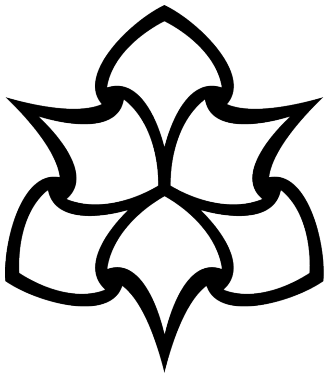

Evidence of steep declines in the heavily-traded Javan White-eye from repeated standardised surveys

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Running title: Steep declines in Javan White-eye

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Summary

Many Indonesian, and in particular Javan birds are suspected to have declined dramatically as a result of unsustainable trapping for the cagebird trade, but quantitative evidence of the scale of declines is lacking for the great majority of species. We conducted field surveys of the heavily-traded Javan White-eye *Zosterops flavus* at 19 key sites in 2018-2019 matching the methods and personnel used in baseline surveys done around ten years earlier. Overall numbers counted were 84% lower in the later survey, and while more white-eyes were recorded at three sites in 2018-2019, there was a significant decline in numbers across all sites. The three sites with highest numbers in 2016-2019 (502 birds counted) had just three individuals counted in 2018-2019, but there was no overall trend for 'declines' to be greater at sites that held more birds originally. Declines in white-eyes were much steeper than those of several lesser-traded bird species at the sites, suggesting that trapping has been a more important driver of declines than habitat changes such as conversion of mangrove to shrimp ponds. Small numbers of white-eyes were recorded at several previously unvisited sites, but we suggest that the species, on Java at least, has shown declines in the region of 80% over the last 10 years. Although since 2018 Javan White-eye is legally protected, we urge that this protection is expanded to all white-eye species, because of their similarity.

Introduction

There has been a long tradition of keeping caged songbirds in Indonesia and other parts of Southeast Asia (e.g. Jepson and Ladle 2005; Marshall *et al.* 2020). Recent surveys of ownership across Java, the island at the centre of the songbird trade indicate that around 12M households across Java keep around 70M birds, including many wild-caught species, and that ownership levels have increased over the past decade (Marshall *et al*. 2020). This has led to acute concerns for the sustainability of this largely domestic trade, the so-called 'Asian Songbird Crisis' affecting wild bird populations in the region (Eaton *et al*. 2015, Lee *et al*. 2016). Effects on wild bird populations are thought to be manifold, hastening the extinction and near-extinction of much sought after species such as Javan Pied Starling *Gracupica jalla* and other Critically Endangered mynas, but also causing severe declines in birds such as

white-eyes, flycatchers, prinias and other once extremely common species from the wider landscape (Squires *et al*. in prep). While losses in the myna species are well-established, largely because they are now extinct or incredibly localised, baseline data for most widespread species are almost totally lacking (e.g. Collen 2008). In these cases, declines are usually inferred from volume or prices of birds in the market, or from anecdotal information (BirdLife International 2020: IUCN Red List for birds, Harris *et al*. 2015; but see Harris *et al*. 2016). This is far from ideal in terms of prioritising species for action, predicting precise patterns of decline, communicating the nature of declines to relevant authorities and civil society, and ultimately in targeting conservation actions effectively.

The Javan White-eye *Zosterops flavus* is a coastal passerine largely restricted to the Javan coastal zone Endemic Bird Area which includes the coastal wetlands, grassland, mangroves, scrub, beaches and mudflats of Java and Madura, Indonesia (BirdLife International (2020) Species factsheet: *Zosterops flavus*). An isolated population occurs in a number of scattered coastal areas in southern Borneo. As the coastal zone in Java and Madura has been densely inhabited for centuries, little of the natural coastal wetlands and grasslands remains (Stattersfield *et al*. 1998). In the 1980s and 1990s, only few records were available for just five scattered localities along the north coast of West and East Java: Pulau Dua, Muara Gembong, Pamanukan and Indramayu in the west, and Ujung Pangkah in the east (Allport and Milton 1988; S. v. B. unpubl. data).

