Harlequin Duck Surveys in Western Montana: 1993

A Report to:

USDA Forest Service
Kootenai National Forest
506 U.S. Highway 2 West
Libby, MT 59923

Submitted by

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October 1994

Montana Natural Heritage Program
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Breeding pair surveys for Harlequin Ducks were done on 409 km of 20 streams during May and June, 1993; a total of 42 Harlequins (27 males, 15 females) were seen on 6 streams. Brood surveys were done on 377 km of 21 streams during July and August, 1993; a total of 78 Harlequins (19 females, 59 young in 21 broods) were seen on 9 streams. Harlequins were reported on an additional 4 streams. Reproductive success, on streams surveyed both for pairs and broods, averaged 0.40 broods per female. Success in the North Fork Flathead drainage was substantially lower (0.32 broods per female) than in the lower Clark Fork drainage (0.60 broods per female). Brood size at or near fledging (Class III) averaged 2.86; August brood sizes were consistent among all drainages. No new breeding streams were confirmed in 1993. No birds were seen during pair (May) or brood (August) surveys of Sullivan Creek, which had Harlequins in 1992.

We continued banding Harlequin Ducks in the Flathead and Clark Fork drainages. Sixty-eight Harlequins (13 adult males, 14 adult females, and 41 juveniles) were marked on 7 streams. This brings the total number of Harlequin Ducks banded in Montana since 1991 to 159 (22 adult males, 34 adult females, and 103 juveniles). We observed 20 previously marked birds on streams. The banding program, while small in scale for waterfowl, is providing a significant tool for local monitoring and identifying coastal areas where Montana breeding birds molt and winter.

Six movements detected in 1993 were interesting. A male marked on McDonald Creek, Glacier National Park, on 6 May 1993, was captured on Hornby Island, along the east coast of Vancouver Island, British Columbia on 5 August 1993. This was the first record of a bird marked in Montana being relocated on the coast. On 14-15 March 1994 three Harlequins were observed
on Hornby Island, all marked as juveniles in 1992-3 on McDonald Creek. Local movements of
birds, heretofore undocumented, include two marked females found on different streams in 1993
than where they were originally marked in 1992. Stream mouths were separated by 6 and 17 km
respectively, across a reservoir and lake.
ACKNOWLEDGEMENTS

We thank Bob Summerfield for his help throughout the study. We were assisted with field work by Stan Beckstrom and Chad Castren. Additional help, location of possible trapping sites, and other logistical support was provided by J. Ashley, J. Davies, R. Galloway, S. Gniadek, C.E. Hidy, T. Hidy, W. Johnson, B. Kennedy, E. Pfalzer, H. Rivera, D. Roemer, N. Warren, and other Forest Service and Park Service personnel. M. Beer, C. Jones and C. Craig assisted with element occurrence and map preparation. Financial support for the project came from the Kootenai National Forest (U.S. Forest Service, Northern Region) and the Montana Natural Heritage Program (Montana State Library and The Nature Conservancy).
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INTRODUCTION

The Harlequin Duck (*Histrionicus histrionicus*) is a small sea duck, which travels inland to breed on fresh water streams. The male is strikingly colored with black and white spots and crescents, and chestnut sides on a deep cobalt blue background. The female is dull brown with three white spots on the face. Harlequins breed in western North America from Alaska and the Yukon south through western Montana to California (Cassirer et al. 1993); in eastern North America they breed form Baffin Island south to eastern Quebec and Labrador (Goudie 1993). In the Palaearctic they breed in Iceland, Greenland and Siberia (A.O.U. 1983). Approximately 110 pairs of Harlequins currently breed in Montana (Genter 1993), with most located in the following areas: 1) tributaries of the lower Clark Fork River; 2) tributaries of the North, Middle, and South Forks of the Flathead River; 3) streams coming off the east front of the Rocky Mountains; and 4) the Boulder River (Miller 1988, 1989, Kerr 1989, Carlson 1990, Fairman and Miller 1990, Diamond and Finnegan 1992, 1993).

During the breeding season Harlequins are found along fast mountain streams (Bengston 1966). In many areas Harlequins use streams with dense timber or shrubs on the banks (Cassirer and Groves 1990), but they are also found in relatively open streams along the east slopes of the Rocky Mountains, Montana (Markum and Genter 1990, Diamond and Finnegan 1992) and the Arctic tundra (Bengston 1972). In Idaho, 90% of observations occurred near old growth or mature timber stands (Cassirer and Groves 1990). Mid-stream rocks, logs, islands, or stream-side gravel bars serve as safe loafing sites and appear to be important habitat components.

Most of the ducks arrive on their inland breeding areas in mid-April to early-May; unmated males typically arrive before pairs (Kuchel 1977). The males return to the coast shortly after the females begin incubation; most are gone by early July (Kuchel 1977). The females and
young remain on the streams until August or early September. This chronology is influenced by elevation and the timing of spring runoff and may vary up to several weeks between years.

The U.S. Forest Service, Region 1, lists the Harlequin Duck as Sensitive (Reel at al. 1989). The species is listed as a Species of Special Concern by the Montana (Genter 1992) and Idaho (Moseley and Groves 1990) Natural Heritage Programs. The eastern North American population is listed as endangered in Canada (Goudie 1993); both eastern and western populations are listed under Category 2 as a candidate for listing under the Endangered Species Act by the U.S. Fish and Wildlife Service (U.S. Department of Interior 1991).

The Montana Natural Heritage Program began surveying Harlequin Ducks in 1988. The survey data gave rise to questions involving site fidelity, productivity and mortality. Individual marking of birds began to a limited extent in 1991 and in 1992 a total of 85 Harlequins were marked on 5 streams. Long term goals include: 1) developing a baseline status report of current and historic Harlequin populations in Montana; 2) gathering information on site fidelity, reproduction and mortality to allow estimations of what constitutes viable Harlequin populations; 3) developing surveying protocols for actual and potential Harlequin streams; 4) developing management guidelines for maintaining and restoring Harlequin populations and habitat; and 5) identify coastal areas where Harlequins from the Northern Rockies occur. Goals for 1993 included: 1) surveying additional streams for presence and status of Harlequins; 2) gathering productivity data on some primary Harlequin streams; and 3) marking as many individuals as possible on selected streams for long-term monitoring.
METHODS AND MATERIALS

Harlequin Ducks were surveyed on parts of the Kootenai, Custer, Flathead, Gallatin, Kaniksu, and Lolo National Forests during May-August 1993. We also marked birds in Glacier National Park; surveys there were conducted primarily by Park Service personnel (John Ashley). Most surveys were conducted by walking the stream channel (when possible) or stream bank. In most cases the surveyor walked upstream, giving more time to observe the bird before it moved out of sight. Some large streams were surveyed by kayak. Dates, locations, km surveyed, and general characteristics of the stream reaches surveyed were recorded; any Harlequins sighted were noted with location, numbers, ages, and sex of birds present. For streams in the Flathead and Clark Fork drainages, we attempted to capture and mark all birds seen, when a licensed, qualified birdbander was present on the survey (Reichel or Genter). Captured birds were identified to sex and age, weighed, measured (wing cord and tail), marked, and released. Except in Glacier National Park, almost all birds were marked with numbered USFWS aluminum leg bands and colored nasal discs, individually recognizable by shape and color combinations (see Appendix B). Birds in Glacier National Park were banded with a USFWS aluminum band and a unique combination of 3 plastic, colored leg bands.
RESULTS AND DISCUSSION

Surveys

Kootenai National Forest. Pair surveys were conducted along 210 km of 9 streams during May-June 1993 (Table 1). A minimum of 20 Harlequins (11 males, 9 females) were seen on 3 streams (Appendix B & C). These included the Vermillion River (3 pairs), Swamp Creek (1 pair) and Marten Creek (5 pairs plus 2♂).

