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## **Three-lobed Water Crowfoot** ***Ranunculus tripartitus* in Pembrokeshire**

### **Summary Report of Survey Work, February 2015**

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## 1. Executive Summary

Most known Pembrokeshire sites for the red-listed plant *Ranunculus tripartitus* were visited in late February 2015. A total of 15 out of 23 sites were found to hold the plant. Most of the sites where it was not found had only held old records, or small, transient populations. Two held more significant populations which have disappeared, but presumably still exist as seed-banks. Other known, active populations take the total number of sites to 20-22. Although most are under some form of conservation management, only half are within SSSIs.

Only 4 populations have shown clear recent increases. Most are relatively stable, although the distribution of plants has frequently changed on site in response to management actions. 4 populations have shown clear recent declines, with eutrophication and lack of disturbance / under-grazing (including scrub-encroachment) being the key factors causing decline. No other factors were noted to be directly affecting populations, but non-native aquatic plants were present at two sites, and recent drainage on or adjoining sites was noted at another two.

Recommendations for various small-scale management actions are given, and detailed further on proformas for each individual site. These generally entail reactivation of buried seed through scrub removal, mechanical disturbance or fenceline realignment. A few sites require the reintroduction of grazing to counteract neglect. A significant amount of work to tackle ongoing or historic diffuse pollution is required, and could form the basis of a new locally delivered partnership project, with support from the farming community required.

## 2. Survey Details

Sites were selected from information provided by the BSBI, via the Freshwater Habitats Trust. This information was last updated in 2010. Due to time constraints, not every known *Ranunculus tripartitus* site could be surveyed. The survey focussed on the less well known or visited sites, and few of the large, established populations on the North-west Pembrokeshire Commons SAC were recorded. Although no new sites were surveyed, some sites potentially worthy of future survey were highlighted following assessment of aerial photographs.

All site visits were made around the end of January and start of February 2015. Known populations were relocated using grid references mapped on to aerial photographs, coupled to site descriptions in the BSBI dataset where available. Many sites were already familiar to the author.

No GPS device was used to record populations, and grid references were ascribed using the mapping application <http://wtp2.appspot.com/wheresthepath.htm>. In the author's experience, this is as or more accurate than standard hand-held GPS devices.

In addition to relocating known populations, all sites were searched for further populations or suitable habitat.

Notes were made on recent management activities, factors affecting the *Ranunculus tripartitus* populations or habitat, and the potential for targeted *Ranunculus tripartitus* conservation work.

Photos were taken of population locations, potentially suitable habitat and locations with management issues such as eutrophication. These photos have not been mapped or otherwise spatially located, but should serve to provide an overview of the site condition.

### 3. Results

#### 3.1 Overview of Pembrokeshire *Ranunculus tripartitus* sites

The following table shows the sites surveyed, together with the overall population status and trends since the last detailed recording, generally carried out by the BSBI county recorder at some point between 1999 and 2005. A + indicates a clear increase, a – indicates a clear decrease. Although a +/- symbol indicates that the population appears broadly stable, it may have shifted in distribution within the site. The number indicates the population size, where 1 = 1-10 plants; 2 = 11-50 plants, 3 = 51-200 plants and 4 = over 201 plants.

<b>Sites Visited – <i>Ranunculus tripartitus</i> present</b>	<b>Sites Visited – <i>Ranunculus tripartitus</i> not found</b>
Hendre + 4	Carn Silin
Keeston Moor - 1	Gwadn Valley
Marloes Mere SSSI +/- 3	Jeffreyston Pastures SSSI
Mynydd Llanllawer +/- 3	Llanwnwr Farm, Strumble
Northmoor Common + or +/- 3	Outer Heath, Trehill Farm, Marloes
Penlan +/- 1	Spittal Common
Rhos y Clegyrn + 3	Ysgeifiog Moor
Shortland Moors (SSSI) - 1	Johnston Lime kilns
Solbury - 1	
St David's Airfield Heaths SSSI +/- 4	
Porthmelgan Valley, St David's Head (SSSI) + 3	
Treledydd Fawr + 4	
Waun Ffynnon-clun + 3	
Waun Isaf - 2	
Wyndrush Pastures SSSI +/- 1	
<b>Sites not Visited – <i>Ranunculus tripartitus</i> known to be present</b>	<b>Sites not Visited – <i>Ranunculus tripartitus</i> not thought to be present</b>
Harglodd uchaf +/- 2	Dudwell Mountain
Dowrog Common SSSI +/- 4	Trerhos Common SSSI
Tretio Common SSSI +/- 4	Ynys Barry, Llanrhian
Ramsey Island SSSI	Waun Fawr SSSI
Skomer Island SSSI	
<b>Sites not Visited – <i>Ranunculus tripartitus</i> likely to be present</b>	
Lecha Farm (owner's contact details changed)	
Skokholm SSSI	

A total of 15 out of 23 surveyed sites were found to hold the plant. It should be noted that most of the sites where it was not found had only held old records (1970s or 80s), or small, transient populations. Two – Gwadn Valley and Ysgeifiog Moor - held more significant populations which seem to have at least temporarily been lost. They presumably still exist as seed-banks which could be reactivated with a return to more suitable management conditions.

Other known, active populations take the total number of sites to 20-22. Although most are under some form of conservation management, only half are within SSSIs. The two isolated populations in south-east Pembrokeshire are both in SSSIs, but the plant is not considered a 'feature' of either.



Large populations of 200+ plants are present on 5 sites. Moderate populations of 51-200 are present on 6; small populations of 11-50 on 2 sites, and very small populations of 1-10 present on 5 sites.

11 populations are partly or wholly on common land, and 6 of these common land populations are in National Trust ownership (together with one further site, Marloes Mere).

Two non-designated, non-common land sites were previously managed under Tir Gofal agreements (Hendre and Solbury) but are not now under agri-environment scheme management. The former, together with nearby Harglodd uchaf, is under benign ownership and good management, but the *Ranunculus tripartitus* population at the latter is looking vulnerable to imminent extinction.

The most dramatically improved site is Rhos-y-Clegyrn, non-SSSI but managed in accordance with a NRW management agreement. Recent hard-grazing, coupled to flail-mower-collecting and chain-sawing of willow scrub, has allowed the small population to the north of the site to expand throughout the southern half. This site could provide an exemplar for recovery management of a wet grassland and heath suited to *Ranunculus tripartitus*.



*Rhos y Clegyrn*

### 3.2 Population Records and Management Information for Individual Sites

Key information for each site has been captured in a site proforma, available electronically in the relevant site folder. Accurate site counts were not always made, as the relatively early survey date meant that many plants were still at the seedling stage, and none were in flower.



#### 4. Discussion

In its core habitat, *Ranunculus tripartitus* thrives with robust management of heathland or marshy grassland over mineral soils. It was perhaps once a rather common plant in the county, as this niche is likely to have been a widespread feature before the advent of intensive farming and the decline in grazing of less productive land. This, coupled to a perhaps very long-lived seed bank, may explain its ability to quickly appear following recovery management in appropriate locations. Effective dispersal of seed by livestock or perhaps snipe and woodcock may also be responsible for new appearances.

The drainage and improvement of pastures has clearly been responsible for large-scale population losses. In a less direct way, this continues to be a factor impacting on current populations. The nutrient-rich water and sediment running on to extant wetland sites causes eutrophication of previously suitable oligotrophic habitats. *Ranunculus tripartitus* disappears with the dominance of the grasses *Glyceria fluitans*, *Agrostis stolonifera* and *Holcus lanatus* which typifies these enriched areas. *Ranunculus omiophyllus*, then *R. hederaceus* typify the habitat with increasing nutrient enrichment. Many of the commons around St David's appear particularly prone to eutrophication, having irregular shapes with a long 'edge', lying in shallow basins and collecting the drainage water from the surrounding ploughed and fertilised farmland. Keeston Moor and Spittal Common have also lost populations to eutrophication, coupled to cessation of livestock movements through the gateways between commons and adjoining fields. Even at Waun Ffynnon-clun, where the population is slowly spreading, wet pockets along the northern edge are grass-dominated and *Ranunculus hederaceus* is frequent instead.



