Utilization status and conservation efforts of bangka island endemic fishes

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Abstract. It is estimated that there are around seven endemic fish species on Bangka Island. Environmental degradation due to human activities in the public waters of Bangka Island is feared to affect the sustainability of fish resources. Therefore, this study aims to determine the status of endemic fish utilisation on Bangka Island, and to determine efforts to conserve endemic fish on Bangka Island. The research method used was survey. Primary data collection method is through literature study and interviews, and secondary data is through literature. Descriptive data analysis method. The results of the study showed that the status of endemic fish on Bangka Island is three species of fish with Vulnerable status, two species of fish with Threatened status, and two species of fish with Critical status. Efforts to conserve fish resources include domestication, fisheries reserves, and fishing regulations.

1 Introduction

Rivers play an important role for the life of aquatic biota and human survival, such as fishing grounds for consumption and ornamental fish, seeds and broodstock for aquaculture businesses and as a place for aquaculture businesses. Previous research by [1] in Tua Tunu River, Pangkalpinang City, Telang River, Bangka Regency, Sembulan River, Tanjung Pura Village, Central Bangka Regency, found that most species came from the Cyprinidae family. According to Lowe-Mc Connell (1987), tropical Asian freshwater fish are generally dominated by the Cyprinidae family.

Endemic fish are certain fish species that only have a limited natural geographic distribution and / or certain ecosystem characteristics [3]. [9] stated that Sumatra Island has 30 endemic fish species. Geographically, the distribution area of freshwater fish in Indonesia is divided into three, namely: Sunda Shelf, Wallacea region, and Sahul Shelf. [8] estimated the number of freshwater fish species in Indonesia at around +1,300 species, which is the highest number in the Asian continent.

The population status of Sumatran endemic fish species is at the vulnerable to precarious level [19]. The critically endangered fish group on Bangka Island is *Parosphomenus deissneri* [2]. The reason for the critical status of *Parosphomenus deissneri* fish is because illegal tin mining is rampant in Bangka Island, causing increased pollution and sedimentation [18].

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The vulnerable group means that vulnerable conditions (VU) are the initial limit of conservation status for flora and fauna that are declared to be on the verge of extinction. The fish groups included in the vulnerable category on Bangka Island are beta fish (*Betta burdigala, B. schalleri* and *B. chloropharynx*) [19]

Fish species categorized as vulnerable are those that inhabit restricted habitats (lakes) or are isolated on remote islands (such as Bangka) with high ecological pressure. Fishes that inhabit these restricted waters are unable to migrate to other waters. Betta burdigala, B. chloropharynx and B. schalleri are groups of fishes that inhabit acidic swamp waters on Bangka Island. Since the last few years, the existence of swamps and rivers has been threatened by the rampant illegal tin mining. As a result of tin mining, swamp and river waters are polluted with pollutants, increased turbidity and high sedimentation [18].

The issue of environmental damage due to human activities in watersheds such as tin mining, agriculture, plantations, bathing, washing and household waste activities, makes this research important. This is reinforced by the opinion of [13], that the existence of endemic fish has decreased due to environmental degradation, habitat loss or change, introduction of foreign fish and excessive exploitation.

Environmental degradation that threatens the sustainability of fish resources is caused by land conversion, overexploitation, competition for water use, waste disposal from industrial, residential, agricultural and plantation activities; loss of fish habitat due to damming and straightening of rivers [14] and climate change [4] .In addition, exploitation of fish resources by using destructive and excessive fishing gear without regard to the sustainability of fish resources has caused a decrease in resources and even some places there is a scarcity of fish resources [16].

The conservation of Sumatran endemic fish resources, especially those that are threatened with extinction, can be done through several efforts, namely in situ and ex situ [17]. Efforts to conserve endemic fish species in situ are to carry out a preservation (conservation) effort in the natural habitat of the species. The activities that can be carried out include: a) Fisheries sanctuaries, which can be established in areas that function as a refuge/breeding ground; b) Environmental rehabilitation and habitat modification are carried out in endemic fish habitats that have decreased in quality due to pollution, land clearing and the use of environmentally unfriendly fishing gear; c) Efforts to control the introduction of foreign fish are carried out in locations that have experienced changes in the structure of the fish community from its natural conditions, due to the entry of invasive species that shift the native fish species of these waters; and d) Fishing regulations, to prevent over fishing. If exploitation is carried out on endemic fish, in the long run it can cause scarcity or extinction of the fish species.

Efforts to conserve endemic fish species ex-situ are to carry out a conservation effort outside the natural habitat of the species. The activity that can be done is domestication. Domestication is done to conserve and increase the stock of endangered fish [20]. Domestication of endemic fish that has been carried out currently leads to aquaculture and conservation activities. Seeds produced from aquaculture activities can be re-stocked in their natural habitat so that their existence is still maintained [15].

A variety of information is needed in biodiversity conservation efforts, including human benefits, distribution, status, trends in disturbance threats, and ecological relationships. The determination of protected areas will not be on target if it is not accompanied by a good knowledge of the distribution of species that allows the prioritization of conservation areas

This study aims to assess the utilization status and conservation efforts of Bangka Island endemic fishes. This research is expected to be useful as a basis for the management of endemic fishes of Bangka Island.

2 Research Method

The research locations were DKP Pangkalpinang City, DKP Central Bangka Regency, and DKP Bangka Regency. The determination of the research location was purposive, with consideration of representing the river where the Bangka Island endemic fish samples were taken.

The method used in this research is the survey method, which is research whose main source of data and information is obtained from respondents as research informants using questionnaires as data collection instruments. Data collection methods in this study include primary data and secondary data. Primary data collection using questionnaires, interviews, observation and documentation. Secondary data collection through literature study.