Brood surveys were conducted along 65 km of 4 streams during late July - August 1993 (Table 1). A minimum of 28 different Harlequin Ducks were observed on 3 streams (Table 1, Appendix B & C). Marten Creek had 2♀ present with 2 broods (4,4). Swamp Creek had 1♀ present with a single chick. Rock Creek had 1♀ present with a brood of 4 and 2 additional chicks were present from another brood (the female was not present). The Vermilion River had 2♀ present with 2 broods (4,4) and an additional single chick was present from another brood (the female was not present).

No Harlequins were observed on Elk Creek during our short survey, but a male was seen by F.S. personnel (Table 2).

Flathead National Forest. Pair surveys were conducted along 88 km of 6 streams during May-June 1993 (Table 1). A minimum of 16 Harlequins (10 males, 6 females) were seen on 2 streams (Table 1, Appendix B & C). These included Big Creek (1♂) and Trail Creek (5 pairs and 3♂); additionally we had a report of Harlequins from Whale Creek (Table 2).

Brood surveys were conducted along 185 km of 11 streams during July - August 1993 (Table 1). A minimum of 26 different Harlequin Ducks were observed on 3 streams (Table 1, Appendix B & C). These included: 1) Middle Fork of the Flathead River (3♀, 3 broods of 1, 3,
and 4 young), 2) Spotted Bear River (1♀, 1 brood of 4 young), and 3) Trail Creek (2♀, 2 broods of 3 & 5 young). No Harlequins were observed on Sullivan Creek where they were observed in 1992.

Custer, Gallatin, Kaniksu, and Lolo National Forests. Pair surveys were conducted along 111 km of 5 streams during May-June 1993 (Table 1). A minimum of 6 Harlequins (6 males) were seen during surveys on 1 stream, the Boulder River in Gallatin NF (Table 1, Appendix B & C). Additionally we had reports of Harlequins from Rattlesnake Creek (pair in 1990: Joe Ball; pair 1989, 1990, 1991).

Brood surveys were conducted along 127 km of 6 streams during July and August 1993 (Table 1). Two different Harlequin Ducks were observed on 1 stream (Table 1, Appendix B & C). The Boulder River had 1 adult female and 1 juvenile present. No Harlequins were observed during surveys of Trout Creek or the North Fork of the Blackfoot River (Lolo NF) where they have been observed in at least one of the past five years.

Glacier National Park. Brood surveys were conducted along 29 km of the McDonald Creek drainage on 10-11 August 1993 (Table 1). A minimum of 22 different Harlequin Ducks (6♀; 6 broods of 1, 2, 2, 3, 4, 4) were observed on McDonald Creek (Table 1, Appendix B & C). Many other surveys were conducted throughout the season by Glacier National Park personnel (Ashley 1993). These surveys found up to 18 adult females present in May.

Breeding Chronology. Breeding was early again this year, probably due to rapid spring runoff in early May. As a result, many females apparently began incubation by 20 May; some males had
left by the second pair survey of Marten Creek on 26 May. The last male was seen on McDonald Creek on 22 June 1992 about 10 days earlier than reported in 1973-75 (Kuchel 1977, Ashley 1993). All young were nearly fledged by the end of July on the Lower Clark Fork drainages and 13 August on Trail Creek. However, most females and young were still present on 10-11 August at McDonald Creek in Glacier National Park, and some young were still downy.
Figure 1. Harlequin Duck Breeding Locations in Montana

- National Forests
- Point locations of breeding ducks
- Stream segments with breeding ducks

Montana Natural Heritage Program, 3/15/94
Table 1. Streams surveyed for Harlequin Ducks in 1993.

<table>
<thead>
<tr>
<th>Stream &amp; Segment</th>
<th>Date</th>
<th>kms</th>
<th>M</th>
<th>F</th>
<th>J</th>
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<th>Pr</th>
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<tbody>
<tr>
<td><strong>Kootenai National Forest</strong></td>
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</tr>
<tr>
<td>Big Beaver Ck (T22N,R32W,S11 to T23N,R30W,S31)</td>
<td>1 Jun</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>*Big Creek (T34N,R30W,S9 to T35N,R29W,S33)</td>
<td>30 May</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Callahan Creek (T31N,R34W,S19 to S23)</td>
<td>28 May</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S Fork (T58N,R3E,S9 to T31N,R34W,S19)</td>
<td>28 May</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>N Fork (T59N,R3E,S21 to T31N,R34W,S19)</td>
<td>28 May</td>
<td>7</td>
<td></td>
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<tr>
<td><strong>Elk Creek</strong></td>
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<td></td>
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<tr>
<td>E Fork (T25N,R34W,S11 to T26N,R34W,S33)</td>
<td>13 May</td>
<td>3</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>Grave Creek (T36N,R25W,S33 to T35N,R26W,S12)</strong></td>
<td>10 May</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>*Marten Creek (T25N,R32W,S32 to T25N,R33W,S28)</td>
<td>13 May</td>
<td>11</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Fork (T24N,R33W,S11 to T25N,R32W,S31)</td>
<td>13 May</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>main T25N,R32W,S32 to T25N,R33W,S32</td>
<td>26 May</td>
<td>16</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>S. Fork (T24N,R33W,S11 to T25N,R32W,S31)</td>
<td>26 May</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>main T25N,R32W,S32 to T25N,R33W,S28</td>
<td>2 Jun</td>
<td>11</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Fork (T24N,R33W,S11 to T25N,R32W,S31)</td>
<td>2 Jun</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>main T25N,R33W,S28 to T25N,R32W,S26</td>
<td>29 Jul</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td></td>
<td>2(4,4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Fork (T24N,R33W,S11 to T25N,R32W,S31)</td>
<td>29 Jul</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Rock Creek (T26N,R32W,S28 to S11)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>*Swamp Creek (T26N,R31W,S34 to T25N,R32W,S14)</td>
<td>31 Jul</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td></td>
<td>2(4,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T25N,R31W,S20 to S4</td>
<td>11 May</td>
<td>18</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T25N,R31W,S4 to T26N,R31W,S34</td>
<td>30 Jul</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Vermillion R. (T24N,R31W,S14 to T24N,R29W,S27)</td>
<td>2 Aug</td>
<td>5</td>
<td>1(1)</td>
<td>(same as 7/30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T24N,R31W,S14 to T24N,R30W,S1</td>
<td>12 May</td>
<td>35</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T24N,R31W,S14 to T24N,R30W,S8</td>
<td>27 May</td>
<td>18</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T24N,R30W,S8 to T24N,R29W,S3</td>
<td>27 Jul</td>
<td>7</td>
<td>1</td>
<td></td>
<td>1(1)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T24N,R29W,S3 to S22</td>
<td>28 Jul</td>
<td>18</td>
<td>2</td>
<td>6</td>
<td></td>
<td>2(4,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T24N,R29W,S3 to S22</td>
<td>1 Aug</td>
<td>8</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yaak River (T35N,R33W,S17 to T34N,R33W,S27)</strong></td>
<td>29 May</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Harlequin breeding has occurred on the stream

# Harlequins have been reported on the stream but status is not confirmed
Table 1. (cont.)Streams surveyed for Harlequin Ducks in 1993.

