APPENDIX No. 10

A Survey of Shingle Vegetation at Mweeloon by Dr. John Conaghan

A SURVEY OF SHINGLE VEGETATION AT MWEELOON, CO. GALWAY

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A report prepared for by

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1. Introduction to shingle bank vegetation at Tawin

Areas of well-developed vegetation on shingle bank occur at Mweeloon, Co. Galway (Grid reference M 3283 1999). This vegetation is an example of the EU Annex Habitat "Perennial vegetation of stony banks" (1220) and lies within the Galway Bay Complex Special Area of Conservation (Site No. 000268). During August and September of 2017 a survey of shingle habitat to the north of the bridge at Tawin Island was undertaken. The primary purpose of this survey was to describe the habitat present in terms of vegetation composition and structure and to make comments/recommendations regarding the future conservation of the habitat.

To the north of Tawin bridge the main area of vegetated shingle habitat dominates a small island, located at the northern margins of the Mweeloon survey area. Most of the island area comprises vegetated shingle habitat which is dominated by grassland vegetation (Photograph 1). The soil associated with the shingle bank areas at Mweeloon is very inorganic and is typically less than 10cm deep.

Photograph 1. Vegetated shingle vegetation at Mweeloon. Note the small areas of exposed shingle on the right of the photograph.

Photograph 2. General view of pioneer shingle vegetation, dominated by *Raphanus maritimus*, at Mweeloon.

Photograph 2. The rare yellow horned poppy growing on shingle vegetation at Mweeloon.

2.1 Vegetation composition

Shingle vegetation was surveyed on the 4th of September 2017. A number of quadrats were recorded and these may be used as monitoring points or stops which can be used to monitor the composition and condition of the vegetation in the future. The vegetation associated with both pioneer shingle and vegetated, grassy shingle is outlined in the following tables. Vegetated shingle is generally richer in species than pioneer shingle and the presence of calcareous grassland plant species in vegetated shingle areas is notable.

The main species in the vegetated shingle areas is the tall grass species *Arrhenatherum elatius* with *Festuca rubra*, *Galium verum, Plantago lanceolata* and *Trifolium repens* also locally common. On a small area of the high shingle ridge, where a skeletal calcareous soil occurs, there is development of species-rich calcareous grassland vegetation characterised by the occurrence of rarer, base-demanding plant species such as *Thymus polytrichus, Carlina vulgaris, Sesleria caerulea, Campanula rotundifolia, Koeleria macrantha* and *Linum catharticum*. The occurrence of calcareous grassland vegetation on vegetated shingle is a very rare occurrence.

Along the northern shore of the island there is a wide shingle beach with a narrow band of pioneer shingle vegetation (Photograph 2). This species-poor shingle vegetation is generally dominated by large shingle and is typically dominated by *Raphanus raphanistrum* subsp. *maritimus* with frequent *Festuca rubra* and *Arrhenatherum elatius.* During the survey the attractive yellow-horned poppy *Glaucium flavum* was noted growing on shingle substrate (Photograph 2). Along the Atlantic coast of Ireland this species is very rare and the shingle beaches of Inner Galway bay are the most northerly sites known along the west coast.

Table 1. Species list for perennial vegetation of stony banks habitat at Mweeloon.

Pioneer shingle	**Vegetated, grassy shingle**
Arrhenatherum elatius	*Achillea millefolium*
Crithmum maritimum	*Agrostis capillaris*
Cymbalaria muralis	*Anthoxanthum odoratum*
Elytrigia junciforme	*Arrhenatherum elatius*
Elytrigia repens	*Campanula rotundifolia*
Festuca rubra	*Carex flacca*
Galium aparine	*Carlina vulgaris*
Geranium robertianum	*Cerastium arvense*
Glaucium flavum	*Cirsium vulgare*
Holcus lanatus	*Cynosurus cristatus*
Lotus corniculatus	*Dactylis glomerata*
Plantago lanceolata	*Galium verum*
Raphanus maritimus	*Holcus lanatus*
Rumex acetosa	*Koeleria macrantha*
Rumex crispus	*Leontodon autumalis*
Senecio jacobea	*Linum catharticum*
Sonchus asper	*Lotus corniculatus*
Taraxacum officinale	*Pilosella officinarium*
Trifolium repens	*Plantago maritima*
Tripleurospermum maritimum	*Poa pratensis*

