

# Stunning Stoneworts

## Introduction

Peer through the crystal-clear water in an old brick pit and you may see a carpet of emerald green whorled vegetation, encrusted with calcium and bustling with life. Look closely and you will see that these are not plants as we know them, they are stoneworts. Stoneworts are a unique group of complex algae that look similar to vascular plants found elsewhere on the land and in water.

Stoneworts, otherwise known as *Charophytes*, are extremely sensitive indicators of good water quality. They need clean, unpolluted water to survive. As the quality of our fresh and brackish water bodies has declined, so have these amazing algae. Out of the 28 native species of stonewort in the UK, over half are listed in the Red Data Book or are Nationally Scarce (Stewart and Church, 1993). They are among the most severely threatened group of plants or animals in the United Kingdom (Stewart, 1996).

Within the Bedfordshire, Cambridgeshire and Northamptonshire area, the commoner species of stonewort can be widespread. These species can turn up in unexpected places, providing there is good water quality, including water troughs and vehicle ruts. Due to its location and history of industry, our area is also home to important assemblages of rarer species.

Stoneworts get their name from their encrusted appearance as they build an external skeleton of calcium carbonate. They live in water bodies up to 10m in depth and as many have an annual life cycle, they can be some of the earliest colonisers of newly formed water bodies. They are an incredibly important part of aquatic ecosystems and help to ensure the water is suitable for a wide range of aquatic life by reducing flow rates and aiding sediment deposition (Lambert, 2009).



### A list of stonewort species recorded from the Bedfordshire, Cambridgeshire and Northamptonshire area since 2000

EN = Endangered,  
NS = Nationally Scarce  
S8 = Section 8 of the Wildlife and Countryside Act.

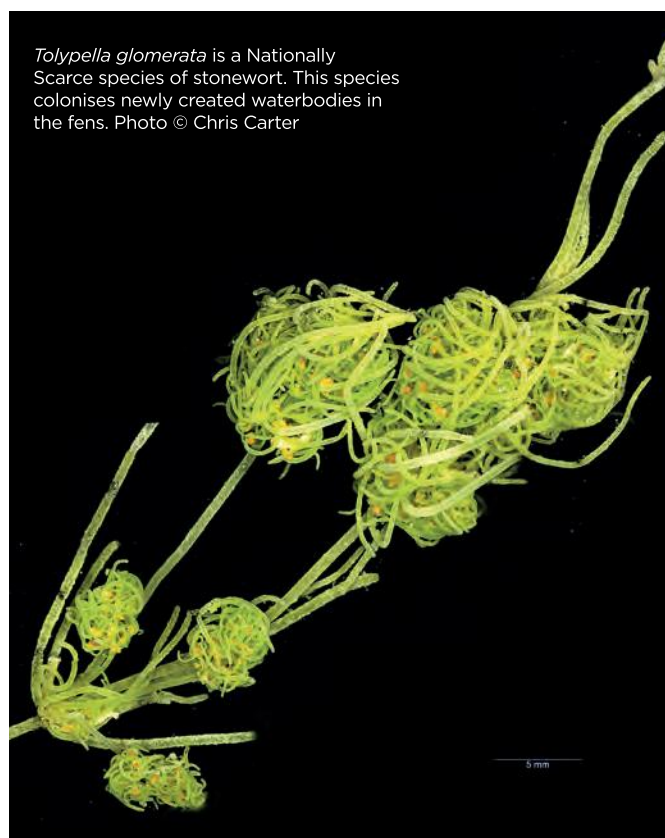
*Chara aculeolata* (NS)  
*Chara aspera*  
*Chara canescens* (EN, S8)  
*Chara contraria*  
*Chara contraria* var. *hispidula*  
*Chara curta* (NS)  
*Chara globularis*  
*Chara hispida*  
*Chara virgata*  
*Chara vulgaris*  
*Chara vulgaris* var. *longibracteata*  
*Chara vulgaris* var. *papillata*  
*Nitella flexilis* (NS)  
*Nitella mucronata* (NS)  
*Nitella mucronata* var. *gracillima* (NS)  
*Nitella opaca*  
*Nitella tenuissima*  
*Tolypella glomerata* (NS)  
*Tolypella intricata* (EN)  
*Tolypella prolifera* (EN)

Stoneworts are a type of algae that grow in fresh and brackish water. They get their name from their encrusted appearance as they build an external skeleton of calcium carbonate. Photo © Judy Webb

## Stoneworts in the fens

The Cambridgeshire fens, extending into the edges of Norfolk and Lincolnshire are one of most species-rich areas for stoneworts in the country, with over half of the British stonewort flora recorded from this area (Stewart, 2004). Many stonewort sites in the Cambridgeshire fens have disappeared or lost their interest (Stewart, 1996). Many ditches in this area are now dominated by coarse fen vegetation, which makes them unsuitable for stoneworts (Stewart, 2004).

In some cases, the main interest lies in the ditches not connected to the main drainage systems, but these are often undermanaged. The regular cycle of ditch cleaning of main waterways provides the early successional stages that stoneworts require. *Tolypella prolifera* and *Tolypella intricata* are both Endangered in the UK and are characteristic of recently managed fen drains, establishing one or two years after disturbance. These two species are more frequent in the Fens of Cambridgeshire and South Lincolnshire than anywhere else in the UK (S. Lambert, 2020, pers. comm.). Freshly created or disturbed ponds within the fens are of particular importance too (Stewart, 2004).