<table>
<thead>
<tr>
<th>Stream</th>
<th>Date</th>
<th>kms</th>
<th>M</th>
<th>F</th>
<th>J</th>
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<tbody>
<tr>
<td><strong>Flathead National Forest</strong></td>
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<td></td>
</tr>
<tr>
<td>#Big Creek (T33N,R20W,S30 to S22)</td>
<td>5 May</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T33N,R21W,S33NE to T33N,R20W,S22</td>
<td>9 Aug</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal Creek (T34N,R21W,S36 to T34N,R20W,S20)</td>
<td>17 Jun</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dolly Varden Ck (T26N,R13W,S1 - T27N,R13W,S26)</td>
<td>30-31 Jul</td>
<td>7</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lake Creek (T26N,R13W,S17 to S7)</td>
<td>31 Jul</td>
<td>5</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Long Creek (T28N,R15W,S29 to T27N,R15W,S5)</td>
<td>1 Aug</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lost Creek (T25N,R17W,S31 to T24N,R18W,S1)</td>
<td>7 Jun</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>*Middle Fork Flathead River</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(T27N,R13W,S8 to T29N,R16W,14)</td>
<td>1-3 Aug</td>
<td>45</td>
<td>3</td>
<td>8</td>
<td></td>
<td></td>
<td>3(1,4)</td>
<td></td>
</tr>
<tr>
<td>Morrison Creek (T28N,R13W,S27 to T27N,R13W,S8)</td>
<td>28-29 Jul</td>
<td>11</td>
<td></td>
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<tr>
<td>N. Fork Flathead River</td>
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</tr>
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<td>(T34N,R20W,S20 to T32N,R20W,S2)</td>
<td>17 Jun</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Schafer Creek (T26N,R13W,S4 to T27N,R13W,S26)</td>
<td>30 Jul</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Spotted Bear River (T25N,R13W,S26 to S16)</td>
<td>14 Aug</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Sullivan Creek (T26N,R16W,S31 to T25N,R16W,S5)</td>
<td>4 May</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>T26N,R16W,S31 to T27N,R17W,S31</td>
<td>5 May</td>
<td>15</td>
<td></td>
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<td></td>
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<tr>
<td>T26N,R16W,S31 to T26N,R17W,S1</td>
<td>16 Aug</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Trail Crk (T37N,R23W,S35NE to T37N,R22W,S36SE)</td>
<td>8 May</td>
<td>22</td>
<td>3</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T37N,R23W,S25SE to T37N,R22W,S34SW</td>
<td>9 May</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T37N,R23W,S25SW to T37N,R22W,S34SW</td>
<td>13 Aug</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
<td>2(3,5)</td>
<td></td>
</tr>
<tr>
<td>#Whale Creek (T36N,R23W,S30SE to T36N,R21W,S30)</td>
<td>12 Aug</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shorty Ck (T36N,R23W,S31SE to S29)</td>
<td>12 Aug</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Harlequin breeding has occurred on the stream
# Harlequins have been reported on the stream but status is not confirmed
Table 1. (cont.) Streams surveyed for Harlequin Ducks in 1993.

<table>
<thead>
<tr>
<th>Stream</th>
<th>Date</th>
<th>kms</th>
<th>M</th>
<th>F</th>
<th>J</th>
<th>U</th>
<th>Pr</th>
<th>Br</th>
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</thead>
<tbody>
<tr>
<td><strong>Gallatin National Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Boulder River (T6S,R12E,S4 to T4S,R12E,S1)</td>
<td>12 Jun</td>
<td>23</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T6S,R12E,S28 to S4</td>
<td>13 Jun</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2S,R13E,S15 to T1S,R14E,S28</td>
<td>14 Jun</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T6S,R12E,S28 to T4S,R12E,S36</td>
<td>22 Jul</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>West Boulder R. (T3S,R11E,S25 to T2S,R13E,S15)</td>
<td>14 Jun</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1(1)</td>
</tr>
<tr>
<td><strong>Lolo National Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#Graves Creek (T22N,R30W,S11 to T23N,R30W,S25)</td>
<td>14 May</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*North Fork Blackfoot River</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T16N,R11W,S27 to T15N,R11W,S29</td>
<td>15 Jun</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T17N,R10W,S30 to T15N,R11W,S14</td>
<td>21 Jul</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Trout Creek (T16N,R26W,S14 to T14N,R27W,S3)</td>
<td>4 Aug</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Custer National Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stillwater R. (T5S,R15E,S32 to T4S,R16E,S31)</td>
<td>25 Jul</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kaniksu National Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightning Creek (T56N,R3E,S7 to T55N,R2E,S3)</td>
<td>27 May</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glacier National Park</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Avalanche Creek (Avalanche Lk to McDonald Ck)</td>
<td>1 Aug</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*McDonald Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake to Mineral Ck crossing of trail</td>
<td>10-11 Aug</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Broods: 6(1,2,3,2,4,4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Harlequin breeding has occurred on the stream
# Harlequins have been reported on the stream but status is not confirmed
<table>
<thead>
<tr>
<th>Stream &amp; Location</th>
<th>Date</th>
<th>Harlequins</th>
<th>Observer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kootenai National Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elk Creek T25N,R34W,S11</td>
<td>summer 1988</td>
<td>1 1+</td>
<td>F.S. Employee</td>
</tr>
<tr>
<td>East Fork T26N,R34W,S21 NW4NW4</td>
<td>16 May 93</td>
<td>1</td>
<td>Jill Davies</td>
</tr>
<tr>
<td>Grave Creek (T36N,R25W,S12)</td>
<td>6 Jun 93</td>
<td>1</td>
<td>Lynn Johnson</td>
</tr>
<tr>
<td>Marten Creek T25N,R32W,S31</td>
<td>22 July 93</td>
<td>1 5</td>
<td>(S)E.Pfalter &amp; T.Hidy</td>
</tr>
<tr>
<td>Swamp Creek T25N,R31W,S16</td>
<td>15-16 May 93</td>
<td>1</td>
<td>Carolyn Hidy</td>
</tr>
<tr>
<td>White Pine Creek T23N,R32W,S28 SE4</td>
<td>Aug 1986</td>
<td>1 1+</td>
<td>F.S. Employee</td>
</tr>
<tr>
<td><strong>Flathead National Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Creek T33N,R21W,S33</td>
<td>late May 91</td>
<td>1</td>
<td>Mike Schwitters</td>
</tr>
<tr>
<td>Middle Fork Flathead R T32N,R18W,S33</td>
<td>18-19 Sep 93</td>
<td>3-5</td>
<td>Jim Williams</td>
</tr>
<tr>
<td>North Fork Flathead River</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal Banks to Anaconda Creek</td>
<td>1 Apr 93</td>
<td>1</td>
<td>John Gangemi</td>
</tr>
<tr>
<td>Spotted Bear River T25N,R13W,S36</td>
<td>4 Aug 1993</td>
<td>1</td>
<td>Cheryl Heisinger</td>
</tr>
<tr>
<td>Whale Creek T36N R23W S29 SE4</td>
<td>21 Jun 93</td>
<td>1</td>
<td>Ben Conard</td>
</tr>
<tr>
<td><strong>Gallatin National Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boulder River T6S,R12E,S4</td>
<td>30 May 93</td>
<td>1</td>
<td>George Fox</td>
</tr>
<tr>
<td>1-2 mi above Hells Canyon</td>
<td>ca 1 June 93</td>
<td>5</td>
<td>Todd Gehrike</td>
</tr>
<tr>
<td>1-2 mi above Hells Canyon</td>
<td>20 May 93</td>
<td>1</td>
<td>Todd Gehrike</td>
</tr>
<tr>
<td>Gallatin River (T5S,R4E,S25)</td>
<td>24 May 93</td>
<td>1</td>
<td>via Ron Krieger</td>
</tr>
<tr>
<td>T5S,R4E,S25</td>
<td>1 May 93</td>
<td>1</td>
<td>Brian Schwitters</td>
</tr>
<tr>
<td><strong>Lolo National Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rattlesnake Creek T15N,R18W,S21</td>
<td>Jun 90</td>
<td>1</td>
<td>Joe Ball</td>
</tr>
<tr>
<td>lower creek</td>
<td>spring 1989</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>lower creek</td>
<td>spring 1990</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>lower creek</td>
<td>spring 1991</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Clark Fork River (Clinton-Turah)</td>
<td>28 Apr 93</td>
<td>1</td>
<td>Mr. Haning</td>
</tr>
</tbody>
</table>
Table 2 (cont.). Miscellaneous reports of Harlequin Ducks during 1993 and reports for prior years received during 1993.

