

# Surveys of Recreational Activity in six zones of Loch Lomond 2022

A Commissioned Report for

The Loch Lomond & the Trossachs  
National Park Authority

**Phoebe Kaiser-Wilks\***

**&**

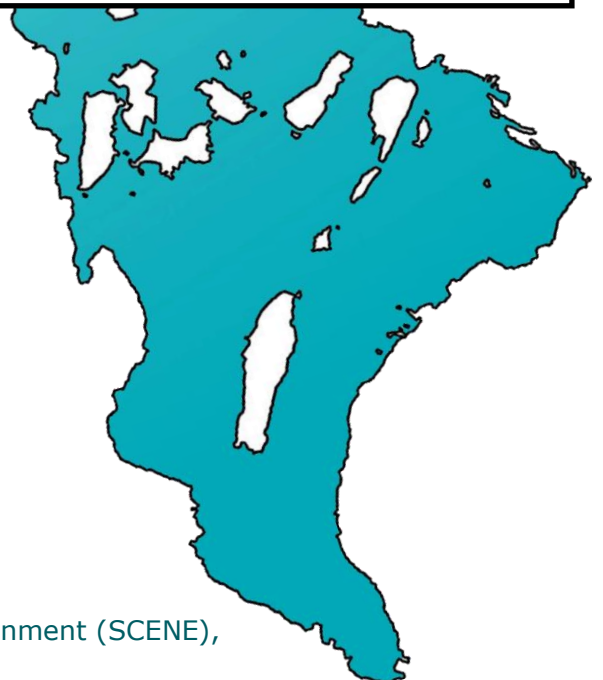
**Colin E Adams\***



**SCENE**  
Loch Lomond



**University  
of Glasgow**



\* Scottish Centre for Ecology and the Natural Environment (SCENE),  
University of Glasgow, Loch Lomond,  
G63 0AW

## Content

Introduction-.....	3
Methods .....	3
Activity across zones.....	3
Types of activity .....	5
Ratio of powered/non-powered boats per zone .....	6
Powered boat interactions with swimmers .....	7
Summary on levels of correctly worn Personal Floatation Devices (PFDs). .....	9
Summary of interactions- .....	9
Diurnal activity.....	10
Appendix I-.....	12
Mean activity/km <sup>2</sup> in each of the six census zones broken down into activity type.....	12
Appendix II.....	15
Zone survey areas .....	15
Appendix III.....	16
Noteworthy Interactions.....	16



## Introduction-

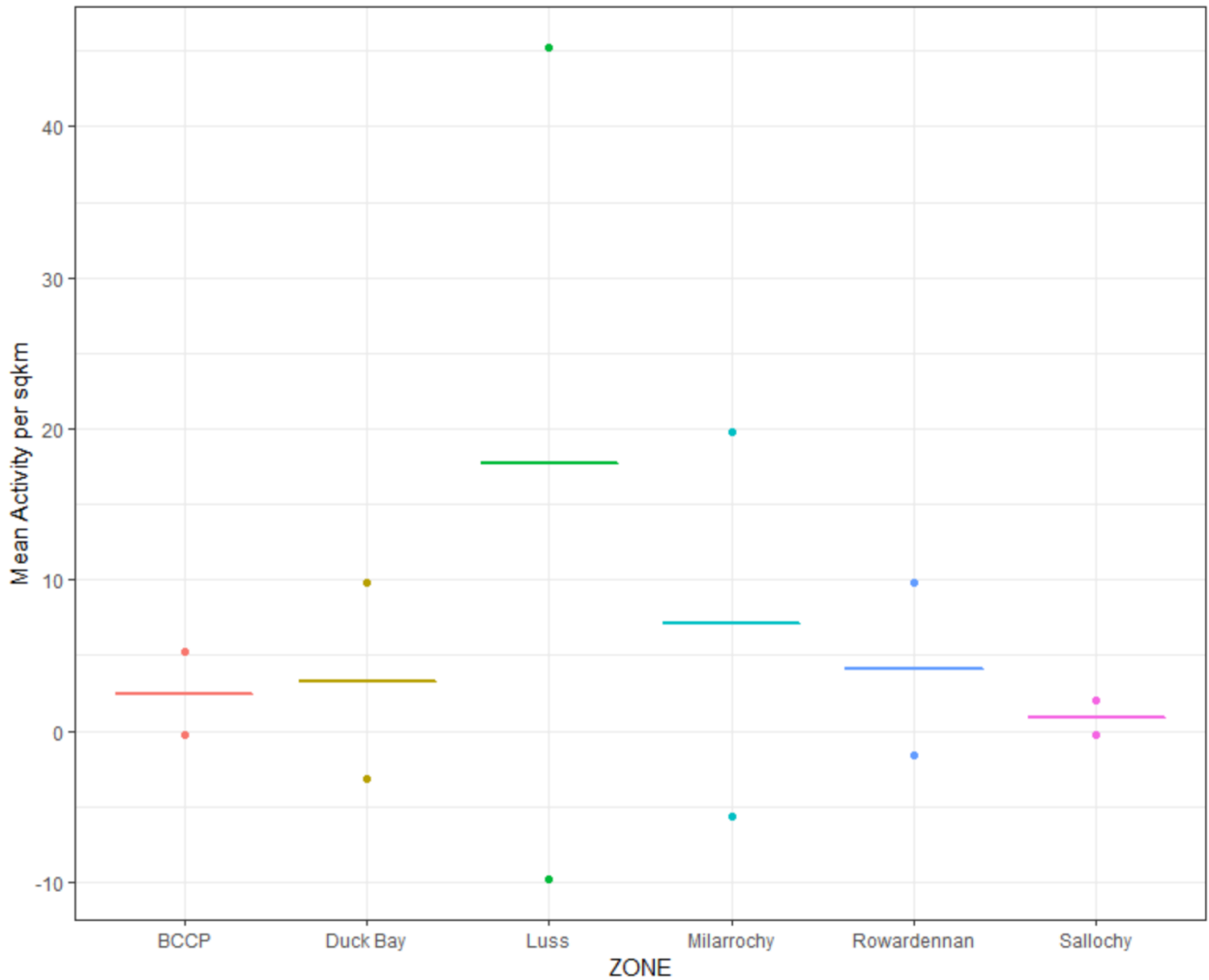
This report examines recreational activity on Loch Lomond in six specific zones. A proposal is currently underway to review the byelaws of Loch Lomond, with a particular focus on these zones. This report will cover the following topics: overall activity across the zones; the types of activity and boat usage on the loch; a comparison of powered and non-powered boats within the zones; interactions between swimmers and powered boats; a summary on the wearing of Personal Flotation Devices (PFDs); a summary on some negative interactions recorded; and two examples of diurnal patterns of recreational activity on the loch.

## Methods

A total of 104 surveys took place across six zones across Loch Lomond from the 28/05/2022 to 02/10/2022. These zones are Balloch Castle Country Park (BCCP)(n=19), Duck Bay (n=18), Luss (n=19), Milarrochy (n=17), Rowardennan (n=15) and Sallochy (n=16). Each survey was conducted on a weekend day during daylight hours, lasting one hour broken down into 15min survey periods. Each survey comprised a visual count of the number of each recreational activity defined by 21 categories (19 boat types, swimming, and shore use). At each site counts were made every 15 mins over the course of 1 hour within a defined area (see appendix II). At 2 sites, on one occasion each, counts were made across a whole day from 6am to 10pm to estimate diurnal patterns. During each survey recreational activity was recorded. Recreational Boating was defined by boat type into the following categories: Fishing, Motor Cruiser, Fast Cruiser, Speed Boat, SB & waterski, SB & wakeboard, SB & Donut (inflatable towed object), (for most of the analysis speed boats were grouped together), RIB, PWC, PWC & Donut, Pleasure Day, Boat, Sailing Dinghy, Tour Boat, Yacht, Rowing Boat, Wind Surfer, Canoe, Stand-up Paddleboard (SUP), Pedalo. Non boating recreation was recorded as Open Water Swimmer and Shore Use including Paddling. Collectively these will be referred to as an “activity”.

