

2023 AFL player performance

AFL

I have applied using data analysis on the AFL 2023 Player Performance datasets based on the link,<https://www.afl.com.au/stats/leaders?category=Key+Stats&seasonId=62&roundId=1&roundNumber=0&sortColumn=dreamTeamPoints&sortDirection=descending&positions=All&teams=All&benchmarking=false&dataType=totals&playerOneId=null&playerTwoId=null> I have copied and pasted into Excel csv files.

Data	Description
Player	List of AFL players currently playing in the 2023 season. There are 808 Players in total.
Age 2024	Current Age up to 2024
Height 2024	Current Height up to 2024 (in cms)
Weight 2024	Current Weight up to 2024 (in kgs)
Current Team 2023	Team Playing in 2023
Position	Describe both the player's main role and by implication their location on the ground
Year Debut	Year the Player Debuted into AFL
Games	Total Games Played in the AFL up to Round 22 2024
No.	Number Jersey
Status	Their current status up to Round 22 2024 (N: Currently in the game, L: Delisted, Free-Agent due to certain circumstances, R: Retired)
CDL%	Constated Defensive Loss %
R	Rating Points
G	Goals: A major score, as judged by the goal umpire. Worth six points to a team's score.
D	Disposals: Legally getting rid of the ball, via a handball or kick.
M	Marks
T	Tackles: Using physical contact to prevent an opponent in possession of the ball from getting an effective disposal.
CLR	Clearances: Credited to the player who has the first effective disposal in a chain that clears the stoppage area, or an ineffective kick or clanger kick that clear the stoppage area.
K	Kicks

Data	Description
H	Handballs: Disposing of the ball by hand.
HO	Hitouts: Knocking the ball out of a ruck contest following a stoppage with clear control, regardless of which side wins the following contest at ground level.
FF	Frees For: When a player is interfered with and is awarded a free kick
FA	Free Against: When an infringement occurs resulting in the opposition receiving a free kick. An umpire must signal a free kick before Champion Data records a free kick.
B	Bounces
OP	One Percenters
ToG%	Time on Ground %
i50s	Inside 50s: Moving the ball from the midfield into the forward zone. Excludes multiple entries within the same chain of possession.
DE%	Disposal Efficiency %: Percentage of disposals that are effective.
C	Clangers: An error made by a player resulting in a negative result for his side. Disposal clangers are any kick or handball that directly turns the ball over to the opposition. Freees and 50-metre penalties against, No Pressure Errors, Dropped Marks and Debits are all.
R50s	Rebound 50s: Moving the ball from the defensive zone into the midfield.
EK	Effective Kicks: The sum of effective short kicks, effective long kicks and effective ground kicks.
KE%	Kick Efficiency %
KHB	Kick to Handball Ratio: Number of kicks recorded per handball.
ED	Effective Disposals
CP	Constanted Possessions: A possession which has been won when the ball is in dispute. Includes looseball-gets, hardball-gets, contested marks, gathers from a hit-out and frees for.
UP	Unconstanted Possessions: Possessions gained whilst under no physical pressure, either from a teammate's disposal or an

Data	Description
	opposition's clanger kick. Includes handball receives, uncontested marks (including lead marks) and intended ball gets from a disposal.
IP	Intercept Possessions: Any possession that is won that breaks an opposition chain.
CPR	Constanted Possession Rate: Percentage of possessions won in a contest.
GBG	Ground Ball Gets: Sum of looseball-gets and hardball-gets.
F50GBG	Fwd 50 Ground Ball Gets
CC	Centre Clearances
SC	Stoppage Clearances
HTA	Hitouts to Advantage: A hitout that reaches an intended teammate.
HTW%	Hitout Win %: Percentage of ruck contests resulting in a hitout win.
HTA%	Hitouts to Advantage %: Percentage of hitouts that reach an intended teammate.
RC	Ruck Contests: Starting as one of the two ruckmen competing for the ball at a stoppage.
Mi50	Marks inside 50
CM	Constanted Marks: When a player takes a mark under physical pressure of an opononent or in a pack.
MOL	Marks on Lead
IM	Intercept Marks: Any mark taken from an opponent's kick.
GA	Goal Assists: Creating a goal by getting the ball to a teammate either via a disposal, knock-on, ground kick or hitout, or by winning a free kick before the advantage is paid to the goal scorer.
GA%	Shot at Goal Accuracy %
SAG	Shots at Goal
SI	Score Involvements: Number of scoring chains where a player was involved with either a disposal, hitout-to-advantage, kick-in or knock-on. If a player has two disposals in the same scoring chain, he is credited with one score involvement.

Data	Description
SL	Score Launches: Scoring chains launched by an intercept possession, free kick, hitout-to-advantage or clearance.
Ti50	Tackles inside 50
PA	Pressure Acts
DHPA	Defensive Half Pressure Acts
S	Spoils: Knocking the ball away from a marking contest preventing an opponent from taking a mark.
CDOOO	Constanted Defensive One on Ones
CDL	Constanted Defensive Losses
CDL%	Constanted Defensive Loss %

Import the packages

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

Step 1: Data Exploration

```
df= pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-
2022_data_kaggle\AFL_Player_Performance_2023_KS.csv')
#Similarly for General Play
df2 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-
2022_data_kaggle\AFL_Player_Performance_2023_GP.csv')

merged_df = pd.merge(df, df2)

#Similarly for Disposals
df3 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-
2022_data_kaggle\AFL_Player_Performance_2023_D.csv')
merged_df_2 = pd.merge(merged_df, df3)

#Similarly for Possessions
df4 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-
2022_data_kaggle\AFL_Player_Performance_2023_P.csv')
merged_df_3 = pd.merge(merged_df_2, df4, on='Player')

#Stoppages
df5 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-
2022_data_kaggle\AFL_Player_Performance_2023_S.csv')
merged_df = pd.merge(merged_df_3, df5, on='Player')

#Marks
```

```

df6 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-2022_data_kaggle\AFL_Player_Performance_2023_M.csv')
merged_df = pd.merge(merged_df, df6, on='Player')

#Scores
df7 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-2022_data_kaggle\AFL_Player_Performance_2023_G.csv')
merged_df = pd.merge(merged_df, df7, on='Player')

#Defences
df8 = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-2022_data_kaggle\AFL_Player_Performance_2023_T.csv')
full_df = pd.merge(merged_df, df8, on='Player')

#Displays all columns and rows
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.width', None)
pd.set_option('display.max_colwidth', None)

```

Check the full dataset for the AFL Player Performance

```

full_df.shape
(808, 59)

full_df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 808 entries, 0 to 807
Data columns (total 59 columns):
 #   Column    Non-Null Count  Dtype  
 --- 
 0   AF        808 non-null    int64  
 1   R         808 non-null    float64 
 2   G_x       808 non-null    int64  
 3   D         808 non-null    int64  
 4   M_x       808 non-null    int64  
 5   T_x       808 non-null    int64  
 6   CLR_x    808 non-null    int64  
 7   K         808 non-null    int64  
 8   H         808 non-null    int64  
 9   HO_x     808 non-null    int64  
 10  Player    808 non-null    object  
 11  FF        808 non-null    int64  
 12  FA        808 non-null    int64  
 13  B_x       808 non-null    int64  
 14  OP        808 non-null    int64  
 15  ToG%     808 non-null    float64 
 16  i50s      808 non-null    int64

```

```
17 DE%      808 non-null    float64
18 C         808 non-null    int64
19 R50s     808 non-null    int64
20 EK        808 non-null    int64
21 KE%       808 non-null    float64
22 KHB       808 non-null    float64
23 ED         808 non-null    int64
24 CP         808 non-null    int64
25 UP         808 non-null    int64
26 IP         808 non-null    int64
27 T_y       808 non-null    int64
28 CPR        808 non-null    float64
29 GBG       808 non-null    int64
30 F50GBG    808 non-null    int64
31 H0_y      808 non-null    int64
32 CC         808 non-null    int64
33 SC         808 non-null    int64
34 CLR_y     808 non-null    int64
35 HTA        808 non-null    int64
36 HTW%      808 non-null    float64
37 HTA%      808 non-null    float64
38 RC         808 non-null    int64
39 M_y       808 non-null    int64
40 Mi50      808 non-null    int64
41 CM         808 non-null    int64
42 MOL        808 non-null    int64
43 IM         808 non-null    int64
44 G_y       808 non-null    int64
45 B_y       808 non-null    int64
46 GA         808 non-null    int64
47 GA%       808 non-null    float64
48 SAG        808 non-null    int64
49 SI         808 non-null    int64
50 SL         808 non-null    int64
51 T          808 non-null    int64
52 Ti50      808 non-null    int64
53 PA         808 non-null    int64
54 DHPA      808 non-null    int64
55 S          808 non-null    int64
56 CD000     808 non-null    int64
57 CDL       808 non-null    int64
58 CDL%      808 non-null    float64
dtypes: float64(10), int64(48), object(1)
memory usage: 372.6+ KB
```

Step 2: Data Cleaning and Exploration

Checking for null values for the AFL Player Performance in 2023

```
full_df.isnull().sum()
```

AF	0
R	0
G_x	0
D	0
M_x	0
T_x	0
CLR_x	0
K	0
H	0
H0_x	0
Player	0
FF	0
FA	0
B_x	0
OP	0
ToG%	0
i50s	0
DE%	0
C	0
R50s	0
EK	0
KE%	0
KHB	0
ED	0
CP	0
UP	0
IP	0
T_y	0
CPR	0
GBG	0
F50GBG	0
H0_y	0
CC	0
SC	0
CLR_y	0
HTA	0
HTW%	0
HTA%	0
RC	0
M_y	0
Mi50	0
CM	0
MOL	0
IM	0

```

G_y      0
B_y      0
GA       0
GA%      0
SAG      0
SI       0
SL       0
T        0
Ti50     0
PA       0
DHPA    0
S        0
CD000    0
CDL     0
CDL%     0
dtype: int64

```

In this case, I have completely cleaned data

However, we need to remove the duplicate rows and columns

```
#Removing the row duplicates
full_df = full_df.drop_duplicates()
full_df.head()
```

	AF	R	G_x	D	M_x	T_x	CLR_x	K	H	H0_x	
Player \											
0 Marshall	2802	517.8	8	493	126	115	121	314	179	639	Rowan
1 English	2730	564.4	16	440	145	100	74	258	182	717	Tim
2 Gulden	2694	493.5	22	643	126	119	93	464	179	0	Errol
3 Bontempelli	2690	668.2	19	636	101	172	175	370	266	1	Marcus
4 Petracca	2618	577.6	28	695	107	99	149	351	344	1	Christian

	FF	FA	B_x	OP	ToG%	i50s	DE%	C	R50s	EK	KE%	KHB	ED
CP \													
0 275	44	25	0	63	84.5	80	63.3	83	41	171	54.5	1.8	312
1 211	42	34	8	98	85.8	73	72.5	83	43	173	67.1	1.4	319
2 236	40	34	9	25	88.2	147	65.2	109	72	275	59.3	2.6	419
3 332	27	33	6	91	84.9	131	67.9	97	42	222	60.0	1.4	432

4	23	22	1	13	83.9	147	66.8	106	31	193	55.0	1.0	464
350													
HTA% \													
0	218	95	95	55.8	124		7	639	37	84	121	178	40.0
27.9													
1	253	98	76	45.5	98		8	717	27	47	74	242	39.5
33.8													
2	404	94	138	36.9	180		16	0	30	63	93	0	0.0
0.0													
3	339	77	122	49.5	193		30	1	75	100	175	1	100.0
100.0													
4	351	78	132	49.9	257		68	1	50	99	149	1	11.1
100.0													
Ti50 \													
0	1597	126	14	35	6	45	8	8	4	44.4	18	113	64
2													
1	1815	145	13	29	3	46	16	4	6	76.2	21	122	70
10													
2	0	126	10	3	7	12	22	20	15	44.0	50	150	35
9													
3	1	101	17	12	1	11	19	14	21	50.0	38	176	51
28													
4	9	107	30	8	15	8	28	34	26	32.2	87	210	46
20													
PA \													
0	357	191	41	16	5	31.3							
1	348	179	60	18	4	22.2							
2	498	259	13	2	1	50.0							
3	582	246	22	2	1	50.0							
4	536	206	6	0	0	0.0							
<i>#Removing column duplicates</i>													
full_df = full_df.drop(['G_y', 'M_y', 'T_y', 'CLR_y', 'H0_y', 'B_y', 'T'], axis=1)													
<i>#Renaming column names</i>													
full_df = full_df.rename(columns={"G_x": "G", "M_x": "M", "T_x": "T", "CLR_x": "CLR", "H0_x": "H0", "B_x": "B"})													
full_df.head()													
Player \													
0	2802	517.8	8	493	126	115	121	314	179	639		Rowan	
Marshall		44											
1	2730	564.4	16	440	145	100	74	258	182	717		Tim	

	GA%	SAG	SI	SL	Ti50	PA	DHPA	S	CD000	CDL	CDL%
0	44.4	18	113	64	2	357	191	41	16	5	31.3
1	76.2	21	122	70	10	348	179	60	18	4	22.2
2	44.0	50	150	35	9	498	259	13	2	1	50.0
3	50.0	38	176	51	28	582	246	22	2	1	50.0
4	32.2	87	210	46	20	536	206	6	0	0	0.0

```

final_df =
full_df[['Player', 'AF', 'R', 'G', 'D', 'M', 'T', 'CLR', 'K', 'H', 'HO', 'FF', 'FA
', 'B', 'OP', 'ToG%', 'i50s', 'DE%', 'C', 'R50s', 'EK', 'KE
%', 'KHB', 'ED', 'CP', 'UP', 'IP', 'CPR', 'GBG', 'F50GBG', 'CC', 'SC', 'H
TA', 'HTW%', 'HTA%', 'RC', 'Mi50', 'CM', 'MOL', 'IM', 'GA', 'GA%',
'SAG', 'SI', 'SL', 'Ti50', 'PA', 'DHPA', 'S', 'CD000', 'CDL', 'CDL
%']]
final_df.head()

```

H0	FF	\	Player	AF	R	G	D	M	T	CLR	K	H	
0	Rowan Marshall		2802	517.8	8	493	126	115	121	314	179		
639	44		Tim English	2730	564.4	16	440	145	100	74	258	182	
717	42		Errol Gulden	2694	493.5	22	643	126	119	93	464	179	
0	40		Marcus Bontempelli	2690	668.2	19	636	101	172	175	370	266	
1	27		Christian Petracca	2618	577.6	28	695	107	99	149	351	344	
1	23												
UP	FA	B	OP	ToG%	i50s	DE%	C	R50s	EK	KE%	KHB	ED	CP
0	25	0	63	84.5	80	63.3	83	41	171	54.5	1.8	312	275
218	95												
1	34	8	98	85.8	73	72.5	83	43	173	67.1	1.4	319	211
253	98												
2	34	9	25	88.2	147	65.2	109	72	275	59.3	2.6	419	236
404	94												
3	33	6	91	84.9	131	67.9	97	42	222	60.0	1.4	432	332
339	77												
4	22	1	13	83.9	147	66.8	106	31	193	55.0	1.0	464	350
351	78												
IM	CPR	GBG	F50GBG	CC	SC	HTA	HTW%	HTA%	RC	Mi50	CM	MOL	
0	55.8	124		7	37	84	178	40.0	27.9	1597	14	35	6
45	4												
1	45.5	98		8	27	47	242	39.5	33.8	1815	13	29	3
46	6												
2	36.9	180		16	30	63	0	0.0	0.0	0	10	3	7
12	15												
3	49.5	193		30	75	100	1	100.0	100.0	1	17	12	1
11	21												
4	49.9	257		68	50	99	1	11.1	100.0	9	30	8	15
8	26												
0	GA%	SAG	SI	SL	Ti50	PA	DHPA	S	CD000	CDL	CDL%		
44.4	18	113	64	2	357	191	41	16	5	31.3			
76.2	21	122	70	10	348	179	60	18	4	22.2			
44.0	50	150	35	9	498	259	13	2	1	50.0			
50.0	38	176	51	28	582	246	22	2	1	50.0			
32.2	87	210	46	20	536	206	6	0	0	0.0			

Check the shape of the finalised dataframe and info of the data types

```
final_df.shape
```

(808, 52)

Convert this dataframe into csv file, Ensure you know where you keep the excel spreadsheet, DO NOT UNCOMMENT THE CODE CELL BELOW!

```
#final_df.to_csv(r'C:\Users\Michael Le\Desktop\final_df.csv', index=False, header=True)
```

Update the final data-frame

```
final_df = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-2022_data_kaggle\ afl_data_kaggle\ afl_df_player_enhanced.csv')
```

Check the head of the data

```
final_df.head()
```

H0	FF	\	Player	AF	R	G	D	M	T	CLR	K	H	
0	25	\	Jack Higgins	1391	277.1	36	293	82	43	7	163	130	
1	21	\	Adam Treloar	2000	459.9	13	557	54	100	108	253	304	
2	22	\	Chad Warner	1943	525.3	15	518	65	90	94	309	209	
3	19	\	Jamarra Ugle-Hagan	1381	219.2	35	261	120	22	0	188	73	
4	18	\	Steven May	1607	373.0	0	396	125	37	3	321	75	
UP	FA	B	OP	ToG%	i50s	DE%	C	R50s	EK	KE%	KHB	ED	CP
0	14	2	18	79.2	32	62.1	45	6	87	53.4	1.3	182	115
1	11	9	17	78.4	75	70.4	72	32	133	52.6	0.8	392	224
2	28	17	22	81.8	121	65.4	90	39	166	53.7	1.5	339	221
3	14	1	20	83.6	58	55.6	59	0	94	50.0	2.6	145	115
4	16	8	156	97.4	33	82.8	56	149	268	83.5	4.3	328	103
IM	IP	CPR	GBG	F50GBG	CC	SC	HTA	HTW%	HTA%	RC	Mi50	CM	MOL
0	20	38.7	79	41	0	7	0	0.0	0.0	0	40	5	24
2	12												
1	64	40.7	172	25	35	73	0	0.0	0.0	0	2	0	0

Step 3: Data Exploration and Analysis

```
# Summary Info
print(final_df.info())

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 808 entries, 0 to 807
Data columns (total 61 columns):
 #   Column           Non-Null Count  Dtype 

```

0	Player	808	non-null	object
1	AF	808	non-null	int64
2	R	808	non-null	float64
3	G	808	non-null	int64
4	D	808	non-null	int64
5	M	808	non-null	int64
6	T	808	non-null	int64
7	CLR	808	non-null	int64
8	K	808	non-null	int64
9	H	808	non-null	int64
10	HO	808	non-null	int64
11	FF	808	non-null	int64
12	FA	808	non-null	int64
13	B	808	non-null	int64
14	OP	808	non-null	int64
15	ToG%	808	non-null	float64
16	i50s	808	non-null	int64
17	DE%	808	non-null	float64
18	C	808	non-null	int64
19	R50s	808	non-null	int64
20	EK	808	non-null	int64
21	KE%	808	non-null	float64
22	KHB	808	non-null	float64
23	ED	808	non-null	int64
24	CP	808	non-null	int64
25	UP	808	non-null	int64
26	IP	808	non-null	int64
27	CPR	808	non-null	float64
28	GBG	808	non-null	int64
29	F50GBG	808	non-null	int64
30	CC	808	non-null	int64
31	SC	808	non-null	int64
32	HTA	808	non-null	int64
33	HTW%	808	non-null	float64
34	HTA%	808	non-null	float64
35	RC	808	non-null	int64
36	Mi50	808	non-null	int64
37	CM	808	non-null	int64
38	MOL	808	non-null	int64
39	IM	808	non-null	int64
40	GA	808	non-null	int64
41	GA%	808	non-null	float64
42	SAG	808	non-null	int64
43	SI	808	non-null	int64
44	SL	808	non-null	int64
45	Ti50	808	non-null	int64
46	PA	808	non-null	int64
47	DHPA	808	non-null	int64

```
48   S                      808 non-null    int64
49   CD000                  808 non-null    int64
50   CDL                   808 non-null    int64
51   CDL%                  808 non-null    float64
52   Age 2024              808 non-null    int64
53   Height 2024           808 non-null    int64
54   Weight 2024           808 non-null    float64
55   Current Team 2023     808 non-null    object
56   Position 2023          808 non-null    object
57   YEAR DEBUT            808 non-null    int64
58   TOTAL GAMES (Up to R22 2024) 808 non-null    int64
59   NO. 2023-2024 Season    808 non-null    int64
60   Status                 808 non-null    object
dtypes: float64(11), int64(46), object(4)
memory usage: 385.2+ KB
None
```

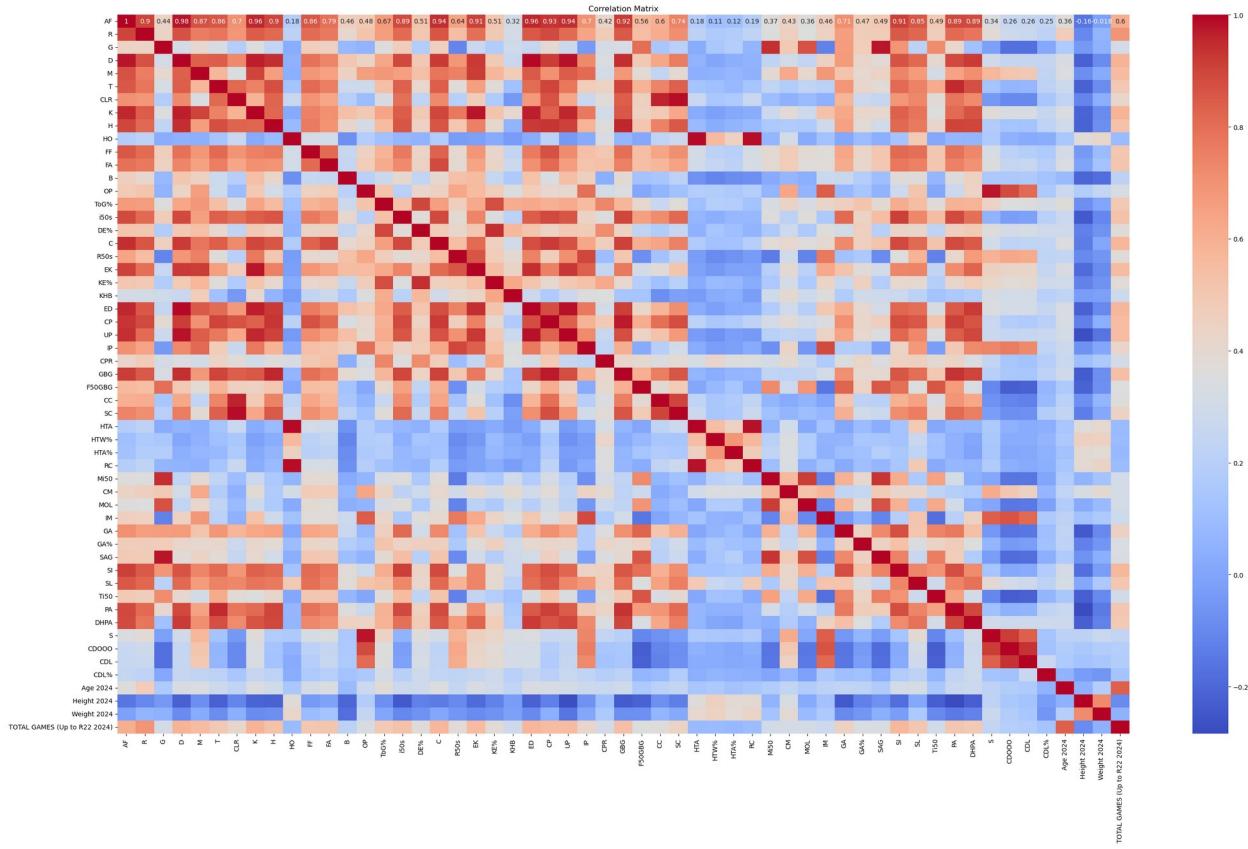
Computing the Correlation Matrix

```
# Correlation matrix
plt.figure(figsize=(10, 8))

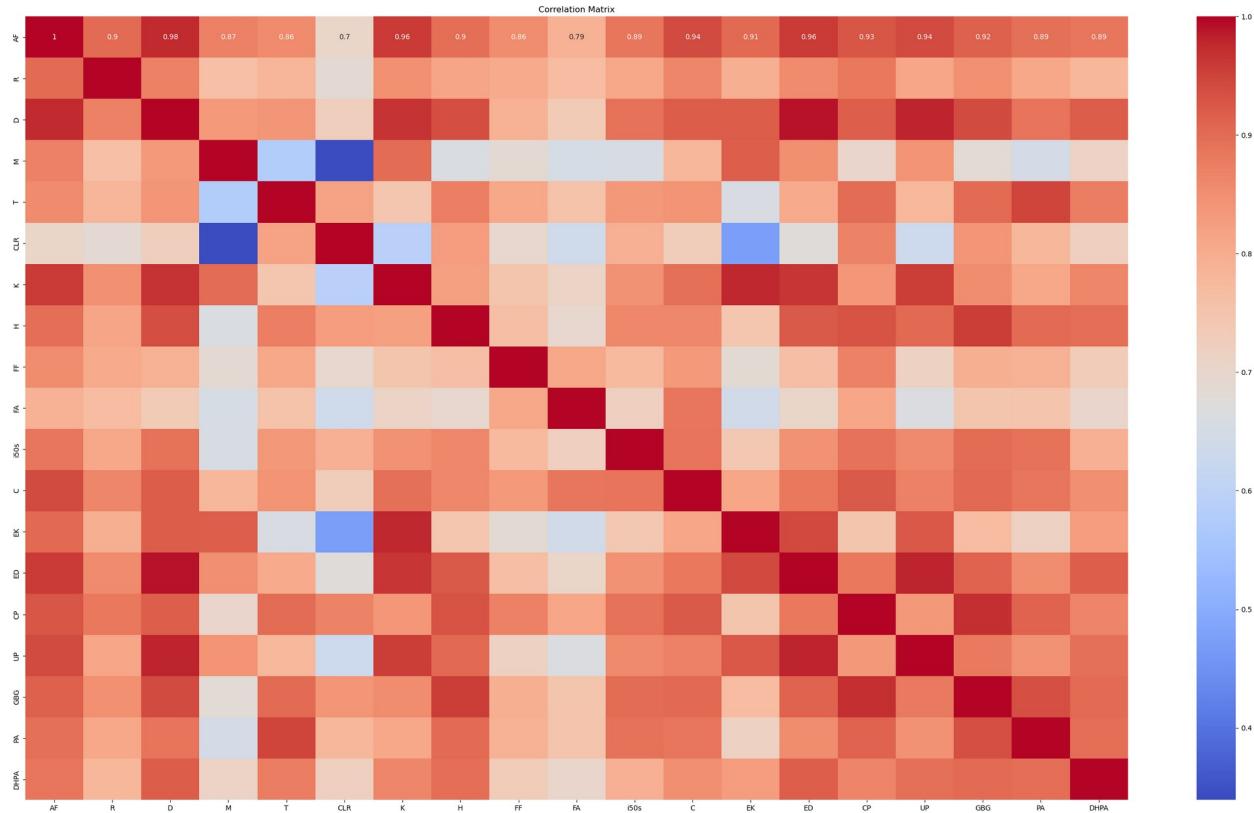
#Drop columns for all player names
final_df.drop(['Player','Current Team 2023','Position 2023','Position 2023','Status ','YEAR DEBUT','NO. 2023-2024 Season'],axis=1,
inplace=True)

<Figure size 1000x800 with 0 Axes>

plt.figure(figsize=(35, 20))
sns.heatmap(final_df.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Matrix')
plt.show()
```



Enhanced Correlation Matrix



Histogram of the individual features

```
#Enter back into the final dataframe
final_df = pd.read_csv(r'C:\Users\Michael Le\Desktop\vfl_afl_1897-2022_data_kaggle\acl_data_kaggle\acl_df_player_enhanced.csv')

from sklearn.model_selection import train_test_split
X =
final_df[['AF', 'R', 'G', 'M', 'T', 'CLR', 'K', 'H', 'HO', 'FF', 'FA', 'B', 'OP',
          'ToG%', 'i50s', 'DE%', 'C', 'R50s', 'EK', 'KE',
          '%', 'KHB', 'ED', 'CP', 'UP', 'IP', 'CPR', 'GBG', 'F50GBG', 'CC', 'SC', 'HTA',
          'HTW%', 'HTA%', 'RC', 'Mi50', 'CM', 'MOL', 'IM', 'GA', 'GA%',
          'SAG', 'SI', 'SL', 'Ti50', 'PA', 'DHPA', 'S', 'CD000', 'CDL', 'CDL',
          '%', 'Age 2024', 'Height 2024', 'Weight 2024', 'TOTAL GAMES (Up to R22
          2024)', 'YEAR DEBUT']]
y = final_df['D']
X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.2)

train_data = X_train.join(y_train)
# Remove duplicate columns
train_data = train_data.loc[:, ~train_data.columns.duplicated()]

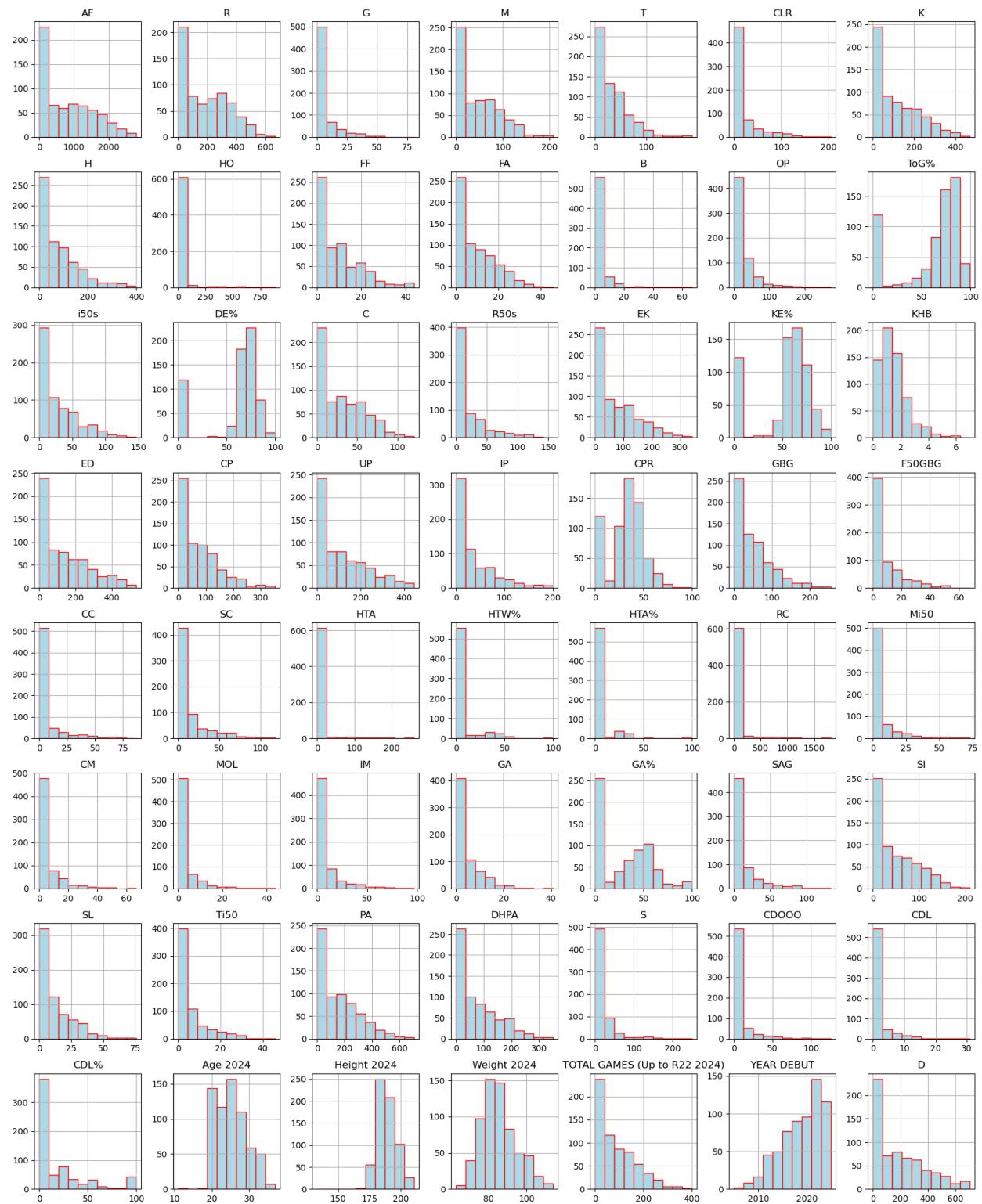
#Display the histogram/distribution of each of the individual features
train_data.hist(figsize=(20,25),color = "lightblue", ec="red")
```

```
array([[<Axes: title={'center': 'AF'}>, <Axes: title={'center': 'R'}>,
       <Axes: title={'center': 'G'}>, <Axes: title={'center': 'M'}>,
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       <Axes: title={'center': 'K'}>],
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       <Axes: title={'center': 'FF'}>, <Axes: title={'center':
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       <Axes: title={'center': 'B'}>, <Axes: title={'center': '0P'}>,
       <Axes: title={'center': 'ToG%'}>],
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       <Axes: title={'center': 'Height 2024'}>,
       <Axes: title={'center': 'Weight 2024'}>,
       <Axes: title={'center': 'TOTAL GAMES (Up to R22 2024)'}>,
```

```

<Axes: title={'center': 'YEAR DEBUT'}>,
<Axes: title={'center': 'D'}>]], dtype=object)

