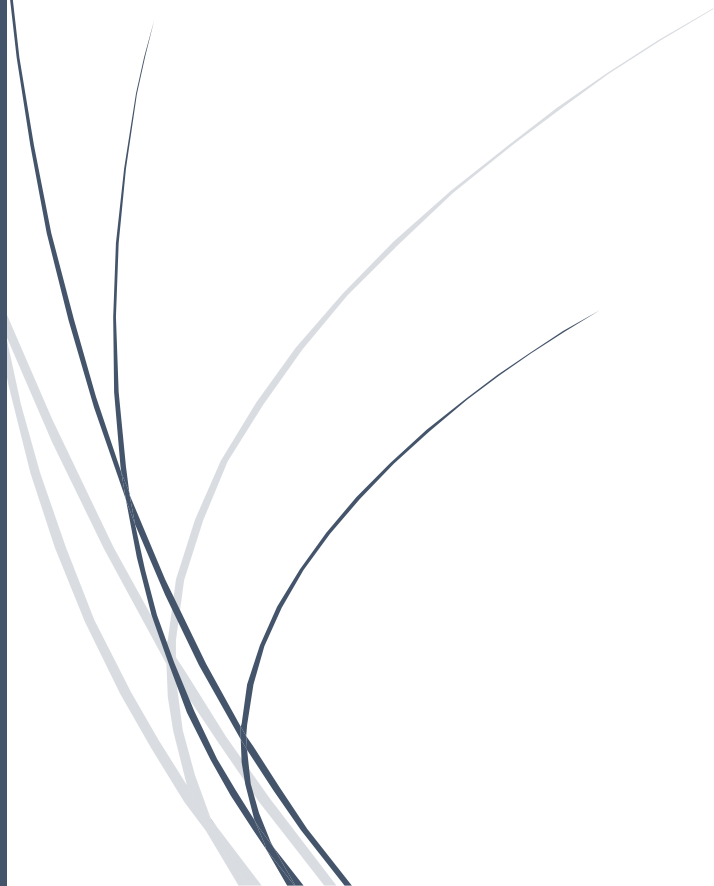


# **Ministry of Agriculture Fisheries Department**

**SEABOB ANNUAL REPORT 2019**



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# Introduction

## Harvest Control Rule Description (HCR) DESCRIPTION

The HCR chosen by the industry (225 Days per vessel) was consistent with attaining MSY and maintaining the stock above the limit reference point. For the HCR index, three reference points were proposed these were based around the observation that approximately 15000 standardized days-at-sea (approximately 20000 nominal days-at-sea) achieve an average SSB of 40% of the unexploited SSB, a proxy for BMSY. The average catch rate at this level of depletion was 630kg processed tail weight per fishing day (Medley 2014).

Consultations with the industry suggested the lowest acceptable of 315kg processed tail weight per fishing day was an acceptable limit reference point (i.e. 50% BMSY). That is, if catch rates fell to this level, a moratorium would be acceptable for economic reasons. Additionally, two trigger points were suggested. Firstly, the main trigger for stock rebuilding at 540kg per standardized day-at-sea, which is approximately 70% of the range between the limit and target reference points. Secondly, a reasonable catch rate based on economic considerations suggested by industry was approximately 600 kg per standardized boat day, a little below the target (Medley 2014).

Table below shows the HCR index reference points used in developing a precautionary HCR.

	<b>Index Value (kilograms processed tail weight per standardized day at sea)</b>
Target Reference Point (TRP)	600
Alternative TRP	630
Trigger Point	540
Limit Reference Point	315

## HCR CALCULATION

For the calculation of the harvest control rule index the standardized effort was calculated based on each trip length. The TAE (Days-at-sea) was calculated using the procedure recommended in the HCR rule report, 2014. Please see calculation below:

### **Important Note:**

**The current index for each year shall be calculated as the average between the previous year's index value and the catch rate of the previous year (i.e. a moving average). The catch rate will be based on reported catch and effort data for all vessels. The catch rate is calculated as the total landing of seabob processed (peeled tail) weight in kilograms divided by the total number of standardized days-at-sea.**

**The HCR Index in any given year t (It) is calculated as:**

$$I_t = 0.5 \left( I_{t-1} + \frac{C_{t-1}}{0.766 D_{t-1}} \right)$$

**Therefore the TAE (Das) quota for 2020 using the above formula would be as follows:**

**Current index Value calculation:**

$$I_t = 0.5(678+573)$$

$$I_t = 0.5(1,251)$$

$$I_t = 625.5$$

**The Das Quota for 2020 will be set at the maximum; 225 DaS per vessel, in accordance the procedure for setting TAE i.e. 'A Maximum 225 days at sea per licensed vessel when the indexed catch is at or above the target index'. (Source Seabob Annual Report 2018)**

# DATA PRESENTATION AND ANALYSIS

## INDUSTRIAL CPUE

### GUYANA INVESTMENT INC. CPUE

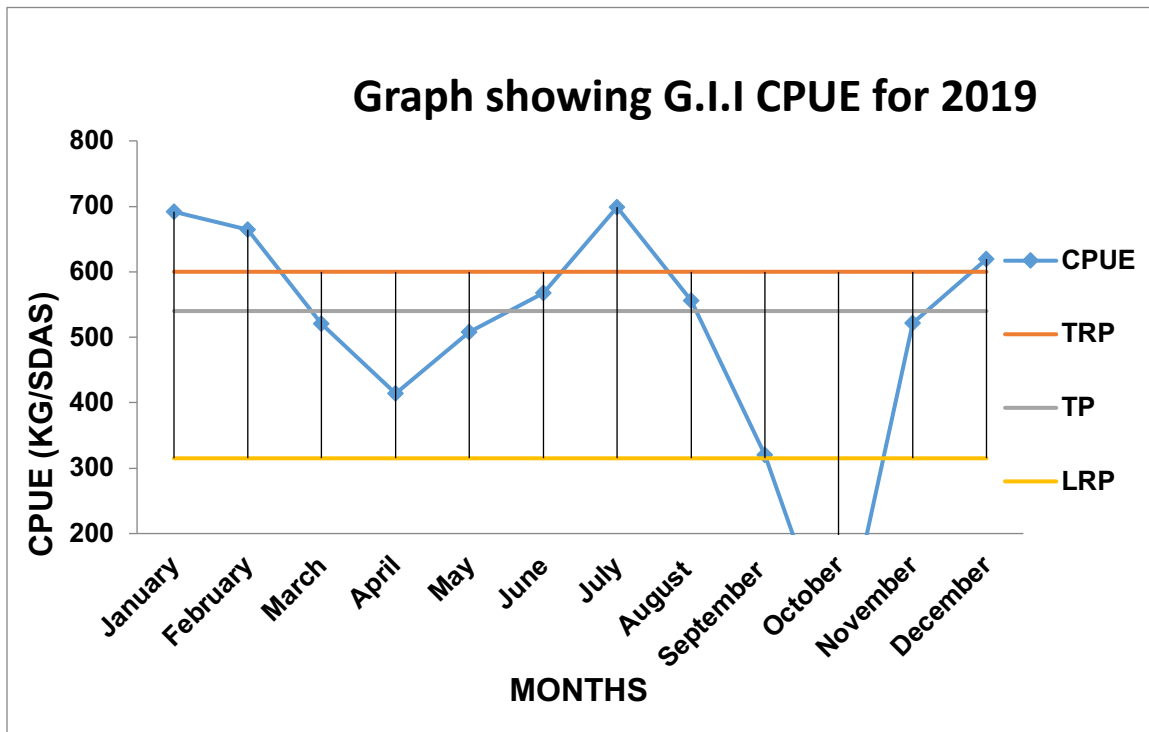


Figure 1 - Graph showing the Seabob Catch per Unit Effort (CPUE) for Guyana Investment Inc. in 2019

