

GREAT NAME BUT LOW IN NUMBER? THE STATUS OF POPULATION OF GREAT KNOT *CALIDRIS TENUIROSTRIS* IN BANYUASIN PENINSULA, SUMATRA, INDONESIA

Muhammad IQBAL¹, Deni MULYANA², Arum SETIAWAN³, Indra YUSTIAN^{3,*},
Hilda ZULKIFLI³

¹Biology Program, Faculty of Science, Sriwijaya University, Jalan Padang Selasa 524, Palembang,
South Sumatra 30139, Indonesia.

²Berbak Sembilang National Park, South Sumatra Office, Jalan Tanjung Api-api Komplek Imadinatuna No. 114,
South Sumatra, Indonesia

³Department of Biology, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32,
Indralaya, South Sumatra, Indonesia

Abstract

Great Knot Calidris tenuirostris (Horsfield, 1821) is *Endangered* widespread shorebird species that occur in Banyuasin Peninsula, South Sumatra Province, Indonesia. We compiled the published and unpublished reports of Great Knot in the Banyuasin Peninsula from 1984 to 2021. The population trend is shown to be increasing, based on the comparison in numbers of Great Knot between periods 1984 to 1989 (six reports, maximum count 66 birds and average 31 birds), with the numbers between 2008 to 2021 (six reports, maximum count 300 birds, average 155 birds). Compared to other shorebirds in Banyuasin Peninsula which can be observed in numbers up to 25.100 birds (*Black-tailed Godwit Limosa limosa*) and 7.061 birds (*Eurasian Curlew Numenius arquata*) in a single observation, the number of Great Knot is relatively low, but this number is regional significance in Indonesia.

Keywords: Number; Great Knot; *Calidris tenuirostris*; *Threatened*; *Endangered*; Indonesia

Introduction

The need to find food is the reason for most bird movements, and for this reason, some shorebirds travel thousands of kilometers in a year [1]. Most birds spend their annual non-breeding period at lower latitudes than their breeding period, but some migrate to similar latitudes in the opposite hemisphere where the seasons are reversed [2]. Shorebirds are groups of birds often remarkably gregarious, feeding, roosting and migrating in large flocks, but they are more solitary when breeding [3].

Great Knot *Calidris tenuirostris* (Horsfield, 1821) is the world's largest *Calidrid* sandpiper that occupies alpine and subalpine habitats in the northeast Siberian sub-Arctic, from the Verkhoyansk Mountains east to the south Chukotskiy Peninsula [4, 5]. They are a long-distance migrant, which travels mainly along the coastal regions and research suggests only a small number of stopovers [6, 7]. In the non-breeding period, Great Knot migrates to Arabia, Indian subcontinent, Southeast Asia, Australia and New Zealand [8, 9]. The number of Great

* Corresponding author: idr_yustian@unsri.ac.id

Knot in East Asian Australasian Flyway (EAAF) is about 379.110 birds, with an estimated 2.000 birds in Indonesia [10].

The Great Knot was considered an Endangered species in 2016, due to a rapid population decline associated with the reclamation of intertidal staging ground in the non-breeding area [11]. As one important staging area for migratory shorebirds in East Asian Australasian Flyway [10], Banyuasin Peninsula in South Sumatra is recognized as a regionally important site for Great Knot in Indonesia. In this paper, we review the population number of Great Knot in Banyuasin Peninsula to look at the population size and trend of the local population.

Experimental part

Methods

Banyuasin Peninsula of South Sumatra Province in Indonesia is an important site for waterbirds [10]. This site was listed as an Important Bird Area (recently known as Key Biodiversity Area), Ramsar site, and important wetlands site in Indonesia [12-14]. Banyuasin Peninsula administratively is located in the Banyuasin II subdistrict, Banyuasin District, South Sumatra Province, Indonesia (Fig. 1). A total of 35 km line of coastal zone stretching from north to south in Banyuasin Peninsula. This coastal zone has provided mudflats that support important staging habitats for migratory shorebirds during the non-breeding period [15-17].