While no Javan White-eyes were identified in the commercial trade in Indonesia in 1991-1993 (Nash 1993), the first decade of this millennium saw a sudden boom in numbers of white-eye hobbyists, with their own specialist clubs and song contests (Yuwono 2013). A 2018 survey of bird ownership involving over 3,000 households in all six of Java's provinces estimated that around 1.5M ± 0.4M (SE) white-eyes, are currently kept in Java alone (Marshall *et al*. 2020). The majority of these individuals are likely to be Sangkar White-eye *Zosterops melanurus* (Lim *et al.* 2019), but Javan white-eyes are also heavily targeted presumably because of accessibility but also a demand for novelty. For example, significant numbers were observed in inventories of the main markets on Java in 2014 (Chng *et al*. 2015), and 2015 (Chng and Eaton 2016). A single bird was found during a survey of Singapore bird shops in 2015 (Eaton *et al*. 2015).

An additional immediate threat to the white-eye comes from the loss of habitat, especially the conversion of large areas of coastal wetlands (mangroves, coastal swamps), mainly for shrimp ponds (Masyuri 1997). The erosion induced by these aquacultures, a globally rising sea level, and subsidence due to groundwater and gas extraction along the north Javan coast (Chaussard *et al.* 2013, Marfai 2014, van Wesenbeeck *et al.* 2015) are additional threats.

In November-December 2006, and May-June 2009, a number of coastal wetland areas, identified from detailed land-use maps, were visited in collaboration with several Indonesian NGOs and universities (van Balen *et al*. 2008, 2009). Inventories were made of the local coastal bird assemblages, with particular attention to four restricted-range species largely confined to the coastal zone, including the Javan White-eye *Zosterops flavus*. During these surveys, Javan White-eyes were counted at 19 sites along the north coast of West,

Central and East Java, including Madura. This 2006-2009 dataset represents a unique baseline against which to gauge the possible decline of the species from excessive trade in the last 10 years (Eaton *et al*. 2015). We therefore aimed to repeat these surveys as closely as possible in 2018-2019 both to determine the current status of Javan white-eye, examine scale and patterns of abundance change over the last decade, and to identify key strongholds and new areas of importance for its conservation on Java.

Methods

Survey sites

Prior to the first surveys in 2006, localities to be visited were selected based on a literature review (Scott 1989, Wibowo and Suyatno 1997-99, Rombang and Rudyanto 1999) and cartographic study. First, maps were scrutinized at large scale (Sandy 1986), based on the presence of estuaries, the remoteness from settlements, and the indication of swamps (*rawa*), and second, maps commercially available at Bakosurtanal at Cibinong (Peta Rupabumi Digital Indonesia series, scale 1 : 25.000; based on field surveys conducted in 1996-2000), were searched for indications of specific vegetation types (*rawa* = swamp"; *hutan rawa* = "swamp forest", *semak/belukar* ("secondary scrub") to detect extant coastal habitat that might be suitable for Javan White-eye.

For the 2016-2019 surveys, areas were revisited as closely as possible the areas covered by the original surveys. At several sites (notably Muara Gembong and Pamanukan), we were forced to visit a different set of sub-localities in 2016-2019, as some of those visited in 2006-2009 had been submerged during the past decade. An additional four sites were visited for the first time in 2016-2019. Three localities that were known to contain Javan White-eyes before 2006, had not been visited in our surveys: Pulau Dua (Allport and Milton 1988), Jakarta (e.g. Vorderman 1883, Hoogerwerf and Rengers Hora Siccama 1937-1938) and Indramayu (S. v. B. unpubl. data). Also the northern coast of Semarang, intensively surveyed since 2006, where the white-eye was found sparsely distributed in very small numbers (Baskoro 2018), and four localities surveyed in 2016-2020 (Atlas Burung Indonesia 2020), with only two records of >10, and max. 15 birds, have not been included in the present surveys.

Bird counts

We recorded Javan White-eye numbers along routes walked through as much as possible representative habitat at each site. Total length of routes covered through suitable white-eye habitat depended on accessibility of the areas, and therefore in the more extensive mangroves in the largest areas, coverage was proportionally less than the smaller areas. To counter any biased interpretation of the results, routes were recorded accurately for future repeat surveys.

