HABITAT ADVISORY VISIT, RIVERS STIFFKEY AND BURN, NORFOLK UNDERTAKEN BY VAUGHAN LEWIS, WINDRUSH AEC ON BEHALF OF TOM COKE, HOLKHAM ESTATE AND NICK ZOLL

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1.0 Introduction

This report is the output of a site visit undertaken by Vaughan Lewis, Windrush AEC to the Rivers Stiffkey and Burn, Norfolk on 22 February 2002. The visit was sponsored by English Nature, as part of its commitment to support the biodiversity of chalk rivers through the offices of the Wild Trout Trust.

Comments in the report are based on observations on the day of the site visit, discussion with Charles Rangeley-Wilson and information provided from the Environment Agency, Anglian Region. Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Hand Bank (LHB) or Right Hand Bank (RHB) whilst looking downstream.

2.0 Background

The Stiffkey and Burn are small chalkstreams draining into the North Sea at Stiffkey and Burnham Overy Staithe respectively. Both rivers have been dredged historically, probably for agricultural purposes.

The rivers support a self-sustaining population of brown trout, with small numbers of sea trout caught in both rivers by anglers each season. Fishing rights on the sections of river visited on 22 February are controlled by Tom Coke and Mr Nick Zoll.

3.0 Enhancement Opportunities

Three sections of river, two on the Stiffkey and one on the Burn, have been identified by the fishery interests as possible sites for habitat enhancement. It is envisaged that these reach-based enhancements will provide evidence of the benefits of such work and will form the basis for larger scale, catchment based projects.

River Burn

The reach selected for enhancement on the Burn runs from the minor road crossing adjacent to All Saints Church, Burnham Thorpe (TF 851417), downstream for some 750m.

Immediately above the bridge at the upper end of the reach is small weir. The river sections provided by the Environment Agency show this weir to be set at 5.429m, against a central bed level downstream of the bridge of 4.94m. This results in an instantaneous water level change of some 480mm.

Downstream on the LHB a raised berm provides clear evidence of past dredging activity. The present bed of the stream is firm, although there appears to be a dearth of suitable gravel habitat for spawning and juvenile trout. It is therefore recommended that over a length of approximately 300m below the bridge, (chainage 5550-5250) up to 4 gravel riffles should be constructed. These should be between 25-40m in length, with a finished summer water level of between 150mm and 500mm. The riffles should be separated by a distance of approximately 35m and will be constructed from a mixture of imported blockstone, flint reject gravel and 20mm-40mm flint gravel. (See attached bill of quantities).

There will be an associated rise in water level adjacent to and upstream of the installed riffles. The landowner is aware of this fact and welcomes it as part of his long-term aspirations to enhance the conservation interest of his land.

In order to further enhance conservation interests and to provide compensation for loss of channel capacity occasioned by the introduction of gravel, the existing LHB will be cut at approximately 100mm above mean summer water level, creating a 2-stage shelf. A volume of spoil equivalent to the volume of gravel introduced will be excavated, removed from the flood plain and incorporated into adjacent arable fields. It is understood that this operation may require an exemption under the Waste Licensing Regulations.

Additional protection to upstream flood interests will be provided by ensuring that the backwater effect of the upstream riffle remains below the retained head of the small weir above the bridge. The weir will thus remain as the effective hydraulic control in the channel.

Between chainage 5250-4750, it is recommended that the large crack willows present should be pollarded in a rotational sequence, with no more than 25% being cut in any year. This will ensure a variety of stages of re-growth, optimising habitat for a range of associated species, whilst reducing shading and promoting growth of in-channel and marginal vegetation. The arisings from the pollarding should be used to create faggots that can be used to form a firm, low-level bank line, promoting the development of strong marginal growth. The existing bank should be cut to a level approximately 100mm above summer water level, both to encourage marginal development and to provide an element of flood compensation.

Larger timber could be used in conjunction with brashings to create one or more stick pile otter holts near to the extensive area of Norfolk reed *Phragmites communis* present at the lower end of this reach.

There is a large amount of large woody debris (LWD) in the stream due to fallen trees and large branches. This is broadly beneficial to conservation and fishery interests and should be managed sensitively to optimise benefits to a range of species. In addition to playing an important role in the sorting of bed substrate and trapping debris in the channel, the LWD has a considerable backwater effect, retaining water levels and ensuring wetting of marginal areas.

River Stiffkey

Wighton

The proposed enhancement site lies behind Grove Farm, Wighton (TF 944403). The River Stiffkey at this location occupies a straight, heavily incised channel, with clear evidence of past drainage work having lowered the riverbed substantially. The channel has very limited areas of remaining gravel that would be suitable for brown trout spawning or juvenile habitat.

It is proposed to create 3 gravel riffles upstream of chainage 8750 at this site. The riffles would be approximately 35-40m in length, with a finished summer water of

between 150mm and 500mm. The riffles should be separated by a distance of approximately 30-35m, and will be constructed from a mixture of imported blockstone, flint reject gravel and 20mm-40mm flint gravel. (See attached bill of quantities).

