

Are the number of canoeists not disinfecting their gear after use contributing to the spread of *Aphanomyces astaci* in Irish waters?

INTRODUCTION

Astacoidea (more commonly known as crayfish) are a type of freshwater organism that can be found in both Irish rivers and lakes. The particular species located in Ireland is given the name *Austropotamobius pallipes* (White-Clawed Crayfish). Recently, in the year 2017, there has been a concerning outbreak of the crayfish plague (*Aphanomyces astaci*) in the river Suir and some other rivers countrywide. This has proved to be an extensive problem as the mortality rate of our native *Astacoidea* has increased. Therefore, there has been a depletion of freshwater species throughout the country. Our hypothesis is that the number of canoeists not disinfecting their gear after use are contributing to the spread of this plague.

EXPERIMENTAL METHODS

To evaluate the potential biosecurity risks that canoeists are posing, we generated an online questionnaire consisting of 10 questions and we forwarded it to the 75 canoe clubs in Ireland. We did this in order to investigate how frequently their equipment was disinfected, their locations of activity and how regularly they paddled per fortnight. We gained a total of 141 responses.

We used this information to then calculate a biosecurity hazard score for each individual canoeist.

METHOD

1. Firstly, we viewed three fundamental responses from each survey respondent;
 - Number of catchments visited
 - Frequency of canoeing on Irish rivers
 - Type of washing and disinfecting of equipment.
2. We then gave each canoeist a score out of 5, with 0 being the best score to receive.
3. We multiplied these 3 figures together to retrieve a biosecurity hazard score.

Below is a sample of our hazards scores:

Response Number	(N)	(F)	(W)	Total Score (NxFxW)
1.	0	5	2	0
2.	0	5	0	0
3.	3	5	0	0
4.	0	4	0	0
5.	0	4	4	0
6.	2	5	1	10
7.	2	4	2	16
8.	2	5	1	10

