

## Red-throated diver *Gavia stellata*

### Status

Amber listed: SPEC 3 (V)  
Schedule 1 of WCA 1981  
Annex I of EC Wild Birds Directive

### National monitoring

Breeding surveys: Shetland 1983.  
National surveys: 1994 (RSPB/SNH), 2004.  
WeBS.

### Population and distribution

Red-throated divers breed predominantly in Shetland, Orkney, the Outer Hebrides and the Caithness fells, although they do occur at lower densities in south-west Scotland (88–91 *Atlas*). Their breeding success varies considerably from year to year (Okill and Wanless 1990). In 1994, there were an estimated 935 breeding pairs in Scotland (Gibbons et al 1995).

The majority of the wintering population of around 4,850 birds (*Population Estimates*) is found on the British east coast. The numbers fluctuate considerably in response to weather conditions.

### Ecology

Red-throated divers usually breed on small pools or lochans in open moorland but will also use pools in forested areas. Most pools and lochs hold only one pair, but where pools are abundant there may be several pairs within a few hundred metres, and densities over large areas may be high (about 1 pair per km<sup>2</sup>) (*Red Data Birds*). The nest is usually near the water's edge, on the loch shore or on an island. Shallow pools with well-vegetated banks, promontories and islets are preferred. Nesting pools or lochans are seldom used for feeding. In coastal areas, the bulk of feeding is carried out at sea, while those breeding inland move to larger lochs close to the nesting loch to feed. Peak egg laying is from late May to early June, and clutch size is 2–3. There is one brood, although early losses are often replaced. The average incubation period lasts 27 days and the nidifugous young fledge after 34–48 days. The chicks tend to remain on the nesting loch until fledged but some pre-fledging movement to larger/other lochs nearby occurs. The chicks are not normally left alone until they are about three weeks old.

### Breeding season survey – population

Survey methods are based on those developed by Gomersall et al (1984) and modified by Gibbons et al (1995).

#### Information required

- number of breeding pairs
- maximum number of non-breeding adults
- map showing boundary of the survey area.

**Number and timing of visits**

Two visits, one visit at the end of May or in June and one in July. There should be at least 14 days between visits.

**Time of day**

Any time of day.

**Weather constraints**

Avoid days with poor visibility, persistent rain or winds stronger than Beaufort force 4.

**Sites/areas to visit**

Small pools and lochans in open moorland and forested areas.

**Equipment**

- Schedule 1 licence
- 1:25,000 OS map of the area
- A4 photocopied map of the survey area for use in the field
- recording forms.

**Safety reminders**

Ensure someone knows where you are going and when you expect to return. Take a compass and always carry a survival bag, waterproofs, whistle, extra clothing, food and a first-aid kit in remote areas. Take extra care when working close to water and if any boat trips are necessary, wear life-jackets and make sure that at least two people are present.

**Disturbance**

No visits should be made to active nests. Observers do not need to search all shorelines on foot – every effort should be made to collect complete data without any disturbance to a sitting bird. Egg-collectors are a threat to this species.