Flood risk at this site is minimal, with no properties apparently at risk in the reach below the road bridge at Wighton. There will be an associated rise in water levels adjacent to and for a short distance upstream of the installed riffles. The landowner is aware of this fact and welcomes it as part of his long-term aspirations to enhance the conservation interest of his land. In order to provide further assurance against any possible flood risks, the following precautionary measures will be incorporated into the enhancement scheme:

- In order to protect upstream water levels, marker pegs will be installed immediately downstream of Wighton bridge. These will show the pre-scheme water level. The constructed riffles will be installed such that their backwater effect does not raise the water level at this point.

- In order to further enhance conservation interests and to provide compensation for loss of channel capacity occasioned by the introduction of gravel, the existing LHB will be cut at approximately 100mm above mean summer water level in order to create a 2-stage shelf. A volume of spoil equivalent to the volume of gravel introduced will be excavated, removed from the flood plain and incorporated into adjacent fields. It is understood that this operation may require an exemption under the Waste Licensing Regulations.

Warham

The Stiffkey upstream of the road bridge at Warham (TF 948415) is a severely degraded section of river. The channel is heavily incised as a result of past dredging activity. A significant bund of excavated hard bed material is present on the RHB. Intensive agriculture has reduced the value of the riparian habitat on both banks.

A number of key actions are recommended in order to improve both instream and riparian habitat quality.

- Create fenced buffer strips along both banks. These should be a minimum of 5m wide, extending to >10m if agricultural considerations permit. If both RHB and LHB fields could be included in an agri-environment scheme (e.g. Countryside Stewardship), this may preclude the need to fence the buffer strips. The advice of the Farming and Wildlife Advisory Group (FWAG) for Norfolk should be sought in order to assess agri-environmental options currently available.
- The RHB should be cut approximately 100mm above summer water level in order to create a low-level berm, suitable for marginal aquatic plants. Spoil arising from this operation should be disposed of outside the flood plain in the adjacent arable field. This would increase the effective flood capacity of the Stiffkey.
- The large bund of excavated river gravel on the RHB should be passed through a mobile screen in order to separate its gravel/stone element. This should be used to create up to five riffles, between chainage 7500 and the Warham road bridge (chainage 7020). These riffles should be approximately 35-40m in length, with a

finished summer water of between 150mm and 500mm. They should be separated by a distance of approximately 30-35m and should be constructed from a mixture of screened river gravel from the site and imported blockstone, 20mm-40mm flint gravel. Waste soil arising from the screening process will be disposed of outside the floodplain by incorporation into the adjacent arable field.

- A mix of native tree and shrub species should be planted on the LHB and RHB in order to provide shade and cover for the channel.

Flood risk at this site is minimal, with no properties apparently at risk in the reach below the road bridge at Wighton. There will be an associated rise in water levels adjacent to and for a short distance upstream of the installed riffles. The landowner is aware of this fact and welcomes it as part of long term aspirations to enhance the conservation interest of his land. Level marker pegs installed immediately downstream of the bridge will ensure that no increase in water levels occurs upstream of this point (as for Warham above).

4.0 General

All works to the Rivers Stiffkey and Burn will require the consent of the Environment Agency under current Land Drainage legislation.

There was evidence of water vole activity at some of the proposed enhancement sites. Under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act, 2001, it is an offence to recklessly or intentionally damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection or to disturb water voles while they are using such a place. Prior to the commencement of any work, a survey for the presence of water voles should be undertaken by a suitably experienced field ecologist. Advice should be then be sought from English Nature regarding suitable mitigation methods for the protection of water voles at any sites at which water voles are active.

Concerns have been raised by the Environment Agency regarding the presence of white-clawed crayfish *Austropotomobius pallipes* at the proposed enhancement sites. For this reason, a survey for the presence of white-clawed crayfish should be carried out under an English Nature licence prior to the commencement of any work. In the event that crayfish are identified, English Nature should be contacted regarding appropriate protection and mitigation.

In order to protect bird populations at the enhancement sites and to comply with the prescriptions of the Wildlife and Countryside Act 1981, all the proposed works will be undertaken in the period late August - early March inclusive (i.e. outside the bird nesting season).

5.0 Bill of quantities

Item 1:

River Burn at Burnham

Work Description	**Unit**	**Quantity**
Plant hire:		
360^0 excavator	Days	10
Dumper truck	Days	10
Introduce gravel/stone (assume mean channel width = 4m)	tonnes	450
Excavate low level berm and cart off flood plain	tonnes	450 (minimum)
Supervision/labour	Days	10
Coppicing/pollarding, formation and placing of 40m faggots (to be repeated annually over a 3 year period)	Days	10
Create one stick pile otter holt	Days	4

Item 2:

River Stiffkey @ Wighton

Work Description	**Unit**	**Quantity**
Plant hire:		
360^0 excavator	Days	10
Dumper truck	Days	10
Introduce gravel/stone (assume average channel width = 5m)	tonnes	475
Excavate low level berm and cart off floodplain	tonnes	475 (minimum)
Supervision/labour	Days	10

River Stiffkey @ Warham

Work Description	**Unit**	**Quantity**
Plant hire:		
360^0 excavator	Days	15
Dumper truck	Days	15
Mobile screen	Days	5
Introduce gravel/stone to create riffles (assume mean channel width = 5m)	tonnes	800
Excavate low level berm and cart off flood plain	tonnes	800 (minimum)
Fencing - 3 strands barbed wire	m	1,000
Planting of native trees and shrubs	No.	300
Supervision/labour	Days	15

Drawings attached:

1. Site location maps for all 3 sites
2. Detail of riffle construction