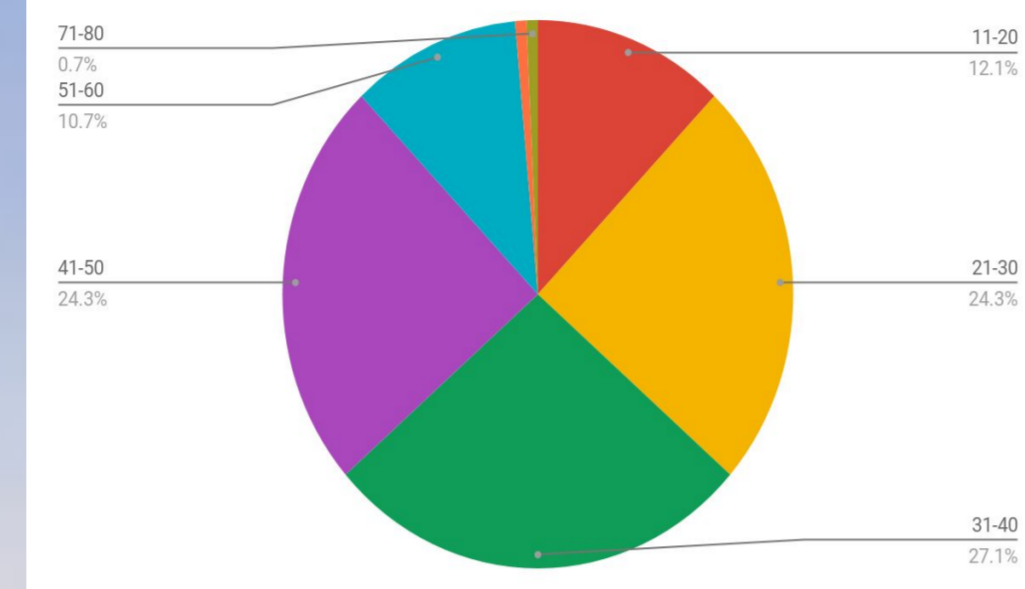


PROJECT AIMS AND ASPIRATIONS

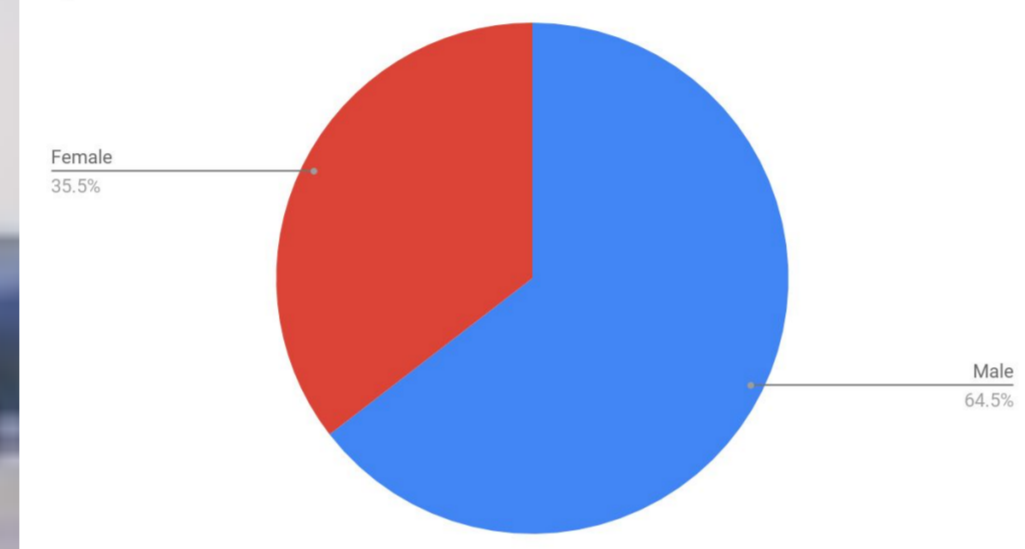
- We aim to further our knowledge about our native *Austropotamobius pallipes* and investigate what it is that may be contributing to the vast spread of *Aphanomyces astaci*.
- The main aspiration within our project is to conduct the first study in the Republic of Ireland, analysing the potential biosecurity risk that canoeists are posing to the country. There have been similar studies carried out in both the UK and Australia, which we will compare our results to.
- We also aim to create more public awareness about this topic, directed at canoeists and their canoe clubs. This is to ensure that an increased number of those canoeing will make it a priority to disinfect their gear after use. By doing this, our livestock can be safeguarded for future generations.

RESULTS

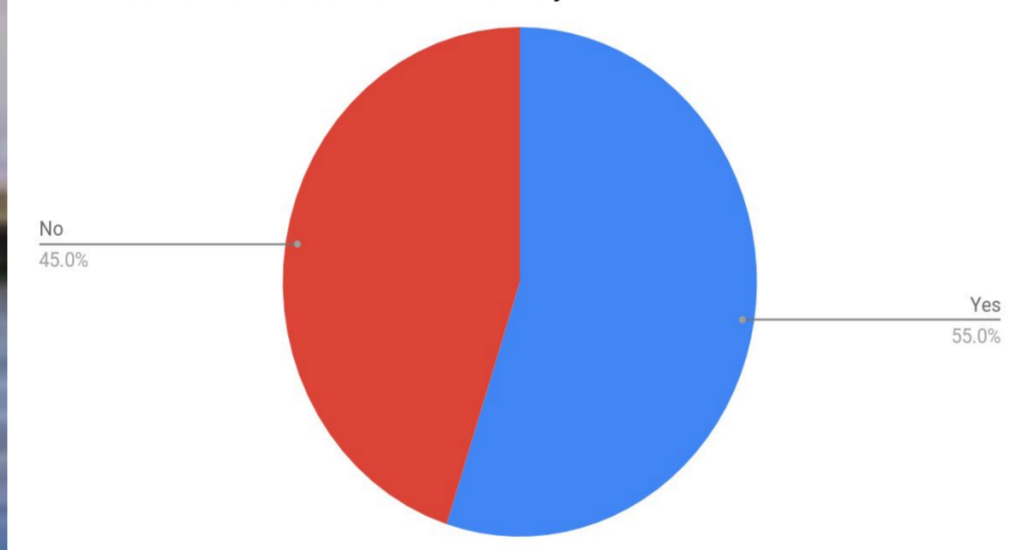
Q1. What age are you?



