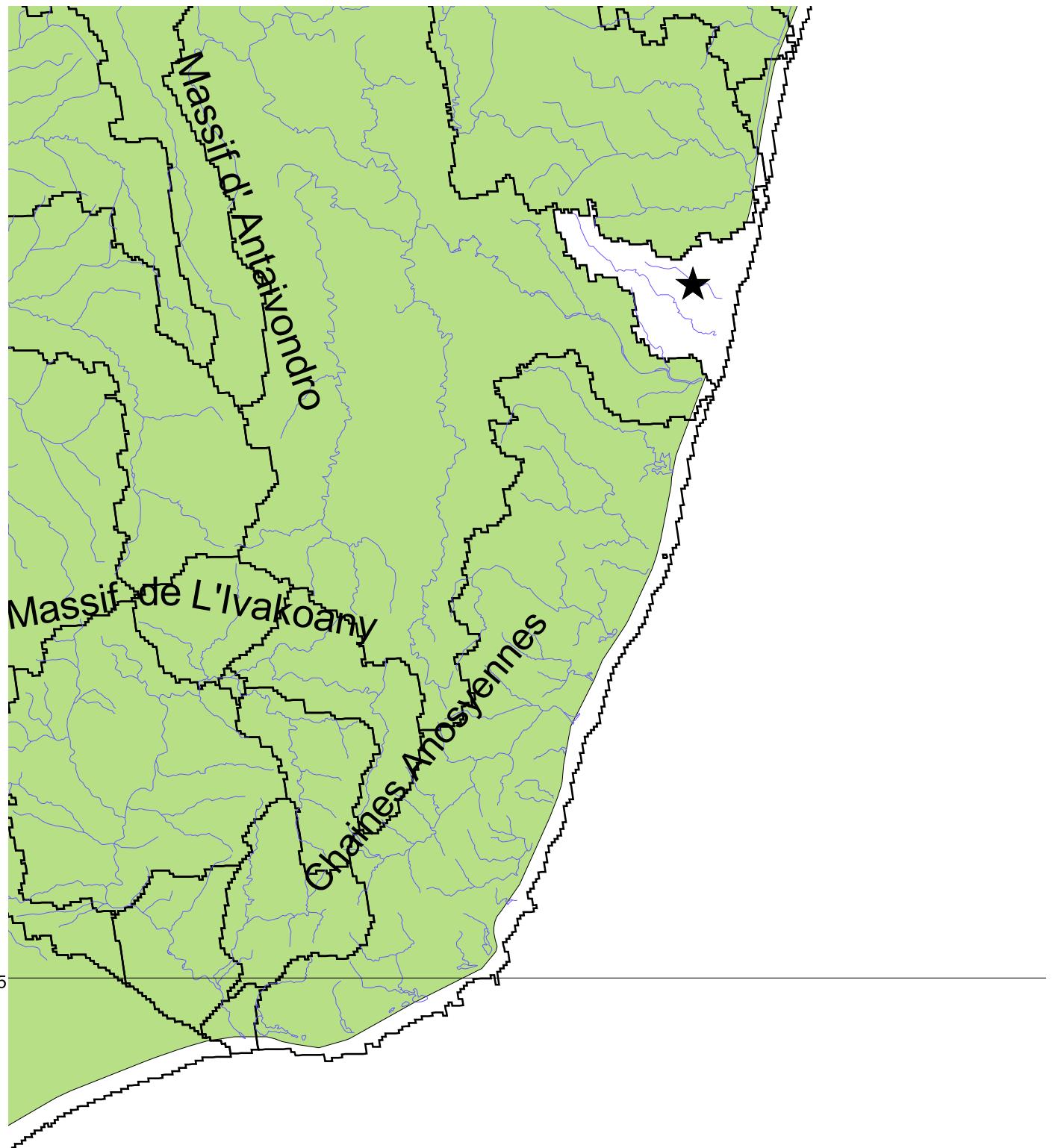
B1ab(i,ii,iii,iv,v)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species is known only from the lower reaches of the Tokahandra River which runs through the National park of Manombo and Manombo Forest. It has an estimated EOO <100km² and is suffering from a continued decline in habitat extent and quality due to deforestation outside the park. The species is also impacted by introduced exotic competing and predatory species and the number of mature individuals is reported as declining.

Data sources (Reference Numbers)

41



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

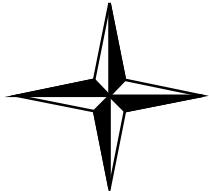


River basin



Associated river basin

N



Bedotia sp. "Nosivola" Undescribed

Category
VU

Criteria
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale
Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species remains abundant in the Nosivolo, a major tributary of the Mangoro River, and is also present in the main channel of the Mangoro for a distance of several kilometers up- and downstream of the town of Marolambo. Pending major shifts in land use in the basin this species is assessed as VU on the basis of its EOO and AOO being <20,000km² and <2,000km², respectively, and a continuing decline in distribution range due to the impact of introduced competing and predatory exotic species.

Data sources (Reference Numbers)

41



Bedotia sp. "Nosivola"



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Bedotia sp. "Namorona" Undescribed

Previously referred to as *Bedotia* sp. "Ranomafana" (Change proposed by Loiselle, P.)

Category

VU

Criteria

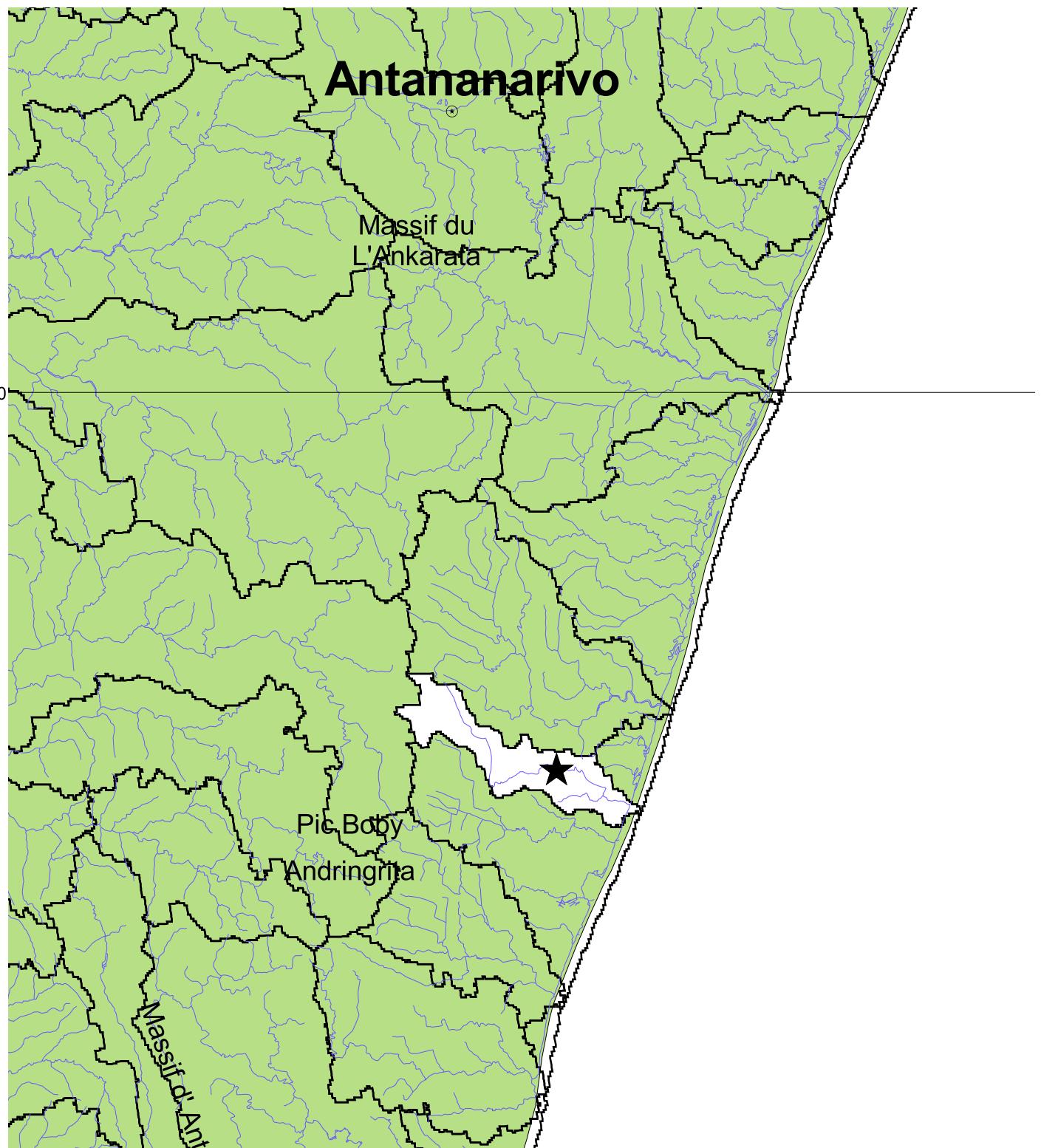
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species is abundant in mid-reaches of the Namorona River basin and has also been reported from its upper reaches. Its range extends into Ranomafana National Park and the park serves to protect limnological integrity of the upper and middle Namorona by preserving the basin's forested watershed. However, due to its restricted range (EOO and AOO <20,000km² and 2,000km², respectively) and continuing decline in habitat due to deforestation outside the park a VU ranking is appropriate.

Data sources (Reference Numbers)

41



10 0 10 20 30 40 Kilometers



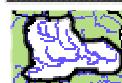
Rivers



Recorded point location

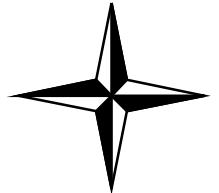


River basin



Associated river basin

N



Bedotia sp. "Sambava" Undescribed

Category

CR

Criteria

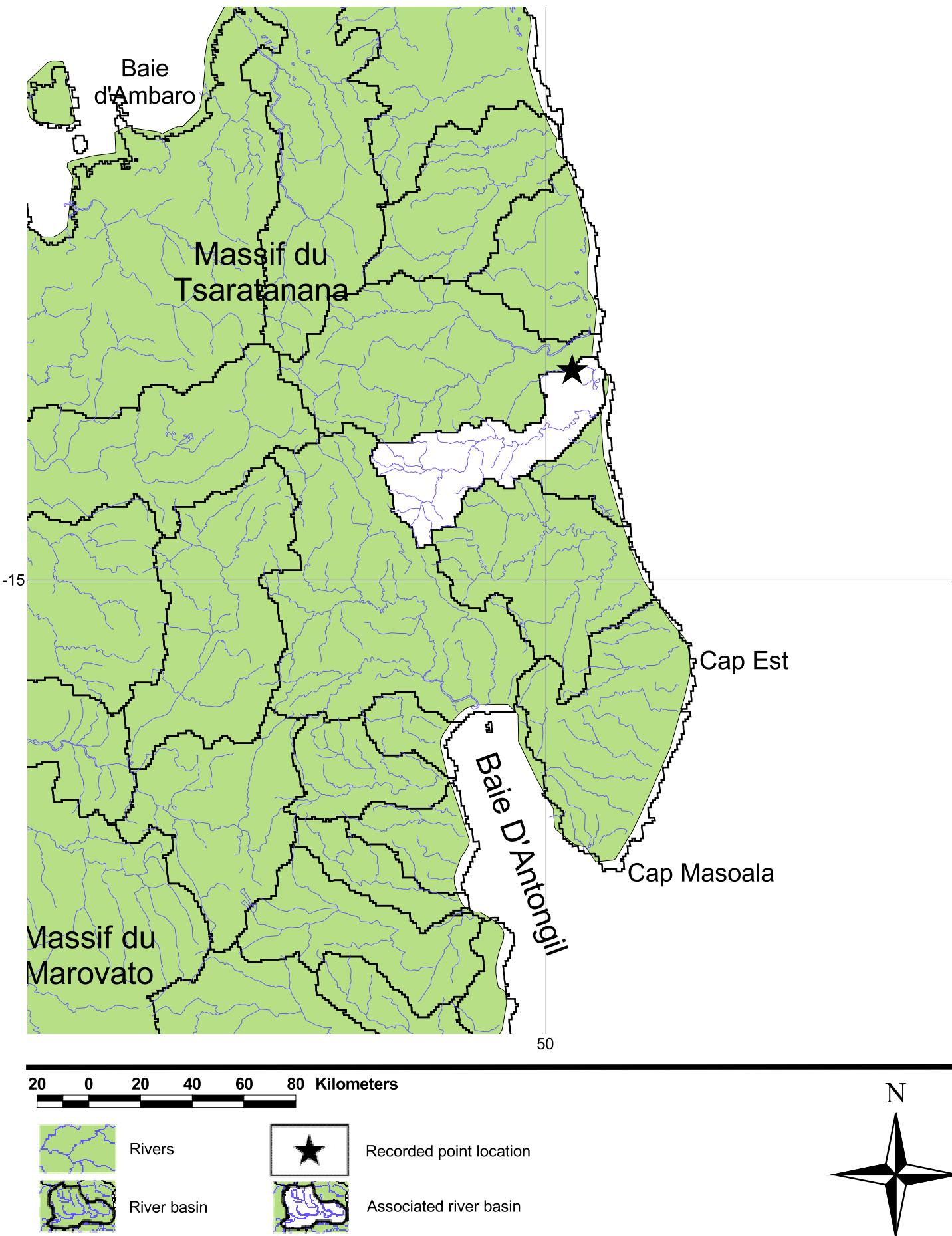
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. This species has only been found in one tributary of the lower Sambava River whose watershed has been almost entirely stripped of forest cover. Efforts to collect additional specimens in 2003 were unsuccessful due to prevailing drought conditions. This species must also cope with an exotic predator, the spotted snakehead. The species is assessed as CR on account of its highly restricted distribution (EOO and AOO <100km² and 10km²), combined with a continued loss of habitat and competition from an invasive species.

Data sources (Reference Numbers)

41



Bedotia sp. "Vevembe" Undescribed

Category

CR

Criteria

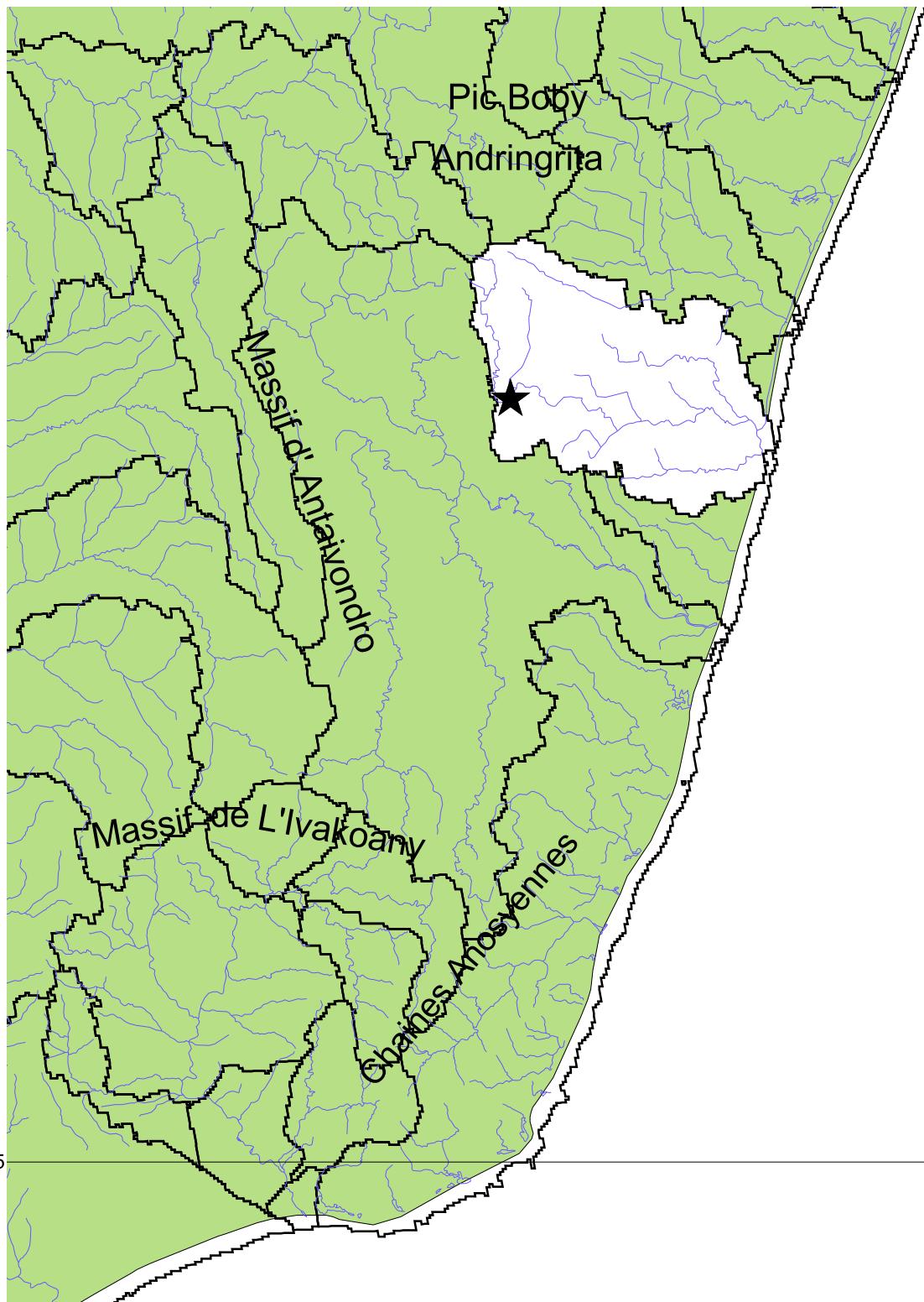
B1ab(i,ii,iii)+2ab(i,ii,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. It is restricted to a small remaining forested region within the Mananara drainage basin. The species is assessed as CR on account of its highly restricted distribution (EOO and AOO < 100km² and 10km²), combined with a continued loss of habitat and competition/predation by invasive species.

Data sources (Reference Numbers)

41, Sparks, pers. obs.



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

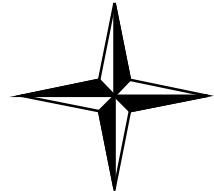


River basin



Associated river basin

N



Bedotia tricolor Pellegrin 1923

Category
CR

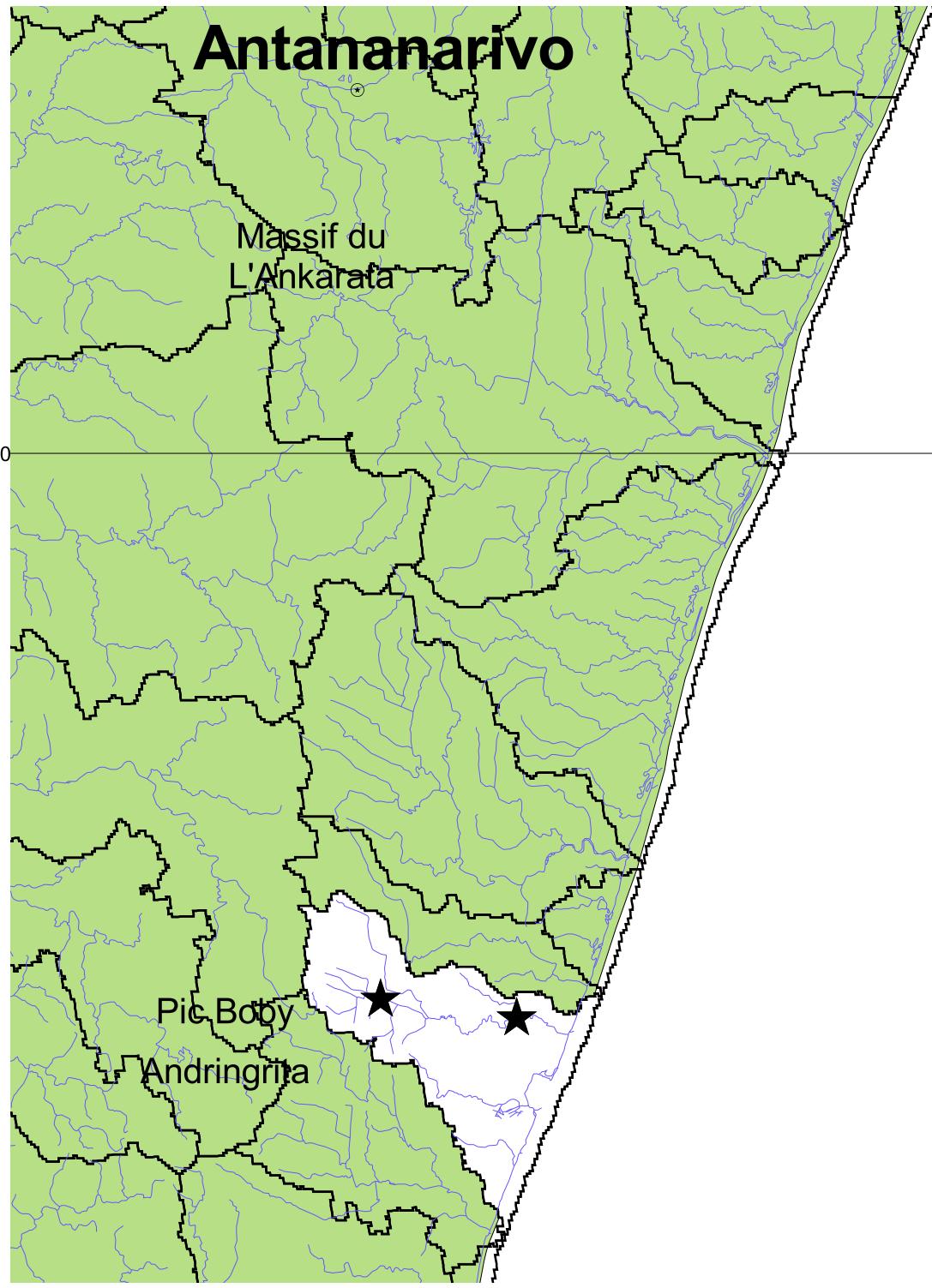
Criteria
B1ab(i,iii)

Rationale

This species has only been found in one tributary of the Faraony River, whose watershed has been almost entirely stripped of forest cover. This species must also cope with an exotic predator, the spotted snakehead. The species is assessed as CR on account of its highly restricted distribution (EOO and AOO < 100km² and 10km²), combined with a continued loss of habitat and competition from an invasive species.

Data sources (Reference Numbers)

41, 60



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

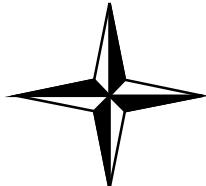


River basin



Associated river basin

N



***Bedotia* sp. "Ankavia-Ankavanana" Undescribed**

Previously referred to as *Bedotia* sp. "Antalaha" (Change proposed by Loiselle, P.)

Category

VU

Criteria

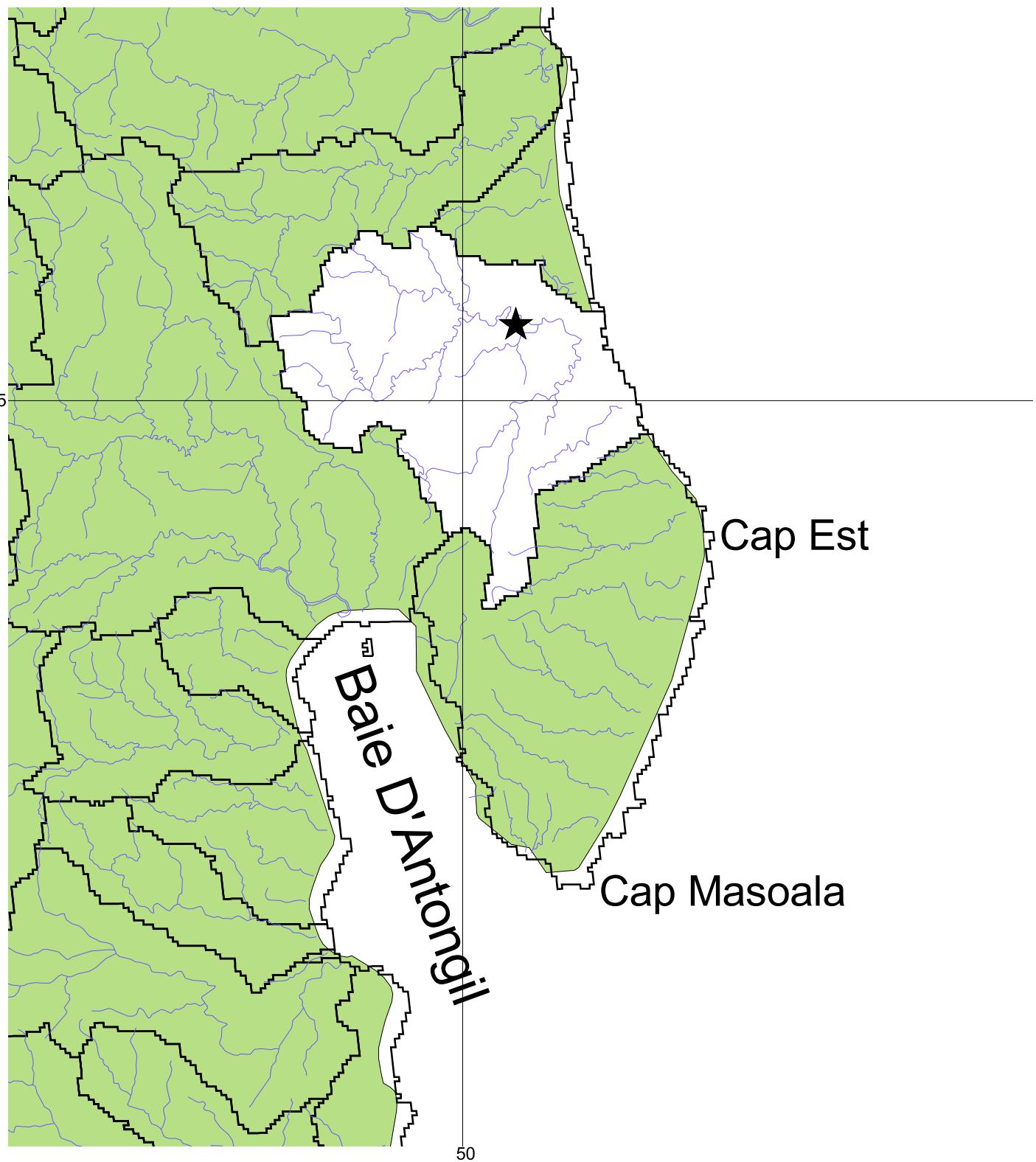
B1ab(i, iii)

Rationale

This is recently recognised undescribed species with voucher specimens held at the American Museum of Natural History. It is highly abundant within a restricted range, where the EOO is <20,000km², and suffers from a continued loss of habitat due to deforestation of the catchment.

Data sources (Reference Numbers)

41



5 0 5 10 15 20 Kilometers



Rivers



Recorded point location

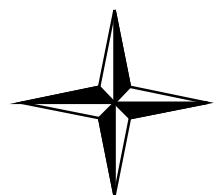


River basin



Associated river basin

N



Bedotia sp. "Makira" Undescribed

Category

DD

Rationale

This species was only recently discovered (late 2003), and is awaiting formal description. The voucher specimens are held by the American Museum of Natural History. Range limits are unknown and there are no baseline data on population size. The species is relatively abundant in undisturbed to moderately disturbed rivers and streams. Pending further study the appropriate assessment for this species is DD.

Data sources (Reference Numbers)

Sparks, pers. obs.

Species distribution unknown

Rhoeclis alaotrensis (Pellegrin 1904)

Category
VU

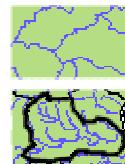
Criteria
B1ab(i,ii,iii,v)

Rationale

This species is known from the upper reaches of the eastward-flowing Mangoro and Rianila Rivers. It has also been recorded from Lac Alaotra. The species has been found to be more widespread than previously supposed (EOO >5,000km² but <20,000km²) with substantial sub-populations in several localities. Nevertheless the population is fragmented due to continued deforestation in the associated catchments and suffers from competition and predation by introduced exotic species. The species is assessed as VU.

Data sources (Reference Numbers)

28, 42, 57, 68, 92



Rivers



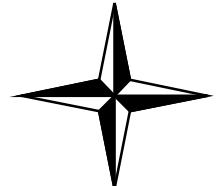
Recorded point location



River basin

Associated river basin

N



Rhoeclis derhami Stiassny & Rodriguez 1992

Category
VU

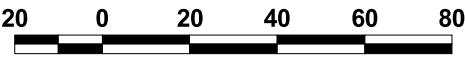
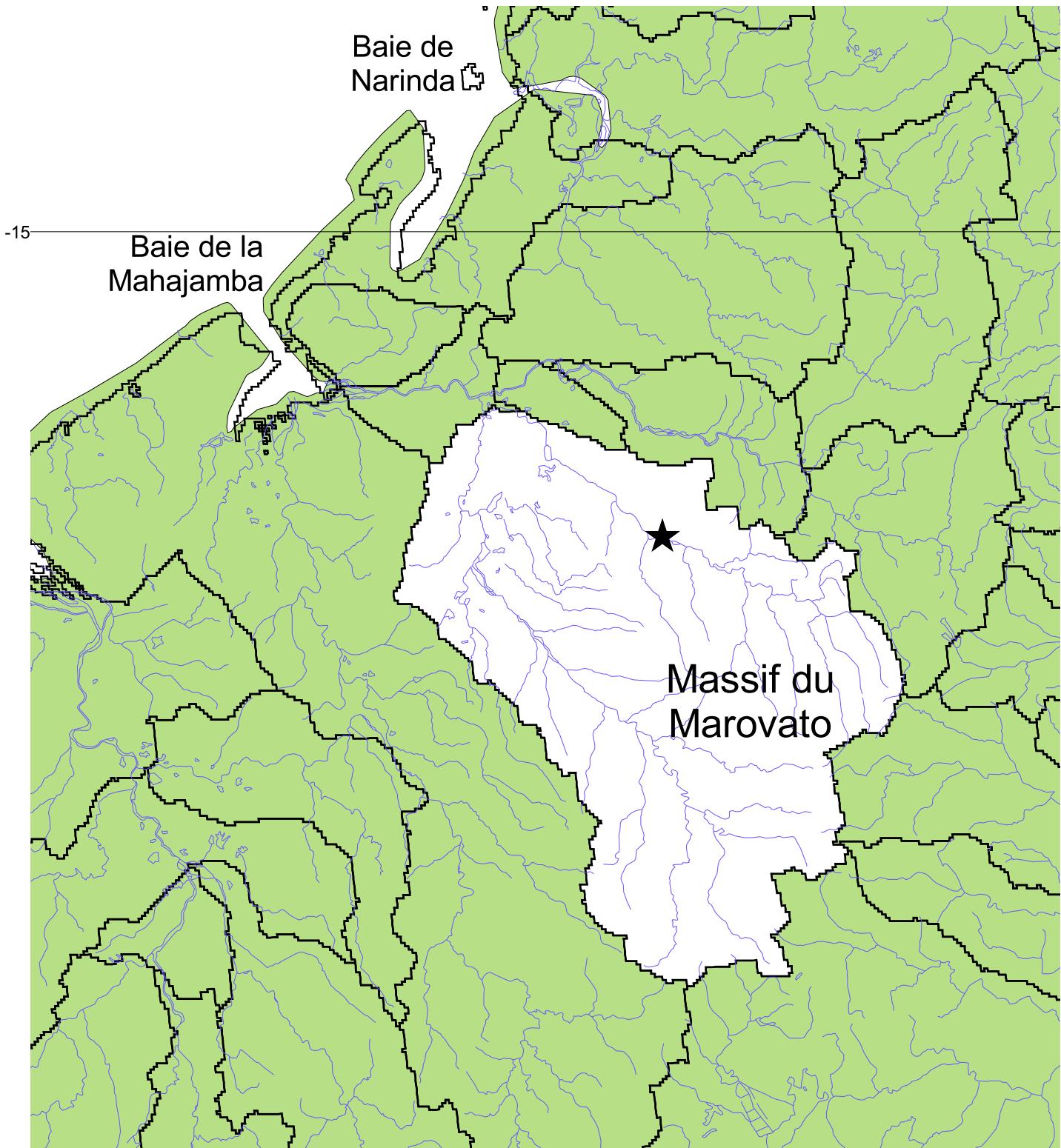
Criteria
D2

Rationale

This species is only known from a single location, a tributary of the Sofia River in Madagascar. Within this range the species is thought to be quite abundant. In the absence of baseline data to say whether or not the population is in decline this species is assessed as VU being limited to a single very restricted location.

Data sources (Reference Numbers)

101



Rivers



Recorded point location



River basin



Associated river basin



Rhoeclis lateralis Stiassny & Reinthal 1992

Category

DD

Rationale

Although recorded from fishing catches in the river Nosivolo, Madagascar, the current distribution and population size of this species are poorly known. It may be more common and widespread than originally thought. Further taxonomic work is required before an accurate assessment of its status can be formulated. Specifically, it needs to be confirmed whether recently collected specimens from different localities are referable to this species. An assessment of DD is appropriate.

Data sources (Reference Numbers)

42, 97



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

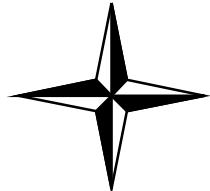


River basin



Associated river basin

N



Rhoeclis pellegrini Nichols & Lamonte 1931

Category

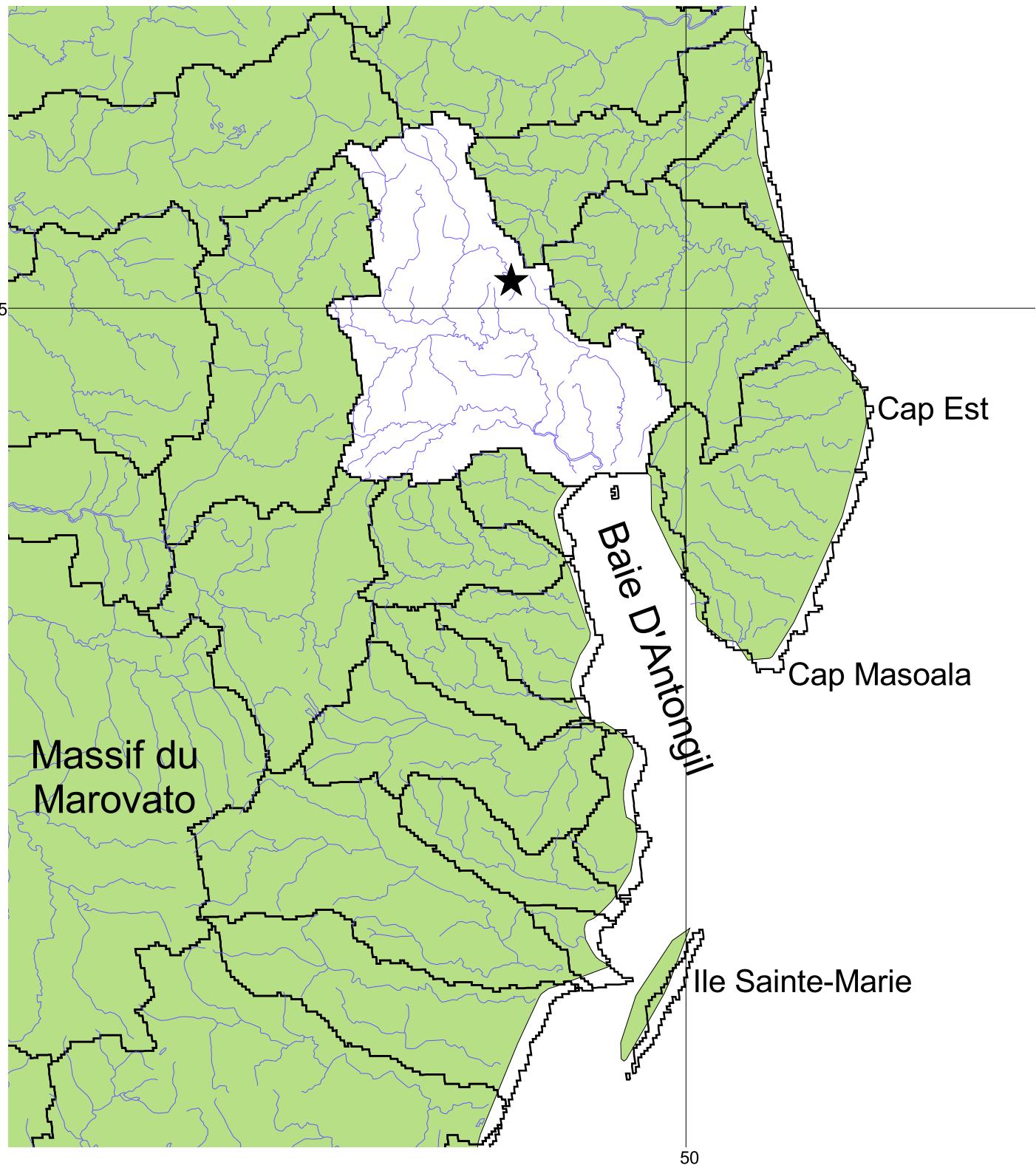
DD

Rationale

This species has not been collected since the 1930s, largely because its exact type locality is not known. There are thus no data available upon which to base statements about the quality of its habitat or the size of its population. It is assessed as DD.

