A Preliminary Survey of the status of the Bourne Stream

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by

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Abstract

The Bourne Stream a small seasonal tributary of the River Wey has been surveyed photographically in some detail in order to assess the environmental problems of this waterway and to evaluate the feasibility of its restoration by volunteers of the Bourne Conservation Group. The survey considers the stream in three sections:

1. A rural section from the source to Sandrock Hill Road

2. An urban section from Sandrock Hill to Redhill House

3. Another rural section from Redhill House to the confluence with the River Wey.

A series of problems are identified. Some of these are serious and are a potential source of serious pollution to the main river, particularly when the Stream is in spate after heavy rain. Some can be resolved by volunteers, but others are well beyond the capabilities of a voluntary task force, and are deemed ultimately to be the responsibility of a variety of agencies and the riparian owners. Notifying the riparian owners in the urban sector of their responsibilities will be difficult, but would probably make an important contribution to a contingency emergency plan for flood emergencies. A coordinated effort is required to resolve of these problems. It is proposed that the restoration of the Bourne Stream would make an ideal pilot sub-project for the Wey Valley Catchment programme.

1. Description of The Bourne Stream

The Bourne Stream is a small seasonal watercourse located between the River Wey North Branch and the River Wey South Branch in Farnham, Hampshire (Figure 1), and has an estimated catchment area of 6.16 km^2. It rises in the Alice Holt Forest as the outflow of Lodge Pond. This pond is an artificial lake dammed before 1974, which is now maintained by the Forestry Commission as a recreational and conservation water body. The Stream flows NNE through The Bourne via a deep valley incised initially into gault clay and lower down into Greensand deposits of the Folkestone Beds. It flows into the north branch of the River Wey about half a kilometre downstream of the Compton Bridge and just over a kilometre upstream of the Waverley Bridge and the double weir near the ruins of Waverley Abbey.

The flow is very responsive to local rainfall and the Stream is reported to have flooded three times in the last 20 years. The most serious incident was in October 2000 when a few houses in the middle reaches were inundated.

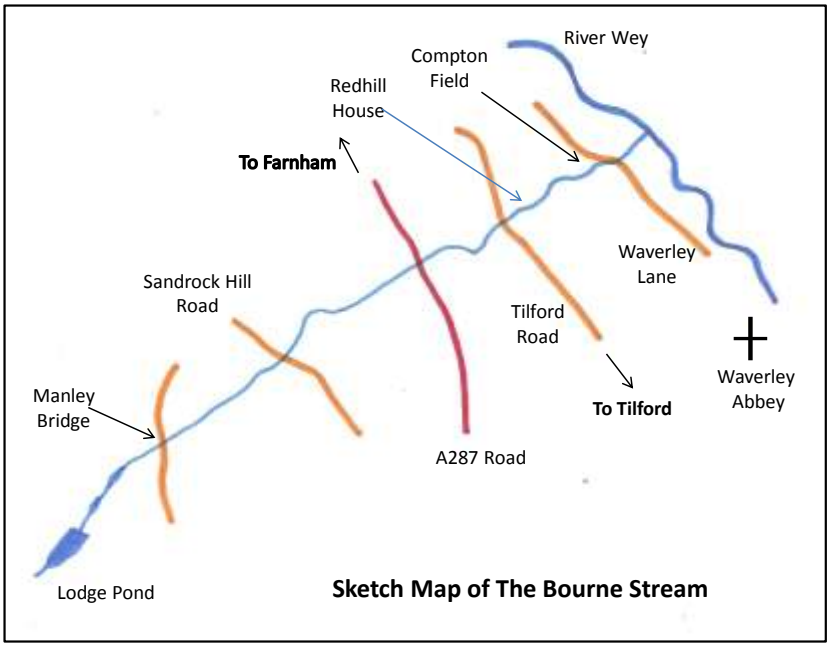

Figure 1

Figure 1 shows a Sketch Map of the stream from Lodge Pond to its confluence with the Wey. The main road bridges are shown and using these it is possible to define the three sectors of the stream used in the survey described in this report. The boundaries between these sectors are somewhat arbitrary and will be subject to change as a result of the on-going development (urbanisation) of Farnham. At present The Bourne Conservation Group finds it appropriate to define these three sectors as:

Sector 1. From the source(s) in Alice Holt Forest through Wrecclesham and Rowledge to Sandrock Hill Road.