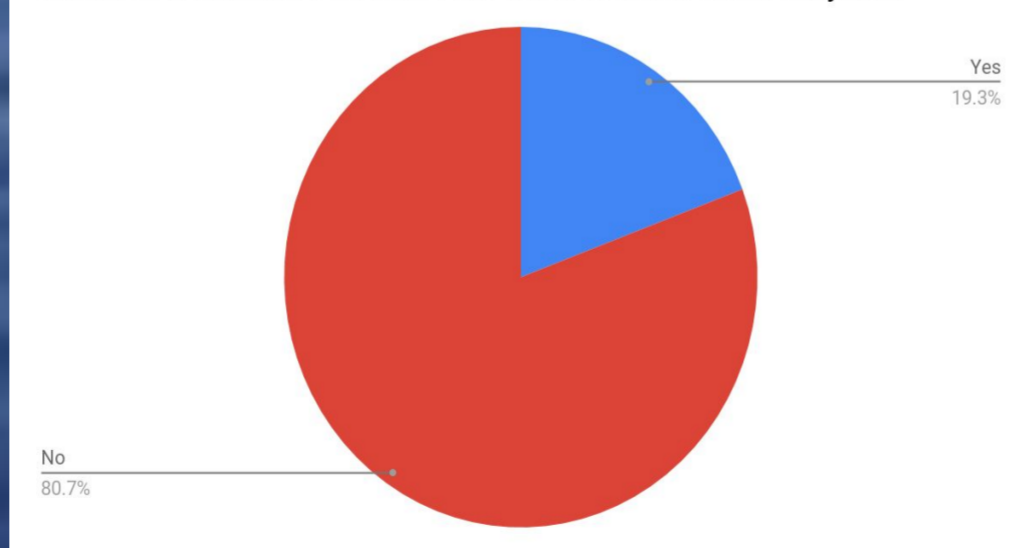
Q2. What sex?



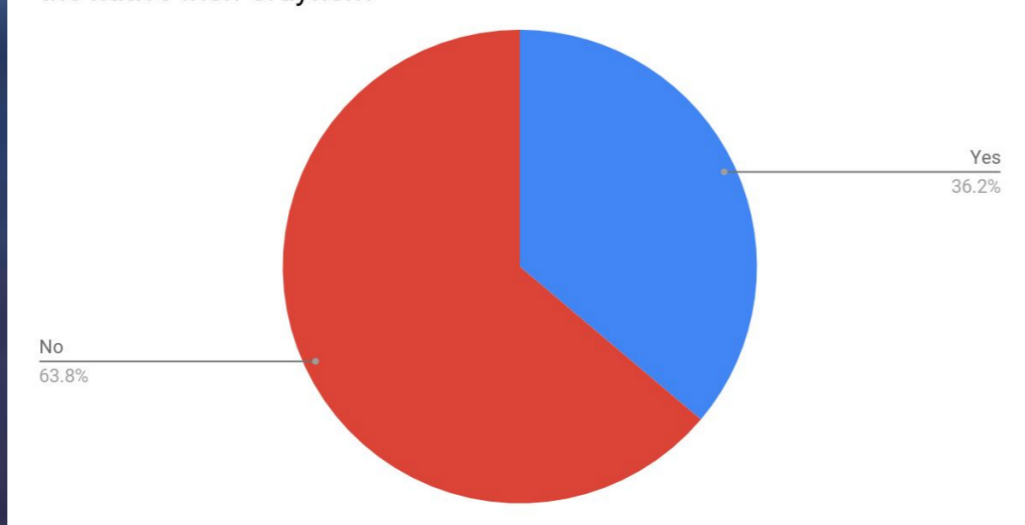
Q3. Before the outbreak of the Crayfish Plague on the Suir, did you know that Ireland had fresh water Crayfish?