## Activity across zones

Overall, the highest mean activity was 104.7 activities conducted per km<sup>2</sup> whilst the lowest was 0 activities per km<sup>2</sup>, the mean of the all the mean activities across all sites was 5.9 activities per km<sup>2</sup> (sd=5.6). Luss had significantly more activity than any other sites with a mean of 17.7 activities per km<sup>2</sup> ( $p<0.001$ ;  $t=3.938$ ) (Fig.1, table 1). Sallochy had the least activity, with a mean of 0.6 per km<sup>2</sup>. There was no significant difference in activity between any of the other sites. Shore use was excluded from this analysis.



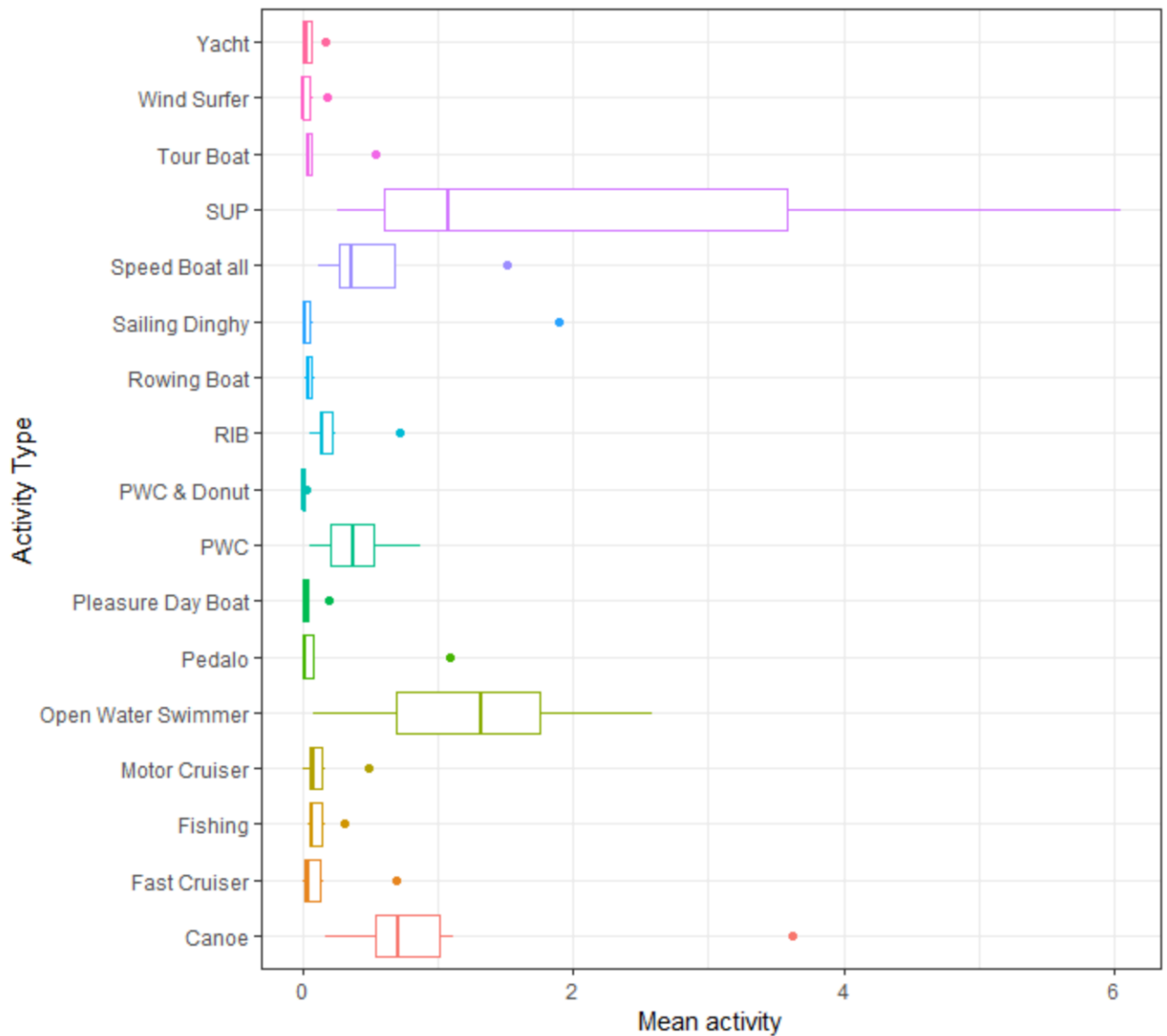
**Figure 1:** The mean activity per km<sup>2</sup> between 28/05/22 and 02/10/2022 across the six zones (the points show Standard Deviation). Luss had significantly more activity per km<sup>2</sup> than the other sites, all other sites had similar activities.

**Table 1:** The min, max mean and standard deviation of activity per km<sup>2</sup> between 28/05/22 and 02/10/2022 across the six zones.

Zone	Mean activity per km <sup>2</sup>			
	Min	Max	Mean	Standard Deviation
BCCP	0	7.8	2.5	2.8
Duck Bay	0	23.7	3.3	6.5
Luss	0	104.7	17.7	27.5
Milarrochy	1.3	47.9	7.1	12.7
Rowardennan	0	19.1	4.1	5.7
Sallochy	0	4.3	0.9	1.2

## Types of activity

Shore use was the most recorded activity (not included in figure 2 to allow a comparison of other activity). The most popular activities were open water swimming and by paddleboarding (SUP) (Fig.2 and Table 6). Appendix I shows the activity type split by survey zone. Throughout all the zones the top activities included different combinations of SUPs, Swimming, Canoeing, Speed boats, and PWCs (Appendix I).



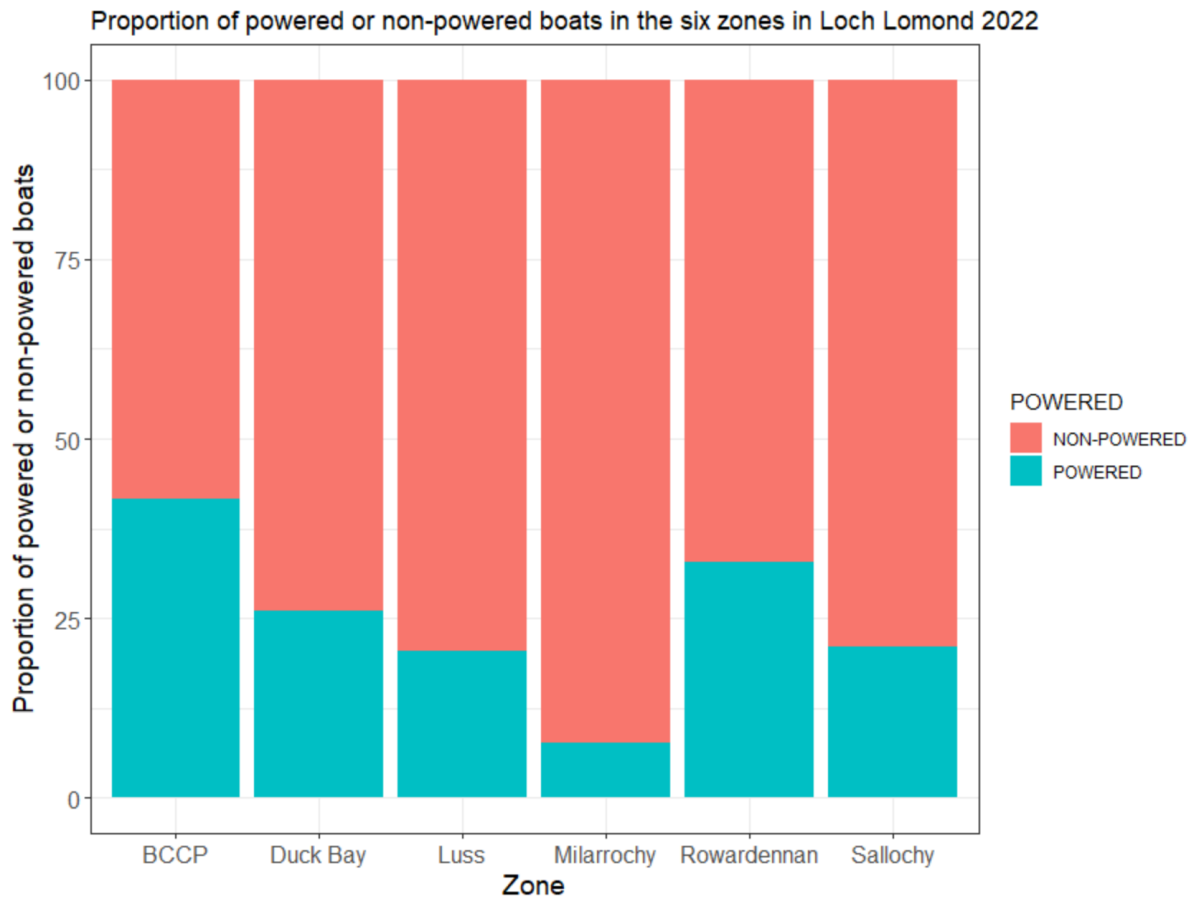
**Figure 2:** The different types of activity between 28/05/22 and 02/10/2022 excluding shore use. The boxplot shows the upper and lower quartiles with the solid line indicating the median.

