

Loch Lomond

Twenty four sample points were considered.

Hydrological characteristics: Areas of permanent fresh water are varied throughout this site and include the River Endrick, eastern shores of Loch Lomond, shallow bog areas (Aber Bog, Gartocharn Bog and Bell Moss), standing open water (Wards Pond) and running burns (Aber Burn). The majority of this open water is <1m in depth, excluding the River Endrick and Loch Lomond which exhibit deeper water. The main use of the majority of open water areas within the reserve are for nature conservation, however, illegal angling activity is apparent. Loch Lomond and the River Endrick do exhibit busy use, especially boat and angling activities. Access to much of the site is currently absent, with most activity occurring on footpaths associated with the Loch Lomond shore.

Water level management is generally only practiced to ensure open water remains at Ward Pond, as such these should be maintained year round to encourage beaver use and inhabitation. Increasing water depths here without interfering with any management plans for waders or geese, could serve to encourage use of this area by beavers. Regular fluctuations in water levels here would be likely to discourage inhabitation (not not necessarily use, e.g. feeding) or encourage damming activity.

Vegetation and banks: The majority of this site consists of flood plain fen, grassland, bog and mire, with smaller areas of wet woodland with scattered pools of open water. There are a series of burns that run through the site and drain into the River Endrick which connects to Loch Lomond. Many of

these burns associate with more mature broadleaf woodland in the eastern part of the site, travelling through areas of wetwood and willow carr in the central regions (Figure 29). However there are also long stretches with no woody species where aquatic and emergent vegetation dominates. Given the area covered by these ditches and the complexity of the system, this is presumed to offer rich feeding opportunities for beavers and the predominance of willow would provide a productive source of woody material. The vegetation associated with the other main fresh water environments within this site differs. Along much of the River Endrick vegetation is grazed to the bank edges, which are prone to natural collapse and erosion, which would discourage lodge formation. In such areas aquatic and emergent vegetation tend to be lacking and trees are mature and sparse. Lack of regeneration may be an issue here, with tree cover especially being removed without replacement with beaver selective felling and regeneration prevention through live stock grazing (Parker *et al.* 2000). There a few smaller patches of broadleaf woodland along the river bank, which in parts can include good stands of willow and more burrowable shores, or at least fixed features (tree root mass) that would facilitate lodge building and be likely locations for such (Figure 30).



Figures 29 & 30. Bank structure and willow carr associated with Aber Bog. Parts of River Endrick have wooded sections and suitable banks, however grazing to river edge results in low regeneration and long strches of more open banks.

Vegetation along the part of the Loch Lomond shore included in this site tends to be composed of either mature broad leaf woodland in the east and open grassland in the west. Emergent and aquatic plants tend to be lacking in both areas. Substrate at each does not also favour burrowing being either quite rocky or sandy in nature (Figure 31). Although not surveyed in this report large parts of Loch Lomond and its associated island offer suitable habitat (woodland and wetland) for beaver occupation. These shores do experience more wave action, which may discourage beaver use for lodge building but given the large area of suitable fresh water and associated vegetation, including a large number of islands means the potential carrying capacity for this area would be high.



Figures 31 & 32. More unfavourable bank structure tends to occur along the Loch Lomond shore line included in the reserve (sandy or rocky), and parts of the River Endrick which can have quite sandy substrate and prone to collapse.

Bank structure and composition varies throughout the site. In areas such as Aber Bog, Gartocharn Bog and Bell Moss, burrowing would be more difficult and prone to flooding. Beavers are likely to adapt to these conditions by creating more free-standing lodges and/or seeking out the stretches of burns that have steeper banks or those associated with wet woodland areas, which offer more burrowing opportunities or more complex base structure (tree roots for example) in which to support bank lodge building. The River Endrick offers more suitable burrowing opportunities given its bank height and friable soils, however the sandier substrate in many parts may encourage bank collapse and erosion with may be a source of conflict (Figure 32). Stretches of river bank with tree cover would be expected to offer favourable lodge building locations.