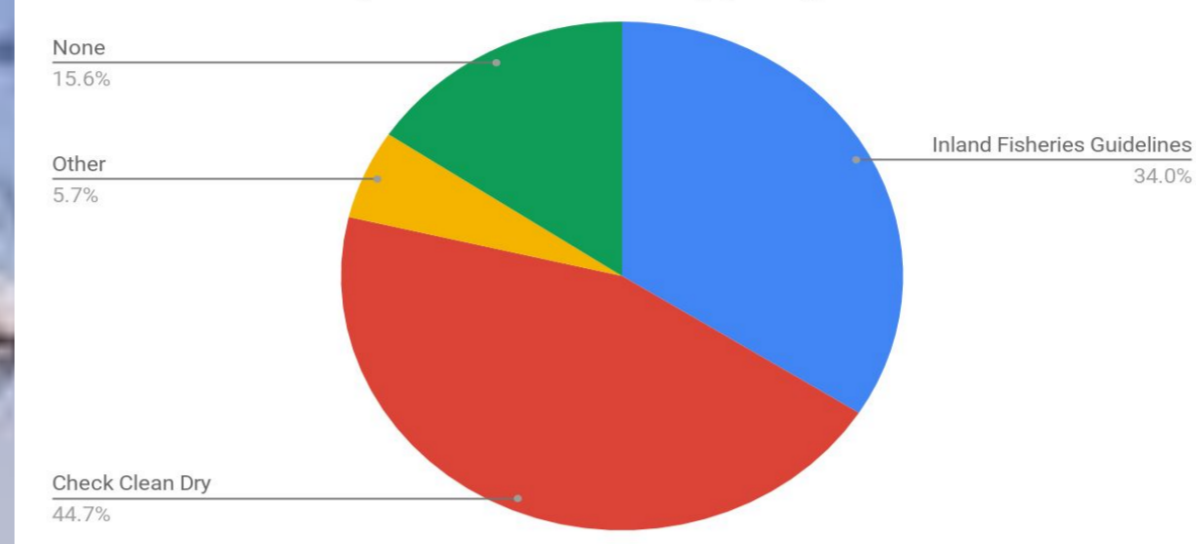
Q4. Before the outbreak of the Crayfish plague on the Suir, were you aware of a disease that could kill 100% of fresh water Crayfish?



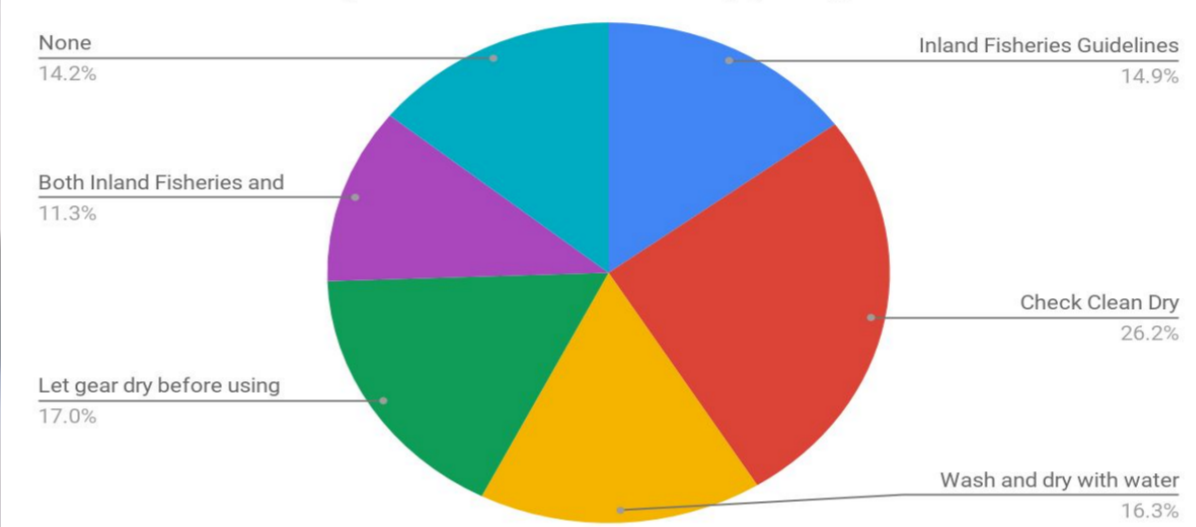
Q5. Were you aware of the threat of invasive species of Crayfish on the native Irish Crayfish?



