



BALLYDRIBEEEN RESIDENTS ASSOCIATION

BIODIVERSITY ACTION PLAN
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Killarney National Park and its surrounding environs are famed for its rivers and lakes, the latter taking up approximately one quarter of the surface area of the park, (NPWS, 2005). The three largest and best well-known lakes within the park are Lough Leane, Muckross Lake and the Upper Lake. Alongside their scenic value, the lakes of Killarney are vitally important from a conservation perspective as they contain numerous species of fish, including five Annex II type species. One such species is the Killarney Shad, (*Alosa fallax killarnensis*), which is unique to Ireland, occurring only in Lough Leane, (NPWS 2019). Combined, the lakes and watercourses within the park, and the hydrological connections stemming from them, are vitally important for the above species, as well as supporting other threatened species such as the Freshwater Pearl Mussel, (*Margaritifera margaritifera*), the Caragh River supporting a nationally important population.

1.3 Project Outline

The River Deenagh is subject to littering, dumping and overgrown banksides. This initiative hopes to reduce and eliminate dumping along the river corridor by promoting the amenity and biodiversity value of the river, by making it a local amenity with benches for all ages in the community to enjoy, in the hope of further enhancing the spirit of stewardship of the river by the local community.

This project aims to enhance the knowledge of conservation of biodiversity in the area, and provide the skills to protect the wider environment. A botanical inventory of the surrounding landscape and an inventory of the aquatic invertebrate groups present in the Deenagh River was carried out. By enhancing local biodiversity in the Deenagh River, the community will monitor local wildlife numbers and will involve local members of the community in biodiversity recording initiatives.

Community engagement will require education and awareness campaigns to deliver the right message in the right way. Results and lessons learnt from other projects and initiatives with a connection to water will also be an advantage going forward. The committee will develop an action plan, which will contain the steps needed to be taken and implemented for this process going forward. This will involve strategic planning and direction for the action plan and the community propose to hold educational days for schools and community organisations to further develop the sense of responsibility amongst the town to protect and develop the river Deenagh in their area of the town.

2 Ecological Survey

The report structure, surveying and habitat mapping will follow the Best Practice Guidance for Habitat Survey and Mapping (Smith *et al*, 2011) and the standard classification of habitats developed by the Heritage Council (Fossitt, J.A 2000). The species nomenclatures follow Webb *et al*. ('An Irish Flora', 1996).

For the field survey Orthophotography was used as the base map for annotation in the field. These already provided a good indication of habitats and features on the ground including information extracted from the OSI historic maps on land formation and management practices. The survey identified habitats on the ground and mapped according to Fossitt (2000) Level 3 classification. Each habitat polygon and linear feature was mapped and recorded with a unique habitat number corresponding to a note on field data sheets. Field notes relating to various aspects of site topography, vegetation composition and management etc. were written at all sites, with a view to providing information for evaluation. The field notes typically included information on the site flora, including scrub species, mosses and lichens, and management issues such locations of pedestrian and vehicle access roads and tracks.

The site was surveyed by walking over the site to classify the extent and condition of habitats on site and note any species of importance. Habitats were classified according to 'A Guide to Habitats in Ireland', JA Fossitt, published by the Heritage Council, 2000.

Habitats classified:

1. Broadleaved Woodland WD1
2. Scattered Trees and Parkland WD5
3. Eroding River FW1

A habitat map is presented in Figure 2 which overviews the habitats present within the survey area. Each of the habitats referenced are described in further detail below. Habitats were classified using FOSSIT 2000. (Julie A. Fossitt, 2000).

Figure 2 Habitat Map



Broadleaved Woodland (WD1)