Typically bright green even in winter, eutrophication is a frequent problem around the edges of sites, such as here at Waun Isaf near St David's



Several sites may be described as under-grazed, although it is trampling, rather than grazing per se, which is required to maintain populations. The plant can persist within fairly coarse *Molinia* tussocks in under-grazed sites (such as parts of the St David's Airfield Heaths) provided there are animal tracks or a vehicular substitute. It is well understood now that the development of 'pinch-points', where animals are funnelled between natural or artificially constructed barriers, is crucial to the survival of the plant at many sites. At Shortland Moors for example, the population was maintained in large part by the fox-hunt riding through the pinch-points on to and off the wet grassland enclosures. Continued extensive cattle grazing does not seem to create enough poaching for the plant to be perpetuated. At Penlan, pinch-points within the gorse-dominated areas adjoining the irrigation reservoir are sufficient to focus livestock movements and maintain a long, open 'slop'. To some limited extent, trampling seems to offset the impacts of enrichment by maintaining the open conditions required by *Ranunculus tripartitus*.



*Trampled pinch-point between gorse at Penlan, where a small *Ranunculus tripartitus* population is maintained*

Few other management issues were encountered. Shading by willow scrub is a factor at some former locations, clearly related to under-grazing. However, even in well-grazed sites, scrub growth may not be effectively controlled by browsing animals and periodic scrub removal is inevitably required. Techniques are discussed in the section below.



Non-native aquatic plants are a potential threat around St David's, where *Crassula helmsii* and 'fly-tipping' of other pond plants has affected several waterbodies. No direct competition has been observed yet, as *Ranunculus tripartitus* perhaps occupies a more disturbed niche in shallower water or mud. *Crassula* removal at Waun isaf has actually encouraged establishment of a *Ranunculus tripartitus* plant in a new pool edge location on site. A more significant impact may be a justified reluctance of conservation organisations to embark on new freshwater creation projects whilst the threat of *Crassula* invasion is present. Alternatively, the animal, people and vehicle movements which would favour *Ranunculus tripartitus* may be discouraged to attempt to prevent spread as at St David's Airfield.



*A variegated form of Phalaris arundinacea dumped near the car park in Waun isaf (left), and a PCNPA enforced 'no-go zone' in a recently dug Crassula infested pond on St David's Airfield (right)*

Drainage works on and adjoining sites act to create drier conditions on sites which may already have been prone to drying out somewhat in recent hot summers. The recent works alongside Keeston Moor have also removed habitat with grey willow and *Molinia*; the opening of a ditch at Solbury has at least enabled a single *Ranunculus tripartitus* plant to germinate and delay the demise of the population at this site.



*Drainage works and wet wood removal on organic farmland alongside Keeston Moor (left), and the in-ditch location of the single Ranunculus tripartitus plant at Solbury (right)*



#### 4.1 Suggestions for New Management Actions

Potential actions to benefit *Ranunculus tripartitus* range from the simple adjustment of existing management, to the implementation of new small-scale actions, to the stimulation of new larger scale action to address the common problem of eutrophication across a range of sites.

##### *Scrub Management*

Where controlled by coppicing, as at Waun Ffynnon-clun and Rhos y Clegyrn, the lack of follow-up herbicide stump treatment means that the resulting vigorous multi-stemmed growth will soon shade the area again. It is worth noting that *Ranunculus tripartitus* seems to thrive under older willow at some sites such as St David's Head where animals are able to access underneath – they will do this to seek shade or refuge from flies on hot summer days. Pollarding might be a preferable alternative to coppicing if a temporary check is the objective rather than eradication. The latter is most effectively achieved by winching of small bushes, as the removal of the whole root-ball both prevents regrowth and creates a small pool at the same time. *Ranunculus tripartitus* temporarily established in the pools created by this method at Shortland Moors, although the dragging of bushes by the winch operation failed to create the deep disturbance needed to fully stimulate the main population. Perhaps similar operations in future could follow willow dragging with the winching through of a heavier object as well. Disposal of bushes is a consideration – although chipping or leaving them to rot is an option. Ideally, the willow would be used as planting material nearby. Willow stumps from Wyndrush Pastures SSSI have previously been used by Salix on a river restoration project in mid-Wales.



*Regrowth from cut willow at Waun Ffynnon-clun (left), and open structure under willow at St David's Head where ponies have encouraged the *Ranunculus tripartitus* under the canopy (right)*

Scrub management is potentially required at 3 sites, totalling a minimum of £2400 + VAT. Costs are based on tractor and winch hire @ £500 / day, and chainsaw operators @ £125 / day. If chipping is required, this would be an additional expense – tracked chipper hire is currently £160 / day + delivery, fuel and an operator (£125 / day)





*Sphagnum inundatum* in pool created by willow winching at Shortland Moors

### ***Mowing and Tractor Rutting***

Mowing is used as a management tool on several sites, both to create firebreaks and create stock access routes by removing coarse vegetation such as gorse and *Molinia*. The National Trust sometimes use a wheeled tractor and a simple ‘knives and chains’ flail which cannot collect the cuttings. This is not generally suitable for use in wetter sites, although the occasional ruts created in damp ground sometimes prove suitable for *Ranunculus tripartitus* (such as at Waun isaf, photo below). Contractors with similar kit have also created ruts and activated new populations (at Keeston and perhaps Waun Fynnon-clun). CCW purchased a Rytex flail-mower collector, which allowed cuttings to be picked up and a mulching effect avoided – with a wheeled tractor, however, access to the wetter sites was still restricted. Some populations on the North-west Pembrokeshire Commons SAC were maintained in this way.

In recent years, the hire of a low ground pressure tracked tractor with a Dukker flail-mower collector has enabled wetter areas to be cut. Cutting across wet areas and shallow streams, such as at Rhos y Clegyrn sometimes encourages water to flow laterally away in the slightly compacted track marks. The plant will thrive in these marks. However, in some drier sites such as Waun Sebon (part of St David’s Airfield Heaths) and Waun Isaf it would seem more appropriate to mow along the streams or wet runnels, rather than across them. This would benefit other scarce plants and invertebrates as well as perhaps encouraging more extensive *Ranunculus tripartitus* populations.





*A flail-mower-collector on a crawler tractor has created a highly suitable network of stock-paths at Rhos-y-Clegyrn, here crossing a stream and encouraging the lateral flow of water in the tracks*



*The cutting of this stock-path used a flail-mower collector to prevent mulching, but could have followed the wet channel to the right of the picture to maximise potential benefits for the specialist wet heath plants such as *Ranunculus tripartitus* (perhaps also enhancing its firebreak capabilities)*





*The deep ruts created by firewood extraction in the willow woods at Hendre – seedlings were located in the right hand section where plants were first found by the author in 2003.*



*A tractor rut with Ranunculus tripartitus in otherwise under-managed habitat at Waun isaf*



### ***Addressing Neglect and the Reactivation of Buried Seed Banks***

Given the apparent longevity of *Ranunculus tripartitus* seed when buried, the plant can rarely be considered extinct unless sites have become unsuitable as a result of drainage and improvement. At all but one or two of the 8 sites where *Ranunculus tripartitus* was not relocated, conditions could theoretically be made suitable for the plant to reappear and flower. However, addressing the causes of neglect at these sites would be necessary before short-term actions were implemented to reactivate seed banks.

