

## Analysis of Condition Metric in Two *Macrobrachium* Species across Three Lagoon Ecosystems in Southwest Nigeria

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### ABSTRACT

*Macrobrachium* species are decapod crustaceans belonging to the infra-order Caridea. These prawn species are found mainly in the Southern part of Nigeria and due to their socio-economic and aquaculture potentials, they have gained a lot of attention, majorly of the biologists. The condition metric (comparison of the weight and length) of brackish water prawn - *Macrobrachium macrobrachion* and African river prawn - *Macrobrachium vollenhovenii* were assessed monthly over a period of 24 months (August, 2021 - July, 2023) from Badagry, Epe and Lagos Lagoons. The result showed that a total of 5634 species of the prawns collected from the three lagoons, comprised of 3978 *M. macrobrachion* (1847 males, 2131 females) and 1656 *M. vollenhovenii* (1166 males, 490 females). The condition metric (K-value) of the prawn species from the three lagoons ranged between 0.3 and 3.1, with the male species having the highest value. The lowest and highest K-value for *M. macrobrachion* and *M. vollenhovenii* were 0.9, 1.7 and 0.3, 3.1 respectively. The K-factor of *M. vollenhovenii* was higher than that recorded for *M. macrobrachion* from the study. The results revealed that the condition metric (K) of both prawn species were equal to and greater than 1, indicating that the individuals were in good health across the studied habitats. These findings provide valuable insights for biologists and resource managers, contributing to the sustainable management and conservation of *Macrobrachium* species within the three lagoon ecosystems.

**Keywords:** Lagoon, Length, *Macrobrachium macrobrachion*, *Macrobrachium vollenhovenii*, Weight, Well-being.

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### INTRODUCTION

The genus *Macrobrachium* is taxonomically classified under Kingdom Animalia, Phylum Arthropoda, Subphylum Mandibulata, Class Crustacea, and Infraorder Caridea. These prawns are known to inhabit both freshwater and brackish environments (Davassi, 2011; Akinwunmi & Lawal-Are, 2019; Akinwunmi, 2020). While some species complete their life cycle entirely in freshwater, many require brackish conditions during their early developmental stages (Banerjee, 2003). Among all shellfish resources in Nigeria, prawns and shrimps are particularly valued due to their significant export potential (Awosika et al., 2002).

Although multiple *Macrobrachium* species are distributed across the West African sub-region, only four have been commonly recorded in Nigeria: *M. vollenhovenii* (Herklots, 1857), *M. macrobrachion*

(Herklots, 1851), *M. felicinum* (Holthius, 1949), and *M. dux* (Lenz, 1910) (Bello-Oluso et al., 2004; Akintola & Bakare, 2011). Of these, *M. vollenhovenii* and *M. macrobrachion* are the largest and most economically important (Ajuzie & Fagade, 1992). Their distribution and commercial value are supported by desirable traits such as rapid growth, disease resistance, high market demand, and palatability (Jimoh et al., 2005).

These two species are morphologically similar and often caught using the same fishing gear, although subtle differences exist. For instance, *M. vollenhovenii* typically has stout chelipeds with one noticeably larger, whereas *M. macrobrachion* has more slender appendages (Marioghae & Ayinla, 1995; Akinwunmi, 2020). Their hardiness allows them to survive temporarily outside of water, and while they share several ecological traits, they show slight variations in habitat preference. Both species are commercially

significant in tropical and warm temperate waters, where they support artisanal and commercial fisheries (Ajani et al., 2013). Maximum reported total lengths for *M. vollenhovenii* range from 182 to 226 mm, while *M. macrobrachion* reaches 120 to 128 mm (Jimoh et al., 2005; Akinwunmi & Lawal-Are, 2018).

In fish biology, condition metrics are used to assess the overall health and well-being of a fish by assessing its physical state, particularly its relative plumpness or robustness. These metrics work by comparing a fish's weight and length, or other factors, to determine if it is in a healthy condition compared to other fish of the same species and length. Hence, understanding condition metrics and length-weight relationships is vital for effective fisheries management, stock assessment, and conservation of prawn populations (Froese, 1998; Oscoz et al., 2005).