```

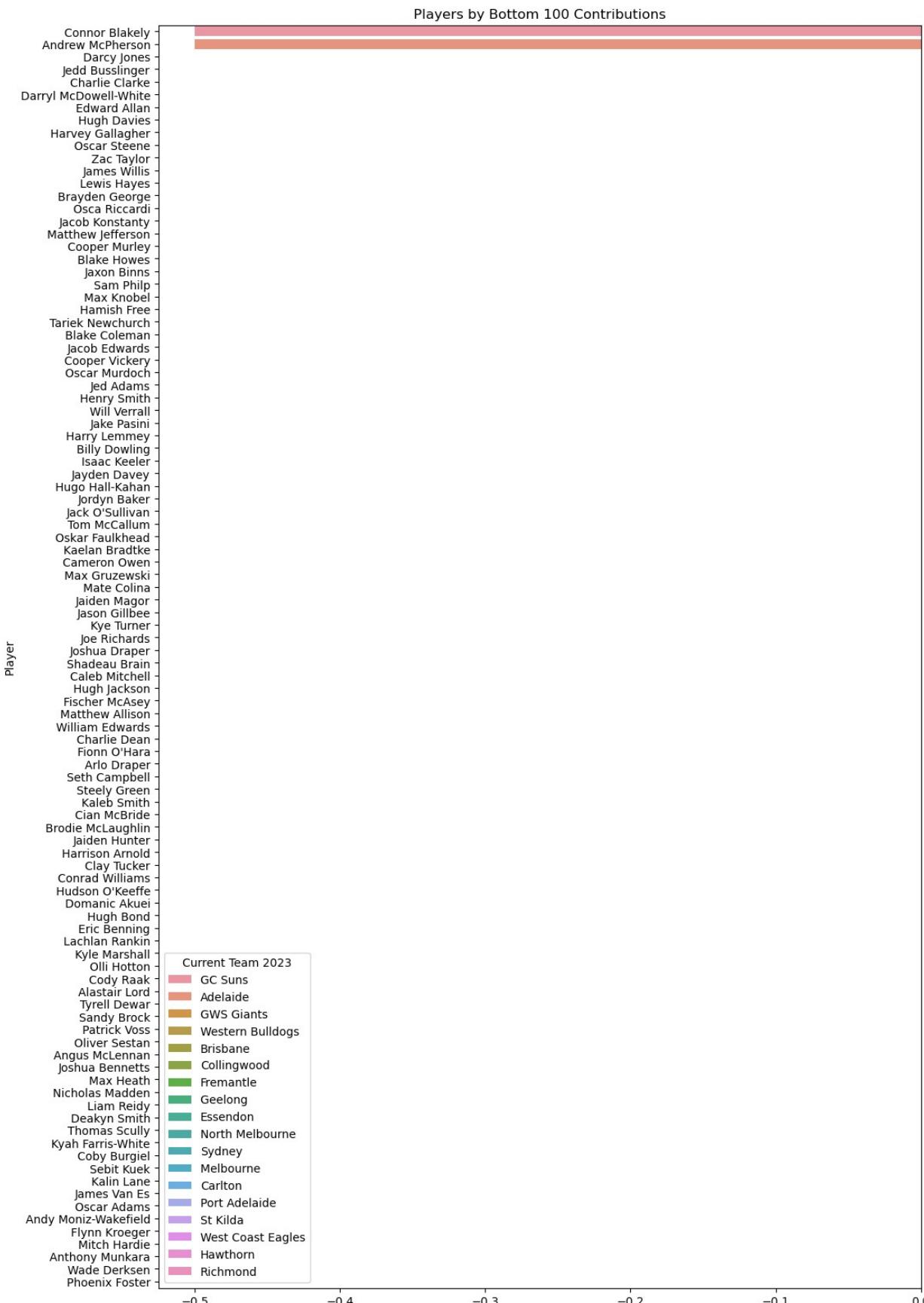


Step 4. Feature Engineering and further analysis

Re-enter Player names back into the final dataframe

Compute the Total Contributions

```
# Bottom performing players based on total contributions
# Displays all columns and rows
bottom_players = final_df.nsmallest(100, 'Total_Contributions')
plt.figure(figsize=(12, 20))
sns.barplot(x='Total_Contributions', y='Player',
            data=bottom_players,hue = 'Current Team 2023',dodge=False)
plt.title('Players by Bottom 100 Contributions')
plt.savefig('foo.png')
plt.show()
```



Top performing players based on total contributions

Displays all columns and rows

```
final_df[['Player',  
'Total_Contributions']].sort_values(by=['Total_Contributions'], ascending=False).head(100)
```

	Player	Total_Contributions
777	Tim English	10271.4
302	Rowan Marshall	10063.3
51	Marcus Bontempelli	9098.9
82	Christian Petracca	8830.5
786	Oscar McInerney	8645.8
121	Lachie Neale	8547.9
395	Errol Gulden	8396.7
782	Reilly O'Brien	8391.1
18	Stephen Coniglio	8296.8
6	Connor Rozee	8275.4
230	Tim Taranto	8228.0
215	Zak Butters	8196.0
196	Jordan Dawson	8184.6
154	Tom Green	8148.7
127	Zach Merrett	8115.3
149	Andrew Brayshaw	8060.8
58	Josh Dunkley	7970.2
28	Caleb Serong	7955.6
702	Jack Sinclair	7954.2
516	Jarrod Witts	7876.3
283	Noah Anderson	7810.2
629	Nick Daicos	7805.7
185	Max Gawn	7774.9
138	Dan Houston	7754.9
541	Rory Laird	7739.7
84	Tom Mitchell	7738.2
431	Tom Liberatore	7661.0
37	Brad Crouch	7629.3
101	Jack Viney	7588.1
508	Bailey J. Williams	7587.0
342	Tim Kelly	7507.1
346	Matt Rowell	7446.3
89	Josh Daicos	7397.4
153	Patrick Cripps	7379.0
40	Lachie Whitfield	7369.7
182	Luke Jackson	7285.9

335	Jack Crisp	7261.6
94	Hugh McCluggage	7256.7
318	Josh Kelly	7241.7
98	Scott Pendlebury	7215.4
367	Nic Newman	7166.0
67	Harry Sheezel	7154.8
299	Sam Docherty	7073.8
490	Luke Parker	7028.4
48	Lachie Ash	7018.6
85	Adam Cerra	7018.3
63	James Worpel	7000.8
59	Jai Newcombe	6994.0
279	Blake Acres	6940.4
123	Jack Steele	6803.4
168	Jack Macrae	6795.0
631	Mason Wood	6792.0
251	Luke Ryan	6768.7
2	Chad Warner	6727.1
373	Todd Goldstein	6701.2
724	Tom Stewart	6673.8
262	Will Day	6667.1
70	Darcy Parish	6649.0
634	Caleb Daniel	6639.3
467	Shai Bolton	6627.5
54	Nasiah Wanganeen-Milera	6582.2
1	Adam Treloar	6563.7
363	Liam Duggan	6555.1
76	James Sicily	6545.8
239	Conor Nash	6543.3
158	Angus Brayshaw	6519.7
497	Willem Drew	6505.4
772	Callum Wilkie	6495.3
461	Tom Atkins	6485.6
328	Ollie Wines	6472.5
787	Jake Lloyd	6432.1
126	James Rowbottom	6407.5
188	Darcy Cameron	6405.3
539	Bailey Dale	6382.1
745	Adam Saad	6352.7
550	Kieren Briggs	6320.1
698	Nic Martin	6305.7
27	Toby Greene	6294.9
288	Dylan Moore	6282.1
488	Mason Redman	6273.3
19	Jordan De Goey	6252.6
30	Joe Daniher	6232.4
487	Hayden Young	6188.4
220	Clayton Oliver	6187.4
418	Toby Nankervis	6186.7

317	Sam Walsh	6157.6
424	Trent Rivers	6131.0
33	Brayden Maynard	6129.2
480	Harry Himmelberg	6116.6
577	Harris Andrews	6090.7
482	Charlie Curnow	6089.6
404	Nick Blakey	6086.8
256	Daniel Rioli	6066.5
11	Andrew McGrath	6039.1
210	Bailey Scott	6033.0
100	Callan Ward	5980.8
191	Lachie Hunter	5970.2
96	Dustin Martin	5915.4
209	Jack Ziebell	5912.2
17	Ben Keays	5906.1

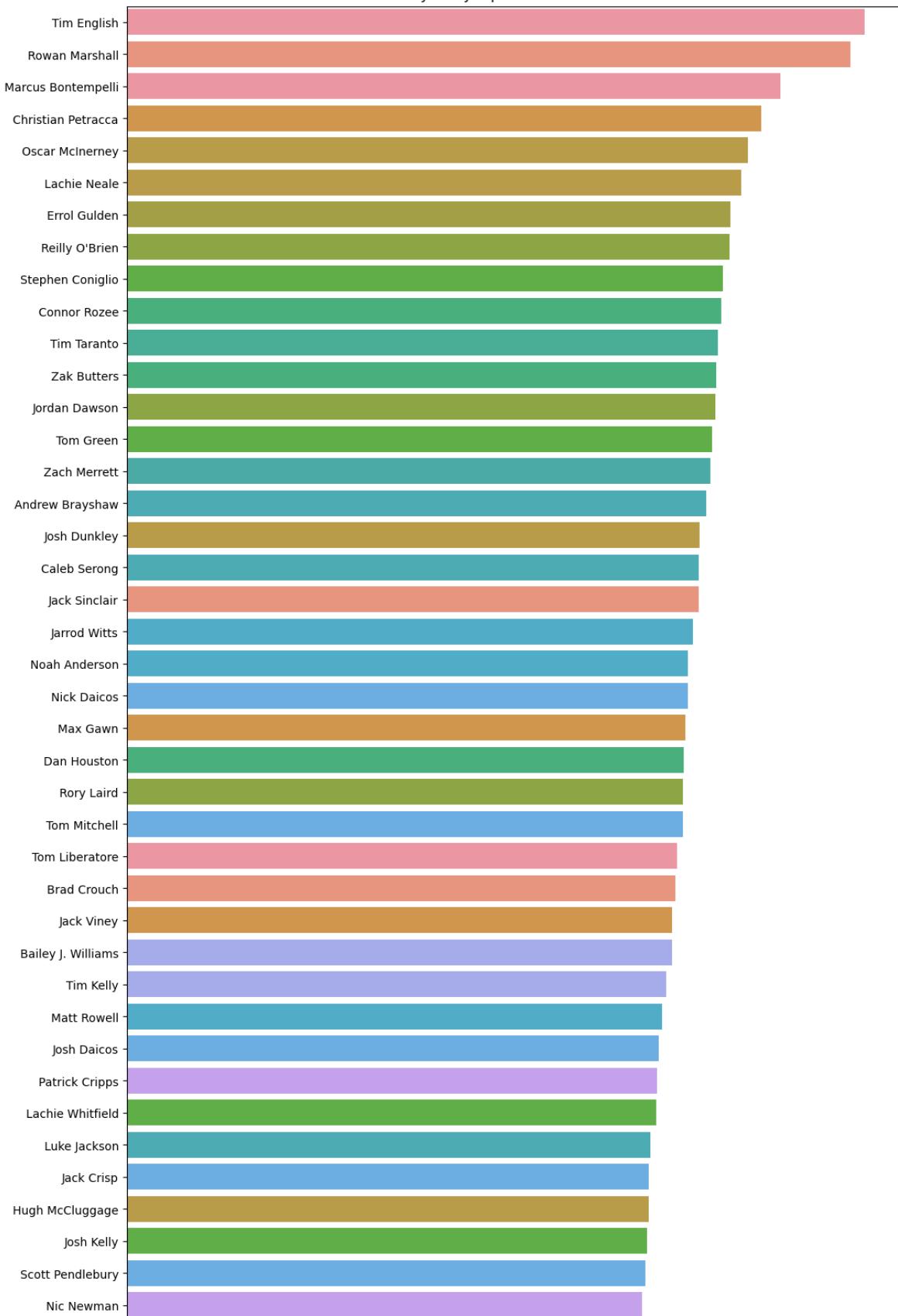
```

from pandas.plotting import register_matplotlib_converters
register_matplotlib_converters()
%matplotlib inline

top_players = final_df.nlargest(100, 'Total_Contributions')
plt.figure(figsize=(12, 50))
sns.barplot(x='Total_Contributions', y='Player',
            data=top_players,hue='Current Team 2023',dodge=False)
plt.title('Players by Top 100 Contributions')
plt.savefig('foo_1.png', format="png")
plt.figure()
plt.show()

```

Players by Top 100 Contributions

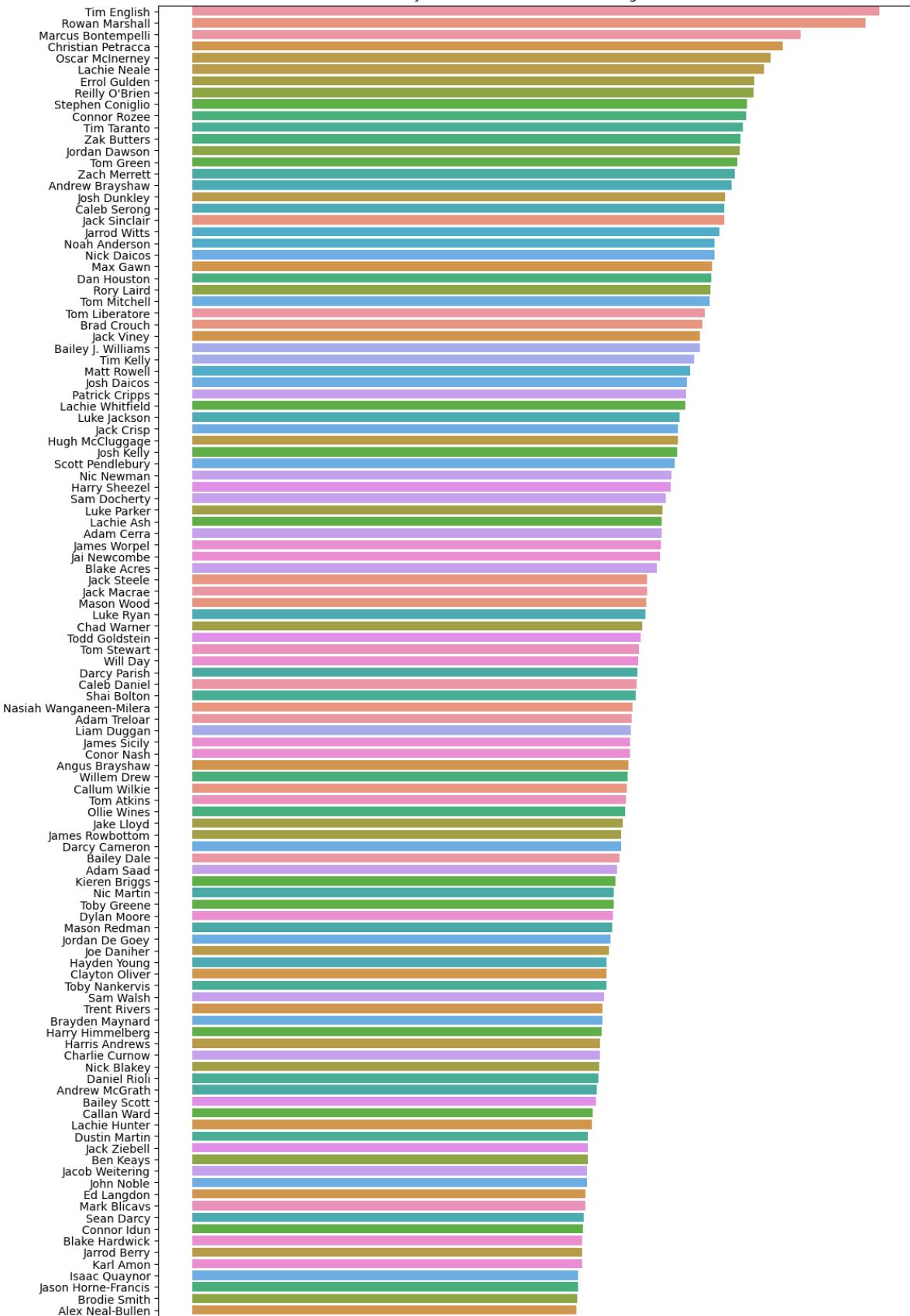


```
<Figure size 640x480 with 0 Axes>
```

Top performing players based on total contributions in descending order

```
full_rank_player_contributions = final_df.nlargest(808,
'Total_Contributions')
plt.figure(figsize=(12, 150))
sns.barplot(x='Total_Contributions', y='Player',
data=full_rank_player_contributions,hue='Current Team
2023',dodge=False)
plt.title('Players Contributions in descending order')
plt.show()
```

Players Contributions in descending order



Some examples of further Player Analysis

Performance Evaluation

Compare key statistics across players to determine who is performing well.

```
final_df[['Player', 'G', 'K', 'M']].sort_values(by='G', ascending=False)
```

	Player	G	K	M
482	Charlie Curnow	81	280	180
208	Taylor Walker	76	226	124
365	Nick Larkey	71	152	97
27	Toby Greene	66	289	106
30	Joe Daniher	61	316	154
427	Charlie Cameron	59	196	88
132	Jeremy Cameron	53	255	114
355	Oscar Allen	53	170	113
73	Kyle Langford	51	218	130
421	Tom Hawkins	49	146	91
320	Jesse Hogan	49	182	141
660	Brody Mihocek	47	189	114
356	Luke Breust	47	144	77
602	Aaron Naughton	44	180	100
567	Eric Hipwood	41	200	140
576	Oliver Henry	41	139	82
448	Jye Amiss	41	112	79
603	Ben King	40	112	67
34	Jamie Elliott	39	170	110
258	Jack Lukosius	39	256	140
241	Jeremy Finlayson	38	207	102
597	Bayley Fritsch	38	139	71
701	Kysiah Pickett	37	193	58
175	Tom Papley	37	254	74
56	Mitch Lewis	36	125	85
80	Todd Marshall	36	155	103
0	Jack Higgins	36	163	82
432	Izak Rankine	36	197	74
478	Jake Riccardi	35	146	84
3	Jamarra Ugle-Hagan	35	188	120
581	Darcy Fogarty	34	157	102
36	Cody Weightman	34	139	54
275	Bobby Hill	33	172	78
512	Lachie Schultz	33	208	100
247	Dan Butler	33	176	49
195	Michael Walters	33	127	56
81	Logan McDonald	32	131	84
169	Jack Riewoldt	32	139	94
467	Shai Bolton	31	315	79
25	Sam Powell-Pepper	31	202	64

307	Willie Rioli	31	136	52
24	Isaac Heeney	30	214	110
641	Zac Bailey	29	254	76
192	Harry McKay	29	190	141
82	Christian Petracca	28	351	107
125	Lincoln McCarthy	28	188	62
194	Max King	28	73	48
21	Jacob van Rooyen	28	90	62
788	Matthew Owies	27	107	48
310	Tyson Stengle	27	146	48
569	Michael Frederick	26	151	77
466	Jack Darling	26	129	80
65	Jaidyn Stephenson	26	146	75
129	Mitch Owens	26	187	83
190	Brent Daniels	26	196	54
172	Luke Pedlar	25	173	72
96	Dustin Martin	25	280	94
128	Will Hayward	25	177	99
717	Kade Chandler	24	152	83
39	Jesse Motlop	24	123	38
554	Levi Casboult	24	138	95
69	Rory Lobb	24	112	65
135	Josh Rachele	23	204	81
174	Cam Rayner	23	215	102
449	Charlie Dixon	23	105	67
807	Jye Menzie	23	100	47
182	Luke Jackson	22	165	78
17	Ben Keays	22	218	72
395	Errol Gulden	22	464	126
249	Jack Gunston	22	134	88
32	Jade Gresham	21	229	87
416	Jake Stringer	21	145	45
651	Ash Johnson	21	83	53
46	Hayden McLean	21	150	97
742	Brad Close	21	124	53
6	Connor Rozee	21	390	117
238	Ben Ainsworth	21	228	100
268	Jake Melksham	20	84	50
111	Daniel McStay	20	77	53
707	Cameron Zurhaar	20	159	39
666	Joel Amartey	20	78	58
230	Tim Taranto	19	337	79
629	Nick Daicos	19	357	71
648	Malcolm Rosas	19	109	38
801	Callum M. Brown	19	118	77
795	Anthony Caminiti	19	78	60
582	Alex Neal-Bullen	19	228	77
51	Marcus Bontempelli	19	370	101
344	Peter Wright	19	64	44

423	Lance Franklin	19	84	53
19	Jordan De Goey	18	257	76
284	Archie Perkins	18	219	95
130	Riley Thilthorpe	18	126	74
347	Gary Rohan	18	89	45
589	Darcy Byrne-Jones	18	192	68
698	Nic Martin	17	290	124
353	Jack Martin	17	75	46
580	Beau McCreery	17	170	67
692	Mason Cox	17	109	69
288	Dylan Moore	17	254	107
9	Sam Sturt	17	65	45
455	Paul Curtis	17	124	54
371	Jamie Cripps	16	88	40
351	Jason Horne-Francis	16	268	78
713	Sam Switkowski	16	134	58
318	Josh Kelly	16	286	64
89	Josh Daicos	16	362	120
777	Tim English	16	258	145
631	Mason Wood	15	332	161
584	Josh Treacy	15	86	58
406	Fergus Greene	15	56	38
528	Ollie Lord	15	47	31
2	Chad Warner	15	309	65
203	Sam Weideman	15	86	65
18	Stephen Coniglio	15	397	80
761	Cooper Sharman	15	97	57
22	Jack Silvagni	14	129	64
546	Matt Guelfi	14	68	30
283	Noah Anderson	14	380	104
481	David Swallow	14	222	78
714	Jed McEntee	14	99	48
429	Mattaes Phillipou	13	124	69
593	Tyler Brockman	13	79	50
215	Zak Butters	13	361	126
157	Nick Holman	13	101	48
94	Hugh McCluggage	13	327	117
1	Adam Treloar	13	253	54
559	Justin McInerney	13	183	87
156	Taylor Adams	13	222	78
630	Jack Ginnivan	12	87	32
164	Toby Bedford	12	105	44
770	Mark Blicavs	12	154	65
165	Liam Baker	12	258	85
703	Daniel Lloyd	12	162	67
521	Samson Ryan	12	66	40
99	Lachlan Murphy	12	190	67
696	Harrison Petty	12	78	64
445	Shane McAdam	12	38	30

617	Eddie Ford	12	92	66
563	Connor Macdonald	12	209	84
480	Harry Himmelberg	12	291	121
59	Jai Newcombe	12	244	100
515	Anthony Scott	12	132	53
100	Callan Ward	11	243	71
558	Xavier O'Halloran	11	103	31
806	Matthew Cottrell	11	160	72
329	Corey Durdin	11	66	16
614	Tom Sparrow	11	213	70
458	Tarryn Thomas	11	125	31
803	Ben Brown	11	44	26
97	Jye Caldwell	11	183	71
627	Bailey Williams	11	215	116
42	Jake Waterman	11	112	71
402	Judson Clarke	11	68	26
360	Bailey Humphrey	11	148	32
511	Joel Smith	11	59	37
149	Andrew Brayshaw	11	322	87
142	Charlie Spargo	11	92	45
560	Patrick Dangerfield	11	213	59
754	Bailey Banfield	11	89	41
185	Max Gawn	10	228	102
414	Jack Petruccelle	10	114	46
552	Francis Evans	10	51	20
342	Tim Kelly	10	288	75
286	Sam Wicks	10	65	19
519	Rhyan Mansell	10	94	40
240	Jake Soligo	10	209	74
211	Isaac Smith	10	326	139
26	Mabior Chol	10	49	28
279	Blake Acres	10	319	137
335	Jack Crisp	10	294	98
63	James Worpel	10	286	52
634	Caleb Daniel	10	295	100
113	Jarrod Berry	10	268	119
92	Brodie Grundy	10	100	46
64	Sam Draper	10	101	37
608	Will Hoskin-Elliott	10	199	92
668	Ryan Maric	9	45	28
154	Tom Green	9	312	75
274	Tom Lynch	9	26	18
786	Oscar McInerney	9	173	44
153	Patrick Cripps	9	226	51
138	Dan Houston	9	389	143
98	Scott Pendlebury	9	305	89
549	Jack Graham	9	147	45
85	Adam Cerra	9	275	74
287	Jy Simpkin	9	194	48

269	Tom De Koning	9	114	54
183	Curtis Taylor	9	148	76
379	Jacob Koschitzke	9	56	39
490	Luke Parker	9	269	86
333	Chad Wingard	9	116	59
459	Tom McDonald	9	43	24
234	Karl Amon	9	326	113
127	Zach Merrett	8	336	112
302	Rowan Marshall	8	314	126
101	Jack Viney	8	315	73
37	Brad Crouch	8	292	90
296	Braeden Campbell	8	238	99
119	Jack Ross	8	185	100
248	Luke Davies-Uniacke	8	175	52
159	Dayne Zorko	8	272	118
118	Will Ashcroft	8	200	61
74	Ryan Burton	8	278	80
112	Tanner Bruhn	8	176	56
743	Marlion Pickett	8	130	54
557	Jaspa Fletcher	8	102	65
431	Tom Liberatore	8	266	59
299	Sam Docherty	8	359	138
86	Dion Prestia	8	211	63
619	Noah Cumberland	8	49	23
518	Conor McKenna	7	358	95
20	Jaeger O'Meara	7	186	55
231	Travis Boak	7	173	60
357	Zaine Cordy	7	59	43
586	Sam Simpson	7	26	12
237	Jayden Short	7	279	100
359	Noah Long	7	99	46
281	Rhylee West	7	62	29
226	Billy Frampton	7	100	51
168	Jack Macrae	7	239	82
110	Brandon Ellis	7	195	86
493	Gryan Miers	7	259	108
488	Mason Redman	7	380	138
115	Jayden Hunt	7	283	125
400	Jacob Hopper	7	162	55
346	Matt Rowell	7	273	43
5	Chayce Jones	7	216	46
452	Tom Powell	7	94	39
184	Max Holmes	7	228	69
649	Jeremy Howe	7	144	84
176	Trent Cotchin	7	161	53
221	Callum Mills	7	207	95
84	Tom Mitchell	7	250	79
304	Ivan Soldo	7	47	31
50	Callum Ah Chee	6	81	42

173	Xavier Duursma	6	146	67
689	Ben Miller	6	49	31
162	Isaac Cumming	6	231	83
266	Oskar Baker	6	191	86
160	Dylan Shiel	6	105	32
328	Ollie Wines	6	201	84
191	Lachie Hunter	6	308	100
548	Tim Membrey	6	53	36
196	Jordan Dawson	6	401	114
503	Sam Butler	6	34	22
120	Bradley Hill	6	271	103
262	Will Day	6	262	122
295	Darcy Tucker	6	165	76
126	James Rowbottom	6	238	27
702	Jack Sinclair	6	470	119
77	Zach Tuohy	6	248	71
317	Sam Walsh	6	222	63
31	Aaron Cadman	6	35	19
229	Ed Langdon	6	272	93
152	Rory Sloane	6	212	69
220	Clayton Oliver	6	224	63
151	Ben Hobbs	6	195	72
456	David Cunningham	6	64	26
538	Kamdyn McIntosh	6	223	93
206	Will Snelling	6	89	44
616	Joel Jeffrey	5	54	16
107	Dom Sheed	5	184	84
72	Ryan Clarke	5	51	24
706	Jason Johannisen	5	150	54
340	Mitch Duncan	5	224	110
75	Sam Flanders	5	179	75
108	Matthew Kennedy	5	157	58
366	Sam Durham	5	178	107
800	Jai Culley	5	14	8
551	Jack Williams	5	35	24
530	Andrew Phillips	5	90	46
148	Alex Sexton	5	29	14
210	Bailey Scott	5	330	120
16	Patrick Lipinski	5	114	40
219	Oliver Florent	5	272	95
508	Bailey J. Williams	5	130	44
197	Ryan Byrnes	5	184	68
188	Darcy Cameron	5	139	65
755	Darcy Wilmot	5	297	107
497	Willem Drew	5	203	62
734	Brandon Ryan	4	15	10
372	Callum Coleman-Jones	4	41	27
217	Jack Bowes	4	156	66
216	Xavier O'Neill	4	100	37

570	Arthur Jones	4	47	17
147	Hunter Clark	4	185	54
362	Josh Weddle	4	135	87
308	Elijah Hewett	4	88	28
60	Bailey Smith	4	230	62
373	Todd Goldstein	4	99	45
550	Kieren Briggs	4	165	47
686	Jacob Bauer	4	14	8
315	Tom Emmett	4	16	7
68	Sean Darcy	4	95	51
610	Jack Henry	4	81	47
407	Denver Grainger-Barras	4	25	19
35	Liam Ryan	4	30	15
785	Anthony McDonald-Tipungwuti	4	27	15
28	Caleb Serong	4	337	72
198	James Aish	4	224	80
792	Matthew Johnson	4	131	59
222	Brayden Fiorini	4	204	69
397	Zac Fisher	4	135	40
256	Daniel Rioli	4	272	97
273	Steele Sidebottom	4	257	85
252	Jake Bowey	4	259	85
504	Jamaine Jones	4	142	47
377	Peter Ladham	4	75	29
723	Lachlan Sholl	4	175	78
245	Touk Miller	4	191	50
594	Lachie Jones	4	94	45
123	Jack Steele	4	227	86
599	Josh Fahey	4	38	15
588	Brodie Smith	4	334	109
526	Alwyn Davey Jnr	4	41	20
749	Quinton Narkle	4	18	7
293	Jack Scrimshaw	4	157	85
516	Jarrod Witts	4	151	51
461	Tom Atkins	4	195	33
793	Lachlan Gollant	4	28	16
523	Charlie Comben	4	28	17
410	James Jordon	4	113	46
139	Lachie Fogarty	4	77	28
782	Reilly O'Brien	4	117	66
474	Ned McHenry	4	75	39
54	Nasiah Wanganeen-Milera	4	419	150
385	James Tsitas	3	10	8
718	Alex Cincotta	3	113	53
352	Matt Taberner	3	20	19
720	Harvey Harrison	3	13	9
368	Noah Balta	3	271	147
337	Reef McInnes	3	11	8
29	Hugh Greenwood	3	66	29