Where grazing is already present, some additional disturbance may be required to stimulate seedbanks. This could be by willow winching as described above, suitable at the sites of ‘lost’ populations such as Jeffreyton Pastures SSSI. Additional mechanical disturbance could be used where machine access is possible, such as at Shortland Moors. Where machine access is not easy, such as at Wyndrush Pastures, some excavation with hand-tools may be sufficient to bring seed to the surface. One approach would be to dig and transport clay from known past locations to suitable new ones nearby – potentially recovering the original population and creating a new one. Realignment of fencing is desirable at Jeffreyton and Wyndrush Pastures to bring former locations back into grazing units.



*Machine access is not possible to this former location at Wyndrush Pastures SSSI, but disturbance with hand-tools couple to cutting back of surrounding scrub could reactivate a seedbank*



Two sites in particular – Ysgeifiog Moor and Gwadn Valley - would benefit from the reintroduction of grazing, with new management agreements perhaps being required. Ysgeifiog in particular stands to lose various other notable species (including pillwort *Pilularia globulifera*) unless actions are taken soon. Mechanical disturbance in the absence of grazing would seem too short-term to be worthwhile contemplating.

Some sites, such as Spittal Common, appear to face insurmountable problems with the reintroduction of sustainable grazing regimes, and are best left abandoned.



*Reactivation of seedbanks at abandoned sites such as Ysgeifiog Moor would first require a significant programme of work to reintroduce grazing, best delivered through a PCNPA or NRW management agreement*

Costs of this work are hard to assess accurately, but recommended manual or mechanical seedbank disturbance at 4 sites totals a minimum of £2750 + VAT. Fenceline adjustment would require a minimum of £750.

New pools and scrapes on sites with *Ranunculus tripartitus* may chance upon a buried seedbank, or may be colonised in time. Correctly located, they will enhance the sites for other species too. A further budget could be included for this work. As well as small pools at Wyndrush and Jeffreyton Pastures, more significant excavations could perhaps be contemplated at Gwadn Valley and Marloes Mere (Ellis Piece). At the latter site, spoil could be used to further reinstate the old hedgebank pattern on this field, gaps through which are readily colonised by *Ranunculus tripartitus*.





*This small pond at Wyndrush Pastures currently holds the only two plants of *Ranunculus tripartitus* on the site. Further small excavations would be desirable.*



*Ellis' Piece, Marloes Mere showing a *Ranunculus tripartitus* location by a breach in the hedgebank, and the 11-year old pools excavated in the lower part of the field behind. There may be an opportunity for further work of this nature*



### ***Eutrophicated Sediment Removal***

The most difficult issue facing *Ranunculus tripartitus* and its wetland habitat would appear to be that of eutrophication. Numerous enriched areas are apparent around the commons in the St David's area. A limited number of these have been 'cleaned out' with excavators, and clean water pools fashioned in their place. The SAC commons at Trefeiddan, Waun Fawr and Dowrog have had some limited work, but it has rarely proved possible to remove the enriched sediment off the common. Recent work at Dowrog, alongside a particularly enriched inflow of water from Trefadog, resorted to burying the sediment under clay alongside the flush (Jon Hudson, pers. comm.). Such actions do not fully address the problem, and the spoil heaps – as well as leaking nutrients back in to waterbodies - can become colonised with undesirable species.



*A pool on the edge of Trefeiddan Moor, created as part of a series of pools on the common delivered by the author for CCW c.12 years ago. Some enriched spoil was taken off the common to the adjoining farm, until ground conditions deteriorated and spoil movements abandoned*

A comprehensive solution to the problem would entail (1) addressing the sources of both point source and diffuse pollution, the latter perhaps through funding the creation of buffer strips in key locations alongside the commons; followed by (2) a significant programme of excavating enriched sediment and removing it to land where it can be used in a constructive fashion, ideally as a soil conditioner. Such a project would require the support of key individuals in the farming community, and would require local leadership and NRW/NT/PCNPA/WTSWW support. Sympathetic landowners at Hendre and Harglodd Uchaf may have opportunities for sediment disposal. Significant funding would be required.





*A typical eutrophication scenario at Treledydd Fawr, where inputs from the adjoining field creates grassy swamps in areas which have held or could hold *Ranunculus tripartitus*. An ideal scenario would perhaps involve returning sediment to the field, creation of an unfertilised, unploughed buffer zone in the field and the excavation of clay and stone bank to create a new bank to define the boundary. Significant diplomacy and incentivisation is required to instigate projects such as this.*

### ***Further Survey***

Two areas without known populations look from aerial photography to hold potentially suitable habitat and would benefit from further targeted survey work. The valley to the west of Waun Isaf, Merry Vale, looks to have suitable wet ground with extensive cattle tracks (around SM7436324930 - SM7435324785). The Northmoor Common area has various horse-grazed wet pastures with some small disturbed clay areas visible on aerial photos. A budget of £600-700 is suggested for this work.

## **APPENDIX 1**

### ***Incidental Records of other Notable Plants***

The time of year was not conducive to botanising, and the known *Ranunculus tripartitus* locations are generally well recorded. However, a find of *Utricularia minor* at Mynydd Llanllawer (at least 8 plants in flush locations upstream from the *Ranunculus tripartitus*) may represent a new hectad record of this species otherwise known in the county only from the St David's area. A randomly collected moss from a boulder by the gateway population of *Ranunculus tripartitus* at Hendre (SM7843127775) proved to be *Hedwigia stellata*, new to Pembrokeshire and apparently conforming to the nationally rare variety, *var leucophaea*.



APPENDIX 2 *Individual Site Proformae*

Site Name	CARN SILIN, ST DAVID'S
Ranunculus tripartitus grid reference	SM73352628
Ranunculus tripartitus refound?	No
Population size (count)	
Past Population info where known	17 plants in 1997; 3 plants in 2003
Current Population info	None found, but a small number may have still been present.
Recent Management info where known	Low sedge-rich pasture alongside reservoir is still horse-grazed.
Management Regime ok?	Perhaps insufficiently disturbed with current level of horse grazing, but vegetation is still short and open.
Success of recent Ran trip work?	
Potential for new Ran trip work?	Reservoir edge has shallow edges and 'bays', created either at the time of construction or subsequently. There may be some potential for more bay construction, or some mechanical disturbance in or around the known Ran trip location.
Estimated Costs	Unknown, low priority but likely to be £250 maximum
Additional info	Ownership not known at time of survey



Carn Silin reservoir edge



Site Name	GWADN VALLEY, SOLVA
Ranunculus tripartitus grid reference	Location A (ditch 4) SM804239 Location B (old meander) SM80552403
Ranunculus tripartitus refound?	No
Past Population info where known	Location A held plants from 1985 to at least 2000, with a maximum count of 94 plants in 2000; Location B held 3 plants in 2000
Current Population info	None found
Recent Management info where known	Appears to have been not or hardly grazed in 2014. Grassland is developing a coarse, tussocky structure, and ditches are developing into swamp with <i>Phragmites</i> , <i>Carex rostrata</i>
Management Regime ok?	No, unless current site aims are to move from grazed wet grassland to ungrazed wetland
Success of recent Ran trip work?	
Potential for new Ran trip work?	Providing it fits with the long-term site aims, some small-scale mechanical disturbance of the ditch location, coupled to summer grazing, is likely to recover the main population. There may be scope for more significant excavations provided spoil can be sensibly used – perhaps to provide enhanced screening around the sewage treatment works upstream. Discussion with NT staff and the tenant farmer would be required at the outset.
Estimated Costs	Small-scale works may be low priority unless grazing regime is improved, but likely to be £500 maximum