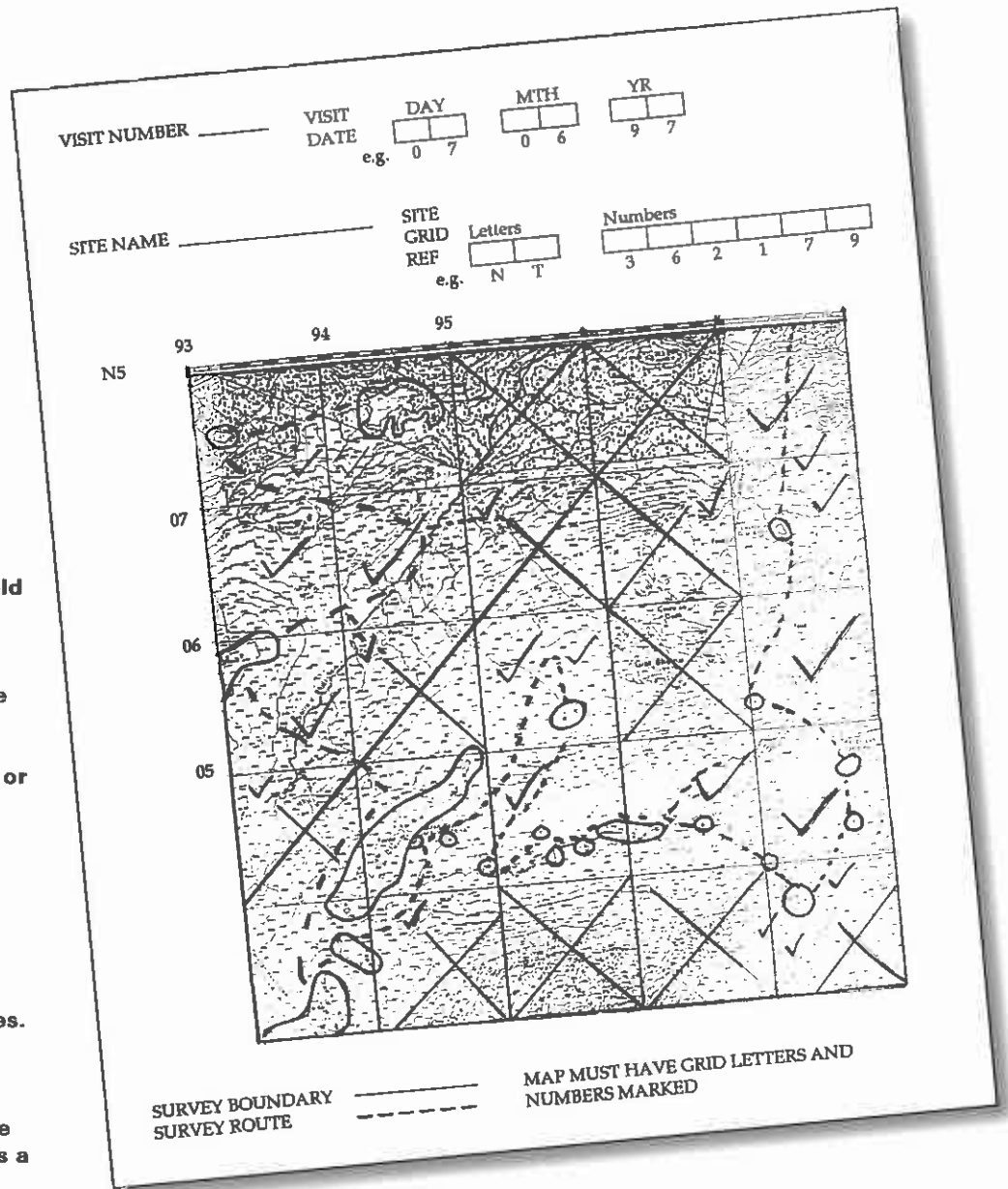
**Methods**

You should have prepared field maps and recording forms (Figures 1-2). Mark the boundary of the survey area clearly on the field map. On each visit mark any area excluded from the survey, due to the ground or habitat being unsuitable, with an X. Circle all lochs and waterbodies visited, tick all other 1-km squares on the map that have been visited. Complete a new map for each visit, but use the same recording form for both visits.

Check all areas of standing water. OS maps may not show all suitable lochans, therefore visit all other flat, apparently dry areas. Exclude areas that are built-up, steeply sloping or have 100% plantation cover, as well as the sea and fast-flowing rivers.

Scan all areas of water and all shorelines. View from a distance to avoid disturbing incubating birds. Note that adults may lie flat on the water or on the nest in an attempt to be inconspicuous. It is not necessary to visit nests – the presence of an incubating bird is sufficient. If you are unsure whether the bird is incubating, brooding or resting, remain at a distance but observe for a longer period for signs of eggs being turned, a changeover or the presence of young.

If birds are only present on the water, or if the loch is sufficiently large to hold two or more territories, or if no birds are observed during



**Figure 1**  
 An example of a field map used in a red-throated diver survey. The areas crossed through are those deemed unsuitable habitat (too steep, built-up or dense plantation forest). The circled areas are waterbodies that have been visited, and ticked 1-km squares have also been searched for suitable waterbodies. The survey area should have its boundary clearly marked (in this case the survey area was a 5-km square).

scanning, walk the entire shoreline and carefully scan any islands for empty nest scrapes, incubating birds or signs that birds may have attempted to breed and failed (eg broken eggshells, dead chicks). At larger lochs, pay particular attention to sheltered bays and the shallower ends of the loch. At dubh (peaty) lochan pool systems, walk through the system to ensure that every pool and shoreline is checked. This should be possible without walking the perimeter of every pool.

Be careful that you do not record signs from the previous year. Eggshell fragments from the previous season will be bleached and almost colourless whereas fresh remains are olive-brown. There may also be the remains of scrapes from the previous year and water-worn hollows which can resemble scrapes. An active nest scrape is one that contains eggs that are still being incubated.

**Bird monitoring methods – red-throated diver**

If no breeding attempt is noted after walking the shoreline but birds are present feeding or loafing on the water, observe their behaviour for up to one hour, taking particular note of birds pairing, birds attempting to go ashore or any other indications that the birds are on territory and may attempt to breed. Observe from a discreet distance so as not to disturb the birds and influence their behaviour. Note the direction in which birds fly if/when they leave the loch. Note that there may be 'assembly lochs' where there are large aggregations of divers which may be inexperienced and which have repeated clutch failures.

If clutch or chick loss is suspected, or evidence of loss is found, continue to search the shores on this and neighbouring lochs for replacement clutches and/or eggshell remains.

On the second visit, various factors can cause confusion, such as more than one pair breeding on the same loch, replacement clutches laid at different lochs by the same pair, unfledged chicks moving to a different loch, and chicks sheltering under banks or diving repeatedly. The water level may also have dropped considerably since the divers started nesting, thereby altering the shoreline.

Use a separate recording form for each breeding territory. Where lochs contain more than one territory (or potential territory) complete a form for each. Use a single recording form for lochs with no breeding territories. Ensure that you record all non-breeding birds on breeding lochs on a single form; generally this will be one of the breeding territory forms.