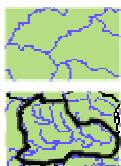
Data sources (Reference Numbers)

42, 50, 92



20 0 20 40 60 80 Kilometers

50



Rivers

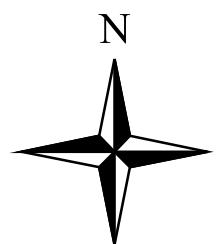


Recorded point location



River basin

Associated river basin



Rhoeclis sikorae Sauvage 1891

Category

DD

Rationale

Since 1996 this species has been collected from 5 forested stream localities near the town of Marolambo, Madagascar, where it is well known to local residents. In view of its (apparently) restricted current range it is likely to qualify as VU. However, considerably more collections are required to confirm the restricted distribution of the species and additional data are required to evaluate any additional threats to its habitat or threats directly impacting the population. This species has to be assessed as DD.

Data sources (Reference Numbers)

42, 74, 92; Loiselle, pers. obs.



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Rhoeclès vatosoa Stiassny, Rodgriguez & Loiselle 2002

Category
VU

Criteria
B1ab(iii)

Rationale

A recently described species known from the Lokoho and Andapa river basins, Madagascar. The catchment of the streams in the Lokoho basin is protected by the Marojejy National Park. The restricted range (EOO <20,000km²), combined with its occurrence at less than 10 locations and a continued decline in habitat extent and quality outside the National Park (mainly due to deforestation), lead to an assessment of VU for this species.

Data sources (Reference Numbers)

42, 102



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

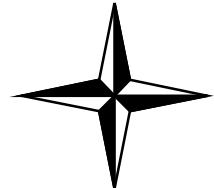


River basin



Associated river basin

N



Rhoeclis sp. "Rianila" Undescribed

Category

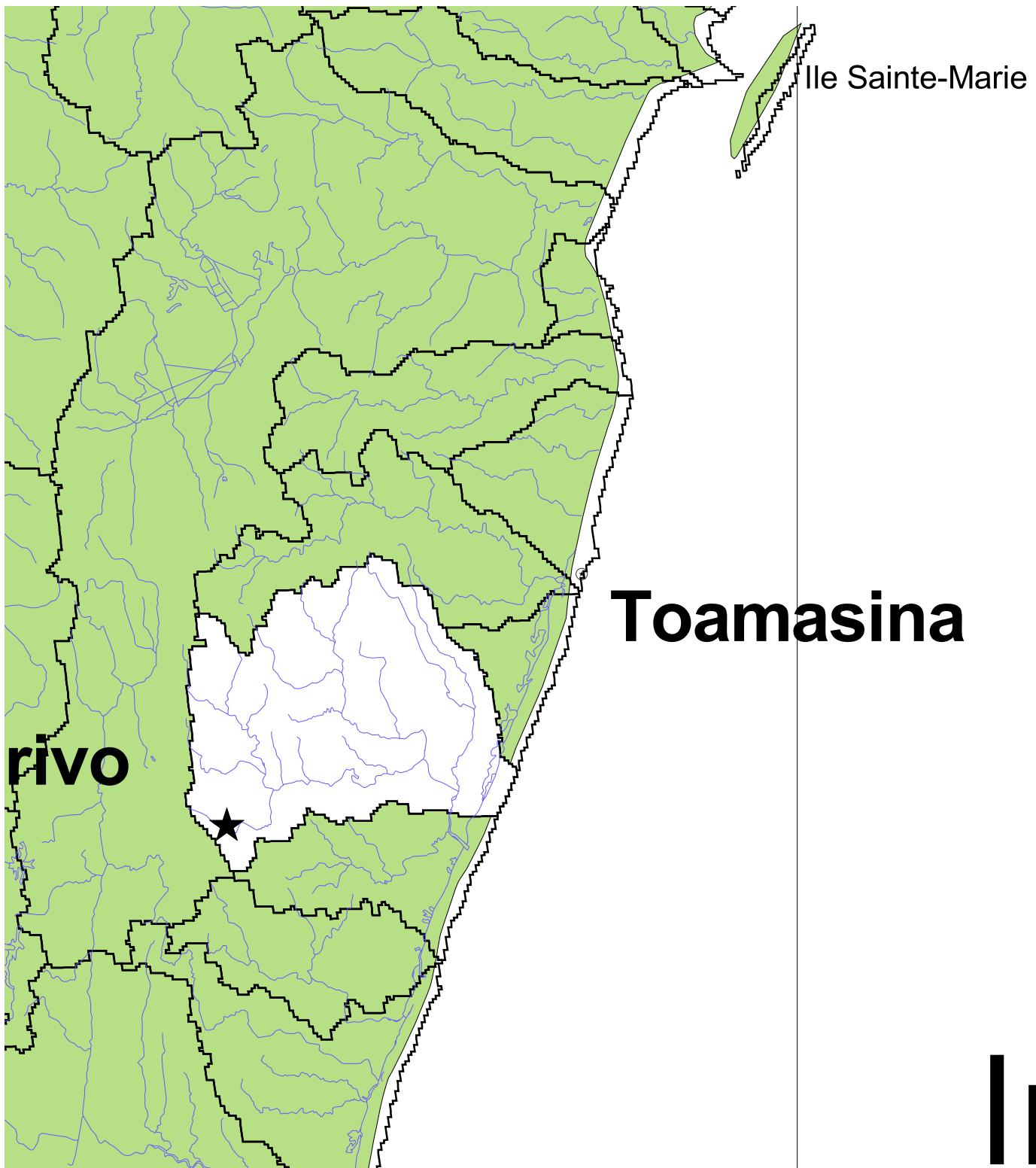
NE

Rationale

An undescribed species with no voucher specimens. It has only been collected once and there are no data upon which to base any assertions about changes in the size of its population or distribution. This species cannot be assessed until a voucher specimen is deposited.

Data sources (Reference Numbers)

Loiselle, pers. obs.



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



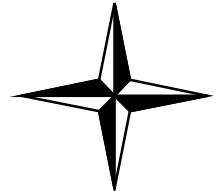
River basin



Associated river basin

50

N



Rhoeclis wrightae Stiassny 1990

Category

EN

Criteria

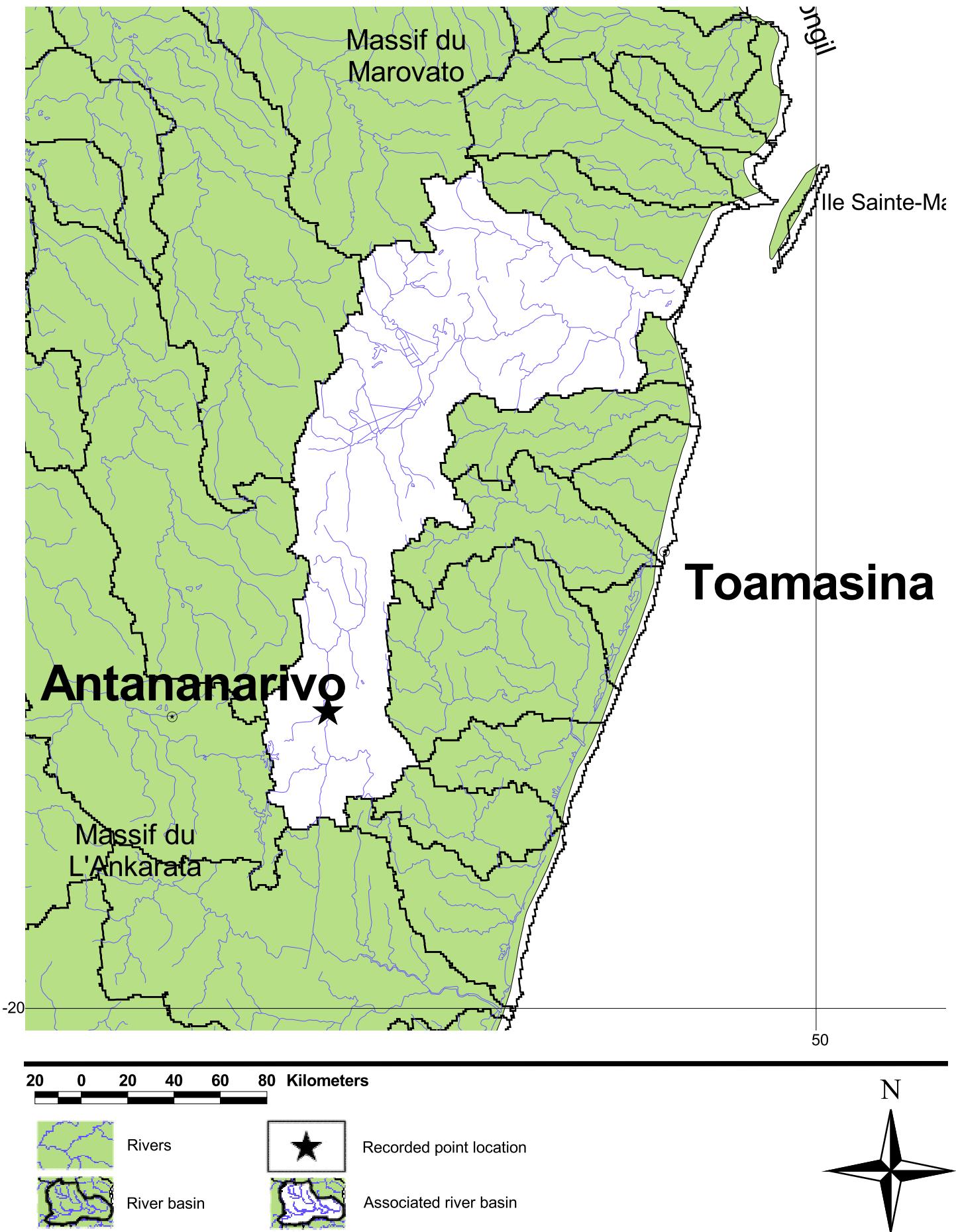
B1ab(i,iii)

Rationale

This species has been collected from two tributaries of the Mangoro River, Madagascar. With a restricted range (EOO <5,000km²), fragmentation and continued decline of habitat extent/quality through the impacts of deforestation, and with threats from introduced exotic species this species is assessed as EN.

Data sources (Reference Numbers)

42, 92



Order: Batrachiformes
Family: Batrachoididae

Batrachus uranoscopus Guichenot 1866

Category

VU

Criteria

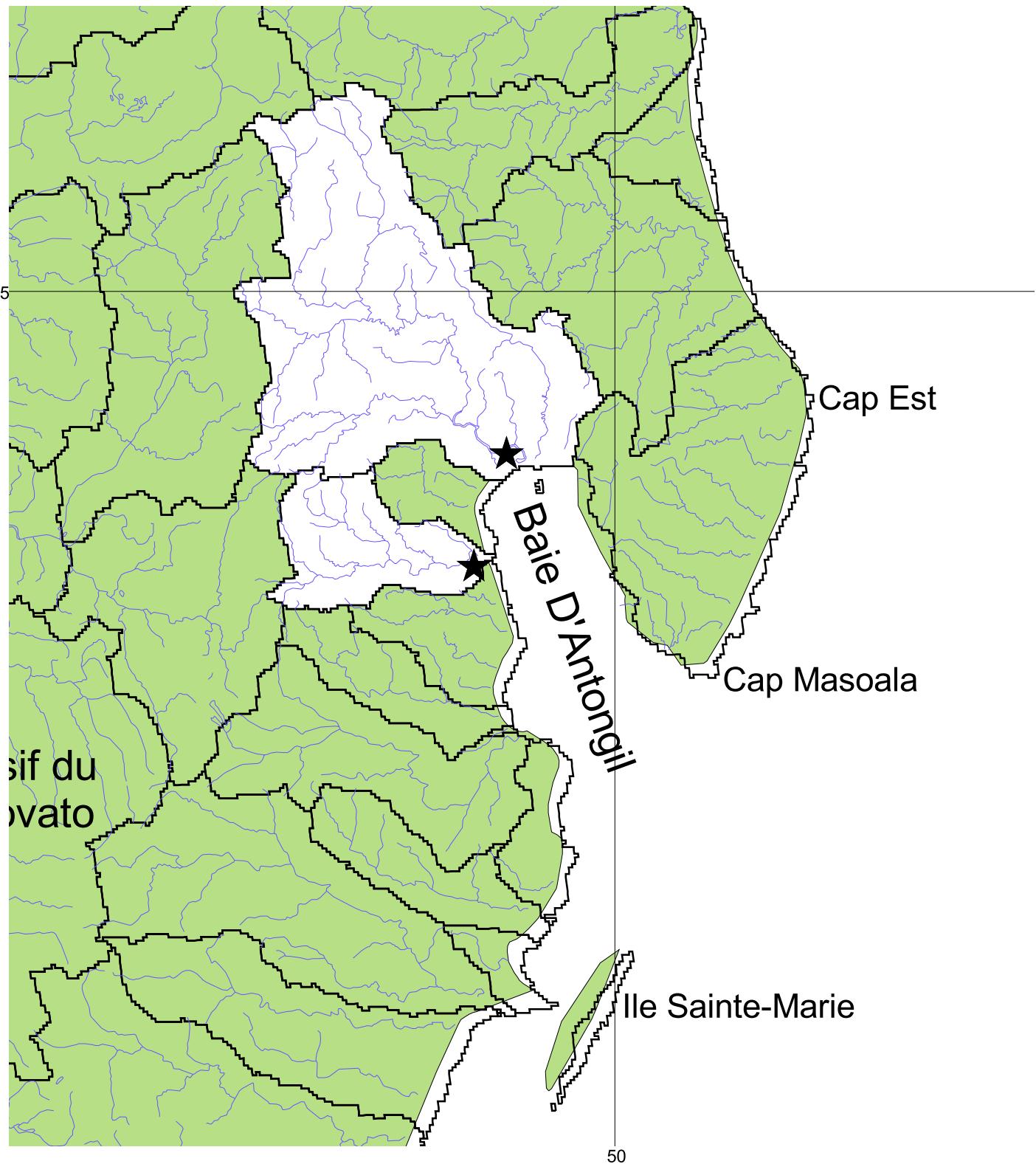
B1ab(i,iii)+2ab(i,iii)

Rationale

This species is reported from the rivers Rantabe and Antanambalana and those other rivers flowing into Antongil Bay. Although its distribution is thought to be wider than this it qualifies as Vulnerable as it's EOO is < 20,000km² and is threatened by a continuing loss of habitat (deforestation of river catchments) leading to a further decline in EOO.

Data sources (Reference Numbers)

20, 28



10 0 10 20 30 40 Kilometers



Rivers



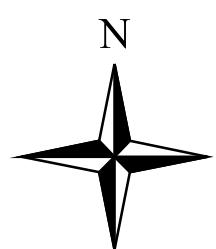
Recorded point location



River basin



Associated river basin



Order: Clupeiformes
Family: Clupeidae

Sauvagella madagascariensis (Sauvage 1883)

Category

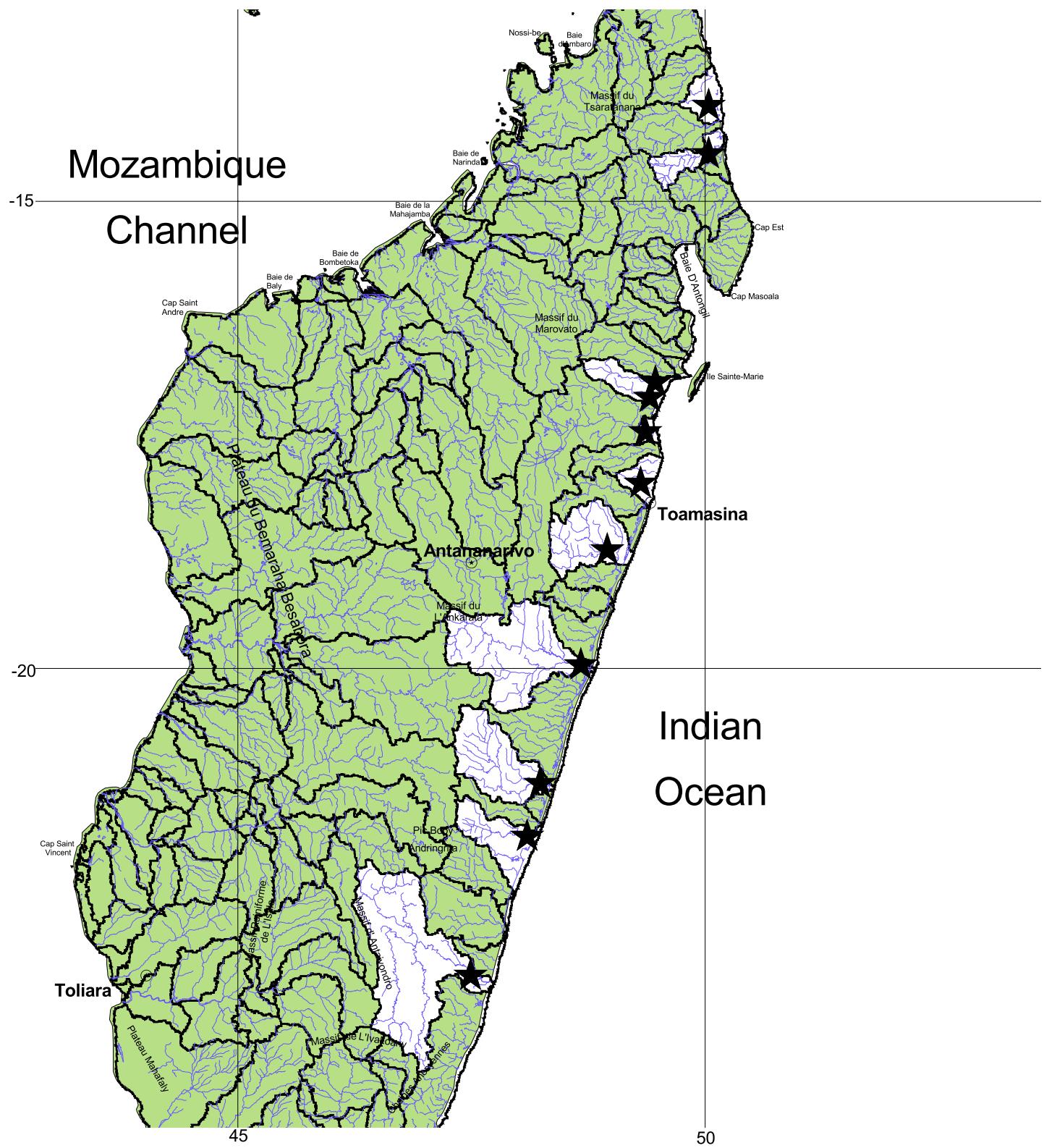
LC

Rationale

This species is widespread and common throughout the east coast rivers of Madagascar. Although many of these rivers are subject to the adverse impacts of widespread deforestation it is thought unlikely that the entire population of this species is at risk from such threats. It is assessed as LC.

Data sources (Reference Numbers)

73, 93



30 0 30 60 90 120 Kilometers



Rivers



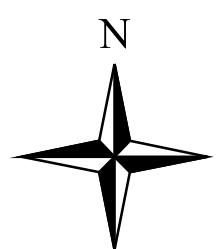
Recorded point location



River basin



Associated river basin



Sauvagella robusta Stiassny 2002

Category

DD

Rationale

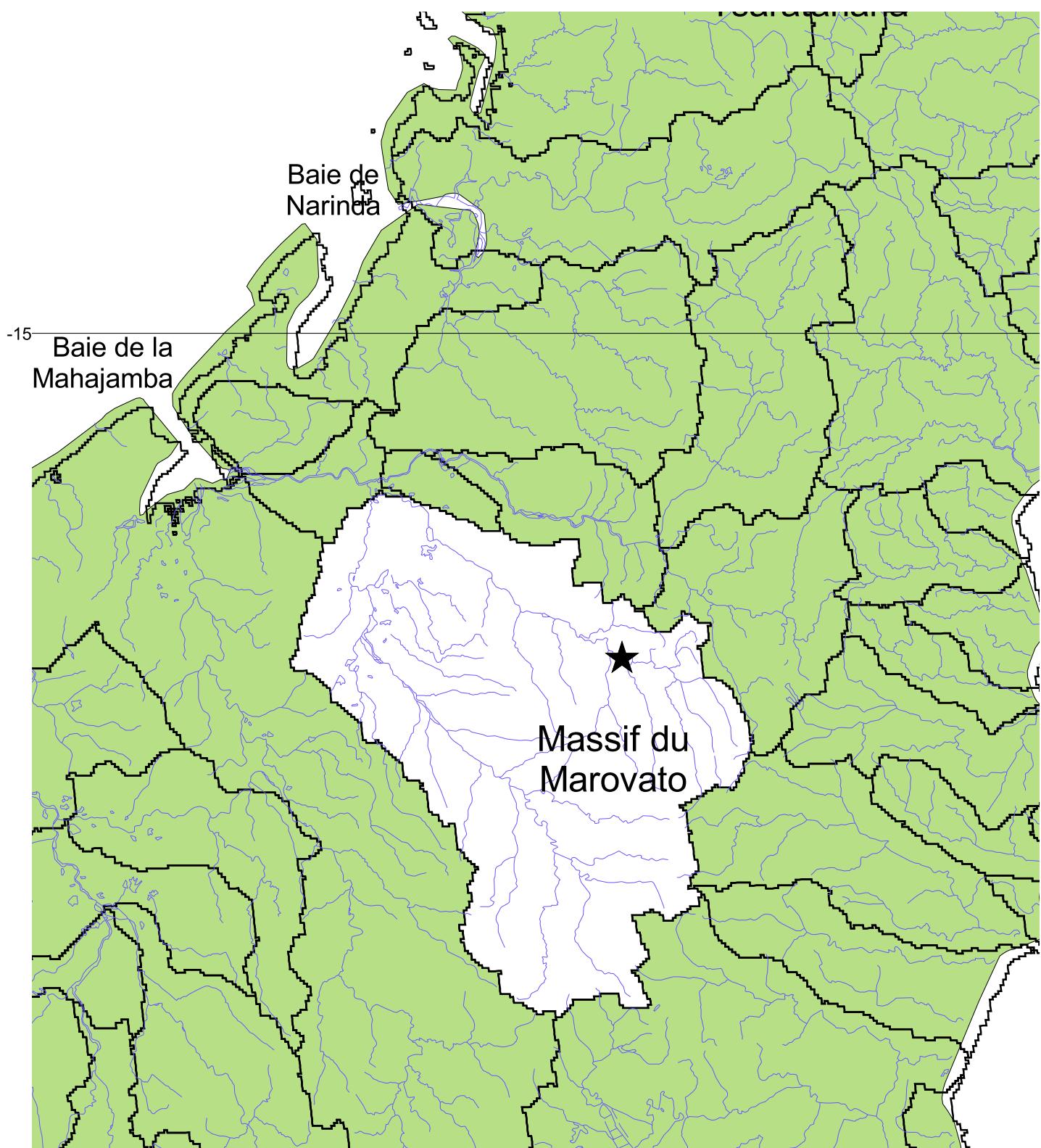
Given the absence of baseline data, there is no basis for any statement regarding range contraction or population decline. Although this species has a restricted range, without evidence for ongoing or past decline in habitat or population size, it is assessed as DD.

Data sources (Reference Numbers)

93



Sauvagella robusta



10 0 10 20 30 40 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Spratellomorpha bianalis (Bertin 1940)

Category

DD

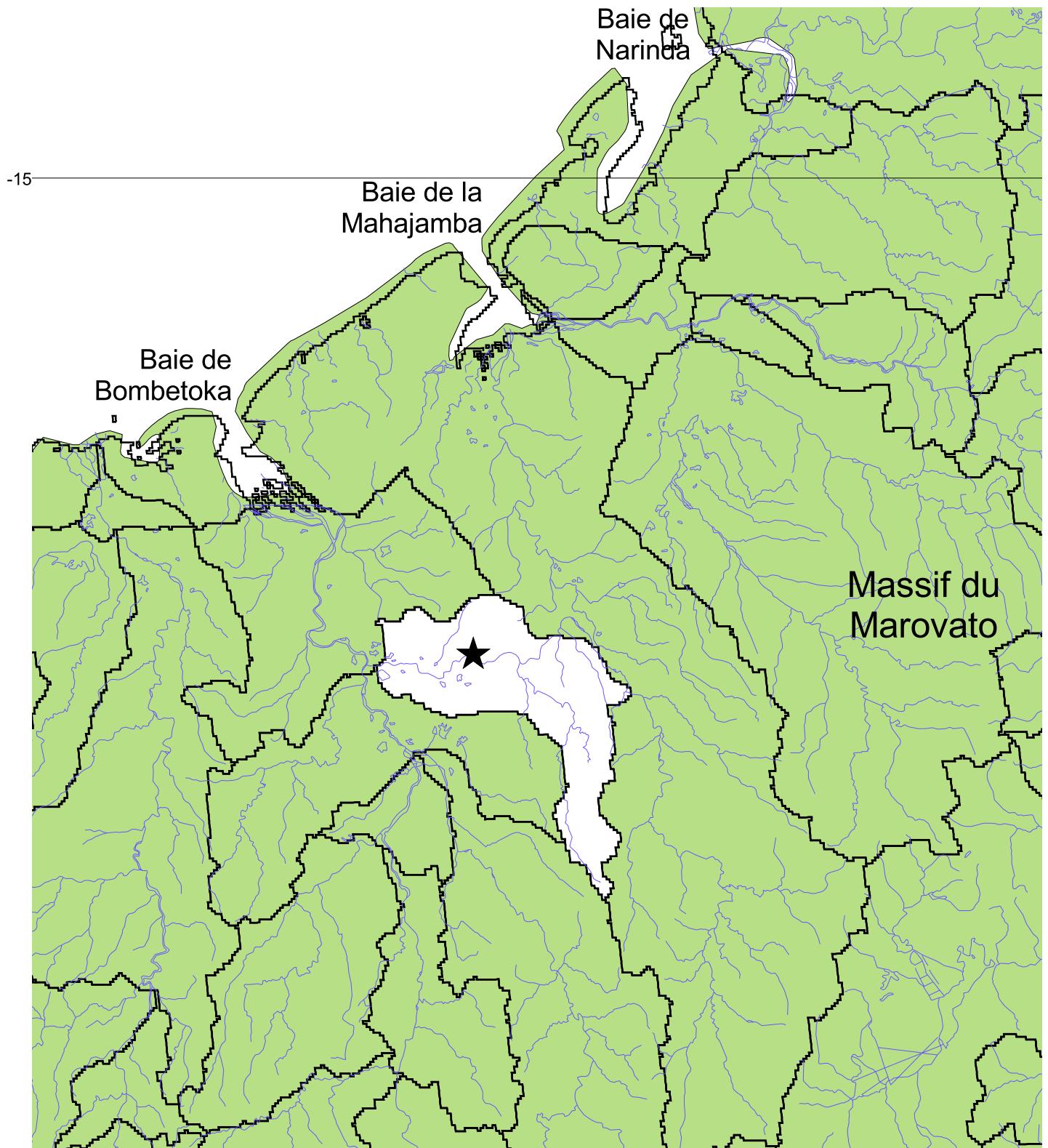
Rationale

The distribution range and population size for this species are unknown. The relationship of this taxon to (and distinctiveness from) East African forms needs further work. Moreover, it remains unclear whether there are multiple congeners present in Madagascar. This species is assessed as DD.

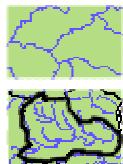
Data sources (Reference Numbers)

10, 93

Spratellomorphia bianalis

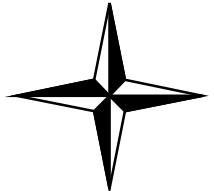


10 0 10 20 30 40 Kilometers



Associated river basin

N



Order: Cyprinodontiformes

Family: Aplocheilidae

Pachypanchax omalonotus (Dumeril 1861)

Category

LC

Rationale

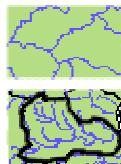
This species is restricted to the offshore island of Nosy Be and the basin of the Sambirano River on the adjacent mainland. It is common throughout its range with no known widespread major threats across its full range. It is assessed as LC.

Data sources (Reference Numbers)

19, 39



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Pachypanchax sakaramyi (Holly 1928)

Category

CR

Criteria

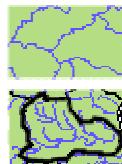
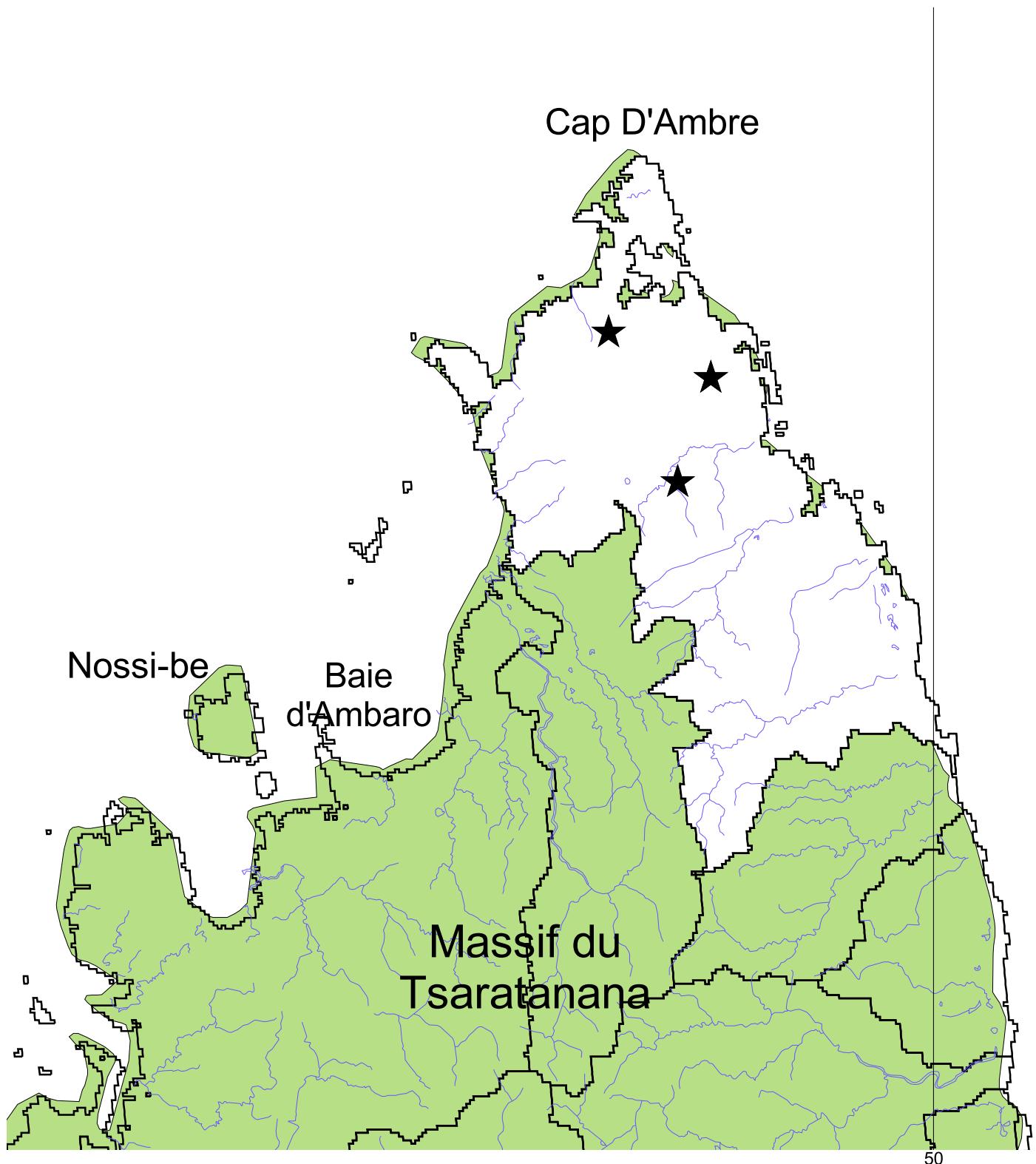
B1ab(i,iii)+2b(i,iii)

Rationale

A visit to Joffreville in 2001 revealed that the upper reaches of the Sakaramy River have been effectively de-watered by diversion of the river's headwaters to domestic use by local residents. Apart from a few fish surviving in puddles fed by the leaking water pipe, this last riverine population of *P. sakaramyi* no longer exists. This species is reputed to occur in Lac Texier and one other low altitude crater lake, both of which are located inside the boundaries of Montagne d'Ambre National Park. However, these habitats have not been sampled since the late 1950's and nothing is known of the current status of these populations. In light of these observations this species is assessed as CR.

Data sources (Reference Numbers)

25, 39

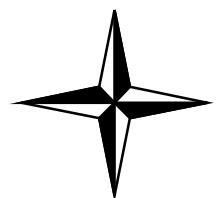


Rivers



Recorded point location

Associated river basin



Pachypanchax sp. "Anjingo" Undescribed

Category

EN

Criteria

B1ab(i,iii,v)+2ab(i,iii,v)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. Reported from the Anjingo river basin in north-west Madagascar. This species has a restricted range (EOO <5000km², AOO <500km²), is found at only two locations within the Anjingo river basin. Habitat loss due to deforestation of the catchment is causing an ongoing decline in EOO, AOO and in the number of mature individuals. This species is assessed as EN.

Data sources (Reference Numbers)

39



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Pachypanchax sp. "Betsiboka" Undescribed

Category
VU

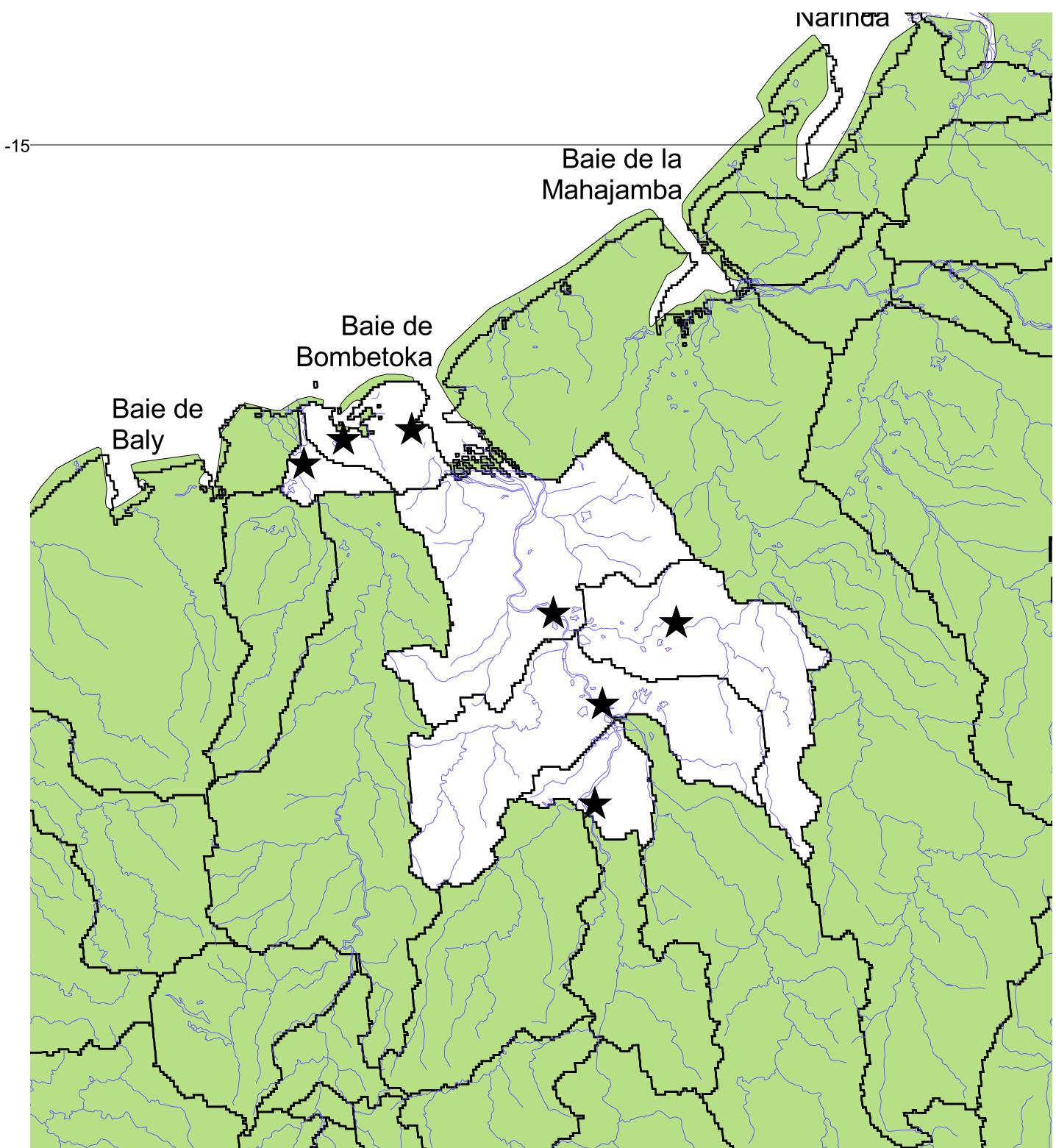
Criteria
B1ab(ii,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. Recorded from rivers on the western slopes of Madagascar from the Betsiboka-Kamoro basin to the Tsiribihina and including Lac Kinkonyi. The Kamoro and Mahavavy du Sud sub-populations are robust and effectively unimpacted by habitat degradation or exotic competitors and/or predators. The Betsiboka/Ikopa sub-populations are, however, impacted by loss of habitat and decline in habitat quality due to deforestation. With an EOO <20,000km², fewer than 10 known locations, and ongoing habitat degradation this species is assessed as Vulnerable.