The annual performance of Guyana Investment Inc. during 2019 can be considered average, with the companies recording the second highest CPUE rate among the companies of **571 kg/sdas**. This average rate is a **14 %** ↓ reduction in annual CPUE when compared to that of 2018 which was approximately **668 kg/sdas**. The following months July and January recorded the highest CPUE of **699 kg/sdas** and **692 kg/sdas** respectively but were still **11 %** low when compared to the two highest recording for 2018. The lowest monthly CPUE was observe in the month of November (i.e. the closed season month note included) which was **521 kg/sdas**.

NOBLE HOUSE SEAFOODS LTD. CPUE

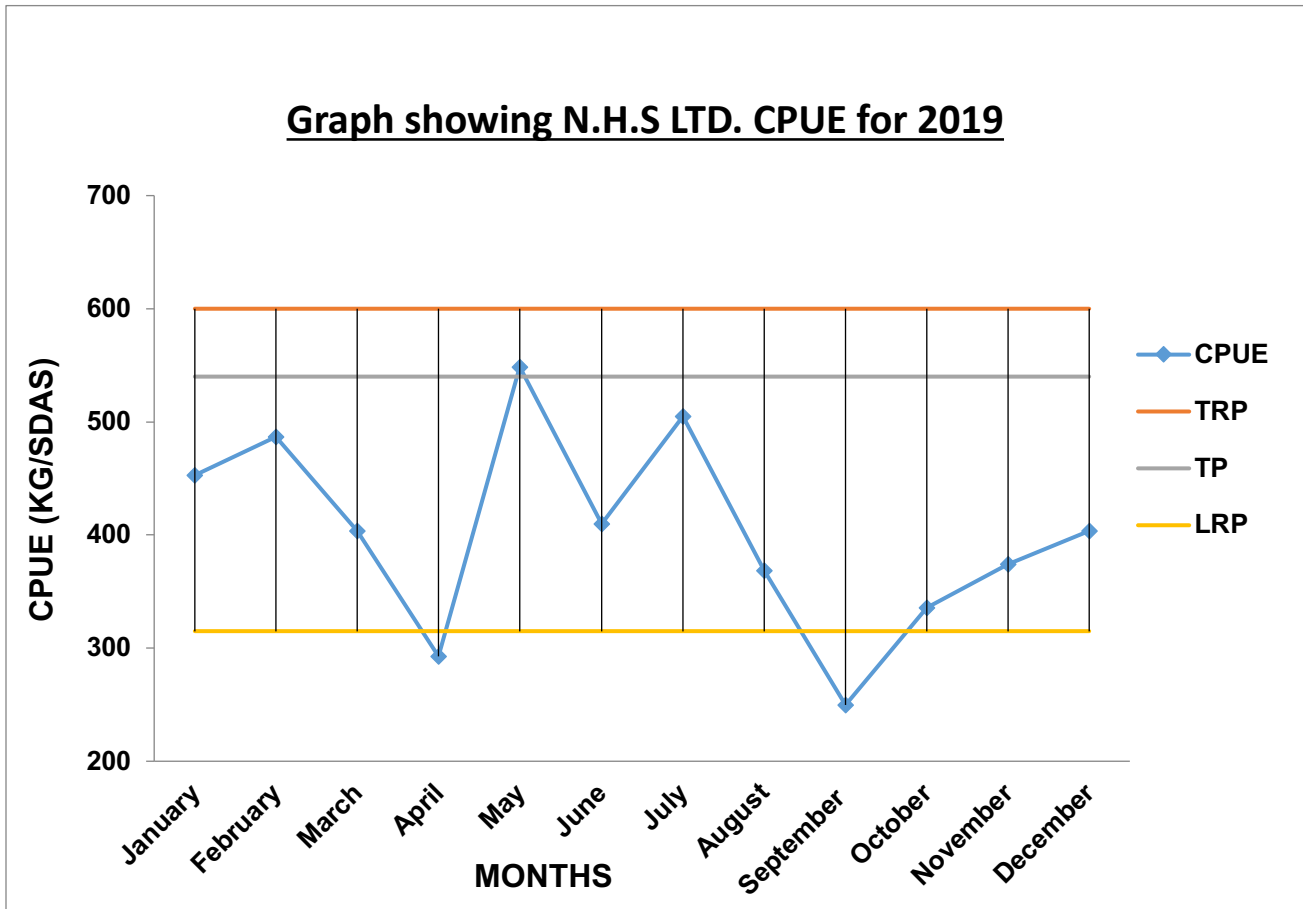


Figure 2- Graph showing the Seabob Catch per Unit Effort (CPUE) for Noble House in 2019

Noble House Seafoods Ltd. the recorded the lowest annual catch rate amongst the companies, which was 421 kg/adas. This was a **16%** ↓ reduction when compared to 2018 annual CPUE which was **502 kg/sdas**. The month of May recorded the highest CPUE of **549 kg/sdas** while the month of April had lowest at **293 kg/sdas**. April CPUE recording was the only month of 2019 which CPUE rate was above **540 kg/sdas**.