Respondents in this study were informants at the Fisheries and Marine Service of Bangka Belitung Province and Regency / City in Bangka Island who understood the endemic fish of Bangka Island related to the status of utilization and conservation efforts that have been and will be carried out. The data analysis method used is the exploratory descriptive method, which describes the situation that occurs systematically and factually with the aim of describing and solving research problems.

Conservation categories based on IUCN Redlist version 3.1 include Extinct (EX; Extinct); Extinct in the Wild (EW; Extinct in the Wild); Critically Endangered (CR; Critical), Endangered (EN; Endangered or Threatened), Vulnerable (VU; Vulnerable), Near Threatened (NT; Near Threatened), Least Concern (LC; Low Risk), Data Deficient (DD; Information Deficient), and Not Evaluated (NE; Not yet evaluated).

1. Extinct (EX; Extinct) is the conservation status given to species where it is proven (beyond reasonable doubt) that the last individual of the species has died out.
2. Extinct in the Wild (EW; Extinct in the Wild) is the conservation status given to species that are only known to exist in captivity or outside their natural habitat.
3. Critically Endangered (CR; Critical) is the conservation status given to species that are at imminent risk of extinction.
4. Endangered (EN; Endangered or Threatened) is the conservation status given to species that are at high risk of extinction in the wild in the foreseeable future.
5. Vulnerable (VU; Vulnerable) is the conservation status given to species that are at risk of extinction in the wild in the foreseeable future.
6. Near Threatened (NT; Near Threatened) is the conservation status given to species that may be in a state of threatened or near threatened extinction, although not in a threatened status.
7. Least Concern (LC; Low Risk) is the IUCN category given to species that have been evaluated but do not fall into any of the categories.
8. Data Deficient (DD; Information Deficient), A taxon is declared "information deficient" when there is insufficient information to make an estimate of its extinction risk based on distribution and population status.
9. Not Evaluated (NE; Not yet evaluated); A taxon is "not yet evaluated" when it has not been evaluated for any of the above criteria. Examples of Indonesian animals with Threatened status include the Togian Punggok,

3 Results

There are six fish species endemic to Bangka Island, namely gourami paros/tempalak (Parosphromenus), kelik sulung (Encheloclarias tapeinopterus), tempalak mirah (Betta burdigala), tempalak budu (Betta chloropharinx), tempalak punggor (Betta schalleri), Sundadanio gargula (Bangka Belitung Endemic Fish Foundation, 2022). The detailed utilization status of Bangka Island endemic fish species is presented in Table 1.

Table 1. Utilization Status of Bangka Island Endemic Fish

No	Species	morphology	Utilization status
1	gurami paros/tempalak (*Parosphromenus deissneri*)		Endangered
2	Kelik sulung (*Encheloclarias tapeinopterus*)		Vulnerable
3	Tempalak mirah *(Betta burdigala)*		Critically Endangered
4	Tempalak budu (*Betta chloropharinx*)		Critically Endangered
5	Tempalak punggor (*Betta schalleri*)		Endangered
6	*Sundadanio gargula*		Vulnerable
7	*Parosphromenus Julinae*		Vulnerable

Source: Bangka Belitung Endemic Fish Foundation, 2022

The utilization status of Bangka Island's endemic fish is 'Vulnerable to critical'. It is suspected that the decline of endemic fish habitat is due to human activities that pollute the environment, such as tin mining in rivers and swamps, land use change and forest logging, as well as declining water quality due to waste. This is in accordance with the opinion of

[18], currently several endemic fish species are threatened with extinction due to environmental degradation, habitat loss or change and overexploitation. Environmental degradation that threatens the sustainability of fish resources is caused by land conversion, overexploitation, competition for water use, waste disposal from industrial, residential, agricultural and plantation activities [14], and climate change [4]. In addition, the exploitation of fish resources using destructive and excessive fishing gear has led to the decline/scarcity of fish resources [16].

Efforts to conserve endemic fishes of Bangka Island by the local government include the collection of endemic fishes in ponds owned by the Fish Seed Center of Pangkalpinang City. The purpose of fish collection is germplasm preservation, for domestication purposes. This is in accordance with the opinion of [20] domestication is carried out to preserve and increase fish stocks that are almost extinct. Razi & Patekkai (2020), efforts to conserve endemic and local fish can be achieved through stock boosting, fish distribution in public waters, stock enhancement, and aquaculture development.

Other efforts include fisheries sanctuaries, namely establishing the Upang River in Bangka Regency as an area that functions as a refuge/breeding ground for endemic fish, and fishing regulations. This is in accordance with the opinion [16], an effort to conserve endemic fish species in-situ is to make a conservation effort in the natural habitat of the species. Fishing regulations, to prevent over fishing.

4 Conclussion

Based on list of aquatic biota species represented in ''The 2000 IUCN Redlist of Threatened Species" (IUCN 2001), can be identified 14 species of freshwater fishes of Sumatra that belong to threatened species of these, 7 species (50%) are endemic to Sumatra i.e. Betta burdigala, B. chloropharynx (found only in Bangka Island), B. miniopinna dan B. spilotogena (found only in Bintan Island), Neolissochilus thienemanni (found only in Lake of Toba), Poropuntius tawarensis and Rasbora tawarensis (found only Lake of Laut Tawar) Wargasasmita (2002).

Environmental degradation due to human activities in the public waters of Bangka Island is feared to affect the sustainability of fish resources. According to (Nur, 2011), domestication of endemic fish that has been carried out currently leads to aquaculture and conservation activities. Seeds produced from aquaculture activities can be re-stocked in their natural habitat so that their existence is still maintained.

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