Data sources (Reference Numbers)

4, 39



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

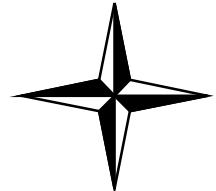


River basin



Associated river basin

N



Pachypanchax sp. "Varatraza" Undescribed

Previously referred to as *Pachypanchax* sp. "Menambery" (Change proposed by Loiselle, P.)

Category

EN

Criteria

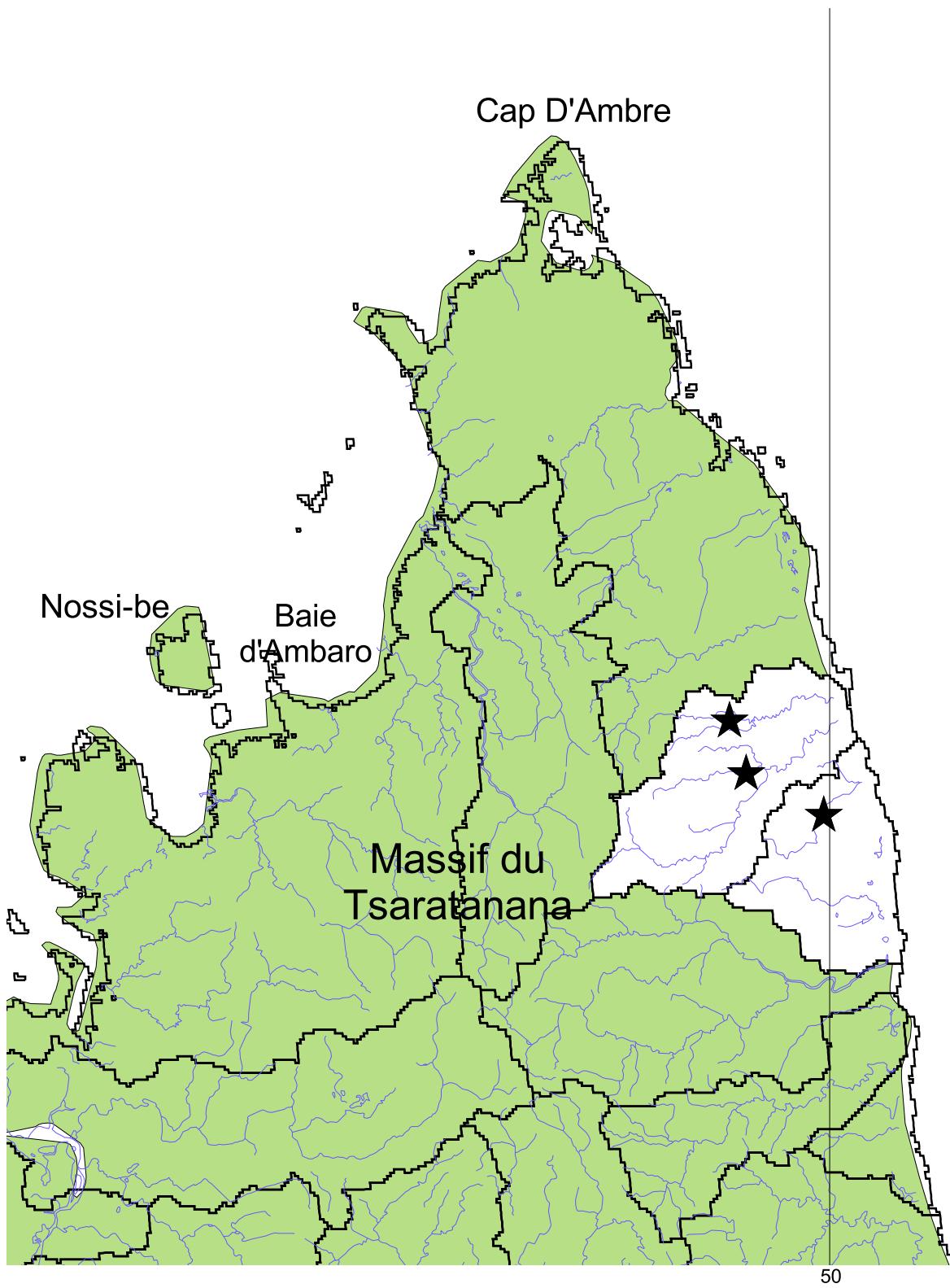
B1ab(i,iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History. This species has been recorded from rivers on the eastern slopes of Madagascar from the Manambato to the Ampanobe. It has a restricted range (EOO <5,000km²), and is known from <5 locations. With habitat degradation (deforestation of the catchment area) also reported in some parts of its range this species is assessed as EN.

Data sources (Reference Numbers)

39



20 0 20 40 60 80 Kilometers



Rivers



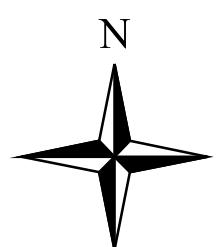
Recorded point location



River basin



Associated river basin



Pachypanchax sp. "Talio" Undescribed

Category
VU

Criteria
B1ab(i,iii)

Rationale

This species is restricted to coastal rivers in NW Madagascar from the Isasy to the Manehoko. It is abundant within its known range, which remains free of exotic predators or competitors. However with an EOO <20,000km², fewer than 10 known locations, and ongoing habitat degradation this species is assessed as Vulnerable.

Data sources (Reference Numbers)

39



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Pachypanchax sp. "*Tsiribihina*" Undescribed

Category

DD

Rationale

An undescribed species known only from a single juvenile specimen in the collection of the M.N.H.N. in Paris. Pending a further survey of the upper Tsiribihina River, this species is classified as DD.

Data sources (Reference Numbers)

39



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Pachypanchax sp. "Sofia" Undescribed

Category

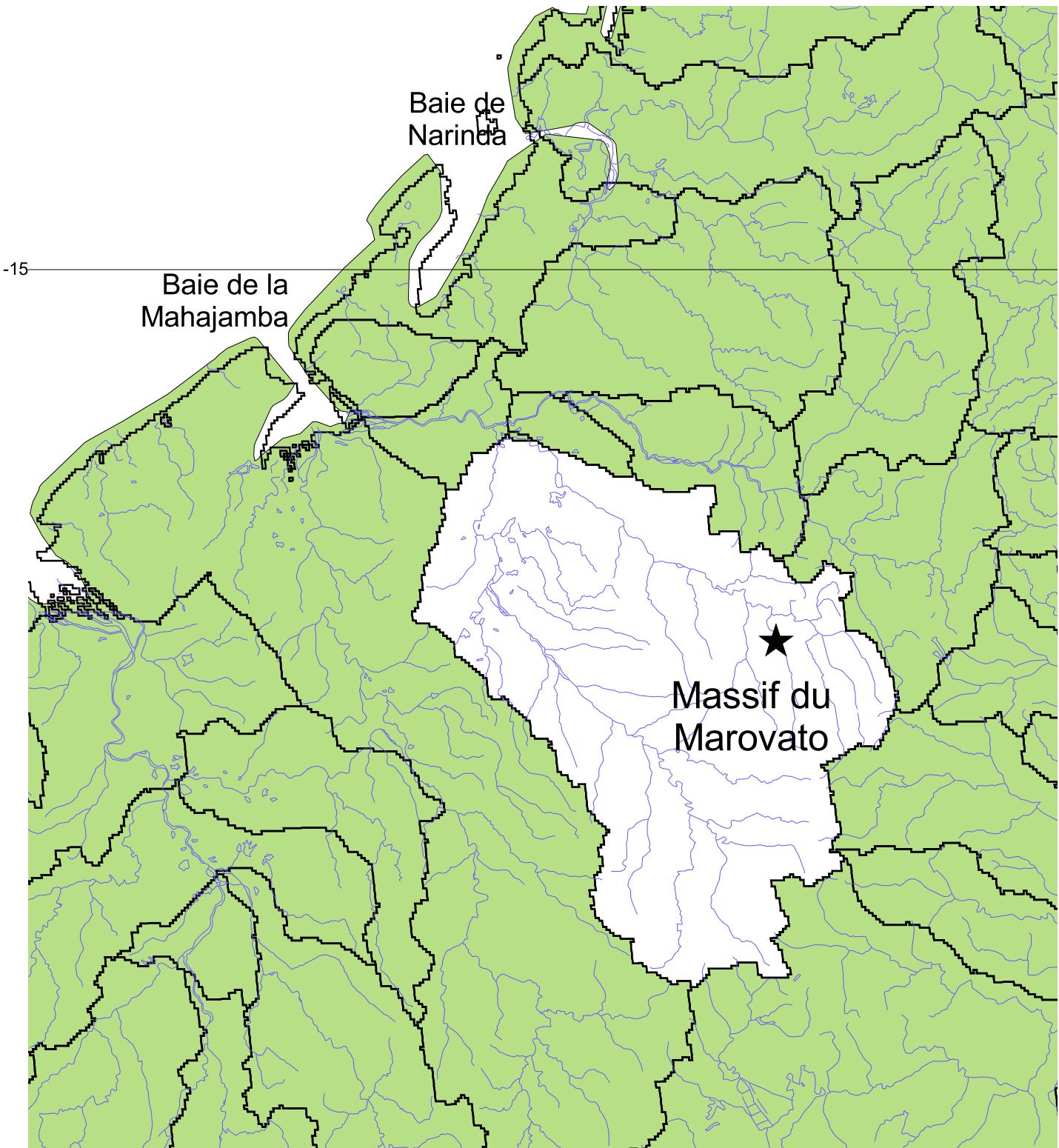
DD

Rationale

Undescribed species with voucher specimens held at the University of Michigan Museum of Zoology. Thought to be rare within its home range but further information is lacking. Pending a further survey of the Sofia River basin, this species is assessed as DD.

Data sources (Reference Numbers)

39



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Pachypanchax sp. "Analava" Undescribed

Category

DD

Rationale

Undescribed species with voucher specimens held at the Department of Animal Science at the University of Antananarivo. The only known specimens were collected from the Loza River basin near the town on Analalava. Pending a further survey of the Loza River basin, this species is assessed as DD.

Data sources (Reference Numbers)

39



7 0 7 142 128 Kilometers



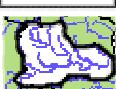
Rivers



Recorded point location

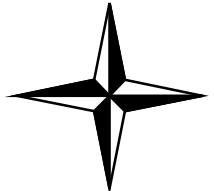


River basin



Associated river basin

N



Order: Cyprinodontiformes

Family: Pantodontidae

Pantanodon madagascariensis (Arnoult 1963)

Category

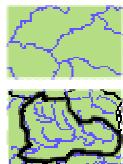
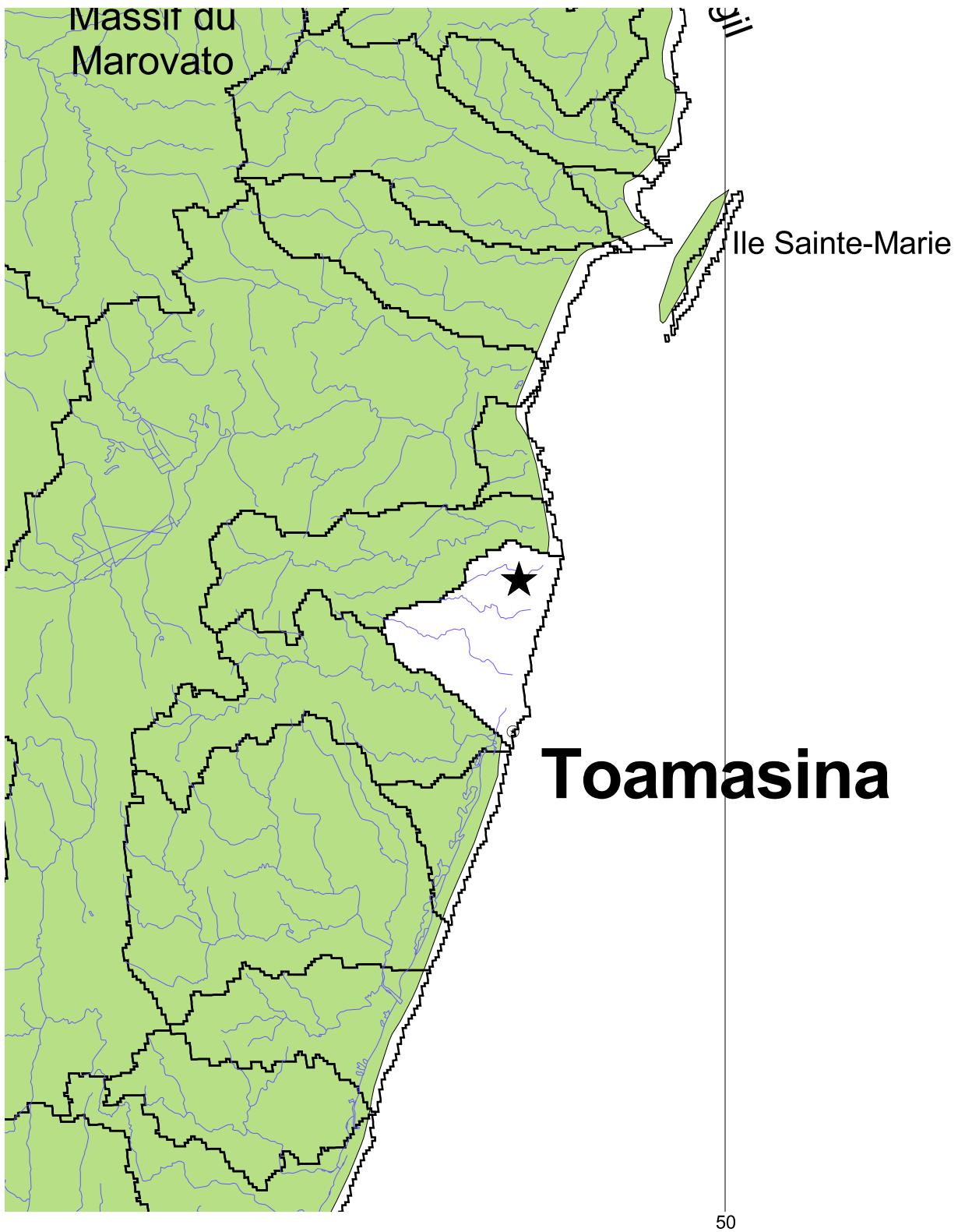
EX

Rationale

Originally known from rivers on the eastern slopes of Madagascar between Mahavelona and Fenoarivo. This species is now thought to be extinct following conversion of its preferred swamp habitat into rice fields.

Data sources (Reference Numbers)

6, 9, 24, 82, 98



Rivers



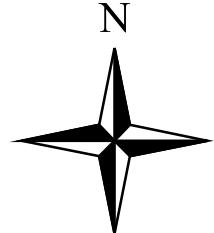
Recorded point location



River basin



Associated river basin



Pantanodon sp. "Manombo" Undescribed

Category

CR

Criteria

A3c;

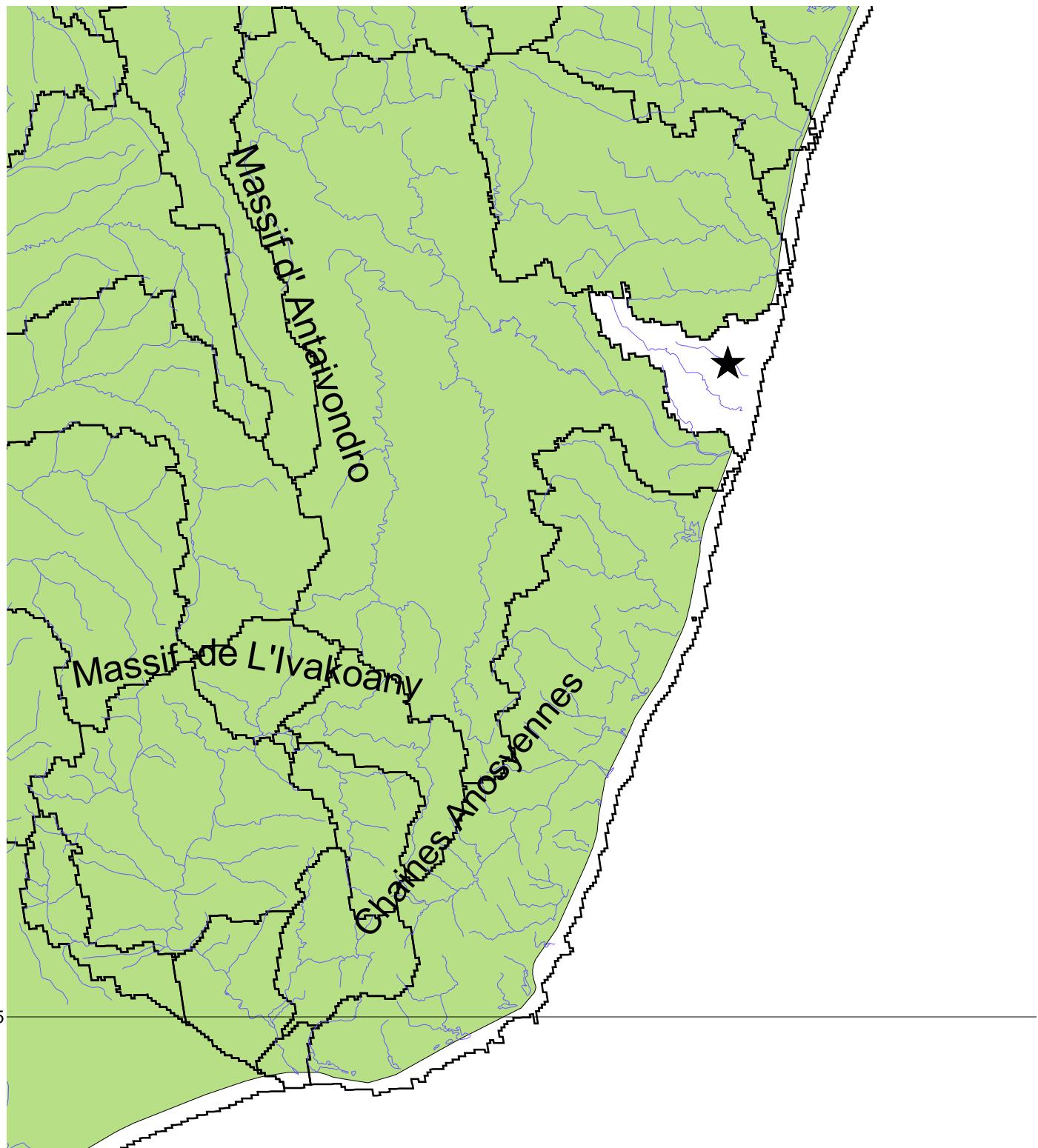
B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. The threats to this species continue, in particular the conversion of swamps into rice fields. It has not been collected in the wild since 1997 and is only known from a single small Pandanas swamp/pool ($\text{EOO} < 100 \text{ km}^2$; $\text{AOO} < 10 \text{ km}^2$) within Manombo Special Reserve. The population has declined by over 80% in 10 years due to habitat loss and the species is thought likely extinct or on the verge of extinction but until this can be confirmed through further survey it is assessed as CR, possibly extinct.

Data sources (Reference Numbers)

82



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

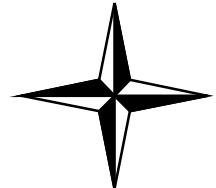


River basin



Associated river basin

N



Order: Perciformes
Family: Ambassidae

Ambassis fontoynonti Pellegrin 1932

Category

DD

Rationale

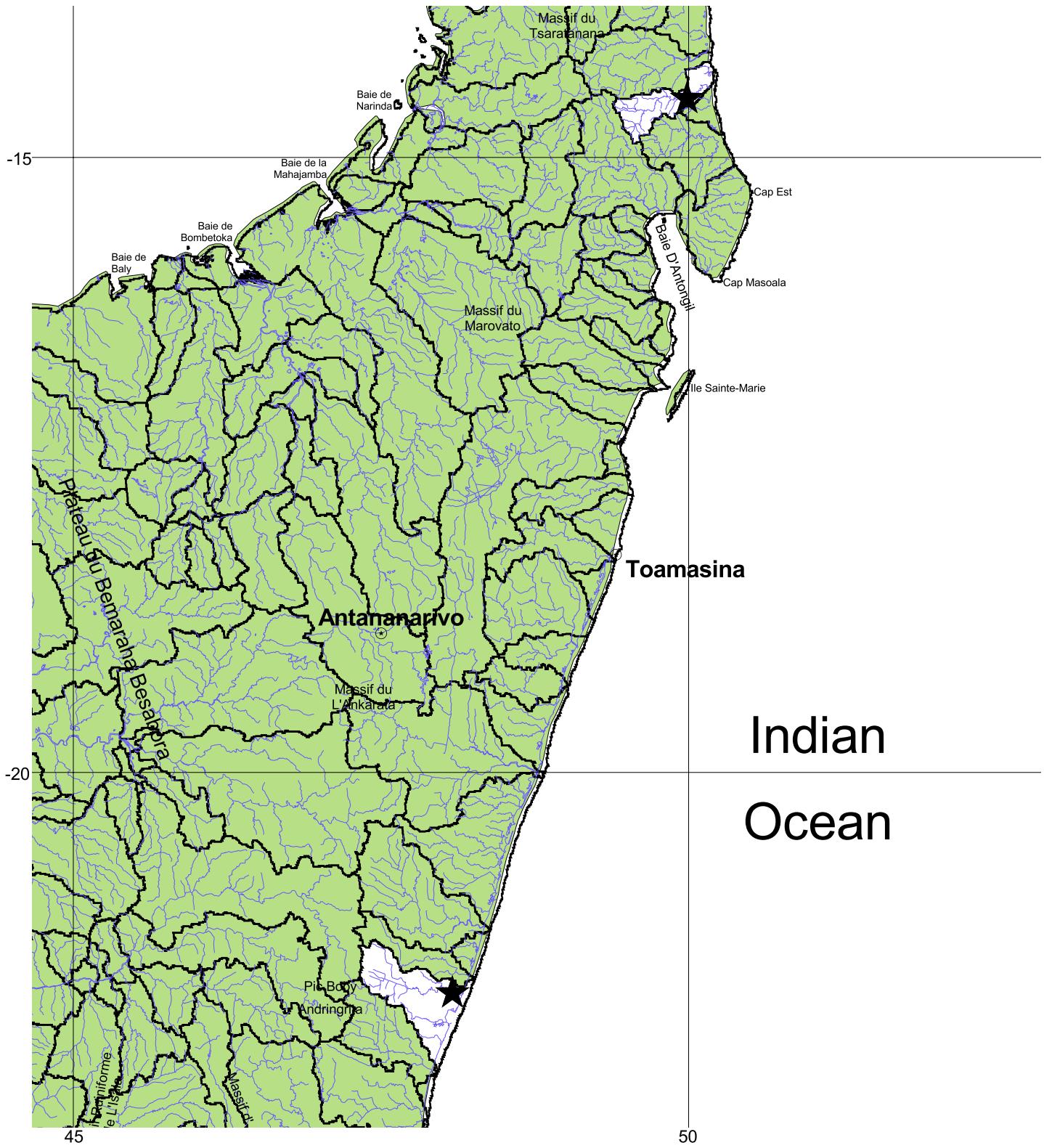
The range limits of this species are unknown and there are no baseline data on population size. The appropriate assessment is therefore DD.

Data sources (Reference Numbers)

1, 5, 28, 61, 63



Ambassis fontoynonti



40 0 40 80 120 160 Kilometers

N



Rivers



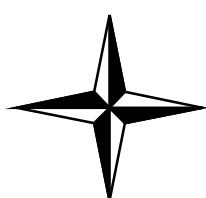
Recorded point location



River basin



Associated river basin



Order: Perciformes
Family: Cichlidae

Oxylapia polli Kiener & Maugé 1966

Category

CR

Criteria

B1ab(i,iii)

Rationale

This species has been reported from the rapids and rocky areas within the Nosivolo river, a tributary of the Mangoro river. Although this species is abundant, it has an EOO $<100\text{km}^2$, is found at only one "location" (see Red List Guidelines for definition of location), and is subject to continued decline in habitat due to deforestation. It therefore qualifies as CR.

Data sources (Reference Numbers)

30, 34, 43, 72, 94



Oxylapia polli



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paratilapia polleni Bleeker 1868

Category
VU

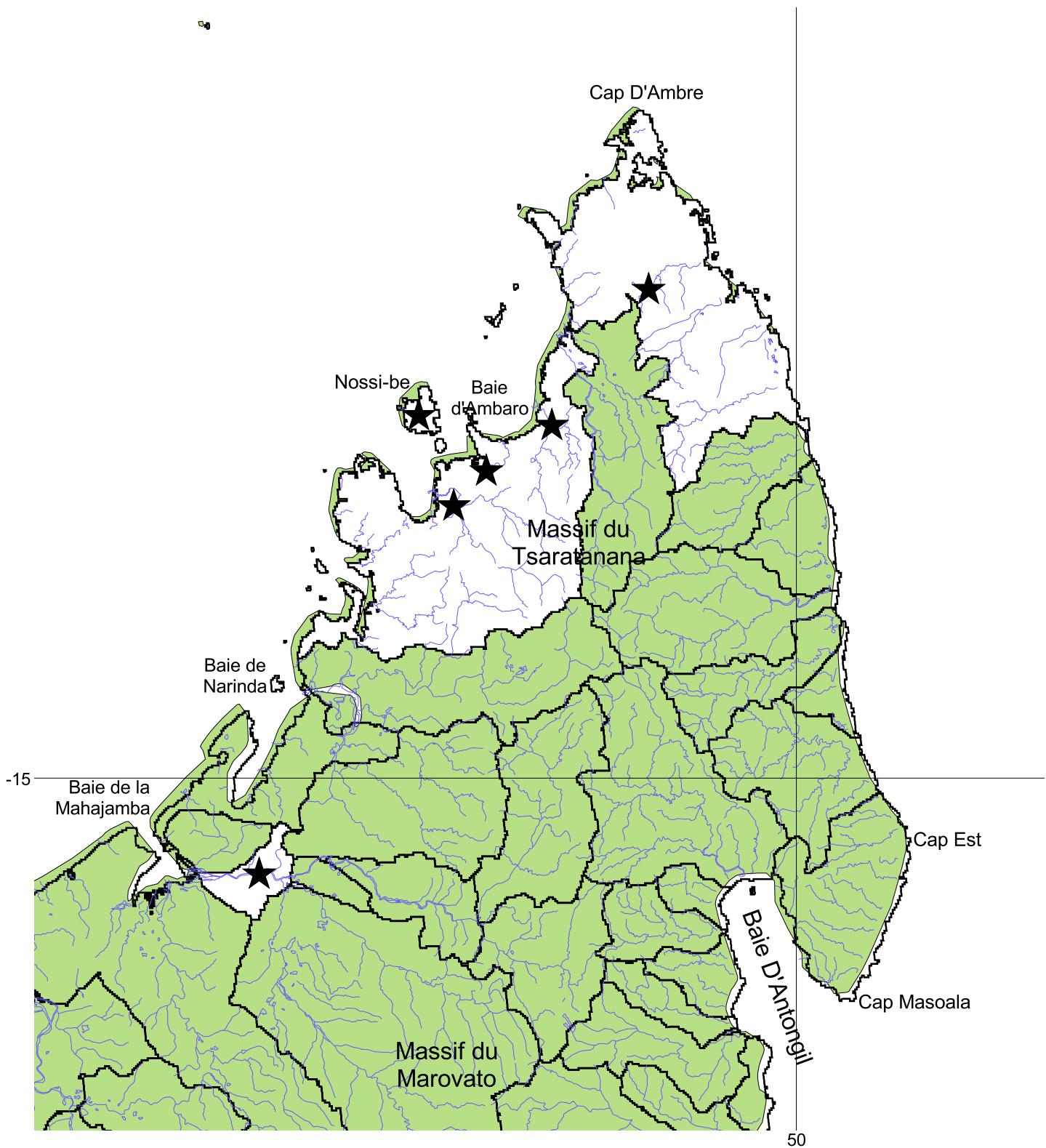
Criteria
B1ab(i,iii,v)

Rationale

Widespread throughout the rivers and lakes of the western and northeastern slopes of Madagascar. It qualifies as VU on account of its limited distribution ($\text{EOO} < 20,000 \text{ km}^2$) and fragmented habitat (mainly due to deforestation of river catchments) which are causing a continued decline in available habitat and the number of mature individuals in the population.

Data sources (Reference Numbers)

12, 32, 33, Loiselle, pers. obs.



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location

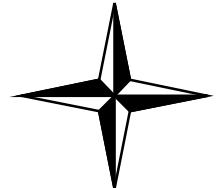


River basin



Associated river basin

N



Paratilapia bleekeri Sauvage 1882

Category

DD

Rationale

This species is only known for certain from the type specimens. It is, however, no longer found at the type locality or the surrounding region. It may be more widespread in western Madagascar, but more survey and detailed morphological study are required to confirm this suggestion. It is assessed as DD.

Data sources (Reference Numbers)

Loiselle, pers. obs.



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Paratilapia typus (Bleeker 1878)

Previously known as *Paratilapia* sp. "Fony"

Category

VU

Criteria

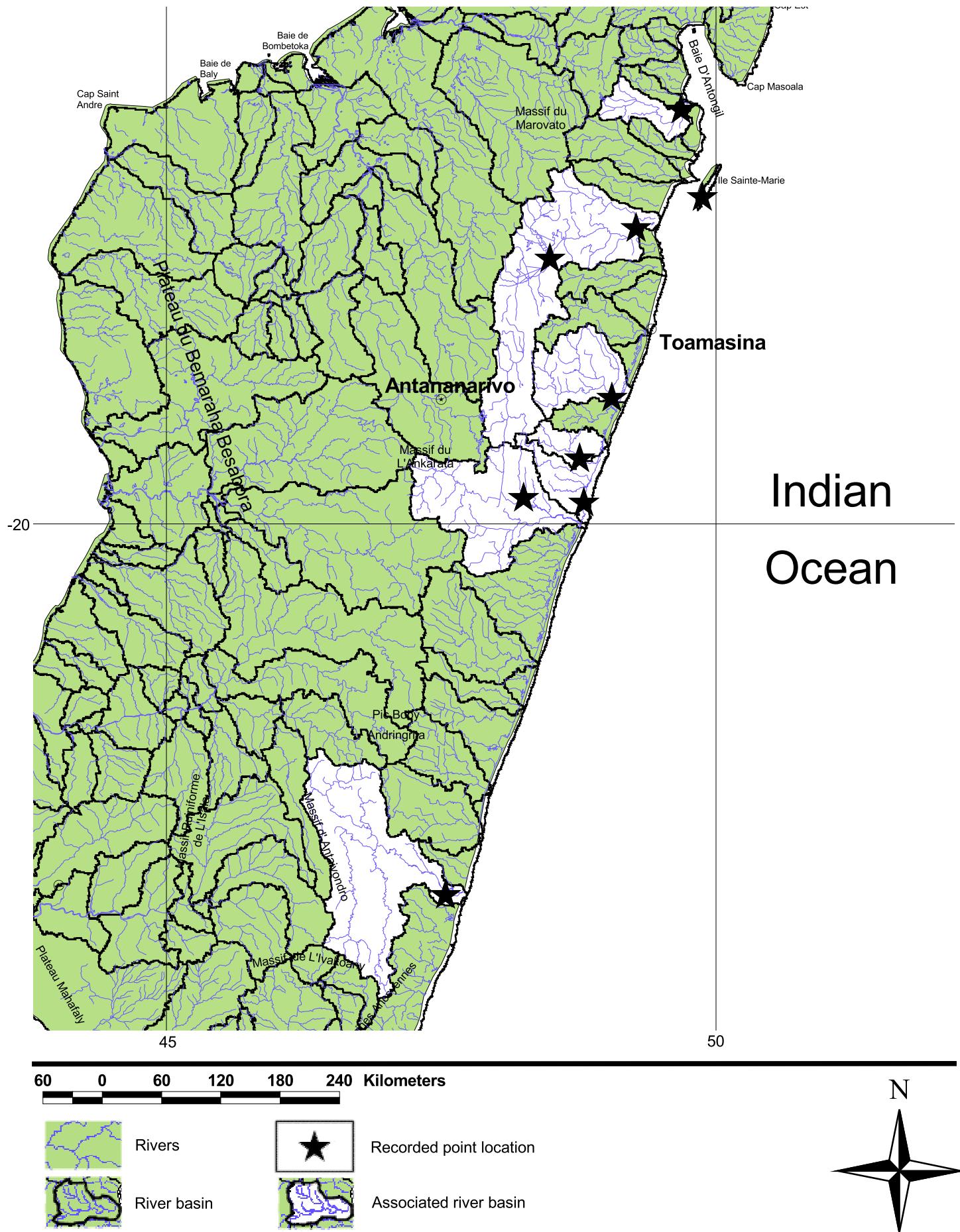
B1ab(i,iii,v)

Rationale

Species of uncertain taxonomic status, with voucher specimens held at the American Museum of Natural History, UMMZ and possibly RMNH. The taxon may be referable to *Paratilapia typus* (Bleeker 1878). The type specimen of this species is, unfortunately, in extremely poor condition and pending the collection of topotypic material from the Mananara River, no formal taxonomic conclusion can be reached. It is recorded from the east coast rivers of Madagascar and Nosy Boraha Island. It has an estimated EOO of < 20,000km², has a highly fragmented habitat (largely due to deforestation), and consequently suffers an ongoing decline in EOO, habitat extent/quality, and the number of mature individuals in the population. It qualifies as VU.

Data sources (Reference Numbers)

32, 33, Loiselle, pers. obs.



Paratilapia sp. "Lac Ihotry" Undescribed

Category

DD

Rationale

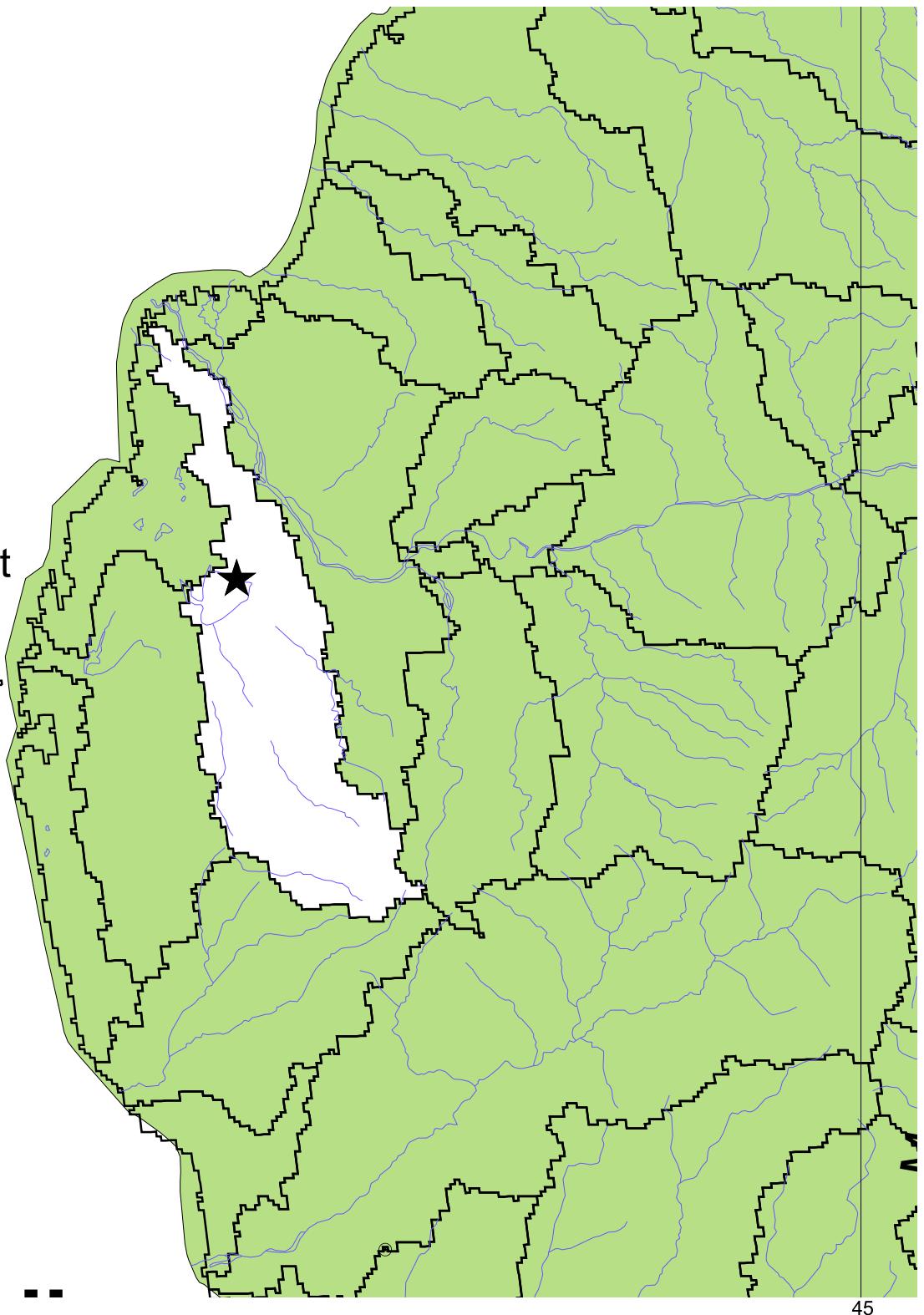
Undescribed species with voucher specimens held at the American Museum of Natural History. It was originally recorded from Lac Ihotry in Madagascar but hasn't been collected again since the 1930's. It is assessed as DD rather than EX because: (1) no one has sampled Lac Ihotry in the last 60 years and, (2) it is unclear whether this population is distinct from *Paratilapia* from the lower Onilahy drainage, whose relationship to congeners is also unclear.

