

Protecting a rare Orchid occurring in Lough Allen

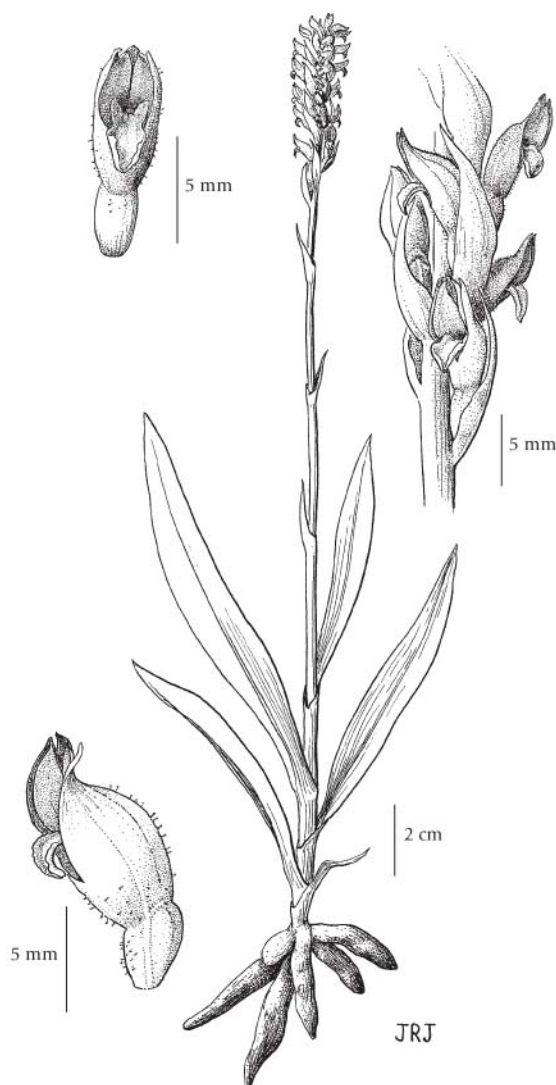
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Spiranthes romanzoffiana (Irish Lady's Tresses) is a rare orchid in Europe, though widespread in North America. Its presence in the Old World is restricted to Scotland and Ireland. In Ireland it is of unsure distribution but apparently declining. Lough Allen would now be one of its strongholds. However, it is under threat here from increasing onshore grazing. This promotional document is intended to manage this problem in a way that involves all parties and saves this listed plant from unintended harm. We would encourage you to fund this important work!

Fig. 1 Anatomy of *S. romanzoffiana*.
(Drawing is provided courtesy of WikiMedia.)



Spiranthes romanzoffia

Irish Lady's Tresses...

Shown here in anatomical detail.

This Project Gutenberg sketch shows the species in a way not many will know.

As a plant, protected in the Republic of Ireland by a Flora Protection Order, it can not be damaged or moved so knowledge of the root structure is slight — but interesting and relevant to conservation work.

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Protecting a rare Orchid occurring in Lough Allen

*This proposal is intended as a means of initiating protective measures for the very rare **Irish Lady's Tresses** found around Lough Allen. It is aimed primarily at local people who own land on the foreshore where this species is found, and seeks to present a picture of just how rare this plant is and also to share technical information with local people and local information with National and International Botanists*

I. Introduction.

This year, 2013, was a bit of a revelation for us at www.LoughAllenBasin.com For the first time a majority of Irish Lady's Tresses have been damaged after emerging in mid July. In previous years the numbers emerging varied greatly (for natural reasons) but on-shore grazing was not a major problem. The survival of the species seemed fairly sure based on the distribution and number of specimens and the survival rates of plants and flower heads. Production of seed has rarely been recorded in Ireland but these plants appearing in new places and re-emerging year after year testified to a viable and sustainable population.

Spiranthes romanzoffiana is a member of a group of orchids which are quite specialised. They occur in a very restricted range of habitats and are generally very local in their distribution. This particular species is even more unusual because of its unique distribution in the Palaearctic — that band of the world below the Arctic that traverses half the globe from the Bering Sea to the west coast of Ireland. *Spiranthes romanzoffiana* is now found only on the western fringe of that large zone, i.e. in Ireland and Scotland. This means that they can be very vulnerable to changes in their environment — be it a generalised pattern of changing climate or more specific local factors such as changing farming patterns and increased land use. Lough Allen is an important site in their survival.

Agriculture is the major occupation in the Lough Allen region. Conserving a small isolated species that survived the Ice Age on our small island may seem a marginal issue, but such an initiative may benefit many — both those who study Natural History and those who just appreciate living in a unique area with a distinct natural heritage. We intend to propose a way of achieving this conservation goal in a manner that will support farming and will involve farmers and landowners as the essential single participants in a national and international endeavour. There will be no loss of income and possibly a marginal gain. Also, as we have found out this year, there may be a significant visitor attraction through this work and in having this unique species thrive here.

Why protect?

Clearly, as ardent Naturalists, we would have specific reasons for wanting to see any endangered part of Lough Allen's biodiversity survive. Many such species would only be locally rare with healthy populations elsewhere in Ireland or Europe. In the case of *Spiranthes romanzoffiana*, it is a plant that is almost unknown in the 'Old World'. However, it is obvious that practical issues need to apply to what we do when considering projects that may impinge socially and economically on landowners around the Lake. There is a clear appreciation of nature and landscape among such people. Farmers take measures to avoid slurry spreading near streams or the lake shore. Similarly more people are becoming conscious of the possibility of effluent from domestic or commercial sources polluting the lake and are seeking to improve their waste handling facilities. This has led to a greatly improved water quality in 2013 as compared with other recent years.

The rare plants and animals living in Lough Allen are there because something in the soil or water meets their needs. As long as they survive, then the environment will remain unaltered. It's akin to Miners using Canaries and Water Treatment Plants using Trout to ensure safety and quality standards. More specific benefits of conservation and protecting the Irish Lady's Tresses are reviewed below.