Search effort in 2018-19 was checked against that in 2006-2009. Efforts were made to equalise the amount of time spent at each site across the surveys, although logistical constraints meant that matching exact times and timings between the two surveys was unfeasible. In all but a few cases search effort in 2018-2019 was similar to that in 2006-2009.

In all other cases, survey effort was allowed to be considerably less in 2018-2019, if these concerned relatively small areas and the survey was considered adequate, as no more white-eyes were expected to be found. All surveys were led by S. v. B.

As Lemon-bellied *Zosterops chloris* and Sangkar White-eye *Z. melanurus* may co-occur marginally, audio-recordings using a Zoom H5 solid State Recorder and Sennheiser MKH70 microphone for documentation and identification were made of in particular distant individuals.

Data analysis

The abundance of white-eyes at each site in 2006-2009 and 2018-2019 surveys are expressed simply as the total count of individuals made. When visits were made to multiple areas of the same site, we summed the records from each area to give a site total. Differences between numbers of white-eyes recorded at sites between the two (paired) surveys were tested using a Wilcoxen signed ranks test. The degree of change in numbers of white-eyes recorded in the two surveys was expressed as the numbers recorded in 2018-2019 as a percentage of the number recorded in 2006-2009. We tested whether 'declines' had been steepest in areas that originally contained many birds, by examining the relationship between 'starting' number of birds in 2006-09 and degree of change in numbers recorded across the survey (see above). We used a Spearman's rank correlation analysis to test this relationship and also between the degree of change and longitude (West-East).

To go some way towards putting abundance change in the white-eye into the context of other bird species at the sites, we compared its abundance changes to changes in the presence of (i) a suite of twelve little-traded bird species, and changes in abundance of (ii) three little-traded species with not dissimilar habitat requirements. The former (i) included: Sunda Collared Dove *Streptopelia bitorquata*, Cerulean Kingfisher *Alcedo caerulescens*, Collared Kingfisher *Todiramphus chloris*, Common Iora *Aegithina tiphia*, Australasian Reed Warbler *Acrocephalus australis*, Yellow-bellied Prinia *Prinia flaviventris*, Plain Prinia *Prinia inornata*, *Ashy Tailorbird *Orthotomus ruficeps*, Golden-bellied Gerygone *Gerygone sulphurea*, *Sunda Pied Fantail *Rhipidura javanica*, *Ornate Sunbird *Cinnyris ornatus*, and *Anthreptes malacensis*; the latter (ii) are indicated with an asterisk.

To explore whether this suite of little-trapped birds had also declined/disappeared from the sites, we tested whether species richness of these species differed across the two surveys using a Wilcoxon signed ranks test, and determined whether declines in species richness among these birds at sites was correlated with degree of decline in the white-eye with Spearman's rank test. For the three focus species, we report overall differences in numbers seen across all sites and tested whether the proportions of sites at which these species declined differed from the proportion of sites at which the white-eye declined using Chi-squared tests with Yates' corrections. All analyses were done in RStudio (RStudio Team (2020).

Results

A total of 19 localities in which the presence of white-eyes was assessed in 2006-09 have been re-visited (Table 1; locality names can be obtained from the first author). A total of 800 white-eyes were recorded at the 19 sites in 2006-2009 and 143 individuals in 2018-2019. White-eyes went unrecorded at five sites in 2018-19, had much lower numbers (60% decrease) recorded in 2018-2019 at five sites, lower to almost equal numbers at seven sites, and had higher numbers in 2018-2019 than 2006-2009 at two sites. There was a significant reduction in white-eye numbers recorded across the 19 sites between 2006-2009 and 2018-2019 (Wilcoxon signed ranks test: V = 172, P = 0.002).

The three sites with highest recorded numbers in 2006: 73, 245, and 184 individuals suffered the biggest 'losses' of birds with 11, 11, and 0 recorded in 2018-2019. Despite this, there was no significant relationship between numbers recorded in 2006 and percentage change in numbers in 2018 ($r_s = 0.15$, n = 19, p = 0.54). Neither was there a significant relationship between 'declines' and longitudinal (West-East) coordinates ($r_s = 0.06$, n = 19, P = 0.82).