Data sources (Reference Numbers)

Loiselle, pers. obs.

Paratilapia sp. "Lac Ihotry"

Cap Saint
Vincent



6 0 6 12 18 24 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



***Paratilapia* sp. "Vevembe" Undescribed**

Previously referred to as *Paratilapia* sp. "Vondrozo" (Change proposed by Loiselle, P.)

Category

CR

Criteria

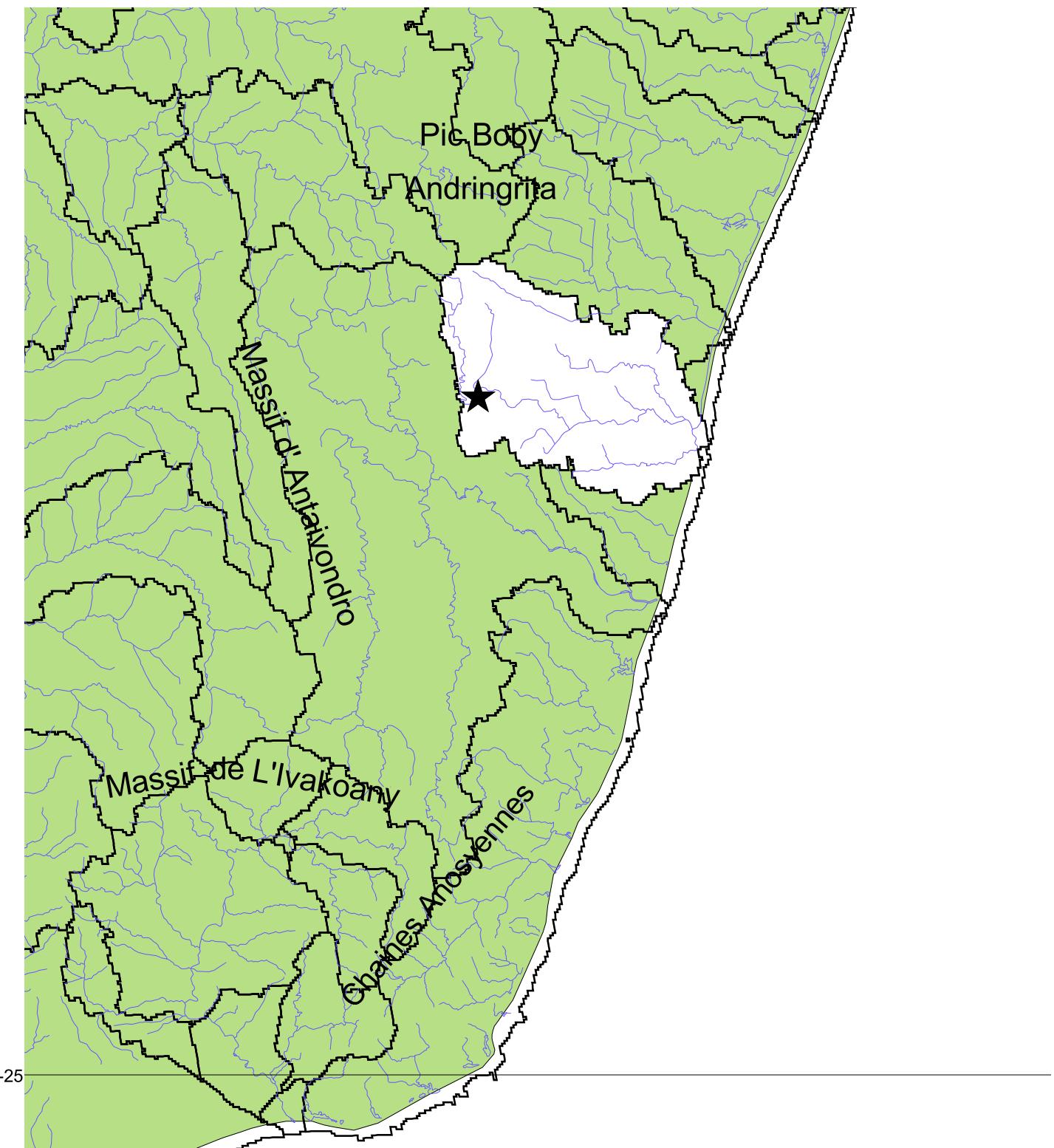
B1ab(I, ii, iii) + 2ab(I, ii, iii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. It has been recorded in small rivers and marshland within a highly restricted location (EOO and AOO <100km² and 10km², respectively) in the Province of Fianarantsoa on the eastern slopes of Madagascar. The habitat is severely impacted by continued deforestation of the associated catchment. This species is assessed as CR.

Data sources (Reference Numbers)

Sparks, pers. obs.



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

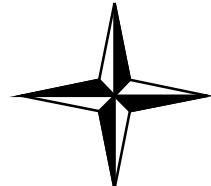


River basin



Associated river basin

N



Paratilapia sp. "Fiamanga" Undescribed

Category

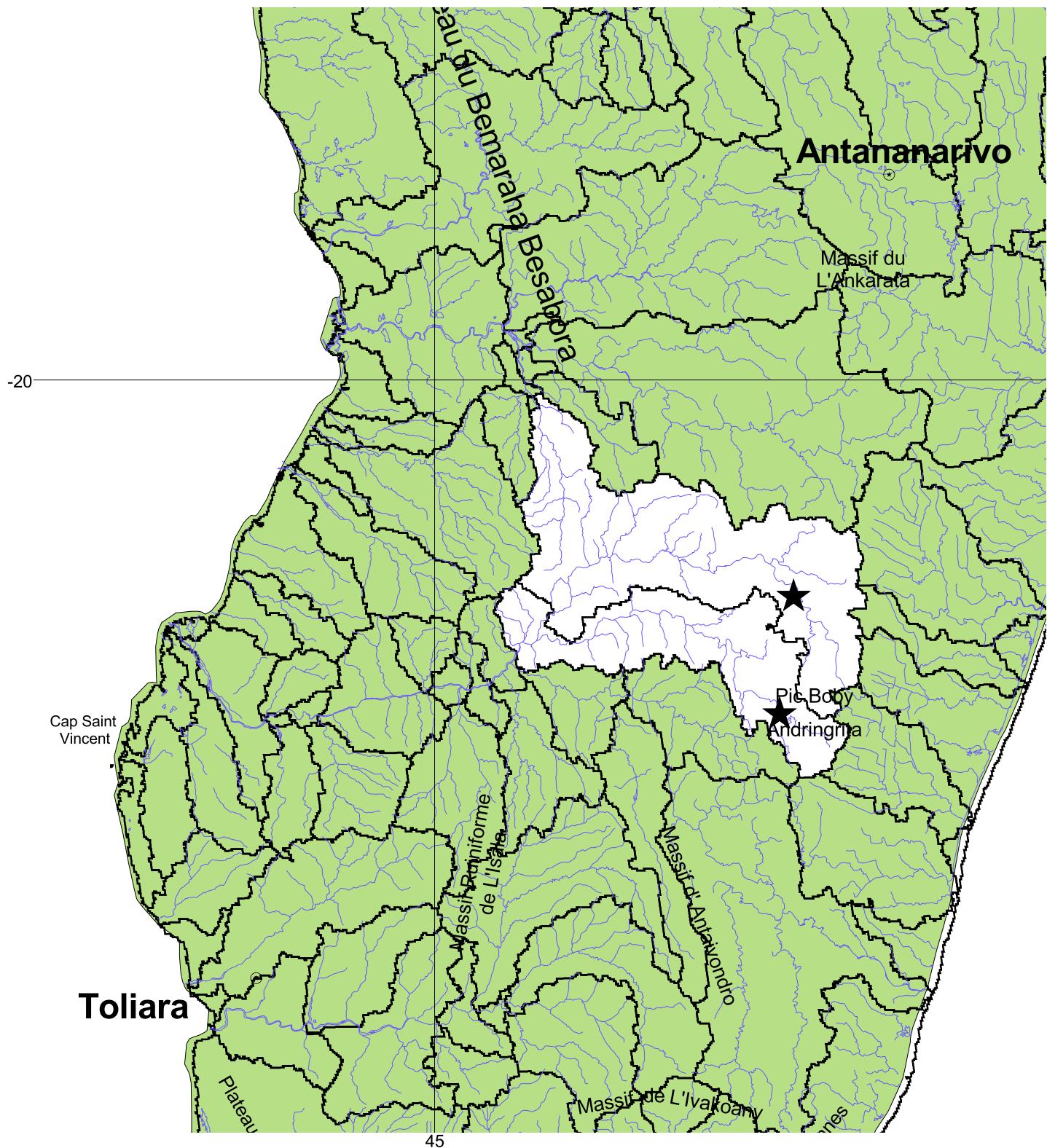
DD

Rationale

This species is only known from a few (poorly preserved) specimens. It is probably quite rare, given a high level of habitat degradation throughout its hypothesized range. More data are required before a threat assessment can be made, hence current listing as DD.

Data sources (Reference Numbers)

72; Sparks, pers. obs.



30 0 30 60 90 120 Kilometers



Rivers

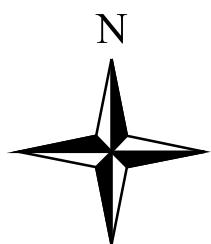


Recorded point location



River basin

Associated river basin



Paretroplus damii Bleeker 1868

Category

DD

Rationale

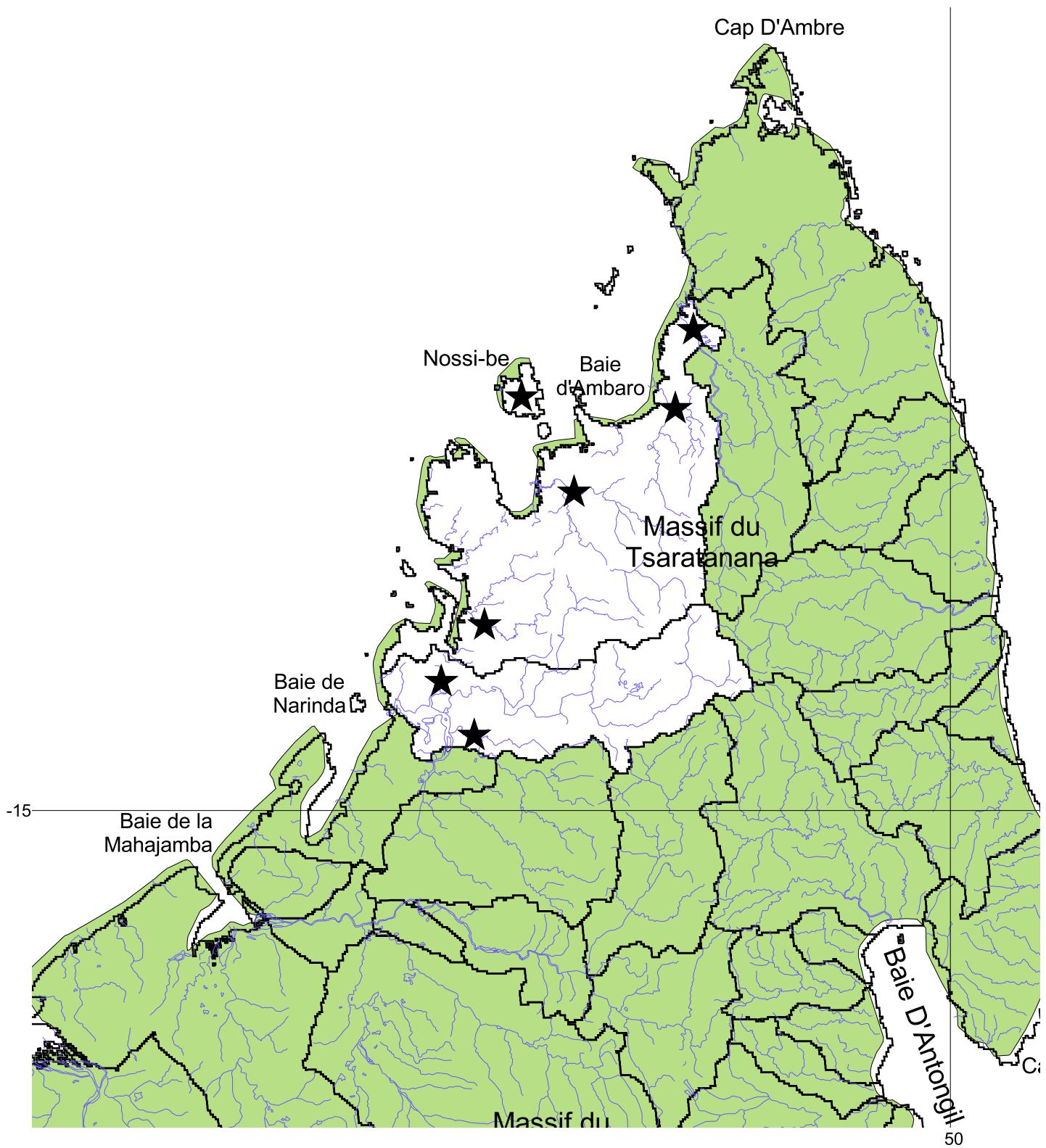
It is thought that this species may in fact comprise a species complex. More taxonomic work is required. Assuming it to be a single species, it is recorded from rivers and lakes in the northeastern parts of Madagascar. Recent surveys suggest that its AOO may exceed 2,000 km² such that it would be assessed as LC. However, until the taxonomy can be confirmed this species is assessed as DD.

Data sources (Reference Numbers)

12, 28, 40, 43, 51, 52, 55, 72, 100



Paretroplus damii



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus kieneri Arnoult 1960

Category
VU

Criteria
B1ab(i,iii)

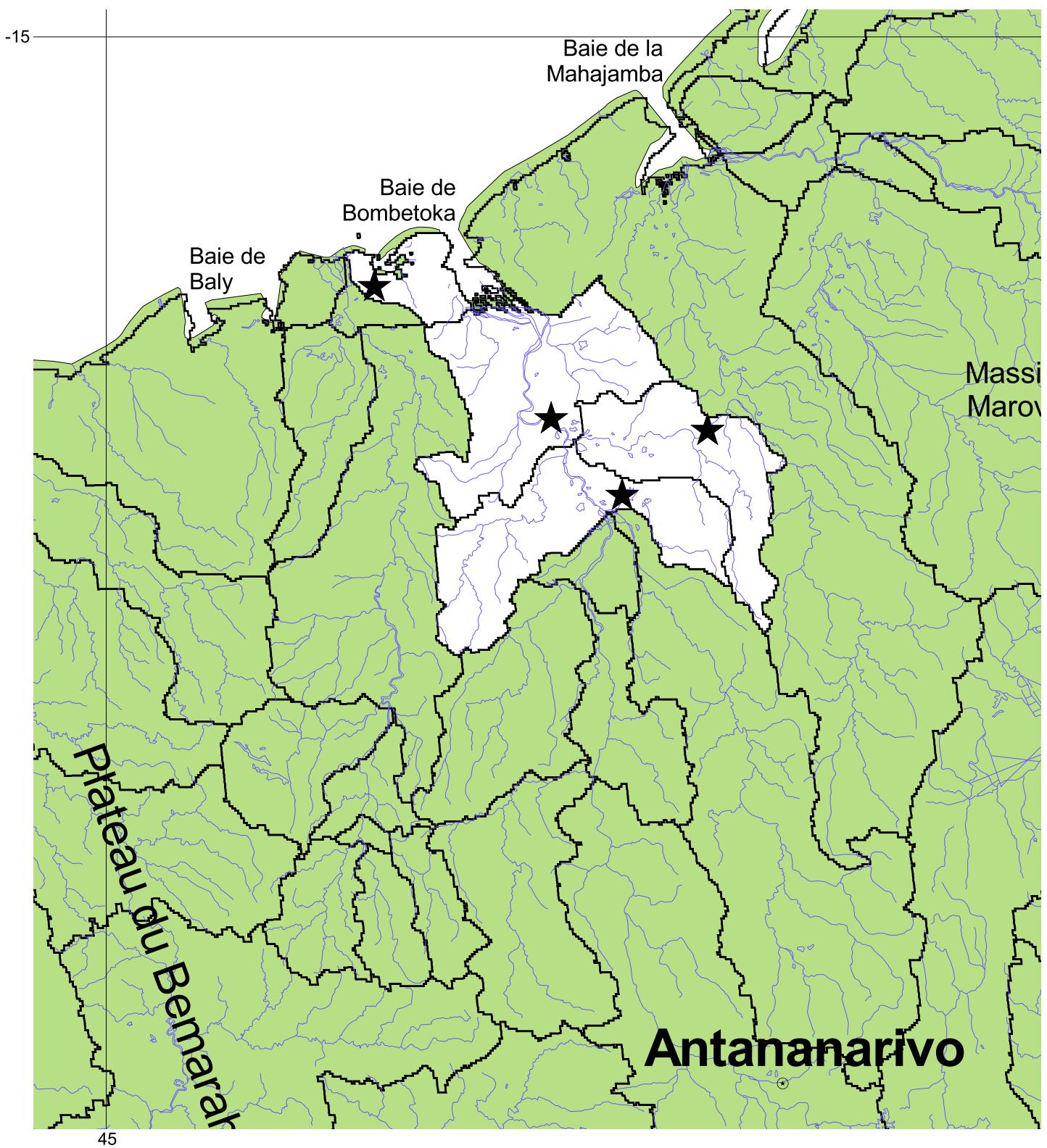
Rationale

This species is known from the lower reaches of the Mahavavy du Sud, Betispoka and Mahajamba river basins and associated lakes in western Madagascar. It has an EOO <20,000km², and the habitat is fragmented due to deforestation in the associated catchments. It is also threatened by competition and predation from introduced fish species. It therefore qualifies as VU.

Data sources (Reference Numbers)

28, 29, 35, 40, 52, 55, 72; Sparks,
pers. obs.

Paretroplus kieneri



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Paretroplus maculatus Keiner & Maugé 1966

Category

CR

Criteria

B1ab(i,iii,v)

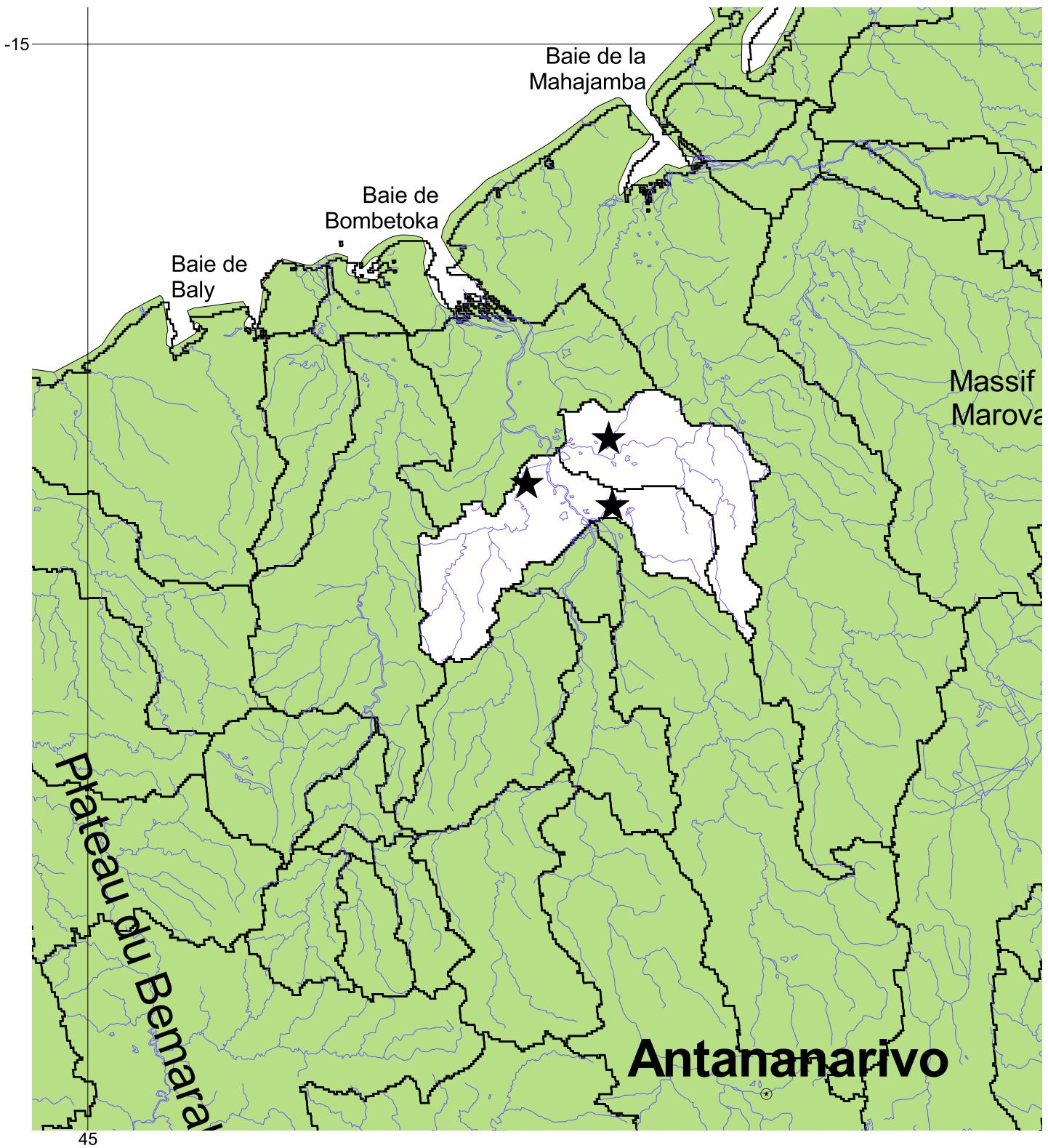
Rationale

This species is known from the Betispoka and Mahajamba river basins on the western slopes of Madagascar. It has experienced a rapid decline in range and population size in the last decade due to severe fishing pressure, impact of exotic introduced species, and habitat destruction. With its estimated EOO <100km², severely fragmented habitat, and a continued decline/loss of habitat and mature individuals this species is assessed as CR.

Data sources (Reference Numbers)

30, 40, 51, 54, 72

Paretroplus maculatus



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Paretroplus maromamdia Reinthal & Sparks (1988)

Category

EN

Criteria

B1ab(i,iii)

Rationale

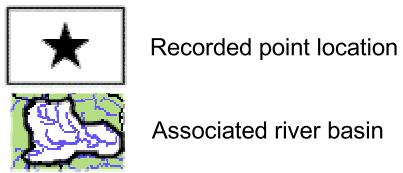
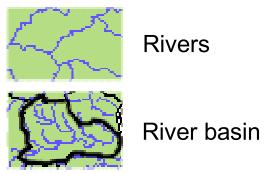
This species is known from the Andanomalaza and Maevarano river basins in northwestern Madagascar. It has an estimated EOO < 5,000km² and is limited to two, possibly three, locations in a highly fragmented habitat. Habitat loss/decline due to deforestation continues and the species is also impacted by competition and predation from introduced exotic fish species. The species is assessed as EN.

Data sources (Reference Numbers)

40, 52, 55, 72, 87, 103



20 0 20 40 60 80 Kilometers



Paretroplus menarambo (Allegayer 1966)

Category

EW

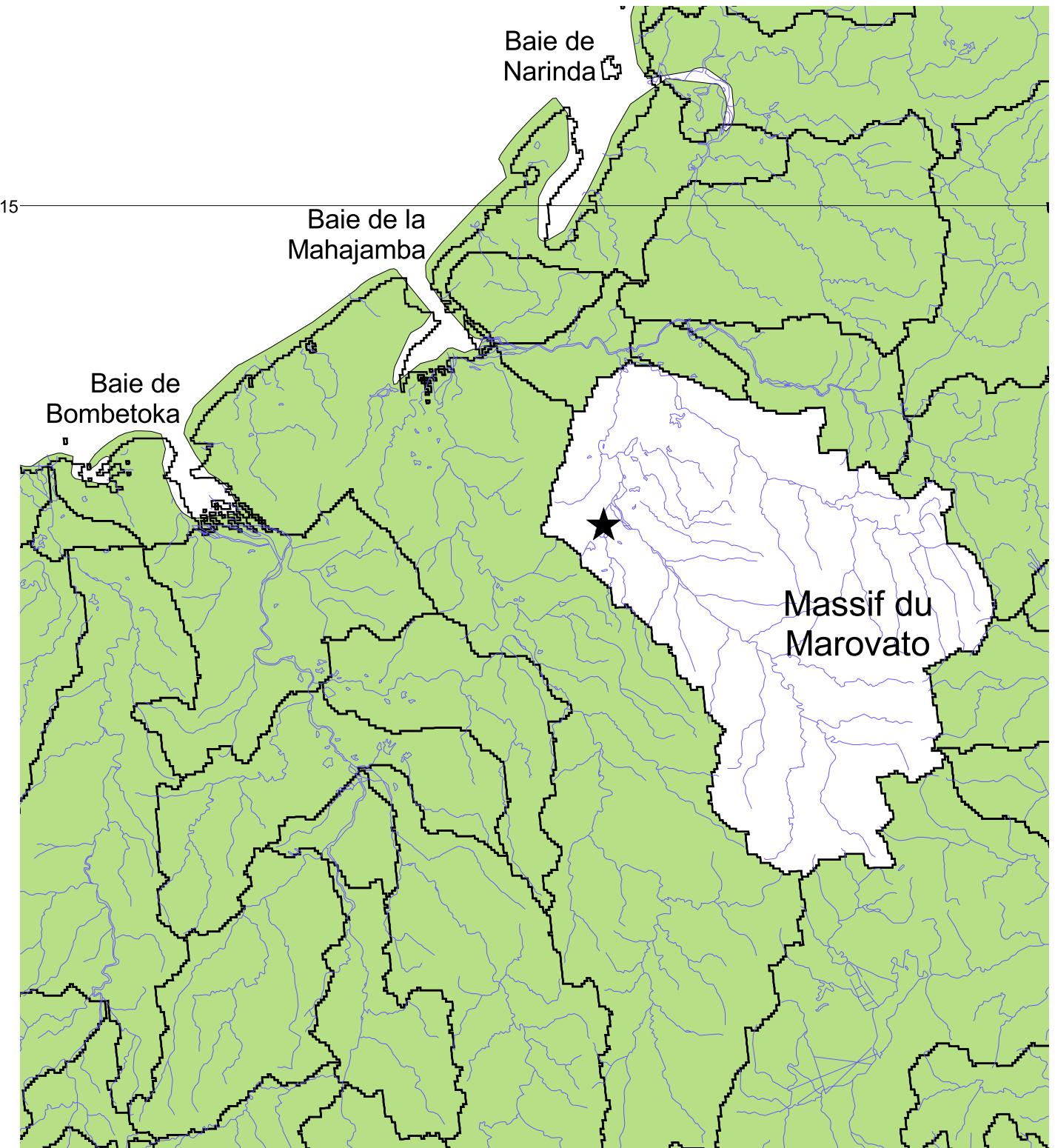
Rationale

Originally endemic to Madagascar and now presumed extinct in the wild. No specimens have been collected in recent years (late 1990's) despite targeted surveys but breeding populations are maintained in captivity. Given that the species was only known from a single locality it is reasonable to assume that sufficient survey has been conducted to assess it as EW. The main causes for the loss of this species were deforestation, introduced exotic species, and overfishing.

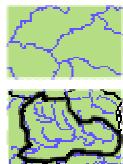
Data sources (Reference Numbers)

2, 35, 36, 40, 51, 52, 54, 72

Paretroplus menarambo



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Paretroplus nourissati (Allegayer 1998)

Category
VU

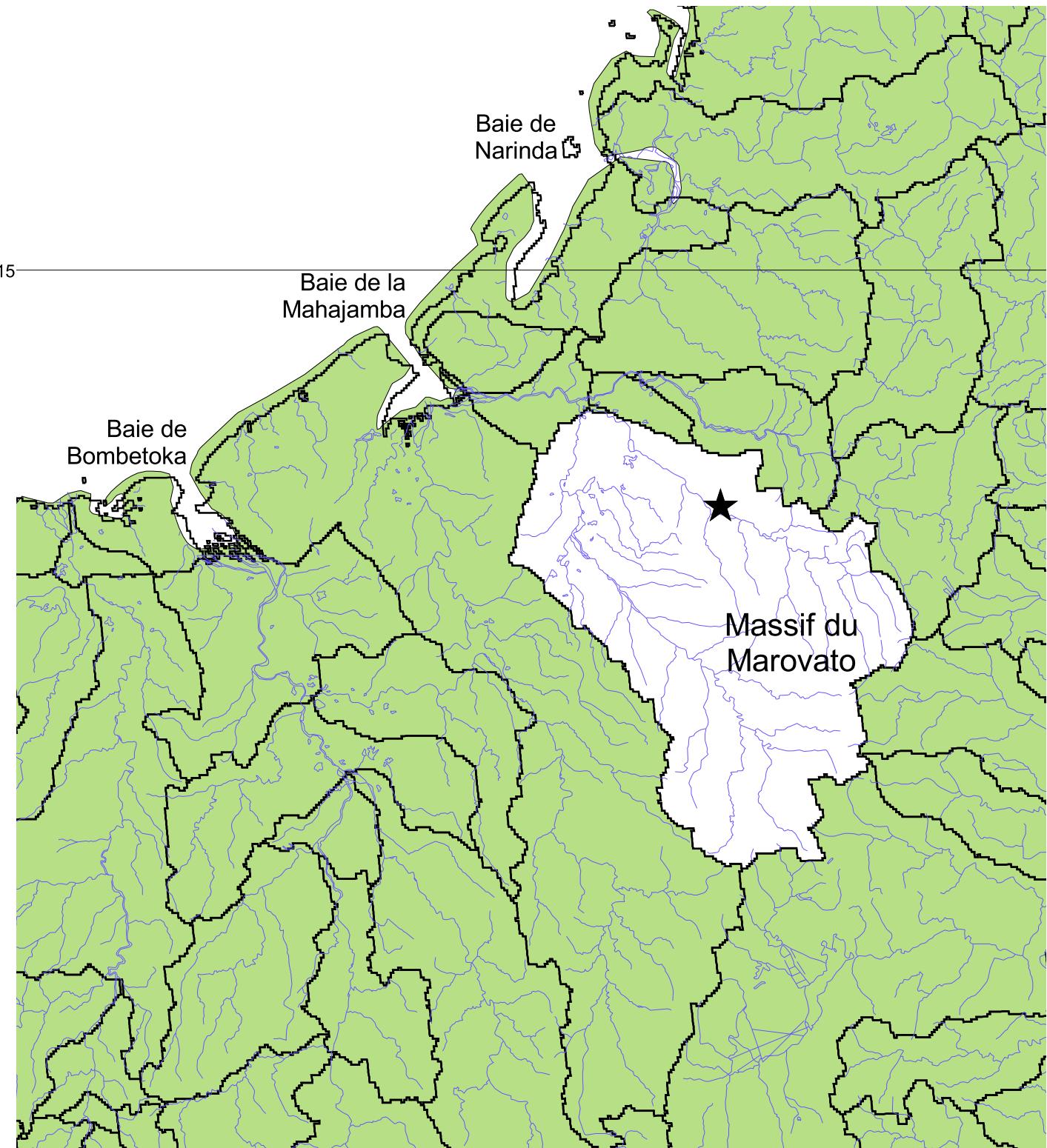
Criteria
B1ab(i,iii)

Rationale

This species is known from the Sofia river drainage in Madagascar. Survey of the area has been limited and it is thought likely to be more widespread. With an estimated EOO <20,000km², a fragmented habitat, and a continued decline in habitat due to deforestation, this species is assessed as VU. It is also subject to competition and predation from introduced exotic fish species.

Data sources (Reference Numbers)

3, 17, 23, 40, 51, 52, 72



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus petiti Pellegrin 1929

Category

DD

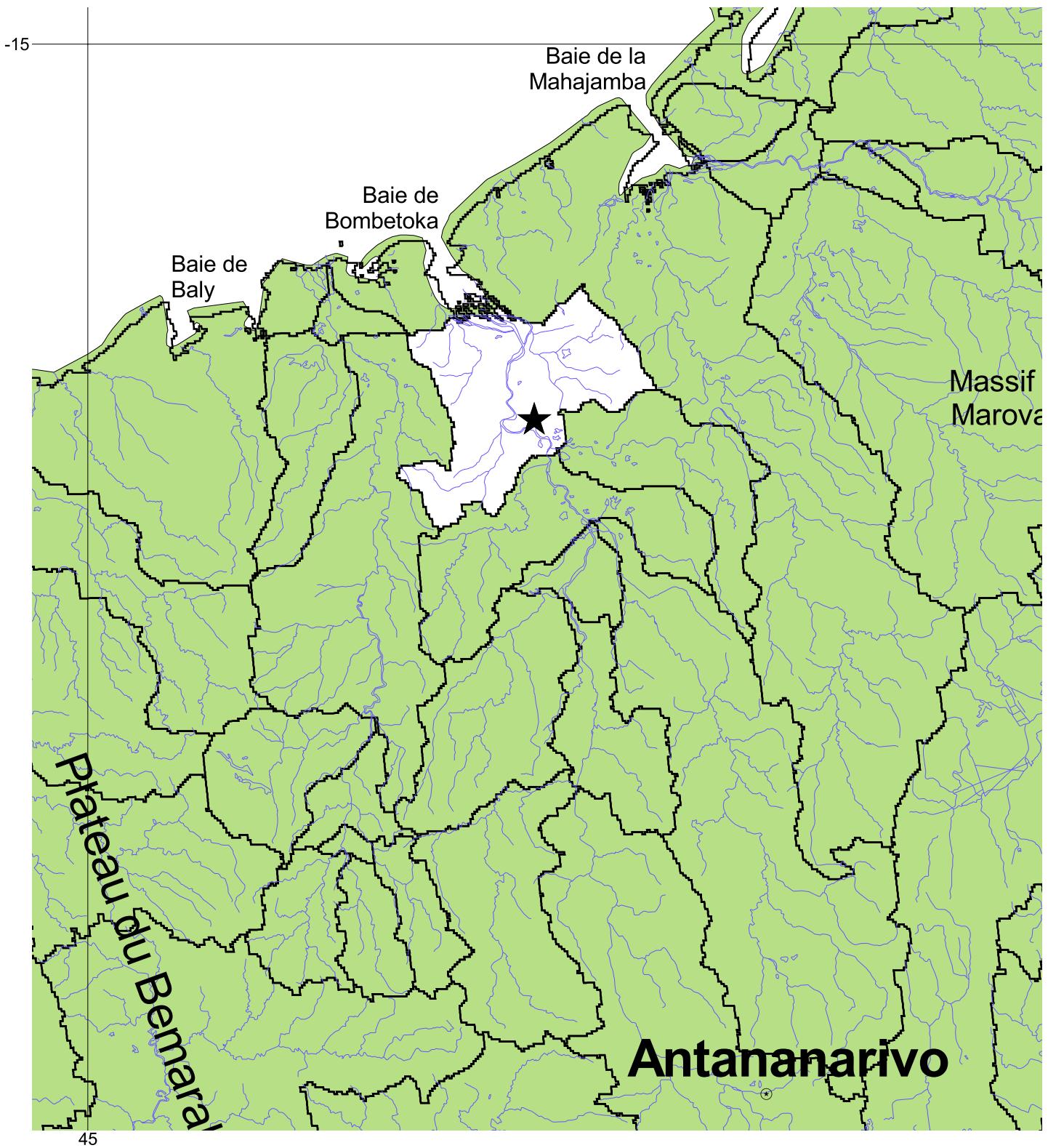
Rationale

This species is known only from the holotype, a juvenile specimen. Historically, the nomen *P. petiti* has been erroneously applied to the recently described *P. dambabe*, a very different species. Attempts to collect additional material of *P. petiti* in 2002 and 2003 were unsuccessful due to uncertainty regarding the type locality. Pending resolution of these difficulties this species is best classified as DD.

