Lough Carra Emergent Vegetation Baseline Survey 2023

This report was produced by Lough Carra Catchment Association for the Lough Carra LIFE Project.

Background

The Lough Carra LIFE Project includes Action D2.2 "Vegetation Surveys" which specifies "a comprehensive survey of emergent vegetation will be carried out in year 1 and year 5, following the method used by Huxley (2007)."

Since there were no realistic bids for the contract to carry out this work, it was decided that an effort would be made by LCCA to conduct it on a voluntary basis. Consequently, Chris Huxley and Peter Byrne agreed to attempt to carry out the field survey work using specialist GPS equipment provided by Mayo County Council. Work started in August 2023 when it became apparent that, while the method appeared to be viable for the NW basin, the proliferation of bulrush growth in the SE basin was such that the technique was unlikely to provide a usable baseline against which future changes could be judged.

On 31 August 2023, I submitted an interim report with respect to the situation at that point. That report is attached herewith as Annex 1. As a result of the findings detailed in that report, the work to survey the NW basin for bulrush *Schoenoplectus lacustris* stands was completed, no further work was undertaken on the SE basin bulrushes and no attempt was made to map the five main beds of *Myriophyllum*. This last exercise will be attempted in 2024.

Discussions were held to decide on a methodology to cope with the extensive proliferation of bulrushes in the SE basin which concluded that recording the extent of the underwater growth of bulrushes (perhaps using an underwater drone) in key areas would provide the necessary baseline information against which future growth (or otherwise) could be measured. The key areas would include where Annies River and the Cloondaver stream enter the lough, but would not necessarily be limited to those areas.

Methods

Bulrush stands were mapped using the specified method from a 5m lake boat with 5 hp Yamaha outboard motor. The latter provides the tightest possible turning which is essential if the edge of the stand is to be followed closely. The GPS equipment used was a Leica GPS system, Controller Model - CS20 3.75G, HEAD - GS18.

The whole of the NW basin was covered with the exception, for reasons of physical difficulty, of one small stand of bulrushes on the Ballycally shoreline where an inflowing drainage channel empties (from Lough Nagoyne) into the lough.

The northernmost section of the SE basin was also covered, and it was this part of the exercise that led to the conclusion that bulrush growth there is such that a different method needed to be used to provide a useful and meaningful baseline. Nonetheless, the results are presented below and may prove to be of some value.

Results

The GPS data are shown in Annex 2 (NW basin) and Annex 3 (SE basin). These data include the location and area (in m²) of each stand and a total area for all stands. If a repeat survey uses the same methodology, it will be possible to compare these metrics and show whether there has been any significant changes, either to individual stands or overall.