Fig. 1. Map of Banyuasin Peninsula, South Sumatra Province, Indonesia

Records of the published and unpublished number of Great Knot in the Banyuasin Peninsula were compiled. These records were checked and reviewed precisely by various reports, researchers and birdwatchers. Published records of the Great Knot were mainly gathered from surveys from 1984 to 2000, and unpublished records were gathered from surveys from 2001 to 2021. A site visit is important to successfully determine the number of Great Knot, and some of the authors have visited Banyuasin Peninsula from 2003 to 2021 [18-22].

Results and discussion

Population size and trend

Based on available information using the Great Knot data set, a series of observations of shorebirds from the Banyuasin Peninsula was summarized from 1984 to 2021 (Table 1). The bird was recorded in three seasons over four migration periods: northward migration (March to April), southward migration (August to October), and winter (November to February); but not recorded in summer (May to July).

Table 1. Records of Great Knot in Banyuasin Peninsula, South Sumatra, during 1984-2021
(Observers: DM = Deni Mulyana, MI = Muhammad Iqbal).

Date	Number	Sources/Observers
Oct-Nov 1984 (date unavailable)	35	[23]
Aug 1985 (date unavailable)	1	[23]
23-29 Mar 1986	66	[23, 24]
Sep 1988 (date unavailable)	1	[25]
Oct 1988 (date unavailable)	65	[25]
Nov 1988 (date unavailable)	0	[25]
Dec 1988 (date unavailable)	0	[25]
Jan 1989 (date unavailable)	0	[25]
Feb 1989 (date unavailable)	0	[25]
Mar 1989 (date unavailable)	0	[25]
Apr 1989 (date unavailable)	21	[25]
May 1989 (date unavailable)	0	[25]
19-23 Mar 2001	0	[26]
31 Jul 2021	0	[27]
9-10 Nov 2001	0	[28]
26 Feb 2002	0	[29]
9 Oct 2002	0	[30]
31 Jul 2003	0	[18]
21 Oct 2003	0	[19]
29 Jun 2004	0	[31]
1 Nov 2008	c. 250	MI <i>pers.obs</i>
Nov 2009 (date unavailable)	0	[32]
Dec 2011 (date unavailable)	0	[32]
Dec 2012	0	[32]
Nov 2014 (date unavailable)	300	[32]
Dec 2015 to Jan 2016 (date unavailable)	0	[32]
8 Sep 2017	0	DM, MI <i>pers.obs</i>
12 May 2018	0	DM, MI <i>pers.obs</i>
24 Nov 2018	0	DM, MI <i>pers.obs</i>
21 Dec 2019	22	DM, MI <i>pers.obs</i>
16 & 25 Oct 2020	156	[20]
6 & 12 Dec 2020	200	[20]
9-10 Apr 2021	3	DM, MI <i>pers.obs</i>

In Banyuasin Peninsula, the Great Knot was recorded for the first time in October and November 1984, where a total of 35 birds were recorded. The following records from 1985 to

1988 range from 1 to 66 birds, with a record of 21 birds in April 1989. The Great Knot was absent from field surveys from 2001 to 2004, but it could be overlooked in the field, due to the similarity of the Great Knot and other shorebirds. This species could be overlooked in the field, due to the similarity to other shorebirds (Figs. 2 and 3), particularly with Red Knot *Calidris canutus*, because of similarities in their feeding action, flocking behavior and habitat choice, and because both are found in Indonesia and Australia [21, 22].