Ditch and grassland near former *Ranunculus tripartitus* location, Gwadrn

Site Name	HENDRE
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	Yes
Population size (count)	Minimum 218 plants
Past Population info where known	186 plants in northern boundary slop, 2001. Small woodland ride population known to author, but apparently not recorded by BSBI.
Current Population info	See below
Historic Management info where known	
Recent Management info where known	The author prepared a Tir Gofal application / plan for owners Jim and Maureen Dale, Hendre, c.2001. Central to this were cattle grazing (by tenant farmer), two small pools in Ran trip field, creation of permissive bridleway and creation of rides in woodland.
Management Regime ok?	Yes, although impact on Ran trip of frequency / severity of rutting in woodland ride hard to gauge.
Success of recent Ran trip work?	n/a 10 year old pools in Ran trip field have not been colonised.
Potential for new Ran trip work?	Not required. Ride populations have further extensive rutted areas to expand into, and opening out of mature willow will also assist population here.
Estimated Costs	n/a

Grid Reference	Name	Description	Count
SM7839227755 - SM7832927723	Northern boundary slop	Long, heavily trampled clay slop between fence and adjoining scrub	150-200
SM7843127775 - SM7843727747	Eastern boundary slop	Slop between fence and adjoining scrub	25
SM7843927789	Gate on to bridleway	Tractor ruts just east of gate	1
SM7851527812	Junction between bridleway and woodland ride	Tractor ruts at start of woodland ride	3
SM7854927741 - SM7856727696	Woodland ride	Heavily, recently rutted section of ride, created by firewood extraction.	40+





Northern boundary slop, Hendre



Eastern boundary slop, Hendre



Site Name	JEFFREYSTON PASTURES SSSI
Ranunculus tripartitus grid reference	SN0882205970
Ranunculus tripartitus refound?	No
Population size (count)	
Past Population info where known	A single flowering plant found by the author in 2005
Current Population info	Not present
Recent Management info where known	No grazing in this enclosure. An attempt to graze was made following the opening of a new access and the installation of a piped water supply. The latter created the disturbance which stimulated a presumably long-buried seed of Ran trip. This was followed by the reported loss of cattle to poisoning by <i>Oenanthe crocata</i> , and grazing was subsequently abandoned.
Management Regime ok?	No
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	None at the previously recorded location, as grazing is unlikely to be reinstated by the current tenant. Clearance of willow and re-fencing to bring the water-trough and previous Ran trip location into the main horse-grazed management unit would seem to be the only possible action. This part of the enclosure currently has no <i>Oenanthe crocata</i> . Removal of willow stumps to create ground disturbance would be required; some additional pool creation may also be beneficial. A stone access track along the field edge limits the opportunities for new slop creation. Despite regular horse-grazing, the remainder of the site is perhaps too dry to support a significant Ran trip population.
Estimated Costs	A c.£2k budget may be required for fencing and scrub clearance.
Additional info	



Former *Ranunculus tripartitus* location, Jeffreyton Pastures

Site Name	KEESTON MOOR
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	Yes, in 2 of 4 known locations
Population size (count)	5
Current Population info	See below
Historic Management info where known	
Recent Management info where known	Common was part of THH project Pembrokeshire's Living Heathlands, which reintroduced livestock grazing and mowed firebreaks and stock-paths etc. Subsequently a site contributing 'Heathland Beef' under NT-led initiative.
Management Regime ok?	Yes, although adjoining dairy land-use not sympathetic. Livestock grazing in place, entailing a small number of cattle (5 dexters) in most summers, and 2 (Section D Welsh Mt) horses in the winter. Appears to be successfully managing the heathland. Firebreaks cut during the Pembrokeshire Living Heathlands Project maintained. The previously significant population in the NW corner gateway has succumbed to eutrophication from the adjoining 'Organic' improved field. Willow growth in this corner, combined with lack of vehicle and livestock movements through this gate, will also have contributed to the current growth of <i>Glyceria fluitans</i> etc. Although not directly impacting on known Ran trip populations, a field of scrub and marshy grassland adjoining the western side has recently been removed, and a deep ditch dug along the boundary.
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	Small amounts of scraping in and around the recorded locations could reveal or extend populations. Managers of common are Pete and Helen Glee, Naples. They would like to see more pools on the common.
Estimated Costs	Depends on spoil disposal options. At a minimum, one day of excavator hire @ c.£250
Additional info	



Grid Reference	Name	Description	Previous High Count	New Count
SM89461879	Second firebreak / track junction	Tractor rut	1 in 2003	0
SM8924418769	Gateway in NW corner	Slop in field entrance	100s in 2003	0
SM8931818791	Just east of gateway in NW corner	Tractor rut	6 in 2003	4 in 2x2m clay slop between scrub
SM8944418802	Trackside flush in lee of Salix	flush	75-100 in 2009	1



Ranunculus tripartitus location east of gateway, Keeston Moor



Site Name	LLANWNWR FARM, STRUMBLE
Ranunculus tripartitus grid reference	SM891403
Ranunculus tripartitus refound?	No
Population size (count)	
Past Population info where known	5-10 plants in 1985; not seen again
Recent Management info where known	The ditch near the grid reference is buried in bramble scrub. A shallow pond a short distance away was briefly examined, but was grassy and unsuitable. The wet grassland in the valley bottom here was grazed but not poached. Horses were grazing on the coastal field and the pond field. Fields to the north have wet patches and there is a poached spring-fed flush, but past improvement has made these too nutrient rich for Ran trip.
Management Regime ok?	Grazing ok
Success of recent Ran trip work?	
Potential for new Ran trip work?	If exact location was determined, mechanical clearance work could be targeted but this would be highly speculative. PCNPA may have a coastal slopes management agreement here.
Estimated Costs	Unknown, low priority.



Pond near former location, Llanwnwr Farm

Site Name	MARLOES MERE
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	At 3 of 10 previously recorded general locations, and 1 new.
Population size (count)	c.85 (likely to be an undercount)
Past Population info where known	Well established with regular high counts, eg. 1112 counted in 2000
Current Population info	See below. Very high water levels meant that plants were not apparent at some known localities, and access was not possible to others.
Historic Management info where known	Cattle and sheep grazed. There was a more intricate field system in Ellis' Piece until the 1980s, as the field was subdivided into 8 by hedge-banks, now mostly removed. These divisions were used to separate cattle from different farms when the mere was used for collective grazing during prolonged summer droughts in the early twentieth century.
Recent Management info where known	Summer cattle grazing, with a S15 agreement in place. Water levels raised through blocking of outlet ditch c.2004.
Management Regime ok?	Yes. Raised water levels may have made more central parts of the mere too wet for the plant, but cattle trampling has encouraged its spread around northern and western edges. Topping of soft rush in dry summers creating additional disturbance. Extensification of management to the north-west and east of the mere may have reduced nutrient inputs, and the plant has appeared in slops which may previously have been too enriched. Presence of Azolla unlikely to threaten Ran trip populations.
Success of recent Ran trip work?	The pool creation on Ellis Piece, instigated by the author, was not targeted specifically at Ran trip. However, the spoil generated was used to re-create one of the former banks dividing the field. The cattle trampled breaches in 3 places along this bank now support Ran trip.
Potential for new Ran trip work?	Not likely to be high priority, but further scrapes and pools on Ellis Piece could generate spoil to re-create more of the original small field pattern here. Breaches in these would produce slops, encouraging further spread of Ran trip.
Estimated Costs	Dependent on extent of work – minimum would be 1.5-2 days excavator / dumper (£1000+)
Additional info	