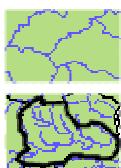
Data sources (Reference Numbers)

28, 29, 35, 40, 52, 55, 72, 79

Paretorplus petiti



20 0 20 40 60 80 Kilometers



Rivers

River basin



Recorded point location

Associated river basin

N



Paretroplus dambane Sparks 2002

Category

EN

Criteria

B1ab(i,ii,iii)

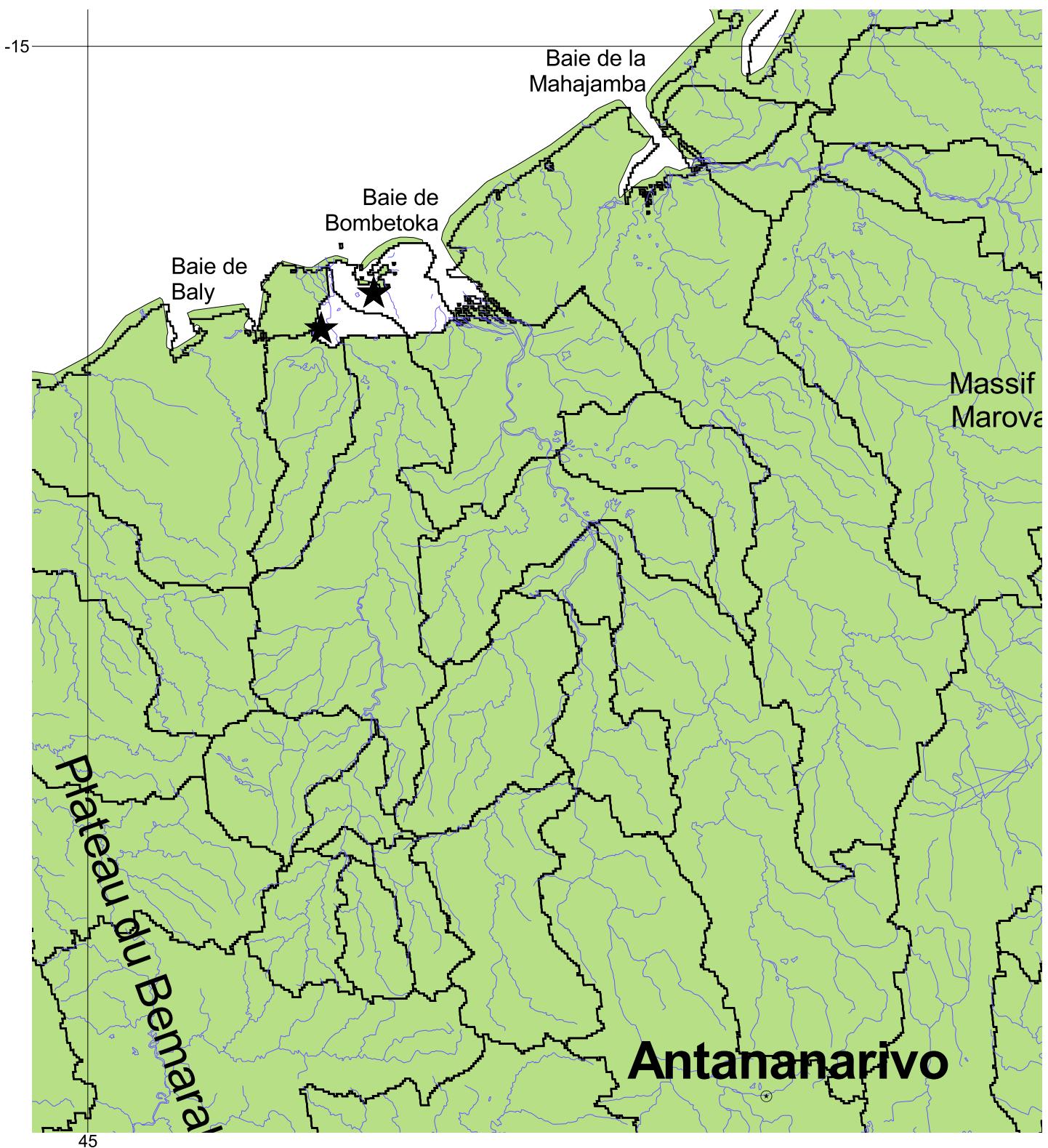
Rationale

Previously referred to as *P. petitii*, populations of this species are only thought to persist in a few small lakes in the delta of the Mahavavy du Sud, near Lac Kinkong. It appears to have recently been extirpated from Lac Kinkong due to overfishing and is under severe pressure in other parts of its range. Given its restricted range (EOO <5,000km²), fragmented population, and continued pressure through catchment deforestation, overfishing and exotic introduced species, it has been assessed as EN.

Data sources (Reference Numbers)

40, 72, 79

Paretroplus dambabe



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus polyactis (Bleeker 1878)

Category
VU

Criteria
B1ab(i,iii,v)

Rationale

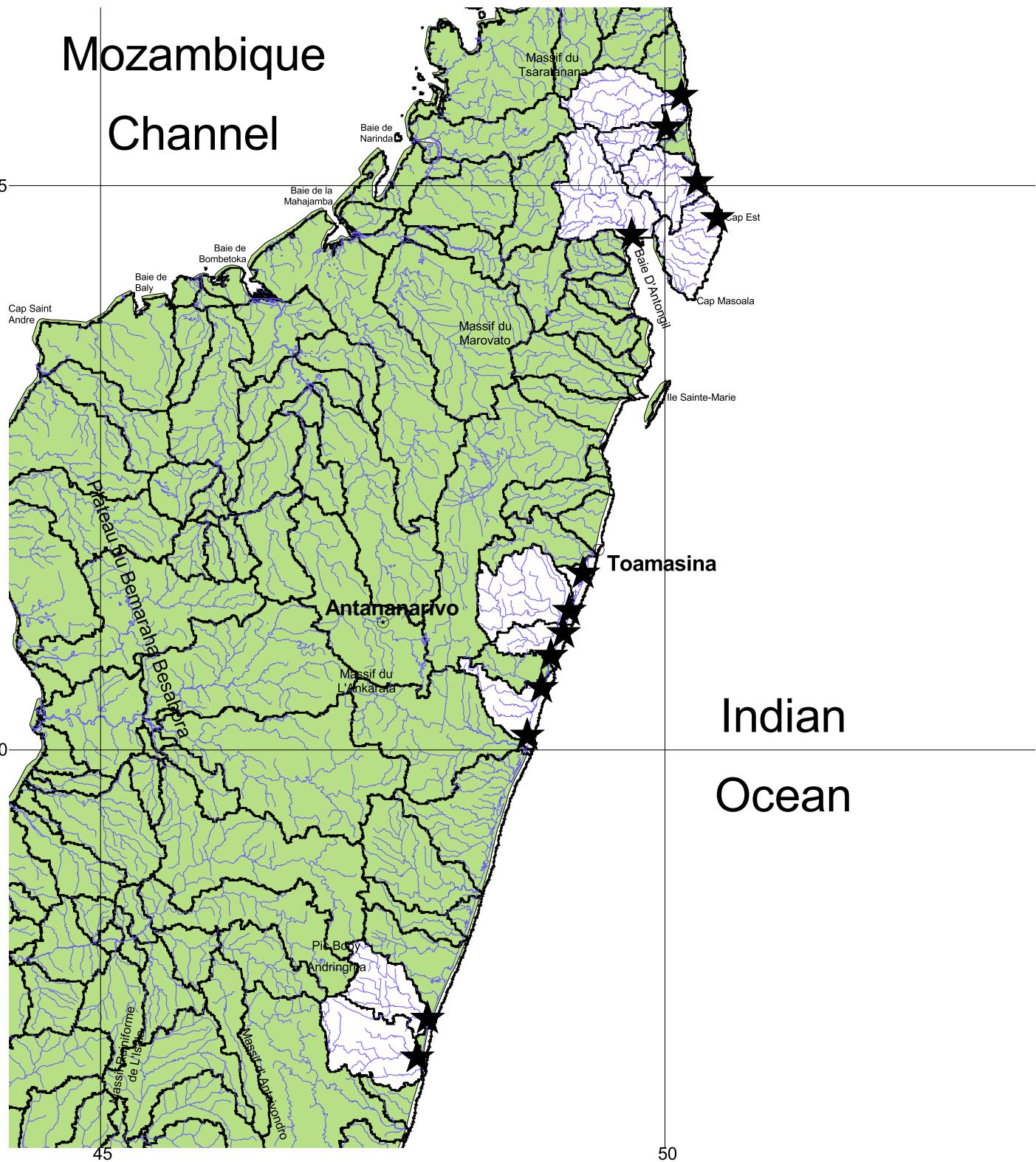
Distributed throughout many rivers of the eastern slopes of Madagascar. The estimated EOO is <20,000km², the population is fragmented. There is a continued decline in EOO, AOO, and the number of mature individuals due to habitat loss from deforestation in the water catchments, and overfishing. This species is assessed as VU.

Data sources (Reference Numbers)

13, 18, 28, 35, 40, 51, 72

Paretroplus polyactis

Mozambique
Channel



60 0 60 120 180 240 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus sp. "Sofia" Undescribed

Category

EN

Criteria

B1ab(i,iii)+2ab(i,iii)

Rationale

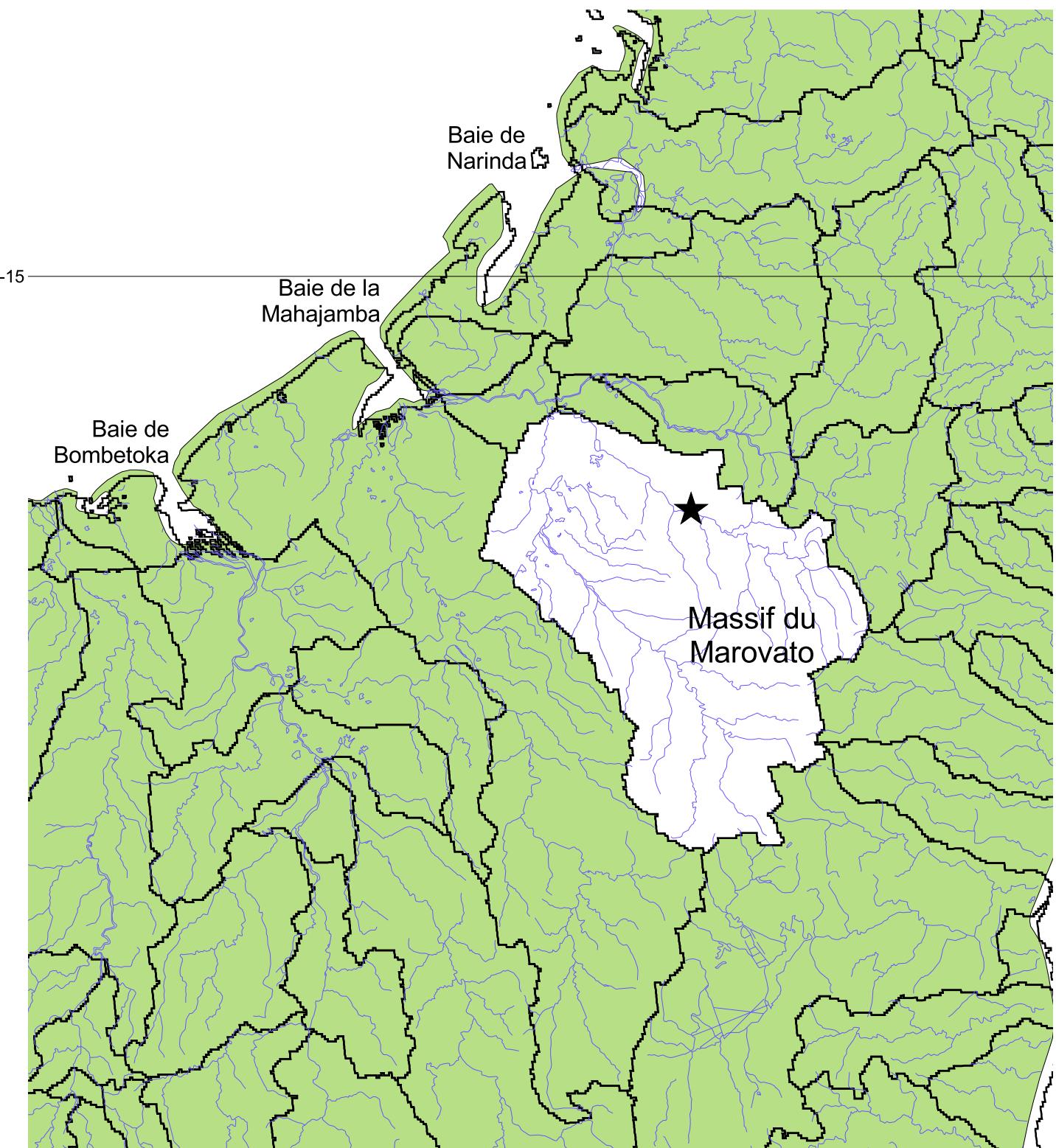
Undescribed species with voucher specimens held at the American Museum of Natural History, UMMZ, and MHNG. Known from the Sofia and Ankofia river basins, Madagascar. This species has an estimated EOO <5,000km² and AOO <500km², is found at less than 5 locations, and suffers continued decline in habitat extent and quality due to deforestation, dam construction, introduced exotic species, and fishing. On this basis it is assessed as EN.

Data sources (Reference Numbers)

40, 54, 55, 72; Sparks, unpubl. data



Paretroplus sp. "Sofia"



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus sp. "Giant Lamena" Undescribed

Previously referred to as *Paretroplus* sp. "Ankarafantsika" and *Paretroplus* sp. "Mahajamba" (Change proposed by Loiselle, P.)

Category

DD

Rationale

This species has only recently been discovered and is awaiting formal description. Voucher specimens have been deposited with the American Museum of Natural History. It was collected from the Mahajamba river drainage in northwestern Madagascar. More data are required before an accurate assessment of threatened status can be made. Although it appears quite abundant within its known range it is currently assessed as DD.

Data sources (Reference Numbers)

72, Nourissat, pers. comm.; Sparks, unpubl. data



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin

Associated river basin

N



Paretroplus sp. "Lac Parinadrina" Undescribed

Category

NE

Rationale

Undescribed species. Photographs can be found in Rham & Nourissat (2003). No voucher specimens deposited. This taxon is known only from a single (juvenile?) specimen and subsequent efforts to collect additional material from the one lake where this specimen was collected (Lac Parinadrina) have been unsuccessful. Until further study is completed, and voucher specimens are deposited, this species cannot be assessed.

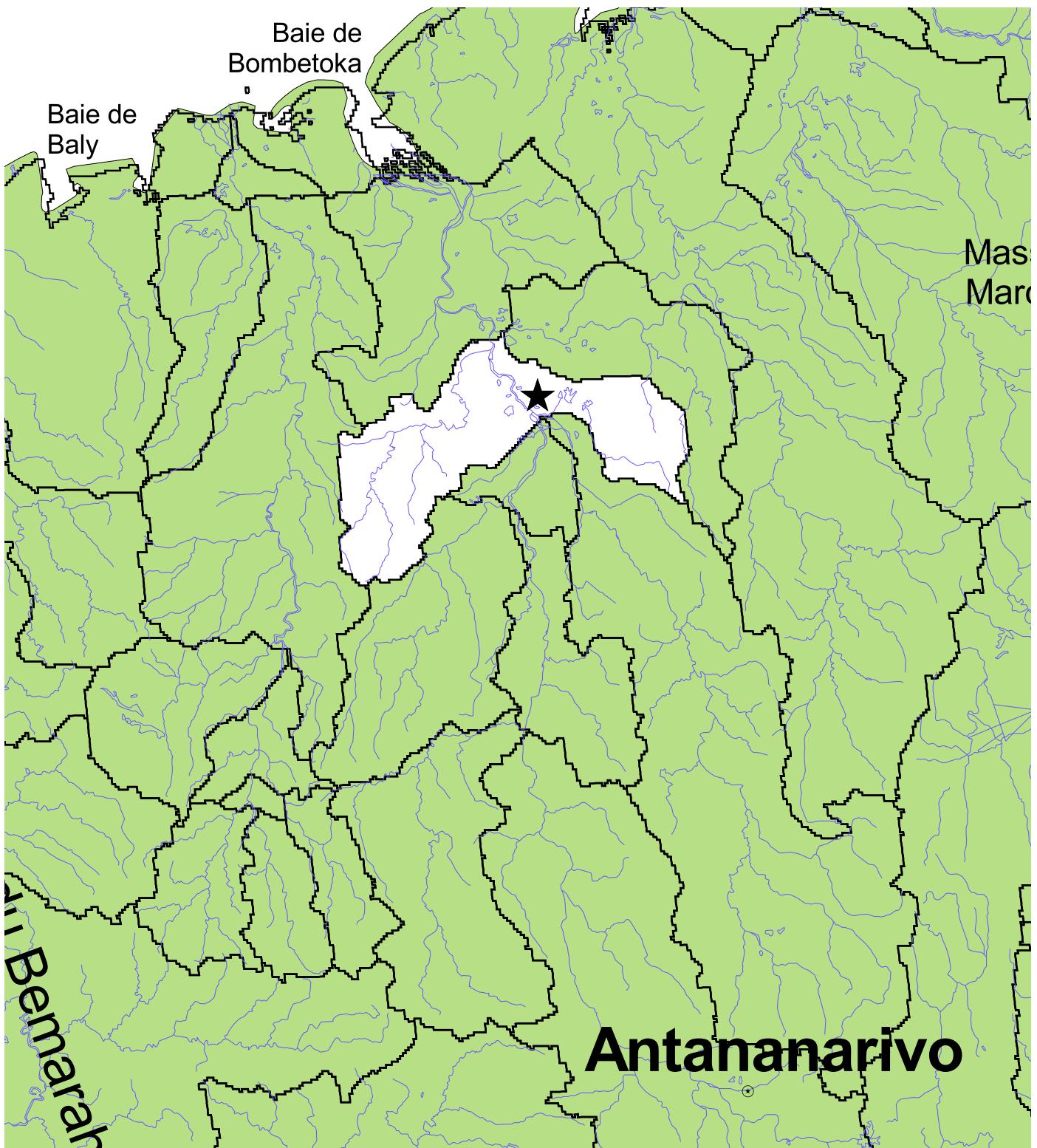
Data sources (Reference Numbers)

54, 72

Paretroplus sp. "Lac Parinadrina"



SPECIES SURVIVAL COMMISSION



20 0 20 40 60 80 Kilometers



Rivers



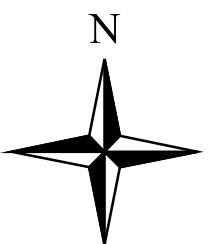
Recorded point location



River basin



Associated river basin



Paretroplus sp. "Dridrimena" Undescribed

Category
VU

Criteria

B1ab(i,ii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History and possibly MHNG (needs to be confirmed). This species was originally collected from streams draining the western slope of the Massif d'Ambre. It has since been found in the Mananjeba, Mahavavy du Nord and Ifasy rivers. Its habitat, although undergoing an ongoing decline, is not seriously degraded, it is not heavily fished and is not under pressure from exotic competitors or predators. Its EOO is <5,000km² but it occurs in more than 5 and less than 10 locations leading to an assessment of VU.

Data sources (Reference Numbers)

72, 103; Loiselle, pers. obs.



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Paretroplus sp. "Ventry" Undescribed

Category
VU

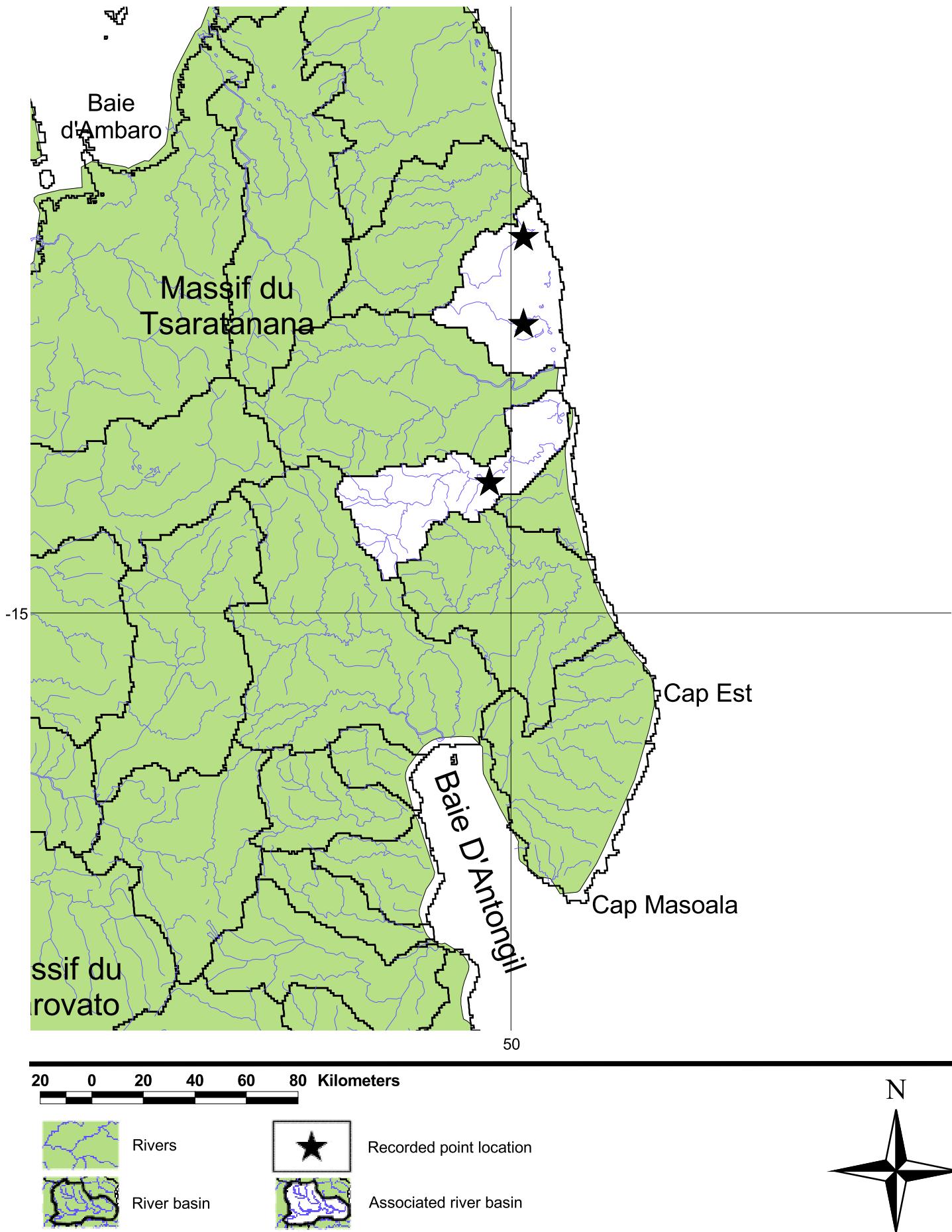
Criteria
B1ab(i,ii)

Rationale

Undescribed species with voucher specimens held at the American Museum of Natural History. This species is originally known from a restricted range in the Mahanara river basin in north-eastern area of Madagascar. Subsequent collection has revealed this species to be more widely distributed with an estimated EOO <20,000km². It is threatened by continued habitat loss and decline due to deforestation and through overfishing and the introduction of exotic competitors and predators. It is assessed as VU.

Data sources (Reference Numbers)

72; Loiselle, pers. obs.



Paretroplus tsimoly Stiassny, Chakrabarty & Loiselle 2001

Category
LC

Rationale

Originally known from the Akalimotra and Boinakely rivers additional robust populations have recently been found in the Kamoro river basin. Given the wide distribution range and lack of any known, major, widespread threats this species is assessed as LC.

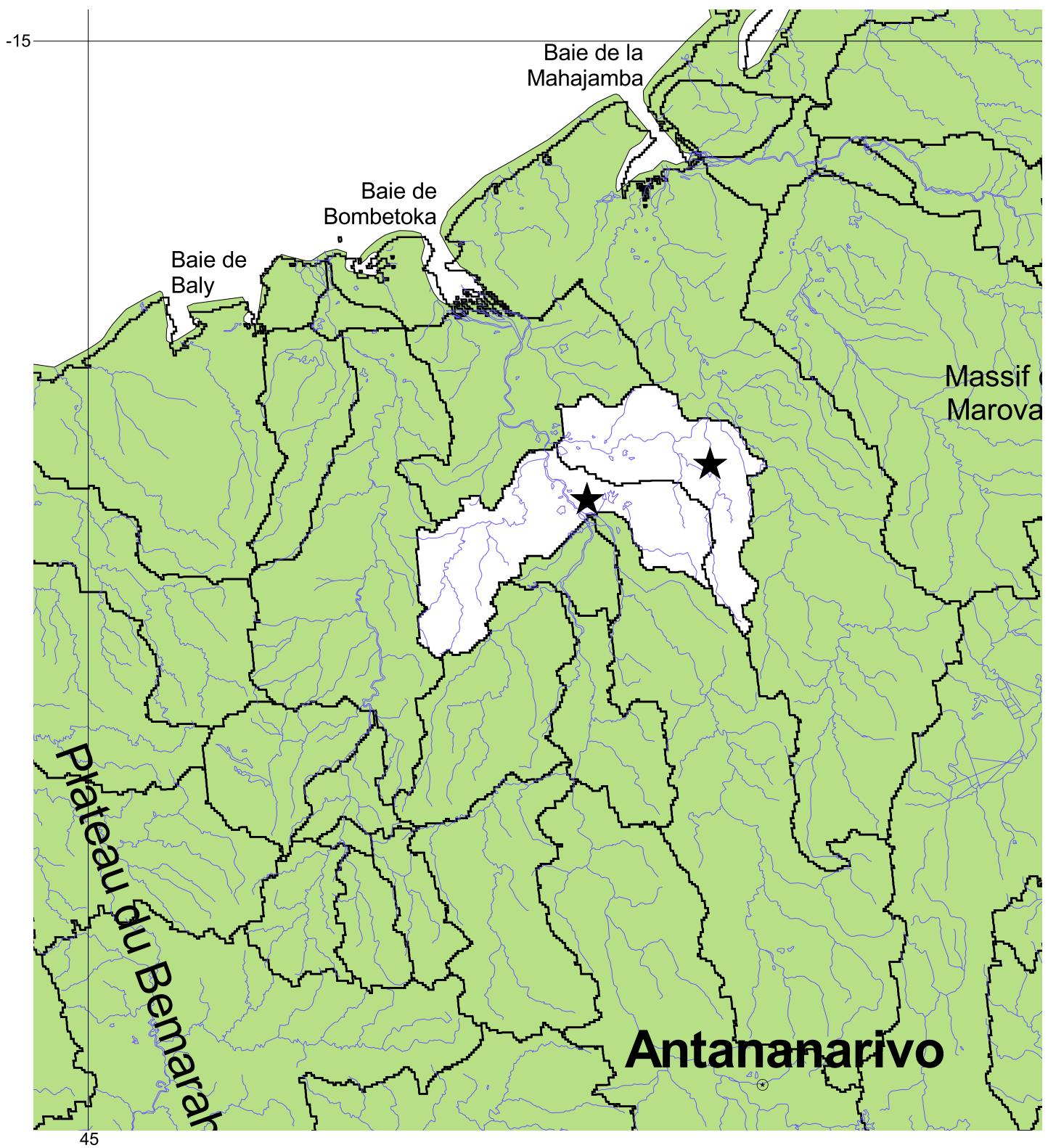
Data sources (Reference Numbers)

23, 40, 72, 100; Loiselle, pers. obs.



Paretroplus tsimoly

SPECIES SURVIVAL COMMISSION



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

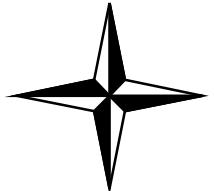


River basin



Associated river basin

N



Ptychochromis grandidieri Sauvage 1882

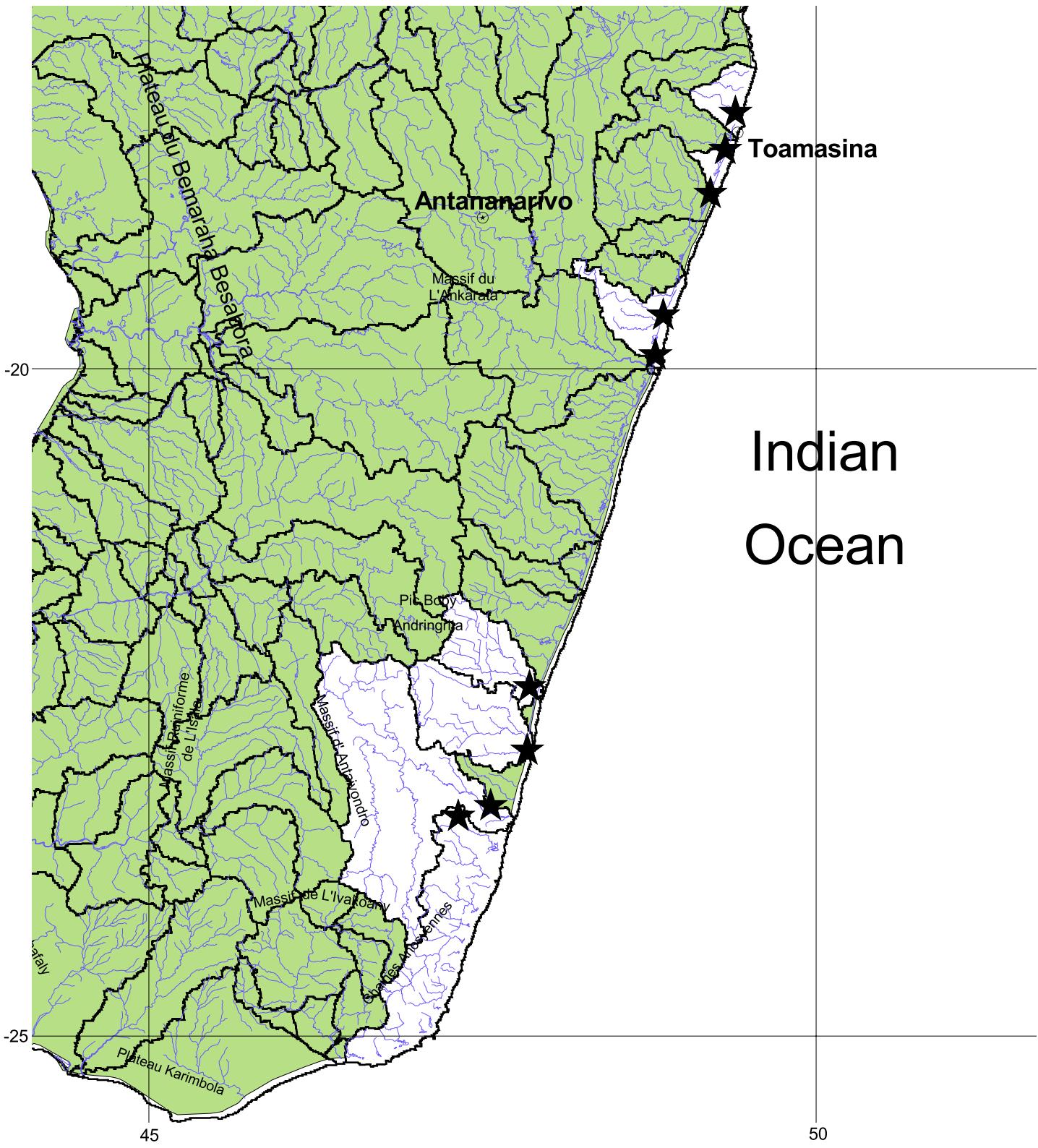
Category
LC

Rationale

This species is common and widespread throughout its current range, which extends along much of eastern coastal Madagascar. There are no known widespread major threats effecting this species throughout its full range. Classification could change with continued habitat degradation, so status needs monitoring. It is assessed as LC.

Data sources (Reference Numbers)

18, 28, 73, 75, 81, 83



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

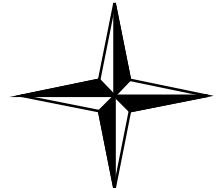


River basin



Associated river basin

N



Ptychochromis inornatus Sparks & Reinthal 2001

Category

EN

Criteria

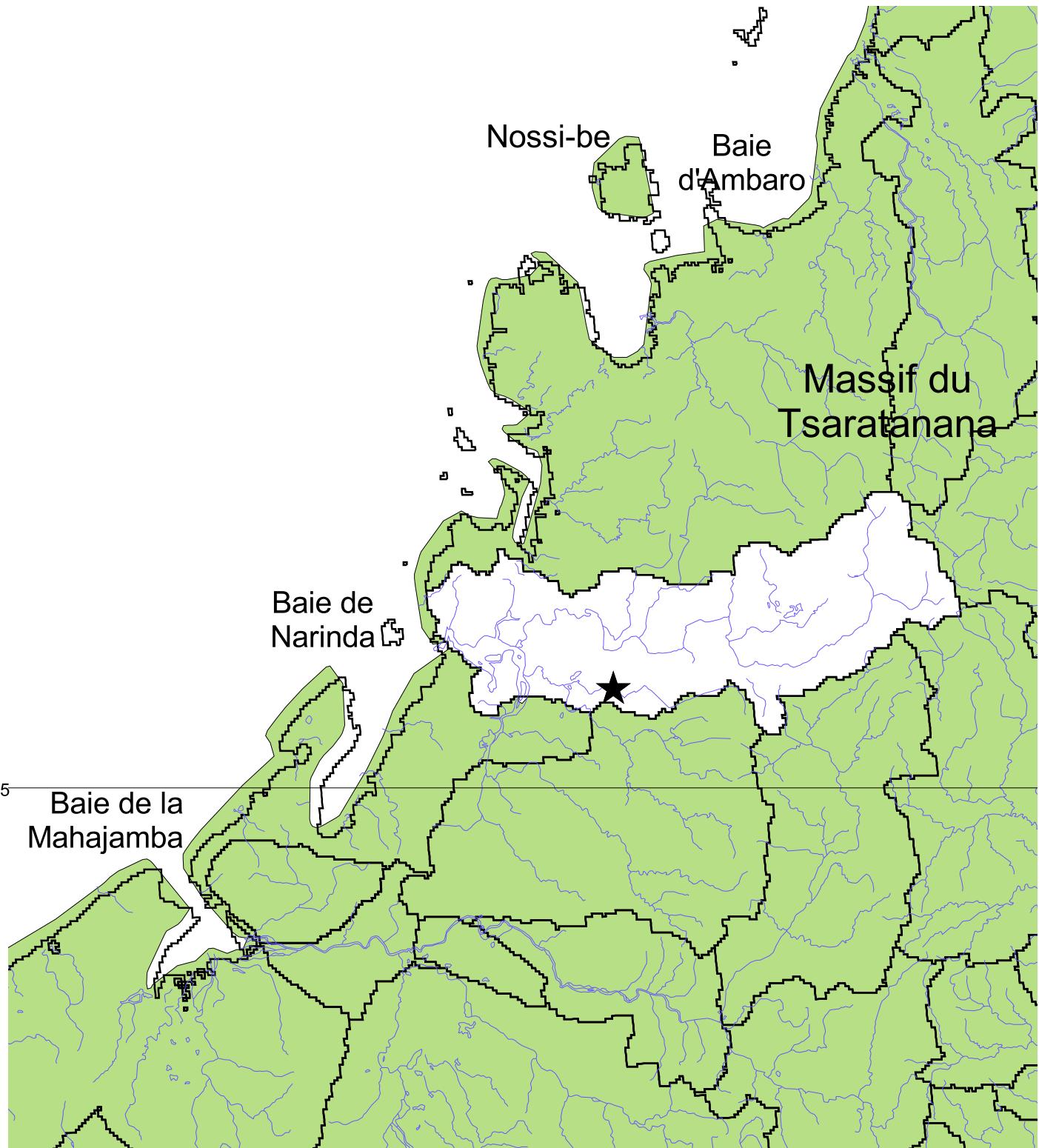
B1ab(i,iii,v)+2ab(i,iii,v)

Rationale

Originally known from the river basin south east of Ankofia including Lac Andropongy in the northwest region of Madagascar. Its restricted range (EOO <5,000km², and AOO <500km²), 3 known locations, and fragmented habitat, combined with a continued threat from habitat loss and decline (mainly through dam construction and deforestation) have led to an assessment of EN. Given its restricted range, and the fact that it is not abundant anywhere, the status of this species could rapidly change to CR with continued habitat destruction. Close monitoring recommended.