PRITIPAUL SINGH INVESTMENT INC. CPUE

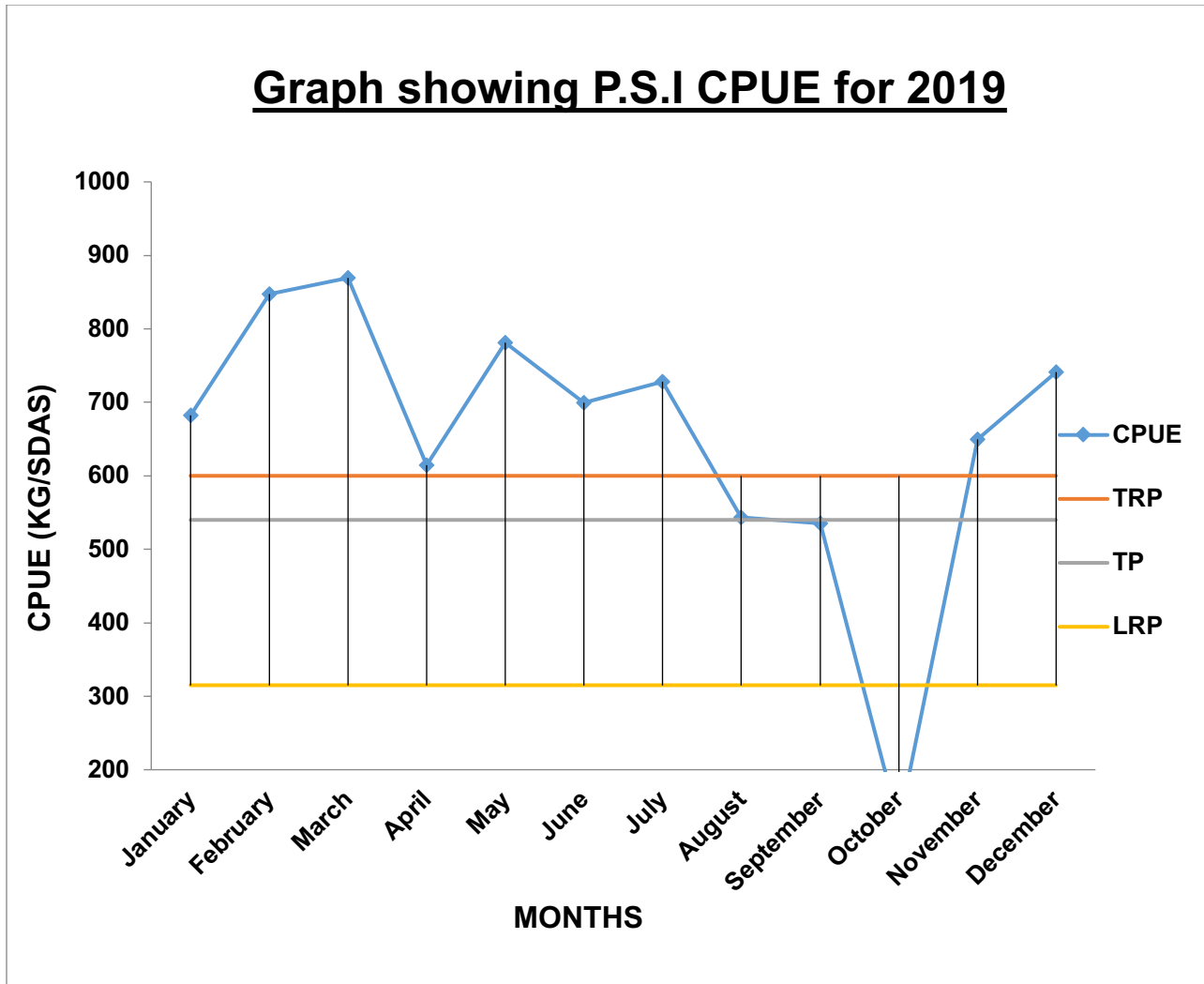


Figure 3- Graph showing the Seabob Catch per Unit Effort (CPUE) for Pritipaul Singh Investment Inc. in 2019

Pritipaul Singh Investment Inc. recorded the highest average CPUE amongst the Industrial companies for 2019 with an overall CPUE of **716 kg/sdas**. However this was still a **13%** ↓ decreases when compared to that of 2018 which was **824 kg/sdas**. The month of March recorded the highest CPUE of **869 kg/sdas** while the month of September had lowest at **535 kg/sdas**. All the CPUE recorded for P.S.I Inc. out of the close season were all above **540 kg/sdas** for 2019.

# INDUSTRIAL CPUE

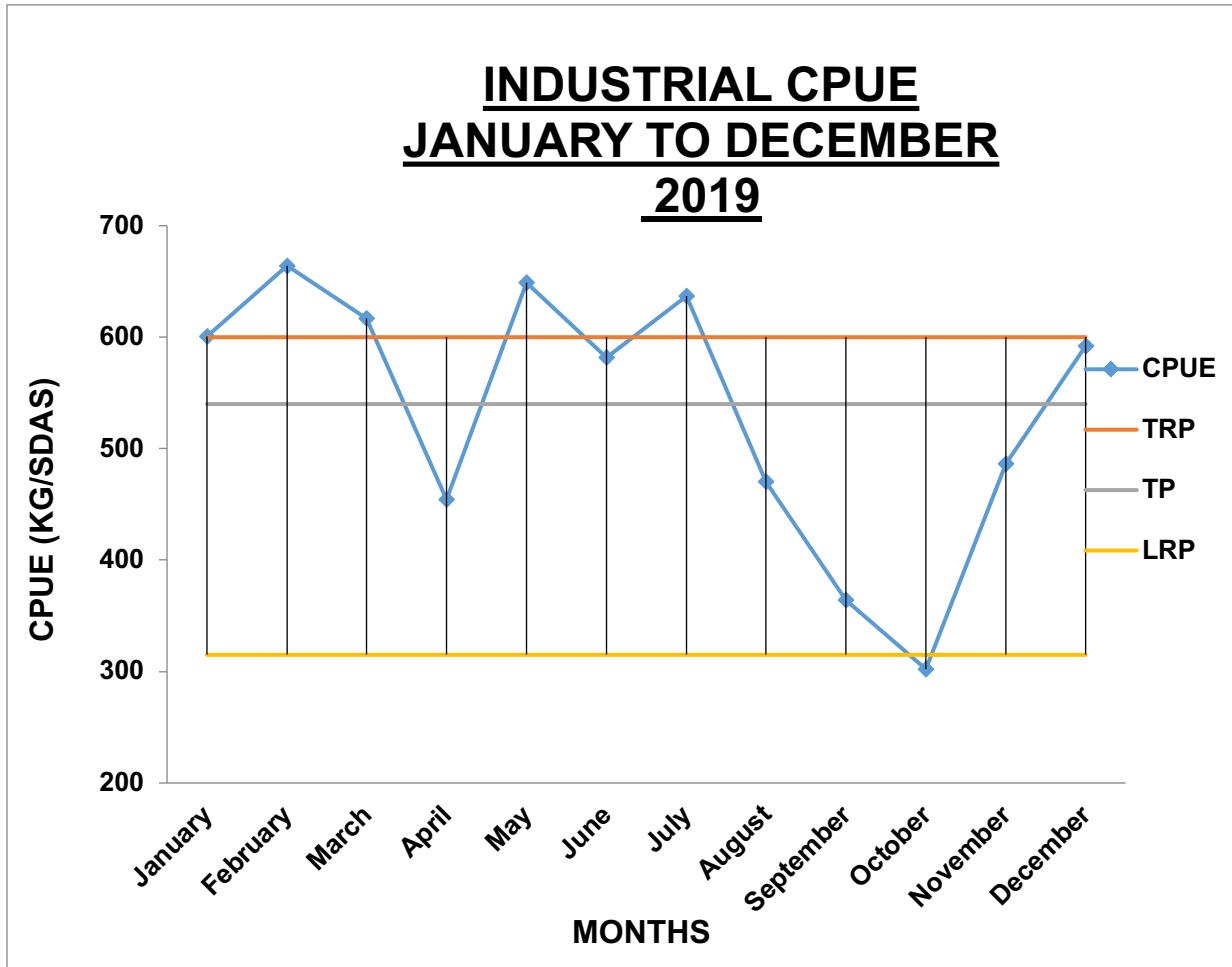


Figure 4 - Graph showing the Seabob Catch per Unit Effort (CPUE) for the Industry (all companies) in 2019.