The K factor can also inform on the feeding intensity, reproductive behavior, and environmental influences (Abowei, 2010). These metrics reflect the health and growth dynamics of aquatic organisms, with condition factor (K) serving as a key metric - values equal to or greater than 1 typically indicate good health (Abobi, 2015). The work of Abohweyere (2008) reported a condition factor (k) of 1.46 for both males and females of *M. vollenhovenii* from the Lagos-Lekki lagoon system while Kingdom et al. (2014) studied the condition indices of *Macrobrachium* species in the Niger Delta with the mean values of  $1.23 \pm 0.02$ ,  $1.26 \pm 0.01$  and  $1.06 \pm 0.06$  for *M. felicinum*, *M. macrobrachion* and *M. vollenhovenii* respectively. Ukagwu et al. (2021) recorded an average condition factor of 4.18 for both *M. vollenhovenii* and *M. felicinum* collected from Akor River in Abia state.

Despite the work done so far on this species, there is still paucity of information on the condition metric of *M. macrobrachion* and *M. vollenhovenii* from Badagry, Epe, and Lagos Lagoons. Against this backdrop, the present study aims to assess the condition metric of *M. macrobrachion* and *M. vollenhovenii* across Badagry, Epe, and Lagos Lagoons, contributing to the knowledge base necessary for sustainable prawn resource management.

## MATERIALS AND METHODS

### Description of the Study Locations

The Badagry, Epe, and Lagos Lagoons (Figure 1) are part of an extensive system of interconnected coastal water bodies in southwestern Nigeria. The Badagry Lagoon originates from the River Queme in the Republic of Benin and flows eastward into the Atlantic Ocean via the Lagos Harbour. It is

geographically situated between longitudes  $3^{\circ}54''$  and  $4^{\circ}13''$ E and latitudes  $6^{\circ}25''$  and  $6^{\circ}35''$ N (Lawal-Are & Kusemiju, 2000; Ndimele & Jimoh, 2011). Characterized by dense vegetation and seasonal salinity shifts, partly due to saltwater intrusion from the Cotonou Lagoon and its temperature ranged 26 to  $30^{\circ}\text{C}$  (Solarin, 1998; Akinwunmi & Lawal-Are, 2019).

Epe Lagoon, located between latitudes  $6^{\circ}29''$ N and  $6^{\circ}38''$ N and longitudes  $3^{\circ}30''$ E and  $4^{\circ}05''$ E, is primarily fed by the River Oshun (Agboola & Anetekhai, 2008). It spans approximately 225 km<sup>2</sup> with a maximum depth of 6 meters and drains into the Gulf of Guinea through the Lagos Harbour (Kumolu-Johnson et al., 2010).

Lagos Lagoon, the largest of the three, lies between longitudes  $3^{\circ}23''$  and  $3^{\circ}53''$ E and latitudes  $6^{\circ}26''$  and  $6^{\circ}37''$ N (Ndimele, 2003). Replenished mainly by the Ogun River, it exhibits marked seasonal salinity variations - brackish in the dry season and fresh during the rains (Ugwumba & Kusemiju, 1992; Solarin, 1998; Lawson, 2001; Lawal-Are, 2006). As a major recipient of effluents from over 2,000 industries, it plays a significant ecological and economic role in the Lagos coastal region (Anetekhai et al., 2007).

### Collection of the Prawn Species

Samples of *M. macrobrachion* and *M. vollenhovenii* were collected monthly from the jetties of Badagry, Epe and Lagos Lagoons between August, 2021 and July, 2023 (24 months) in traps set within the lagoons. The prawns were randomly sampled in relation to size. They were preserved immediately in an ice-chest and thereafter transported into a freezer ( $-20^{\circ}\text{C}$ ) in the laboratory of the Department of Marine Sciences prior to further biological analysis.