Broadleaved woodland was the habitat types that covered the largest expanse within the survey area. The canopy was dominated by species Ash and Sycamore, with Alder and Beech also occasionally present in the canopy. In the understory, the most frequently recorded species were Hazel, Hawthorn and Holly. The ground layer varied depending on the degree of wetness and light availability. In less tramped areas that were dry and shady, Ivy and Bramble tended to dominate with occasional herbs such as Wood avens. A rich spring flora was also observed and included species such as Lords-and-ladies, Bluebell, Sanicle and Pignut, all of which were for the most part frequent with other species such as Primrose, Lesser Celandine occurring sparingly. In damper areas and along the banks of the river, Hemlock Water-dropwort was abundant, along with frequent patches of Wild Garlic. The invasive Three-cornered Leek was also noted on the riverbank, but only at one location (shown in Figure 4). Grazing pressure within the woodland appeared to be very low, with few signs of grazing observed. Regeneration of both native and non-native tree species was observed regularly, especially of the non-native Sycamore which was profusely regenerating in some places. Due to the high abundance of non-native trees, the woodland cannot be classified as native woodland, however the

woodland otherwise closely aligns with Oak-ash-hazel woodland, a native woodland type that tends to occur over limestone soils and is species-rich, often with a rich spring flora.

Photo 1 WD1 Along the Watercourse



Scatter trees and parkland (WD5)

Lime Trees were scattered along the verge, bordering the pavement. The grass sward was mixed and appeared to be mown regularly. A variety of grass were recorded within the habitat including Yorkshire Fog, Perennial Rye-grass, Couch Grass and Bent Grasses. Herb species were dominated by a handful of species including Dandelion, Plantains, Clover, and Common Daisy. Daffodils also appeared to have been planted within the habitat at irregular intervals. In slightly wetter areas, large patches of Cuckoo Flower were observed, a species which is important for pollinators and is the primary food plant of the larvae of the Orange-tip butterfly.

Ballydribeen Resident's Association: Biodiversity Plan

Photo 2 Scattered Trees and Parkland



River Deenagh: Eroding River (FW1)

The River Deenagh rises within Toremore, Kilcummin, approximately 9km north-east of Ballydribeen and flows in a south-westerly direction through the town of Killarney, before discharging into Lough Leane. The Deenagh is an important system for both its amenity and ecological value, its value as a salmonid fishery is of particular note. According to the latest EPA Water Quality assessments, a large proportion of the Deenagh is of good ecological status, with a Q value of 4. In contrast however the majority of the river systems are of poor ecological quality and have a lower Q value rating of Q3-4.

Ballydribeen Resident's Association: Biodiversity Plan

Figure 3: Water Framework Directive Status of the Deenagh and other waterbodies in the wider vicinity. Circles represent EPA Q-value stations. Map modified from EPA maps (2021).



3 Aquatic survey

Sampling was carried out under normal to high flow conditions. Weather at the time was warm, dry and cloudy.

3.1 Aquatic invertebrates

Analysis was carried out in accordance with McGarrigle *et al.* (2005) using a two minute kick sample and one minute stone wash at each sample site. Specimens were segregated and preserved in 70% ethanol and stored in sample tubes following sampling. Identification was completed by means of a stereo microscope and dichotomous keys.

The methodology outlined in Toner *et al.* (2005) was followed in order to determine the Biotic Quality Rating (Q-Value) at each sampling site. Macroinvertebrates were identified down to the lowest taxon as outlined in Appendix I of McGarrigle *et al.* (2005).

In the presence of pollution, characteristic and well-documented changes are induced in the flora and fauna of rivers and streams. Particularly well documented are the changes brought about by organic pollution in the macroinvertebrate community. The changes which occur are due to the varying sensitivities of the different components of the macroinvertebrate community to the stresses caused by pollution. It is known that similar organisms inhabit similar habitats and that the most sensitive species inhabit the riffle areas. It is also well known that macroinvertebrate community diversity declines in the presence of pollution and that sensitive species are progressively replaced by more tolerant forms as pollution increases. It is, therefore, possible to relate certain faunal groupings or community types to particular levels of pollution.

For the purposes of the assessment procedure benthic macroinvertebrates are grouped in to five ‘indicator groups’ based upon their relative sensitivities to pollution, from “Group A” being the most sensitive to “Group E” being the most tolerant of pollution (Appendix 3). The relative abundances of each group were calculated and the Q-Value for each sample site was determined. The correlation between Q-Values and water quality can be seen in Table 2 below.

Table 1 Relationship between Q-Value and Water Quality

Q-Value	Community Diversity	Water Quality	Condition*
Q5	High	Good	Satisfactory
Q4	Reduced	Fair	Satisfactory
Q3	Much reduced	Doubtful	Unsatisfactory
Q2	Low	Poor	Unsatisfactory
Q1	Very Low	Bad	Unsatisfactory

*‘Condition’ refers to the likelihood of interference with beneficial or potential beneficial uses.