Overall this is essentially rural in nature. The Lodge Pond to Manley Bridge section has many rural characteristics but in Rowledge the stream has in many places been incorporated into the gardens of residential properties. Two small lakes constructed post 1978 where once there were clay pits associated with brick making drain into the water course and there are other small tributary watercourses.

Below Manley Bridge the stream flows through farmland and the inflow is progressively from local drainage and an assortment of pipes that come from road drains.

Sector 2. From Sandrock Hill to Redhill House on the Tilford Road.

This is a predominantly urban stretch of the watercourse .The area is increasingly built up with many properties running down to the stream but there are also several public footpaths along some sections. At Ford Lane there is a water splash through which local traffic drives, and where inflows from road run-off is more direct. Further downstream the banks are culverted and are generally in a poor state of repair. It flows under the A287 near the Fox Inn where on the north bank (at SU845 452) is a bore hole that was drilled to a depth of 134m into the Folkestone beds and supplies water to the reservoir further north up the A287 road for the supply of drinking water to Farnham.

Any attempts to improve the landscaping of the valley in this central 'urban' section will face considerable challenges, because of:

1. The multiplicity of riparian owners;
2. The existing clumsy attempts to ameliorate flood risk,
3. The general lack of sympathetic maintenance by all concerned.

Sector 3. From Redhill House to the stream's confluence with the Wey.

Rural in nature, this is perhaps the scenically most attractive stretch of the stream. It flows through private land but there is a very pleasant public footpath known as Boreas Dene close to it between Tilford Road and Waverley Lane. Figure 2 below portrays this section in more detail. There are different views on the names of some of the fields but we have used the name Compton Field as shown with some confidence after consulting the Farnham Museum.

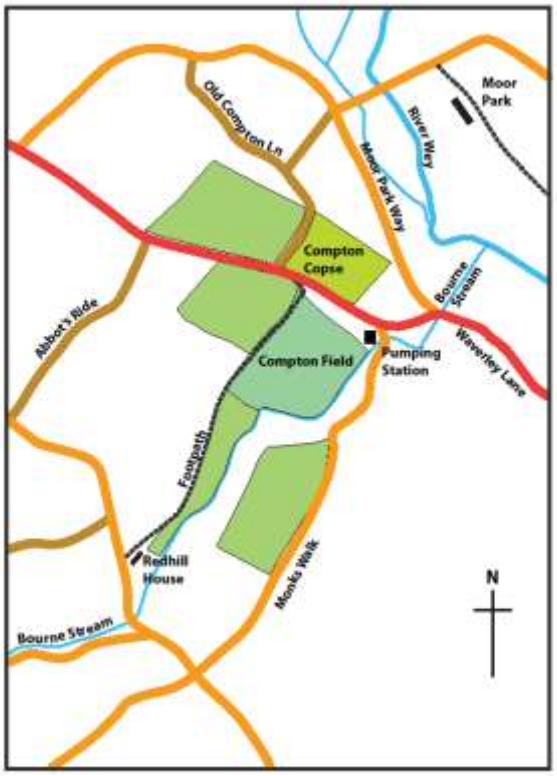

Figure 2. Detail of Sector 3

Survey method

A simple photographic approach has been adopted as the simplest means of illustrating the series of problems along the three sectors.

Sector 1. From the source in Alice Holt Forest through Wrecclesham to Sandrock Hill Road

Figure 3. There are two main sources in Alice Holt Forest. This is the main one that is Lodge Pond that drains into marshy ground and thence the water flows over a weir into another

Figure 4. At the southern end of Lodge Pond there is a marshy area that the Forestry Commission is planning to open up for recreation.