**Table 2:** The min, max, mean and standard deviation of mean activity between 28/05/22 and 02/10/2022 split by activity type.

Zone	Mean activity			
	Min	Max	Mean	Standard Deviation
Canoe	0.175	3.621	1.135	1.256
Fast Cruiser	0	0.694	0.158	0.268
Fishing	0.042	0.306	0.119	0.102
Motor Cruiser	0	0.484	0.141	0.176
Open Water Swimmer	0.075	2.588	1.279	0.908
Pedalo	0	1.084	0.200	0.434
Pleasure Day Boat	0	0.200	0.052	0.075
PWC	0.05	0.866	0.397	0.293
PWC & Donut	0	0.0333	0.009	0.013
RIB	0.05	0.715	0.236	0.243
Rowing Boat	0.013	0.094	0.048	0.032
Sailing Dinghy	0	1.894	0.333	0.765
Speed boat	0.122	1.515	0.592	0.627
SUP	0.263	6.042	2.220	2.378
Tour boat	0.025	0.536	0.126	0.202
Wind Surfer	0	0.188	0.044	0.077
Yacht	0	0.176	0.050	0.069

### Ratio of powered/non-powered boats per zone

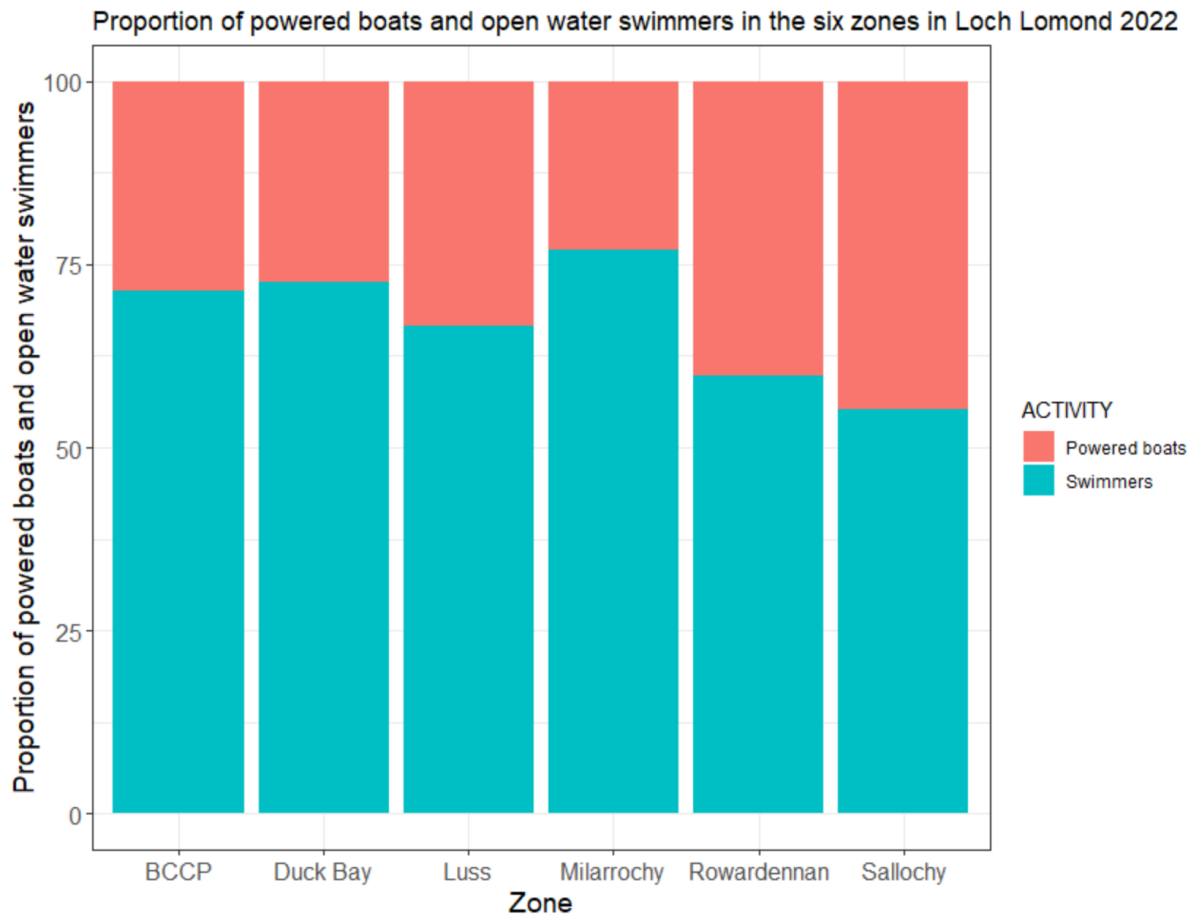
For all zones, non-powered boats outnumbered powered vessels. The relative frequency of powered boats and non-powered boats is significantly different between the different areas ( $\chi^2 = 99$ ,  $P < 0.001$ ). Balloch Castle County Park (BCCP) had the highest proportion of powered boats with 58% non-powered and 42% powered, followed by Rowardennan with 67% non-powered and 33% powered (Fig. 3). Milarrochy had the lowest proportion of powered boats with 92% non-powered and only 8% powered boats in this zone (Fig. 3).



**Figure 3:** The ratio of powered to non-powered boats in Loch Lomond at six different sites during summer 2022.

### Powered boat interactions with swimmers

On 172 occasions swimmers were recorded in the water, on 55% of powered craft were also present. Of these interactions 32% were at Duck Bay, 28% at Luss, 19% at Rowardennan, 12% at Milarrochy, 7% at BCCP, while Sallochy only comprised 2%. For all zones, powered boats were outnumbered by open water swimmers. The relative frequency of powered boats and open water swimmers is significantly different between the different areas ( $\chi^2 = 22$ ,  $P < 0.001$ ) (Fig.4). Sallochy has the highest proportion of powered boats and swimmers, while Milarrochy has the lowest proportion (Fig.4).