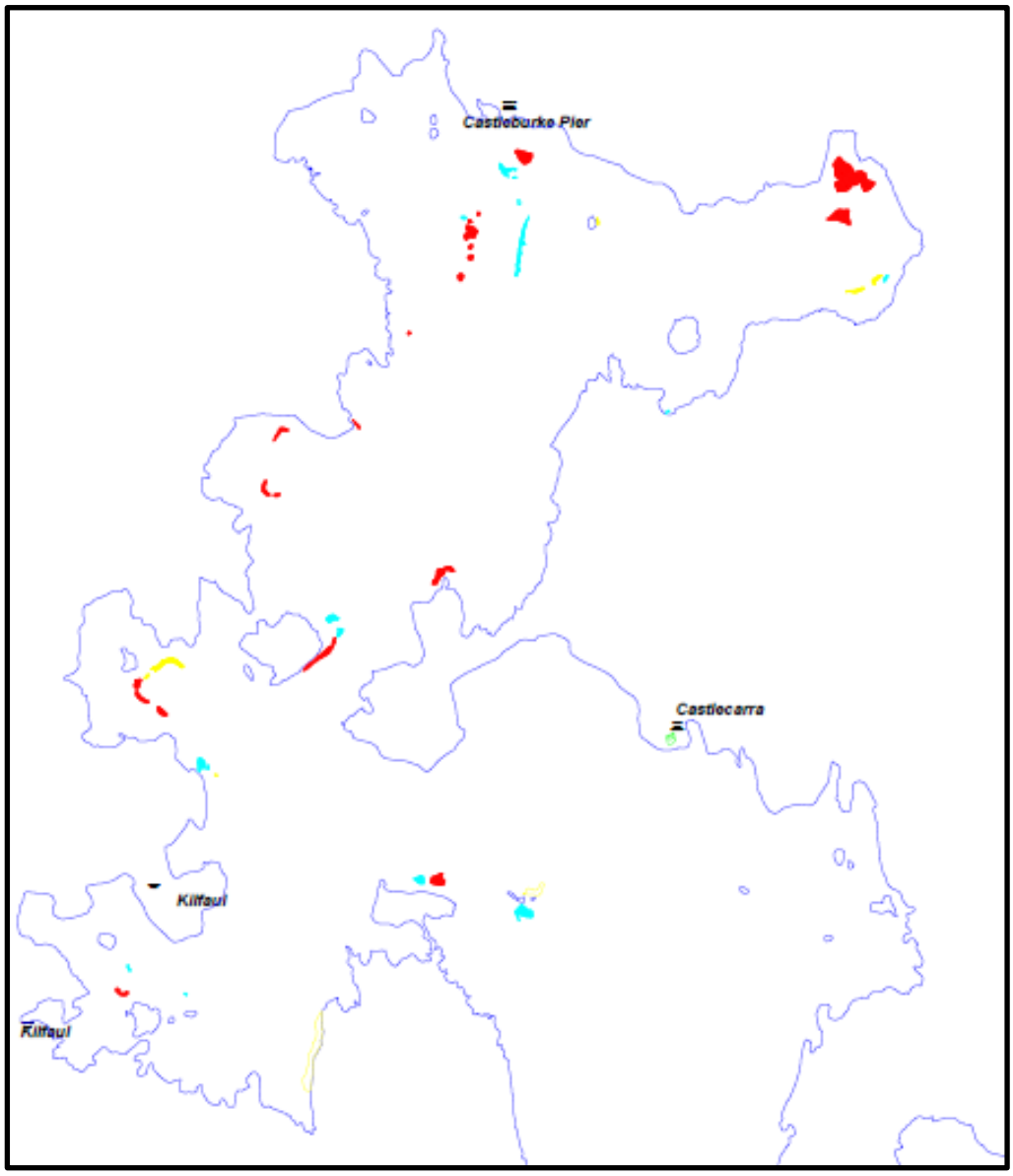

Figure 1. Map of the norther half of the NW basin showing the location, outline and relative density of the 47 stands that were mapped. Dense stands are in red, sparse stands in blue and very sparse stands in yellow (see Huxley, 2007, for illustrations of these arbitrary categories).