	Pteridium aquilinum
	Ranunculus bulbosus
	Rhytidiadelphus squarrosus
	Rumex acetosa
	Scleropodium purum
	Senecio jacobea
	Sesleria caerulea
	Taraxacum officinale
	Thymus polytrichus
	Trifolium pratense
	Trifolium repens
	Veronica chamaedrys
	Viola riviniana

Table 2. Shingle vegetation quadrats at Mweeloon.

Code	SB1	SB2	SB3	SB4	SB5	SB6	SB7	SB8	SB9	SB10
Quadrat size	2x2	2x2	2x2	2x2	2x2	2x2	2x2	2x2	2x2	2x3
Easting	M32838	M33095	M33123	M33011	M32917	M32865	M32786	M32820	M33149	M33655
Northing	20035	20018	20010	20022	20023	20019	19996	19981	19959	20169
Veg Ht. (cm)	5	30 to 40	30 to 40	30 to 50	5 to 10	20 to 30	10 to 30	10 to 20	5 to 15	20 to 30
Veg cover (%)	35	60	65	55	80	95	100	98	100	100
Bare stone (%)	65	60	50	50	25	5	0	2	0	0
Shrub (%)	0	0	0	0	0	0	0	0	0	0
Herb (%)	35	60	65	55	80	95	95	95	95	100
Bryophyte (%)	0	0	0	0	0	0	10	35	35	0
	Pioneer	Pioneer	Pioneer	Pioneer	Pioneer	Grassy	Grassy	Grassy	Grassy	Grassy
Raphanus maritimus	3	60	25	20	5	3				3
Arrhenatherum elatius			20	5	5	60	40	30	10	20
Elymus farctus				10	5					3
Elytrigia repens			10							
Festuca rubra			3	20	30	5	10	10	15	35
Galium aparine		2	1	2						
Geranium robertianum		1	5	5	2	2				
Holcus lanatus					1				3	
Senecio jacobea					1					
Taraxacum officinale			1			1	1		1	
Trifolium repens					3	3			30	1
Tripleurospermum marit	30		8							
Leontodon autumnalis						2				
Rumex crispus						1				
Galium verum						8	15	15	20	
Plantago lanceolata					1		15	15	10	10
Lotus corniculatus					25	10	3	3	15	
Achillea millefolium						5	5	2	5	10
Rumex acetosa				2		3	3	3		3
Galium verum							15	15	20	
Scleropodium purum							10	35	30	
Dactylis glomerata							5		2	3
Carex flacca							3		2	
Cerastium arvense						3				8
Cirsium vulgare						1				
Agrostis capillaris							2			
Anthoxathum odoratum							1			
Ranunculus bulbosus							1			
Sesleria caerulea								15		
Rhytidiadelphus squarr								3	5	
Poa pratensis								2		
Koeleria macrantha									1	
Rosa pimpinellifolia										15
Ranunculus repens										3

2.2 Assessment of habitat

The condition of the stony bank habitat is assessed in accordance with the criteria outlined in Martin *et al*. (2017). Table 3 presents the results which are based on the monitoring stops/quadrats outlined above. The stony bank habitat at Mweeloon shows no fails when marked on the various habitat assessment criteria which suggests that the area of the habitat is in favourable conservation condition. It is noted that the cover of both negative indicator plant species and invasive non-native is very low.

In the table below the first 5 columns (T1 to T5) are ascribable to the Fossitt habitat Shingle and gravel banks (CB1) while the last 4 columns (T6 to T10) are examples of dry meadow vegetation (GS2) which has developed on shingle bank.

Table 3. Shingle habitat assessment at Mweeloon.