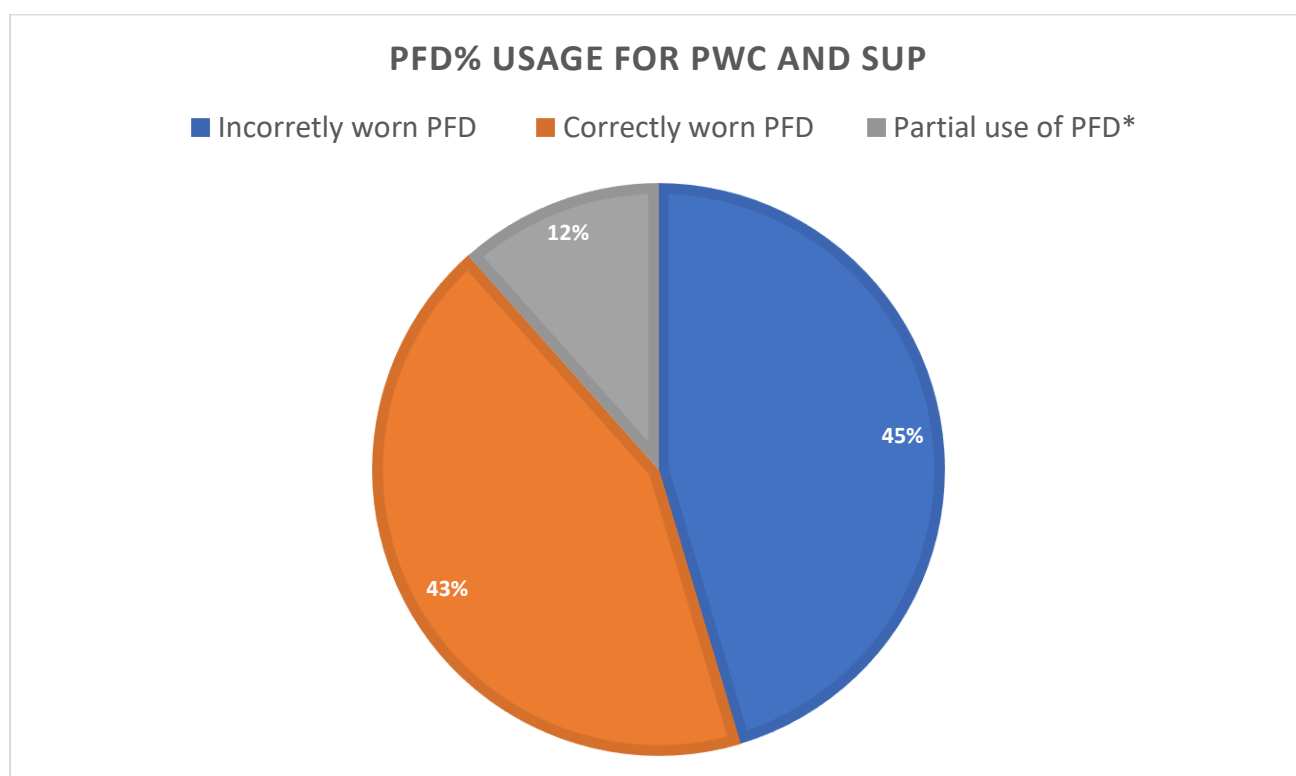
**Figure 4:** The ratio of powered boats and open water swimmers in Loch Lomond at six different sites during summer 2022.



## Summary on levels of correctly worn Personal Floatation Devices (PFDs).

The PFD data was collected for Personal Watercrafts (PWCs) and Stand-up Paddleboards (SUPs) only, for the following reasons: users of both of these types of vessels are easy to see and ride on top of the vessel therefore, determining whether a user is wearing a PFD is straightforward, when compared with other vessels which have storage spaces out of the view of the surveyor.

The numbers of correctly worn Personal Flotation Devices (PFDs), across all sites combined was: 43% of occasions where the correct wearing of PFDs could be verified, and 45% of occasions showing PFDs were not worn or incorrectly worn (Fig. 5). In 12% of cases some individuals on board were wearing a PFD correctly and some were not.



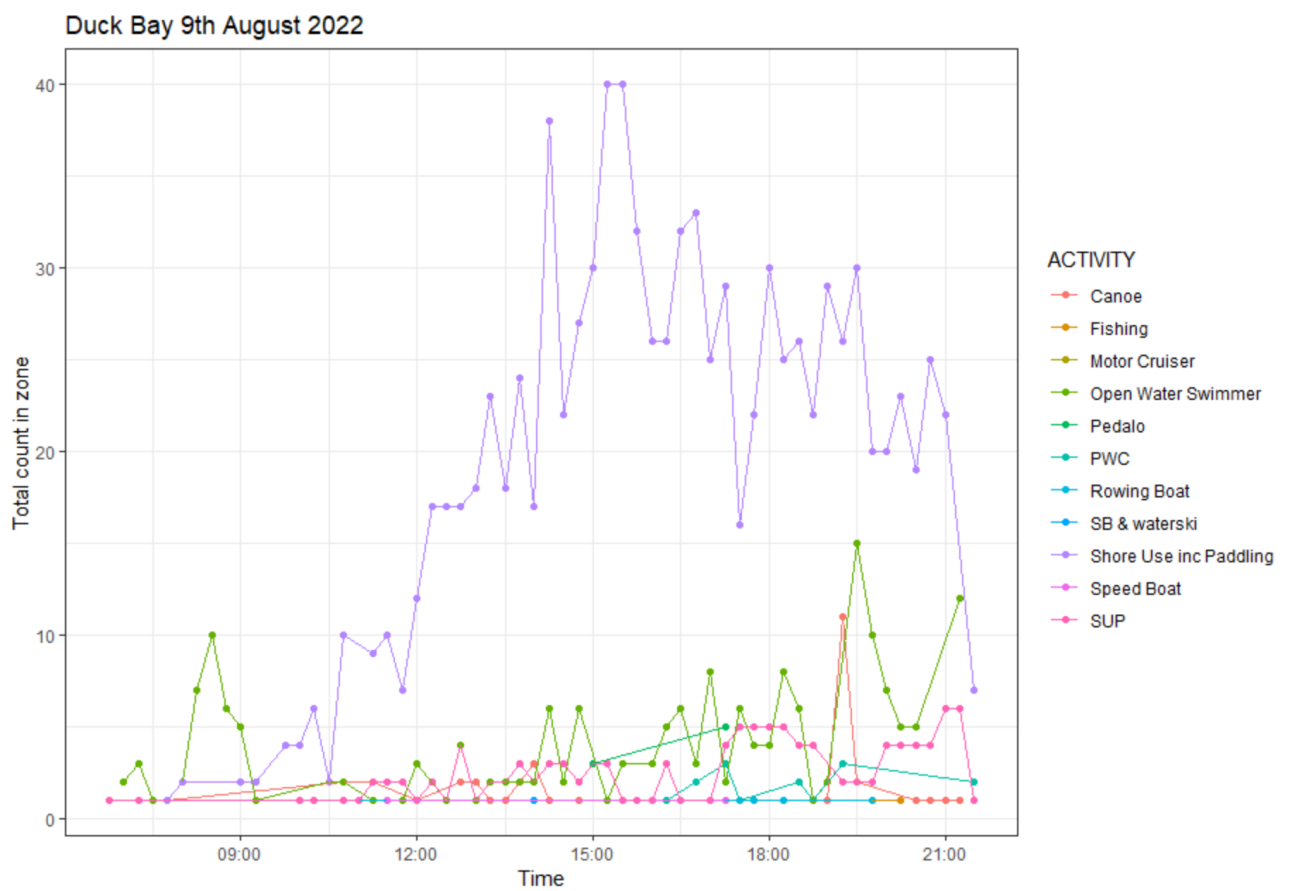
**Figure 5:** The PFD% usage on PWCs and SUPs recorded from 28/05/22- 02/10/2022 throughout Loch Lomond. \*Partial use of PFD indicates some of those on board were wearing PFDs and other were not.