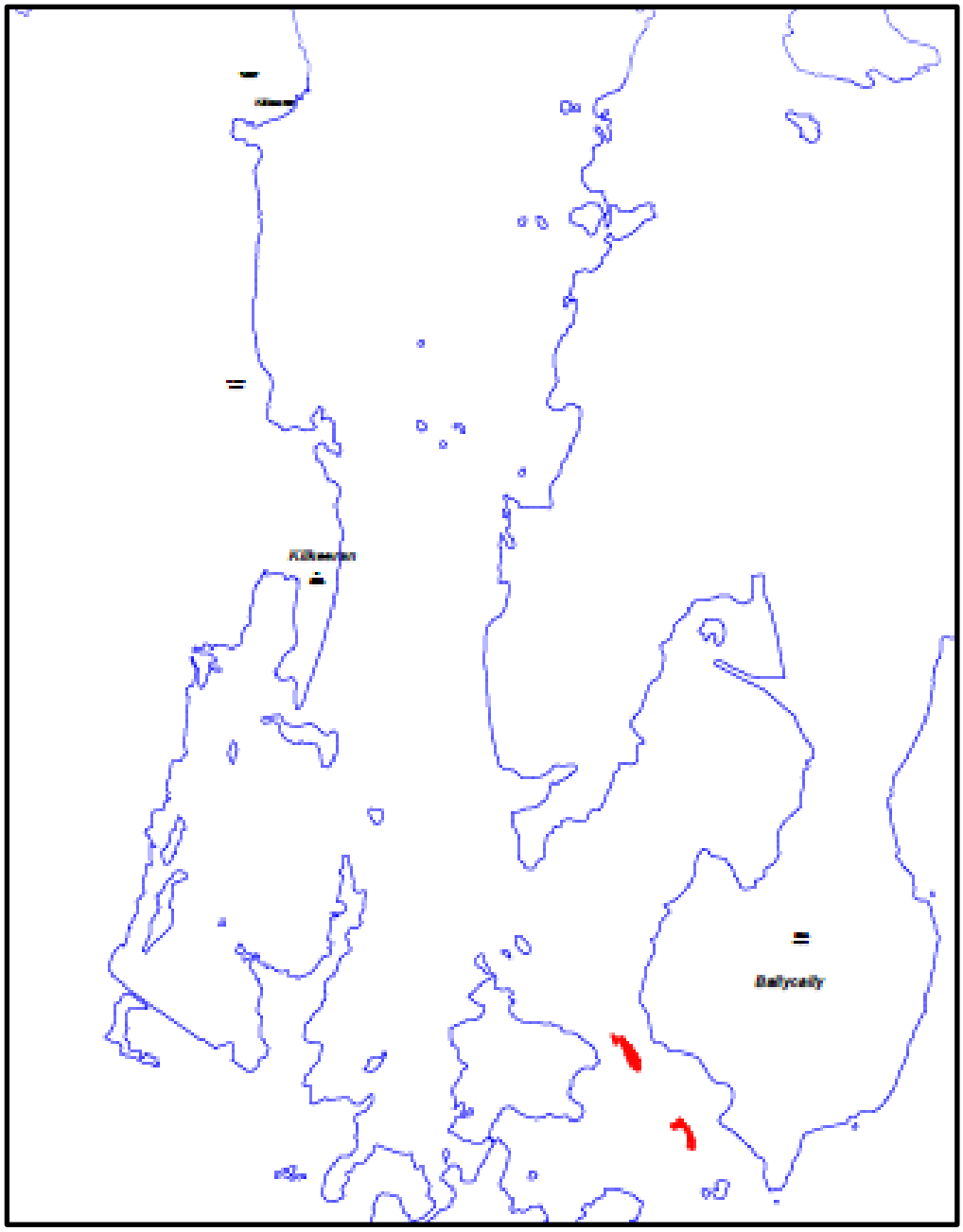

Figure 2. Map of the southern half of the NW basin showing the location, outline and relative density of the 47 stands that were mapped. Dense stands are in red, sparse stands in blue and very sparse stands in yellow (see Huxley, 2007, for illustrations of these arbitrary categories).