There was no significant difference in species richness of the lesser-traded species across the 19 sites (Wilcoxon signed ranks test: V = 77, P = 0.66). Further, there was no relationship between changes in species richness of the little-trapped species and degree of 'decline' in the white-eye across sites ($r_s = 0.09$, n = 19, P = 0.71). All three focal little-traded species were recorded in lower numbers overall across sites in 2018-19 than in 2006-9: Sunda Pied Fantail 81 individuals versus 88 individuals; Ashy Tailorbird 37 vs 62; Olive-backed Sunbird 61 vs 85, these 'declines' being far less steep than that of the white-eye. Absences from sites surveyed in 2018-19 where they were recorded in 2006-9 were rare in these species (fantail: one site; tailorbird: two sites; sunbird: three sites). The proportion of sites at which the white-eye had declined (16 of 19) was significantly greater than that for the fantail (7 of 19 sites; $\chi^2_2 = 7.0$, p = 0.008), but not for the tailorbird (9 of 15 sites; $\chi^2_2 = 1.4$, p = 0.23) or the sunbird (12 of 19 sites; $\chi^2_2 = 1.2$, p = 0.27). Small numbers of white-eyes were recorded at two new sites in Sidoarjo regency which were not visited in 2006-9.

Discussion

Our surveys of 19 sites in coastal Java recorded 143 individual white-eyes, less than 18% of the 800 counted using similar methods around a decade earlier. We found a few new sites holding modest numbers of white-eyes. White-eyes had systematically 'declined' across the 19 sites, and although there was no consistent pattern that sites holding most birds in the earlier survey had seen steepest declines, three sites where over 500 birds were recorded in 2006-9 had just three individuals in the recent survey. We did not undertake a formal analysis of habitat change at the sites but did find that a suite of lesser-traded co-occurring species had not declined or disappeared from the 19 sites in any way similar to the declines suffered by the white-eye. Taken together, we posit that the white-eye is likely to have undergone a serious decline, perhaps in the order of 80%, over the past decade. Our surveys sampled birds at the sites and as such tell us little about the population sizes of white-eyes at each site. This said, our surveys covered fairly well many of the 'best' sites for the species, so we suggest

that its Java-wide population is certainly not large, perhaps in the order of 250-2,500 individuals.

White-eyes have become extremely heavily-traded on Java over the past decade or so (Iqbal 2015; Marshall *et al*. 2020). While not commonly recorded during market or ownership surveys, on account of difficulties in species identification (van Balen 2008) and due also to the large numbers of Sangkar and other white-eyes for sale, Javan white-eyes are without doubt significantly traded. Even so, the tens of individuals that have been recorded in market surveys this decade are likely to make up a considerable proportion of the wild population on Java. At all localities, especially where white-eye numbers had decreased drastically, direct evidence or local reports indicated intensive trapping, usually with the use of lime sticks. Concurrent with this trapping pressure has been habitat change and we acknowledge that loss and degradation of mangroves and other suitable habitat for the white-eye has occurred at some sites – Symes *et al*. (2018) estimated that around 15% of the species' habitat has been lost in the last decade. Such figures for habitat lost seem more compatible with the degrees of decline we noted in some of the lesser-traded species such as Sunda Pied Fantail, Ashy Tailorbird, and Olive-backed Sunbird, than those of the white-eye. In none of the survey areas had suitable white-eye habitat disappeared or deteriorated entirely, except for large parts of the two of the larger areas that had inundated permanently since 2006-2009. In some areas, the extent of mangroves has actually expanded due to reforestation schemes (e.g. Randy *et al.* 2015). Detailed accounts of the habitat condition and protection measures already underway are not given here for security reasons but are available on request from the corresponding author.