Respect for Heritage.

Ireland as a nation places a huge value on tradition and links to the past. These relate to ancestors and to Irish language and music more so than to the natural environment. But there is always an association in the minds of older people with things they remember from their youth that are no longer with us, for example the Corncrake. Natural heritage is referred to in songs and words and Ireland, for its size, has produced many literary greats as well as noted scientists in the field of Natural History — Corry, Praeger, Parke and Webb spring to mind — many of these closely associated with Leitrim.

Their names are well known in Leitrim where they either lived or conducted many field studies.

T.H.Corry was a brilliant young botanist who spent some time in Sligo and Leitrim studying the plant life of Lough Allen and Lough Gill but who sadly drowned in a boating accident on Lough Gill in 1883. His name is still very much associated with Lough Allen. **Webb** and **Praeger** both discussed *Spiranthes romanzoffiana* extensively in their research.

To Sustain Biodiversity

LoughAllenBasin.com has listed a 'Dozen Spectacular Species' that form the core of the area's unique biodiversity. Biodiversity defines the natural wealth of an area — what makes a place worth travelling to see and explore. Lough Allen would not yet have the same draw as places like The Burren in Co. Clare or Bull Island in Co. Dublin but it has considerable potential.

If we sustain and enhance the biodiversity of an area not only can we draw committed wildlife enthusiasts from overseas but also provide the background for research and study among local people and by visiting scientists for whom the status of *Spiranthes* is now a major concern. In some of its remaining habitats in Ireland and Britain it is not being looked after well and in some of these areas it has now disappeared. By establishing unique and effective conservation measures for this species in the Lough Allen area we hope to sustain this interesting plant for further generations.

Apart from the rarity value (or the significant occurrence here) of these species, the factors that attract these particular plants and animals also suit many other commoner species. This means that people can go out and walk along our shores and see many attractive commoner plants and animals such as the Amphibious Bistort, Creeping Jenny, the amazing Shoreweed, other common and rare Orchid varieties, as well as the Mergansers, Sandpipers, Lapwings and Curlews. Not to mention the unusual fish, the Pollan — but this is harder to see!

Maintaining Beneficial Water Quality for us all.

In an area of exceptional natural beauty, the quality of an environment becomes more noticeable. The physical conditions in Lough Allen are very important for *Spiranthes romanzoffiana*. It is the reason why they are here and not in another lake! If a lake does not have a significant biodiversity then it will not have people coming to it for holidays or to study. It will, at best, be ignored and, at worst, used as a dumping ground. So the rare plants and animals help keep the environment clean for us Humans!

This section has been inserted because of concerns regarding seriously diminished water quality in Lough Allen over the past 5 years. There is no evidence that this pollution has had an impact on the *Spiranthes*. There are tenuous ways in which this could be true but to blame their decline (at a time when this seems global) on this factor alone would be unrealistic. But it is clear that many organisms have a very close relationship with their environment and small changes, that we may not notice, may lead to their disappearance in a place or even a country. By scouring the area for rare plants, birds, and other organisms, we inevitably come across instances of damage to the environment in the form of pollution (severe to minimal), mechanical changes to habitat, thoughtless use of either the shore or water, and natural changes due to altering weather and climate. The latter has had a profound effect on Lough Allen.

Two changes in the water resource can be discussed here. Firstly, it is generally conceded that a 'slow' process of eutrophication is taking place in Lough Allen. This basically means the lake is changing from a poorly nourished (oligotrophic) to a more normally enriched water body (mesotrophic). This may sound like an improvement but it does cause major problems wherever it happens. The reason for Lough

Allen's former oligotrophic status was that it is surrounded by much sandstone rocks and many moorland hills both of which produce an acidic run off. i.e. it is a standard western lake with little mineral resources and slow growing fish like the *ferox* Brown Trout for which it is famous. These conditions, apparently, suit the *Spiranthes* well as it is a plant — unusual among Orchids — that does not require alkaline (limestone) conditions. In fact, it is hardly found in such an environment. The process of enrichment is triggered when unusual amounts of nutrients enter a water body. This often means man-made changes and in the past 5 years this impact has been clearly evident in the form of persistent artificial-looking foam settling on shores around the lake. The situation is better this year and evident contamination is much less than in 2012. We believe the source is increased levels of detergent or other washing products entering the lake from 'new style' septic tanks or treatment plants.

Detergent contains phosphate and surfactant agents. The latter may be producing the foaming; the former could be enriching the water. This enrichment can mean there are more growth promoting elements in the water than naturally should be there. This leads to certain plants or bacteria reproducing rapidly which has led recently to a blue-green algal bloom in Lough Allen with serious impact on animals and children. This, thankfully, has lessened this year with no reports of skin irritation. The increased phosphate, for its part, could be a factor in causing lush and high growth of vegetation in silty shore areas which often have had minimal growth in the past and where *Spiranthes* used to thrive. Large deposits of foam have occurred in recent years on shores where *Spiranthes* are, or were, known to occur. Some of these are now overgrown?

Local and Community Benefit

The clearest benefit to people lies in maintaining our environment clean and wholesome for all to enjoy. Whatever tools we use in achieving this surely are worth while? Biodiversity is one such weapon. Biodiversity can yield other tangible benefits both in terms of livelihood and quality of life.

LoughAllenBasin.com was set up many years ago to publicise and promote the richness of the environment in this area. There is an EU scheme called **LIFE+ (Biodiversity)** which funds campaigns either to protect outstanding habitats (e.g The Burren) or species (e.g. returning the Bittern as a breeding bird in Britain). Initially we thought that such a scheme would be appropriate for Lough Allen and could be beneficial to the local economy.

Niche tourism, where people come from other parts of Ireland and abroad, is becoming more and more popular as people with varying interests and hobbies wish to visit areas where these interests can be whetted. These interests can include Photography, Botany, Geology, Wildlife — all of which can, with a bit of work, be catered for around Lough Allen. But in the case of Irish Lady's Tresses — which was the reason for a number of botanists to visit the Lough Allen area this year — we have to be sure that the plants continue to grow and prosper.