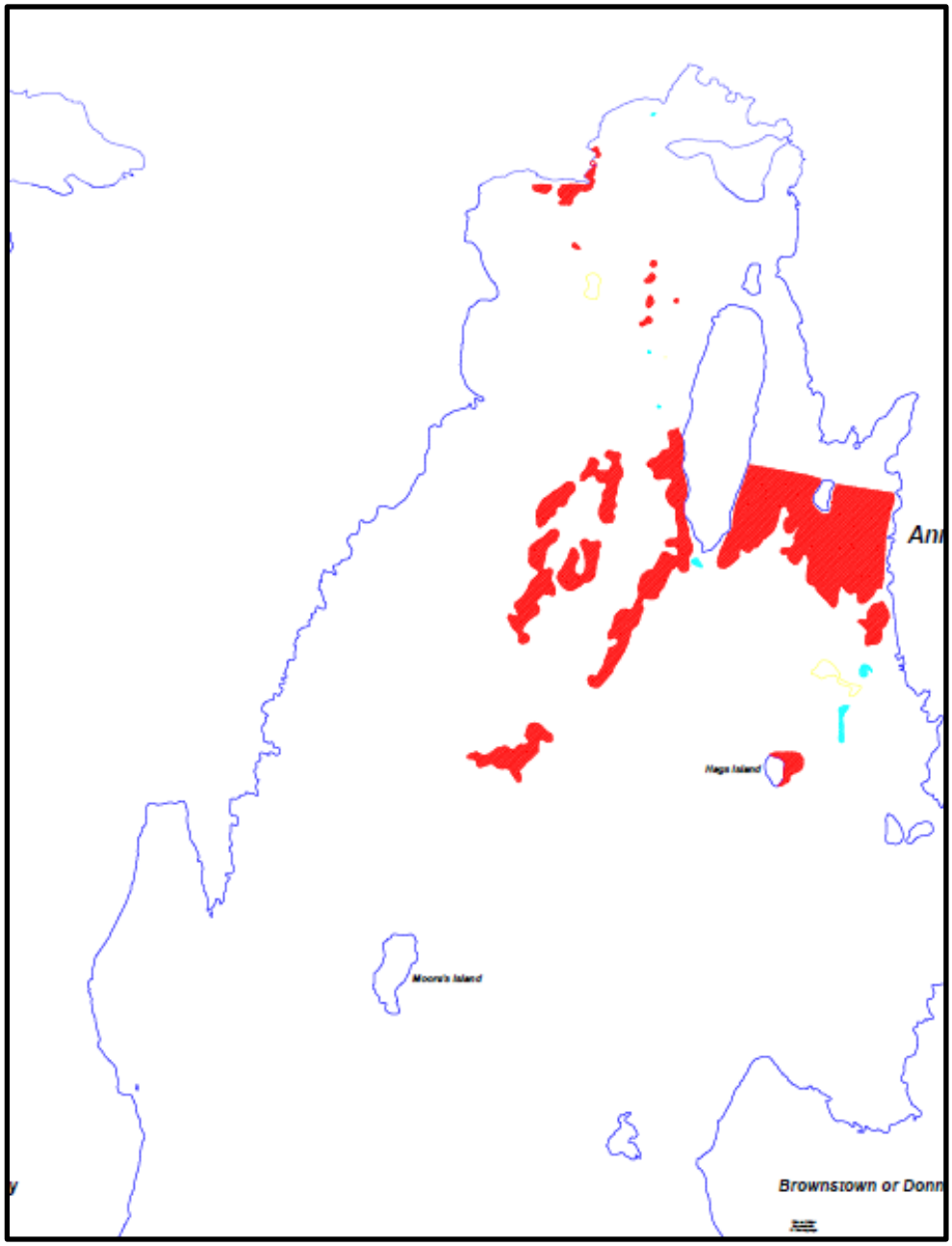

Figure 3. Map of the northernmost section of the SE basin. It should be noted that the northern limit of the bulrush stand at the mouth of Annies River was not mapped (it was not feasible to do this), so an arbitrary line was drawn across from East to West.

Discussion

Since 2007, there have been both losses and gains in the NW basin, with an overall slight increase in the number of stands. This suggests that the trend of range expansion noted in 2007 has continued, albeit at perhaps a reduced rate in comparison with the period 1975 to 2007. Notable in the changes recorded in this survey is the establishment of a new, dense and very large stand in the NE corner of Quinn's Bay and it is thought significant that this is where a stream enters the lough from the north. There has also been an enlargement of a very sparse stand near the mouth of the Portroyal stream. These observations support the hypothesis that the expansion and intensification of bulrush growth is linked to increased nutrients.

Similarly, in the north section of the SE basin, new stands have become established close to the inflow from the underwater spring just south of the Moorehall car park and the dense, well-established stand in the mouth of Annies River has expanded since 2007.

Conclusions

No baseline is yet available for the extent of any of the five main beds of *Myriophyllum*. The submerged vegetation survey carried out in 2023 may provide same data of relevance, but there is a need for the mapping of the five beds to be conducted in 2024.

A baseline has been established for the distribution and density of bulrushes in the NW basin. The data collected in this exercise have shown that, since 2007, there has been a small overall increase in the number of stands of bulrush in this basin and that some of the stands have increased in extent in that period. However, a small number of the stands recorded in 2007 have disappeared, so there appears to be some anomalous variation. The new data now provide the opportunity to monitor the extent of each stand and also the total extent of bulrushes in the NW basin. Repeating the survey at the end of the project, using equipment of equivalent precision and accuracy, will show any changes that have occurred in the interim. There will also be the opportunity for further repeats into the future as the AfterLIFE takes effect.

A baseline has also been established for the distribution and density of bulrushes in the northernmost section of the SE basin. However, the growth of bulrushes in the SE basin since 2007 has been such that mapping the extent of the stands has become impractical as a result of what were once discrete stands merging and an overall proliferation of growth. For this reason, a new methodology is recommended which would be based on recording the extent of the underwater form of bulrush in key areas, particularly at Moorehall, Annies River and the Cloondaver stream. Nonetheless, the data from this survey can be used as a baseline to record the extent of bulrushes in some stands, providing the possibility of measuring the same stands in the same way in the future.

No mapping of common reed *Phragmites australis* was carried out because of the extraordinary reed dieback observed in several areas over the last few years, for which there is no obvious cause. There is a need to investigate this phenomenon, although not necessarily as part of the LIFE project.

Overall, sufficient data have been collected to provide a monitoring baseline of emergent vegetation in the lough.

Chris Huxley 15/02/2024.