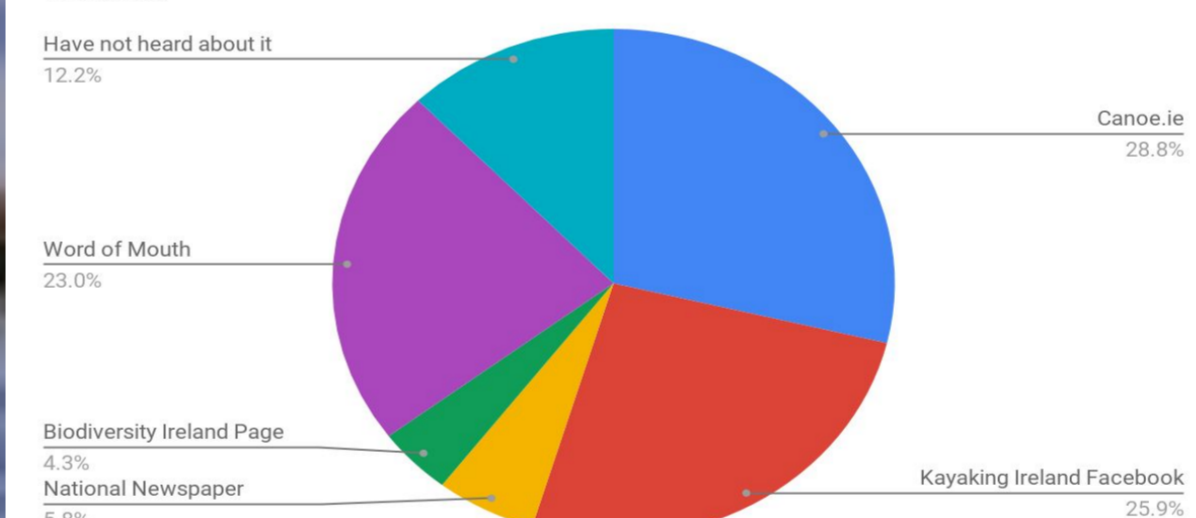
Q6. Have you heard of the Inland Fisheries boat washing guidelines or the Check Clean Dry method for cleaning your gear?



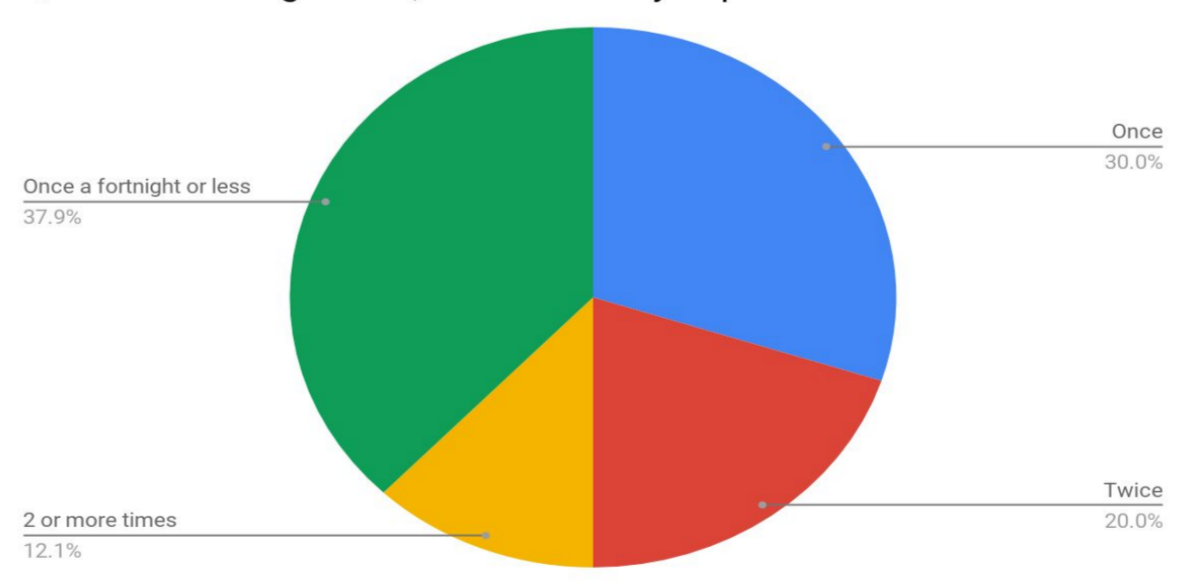
Q7. Do you follow the Inland Fisheries Guidelines on boat washing or the Check Clean Dry method when cleaning your gear?