This 'environmental tourism' is just one example of how nature can benefit people. The Lough Allen area does not have enough traditional leisure or environmental resources to attract 'conventional' tourism. However, as this year has shown, specialist tourists will travel to follow their interest, be it photography or whatever. It is small business but it can grow — as long as we have *Spiranthes* here.

II. The Orchid: what are we protecting?

Spiranthes romanzoffiana is the scientific name of this plant; the name describes its spiral flower and acknowledges its 'patron'. We often refer to it simply as *Spiranthes*, though there are a few other species with the same generic name. The common name, Irish Lady's Tresses, is a bit of a mouthful and perhaps somewhat anthropomorphic for general use. The species was collected by a Russian scientist called Chamisso on the Aleutian Islands during an Expedition from 1815-1818, when Russia still governed Alaska. This expedition was organised by the then Russian Governor of Kamchatka, Nikolai Romanzoff and later, in 1828, it was named *Spiranthes romanzoffiana* (Chamisso) in honour of the Governor.

It appears that this was the first time this orchid was collected and catalogued in what is now the United States of America, though a Scottish Botanist called Drummond had discovered it in County Cork

in 1810! This botanist was the Curator of the Botanic Gardens in Cork and travelled widely throughout Cork and Kerry to study plants. He described *Spiranthes romanzoffiana* in great detail, and sent samples to other botanists to confirm that it was, in fact, a new species. However it was only in 1828, after the Romanzoff expedition, that the present classification and name was given to the plant discovered in Cork so many years earlier.

Description

Irish Lady's Tresses are members of a small tribe of Orchids known as the Cranichideae which includes two very rare groups. The genus *Spiranthes* contains just two species surviving in Britain and Ireland:

Spiranthes romanzoffiana, Irish Lady's Tresses, and

Spiranthes spiralis, Autumn Lady's Tresses.

Similar in appearance, both species are found in Ireland and Britain. *S. spiralis* is widespread in Europe. *S. romanzoffiana* does not occur there, but is found in North America.

Plants of this genus share a common spiral form to their flowering spike with several rows of flowers rotating in a gentle spiral for the 4 – 8 cm length of the flower. The generic name, *Spiranthes*, means 'spiral flowers'. They both also have a characteristic white flower with a distinctive ivory or green shade to it. They can be hard to see if small and growing in among grass but once seen are readily identified. In Ireland *Spiranthes romanzoffiana* always occurs on lake shores and we know of no record of it being found elsewhere. Very typically it also occurs in a narrow band at a defined water level, possibly where seeds settled after Autumn dispersal. So they often flower close to water or within a vertical height no more than 50 cm above normal Summer water levels.

They have tuberous roots — only seen where they have been flooded — and two or more large thin leaves originating from ground level — occasionally higher up — with two under developed spiky leaves off the stem just below the flower. They produce one flowering head and when two specimens are seen together this may represent either two individual orchids or one plant cloning off the other. All Orchids are Monocots. i.e. they have parallel venation in their leaves. Some Dicotyledonous plants may produce spiral flowers superficially resembling orchids but will have different leaves with lobes or branching veins.

Around Lough Allen plants are rarely more than 30 cms. high and often much smaller. In the first year we studied them, many fine specimens were found but specimens have been fewer and smaller ever since. For more details and pictures go to our website. (www.LoughAllenBasin.com/spiranthes.html). This may simply be a factor of changing Summer weather as these are late flowering plants and there is not much warm growing weather remaining in Autumn as the flowering season ends.

Biology

Despite their patchy and declining distribution in Ireland, much study has been undertaken and some understanding obtained as to how they survive and as to how they have such an isolated occurrence on the fringes of western Europe. Some of the salient features of their life cycle are reported here as it is crucial to protecting and conserving a marginal species. They need to be able to seed, or reproduce in some way, in order for the population to survive.

It is believed that *Spiranthes* have two basic ways of reproducing, by seed and vegetatively. The root of *Spiranthes romanzoffiana* (shown on Title page) is alternately described as a swollen root or as a tuber. References have been made to this being transported short or long distances, in one piece or fragmented, and being the source of new plants appearing in a new site.

Producing seed is, of course, a very much more effective way of dispersing the species. Orchid seeds are very light and easily carried by wind or by water. In 2008 many *Spiranthes* plants occurred in Mount Allen on the west side of Lough Allen. They have not occurred there since. That year many specimens were also recorded for the first time in the Derrintober or Corlough area on the east shore of Lough Allen. We observed that many of these specimens occurred within a very close height band above

the Summer water level. (Of course, depending on the slope of the shore this zone was horizontally at a greatly varying distance from the water.) The zone of emergence also followed curves and patterns like a flat shore with bays and ponds. It was very easy to hypothesise that this represented a point of deposition. i.e. seeds had come across L. Allen either by wind or water, had floated on the water, and had been left at the particular level where the water had been in a previous Autumn? Wind blown dispersion may have been the start with seeds quickly landing in the water and following the normal east to west and north to south movement of water in Lough Allen. Who knows...

Today, conditions are quite different. The seed source on the western shore has been missing for several years. There may be a potential source of seeds further west, Mayo, Roscommon? However, there has been a significant string of unusual Summers — Summers for which this species does not seem adapted. We are watching a surviving few plants as this report is drafted and, as shown in Fig. 2, they are not looking healthy or as if they have formed any seeds.

For seed production a fertile and genetically viable source is required, a means of fertilisation is needed, and time and suitable weather is required for the fertilised seeds to develop and mature — up to two months. As far as we can see, no seed is being set in the specimen photographed in Fig 2. Bees, Flies, and particularly Carder Bees, have often been seen on specimens during the flowering period. In some locations so few flowers blossomed that it may have been difficult for pollen to be transferred from one plant to another. However, in one area, Drumshanbo, there were up to 24 viable flowers in bloom near one another and for a reasonable length of time.