Figure 5. Through Rowledge there are stretches of attractive farmland but further downstream there are similar abuses to those found along the urban stretch.

Figure 6. Here a potentially small sandy cliff that is attractive and of high biodiversity values is scarred by a jumble of barbed

Figure 7. Here a private weir is acting as a barrier to the movements of fish and other aquatic animals.

Figure 8. The stream flows through farmland.

Figure 9. A large masonry block that has come to rest under a footbridge, along with untidy wire.

Sector 2. From Sandrock Hill to Redhill House on the Tilford Road

In general this section consists of a steeply incised, well-wooded valley which cuts a green swathe through The Bourne Ward which has a population of 3835. A few Victorian cottages are scattered along the stream, but since the 1960's there has been extensive house building close to the watercourse, for example in Kiln Lane, Fox Road and Stream Farm Close. There are a few open meadows which are in private hands, but these may be targeted for house building in the future. There are also some attractive and well used public footpaths which follow the stream bank, for example those grouped together as the 'Millennium Walk' from Ford Lane to Bourne Grove.

As indicated by its name, this stream has always been seasonal. In recent years it does seem to have remained dry for longer periods each year, and the flow has been as unpredictable as the rainfall. A study recently completed by SE Water at the behest of

OFWAT has found no good evidence to support this conclusion. When it flows The Bourne Stream is an attractive watercourse and is of great value to wildlife. When dry it accumulates litter of all descriptions as is so often the case in urban areas, some blown, some dropped in. This the longer periods of no-flow are probably having an adverse effect on wildlife and when it is in spate it inputs spikes of pollutants that have accumulated in the stream bed during the drought. For example, during this wet summer (2012) there has been higher than normal use of slug pellets in gardens. The active ingredient is metaldehyde which is not be removed by water treatment. So if there is another spate this summer the concentrations of metaldehyde injected into the main water course of the Wey are likely to exceed greatly the limits of acceptability.

Under heavy rain conditions the water level rises quickly and subsides equally quickly when the rain stops. This effect has intensified in recent years as a result of the increase in building in the catchment area leading to faster run-off from properties and roads. The risk of flooding remains. The Bourne Conservation Group has an informal report compiled by one resident which lists the flood events he has experienced. The latest was in October 2000 after some days of heavy rain although on this occasion we know of no houses being inundated.

The signs of measures, many of them ‘amateur’, taken to protect properties are apparent all along the stream banks, which not only detracts from their attractiveness but greatly reduces their value for wildlife. The photographs illustrate some of these flood relief structures, which include not only some substantial work undertaken by the local authority but also the wide assortment of *ad hoc* measures taken by residents to protect their homes and gardens. Many of these structures are in a very bad state of repair, and not only detract from the attractiveness of The Bourne Corridor but also have serious implications for the quality of water flowing into the main river.

The stream is now classed as a Main River from Browns Walk and the Environment Agency have a programme of annual maintenance to clear vegetation likely to cause obstruction.

Figure 10. An example of some *ad hoc* revetting along the bank of the public footpath near Sandrock Hill.

Figure 11. An example of the fate of such an *ad hoc* revetment.

Figure 12. Prefabricated revetment recently installed to protect commercial premises - no doubt effective against flooding but very unsightly and not at all wildlife friendly.

Figure 13. Here a boundary fence has become embedded in the stream's bank – not only unsightly but also ineffective.

Figure 14. An example of a most unattractive house boundary backing on to the stream, with a tangle of posts, netting and fence panels, which is unsightly and inimical to wildlife.

Figure 15. The crossing at the bottom of Ford Lane, where run-off from the roads can flow directly into the stream.

Figure 16. Formal flood defences at a choke point probably put in by Farnham Urban District Council. This has been a hot spot for Himalayan Balsam, but this invasive alien plant has been eradicated by The Bourne Conservation Group here and throughout the length of the Bourne Valley.

Figure 17. Sturt Walk – 'Footpath 215' the stream is to the right. This is one of the many public footpaths on land belonging to Waverley Borough Council that criss-cross The Bourne. The WBC is assiduous in mowing the grass under contract, but attempts are being made to change the mowing regime to encourage wild flowers. These footpaths are well used by local people.