418	Toby Nankervis	3	130	37
367	Nic Newman	3	376	183
339	Nick Hind	3	220	68
433	Connor West	3	40	16
657	Josh Honey	3	27	14
67	Harry Sheezel	3	357	125
541	Rory Laird	3	262	67
547	Wayne Milera	3	247	96
47	Dylan Stephens	3	113	37
186	Angus Sheldrick	3	49	19
180	Elijah Hollands	3	72	23
637	Zach Guthrie	3	251	128
632	Ed Curnow	3	141	46
13	Deven Robertson	3	71	34
787	Jake Lloyd	3	372	138
121	Lachie Neale	3	311	109
117	Harry Cunningham	3	171	85
109	Nat Fyfe	3	52	23
106	Andrew Gaff	3	210	90
621	Harry Perryman	3	224	66
93	John Noble	3	322	123
605	Tristan Xerri	3	30	9
62	Jarman Impey	3	299	120
70	Darcy Parish	3	271	78
213	Finn Callaghan	3	208	97
712	Darcy Macpherson	3	306	128
43	Rory Atkins	3	241	87
479	Cam Mackenzie	3	86	26
324	Josh Corbett	3	23	20
323	Lloyd Meek	3	46	36
322	Liam Shiels	3	139	66
319	Mitch Hannan	3	29	14
301	Miles Bergman	3	225	115
750	Hewago Oea	3	41	11
278	Ben Cunningham	3	62	20
476	George Hewett	3	182	49
267	Sam Petrevski-Seton	3	94	35
662	Mark O'Connor	3	186	96
499	Caleb Poulter	3	68	24
485	Will Phillips	3	113	28
484	Riley Bonner	2	100	37
492	Harry Schoenberg	2	76	29
439	Josh Ward	2	181	76
424	Trent Rivers	2	307	119
539	Bailey Dale	2	393	92
622	Greg Clark	2	59	31
7	Nick Vlastuin	2	283	144
23	Paddy Dow	2	96	15
465	Laitham Vandermeer	2	87	30

591	Nathan Broad	2	192	101
587	Brennan Cox	2	210	151
678	Henry Hustwaite	2	10	5
390	Harry Sharp	2	34	13
14	Marcus Windhager	2	156	74
536	Lachlan McNeil	2	28	12
404	Nick Blakey	2	318	98
612	Kayne Turner	2	60	36
102	Matt Crouch	2	55	18
732	Robbie Fox	2	152	61
331	Daniel Howe	2	107	40
330	Luke Shuey	2	105	20
58	Josh Dunkley	2	261	120
53	Harry Morrison	2	163	69
305	Ethan Hughes	2	157	85
790	Jackson Mead	2	32	12
158	Angus Brayshaw	2	279	93
170	Kane Farrell	2	281	82
757	Taj Woewodin	2	18	8
259	Orazio Fantasia	2	13	5
179	Maurice Rioli	2	40	14
48	Lachie Ash	2	403	140
193	Mitch Knevitt	2	61	24
243	Mitch McGovern	2	297	105
235	Nick Haynes	2	214	125
225	Keidean Coleman	2	306	120
207	Will Setterfield	2	112	47
214	Jarryd Lyons	2	47	12
122	Daniel Rich	2	113	38
298	Blake Hardwick	2	314	147
44	Oliver Hollands	2	163	58
83	Ned Reeves	2	70	31
374	Harrison Jones	2	29	21
380	Mitch Georgiades	2	18	12
76	James Sicily	2	324	189
78	Elijah Tsatas	1	35	15
223	Hugo Ralphsmith	1	77	43
487	Hayden Young	1	323	105
49	Sebastian Ross	1	190	42
272	Jordan Ridley	1	259	126
40	Lachie Whitfield	1	407	139
276	Jayden Laverde	1	186	124
280	Luke McDonald	1	249	119
564	Nathan O'Driscoll	1	92	43
167	Aaron Francis	1	88	61
633	Matt Roberts	1	28	12
95	Jordan Clark	1	266	131
531	Neil Erasmus	1	94	43
472	Tom Cole	1	108	67

87	Brandan Parfitt	1	58	6
746	Massimo D'Ambrosio	1	56	24
679	Ryan Lester	1	197	119
376	Harry Rowston	1	28	11
294	Josh Schache	1	7	5
791	Jy Farrar	1	48	21
264	Jack Hayes	1	2	4
177	Changkuoth Jiath	1	77	28
669	Riley Garcia	1	12	2
396	Marc Sheather	1	5	2
205	George Wardlaw	1	58	18
522	Toby McMullin	1	10	3
232	Jack Billings	1	22	13
656	Robbie McComb	1	7	4
767	Cooper Hamilton	1	27	12
384	Nick Bryan	1	43	20
239	Conor Nash	1	213	60
509	Jake Kelly	1	136	91
244	Charlie Ballard	1	230	142
681	Brandon Starcevich	1	233	116
199	Brynn Teakle	1	16	5
246	Sam Day	1	13	10
79	James Harmes	1	50	13
398	Mitchell Hinge	1	313	104
391	Oleg Markov	1	151	83
181	Reuben Ginbey	1	86	25
494	Shannon Neale	1	9	12
381	Ed Richards	1	292	107
573	Finn Maginness	1	65	41
413	Lachlan Keeffe	1	43	28
105	Ryan Angwin	1	62	31
434	Oliver Dempsey	1	16	8
583	Darcy Fort	1	37	12
623	Elliott Himmelberg	1	18	11
419	Jack Bytel	1	25	15
426	Matthew Coulthard	1	18	7
131	Alex Davies	1	60	15
724	Tom Stewart	1	408	182
590	Cooper Harvey	1	17	11
425	Alex Witherden	1	304	117
363	Liam Duggan	1	365	167
345	Dyson Heppell	1	253	156
436	Zane Trew	1	15	3
697	Corey Warner	1	6	3
343	Griffin Logue	1	105	76
341	James O'Donnell	1	60	34
209	Jack Ziebell	1	389	149
133	Aidan Corr	1	206	93
592	Matt Flynn	1	47	15

134	Elliot Yeo	1	115	34
738	Ryan Gardner	1	61	36
460	Josh Battle	1	216	146
103	Lachlan Bramble	1	120	46
306	Jaxon Prior	1	36	14
575	Phoenix Spicer	1	18	6
12	Kai Lohmann	1	24	11
577	Harris Andrews	1	281	203
10	Tom Jonas	1	63	44
453	Flynn Perez	1	32	17
685	Sam Banks	1	55	17
417	Liam Henry	1	196	79
450	Ned Long	1	14	6
312	Brodie Kemp	1	182	113
313	Will Brodie	1	37	5
775	Oscar Adams	0	0	0
776	Andy Moniz-Wakefield	0	0	0
642	Ted Clohesy	0	1	1
794	Rhett Montgomerie	0	0	0
643	Joshua Draper	0	0	0
644	Will Kelly	0	9	6
774	Jack Buckley	0	198	114
645	Kallan Dawson	0	6	3
624	Mate Colina	0	0	0
615	Lloyd Johnston	0	16	4
646	Shadeau Brain	0	0	0
647	Luke Cleary	0	5	2
773	James Van Es	0	0	0
639	Ben Paton	0	92	53
799	Trent Dumont	0	0	0
796	Leo Connolly	0	0	0
618	Cameron Owen	0	0	0
789	Alex Mirkov	0	0	0
628	Dante Visentini	0	10	2
783	Wade Derksen	0	0	0
626	Max Ramsden	0	5	5
635	Jason Gillbee	0	0	0
636	Kye Turner	0	0	0
781	Anthony Munkara	0	0	0
625	Jaiden Magor	0	0	0
797	Nathan Barkla	0	0	0
620	Max Gruzewski	0	0	0
780	Ned Moyle	0	6	0
804	Lachlan McAndrew	0	4	2
802	Kieran Strachan	0	0	0
798	Ethan Stanley	0	7	2
805	Mark Keane	0	46	29
638	Joe Richards	0	0	0
640	Blake Drury	0	14	5
779	Mitch Hardie	0	0	0

778	Flynn Kroeger	0	0	0
784	Phoenix Foster	0	0	0
711	Alex Keath	0	128	92
650	Aiden Begg	0	0	0
690	Steely Green	0	0	0
695	Andrew McPherson	0	0	0
731	Lachlan Rankin	0	0	0
694	Jordan Boyd	0	83	26
693	Cian McBride	0	0	0
733	Kyle Marshall	0	0	0
735	Olli Hotton	0	0	0
691	Kaleb Smith	0	0	0
736	Cody Raak	0	0	0
729	Eric Benning	0	0	0
688	Tylar Young	0	129	55
737	Alastair Lord	0	0	0
687	Seth Campbell	0	0	0
739	Tyrell Dewar	0	0	0
684	Tyler Sonsie	0	16	4
740	Sandy Brock	0	0	0
741	Patrick Voss	0	0	0
730	Robert Hansen Jr	0	4	1
613	Max Lynch	0	0	0
682	Carter Michael	0	0	0
704	Jake Stein	0	0	0
710	Jaiden Hunter	0	0	0
709	Jack Buller	0	1	2
708	Noah Answerth	0	18	10
715	Harrison Arnold	0	0	0
716	Connor Idun	0	225	142
4	Steven May	0	321	125
705	Brodie McLaughlin	0	0	0
719	Tom Campbell	0	0	0
728	Hugh Bond	0	0	0
721	Clay Tucker	0	0	0
722	Conrad Williams	0	0	0
700	Darragh Joyce	0	37	25
725	Harry Edwards	0	12	7
699	Patrick Parnell	0	37	17
726	Hudson O'Keeffe	0	0	0
727	Domanic Akuei	0	0	0
683	Jack Payne	0	177	124
680	Rhys Mathieson	0	0	0
772	Callum Wilkie	0	329	207
658	James Borlase	0	20	15
665	William Edwards	0	0	0
663	Matthew Allison	0	0	0
763	Liam Reidy	0	0	0
764	Deakyn Smith	0	0	0

661	Fischer McAsey	0	0	0
659	Callum Jamieson	0	14	7
765	Thomas Scully	0	0	0
766	Kyah Farris-White	0	0	0
760	Nicholas Madden	0	0	0
768	Coby Burgiel	0	0	0
655	Hugh Jackson	0	0	0
769	Sebit Kuek	0	0	0
654	Emerson Jeka	0	0	0
653	Cooper Whyte	0	1	1
652	Caleb Mitchell	0	0	0
771	Kalin Lane	0	0	0
762	Tex Wanganeen	0	0	0
759	Max Heath	0	0	0
744	Adam Kennedy	0	22	8
673	Bailey Macdonald	0	13	11
745	Adam Saad	0	341	111
677	Josh Carmichael	0	0	0
676	Arlo Draper	0	0	0
675	Trey Ruscoe	0	9	7
747	Oliver Sestan	0	0	0
674	Fionn O'Hara	0	0	0
748	Caleb Graham	0	0	0
751	Lewis Melican	0	47	19
667	Roarke Smith	0	0	0
672	Charlie Dean	0	0	0
752	Angus McLennan	0	0	0
753	Joshua Bennetts	0	0	0
671	Seamus Mitchell	0	131	66
670	Jakob Ryan	0	3	2
756	Jordon Butts	0	85	56
758	Daniel Turner	0	17	7
664	Aaron Hall	0	103	35
66	Judd McVee	0	192	69
611	Kaelan Bradtke	0	0	0
257	Max Michalanney	0	159	80
316	Isaac Quaynor	0	250	143
314	Adam Tomlinson	0	91	39
311	James Willis	0	0	0
309	Aiden Bonar	0	7	7
38	Lachlan Cowan	0	49	20
303	James Stewart	0	0	0
300	Jack Carroll	0	1	0
297	Josh Bruce	0	43	36
292	Thomas Berry	0	24	10
291	Taylor Duryea	0	147	84
290	Zac Taylor	0	0	0
289	Travis Colyer	0	0	0
285	Nathan Wilson	0	44	22

282	Will Hamill	0	0	0
277	Leek Aleer	0	0	0
271	Tom Doedee	0	92	49
270	Josh Gibcus	0	0	0
265	Esava Ratugolea	0	93	70
263	James Peatling	0	64	26
261	Jack Peris	0	5	3
260	Lachie Weller	0	138	61
321	Lewis Hayes	0	0	0
325	Nic Naitanui	0	0	0
326	Brayden George	0	0	0
361	Jacob Weitering	0	317	208
387	Jed Bews	0	79	36
386	Josh Rotham	0	102	68
383	Sam Reid	0	0	0
382	Cooper Murley	0	0	0
378	Lachie Young	0	26	16
375	Luke Edwards	0	86	42
370	Liam Jones	0	129	89
369	Shannon Hurn	0	202	70
364	Jeremy Sharp	0	0	0
358	Caleb Marchbank	0	77	46
327	Jed Anderson	0	0	0
33	Brayden Maynard	0	318	125
354	Matthew Jefferson	0	0	0
350	Cooper Stephens	0	0	0
349	Jacob Konstanty	0	0	0
348	Lachie Plowman	0	9	5
338	Tom Fullarton	0	0	0
336	Osca Riccardi	0	0	0
334	Tom Clurey	0	2	1
332	Dougal Howard	0	150	99
41	Rhys Stanley	0	78	30
255	Brayden Cook	0	10	5
609	Oskar Faulkhead	0	0	0
254	Trent McKenzie	0	147	74
155	Nathan Kreuger	0	2	1
150	Toby McLean	0	10	8
146	Jake Kolodjashnij	0	136	89
145	Darryl McDowell-White	0	0	0
144	James Madden	0	5	0
143	Robbie Tarrant	0	0	0
141	Charlie Clarke	0	0	0
140	Toby Conway	0	2	1
137	Nakia Cockatoo	0	0	0
136	Tom Wilson	0	2	2
55	Sam Berry	0	27	6
57	Jedd Busslinger	0	0	0
124	Braydon Preuss	0	0	0

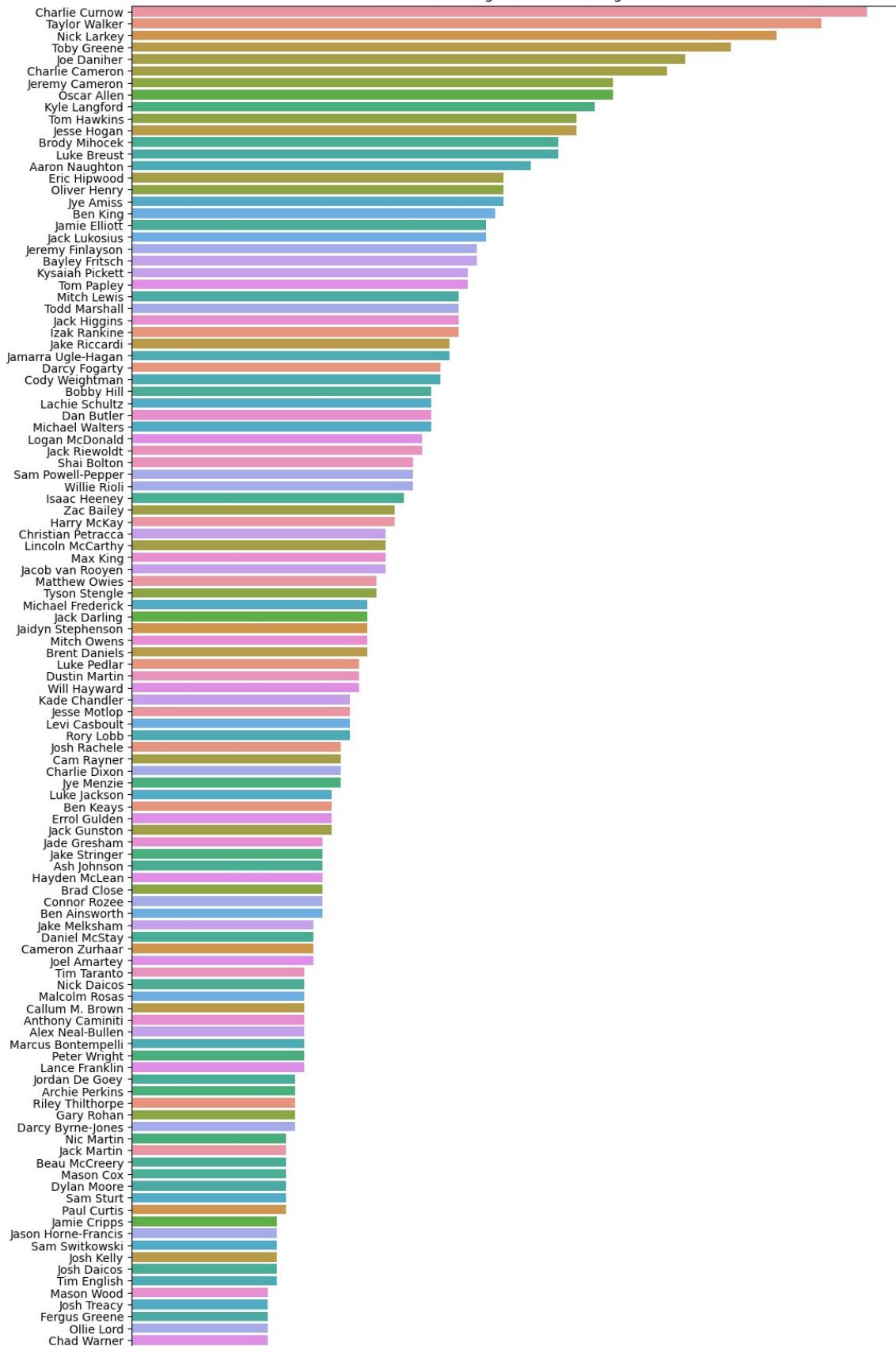
116	Jacob Wehr	0	13	7
114	Jake Lever	0	194	129
104	Jackson Hately	0	0	1
91	Sam Frost	0	116	75
90	Trent Bianco	0	7	3
88	Zac Williams	0	0	0
61	Dylan Grimes	0	121	52
71	Heath Chapman	0	23	15
161	Sam Menegola	0	17	6
163	Sam Darcy	0	7	2
166	Paddy McCartin	0	30	15
218	Jhye Clark	0	4	0
253	Nick Coffield	0	0	0
251	Luke Ryan	0	451	189
250	Sam De Koning	0	129	86
242	Jonathon Ceglar	0	34	21
236	Bailey Laurie	0	14	3
233	Nik Cox	0	32	18
228	Oscar Steene	0	0	0
227	Finlay Macrae	0	0	0
224	Conor Stone	0	7	2
212	Jason Castagna	0	0	0
52	Christian Salem	0	200	63
204	Harvey Gallagher	0	0	0
202	Hugh Davies	0	0	0
201	Liam Stocker	0	239	145
200	Josh Sinn	0	10	5
45	Lochie O'Brien	0	30	17
189	Edward Allan	0	0	0
187	Jase Burgoyne	0	27	13
178	Paul Seedsman	0	0	0
171	Sam Taylor	0	118	93
388	Daniel McKenzie	0	0	0
389	Campbell Chesser	0	80	33
392	Brady Hough	0	138	85
393	Blake Howes	0	0	0
553	Charlie Lazzaro	0	15	6
545	Jack Mahony	0	12	8
544	Darcy Gardiner	0	22	12
543	Rhett Bazzo	0	41	34
542	Jimmy Webster	0	159	94
540	Harry Lemmey	0	0	0
537	Jackson Archer	0	24	12
535	Josh Goater	0	79	46
534	Jake Pasini	0	0	0
533	Phil Davis	0	0	0
532	Oisin Mullin	0	22	12
529	Nick Murray	0	114	67
527	Luke Nankervis	0	36	18

525	Zach Reid	0	0	0
524	Sam Durdin	0	0	0
520	Chris Burgess	0	3	1
517	Will Gould	0	17	9
514	Luke Foley	0	72	41
513	Brandon Zerk-Thatcher	0	164	120
510	Dominic Bedendo	0	0	0
507	Wil Powell	0	275	115
15	Zak Jones	0	26	9
555	Mac Andrew	0	148	88
556	Billy Dowling	0	0	0
585	Charlie Constable	0	36	12
607	James Blanck	0	50	29
606	Connor Budarick	0	29	10
604	James Trezise	0	13	3
8	Darcy Jones	0	0	0
601	Tom McCartin	0	89	60
600	Tom McCallum	0	0	0
598	Jack O'Sullivan	0	0	0
596	Sam Hayes	0	13	6
595	Jordyn Baker	0	0	0
11	Andrew McGrath	0	289	120
561	Lewis Young	0	114	77
579	Hugo Hall-Kahan	0	0	0
578	Tom Barrass	0	115	93
574	Corey Wagner	0	110	41
572	Jayden Davey	0	0	0
571	Bodhi Uwland	0	19	5
568	Brandon Walker	0	93	41
566	Scott Lycett	0	49	14
565	James Tunstill	0	5	2
562	Isaac Keeler	0	0	0
506	Josh Morris	0	0	0
505	Hayden Crozier	0	36	19
502	Will Verrall	0	0	0
420	Isiah Winder	0	0	0
443	Blake Coleman	0	0	0
442	Kaine Baldwin	0	26	19
441	Cameron Fleeton	0	8	3
440	Tim O'Brien	0	63	36
438	Thomson Dow	0	27	10
435	Karl Worner	0	23	12
430	Dane Rampe	0	140	62
428	Tariek Newchurch	0	0	0
422	Hamish Free	0	0	0
415	Ben Long	0	114	42
446	Jacob Edwards	0	0	0
412	Max Knobel	0	0	0
411	Tom Hickey	0	62	26

409	Aliir Aliir	0	202	121
408	Tyler Brown	0	0	0
405	Nathan Murphy	0	145	86
403	Sam Philp	0	0	0
401	Jeremy McGovern	0	110	64
399	Jaxon Binns	0	0	0
394	Joel Hamling	0	18	17
444	Darcy Moore	0	253	137
447	Marc Pittonet	0	89	24
501	Tom Highmore	0	0	0
475	Jed Adams	0	0	0
500	Henry Smith	0	0	0
498	Tom Brown	0	12	6
496	Connor Blakely	0	0	0
495	Jordon Sweet	0	0	0
491	Luke Dunstan	0	0	0
489	Buku Khamis	0	3	1
486	Jai Serong	0	15	8
483	Sam Collins	0	176	127
477	Dylan Williams	0	247	101
473	Harry Barnett	0	0	0
451	Josh Worrell	0	127	47
471	Michael Hibberd	0	83	36
470	Oscar Murdoch	0	0	0
469	Sean Lemmens	0	83	38
468	Cooper Vickery	0	0	0
464	Marcus Adams	0	0	0
463	Bigoa Nyuon	0	0	0
462	Miller Bergman	0	86	42
457	Alex Pearce	0	134	90
454	Cameron Guthrie	0	77	25
437	Ben McKay	0	146	113

```
full_rank_player_contributions = final_df.nlargest(808, 'G')
plt.figure(figsize=(12, 150))
sns.barplot(x='G', y='Player',
            data=full_rank_player_contributions,hue='Current Team 2023',dodge=False)
plt.title('Total amount of goals in descending order')
plt.show()
```

Total amount of goals in descending order



Identifying Strengths and Weaknesses

Analyze specific metrics to highlight areas of strength and improvement.

```
final_df['Goals_to_Kicks_Ratio'] = final_df['G'] / final_df['K']
top_scorers = final_df[final_df['G'] > 20] # Identify players with more than 20 goals
print(top_scorers[['Player', 'Goals_to_Kicks_Ratio']])
```

	Player	Goals_to_Kicks_Ratio
0	Jack Higgins	0.220859
3	Jamarra Ugle-Hagan	0.186170
6	Connor Rozee	0.053846
17	Ben Keays	0.100917
21	Jacob van Rooyen	0.311111
24	Isaac Heeney	0.140187
25	Sam Powell-Pepper	0.153465
27	Toby Greene	0.228374
30	Joe Daniher	0.193038
32	Jade Gresham	0.091703
34	Jamie Elliott	0.229412
36	Cody Weightman	0.244604
39	Jesse Motlop	0.195122
46	Hayden McLean	0.140000
56	Mitch Lewis	0.288000
65	Jaidyn Stephenson	0.178082
69	Rory Lobb	0.214286
73	Kyle Langford	0.233945
80	Todd Marshall	0.232258
81	Logan McDonald	0.244275
82	Christian Petracca	0.079772
96	Dustin Martin	0.089286
125	Lincoln McCarthy	0.148936
128	Will Hayward	0.141243
129	Mitch Owens	0.139037
132	Jeremy Cameron	0.207843
135	Josh Rachele	0.112745
169	Jack Riewoldt	0.230216
172	Luke Pedlar	0.144509
174	Cam Rayner	0.106977
175	Tom Papley	0.145669
182	Luke Jackson	0.133333
190	Brent Daniels	0.132653
192	Harry McKay	0.152632
194	Max King	0.383562
195	Michael Walters	0.259843
208	Taylor Walker	0.336283
238	Ben Ainsworth	0.092105
241	Jeremy Finlayson	0.183575
247	Dan Butler	0.187500

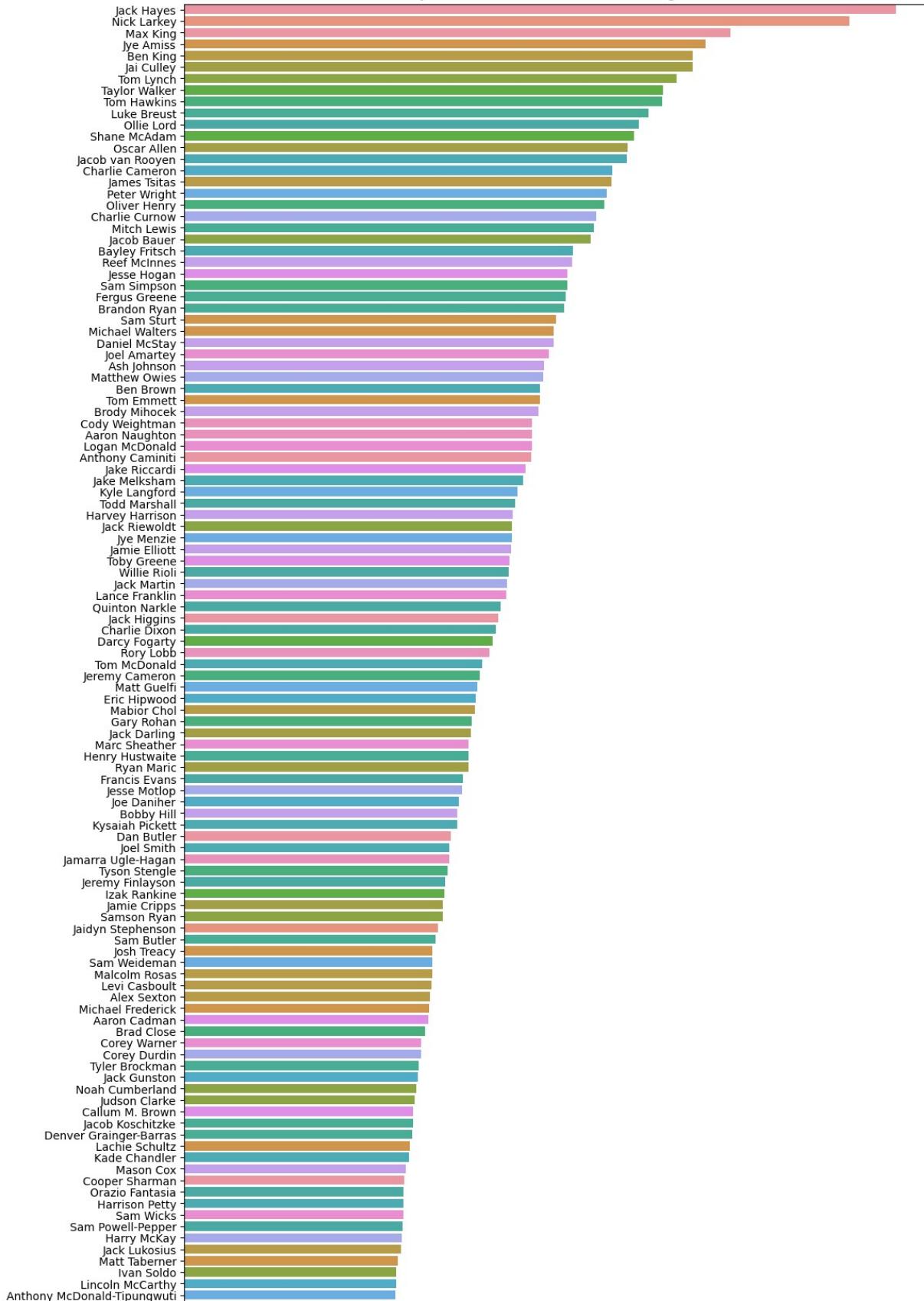
249	Jack Gunston	0.164179
258	Jack Lukosius	0.152344
275	Bobby Hill	0.191860
307	Willie Rioli	0.227941
310	Tyson Stengle	0.184932
320	Jesse Hogan	0.269231
355	Oscar Allen	0.311765
356	Luke Breust	0.326389
365	Nick Larkey	0.467105
395	Errol Gulden	0.047414
416	Jake Stringer	0.144828
421	Tom Hawkins	0.335616
427	Charlie Cameron	0.301020
432	Izak Rankine	0.182741
448	Jye Amiss	0.366071
449	Charlie Dixon	0.219048
466	Jack Darling	0.201550
467	Shai Bolton	0.098413
478	Jake Riccardi	0.239726
482	Charlie Curnow	0.289286
512	Lachie Schultz	0.158654
554	Levi Casboult	0.173913
567	Eric Hipwood	0.205000
569	Michael Frederick	0.172185
576	Oliver Henry	0.294964
581	Darcy Fogarty	0.216561
597	Bayley Fritsch	0.273381
602	Aaron Naughton	0.244444
603	Ben King	0.357143
641	Zac Bailey	0.114173
651	Ash Johnson	0.253012
660	Brody Mihocek	0.248677
701	Kysaiah Pickett	0.191710
717	Kade Chandler	0.157895
742	Brad Close	0.169355
788	Matthew Owies	0.252336
807	Jye Menzie	0.230000

```

full_rank_player_contributions = final_df.nlargest(808,
'Goals_to_Kicks_Ratio')
plt.figure(figsize=(12, 150))
sns.barplot(x='Goals_to_Kicks_Ratio', y='Player',
data=full_rank_player_contributions,hue='Current Team
2023',dodge=False)
plt.title('Players Goal to Kicks Ratio in descending order')
plt.show()

```

Players Goal to Kicks Ratio in descending order



Strategic Planning

Use data to make strategic decisions for upcoming matches.

```
# Example: Finding players with high tackles and clearances for
# defensive strategies using data manipulation from pandas.
defensive_players = final_df[(final_df['T'] > 30) & (final_df['CLR'] >
20)]
print(defensive_players[['Player', 'Current Team 2023', 'T', 'CLR']])
```