Survey and assessment of vegetated shingle 2017

1220 Perennial vegetation of stony banks

Monitoring stop data																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Shingle habitat																
List Fossitt code for 1220 community	✓	✓	✓	✓	✓	✓	✓	✓	✓							
2. Native species (list species present)	Record presence/absence of vascular plant species															
3. Notable species	Record % cover															
Crambe maritima																
Glaucium flavum																
Lathrus japonicus																
Mertensia maritima																
Other:																
4. Negative indicator species	Record % cover															
Cirsium arvense						3										
Cirsium vulgare						1										
Lolium perenne																
Pteridium aquilinum																
Senecio jacobaea					1											
Urtica dioica																
Other:																
5. Non-native species (Domin)	Record % cover															
Centranthus ruber																
Other:																

Notes:

1. Calculate % of habitat by averaging % cover scores for stops

2. No failures = Favourable, 1-2 failures = Unfavourable - Inadequate, 3+ failures = Unfavourable - Bad

Habitat assessment at the site level		
Habitat assessment criteria	Required to pass	Result (pass/fail)
1. Shingle habitat	No evidence of decline in 1220 community diversity over time. Ideally both pioneer and more stable 1220 communities (e.g. grassland on shingle) are	Pass
2. Native plant species	No evidence of a decline over time in the diversity of typical species within 1220 communities present. Consider additional typical species observed outside	Pass
3. Notable species	No evidence of decline in number of individuals over time. Individuals both within and outside stops should be counted Glaucium flavum present but not recorded in stops	Pass
4. Negative indicator species		Pass
a)	No species present in more than 60% of stops	
b)	Combined cover in any individual stop 25% or less	
5. Non-native species		Pass
a)	No species present in more than 20% of stops	
b)	Combined cover in any individual stop 1% or less	
c)	Cover across whole site[1] 1% or less. At a site level if a non-native species has been under recorded, or not recorded, via the stops the % cover for the species across the site should be recorded and assessed	
6. Coastal defences		Pass
a)	None built pre-designation which currently affect the habitat due to modification of the shingle habitat or changes to the sediment cycle at the site. Stabilising features such as coast roads could be included (presence/absence)	
b)	Post-designation anthropogenic impacts on the substrate/mobility of the system (e.g. new stabilisation works, sediment extraction) (presence/absence)	
7. Disturbance	No more than 20% of 1220 habitat affected by disturbance (e.g. heavy trampling, vehicle damage, removal of substrate)	
	No. of criteria failed	None
	Habitat assessment[2]	

General observations

3. Habitat management

Areas of coastal shingle habitat in Ireland are vulnerable to a range of threats including shingle extraction, catastrophic storm damage, agricultural reclamation, overgrazing and trampling by livestock. These damaging operations can, over time, have a detrimental effect on the composition and quality of the habitat. Obvious threats such as the removal of shingle and the movement of machinery should be stopped as they can result in damage to the shingle bank structure and lead to losses of characteristic shingle vegetation.

During the survey at Mweelon in 2017 there was no evidence of grazing or trampling by livestock noted in areas of shingle habitat although evidence of livestock trampling and grazing was observed in late spring of 2017. Cattle can easily across onto the island from the east apart from during short periods of high tide. Whilst high levels of grazing and trampling by livestock can be detrimental to the integrity of shingle habitat and the constituent vegetation, Martin *et al.* (2017) suggest that short periods of light grazing can occur in areas of stable vegetated shingle habitat dominated by a closed grassland sward.

The implementation of a habitat management plan for areas of shingle habitat in this area is advisable. This plan should primarily focus on the prevention of vehicular access and shingle extraction and the implementation of a light grazing regime if possible. Monitoring of the rare plan species *Glaucium flavum* should also take place at this, the most northerly site for the species on the west coast of Ireland. Survey protocols for the monitoring of the shingle habitat have been devised recently by Martin *et al.* (2017) and these can be used to monitor the composition and condition of the habitat in the future.

Reference

Martin, J.R., Daly, O.H. and Devaney F.M. (2017). Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites in Ireland. *Irish Wildlife Manuals*, No. 98. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Ireland.