### Laboratory Studies

The prawns were removed from the freezer and allowed to thaw for several hours, after which excess water was absorbed using a pile of filter papers. The total length of each prawn was measured from the rostrum tip to the end of the telson using a graduated ruler to the nearest 0.1 cm, while the total body weight was measured using an electronic weighing balance (Model: DT 1051A) to the nearest 0.01 gram (Akinwunmi, 2020). The size composition, including length and weight ranges of *M. macrobrachion* and *M. vollenhovenii* collected from the three lagoons, was grouped and recorded accordingly (Akinwunmi & Lawal-Are, 2018). The condition metric (K), indicating the general wellness of the prawns, was calculated using the formula in Eq. 1 as described by Gayanilo et al. (1989) and Enin (1995).

$$K = 100W/L^3 \dots \dots \dots (Eq. 1)$$

Where:

K = condition metric/well-being of the prawn

W = prawns' weight in grams

L = total length of the prawn in cm

The condition metric (K) was determined for the species on a monthly basis using the size groups.

### Statistical Analysis

The data on the length and weight collected from the study were analyzed using descriptive statistics. All analysis was performed with Microsoft Excel for windows (2008).

### RESULTS

A total of 5634 species of *M. macrobrachion* and *M. vollehovenii* were collected from Badagry, Epe and Lagos Lagoons which consisted of 3978 *M. macrobrachion* and 1656 *M. vollehovenii*. A total of 2035 species were collected from Badagry Lagoon (1912 and 123 of *M. macrobrachion* and *M. vollehovenii* respectively), 2567 from Epe Lagoon (1140 and 1427 of *M. macrobrachion* and *M. vollehovenii* respectively) and 1032 from Lagos Lagoon (926 and 106 of *M. macrobrachion* and *M. vollehovenii* respectively) as shown in Table 1.

The total length of *M. macrobrachion* and *M. vollehovenii* from Badagry Lagoon ranged from 5.0 - 12.0 and 5.6 - 16.1 cm while the total weight ranged between 1.3 - 22.8 and 3.1 - 73.7 g respectively. In Epe lagoon, the size of *M. macrobrachion* and *M. vollehovenii* ranged between 5.3 - 13.2 and 4.5 - 22.8 cm (total length) and between 1.6 - 40.3 and 1.5 - 76.6 g (total weight) respectively while in Lagos Lagoon, the total length of *M. macrobrachion* and *M. vollehovenii* ranged between 5.1 - 12.1 and 4.7 - 16.8 cm with the total weight ranging between 1.3 - 22.2 and 1.3 - 140.8 g respectively as shown in Table 2.

The differences in the condition metric by size and sex of both species from the three lagoons are shown in Tables 3-8. The K values for *M. macrobrachion* and *M. vollehovenii* from Badagry lagoon, ranged from 1.2 - 1.4, 1.6 - 2.7 (male), 1.1 - 1.2, 1.5 - 2.0 (female) and 0.3 - 1.4, 0.4 - 2.7 (combined sexes) respectively. In Epe Lagoon, the K values for *M. macrobrachion* and *M. vollehovenii* ranged from 1.2 - 1.9, 0.8 - 2.1 (male), 1.1 - 1.5, 0.3 - 2.0 (female) and 0.3 - 1.9, 0.1 - 2.1 (combined sexes) respectively while in Lagos Lagoon, the K values for *M. macrobrachion* and *M. vollehovenii* ranged from 0.9 - 1.4, 1.2 - 3.1 (male),