	Player	Current Team 2023	T	CLR
1	Adam Treloar	Western Bulldogs	100	108
2	Chad Warner	Sydney	90	94
5	Chayce Jones	Adelaide	49	40
6	Connor Rozee	Port Adelaide	117	94
13	Deven Robertson	Brisbane	42	25
16	Patrick Lipinski	Collingwood	47	28
17	Ben Keays	Adelaide	87	59
18	Stephen Coniglio	GWS Giants	116	134
19	Jordan De Goey	Collingwood	68	119
20	Jaeger O'Meara	Fremantle	102	90
22	Jack Silvagni	Carlton	43	27
24	Isaac Heeney	Collingwood	99	41
25	Sam Powell-Pepper	Port Adelaide	78	38
27	Toby Greene	GWS Giants	60	42
28	Caleb Serong	Fremantle	109	167
29	Hugh Greenwood	North Melbourne	69	45
32	Jade Gresham	St Kilda	74	35
37	Brad Crouch	St Kilda	142	131
41	Rhys Stanley	Geelong	32	30
44	Oliver Hollands	Carlton	48	22
46	Hayden McLean	Sydney	55	28
49	Sebastian Ross	St Kilda	61	63
51	Marcus Bontempelli	Western Bulldogs	172	175
58	Josh Dunkley	Brisbane	165	119
59	Jai Newcombe	Hawthorn	94	122
60	Bailey Smith	Western Bulldogs	66	69
63	James Worrel	Hawthorn	92	149
67	Harry Sheezel	North Melbourne	67	39
68	Sean Darcy	Fremantle	48	61
70	Darcy Parish	Essendon	77	139
75	Sam Flanders	GC Suns	35	48
77	Zach Tuohy	Geelong	32	23
82	Christian Petracca	Melbourne	99	149
83	Ned Reeves	Hawthorn	57	51
84	Tom Mitchell	Collingwood	157	126
85	Adam Cerra	Carlton	106	98
86	Dion Prestia	Richmond	56	77
89	Josh Daicos	Collingwood	59	79
92	Brodie Grundy	Melbourne	49	50

94	Hugh McCluggage	Brisbane	91	96
96	Dustin Martin	Richmond	38	56
97	Jye Caldwell	Essendon	89	70
98	Scott Pendlebury	Collingwood	108	106
99	Lachlan Murphy	Adelaide	67	49
100	Callan Ward	GWS Giants	70	86
101	Jack Viney	Melbourne	142	119
102	Matt Crouch	Adelaide	35	45
106	Andrew Gaff	West Coast Eagles	66	33
107	Dom Sheed	West Coast Eagles	47	63
108	Matthew Kennedy	Carlton	48	50
110	Brandon Ellis	GC Suns	37	26
112	Tanner Bruhn	Geelong	92	55
113	Jarrod Berry	Brisbane	64	50
115	Jayden Hunt	West Coast Eagles	54	24
118	Will Ashcroft	Brisbane	63	64
119	Jack Ross	Richmond	35	32
121	Lachie Neale	Brisbane	106	205
123	Jack Steele	St Kilda	150	97
125	Lincoln McCarthy	Brisbane	72	27
126	James Rowbottom	Sydney	176	112
127	Zach Merrett	Essendon	121	103
129	Mitch Owens	St Kilda	87	37
130	Riley Thilthorpe	Adelaide	31	25
131	Alex Davies	GC Suns	39	24
134	Elliot Yeo	West Coast Eagles	34	30
135	Josh Rachele	Adelaide	70	30
138	Dan Houston	Port Adelaide	85	71
147	Hunter Clark	St Kilda	68	52
149	Andrew Brayshaw	Fremantle	143	100
151	Ben Hobbs	Essendon	73	62
152	Rory Sloane	Adelaide	113	83
153	Patrick Cripps	Carlton	130	162
154	Tom Green	GWS Giants	111	134
156	Taylor Adams	Collingwood	105	85
158	Angus Brayshaw	Melbourne	79	80
159	Dayne Zorko	Brisbane	71	44
160	Dylan Shiel	Essendon	38	40
164	Toby Bedford	GWS Giants	97	36
168	Jack Macrae	Western Bulldogs	97	90
172	Luke Pedlar	Adelaide	55	29
173	Xavier Duursma	Port Adelaide	44	25
174	Cam Rayner	Brisbane	58	41
175	Tom Papley	Sydney	42	68
176	Trent Cotchin	Richmond	45	50
181	Reuben Ginbey	West Coast Eagles	101	42
182	Luke Jackson	Fremantle	81	59
184	Max Holmes	Geelong	88	67
185	Max Gawn	Melbourne	44	94

188	Darcy Cameron	Collingwood	61	60
190	Brent Daniels	GWS Giants	66	39
191	Lachie Hunter	Melbourne	42	51
196	Jordan Dawson	Adelaide	153	88
197	Ryan Byrnes	St Kilda	42	22
198	James Aish	Fremantle	49	37
205	George Wardlaw	North Melbourne	46	33
207	Will Setterfield	Essendon	60	30
210	Bailey Scott	North Melbourne	60	35
211	Isaac Smith	Geelong	36	25
213	Finn Callaghan	GWS Giants	42	29
215	Zak Butters	Port Adelaide	86	110
216	Xavier O'Neill	West Coast Eagles	60	24
217	Jack Bowes	Geelong	40	24
219	Oliver Florent	Sydney	45	27
220	Clayton Oliver	Melbourne	101	104
221	Callum Mills	Sydney	88	40
222	Brayden Fiorini	GC Suns	44	34
225	Keidean Coleman	Brisbane	62	22
229	Ed Langdon	Melbourne	54	45
230	Tim Taranto	Richmond	154	142
231	Travis Boak	Port Adelaide	58	40
234	Karl Amon	Hawthorn	37	24
237	Jayden Short	Richmond	40	24
238	Ben Ainsworth	GC Suns	39	25
239	Conor Nash	Hawthorn	110	109
240	Jake Soligo	Adelaide	65	54
241	Jeremy Finlayson	Port Adelaide	40	34
245	Touk Miller	GC Suns	68	66
248	Luke Davies-Uniacke	North Melbourne	63	94
262	Will Day	Hawthorn	73	89
269	Tom De Koning	Carlton	47	67
273	Steele Sidebottom	Collingwood	72	48
279	Blake Acres	Carlton	62	57
283	Noah Anderson	GC Suns	79	148
284	Archie Perkins	Essendon	65	32
287	Jy Simpkin	North Melbourne	71	76
288	Dylan Moore	Hawthorn	91	31
296	Braeden Campbell	Sydney	63	26
299	Sam Docherty	Carlton	90	52
301	Miles Bergman	Port Adelaide	57	29
302	Rowan Marshall	St Kilda	115	121
317	Sam Walsh	Carlton	87	69
318	Josh Kelly	GWS Giants	97	89
322	Liam Shiels	North Melbourne	88	41
323	Lloyd Meek	Hawthorn	58	34
328	Ollie Wines	Port Adelaide	85	92
330	Luke Shuey	West Coast Eagles	48	44
335	Jack Crisp	Collingwood	114	68

340	Mitch Duncan	Geelong	40	25
342	Tim Kelly	West Coast Eagles	104	130
346	Matt Rowell	GC Suns	190	177
351	Jason Horne-Francis	Port Adelaide	69	115
360	Bailey Humphrey	GC Suns	49	27
363	Liam Duggan	West Coast Eagles	63	33
366	Sam Durham	Essendon	47	24
367	Nic Newman	Carlton	85	22
373	Todd Goldstein	North Melbourne	38	73
375	Luke Edwards	West Coast Eagles	37	24
395	Errol Gulden	Sydney	119	93
400	Jacob Hopper	Richmond	64	68
410	James Jordon	Melbourne	37	22
414	Jack Petruccelle	West Coast Eagles	55	36
416	Jake Stringer	Essendon	51	45
418	Toby Nankervis	Richmond	82	65
424	Trent Rivers	Melbourne	55	25
429	Mattaes Phillipou	St Kilda	54	26
431	Tom Liberatore	Western Bulldogs	141	167
432	Izak Rankine	Adelaide	64	38
439	Josh Ward	Hawthorn	31	32
447	Marc Pittonet	Carlton	32	55
458	Tarryn Thomas	North Melbourne	57	51
461	Tom Atkins	Geelong	175	116
467	Shai Bolton	Richmond	70	93
476	George Hewett	Carlton	102	78
479	Cam Mackenzie	Hawthorn	37	21
480	Harry Himmelberg	GWS Giants	44	27
481	David Swallow	GC Suns	101	71
485	Will Phillips	North Melbourne	66	63
487	Hayden Young	Fremantle	86	35
490	Luke Parker	Sydney	114	128
493	Gryan Miers	Geelong	67	42
497	Willem Drew	Port Adelaide	166	109
508	Bailey J. Williams	West Coast Eagles	79	97
512	Lachie Schultz	Fremantle	95	21
516	Jarrod Witts	GC Suns	55	91
530	Andrew Phillips	Essendon	48	36
531	Neil Erasmus	Fremantle	43	26
539	Bailey Dale	Western Bulldogs	42	21
541	Rory Laird	Adelaide	175	140
549	Jack Graham	Richmond	77	27
550	Kieren Briggs	GWS Giants	77	110
560	Patrick Dangerfield	Geelong	67	101
566	Scott Lycett	Port Adelaide	52	56
582	Alex Neal-Bullen	Melbourne	118	22
588	Brodie Smith	Adelaide	50	26
614	Tom Sparrow	Melbourne	81	60
621	Harry Perryman	GWS Giants	92	32

627	Bailey Williams	Western Bulldogs	60	35
629	Nick Daicos	Collingwood	84	88
631	Mason Wood	St Kilda	64	35
634	Caleb Daniel	Western Bulldogs	88	75
641	Zac Bailey	Brisbane	72	60
662	Mark O'Connor	Geelong	68	29
698	Nic Martin	Essendon	50	31
701	Kysiah Pickett	Melbourne	93	29
702	Jack Sinclair	St Kilda	49	68
707	Cameron Zurhaar	North Melbourne	36	33
713	Sam Switkowski	Fremantle	89	45
723	Lachlan Sholl	Adelaide	31	22
742	Brad Close	Geelong	56	23
745	Adam Saad	Carlton	48	23
755	Darcy Wilmot	Brisbane	43	24
770	Mark Blicavs	Geelong	88	80
777	Tim English	Western Bulldogs	100	74
782	Reilly O'Brien	Adelaide	72	66
786	Oscar McInerney	Brisbane	72	140
792	Matthew Johnson	Fremantle	46	33

Player Development

Track player progress and set development goals.

```
final_df['Improvement'] = final_df['D'].pct_change() # Percentage
change in disposals
print(final_df[['Player', 'Current Team 2023', 'Improvement']])
```

	Player	Current Team 2023	Improvement
0	Jack Higgins	St Kilda	NaN
1	Adam Treloar	Western Bulldogs	0.901024
2	Chad Warner	Sydney	-0.070018
3	Jamarra Ugle-Hagan	Western Bulldogs	-0.496139
4	Steven May	Melbourne	0.517241
5	Chayce Jones	Adelaide	-0.207071
6	Connor Rozee	Port Adelaide	1.050955
7	Nick Vlastuin	Richmond	-0.388199
8	Darcy Jones	GWS Giants	-1.000000
9	Sam Sturt	Fremantle	inf
10	Tom Jonas	Port Adelaide	-0.168067
11	Andrew McGrath	Essendon	4.292929
12	Kai Lohmann	Brisbane	-0.919847
13	Deven Robertson	Brisbane	2.428571
14	Marcus Windhager	St Kilda	1.111111
15	Zak Jones	St Kilda	-0.802632
16	Patrick Lipinski	Collingwood	3.150000
17	Ben Keays	Adelaide	0.771084

18	Stephen Coniglio	GWS Giants	0.603175
19	Jordan De Goey	Collingwood	-0.289958
20	Jaeger O'Meara	Fremantle	-0.181275
21	Jacob van Rooyen	Melbourne	-0.576642
22	Jack Silvagni	Carlton	0.247126
23	Paddy Dow	Carlton	-0.267281
24	Isaac Heeney	Collingwood	1.245283
25	Sam Powell-Pepper	Port Adelaide	-0.039216
26	Mabior Chol	GC Suns	-0.822157
27	Toby Greene	GWS Giants	5.983607
28	Caleb Serong	Fremantle	0.584507
29	Hugh Greenwood	North Melbourne	-0.702222
30	Joe Daniher	Brisbane	0.930348
31	Aaron Cadman	GWS Giants	-0.860825
32	Jade Gresham	St Kilda	6.481481
33	Brayden Maynard	Collingwood	0.123762
34	Jamie Elliott	Collingwood	-0.403084
35	Liam Ryan	West Coast Eagles	-0.856089
36	Cody Weightman	Western Bulldogs	4.076923
37	Brad Crouch	St Kilda	2.287879
38	Lachlan Cowan	Carlton	-0.894009
39	Jesse Motlop	Carlton	2.028986
40	Lachie Whitfield	GWS Giants	2.095694
41	Rhys Stanley	Geelong	-0.760433
42	Jake Waterman	West Coast Eagles	0.019355
43	Rory Atkins	GC Suns	1.183544
44	Oliver Hollands	Carlton	-0.228986
45	Lochie O'Brien	Carlton	-0.838346
46	Hayden McLean	Sydney	5.302326
47	Dylan Stephens	Sydney	-0.350554
48	Lachie Ash	GWS Giants	2.539773
49	Sebastian Ross	St Kilda	-0.475120
50	Callum Ah Chee	Brisbane	-0.614679
51	Marcus Bontempelli	Western Bulldogs	4.047619
52	Christian Salem	Melbourne	-0.518868
53	Harry Morrison	Hawthorn	-0.212418
54	Nasiah Wanganeen-Milera	St Kilda	1.336100
55	Sam Berry	Adelaide	-0.928952
56	Mitch Lewis	Hawthorn	3.800000
57	Jedd Busslinger	Western Bulldogs	-1.000000
58	Josh Dunkley	Brisbane	inf
59	Jai Newcombe	Hawthorn	-0.049828
60	Bailey Smith	Western Bulldogs	-0.191682
61	Dylan Grimes	Richmond	-0.557047
62	Jarman Impey	Hawthorn	1.328283
63	James Worpel	Hawthorn	0.301518
64	Sam Draper	Essendon	-0.743333
65	Jaidyn Stephenson	North Melbourne	0.467532
66	Judd McVee	Melbourne	0.415929

67	Harry Sheezel	North Melbourne	0.943750
68	Sean Darcy	Fremantle	-0.667203
69	Rory Lobb	Western Bulldogs	-0.004831
70	Darcy Parish	Essendon	1.694175
71	Heath Chapman	Fremantle	-0.918919
72	Ryan Clarke	Sydney	1.733333
73	Kyle Langford	Essendon	1.552846
74	Ryan Burton	Port Adelaide	0.070064
75	Sam Flanders	GC Suns	0.008929
76	James Sicily	Hawthorn	0.477876
77	Zach Tuohy	Geelong	-0.275449
78	Elijah Tsatas	Essendon	-0.820937
79	James Harmes	Melbourne	0.707692
80	Todd Marshall	Port Adelaide	0.765766
81	Logan McDonald	Sydney	-0.010204
82	Christian Petracca	Melbourne	2.582474
83	Ned Reeves	Hawthorn	-0.755396
84	Tom Mitchell	Collingwood	2.823529
85	Adam Cerra	Carlton	-0.138462
86	Dion Prestia	Richmond	-0.216071
87	Brandan Parfitt	Geelong	-0.740319
88	Zac Williams	Carlton	-1.000000
89	Josh Daicos	Collingwood	inf
90	Trent Bianco	Collingwood	-0.986154
91	Sam Frost	Hawthorn	24.555556
92	Brodie Grundy	Melbourne	0.056522
93	John Noble	Collingwood	0.934156
94	Hugh McCluggage	Brisbane	0.187234
95	Jordan Clark	Fremantle	-0.209677
96	Dustin Martin	Richmond	0.070295
97	Jye Caldwell	Essendon	-0.171610
98	Scott Pendlebury	Collingwood	0.460358
99	Lachlan Murphy	Adelaide	-0.423818
100	Callan Ward	GWS Giants	0.492401
101	Jack Viney	Melbourne	0.252546
102	Matt Crouch	Adelaide	-0.695935
103	Lachlan Bramble	Hawthorn	-0.026738
104	Jackson Hately	Adelaide	-0.978022
105	Ryan Angwin	GWS Giants	35.500000
106	Andrew Gaff	West Coast Eagles	2.150685
107	Dom Sheed	West Coast Eagles	-0.204348
108	Matthew Kennedy	Carlton	-0.204918
109	Nat Fyfe	Fremantle	-0.570447
110	Brandon Ellis	GC Suns	1.304000
111	Daniel McStay	Collingwood	-0.590278
112	Tanner Bruhn	Geelong	1.627119
113	Jarrod Berry	Brisbane	0.419355
114	Jake Lever	Melbourne	-0.229545
115	Jayden Hunt	West Coast Eagles	0.268437

116	Jacob Wehr	GWS Giants	-0.939535
117	Harry Cunningham	Sydney	11.269231
118	Will Ashcroft	Brisbane	0.247649
119	Jack Ross	Richmond	-0.130653
120	Bradley Hill	St Kilda	0.315029
121	Lachie Neale	Brisbane	0.525275
122	Daniel Rich	Brisbane	-0.802594
123	Jack Steele	St Kilda	2.642336
124	Braydon Preuss	GWS Giants	-1.000000
125	Lincoln McCarthy	Brisbane	inf
126	James Rowbottom	Sydney	0.530249
127	Zach Merrett	Essendon	0.474419
128	Will Hayward	Sydney	-0.575710
129	Mitch Owens	St Kilda	0.286245
130	Riley Thilthorpe	Adelaide	-0.355491
131	Alex Davies	GC Suns	-0.421525
132	Jeremy Cameron	Geelong	1.488372
133	Aidan Corr	North Melbourne	-0.105919
134	Elliot Yeo	West Coast Eagles	-0.393728
135	Josh Rachele	Adelaide	0.844828
136	Tom Wilson	Collingwood	-0.984424
137	Nakia Cockatoo	Brisbane	-1.000000
138	Dan Houston	Port Adelaide	inf
139	Lachie Fogarty	Carlton	-0.744863
140	Toby Conway	Geelong	-0.959732
141	Charlie Clarke	Western Bulldogs	-1.000000
142	Charlie Spargo	Melbourne	inf
143	Robbie Tarrant	Richmond	-1.000000
144	James Madden	Brisbane	inf
145	Darryl McDowell-White	Brisbane	-1.000000
146	Jake Kolodjashnij	Geelong	inf
147	Hunter Clark	St Kilda	0.587156
148	Alex Sexton	GC Suns	-0.875723
149	Andrew Brayshaw	Fremantle	14.604651
150	Toby McLean	Western Bulldogs	-0.926975
151	Ben Hobbs	Essendon	6.224490
152	Rory Sloane	Adelaide	0.127119
153	Patrick Cripps	Carlton	0.493734
154	Tom Green	GWS Giants	0.182886
155	Nathan Kreuger	Collingwood	-0.990071
156	Taylor Adams	Collingwood	59.571429
157	Nick Holman	GC Suns	-0.450472
158	Angus Brayshaw	Melbourne	1.351931
159	Dayne Zorko	Brisbane	-0.310219
160	Dylan Shiel	Essendon	-0.407407
161	Sam Menegola	Geelong	-0.879464
162	Isaac Cumming	GWS Giants	11.370370
163	Sam Darcy	Western Bulldogs	-0.970060
164	Toby Bedford	GWS Giants	24.000000

165	Liam Baker	Richmond	0.752000
166	Paddy McCartin	Sydney	-0.910959
167	Aaron Francis	Sydney	2.615385
168	Jack Macrae	Western Bulldogs	2.950355
169	Jack Riewoldt	Richmond	-0.662478
170	Kane Farrell	Port Adelaide	0.914894
171	Sam Taylor	GWS Giants	-0.338889
172	Luke Pedlar	Adelaide	0.046218
173	Xavier Duursma	Port Adelaide	-0.016064
174	Cam Rayner	Brisbane	0.502041
175	Tom Papley	Sydney	-0.065217
176	Trent Cotchin	Richmond	-0.095930
177	Changkuoth Jiath	Hawthorn	-0.562701
178	Paul Seedsman	Adelaide	-1.000000
179	Maurice Rioli	Richmond	inf
180	Elijah Hollands	GC Suns	0.838710
181	Reuben Ginbey	West Coast Eagles	1.043860
182	Luke Jackson	Fremantle	0.484979
183	Curtis Taylor	North Melbourne	-0.361272
184	Max Holmes	Geelong	0.809955
185	Max Gawn	Melbourne	-0.070000
186	Angus Sheldrick	Sydney	-0.712366
187	Jase Burgoyne	Port Adelaide	-0.588785
188	Darcy Cameron	Collingwood	4.659091
189	Edward Allan	Collingwood	-1.000000
190	Brent Daniels	GWS Giants	inf
191	Lachie Hunter	Melbourne	0.601190
192	Harry McKay	Carlton	-0.540892
193	Mitch Knevitt	Geelong	-0.615385
194	Max King	St Kilda	0.084211
195	Michael Walters	Fremantle	0.932039
196	Jordan Dawson	Adelaide	2.130653
197	Ryan Byrnes	St Kilda	-0.462279
198	James Aish	Fremantle	0.182090
199	Brynn Teakle	Port Adelaide	-0.896465
200	Josh Sinn	Port Adelaide	-0.609756
201	Liam Stocker	St Kilda	23.500000
202	Hugh Davies	Fremantle	-1.000000
203	Sam Weideman	Essendon	inf
204	Harvey Gallagher	Western Bulldogs	-1.000000
205	George Wardlaw	North Melbourne	inf
206	Will Snelling	Essendon	0.461538
207	Will Setterfield	Essendon	0.216374
208	Taylor Walker	Adelaide	0.375000
209	Jack Ziebell	North Melbourne	0.706294
210	Bailey Scott	North Melbourne	0.043033
211	Isaac Smith	Geelong	-0.070727
212	Jason Castagna	Richmond	-1.000000
213	Finn Callaghan	GWS Giants	inf

214	Jarryd Lyons	Brisbane	-0.786697
215	Zak Butters	Port Adelaide	6.387097
216	Xavier O'Neill	West Coast Eagles	-0.735080
217	Jack Bowes	Geelong	0.434066
218	Jhye Clark	Geelong	-0.977011
219	Oliver Florent	Sydney	78.500000
220	Clayton Oliver	Melbourne	-0.048218
221	Callum Mills	Sydney	-0.112335
222	Brayden Fiorini	GC Suns	-0.250620
223	Hugo Ralphsmith	Richmond	-0.526490
224	Conor Stone	GWS Giants	-0.923077
225	Keidean Coleman	Brisbane	34.636364
226	Billy Frampton	Collingwood	-0.619898
227	Finlay Macrae	Collingwood	-0.953020
228	Oscar Steene	Collingwood	-1.000000
229	Ed Langdon	Melbourne	inf
230	Tim Taranto	Richmond	0.351020
231	Travis Boak	Port Adelaide	-0.493958
232	Jack Billings	St Kilda	-0.865672
233	Nik Cox	Essendon	0.577778
234	Karl Amon	Hawthorn	5.845070
235	Nick Haynes	GWS Giants	-0.351852
236	Bailey Laurie	Melbourne	-0.885714
237	Jayden Short	Richmond	8.888889
238	Ben Ainsworth	GC Suns	0.042135
239	Conor Nash	Hawthorn	0.487871
240	Jake Soligo	Adelaide	-0.371377
241	Jeremy Finlayson	Port Adelaide	-0.195965
242	Jonathon Ceglar	Geelong	-0.727599
243	Mitch McGovern	Carlton	3.986842
244	Charlie Ballard	GC Suns	-0.226913
245	Touk Miller	GC Suns	0.105802
246	Sam Day	GC Suns	-0.941358
247	Dan Butler	St Kilda	12.631579
248	Luke Davies-Uniacke	North Melbourne	0.478764
249	Jack Gunston	Brisbane	-0.556136
250	Sam De Koning	Geelong	0.376471
251	Luke Ryan	Fremantle	1.354701
252	Jake Bowey	Melbourne	-0.326679
253	Nick Coffield	St Kilda	-1.000000
254	Trent McKenzie	Port Adelaide	inf
255	Brayden Cook	Adelaide	-0.908571
256	Daniel Rioli	Richmond	28.750000
257	Max Michalanney	Adelaide	-0.502101
258	Jack Lukosius	GC Suns	0.253165
259	Orazio Fantasia	Port Adelaide	-0.922559
260	Lachie Weller	GC Suns	7.434783
261	Jack Peris	St Kilda	-0.932990
262	Will Day	Hawthorn	40.307692

263	James Peatling	GWS Giants	-0.797020
264	Jack Hayes	St Kilda	-0.926606
265	Esava Ratugolea	Geelong	16.750000
266	Oskar Baker	Western Bulldogs	0.859155
267	Sam Petrevski-Seton	West Coast Eagles	-0.329545
268	Jake Melksham	Melbourne	-0.418079
269	Tom De Koning	Carlton	1.213592
270	Josh Gibcus	Richmond	-1.000000
271	Tom Doedee	Adelaide	inf
272	Jordan Ridley	Essendon	1.090909
273	Steele Sidebottom	Collingwood	0.208696
274	Tom Lynch	Richmond	-0.918465
275	Bobby Hill	Collingwood	6.264706
276	Jayden Laverde	Essendon	0.218623
277	Leek Aleer	GWS Giants	-1.000000
278	Ben Cunnington	North Melbourne	inf
279	Blake Acres	Carlton	2.235955
280	Luke McDonald	North Melbourne	-0.335069
281	Rhylee West	Western Bulldogs	-0.642298
282	Will Hamill	Adelaide	-1.000000
283	Noah Anderson	GC Suns	inf
284	Archie Perkins	Essendon	-0.432956
285	Nathan Wilson	Fremantle	-0.826211
286	Sam Wicks	Sydney	0.918033
287	Jy Simpkin	North Melbourne	2.179487
288	Dylan Moore	Hawthorn	0.290323
289	Travis Colyer	Fremantle	-1.000000
290	Zac Taylor	Adelaide	NaN
291	Taylor Duryea	Western Bulldogs	inf
292	Thomas Berry	GC Suns	-0.833333
293	Jack Scrimshaw	Hawthorn	5.900000
294	Josh Schache	Melbourne	-0.963768
295	Darcy Tucker	North Melbourne	28.300000
296	Braeden Campbell	Sydney	0.232082
297	Josh Bruce	Western Bulldogs	-0.770083
298	Blake Hardwick	Hawthorn	4.626506
299	Sam Docherty	Carlton	0.254818
300	Jack Carroll	Carlton	-0.993174
301	Miles Bergman	Port Adelaide	81.750000
302	Rowan Marshall	St Kilda	0.489426
303	James Stewart	Essendon	-1.000000
304	Ivan Soldo	Richmond	inf
305	Ethan Hughes	Fremantle	2.423077
306	Jaxon Prior	Brisbane	-0.838951
307	Willie Rioli	Port Adelaide	3.767442
308	Elijah Hewett	West Coast Eagles	-0.082927
309	Aiden Bonar	North Melbourne	-0.872340
310	Tyson Stengle	Geelong	8.041667
311	James Willis	Geelong	-1.000000

312	Brodie Kemp	Carlton	inf
313	Will Brodie	Fremantle	-0.617100
314	Adam Tomlinson	Melbourne	0.174757
315	Tom Emmett	Fremantle	-0.752066
316	Isaac Quaynor	Collingwood	13.033333
317	Sam Walsh	Carlton	0.218527
318	Josh Kelly	GWS Giants	0.153996
319	Mitch Hannan	Western Bulldogs	-0.927365
320	Jesse Hogan	GWS Giants	6.000000
321	Lewis Hayes	Essendon	-1.000000
322	Liam Shiels	North Melbourne	inf
323	Lloyd Meek	Hawthorn	-0.455830
324	Josh Corbett	Fremantle	-0.785714
325	Nic Naitanui	West Coast Eagles	-1.000000
326	Brayden George	North Melbourne	NaN
327	Jed Anderson	GC Suns	NaN
328	Ollie Wines	Port Adelaide	inf
329	Corey Durdin	Carlton	-0.821363
330	Luke Shuey	West Coast Eagles	1.041237
331	Daniel Howe	North Melbourne	-0.191919
332	Dougal Howard	St Kilda	0.443750
333	Chad Wingard	Hawthorn	-0.142857
334	Tom Clurey	Port Adelaide	-0.984848
335	Jack Crisp	Collingwood	184.000000
336	Osca Riccardi	Geelong	-1.000000
337	Reef McInnes	Collingwood	inf
338	Tom Fullarton	Brisbane	-1.000000
339	Nick Hind	Essendon	inf
340	Mitch Duncan	Geelong	0.233677
341	James O'Donnell	Western Bulldogs	-0.724234
342	Tim Kelly	West Coast Eagles	5.272727
343	Griffin Logue	North Melbourne	-0.698873
344	Peter Wright	Essendon	-0.486631
345	Dyson Heppell	Essendon	3.614583
346	Matt Rowell	GC Suns	0.099323
347	Gary Rohan	Geelong	-0.724846
348	Lachie Plowman	Carlton	-0.910448
349	Jacob Konstanty	Sydney	-1.000000
350	Cooper Stephens	Hawthorn	NaN
351	Jason Horne-Francis	Port Adelaide	inf
352	Matt Taberner	Fremantle	-0.914692
353	Jack Martin	Carlton	2.944444
354	Matthew Jefferson	Melbourne	-1.000000
355	Oscar Allen	West Coast Eagles	inf
356	Luke Breust	Hawthorn	-0.054622
357	Zaine Cordy	St Kilda	-0.546667
358	Caleb Marchbank	Carlton	0.088235
359	Noah Long	West Coast Eagles	0.891892
360	Bailey Humphrey	GC Suns	0.123810

361	Jacob Weitering	Carlton	0.703390
362	Josh Weddle	Hawthorn	-0.268657
363	Liam Duggan	West Coast Eagles	0.782313
364	Jeremy Sharp	GC Suns	-1.000000
365	Nick Larkey	North Melbourne	inf
366	Sam Durham	Essendon	0.680556
367	Nic Newman	Carlton	0.545455
368	Noah Balta	Richmond	-0.395722
369	Shannon Hurn	West Coast Eagles	-0.197640
370	Liam Jones	Western Bulldogs	-0.389706
371	Jamie Cripps	West Coast Eagles	-0.054217
372	Callum Coleman-Jones	North Melbourne	-0.477707
373	Todd Goldstein	North Melbourne	2.170732
374	Harrison Jones	Essendon	-0.826923
375	Luke Edwards	West Coast Eagles	2.533333
376	Harry Rowston	GWS Giants	-0.691824
377	Peter Ladhams	Sydney	1.795918
378	Lachie Young	North Melbourne	-0.620438
379	Jacob Koschitzke	Hawthorn	0.980769
380	Mitch Georgiades	Port Adelaide	-0.737864
381	Ed Richards	Western Bulldogs	13.925926
382	Cooper Murley	Collingwood	-1.000000
383	Sam Reid	Sydney	NaN
384	Nick Bryan	Essendon	inf
385	James Tsitas	GC Suns	-0.736111
386	Josh Rotham	West Coast Eagles	5.842105
387	Jed Bews	Geelong	0.207692
388	Daniel McKenzie	St Kilda	-1.000000
389	Campbell Chesser	West Coast Eagles	inf
390	Harry Sharp	Brisbane	-0.754601
391	Oleg Markov	Collingwood	5.975000
392	Brady Hough	West Coast Eagles	-0.189964
393	Blake Howes	Melbourne	-1.000000
394	Joel Hamling	Fremantle	inf
395	Errol Gulden	Sydney	13.288889
396	Marc Sheather	Sydney	-0.982893
397	Zac Fisher	Carlton	21.727273
398	Mitchell Hinge	Adelaide	0.728000
399	Jaxon Binns	Carlton	-1.000000
400	Jacob Hopper	Richmond	inf
401	Jeremy McGovern	West Coast Eagles	-0.555556
402	Judson Clarke	Richmond	-0.243421
403	Sam Philp	Carlton	-1.000000
404	Nick Blakey	Sydney	inf
405	Nathan Murphy	Collingwood	-0.529412
406	Fergus Greene	Hawthorn	-0.616379
407	Denver Grainger-Barras	Hawthorn	-0.561798
408	Tyler Brown	Adelaide	-0.974359
409	Aliir Aliir	Port Adelaide	282.000000