It is striking that the three areas with largest numbers of white-eyes recorded in 2006-2009 had greater losses. An obvious conclusion is that the abundance of white-eyes in the past was a major attraction for bird trappers, who were able to trap out large numbers of white-eyes effectively. In one of these sites, we were told that Javan White-eye was the main target for bird trappers coming from outside the region. The white-eye should not be a difficult bird to catch – the habitat is fairly low and often linear in nature, while the white-eye occurs in fairly large, cohesive, groups which may be trappable en mass, as they are strongly attracted by the distress calls of already captured conspecifics. In smaller mangrove plots, the few scattered Javan White-eye flocks were possibly less worth the effort, as are areas already depleted of most of their white-eyes. This possible ‘damping down’ of differences in population density of traded birds is not often confirmed but should be of great interest to conservationists and ecologists. On one hand it may act as a welcome brake on local trapping when local densities of remaining birds becomes not economically worthwhile harvesting but on the other it may be the nail in the coffin of remnant local populations unable to withstand Allee effects (Peteren and Levitan 2001) or other barriers to recovery (e.g. Bundy and Fanning 2005) and doomed to extinction.

As far as we know, no single local Javan White-eye population is included in a national park on Java, however, in several areas, local conservation measures, such as the establishment of mangrove plots by replanting schemes may have/have had a positive effect on white-eye populations. Areas containing white-eyes, or with habitat suitable for (re-) introduction that

enjoy protection to some extent are described in the Supplementary Materials. Local awareness programmes at these sites should explain the Javan White-eyes' ecological importance as insectivores, of mainly beetles and caterpillars (M. E. G. Bartels unpubl. data, Sody in Becking 1989). We also recommend further surveys on Java, especially Madura island, as our own surveys were certainly not exhaustive. The Javan White-eye population on Kalimantan is also very little known, and a survey of the coastal areas of the southern half of the island is urgently needed, especially since the discovery of a shipment of 14 Javan White-eye offered for sale in Kediri (E Java), allegedly originating from Kalimantan (I. Kartiko pers. comm. 2020).

Since 2018 the Javan White-eye is protected under Indonesian law (Anonymous 2018). Law enforcement however may be a problem because of a fair number of near-identical yellow-bellied white-eye species in trade. The protection of all species of white-eye is therefore necessary. This said, there may be a ray of hope in the report that bird fanciers are slowly realizing that Javan White-eye are actually poor songsters (I. Kartiko pers. comm. 2021).

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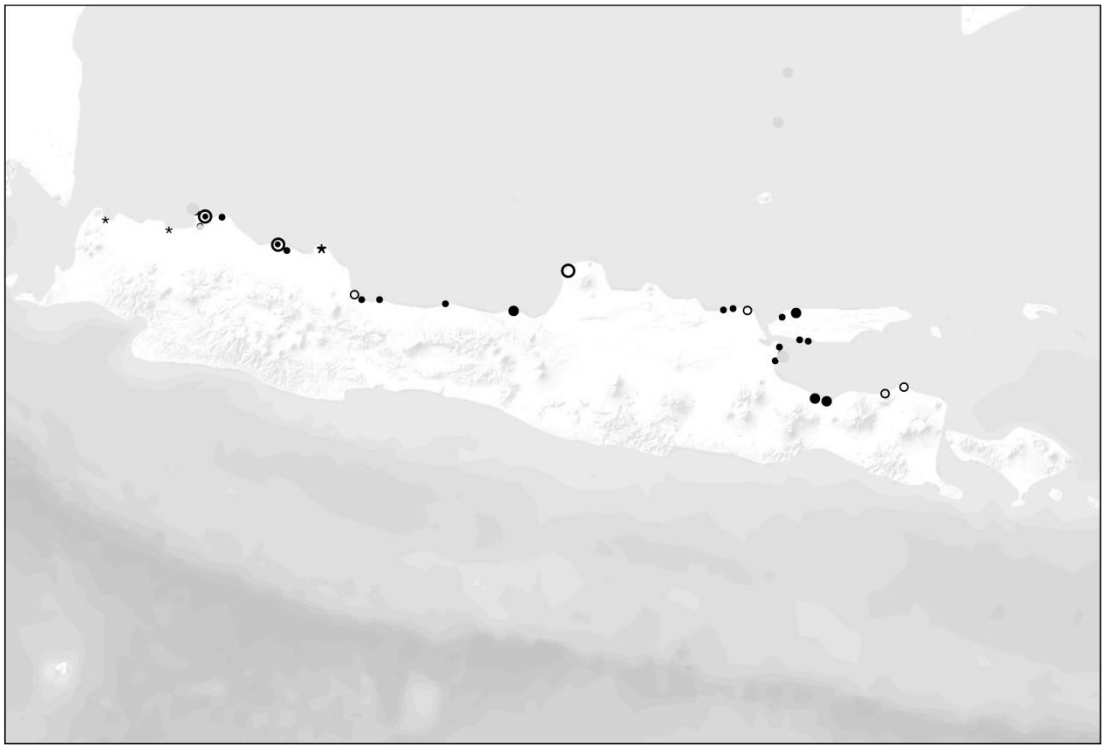
Table 1. Survey efforts (in hours), numbers of Javan White-eyes recorded, and numbers of selected species (see text) recorded during the 2006-2009 and 2018-2019 surveys. Sites are given numbers for security reasons.