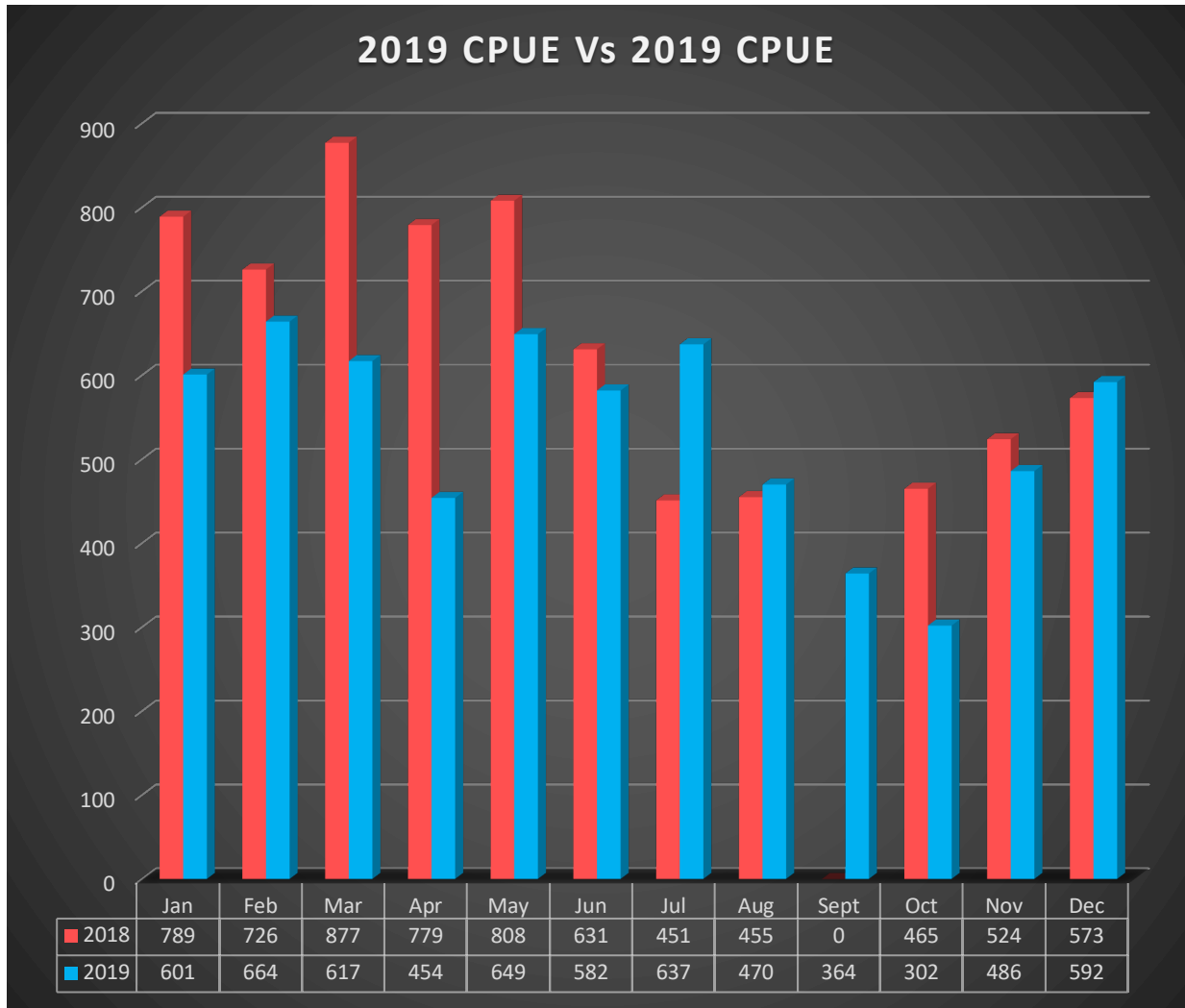


Figure 5 - Graph showing the Seabob Catch per Unit Effort (CPUE) for the Industry (all companies) in 2019 compared with 2018.

The performance of the Seabob Industry during 2019 can be considered fairly average since the CPUE (annual) for the Industry was **573 kgs/sdas**; representing **15%** decrease when compared with 2018 CPUE of **678 kg/sads**. The highest recorded Seabob CPUE was observed in February (**664 kgs/sdas**) and the lowest (i.e. outside of the primary closed season's months) was in April (**454 kgs/sdas**)

## Data Analysis

A t- test analysis was conducted using monthly CPUE from 2018 vs. that of 2019 to see if there were any significant difference between the two years. The analysis resulted showed that there was not a significant difference between the means of the trials since the p values were above 0.05. The test assumed the two samples were unequal variance and the alpha value was set at 0.05. The results were as followed:

Table 1 - showing the t-test results when comparing monthly CPUE of 2018 vs. 2019.

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Variable 1</i>	<i>Variable 2</i>
Mean	589.8	534.8
Variance	57391.6	13936.0
Observations	12.0	12.0
Hypothesized Mean Difference	0.0	
df	16.0	
t Stat	0.7	
P(T<=t) one-tail	0.2	
t Critical one-tail	1.7	
P(T<=t) two-tail	0.5	
t Critical two-tail	2.1	

## CATCH AND EFFORT OVERVIEW FOR 2019

Table 2 - Shows a summary of Guyana`s industrial processed Seabob landings 2019.

INDUSTRIAL SEABOB CPUE 2019			
Months	Processed Weight (kg)	Standardized DAS (sdas)	Monthly CPUE (kg/sdas)
January	706,918	1,176.624	<b>601</b>
February	770,903	1,160.754	<b>664</b>
March	754,175	1,222.478	<b>617</b>
April	556,533	1,225.140	<b>454</b>
May	773,714	1,192.827	<b>649</b>
June	610,211	1,048.566	<b>582</b>
July	804,774	1,264.043	<b>637</b>
August	565,128	1,201.634	<b>470</b>
September	56,317	154.756	<b>364</b>
October	7,400	24.490	<b>302</b>
November	462,843	951.782	<b>486</b>
December	593,074	1,001.550	<b>592</b>
	<b><u>6,661,990</u></b>	<b><u>11,624.644</u></b>	<b><u>573</u></b>

\*The landing data submitted in September were caught in the month August.

Nb. The close season was observed during 1<sup>st</sup> September 2019 to 21<sup>st</sup> October, 2019 (both dates inclusive).

