

Wild Ennerdale



Photograph River Liza, Ennerdale by P. Ullrich June 2007

Dipper *Cinclus cinclus* – survey of the River Liza 2007

A report by
Peter Ullrich

Commissioned by
The Wild Ennerdale Partnership -
Forestry Commission, National Trust
& United Utilities
20th July 2007

Peter Ullrich
Ornithological Consultant

25 Arlecdon Parks Road
Arlecdon
Frizington
Cumbria
CA26 3XG

email: peter.ullrich@hotmail.com
Tel: 01946 861376

Introduction and background

White-throated dipper *Cinclus cinclus* (hereafter referred to simply, as dipper) is a bird species most commonly associated with fast flowing shallow upland becks and streams with gravel beds, although it can occur in lowland areas if these conditions prevail and providing the water quality is good enough to support an abundant aquatic invertebrate population. The dipper can almost be described as semi-aquatic and exhibits a remarkable feeding strategy. They forage by submerging, and then using a combination of walking and wing propulsion. They move along the riverbed and move small stones and pebbles in search of large aquatic invertebrates. They usually nest beside the watercourse, with the domed mossy nest hidden away under an overhanging riverbank or under a bridge. Nesting can take place as early as February and birds are usually double brooded.

Dipper is neither a rare nor significantly declining species either locally or nationally but it is important as its presence is a useful indicator of water quality and of the general “health” of the upland riverine ecology.

Dipper has long been regarded as absent as a breeding species on the River Liza in Ennerdale.

The earliest reference found to the lack of breeding dipper on the Liza is taken from “*The Birds Of The lake Counties*” by Ralph Stokoe (1962). This entry is quoted in its entirety from the section on dipper: “*Reflecting decreases first commented on for these districts about twenty years ago, none is now known to breed in Low Furness west of Ulverston (Allan Smith), and no nests were found on the River Liza or its tributaries above Ennerdale Water in 1961, though birds were present below the lake and in neighbouring valleys (P.A. Banks).*”

This is a fascinating account, as it seems to imply that dipper did breed on the Liza but in decreased numbers twenty years previously in the 1940s.

It is likely that we will never know how many pairs of dipper bred in the valley pre-afforestation in the 1920s, but Stokoe's account suggests a steady decline of the breeding population over many years.

The lack of dipper here was also evident in the period 1981-1992 when Mike Mills, a keen ornithologist, was warden at Low Gillerthwaite Field Centre. He suggested (personal comment) that a lack of invertebrate prey linked to long-term conifer afforestation of the valley was the most likely reason for the absence of breeding dipper.

Dipper was not recorded on the River Liza during *The Breeding Birds of Cumbria a tetrad atlas 1997-2001*. However this was not a linear survey of the Liza. The routes taken by the surveyor are unknown and focused on surveying tetrads. It is conceivable that only stretches of the river with adjacent footpaths and tracks allowing easy access were surveyed. Although

the survey is highly indicative of no dipper being present on the Liza, the survey was not a species specific linear survey of the entire watercourse and therefore the results indicating a lack of dipper cannot be regarded as totally conclusive.

It is clear that recent ornithological survey work in the valley has not focused specifically on the watercourses.

Research in the eighties and nineties (Ormerod et al) on the dipper provided the first ever evidence that birds were affected adversely by acidification, with the causal mechanisms now clear. This led to the use of dippers internationally as indicators of not only acidification but also other water pollutants.

It is thought that long-term conifer afforestation and the resultant acidification of the Liza is a key factor in the lack of colonisation of this watercourse by this species. Acidification results in a depletion of the dipper's preferred invertebrate prey such as mayfly and caddis larvae (Ormerod & Tyler 1987). The establishment of baseline population data for dipper on the Liza at the outset of the Wild Ennerdale Project, and the selection of dipper as a key environmental indicator species are key parts of the long-term environmental monitoring programme for the project area.

It was therefore agreed that a baseline survey of dipper be carried out in the spring of 2007 to reliably estimate the number of breeding pairs and their distribution on the River Liza.

Survey Proposals

To estimate the spring population of dipper present on the River Liza, and to carry this out in a cost effective and readily repeatable method.

Timing

Walk the Liza once in March and again in May. If birds are located in May then extra visits may be required to establish whether they are nesting.

Weather

Can be carried out in most conditions but avoid heavy rain and strong winds.

Methodology

Walk the length of the Liza starting where the Liza enters Ennerdale Water at 6-figure grid reference NY124144, altitude 116m and ending where the

unnamed beck from Beck Head joins the Liza at NY 204115 altitude 360m. A distance in excess of 8km.