410	James Jordon	Melbourne	-0.169611
411	Tom Hickey	Sydney	-0.378723
412	Max Knobel	Fremantle	-1.000000
413	Lachlan Keeffe	GWS Giants	inf
414	Jack Petruccelle	West Coast Eagles	1.494382
415	Ben Long	GC Suns	-0.229730
416	Jake Stringer	Essendon	0.333333
417	Liam Henry	Fremantle	0.434211
418	Toby Nankervis	Richmond	-0.232416
419	Jack Bytel	St Kilda	-0.808765
420	Isiah Winder	West Coast Eagles	-1.000000
421	Tom Hawkins	Geelong	inf
422	Hamish Free	North Melbourne	-1.000000
423	Lance Franklin	Sydney	inf
424	Trent Rivers	Melbourne	3.073770
425	Alex Witherden	West Coast Eagles	-0.106640
426	Matthew Coulthard	Richmond	-0.934685
427	Charlie Cameron	Brisbane	7.862069
428	Tariek Newchurch	Adelaide	-1.000000
429	Mattaes Phillipou	St Kilda	inf
430	Dane Rampe	Sydney	-0.233553
431	Tom Liberatore	Western Bulldogs	1.463519
432	Izak Rankine	Adelaide	-0.445993
433	Connor West	West Coast Eagles	-0.710692
434	Oliver Dempsey	Geelong	-0.586957
435	Karl Worner	Fremantle	0.157895
436	Zane Trew	West Coast Eagles	-0.181818
437	Ben McKay	North Melbourne	5.444444
438	Thomson Dow	Richmond	-0.698276
439	Josh Ward	Hawthorn	3.742857
440	Tim O'Brien	Western Bulldogs	-0.759036
441	Cameron Fleeton	GWS Giants	-0.787500
442	Kaine Baldwin	Essendon	1.058824
443	Blake Coleman	Brisbane	-1.000000
444	Darcy Moore	Collingwood	inf
445	Shane McAdam	Adelaide	-0.818182
446	Jacob Edwards	North Melbourne	-1.000000
447	Marc Pittonet	Carlton	inf
448	Jye Amiss	Fremantle	-0.017544
449	Charlie Dixon	Port Adelaide	0.023810
450	Ned Long	Hawthorn	-0.802326
451	Josh Worrell	Adelaide	4.147059
452	Tom Powell	North Melbourne	0.314286
453	Flynn Perez	North Melbourne	-0.769565
454	Cameron Guthrie	Geelong	1.528302
455	Paul Curtis	North Melbourne	0.485075
456	David Cunningham	Carlton	-0.165829
457	Alex Pearce	Fremantle	0.385542
458	Tarryn Thomas	North Melbourne	0.021739

459	Tom McDonald	Melbourne	-0.693617
460	Josh Battle	St Kilda	3.555556
461	Tom Atkins	Geelong	0.359756
462	Miller Bergman	North Melbourne	-0.692825
463	Bigoa Nyuon	Richmond	-1.000000
464	Marcus Adams	Brisbane	NaN
465	Laitham Vandermeer	Western Bulldogs	inf
466	Jack Darling	West Coast Eagles	0.387755
467	Shai Bolton	Richmond	1.450980
468	Cooper Vickery	Sydney	-1.000000
469	Sean Lemmens	GC Suns	inf
470	Oscar Murdoch	Geelong	-1.000000
471	Michael Hibberd	Melbourne	inf
472	Tom Cole	West Coast Eagles	0.458647
473	Harry Barnett	West Coast Eagles	-0.989691
474	Ned McHenry	Adelaide	64.500000
475	Jed Adams	Melbourne	-1.000000
476	George Hewett	Carlton	inf
477	Dylan Williams	Port Adelaide	-0.298876
478	Jake Riccardi	GWS Giants	-0.365385
479	Cam Mackenzie	Hawthorn	-0.060606
480	Harry Himmelberg	GWS Giants	1.451613
481	David Swallow	GC Suns	-0.162281
482	Charlie Curnow	Carlton	-0.068063
483	Sam Collins	GC Suns	-0.213483
484	Riley Bonner	Port Adelaide	-0.492857
485	Will Phillips	North Melbourne	1.119718
486	Jai Serong	Hawthorn	-0.930233
487	Hayden Young	Fremantle	22.428571
488	Mason Redman	Essendon	0.024390
489	Buku Khamis	Western Bulldogs	-0.988095
490	Luke Parker	Sydney	89.500000
491	Luke Dunstan	Melbourne	-1.000000
492	Harry Schoenberg	Adelaide	inf
493	Gryan Miers	Geelong	1.939597
494	Shannon Neale	Geelong	-0.952055
495	Jordon Sweet	Western Bulldogs	-1.000000
496	Connor Blakely	GC Suns	NaN
497	Willem Drew	Port Adelaide	inf
498	Tom Brown	Richmond	-0.963134
499	Caleb Poulter	Western Bulldogs	7.312500
500	Henry Smith	Brisbane	-1.000000
501	Tom Highmore	St Kilda	NaN
502	Will Verrall	Melbourne	NaN
503	Sam Butler	Hawthorn	inf
504	Jamaine Jones	West Coast Eagles	1.722892
505	Hayden Crozier	Western Bulldogs	-0.761062
506	Josh Morris	Hawthorn	-1.000000
507	Wil Powell	GC Suns	inf
508	Bailey J. Williams	West Coast Eagles	-0.191781

509	Jake Kelly	Essendon	-0.172881
510	Dominic Bedendo	Western Bulldogs	-1.000000
511	Joel Smith	Melbourne	inf
512	Lachie Schultz	Fremantle	3.195402
513	Brandon Zerk-Thatcher	Essendon	-0.268493
514	Luke Foley	West Coast Eagles	-0.573034
515	Anthony Scott	Western Bulldogs	1.078947
516	Jarrod Witts	GC Suns	0.223629
517	Will Gould	Sydney	-0.910345
518	Conor McKenna	Brisbane	15.884615
519	Rhyam Mansell	Richmond	-0.699317
520	Chris Burgess	GC Suns	-0.962121
521	Samson Ryan	Richmond	18.800000
522	Toby McMullin	GWS Giants	-0.858586
523	Charlie Comben	North Melbourne	2.928571
524	Sam Durdin	Carlton	-1.000000
525	Zach Reid	Essendon	NaN
526	Alwyn Davey Jnr	Essendon	inf
527	Luke Nankervis	Adelaide	-0.280000
528	Ollie Lord	Port Adelaide	0.759259
529	Nick Murray	Adelaide	0.747368
530	Andrew Phillips	Essendon	-0.084337
531	Neil Erasmus	Fremantle	0.151316
532	Oisin Mullin	Geelong	-0.720000
533	Phil Davis	GWS Giants	-1.000000
534	Jake Pasini	Port Adelaide	NaN
535	Josh Goater	North Melbourne	inf
536	Lachlan McNeil	Western Bulldogs	-0.428571
537	Jackson Archer	North Melbourne	-0.475000
538	Kamdyn McIntosh	Richmond	6.547619
539	Bailey Dale	Western Bulldogs	0.807571
540	Harry Lemmey	Carlton	-1.000000
541	Rory Laird	Adelaide	inf
542	Jimmy Webster	St Kilda	-0.594976
543	Rhett Bazzo	West Coast Eagles	-0.631783
544	Darcy Gardiner	Brisbane	-0.642105
545	Jack Mahony	North Melbourne	-0.264706
546	Matt Guelfi	Essendon	4.520000
547	Wayne Milera	Adelaide	2.137681
548	Tim Membrey	St Kilda	-0.822171
549	Jack Graham	Richmond	2.935065
550	Kieren Briggs	GWS Giants	-0.135314
551	Jack Williams	West Coast Eagles	-0.736641
552	Francis Evans	Port Adelaide	0.086957
553	Charlie Lazzaro	North Melbourne	-0.293333
554	Levi Casboult	GC Suns	2.679245
555	Mac Andrew	GC Suns	-0.041026
556	Billy Dowling	Adelaide	-1.000000
557	Jaspa Fletcher	Brisbane	inf

558	Xavier O'Halloran	GWS Giants	0.127273
559	Justin McInerney	Sydney	0.747312
560	Patrick Dangerfield	Geelong	0.135385
561	Lewis Young	Carlton	-0.457995
562	Isaac Keeler	St Kilda	-1.000000
563	Connor Macdonald	Hawthorn	inf
564	Nathan O'Driscoll	Fremantle	-0.628099
565	James Tunstill	Brisbane	-0.911111
566	Scott Lycett	Port Adelaide	11.416667
567	Eric Hipwood	Brisbane	0.724832
568	Brandon Walker	Fremantle	-0.435798
569	Michael Frederick	Fremantle	0.565517
570	Arthur Jones	Western Bulldogs	-0.563877
571	Bodhi Uwland	GC Suns	-0.747475
572	Jayden Davey	Essendon	-1.000000
573	Finn Maginness	Hawthorn	inf
574	Corey Wagner	Fremantle	0.171642
575	Phoenix Spicer	North Melbourne	-0.751592
576	Oliver Henry	Geelong	4.769231
577	Harris Andrews	Brisbane	0.640000
578	Tom Barrass	West Coast Eagles	-0.509485
579	Hugo Hall-Kahan	Sydney	-1.000000
580	Beau McCreery	Collingwood	inf
581	Darcy Fogarty	Adelaide	-0.066929
582	Alex Neal-Bullen	Melbourne	0.632911
583	Darcy Fort	Brisbane	-0.847545
584	Josh Treacy	Fremantle	1.610169
585	Charlie Constable	GC Suns	-0.707792
586	Sam Simpson	Geelong	0.222222
587	Brennan Cox	Fremantle	5.145455
588	Brodie Smith	Adelaide	0.378698
589	Darcy Byrne-Jones	Port Adelaide	-0.373391
590	Cooper Harvey	North Melbourne	-0.904110
591	Nathan Broad	Richmond	9.892857
592	Matt Flynn	GWS Giants	-0.652459
593	Tyler Brockman	Hawthorn	0.575472
594	Lachie Jones	Port Adelaide	-0.041916
595	Jordyn Baker	West Coast Eagles	-1.000000
596	Sam Hayes	Port Adelaide	inf
597	Bayley Fritsch	Melbourne	4.457143
598	Jack O'Sullivan	Hawthorn	-1.000000
599	Josh Fahey	GWS Giants	inf
600	Tom McCallum	Port Adelaide	-1.000000
601	Tom McCartin	Sydney	inf
602	Aaron Naughton	Western Bulldogs	0.412698
603	Ben King	GC Suns	-0.408240
604	James Trezise	Richmond	-0.892405
605	Tristan Xerri	North Melbourne	5.058824
606	Connor Budarick	GC Suns	-0.660194

607	James Blanck	Hawthorn	1.542857
608	Will Hoskin-Elliott	Collingwood	2.213483
609	Oskar Faulkhead	GC Suns	-1.000000
610	Jack Henry	Geelong	inf
611	Kaelan Bradtke	Richmond	-1.000000
612	Kayne Turner	North Melbourne	inf
613	Max Lynch	Hawthorn	-0.982609
614	Tom Sparrow	Melbourne	196.500000
615	Lloyd Johnston	GC Suns	-0.939241
616	Joel Jeffrey	GC Suns	1.791667
617	Eddie Ford	North Melbourne	1.910448
618	Cameron Owen	Sydney	-1.000000
619	Noah Cumberland	Richmond	inf
620	Max Gruzewski	GWS Giants	-1.000000
621	Harry Perryman	GWS Giants	inf
622	Greg Clark	West Coast Eagles	-0.654639
623	Elliott Himmelberg	Adelaide	-0.805970
624	Mate Colina	Richmond	-1.000000
625	Jaiden Magor	Sydney	NaN
626	Max Ramsden	Hawthorn	inf
627	Bailey Williams	Western Bulldogs	26.142857
628	Dante Visentini	Port Adelaide	-0.942105
629	Nick Daicos	Collingwood	30.000000
630	Jack Ginnivan	Collingwood	-0.813783
631	Mason Wood	St Kilda	3.031496
632	Ed Curnow	Carlton	-0.560547
633	Matt Roberts	Sydney	-0.817778
634	Caleb Daniel	Western Bulldogs	12.097561
635	Jason Gillbee	GWS Giants	-1.000000
636	Kye Turner	Melbourne	NaN
637	Zach Guthrie	Geelong	inf
638	Joe Richards	Collingwood	-1.000000
639	Ben Paton	St Kilda	inf
640	Blake Drury	North Melbourne	-0.820988
641	Zac Bailey	Brisbane	12.862069
642	Ted Clohesy	Geelong	-0.987562
643	Joshua Draper	Fremantle	-1.000000
644	Will Kelly	Collingwood	inf
645	Kallan Dawson	North Melbourne	-0.307692
646	Shadeau Brain	Brisbane	-1.000000
647	Luke Cleary	Western Bulldogs	inf
648	Malcolm Rosas	GC Suns	21.125000
649	Jeremy Howe	Collingwood	0.152542
650	Aiden Begg	Collingwood	-1.000000
651	Ash Johnson	Collingwood	inf
652	Caleb Mitchell	Sydney	-1.000000
653	Cooper Whyte	Geelong	inf
654	Emerson Jeka	Hawthorn	-1.000000
655	Hugh Jackson	Port Adelaide	NaN

656	Robbie McComb	Western Bulldogs	inf
657	Josh Honey	Carlton	2.384615
658	James Borlase	Adelaide	-0.272727
659	Callum Jamieson	West Coast Eagles	0.218750
660	Brody Mihocek	Collingwood	5.384615
661	Fischer McAsey	Adelaide	-1.000000
662	Mark O'Connor	Geelong	inf
663	Matthew Allison	St Kilda	-1.000000
664	Aaron Hall	North Melbourne	inf
665	William Edwards	Sydney	-1.000000
666	Joel Amartey	Sydney	inf
667	Roarke Smith	Western Bulldogs	-1.000000
668	Ryan Maric	West Coast Eagles	inf
669	Riley Garcia	Western Bulldogs	-0.690000
670	Jakob Ryan	Collingwood	-0.838710
671	Seamus Mitchell	Hawthorn	45.600000
672	Charlie Dean	Collingwood	-1.000000
673	Bailey Macdonald	Hawthorn	inf
674	Fionn O'Hara	Hawthorn	-1.000000
675	Trey Ruscoe	Collingwood	inf
676	Arlo Draper	Collingwood	-1.000000
677	Josh Carmichael	Collingwood	inf
678	Henry Hustwaite	Hawthorn	13.000000
679	Ryan Lester	Brisbane	8.571429
680	Rhys Mathieson	Brisbane	-1.000000
681	Brandon Starcevich	Brisbane	inf
682	Carter Michael	Brisbane	-1.000000
683	Jack Payne	Brisbane	inf
684	Tyler Sonsie	Richmond	-0.848889
685	Sam Banks	Richmond	1.411765
686	Jacob Bauer	Richmond	-0.780488
687	Seth Campbell	Richmond	-1.000000
688	Tylar Young	Richmond	inf
689	Ben Miller	Richmond	-0.463277
690	Steely Green	Richmond	-1.000000
691	Kaleb Smith	Richmond	NaN
692	Mason Cox	Collingwood	inf
693	Cian McBride	Essendon	-1.000000
694	Jordan Boyd	Carlton	inf
695	Andrew McPherson	Adelaide	-1.000000
696	Harrison Petty	Melbourne	inf
697	Corey Warner	Sydney	-0.915493
698	Nic Martin	Essendon	41.166667
699	Patrick Parnell	Adelaide	-0.895257
700	Darragh Joyce	Brisbane	-0.188679
701	Kysiah Pickett	Melbourne	5.162791
702	Jack Sinclair	St Kilda	1.615094
703	Daniel Lloyd	GWS Giants	-0.571429
704	Jake Stein	GC Suns	-1.000000

705	Brodie McLaughlin	GC Suns	NaN
706	Jason Johannisen	Western Bulldogs	inf
707	Cameron Zurhaar	North Melbourne	0.240385
708	Noah Answerth	Brisbane	-0.875969
709	Jack Buller	Sydney	-0.937500
710	Jaiden Hunter	Essendon	-1.000000
711	Alex Keath	Western Bulldogs	inf
712	Darcy Macpherson	GC Suns	1.032258
713	Sam Switkowski	Fremantle	-0.301587
714	Jed McEntee	Port Adelaide	-0.327922
715	Harrison Arnold	Sydney	-1.000000
716	Connor Idun	GWS Giants	inf
717	Kade Chandler	Melbourne	-0.384270
718	Alex Cincotta	Carlton	-0.145985
719	Tom Campbell	St Kilda	-1.000000
720	Harvey Harrison	Collingwood	inf
721	Clay Tucker	Hawthorn	-1.000000
722	Conrad Williams	Fremantle	NaN
723	Lachlan Sholl	Adelaide	inf
724	Tom Stewart	Geelong	0.843636
725	Harry Edwards	West Coast Eagles	-0.968442
726	Hudson O'Keefe	Carlton	-1.000000
727	Domanic Akuei	Carlton	NaN
728	Hugh Bond	Adelaide	NaN
729	Eric Benning	Fremantle	NaN
730	Robert Hansen Jr	North Melbourne	inf
731	Lachlan Rankin	Sydney	-1.000000
732	Robbie Fox	Sydney	inf
733	Kyle Marshall	Port Adelaide	-1.000000
734	Brandon Ryan	Hawthorn	inf
735	Olli Hotton	St Kilda	-1.000000
736	Cody Raak	Western Bulldogs	NaN
737	Alastair Lord	Essendon	NaN
738	Ryan Gardner	Western Bulldogs	inf
739	Tyrell Dewar	West Coast Eagles	-1.000000
740	Sandy Brock	GC Suns	NaN
741	Patrick Voss	Essendon	NaN
742	Brad Close	Geelong	inf
743	Marlion Pickett	Richmond	-0.018051
744	Adam Kennedy	GWS Giants	-0.867647
745	Adam Saad	Carlton	12.944444
746	Massimo D'Ambrosio	Essendon	-0.826693
747	Oliver Sestan	Melbourne	-1.000000
748	Caleb Graham	GC Suns	NaN
749	Quinton Narkle	Port Adelaide	inf
750	Hewago Oea	GC Suns	1.218750
751	Lewis Melican	Sydney	0.126761
752	Angus McLennan	St Kilda	-1.000000
753	Joshua Bennetts	Hawthorn	NaN

754	Bailey Banfield	Fremantle	inf
755	Darcy Wilmot	Brisbane	1.537500
756	Jordon Butts	Adelaide	-0.647783
757	Taj Woewodin	Melbourne	-0.741259
758	Daniel Turner	Melbourne	-0.459459
759	Max Heath	St Kilda	-1.000000
760	Nicholas Madden	GWS Giants	NaN
761	Cooper Sharman	St Kilda	inf
762	Tex Wanganeen	Essendon	-1.000000
763	Liam Reidy	Fremantle	NaN
764	Deakyn Smith	Melbourne	NaN
765	Thomas Scully	Port Adelaide	NaN
766	Kyah Farris-White	Melbourne	NaN
767	Cooper Hamilton	GWS Giants	inf
768	Coby Burgiel	West Coast Eagles	-1.000000
769	Sebit Kuek	Fremantle	NaN
770	Mark Blicavs	Geelong	inf
771	Kalin Lane	Brisbane	-1.000000
772	Callum Wilkie	St Kilda	inf
773	James Van Es	St Kilda	-1.000000
774	Jack Buckley	GWS Giants	inf
775	Oscar Adams	St Kilda	-1.000000
776	Andy Moniz-Wakefield	Melbourne	NaN
777	Tim English	Western Bulldogs	inf
778	Flynn Kroeger	Geelong	-1.000000
779	Mitch Hardie	Geelong	NaN
780	Ned Moyle	GC Suns	inf
781	Anthony Munkara	Essendon	-1.000000
782	Reilly O'Brien	Adelaide	inf
783	Wade Derksen	GWS Giants	-1.000000
784	Phoenix Foster	Geelong	NaN
785	Anthony McDonald-Tipungwuti	Essendon	inf
786	Oscar McInerney	Brisbane	5.200000
787	Jake Lloyd	Sydney	0.725806
788	Matthew Owies	Carlton	-0.699065
789	Alex Mirkov	Carlton	-1.000000
790	Jackson Mead	Port Adelaide	inf
791	Jy Farrar	GC Suns	0.480769
792	Matthew Johnson	Fremantle	2.324675
793	Lachlan Gollant	Adelaide	-0.851562
794	Rhett Montgomerie	Essendon	-1.000000
795	Anthony Caminiti	St Kilda	inf
796	Leo Connolly	St Kilda	-1.000000
797	Nathan Barkla	Port Adelaide	NaN
798	Ethan Stanley	Fremantle	inf
799	Trent Dumont	Port Adelaide	-1.000000
800	Jai Culley	West Coast Eagles	inf
801	Callum M. Brown	GWS Giants	3.785714
802	Kieran Strachan	Adelaide	-1.000000
803	Ben Brown	Melbourne	inf

```
804          Lachlan McAndrew           Sydney    -0.818182
805          Mark Keane              Adelaide   4.583333
806          Matthew Cottrell        Carlton   2.552239
807          Jye Menzie             Essendon  -0.235294
full_rank_player_contributions = final_df.nlargest(808, 'Improvement')
plt.figure(figsize=(12, 150))
sns.barplot(x='Improvement', y='Player',
data=full_rank_player_contributions,hue='Current Team
2023',dodge=False)
plt.title('Percentage change in disposals in descending order')
plt.show()
```

Percentage change in disposals in descending order



Injury Prevention

```
# Example: Calculate average disposals per game
final_df['Disposals_per_Game'] = final_df['D'] / final_df['TOTAL GAMES
(Up to R22 2024)']
print(final_df[['Player', 'Current Team 2023', 'Disposals_per_Game']])
```

Disposals_per_Game	Player	Current Team 2023
0	Jack Higgins	St Kilda
2.441667	Adam Treloar	Western Bulldogs
2.219124	Chad Warner	Sydney
6.395062	Jamarra Ugle-Hagan	Western Bulldogs
4.078125	Steven May	Melbourne
1.685106	Chayce Jones	Adelaide
3.450549	Connor Rozee	Port Adelaide
5.235772	Nick Vlastuin	Richmond
1.713043	Darcy Jones	GWS Giants
0.000000	Sam Sturt	Fremantle
4.103448	Tom Jonas	Port Adelaide
0.458333	Andrew McGrath	Essendon
3.380645	Kai Lohmann	Brisbane
1.500000	Deven Robertson	Brisbane
3.348837	Marcus Windhager	St Kilda
5.846154	Zak Jones	St Kilda
0.408163	Patrick Lipinski	Collingwood
2.146552	Ben Keays	Adelaide
3.315789	Stephen Coniglio	GWS Giants
3.319249	Jordan De Goey	Collingwood
2.935673	Jaeger O'Meara	Fremantle

2.233696		
21	Jacob van Rooyen	Melbourne
4.461538		
22	Jack Silvagni	Carlton
1.886957		
23	Paddy Dow	Carlton
1.962963		
24	Isaac Heeney	Collingwood
3.367925		
25	Sam Powell-Pepper	Port Adelaide
2.415493		
26	Mabior Chol	GC Suns
0.762500		
27	Toby Greene	GWS Giants
1.812766		
28	Caleb Serong	Fremantle
6.683168		
29	Hugh Greenwood	North Melbourne
1.661157		
30	Joe Daniher	Brisbane
1.969543		
31	Aaron Cadman	GWS Giants
1.741935		
32	Jade Gresham	St Kilda
2.589744		
33	Brayden Maynard	Collingwood
2.193237		
34	Jamie Elliott	Collingwood
1.411458		
35	Liam Ryan	West Coast Eagles
0.375000		
36	Cody Weightman	Western Bulldogs
2.712329		
37	Brad Crouch	St Kilda
6.382353		
38	Lachlan Cowan	Carlton
3.285714		
39	Jesse Motlop	Carlton
5.648649		
40	Lachie Whitfield	GWS Giants
2.813043		
41	Rhys Stanley	Geelong
0.752427		
42	Jake Waterman	West Coast Eagles
1.549020		
43	Rory Atkins	GC Suns
2.500000		
44	Oliver Hollands	Carlton
6.820513		

45	Lochie O'Brien	Carlton
0.565789		
46	Hayden McLean	Sydney
3.662162		
47	Dylan Stephens	Sydney
3.087719		
48	Lachie Ash	GWS Giants
6.357143		
49	Sebastian Ross	St Kilda
1.549763		
50	Callum Ah Chee	Brisbane
0.926471		
51	Marcus Bontempelli	Western Bulldogs
2.694915		
52	Christian Salem	Melbourne
1.758621		
53	Harry Morrison	Hawthorn
2.434343		
54	Nasiah Wanganeen-Milera	St Kilda
9.229508		
55	Sam Berry	Adelaide
0.740741		
56	Mitch Lewis	Hawthorn
2.742857		
57	Jedd Busslinger	Western Bulldogs
0.000000		
58	Josh Dunkley	Brisbane
3.637500		
59	Jai Newcombe	Hawthorn
7.680556		
60	Bailey Smith	Western Bulldogs
4.339806		
61	Dylan Grimes	Richmond
0.846154		
62	Jarman Impey	Hawthorn
2.388601		
63	James Worpel	Hawthorn
4.878049		
64	Sam Draper	Essendon
2.169014		
65	Jaidyn Stephenson	North Melbourne
1.852459		
66	Judd McVee	Melbourne
6.956522		
67	Harry Sheezel	North Melbourne
14.136364		
68	Sean Darcy	Fremantle
1.881818		
69	Rory Lobb	Western Bulldogs

1.190751		
70	Darcy Parish	Essendon
3.468750		
71	Heath Chapman	Fremantle
1.125000		
72	Ryan Clarke	Sydney
1.500000		
73	Kyle Langford	Essendon
2.079470		
74	Ryan Burton	Port Adelaide
2.240000		
75	Sam Flanders	GC Suns
5.296875		
76	James Sicily	Hawthorn
3.296053		
77	Zach Tuohy	Geelong
1.354478		
78	Elijah Tsatas	Essendon
5.909091		
79	James Harmes	Melbourne
0.693750		
80	Todd Marshall	Port Adelaide
1.704348		
81	Logan McDonald	Sydney
2.984615		
82	Christian Petracca	Melbourne
3.677249		
83	Ned Reeves	Hawthorn
4.047619		
84	Tom Mitchell	Collingwood
3.201970		
85	Adam Cerra	Carlton
4.375000		
86	Dion Prestia	Richmond
1.977477		
87	Brandan Parfitt	Geelong
0.876923		
88	Zac Williams	Carlton
0.000000		
89	Josh Daicos	Collingwood
5.241935		
90	Trent Bianco	Collingwood
0.375000		
91	Sam Frost	Hawthorn
1.277778		
92	Brodie Grundy	Melbourne
1.130233		
93	John Noble	Collingwood
4.272727		

94	Hugh McCluggage	Brisbane
3.188571		
95	Jordan Clark	Fremantle
4.410000		
96	Dustin Martin	Richmond
1.562914		
97	Jye Caldwell	Essendon
5.144737		
98	Scott Pendlebury	Collingwood
1.423940		
99	Lachlan Murphy	Adelaide
2.937500		
100	Callan Ward	GWS Giants
1.578778		
101	Jack Viney	Melbourne
2.834101		
102	Matt Crouch	Adelaide
1.206452		
103	Lachlan Bramble	Hawthorn
3.033333		
104	Jackson Hately	Adelaide
0.129032		
105	Ryan Angwin	GWS Giants
7.300000		
106	Andrew Gaff	West Coast Eagles
1.648746		
107	Dom Sheed	West Coast Eagles
2.218182		
108	Matthew Kennedy	Carlton
2.530435		
109	Nat Fyfe	Fremantle
0.525210		
110	Brandon Ellis	GC Suns
1.147410		
111	Daniel McStay	Collingwood
0.659218		
112	Tanner Bruhn	Geelong
4.920635		
113	Jarrod Berry	Brisbane
4.888889		
114	Jake Lever	Melbourne
5.745763		
115	Jayden Hunt	West Coast Eagles
2.774194		
116	Jacob Wehr	GWS Giants
1.040000		
117	Harry Cunningham	Sydney
1.571429		
118	Will Ashcroft	Brisbane

16.58333		
119	Jack Ross	Richmond
5.088235		
120	Bradley Hill	St Kilda
1.798419		
121	Lachie Neale	Brisbane
2.618868		
122	Daniel Rich	Brisbane
0.498182		
123	Jack Steele	St Kilda
2.787709		
124	Braydon Preuss	GWS Giants
0.000000		
125	Lincoln McCarthy	Brisbane
1.860927		
126	James Rowbottom	Sydney
3.839286		
127	Zach Merrett	Essendon
2.792952		
128	Will Hayward	Sydney
1.702532		
129	Mitch Owens	St Kilda
6.784314		
130	Riley Thilthorpe	Adelaide
4.460000		
131	Alex Davies	GC Suns
4.300000		
132	Jeremy Cameron	Geelong
1.284000		
133	Aidan Corr	North Melbourne
1.793750		
134	Elliot Yeo	West Coast Eagles
0.828571		
135	Josh Rachele	Adelaide
5.944444		
136	Tom Wilson	Collingwood
0.625000		
137	Nakia Cockatoo	Brisbane
0.000000		
138	Dan Houston	Port Adelaide
3.497006		
139	Lachie Fogarty	Carlton
2.128571		
140	Toby Conway	Geelong
1.000000		
141	Charlie Clarke	Western Bulldogs
0.000000		
142	Charlie Spargo	Melbourne
1.428571		

143 0.000000	Robbie Tarrant	Richmond
144 0.538462	James Madden	Brisbane
145 0.000000	Darryl McDowell-White	Brisbane
146 1.123711	Jake Kolodjashnij	Geelong
147 3.604167	Hunter Clark	St Kilda
148 0.238889	Alex Sexton	GC Suns
149 4.659722	Andrew Brayshaw	Fremantle
150 0.345070	Toby McLean	Western Bulldogs
151 7.866667	Ben Hobbs	Essendon
152 1.564706	Rory Sloane	Adelaide
153 2.921569	Patrick Cripps	Carlton
154 8.011364	Tom Green	GWS Giants
155 0.259259	Nathan Kreuger	Collingwood
156 1.774059	Taylor Adams	Collingwood
157 1.806202	Nick Holman	GC Suns
158 3.281437	Angus Brayshaw	Melbourne
159 1.400000	Dayne Zorko	Brisbane
160 1.027523	Dylan Shiel	Essendon
161 0.180000	Sam Menegola	Geelong
162 4.227848	Isaac Cumming	GWS Giants
163 0.400000	Sam Darcy	Western Bulldogs
164 4.310345	Toby Bedford	GWS Giants
165 3.448819	Liam Baker	Richmond
166 0.565217	Paddy McCartin	Sydney
167	Aaron Francis	Sydney