Unfortunately since August, though the weather remained fine for longer than we have come to expect, there has been some grazing of that area and periods of wet and cold weather have reduced the plants to a sorry state. It is a hit and miss game — just like the Mergansers in Lough Allen this year, where conditions were not good enough for them in the early part of the Summer and no young have been produced. So too it appears to have been a bit of a failure for *Spiranthes*; the one single action we can initiate to improve this is to limit grazing or trampling during the crucial flowering period.

History in Ireland

Spiranthes were first found in Ireland in 1810 in west Cork. Interestingly this was before they were classified in Russian Alaska. Their Irish name is Cúilín gaelach but no records of them exist before that date so that name is probably a modern invention? However there is genetic evidence that *Spiranthes* occurred in Ireland in ancient times and were not a relatively recent introduction or wind-blown invader from North America. The Irish specimens show differences in their genetic patterns that points to their being an isolated population in Ireland and Britain over a long period of time.

Webb, in dismissing the notion of introduction by Man, proposed that this species (and some others) are post-glacial relicts and that before the Ice Age a population co-existed in western Europe and America. They could have had a greater distribution in Europe, maybe akin to the present distribution of their cousin *Spiranthes spiralis*, before the last Ice Age. In the period 18,000 – 12,000 BC when the Arctic effectively moved south to cover much of Europe *Spiranthes romanzoffiana* could have been eliminated in continental Europe and pushed to the western margins where warmer coasts would have been maintained by the Gulf Stream. As the climate later warmed they would have spread across Ireland and Scotland but maybe never reaching Europe as Britain would have been isolated by then. Having been first identified in the Aleutian Islands off Russia and Alaska, this begs the question was this the land route that enabled them to travel from America to Asia and Europe in ancient times? Webb talks about amphiatlantic plants occurring on both sides of the Atlantic but also considers modern transfer across that ocean by Birds (or as seeds) to be unlikely?

It is an interesting debate but the historical record of them in Ireland only dates from 1810. Their status and distribution in Britain and Ireland since then has been poorly chronicled and at present it is still very hard to find clear records of their current occurrence. Many reports hark back a few years to locations where it is not definite they now occur. *S. romanzoffiana* has the ability to flower in good numbers one year and then disappear for many years before re-emerging again. The root seems to be able to survive underground for 10 years or more. It seems that some people assume that this is what is happening and that they are not slowly moving north and disappearing from our Islands? Several

recently published books still refer to them occurring in South West England where they have not been seen for years — and were assumed to be extinct?

Our knowledge of the definite occurrence of this species in **Ireland and Britain** prior to 2013 is listed below. (2013 data listed later on.) This list may be a very limited account as it is extremely difficult to get current and accurate data. Much printed information is now out of date. We have presented this data in a list form so it can easily be corrected and we hope it might be a basis for accurate assessment of the population particularly in Ireland.

Summary of historic distribution in Ireland:

1. The first specimen found in Ireland was obtained in 1810 in Castletownbere, Co. Cork
2. Records from Co. Armagh date from 1892, where Irish Lady's Tresses was first found on Brackagh Bog, near Portadown. Shortly after it was found in Lough Beg and on Lough Neagh and other sites.
3. *Spiranthes* was first found in Britain, on the island of Coll, Hebrides in 1921. It is now found on a few of the Hebridean Islands (Coll and Benbecula at least).and is said to be present in small numbers in a few sites on the Scottish mainland.
4. Lough Allen, Co. Leitrim, Ireland. First recorded in 2001 with peaks in 2008. (Records for subsequent years on LoughAllenBasin.com) (2013 = 36)
5. Lough Cullen, Co. Mayo. Good numbers in the past! (2013 = 12)
6. Levally Lough. Co Mayo. 2 in recent years (2013 = 1?)
7. Lough Corrib, Found in four sites up to 2005. (2013 = 3 on Doorus peninsula)
8. Lough Mask, Co. Mayo. One site known from 1970 until 2006 but absent in 2013
9. Lough Conn. Three sites with 380 specimens in 2004
10. Caragh Lake, Co. Kerry. Reported present in 1978.

[WE WILL UPDATE THIS LIST AT ANY TIME GIVEN CONFIRMED RECORDS.]

Irish Distribution in 2013

Much regarding distribution of this species has been covered in the section dealing with the history of this plant in this country. Distribution and history, inevitably, seem to get mixed up. With a changing distribution the 'here and now' is very important. Many people, for very understandable reasons, like to hark back to the past. For conservation purposes we need to record change and always have a current (i.e. 2013/14) understanding of where this species occurs and in what numbers. (It would be ideal if there was one person resident locally to record each site and file returns regularly.) *Spiranthes* can't live in the past — though it can survive underground for many years. As far as we know this species is extinct in England, marginal in Scotland, but thriving on some Scottish Islands.

Summary of distribution of *S. romanzoffiana* in Ireland in 2013

1. Lough Allen, Co. Leitrim. 36 specimens in 4 small sites were recorded in 2013, mainly along the eastern shore of the Lake. All sites have been visited several times, photographed, and their positions recorded.
2. Lough Cullen, Co. Mayo 12 flowering in 2013 but another cluster of similar size present in 2012 has been excavated!
3. Levally Lough, off L. Conn, Co. Mayo. Just 1 found this year.
4. Lough Corrib. 3 specimens kindly brought to our attention by a resident on the Doorus peninsula.
5. Lough Beg/Lough Neagh, Northern Ireland. Reports of good numbers from the RSPB, Lough Beg.
6. Lough Mask, Galway/Mayo. NONE present at Ferry Bridge.

If anyone can add confirmed records to the 2013 list please do let us know. If our concerns about a declining population are true that strengthens the need for immediate conservation measures; if we are substantially wrong in this overview then that is good news for the plant!