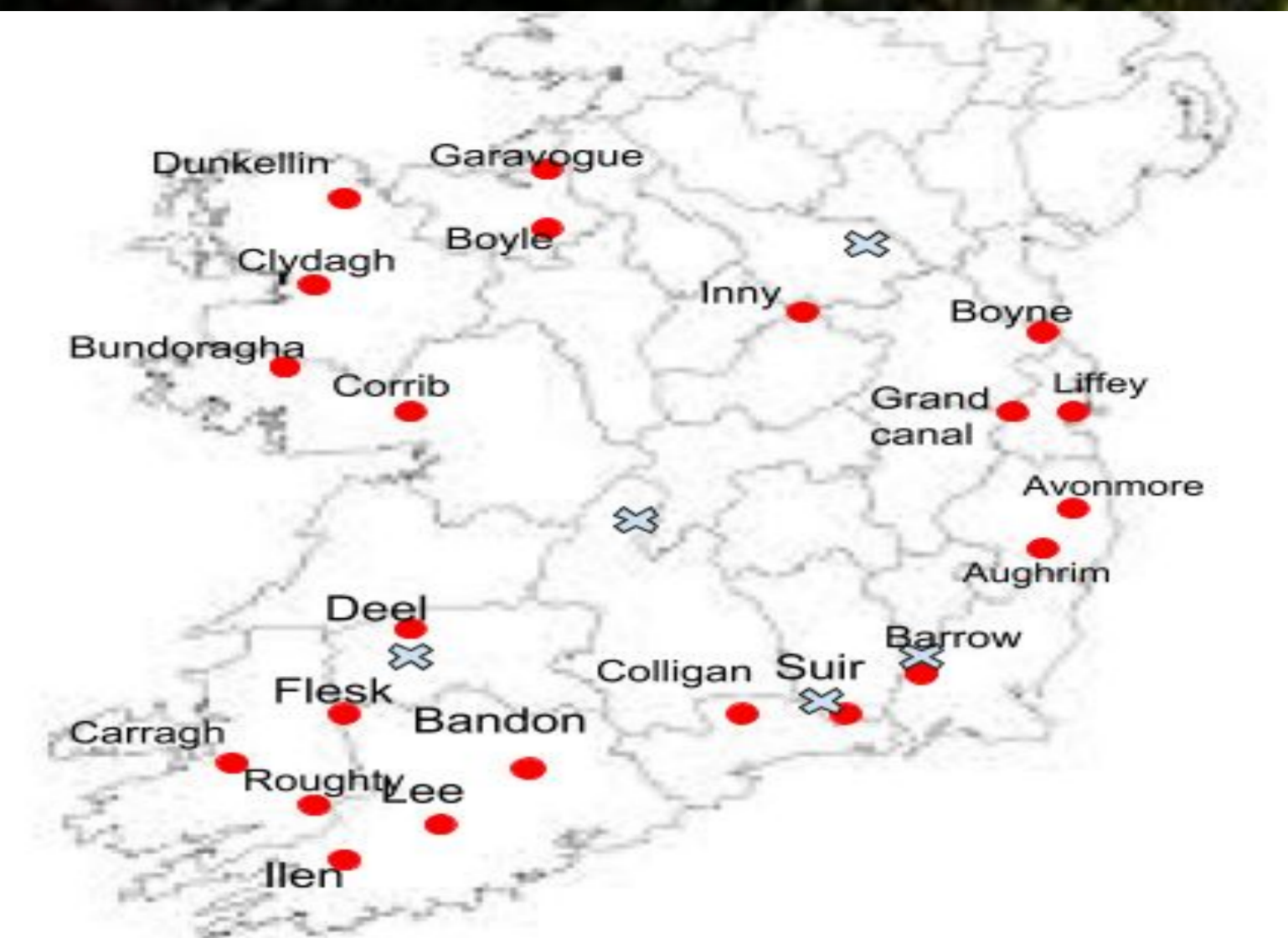
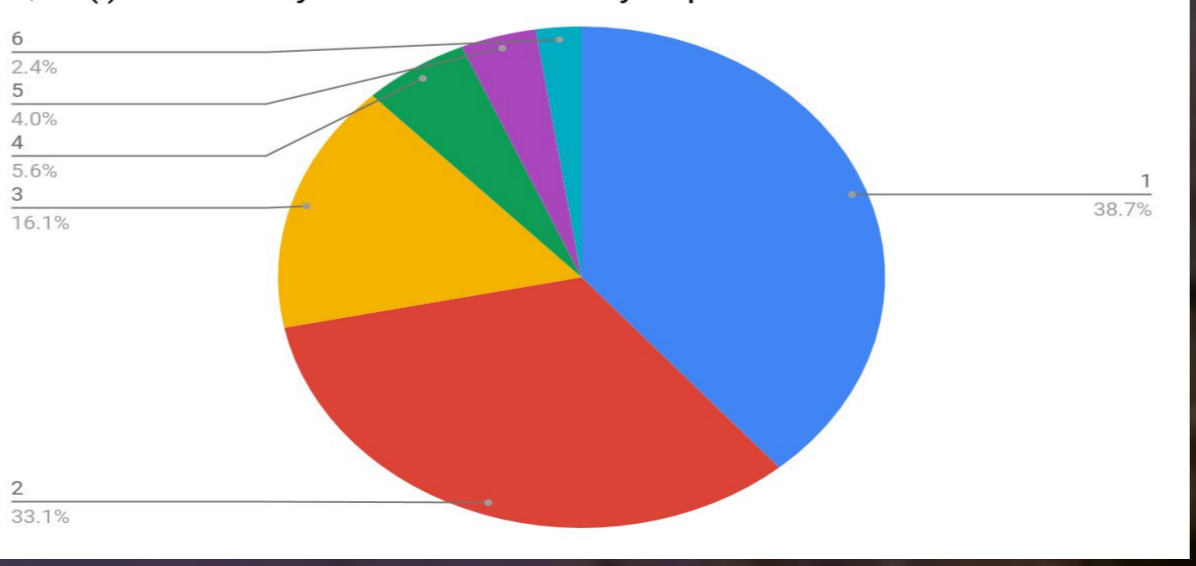
Q8. How did you find out about the outbreak of Crayfish plague in Ireland?