Fig. 2. Great Knot (yellow arrow) with other shorebirds standing on a mudflat on 21 December 2019 in the coastal zone of Banyuasin Peninsula, South Sumatra province, Indonesia



Fig. 3. A number of Great Knot with other shorebirds on a mudflat, 1 November 2008 in the coastal zone of Banyuasin Peninsula, South Sumatra province, Indonesia

The significant records of over 100 Great Knots in a count are recorded in November 2008 (c. 250 birds), November 2014 (300 birds), October 2020 (156 birds) and December 2020 (200 birds). The population trend of Great Knot is shown to be increasing (Fig. 4), based on the comparison in the number of Great Knots between periods 1984 to 1989 (six reports, maximum count 66 birds and average 31 birds), with the number in 2008 to 2021 (six reports, maximum

count 300 birds, average 155 birds). Loss of staging areas of Great Knot in the Yellow Sea region is thought to be a key driver in the population declines of this species in last recent years [33, 34]. The degradation of intertidal habitats in the Yellow Sea could have had an impact on the increasing number of Great Knot in the Banyuasin Peninsula in recent years. However, it is also possible that the increasing number of Great Knot was a result of improved equipment for the field surveys, particularly the availability of long zoom cameras. The documentation of a number of new or vagrant shorebird species in Sumatra over the last two decades have only been possible with the support of good field pieces equipment [35, 36].

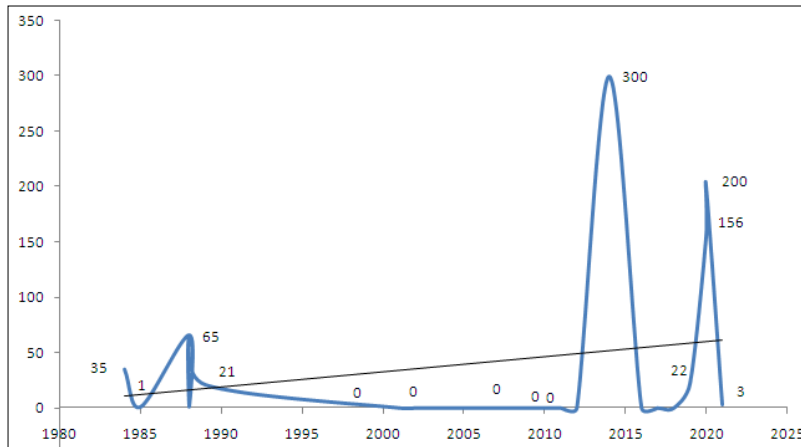


Fig. 4. Population trend of Great Knot in Banyuasin Peninsula from 1984 to 2021

Sumatra is an important area as staging habitat for migratory shorebirds during the non-breeding period, but no information has confirmed a site as a staging area for 1% of the EAAF population for Great Knot [10, 37]. The Great Knot is a winter visitor shorebird in Sumatra [38], and four fieldworks in North Sumatra suggest that the area supports important population, with counts of 380 birds in March 2002, 100 birds in January 2009, 436 birds in March 2011 and 1.255 birds in October 2014 to April 2015 [39-42]. A current survey from Aceh province of northernmost Sumatra Island observed 12 Great Knots [43].

Conservation

Because of the hunting pressure on migratory shorebirds, the East Asian Australasian Flyway is the most threatened flyway when compared to the other flyways in the world [44]. As a long-distance migratory shorebird [7]. The Great Knot is also threatened by hunting in its staging areas during the non-breeding period. Campaigning to stop shorebirds hunting in Asia countries is one of the conservation actions for Great Knot proposed by Birdlife International [11]. The hunting of Great Knot was never observed and reported in Banyuasin Peninsula. Banyuasin Peninsula has benefitted from its conservation status as part of the area of Berbak Sembilang National Park, so it is not surprising that shorebirds in this area are safe from hunting or other human disturbances [45, 46]. In addition, the Great Knot is protected by Indonesian law [47].

The East Asian Australasian Flyway 1% flyway population threshold for Great Knot is 2.900 birds, and the East Asian Australasian Flyway 0,25% staging threshold is 725 birds [37]. The number of Great Knot in the Banyuasin Peninsula is not reaching 1% EAAF population, nor the Flyway 0,25% staging threshold. Compare to other numbers of shorebird species in the Banyuasin Peninsula, the number of Great Knot is relatively low. In a single observation, other shorebird species can be observed up to 25.100 birds (Black-tailed Godwit *Limosa limosa*) and

7.061 birds (Eurasian Curlew *Numenius arquata*) [25]. However, the number of Great Knot in the Banyuasin Peninsula is regionally significant for the country. Further monitoring of the population of the Great Knot in Banyuasin Peninsula is needed in the future.