We passionately wish to see *Spiranthes* surviving in Lough Allen and other parts of Ireland. Not enough attention is given to this work and yet the reasons for doing it are fundamental and inspiring. This plant adds a touch of uniqueness to our place — making Lough Allen still more special! The confirmed recorded number of plants in this Island could be no more than a couple of hundred. That is a stark figure! It is likely that there are more *Spiranthes* occurring in remote areas so far not discovered. It is probably impossible that there is such a distribution on such a large scale as to ensure the standing of the species in Ireland is secure? Maybe we will be proved wrong in future years — let's hope so?

World Distribution

This is largely a North American species. It has always been so. Its occurrence in the British Isles has been a curious anomaly. Distribution in America and Canada is widespread and, apparently, not of much concern. It is found from Alaska across Canada and northern United States to the east coast and from Washington down to California, and inland to Arizona and Mexico. The local habitat includes open moist meadows, bogs, open wooded areas, dry woods, sandy and gravelly beaches and stream sides — sometimes seen at altitudes of up to 1000 metres! In addition they are found on Unalaska Island and also on the eastern and central Aleutian Islands (all part of the USA) It has a significant base in the Nearctic — that band south of the Arctic in the New World.

Particular Conservation issues in its Life Cycle

To ensure the future of this species we need to put in place those measures that it needs to grow and expand its population — these will be 'conservation measures'. Other vital ingredients in their survival that we cannot control may affect the impact and the very achievement of our goal. The main concerning issue here is global weather patterns and the apparent changes we see locally. However, even though these may be global it may well be possible to improve (in some way) the conditions under which *Spiranthes* grows in this locality.

Survival and Weather

Funnily enough, there is something that we may be able to do about this but probably don't need to do. Lough Allen has shown a pattern of heavy rainfalls at the end of the Summer (August) and this has led to high water levels which have flooded the ground *Spiranthes* needs to grow on. At one stage this seemed as if it was the delimiting factor in plant survival and reproduction. However, over the 6 years of work by LoughAllenBasin.com, taking an overview, it has not been a major issue. A viable population, setting seed, will adapt to changing shore height by gradually moving up the shore. As discussed earlier, the pattern of distribution of plants in 2008 seemed to reflect a former shoreline years previously when the seeds were deposited. Many of the plants now being found still occur at this position but an interesting cluster was found this year significantly higher up. This new colony is above the 'high water' level and seems secure from flooding but not (yet) from grazing.

Pollution

Another declining worry. In the past few years we have been concerned about foam landing on orchid shores and possibly fertilising the vegetation in such localities so that growth is high and inhibits the *Spiranthes* emerging late in the season. This concern is much less visible this Summer (2013) though still present at a low level and needing to be watched. Significant eutrophication is not in the interest of Lough Allen or of the *Spiranthes* but, with careful management and monitoring, a lake the size of Lough Allen should remain clean.

Suitable Shoreline

Spiranthes needs a suitable sometimes flooded, well grazed shore line with the right mix of sand, stones and soil. It is a plant of poor ground and the rocky or sandy or Alder covered areas of Lough Allen seem to suit it well. Bulldozing these shores is definitely a negative factor. *Spiranthes*, because of the way it is distributed, needs a modest width of shoreline. In some places the band between the water and trees is too narrow or steep for the plants to occur. In many places, the shore is wide and gently sloping and ideal for this species. Many records are also from a south west facing shore as the plant seems to appreciate the late Summer sun. Shoreline chemistry can be slightly acid unlike the limy substrate favoured by many other orchid species. Again, with its mixture of sandstone and shale rocks around most of the shore and its hinterland, Lough Allen seems to provide the ideal environment for the species. That is probably why they are here and not common in limestone lakes further south.

Flowering.

The first thing most people see of *Spiranthes* is its cheerful creamy spike in mid July. It is almost impossible to spot this plant before the buds appear and we have never in six years of study recorded a non-flowering specimen? We would have expected to see such specimens in places with a fairly clear

shore and where we have intensively searched in among flowering specimens. Emerging and flowering occurs very rapidly. Flowers may remain in a fresh state for up to three weeks gradually shrivelling from the bottom up. Flower size is generally small to medium around Lough Allen with occasional magnificent specimens being found with flower heights of 7 – 8 cm. One keen botanist who visits the area is always asking... 'are there any good specimens?'



Fig 2. Late specimen. Are seeds setting? (29/09/13)

Pollination

Bees and other pollinators do attend *Spiranthes* whenever they are attractive enough. This Summer visiting Czech botanists brought our attention to the light sweet smell these plants emit when mature and especially on a hot day. Nothing like as strong as the Fragrant Orchid but probably a way of attracting and rewarding fertilising insects. Species seen visiting *Spiranthes* include Bumble Bees, Carder Bees and certain flies.

Seed setting

Four plants survive at the time of writing (Sept. 2013) and in one the ovary shows some swelling. The setting of seed is a major issue for Irish and Scottish botanists. We feel that *Spiranthes* is struggling with the weather — though this may be the old attitude of thinking our late Summers were hotter when we were young! Typical conditions can be warm and encouraging to growth at the time of the year when *Spiranthes* start to emerge. In all recent years the change to Autumn in early September has been palpable. The mature and decaying flowers seem less hardy and appear to stop growing. Bees and insects are not flying or in very reduced numbers. By this stage pollination would need to have occurred, but the plants still need a growing season to allow fertilised seeds to set, to produce growth for next year, and to store the necessary resources in their roots.

In Lough Allen in the years we have studied the plant, the specimens seem to go into decline just right at the end of the flowering period. However, four plants are being watched and we will update this space should any conclusive results be obtained... UPDATE: Flowers have now withered but all 4 specimens have healthy lateral buds which are strong and green and lasting into the Winter. (Nov. 5th.)

Seed dispersal and germination

There are widespread reports of seed not forming on this species whilst they readily form in *Spiranthes spiralis* — an even later flowering species. But *S. spiralis* is the *Spiranthes* that survived in Europe, is smaller, and has remarkably different growth requirements.