Intermediate indices Q1-2, 2-3, 3-4, 4-5 are also used to denote transitional conditions. The scheme mainly reflects the effects of biodegradable organic wastes (i.e. deoxygenation and eutrophication) but toxic effects are also readily discernible and where such effects are suspected or apparent the suffix '0' is added to the biotic index (e.g. Q1/0, 2/0 or 3/0). In order to simplify this scheme the biotic indices are related to four Water Quality Classes viz., Unpolluted, Slightly Polluted, Moderately Polluted and Seriously Polluted as follows:-

Table 2 Intermediate Q-Value indices and Water Quality

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class B
Q2, 1-2, 1	Seriously Polluted	Class D

Waters assessed as Q3-4 (Slightly Polluted – Class B) are essentially transitional between the satisfactory Class A and the unsatisfactory Classes C and D. It is considered prudent, however, that these slightly polluted waters should also be classified as unsatisfactory in the analyses set out in this report because of the potential risk to wild game fish population of nocturnal dissolved oxygen (DO) depletion which may occur in such waters, particularly in times of low flow and elevated temperature.

BMWP (Biological Monitoring Working Party)

The BMWP (Biological Monitoring Working Party) Score (Armitage et al. 1983) was also calculated. These measures involve a precise calculation using scores that reflect species sensitivity to organic pollution, assigning a value of 1 to 10 in order of decreasing tolerance to pollution. The numbers assigned to each taxon identified within a sample are then added to attain the BMWP score.

The scoring system used for the BMWP system is included in Appendix IV. BMWP scores were revised in 1996 (Walley & Hawkes, 1996), including updated taxon sensitivity scores and habitat specific scores and these are now becoming accepted as more accurately reflecting pollution sensitivity in Britain.

The BMWP scoring system was devised for the taxonomic families occurring in British rivers with established correlation to known water quality status and would need modification for use in Irish rivers. The scores determined as part of this assessment, therefore, should be viewed with caution.

3.2 Results

Table 3 Taxa recorded and their abundance and BMWP Score.

Taxa	Group	Abundance	BMWP score
<i>Baetidae</i>	B	10	4
<i>Beraeidae</i>	B	5	10
<i>Chironimidae</i>	C	1	2
<i>Gammaridae</i>	C	30	6
<i>Heptageniidae</i>	A	6	10
<i>Hydorbiidae</i>	C	4	5
<i>Hydropsychidae</i>	C	10	5
<i>Leptoceridae</i>	B	5	10
<i>Limnephilidae</i>	B	5	7
<i>Odonata</i>	B	1	6
<i>Philopotamidae</i>	C	2	8

Table 4 Scores assigned to the section of the Deenagh River surveyed at Ballydribeen, Killarney.

Scoring System		
Q-value	Q3-4	Slightly Polluted
BMWP	73	Clean, but slightly impacted

4 Invasive Species

Figure 4 IAS Present on Site



Rhododendron ponticum

Although there are several species of *Rhododendron*, it is only the species *Rhododendron ponticum* which causes the most havoc when it escapes into the natural landscape. The species is a large evergreen shrub with leathery dull-green leaves and possesses distinctive purple flowers. A large thicket of *Rhododendron* was recorded at the north of the site and was located on the western bank edge across from the river. The full extent was not visible from the bankside; however, it appears that the thicket was at least 10m wide. *Rhododendron ponticum* is a notorious invasive that has caused considerable ecological damage in many areas of Oak woodland within the national park. It outcompetes and displaces native vegetation producing dense thickets that cast a deep shade, under which very little can survive. *Rhododendron* is also a third schedule species, meaning it is subject to Regulations 49 and 50.