Q9. On an average week, how often do you paddle?



Q10 (i). How many different rivers do you paddle?



Red dot: Locations of rivers where the respondents are not disinfecting their gear correctly.

Grey X: Locations of the crayfish plague in Ireland

CONCLUSION

- Our results indicate that 45.39% of canoeists were paddling once a fortnight or more and were not washing their gear properly (36.36% male between the age group of 31-50 yrs.) Of this, 54.69% were canoeing in 2+ catchments in Ireland. This information outlines the time period that a range of invasive non-native species as well as aquatic pathogens have the ability to survive in damp or saturated conditions. Therefore, these individuals could be acting as vectors for the spread of the *Aphanomyces astaci*.
- In terms of biosecurity hazards, there is a clear variation in the hazard scores that we calculated. For instance, the highest hazard score was 100 and the lowest was 0. We feel that by focusing this issue upon canoeists, that in years to come, the scores can be checked and compared to hopefully see a subsequent change. We think that by ensuring a provision of a cleaning location in every canoe club where boating traffic is highest, it will encourage more people to disinfect their gear after use.
- In conclusion, public attention and engagement is vital to effectively manage and prevent the spread of *Aphanomyces astaci*. We have supplied an important baseline from our results that particularly highlights the need to increase biosecurity awareness to those that display an enjoyment in water sports. If the canoeists in Ireland continue to not disinfect their gear, they will definitely act as a vector to the spread of *Aphanomyces astaci* in the water.