However, the scene of the crime clearly implies that *Spiranthes romanzoffiana* does set seed, and in vast amounts under certain conditions. Orchid seed is very fine and can be wind blown over great distances. We believe the shore-following pattern of occurrence at the southern end of Lough Allen predicates a source of seed to the west that lands on the water and then gets washed ashore at what ever height the lake is at in, or around, October. The obvious (though possibly temporary) change in Autumn weather around Lough Allen may mean a decline in that available seed stock or, indeed, a

complete loss of it. If viable seeds do enter the substrate they take very many years to produce emergent plants. They form a symbiotic association with mycorrhiza (soil root-like fungi) that provides the Orchids with food to develop a tuber that will initiate flowering in the long term.

Mycorrhiza

Mycorrhizae are root like fungi that often are associated with higher plants. They seem to allow such flowering plants to survive in nutrient poor areas or in other situations where the plant can not survive on their own. The fungal hyphae provide nutrients to the plant. Such a relationship is essential to the presence of *Spiranthes* in Lough Allen. It is interesting that Alder trees have a similar nutrient fixing regime that enables them to survive in very bleak conditions around L. Allen. (In the case of Alders the symbiotic relationship is with a nitrogen fixing bacteria.) Also *Anabaena spp.* (a 'blue-green algal' species) has specialised cells which (in a similar manner) provide Nitrogen to the rest of the colony.

It is essential, therefore, that any *Spiranthes* seeds landing on Lough Allen shores can enter the substrate and form an association with mycorrhizae. It is not known if this is a specific species of fungus or whether an association can be formed between the orchid and a group of mycorrhizae spp. However, we have no reason to believe this is an issue for *Spiranthes* in this area. It is an issue for people growing orchids but it is important to note that this species is strictly protected and it is both futile and illegal to remove any specimens from the wild.

Lateral Buds

After flowering, in ideal conditions, *Spiranthes* will go on to form lateral buds at the base of the stem which is a preparation for the plants growth in the following year. Our careful marked specimens are now undergoing this process.

Twin lateral buds emerging from Spiranthes root beside this years flowering stalk



III. Outline of proposed Conservation Strategy.

The distribution of this species around Lough Allen has been highly variable in the 6 years they have been intensively monitored, with an overall tendency to move (within the lake) in a northerly and easterly direction, though there have been years when this has been reversed? This behaviour reflects the behaviour of this Orchid in Ireland and in America.

A Progressive Approach.

We are proposing a step by step approach. If a successful pilot program can be established in one location it can then readily be extended to other areas, either known locations or locations that seem suitable for *Spiranthes*. Fortunately landowners in all sites indicated are supportive of our record keeping and willingly provide us with access to the sites. We hope to build on this good will over the years.

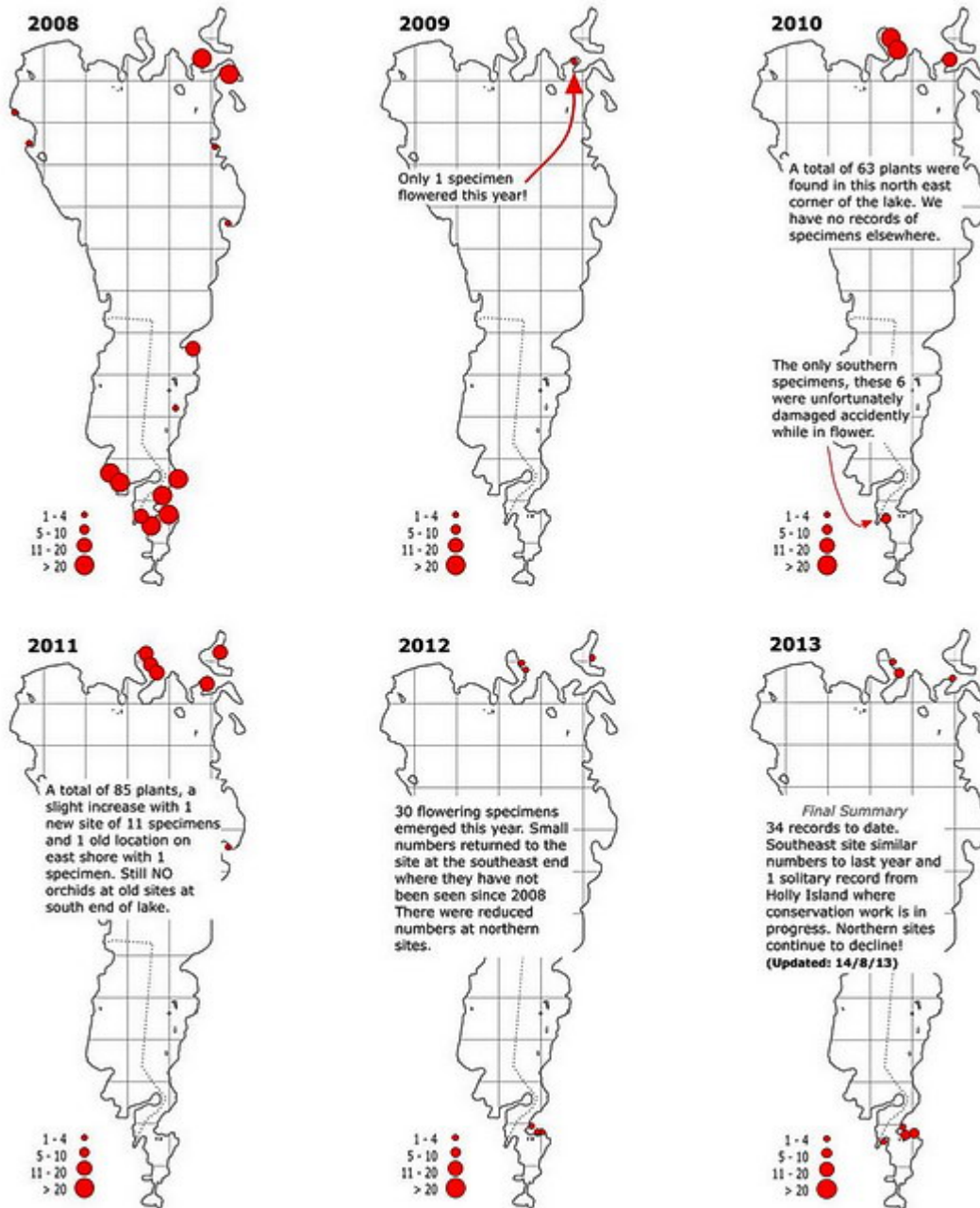
For this proposal, and for planned conservation work in 2014, we are concentrating on one particular site at the south end of the lake where the species was most successful in 2013. With reference to the six Distribution Maps (below), and having regard to this year's experience, this seems to be the area most likely to produce good results next year. This site is defined in Addendum I.