Table 3 - Shows Guyana`s industrial processed Seabob landings & Standardized Days Used 2019 by companies.

## Seabob CPUE 2019 by Company

Companies	Processed Wt (kg)	% Breakdown	Standardized DAS (sdas)	% Breakdown
GII	1,303,980	19.5	2,282	38.9
NHS	1,909,669	28.6	4,532.85	19.6
PSI	3,444,488	52.7	4,809.37	41.3
Total	6,661,990		11,624.64	

## Processed Catches for 2019

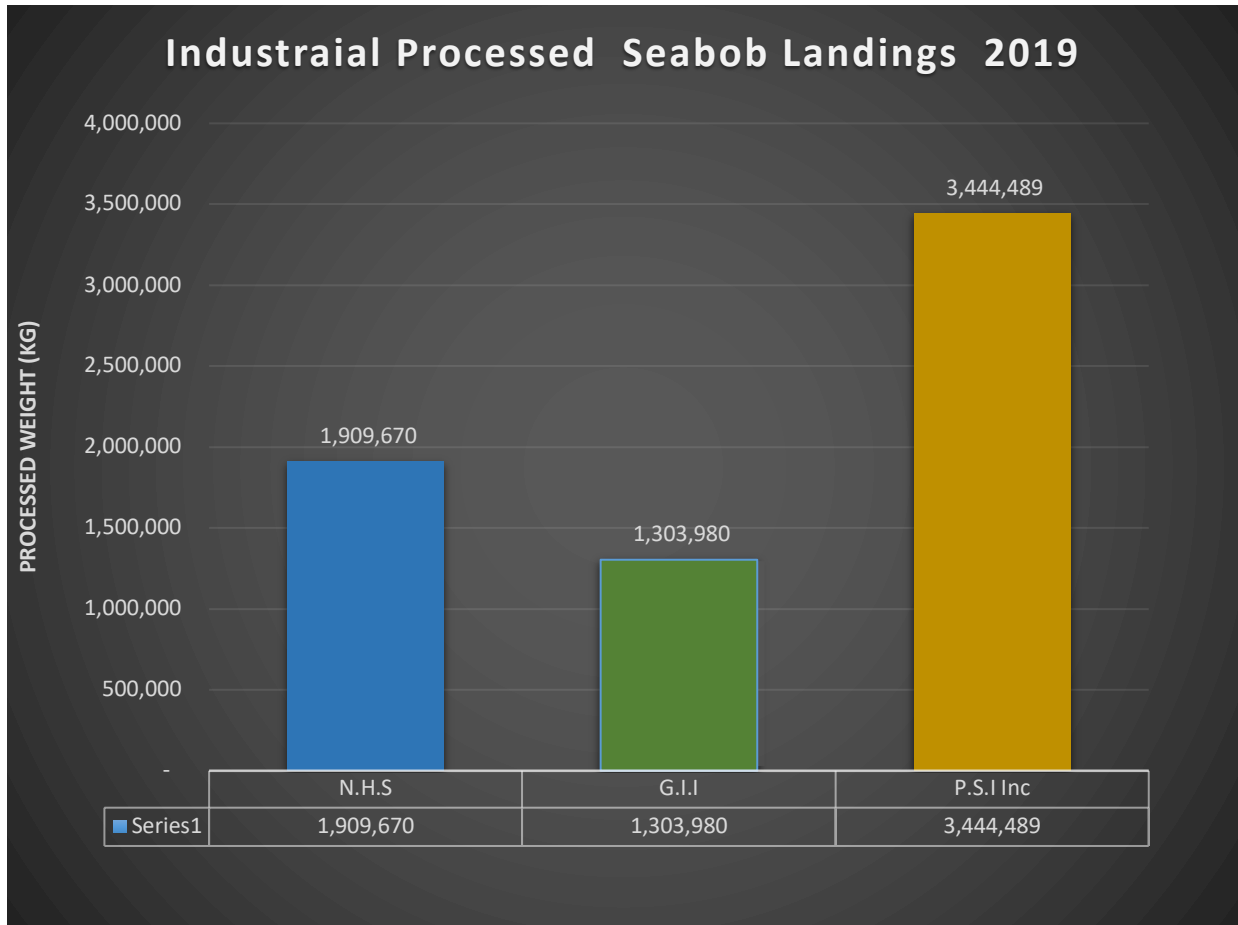


Figure 6- Graph showing Guyana's Industrial processed Seabob landings 2019 by companies.

The graph above represents the total number of Seabob processed after landing (in kg) by each of the Industrial Seabob companies from January to December 2019. A total of **6,661,990 kg** of seabob was processed after landing. Pritipaul Singh Investments Inc. landed **3, 44,488 kgs** of that amount; this represents **52%** (the highest) of the total weight. Noble House Seafood's Ltd. landed **1,909,669 kgs**, this translated to **28%** (the second highest) of the total weight and Guyana Investment Inc. **1,303,980 kg** representing **19%** (the lowest) of the total weight landed.