Three-cornered Leek

Also known as Three-cornered Garlic, this species is often confused with the native Wild Garlic (*Allium ursinum*). However, the two species differ in many ways. Firstly, the leaves of both species differ

greatly. Three-cornered Leek has long linear leaves, not dissimilar to those of a bluebell, however the leaves are distinctly keeled and when crushed have a 'leek' scent. (The leaves of Wild Garlic are oval-oblong and have a string garlic smell when crushed). The flowers of Three-cornered Leek are bell-shaped with green veins and hang to one side. (Wild Garlic have flowers which are solid white and star-like, held in an upright umbel). Like Rhododendron, Three-cornered Leek is a third schedule species, meaning it is subject to regulations 49 and 50.

Winter Heliotrope

A member of daisy family, (Asteraceae) Winter Heliotrope as the name suggests comes into bloom during the winter period when few other species are in flower. The flowers are pink/white in colour and are strongly scented and the leaves of Winter Heliotrope are kidney-shaped. Within the survey area, it was recorded growing parallel to the pavement following the woodland edge.

Photo 3 *Winter Heliotrope*, leaves and inflorescence



Buddleia

A small buddleia bush was located on the northern section of the river bank. It is likely a garden escapee or planted by a member of the public. *B. davidii* is a small multi-stemmed tree, displaying a wide range of phenotypes depending in the environment. They are fast growing; depending on the environment, they may grow 0.5m-2m in height annually. The flowers appear at the end of the branches and can be to 30cm long. This is an opportunistic species and can establish in both natural and disturbed areas, and can grow in a wide range of conditions. It may be seen in disturbed areas, such as broken walls or derelict sites, or natural areas, like riparian areas, transport corridors and clear cut forests. It forms monocultures and can prevent the growth and regeneration of native species. It may displace primary colonisers across different habitats.

Montbretia

When in flower, this species cannot be confused with anything else, with its distinctive dense clumps of green grass-like leaves and bright orange flowers, it's commonly seen around County Kerry covering large areas of hedgerow, roadside and riverbank habitat. Not only does *Montbretia* outcompete other

native species, but it also poses a threat to the stability of a riverbank. On the day of the field study, only one small patch of Montbretia was recorded, however there are likely to be other pockets that were missed due to accessibility.

4.2 Issues Identified

A number of issues have been identified that need to be addressed. They are as follows;

1. Invasive Species;
2. Dumping;
3. Non-native tree species regeneration within the woodland (Eg Sycamore/Beech);
4. No proper access point into the woodland (at present having to hop over fence, makes it feel like you are 'escaping' or breaking into a woodland whereas it could be made into an inviting, accessible place for all to enjoy.

4.3 Recommendations

The following recommendations are proposed;

4.3.1 Management of Invasive Species

An invasive species management plan should be put into place and contain the following;

- Introduction giving the site location, project description and scope of the works;
- Information on the legislation surrounding invasive alien species, (IAS);
- Survey findings and extent of IAS infestations;
- Methods to deal with identified IAS infestations. Removal/control of Sycamore/Beech seedlings/saplings to allow native species to dominate and prosper;
- Biosecurity protocols to be implemented during IAS treatments.

4.3.2 Management of littering/Dumping (in river and woodland)

An outreach programme to help combat the issue of illegal dumping should be implemented. The "Your Country - Your Waste" campaign has been developed as part of the Anti-Dumping Initiative, and includes a tailored suite of information and awareness messaging for use by Local Authorities, community and voluntary groups. Community assets have been developed as part of the communication initiative and are now available to local community groups, voluntary organisations, schools and corporations to support initiatives in communities across Ireland. Community assets are available for local community groups, voluntary organisations, schools and corporations to advertise their anti-dumping initiatives or other associated activities. Poster artworks are included in these assets which may be used to written or overprint with notifications or details, as relevant. Digital artworks including static social media assets, gifs and an animation are also available as part of this suite of materials, for use on social animation accounts.

4.3.3 Community Outreach

Implement a community engagement programme to deliver Biodiversity Training to a number of community participants, with a view to enabling participants to implement practical effective measures in their community that will deliver a big improvement in biodiversity. In addition the community will be brought through the process of creating a practical and constructive Biodiversity Action Plan which will form a solid basis for funding applications to implement practical on the ground changes in the community.

Training should be delivered with a relaxed and learning ethos and take a citizen science type approach. Outcomes of this learning should enable participants to gain a deeper understanding of the natural habitats and species, learn simple and practical ways to increase biodiversity in the locality and gain knowledge of threats posed by IAS. This will allow each participant to gain a wider variety of practical skills such as native tree planting, pollinator surveys, IAS eradication techniques, seed saving, habitat surveying etc.