Figure 18. Regrettably the attractiveness of Sturt Walk is marred by this attempt to provide protection from flooding for the property of an OAP. Surely there must be a better way!

Figure 19. An example of bad engineering. Collapse of this steep bank close to the bottom of Old Church Lane has resulted in local flooding in the past. If properly engineered this embankment could be made not only safer but also more wildlife friendly.

Figure 20.This is a more visually attractive type of revetment put in place by Waverley Borough Council in 2008. So far it has been effective in flood control, but it is not wildlife friendly and what happens when the wood rots?

Figure 21. At the bottom of Deep Dene is one of several foot bridges that cross the stream along the footpath network in The Bourne. Taken in a summer when the stream flow totally dried up, as has been the normal pattern over the years. The stream has always had a seasonal flow, but over the last few years does seem to have been drying out more frequently and for longer.

Figure 22. However, Deep Dene is a steep public footpath down which in heavy rain water cascades down into the stream. There is a loose sandy unauthorised car park on the right, which is contributing to the siltation of the stream bed at this point.

Figure 23. Alongside Bourne Grove, public highway, the stream's embankments tend to be unstable. This stretch is currently the subject of a dispute over ownership of the bank.

Sector 3 The rural stretch from Redhill House on the Tilford Road to the road bridge for the B3001

We have not been able to survey the final 100m stretch from the B3001 road bridge, since we have not been able to identify the riparian owner(s), but the stream flows through flood plain meadows grazed by stock and appears from the road to be in good order. Downstream from the road bridge near Redhill house, the stream flows through private land. To the south the ground slope steeply up and is covered with ancient woodland, which has been rather neglected and full of rhododendron is in need of good management. Along the north bank the stream is bordered by a long narrow field in which until recently free-range chickens have been kept and a couple of heifers have been grazed. Beyond that is Compton Field which is an exceptionally diverse and attracted unimproved meadow. Again until recently Compton Filed has been grazed by three horses and roe deer regularly graze there. Figure 21 shows a panoramic view of the stream valley taken from the north-west corner of Compton Field close to the gate on the footpath that leads along the north side of the Field and exits on to the B3001 close its junction with Old Compton Way at SU 861 459. This meadow is remarkably diverse and the woodland around it hosts many bats throughout the spring and summer.

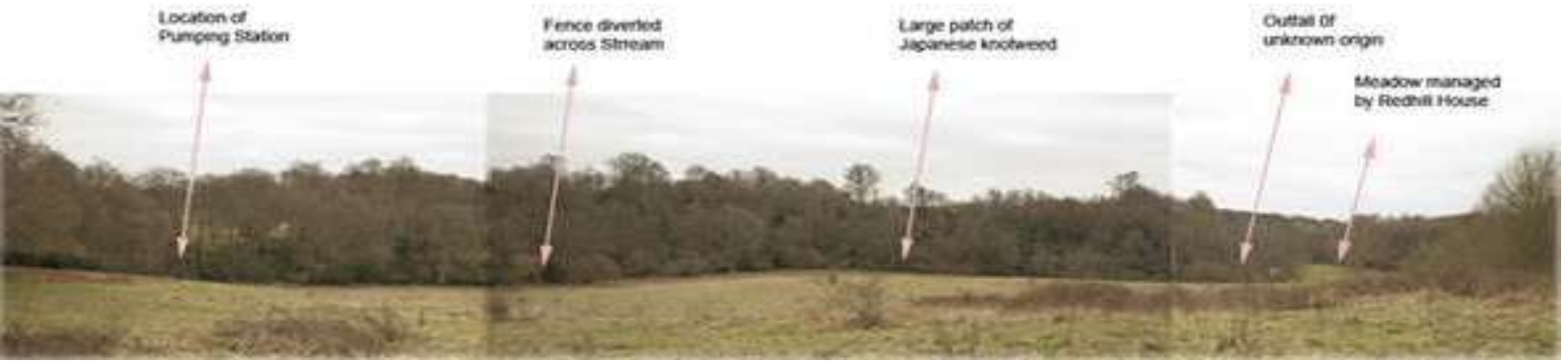

Figure 24 Panoramic view of Compton Field where the stream flows along the edge of the woodland.