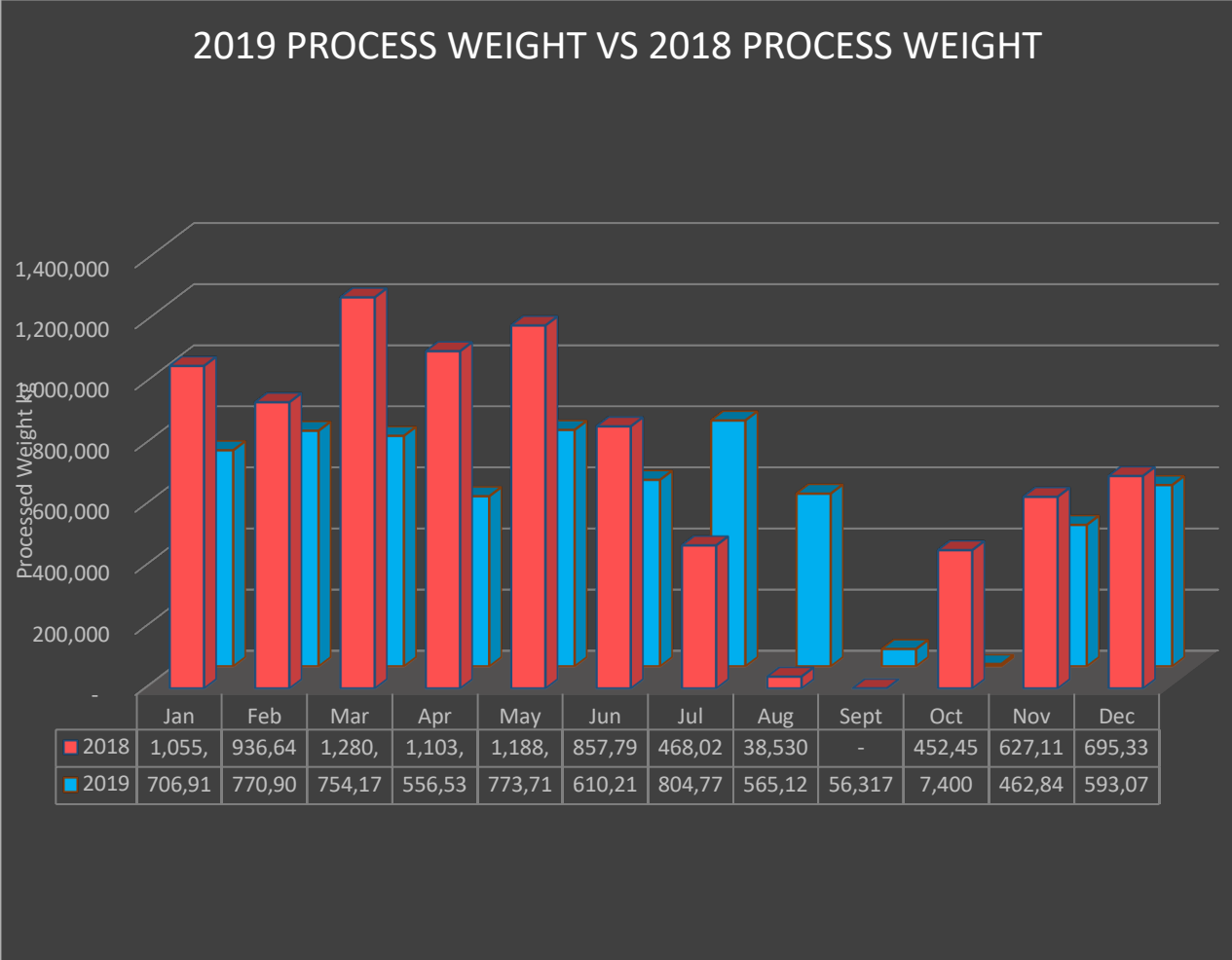


Figure 7- Graph showing Guyana’s Industrial processed Seabob landings in 2019 compared with that of 2018 by companies.

The graph above represents the total number of Seabob processed after landing (in kg) by each of the Industrial Seabob companies from January to December 2019 compared with that of 2018. As show above the average process weight of seabob in 2018 is **24 %** higher than that of 2019.

## EFFORT (standardized days-at-sea) for 2019

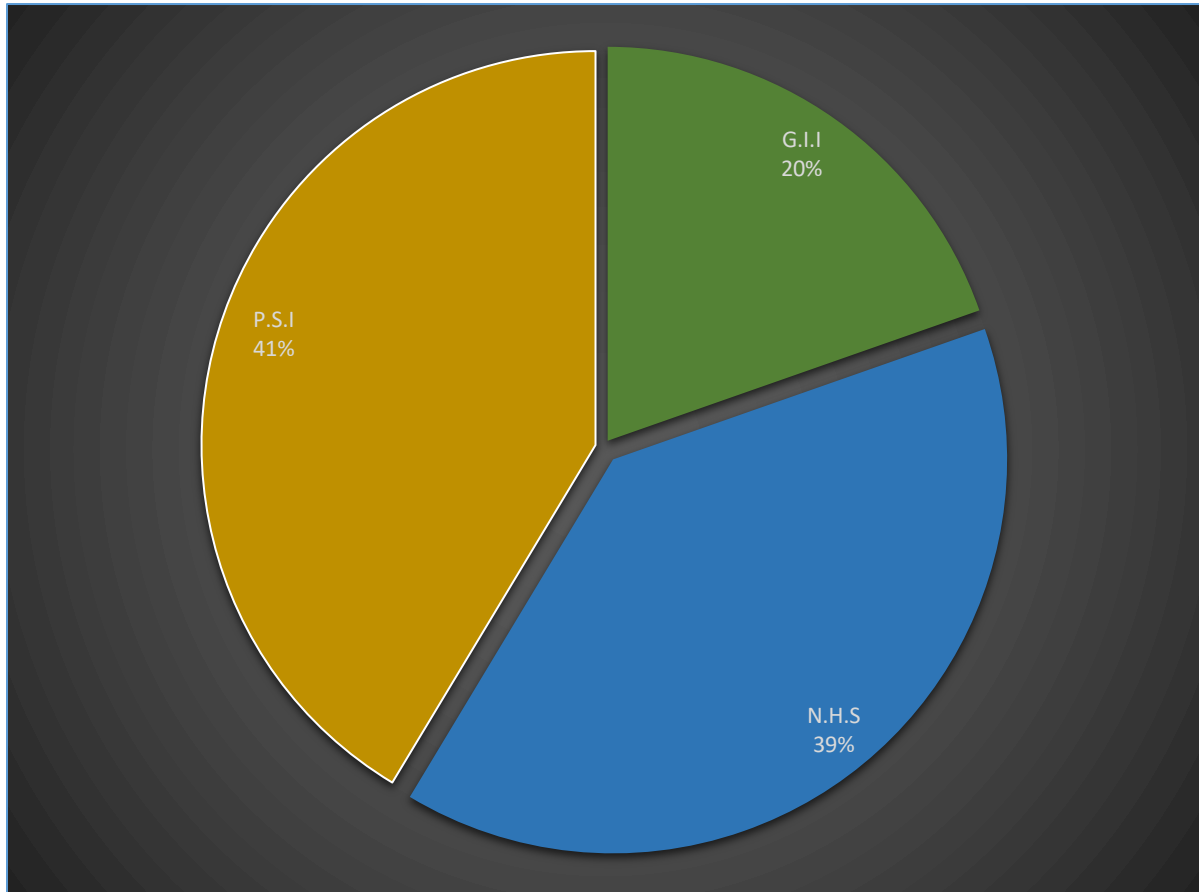


Figure 8- Chart showing the standardized days-at-sea (sdas) usage by the companies in 2019.

The chart above shows the percentage of fishing efforts (standardized days at sea) utilized by each company in 2019. An approximate total of **11,624 sdas** were used which was below the total allowable effort which is 15,000 sdas.

Pritipaul Singh Investments Inc. standardized days at sea represents **41%** of the total days used by Industrial fleet (**4,809 sdas**), Noble House Seafood Ltd. `s exploited **39 %** of the aforesaid days (**4,532 sdas**) and Guyana Investment Inc. were responsible for 20% (**2,282sdas**).