Grid Reference	Name	Description	Count
SM7716608136	Ellis Piece bank south	Slop in breached bank	25
SM7716308164	Ellis Piece bank central	Slop in breached bank	1



SM7715908188	Ellis Piece bank north	Slop in breached bank	20
SM7726208235	SSSI west bank north	Slop in breached bank	20
SM7726108246	SSSI west bank north	Slop in breached bank	10
SM7726108262	SSSI west bank north	Slop in breached bank	5
SM7726808270	SSSI north boundary	Slop in access off track	3
SM7765908389	Varna bank north	Pinch-point between water and boundary ditch/bank	1
SM7747008011 - SM7764708027	Ditch alongside track to south of Mere	Ditch	0
SM7727808114 - SM7731708132	SSSI west bank central	Slop in breached bank	0
SM7728907989 - SM7728308040	SSSI west bank south	Slop in breached bank	0
SM7740908221	Mere central	Slop in breached bank	Not accessed
SM7700307990	Rath	Ditch	0
SM7651008291	Outer Heath	Ephemeral – single plant for 1 year following water trough installation	0



Marloes Mere SSSI west bank north



Site Name	MYNYDD LLANLLAWER
Ranunculus tripartitus grid reference	SN0166036834 (roadside quarry) SN0166536781 (roadside flush)
Ranunculus tripartitus refound?	Yes
Total Population size	c.100
Past Population info where known	The smaller quarry population has fluctuated between 0 and 26 plants. The flush population had increased to 90-100 plants in 2010. A single plant had been noted in a stream pool just over the road from the latter.
Current Population info	12 in roadside quarry 90-100 in roadside flush
Historic Management info where known	Livestock grazing, predominantly with sheep.
Recent Management info where known	<p>Sheep grazed in summer.</p> <p>Illegal off road 4x4 driving was a contentious issue c. 5-10 years ago, but although temporarily preventing flowering of populations through excessive disturbance, it may have had a positive impact in the short-medium term.</p> <p>The roadside quarry appeared to have been used as a firework display point in the autumn – perhaps another small-scale disturbance of benefit to the plant.</p> <p>Water quality in the roadside quarry may not be ideal, and the associated vegetation is rather enriched and weedy, with <i>Bellis perennis</i> etc.</p> <p>Water quality in the roadside flush is good, and no pollution sources were noted.</p>
Management Regime ok?	Yes, although the two populations are very localised and dependent on ongoing disturbance by sheep, human and vehicle trampling
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	<p>The whole flush system above the road was searched for new populations. Although wet and well grazed, disturbance is not heavy enough to encourage <i>Ranunculus tripartitus</i>. It does, however, support interesting vegetation, with species such as <i>Callitriche brutia</i> var. <i>hamulata</i> in the stream channels and <i>Littorela uniflora</i> and <i>Utricularia minor</i> in the shallow pools (the latter perhaps a new record, and the only Pembs site outside St David's). It would not be a suitable location for new work.</p> <p>There may be opportunities downstream across the road, but this land was not accessed and ownership interests are not known.</p>
Estimated Costs	n/a





Roadside quarry, Mynydd Llanllawer



Roadside flush, Mynydd Llanllawer



Site Name	NORTHMOOR COMMON
Ranunculus tripartitus grid reference	a) SM9489111994 b) SM9497511966
Ranunculus tripartitus refound?	Yes
Total Population size (count)	100+ plants
Past Population info where known	c.150 plants in 2000, including R. x novae-forestae
Current Population info	Plants were noted in the original, known location (a), but failing light prevented a count being made. A second population (b) was located, to either side of a large trampled clay slop. 3 plants (+1 probable R. x novae-forestae) were noted on the north-west edge of the slop, whilst c.100 plants were in narrow puddles on the stock-path a few metres to the south-east of the slop.
Recent Management info where known	Well-grazed by 2 horses at time of survey. Installation of LNG pipeline created heavy disturbance – heathland turf was stripped from part of site, and ‘lost’ before it could be replaced.
Management Regime ok?	Yes
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	Further survey in this area would be desirable. Time / access didn’t permit investigation of other potentially suitable slops visible on aerial photos, ie. at SM9454212127, SM9486611139, SM9443911485, SM9443911485, SM9412411236, SM9641110945 and SM9501112226. This area is perhaps poorly investigated by naturalists, and could well reveal hitherto unknown Ran trip populations. Although there are no obvious <i>Molinia</i> or wet-heath areas remaining, there are extensive areas of wet, rushy ground. Horses are prominent in this area - this is likely to mean that fertilisers aren’t extensively used, and poached areas are common.  There is little need or potential for direct management work on the common, but pool creation in the surrounding area, eg. in the field adjoining the common to the south, may have some potential to extend the population.
Estimated Costs	1.5-2 days survey / reporting c.£450-600





Trampled clay slop at location b, Northmoor Common



c. 100 plants in the stock-path south-east of the slop



Site Name	PENLAN
Ranunculus tripartitus grid reference	SM7438825893 SM7438525886 (Original GR slightly further south at SM74372586)
Ranunculus tripartitus refound?	Yes
Total Population size (count)	10 plants
Past Population info where known	16 plants in 1999
Current Population info	A few plants either side of a long slop through gorse to the north-west of the farm reservoir (7 to north, 3 to south)
Recent Management info where known	Cattle grazed and trampled, in conjunction with adjoining improved fields.
Management Regime ok?	Ok. Tenant is William Lawrence, 07968 096336.
Success of recent Ran trip work?	
Potential for new Ran trip work?	Limited. Northern side of reservoir field is perhaps too eutrophic, and <i>R. hederaceus</i> dominates in the smaller, drier slops here. Rides could be cut through gorse to south-west of reservoir, but these are unlikely to be wet enough for Ran trip. Surrounding land is all improved grassland.
Estimated Costs	n/a



Ranunculus tripartitus location at Penlan

Site Name	RHOS Y CLEGYRN
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	Yes, in 1 of 3 original locations and 5 new ones
Total Population size (count)	180+ (quick minimum count in fading light)
Past Population info where known	Counts made in 2001/2, see table below
Current Population info	See below
Historic Management info where known	An old common, with historic interest – the gateway population may be very old.
Recent Management info where known	The original population is en route to an improved field; tractor access has created the required disturbance but the slop is somewhat eutrophic. The whole of this area was disturbed / rotoated approximately 15 years ago. The improved field to the east may have been further improved since 2002, and the locations appear eutrophic and unsuitable. The main heathland is under a S39 agreement with NRW, and has had hard grazing, flail-mowing-collecting and willow scrub cutting
Management Regime ok?	Yes. Heathland has undergone excellent recovery management, ideally suited to Ran trip. No obvious eutrophication problems here. Northern gateway is enriched, but population has increased and plants have spread a few metres into wet <i>Juncus</i> tussocks immediately to the south. Improved field populations are assumed lost.
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	Not required – the plant is likely to spread and develop large populations if current management is continued.
Estimated Costs	n/a



Grid Reference	Name	Description	Previous High Count	New Count
SM9133335491		Gateway from improved field	20	45-50
SM9145935460		Wet field corner by stream	14	0
SM91593541		Wet field edge	5	0
SM9134835189		Poached and flooded area of mown strip		1
SM9137735132		Slop in mown strip		2
SM9139335126		Wet Molinia near slop		1
SM9140035041 - SM9138535034		Mown strip / Stream through willow scrub		125+
SM9137134996		Mown strip		2



Rhos y Clegyrn 2 plants here at SM9137735132, large expansions likely in this population