1.931507		
168	Jack Macrae	Western Bulldogs
2.264228		
169	Jack Riewoldt	Richmond
0.541787		
170	Kane Farrell	Port Adelaide
3.956044		
171	Sam Taylor	GWS Giants
2.224299		
172	Luke Pedlar	Adelaide
8.300000		
173	Xavier Duursma	Port Adelaide
2.784091		
174	Cam Rayner	Brisbane
2.766917		
175	Tom Papley	Sydney
1.890110		
176	Trent Cotchin	Richmond
1.016340		
177	Changkuoth Jiath	Hawthorn
2.428571		
178	Paul Seedsman	Adelaide
0.000000		
179	Maurice Rioli	Richmond
1.771429		
180	Elijah Hollands	GC Suns
3.454545		
181	Reuben Ginbey	West Coast Eagles
6.131579		
182	Luke Jackson	Fremantle
3.604167		
183	Curtis Taylor	North Melbourne
2.907895		
184	Max Holmes	Geelong
5.555556		
185	Max Gawn	Melbourne
1.675676		
186	Angus Sheldrick	Sydney
11.888889		
187	Jase Burgoyne	Port Adelaide
1.419355		
188	Darcy Cameron	Collingwood
2.677419		
189	Edward Allan	Collingwood
0.000000		
190	Brent Daniels	GWS Giants
3.262136		
191	Lachie Hunter	Melbourne
2.703518		

192	Harry McKay	Carlton
1.944882		
193	Mitch Knevitt	Geelong
7.307692		
194	Max King	St Kilda
1.240964		
195	Michael Walters	Fremantle
0.836134		
196	Jordan Dawson	Adelaide
4.867188		
197	Ryan Byrnes	St Kilda
5.491803		
198	James Aish	Fremantle
2.163934		
199	Brynn Teakle	Port Adelaide
2.733333		
200	Josh Sinn	Port Adelaide
2.000000		
201	Liam Stocker	St Kilda
6.030769		
202	Hugh Davies	Fremantle
0.000000		
203	Sam Weideman	Essendon
1.933333		
204	Harvey Gallagher	Western Bulldogs
0.000000		
205	George Wardlaw	North Melbourne
4.875000		
206	Will Snelling	Essendon
2.137500		
207	Will Setterfield	Essendon
2.929577		
208	Taylor Walker	Adelaide
1.036232		
209	Jack Ziebell	North Melbourne
1.787546		
210	Bailey Scott	North Melbourne
5.141414		
211	Isaac Smith	Geelong
1.689286		
212	Jason Castagna	Richmond
0.000000		
213	Finn Callaghan	GWS Giants
9.478261		
214	Jarryd Lyons	Brisbane
0.479381		
215	Zak Butters	Port Adelaide
6.026316		
216	Xavier O'Neill	West Coast Eagles

3.370370		
217	Jack Bowes	Geelong
2.211864		
218	Jhye Clark	Geelong
0.375000		
219	Oliver Florent	Sydney
2.926380		
220	Clayton Oliver	Melbourne
2.480874		
221	Callum Mills	Sydney
2.534591		
222	Brayden Fiorini	GC Suns
2.876190		
223	Hugo Ralphsmith	Richmond
3.042553		
224	Conor Stone	GWS Giants
0.916667		
225	Keidean Coleman	Brisbane
6.030769		
226	Billy Frampton	Collingwood
2.614035		
227	Finlay Macrae	Collingwood
0.350000		
228	Oscar Steene	Collingwood
0.000000		
229	Ed Langdon	Melbourne
2.768362		
230	Tim Taranto	Richmond
4.442953		
231	Travis Boak	Port Adelaide
0.915301		
232	Jack Billings	St Kilda
0.266272		
233	Nik Cox	Essendon
1.339623		
234	Karl Amon	Hawthorn
2.927711		
235	Nick Haynes	GWS Giants
1.500000		
236	Bailey Laurie	Melbourne
3.600000		
237	Jayden Short	Richmond
2.069767		
238	Ben Ainsworth	GC Suns
2.768657		
239	Conor Nash	Hawthorn
5.872340		
240	Jake Soligo	Adelaide
6.087719		

241	Jeremy Finlayson	Port Adelaide
2.325000		
242	Jonathon Ceglar	Geelong
0.584615		
243	Mitch McGovern	Carlton
3.007937		
244	Charlie Ballard	GC Suns
2.236641		
245	Touk Miller	GC Suns
1.714286		
246	Sam Day	GC Suns
0.122581		
247	Dan Butler	St Kilda
1.811189		
248	Luke Davies-Uniacke	North Melbourne
3.613208		
249	Jack Gunston	Brisbane
0.666667		
250	Sam De Koning	Geelong
3.774194		
251	Luke Ryan	Fremantle
3.601307		
252	Jake Bowey	Melbourne
6.288136		
253	Nick Coffield	St Kilda
0.000000		
254	Trent McKenzie	Port Adelaide
1.060606		
255	Brayden Cook	Adelaide
0.592593		
256	Daniel Rioli	Richmond
2.644444		
257	Max Michalanney	Adelaide
5.642857		
258	Jack Lukosius	GC Suns
2.582609		
259	Orazio Fantasia	Port Adelaide
0.205357		
260	Lachie Weller	GC Suns
1.385714		
261	Jack Peris	St Kilda
1.625000		
262	Will Day	Hawthorn
7.782609		
263	James Peatling	GWS Giants
2.658537		
264	Jack Hayes	St Kilda
1.000000		
265	Esava Ratugolea	Geelong
1.526882		

266	Oskar Baker	Western Bulldogs
6.769231		
267	Sam Petrevski-Seton	West Coast Eagles
1.654206		
268	Jake Melksham	Melbourne
0.453744		
269	Tom De Koning	Carlton
2.961039		
270	Josh Gibcus	Richmond
0.000000		
271	Tom Doedee	Adelaide
2.012195		
272	Jordan Ridley	Essendon
3.670213		
273	Steele Sidebottom	Collingwood
1.267477		
274	Tom Lynch	Richmond
0.154545		
275	Bobby Hill	Collingwood
2.872093		
276	Jayden Laverde	Essendon
2.333333		
277	Leek Aleer	GWS Giants
0.000000		
278	Ben Cunnington	North Melbourne
0.747899		
279	Blake Acres	Carlton
3.490909		
280	Luke McDonald	North Melbourne
1.905473		
281	Rhylee West	Western Bulldogs
2.403509		
282	Will Hamill	Adelaide
0.000000		
283	Noah Anderson	GC Suns
6.068627		
284	Archie Perkins	Essendon
4.500000		
285	Nathan Wilson	Fremantle
0.393548		
286	Sam Wicks	Sydney
1.772727		
287	Jy Simpkin	North Melbourne
2.480000		
288	Dylan Moore	Hawthorn
5.000000		
289	Travis Colyer	Fremantle
0.000000		
290	Zac Taylor	Adelaide

0.000000		
291	Taylor Duryea	Western Bulldogs
1.137441		
292	Thomas Berry	GC Suns
0.930233		
293	Jack Scrimshaw	Hawthorn
2.679612		
294	Josh Schache	Melbourne
0.131579		
295	Darcy Tucker	North Melbourne
1.993197		
296	Braeden Campbell	Sydney
5.918033		
297	Josh Bruce	Western Bulldogs
0.509202		
298	Blake Hardwick	Hawthorn
2.779762		
299	Sam Docherty	Carlton
3.488095		
300	Jack Carroll	Carlton
0.210526		
301	Miles Bergman	Port Adelaide
4.243590		
302	Rowan Marshall	St Kilda
3.792308		
303	James Stewart	Essendon
0.000000		
304	Ivan Soldo	Richmond
1.200000		
305	Ethan Hughes	Fremantle
2.495327		
306	Jaxon Prior	Brisbane
1.131579		
307	Willie Rioli	Port Adelaide
2.411765		
308	Elijah Hewett	West Coast Eagles
13.428571		
309	Aiden Bonar	North Melbourne
0.705882		
310	Tyson Stengle	Geelong
2.679012		
311	James Willis	Geelong
NaN		
312	Brodie Kemp	Carlton
6.560976		
313	Will Brodie	Fremantle
1.907407		
314	Adam Tomlinson	Melbourne
0.661202		

315	Tom Emmett	Fremantle
2.000000		
316	Isaac Quaynor	Collingwood
3.971698		
317	Sam Walsh	Carlton
4.422414		
318	Josh Kelly	GWS Giants
2.805687		
319	Mitch Hannan	Western Bulldogs
0.358333		
320	Jesse Hogan	GWS Giants
1.869565		
321	Lewis Hayes	Essendon
0.000000		
322	Liam Shiels	North Melbourne
0.989510		
323	Lloyd Meek	Hawthorn
3.208333		
324	Josh Corbett	Fremantle
0.804878		
325	Nic Naitanui	West Coast Eagles
0.000000		
326	Brayden George	North Melbourne
0.000000		
327	Jed Anderson	GC Suns
0.000000		
328	Ollie Wines	Port Adelaide
2.189516		
329	Corey Durdin	Carlton
2.155556		
330	Luke Shuey	West Coast Eagles
0.671186		
331	Daniel Howe	North Melbourne
1.495327		
332	Dougal Howard	St Kilda
1.736842		
333	Chad Wingard	Hawthorn
0.908257		
334	Tom Clurey	Port Adelaide
0.024194		
335	Jack Crisp	Collingwood
2.246964		
336	Osca Riccardi	Geelong
Nan		
337	Reef McInnes	Collingwood
0.900000		
338	Tom Fullarton	Brisbane
0.000000		
339	Nick Hind	Essendon

3.063158		
340	Mitch Duncan	Geelong
1.229452		
341	James O'Donnell	Western Bulldogs
4.304348		
342	Tim Kelly	West Coast Eagles
4.373239		
343	Griffin Logue	North Melbourne
2.308642		
344	Peter Wright	Essendon
0.721805		
345	Dyson Heppell	Essendon
1.757937		
346	Matt Rowell	GC Suns
5.867470		
347	Gary Rohan	Geelong
0.660099		
348	Lachie Plowman	Carlton
0.082759		
349	Jacob Konstanty	Sydney
0.000000		
350	Cooper Stephens	Hawthorn
0.000000		
351	Jason Horne-Francis	Port Adelaide
7.033333		
352	Matt Taberner	Fremantle
0.288000		
353	Jack Martin	Carlton
0.940397		
354	Matthew Jefferson	Melbourne
Nan		
355	Oscar Allen	West Coast Eagles
2.615385		
356	Luke Breust	Hawthorn
0.760135		
357	Zaine Cordy	St Kilda
0.728571		
358	Caleb Marchbank	Carlton
1.761905		
359	Noah Long	West Coast Eagles
8.076923		
360	Bailey Humphrey	GC Suns
6.210526		
361	Jacob Weitering	Carlton
2.258427		
362	Josh Weddle	Hawthorn
7.736842		
363	Liam Duggan	West Coast Eagles
2.960452		

364	Jeremy Sharp	GC Suns
0.000000		
365	Nick Larkey	North Melbourne
1.878261		
366	Sam Durham	Essendon
5.260870		
367	Nic Newman	Carlton
4.282443		
368	Noah Balta	Richmond
3.356436		
369	Shannon Hurn	West Coast Eagles
0.847352		
370	Liam Jones	Western Bulldogs
0.842640		
371	Jamie Cripps	West Coast Eagles
0.630522		
372	Callum Coleman-Jones	North Melbourne
2.645161		
373	Todd Goldstein	North Melbourne
0.790274		
374	Harrison Jones	Essendon
0.900000		
375	Luke Edwards	West Coast Eagles
4.297297		
376	Harry Rowston	GWS Giants
7.000000		
377	Peter Ladhams	Sydney
2.584906		
378	Lachie Young	North Melbourne
1.061224		
379	Jacob Koschitzke	Hawthorn
1.716667		
380	Mitch Georgiades	Port Adelaide
0.415385		
381	Ed Richards	Western Bulldogs
3.303279		
382	Cooper Murley	Collingwood
0.000000		
383	Sam Reid	Sydney
0.000000		
384	Nick Bryan	Essendon
4.235294		
385	James Tsitas	GC Suns
3.800000		
386	Josh Rotham	West Coast Eagles
1.805556		
387	Jed Bews	Geelong
0.934524		
388	Daniel McKenzie	St Kilda

0.000000		
389	Campbell Chesser	West Coast Eagles
5.258065		
390	Harry Sharp	Brisbane
2.857143		
391	Oleg Markov	Collingwood
3.065934		
392	Brady Hough	West Coast Eagles
4.431373		
393	Blake Howes	Melbourne
0.000000		
394	Joel Hamling	Fremantle
0.494505		
395	Errol Gulden	Sydney
7.390805		
396	Marc Sheather	Sydney
0.733333		
397	Zac Fisher	Carlton
2.032520		
398	Mitchell Hinge	Adelaide
6.260870		
399	Jaxon Binns	Carlton
0.000000		
400	Jacob Hopper	Richmond
2.460432		
401	Jeremy McGovern	West Coast Eagles
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402	Judson Clarke	Richmond
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403	Sam Philp	Carlton
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404	Nick Blakey	Sydney
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405	Nathan Murphy	Collingwood
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406	Fergus Greene	Hawthorn
11.125000		
407	Denver Grainger-Barras	Hawthorn
1.392857		
408	Tyler Brown	Adelaide
0.037037		
409	Aliir Aliir	Port Adelaide
1.874172		
410	James Jordon	Melbourne
2.732558		
411	Tom Hickey	Sydney
0.712195		
412	Max Knobel	Fremantle
Nan		

413	Lachlan Keeffe	GWS Giants
0.794643		
414	Jack Petruccelle	West Coast Eagles
2.581395		
415	Ben Long	GC Suns
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416	Jake Stringer	Essendon
1.085714		
417	Liam Henry	Fremantle
5.945455		
418	Toby Nankervis	Richmond
1.629870		
419	Jack Bytel	St Kilda
1.714286		
420	Isiah Winder	West Coast Eagles
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421	Tom Hawkins	Geelong
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422	Hamish Free	North Melbourne
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423	Lance Franklin	Sydney
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424	Trent Rivers	Melbourne
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425	Alex Witherden	West Coast Eagles
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426	Matthew Coulthard	Richmond
5.800000		
427	Charlie Cameron	Brisbane
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428	Tariek Newchurch	Adelaide
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429	Mattaes Phillipou	St Kilda
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430	Dane Rampe	Sydney
0.947154		
431	Tom Liberatore	Western Bulldogs
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432	Izak Rankine	Adelaide
3.925926		
433	Connor West	West Coast Eagles
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434	Oliver Dempsey	Geelong
1.357143		
435	Karl Worner	Fremantle
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436	Zane Trew	West Coast Eagles
3.000000		
437	Ben McKay	North Melbourne

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438	Thomson Dow	Richmond
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439	Josh Ward	Hawthorn
8.300000		
440	Tim O'Brien	Western Bulldogs
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441	Cameron Fleeton	GWS Giants
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442	Kaine Baldwin	Essendon
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443	Blake Coleman	Brisbane
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444	Darcy Moore	Collingwood
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445	Shane McAdam	Adelaide
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446	Jacob Edwards	North Melbourne
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447	Marc Pittonet	Carlton
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448	Jye Amiss	Fremantle
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449	Charlie Dixon	Port Adelaide
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450	Ned Long	Hawthorn
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451	Josh Worrell	Adelaide
6.481481		
452	Tom Powell	North Melbourne
3.484848		
453	Flynn Perez	North Melbourne
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454	Cameron Guthrie	Geelong
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455	Paul Curtis	North Melbourne
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456	David Cunningham	Carlton
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457	Alex Pearce	Fremantle
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458	Tarryn Thomas	North Melbourne
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459	Tom McDonald	Melbourne
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460	Josh Battle	St Kilda
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461	Tom Atkins	Geelong
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462	Miller Bergman	North Melbourne
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463	Bigoa Nyuon	Richmond
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464	Marcus Adams	Brisbane
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465	Laitham Vandermeer	Western Bulldogs
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466	Jack Darling	West Coast Eagles
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467	Shai Bolton	Richmond
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468	Cooper Vickery	Sydney
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469	Sean Lemmens	GC Suns
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470	Oscar Murdoch	Geelong
Nan		
471	Michael Hibberd	Melbourne
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472	Tom Cole	West Coast Eagles
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473	Harry Barnett	West Coast Eagles
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474	Ned McHenry	Adelaide
1.871429		
475	Jed Adams	Melbourne
Nan		
476	George Hewett	Carlton
2.528409		
477	Dylan Williams	Port Adelaide
11.555556		
478	Jake Riccardi	GWS Giants
2.869565		
479	Cam Mackenzie	Hawthorn
5.812500		
480	Harry Himmelberg	GWS Giants
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481	David Swallow	GC Suns
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482	Charlie Curnow	Carlton
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483	Sam Collins	GC Suns
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484	Riley Bonner	Port Adelaide
1.267857		
485	Will Phillips	North Melbourne
7.166667		
486	Jai Serong	Hawthorn

2.33333		
487	Hayden Young	Fremantle
6.307692		
488	Mason Redman	Essendon
4.131148		
489	Buku Khamis	Western Bulldogs
0.230769		
490	Luke Parker	Sydney
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491	Luke Dunstan	Melbourne
0.000000		
492	Harry Schoenberg	Adelaide
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493	Gryan Miers	Geelong
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494	Shannon Neale	Geelong
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495	Jordon Sweet	Western Bulldogs
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496	Connor Blakely	GC Suns
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497	Willem Drew	Port Adelaide
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498	Tom Brown	Richmond
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499	Caleb Poulter	Western Bulldogs
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500	Henry Smith	Brisbane
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501	Tom Highmore	St Kilda
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502	Will Verrall	Melbourne
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503	Sam Butler	Hawthorn
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504	Jamaine Jones	West Coast Eagles
3.424242		
505	Hayden Crozier	Western Bulldogs
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506	Josh Morris	Hawthorn
0.000000		
507	Wil Powell	GC Suns
3.543689		
508	Bailey J. Williams	West Coast Eagles
4.214286		
509	Jake Kelly	Essendon
1.284211		
510	Dominic Bedendo	Western Bulldogs
0.000000		

511	Joel Smith	Melbourne
2.071429		
512	Lachie Schultz	Fremantle
3.379630		
513	Brandon Zerk-Thatcher	Essendon
3.708333		
514	Luke Foley	West Coast Eagles
3.562500		
515	Anthony Scott	Western Bulldogs
4.016949		
516	Jarrod Witts	GC Suns
1.620112		
517	Will Gould	Sydney
2.888889		
518	Conor McKenna	Brisbane
3.720339		
519	Rhyan Mansell	Richmond
2.640000		
520	Chris Burgess	GC Suns
0.116279		
521	Samson Ryan	Richmond
4.500000		
522	Toby McMullin	GWS Giants
1.000000		
523	Charlie Comben	North Melbourne
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524	Sam Durdin	Carlton
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525	Zach Reid	Essendon
0.000000		
526	Alwyn Davey Jnr	Essendon
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527	Luke Nankervis	Adelaide
2.571429		
528	Ollie Lord	Port Adelaide
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529	Nick Murray	Adelaide
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530	Andrew Phillips	Essendon
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531	Neil Erasmus	Fremantle
7.608696		
532	Oisin Mullin	Geelong
3.266667		
533	Phil Davis	GWS Giants
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534	Jake Pasini	Port Adelaide
0.000000		
535	Josh Goater	North Melbourne
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536	Lachlan McNeil	Western Bulldogs
1.568627		
537	Jackson Archer	North Melbourne
2.000000		
538	Kamdyn McIntosh	Richmond
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539	Bailey Dale	Western Bulldogs
3.769737		
540	Harry Lemmey	Carlton
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541	Rory Laird	Adelaide
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542	Jimmy Webster	St Kilda
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543	Rhett Bazzo	West Coast Eagles
4.750000		
544	Darcy Gardiner	Brisbane
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545	Jack Mahony	North Melbourne
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546	Matt Guelfi	Essendon
1.277778		
547	Wayne Milera	Adelaide
4.373737		
548	Tim Membrey	St Kilda
0.435028		
549	Jack Graham	Richmond
2.367188		
550	Kieren Briggs	GWS Giants
5.695652		
551	Jack Williams	West Coast Eagles
2.555556		
552	Francis Evans	Port Adelaide
2.586207		
553	Charlie Lazzaro	North Melbourne
1.514286		
554	Levi Casboult	GC Suns
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555	Mac Andrew	GC Suns
4.794872		
556	Billy Dowling	Adelaide
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557	Jaspa Fletcher	Brisbane
4.852941		
558	Xavier O'Halloran	GWS Giants
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559	Justin McInerney	Sydney
3.651685		
560	Patrick Dangerfield	Geelong

1.108108		
561	Lewis Young	Carlton
3.125000		
562	Isaac Keeler	St Kilda
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563	Connor Macdonald	Hawthorn
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564	Nathan O'Driscoll	Fremantle
6.136364		
565	James Tunstill	Brisbane
1.333333		
566	Scott Lycett	Port Adelaide
0.955128		
567	Eric Hipwood	Brisbane
1.502924		
568	Brandon Walker	Fremantle
2.338710		
569	Michael Frederick	Fremantle
2.986842		
570	Arthur Jones	Western Bulldogs
7.615385		
571	Bodhi Uwland	GC Suns
1.136364		
572	Jayden Davey	Essendon
0.000000		
573	Finn Maginness	Hawthorn
3.190476		
574	Corey Wagner	Fremantle
4.131579		
575	Phoenix Spicer	North Melbourne
2.052632		
576	Oliver Henry	Geelong
3.409091		
577	Harris Andrews	Brisbane
1.800000		
578	Tom Barrass	West Coast Eagles
1.206667		
579	Hugo Hall-Kahan	Sydney
0.000000		
580	Beau McCreery	Collingwood
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581	Darcy Fogarty	Adelaide
2.393939		
582	Alex Neal-Bullen	Melbourne
2.224138		
583	Darcy Fort	Brisbane
1.685714		
584	Josh Treacy	Fremantle
2.750000		

585	Charlie Constable	GC Suns
2.250000		
586	Sam Simpson	Geelong
0.916667		
587	Brennan Cox	Fremantle
3.100917		
588	Brodie Smith	Adelaide
1.778626		
589	Darcy Byrne-Jones	Port Adelaide
1.505155		
590	Cooper Harvey	North Melbourne
9.333333		
591	Nathan Broad	Richmond
2.103448		
592	Matt Flynn	GWS Giants
2.650000		
593	Tyler Brockman	Hawthorn
4.638889		
594	Lachie Jones	Port Adelaide
3.137255		
595	Jordyn Baker	West Coast Eagles
Nan		
596	Sam Hayes	Port Adelaide
1.521739		
597	Bayley Fritsch	Melbourne
1.299320		
598	Jack O'Sullivan	Hawthorn
0.000000		
599	Josh Fahey	GWS Giants
7.428571		
600	Tom McCallum	Port Adelaide
0.000000		
601	Tom McCartin	Sydney
1.476562		
602	Aaron Naughton	Western Bulldogs
1.907143		
603	Ben King	GC Suns
1.698925		
604	James Trezise	Richmond
2.833333		
605	Tristan Xerri	North Melbourne
1.907407		
606	Connor Budarick	GC Suns
1.029412		
607	James Blanck	Hawthorn
3.708333		
608	Will Hoskin-Elliott	Collingwood
1.288288		
609	Oskar Faulkhead	GC Suns

0.000000		
610	Jack Henry	Geelong
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611	Kaelan Bradtke	Richmond
0.000000		
612	Kayne Turner	North Melbourne
0.884615		
613	Max Lynch	Hawthorn
0.060606		
614	Tom Sparrow	Melbourne
4.702381		
615	Lloyd Johnston	GC Suns
2.666667		
616	Joel Jeffrey	GC Suns
2.392857		
617	Eddie Ford	North Melbourne
5.000000		
618	Cameron Owen	Sydney
0.000000		
619	Noah Cumberland	Richmond
2.880000		
620	Max Gruzewski	GWS Giants
0.000000		
621	Harry Perryman	GWS Giants
3.104000		
622	Greg Clark	West Coast Eagles
6.380952		
623	Elliott Himmelberg	Adelaide
0.520000		
624	Mate Colina	Richmond
NAN		
625	Jaiden Magor	Sydney
0.000000		
626	Max Ramsden	Hawthorn
2.800000		
627	Bailey Williams	Western Bulldogs
2.567568		
628	Dante Visentini	Port Adelaide
4.400000		
629	Nick Daicos	Collingwood
10.029412		
630	Jack Ginnivan	Collingwood
2.081967		
631	Mason Wood	St Kilda
3.849624		
632	Ed Curnow	Carlton
1.018100		
633	Matt Roberts	Sydney
1.640000		

634	Caleb Daniel	Western Bulldogs
2.841270		
635	Jason Gillbee	GWS Giants
Nan		
636	Kye Turner	Melbourne
0.000000		
637	Zach Guthrie	Geelong
3.785714		
638	Joe Richards	Collingwood
0.000000		
639	Ben Paton	St Kilda
2.281690		
640	Blake Drury	North Melbourne
3.222222		
641	Zac Bailey	Brisbane
3.022556		
642	Ted Clohesy	Geelong
1.666667		
643	Joshua Draper	Fremantle
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644	Will Kelly	Collingwood
0.684211		
645	Kallan Dawson	North Melbourne
0.642857		
646	Shadeau Brain	Brisbane
0.000000		
647	Luke Cleary	Western Bulldogs
1.142857		
648	Malcolm Rosas	GC Suns
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649	Jeremy Howe	Collingwood
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650	Aiden Begg	Collingwood
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651	Ash Johnson	Collingwood
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652	Caleb Mitchell	Sydney
0.000000		
653	Cooper Whyte	Geelong
inf		
654	Emerson Jeka	Hawthorn
0.000000		
655	Hugh Jackson	Port Adelaide
0.000000		
656	Robbie McComb	Western Bulldogs
0.812500		
657	Josh Honey	Carlton
2.588235		
658	James Borlase	Adelaide

2.461538		
659	Callum Jamieson	West Coast Eagles
2.294118		
660	Brody Mihocek	Collingwood
1.817518		
661	Fischer McAsey	Adelaide
0.000000		
662	Mark O'Connor	Geelong
2.532787		
663	Matthew Allison	St Kilda
0.000000		
664	Aaron Hall	North Melbourne
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665	William Edwards	Sydney
0.000000		
666	Joel Amartey	Sydney
2.437500		
667	Roarke Smith	Western Bulldogs
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668	Ryan Maric	West Coast Eagles
3.571429		
669	Riley Garcia	Western Bulldogs
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670	Jakob Ryan	Collingwood
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671	Seamus Mitchell	Hawthorn
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672	Charlie Dean	Collingwood
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673	Bailey Macdonald	Hawthorn
12.500000		
674	Fionn O'Hara	Hawthorn
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675	Trey Ruscoe	Collingwood
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676	Arlo Draper	Collingwood
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677	Josh Carmichael	Collingwood
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678	Henry Hustwaite	Hawthorn
4.666667		
679	Ryan Lester	Brisbane
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680	Rhys Mathieson	Brisbane
0.000000		
681	Brandon Starcevich	Brisbane
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682	Carter Michael	Brisbane
0.000000		

683	Jack Payne	Brisbane
3.515625		
684	Tyler Sonsie	Richmond
1.416667		
685	Sam Banks	Richmond
4.555556		
686	Jacob Bauer	Richmond
4.500000		
687	Seth Campbell	Richmond
0.000000		
688	Tylar Young	Richmond
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689	Ben Miller	Richmond
2.209302		
690	Steely Green	Richmond
0.000000		
691	Kaleb Smith	Richmond
0.000000		
692	Mason Cox	Collingwood
1.228346		
693	Cian McBride	Essendon
0.000000		
694	Jordan Boyd	Carlton
3.200000		
695	Andrew McPherson	Adelaide
0.000000		
696	Harrison Petty	Melbourne
1.775000		
697	Corey Warner	Sydney
1.500000		
698	Nic Martin	Essendon
7.784615		
699	Patrick Parnell	Adelaide
3.117647		
700	Darragh Joyce	Brisbane
2.047619		
701	Kysaiah Pickett	Melbourne
2.548077		
702	Jack Sinclair	St Kilda
3.745946		
703	Daniel Lloyd	GWS Giants
3.337079		
704	Jake Stein	GC Suns
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705	Brodie McLaughlin	GC Suns
Nan		
706	Jason Johannisen	Western Bulldogs
1.061224		
707	Cameron Zurhaar	North Melbourne

2.168067		
708	Noah Answerth	Brisbane
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709	Jack Buller	Sydney
2.000000		
710	Jaiden Hunter	Essendon
0.000000		
711	Alex Keath	Western Bulldogs
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712	Darcy Macpherson	GC Suns
4.546392		
713	Sam Switkowski	Fremantle
3.581395		
714	Jed McEntee	Port Adelaide
4.704545		
715	Harrison Arnold	Sydney
0.000000		
716	Connor Idun	GWS Giants
5.000000		
717	Kade Chandler	Melbourne
5.074074		
718	Alex Cincotta	Carlton
7.090909		
719	Tom Campbell	St Kilda
0.000000		
720	Harvey Harrison	Collingwood
1.937500		
721	Clay Tucker	Hawthorn
0.000000		
722	Conrad Williams	Fremantle
Nan		
723	Lachlan Sholl	Adelaide
3.873239		
724	Tom Stewart	Geelong
3.017857		
725	Harry Edwards	West Coast Eagles
0.432432		
726	Hudson O'Keffe	Carlton
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727	Domanic Akuei	Carlton
0.000000		
728	Hugh Bond	Adelaide
0.000000		
729	Eric Benning	Fremantle
Nan		
730	Robert Hansen Jr	North Melbourne
1.333333		
731	Lachlan Rankin	Sydney
0.000000		

732	Robbie Fox	Sydney
2.970588		
733	Kyle Marshall	Port Adelaide
0.000000		
734	Brandon Ryan	Hawthorn
4.500000		
735	Olli Hotton	St Kilda
0.000000		
736	Cody Raak	Western Bulldogs
0.000000		
737	Alastair Lord	Essendon
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738	Ryan Gardner	Western Bulldogs
1.679245		
739	Tyrell Dewar	West Coast Eagles
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740	Sandy Brock	GC Suns
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741	Patrick Voss	Essendon
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742	Brad Close	Geelong
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743	Marlion Pickett	Richmond
3.022222		
744	Adam Kennedy	GWS Giants
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745	Adam Saad	Carlton
2.601036		
746	Massimo D'Ambrosio	Essendon
2.416667		
747	Oliver Sestan	Melbourne
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748	Caleb Graham	GC Suns
0.000000		
749	Quinton Narkle	Port Adelaide
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750	Hewago Oea	GC Suns
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751	Lewis Melican	Sydney
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752	Angus McLennan	St Kilda
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753	Joshua Bennetts	Hawthorn
0.000000		
754	Bailey Banfield	Fremantle
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755	Darcy Wilmot	Brisbane
8.285714		
756	Jordon Butts	Adelaide