<table>
<thead>
<tr>
<th>Stream &amp; Location</th>
<th>Date</th>
<th>M</th>
<th>F</th>
<th>J</th>
<th>U</th>
<th>Pr</th>
<th>Br</th>
<th>Observer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glacier National Park</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral Creek</td>
<td>28 Apr 93</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>John Gangemi</td>
</tr>
<tr>
<td>McDonald Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L. McDonald to Avalanche Ck)</td>
<td>1 May 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td>John Gangemi</td>
</tr>
</tbody>
</table>


Reproduction

Harlequins were present this year on at least 12 streams in the study area and adult females or broods were seen on 11 of those streams. A minimum of 43 adult females were present. Late-July to early-August brood size on all streams averaged 2.81 (n=21). This was lower than in 1992 (3.27). Brood size did not vary between the North Fork Flathead and Lower Clark Fork drainages in 1993. Most broods were seen in Class III or fledged stages of development (Bellrose 1976:27), and we made no adjustment for age of broods in our calculation of mean brood size.

Of 37 potential broods on North Fork of the Flathead and lower Clark Fork drainages, a minimum of 16 were produced for a 43% success rate of broods per adult female. From 1989 to 1993 (Table 4), the success rate averaged 46.5% (range= 24-55%; n=200 pairs on 35 streams). In 1993, the differences in success rates between the North Fork Flathead drainage (32%) and the Lower Clark Fork drainage (60%) were large. Annual differences in success rates from 1989-1992 were primarily associated with the amount and timing of runoff. High runoff, particularly in June-early July, and runoff in years with "double peaks" caused lower reproductive success. This was particularly evident in 1991 (Table 4, Figure 2, 3) the only year where runoff exceeded 20,000 cfs and when production was lowest (24%). The changes in reproductive success were primarily due to changes in numbers of broods per pair, not changes in the size of successful broods. This indicates that differences in mortality were due to events that affected entire clutches or very young broods.
Capture and Marking

We continued to make good progress during the second year of the juvenile Harlequin Duck site fidelity and survival study. A total of 41 juvenile birds from 7 drainages were captured and marked (Table 5, Appendix D & E). Thirteen adult males and 14 adult females were also marked in 1993 (Table 5, Appendix D & E).

Relocation and marking effects

Table 6 shows when and where adults were marked and relocated, and if other ducks were present at the time. Of 6 adult birds marked in 1991 with nasal markers, 4 have been seen in subsequent years; however, 2 males not seen in 1992 were resighted in 1993. Of 11 adult birds marked with nasal discs in 1992, 6 were resighted in 1993. Of 2 females marked in 1991, both successfully raised broods in 1992, and one again in 1993. Of 5 females marked in 1992, 4 were resighted in 1993 and 2 of those successfully raised broods in 1993.

Of 13 adult birds (all females) marked with colored leg bands in 1992, 6 were resighted in 1993 and 2 of those successfully raised broods in 1993.

Adults marked with nasal discs were relocated in the second year at a slightly (non-significant) higher rate than birds marked with colored leg bands (47% versus 46%). Females marked with nasal discs which returned in the second year, successfully raised broods at higher rate than those marked with colored leg bands (57% versus 33%). These preliminary results indicate that the use of nasal discs on adult Harlequin females has little if any negative effect on survival or reproductive success.
Movements

Several movements of note were detected in 1993 (Table 6 and Table 7). A female marked on Marten Creek in August 1992 with a single juvenile was found in August 1993 on Swamp Creek, again with a single juvenile. The mouth of Swamp Creek is 6 km north east (across Noxon Reservoir) of the mouth of Marten Creek.

A female marked with 7 juveniles on McDonald Creek in August 1992 was seen again on McDonald Creek on 8 May 1993 with an unbanded male. On 11 May 1993 she was found with an unbanded male on Fish Creek (John Ashley, pers. comm.). The mouth of Fish Creek is 17 km southwest (across Lake McDonald) of the mouth of McDonald Creek.

Four Harlequins marked on McDonald Creek, Glacier National Park were recaptured or resighted on Hornby Island, off Vancouver Island in August 1993 and March 1994 (Table 7). However, in only a single case was the exact individual able to be identified. These are the first records of birds marked in Montana being relocated in coastal areas.
Figure 2. Hydrograph: 1988-1990 for the North Fork Flathead River near Columbia Falls, Montana.
Figure 3. Hydrograph: 1991-1993 for the North Fork Flathead River near Columbia Falls, Montana.
Table 3. Harlequin Duck reproduction in 1993 for streams with both pair and brood (at fledging) information.

<table>
<thead>
<tr>
<th>Stream</th>
<th>#Adult♀♀</th>
<th>#Broods</th>
<th>#Young</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Fork Flathead Drainage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Creek</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>McDonald Creek</td>
<td>17</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Trail Creek</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Whale Creek</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drainage Total</td>
<td>25</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>0.32 Broods per adult female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.96 Young per adult female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00 Young per brood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lower Clark Fork Drainage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marten Creek</td>
<td>5</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Swamp Creek</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Vermilion River</td>
<td>3</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Drainage Total</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>0.60 Broods per adult female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.60 Young per adult female</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2.67 Young per brood</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>35</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>0.40 Broods per adult female</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1.14 Young per adult female</td>
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</tr>
<tr>
<td>2.86 Young per brood</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th># adult females</th>
<th>broods per ad. female</th>
<th>young per ad. female</th>
<th>young per brood</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>13</td>
<td>54%</td>
<td>3.15</td>
<td>5.86</td>
</tr>
<tr>
<td>1990*</td>
<td>31</td>
<td>55%</td>
<td>2.10</td>
<td>3.82</td>
</tr>
<tr>
<td>1991*</td>
<td>37</td>
<td>24%</td>
<td>0.84</td>
<td>3.44</td>
</tr>
<tr>
<td>1992*</td>
<td>71</td>
<td>55%</td>
<td>1.37</td>
<td>3.38</td>
</tr>
<tr>
<td>1993</td>
<td>48</td>
<td>44%</td>
<td>1.23</td>
<td>2.81</td>
</tr>
</tbody>
</table>

Mean 46.5% 1.74 3.86

* includes data from the Rocky Mountain Front (Diamond and Finnegan 1992, 1993)
Table 5. Summary of Harlequin Ducks marked in 1993.

<table>
<thead>
<tr>
<th>Location</th>
<th>Male</th>
<th>Female</th>
<th>Juv.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonald Creek, Glacier NP</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Trail Creek, Flathead Co.</td>
<td>4</td>
<td>1</td>
<td>7</td>
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<td>w/♂76061</td>
<td>7/20*</td>
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<tr>
<td>755-76069</td>
<td>♂</td>
<td>w/♂76068</td>
<td>6/8*</td>
</tr>
</tbody>
</table>

* last date seen (Ashley pers. comm.)
* female not seen from 6/8/93 until recaptured 8/11/93 despite weekly surveys (Ashley pers. comm.)
# female w/unbanded male on lower McDonald Creek 5/8 and on Fish Creek 5/11; not seen subsequently (Ashley pers. comm.)
@ female w/unbanded male on Avalanche Creek on 5/10; not seen subsequently (Ashley pers. comm.)
Table 7. Sightings and recaptures of Harlequins on the Pacific Ocean which were originally marked in Glacier National Park, Montana.