We are aware of the owners of this land and are in touch with them but are no familiar with their long term intensions. However, with talk in the media of more green field development it will be important to ensure that any development safeguards the stream. However, at the present time, as will be shown below the quality of the stream as a habitat is compromised, and there is evidence of pollution and potential flood risk. On the left of the panoramic view is a pumping station that has an overflow that has been known to emit noisome discharges into the stream just

above the bridge that carries a minor road Monk's Walk, (and is just upstream of another bridge carrying the B3001 - see A in Figure 1). The whole of this stretch of the valley (and all the higher reaches of the Stream) was until recently heavily infested with Himalayan balsam (*Impatiens balsamifera*), but during the last four years volunteers of the Bourne Conservation Group have succeeded in nearly totally eradicated it. In 2011 two more extensive patches of balsam were discovered, one in the woodland to the south of the Stream and one to the north. The patch to the south which was growing in woodland belonging to the owner of Redhill House, was immediately cut by BCG volunteers, and was re-pulled in 2012. The patch on the north bank was discovered too late in 2011 to get permission from the landowner (a different one) to cut. However this year, with the permission of the land owner it has been pulled, but will need further attention in 2013. However, the BCG volunteers have been unable to do anything about the Japanese knotweed, which occurs scattered along the valley, with one particularly extensive clump on the edge of the meadow (see below). Once alerted to the menace, the owner of Redhill House eradicated much of the knotweed along his stretch of the Stream by spraying.

As will be illustrated below, this length of the Stream, particularly along the lower stretch, is in urgent need of management. The stream bed is littered with man-made artefacts, some of which have probably been carried downstream when the Stream has been in spate, but there are larger artefacts which have been dumped a decade or more ago. There are also numerous obstructions caused by fallen trees, which are trapping accumulations of brash and threaten seriously to obstruct the flow. Overhanging vegetation, especially rhododendrons are exacerbating these problems - cluttering and clogging of the stream bed. There are a few outfalls which may be sources of pollution. In particular the outfall near the pumping station at SU 860 460 (which was dry at the time of the survey). We have noted and reported discharges of particularly foul-smelling liquids that may be raw sewage, and the water company has taken measures to stop further occurrences. However, the access road to the pumping station has been used for fly-tipping, and despite our complaints has not been cleared for many months. The boundary fence has collapsed into the stream bed and debris has cascaded into the stream. Further upstream, the boundary fence keeping the grazing horses from away the stream has also fallen into disrepair and has fallen into the stream bed. In one place the fence line has been diverted to provide the animals access to water in the stream (an ineffective measure when the survey was conducted as the stream is totally dry). However, during the summer of 2012 there have been no horses in the meadow.

Figure 25. The stream just above the bridge carrying the Farnham to Tilford road is the site of an old council depot. It may have been the source of the Japanese knotweed infestations which have occurred around the houses here and is spreading downstream. In March when this part of the survey was carries out the stream was not flowing.

Figure 26. Below the bridge is a typical accumulation of brash which has caught up debris that has either been carried downstream of has been thrown or blown over the parapet of the bridge. The sight of rubbish will often encourage others to throw their rubbish into the stream rather than take it home.

Figure 27. Under the bridge is a concrete spillway, below which a deep pool has been eroded. Note the plastic rubbish and the first of the fallen trees to be encountered along this stretch.

Figure 28. Where the stream flow through the garden of Redhill House it is reasonably clear of obstructions and debris. We do not know what lies under the circular concrete lid.

Figure 29. View upstream towards the garden of Redhill House showing a small weir that had kept water in the stream even during this drought period. A week later after heavy rain this weir would have been under water.