Data sources (Reference Numbers)

52, 80, 81, 83



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

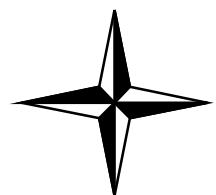


River basin



Associated river basin

N



Ptychochromis oligacanthus Bleeker 1868

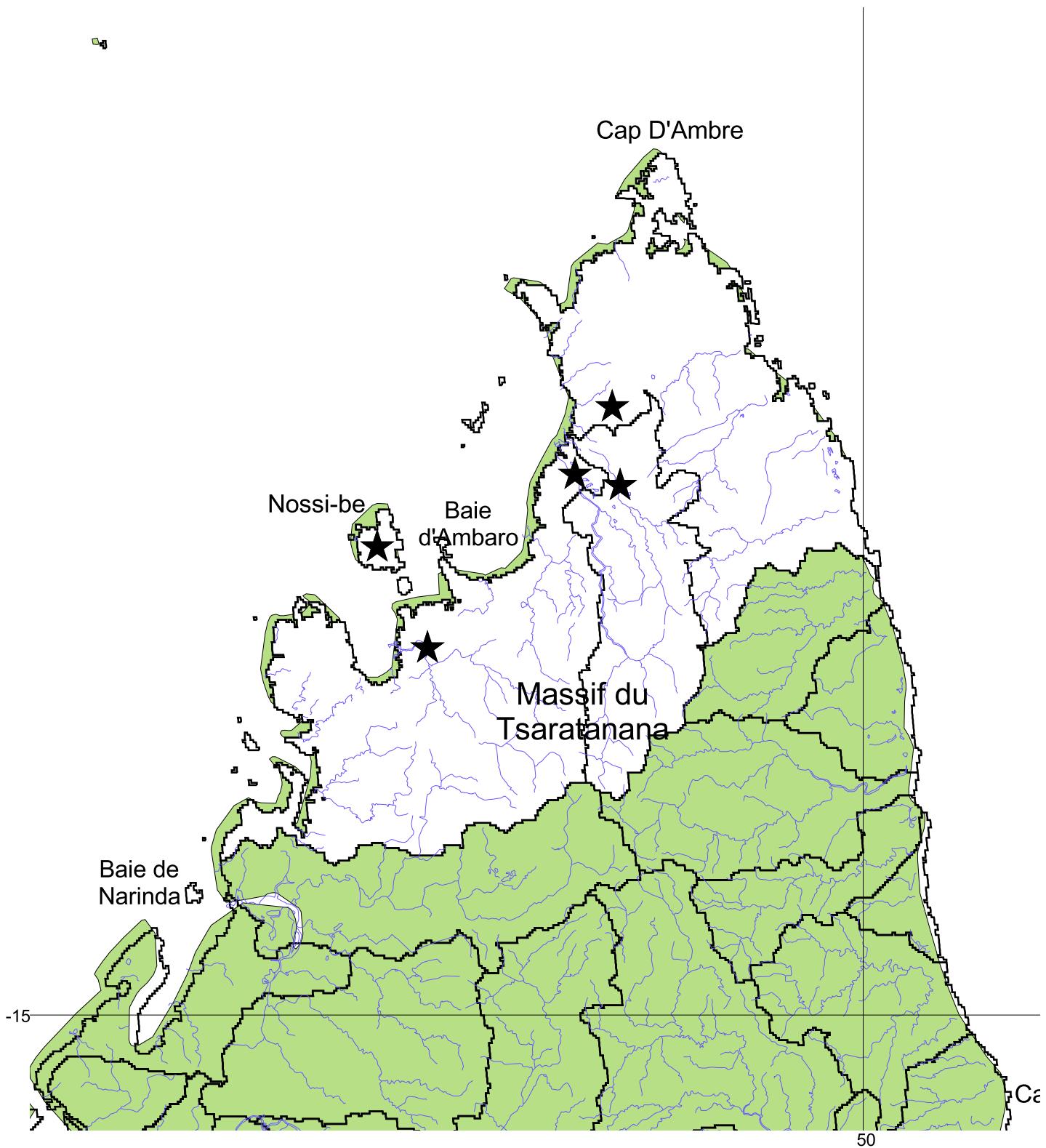
Category
LC

Rationale

This species' range on the mainland extends from Mananjeba to Sambirano and includes 10 crater lakes on Nosy Be. Its habitat is in reasonably good condition on the mainland and virtually pristine on Nosy Be. It is not heavily fished and is not currently impacted by either exotic predators or competitors. This species is assessed as LC.

Data sources (Reference Numbers)

12, 22, 26, 34, 43, 53, 80, 81, 83



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

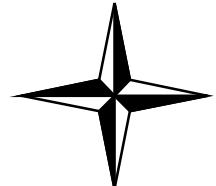


River basin



Associated river basin

N



Ptychochromis sp. "Kotro" Undescribed

Category

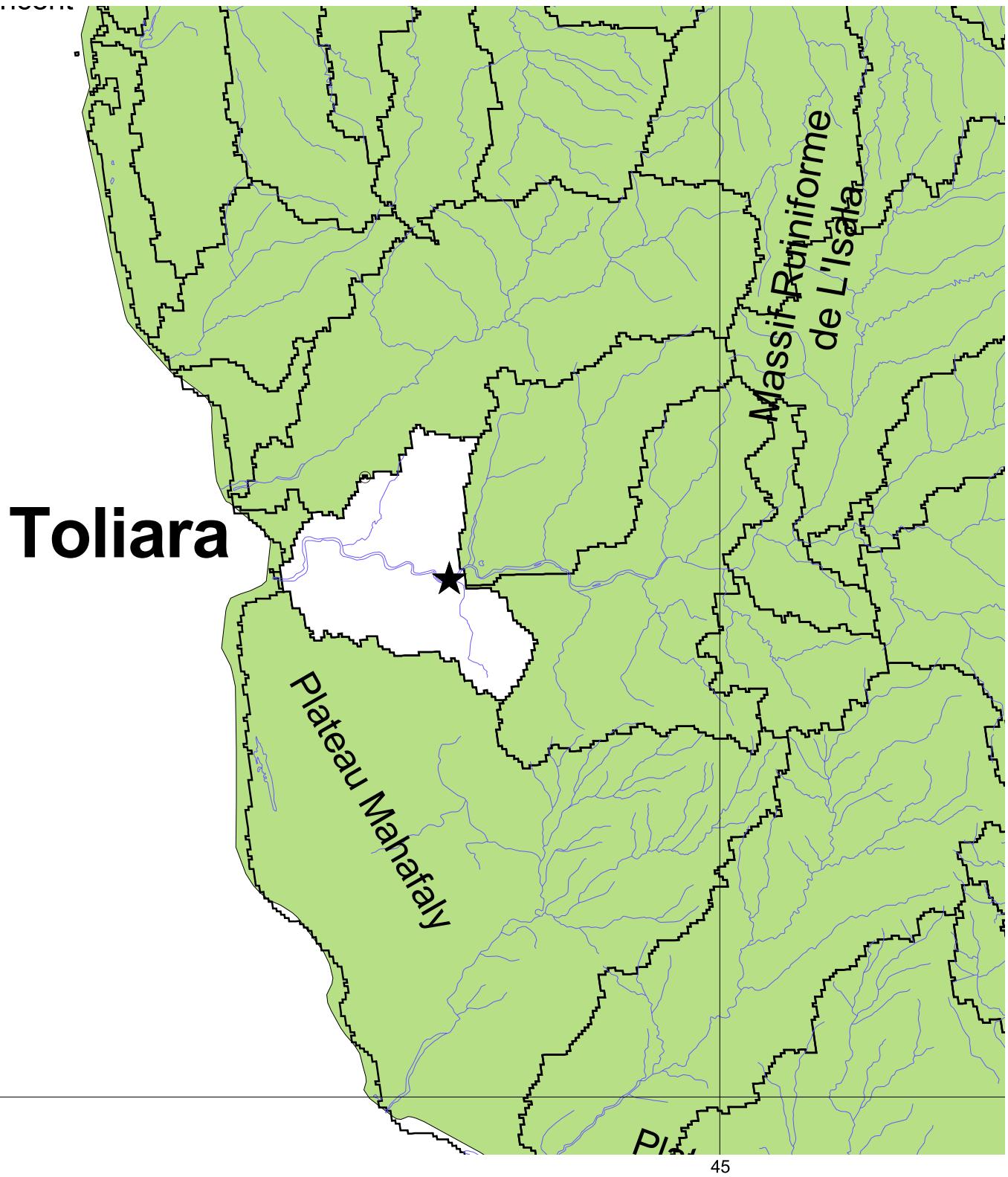
EX

Rationale

Undescribed species with voucher specimens held at MNHN. It has not been collected for many years despite targeted efforts within its former range. Five preserved specimens represent the only known material collected from the Onilahy River in 1962. The main impacts thought to have caused the decline of this species are deforestation leading to loss of habitat through increased sedimentation, competition from introduced tilapias, and overfishing. This species is assessed as EX.

Data sources (Reference Numbers)

28, 80, 81, 83



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Ptychochromoides sp. “Green Garaka” Undescribed

Previously referred to as *Ptychochromis* sp. “*Tsipoy verte*” (Change proposed by Loiselle, P.)

Category

EN

Criteria

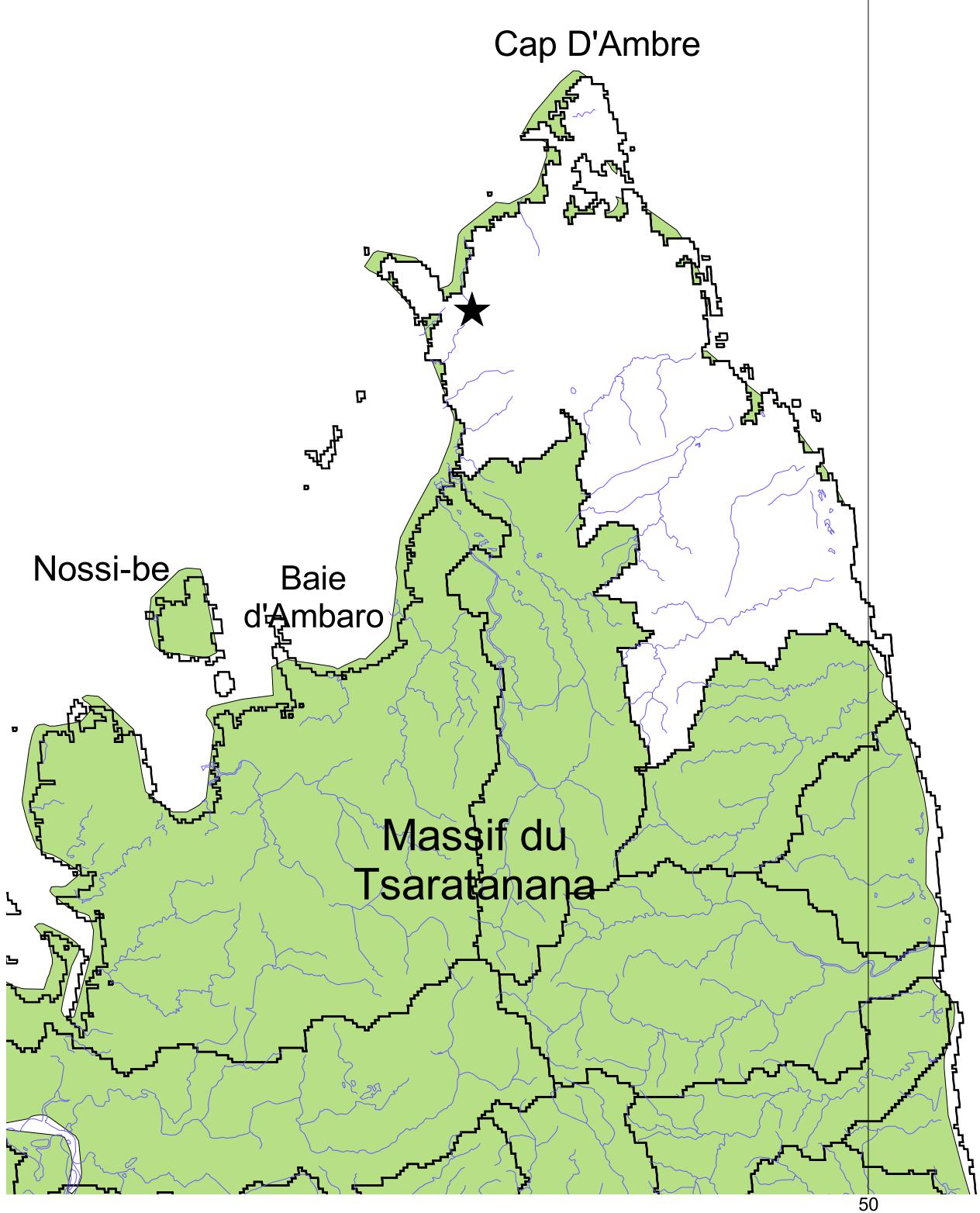
B1ab(i,ii, iii)+2ab(i,ii, iii)

Rationale

An undescribed species with voucher specimens held at MNHN. This species is known from the rivers of the Massif Ambre in northern Madagascar. EOO & AOO are $<5000\text{km}^2$ and $<500\text{km}^2$, respectively. There is a continuing decline in EOO and AOO and sub-populations are known from less than five separate locations. The main causes of habitat decline and loss are deforestation. This species has also declined due to competition and predation from introduced exotic fish species. This species is assessed as EN.

Data sources (Reference Numbers)

72, 103; Loiselle, pers. comm.



7 0 7 14 21 28 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Ptychochromis sp. "Garaka" Undescribed

Category
VU

Criteria
B1ab(i,iii)

Rationale

An undescribed species with voucher specimens held at the American Museum of Natural History. Known from the Fanabana, Mahanara and Bemarivo river basins on the north-eastern slopes of Madagascar. It is sympatric with *P.* sp./Ventritry within the Mahanara river basin. It has an estimated EOO <20,000km², which is declining, and sub-populations are known from less than five separate locations. The main causes of habitat decline and loss are deforestation and it is heavily impacted by competition and predation from introduced exotic fish species. This species qualifies as VU.

Data sources (Reference Numbers)

80, 81, 83; Loiselle, pers. comm.



20 0 20 40 60 80 Kilometers

N



Rivers



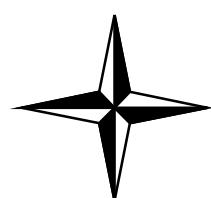
Recorded point location



River basin



Associated river basin



Ptychochromis sp. "Joba mena" Undescribed

Category

CR

Criteria

B1ab(i,iii,v)+2ab(i,iv,v)

Rationale

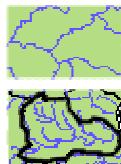
An undescribed species with voucher specimens held at the American Museum of Natural History, UMMZ and MHNG (to be confirmed). This species is also referred to as *Ptychochromis* sp. "Sofia" and "Amboaboa" in the literature. It appears to be extremely rare within its known and very restricted range (Sofia river drainage). EOO and AOO are estimated at <100km² and <10km², respectively. Despite targeted efforts it is rarely collected. Given the high rate of deforestation in the region, construction of dams and introduction of exotic competitors and predators, this species faces a very high risk of extinction. CR is an appropriate assessment.

Data sources (Reference Numbers)

28, 55, 78, 80, 81, 83, 88



20 0 20 40 60 80 Kilometers



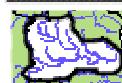
Rivers



Recorded point location

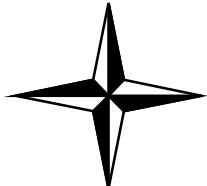


River basin



Associated river basin

N



Ptychochromis sp. "Fort Dauphin" Undescribed

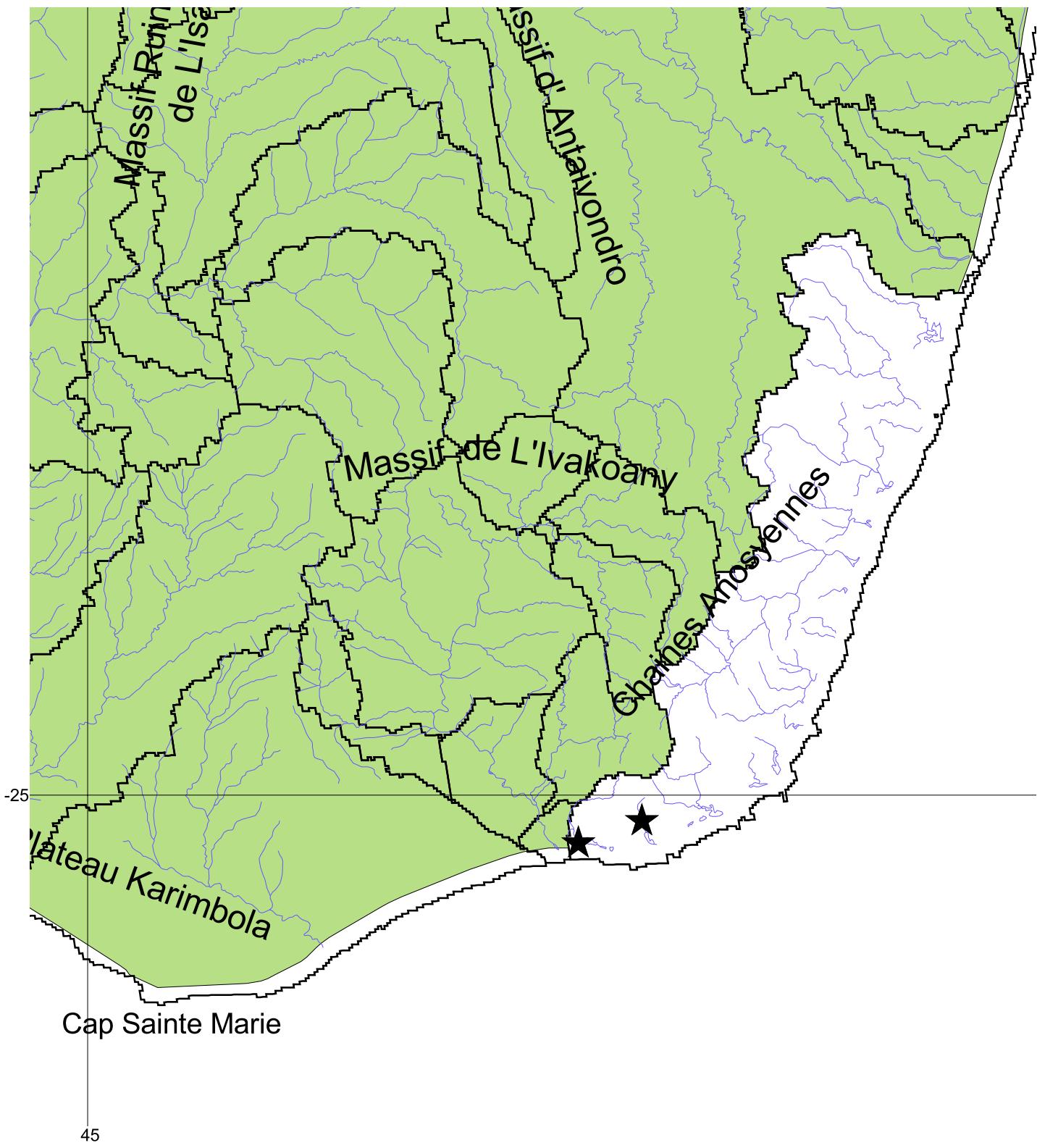
Category
NE

Rationale

This species is only known from photographs in Rham & Nourissat (2002). Further data are required to estimate the range and population size of this taxon. Studies are also needed to determine if this taxon is distinct from *Ptychochromis grandidieri*. Until further study is completed, and voucher specimens are deposited, this species can not be assessed.

Data sources (Reference Numbers)

78, 80, 81, 83



Rivers



Recorded point location

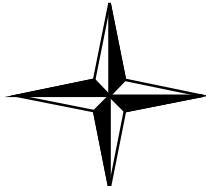


River basin



Associated river basin

N



Ptychochromoides betsileanus (Boulenger 1899)

Category

CR

Criteria

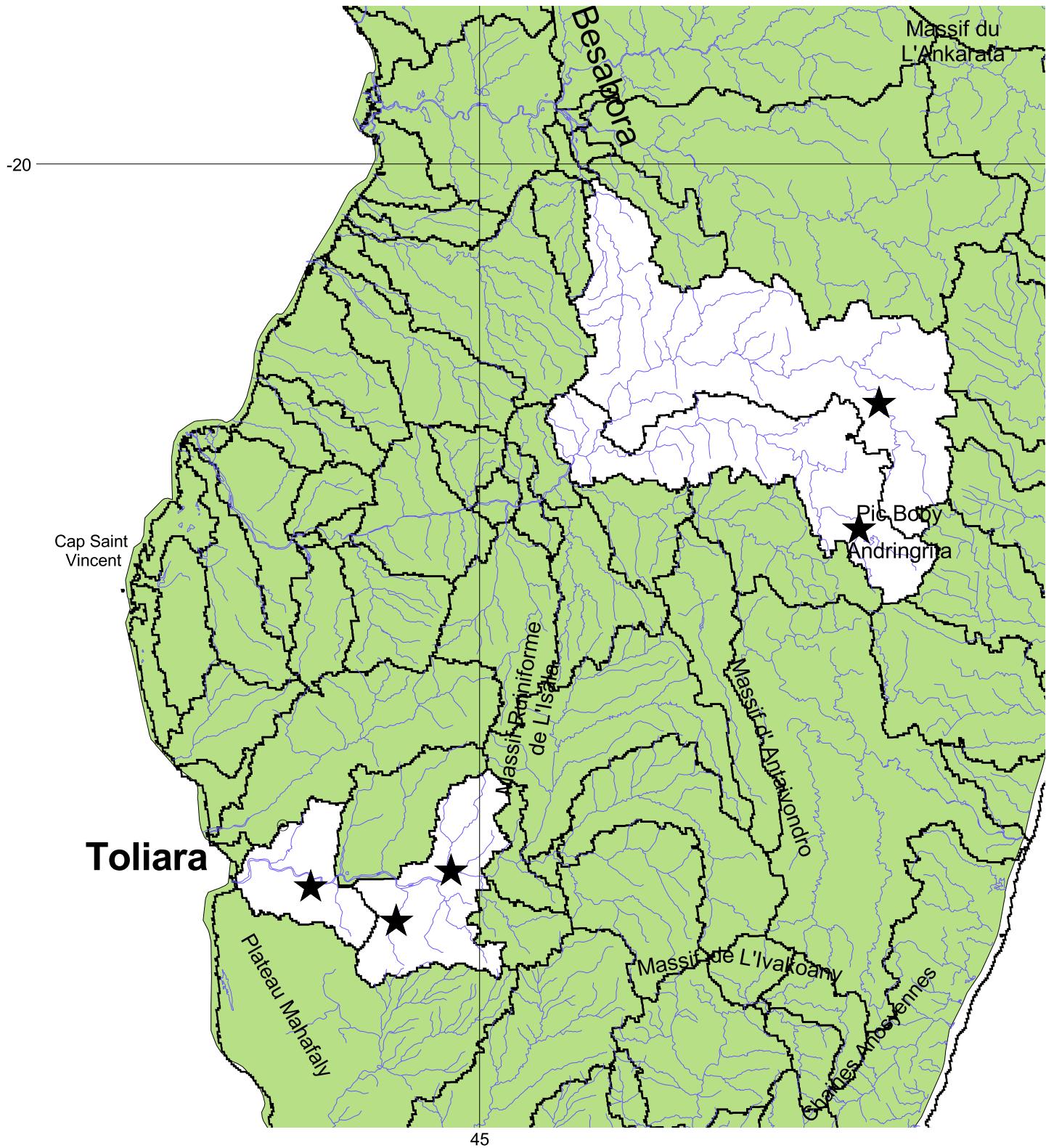
B2ab(ii)

Rationale

This species is known from the Onilahy river basin in the southwest part of Madagascar. Its remaining habitat is under severe pressure and the few surviving small sub-populations are subject to both heavy fishing pressure and must contend with exotic competitors and predators. The area of occupancy of this rare species is less than 10km². This species is assessed as CR.

Data sources (Reference Numbers)

15, 26, 28, 34, 36, 46, 53, 72, 84, 88



40 0 40 80 120 160 Kilometers



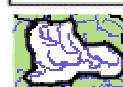
Rivers



Recorded point location

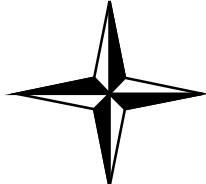


River basin



Associated river basin

N



Ptychochromoides katria Reinthal & Stiassny 1997

Category
VU

Criteria
D2

Rationale

This species has a restricted distribution within the Nosivolo and Mangoro rivers, but its habitat is in very good condition and it does not have to deal with either exotic predators or competitors. Given the lack of evidence for decline in quality of habitat or population size (it is a very common species within its range) this species is assessed as VU on account of its restriction to a single location.

Data sources (Reference Numbers)

26, 28, 34, 43, 46, 53, 71, 84, 88



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

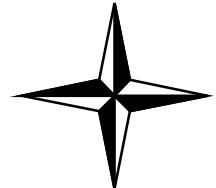


River basin



Associated river basin

N



Ptychochromoides itasy Sparks 2004

Previously known as *Ptychochromoides* sp. "Lac Itasy"

Category

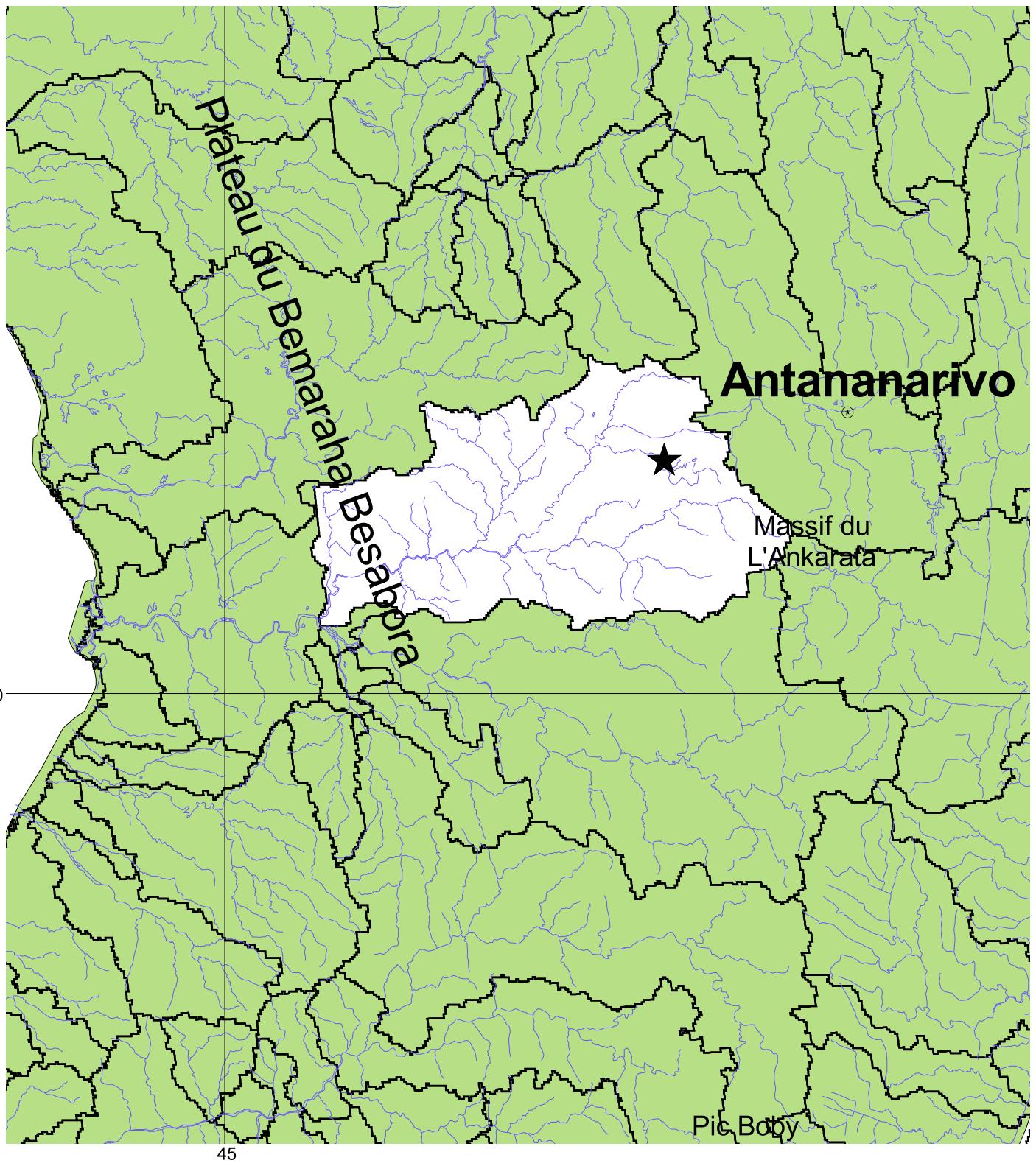
EX

Rationale

An undescribed species with voucher specimens held at the American Museum of Natural History and UMMZ. It has been many decades (early 1960's) since any specimen of this taxon has been caught in Lac Itasy. The lake and surrounding region are highly degraded and numerous exotics (potential competitors and predators) are established. Despite continued reports of the persistence of a relict population of cichlids resembling this species in the upper reaches of both the Tsiribihina and Ikopa Rivers, no *Ptychochromoides* has to date been collected from either drainage. Under the circumstances (targeted collecting efforts, presence of numerous exotics, and time lapsed since last collected), it is defensible to treat this species as EX.

Data sources (Reference Numbers)

26, 28, 46, 72, 84, 88



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location



River basin



Associated river basin



Ptychochromoides vondrozo Sparks & Reinthal 2001

Category

CR

Criteria

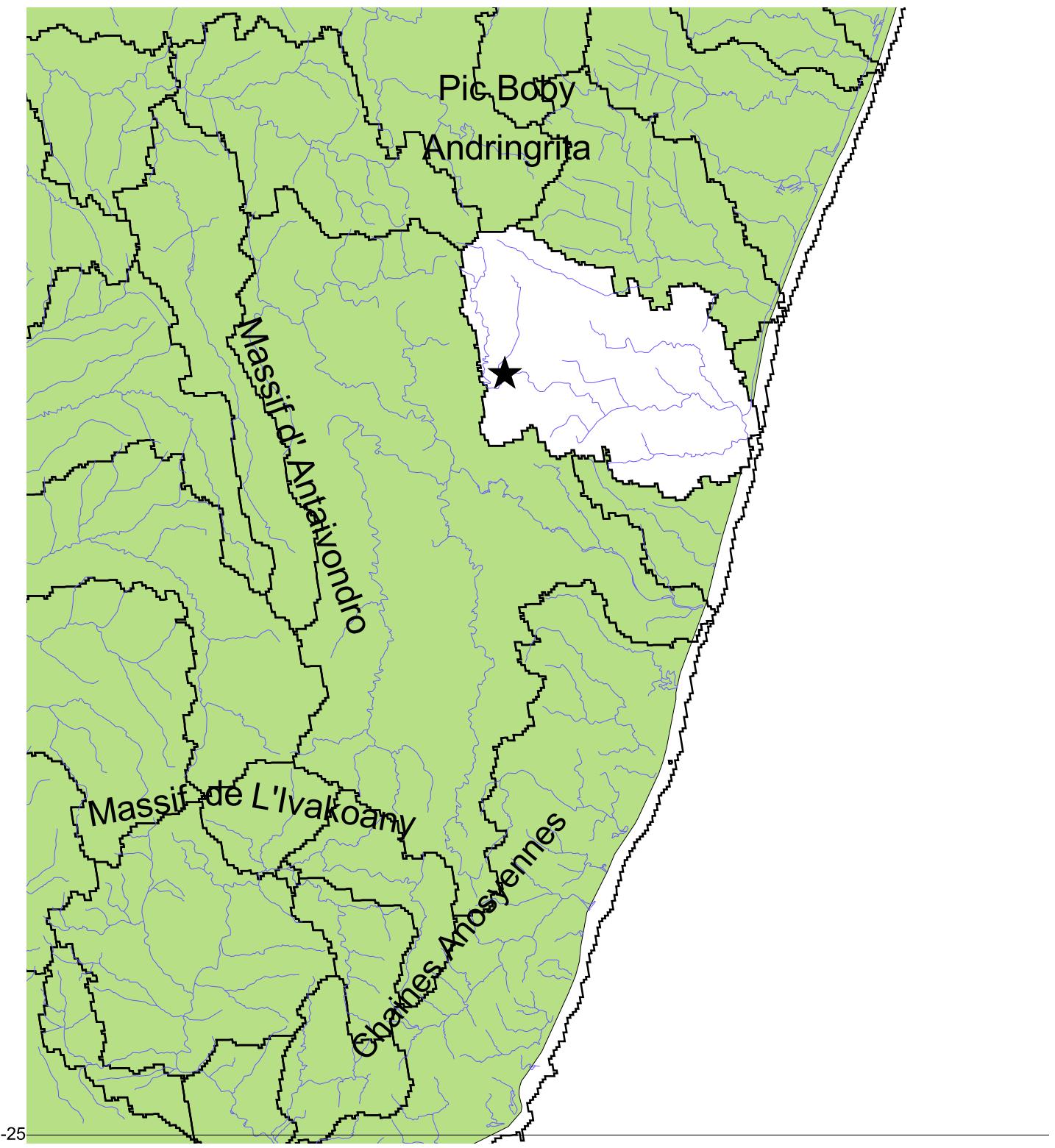
B1ab(i,iii)

Rationale

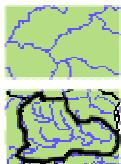
Known from the Mananara-sud river and tributaries near the village of Vondrozo, Madagascar. It has a highly restricted range (EOO <100km²), and the population is highly fragmented and threatened by continued deforestation and subsequent sedimentation of its habitat. It also has to contend with introduced exotic species. It is assessed as CR.

Data sources (Reference Numbers)

26, 28, 34, 43, 46, 53, 71, 72, 84, 88



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

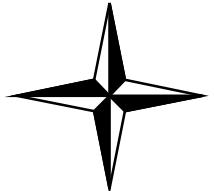


River basin



Associated river basin

N



Order: Perciformes
Family: Eliotridae

Ratsirakia legendrei (Pellegrin 1919)

Category

DD

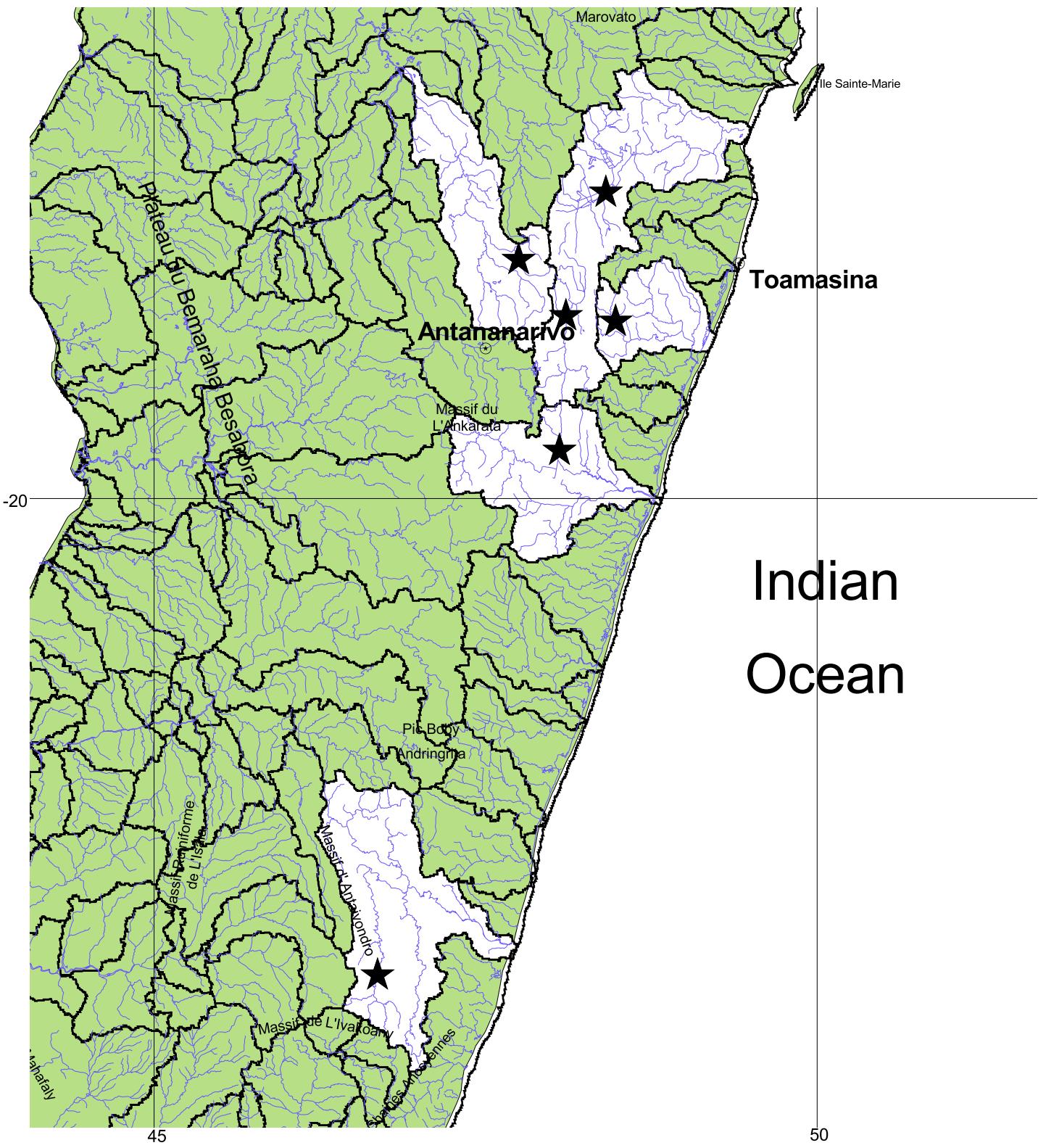
Rationale

This taxon has been reported from the upper reaches of the eastward draining Rianila River, as well as from the Mangoro, and from many westward-draining rivers in the Mahanjanga and Toliara provinces of Madagascar. However, this name may apply to as many as four other taxonomic entities, each of whose circumstances may differ significantly. Until these taxonomic issues are resolved, this 'species' is best classified as DD. Additional data regarding range and population sizes are also required.