## Summary of interactions-

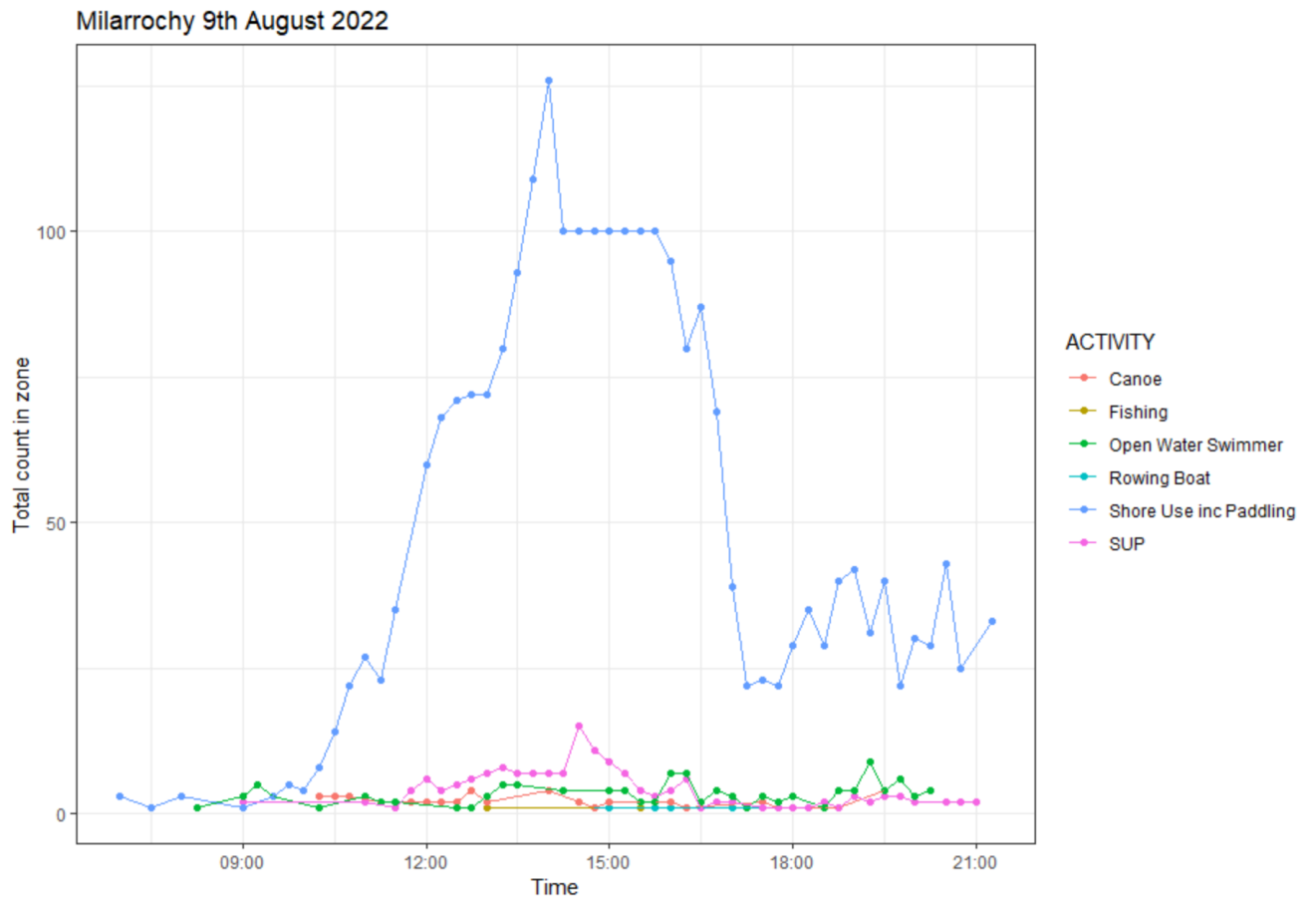
In addition to the surveying for recreational activity, noteworthy interactions between recreational uses were also recorded. Eighty seven percent of the negative interactions that occurred were people on PWCs/Jet Skis (60%) and Speed boats (27%). The issues recorded included speeding near the shore within the 11kph area and/or creating a heavy wake that would disturb SUPs or swimmers. There is a detailed table of these interactions in Appendix III.

## Diurnal activity

On the 09/08/22 at Duck Bay and Milarrochy surveys were conducted over the whole, from 06.00 to 21.45. There is a distinct diurnal pattern of activity for shore use which includes recreational paddling for both Duck Bay and Milarrochy, with an increase in the morning and a peak around 14:00 to 15:00, then a decrease throughout the late afternoon and evening (Fig.6 & Fig.7). The other activities did not show any clear daily patterns (Fig.6 & Fig.7).



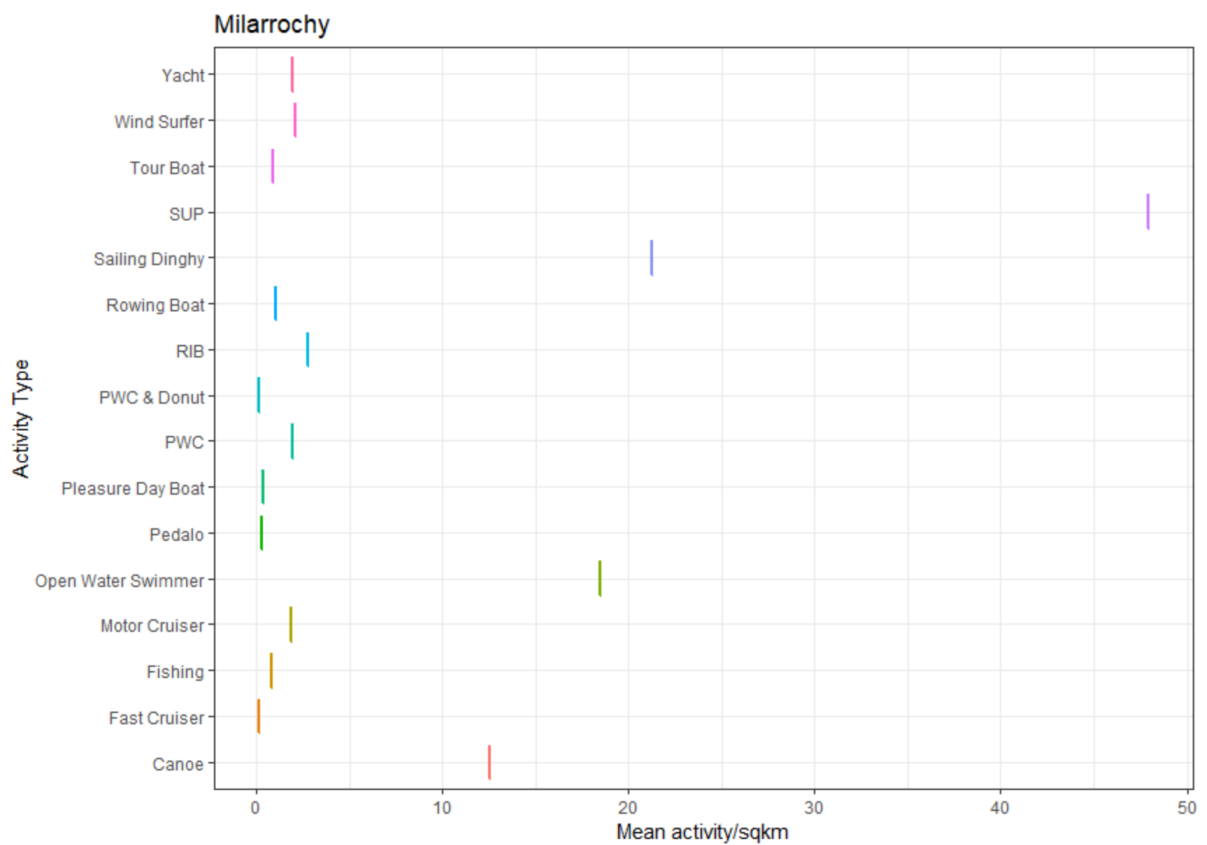
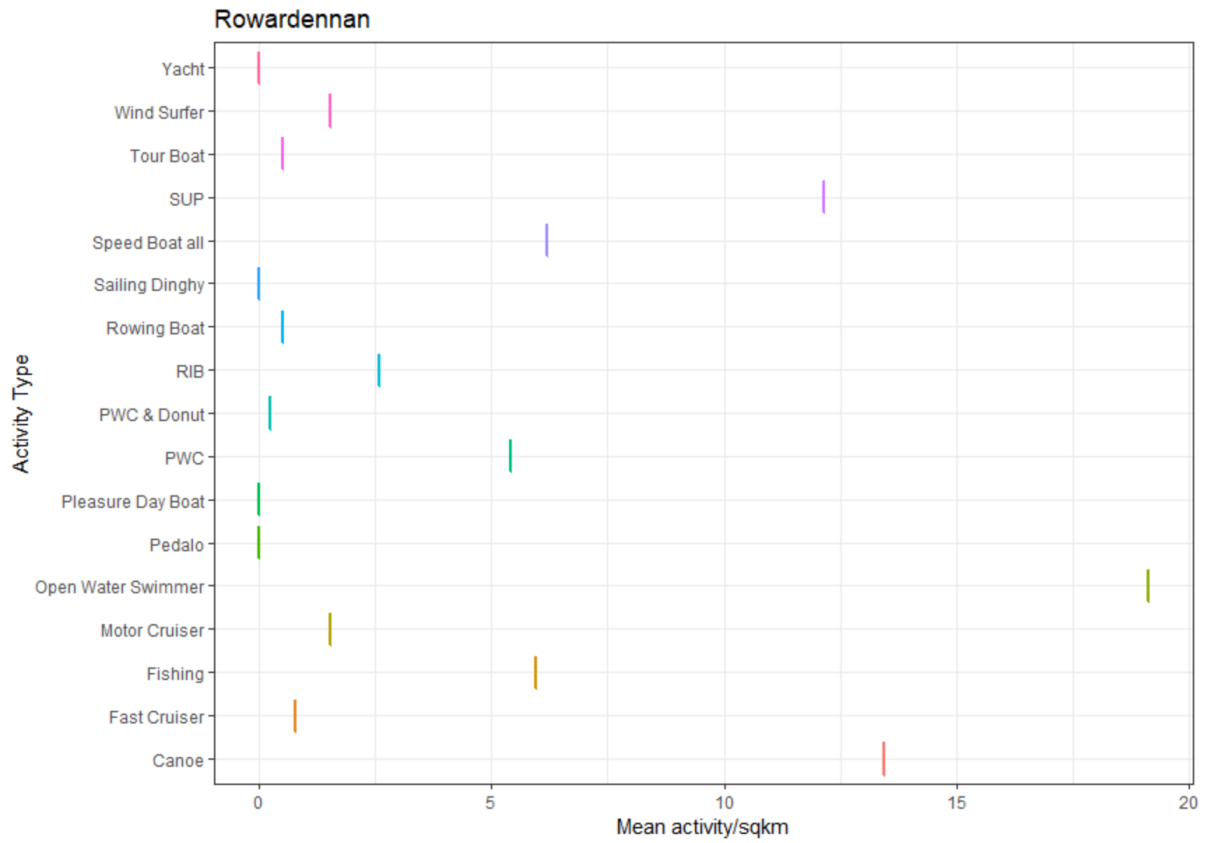
**Figure 6:** Total recreational activity frequency at Duck Bay on the 09/08/2022 from 06:00-21:45.