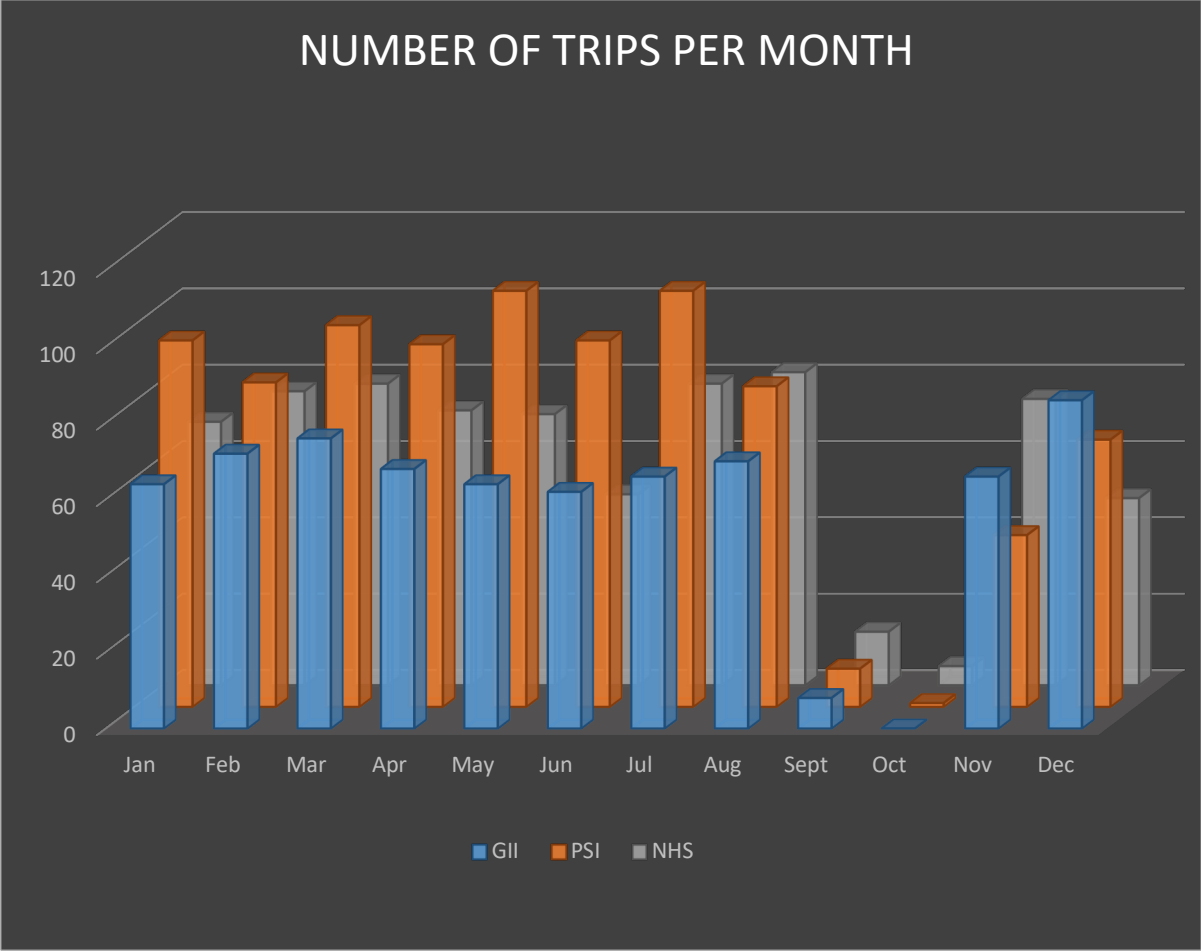


Figure 9- Graph showing the number of trips made by vessels per month by companies in 2019.

The graph above represents the total number of monthly trips made by vessel in 2019 by the Industrial Seabob companies from January to December 2019. A total of **2,324** trip occurred for the year 2019 of which **900** were made by P.S.I Inc. vessels, **722** trips by N.H.S vessels and **702** by G.I.I vessels. The highest amount of trips occurred during the month March while the month of November recorded the lowest (i.e. excluding the close seasons).

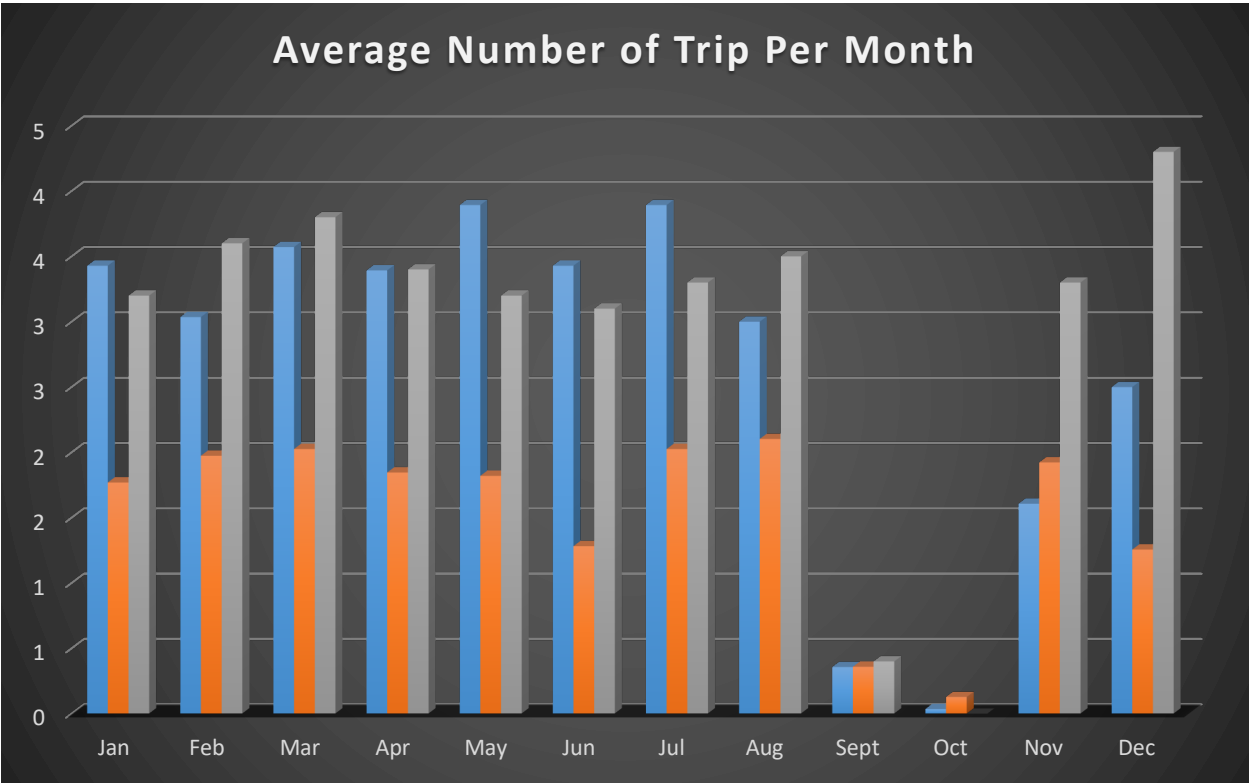


Figure 10 - Graph showing the average number of trips made per month by companies in 2019.

The graph above represents the average number of monthly trips made by vessel in 2019 by the Industrial Seabob companies from January to December 2019. P.S.I vessels made average of **3** trips per month similar with vessel from G.I.I while vessels from N.H.S only made a monthly average of **2** trips per vessel.