Site Name	SHORTLAND MOORS (YERBESTON MOORS SSSI)
Ranunculus tripartitus GR	Location A (SN0284509770) Location B (SN0282409672) Location C (SN0286809645)
Ranunculus tripartitus refound?	Only at location A. Not seen now at locations B and C for c.15 years.
Population size (count)	5
Past population info where known	The plant was found here by the author in April 1999. Some 20-30 plants, including some R x novae-forestae, were found at Location A, whilst locations B and C held smaller numbers (c.5 at each from memory). It disappeared from B and C soon after, and counts at Location A have fallen (perhaps absent in some years). It responded initially to management work carried out by NRW in 2012, appearing in some of the small pools created by extraction of willow bushes.
Current population info	All 5 plants were noted at Location A, in the less shaded part of the slop at the edge of the small wet grassland glade.
Historic management info where known	All locations are at access points on to and off the wet grassland regularly used by the horses, riders and hounds of the South Pembrokeshire Hunt. This may have been a long-standing practice
Recent management info where known	The site has been grazed by beef cattle, for at least the last 15 years and probably for many decades before that. Grazing has been in summer or autumn, sometimes sporadic, but the core wet grassland interest of the site has generally been kept in good condition. The hunt continues to go through the site, most recently in January 2015. Hoof marks suggested a small number of animals, and they took a route through the enclosures which missed all Ran trip locations. CCW organised scrub clearance work in conjunction with BTCV sometime around 2001. More significantly, AJ Butler was employed in 2012 to winch willow bushes from the southern enclosure around known locations, and also in the second enclosure to the north opening the edges of the glade. The aim of this was to slow down encroachment, and disturb the slops in the process.
Management Regime ok?	Generally OK. Grazing alone probably too light for Ran trip, but an increase would potentially be detrimental to the wet grassland with carpets of <i>Sphagna</i> and the uncommon <i>Genista anglica</i> . Disturbance by the hunt now follows different paths into and out of the enclosure; in any case the winter timing of this would not be ideal for Ran trip. Scrub encroachment will need periodic checking; grazing alone will never be sufficient to prevent succession here.
Success of recent Ran trip work?	Disturbance at Location A has temporarily maintained the population. The plant has not naturally spread to the few other potentially suitable small 'slops', or persisted in the small pools created by willow extraction near Location A. These have become bog pools with <i>Sphagnum inundatum</i> .
Potential for new Ran trip work?	The scrub surrounding all slops, whether known locations or potentially suitable, could be further removed to allow more light in, and they could be more heavily disturbed with machinery.
Estimated Costs	£500





Shortland Moors, Location A



Potentially suitable location for new slop creation en route to northern enclosure, SN0286709838



Site Name	SOLBURY FARM (RATFORD BRIDGE PASTURES)
Ranunculus tripartitus grid reference	Original SM9035812123 New SM9035612121
Ranunculus tripartitus refound?	Yes
Total Population size (count)	1 small plant
Past Population info where known	46 plants and 1 of R x novae-forestae in slop through hedgebank
Current Population info	A single small plant in a recently created ditch. This is likely to be washed out by strong water flow before it flowers and seeds.
Recent Management info where known	Site surveyed and Ran trip found by the author in 2001. Grazing had ceased on the field to the south in the previous year. New owners at this time. Tir Gofal agreement c. 2002-2012. Dexter cattle grazing introduced on central <i>Molinia</i> pasture, but southern and northern fields continued to be ungrazed. Deep ditch recently opened, draining west to east across central field. Electric fencing used to retain cattle; one corner of this located in the centre of the slop which held the original Ran trip population. Small tractor ruts to the south of the new ditch currently represent the most suitable habitat.
Management Regime ok?	No.
Success of recent Ran trip work?	
Potential for new Ran trip work?	Management discussed with the owner, Alan Carrington (07770 475 978) following visit. Suggested moving corner of electric fence to allow cattle access to / through slop. Discussed potential for grazing neglected <i>Molinia</i> pastures – perceived as too wet. Temporary fencing could exclude the well-defined swampy area; flail-mowing with a crawler tractor would be required to reduce the tussock height and create stock access. Tir Gofal has made Alan wary of schemes. He is keen to further drain the site; his sons will take over the management in a few years and their stated intention is to immediately sell the cattle then drain and plough the land to grow potatoes. With this in mind, any work would be too short-term to be worthwhile unless SSSI notification was implemented. Parts of the site have been destroyed by landfill site creation since original NVC survey, and notification would now be very unlikely.
Estimated Costs	n/a





Original location at Solbury



Shallow poached slop at Solbury, lacking *Ranunculus tripartitus*



Site Name	SPITTAL COMMON
Ranunculus tripartitus grid reference	SM972225 SM97112257
Ranunculus tripartitus refound?	No
Past Population info where known	13 plants in 1998, in wet ruts on mown path along northern edge. Also two just outside gate to common
Current Population info	None found 16.1.15
Recent Management info where known	The mown path along the northern edge of the site represents the only recent management. It has wet hollows in five places and old ruts are still discernible. These hold <i>Ranunculus flammula</i> , <i>Anagallis tenella</i> and <i>Juncus bufonius</i> etc. The gateway that held two plants is now enriched as the adjoining field is improved grassland. The path to the east of the site becomes increasingly enriched; there is a sewage treatment works on the eastern side which may be encouraging this.
Management Regime ok?	No. The site is effectively abandoned.
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	Not worthwhile. Heavier trampling / mechanical or hand tool disturbance along footpath, perhaps coupled to some scrub clearance around the last known locations, could temporarily promote re-establishment from buried seed. With a more regular, sustainable form of ongoing disturbance such as grazing seeming highly unlikely, this would be an ineffective use of resources.
Estimated Costs	n/a



Previous gateway location at Spittal Common, now unused and enriched





Wet areas along bridleway at Spittal, mostly shaded by willow scrub



Presumed former location on mown path at Spittal, with old ruts still discernible



Site Name	ST DAVID'S AIRFIELD HEATHS SSSI
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	Yes
Population size (count)	Minimum 250-450
Past Population info where known	Well established with regular high counts from various sub-populations
Current Population info	See below. Not all sub-populations visited, and data only presented for those that were.
Historic Management info where known	Long-standing commons with management carried out by rights holders – clay digging, grazing etc.
Recent Management info where known	Cattle and pony grazing, some winter grazing on drier parts of the site. Cattle numbers diminished in last c. 5 years. Some small pool excavations c.2003. Firebreak / stock path mowing on western part of site (Waun Fachelich)
Management Regime ok?	Broadly, yes, but much of the site would benefit from harder grazing. There are eutrophication issues apparent in places, particularly towards the eastern end of the site. Spread of <i>Crassula</i> on to SSSI may ultimately threaten some Ran trip populations.
Success of recent Ran trip work?	One small pool, dug by pupils of St David's school in c.2003, had Ran trip shortly afterwards, and there are still plants here or close to it.
Potential for new Ran trip work?	Several enriched areas around the southern and western margins of Waun Caerfachell / Treflodan (eg. SM7953126168) could be targeted for scrapes. Removal of eutrophic organic sediment here would expose clay. Providing nutrient inflows were historic and are no longer a problem, these could prove attractive to Ran trip as well as <i>Cicendia filiformis</i> and <i>Pilularia</i> . <i>Crassula</i> threat may be considered an issue here though. Adjustments to mowing regime could be made, particularly at Waun Sebon. Mowing along wet channels (eg. at SM7905626953) rather than near them would potentially improve habitat for Ran trip and other wet heath species. Effective grazing required here, and on Waun Llandruidion. Some judicious scrub clearance, eg. at SM7919926300, could extend existing populations.
Estimated Costs	Dependent on extent of work and spoil disposal options available. Could be seen as larger project targeting enriched areas around all St David's commons. Many £1000s perhaps needed to be effective.