<table>
<thead>
<tr>
<th>Bird</th>
<th>Date Marked</th>
<th>Age when Marked</th>
<th>Sex</th>
<th>Date Relocated</th>
<th>Place relocated</th>
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</thead>
<tbody>
<tr>
<td>755-76063</td>
<td>5/7/93</td>
<td>Adult</td>
<td>♂</td>
<td>8/4/93</td>
<td>Hornby Is. (Heron Rock) off Vancouver Island, B.C.</td>
</tr>
<tr>
<td>775-38606?</td>
<td>8/11/93</td>
<td>Juv.</td>
<td>♀</td>
<td>3/15/94</td>
<td>Hornby Is. (Ford's Cove) Vancouver Isl.</td>
</tr>
<tr>
<td>755-76056?</td>
<td>9/2/92</td>
<td>Juv.</td>
<td>♀</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

reported as ♀ with w/y p/s with plastic bands cut in half; 606 is w/y-4 p/s with wire style bands; 040 is w/o p/s with plastic bands cut in half; 056 is y/w p/s with plastic bands cut in half.


however reported as ♀ with w/o-4 w/s with top wire bands, while 606 is w/y-4 p/s with wire style bands; yellow-4 could easily be mistaken for orange-4; no orange-4 bands are known to have been used anywhere in North America.

| 775-38599 | 8/10/93 | Juv. | ? | 3/14/94 | Hornby Is. off Vancouver Island, B.C. |

however reported as ♀ with p/s y while 599 is p/s y/y-1; if a right band came off and only a single yellow band was present it could have been any of 10 birds marked as juveniles (all in GNP) in 1992 and 1993.
MANAGEMENT RECOMMENDATIONS AND RESEARCH NEEDS

Adult Harlequins show strong fidelity to breeding sites (Bengston 1972, Kuchel 1977, Dzinbal 1982, Wallen 1987). The extent of fidelity to natal areas by adults breeding for the first time is unknown, but is likely to be strong. Colonization of currently unoccupied streams is likely to be a rare event. Harlequins appear sensitive to human disturbance (Clarkson 1992, Cassirer and Groves 1991). Repeated disturbances may discourage nesting at traditional sites and reduce productivity (Rodrick and Milner 1991). However, proximity to trails and roads does not always correlate with reduced reproductive success. Sixty percent of Harlequin sites were within 50 m of trails on the Rocky Mountain Front (Diamond and Finnegan 1992). In this case, most Harlequin streams are located in roadless or wilderness areas and receive limited human activity prior to or during the nesting period.

Mid-stream loafing sites are important in breeding areas (Cassirer and Groves 1990). Brood rearing areas in Idaho and Montana west of the Continental Divide have a dense shrub or timber/shrub mosaic on the banks (Cassirer and Groves 1989, Gangemi 1991). East of the Divide in Montana stream banks are more open, and most observation sites had banks composed of gravel, grass-forb, or bedrock habitat (Diamond and Finnegan 1992, Markum and Genter 1990). Low benthic macroinvertebrate biomass may limit the number and productivity of Harlequins (Bengston and Ulfstrand 1971, Kuchel 1977). Given these factors, we recommend the following management strategies on Harlequin streams:

1) minimize unnecessary human activity along Harlequin streams during May through August;
2) a stream buffer of > 50 m should be maintained on both sides of streams for most activities;
   roads and trails should be > 100 m from streams and not visible from the streams;
3) major activities (road building, timber harvest, restoration projects, etc.) that are to be undertaken within 300 m of a stream should be done during the period 15 August - 1 April;

4) minor activities within stream buffers (e.g. trail maintenance or reconstruction) should not be preformed during 1 May - 15 July;

5) avoid activities which will change stream runoff patterns or decrease water quality;

6) in any area where major management activities are to take place in potential Harlequin habitat, survey for the preceding two years both for pairs (May) and broods (mid-July to mid-August). If Harlequins are present, develop a monitoring plan for Harlequins during and after the activity is to take place.

Long term research and management needs involve:

1) develop a baseline status report of current and historic Harlequin populations in Montana (currently in preparation);

2) investigate site fidelity, inter-stream movement, reproduction and mortality to allow estimations and modeling of what constitutes a viable Harlequin population (began in 1992);

3) determining the primary limiting factors for Harlequin Duck populations in occupied and historic habitat situations in the Northern Rockies;

4) developing standardized surveying protocols for occupied and potential Harlequin streams;

5) developing management guidelines for maintaining Harlequin populations and habitat; and

6) assess the impacts of past and current habitat modification and develop techniques to restore Harlequin populations and habitat.
LITERATURE CITED


APPENDICES

Appendix A. Data forms
Harlequin Duck Survey Form.

Date_________ Time_________ Surveyor(s)______________ (Start/Finish)

Stream
Include map with exact area(s) surveyed on back of this page

Weather
(Temp., wind dir & speed, cloud cover, precip last 24 hrs)

Accessibility?

Group #_________ # Individuals____________
(Put on map)

Sexes & Ages______________________________

Marked?________________________________

Accessibility?____________________________

Group #_________ # Individuals____________
(Put on map)

Sexes & Ages______________________________

Marked?________________________________

Accessibility?____________________________

Group #_________ # Individuals____________
(Put on map)

Sexes & Ages______________________________

Marked?________________________________

Accessibility?____________________________

NOTES:
Harlequin Duck Banding Form.

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<th>Age</th>
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<th>R</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td>Nasal Saddles</td>
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<td></td>
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<td></td>
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<td>Color Bands</td>
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<th>Rt</th>
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<table>
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<th>Wing chord</th>
<th>Tail</th>
<th>Tarsus</th>
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<table>
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<th>Molt</th>
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Notes (with other ducks? marked, sex, age? etc.)

+---------------------------------------------------------------------------------------------------+

Date Location

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<td>Color Bands</td>
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Notes (with other ducks? marked, sex, age? etc.)

+---------------------------------------------------------------------------------------------------+

Date Location

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Notes (with other ducks? marked, sex, age? etc.)

+---------------------------------------------------------------------------------------------------+

NOTES:
Appendix B. List of Harlequin Ducks marked in 1993 or marked in previous years and sighted in 1993.
Appendix B

Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

- **C** = Circle  **red** = red  **yel** = yellow  **wht** = white
- **T** = Triangle  **grn** = green  **blk** = black  **ora** = orange
- **S** = Square  **blu** = blue

**MARTEN CREEK, KOOTENAI NATIONAL FOREST, SANDERS CO., MT**

<table>
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<td>1) 29 July 93</td>
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</tr>
<tr>
<td>Juvenile</td>
<td>755-76087</td>
<td>S-ora</td>
<td>C-blu</td>
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<tr>
<td>Juvenile</td>
<td>755-76088</td>
<td>C-wht</td>
<td>S-ora</td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76089</td>
<td>S-ora</td>
<td>C-blu</td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76090</td>
<td>S-ora</td>
<td>C-whi</td>
</tr>
<tr>
<td><strong>Adult Female</strong></td>
<td>755-27556</td>
<td>T-blk</td>
<td>T-blk</td>
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<td>(caught 15 May 91 with adult male 765-27555; had brood of 4 chicks 5 Aug 92)</td>
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<td></td>
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<tr>
<td>Juvenile</td>
<td>755-76091</td>
<td>C-grn</td>
<td>T-yel</td>
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<tr>
<td>Juvenile</td>
<td>755-76092</td>
<td>C-grn</td>
<td>S-blu</td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76093</td>
<td>C-whi</td>
<td>S-grn</td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76094</td>
<td>S-ora</td>
<td>S-grn</td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76095</td>
<td>S-ora</td>
<td>T-yel</td>
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<tr>
<td>2) 26 May 93</td>
<td>755-76075</td>
<td>C-grn</td>
<td>C-blu</td>
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<td>3) 26 May 93</td>
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<tr>
<td>Adult Male</td>
<td>755-76076</td>
<td>C-grn</td>
<td>S-ora</td>
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<tr>
<td>(with one unmarked male)</td>
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</tr>
<tr>
<td>Adult Female</td>
<td>755-76074</td>
<td>C-grn</td>
<td>C-whi</td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76078</td>
<td>C-grn</td>
<td>C-whi</td>
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<tr>
<td>4) 2 June 93</td>
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</tr>
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<td><strong>Adult Female</strong></td>
<td>755-76074</td>
<td>C-grn</td>
<td>C-whi</td>
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<tr>
<td>with male but markings not seen; marked 26 May 93</td>
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<tr>
<td>5) 13 May 93</td>
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<td>T-grn</td>
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<tr>
<td>marked 4 Aug 92 with 4 juveniles (755-76009-10, 755-76012-13); seen with unmarked male</td>
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<tr>
<td>6) 13 May 93</td>
<td>765-27557</td>
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<td>T-grn</td>
</tr>
<tr>
<td><strong>Adult Male</strong></td>
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<td></td>
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</tr>
<tr>
<td>marked 29 May 91 with other male; seen with unmarked female</td>
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Marten Creek harlequin duck marking sites, 1993.
Quad: Noxon
Marten Creek harlequin duck marking sites, 1993.
Quad: Bloom Peak
Marten Creek harlequin duck marking sites, 1993.
Quad: Noxon
Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