## Summary

The CPUE effort observed for the year 2019 can be considered fairly acceptable at **573 kgs/sdas**. The aforesaid catch rate was **15%** less than that obtained in 2018 which was **678 kgs/sdas**. Additionally, the annual processed tail weight of seabob has decreased by **23.4%** in 2019. A total of 87 vessels operated during the year of 2019 and the overall effort (Days) decreased by **9.5%**, when compared to the previous year, respectively. During the year of 2019 the Seabob production in Guyana was influence by several factors, which included the early influx of Sargassum weed which was observed between the months of February to July.

## Stock Assessment Update

Following a peer review meet by Continental Shelf Seabob Working Group on the Guyana - Suriname Seabob Stock Assessment Report which was held form the 20<sup>th</sup> -22<sup>nd</sup> August, 2019, new H.C.R and C.P.U.E calculation method was implemented. The report was a joint assessment done by Dr. Paul Medley. (Please see working group Report) The new calculation and method will be adopted and in effect from January 2020.

## APPENDICES

### PROCEDURE FOR SETTING THE TAE FOR GUYANA SEABOB AS OF 2019.

The Total Allowable Effort days-at-Sea (DaS) Quota shall be set at:

- Maximum 87 licenses to fish seabob
- Maximum 225 days at sea per licensed vessel when the indexed catch index is at or above the target index.
- A linearly declining value when the current index is above the trigger index, but below the target index, according to the calculation (TAE in days at sea per vessel):

$$TAE = 205 + 20 * (\text{Current Index} - \text{Trigger Index}) / (\text{Target Index} - \text{Trigger Index})$$

- A linearly declining value when the current index is above the limit index, but below the trigger index, according to the calculation (TAE in days at sea per vessel):

$$TAE = 205 * (\text{Current Index} - \text{Limit Index}) / (\text{Trigger Index} - \text{Limit Index})$$

- Zero (there is an export moratorium) if the current index is at or below the limit index. The current index for each year shall be calculated as the average between the previous year's index value and the catch rate of the previous year (i.e. a moving average). The catch rate will be based on reported catch and effort data for all vessels. The catch rate is calculated as the total landings of seabob processed (peeled tail) weight in kilograms divided by the total number of standardized days-at-sea.

The HCR Index in any given year t ( $I_t$ ) is calculated as:

$$I_t = 0.5 \left( I_{t-1} + \frac{C_{t-1}}{0.766 D_{t-1}} \right)$$

Where Ct-1=catch (kg processed tail weight) in the year t-1 and Dt-1 = total nominal days-at-sea required to catch Ct-1. The index calculation should include all observed reliable catch and effort data.

<b>GUYANA INVESTMENT INC. SEABOB CPUE 2019</b>				
<b>Months</b>	<b>Processed Weight(kg)</b>	<b>Standardized DAS</b>	<b>Monthly CPUE</b>	<b>Current CPUE</b>
<b>January</b>	138,624	200	692	
<b>February</b>	158,247	238	664	
<b>March</b>	124,239	239	521	
<b>April</b>	97,536	236	414	
<b>May</b>	101,387	200	507	
<b>June</b>	115,015	203	567	
<b>July</b>	143,120	205	699	
<b>August</b>	127,142	229	555	
<b>September</b>	11,221	35	320	
<b>October</b>	-	-	0	
<b>November</b>	113,240	217.158	521	
<b>December</b>	174,210	281.123	620	
	<b><u>1,303,980</u></b>	<b><u>2,282</u></b>		<b><u>571</u></b>

<b>NOBLE HOUSE SEAFOODS. SEABOB CPUE 2019</b>				
<b>Months</b>	<b>Processed Weight</b>	<b>Standardized DAS</b>	<b>Monthly CPUE</b>	<b>Current CPUE</b>
<b>January</b>	192,812	425.59	453	
<b>February</b>	228,308	468.849	487	
<b>March</b>	195,250	483.902	403	
<b>April</b>	139,196	475.628	293	
<b>May</b>	244,207	445.178	549	
<b>June</b>	136,234	332.614	410	
<b>July</b>	247,670	490.377	505	
<b>August</b>	191,277	519.041	369	
<b>September</b>	16,603	66.480	250	
<b>October</b>	6,905	20.552	336	
<b>November</b>	173,584	463.805	374	
<b>December</b>	137,624	340.836	404	
	<b><u>1,909,670</u></b>	<b><u>4,532.851</u></b>		<b><u>421</u></b>

<b>PRITIPAUL SINGH INVESTMENT SEABOB CPUE 2019</b>				
<b>Months</b>	<b>Processed Weight</b>	<b>Standardized DAS</b>	<b>Monthly CPUE</b>	<b>Current CPUE</b>
<b>January</b>	375,482	550.6	682	
<b>February</b>	384,348	453.5	847	
<b>March</b>	434,686	500.0	869	
<b>April</b>	315,950	514.0	615	
<b>May</b>	428,120	547.9	781	
<b>June</b>	358,961	513.2	699	
<b>July</b>	413,984	568.8	728	
<b>August</b>	246,709	453.7	544	
<b>September</b>	28,493	53.3	535	
<b>October</b>	495	3.938	126	
<b>November</b>	176,018	270.819	650	
<b>December</b>	281,241	379.591	741	
	<b><u>3,444,489</u></b>	<b><u>4,809</u></b>		<b><u>716</u></b>

<b>INDUSTRIAL SEABOB CPUE - 2019</b>				
<b>Months</b>	<b>Processed Weight (KG)</b>	<b>Standardized DAS</b>	<b>Monthly CPUE</b>	<b>Overall CPUE</b>
<b>January</b>	706,918	1,176.624	601	
<b>February</b>	770,903	1,160.754	664	
<b>March</b>	754,175	1,222.478	617	
<b>April</b>	556,533	1,225.140	454	
<b>May</b>	773,714	1,192.827	649	
<b>June</b>	610,211	1,048.566	582	
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<b>December</b>	593,074	1,001.550	592	
	<b><u>6,661,990</u></b>	<b><u>11,624.644</u></b>		<b><u>573</u></b>

Number of Trips			
Months	P.S.I	N.H.S	G.I.I
January	96	69	64
February	85	77	72
March	100	79	76
April	95	72	68
May	109	71	64
June	96	50	62
July	109	79	66
August	84	82	70
September	10	14	8
October	1	5	0
November	45	75	66
December	70	49	86
<b>Total</b>	<b><u>900</u></b>	<b><u>722</u></b>	<b><u>702</u></b>

Average Number of Trips			
Months	P.S.I	N.H.S	G.I.I
January	3	2	3
February	3	2	4
March	4	2	4
April	3	2	3
May	4	2	3
June	3	1	3
July	4	2	3
August	3	2	4
September	0	0	0
October	0	0	0
November	2	2	3
December	3	1	4
<b>Average trips</b>	<b><u>3</u></b>	<b><u>2</u></b>	<b><u>3</u></b>