Site no.	Effort		Javan White-eye		Selected spp	
	2006-2009	2018-2019	2006-2009	2018-2019	2006-2009	2018-2019
1	18.6	20.5	73	11	10	10
2	15.6	20.4	240	11	8	9
3	2.5	2.3	22	0	7	5
4	7.8	3.3	4	2	6	5
5	2.4	3.9	38	1	6	6
6	7.9	6.4	25	10	7	9
7	3.3	3.1	4	29	8	6
8	6.8	8.8	184	0	8	6
9	1.3	4.0	8	16	9	8
10	1.9	1.4	11	6	7	9
11	3.0	1.7	12	0	5	8
12	2.2	1.9	7	2	7	7
13	4.7	1.0	19	8	8	5
14	2.0	4.4	28	15	6	10
15	5.0	5.1	18	4	7	8
16	2.0	1.5	35	8	9	5
17	8.6	9.4	61	20	11	10
18	1.5	1.1	9	0	6	4
19	1.3	2.3	2	0	5	7

SUPPLEMENTARY MATERIAL * available on request from corresponding author

Appendix 1. Localities where Javan White-eyes have been recorded; (small dot <20 individuals; large dot >20 individuals); ◦ found in 2006-09, not in 2018-19 • found during 2018-19 survey; * historical / not visited during present surveys (numbers unknown)



Appendix 2. Regencies and coordinates of survey areas.

	Localities	Sublocalities	Regency	coordinates	
1	**Muara Gembong**	Sembilangan / Pondokdua / Cibeel / Muara Blacan / Pantai Mekar / Pantai Bahagia / Muara Bendera	Bekasi WJ	107°00' - 107°01'	05°56' - 06°03
2	**Ujung Pamanukan**	Mayangan / Tegallurung / Tegalsari / Sirewang / Muara Ciasem	Subang WJ	107°18 - 107°41’	05°58' - 06°12’
3	**Losari 1**	Playangan	Brebes CJ	108°45’	06°49’
4	**Losari 2**	Karangkletak	Brebes CJ	108°50’	06°45’
5	**Ujung Brebes**	Kaliwlingi	Brebes CJ	109°04’	06°46’
6	**Ujung Pemalang**	Sidomulyo/Patarukan	Pemalang CJ	109°31’	06°47’
7	**Tanjung Karangwelang**	Wonosari/Kartikajaya	Kendal CJ	110°13’	06°52'
8	**Ujung Piring**	Blebak	Jepara CJ	110°40’	06°30’
9	**Kentong 1**	Brondong	Lamongan EJ	112°11’	06°53’
10	**Kentong 2**	Cemplung	Lamongan EJ	112°14’	06°52’
11	**Solo delta**	Ujung Pangkah	Surabaya EJ	112°33’	06°54’
12	**Brantas delta 1**	Sedati	Sidoarjo EJ	112°49'	07°22'
13	**Arosbaya**	Kool	Bangkalan EJ	112°50'	06°55'
14	**Lembung**	Labuhan	Bangkalan EJ	113°00’	06°53’
15	**Sampang**	Apaan / se Sampang	Sampang EJ	113°10' - 113°14'	07°13'
16	**Pesisir**		Probolinggo EJ	113°14'	07°44'
17	**Probolinggo**	Krajan/Pt Bentar/Curahsawo	Probolinggo EJ	113°16'	07°46'
18	**Tanjung Ketah**		Panarukan EJ	113°42'	07°42'
19	**Tanjung Pecinan**		Panarukan EJ	114°02'	07°36'
"New" localities					
20	**Tanjung Sedari**		Karawang WJ	107°18'	05°58'
21	**Brantas delta 2**	Gunung Anyar/Wonorejo	Sidoarjo EJ	112° 49'	07°18' - 07°20'

Appendix 3 Brief accounts of habitat condition and protection measures taken in a selection of localities.