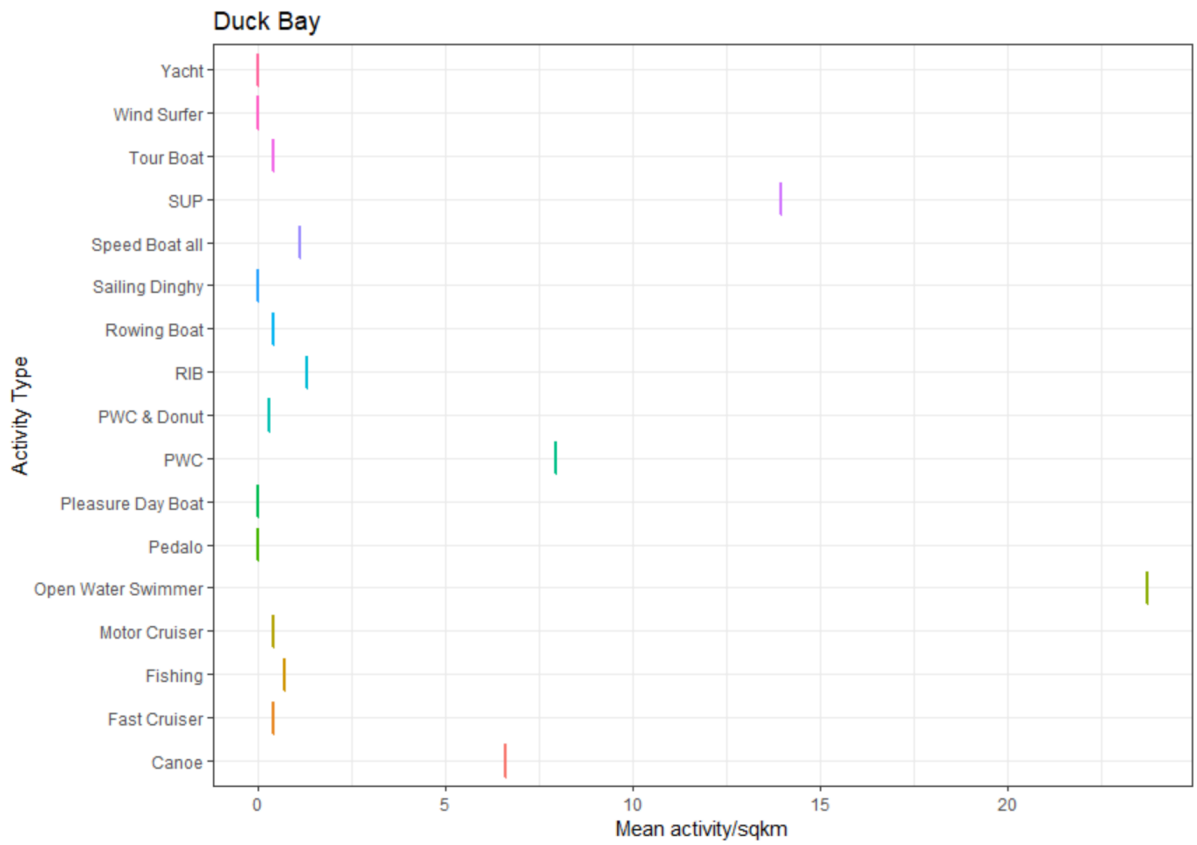
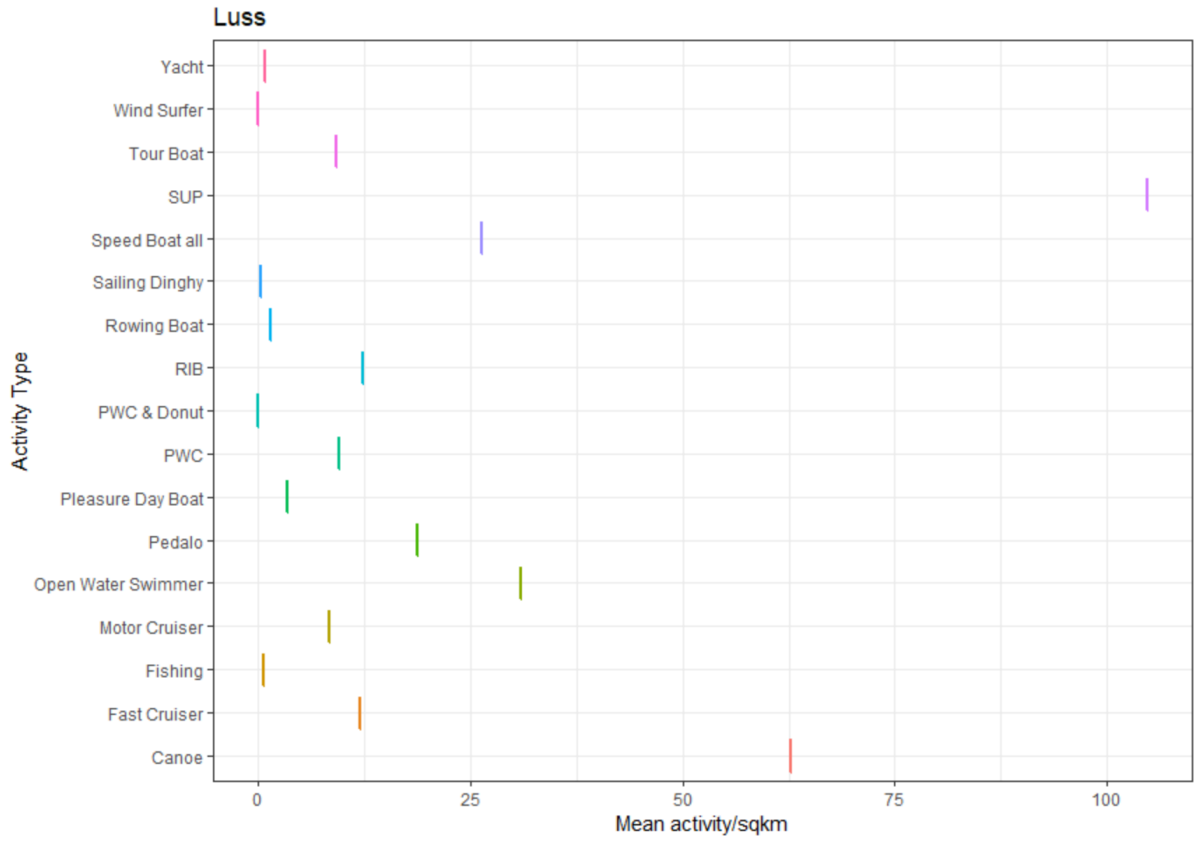