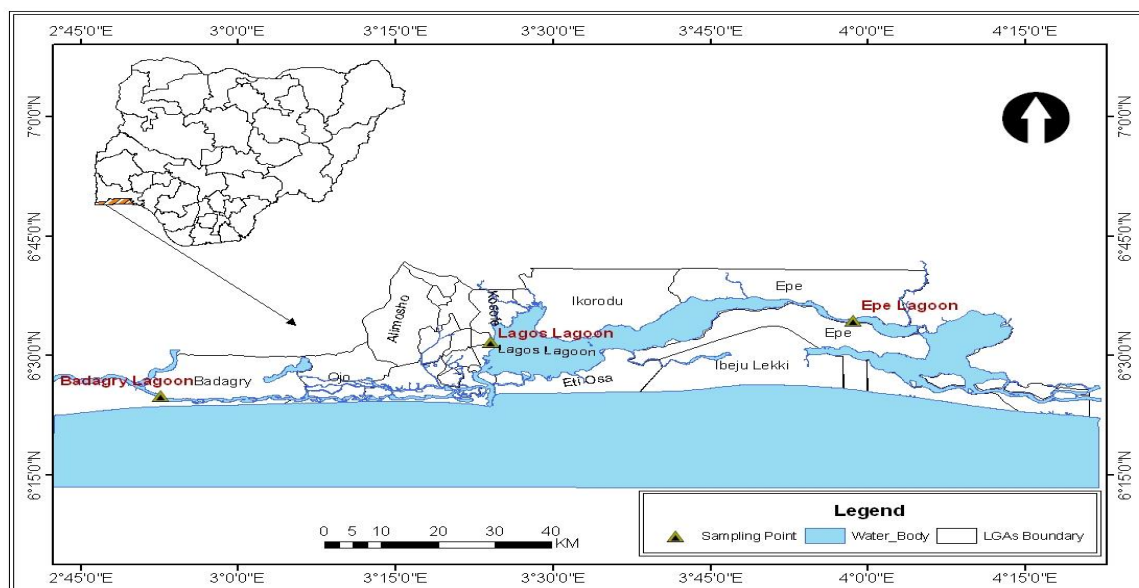
1.1 - 1.7, 1.3 - 2.0 (female) and 0.3 - 1.4, 0.4 - 3.1 (combined sexes) respectively.

The lowest and highest mean K-value for *M. macrobrachion* from the three lagoons was 0.9 and 1.9 respectively and these values were observed in the male species from Lagos and Epe lagoons respectively. The lowest mean K-value for *M. vollehovenii* from the three lagoons is 0.3 which was observed in the female species from Epe lagoon while the highest K-value of 3.1 was observed for the male species from Lagos lagoon.

### DISCUSSION

The overall mean values of the condition metric for both females and males of the two *Macrobrachium* species are 1 and more, as supported by the work reported by Rossiter & Ansyari (2021). This implies the overall well-being, good feeding intensity and reproductive behaviour of the species. Szalkiewicz et al. (2022) posited that an aquatic organism could be said to be in a good condition when the K-value is equal to 1 or more. The result from this study showed that males of *M. macrobrachion* and *M. vollehovenii* had higher K values than the females. This could be due to the fact that males of these two species are known to be larger in size than the females (Akinwunmi & Lawal-Are, 2018). This finding agrees with the report of Lawal-Are & Kusemiju (2000) on crabs. However, this is contrary to the findings of Konan et al., (2017) on *M. macrobrachion* collected from Côte d'Ivoire (West Africa). Their report showed that the female prawns had higher condition factor than the males. This variation, compared to what was observed in this current study might be attributed to difference in the habitat, season and location of study. Besides, Khallaf et al. (2003) observed that the condition factor of a fish can be influenced by sex and season of the year.

The overall condition metric of both species was considered owing to the fact that these two species were collected from the same lagoons all through the period of study. The values of the overall condition metric ranged between 0.3 and 3.1. These ranges differ from the K values of 0.5914 - 0.6909 that was reported by Udoinyang et al. (2016), 0.49 - 0.82 was reported by Komi & Francis (2017) and 1.26-1.32 was reported by Khanipour et al. (2020) on shrimp species collected from Iko river estuary, Andoni River System in Niger Delta and Anzali lagoon of Iran respectively. These differences might be as a result of variation in the study sites, season and time of collection. However, Ajibare et al. (2020) gave a report that the condition factor of *M. vollehovenii* from Asejire Reservoir, Nigeria ranged 2.79-3.33, which is in line with values reported in this work.