Conclusions

The maximum count of Great Knots in the Banyuasin Peninsula was 300 birds in November 2014. After this record, the maximum count has been c. 250 birds in non-breeding period in November 2008.

Based on comparisons in numbers of Great Knots during the period between 1984 to 1989 with numbers in 2008 to 2021, the population trend is increasing.

Although the maximum count of 300 Great Knots in the Banyuasin Peninsula is relatively small, this number is of regional significance in Indonesia.

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References

- [1] N. Hammond, B. Pearson, **Waders**, Hamlyn Limited, London, 1994, p. 174.
- [2] I. Newton, **The Migration Ecology of Birds**, Academic Press, London, 2008, p. 976.
- [3] S. Message, D. Taylor, **Shorebirds of North America, Europe and Asia**, Princeton University Press, Princeton, 2005, p. 224.
- [4] P.S. Tomkovich, *Breeding distribution, migrations and conservation status of the Great Knot Calidris tenuirostris in Russia*, **EMU**, **97**, 1997, pp. 265–282.
- [5] O. Campbell, P. Hellyer, *A review of the status of Great Knot in the United Arab Emirates, with comments on observations from a newly discovered wintering site*, **Tribulus**, **23**, 2015, pp. 107–110.
- [6] J. van Gils, P. Wiersma. **Scolopacidae (Snipes, Sandpipers and Phalaropes)** (Editors: J. del Hoyo, A. Elliot, J. Sargatal) **Handbook of the Birds of the World. Vol. 3. Hoatzin to Auk**, Lynx Editions, Barcelona, 1996, pp 489–533.
- [7] S. Lisovski, K. Gosbell, C. Hassell, C. Minton, *Tracking the full annual-cycle of the Great Knot Calidris tenuirostris, a long-distance migratory shorebird of the East Asian-Australasian Flyway*, **Wader Study**, **123**(3), 2016, pp. 177–189.
- [8] B. Brown, *A Great Knot in Manukau harbor*, **Notornis**, **27**, 1980, pp. 91.
- [9] P. Hayman, J. Marchant, T. Prater, **Shorebirds: An Identification Guide to the Waders of the World**, Houghton Mifflin Company, Boston, 1986, p. 412.
- [10] M. Bamford, D. Watkins, W. Bancroft, G. Tischler, J. Wahl. 2008, **Migratory Shorebirds of the East Asian - Australasian Flyway; Population Estimates and Internationally Important Sites**, Wetlands International-Oceania, Canberra, 2008, p. 240.
- [11] * * *, **Species Factsheet: Great Knot**, BirdLife International, 2021. <http://www.birdlife.org> on 25/08/2021.
- [12] D. Holmes, W.M. Rombang, **Daerah Penting Bagi Burung di Sumatera**. /BirdLifeInternational Indonesia Programme, Bogor, 2001, p. 103. [in Indonesian]