Keep as close to the banks of the Liza as terrain and undergrowth allow, although it may be impossible to follow the braided river system in its entirety in the vicinity of Low Gillerthwaite due to impenetrable gorse cover.

Any dipper sightings are recorded using British Trust For Ornithology (BTO) standard notation on to a photocopy of an appropriate scaled map as well as recording sightings of other riverine species such as goosander, common sandpiper, kingfisher and grey wagtail.

Record whether the water levels in the river are low, normal or high.

If dipper are present, try and establish whether birds are on territory and try to establish if birds are nesting. This may require pausing the riverbank walkover to be able to study the behaviour of any dipper observed. If no nests are found but foraging adults are present it would be advisable to carry out at least one extra visit to establish whether the bird is a non-breeder.

The March survey is likely to pick up any singing birds whereas the May survey is likely to pick up nesting birds feeding young.

Use a global positioning system (GPS) to record the survey track and all dipper observations as well as any other interesting riverine species. Enter these locations in to the device by way of a unique waypoint number.

Download the track log and waypoints on to Memory Map software and store on a personal computer (PC).

Make hard copies of each survey map which clearly show the findings.

At the end of the survey estimate the number of dipper present and the number of dipper either territorial and/or nesting.

Future surveys

Linear watercourse surveys are readily repeatable.

Carry out future surveys using the same format and following the exact methods and routes every five years. However, increase the number of visits from two to three by adding a survey date in June. It was felt that two visits were not necessarily considered adequate enough to assess the breeding status of birds seen on the March and May visits. This third visit would be useful to confirm the observations seen on the second visit.

The Surveys

Dipper Survey of Liza - visit 1 - 15/03/07

- Start - mouth of Liza at 6 figure grid ref NY121146 - 12:15hrs (GMT).
- End - where unnamed beck from Beck Head joins Liza at 6 figure grid ref NY204115 - 15:40hrs (GMT).
- The riverbank was followed as closely as possible throughout the survey to ensure the watercourse was thoroughly covered. Refer to GPS track log on survey map for exact route.
- Survey duration 3hrs 25mins (6.97 miles)
- The return trip down the valley was not part of the survey. The return was made via the forest track on the north side of the Liza. However, as it was impossible to follow the braided river system in the vicinity of Gillerthwaite in its entirety along the south banks of the Liza (due to impenetrable gorse), the opportunity was taken to follow the northern riverbank on the return journey in the vicinity of Gillerthwaite thus ensuring coverage of the braided river system.

Weather Conditions

- Exceptionally mild.
- Wind SW force 4/5. However in reality the wind strength along the Liza is much less due to the shelter provided by the local fells and trees.
- Light rain as far as the middle concrete bridge then dry.
- 100% cloud cover with the cloud base at around 500m.

Liza water level

- Low

Survey Results

- No dipper were recorded on the March survey (visit 1).
- A single grey wagtail was recorded at NY178131.
- No other riverine bird species were recorded.

Dipper Survey of Liza - visit 2 - 09/05/07

- Start - mouth of Liza at 6 figure grid ref NY121146 - 14:40hrs (BST).
- End - where unnamed beck from Beck Head joins Liza at 6 figure grid ref NY204115 - 18:12hrs (GMT).

- The riverbank was followed as closely as possible throughout the survey to ensure the watercourse was thoroughly covered. Refer to GPS track log on survey map for exact route.
- Survey duration 3hrs 32mins (6.97 miles)
- The return trip down the valley was not part of the survey. The return was made via the forest track on the north side of the Liza.

Weather Conditions

- Wind ESE generally light but with sudden gusts.
- Dry and cool.
- 80% cloud cover with the cloud base above the local fells.

Liza water level

- Slightly lower than normal.

Survey Results

- A single adult dipper was recorded on the 09/05/07 survey (visit 1).
- This dipper was seen successfully foraging on the Liza at NY147138 (alt 135m). It was last seen flying up Low Beck where it joins the Liza at NY149138 (alt 137m).
- No other sightings of dipper were obtained on this survey.
- Other riverine species recorded were two pairs of goosander, located between Irish and Middle Bridge. See survey map for exact locations of these. Other interesting bird species encountered were woodcock, tawny owl and wood warbler.

Supplementary dipper survey No1 of Liza - 12/05/07

It was decided to carry out supplementary surveys to ascertain whether the dipper sighting on 09/05/07 related to a breeding or non-breeding bird.