**Figure 1:** Map of the lagoons, indicating the sampling sites (Akinwunmi & Moruf, 2021)

**Table 1:** Composition of *Macrobrachium macrobrachion* and *Macrobrachium vollenhovenii* from Badagry, Epe and Lagos Lagoons (August 2021 – July 2023)

Species	Badagry	Epe	Lagos	Total
<i>M. macrobrachion</i>	1912	1140	926	3978
<i>M. vollenhovenii</i>	123	1427	106	1656
Total	2035	2567	1032	5634

**Table 2:** Size variations of *Macrobrachium macrobrachion* and *Macrobrachium vollenhovenii* from Badagry, Epe and Lagos Lagoons (August 2021 – July 2023)

Study Sites	<i>M. macrobrachion</i>		<i>M. vollenhovenii</i>	
	TL	TW	TL	TW
Badagry Lagoon	5.0-12.0	1.3-22.8	5.6-16.1	3.1-73.7
Epe Lagoon	5.3-13.2	1.6-40.3	4.5-22.8	1.5-76.6
Lagos Lagoon	5.1-12.1	1.3-22.2	4.7-16.8	1.3-140.8

TL = Total length (cm), TW = Total weight (g)

**Table 3:** Variation in the Condition metric (K) by size and sex of *Macrobrachium macrobrachion* from Badagry Lagoon (August, 2021 – July, 2023)

Size Group	Female				Male				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
4.5-5.4	34	5.2	1.6	1.1	-	-	-	-	34	5.2	1.6	1.1
5.5-6.4	168	6.0	2.6	1.2	12	6.0	2.9	1.3	180	12.0	5.5	0.3
6.5-7.4	426	7.0	4.0	1.2	103	7.0	4.3	1.2	529	14.0	8.2	0.3
7.5-8.4	263	7.9	5.7	1.2	224	8.0	6.2	1.2	487	15.8	11.9	0.3
8.5-9.4	187	8.8	8.3	1.2	301	8.9	8.7	1.2	488	17.7	17.0	0.3
9.5-10.4	10	9.7	10.2	1.1	145	9.9	11.5	1.2	155	19.6	21.7	0.3
10.5-11.4	-	-	-	-	31	10.8	15.6	1.2	31	10.8	15.6	1.2
11.5-12.4	-	-	-	-	8	11.7	21.7	1.4	8	11.7	21.7	1.4
	1088			1.2	824			1.3	1912			0.7

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

**Table 4:** Variation in the Condition metric (K) by size and sex of *Macrobrachium macrobrachion* from Epe Lagoon (August, 2021 – July, 2023)

Size Group	Female				Male				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
4.5-5.4	6	5.2	1.6	1.1	-	-	-	-	6	5.2	1.6	1.1
5.5-6.4	6	6.1	3.1	1.4	18	6.1	2.8	1.2	24	12.2	5.8	0.3
6.5-7.4	50	7.1	4.3	1.2	69	7.1	4.3	1.2	119	14.2	8.6	0.3
7.5-8.4	192	7.9	6.1	1.2	152	8.1	6.4	1.2	344	16.0	12.5	0.3
8.5-9.4	161	8.8	8.4	1.2	115	9.0	9.1	1.2	276	17.8	17.5	0.3
9.5-10.4	20	9.6	10.0	1.1	184	9.9	12.1	1.3	204	19.5	22.1	0.3
10.5-11.4	1	10.8	19.1	1.5	86	10.9	17.0	1.3	87	21.7	36.1	0.4
11.5-12.4	-	-	-	-	78	11.7	21.2	1.3	78	11.7	21.2	1.3
12.5-13.4	-	-	-	-	2	12.8	40.1	1.9	2	12.8	40.1	1.9
	436			1.3	704			1.3	1140			0.7

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

**Table 5:** Variation in the Condition metric (K) by size and sex of *Macrobrachium macrobrachion* from Lagos Lagoon (August, 2021 – July, 2023)