C = Circle  red = red  yell = yellow  whit = white
T = Triangle  grn = green  blk = black  ora = orange
S = Square  blu = blue

SWAMP CREEK, KOOTENAI NATIONAL FOREST, SANDERS CO., MT

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<td>T-grn</td>
<td>S-ora</td>
<td></td>
</tr>
<tr>
<td>** Adult Female</td>
<td>755-76007</td>
<td>T-blk</td>
<td>T-grn</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(caught 4 Aug 92 at mouth of Marten Creek; had brood of 1 chick which could probably fly)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) 2 Aug 1993</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Juvenile</td>
<td>755-76096</td>
<td>T-grn</td>
<td>S-ora</td>
<td></td>
</tr>
<tr>
<td>sighting of bird marked 30 July 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Swamp Creek harlequin duck marking sites, 1993.
Quad: Goat Peak
Appendix B (cont.)

Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

- $C = \text{Circle}$, $\text{red} = \text{red}$
- $T = \text{Triangle}$, $\text{grn} = \text{green}$
- $S = \text{Square}$, $\text{blu} = \text{blue}$
- $\text{yel} = \text{yellow}$, $\text{blk} = \text{black}$, $\text{wht} = \text{white}$
- $\text{ora} = \text{orange}$

**VERMILLION RIVER, KOOTENAI NATIONAL FOREST, SANDERS CO., MT**

<table>
<thead>
<tr>
<th>Site</th>
<th>USFWS Band #</th>
<th>Nasal Discs</th>
<th>left</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 27 Jul 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76077</td>
<td>C-blu</td>
<td>T-blk</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(no accompanying adult; too large to belong to other broods caught on Vermilion River)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) 28 Jul 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76079</td>
<td>S-ora</td>
<td>C-grn</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76080</td>
<td>S-ora</td>
<td>T-blk</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76081</td>
<td>T-blk</td>
<td>S-ora</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76082</td>
<td>T-yel</td>
<td>S-grn</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76083</td>
<td>S-grn</td>
<td>S-ora</td>
<td></td>
</tr>
<tr>
<td>3) 28 Jul 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76084</td>
<td>S-red</td>
<td>C-grn</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76085</td>
<td>T-blk</td>
<td>S-blu</td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76086</td>
<td>C-grn</td>
<td>S-ora</td>
<td></td>
</tr>
</tbody>
</table>
Vermilion River harlequin duck marking sites, 1993.
Quad: Trout Creek
Vermilion River harlequin duck marking sites, 1993.
Quad: Seven Point Mountain
Vermilion River harlequin duck marking sites, 1993.
Quad: Seven Point Mountain
Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

C = Circle  red = red  yell = yellow  wht = white
T = Triangle grn = green  blk = black  ora = orange
S = Square  blu = blue

ROCK CREEK, KOOTENAI NATIONAL FOREST, SANDERS CO., MT

<table>
<thead>
<tr>
<th>Site</th>
<th>USFWS Band #</th>
<th>Nasal Discs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>left</td>
<td>right</td>
<td></td>
</tr>
<tr>
<td>1) 31 July 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76097</td>
<td>T-yel</td>
<td>S-ora</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76098</td>
<td>T-blk</td>
<td>S-grn</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76099</td>
<td>T-grn</td>
<td>S-blu</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>755-76100</td>
<td>T-grn</td>
<td>T-yel</td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38603</td>
<td>S-ora</td>
<td>T-grn</td>
<td></td>
</tr>
<tr>
<td>2) 31 July 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38604</td>
<td>only pink band 70, right leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38605</td>
<td>only pink band 69, right leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>no accompanying adult</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

43
Rock Creek harlequin duck marking sites, 1993.
Quad: Elephant Peak
Rock Creek harlequin duck marking sites, 1993.
Quad: Noxon Rapids Dam
Appendix B (cont.)

Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

\[ C = \text{Circle} \quad \text{red} = \text{red} \quad \text{yel} = \text{yellow} \quad \text{whi} = \text{white} \]
\[ T = \text{Triangle} \quad \text{grn} = \text{green} \quad \text{blk} = \text{black} \quad \text{ora} = \text{orange} \]

TRAIL CREEK, FLATHEAD NATIONAL FOREST, FLATHEAD CO., MT

<table>
<thead>
<tr>
<th>Site</th>
<th>USFWS Band #</th>
<th>Nasal Discs</th>
<th>left</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 9 May 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76070</td>
<td>S-ora</td>
<td>T-grn</td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76045</td>
<td>S-ora</td>
<td>T-grn</td>
<td></td>
</tr>
</tbody>
</table>
| marked as adult 12 Aug 1992 with brood of 4
| Adult Male    | 755-76071    | C-whi       | C-whi|       |
| (with unmarked female) |
| 2) 13 Aug 93  |              |             |      |       |
| Juvenile      | 775-38613    | C-grn       | C-red|       |
| Juvenile      | 775-38614    | C-whi       | C-red|       |
| Juvenile      | 775-38615    | S-blu       | C-red|       |
| Juvenile      | 775-38616    | S-red       | C-whi|       |
| Adult Female  | 775-38617    | C-whi       | C-whi|       |
| (one additional unmarked juv in brood) |
| Juvenile      | 775-38618    | S-grn       | C-blu|       |
| Juvenile      | 775-38619    | C-blu       | S-grn|       |
| Juvenile      | 775-38620    | S-grn       | T-yel|       |
| ** Adult Female | 755-76045  | S-ora       | T-grn|       |
| marked as adult 12 Aug 1992 with brood of 4|
| 3) 9 May 93   |              |             |      |       |
| Adult Male    | 755-76072    | S-red       | S-red|       |
| Adult Male    | 755-76073    | S-blu       | S-blu|       |
| ** Adult Female | 765-27566  | C-blu       | C-blu|       |
| marked as adult 10 Jun 1992 with different male: 765-27565 |
| 4) 9 May 93   |              |             |      |       |
| ** Adult Female | 755-76045  | S-ora       | T-grn|       |
| marked as adult 12 Aug 1992 with brood of 4|
| 5) 9 May 93   |              |             |      |       |
| ** Adult Male  | 765-27563    | C-blu       | C-blu|       |
| ** Adult Female | 765-27564  | S-ora       | S-ora|       |
| pair marked together 10 June 92 |
Trail Creek harlequin duck marking sites, 1993.
Quad: Trailcreek
Trail Creek harlequin marking sites, 1993.
Quad: Mount Hefty
Appendix B (cont.)