- [13] P. Wibowo, N. Suyatno, **An overview of Indonesian wetland sites – included in wetland database**, Wetlands International–Indonesia Programme/PHPA, Bogor, 1997, p. 85.
- [14] BirdLife International, 2021, **Important Bird Areas factsheet: Sembilang**, Downloaded from <http://www.birdlife.org> on 25/08/2021.
- [15] F. Danielsen, W. Verheught, **Integrating Land-use Planning in the Coastal Region of South Sumatra, Indonesia**, PHPA/AWB, Bogor, 1990. p 207.
- [16] M. Iqbal, C.D. Handono, D. Mulyana, A. Setiawan, Z. Hanafiah, H. Martini, Sarno., I. Yustian, H. Zulkifli, *Is the global decline reflects local declines? A case of the population trend of Far Eastern Curlew Numenius madagascariensis in Banyuasin Peninsula, South Sumatra, Indonesia*, **EcologicaMontenegrina**, **44**, 2021, pp. 11-18. DOI: <https://doi.org/10.37828/em.2021.44.2>.
- [17] M. Iqbal, D. Mulyana, F. Hasudungan, H. Martini, Y.R. Noor, A. Setiawan, A.Y. Mulyani, I. Yustian, H. Zulkifli, *Population size and trend of Asian Dowitcher Limnodromus semipalmatus in Banyuasin Peninsula, Sumatra, Indonesia*, **International Journal of Conservation Science**, **12**(2), 2021, pp. 577–584.
- [18] M. Iqbal, **Pemantauan Kawasan Sembilang No. 7, Juli/Agustus 2003. Laporan Teknis No. 74**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2003, p. 29.
- [19] M. Iqbal, **Pemantauan Kawasan Sembilang No. 8, Oktober 2003. Laporan Teknis No. 76**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2003, p. 31.
- [20] M. Iqbal, D. Mulyana, A. Setiawan, H. Martini, Sarno., Z. Hanafiah, I. Yustian, H. Zulkifli, *Shorebirds in aquaculture ponds in Banyuasin Peninsula, South Sumatra, Indonesia*, **Wader Study, in prep (paper received for publication)**.
- [21] J.P. Marchant, *Identification, habits and status of Great Knot*, **British Birds**, **79**, 1986, p. 123-135.
- [22] R. Chandler. **Shorebirds of the Northern Hemisphere**, Christopher Helm, London, 2009, p. 448.
- [23] M. Silvius. *On the importance of Sumatra's East coast for waterbirds, with notes on the Asian Dowitcher Limnodromus semipalmatus*, **Kukila**, **3**(3-4), 1988, pp. 117-137.
- [24] M. Silvius. *Northward wader migration along the East coast of Sumatra: joint PHPA/Interwader Study*. **Stilt**, **10**, 1987, pp. 31-35.
- [25] W.J.M. Verheugt, F. Danielsen, H. Skov, A. Purwoko, R. Kadarisman, U. Suwarman. *Seasonal variations in the wader populations of the Banyuasin Delta, South Sumatra, Indonesia*, **Wader Study Group Bulletin**, **58**, 1990, pp. 28-53.
- [26] * * *, **Survei Pengkajian Cepat CTN Sembilang, Sumatera Selatan**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, Wetland International Indonesia Programme, 2001. [in Indonesian]
- [27] C. Goenner, F. Hasudungan. **Sembilang Monitoring Report No. 1. July/August 2001. Technical Report Project Document No. 18**, Greater Berbak Sembilang Project, Palembang, 2001.
- [28] F. Hasudungan, D. Sutaryo, **Pemantauan Kawasan Sembilang No. 4, Juni 2002. Laporan Teknis No. 50**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2002, p. 22. [in Indonesian]
- [29] F. Hasudungan, S.A. Wardoyo, **Pemantauan Kawasan Sembilang No. 3, Februari/Maret 2002. Laporan Teknis No. 38**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2002, p. 23. [in Indonesian]
- [30] F. Hasudungan, S.A. Wardoyo, **Pemantauan Kawasan Sembilang No. 5, Oktober 2002. Laporan Teknis No. 62**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2002, p. 25. [in Indonesian]