*Tolypella glomerata* is a Nationally Scarce species of stonewort. This species colonises newly created waterbodies in the fens. Photo © Chris Carter

## Peterborough and Whittlesey brick pits

Peterborough and Whittlesey have long been famous for brick making, and this has left behind a series of abandoned clay pits on the south and east sides of the city. Some of these clay pits are now amazing habitats for a wide variety of species. One such example is Orton Pit where clay was excavated in channels creating lines of ridges and troughs. These troughs filled with water over time and were colonised by wildlife.

Today, these linear ponds provide a remarkable example of aquatic succession. Moving across the site, each line of pools is around a year younger than the one before it (Stewart, 1996). At Orton Pit, 10 stonewort species have been recorded (Stewart, 2004), this is over a third of all species found in Britain. This includes large populations of the Endangered bearded stonewort *Chara canescens* and the Nationally Scarce hedgehog stonewort *Chara aculeolata*.

*Chara canescens* is usually found in brackish water, so is unusual inland and forms the only English population. This species is also listed on section 8 of the Wildlife and Countryside act. The Peterborough and Whittlesey Brick Pits are of European importance for their stonewort flora.



### Stoneworts of the Peterborough Brick Pits

EN = Endangered, NS = Nationally Scarce, S8 = Section 8 of the Wildlife and Countryside Act. (Stewart, 2004)

*Chara aculeolata* (NS)  
*Chara aspera*  
*Chara canescens* (EN, S8)  
*Chara contraria*  
*Chara curta* (NS)  
*Chara globularis*  
*Chara hispida*  
*Chara virgata*  
*Chara vulgaris*  
*Nitella flexilis* agg  
*Tolypella glomerata* (NS)

*Chara canescens* is an Endangered species. The only English site for this species is the Peterborough Brick Pits. Photo © Chris Carter





Dogsthorpe Star Pit is made up of a series of ponds, with new ponds being created on a rotational basis; this provides the perfect home for a variety of stoneworts including some rare and scarce species. Photo © Josh Hellon

## Stoneworts on our reserves

Stoneworts are found on a number of our reserves including Cople Pits, Barnes Meadows, Dogsthorpe Star Pit, Felmersham Gravel Pits, Pitsford Water, Summer Leys, Titchmarsh, Upwood Meadows and Woodwalton Fen.

As part of the Great Fen Project, two areas were surveyed in 2019; these were Engine Farm and Rymes Reedbed. During the survey, seven stonewort species were recorded, including the Nationally Scarce Clustered Stonewort *Tolypella glomerata* (Lambert and Kirby-Lambert, 2019). Woodwalton Fen, now a Wildlife Trust reserve, also has records for five stonewort species. The reserve forms part of the Ramsey Fens Important Plant Area, which is of European importance for its stoneworts (Stewart, 2004). The ditches here are maintained to ensure some are suitable for stonewort species. The Great Fen project is creating a wide range of water bodies, many of which will be suitable for stoneworts, as long as new waterbodies are continuously created or kept at an early successional stage. It is clear that the area is already important for this fascinating group and it has the potential to become increasingly important.

Dogsthorpe Star Pit is an old clay pit and is the perfect home for a variety of stoneworts including some rare and scarce species. Removing encroaching vegetation ensures areas of open water and early successional ponds are maintained. Our gravel and chalk pits usually have fewer species of stonewort than smaller waterbodies but can support large populations of these species. Areas of the river Nene, especially the backwater channels, can support large stonewort populations including species in the genus *Nitella* which are adapted to living at the bottom of these channels.

Outside of our reserves we actively carry out surveys on a wide variety of local wildlife sites, several of which are designated for their stonewort floras. We provide advice to landowners to ensure that the habitat is managed appropriately for these species.



The creation of new ponds is often important to create the early successional habitats needed to support stoneworts. Photo © Amanda Kent



## Stonewort conservation

Over half of the species of Stonewort in the UK are listed in the Red Data Book for this group or are Nationally Scarce. Therefore, proactive conservation measures are needed to conserve these species. Eutrophication is quite possibly the biggest threat to stoneworts due to their high sensitivity to nutrients. Succession is thought to be the second biggest threat, as stoneworts thrive in newly created or disturbed habitats and cannot compete with vascular plants in many cases. Encroachment from common reed *Phragmites australis* is a key component of this problem and needs to be actively managed.

The decline of the brick-making industry is also negatively affecting stoneworts in the area. The Whittlesey brickpits is the only brickpit in the Peterborough area still carrying out excavations and therefore providing extensive new stonewort habitat. It is difficult and expensive to maintain extensive early successional stages once the extraction has ceased. If left undisturbed the waterbodies become rapidly less suitable for stoneworts due to succession. Other problems facing stoneworts include sedimentation, non-native species, grazing by waterfowl and sea level rises (Lambert, 2009).

## Acknowledgements

Our thanks go to Chris Carter for information for this case study and use of his spectacular images. Thanks also to Sarah Lambert who commented on the draft and provided additional information. We would also like to thank Plantlife International for access to their Important Stonewort Areas report.

## References

- Lambert, S. (2009). *Stoneworts: Their habitats, Ecological Requirements and Conservation*. Bristol, UK: Environment Agency.
- Lambert, S. and Kirby-Lambert, A. (2019). *Great Fen Stonewort Survey*. Unpublished.
- Stewart, N.F. (1996). Stoneworts - Connoisseurs of Clean Water. *British Wildlife*, 8(2), pp.92-99.
- Stewart, N.F. (2004). *Important Stonewort Areas: an Assessment of the Best Areas for Stoneworts in the United Kingdom*. Salisbury, UK: Plantlife International.
- Stewart, N.F. and Church, J.M. (1993). *Red Data Books of Britain and Ireland: Stoneworts*. Peterborough: Joint Nature Conservation Committee.