Figure 30. A deep pool scoured out downstream of the private bridge at Redhill House holds semi-permanent water. However, it is totally overhung with rhododendron making it rather unproductive,

Figure 31. The stream alongside the chicken run is cluttered with brash which has caught artefacts being washed down. There is evidence of bank erosion. Volunteers would be able to clean up these sorts of problems

Figure 32. The stream bed is littered with logs, brash and artefacts and a large tractor tyre lies buried in the substrate. The tyre needs to be dug out and disposed of. This clearance can be achieved using volunteers, but disposal will need the use of a skip.

Figure 33. One of several large trees that has fallen across the streambed. At present it is not causing a blockage, but needs to be cleared using a chain saw. The smaller branches are within the capability of a volunteer work force.

Figure 34. Bank erosion has resulted in a coppiced hazel falling into the stream. This will be likely to cause a blockage in the future. The encroaching rhododendron also needs to be cleared.

Figure 35. A more serious blockage caused by a fallen tree, which will need to be cleared using a chain saw.

Figure.36. The same blockage as illustrated in figure 32, showing how it has trapped artefacts and brash.

Figure 37. A land drain enters the stream near the field boundary between Compton Field and the Redhill House meadow. It is not known when this drain was put in, but there has been extensive bank erosion since then, There is an inspection cover in the dip of Compton Field associated with this drain.

Figure 38. Another view of the land drain outfall showing just how extensive the bank erosion has been. Since this survey was undertaken in March 2012. The stream bed at the outfall has be constantly full of water.

Figure 39. View from the footpath along the north side of the Redhill House meadow, with Compton field with a brown sward in the distance. The land drain is in the corner of the wood just to the left of the flowering blackthorn tree. The stream flows along the edge of the woodland which is ancient forest.

Figure 40. Just downstream of the outfall is a blockage caused mainly by overhanging rhododendron – as well as general brash large number of artefacts have accumulated at the blockage

Figure 41. Another view of the blockage showing the overhang of rhododendron.

Figure 42. This picture shows three serious problems. The large fallen tree, the consequential accumulation of brash and artefacts, and a very extensive patch of Japanese knotweed.(the brown dead sticks are last year's growth of the knotweed). The knotweed does not affect water quality, but it is a serious invasive species and should be eradicated. Its presence will seriously limit the use of Compton field for either housing or green infrastructure.

Figure 43. Alongside the knotweed patch is another fallen tree that is beginning to cause a serious blockage to the flow of water.

Figure 44. The knotweed patch with Compton Field behind. The pumping station is directly beyond the hose in the foreground. Two years ago this area supported rampant growth of Himalayan Balsam, but this invasive alien has been almost totally eliminated from the Bourne Valley by the Bourne Conservation Group.

Figure 45. Just downstream from the knotweed patch is a large pile of dry cuttings. Probably the best way of disposing of this debris is by burning it on the knotweed

Figure 46. Buried in the stream bed is a large galvanised water tank, which need to be dug out and removed.

Figure 47. Just downstream from the tank a fence post lies in the stream bed under a severely eroded hazel coppice.

Figure 48. The fence here has fallen into the stream, and the netting has trapped a large accumulation of leaves and artefacts. While volunteers can clear the accumulated debris, the fence will need to be repaired by the land-owner.

Figure 49. These logs cluttering the stream bed are probably just within the capabilities of volunteers to remove.

Figure 50. The fence has been diverted to cross the stream. While this gives the grazing horses access to the water in the stream it also introduced manure and mud into the flow, as is evident from the trampling.

Figure 51. Another accumulation of bash trapping artefacts in the stream bed.

Figure 52. Bank erosion has cause this hazel coppice to fall and partially block the stream bed.

Figure 53. A tree across the stream will need a chain saw to clear. The overhanging rhododendron can be cut back and the artefacts littering the stream bed removed by volunteers.

Figure 54. The boundary fence which has fallen into the stream bed is accumulating all manner of debris. While the debris can be cleared by volunteers, repairing the fence is a matter for the owners. Note the pumping station can be seen in the background.

Figure 55. Just downstream of the collapsed fence a plastic sack, a length of hose and accumulated bash litter the stream bed.