- [31] M. Iqbal. **Pemantauan Kawasan Sembilang No. 9, Februari 2004. Laporan Teknis No. 82**, Proyek Konservasi Terpadu Lahan Basah Pesisir Berbak Sembilang, Palembang, 2004. [in Indonesian]
- [32] * * *, **Data Pengamatan Kelompok Burung Air Jenis Migrant dan Residen Pada Setiap Spot Pengamatan Kawasan TN Sembilang 2008–2014**, Balai Taman Nasional Sembilang, Palembang, 2021. [in Indonesian, Unpublished]
- [33] N.J. Murray, R.S. Clemens, S.R. Phinn, H.P. Possingham, R.A. Fuller, R.A. *Tracking the rapid loss of tidal wetlands in the Yellow Sea*, **Frontiers in Ecology and the Environment**, **12**, 2014, pp. 267-272. <https://doi.org/10.1890/130260>.
- [34] C.E. Studds, B.E. Kendall, N.J. Murray, H.B. Wilson, D.I. Rogers, R.S. Clemens, K. Gosbell, C.J. Hassell, C.J., Jessop, R., Melville, D.S., Milton, D.A., Minton, C.D.T., Possingham, H.P., Riegen, A.C., Straw, P., E.J. Woehler, R.A. Fuller, R.A. *Rapid population decline in migratory shorebirds relying on Yellow Sea tidal mudflats as stopover sites*, **Nature Communications**, **8**, 2017, Article number: 14895.DOI: 10.1038/ncomms14895.
- [35] T. Imansyah, M. Iqbal. *Pied Avocet Recurvirostra avosetta in Sumatra: a new species for Indonesia*, **Wader Study**, **122**(2), 2015, pp 161-162.
- [36] M. Iqbal, A. Kuswanto, Jarulis., A. Setiawan, I. Yustian, H. Zulkifli, H. *First record of Beach Thick-knee and Grey-tailed Tattler on Enggano Island, Indonesia*, **Wader Study**, **127**(2), 160-161.
- [37] J.R. Conklin, Y.I. Verkuil, B.R. Smith, **Prioritizing migratory shorebirds for conservation action on the East Asian-Australasian Flyway**, WWF-Hong Kong, Hong Kong, 2014, p. 128.
- [38] M. Iqbal, H. Abdillah, A. Nurza, T. Wahyudi, Giyanto, M. Iqbal, *A review of new and noteworthy shorebird records in Sumatra, Indonesia, during 2001–2011*, **Wader Study Group Bulletin**, **120**, 2013, pp. 85–95.
- [39] A.C. Crossland, S.A. Sinambela, A.S. Sitorus, A.W. Sitorus, *The coastal zone of Asahan regency: An area of international importance for migratory waders in North Sumatra province, Indonesia*, **Stilt**, **55**, 2009, pp. 8-12.
- [40] M. Iqbal, Giyanto, H. Abdillah, 2010, *Wintering shorebirds migrate during January 2009 along the east coast of North Sumatra Province, Indonesia*, **Stilt**, **58**, 2010, pp. 18-23.
- [41] C.A. Putra, D. Hikmatullah, D.M. Prawiradilaga, J.B.C. Harris, *Surveys at Bagan Percut, Sumatra, reveal its international importance to migratory shorebirds and breeding herons*, **Kukila**, **18**, 2015, pp. 46-59.
- [42] C.A. Putra, D. Perwitasari-Farajallah, Y.A. Mulyani, *Habitat use of migratory shorebirds on the coastline of Deli Serdang Regency, North Sumatra Province*, **Hayati**, **24**(1), 2017, pp. 16-21.
- [43] C.A. Putra, D. Hikmatullah, D.L. Yong, Y. Muzika, Z. Arico, Feryadi., I. Haka, S.U. Chowdhury, *Identifying priority shorebird sites for conservation on the east coast of Aceh province, Indonesia*, **Forktail**, **36**, 2020, 106-113.
- [44] E. Gallo-Cajiao, T.H. Morrison, B.K. Woodworth, A.C. Lees, L.C. Naves, D.L. Yong, C. Choi, T. Mundkur, J. Bird, A. Jain, K. Klovov, E. Syroechkovskiyk, S.U. Chowdhury, V.W.K. Fu, J.E.M. Watson, R.A. Fuller. *Extent and potential impact of hunting on migratory shorebirds in the Asia-Pacific*, **Biological Conservation**, **246**, 2020, Article Number: 108582. DOI: 10.1016/j.biocon.2020.108582.
- [47] * * *, **Perubahan Kedua atas Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.106/MENLHK/SETJEN/KUM.1/12/2018 Tentang Jenis Tumbuhan Dan Satwa Yang Dilindungi**, Ministry of Environment and Forestry, Jakarta, 2018, p. 31. [in Indonesian]

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