1.906667		
757	Taj Woewodin	Melbourne
1.947368		
758	Daniel Turner	Melbourne
1.250000		
759	Max Heath	St Kilda
Nan		
760	Nicholas Madden	GWS Giants
Nan		
761	Cooper Sharman	St Kilda
3.106383		
762	Tex Wanganeen	Essendon
0.000000		
763	Liam Reidy	Fremantle
Nan		
764	Deakyn Smith	Melbourne
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765	Thomas Scully	Port Adelaide
0.000000		
766	Kyah Farris-White	Melbourne
Nan		
767	Cooper Hamilton	GWS Giants
7.125000		
768	Coby Burgiel	West Coast Eagles
Nan		
769	Sebit Kuek	Fremantle
Nan		
770	Mark Blicavs	Geelong
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771	Kalin Lane	Brisbane
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772	Callum Wilkie	St Kilda
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773	James Van Es	St Kilda
0.000000		
774	Jack Buckley	GWS Giants
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775	Oscar Adams	St Kilda
0.000000		
776	Andy Moniz-Wakefield	Melbourne
0.000000		
777	Tim English	Western Bulldogs
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778	Flynn Kroeger	Geelong
Nan		
779	Mitch Hardie	Geelong
Nan		
780	Ned Moyle	GC Suns
0.900000		

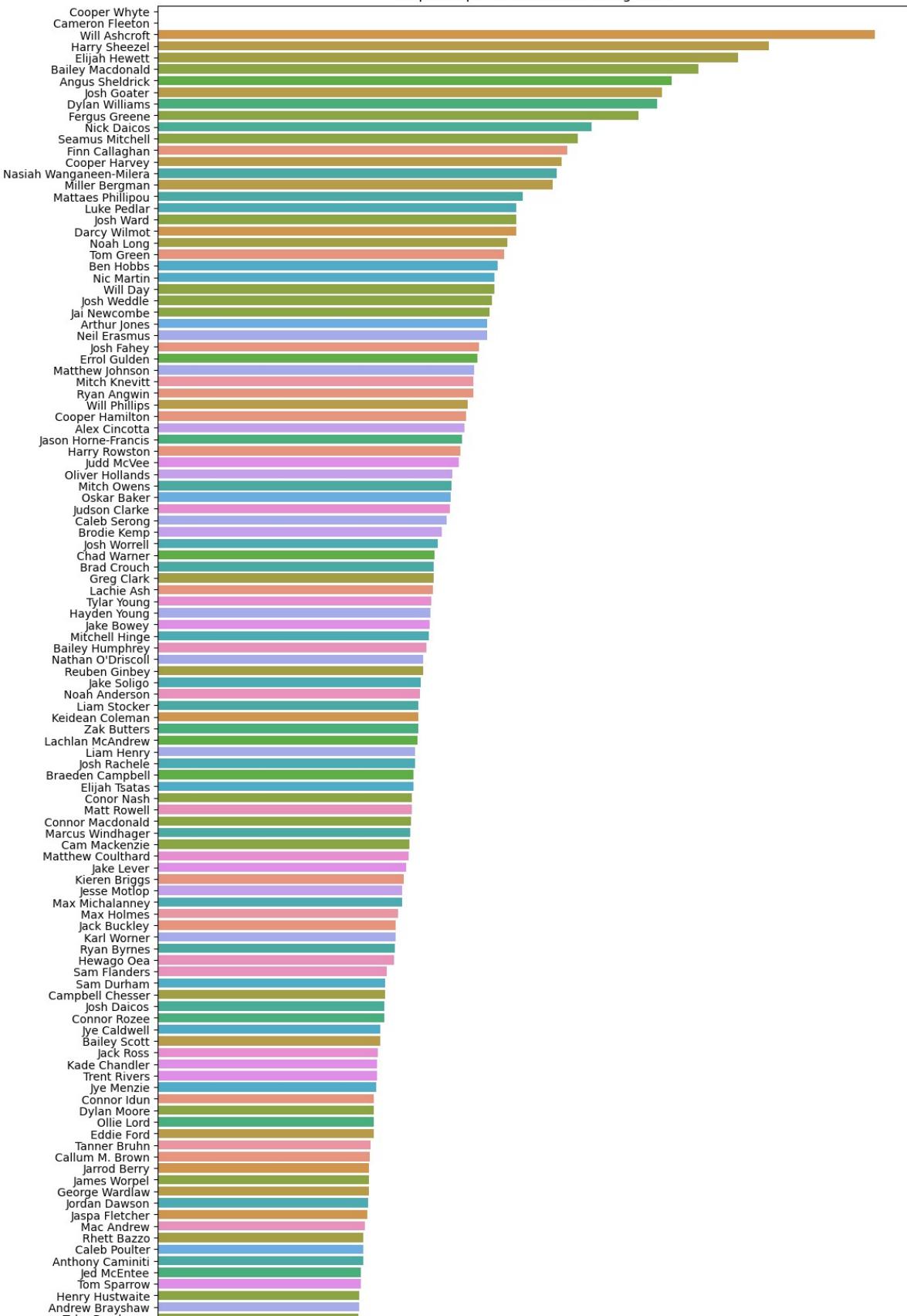
781 0.000000	Anthony Munkara	Essendon
782 2.423729	Reilly O'Brien	Adelaide
783 0.000000	Wade Derksen	GWS Giants
784 Nan	Phoenix Foster	Geelong
785 0.446429	Anthony McDonald-Tipungwuti	Essendon
786 2.137931	Oscar McInerney	Brisbane
787 2.192623	Jake Lloyd	Sydney
788 2.300000	Matthew Owies	Carlton
789 0.000000	Alex Mirkov	Carlton
790 1.333333	Jackson Mead	Port Adelaide
791 2.264706	Jy Farrar	GC Suns
792 7.314286	Matthew Johnson	Fremantle
793 2.533333	Lachlan Gollant	Adelaide
794 0.000000	Rhett Montgomerie	Essendon
795 4.750000	Anthony Caminiti	St Kilda
796 0.000000	Leo Connolly	St Kilda
797 0.000000	Nathan Barkla	Port Adelaide
798 4.000000	Ethan Stanley	Fremantle
799 0.000000	Trent Dumont	Port Adelaide
800 3.500000	Jai Culley	West Coast Eagles
801 4.902439	Callum M. Brown	GWS Giants
802 0.000000	Kieran Strachan	Adelaide
803 0.377143	Ben Brown	Melbourne
804 6.000000	Lachlan McAndrew	Sydney
805 2.310345	Mark Keane	Adelaide

806	Matthew Cottrell	Carlton
3.500000		
807	Jye Menzie	Essendon
5.055556		

Monitor workload and performance trends to prevent injuries

```
full_rank_player_contributions = final_df.nlargest(808,
'Disposals_per_Game')
plt.figure(figsize=(12, 15))
sns.barplot(x='Disposals_per_Game', y='Player',
data=full_rank_player_contributions,hue='Current Team
2023',dodge=False)
plt.title('Disposals per Game in descending order')
plt.show()
```

Disposals per Game in descending order



Scouting and Recruitment

```
# Example: Find young players with high potential
young_talents = final_df[(final_df['Age 2024'] < 25) &
                        (final_df['Total_Contributions'] > 100)]
print(young_talents[['Player', 'Current Team 2023', 'Age 2024',
                     'Total_Contributions']])
```

Total_Contributions	Player	Current Team 2023	Age 2024
2	Chad Warner	Sydney	23
6727.1	Jamarra Ugle-Hagan	Western Bulldogs	22
4012.5	Chayce Jones	Adelaide	24
4207.2	Connor Rozee	Port Adelaide	24
8275.4	Sam Sturt	Fremantle	24
2002.9	Kai Lohmann	Brisbane	21
772.8	Deven Robertson	Brisbane	23
2256.7	Marcus Windhager	St Kilda	21
3707.9	Jacob van Rooyen	Melbourne	21
3556.6	Paddy Dow	Carlton	24
2120.3	Isaac Heeney	Collingwood	24
5656.4	Caleb Serong	Fremantle	23
7955.6	Aaron Cadman	GWS Giants	20
1121.0	Cody Weightman	Western Bulldogs	23
3528.4	Lachlan Cowan	Carlton	19
1183.8	Jesse Motlop	Carlton	20
3302.9	Oliver Hollands	Carlton	20
44	Lochie O'Brien	Carlton	24
3668.1	Dylan Stephens	Sydney	23
45	Lachie Ash	GWS Giants	23
842.9			
47			
2625.4			
48			
7018.6			

54	Nasiah Wanganeen-Milera	St Kilda	21
6582.2			
55	Sam Berry	Adelaide	22
1047.8			
59	Jai Newcombe	Hawthorn	23
6994.0			
60	Bailey Smith	Western Bulldogs	23
5188.3			
66	Judd McVee	Melbourne	21
4093.7			
67	Harry Sheezel	North Melbourne	19
7154.8			
71	Heath Chapman	Fremantle	22
975.9			
75	Sam Flanders	GC Suns	23
4038.5			
78	Elijah Tsatas	Essendon	19
968.7			
81	Logan McDonald	Sydney	22
3367.2			
85	Adam Cerra	Carlton	24
7018.3			
90	Trent Bianco	Collingwood	23
270.0			
95	Jordan Clark	Fremantle	23
5661.4			
97	Jye Caldwell	Essendon	23
5370.5			
104	Jackson Hately	Adelaide	23
253.8			
105	Ryan Angwin	GWS Giants	21
2178.8			
112	Tanner Bruhn	Geelong	22
4332.6			
114	Jake Lever	Melbourne	21
4893.8			
118	Will Ashcroft	Brisbane	20
4892.1			
119	Jack Ross	Richmond	23
4582.4			
126	James Rowbottom	Sydney	23
6407.5			
129	Mitch Owens	St Kilda	20
5591.5			
130	Riley Thilthorpe	Adelaide	22
4147.5			
131	Alex Davies	GC Suns	22
2072.1			
135	Josh Rachele	Adelaide	21

4664.5			
136	Tom Wilson	Collingwood	22
283.2			
140	Toby Conway	Geelong	21
598.8			
142	Charlie Spargo	Melbourne	24
2373.4			
144	James Madden	Brisbane	24
410.5			
149	Andrew Brayshaw	Fremantle	24
8060.8			
151	Ben Hobbs	Essendon	20
4690.0			
154	Tom Green	GWS Giants	23
8148.7			
163	Sam Darcy	Western Bulldogs	21
497.8			
164	Toby Bedford	GWS Giants	24
4041.3			
172	Luke Pedlar	Adelaide	22
3774.7			
173	Xavier Duursma	Port Adelaide	24
3406.9			
174	Cam Rayner	Brisbane	24
5232.0			
179	Maurice Rioli	Richmond	21
1249.7			
180	Elijah Hollands	GC Suns	22
1817.5			
181	Reuben Ginbey	West Coast Eagles	19
3641.1			
182	Luke Jackson	Fremantle	22
7285.9			
183	Curtis Taylor	North Melbourne	24
3296.5			
184	Max Holmes	Geelong	21
5418.8			
186	Angus Sheldrick	Sydney	20
1554.0			
187	Jase Burgoyne	Port Adelaide	21
906.8			
193	Mitch Knevitt	Geelong	21
1483.7			
194	Max King	St Kilda	24
2163.3			
197	Ryan Byrnes	St Kilda	23
4287.0			
199	Brynn Teakle	Port Adelaide	24
1382.6			

200	Josh Sinn	Port Adelaide	21
457.6			
201	Liam Stocker	St Kilda	24
4795.7			
205	George Wardlaw	North Melbourne	20
1944.5			
210	Bailey Scott	North Melbourne	24
6033.0			
213	Finn Callaghan	GWS Giants	21
5003.3			
215	Zak Butters	Port Adelaide	23
8196.0			
216	Xavier O'Neill	West Coast Eagles	24
2872.0			
218	Jhye Clark	Geelong	20
246.1			
223	Hugo Ralphsmith	Richmond	22
1956.3			
224	Conor Stone	GWS Giants	22
338.1			
225	Keidean Coleman	Brisbane	24
5283.6			
227	Finlay Macrae	Collingwood	22
298.6			
233	Nik Cox	Essendon	22
1212.2			
236	Bailey Laurie	Melbourne	22
597.4			
240	Jake Soligo	Adelaide	21
4889.1			
241	Jeremy Finlayson	Port Adelaide	11
5235.8			
250	Sam De Koning	Geelong	23
3558.6			
252	Jake Bowey	Melbourne	21
4768.2			
255	Brayden Cook	Adelaide	22
503.6			
257	Max Michalanney	Adelaide	20
3705.1			
258	Jack Lukosius	GC Suns	24
4646.4			
262	Will Day	Hawthorn	23
6667.1			
263	James Peatling	GWS Giants	23
1826.2			
270	Josh Gibcus	Richmond	21
127.9			
275	Bobby Hill	Collingwood	24

4033.4				
281	Rhylee West	Western Bulldogs		24
2255.2				
283	Noah Anderson	GC Suns		23
7810.2				
284	Archie Perkins	Essendon		22
4859.8				
286	Sam Wicks	Sydney		24
2145.3				
292	Thomas Berry	GC Suns		24
832.8				
296	Braeden Campbell	Sydney		22
4920.7				
300	Jack Carroll	Carlton		21
334.7				
301	Miles Bergman	Port Adelaide		22
4892.7				
306	Jaxon Prior	Brisbane		23
966.9				
308	Elijah Hewett	West Coast Eagles		20
2327.3				
312	Brodie Kemp	Carlton		23
3783.9				
315	Tom Emmett	Fremantle		22
733.7				
316	Isaac Quaynor	Collingwood		24
5764.0				
317	Sam Walsh	Carlton		24
6157.6				
329	Corey Durdin	Carlton		22
2007.2				
337	Reef McInnes	Collingwood		21
581.5				
341	James O'Donnell	Western Bulldogs		21
1569.0				
346	Matt Rowell	GC Suns		23
7446.3				
351	Jason Horne-Francis	Port Adelaide		21
5760.8				
359	Noah Long	West Coast Eagles		19
3014.6				
360	Bailey Humphrey	GC Suns		19
3425.5				
362	Josh Weddle	Hawthorn		20
3709.4				
366	Sam Durham	Essendon		23
4733.6				
368	Noah Balta	Richmond		24
5206.5				

374	Harrison Jones	Essendon	23
970.7			
375	Luke Edwards	West Coast Eagles	22
2193.9			
376	Harry Rowston	GWS Giants	20
957.7			
379	Jacob Koschitzke	Hawthorn	24
2141.9			
380	Mitch Georgiades	Port Adelaide	22
637.6			
384	Nick Bryan	Essendon	22
1973.2			
389	Campbell Chesser	West Coast Eagles	21
2140.8			
390	Harry Sharp	Brisbane	21
960.3			
392	Brady Hough	West Coast Eagles	21
3057.9			
395	Errol Gulden	Sydney	22
8396.7			
396	Marc Sheather	Sydney	24
418.2			
402	Judson Clarke	Richmond	20
1820.4			
404	Nick Blakey	Sydney	24
6086.8			
405	Nathan Murphy	Collingwood	24
3884.9			
406	Fergus Greene	Hawthorn	23
1647.8			
407	Denver Grainger-Barras	Hawthorn	22
941.9			
408	Tyler Brown	Adelaide	24
223.6			
410	James Jordon	Melbourne	23
3138.7			
417	Liam Henry	Fremantle	22
3827.3			
419	Jack Bytel	St Kilda	24
841.9			
424	Trent Rivers	Melbourne	23
6131.0			
426	Matthew Coulthard	Richmond	23
635.9			
429	Mattaes Phillipou	St Kilda	19
4210.9			
432	Izak Rankine	Adelaide	24
4836.3			
433	Connor West	West Coast Eagles	24

1496.3			
434	Oliver Dempsey	Geelong	21
700.0			
435	Karl Worner	Fremantle	22
703.1			
436	Zane Trew	West Coast Eagles	22
755.2			
438	Thomson Dow	Richmond	22
1012.1			
439	Josh Ward	Hawthorn	20
4037.8			
441	Cameron Fleeton	GWS Giants	22
493.9			
442	Kaine Baldwin	Essendon	22
862.0			
448	Jye Amiss	Fremantle	21
3013.2			
450	Ned Long	Hawthorn	21
783.1			
451	Josh Worrell	Adelaide	23
2665.0			
452	Tom Powell	North Melbourne	22
2997.2			
453	Flynn Perez	North Melbourne	22
1084.7			
455	Paul Curtis	North Melbourne	21
3262.5			
458	Tarryn Thomas	North Melbourne	24
3480.8			
462	Miller Bergman	North Melbourne	21
1955.2			
473	Harry Barnett	West Coast Eagles	20
167.9			
474	Ned McHenry	Adelaide	24
1922.6			
477	Dylan Williams	Port Adelaide	23
4006.0			
478	Jake Riccardi	GWS Giants	24
3522.6			
479	Cam Mackenzie	Hawthorn	20
2433.6			
485	Will Phillips	North Melbourne	22
3832.2			
486	Jai Serong	Hawthorn	21
557.5			
487	Hayden Young	Fremantle	23
6188.4			
489	Buku Khamis	Western Bulldogs	24
344.6			

492	Harry Schoenberg	Adelaide	23
2162.1			
494	Shannon Neale	Geelong	22
820.8			
498	Tom Brown	Richmond	21
476.5			
499	Caleb Poulter	Western Bulldogs	21
1829.6			
503	Sam Butler	Hawthorn	21
1413.2			
507	Wil Powell	GC Suns	24
4806.1			
508	Bailey J. Williams	West Coast Eagles	24
7587.0			
514	Luke Foley	West Coast Eagles	24
1769.0			
517	Will Gould	Sydney	24
643.6			
519	Rhyan Mansell	Richmond	24
2254.7			
521	Samson Ryan	Richmond	23
2701.8			
522	Toby McMullin	GWS Giants	20
463.5			
523	Charlie Comben	North Melbourne	23
1248.0			
526	Alwyn Davey Jnr	Essendon	20
1366.8			
527	Luke Nankervis	Adelaide	21
964.9			
528	Ollie Lord	Port Adelaide	22
1923.0			
529	Nick Murray	Adelaide	23
2845.3			
531	Neil Erasmus	Fremantle	20
2454.8			
532	Oisin Mullin	Geelong	24
889.7			
535	Josh Goater	North Melbourne	21
2012.8			
536	Lachlan McNeil	Western Bulldogs	22
1563.6			
537	Jackson Archer	North Melbourne	21
808.8			
543	Rhett Bazzo	West Coast Eagles	20
1493.9			
545	Jack Mahony	North Melbourne	22
542.8			
550	Kieren Briggs	GWS Giants	24

6320.1			
551	Jack Williams	West Coast Eagles	20
1607.6			
552	Francis Evans	Port Adelaide	22
1382.0			
553	Charlie Lazzaro	North Melbourne	22
988.5			
555	Mac Andrew	GC Suns	20
3018.2			
557	Jaspa Fletcher	Brisbane	20
2486.3			
558	Xavier O'Halloran	GWS Giants	24
2909.9			
559	Justin McInerney	Sydney	23
4352.0			
563	Connor Macdonald	Hawthorn	21
4612.5			
564	Nathan O'Driscoll	Fremantle	22
2076.7			
565	James Tunstill	Brisbane	21
370.9			
568	Brandon Walker	Fremantle	21
2220.7			
569	Michael Frederick	Fremantle	24
3616.3			
570	Arthur Jones	Western Bulldogs	21
1728.2			
571	Bodhi Uwland	GC Suns	21
540.1			
573	Finn Maginness	Hawthorn	23
1947.7			
575	Phoenix Spicer	North Melbourne	22
880.3			
576	Oliver Henry	Geelong	22
3757.3			
580	Beau McCreery	Collingwood	23
4242.4			
581	Darcy Fogarty	Adelaide	24
3897.1			
584	Josh Treacy	Fremantle	22
3157.7			
590	Cooper Harvey	North Melbourne	20
719.4			
593	Tyler Brockman	Hawthorn	21
2534.8			
594	Lachie Jones	Port Adelaide	22
2764.7			
599	Josh Fahey	GWS Giants	20
872.8			

601	Tom McCartin	Sydney	24
3076.6			
602	Aaron Naughton	Western Bulldogs	24
4801.0			
603	Ben King	GC Suns	24
2761.6			
604	James Trezise	Richmond	22
505.1			
606	Connor Budarick	GC Suns	23
848.0			
607	James Blanck	Hawthorn	23
1857.1			
614	Tom Sparrow	Melbourne	24
5289.3			
615	Lloyd Johnston	GC Suns	19
597.2			
616	Joel Jeffrey	GC Suns	22
1327.9			
617	Eddie Ford	North Melbourne	22
2722.9			
619	Noah Cumberland	Richmond	23
1391.1			
626	Max Ramsden	Hawthorn	21
572.1			
628	Dante Visentini	Port Adelaide	21
930.4			
629	Nick Daicos	Collingwood	21
7805.7			
630	Jack Ginnivan	Collingwood	22
2084.3			
633	Matt Roberts	Sydney	21
881.2			
640	Blake Drury	North Melbourne	20
644.1			
641	Zac Bailey	Brisbane	24
5735.9			
642	Ted Clohesy	Geelong	19
303.1			
644	Will Kelly	Collingwood	23
373.1			
647	Luke Cleary	Western Bulldogs	22
420.7			
648	Malcolm Rosas	GC Suns	23
3003.9			
657	Josh Honey	Carlton	22
923.8			
658	James Borlase	Adelaide	22
861.3			
659	Callum Jamieson	West Coast Eagles	24

1093.3			
666	Joel Amartey	Sydney	24
2505.7			
668	Ryan Maric	West Coast Eagles	19
1744.1			
669	Riley Garcia	Western Bulldogs	23
686.0			
670	Jakob Ryan	Collingwood	19
251.3			
671	Seamus Mitchell	Hawthorn	22
2844.4			
673	Bailey Macdonald	Hawthorn	20
544.0			
675	Trey Ruscoe	Collingwood	22
548.7			
677	Josh Carmichael	Collingwood	24
257.5			
678	Henry Hustwaite	Hawthorn	20
746.9			
683	Jack Payne	Brisbane	24
3710.2			
684	Tyler Sonsie	Richmond	21
639.5			
685	Sam Banks	Richmond	21
1241.0			
686	Jacob Bauer	Richmond	22
547.1			
689	Ben Miller	Richmond	24
2679.4			
696	Harrison Petty	Melbourne	24
2808.8			
697	Corey Warner	Sydney	20
548.0			
698	Nic Martin	Essendon	23
6305.7			
699	Patrick Parnell	Adelaide	22
948.3			
701	Kysaiah Pickett	Melbourne	23
4682.6			
709	Jack Buller	Sydney	23
296.8			
714	Jed McEntee	Port Adelaide	23
3263.4			
716	Connor Idun	GWS Giants	24
5836.2			
717	Kade Chandler	Melbourne	24
4171.2			
720	Harvey Harrison	Collingwood	20
777.2			
723	Lachlan Sholl	Adelaide	24

3614.1			
725	Harry Edwards	West Coast Eagles	23
649.1			
730	Robert Hansen Jr	North Melbourne	20
220.1			
746	Massimo D'Ambrosio	Essendon	21
1324.8			
748	Caleb Graham	GC Suns	24
121.2			
750	Hewago Oea	GC Suns	22
1314.2			
755	Darcy Wilmot	Brisbane	20
5368.5			
756	Jordon Butts	Adelaide	24
2340.9			
757	Taj Woewodin	Melbourne	21
771.5			
758	Daniel Turner	Melbourne	22
549.3			
761	Cooper Sharman	St Kilda	24
2585.3			
767	Cooper Hamilton	GWS Giants	20
851.4			
780	Ned Moyle	GC Suns	22
848.4			
790	Jackson Mead	Port Adelaide	22
1184.5			
792	Matthew Johnson	Fremantle	21
3346.9			
793	Lachlan Gollant	Adelaide	22
975.7			
795	Anthony Caminiti	St Kilda	20
2951.7			
798	Ethan Stanley	Fremantle	20
227.7			
800	Jai Culley	West Coast Eagles	21
969.1			
801	Callum M. Brown	GWS Giants	23
3310.8			
804	Lachlan McAndrew	Sydney	24
580.4			
805	Mark Keane	Adelaide	24
1255.0			
806	Matthew Cottrell	Carlton	24
3450.2			
807	Jye Menzie	Essendon	21
3053.8			

Identify potential recruits based on performance data.

Further analysis

```
final_df.describe(include="all")
```

	Player	AF	R	G	D	\
\count	808	808.000000	808.000000	808.000000	808.000000	
unique	808	NaN	NaN	NaN	NaN	NaN
top	Jack Higgins	NaN	NaN	NaN	NaN	NaN
freq	1	NaN	NaN	NaN	NaN	NaN
mean	NaN	823.493812	187.475743	6.472772	193.805693	
std	NaN	734.778141	156.095030	10.980404	183.783406	
min	NaN	0.000000	-1.700000	0.000000	0.000000	
25%	NaN	105.000000	32.300000	0.000000	24.000000	
50%	NaN	687.000000	164.800000	2.000000	154.500000	
75%	NaN	1389.500000	314.150000	8.000000	314.000000	
max	NaN	2802.000000	668.200000	81.000000	707.000000	
	M	T	CLR	K	H	\
\count	808.000000	808.000000	808.000000	808.000000	808.000000	
unique	NaN	NaN	NaN	NaN	NaN	NaN
top	NaN	NaN	NaN	NaN	NaN	NaN
freq	NaN	NaN	NaN	NaN	NaN	NaN
mean	48.509901	32.721535	19.863861	114.574257	79.231436	
std	45.008493	34.079256	32.751988	109.666802	82.690954	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	6.000000	4.000000	0.000000	13.000000	8.000000	
50%	41.000000	24.000000	5.500000	89.000000	59.000000	
75%	80.000000	48.000000	24.000000	192.000000	121.000000	
max	208.000000	190.000000	205.000000	470.000000	400.000000	
	H0	FF	FA	B	OP	\
\count	808.000000	808.000000	808.000000	808.000000	808.000000	
unique	NaN	NaN	NaN	NaN	NaN	NaN
top	NaN	NaN	NaN	NaN	NaN	NaN
freq	NaN	NaN	NaN	NaN	NaN	NaN
mean	20.355198	9.450495	9.425743	2.936881	25.245050	
std	93.732007	9.536080	8.935369	6.395067	33.526839	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	1.000000	1.000000	0.000000	2.000000	

50%	0.000000	7.000000	8.000000	0.000000	15.000000		
75%	0.000000	15.000000	15.000000	3.000000	34.000000		
max	888.000000	44.000000	46.000000	67.000000	275.000000		
	ToG%	i50s	DE%	C	R50s	\	
count	808.000000	808.000000	808.000000	808.000000	808.000000		
unique	Nan	Nan	Nan	Nan	Nan		
top	Nan	Nan	Nan	Nan	Nan		
freq	Nan	Nan	Nan	Nan	Nan		
mean	60.801485	28.174505	59.045297	30.868812	21.269802		
std	31.155673	30.481806	28.989697	27.609018	30.247783		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	53.375000	2.750000	61.800000	4.000000	0.000000		
50%	74.050000	18.500000	69.900000	27.000000	8.000000		
75%	82.125000	46.000000	76.300000	51.000000	31.000000		
max	99.400000	147.000000	100.000000	121.000000	168.000000		
	EK	KE%	KHB	ED	CP	\	
count	808.000000	808.000000	808.000000	808.000000	808.000000		
unique	Nan	Nan	Nan	Nan	Nan		
top	Nan	Nan	Nan	Nan	Nan		
freq	Nan	Nan	Nan	Nan	Nan		
mean	75.675743	52.445668	1.379579	140.850248	72.811881		
std	76.003759	27.670067	1.085681	135.383731	72.202690		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	7.000000	49.875000	0.700000	16.500000	8.000000		
50%	57.000000	60.350000	1.300000	109.000000	59.000000		
75%	121.000000	70.300000	1.925000	229.000000	113.250000		
max	401.000000	100.000000	7.000000	537.000000	353.000000		
	UP	IP	CPR	GBG	F50GBG	\	
count	808.000000	808.000000	808.000000	808.000000	808.000000		
unique	Nan	Nan	Nan	Nan	Nan		
top	Nan	Nan	Nan	Nan	Nan		
freq	Nan	Nan	Nan	Nan	Nan		
mean	117.211634	36.965347	31.962376	49.733911	8.337871		
std	113.720427	43.472378	18.533802	50.206683	11.503610		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	14.000000	3.000000	24.500000	5.000000	0.000000		
50%	89.500000	21.000000	35.150000	38.000000	3.000000		
75%	193.250000	56.000000	43.725000	75.250000	13.000000		
max	447.000000	201.000000	100.000000	257.000000	68.000000		
	CC	SC	HTA	HTW%	HTA%	\	
count	808.000000	808.000000	808.000000	808.000000	808.000000		
unique	Nan	Nan	Nan	Nan	Nan		
top	Nan	Nan	Nan	Nan	Nan		
freq	Nan	Nan	Nan	Nan	Nan		
mean	6.352723	13.511139	5.800743	5.538119	3.863985		
std	13.144251	20.381245	27.730803	14.358062	11.860373		

min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	0.000000	0.000000	
50%	0.000000	4.000000	0.000000	0.000000	0.000000	
75%	5.000000	18.000000	0.000000	0.000000	0.000000	
max	87.000000	118.000000	260.000000	100.000000	100.000000	
count	808.000000	808.000000	808.000000	808.000000	808.000000	\
unique	Nan	Nan	Nan	Nan	Nan	
top	Nan	Nan	Nan	Nan	Nan	
freq	Nan	Nan	Nan	Nan	Nan	
mean	50.324257	6.391089	5.632426	3.478960	8.741337	
std	213.749552	11.722547	8.915258	6.514462	14.652985	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	0.000000	0.000000	
50%	0.000000	2.000000	2.000000	1.000000	3.000000	
75%	0.000000	7.000000	7.000000	4.000000	11.000000	
max	1934.000000	73.000000	67.000000	44.000000	97.000000	
count	808.000000	808.000000	808.000000	808.000000	808.000000	\
unique	Nan	Nan	Nan	Nan	Nan	
top	Nan	Nan	Nan	Nan	Nan	
freq	Nan	Nan	Nan	Nan	Nan	
mean	4.607673	29.440223	13.476485	48.462871	12.071782	
std	5.681404	27.245511	20.723158	46.388304	13.285159	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	5.000000	1.000000	
50%	2.000000	33.300000	5.000000	36.000000	8.000000	
75%	8.000000	50.000000	18.000000	81.000000	19.250000	
max	41.000000	100.000000	134.000000	210.000000	76.000000	
count	808.000000	808.000000	808.000000	808.000000	808.000000	\
unique	Nan	Nan	Nan	Nan	Nan	
top	Nan	Nan	Nan	Nan	Nan	
freq	Nan	Nan	Nan	Nan	Nan	
mean	5.773515	160.188119	75.779703	17.704208	7.023515	
std	8.105527	150.921110	75.239797	29.012502	15.215533	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	23.000000	8.000000	1.000000	0.000000	
50%	2.000000	133.000000	54.000000	7.000000	1.000000	
75%	9.000000	250.000000	125.000000	21.000000	6.000000	
max	46.000000	709.000000	351.000000	250.000000	126.000000	
CDL CDL% Age 2024 Height 2024 Weight						
2024 \ count	808.000000	808.000000	808.000000	808.000000	808.000000	
unique	Nan	Nan	Nan	Nan	Nan	

top	NaN	NaN	NaN	NaN	NaN
freq	NaN	NaN	NaN	NaN	NaN
mean	1.743812	17.571411	25.221535	188.961634	85.763243
std	3.580196	27.860341	4.165318	7.897250	9.061773
min	0.000000	0.000000	11.000000	133.000000	63.000000
25%	0.000000	0.000000	22.000000	183.000000	80.000000
50%	0.000000	0.000000	25.000000	188.000000	85.000000
75%	2.000000	26.925000	28.000000	194.000000	91.000000
max	31.000000	100.000000	37.000000	211.000000	114.000000
count	808	808	808.000000	808.000000	808
unique	18	7	NaN	NaN	3
top	GC	Suns	Forward	NaN	N
freq	48	196	NaN	NaN	650
mean	NaN	NaN	2018.466584	NaN	NaN
std	NaN	NaN	4.172712	NaN	NaN
min	NaN	NaN	2005.000000	NaN	NaN
25%	NaN	NaN	2016.000000	NaN	NaN
50%	NaN	NaN	2019.000000	NaN	NaN
75%	NaN	NaN	2022.000000	NaN	NaN
max	NaN	NaN	2025.000000	NaN	NaN
count	TOTAL GAMES	(Up to R22 2024)	NO.	2023-2024 Season	Status
unique	808.000000	808.000000	808.000000	808	808
top	NaN	NaN	NaN	NaN	3
freq	NaN	NaN	NaN	NaN	650
mean	89.532178	23.280941	23.280941	NaN	NaN
std	79.794618	13.535360	13.535360	NaN	NaN
min	0.000000	1.000000	1.000000	NaN	NaN
25%	20.750000	11.000000	11.000000	NaN	NaN
50%	68.500000	23.000000	23.000000	NaN	NaN
75%	138.250000	35.000000	35.000000	NaN	NaN
max	401.000000	51.000000	51.000000	NaN	NaN
count	Total_Contributions	Goals_to_Kicks_Ratio	Improvement	NaN	NaN
unique	808.000000	657.000000	771.000000	NaN	NaN
top	NaN	NaN	NaN	NaN	NaN

freq	NaN	NaN	NaN
mean	2864.574629	0.065832	inf
std	2387.610086	0.085888	NaN
min	-0.500000	0.000000	-1.000000
25%	637.175000	0.002740	-0.799673
50%	2543.200000	0.028846	-0.017544
75%	4664.750000	0.098214	3.052633
max	10271.400000	0.500000	inf
Disposals_per_Game			
count	787.000000		
unique	NaN		
top	NaN		
freq	NaN		
mean	inf		
std	NaN		
min	0.000000		
25%	0.720491		
50%	2.032520		
75%	3.486472		
max	inf		