These surveys were targeted at specific sections of river relating to previous dipper sightings. See survey map showing GPS track log for exact route.

The survey started at 6 figure grid ref NY130139 (Mk001) at 09:00hrs (BST) and explored the braided river system as well as Low Beck and the area of the Liza where the 09/05/07 dipper sighting was made. The survey ended back at NY130139 (Mk001) at 11:41hrs (BST)

Survey distance 4.7 miles. Survey duration 2hrs 41mins.

Weather Conditions

- No wind.
- Dry and mild.
- 100% cloudcover, cloudbase down to 300m.

Survey Results

- No dipper were recorded. No riverine species were recorded.
-

Casual supplementary dipper record on Liza 23/06/07

During a casual stroll from Irish Bridge to Middle Concrete Bridge an adult dipper was seen flying down stream over Middle Concrete Bridge at NY165135 (alt 176m) at 10:46hrs. At 10:56hrs what was thought to be the same bird was seen returning upstream. The views were brief and the bird did not appear to be carrying food.

A grey wagtail nest was located 50m upstream of the bridge with the adult pair in attendance. The female was seen carrying food to the nest.

Supplementary dipper survey No2 of Liza - 26/06/07

No dipper were seen on the supplementary survey centred round Low Beck on 13/05/07, yet a casual sighting of dipper was obtained on 23/06/07 at Middle Concrete Bridge. It was decided to carry out another supplementary survey, this time upstream of middle bridge to try and gather additional data to help ascertain the breeding status of dipper on the Liza.

The survey started at the footbridge (provided by the Fell and Rock Climbing Club of the English Lake District) at 6 figure grid ref NY176132 (alt 210m) at 18:30hrs (BST) and explored the Liza as far upstream as NY183127 (alt 235m), before returning the same way. The survey ended at 19:45hrs. See survey map showing GPS track log for exact route.

Weather Conditions

- Sunny.
- Dry and cool.
- Clear skies with good visibility.

Liza water level

- Slightly lower than normal.

Survey Results

A single adult dipper was recorded and followed upstream. It was first seen at rest on boulders at NY177131 (alt 217m). It leapfrogged ahead of the surveyor and was last seen at a pool with cascades at NY179130 (alt 220m). A search upstream was made as far as NY183127 (alt 235m) and on the way back a 20 minute vantage point watch was carried out at the pool (VP001, see survey map for location) however the dipper was not seen again. All three sightings of the dipper were of the bird loafing on boulders and the bird was not seen foraging or carrying food.

Summary of survey results.

- 15/03/07 visit 1 – No dipper recorded on the Liza.
- 09/05/07 visit 2 - 1 adult dipper present on the Liza.
- 13/05/07 supplementary survey no1 – No dipper recorded. (see appropriate survey map to see extent of river section surveyed).
- 23/06/07 casual record of 1 adult dipper at Concrete Middle Bridge.
- 26/06/07 supplementary survey no2 – 1 adult dipper upstream of Fell and Rock Climbing Club footbridge. (see appropriate survey map to see extent of river section surveyed).

- Single adult dippers were located on two out of the four surveys, these being the second systematic survey of the entire length of the Liza on 09/05/07 and on the second supplementary survey targeted at a key stretch of the Liza on 26/06/07.
- A single adult was also recorded casually at Concrete Middle Bridge on 23/06/07.
- None of the dipper located on any of the surveys exhibited any behaviour which might suggest that they bred on the Liza.

If the sightings were concentrated on a particular stretch of river this would have been highly indicative of a breeding territory. However the records were well spread out and dispersed over a 3.6km stretch of river

Only single birds were ever recorded on any of the surveys. The observations are likely to refer to the same single non-breeding individual, which forages unchallenged along this stretch of the Liza.

See Summary maps showing all dipper sightings.

Discussion

This survey located a single non-breeding dipper. The bird was present on the Liza in May and June 2007. There was a casual record from 2005 of a dipper in the same location as the 26/06/07 record (grid ref NY179130).