Annex 1

Monitoring the emergent vegetation of Lough Carra

A progress report - 31 August 2023

Introduction

With the failure to secure any realistic response to the invitation to tender for the work to set a baseline for the emergent vegetation, it was agreed that the work would be carried out "internally", i.e. within the LIFE Project using volunteers and equipment from LCCA and MayoCoCo. The work was planned for August/September and was to cover the recording and mapping of the bulrush stands and the five known major *Myriophyllum* beds. Methodology for the bulrush survey was to follow that used by me in 2007. This was proposed primarily so that the results would be more or less compatible and comparable with the 2007 results. In view of what is described below, it is important to recognise that the methodology was specified for that reason, and not because there had been any detailed discussion of any alternative methods.

The method used in 2007 provided a comparison with the results from Shackleton's surveys in the 1970s, all of which is available on the Lough Carra website.

The essence of the simple mapping technique is to drive a small, light boat around the outer edge of each stand of bulrush using a GPS to record the limits of the stand. The method requires a certain amount of subjective judgement as stands often have irregular edges and indentations and in 2007 this was managed thus:

"Since the outer boundary of a reedbed or bulrush stand is usually irregular and often heavily indented, judgements had to be made as to what constituted the edge. In general, if an indentation was greater in width than about 5 metres, the boat was guided into the indentation. If it was less than about 5 metres, the boat was driven across the indentation."

Mapping the *Myriophyllum*

This year, it will not be possible to map the five major beds of *Myriophyllum* because of the extraordinary conditions. The water levels in the lake have been and still are exceptionally high, such that, combined with poor water clarity, it is almost impossible to see the plant in the deeper water where the five beds are located. Despite knowing approximately where each large bed is, I have been able to locate only one (the easiest to find) and even then, it is not possible to see the outer edge of the bed because water clarity does not allow it.

Mapping the bulrushes

Peter Byrne and I have carried out two sessions so far, one at the northern part of the north-west basin (Quinn's Bay, Church Island, Heneghan's Bay area) and one at the northern part of the south-east basin (Moorehall, Annies area). The provisional results from the former show that there has been an expansion of some (or all?) of the previously recorded stands and an increase in the overall number of stands. However, there are two aspects that are of concern: firstly, it is apparent that the expansion of stands is leading to the amalgamation of stands, thus negating the importance of using the number of stands as a measure of proliferation and, secondly, we are now seeing the appearance of scattered and isolated very sparse stands which require the whole surface area of the lake to be searched carefully if they are to be recorded. As an example, since we carried out the survey in the north basin, I have discovered another

isolated, very sparse stand – just a few stems barely showing above the surface – which we missed in the survey, despite passing quite close to it.

Nevertheless, the data from the north basin is reasonably reliable and can probably be used as the baseline for the Project. There are a few areas remaining to be covered which we hope to be able to do in early September.

A much greater problem has arisen from the session we spent in the Moorehall and Annies area of the south east basin and, from casual observation of much of the rest of that basin the problem occurs throughout. As expected, the bulrushes have proliferated in that area, but to the extent that I do not believe that the methodology we are using is appropriate or useful now. What has happened is that the spread has been such that many previously discrete stands have, in effect, amalgamated and this, combined with appearance of apparently new, very sparse stands, makes it extremely difficult, if not impossible to map the stands in an objective and repeatable manner. It is difficult to describe the situation, but there seem to be stems popping up all over the place! This problem is exacerbated by the extraordinarily high water levels which make the new growth even more difficult to record as there are sometimes just a few inches of stems showing above the surface.

The purpose of this exercise is to provide a baseline, against which future changes can be measured. This requires that the method is objective and repeatable, and I do not believe that it is either of these.

By way of example: the size of the stand at the mouth of Annies River might be thought to be a useful measure. We have the boundary mapped in 2007, and we have now mapped it again. However, I am not confident that the boundary we mapped this year is "correct" because there are so many isolated stems spreading out into the lake that it is very difficult to decide where the stand ends. The judgement on this is very much a subjective one and, therefore, not repeatable with any degree of confidence.

The need for this method to be carried out in light winds (or no wind) is now even greater since finding isolated stems with only a few inches showing is more or less impossible in winds above force two or three.

Conclusion

I do not believe that the methodology is now fit for purpose. For the north west basin we will have the data using this method and I think that the changes there are such that repeating the exercise in four years time might be feasible and might allow comparisons. For the top end of the northeast basin we will also have data, but I have no confidence that the survey could be reliably repeated in the future.

If we are to monitor the proliferation of bulrushes in the lake, I believe we need a different methodology. I recommend that we make the best of what we have carried out so far and discuss how we might establish a better way of recording changes in bulrush distribution.

Chris Huxley
31/08/2023