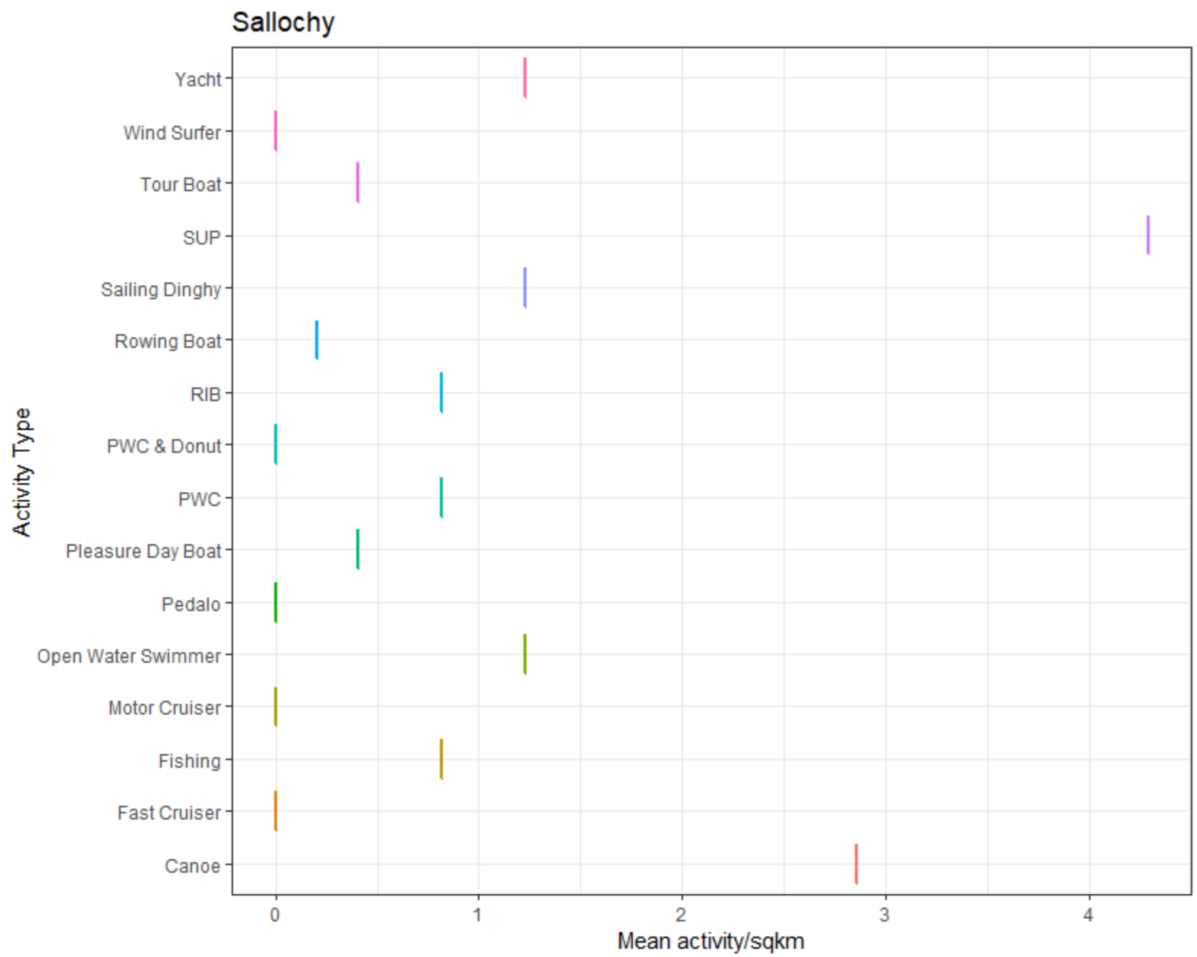
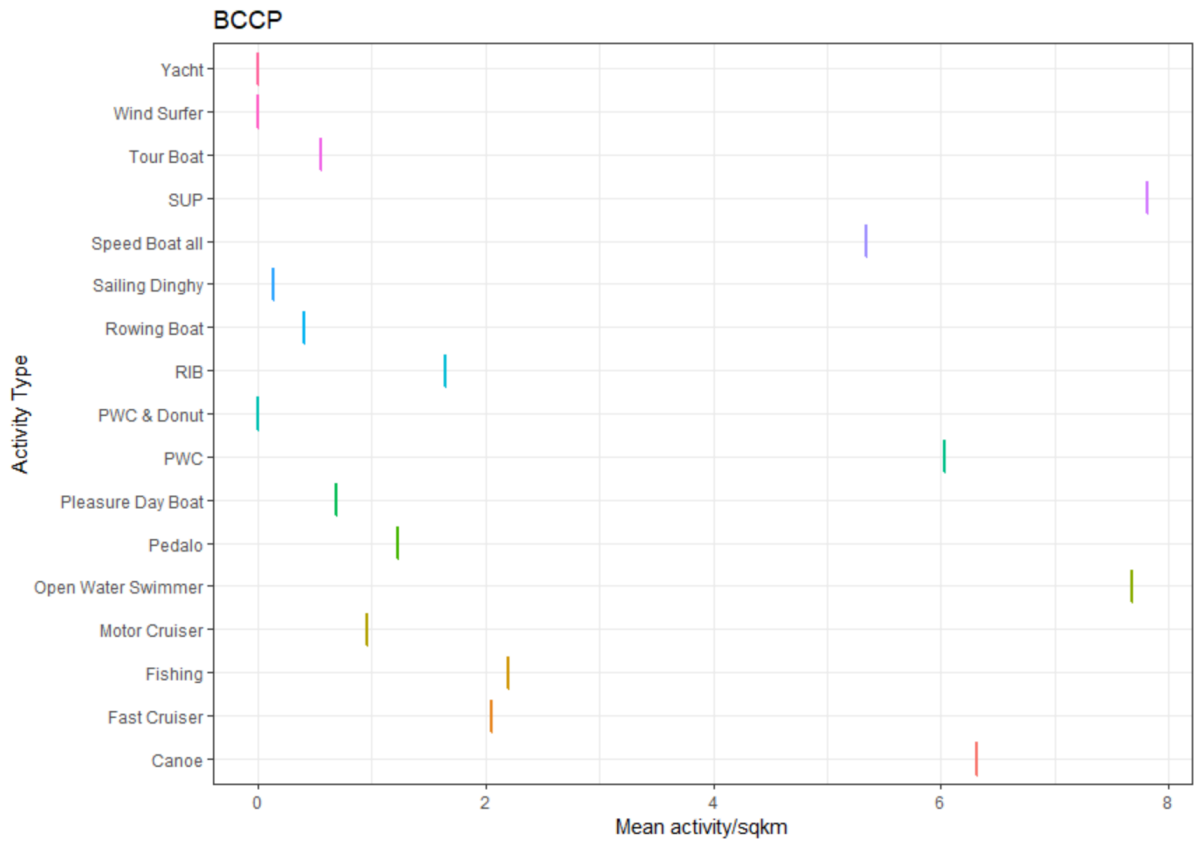
**Figure 7:** Total recreational activity frequency at Milarrochy on the 09/08/2022 from 06:00-21:45.