1. *Muara Gembong* Muara Blacan protection forest in the southern, and the Lutung Jawa wildlife reserve in the north-west offer protected and suitable habitat remnants of a once huge area.

6. Ujung Pemalang Everything that still indicated a swampy area on the Bakosurtanal map, was converted to rather small 30 x 30m tambaks etc., surrounded by planted mangrove stands. Forest rehabilitation project existed at Kendalrejo; at Sidomulyo an edge of tambaks, *Rhizophora* and *Casuarina* was found and here a reforestation project of Wetlands International was started with the local community; many *Rhizophora* trees (now 6-8m tall) were planted along fish pond dikes.

11. *Brondong / Kentong* A narrow fringe of mangroves, with well vegetated pond dikes offers good habitat for white-eye, and indeed, groups of 2-3 birds were seen at three places. Part of the area is being developed for tourism, with bamboo shelters inside the forest up to 100-200m west of Labuhan village, called Pantai Kutang.

12. *Solo delta*: at Ujung Pangkah the ponds with the former rich heronries are nowadays more and more enclosed by settlement area. The heronries were this year again plundered because of the alleged harm of the breeding waterbirds, but the pond with remains of the formerly large heronry could still be found by GPS. No white-eyes were heard at all, a warung keeper could not tell me why, as he did not even know the birds. He was used to guide foreign birdwatchers around on a boat out on the sea.

14. *Labuhan/Lembung*. The Mangrove Forest Education Center in the west part, and the Pertamina sponsored Lembung Paseser project in the eastern part harbour good populations of Javan White-eye.

16. *Pesisir*. The area is still "pristine", i.e., more or less in the same condition as indicated on the 'old' map: no mangrove, but all tambaks. Nevertheless there is good foraging habitat available with lanes of *Rhizophora*, waru trees etc. The area was discovered by Hendra Trisianto c.s., he is active since 2014 for the Indonesian ministry of information, and has gathered an active club of bird photographers, very keen on the conservation of the area and its wildlife.

18. *Tanjung Ketah.* The vegetation of 2009 was found mostly untouched, though not expanded or grown much taller. A newly established mangrove plot is now present south of the village (Pantai Dubibir), managed by local people, such as Pak Alland, who is developing it a *wisata bakau* project, in which the main aim is to restore the mangrove forest. No white-eyes were seen, the 'new' mangroves may be still too young and monotonous for holding a healthy populations yet.

20. Tanjung Sedari. Wana Sedari, first stone by Soeharto in 1991, the 58 ha area has been protected by Perhutani in cooperation with the local community of which Pak Wajan (mitra kehutanan) whom we met several times, was the middleman (Lembaga Masyarakat Desa Hutan). Since 2007 the area was established as *hutan wisata* and since 2018, effectively protected against hunters, who used to come here often in groups, bringing home up to 5 birds/hunter. A quite tall mangrove stand, with wooden platforms and walking boards, bordered by tambaks.

21. *Wonorejo.* Gunung Anyar - Huge area, both 'exotic' Sangkar and Lemon-bellied White-eyes have been found here (C. Bocos, pers. comm.). The area will be developed as a mangrove botanical garden, the largest of SE Asia (Dinas Ketahanan Pangan & Pertanian Kota Surabaya). Alas, on Sundays birds were trapped with bird lime by 'back-door' trappers. Wonorejo is a well-managed 300 hectares area, where awareness programmes in cooperation with local government are aimed at local fishpond holders (I Febrianto verbally). Mudflats, mangrove boardwalk; also *Centropus nigrorufus* is present, two birds were seen during the survey (but many more recently reported, Carlos Bocos, pers. comm. 2019), and up to three different birds heard. Well-visited by young people walking along the boardwalk (on Sundays).