As part of the overall plan, management of parkland/grasslands habitat to provide better habitat quality for pollinators and insects and improve biodiversity will be undertaken. Areas of Cuckoo Flower especially should be allowed grow. A purposeful pathway could be cut to make it look 'intentional' and not just look abandoned.

References

Lucey, J., Clabby, K., & McGarrigle, M. (2006). Interim Report on the Biological Survey of River Quality. Results of the 2004 Investigations. EPA.

M. McGarrigle, Toner, P., Bowman, J., Clabby, K., Lucey, J., Concannon, C., Quinn, R. (2005). Water Quality in Ireland 2001-2003. Wexford: EPA Ireland.

Appendix 1: Species List - Scattered Trees and Parkland (WD5)

Table 5: Species recorded within the Scattered trees and parkland habitat

Scattered Trees and Parkland (WD5)		
Common Name	Scientific	Frequency
Herbs		
Broadleaf Plantain	<i>Plantago major</i>	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	R
Cat's-ear	<i>Hypochaeris radicata</i>	O
White Clover	<i>Trifolium repens</i>	O-F
Common Nettle	<i>Urtica dioica</i>	O
Common Ragwort	<i>Jacobaea vulgaris</i>	R
Cuckoo Flower	<i>Cardamine pratensis</i>	O-F
Creeping Buttercup	<i>Ranunculus repens</i>	R
Dandelion	<i>Taraxacum officinale agg</i>	F
Dog-violets	<i>Viola sp.</i>	O
Lesser Celandine	<i>Ficaria verna</i>	O – R
Ox-eye Daisy	<i>Leucanthemum vulgare</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	O
Self-heal	<i>Prunella vulgaris</i>	O
Speedwells	<i>Veronica sp.</i>	O-R
Grasses/sedges and wood-rushes		
Bent Grasses	<i>Agrostis sp.</i>	F
Hairy Bitter-cress	<i>Cardamine hirsuta</i>	O
Cock's-foot Grass	<i>Dactylis glomerata</i>	O
Couch Grass	<i>Elytrigia repens</i>	O
Fescue Grasses	<i>Festuca sp.</i>	O-R
Field Wood-rush	<i>Luzula campestris</i>	F
Oval Sedge	<i>Carex leporina</i>	R
Perennial Rye-grass	<i>Lolium perenne</i>	O
Rushes	<i>Juncus sp.</i>	R
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	O
Yorkshire Fog Grass	<i>Holcus lanatus</i>	D

Appendix 2: Species list - Broadleaved Woodland (WD1)

Table 6: Species recorded within the Broadleaved Woodland. Invasive species highlighted in yellow. *Denotes non-native