Size Group	Female				Male				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
4.5-5.4	24	5.1	2.2	1.7	2	5.4	1.4	0.9	26	10.5	3.6	0.3
5.5-6.4	132	6.0	2.6	1.2	36	6.0	2.9	1.3	168	12.1	5.5	0.3
6.5-7.4	218	7.0	4.1	1.2	139	7.0	4.1	1.2	357	14.0	8.2	0.3
7.5-8.4	169	7.9	5.8	1.2	54	8.0	6.8	1.3	223	15.8	12.6	0.3
8.5-9.4	58	8.7	8.0	1.2	47	8.9	10.0	1.4	105	17.6	18.0	0.3
9.5-10.4	6	9.6	10.0	1.1	19	9.8	13.1	1.4	25	19.4	23.1	0.3
10.5-11.4	-	-	-	-	15	10.7	17.4	1.4	15	10.7	17.4	1.4
11.5-12.4	-	-	-	-	7	11.7	21.0	1.3	7	11.7	21.0	1.3
	607			1.3	319			1.3	926			0.6

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

**Table 6:** Variation in the Condition metric (K) by size and sex of *Macrobrachium vollenhovenii* from Badagry Lagoon (August, 2021 – July, 2023)

Size Group	Female				Male				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
4.5-5.4	-	-	-	-	2	5.4	3.0	1.9	2	5.4	3.0	1.9
5.5-6.4	-	-	-	-	8	6.1	3.8	1.7	8	6.1	3.8	1.7
6.5-7.4	6	7.1	5.5	1.5	11	7.0	5.6	1.7	17	14.0	11.1	0.4
7.5-8.4	3	8.3	9.1	1.6	29	7.8	8.5	1.8	32	16.1	17.6	0.4
8.5-9.4	7	8.5	12.6	2.0	20	8.9	11.9	1.7	27	17.5	24.5	0.5
9.5-10.4	6	10.1	18.7	1.8	7	10.0	17.2	1.7	13	20.0	35.8	0.4
10.5-11.4	3	10.6	20.7	1.7	6	10.8	23.2	1.8	9	21.4	43.9	0.4
11.5-12.4	-	-	-	-	6	11.9	29.4	1.7	6	11.9	29.4	1.7
12.5-13.4	-	-	-	-	1	13.1	35.8	1.6	1	13.1	35.8	1.6
13.5-14.4	1	14.1	51.5	1.8	4	14.0	44.4	1.6	5	28.1	95.9	0.4
14.5-15.4	-	-	-	-	1	13.1	60.9	2.7	1	13.1	60.9	2.7
15.5-16.4	-	-	-	-	2	15.7	62.4	1.6	2	15.7	62.4	1.6
	26			1.8	97			1.8	123			1.2

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

**Table 7:** Variation in the Condition metric (K) by size and sex of *Macrobrachium vollenhovenii* from Epe Lagoon (August, 2021 – July, 2023)

Size Group	Female				Male				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
3.5-4.4	-	-	-	-	2	4.3	1	1.3	2	4.3	1.0	1.3
4.5-5.4	6	5.2	2.2	1.6	7	5.3	2.2	1.5	13	10.4	4.4	0.4
5.5-6.4	8	6.0	3.7	1.7	54	6.0	3.6	1.6	62	12.1	7.3	0.4
6.5-7.4	41	6.9	5.5	1.7	189	7.1	6.0	1.7	230	14.0	11.5	0.4
7.5-8.4	154	7.9	8.0	1.6	251	8.0	8.6	1.7	405	15.9	16.5	0.4
8.5-9.4	72	9.0	11.9	1.6	184	8.9	11.8	1.7	256	17.9	23.6	0.4
9.5-10.4	68	10.0	17.0	1.7	207	9.9	16.1	1.7	275	19.9	33.1	0.4
10.5-11.4	25	10.9	22.3	1.7	75	11.0	21.7	1.6	100	21.8	44.0	0.4
11.5-12.4	18	11.9	28.2	1.7	30	11.9	31.5	1.9	48	23.8	59.7	0.4
12.5-13.4	8	12.6	39.5	2.0	9	12.8	33.4	1.6	17	25.4	72.8	0.4
13.5-14.4	-	-	-	-	10	14.0	46.0	1.7	10	14.0	46.0	1.7
14.5-15.4	-	-	-	-	3	15.0	70.6	2.1	3	15.0	70.6	2.1
15.5-16.4	-	-	-	-	-	-	-	-	0	-	-	-
16.5-17.4	-	-	-	-	-	-	-	-	0	-	-	-
17.5-18.4	-	-	-	-	-	-	-	-	0	-	-	-
18.5-19.4	-	-	-	-	-	-	-	-	0	-	-	-
19.5-20.4	-	-	-	-	-	-	-	-	0	-	-	-
20.5-21.4	-	-	-	-	-	-	-	-	0	-	-	-
21.5-22.4	-	-	-	-	3	21.6	81.2	0.8	3	21.6	81.2	0.8
22.5-23.4	2	22.5	31.5	0.3	1	21.1	92.4	1.0	3	43.6	123.9	0.1
	402			1.6	1025			1.6	1427			0.7