**RED-THROATED DIVER SURVEY**

Please write clearly in **BLOCK LETTERS**.  
Please use 24 hr clock.

OBSERVER A. SPOTTER SITE NAME GREEN MHAIRI LOCH NAME MHAIRI

LOCH GRID REF 

Letters	N	H
e.g.	N	T

Numbers	1	2	3	4	5	6
	3	6	2	1	7	9

LOCH AREA (ha) 15ha N° OF ISLANDS 1 NEST LOCATION: SHORE \_\_\_\_\_ ISLAND  FLOATING VEG. \_\_\_\_\_ (tick one only)

NEST GRID REFERENCE 

N	H
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1	2	3	4	5	6
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 SHORE TYPE AT NEST GRASS

VISIT DATA "I" refers to an incubating adult, "A" refers to an active nest and "½" refers to the size of the young relative to an adult.

VISIT	DATE	START TIME	END TIME	NUMBER ADULTS	NUMBER NESTS	NUMBER EGGS	NUMBER EGG SHELLS	NUMBER OF YOUNG	SIZE OF YOUNG	COMMENTS
1	7/6/94	08:30	10:00	1I + 1	1A + 1	2	0	2	½	ADULT INCLUDING THE OTHER FLEDG IN PREVIOUS CLUTCH PROUD
2	11/7/94	09:05	10:30	1						ADULT WITH 2 EGGS BUILT BELOW BANK ON LEFT SIDE OF ADULT
3	/ /	:	:							
4	/ /	:	:							

**Figure 2**  
An example of a recording form used in a red-throated diver survey. This type of recording form helps to standardise the information collected. From the examples given 'I' refers to an incubating adult, 'A' refers to an active nest and ½ refers to the size of young relative to an adult.

On the survey form record:

- date
- start and finish time
- waterbody area (this can be estimated from the map)
- nest location (shore, island or floating vegetation)
- six-figure grid reference of active nest site (if present)
- number of incubating adults (I) plus the number of adults feeding, loafing, etc (eg 1I+1 = one incubating bird plus one other)
- number of nest scrapes (A) plus the number of empty scrapes (eg 1A + 1 = one active nest-site plus one empty scrape)
- number of eggs
- number of eggs estimated from broken shells
- number and size of any chicks seen (see below).

Report the following:

- number of breeding pairs (incubating birds seen, or young, eggshell fragments or dead chicks located)
- maximum number of non-breeding adults which is the sum of the following:
  - the maximum number of non-breeding adults on lochs where birds were recorded on one or both visits but there was no evidence of breeding; and
  - the maximum number of non-breeding adults on lochs containing breeding pairs (calculate this as the maximum number of adults across the two visits minus the number of breeding adults).

## **Breeding season survey – productivity**

### **Information required**

- number of viable young (ie about two-thirds grown) per pair.

### **Number and timing of visits**

One visit (additional to the two to estimate the number of breeding pairs) after 23 July (best from 23 July to 15 August), checking those birds which laid earliest first.

### **Time of day**

As for population survey (above). Allow sufficient time for the size of the loch.

### **Weather constraints, Sites/areas to visit**

As for the population survey (above).

### **Disturbance**

It is particularly important not to disturb any adults with young. It is possible to get all the information necessary by observing the area from a distance, eg from a small hill overlooking the water.

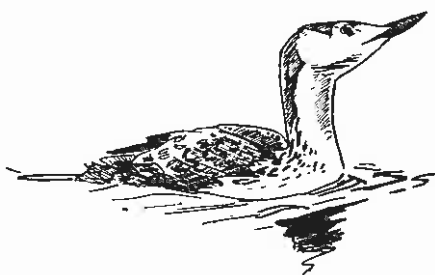
### **Methods**

Check all areas of water within the survey where adults were present earlier in the season (whether proved breeding or not) for young. Scan

the water and shoreline to locate any young present. If adults are located, scan the whole of the water surface and shoreline, even if there do not appear to be any young with them. The young are not always with their parents, often being close inshore and diving repeatedly, making them difficult to spot.

Record the number of adults present and the number and size of the chicks. Size chicks by comparing the water-line length of the chick with that of a nearby adult. They usually appear to be about 20–25% of adult length shortly after hatching. Record details of any sightings on the same recording form as used earlier in the season when locating adults and nests. Notes on the behaviour of the birds during the observation period can be made on the other side of the recording form.

## Winter survey



WeBS.

Survey methods for *Inshore marine waterfowl* and *Waterfowl and seabirds at sea* are outlined in the generic survey methods section.

## References

- Gibbons, D W, Bainbridge, I and Mudge, G (1995) *The 1994 Red-throated Diver Gavia stellata Survey*. Unpublished RSPB report to SNH.
- Gomersall, C H, Morton, J S and Wynde, R M (1984) Status of breeding red-throated divers in Shetland, 1983. *Bird Study* 31: 223–229.
- Okill, J D and Wanless, S (1990) Breeding success and chick growth of red-throated divers *Gavia stellata* in Shetland 1979–88. *Ringing and Migration* 11: 65–72.