In order to better understand the relationship between dipper, water quality and food availability it is worth studying the following abstract from important research carried out by Ormerod and Tyler (1992):

"Previous work has shown that the breeding density of a bird characteristic of upland streams, the dipper *Cinclus cinclus*, is markedly reduced at low pH in both Wales and Scotland. Populations also declined when streams became more acidic. Evidence of causal explanation for these relationships is that:

- (1) Food quantity is reduced in acidic streams, and important prey, including those rich in calcium, are scarce;
- (2) Blood chemistry in pre-breeding birds differs between acid and circumneutral streams, with plasma calcium reduced in those breeding at low pH. Skeletal sources of calcium are probably limited;
- (3) The time spent foraging by pre-breeding birds on acidic streams is markedly increased, even though overall energy costs on acidic and circumneutral streams are similar. Body condition is inferior to birds on circumneutral streams;
- (4) Egg laying is significantly delayed on acidic streams irrespective of an effect on laying of altitude, and clutch and brood sizes are significantly reduced;
- (5) Eggs are lighter and shells thinner at low pH;
- (6) Chick growth is reduced at low pH;
- (7) Contamination by heavy metals and persistent organochlorines is low in the populations on acidic streams and cannot explain the impaired breeding performance. None of these features can exclude the possibilities that acidic streams either hold populations of poor quality birds, which show the above features, or that acidity affects the breeding ecology of all dippers that attempt to breed at low pH. The qualitative outcome of these two alternatives is identical."

It is too early to speculate as to whether these recent records on the Liza could be indicative of the first signs of recovery of the Liza from acidification and that this gradual improvement in water quality is directly related to recent work removing conifers from the upper Ennerdale valley.

Research shows that dipper can be present on rivers suffering from acidification. In order to survive, birds spend more time expending energy in the search for food as aquatic invertebrate prey is more limited. This, understandably, has repercussions for the birds in terms of their condition and ability to breed. (O'Halloran et al -1990 - The ecology of dippers *Cinclus cinclus* (L.) in relation to stream acidity in upland Wales: time-activity budgets and energy expenditure).

A lack of the availability of calcium in the aquatic ecosystem due to acidification results in decreased productivity and a reduction in population. (Chamberlain et al from BTO report No 236 on Acidification and terrestrial birds)

The Breeding Birds of Cumbria a tetrad atlas 1997-2001 shows clearly that the River Ehen has a healthy population of dipper. Providing this population does not decline and given that the Ehen is noted for extremely good water quality, it would be conceivable that dispersing juveniles from this population could well repopulate the River Liza.

Clearly it is highly encouraging to see dipper returning to the Liza after a long absence, albeit presently these birds being non-breeders.

As the project plans major changes to the habitats particularly in the eastern valley, with large scale planting of deciduous woodland it is likely that the Liza will benefit from improved water quality. The recolonisation of this watercourse by a breeding population of dipper would be a major achievement in the rehabilitation of the Liza and a major milestone for the project.

Recommendations

1. As a key indicator species of water quality, the Liza warrants careful monitoring. Therefore repeat the survey every three years.
2. Increase the number of visits from two to three by adding a survey date in June.

Bibliography and further reading

Chamberlain et al from BTO report No 236 on Acidification and terrestrial birds.

O'Halloran J. et al 1990 The ecology of dippers *Cinclus cinclus* (L.) in relation to stream acidity in upland Wales: time activity budgets and energy expenditure

Stokoe R. 1962 "The Birds of the Lake Counties"

Stott et al. 2002 "The Breeding Birds of Cumbria – A Tetrad Atlas 1997-2001".

Tyler SJ & Ormerod SJ 1992 A review of the likely causal pathways relating the reduced density of breeding dippers *Cinclus cinclus* to the acidification of upland streams.

Survey Maps

Wild Ennerdale Dipper survey
visit 1 15/03/07
Start Mouth of Liza NY124146
12:15 hrs
End Beckhead Beck joins Liza
NY204115 15:40hrs Mk002
Survey duration upstream 3:25
hrs.6.97miles