Grid Reference	Name	Description	Previous High Count	Count
SM7936926248	Waun Llechell – Treflodan gateway	Slop between commons	200+ in 2002	c.30. Smaller area, eastern end enriched
SM7933226225	Waun Llechell east	Cattle track	3 in 2002	2
SM7919926259 - SM7920926272	Waun Llechell 'causeway path'	Wet section of path at end of causeway	c.50, 2002	c.50
SM7908126258	Waun Llechell	Wet area	200+	Not counted – perhaps a few dozen in this area
SM7911826239 SM7914526302	Waun Llechell	Old track	300+	Not counted – dozens of plants in this area
SM7789325939	Waun Fachelich boardwalk	End of stream / flush channel	20 in 1999	50-100
SM7792425890	Waun Fachelich, centre of flush	Mid-section of stream / flush channel and adjoining cattle path to south		25-50
c.SM7800025747	Waun Fachelich south	Wet areas in <i>Molinia</i> / <i>Juncus</i>	c.40 around this GR inn 2002	100-200
SM79092656	Waun Tresais (non-SSSI)	Poached area on footpath through wet semi-improved field	1 in 2003	0





*Ranunculus tripartitus* following stock path out across shallow water at Waun Fachelich, flush centre



Relatively enriched vegetation, presumably associated with historic diffuse pollution from the airfield creation, is frequent as here at SM7953126168



Site Name	PORTHMELGAN VALLEY, ST DAVID'S HEAD ST DAVIDS PENINSULA COAST SSSI
Ranunculus tripartitus GR	Location A – pond (SN0900204078) Location B – <i>Molinia</i> / willows (SM73431 28386, now centred on SM73442 28379) New Location C – stream below willows (SM73414 28342) New Location D – stream between pond and willows (SM73300 28230) New Location E – puddle on path at top of valley (SM73603 28645)
Ranunculus tripartitus re-found?	Yes. In or near both original locations, also extended and new populations.
Population size (count)	Total count a minimum of 104 plants, but small plants hidden in stream channel vegetation are likely to have been missed.
Past population info where known	Although first recorded in 1952, it was not seen between 1963 and 2000. Modern records start following partial clearance of the shallow pond on the streamline in the late 1980's. This population (A) has persisted but only numbered 4-6 plants. A second population (B) was first noted in 2004, where 70-90 plants were counted in the wet open runnels between <i>Molinia</i> tussocks to the north-west of a clump of grey willow.
Current Population info	A small increase was apparent at Location A, with 10 plants at the edge of the vegetation mat on the north side of the pond, and 1 plant in the open water. The population at Location B seems to have shifted, as all plants were under the willows rather than in the adjoining <i>Molinia</i> . 43 plants were noted in the c.20cm of standing water here, many partly obscured by the accompanying <i>Potamogeton polygonifolius</i> . Just downstream from this patch of willow is a further sub-population (C). This is in the stream-channel, centred on a point where the stream passes through a line of rocks (perhaps an old boundary). A minimum of 25 plants are present along a 10m stretch of this stream, many small and hidden in the stream vegetation. A single plant was found in a similar context at a new location (D), between the willows and the pond. 20 plants were found in a 2x2m shallow pool / puddle on the main grassy path near the top of the valley.
Historic management info where known	Location A is an old pond, partly cleared in the 1980s. Location C is perhaps associated with an old boundary / stream-gate feature.
Recent management info where known	The site has been grazed with Welsh Mt ponies for 20 years of more now. Location B was considered a pinch-point, with ponies moving between the willows and the blackthorn scrub above; the spread of the plant into the willows has presumably been encouraged by ponies seeking shade, shelter (eg. from flies) and ivy and willow leaves to browse on. Birders looking for migrants in these bushes will have assisted with summer trampling. Location C was dominated by reed <i>Phragmites</i> until the late 90's; one particular pony developed a taste for it and then the herd followed and quickly eradicated it. This and Location D appear much more open than 10 years ago due to sustained grazing pressure. Location E is maintained by people walking and pony trampling.
Management Regime ok?	OK, good
Success of recent Ran trip work?	No specific work carried out.
Potential for new Ran trip work?	Not really possible or necessary. Clearance of tall <i>Molinia</i> tussocks and other streamside vegetation below the pond, possibly accompanied by some re-profiling to create shallow 'bays' was proposed by the author in the early 2000's, but was not be countenanced by the relevant



	archaeologists. They will not sanction any machine work, excavation or flailing. NT warden carried out some very minor work with hand-tools, but this has not resulted in new plants.
Estimated Costs	n/a



Location E, St David's Head



Location C (left) and D (right), St David's Head



Site Name	TRELEDYDD FAWR MOOR
Ranunculus tripartitus grid reference	See below
Ranunculus tripartitus refound?	Yes
Population size (count)	c.300-350
Past Population info where known	c.65-70 in scattered locations, on northern boundary where not refound, and on southern boundary and central cattle tracks where now increased.
Current Population info	See table below
Historic Management info where known	Southern boundary population is associated with ancient gateway on to common. Common is presumed to have been well used by commoners for grazing, clay excavation etc.
Recent Management info where known	Cutting and grazing stimulated through Pembrokeshire Living Heathlands project (c.2003-6) following a period of neglect. Grazing perhaps subsequently less, but some pony and/or cattle grazing in 2014.
Management Regime ok?	Smaller area west of road is well-grazed; main eastern area is undergrazed and eutrophication is apparent along northern edge where populations were previously scattered. Large population on southern boundary is mainly a response to recent disturbance by fencing contractors.
Success of recent Ran trip work?	
Potential for new Ran trip work?	Yes, but would be best achieved as part of wider St David's commons project addressing eutrophication. Several areas along the northern boundary would be worth removing enriched sediment from, particularly if it could be returned to the adjoining farmland.
Estimated Costs	Significant if part of wider project



Grid Reference	Name	Description	Previous High Count	Count
SM7569027018	Southern boundary of common	Slop in gateway onto common	40 in 2003	250-300
SM75692700	Southern boundary of common	Boundary pool south of slop in gateway		c.30 including probable x novae-forestae
SM7565227022	Riverside field adjoining common	Poached path south of gateway		1
SM7574027098 - SM7572727054	Central heathland area	Cattle track off wet heath		c.25
SM7565827398	West of minor road by Rhos y gadw	By electric fenceline		1
SM7586127199	Northern boundary	Tractor rut	5 in 2003	0
SM7569227222	Northern boundary	Pinch-point crosses a seepage that comes out of the corner of the field	5 in 2009	0
SM75822718	Northern boundary	3 x 2 paces of small flush just below fenced hedgebank	16 in 2003	0
SM7580627110	Central heathland area	Cut strip / cattle track	1 in 2003	Not found





West of minor road by Rhos y Gadw, Treledydd Fawr



Cattle track off wet heath, central heathland area Treledydd Fawr



Site Name	WAUN FYNNON CLUN
Ranunculus tripartitus grid reference	SM9390138749 - SM9388838828 (track) SM9393538751 (stream/flush channel)
Ranunculus tripartitus refound?	Yes
Population size (count)	c.125-150
Past Population info where known	This well-established population has been regularly counted. A maximum count of 200-250 plants was made in 2000. The most recent count was of 34 plants in 2009, with a spread out from the core location in the centre of the track noted.
Current Population info	125-150 along firebreak / track running north through common. A single plant in stream / flush channel to the east.
Recent Management info where known	Pony grazed in summer. Firebreaks mown, and tractor ruts created. Willow cutting last year. Water quality appears ok in the centre of the site, but the edges of the common to the north and west appear greener and hold <i>Ranunculus hederaceus</i> instead, suggestive of nitrogen enrichment.
Management Regime ok?	Yes
Success of recent Ran trip work?	n/a
Potential for new Ran trip work?	It would be desirable to remove willow stumps by digging or winching, as the cut stumps don't appear to have been treated and coppice regrowth is likely to produce dense multi-stemmed bushes again in a few years. Disturbance and small pools created by this approach would encourage further spread of the population. However, there would be logistical issues with this approach, primarily with disposal, and it would only be a viable option if the stumps could be used off-site as planting material or similar.
Estimated Costs	n/a