Figure 56. A fence post and some artefacts litter the stream bed

Figure 57. Two large trees leaning over the steep banks in this sector, need to be cleared, as do the overhanging holly and rhododendron along with the artefacts.

Figure 58. Just upstream from the pumping station a large tree has fallen across the water course and beneath it is a pool of water. Note that the fence inside the gate has fallen down.

Figure 59. By the gate into Compton Field near the pumping station is a serious amount of fly-tipping. The rubbish has begun t fall into the stream because the fence has collapsed, and will be a serious source of pollution reaching the main river unless it is cleared.

Figure 60. This shows some serious rubbish – a tyre, old gate and a variety of other artefacts that have fallen into the stream bed.

Figure 61. The emergency overflow for the pumping station. Note its sad state of repair and the concrete posts. Behind rubbish from the fly-tipping is falling into the stream. Noisome effluents have been known to be emitted from this overflow. In the past. **If we achieve nothing else the cleaning up of this area must be a priority.**

Figure 62. The road bridge that carries Monks Walk over the stream. This is the lower limit to our survey. The remaining 100m of the stream before its confluence with the River Wey is not expected to be quite so polluted.

Discussion

The survey illustrates the many environmental problems of The Bourne Stream along the third sector. There are long term problems resulting from:-

1. The outflow from the pumping station.
2. The lack of maintenance of the fencing along the stream bank by the meadow.
3. Water erosion of the outflow of the possible land drain.
4. Some of the large artefacts which have become buried within the mud.
5. The large trees that have fallen across the stream and are both accumulating water bourn debris, and resulting in deep scouring of the stream bed.
6. The large patch of Japanese knotweed (we note that this invasive alien plant is not just confined to this patch but is spreading along the Stream – the owner of Redhill House has already taken steps to eradicate it from his land).

There are shorter term problems some of which are acute and need immediate resolution:-

7. The fly-tipping that has occurred at the pumping station, and which despite being reported, is yet to be cleared.
8. Accumulation of artefacts, most of which have probably been carried downstream when the Stream is in spate. However, there are some objects (e.g. the tyre [see Figure 41] and the metals tank [see Figure 46], which have clearly been in place for many years.
9. The overgrowth of vegetation, particularly by rhododendrons, which is contributing to choking of the waterway.
10. In the summer there have been rampant growth of another invasive alien plant – Himalayan Balsam, but this has largely been eradicated by the volunteers of the Bourne Conservation Group and the owner of Redhill House.
11. The diversion of the fence in the meadow across the stream giving access to the stream by the grazing animals.

While many of these problems can be tackled by volunteers of the Bourne Conservation Group, many are clearly beyond their capabilities particularly those which are the responsibility of various agencies *viz.* the local land owner (the fencing along the boundary of the meadow), the water authority (the pumping station issues), and the Environment Agency (the Japanese knotweed problem). The clearance of the fly tipping debris is clearly a high priority, and some professional input will be needed to clear the larger obstacles created by the fallen trees. These problems will have direct and indirect impacts on three main aspects:-

A. Water quality of the outflow into the River Wey.

B. Biodiversity of the Stream and valley.

C. Flood risk in the Valley

The Bourne Conservation Group has been considering developing the clearance of the Bourne Stream along its full length as one of its projects. A detailed survey of the remaining upper stretches of the Stream are required to assess fully what needs to be done along the whole catchment of the Stream. Such a survey will also be needed to assess what can, and cannot, be undertaken by the BCG's team of volunteers. The Stream and its valley is an important wildlife corridor that links Alice Holt Forest and the Wey Valley, and surveys within The Bourne have demonstrated that there is a rich biodiversity.

The restoration of the Bourne Stream merits becoming a component project of the Wey Valley Catchment programme. But even if that can not achieved, there are a variety of improvements to the stream that can be accomplished with fewer resources. A volunteer task force is available to undertake much of the manual labour, but will need some professional back-up support not only to undertake some of the tasks, but also to integrate these efforts with responsible agencies.