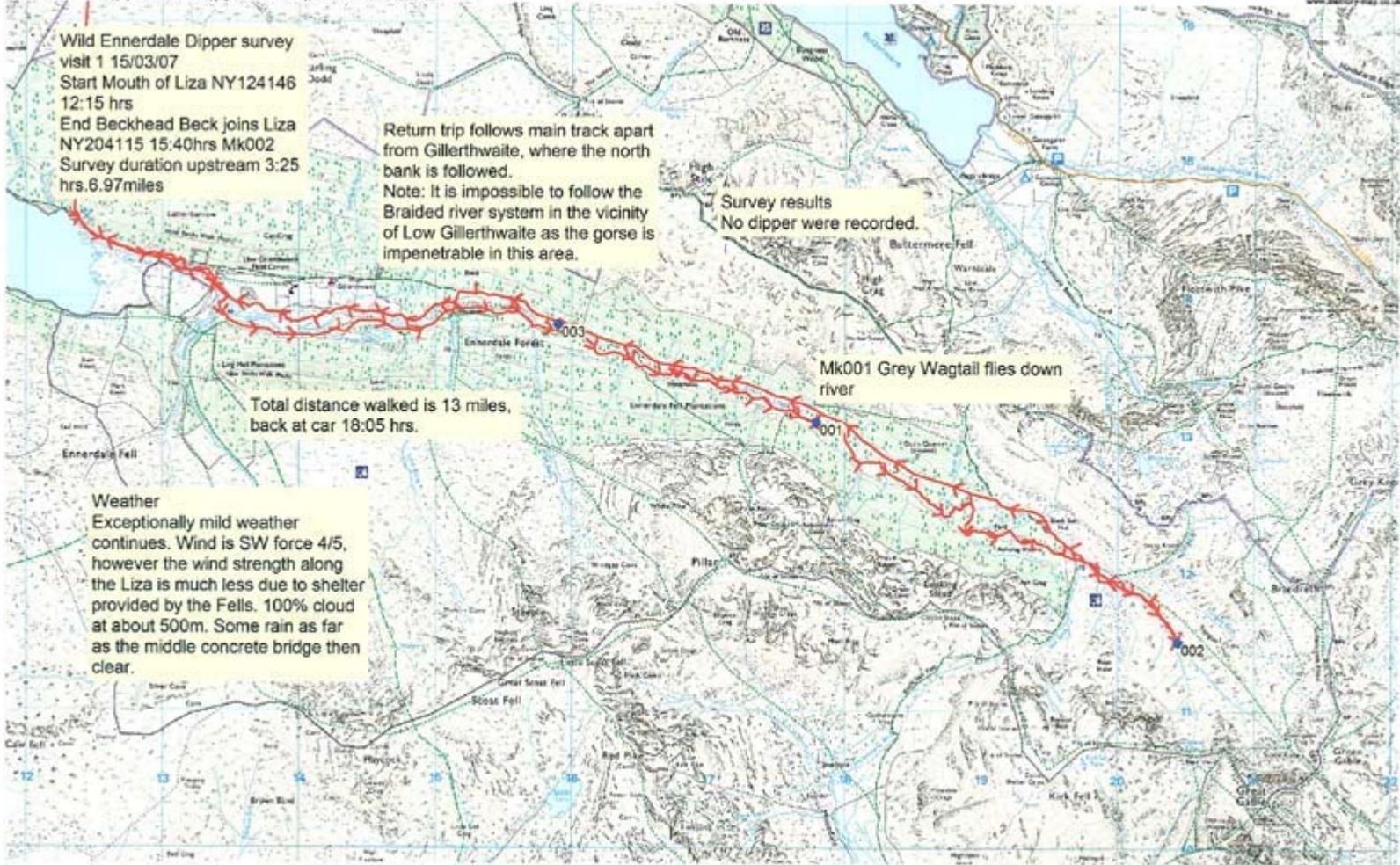
Return trip follows main track apart
from Gillerthwaite, where the north
bank is followed.
Note: It is impossible to follow the
Braided river system in the vicinity
of Low Gillerthwaite as the gorse is
impenetrable in this area.

Survey results
No dipper were recorded.

Mk001 Grey Wagtail flies down
river

Total distance walked is 13 miles,
back at car 18:05 hrs.

Weather
Exceptionally mild weather
continues. Wind is SW force 4/5,
however the wind strength along
the Liza is much less due to shelter
provided by the Fells. 100% cloud
at about 500m. Some rain as far
as the middle concrete bridge then
clear.



wild Ennerdale Dipper survey
Visit 2 09/05/07
Start Mk001 NY124146
mouth of Liza 14:40hrs
End Mk002 NY204115 18:12hrs
Back at car Mk001 20:10hrs
Total distance walked incs walk
back down forest track 12.5miles

Survey results
A single dipper is seen foraging
successfully on the Liza at
NY147138. It is last seen flying up
Low Beck where it joins the Liza.
2 pairs of Gossander between Irish
and Middle bridge.

Due to impenetrable gorse it is
impossible to follow braided river
system in the vicinity of Low
Gillerthwaite.

Liza water levels slightly lower than
normal

Weather
Breezy, cool, 80% high cloud

- BT0 codes
- DI Dipper
- GD Gossander
- WK Woodcock
- WO Wood Warbler
- TO Tawny Owl