Anthropogenic factors: Currently anthropogenic disturbance is low throughout much of this site as former paths are not open to the general public and most walking activity occurs around the shoreline of Loch Lomond. Boat and angling disturbance is evident on the River Endrick, the main body of Loch Lomond and on the Ward Pond (no boat use). Surrounding land use is predominantly improved grassland with extensive grazing throughout. Therefore organic pollution in the form of agricultural run-off is present throughout most of the site, with inorganic pollution being associated mainly with the caravan park to the west of the Aber Bog, and power boat use on Loch Lomond. Overall however water quality is generally good throughout the site.

Dispersal potential: The potentially suitable habitat available within a 50km radius of this site is high and includes all of the Loch Lomond and the Trossachs National Park, including Queen Elizabeth Forest Park, Loch Ard Forest, Strathyre Forest, Argyll Forest Park, Ben More Forest and the northern end of the Clyde Muirshiel Regional Park. This area contains numerous interconnecting water bodies from large loch systems, sea lochs and a number of significant river catchments with numerous tributaries. Loch Lomond is a regional where several catchments come together, so connectivity is high. There are also areas of high ground and with steep waterways that may deter beaver dispersal.

Although some catchments are separated by sea lochs these should not be viewed as complete barriers to beaver dispersal.

In theory Loch Lomond could be an ideal release location to encourage beaver dispersal. Strategically this could act as a corridor to facilitate the meeting and gene-flow of the two currently existing Scottish beaver populations. However, the potential for animals to disperse into the greater Glasgow area is high.

This site scored highly on potential carrying capacity, given the amount of tree lined water bodies on and the complexity of the fresh water system, particularly in the north and east of the 50km radius. Potentially damaging effects of beavers on the majority of the habitat is presumed to be low given the lack of farmed and arable land, being largely forest and high ground dominated. However, large amounts of urban and developed areas are present in the southern part of the radius, which therefore increases the potential for human-beaver conflicts.

Additional considerations: The reserve is a designated SAC/Natura 2000 for its populations of river (*Lampetra fluviatilis*) and brook (*L. planeri*) lamprey, and Atlantic salmon (*Salmo salar*). Beavers are unlikely to have any impact on these species within Loch Lomond and the River Endrick, but further evaluation in relation to the impact of any potential damming activity on the burn system throughout the reserve is recommended. Many of the burns are dammable, although this should not be seen as a complete barrier to fish movement but this may require monitoring and potential management in the future. Damming at some points may impact on access routes so monitoring and management may be required (Figure 33). Given the topography of the main body of the reserve, water flow and the structure of water courses (Figure 4) allowing beavers to dam at various points could serve to slow water drainage into the River Endrick and create a series of pools that may be favourable for biodiversity objectives. Ecological services of any damming such as water management and water purification should be subject to further considerations, especially in relation to long-term benefits including improving water quality entering Loch Lomond.



Figure 33. Some access routes around the reserves and field margins may become waterlogged or put out of use if favourable water courses nearby are dammed.

Water management that results in large fluctuations within the reserve, especially in relation to open water at Wards Pond may serve to discourage beaver use of these areas particularly for

burrow/lodge construction, or may encourage damming activity in areas which may not be so suitable. Gradual change in levels would be less felt by any beavers but this area offers productive feeding and if water levels could be raised above current levels this could provide great habitat. Any management practices involving scrub clearance in this area should be reconsidered, beavers could act as a management tool in the future if some scrub is allowed to develop closer the shoreline.

A small number of houses, including gardens border this reserve although the potential of any resultant beaver impact may be low scale, perception may be significant locally. Pre-release preparation would be advised with neighbouring properties and preventative measures including garden fence re-enforcement and/or wiring of trees should be considered. Socio-economic benefits may be witnessed especially for local accommodation providers such as the caravan park and local BnB's, with guided walks and observation hides potential areas for development on site.