Harlequin Duck marking outside Glacier National Park utilizing nasal discs and USFWS bands.

\[
\begin{align*}
C &= \text{Circle} \\
T &= \text{Triangle} \\
S &= \text{Square} \\
\text{red} &= \text{red} \\
\text{grn} &= \text{green} \\
\text{blu} &= \text{blue} \\
\text{yel} &= \text{yellow} \\
\text{blk} &= \text{black} \\
\text{wht} &= \text{white} \\
\text{ora} &= \text{orange}
\end{align*}
\]

SPOTTED BEAR RIVER, FLATHEAD NATIONAL FOREST, FLATHEAD CO., MT

<table>
<thead>
<tr>
<th>Site</th>
<th>USFWS Band #</th>
<th>Nasal Discs</th>
<th>Nasal Discs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>left</td>
<td>right</td>
</tr>
<tr>
<td>1) 15 Aug 93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38621</td>
<td>T-blk</td>
<td>C-whi</td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38622</td>
<td>S-blu</td>
<td>T-blk</td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38623</td>
<td>T-blk</td>
<td>C-blu</td>
</tr>
<tr>
<td>Adult female</td>
<td>925-09301</td>
<td>C-blu</td>
<td>T-yel</td>
</tr>
<tr>
<td>(one additional unmarked juv in brood)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Spotted Bear River marking site, 1993.
QUAD: Whitcomb Peak
50
Appendix B (cont.)

Colored Leg Bands used in Glacier National Park (pink/USFWS for 1992 & 1993 juveniles)

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>g = green</td>
<td>white</td>
</tr>
<tr>
<td>b = blue</td>
<td>orange</td>
</tr>
<tr>
<td>p = pink</td>
<td>red</td>
</tr>
<tr>
<td>y = yellow</td>
<td>silver (FWS band)</td>
</tr>
</tbody>
</table>

McDONALD CREEK (Glacier National Park)

<table>
<thead>
<tr>
<th>Site</th>
<th>USEWS Band #</th>
<th>Plastic leg bands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>left</td>
<td>right</td>
</tr>
<tr>
<td>1) 6 May 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76059</td>
<td>o/s</td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76060</td>
<td>o/s</td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76061</td>
<td>b/o</td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76062</td>
<td>b/o</td>
</tr>
<tr>
<td>2) 10 Aug 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>765-27597</td>
<td>y/s</td>
</tr>
<tr>
<td>Juvenile</td>
<td>765-27598</td>
<td>g/y-2</td>
</tr>
<tr>
<td>Juvenile</td>
<td>765-27599</td>
<td>p/s</td>
</tr>
<tr>
<td>Juvenile</td>
<td>765-27600</td>
<td>b/y-3</td>
</tr>
<tr>
<td>** Adult Female</td>
<td>755-76033</td>
<td>y/s</td>
</tr>
<tr>
<td>recapture from 11 Aug 92; with brood of 2 in 1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) 7 May 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76063</td>
<td>g/o</td>
</tr>
<tr>
<td>recaptured on Hornby Is. off Vancouver Island 4 Aug 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76064</td>
<td>g/o</td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76065</td>
<td>o/s</td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76066</td>
<td>o/s</td>
</tr>
<tr>
<td>4) 11 Aug 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38606</td>
<td>w/y-4</td>
</tr>
<tr>
<td>** Adult Female</td>
<td>755-76064</td>
<td>g/o</td>
</tr>
<tr>
<td>recapture from 7 May 1993; one additional chick was present but drowned in the net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38607</td>
<td>p/s</td>
</tr>
<tr>
<td>** Adult Female</td>
<td>765-27586</td>
<td>y/s</td>
</tr>
<tr>
<td>2 additional chicks were present but not captured; recapture from 11 Aug 92; with brood of 2 in 1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) 7 May 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76067</td>
<td>w/o</td>
</tr>
<tr>
<td>6) 7 May 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>755-76068</td>
<td>y/o</td>
</tr>
<tr>
<td>Adult Female</td>
<td>755-76069</td>
<td>y/o</td>
</tr>
<tr>
<td>7) 11 Aug 93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38608</td>
<td>p/s</td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38609</td>
<td>p/s</td>
</tr>
<tr>
<td>Adult Female</td>
<td>775-38610</td>
<td>g/y</td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38611</td>
<td>p/s</td>
</tr>
<tr>
<td>Juvenile</td>
<td>775-38612</td>
<td>p/s</td>
</tr>
</tbody>
</table>
McDonald Creek harlequin duck marking sites, 1993.
Quad: Mount Cannon
McDonald Creek harlequin duck marking sites, 1993.  
Quad: Mount Cannon
McDonald Creek harlequin duck marking sites, 1993.
Quad: Mount Cannon
Appendix C. Element Occurrence Records from 1993 Surveys
Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5
State rank: S2B,SZN
Element occurrence code: ABNJB15010.001
Element occurrence type: y

Survey site name: BOULDER RIVER
EO rank: C
EO rank comments: NOT SURE OF BOATING AND FISHING USE; IF BOTH ARE MODERATE TO HEAVY, THEN RANK SHOULD BE D.

County: PARK
USGS quadrangle: MOUNT DOUGLAS CHROME MOUNTAIN

Elevation: 5200 - 7350
Slope/aspect: 0
Size (acres):

Location:
FROM BIG TIMBER, MT, DRIVE SOUTH AND WEST 25 MILES ALONG THE MAIN BOULDER RIVER TO THE NAT'L FOREST BOUNDARY, THEN ANOTHER 17 MILES TO HILLEARY BRIDGE, JUST S. OF FOURMILE CR.

CA. 5-6 PAIRS OBSERVED EACH SPRING, BUT GENERALLY ONLY ONE OR TWO (OR NO) BROODS REPORTED LATER IN SUMMER. MOST OBSERVATIONS FROM FOURMILE - HICKS PARK SECTION. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
A CA. 20 MILE SEGMENT OF MOUNTAIN STREAM, FROM THE EAST FORK ABOVE BOX CANYON STATION DOWN TO FALLS CREEK.

Land owner/manager:
GALLATIN NATIONAL FOREST, BIG TIMBER RANGER DISTRICT

Observation summary:
Observer/date: 1993-05-30, FOX   Location: FOURMILE C.G.   Observation: PAIR
1993-06-12, CASTREN   TO6SR12E, S4
1993-06-13, CASTREN   TO6SR12E, S16
1993-06-14, CASTREN   WEST BOULDER RIVER
1993-07-22, CASTREN   HICKS PARK C.G.   NONE
   HEN + 1 JUV.

Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5
State rank: S2B,SZN

Element occurrence code: ABNJB15010.002
Element occurrence type:

Survey site name: UPPER MCDONALD CREEK
EO rank: A/B
EO rank comments: 11-14 PAIRS PRESENT ON MCDONALD CREEK BELOW LOGAN CREEK; PERHAPS 20 PAIRS IN ENTIRE COMPLEX. WHILE AREA IS NOT DIFFICULT ACCESS OR REMOTE, DUCKS HAVE ADAPTED TO VISITORS AND SOME AREAS HAVE DIFFICULT ACCESS.

County: FLATHEAD
USGS quadrangle: MOUNT CANNON
AHERN PASS
MOUNT GEDUHN

Township: 034N Range: 017W Section: 27 TRS comments: NW4

Precision: M
Survey date: 1973
First observation: 1973
Last observation: 1992-09-02

Elevation: 3153 - 4200
Slope/aspect:
Size (acres): 60

Location:
UPPER MCDONALD CREEK IN GLACIER NP; STREAM SECTION FROM CONTINENTAL CREEK SW TO THE NORTH END OF LAKE MCDONALD, AND INCLUDING MINERAL CREEK, AVALANCHE CREEK AND AVALANCHE LAKE.

Element occurrence data:
PERHAPS 20 PAIRS PRESENT EACH SPRING, WITH CA. 10 BROODS REPORTED EACH SUMMER. A WELL-SURVEYED POPULATION, WITH MANY DUCKS BANDED IN THE EARLY 1990s. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
CA. 20 MILES OF MOUNTAIN STREAM ON MACDONALD CREEK AND ITS TRIBUTARIES.