Broadleaved Woodland (WD1)		
Common Name	Scientific Name	Frequency
Herbs and woody species		
Bluebell*	<i>Hyacinthoides sp.</i>	O
Bramble	<i>Rubus fruticosus agg</i>	D
Greater Willowherb	<i>Epilobium hirsutum</i>	R
Cleavers	<i>Galium aparine</i>	R
Common Daisy	<i>Bellis perennis</i>	R
Creeping Buttercup	<i>Ranunculus repens</i>	R
Creeping Jenny	<i>Lysimachia nummularia</i>	R
Cuckoo Pint/ (Lords-and-ladies)	<i>Arum maculatum</i>	F
Dandelion	<i>Taraxacum officinale agg</i>	O
Enchanter's-nightshade	<i>Circaea lutetiana</i>	O
Foxglove	<i>Digitalis purpurea</i>	O
Ground-ivy	<i>Glechoma hederacea</i>	R
Hart's-tongue Fern	<i>Asplenium scolopendrium</i>	O
Hemlock Water Dropwort	<i>Oenanthe crocata</i>	F (river edge only), R elsewhere
Herb Robert	<i>Geranium robertianum</i>	O
Hedge Woundwort	<i>Stachys sylvatica</i>	R
Hogweed (Common)	<i>Heracleum sphondylium</i>	R-O
Irish Spurge	<i>Euphorbia hyberna</i>	R
Ivy	<i>Hedera helix</i>	A
Lesser Celandine	<i>Ficaria verna</i>	F
Monbretia*	<i>Crocoshmia</i>	R
Pignut	<i>Conopodium majus</i>	O
Primrose	<i>Primula vulgaris</i>	R
Sanicle	<i>Sanicula europaea</i>	O
Sticky Mouse-ear	<i>Cerastium glomeratum</i>	R
Three-cornered Leek*	<i>Allium triquetrum</i>	R
Wild Garlic	<i>Allium ursinum</i>	O (river edge only)
Winter Heliotrope	<i>Petasites pyrenaicus</i>	R
Wood Anemone	<i>Anemone nemorosa</i>	F (river edge only), O elsewhere
Wood avens	<i>Geum urbanum</i>	F
Wood Speedwell	<i>Veronica montana</i>	O
Yellow-flag Iris	<i>Iris pseudacorus</i>	R
Grasses and Wood-rushes		
Bent Grasses	<i>Agrostis sp.</i>	O
Cock's-foot Grass	<i>Dactylis glomerata</i>	O
False Brome	<i>Brachypodium sylvaticum</i>	O
Greater Wood-rush	<i>Luzula sylvatica</i>	O
Yorkshire Fog	<i>Holcus lanatus</i>	O
Trees and Shrubs		
Alder	<i>Alnus sp.</i>	O
Ash	<i>Fraxinus excelsior</i>	A
Beech*	<i>Fagus sylvatica</i>	R
Blackthorn	<i>Prunus spinosa</i>	R

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Buddleia/Butterfly Bush*	<i>Buddleia davidii</i>	R overall, O in some areas
Elder	<i>Sambucus nigra</i>	R
Hawthorn	<i>Crataegus monogyna</i>	F
Hazel	<i>Corylus avellana</i>	F
Holly	<i>Ilex aquifolium</i>	O
Horse Chestnut*	<i>Aesculus hippocastanum</i>	R
Oak	<i>Quercus sp.</i>	R
Poplar	<i>Populus sp.</i>	R
Rhododendron*	<i>Rhododendron ponticum</i>	R
Sycamore*	<i>Acer pseudoplatanus</i>	D
Willows	<i>Salix sp.</i>	R-O
Wych Elm	<i>Ulmus glabra</i>	O

Appendix 3 Q Value Groupings

Macroinvertebrates grouped according to their sensitivity to organic pollution					
Taxa	Group A	Group B	Group C	Group D	Group E
	<i>Sensitive</i>	<i>Less Sensitive</i>	<i>Tolerant</i>	<i>Very Tolerant</i>	<i>Most Tolerant</i>
Plecoptera	All except <i>Leuctra</i> spp.	Leuctra spp.			
Ephemeroptera	Heptageniidae Siphonuriidae <i>Ephemera Danica</i>	Baetidae (excl. <i>B. rhodani</i>) Leptophlebiidae	<i>Baetis rhodani</i> Caenidae Ephemerellidae		
Trichoptera		Cased spp.	Uncased spp.		
Odonata		All taxa			
Megaloptera				Sialidae	
Hemiptera		<i>Aphelocheirus aestivalis</i>	All except <i>A. aestivalis</i>		
Coleoptera			Coleoptera		
Diptera			Chironomidae (excl. <i>Chironomus</i> spp.) Simuliidae Tipulidae		<i>Chironomus</i> spp. <i>Eristalis</i> sp.
Hydracarina			Hydracarina		
Crustacea			<i>Gammarus</i> spp. <i>Austropotamobius pallipes</i>	<i>Asellus</i> spp. <i>Crangonyx</i> spp.	
Gastropoda			Gastropoda (excl. <i>Lymnaea peregra</i> & <i>Physa</i> sp.)	<i>Lymnaea peregra</i> <i>Physa</i> sp.	
Lamellibranchiata	<i>Margaritifera Margaritifera</i>		<i>Anodonta</i> spp.	Sphaeriidae	
Hirudinea			<i>Piscicola</i> sp.	All except <i>Piscicola</i> sp.	
Oligochaeta					Tubificidae
Platyhelminthes			All		