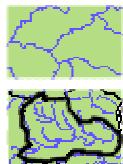
Data sources (Reference Numbers)

28, 31, 44, 59; Loiselle, pers. obs.; Harrison, pers. comm.

Ratsirakia legendrei



20 0 20 40 60 80 Kilometers



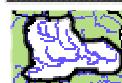
Rivers



Recorded point location

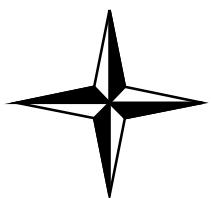


River basin



Associated river basin

N



Eliotris pellegrini Maugé 1984

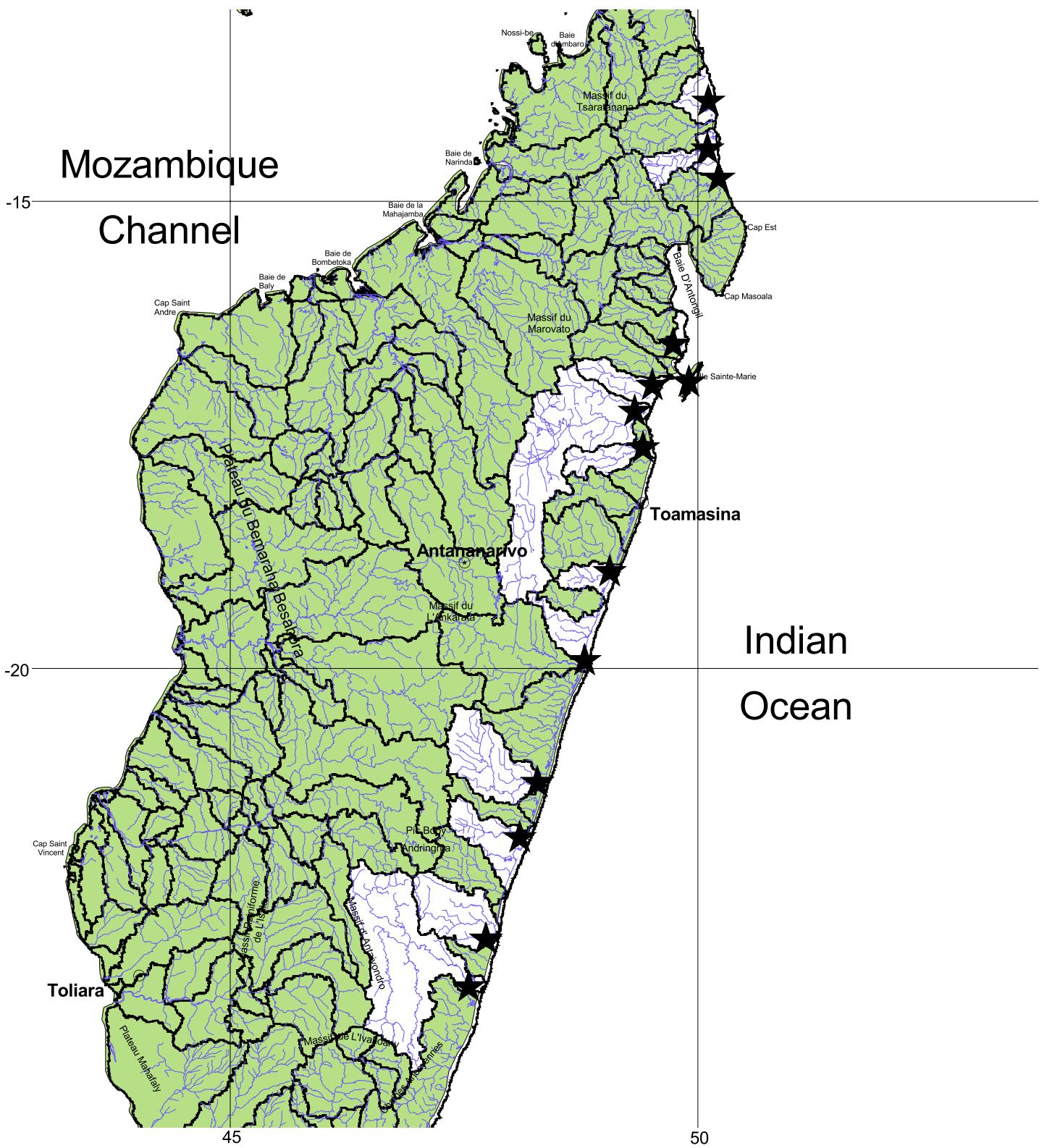
Category
NT

Rationale

This species has a restricted range (EOO <5000km²) in the estuaries and lower reaches of rivers on the western slopes of Madagascar where the habitat is declining due to deforestation but doesn't quite qualify as Vulnerable under Criterion "B" as it is found in more than 10 locations.

Data sources (Reference Numbers)

5, 28, 44, 63



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location

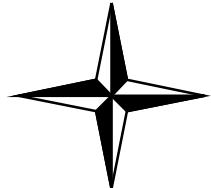


River basin



Associated river basin

N



Eliotris vomerodentata Maugé 1984

Category

DD

Rationale

This species is known only from a single type specimen, a juvenile. No material has been collected subsequent to its description. It is therefore assessed as DD.

Data sources (Reference Numbers)

44



7 0 7 14 21 28 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Hypseleotris tohizonae (Steindachner 1880)

Category

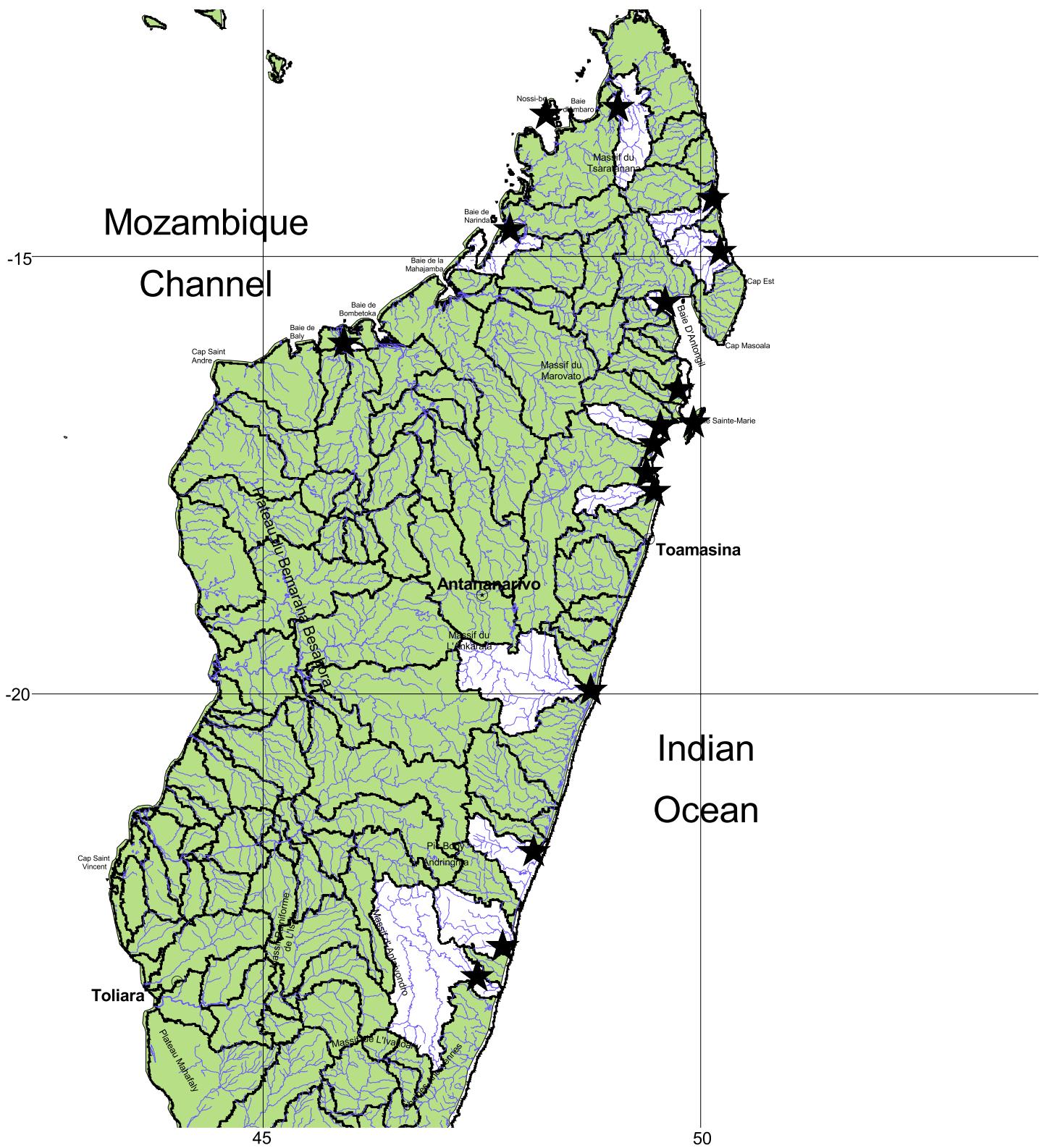
LC

Rationale

This species is widespread throughout Madagascar and has no known major widespread threats impacting on the entire population. In view of its extreme physiological plasticity and amphidromous life history LC is the most appropriate assessment of its status.

Data sources (Reference Numbers)

28, 63, 91



30 0 30 60 90 120 Kilometers



Rivers



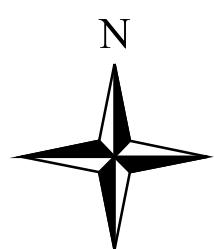
Recorded point location



River basin



Associated river basin



Ophieleotris margaritacea (Valenciennes 1837)

Category

DD

Rationale

Ian Harrison (pers. comm.) points out that recent studies indicate that *Ophiocara macrolepidota* does not occur in Madagascar, and that these reported specimens are referable instead to *Ophieleotris margaritacea* (a widespread Indo-Pacific taxon). More data are required to determine whether more than a single species of *Ophiocara* is present in Madagascar so DD is currently the best assessment.

Data sources (Reference Numbers)

5, 14, 28, 63

Not endemic to Madagascar

Typhleotris madagascariensis Petit 1933

Category

EN

Criteria

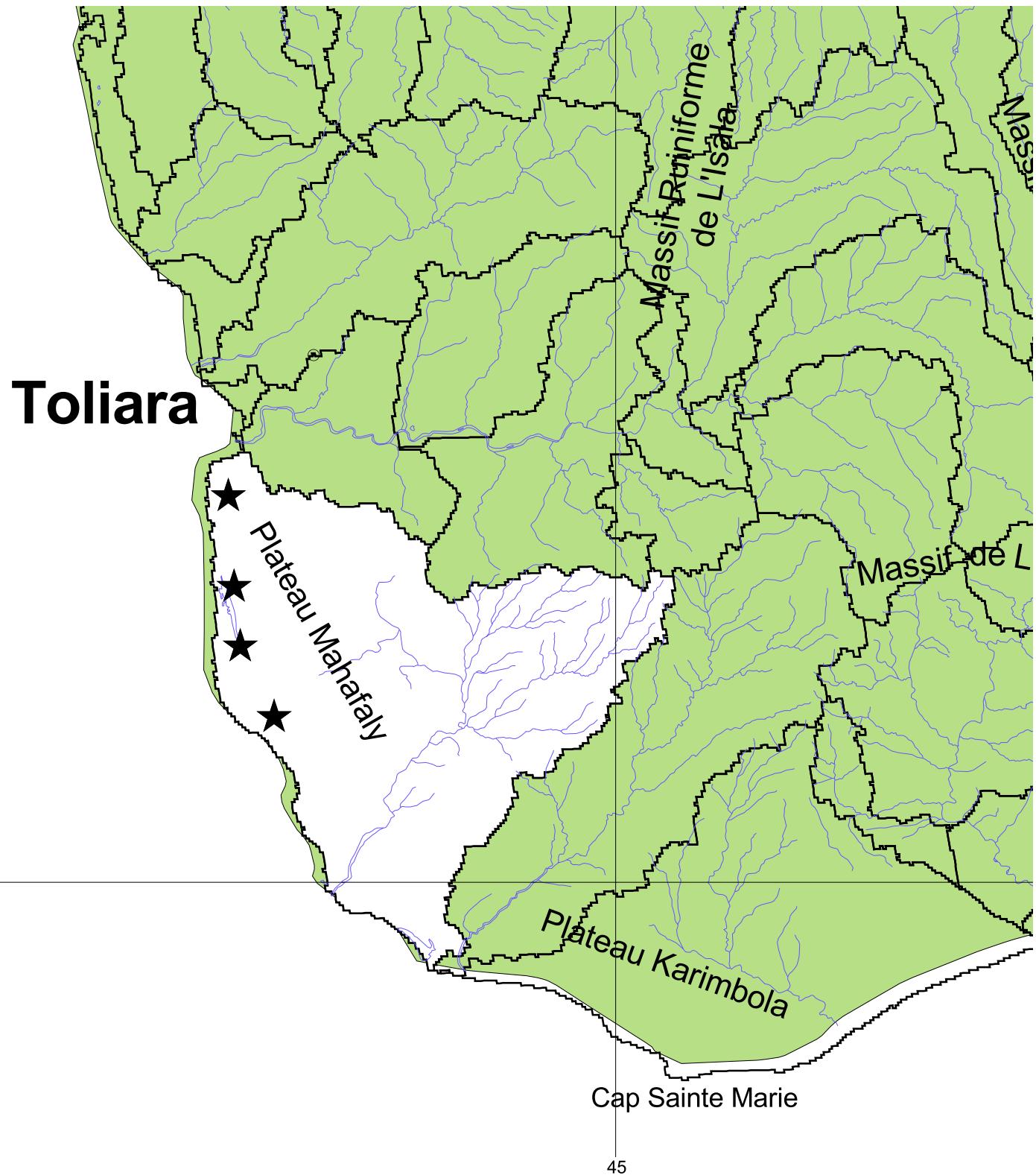
B1ab(i,iii)+2ab(i,iii)

Rationale

Both nominal species of *Typhleotris* exhibit very restricted ranges and patchy distributions, given their limestone cave habitats. It is likely that more than 2-3 species of *Typhleotris* inhabit the southwestern region of Madagascar. This has not been a region of focus for ichthyologists and little is known regarding the ranges or population sizes of the two nominal species. For this species the estimated EOO is < 5,000km² and AOO is < 500km² and it is most likely found in less than six locations. It is also indicated that the EOO and habitat are declining. On this basis this species is assessed as EN. If, however, further research finds these caves to hold numerous species with allopatric distributions in the region then the assessment may need to be raised to CR as the distribution range for each species will be lower than originally thought. Taxonomic work is required before such an assessment can be made.

Data sources (Reference Numbers)

18, 28, 65, 66, 67, 86



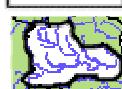
Rivers



Recorded point location

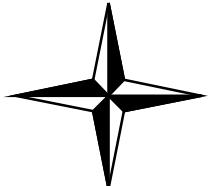


River basin



Associated river basin

N



Typhleotris pauliani Arnoult 1959

Category

EN

Criteria

B1ab(i,iii)+2ab(i,iii)

Rationale

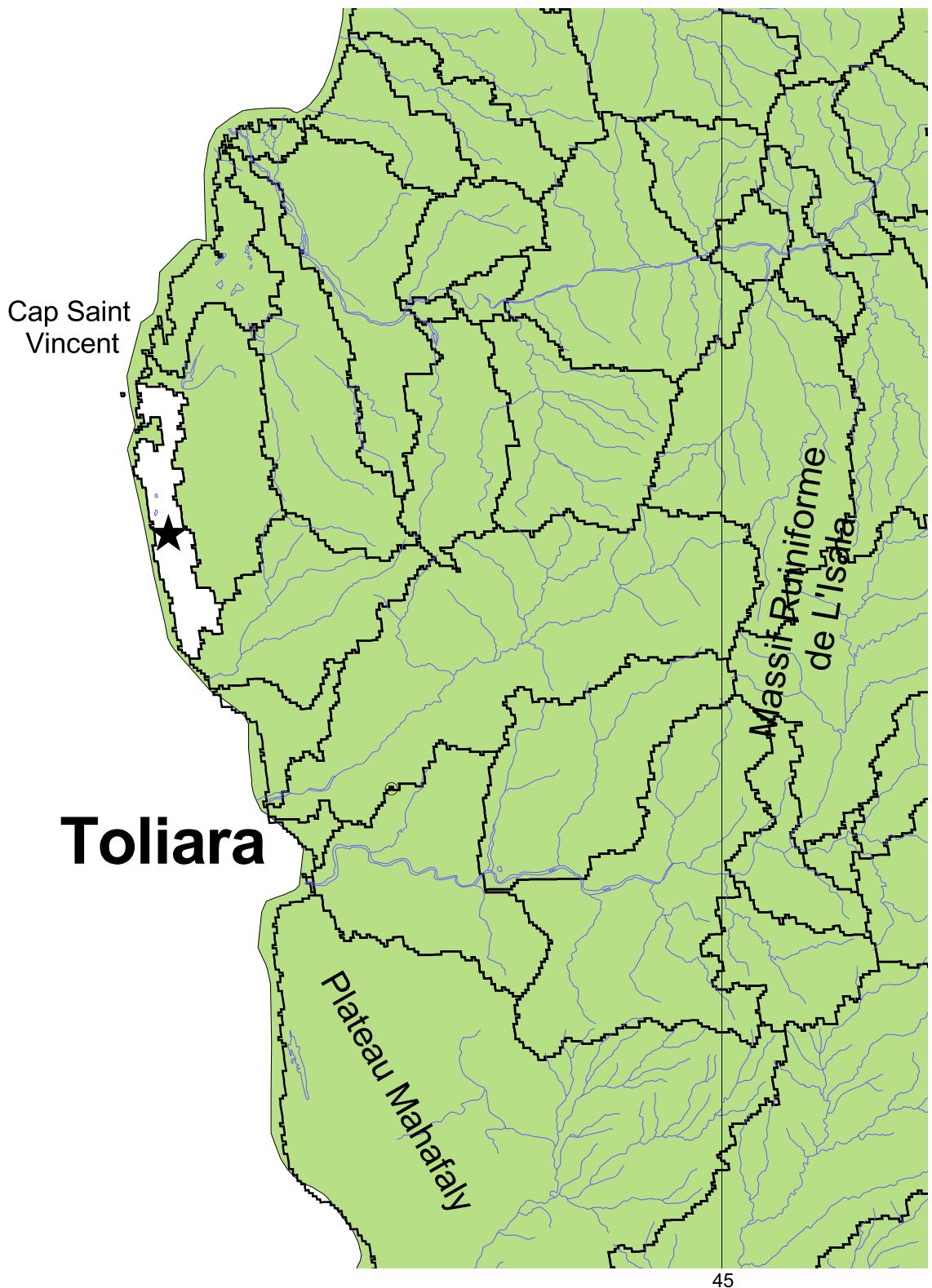
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Data sources (Reference Numbers)

18, 28, 65, 66, 67, 86



Typhleotris pauliani



10 0 10 20 30 40 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Typhleotris sp. Undescribed

Category

NE

Rationale

This undescribed species is only known from a handful of specimens collected at a single locality. No data are available on range or population size. Without reference to voucher specimens the species cannot be evaluated.

Data sources (Reference Numbers)

28, 86

Species distribution unknown

Order: Perciformes
Family: Gobiidae

Acentrogobius therezieni Kiener 1963

Category

DD

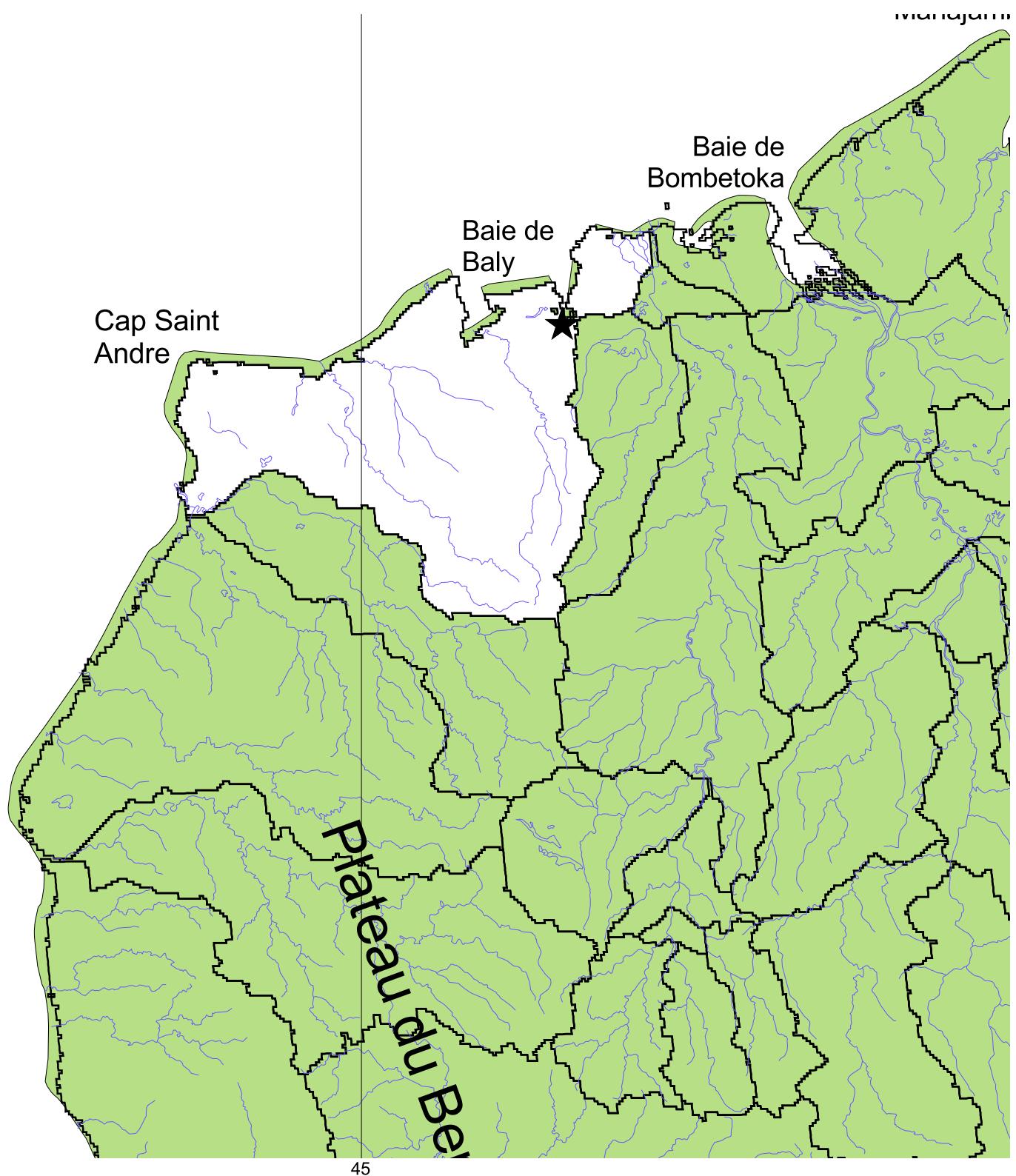
Rationale

The range limits of this species are unknown and there are no baseline data on population size. The appropriate assessment is therefore DD.

Data sources (Reference Numbers)

27

Acentrogobius therezieni



8 0 8 16 24 32 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Awaous macrorhynchus (Bleeker 1867)

Previously known as *Chonophorus macrorhynchus*

Category

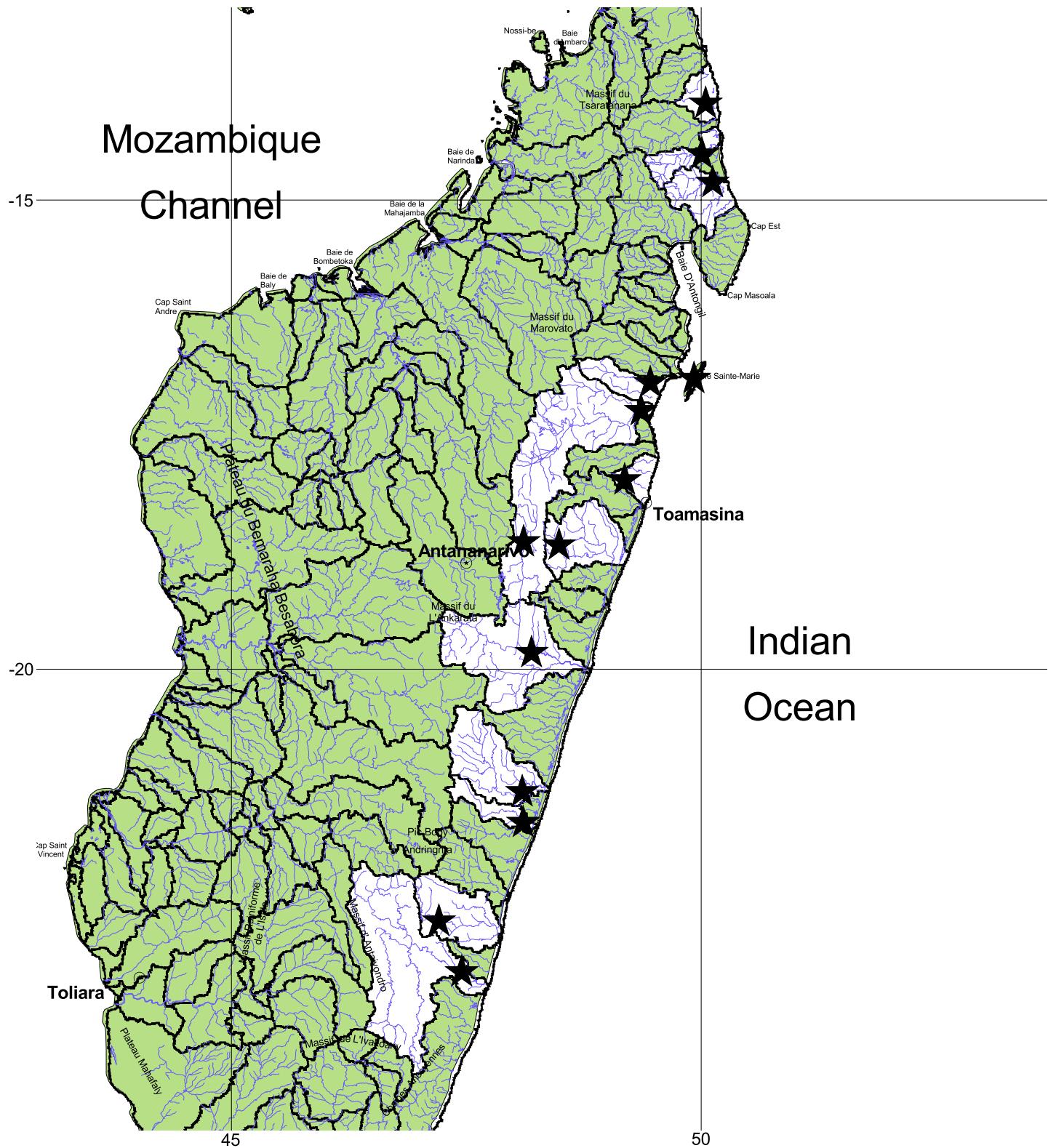
LC

Rationale

Widespread through the rivers of Madagascar with no major, widespread threats identified. Given the marine adult phase of this species it is able to disperse between river basins thus reducing risk from localised habitat loss. It is assessed as LC.

Data sources (Reference Numbers)

5, 11, 28, 63



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Glossogobius ankaranensis Bannister 1991

Category
VU

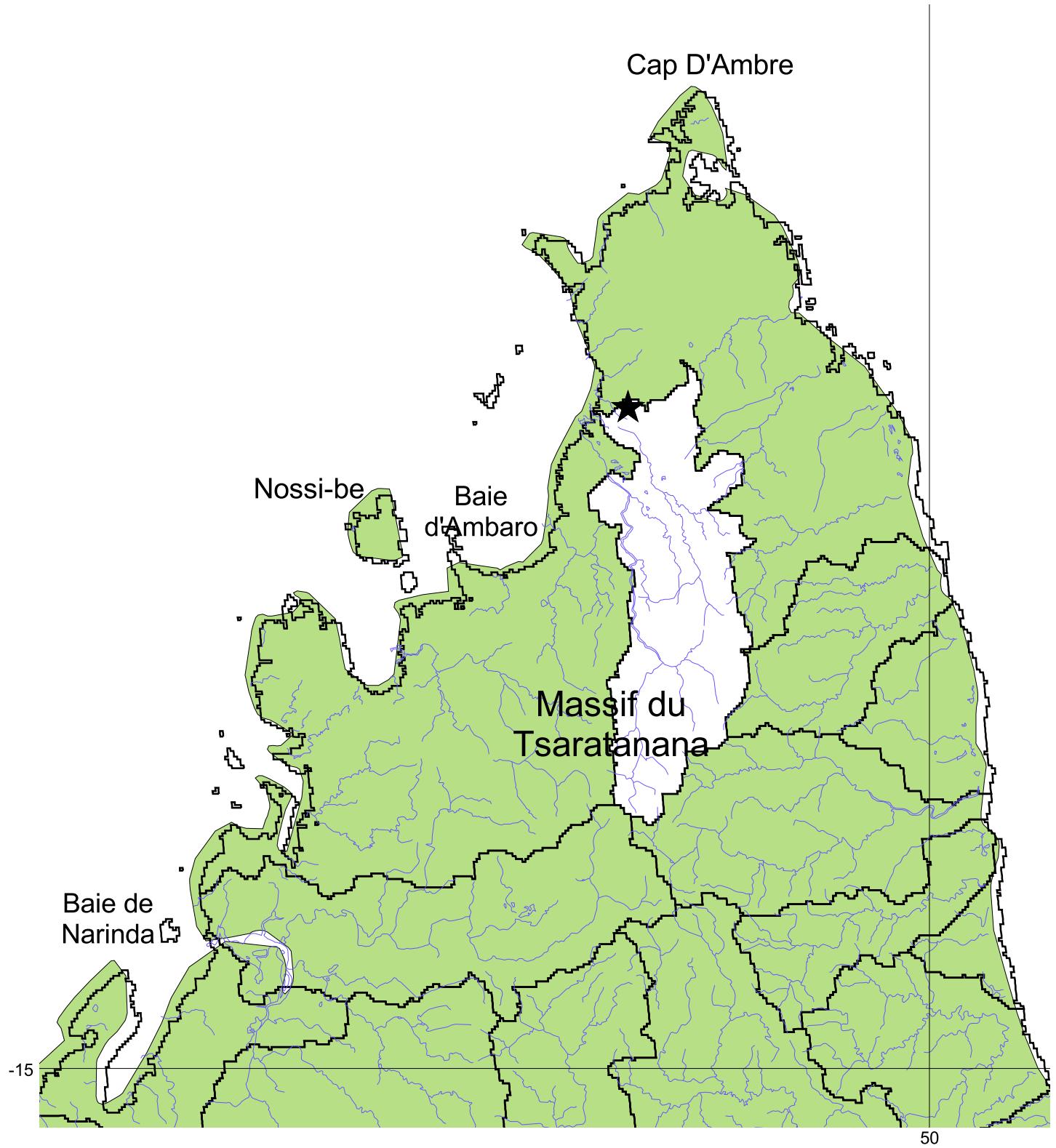
Criteria
D2

Rationale

The range of this cave-dwelling species falls entirely within the boundaries of Ankarana N.P. Its habitat is not subject to anthropogenic degradation and powerful "fady" protects it from direct exploitation by the local populous. It currently has no exotic predators or competitors. However, its restricted range justifies VU status. The species is rarely collected given its isolated habitat so further information are lacking.

Data sources (Reference Numbers)

7, 108



9 0 9 18 27 36 Kilometers



Rivers



Recorded point location

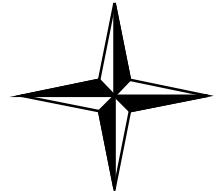


River basin



Associated river basin

N



Gobius hypselosoma Bleeker 1867

Category

LC

Rationale

This species is widespread throughout Madagascar and has no known major widespread threats impacting on the entire population. It is assessed as LC.

Data sources (Reference Numbers)

11, 28



Gobius hypselosoma



10 0 10 20 30 40 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Sicyopterus franouxi Pellegrin 1932

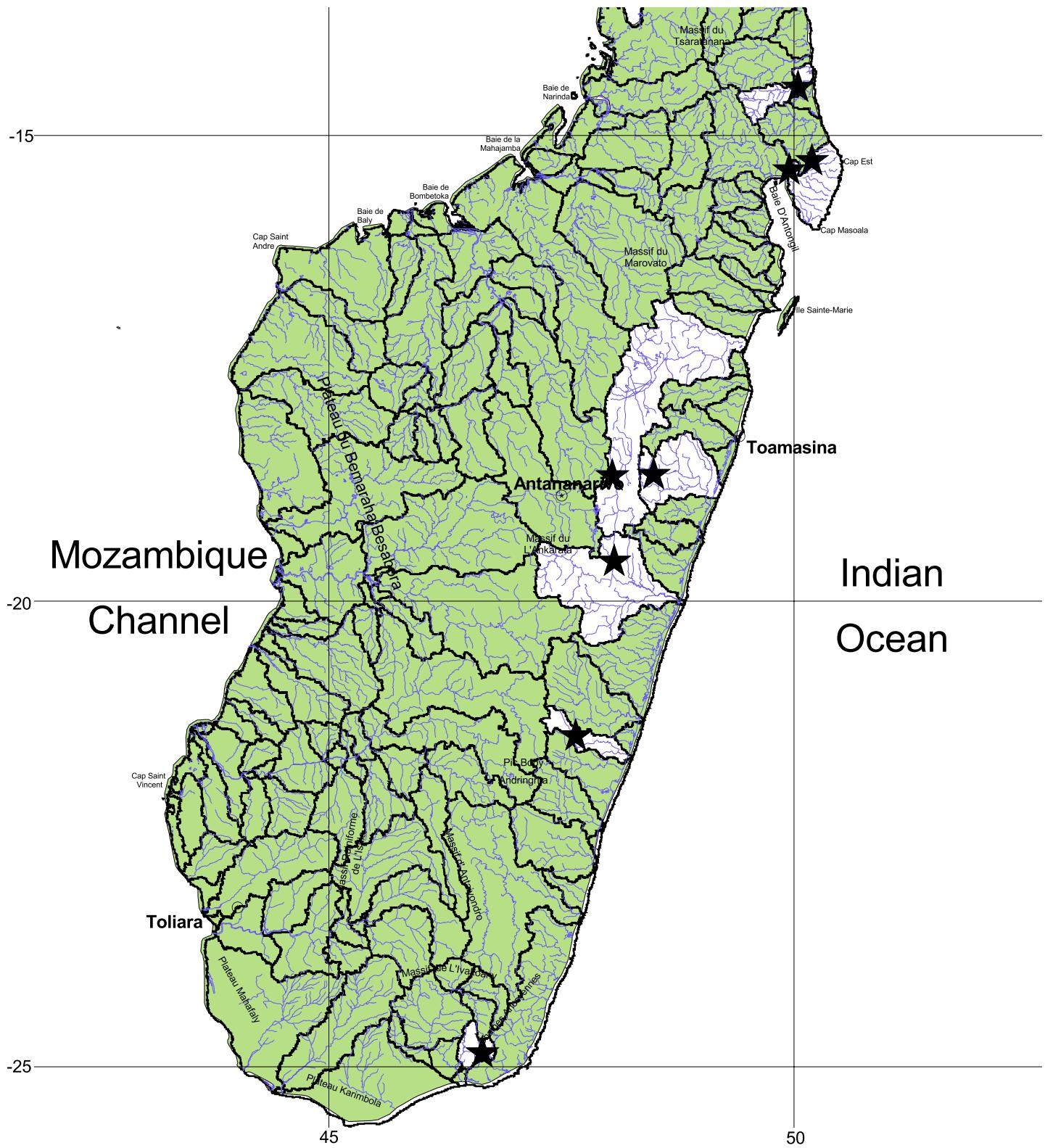
Category
LC

Rationale

Widespread throughout many of Madagascar's rivers with no apparently widespread major threats effecting the population throughout its range. Its amphidromous lifehistory allows it to move between river basins providing flexibility to respond to localised impacts. This species is assessed as LC.