Co-Funding.

It will be necessary to provide funding for this work. The work entailed is outlined in the ways and means section below and, in more detail, in an Addendum to this document outlining technical details for the first Conservation Area in agreement and consultation with the landowner. LoughAllenBasin.com supports the idea of farmers receiving payment for any work done and for loss of use of the land during

the 'Spiranthes season', c. 3 months of Summer. Also, we cannot personally fund much of this work. But our labour is free and we can prepare cases and submissions to partners who might be willing to come on board. For this specific initiative we would be very pleased to secure local funding, as well as National funding, which is in harmony with the specific conservation goals.

Fig 3. Lough Allen Distribution of *Spiranthes romanzoffiana* over the past six years.



Community Partnerships.

The various essential contributors to successfully implementing a conservation policy are listed below. It must be reiterated that there are no guarantees in this work and that to be valuable it needs to be tried for at least 5 years and then sustained should it prove successful. This will imply that yearly funding will have to be kept small. No one will profit from this work — except the plants and the community. But neither should any well-meaning supporter be out of pocket or disadvantaged. No one can afford that in present circumstances!

Local Observers.

This work is a voluntary commitment and there are many local and non-local people who have a passionate interest in keeping this unique plant alive in our area. It would be profoundly depressing if we lost this battle. 'What would we do if the *Spiranthes* ever died out?' Thankfully there are many other mad naturalists that share this worry!

Local Landowners.

Farmers and other landowners on the shores of Lough Allen will be the clear leaders in this work. This report has been prepared in response to one landowner and will be the subject of negotiations and discussions between us over the Winter. We believe these discussions will go well and, if we can get all the necessary requirements in place, then at least one important *Spiranthes* area will be effectively conserved in 2014. The contribution farmers will make will be in...

1. Grazing their land in the usual manner for most of the year.
2. Keeping the area defined clear of stock from mid July to October (period may vary)
3. Fencing off the area securely but in a way that will facilitate grazing for most of the year.
4. Working with partners to ensure as much as possible that *Spiranthes* within the protected zone are not damaged by others or by accident.

All of the above elements do not have to be undertaken by the farmer but, in many ways, they would be the ideal people to undertake this process as effectively as possible. The cost of loss of grazing and the groundwork needed should be covered by other partners in the Conservation Project.

If preferred, by the owners of the land, outside contractors can be taken on but they will need to be carefully advised as land in these zones is very delicate, species rich, and prone to compaction and other damage. Some people working on the shore may not be familiar with the many conservation issues involved. Certain specific tasks would be best done by totally keeping heavy machinery off the shore and relying on mechanical equipment only where absolutely necessary for fencing and cutting.

Owners of the shore.

It is not clear who owns the shore — that area of the shoreline between high and low water levels. This, depending on how it is measured, is a critical zone for *Spiranthes*. The Foreshore Act does not apply to inland lakes and specifies known and predictable areas of marine shore below high tide. Water levels (and consequent foreshore area) are much less predictable in Lough Allen. The ESB own the fishing rights on the entire Shannon system, including Lough Allen, and also operate the Ballintra Sluices (part of the Ardnacrusha hydroelectric scheme) where the Shannon exits Lough Allen. Local people refer to lands as 'ESB lands' but it is not clear if areas where they control fishing rights are actually owned by the ESB. They may be 'State Lands'? Either way, it would be a great help to us if the ESB, because of its connection with the area, would contribute to funding this part of environmental conservation as well. It would, in a sense, discharge their responsibility to this species under the Flora Protection Order.

The National Botanic Gardens.

We have already had considerable advice from the **Botanic Gardens** in preparing this 'LoughAllenBasin proposal' and hope to get their further assistance as to how to best manage a project like this from a botanical point of view. The conservation of *Spiranthes romanzoffiana* is a major interest not just for local people, but also for Ireland as a whole, and this plant also has a status as an endangered species within Europe, i.e. only found in Ireland and Britain. Ireland has an international responsibility to protect this species. We will adopt and adapt all best advice, both local and national, that we can get to make this endeavour as good as it can be for the people of the area and for the *Spiranthes*. The Irish Orchid specialist in the Botanic Gardens has told us that he... "is very supportive of active conservation projects" and assured us of "his best wishes for the successful implementation of this project."

National Parks & Wildlife Service.

National Parks and Wildlife Service may be able to help in allocating funding even in these straitened times. We very much appreciate the liaison we have enjoyed from the NPWS who have reviewed an early draft of this document and provided much salient advice and supportive comments.

They regard this as a 'good project' and reckon it could be very useful. This is a Wildlife Act protected species and the NPWS and Local Authorities would both have responsibilities in this area. We have obtained a licence under the terms of the Wildlife Act to enable us to undertake the necessary site conservation activities. The outline of this project has been supported. Lough Allen is not a designated conservation site but, as we have been reminded, *Spiranthes romanzoffiana* is a species completely protected by the Flora Protection Order.

Flora Protection Orders.