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

**Table 8:** Variation in the Condition metric (K) by size and sex of *Macrobrachium vollenhovenii* from Lagos Lagoon (August, 2021 – July, 2023)

Size Group	Female				Female				Combined Sex			
	N	TL	WT	K	N	TL	WT	K	N	TL	WT	K
4.5-5.4	-	-	-	-	1	4.5	1.1	1.2	1	4.5	1.1	1.2
5.5-6.4	-	-	-	-	5	6.0	3.5	1.6	5	6.0	3.5	1.6
6.5-7.4	3	7.0	5.3	1.5	6	6.9	5.1	1.5	9	13.9	10.3	0.4
7.5-8.4	8	8.1	9.0	1.7	10	7.9	7.4	1.5	18	16.1	16.4	0.4
8.5-9.4	9	8.9	12.6	1.8	1	8.6	11.6	1.8	10	17.5	24.2	0.5
9.5-10.4	8	10.0	19.0	1.9	5	10.2	21.1	2.0	13	20.2	40.0	0.5
10.5-11.4	7	10.8	22.4	1.8	6	11.1	30.5	2.2	13	22.0	52.9	0.5
11.5-12.4	13	11.8	31.5	1.9	4	11.9	35.3	2.1	17	23.7	66.8	0.5
12.5-13.4	9	13.0	42.9	2.0	2	13.0	52.4	2.4	11	25.9	95.3	0.5
13.5-14.4	4	13.6	47.7	1.9	3	14.0	71.9	2.6	7	27.6	119.6	0.6
14.5-15.4	1	15.2	46.8	1.3	-	-	-	-	1	15.2	46.8	1.3
15.5-16.4	-	-	-	-	-	-	-	-	0	-	-	-
16.5-17.4	-	-	-	-	1	16.6	140.0	3.1	1	16.6	140.0	3.1
	62			1.8	44			2.0	106			0.9

Key: N = Number, TL = Total Length in cm, WT = Total weight in g, K = Condition metric

The works reported by Suryanti et al. (2018) and Solanki et al. (2020) indicated that the condition factor of *Penaeus merguensis* and *Penaeus monodon* from Indonesia and India ranged from 0.570-1.773 and 0.455-1.646 respectively. While the report of Moslen & Miebaka (2018) gave a condition factor that ranged between 1.03 and 1.32 for *Penaeus* species from Bonny Estuary, Niger Delta. The variation in the values from these authors might be due to the

differences in the species and habitats from where the species were collected.

It was also observed that the K-values for the combined sexes of *M. vollenhovenii* were higher than that of *M. macrobrachion* for Badagry, Epe and Lagos Lagoons. This invariably means that *M. vollenhovenii* had a better condition metric, which might be due to its large size when compared to *M. macrobrachion* and also due to its high occurrence in fresh water environment (Akinwunmi & Lawal-Are, 2018).

The current study evaluated the condition metric of brackish water prawns and African river prawns from three (Badagry, Epe and Lagos) lagoons. The findings from this research suggested that the prawn species are in good condition in their various habitats. The condition metric of *M. vollenhovenii* was higher when compared to that of *M. macrobrachion*. It was also observed that the K metric of the males of *M. vollenhovenii* were higher than that of the females. Therefore, the findings from this research have provided valuable information on the well-being of these *Macrobrachium* species from the three lagoons for the sustainable management of the prawn resources.

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**Conflicts of Interest:** The authors declare that no conflicts of interest exist in respect to publishing these research findings.

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