Data sources (Reference Numbers)

28, 64, 77, 90



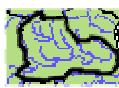
30 0 30 60 90 120 Kilometers



Rivers



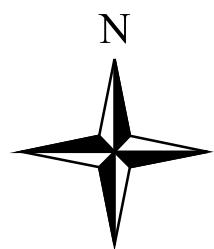
Recorded point location



River basin



Associated river basin



***Sicyopterus punctissimus* Sparks & Nelson 2004**

Previously known as *Sicyopterus sp. "Masoala"*

Category

DD

Rationale

This species has recently been described (Sparks & Nelson, 2004) with voucher specimens deposited in the American Museum of Natural History. It has a restricted range in northeastern Madagascar where it is uncommon. Data are lacking to assess population status and any change in distribution. Specimens referable to the new species have historically been misidentified as *Sicyopterus lagocephalus*, a taxon which does not occur in the Indian Ocean (and a taxon of uncertain placement beyond the subfamilial level). Determining the relationship of this taxon to (and distinctiveness from) East African forms needs further work. Moreover, it remains unclear whether there are multiple congeners present in Madagascar. This species is classified as DD.

Data sources (Reference Numbers)

90



8 0 8 16 24 32 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Stenogobius polyzona Bleeker 1867

Category
LC

Rationale

This species is widespread throughout the west and east coast rivers of Madagascar. Although many river habitats are subject to the adverse impacts of deforestation and there is a potential threat from introduced exotic taxa it is thought unlikely that any impact will threaten the entire population. This species is assessed as LC.

Data sources (Reference Numbers)

11, 28, 107

Stenogobius polyzona



9 0 9 18 27 36 Kilometers



N



Order: Perciformes
Family: Mugilidae

Agonostomus telfairi Bennett 1831

Category

VU

Criteria

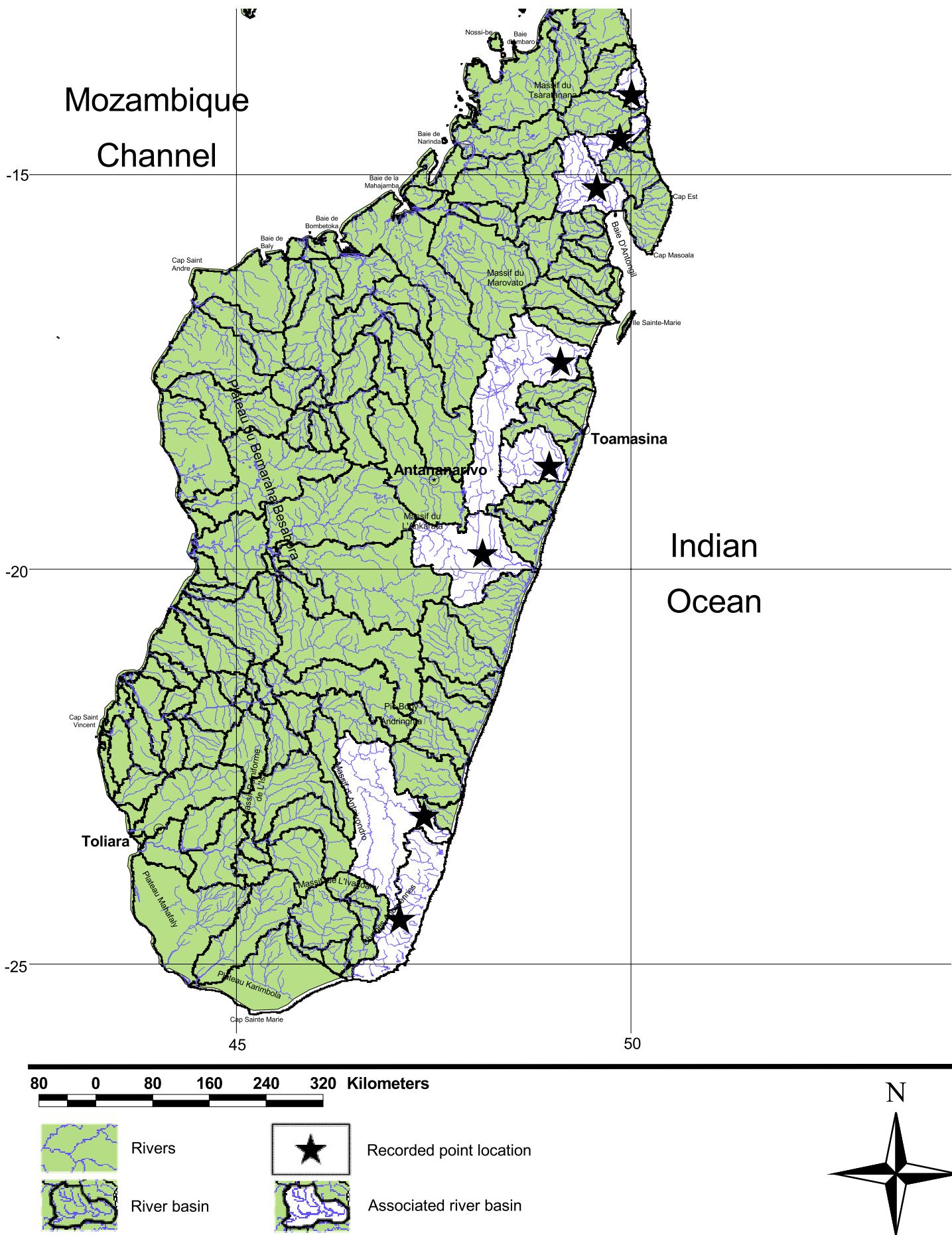
AC3cd

Rationale

This is a "Regional Assessment" as the species range extends beyond Madagascar. It is widespread throughout the east coast rivers of Madagascar. Ongoing impacts of deforestation and fishery exploitation have led to a projected population decline of at least 30% over the next 10 years.

Data sources (Reference Numbers)

8, 28, 69



Order: Perciformes
Family: Teraponidae

Mesopristes elongates (Guichenot 1866)

Category

VU

Criteria

B1ab(ii,iii,v)+2ab(ii,iii,v)

Rationale

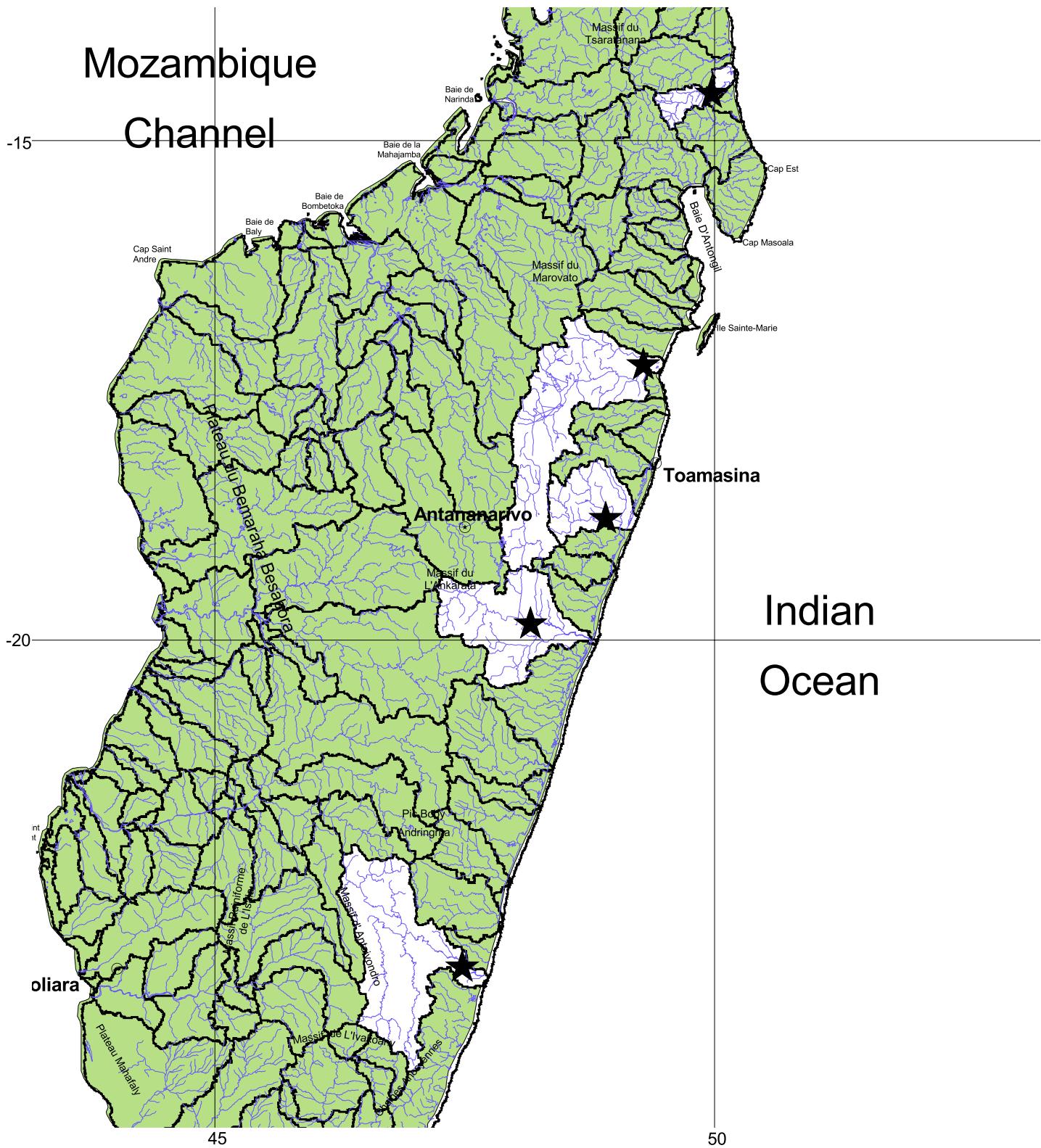
This species remains widely distributed in Madagascar's east coast rivers between Mahanara and Manarara. Pending major shifts in land use in the basin, this species is assessed as VU on the basis of its EOO and AOO being $<20,000\text{km}^2$ and $<2,000\text{km}^2$, respectively, and a continuing decline in distribution range due to the impact of deforestation leaving the habitat highly fragmented. The species is rarely collected, despite much recent effort throughout its presumed range, and it is debatable whether it should be upgraded to an assessment status of EN. However, data are currently lacking to resolve this question.

Data sources (Reference Numbers)

20, 28, 105, 106



Mozambique
Channel



Indian
Ocean



Rivers



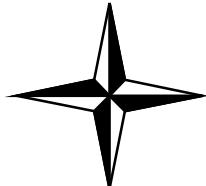
Recorded point location



River basin

Associated river basin

N



Order: Perciformes

Family: Trichinotidae (Kraemeriidae)

Gobitrichinotus arnoulti Keiner 1963

Category

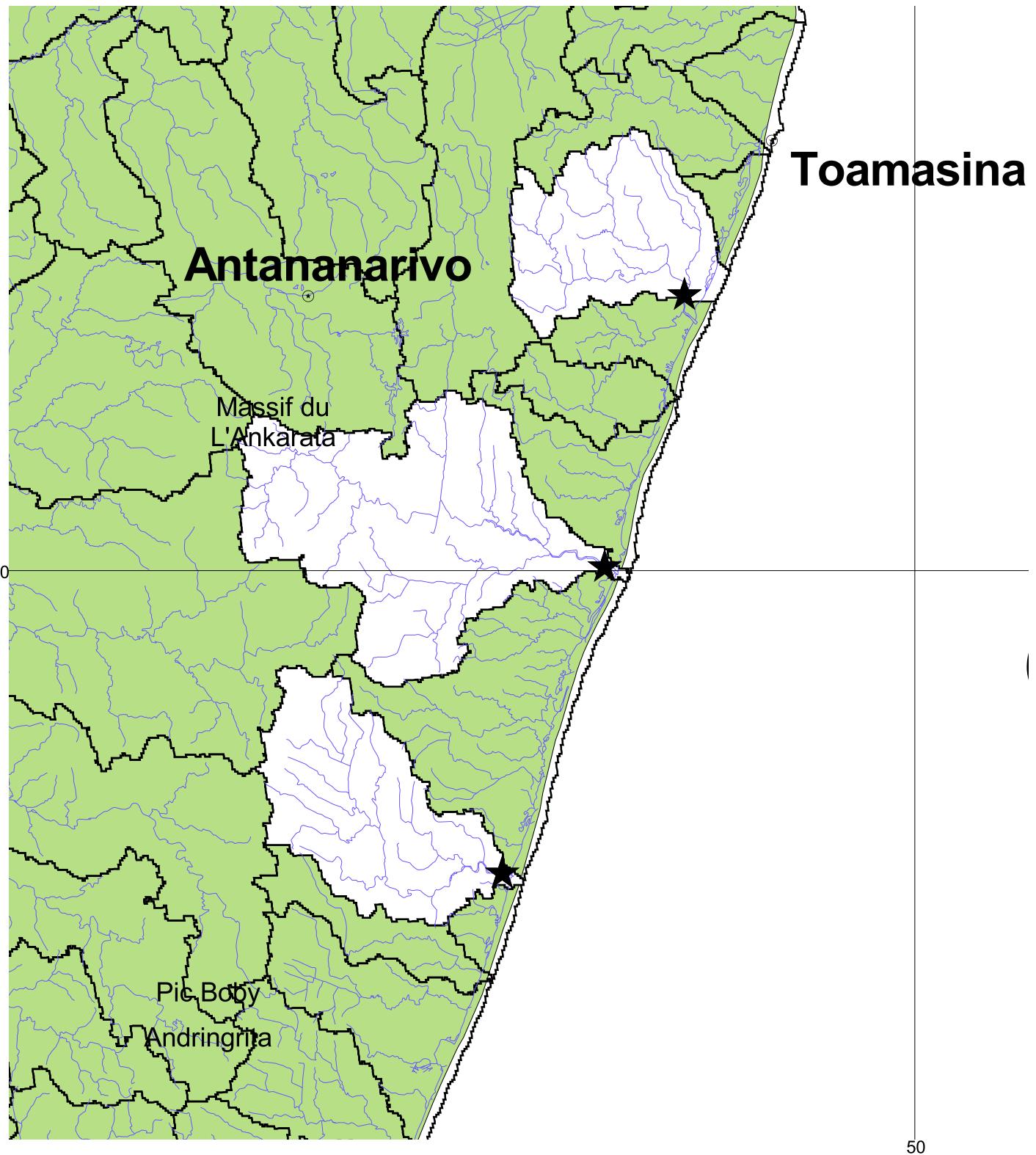
DD

Rationale

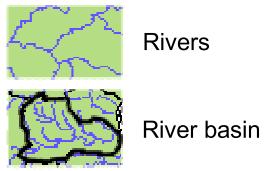
This species is known from the rivers on the eastern slopes of Madagascar but its full distribution range remains unknown and there are no baseline data on population size. The appropriate assessment is DD.

Data sources (Reference Numbers)

27, 28



20 0 20 40 60 80 Kilometers



Order: Siluriformes

Family: Ariidae

Ancharius brevibarbus Boulenger 1911

Category

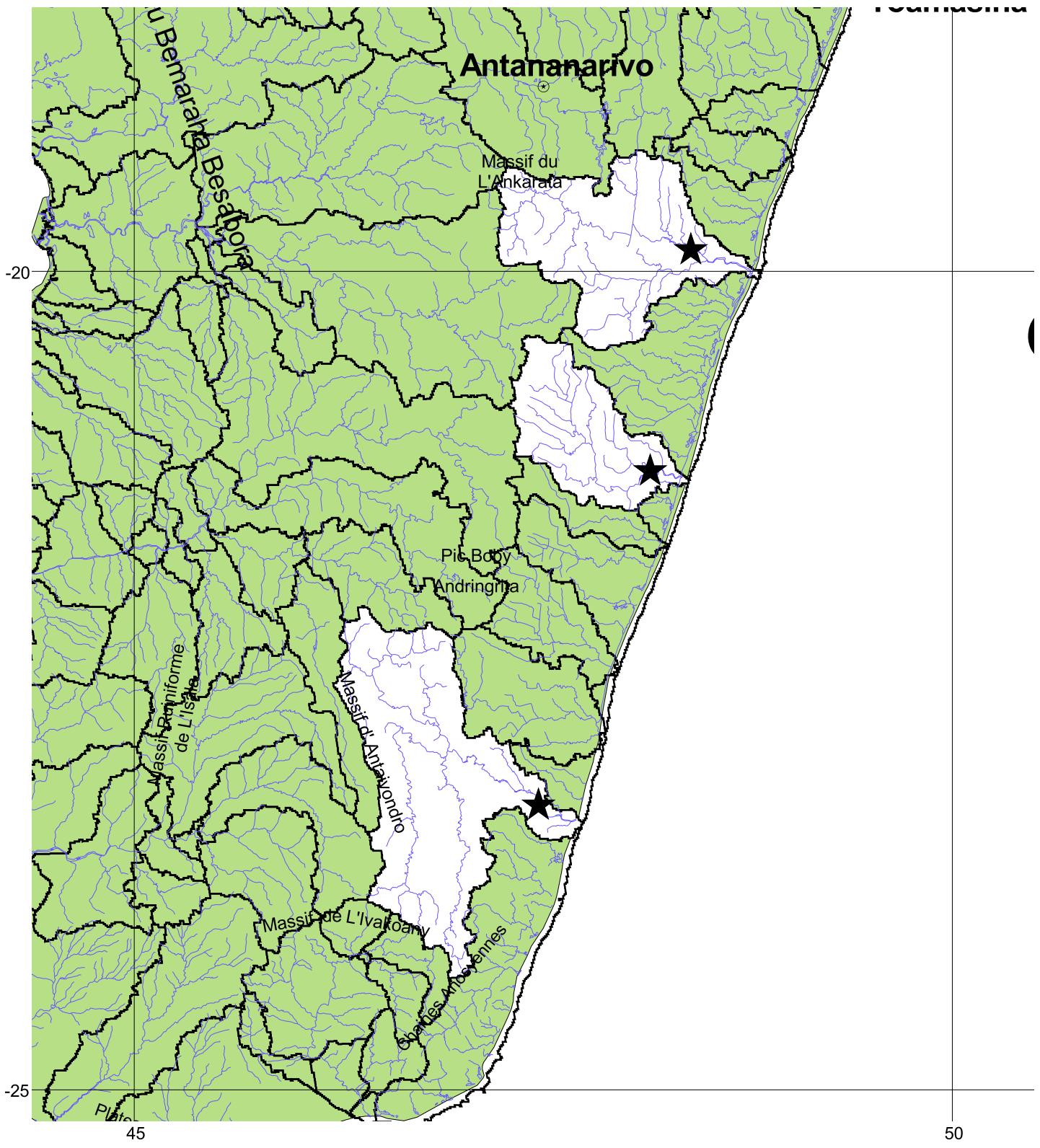
DD

Rationale

This distribution range of this species was thought to include the east coast rivers between Mangoro and Mananara du Sud, Madagascar. Recent research, however, suggests that *A. fuscus* and *A. brevibarbus* are complexes of allopatrically distributed species. In light of this evidence, the assessment for both taxa becomes DD. Prior assumptions regarding range and population size are no longer valid.

Data sources (Reference Numbers)

5, 16, 28, 45, 48, 63



20 0 20 40 60 80 Kilometers



Rivers



Recorded point location

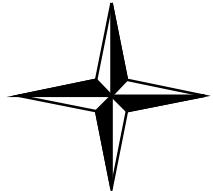


River basin



Associated river basin

N



Ancharius fuscus Steindachner 1881

Category

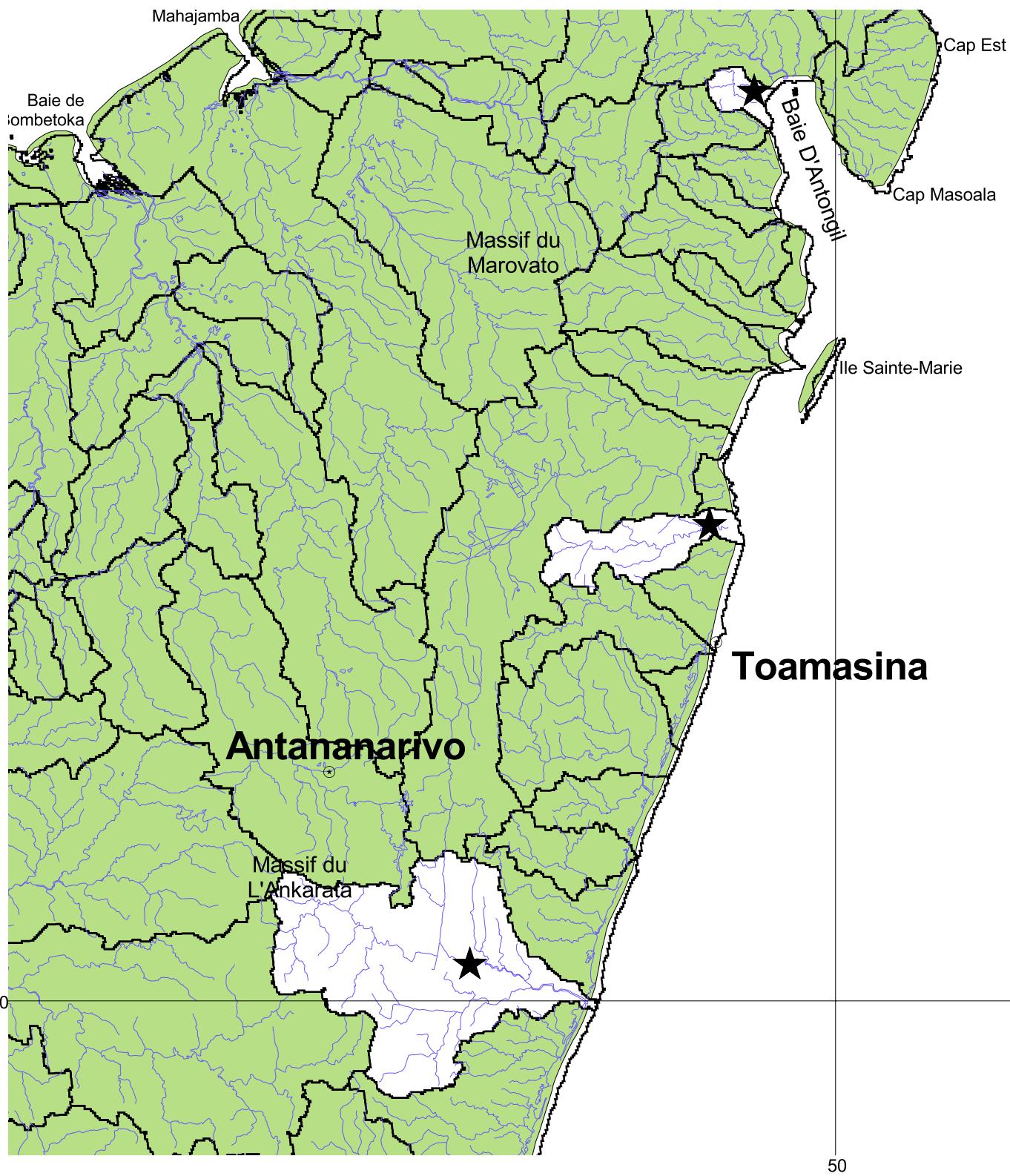
DD

Rationale

This distribution range of this species was thought to include the east coast rivers between Antananbalo and Mananjary, Madagascar. Recent research, however, suggests that *A. fuscus* and *A. brevibarbus* are complexes of allopatrically distributed species. In light of this evidence, the assessment for both taxa becomes DD. Prior assumptions regarding range and population size are no longer valid.

Data sources (Reference Numbers)

45, 48, 91



30 0 30 60 90 120 Kilometers



Rivers



Recorded point location

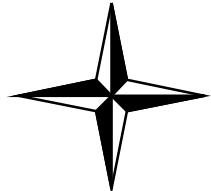


River basin



Associated river basin

N



Ancharius sp. "Onilahy" Undescribed

Category

DD

Rationale

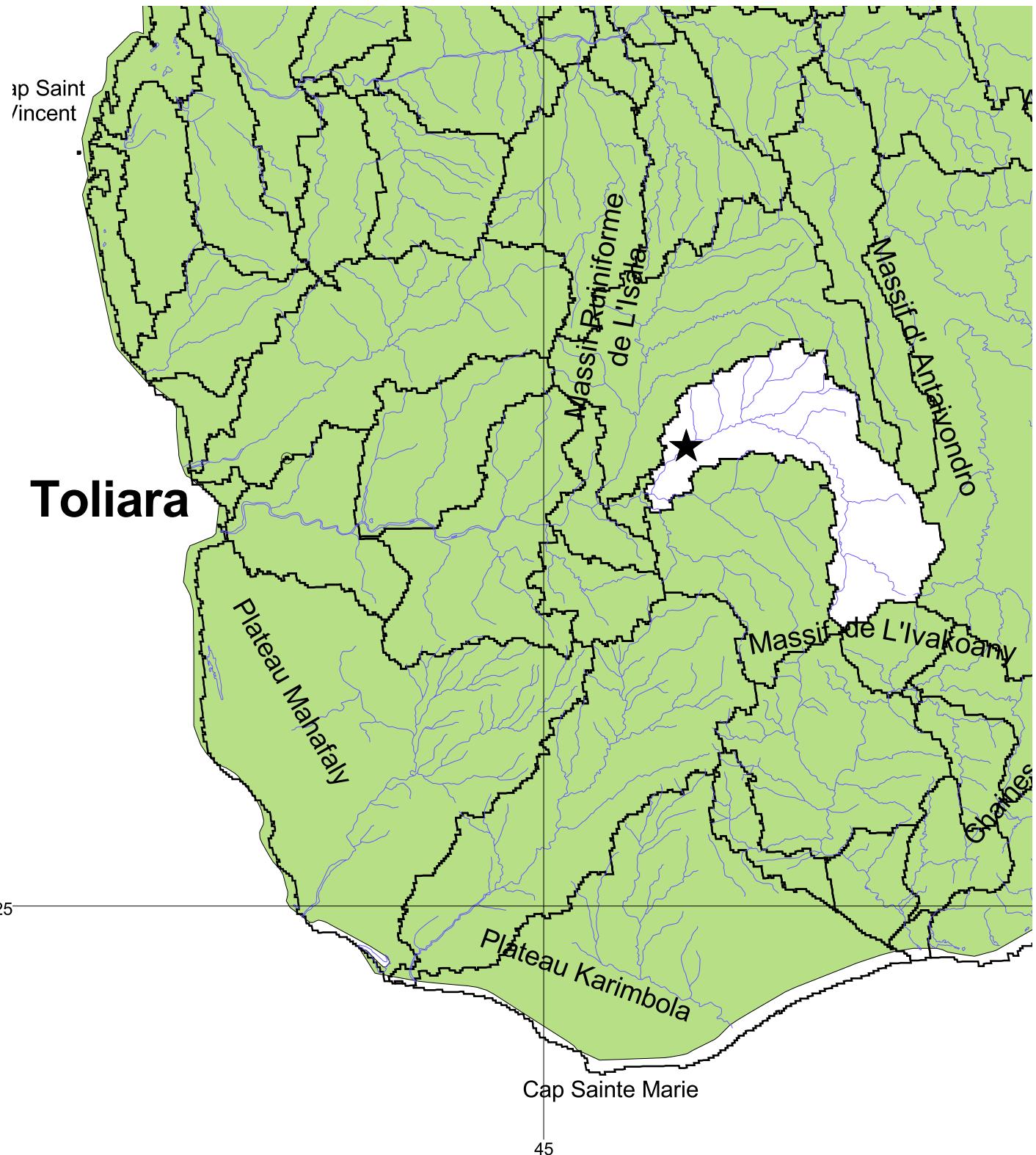
The range limits of this species are unknown and there are no baseline data on population size. The appropriate assessment for this species is DD.

Data sources (Reference Numbers)

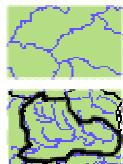
48



Ancharius sp. "onilahy"



30 0 30 60 90 120 Kilometers



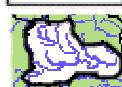
Rivers



Recorded point location

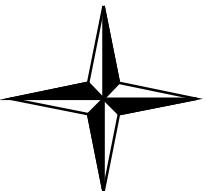


River basin



Associated river basin

N



Arius madagascariensis Vaillant 1894

Category

LC

Rationale

Widespread species in western Madagascar with no major widespread threats identified. This species is assessed as LC.

Data sources (Reference Numbers)

49, 104



30 0 30 60 90 120 Kilometers



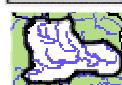
Rivers



Recorded point location



River basin



Associated river basin

N



Arius uncinatus Ng & Sparks 2003

Category

EN

Criteria

B1ab(i,ii,iii,v)

Rationale

This species has recently been described by Ng & Sparks (2003). This new taxon comprises the formerly referenced *Arius* sp./Ankofia and *Arius* sp./Lac Andrapongy. It qualifies as Endangered as the EOO is <5,000km², it is only known from Lake Andrapongy and the river Ankofia, and habitat loss and degradation continue leading to a decline in EOO and in the number of mature individuals.

Data sources (Reference Numbers)

49



Arius uncinatus

SPECIES SURVIVAL COMMISSION



10 0 10 20 30 40 Kilometers



Rivers



Recorded point location



River basin



Associated river basin

N



Arius festinus Ng & Sparks 2003

Category

EN

Criteria

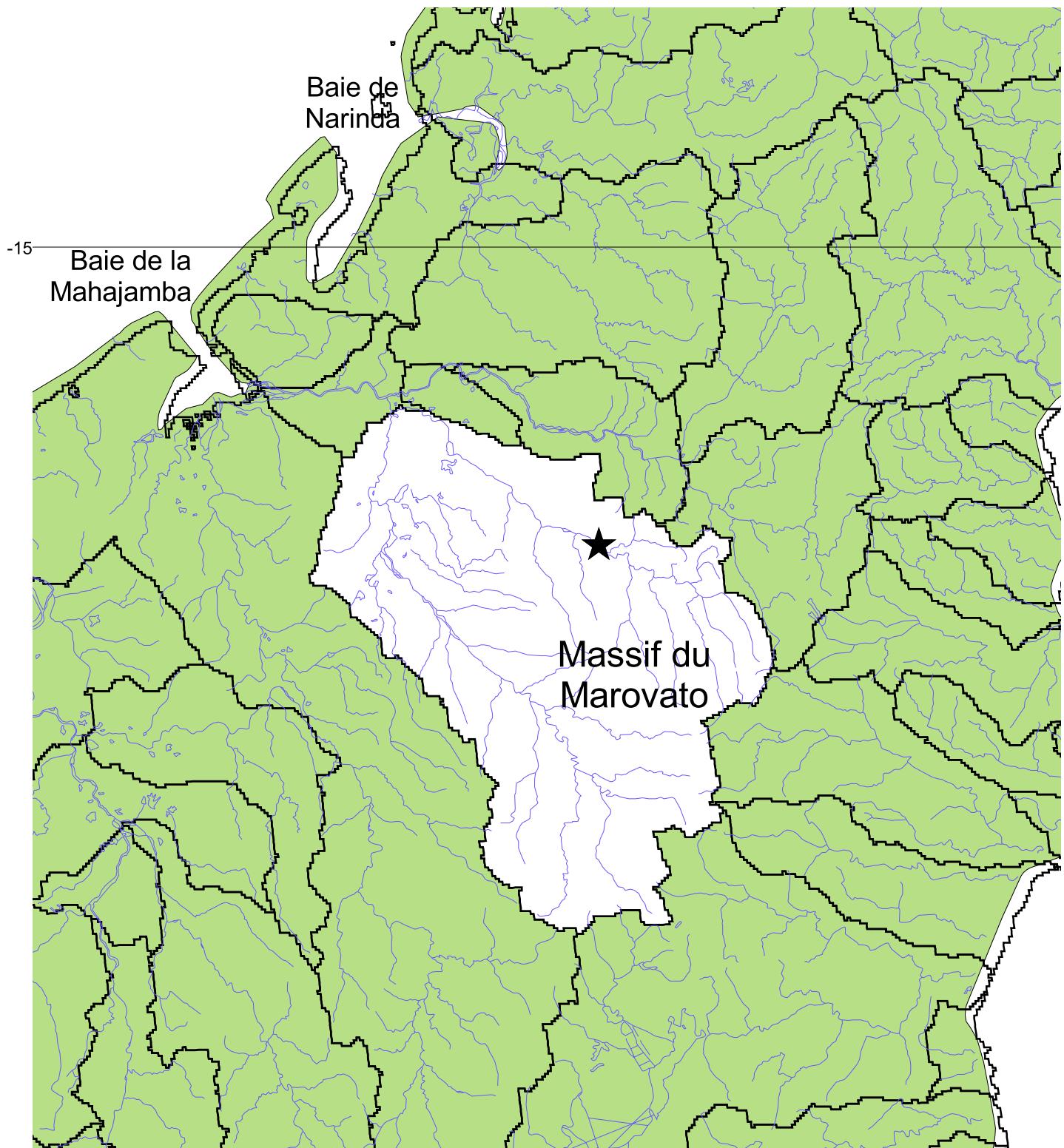
B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)

Rationale

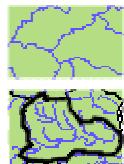
This species was recently described (Ng & Sparks, 2003). EOO and AOO are <5,000km² and 500km², respectively. It is only known from the Sofia River, where it is threatened by continuing habitat loss and dam construction leading to a decline in EOO, AOO, and the number of mature individuals.

Data sources (Reference Numbers)

49



10 0 10 20 30 40 Kilometers



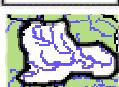
Rivers



Recorded point location



River basin



Associated river basin

N



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Appendix 1: SUMMARY OF THE 2001 IUCN RED LIST CRITERIA (VER 3.1) FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

A. Reduction in population size

A. Reduction in population size	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
A1. An observed, estimated, inferred or suspected population size reduction of:			
	$\geq 90\%$	$\geq 70\%$	$\geq 50\%$
over the last 10 years or 3 generations whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:			
	(a) direct observation (b) an index of abundance appropriate for the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.		

A. Reduction in population size	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
A2. An observed, estimated, inferred or suspected population size reduction of:			
	$\geq 80\%$	$\geq 50\%$	$\geq 30\%$
over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR be understood OR be reversible, based on (and specifying) any of the following:			
	(a) direct observation (b) an index of abundance appropriate for the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.		

A. Reduction in population size	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
A3: A population size reduction of at least:			
	80%	50%	30%
projected or suspected to be met within the next 10 years or 3 generations whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of the following:			
	(b) an index of abundance appropriate for the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.		

A. Reduction in population size	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
A4. An observed, estimated, inferred, projected or suspected population size reduction of:			
	≥ 80%	≥ 50%	≥ 30%
over any period of 10 years or 3 generations whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, and where the decline or its causes have not ceased OR be understood OR be reversible, based on (and specifying) any of the following:			
<ul style="list-style-type: none"> (b) an index of abundance appropriate for the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites. 			

B: Geographic range

B: Geographic range ...	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
... in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:			
B1: Extent of occurrence estimated to be (km ²), and estimates indicating any two of a-c:	< 100	< 5,000	< 20,000
B2: Area of occupancy estimated to be (km ²), and estimates indicating any two of a-c:	< 10	< 500	< 2,000
a: Severely fragmented or known to exist at	only 1 location	≤ 5 locations	≤ 10 locations
b. Continuing decline, observed, inferred or projected, in any of the following:			
(i) extent of occurrence			
(ii) area of occupancy			
(iii) area, extent and/or quality of habitat			
(iv) number of locations or subpopulations			
(v) number of mature individuals.			
c. Extreme fluctuations in any of the following:			
(i) extent of occurrence			
(ii) area of occupancy			
(iii) number of locations or subpopulations			
(iv) number of mature individuals.			

C: Population size

C: Population size ...	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
... estimated to number less than (mature individuals):			
	250	2,500	10,000
and either:			
C1. An estimated continuing decline of at least:			
	25%	20%	10%
in:	3 years	5 years	10 years
or:	1 generation	2 generations	3 generations
whichever is longer (up to a maximum of 100 years) OR			
C2: A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following: (a-b)			
(a) Population structure in the form of one of :			
(i) no subpopulation estimated to contain more than (mature individuals):			
	50	250	1,000
OR			
(ii) at least:			
	90%	95%	All (100%)
of mature individuals are in one subpopulation			
(b) Extreme fluctuations in number of mature individuals.			

D: Population size

D1: Population size	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
estimated to number less than (mature individuals):			
	50	250	1,000

VU D2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically 5 or less) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period

E: Quantitative analysis

E. Quantitative analysis	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
showing the probability of extinction in the wild is at least:			
	50%	20%	10%
within:	10 years	20 years	100 years
or:	3 generations	5 generations	100 years
whichever is the longer (up to a maximum of 100 years).			