Start of main track population, and single plant in stream flush channel to the east, Waun Ffynnon clun



Site Name	WAUN ISAF
Ranunculus tripartitus grid reference	1) SM7470824783 2) SM7467924709 -SM7469324747 3) SM7465024688 - SM7465724705 4) SM7464224738 5) SM7470224867
Ranunculus tripartitus refound?	Yes, although further southern and western populations not located
Population size (count)	40-50
Past Population info where known	Location 3 had a high count of 63 plants in 2003 Location 4 was a new location with hundreds of plants in 2005.
Current Population info	Location 1 is a small pool, with c.30 plants in the water along the southern and eastern margins. Location 2 is a mown strip, with 7 plants in tractor ruts. Location 3 is a wet, trampled section of path alongside the central stepping stones with 7 small plants on the mud. Location 4 is a deep pool alongside the hedge-bank (plants no longer present here). Location 5 is the main pool, with 1 plant in the water on the NW side (a new location)
Recent Management info where known	<i>Crassula helmsii</i> control measures have apparently been taken, and plants / spoil are heaped up at the site entrance and covered with black plastic. The main pond has been rejuvenated in the process. A few narrow firebreaks have been mown, with a wheeled tractor and a flail without collection facility.
Management Regime ok?	No The site is un-grazed or under-grazed, and Ran trip plants are confined to pool edges, paths and tractor ruts on firebreaks. The site is small and surrounded by intensively managed fields – eutrophication impacts are clearly apparent, and have made one previous Ran trip location unsuitable. Issues with invasive non-native aquatic plants may still be ongoing. No <i>Crassula</i> was noted, but <i>Phalaris arundinacea variegata</i> in the first wet area beyond the car park is perhaps indicative of how prone this site is to ‘fly-tipping’ of pond plants.
Potential for new Ran trip work?	Perhaps not viable without a sustainable grazing regime in place. Further cutting could be more closely aligned with the wetter flush channels. Mowing could be lower, with arisings removed. Long-term solutions need to be found to the eutrophication issues here, as with on the other smaller St David’s commons. Here, this would be an expensive operation involving removal of enriched sediment, particularly from alongside the north-eastern and south-western boundaries. This would require sensible use off-site in conjunction with a sympathetic nearby landowner. The ploughing pattern on the arable fields to the east would benefit from being changed to reduce run-off, and creation of a buffer strip. This would require agri-environment scheme or NRW/PCNPA management agreement. The valley to the West, Merry Vale, looks from aerial photography to have suitable Ran trip habitat (around SM7436324930 - SM7432324817 - SM7435324785) and would benefit from survey.
Estimated Costs	£1000’s





Location 3, Waun Isaf



This large area of enriched vegetation by the Waun isaf car park may be suitable for excavation



Site Name	WYNDRUSH PASTURES SSSI
Ranunculus tripartitus GR	Location A (SN0900204078 / SN0899004087) Location B (SN0891104203) Location C (SN0889804390) Location D (SN0917603476)
Ranunculus tripartitus refund?	Not at original locations, where not seen now since a single plant in 2011 and 2012. Found at a new location on the Minerton Farm part of the SSSI (Location D).
Population size (count)	2
Past population info where known	The plant was found here by the author in June 2002. This followed mechanical clearance and fencing of the farm boundary by the previous owner. Location A initially had 2 plants by the gate, and a single plant 10m further west along the fenceline. Location B held 8 plants. Location C, not recorded on the BSBI spreadsheet, had a similar or smaller number. <i>Ranunculus omiophyllus</i> , and possible <i>R. x novae-forestae</i> , was recorded at Locations A and C.
Current population info	2 plants were noted on the northern edge / outflow of a small pond next to a boulder at the edge of the marshy grassland where it meets a boundary bank and willow scrub.
Historic management info where known	Location A has an old metal gate indicating continuous use as a gateway in the recent past. Location B is associated with a 6' gap in the boundary bank which may once have had a hunting gate to allow access between farms (the South Pembrokeshire hunt regularly chased foxes over this land, known to them as 'Twigg's Moors'). Location C is a wet area on the farm boundary where the old road to Tenby (in times of horse-drawn transport) once entered – there are multiple banks and a row of mature oak trees here.
Recent management info where known	The site has a long history of beef cattle grazing, continued by the author as present owner. Location A, which held plants for 10 years, has been actively disturbed with the herd of up to 20 cattle being driven through this gateway once or twice a year. Trampling with wellies and a small amount of cutting back of willow has also been carried out. Location B lies outside of the fenceline, and although it receives some trampling by the horses in the neighbouring woods, it is shaded by bramble and bushy growth. Location C is still cattle trampled, but does not receive the deeper disturbance which would perhaps have brought the buried seed to the surface in 2002. It is heavily shaded by mature oaks. Location D is part of Minerton Farm, and this field is topped in summer and cattle grazed. The age of the pond is not known, but at least 15 years old. It is presumably used by cattle to drink from, and the clay edges are lightly poached.
Management Regime ok?	OK, although grazing now potentially too light
Success of recent Ran trip work?	Small-scale disturbance at Location A has failed to maintain the population. The plant has not naturally spread to other potentially suitable 'slops', or the shallow ponds dug at the top of the farm. The latter have <i>Ranunculus hederaceus</i> and <i>R. omiophyllus</i> , which perhaps indicate that the water is not as oligotrophic as <i>R. tripartitus</i> requires.
Potential for new Ran trip work?	There are 6 'slops' elsewhere on the SSSI (3 in my ownership and 3 on Minerton Farm) which are now potentially more suitable than the original locations. One Minerton location is through the



	<p>hunting gate where the fox hunt rode between farms, so may have buried seed. There are two further slops a short distance to the east of Location D.</p> <p>The scrub surrounding all these slops could be cut back to allow more light in, and they could be actively disturbed with machinery or hand tools. Clay could be excavated from Location A and transferred to one or more of these new slops, in an attempt to activate seed banks. Extension of clay pools at the top of the farm could make these more suitable.</p> <p>Realignment of fencing at Location B, coupled to scrub removal and disturbance, could be attempted.</p>
<p>Estimated Costs</p>	<p>Slop work – c.2 days £350-400. Pool extension, minimum of 2 days for machines and operators c.£1000. Fenceline realignment c.£150 for part, £450 for all</p>



Plant in newly discovered location, Wyndrush Pastures



Site Name	YSGEIFIOG MOOR
Ranunculus tripartitus grid reference	SM80592790 etc.
Ranunculus tripartitus refound?	No
Population size (count)	0
Past Population info where known	c100 plants in scattered location, noted by CCW Phase II survey in 2003. Some populations refound in 2005
Historic Management info where known	Previous Ran trip locations are mostly associated with a central track, and the gateways off this in to the historic individual enclosures.
Recent Management info where known	Main part of site, with all previous records, now completely ungrazed. Some cattle grazing during previous summer now apparent on western part of site
Management Regime ok?	No
Success of recent Ran trip work?	
Potential for new Ran trip work?	Stimulation of grazing is the key here, no other actions would be worthwhile.
Estimated Costs	Not known; requires management agreement



Central 'trackway' fen, Ysgeifiog Moor