## Appendix I-

Mean activity/km<sup>2</sup> in each of the six census zones broken down into activity type.

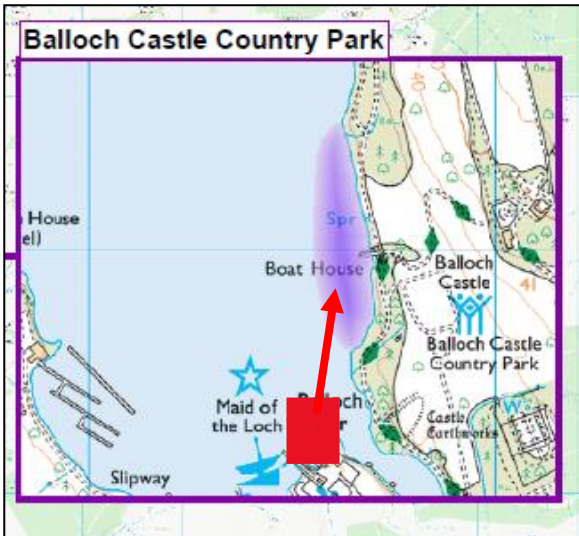




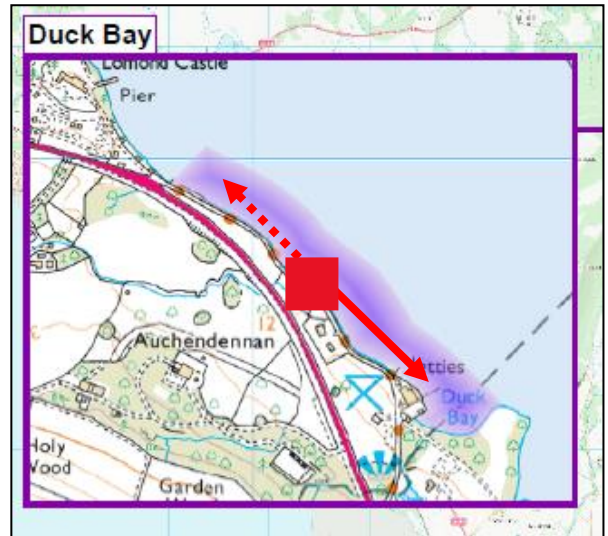


# Appendix II

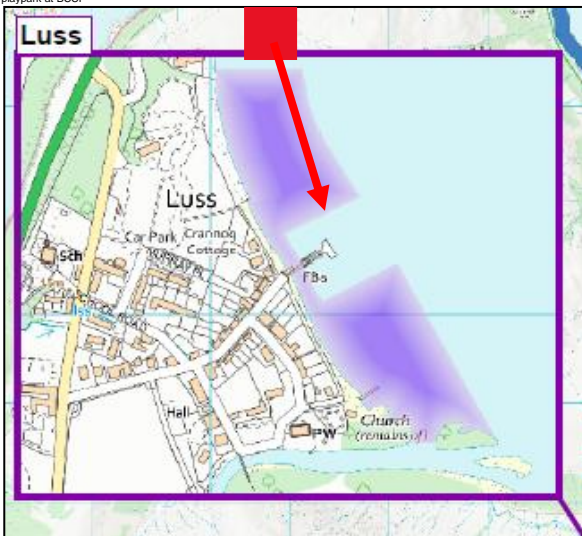
## Zone survey areas



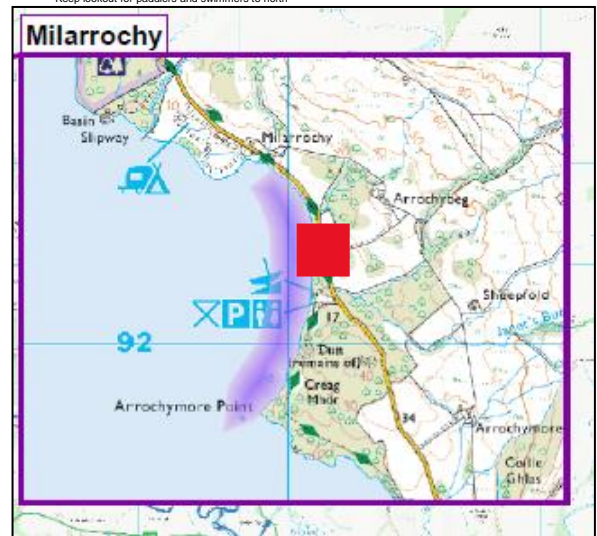
View from Maid of Loch Pier, from point at northern most green lateral to point to the north past bank of trees to north of playpark at BCCP



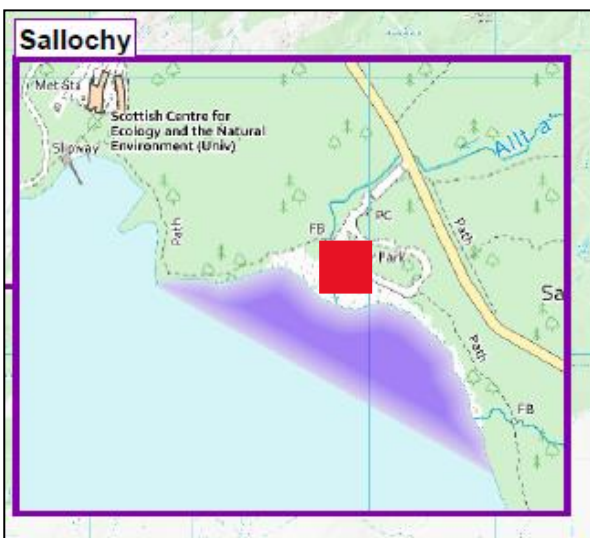
Access point at Waterside Cottage. Limited view to North but most activity will take place to south. Keep lookout for paddlers and swimmers to north



View from Campsite slipway (parking available at campsite, check in/out with reception. Limited view to south of pier, but should pick up most activity.



View from Ranger Base beach front



View from wall at beach front



View from rocks or beach area to north of pier.

## Appendix III

### Noteworthy Interactions

<b>Date</b>	<b>Boat type</b>	<b>Location</b>	<b>Interaction</b>
06/08/2022	Motor Cruiser	Luss	Passed very close to canoes
13/08/2022	PWC	BCCP	PWV good byelaw compliance and consideration for others
13/08/2022	PWC	BCCP	PWC speeding in 11kph area
13/08/2022	PWC	Duck Bay	PWC at speed near shore, people in water
13/08/2022	PWC	Duck Bay	One PWC speeding near shore
13/08/2022	PWC	Duck Bay	2 x PWC at speed and making tight turns around kayak and SUP, I would deem this to be reckless navigation.
13/08/2022	PWC	Luss	PWC not quite on plane creating large wake causing SUP users to fall off.
28/05/2022	PWC	Luss	3 PWCs speeding less than 150m from shore, close passes to pedalos, SUPs and kayaks.
28/05/2022	PWC	Duck Bay	PWCs speeding from the shore
04/09/2022	PWC	Milarrochy	PWCs travelling at speed in 11kph area
29/05/2022	PWC & Speed Boat	Duck Bay	1 Speedboat and 3 PWC at speed into shore, 2 children left the water as a result
28/05/2022	RIB	Milarrochy	Launched from Milarrochy, not registered
17/07/2022	Speed Boat	Luss	boat couldn't access due to leisure swimmers inc kids
13/08/2022	Speed Boat	Duck Bay	Speeding near shore
21/08/2022	Speed Boat	Rowardennan	Speeding within 11kph area

<b>Zone</b>	<b>Area (km<sup>2</sup>)</b>
BCCP	0.077
Duck Bay	0.109
Luss	0.058
Milarrochy	0.089
Rowardennan	0.052
Sallochy	0.061