The Flora (Protection) Order, 1999, under the Wildlife Act of 1976, has as its goal the protection of a list of rare and endangered plants through providing a legal ban on damaging, removing, or interfering with, species like *Spiranthes*. We have never seen anyone knowingly harm or remove *Spiranthes* around Lough Allen. It may have occurred in the past. However, there have been instances where plants have been destroyed when the landowners were unaware of their presence on their land. In such circumstances the landowners have always responded positively when informed of the situation.

Fishermen have in the past driven along the shore at Holly Island on the west side of Lough Allen, exactly where *Spiranthes* occurred in 2008. There has been a generous car Park provided away from the shore and a barrier erected at the entrance to the shore. Occasionally we have seen cars going through that barrier when it was left unlocked. This is regrettable and is probably just a matter of further education. However, this area is no longer a valuable *Spiranthes* site though it might be brought back in future years if issues there can be resolved.

No such issues relate to the pilot Conservation Area that is the subject of this proposal. Here the twin needs are more grazing for most of the year to provide a low sward by the middle of July, followed by a period of 3 – 4 months when animals are excluded. Accidental grazing of *Spiranthes* by livestock is not covered by the Flora Protection Order. Details, location and critical zones required to effectively protect this particular area north of Drumshanbo are included in Addendum A. (This may not be attached to this copy.)

Ways and means of Implementing a Conservation effort.

As far as we know, no *on-the-ground* conservation process has been put in place in Ireland to date. Up to this year it looked as if a *laissez faire* policy might be the wisest and the best. However, with increasing grazing, and other, pressures on Lough Allen, it does seem advisable at this time to try and ensure that whatever plants do emerge can flower and mature without any disturbance. Here we must insert a careful and rational reminder. Even with the best will in the world and even with the utmost commitment from all involved, even with kind and suitable weather and water levels, there is a real possibility that we may not succeed in maintaining a population of these orchids in this place. They have died out in England, they are retreating from the Scottish mainland, and they never occurred anywhere else in the Palaearctic!

Positive and Hopeful.

To lose them would be a shame, and we aim to proceed diligently and with hope. Certainly, we can control the inadvertent damage to this species and we can also guarantee the best turf height and growing conditions for these plants at the time they emerge. The rest is left to nature, chance, and our changing environment!

Methodology

Briefly, a Conservation Project for *Spiranthes romanzoffiana* can be organised in a number of ways. For confidentiality a specific proposal will be drawn up for individual areas and individual landowners. Only one Conservation Area is envisaged for 2014. This will act as a pilot project where the various environmental, social and economic factors can be tried out. A specific memorandum will be prepared and submitted with this proposal as a means to completing an understanding. Hopefully further expansion of this scheme could be applied to other areas of the lake where *Spiranthes* either occurred this year or have been recorded in previous years and may return if the conditions are suitable. *Spiranthes* could possibly be protected individually after they emerge. But this would require great alertness at the start of the flowering season and cages needed could be both disruptive to fertilisation of

the plants and harmful to grazing animals left in the area. The workload would be continuous every year and this would be both more expensive to apply and more disruptive to both farmers and the plants we wish to conserve.

Instead a permanent fenced off zone with gate(s) seems an easier option. Furthermore, only one side of the zone may need fencing as it will almost always be a line parallel to the waterline and a varying distance up the shore depending on the slope of the site. This distance varies greatly from place to place around the lake as the habitat and topography of all the places *Spiranthes* has occurred in Lough Allen vary quite considerably. However, in the first Conservation Area we are considering (an area north of Drumshanbo indicated by 3 red dots on the 2013 distribution map shown in Fig. 3 above), there is a large area of wet foreshore or slightly raised rushy meadow of varying width leading to a steeper bank with gorse and Alders, above which the ground is drier with good grass. This natural demarcation will probably define the landward edge of the Conservation Zone. Fencing of the zones will consist of two fences running into the lake perpendicular to the shore and a fence parallel to the shore linking these two fences.

Zone Construction

In the first Conservation Area there could be two quite distinct zones that would justify protection, one large and one much smaller. The larger one, or both, could be attempted in 2014. Both will require stock proof fencing extending out into the lake for a considerable distance. It would be a mistake to underestimate the distance the water may withdraw to in dry weather and to establish an inadequate fence that might allow stock to get by. Using a fence on three sides will eliminate the need for a long rather unsightly fence in the water below the normal Summer waterline. However the practicalities of both approaches is probably something best agreed in discussion with landowners and other authorities.

All the shore can be grazed up to the middle of July and it is essential that the area within the fences should be grazed to a low sward at this time. A simple method to achieve this is to place gates in each enclosure and just leave these gates open for most of the year so stock can freely roam. Then, in mid July these gates are closed and all stock excluded from the enclosures. The amount of land will not be great but it is important that fencing be secure as land ungrazed after a couple of months will look very attractive to livestock. Also fencing will need to be strong and well designed as some of the ground in these areas is quite muddy.

Precise location of all plants worth protecting is known and this can be plotted onto a map and appropriate fencing layout designed and installed. We would advocate very light machinery working and only outside the perimeter of the proposed enclosures as leaves and tubers of *Spiranthes* may persist near the surface of the soil. No work needs to be done on the site urgently. Spring may be the best time for implementing such works. Hopefully a full plan and agreement will be in place by then and low Spring/early Summer water levels may facilitate installation and establishment of the Conservation Zones.

Particular details of areas and the size of zones for the first Conservation Area are being prepared and will be attached to this report when ready (as an Addendum). Hopefully, in later years and with further support from local communities, more areas can be established. It seems prudent to plan and prepare this work with a 5 year initial test programme in mind. These plants are well known to disappear on a whim only to return several years later.

Conclusion

This report is prepared with all good will. We, for our part, will undertake any agreement we enter into, and will advocate a fair deal for all helping in this conservation endeavour. We hope that funding will be available for next year and will work to achieve this as well as completing and refining our understanding of the needs of this unique plant and the practicalities and methods of its conservation.

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