Some Example of Pair Box plots and other data visualisations

```
final_df.info()
```

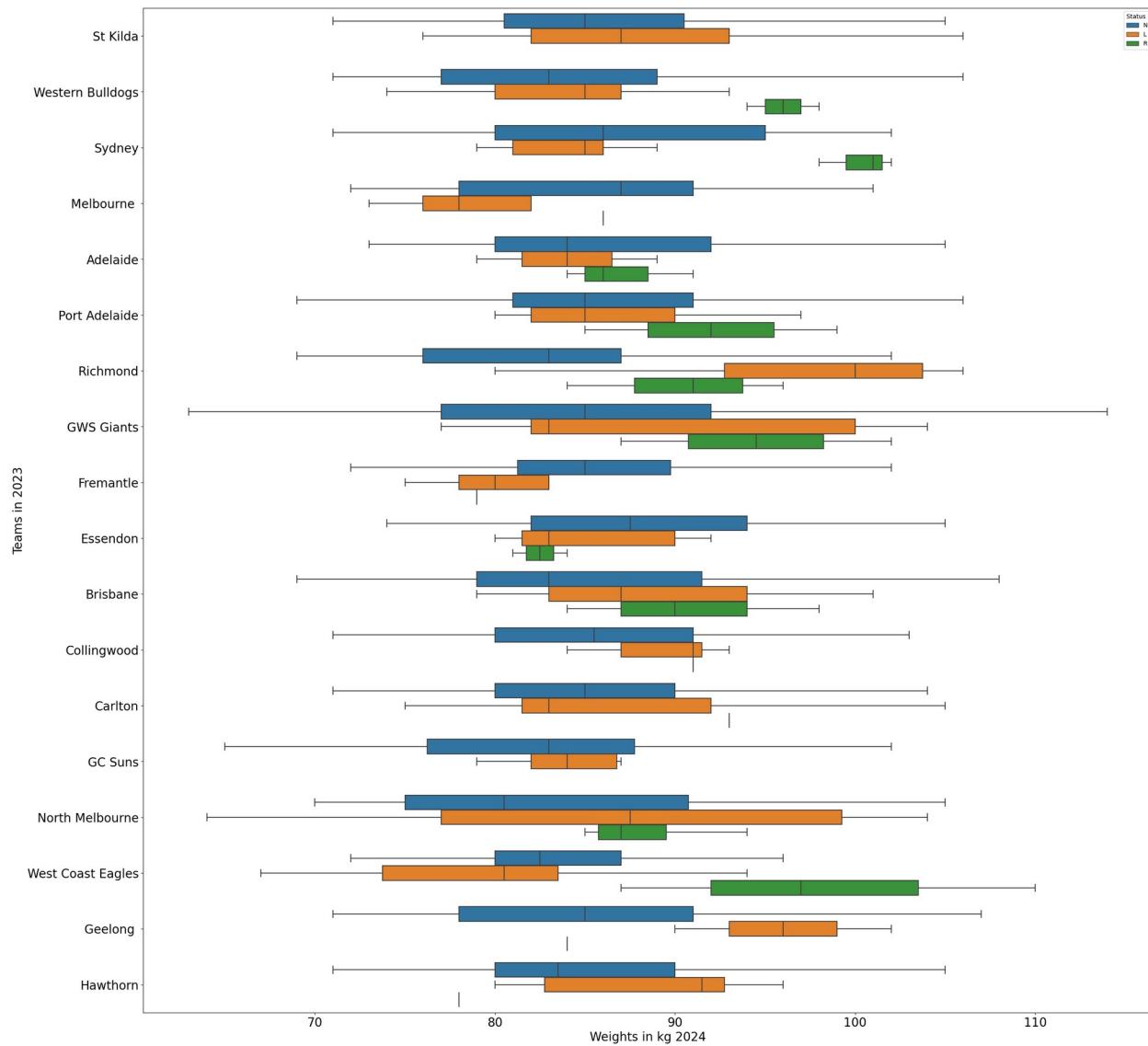
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 808 entries, 0 to 807
Data columns (total 65 columns):
 #   Column           Non-Null Count  Dtype  
 ---  --  
 0   Player          808 non-null    object 
 1   AF              808 non-null    int64  
 2   R               808 non-null    float64
 3   G               808 non-null    int64  
 4   D               808 non-null    int64  
 5   M               808 non-null    int64  
 6   T               808 non-null    int64  
 7   CLR             808 non-null    int64  
 8   K               808 non-null    int64  
 9   H               808 non-null    int64  
 10  HO              808 non-null    int64  
 11  FF              808 non-null    int64  
 12  FA              808 non-null    int64  
 13  B               808 non-null    int64  
 14  OP              808 non-null    int64  
 15  ToG%            808 non-null    float64
 16  i50s             808 non-null    int64  
 17  DE%             808 non-null    float64
 18  C               808 non-null    int64
```

19	R50s	808	non-null	int64
20	EK	808	non-null	int64
21	KE%	808	non-null	float64
22	KHB	808	non-null	float64
23	ED	808	non-null	int64
24	CP	808	non-null	int64
25	UP	808	non-null	int64
26	IP	808	non-null	int64
27	CPR	808	non-null	float64
28	GBG	808	non-null	int64
29	F50GBG	808	non-null	int64
30	CC	808	non-null	int64
31	SC	808	non-null	int64
32	HTA	808	non-null	int64
33	HTW%	808	non-null	float64
34	HTA%	808	non-null	float64
35	RC	808	non-null	int64
36	Mi50	808	non-null	int64
37	CM	808	non-null	int64
38	MOL	808	non-null	int64
39	IM	808	non-null	int64
40	GA	808	non-null	int64
41	GA%	808	non-null	float64
42	SAG	808	non-null	int64
43	SI	808	non-null	int64
44	SL	808	non-null	int64
45	Ti50	808	non-null	int64
46	PA	808	non-null	int64
47	DHPA	808	non-null	int64
48	S	808	non-null	int64
49	CD000	808	non-null	int64
50	CDL	808	non-null	int64
51	CDL%	808	non-null	float64
52	Age 2024	808	non-null	int64
53	Height 2024	808	non-null	int64
54	Weight 2024	808	non-null	float64
55	Current Team 2023	808	non-null	object
56	Position 2023	808	non-null	object
57	YEAR DEBUT	808	non-null	int64
58	TOTAL GAMES (Up to R22 2024)	808	non-null	int64
59	NO. 2023-2024 Season	808	non-null	int64
60	Status	808	non-null	object
61	Total_Contributions	808	non-null	float64
62	Goals_to_Kicks_Ratio	657	non-null	float64
63	Improvement	771	non-null	float64
64	Disposals_per_Game	787	non-null	float64

dtypes: float64(15), int64(46), object(4)
memory usage: 410.4+ KB

Box Plot of Weights for each team based on Status

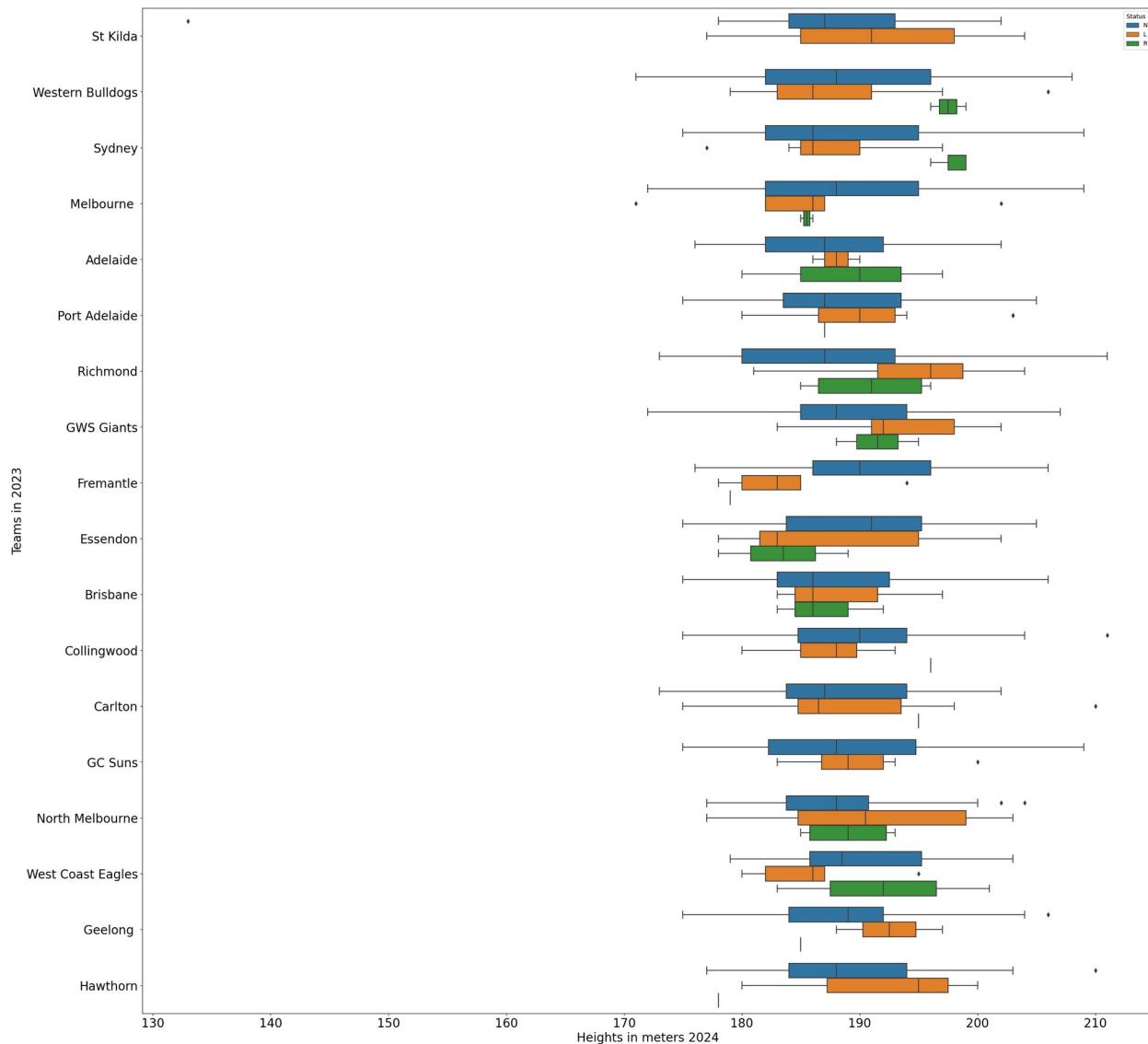
```
fig, ax = plt.subplots(figsize=(30, 30))
b = sns.boxplot(data=final_df,x="Weight 2024", y="Current Team 2023",
hue="Status ", showfliers=False)
b.set_xlabel("Weights in kg 2024", fontsize=20)
b.set_ylabel("Teams in 2023", fontsize=20)
b.tick_params(labelsize=20)
```



Box Plot of Heights for each team based on Status

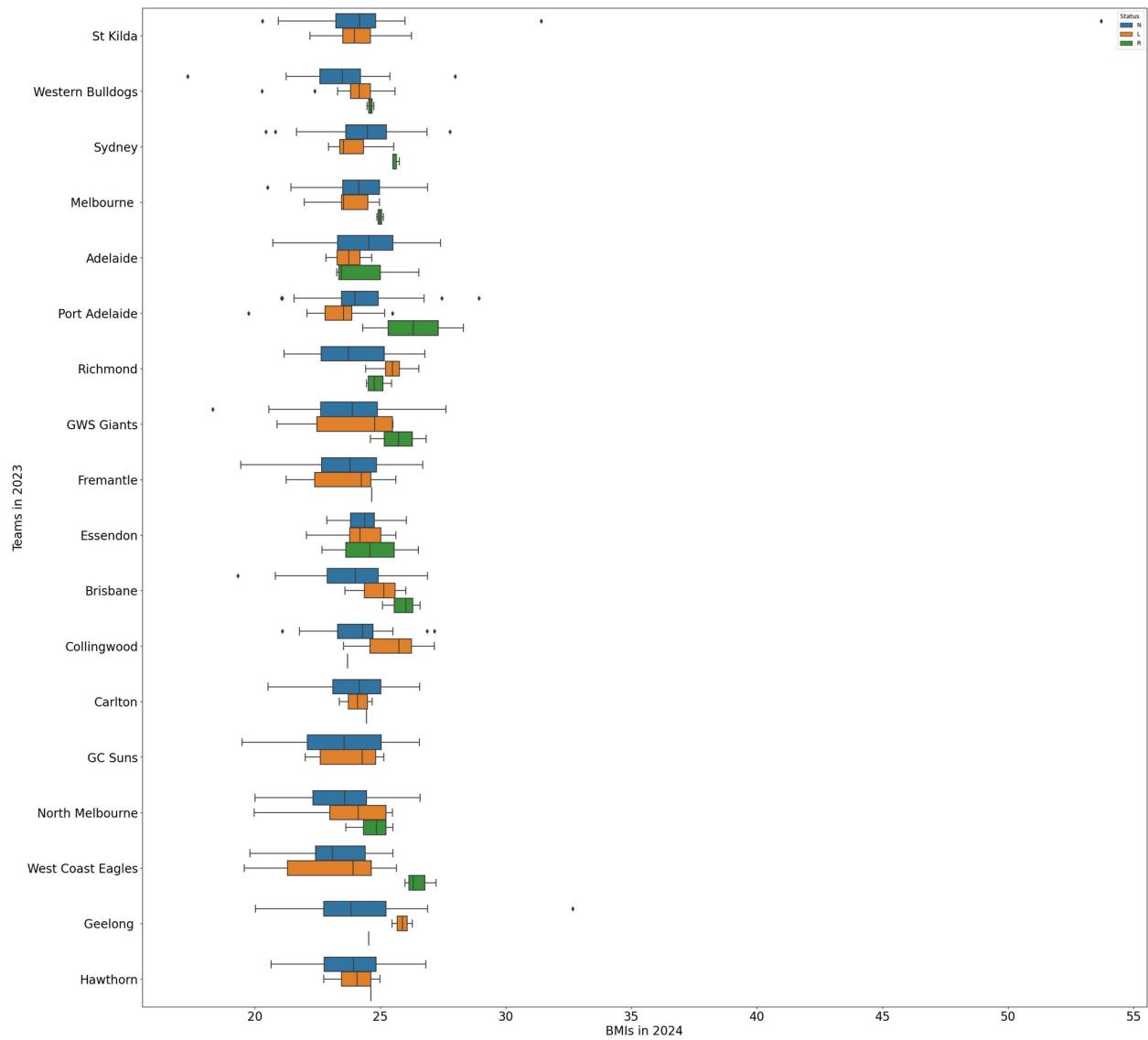
```
fig, ax = plt.subplots(figsize=(30, 30))
b=sns.boxplot(data=final_df,x="Height 2024", y="Current Team 2023",
hue="Status ")
b.set_xlabel("Heights in meters 2024", fontsize=20)
```

```
b.set_ylabel("Teams in 2023", fontsize=20)
b.tick_params(labelsize=20)
```



Box Plot of BMIs for each team based on Status

```
final_df['BMI 2024'] = final_df['Weight 2024'] / ((final_df['Height 2024'] / 100) ** 2)
fig, ax = plt.subplots(figsize=(30, 30))
b = sns.boxplot(data=final_df, x="BMI 2024", y="Current Team 2023",
hue="Status")
b.set_xlabel("BMIs in 2024", fontsize=20)
b.set_ylabel("Teams in 2023", fontsize=20)
b.tick_params(labelsize=20)
```



Step 5a: Creating a suitable Machine Learning Model for AFL Player Performance

We want to use the number of disposals as our predictor, for player performance

```

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score

# Define features and target, using the same variables based on the
enhanced correlation matrix
X =
final_df[['AF', 'R', 'M', 'T', 'CLR', 'K', 'H', 'FF', 'FA', 'i50s', 'C', 'EK', 'ED
', 'CP', 'UP', 'GBG', 'PA', 'DHPA']]
y = final_df['D']

# Split the data into training and testing sets (Using 20% from the
full dataset for testing)
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

```

Compute the mean square error using linear Regression

```

from sklearn.metrics import mean_squared_error as mse
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import StandardScaler

# This seems to be a good fit for the model
# NOTE: If the MSE values are large the model will likely to appear to
be overfitted
lm = LinearRegression().fit(X_train,y_train)
mse(lm.predict(X_train),y_train,squared=False),
mse(lm.predict(X_test),y_test,squared=False)

(1.2434095042670253e-13, 1.269914932829233e-13)

```

Compute the mean square error using KNN (K-Nearest Neighbour), Where K is any Natural Number (i.e. 1,2,..etc)

```

from sklearn.neighbors import KNeighborsRegressor

# Can set the n_neighbors for 12 for now.
# To note: As K increases, the KNN fits a smoother curve to the data.
# This is because a higher value of
# K reduces the edginess by taking more data into account, thus
# reducing the overall complexity and flexibility of the model.

#NOTE: If my MSE validation is lower than the MSE training data, this
#suggests there is overfitting in the training set
knn = KNeighborsRegressor(n_neighbors = 12).fit(X_train,y_train)
mse(knn.predict(X_train),y_train,squared = False),
mse(knn.predict(X_test),y_test,squared=False)

(19.506697424475647, 19.234952833158367)

```

Compute the mean square error using the Random-Forest

```
from sklearn.ensemble import RandomForestRegressor
rfr = RandomForestRegressor(max_depth = 12).fit(X_train,y_train)
#Can set the max_depth to 50
# NOTE: increases the performance and makes the predictions more
# stable, but it also slows down the computation.
mse(rfr.predict(X_train), y_train, squared =
False),mse(rfr.predict(X_test), y_test, squared = False)

(4.915866995892776, 12.689029090984098)
```

Compute the mean square error using the GradientBoostingRegressor

```
from sklearn.ensemble import GradientBoostingRegressor
gbr = GradientBoostingRegressor(n_estimators =
250).fit(X_train,y_train)

mse(gbr.predict(X_train), y_train, squared =
False),mse(gbr.predict(X_test), y_test, squared = False)

(1.6884169846511274, 11.227567107991954)
```

Compute the mean square error using Support Vector Machine

```
from sklearn import svm
svm = svm.SVC().fit(X_train,y_train)
mse(svm.predict(X_train), y_train, squared =
False),mse(svm.predict(X_test), y_test, squared = False)

(60.64895436555089, 80.3576880248017)
```

Using the material from La Trobe University CSE5ML: Machine Learning

Apply normalization on both train and testing dataset on the X (explanatory variables)

One reason this is important is because the variables are multiplied by the model weights. So the scale of the outputs and the scale of the gradients are affected by the scale of the inputs.

Although a model might converge without normalization, normalization makes training much more stable.

```
from sklearn.preprocessing import MinMaxScaler  
  
# fit scaler on training data  
norm = MinMaxScaler().fit(X_train)  
  
# transform training data  
X_train_norm = norm.transform(X_train)  
  
# transform testing data  
X_test_norm = norm.transform(X_test)
```

Approach 1: Train and evaluate the two regression models on the training set with a cross-validation method, optimise the models, and evaluate models on the test set.

Example of how to build a Linear Regression (LR) model

```
from sklearn.linear_model import LinearRegression  
  
model = LinearRegression()  
  
model.fit(X_train_norm, y_train)  
  
test_score = model.score(X_test_norm, y_test)  
print("R2 of LR:", test_score)  
  
R2 of LR: 1.0
```

Example of how to build a support vector machine (SVM) model

```
from sklearn.svm import SVR  
  
model = SVR()  
  
model.fit(X_train_norm, y_train)  
  
test_score = model.score(X_test_norm, y_test)  
print("R2 of SVM:", test_score)  
  
R2 of SVM: 0.552740304101232
```

Approach 2: Train the model based on training dataset with cross validation and then evaluate the model based on testing dataset

Define five-fold cross-validation to train and evaluate the two models based on the average score

```
from sklearn.model_selection import KFold  
  
kfold = KFold(n_splits=5, shuffle=True, random_state=123) #set 5-fold  
cross validation after shuffle the dataset with random seed 5
```

Example of how to build a Linear Regression (LR) model

```
from sklearn.model_selection import cross_val_score
from sklearn.linear_model import LinearRegression

#Basic training of the linear regression model
# define a LR model with default parameter setting
lr = LinearRegression()
# run the previously defined 10-fold validation on the dataset
results = cross_val_score(lr, X_train_norm, y_train, cv=kfold)
# print the average r squared scores
print("Average R2 of LR:", results.mean())

Average R2 of LR: 1.0

results

array([1., 1., 1., 1., 1.])
```

Example of how to build a support vector machine (SVM) model

```
from sklearn.svm import SVR

svr = SVR()
results = cross_val_score(svr, X_train_norm, y_train, cv=kfold)
print("Average R2 of SVM:", results.mean())

Average R2 of SVM: 0.5762793744474892

results

array([0.6148782 , 0.5542225 , 0.68941505, 0.52482562, 0.4980555 ])
```

Apply parameter finetuning steps to the two models separately to optimise the model performances and compare the cross-validated results before and after finetuning for each model.

Approach 3: Optimize models with cross validation

First we optimize the Linear Regression model

The parameters that can be applied in grid_params can be found here:

https://scikit-learn.org/stable/modules/generated/sklearn.linear_model.LinearRegression.html
You can add more values and parameters in the grid_params_lr.

```
# fine tune parameters for lr model
from sklearn.model_selection import GridSearchCV

grid_params_lr = {
    'fit_intercept': [True, False],
    'positive': [True, False]
```

```

}

lr = LinearRegression()
gs_lr_result = GridSearchCV(lr, grid_params_lr,
cv=kfold).fit(X_train_norm, y_train)
print(gs_lr_result.best_score_)

1.0

```

Then we optimize the SVM model

The parameters that can be applied in grid_params can be found here:
<https://scikit-learn.org/stable/modules/generated/sklearn.svm.SVR.html> You can add more values and parameters in the grid_params_svr. Note: it will take some time to find the optimal SVM model. (sometimes more than 1 hour or even more)

```

from sklearn.model_selection import GridSearchCV

grid_params_svr = {
    #Change () to [] for kernel
    'kernel': ('linear', 'poly', 'rbf', 'sigmoid'),
    'C': [1, 10],
    #Can change the poly (this is the reason why the model is running
    extremely slow)
    'degree': [3, 8],
    'coef0' : [0.01, 10, 1],
    'gamma': ('auto', 'scale')
}

svr = SVR()
gs_svr_result = GridSearchCV(svr, grid_params_svr,
cv=kfold).fit(X_train_norm, y_train)
print(gs_svr_result.best_score_)

0.9999997541778043

```

Evaluate the trained Linear Regression model using testing dataset

```

# use the best model and evaluate on testing set
lr_test_R2 = gs_lr_result.best_estimator_.score(X_test_norm, y_test)
print("R2 of LR in testing:", lr_test_R2)

R2 of LR in testing: 1.0

# check the parameter setting for the best selected model
gs_lr_result.best_params_

{'fit_intercept': True, 'positive': True}

```

Evaluate the trained Support Vector Machine model using testing dataset

```
# use the best model and evaluate on testing set
svr_test_R2 = gs_svr_result.best_estimator_.score(X_test_norm, y_test)
print("R2 of SVM in testing:", svr_test_R2)

R2 of SVM in testing: 0.9999998432337114

# check the parameter setting for the best selected model
gs_svr_result.best_params_

{'C': 1, 'coef0': 10, 'degree': 8, 'gamma': 'auto', 'kernel': 'poly'}
```

Predict with a trained model

```
# predict with the first 5 data points
y_predict = gs_lr_result.best_estimator_.predict(X_test_norm[:5])
print(y_predict)

[1.20000000e+01 3.61000000e+02 7.00000000e+00 8.52651283e-14
 4.20000000e+01]

# predict with the first 5 data points
y_predict = gs_svr_result.best_estimator_.predict(X_test_norm[:5])
print(y_predict)

[1.20606733e+01 3.61000741e+02 7.06220045e+00 6.87541399e-02
 4.20628687e+01]
```

Save and load a trained model

linear regression model

```
import pickle

# Save to file in the current working directory
pkl_filename = "lr_model.pkl"
with open(pkl_filename, 'wb') as file:
    pickle.dump(gs_lr_result.best_estimator_, file)

# Load from file
with open(pkl_filename, 'rb') as file:
    pickle_model = pickle.load(file)

# Calculate the accuracy score and predict target values
score = pickle_model.score(X_test_norm, y_test)
print("R2 score:", score)

R2 score: 1.0
```

similarly for a svm model

```
import pickle

# Save to file in the current working directory
pkl_filename = "svm_model.pkl"
with open(pkl_filename, 'wb') as file:
    pickle.dump(gs_svr_result.best_estimator_, file)

# Load from file
with open(pkl_filename, 'rb') as file:
    pickle_model = pickle.load(file)

# Calculate the accuracy score and predict target values
score = pickle_model.score(X_test_norm, y_test)
print("R2 score:", score)

R2 score: 0.9999998432337114
```

Step 5b: To Identify Overfitting Machine Learning Models in Scikit-Learn

Refer to this Link:

1. <https://machinelearningmastery.com/overfitting-machine-learning-models/>

```
# summarize the shape of the train and test sets
print(X_train.shape, X_test.shape, y_train.shape, y_test.shape)
(646, 18) (162, 18) (646,) (162,)

# define the tree depths to evaluate
values = [i for i in range(1, 21)]

from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score

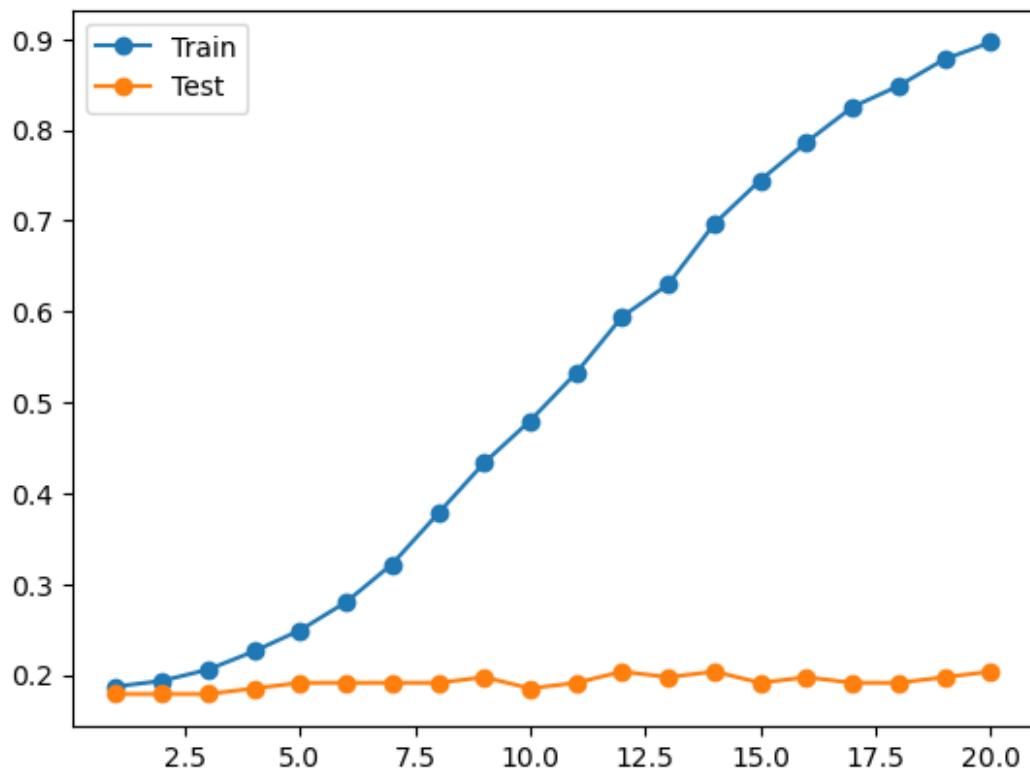
train_scores, test_scores = list(), list()
# evaluate a decision tree for each depth
for i in values:
    # configure the model
    model = DecisionTreeClassifier(max_depth=i)
    # fit model on the training dataset
    model.fit(X_train, y_train)
    # evaluate on the train dataset
    train_yhat = model.predict(X_train)
    train_acc = accuracy_score(y_train, train_yhat)
    train_scores.append(train_acc)
    # evaluate on the test dataset
    test_yhat = model.predict(X_test)
```

```

    test_acc = accuracy_score(y_test, test_yhat)
    test_scores.append(test_acc)
    # summarize progress
print('>%d, train: %.3f, test: %.3f' % (i, train_acc, test_acc))
>20, train: 0.896, test: 0.204

plt.plot(values, train_scores, '-o', label='Train')
plt.plot(values, test_scores, '-o', label='Test')
plt.legend()
plt.show()

```



```

from sklearn.neighbors import KNeighborsClassifier

# define the tree depths to evaluate
values = [i for i in range(1, 170)]
# evaluate a decision tree for each depth
train_scores, test_scores = list(), list()
for i in values:
    # configure the model
    model = KNeighborsClassifier(n_neighbors=i)
    # fit model on the training dataset
    model.fit(X_train, y_train)
    # evaluate on the train dataset
    train_yhat = model.predict(X_train)

```

```

train_acc = accuracy_score(y_train, train_yhat)
train_scores.append(train_acc)
# evaluate on the test dataset
test_yhat = model.predict(X_test)
test_acc = accuracy_score(y_test, test_yhat)
test_scores.append(test_acc)
# summarize progress
print('>%d, train: %.3f, test: %.3f' % (i, train_acc, test_acc))
# plot of train and test scores vs number of neighbors
plt.plot(values, train_scores, '-o', label='Train')
plt.plot(values, test_scores, '-o', label='Test')
plt.legend()
plt.show()

>169, train: 0.195, test: 0.179

```