Land owner/manager: GLACIER NATIONAL PARK
Comments:
EXTENT OF OCCUPIED BREEDING HABITAT UNKNOWN. SPRING PAIRS AND LATE SEASON YOUNG REPORTED ON LOWER MCDONALD CREEK, FISH CREEK, ETC., MAY OR MAY NOT BE BIRDS FROM UPPER MCDONALD CREEK POPULATION.

Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5
State rank: S2B,SZN

Forest Service status: SENSITIVE
Federal Status: C2

Element occurrence code: ABNJB15010.005
Element occurrence type:

Survey site name: ROCK CREEK (NOXON)
EO rank: D
EO rank comments: 2 PAIRS PRESENT IN 1993, FEWER IN PREVIOUS YEARS.
3-4 OTHER STREAMS WITHIN 20 KM WITH TOTAL OF 9-12 PAIRS; ACCESS DIFFICULT, NO BOATING AND LITTLE FISHING.

County: SANDERS

USGS quadrangle: NOXON RAPIDS DAM
ELEPHANT PEAK

Township: 026N
Range: 032W
Section: 27
TRS comments: 15,22

Precision: M
Survey date: 1986
First observation: 1986
Last observation: 1993-07-31
Elevation: 2400 - 2680
Slope/aspect:
Size (acres): 0

Location:
ABOUT 1.5 AIR MILES NE OF NOXON RAPIDS DAM, WHERE FOREST SERVICE ROAD #150 FIRST INTERSECTS ROCK CREEK.

Element occurrence data:
SPORADIC SIGHTINGS SINCE 1986; PROBABLY 1 OR 2 BROODS GENERALLY PRODUCED EACH YEAR. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
A CA. 3 MILE STRETCH OF MOUNTAIN STREAM, EXTENDING UPSTREAM FROM MAPPED LOCATION.

Land owner/manager:
KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:
FISH TRAP PLACED BY MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS.

Information source: WILDLIFE BIOLOGIST, KOOTENAI NATIONAL FOREST, 506 US HWY 2 WEST, LIBBY, MT 59923.
EcoMonitoring

Name: HISTRIONICUS HISTRIONICUS
Common name: HARLEQUIN DUCK

Reference code: EM.USMTHP * 23    Survey site: ROCK CREEK (NOXON)

Goals & Objectives:

Management plan: Monitoring plan:
Monitoring level:

Management goals:
Monitoring goals: TRACK CHANGES IN THE POPULATION AND REPRODUCTIVE SUCCESS; DETERMINE SITE FIDELITY.

Parameter: Threshold note:
SINGLE MALES 1
SINGLE FEMALES 1
PAIRS 1
JUVENILES 1
BROODS 0

Methods: VISUAL SURVEYS, WALKING LENGTH OF EO UPSTREAM (IF POSSIBLE).

Sampling frequency: MINIMUM TWICE PER YEAR, CA. MAY & JULY/AUGUST.

Visit dates: 1993-07-31
Coordinator: REICHEL, JIM

Trends & Recommendations:

Short-term trend: UNKNOWN          Long-term trend: UNKNOWN
Interpretation:

Current condition: UNKNOWN
Comments:

Management recommendations:
Monitoring recommendations:
Ecomonitoring Visits

Reference: EM.USMTHP * 23 * 1

Start date: 1993-07-31
Observer: REICHEL BECKSTROM

Person hours: 11.00
Effort: HWY 200 UP TO SECTION 10/11 LINE.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0
SINGLE FEMALES 1, 1 BANDED .45 MI BELOW 1ST BRIDGE
PAIRS 0
JUVENILES 6, 6 BANDED ABOVE + 1 MI ABOVE BRIDGE
BROODS 2

Other observations: BROODS IN SE4NW4 S27, AND SE4SE4 S15.
MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5
State rank: S2B, SZN
Forest Service status: SENSITIVE
Federal Status: C2

Element occurrence code: ABNJB15010.006
Element occurrence type:

Survey site name: MARTEN CREEK
EO rank: C/B
EO rank comments: 5 PAIRS PRESENT IN 1993, FEWER IN PREVIOUS YEARS.
3-4 OTHER STREAMS WITHIN 20 KM WITH TOTAL OF 9-12 PAIRS; NO BOATING, LITTLE FISHING.

County: SANDERS
USGS quadrangle: NOXON BLOOM PEAK

Township: 025N
Range: 032W
Section: 32

Precision: M
Survey date: First observation: 1986
Last observation: 1993-07-29

TRS comments: ADDITIONAL SECTIONS
Elevation: 2330 - 2850
Slope/aspect: Size (acres): 0

Location:
THE SOUTH AND NORTH FORKS OF MARTEN CREEK ARE ON THE WEST SIDE OF NOXON RESERVOIR, CA. 8 MILES NW OF TROUT CREEK.

Element occurrence data:
GENERALLY 2 TO 4 PAIRS BREED. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
MOUTH OF MARTEN CREEK IS MAPPED. THIS EO INCLUDES THE NORTH BRANCH (CA. 5 MILES) AND SOUTH BRANCH (CA. 1.5 MILES) AS CONTIGUOUS HABITAT.

Land owner/manager:
KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

Comments:

EcoMonitoring

Name: HISTRIONICUS HISTRIONICUS
Common name: HARLEQUIN DUCK

Reference code: EM.USMTHP2 * 1  Survey site: MARTEN CREEK

Goals & Objectives:

Management plan: Monitoring plan: Y  Monitoring level: 2

Management goals:

Monitoring goals: TRACK CHANGES IN THE POPULATION AND REPRODUCTIVE SUCCESS; DETERMINE SITE FIDELITY.

Parameter: Threshold note:
SINGLE MALES  1
SINGLE FEMALES  1
PAIRS  1
JUVENILES  1
BROODS  1

Methods: VISUAL SURVEYS, WALKING LENGTH OF EO UPSTREAM (IF POSSIBLE).

Sampling frequency: MINIMUM TWICE PER YEAR, CA. MAY & JULY/AUGUST.

Visit dates: 1987-06-18
1987-06-22
1988-06-18
1989
1993-06-02
1993-06-02
1993-07-29
1993-07-29
1992-05-12
1992-06-01
1992-08-04

Coordinator: REICHEL, JIM

Trends & Recommendations:

Short-term trend: STABLE  Long-term trend:

Interpretation: POPULATION APPEARS STABLE OVER LAST 5 YEARS.

Current condition: SATISFACTORY

Comments: CURRENT POPULATION SEEMS TO BE MAXIMUM THAT HABITAT CAN SUPPORT.

Management recommendations:

Monitoring recommendations:
### Ecomonitoring Visits

**Reference:** EM.USMTHP2 * 1 * 4  
**Survey site:** MARTEN CREEK

**Start date:** 1993-06-02  
**Observer:** CASTREN  
**BECKSTROM**  
**REICHEL**

- **Person hours:** 6.00  
- **Effort:** STAN DID LOWER 1.5 MI OF S.FK.; ALL DID N.FK. FROM 1 MILE ABOVE DEVILS GAP TO BAY.

#### Parameter: Quantitative summary: Quality note:

- **SINGLE MALES:** 5  
- **SINGLE FEMALES:** 0  
- **PAIRS:** 1, FEMALE BANDED  
- **JUVENILES:** 0  
- **BROODS:** 0

**Quality note:** 2 LOCATIONS

**Quality note:** .3 MI UP N.FK. FROM JCT

**Other observations:** SINGLE MALES JUST UP S.FK. AND JUST BELOW JUNCTION.

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### Ecomonitoring Visits

**Reference:** EM.USMTHP2 * 1 * 5  
**Survey site:** MARTEN CREEK

**Start date:** 1993-07-29  
**Observer:** JOHNSON, W.  
**PFALZER, E.**  
**HIDY, T.**  
**CASTREN**  
**REICHEL**  
**BECKSTROM**

- **Person hours:** 8.00  
- **Effort:** S.FK. TO MCNEELEY CREEK; N.FK. TO DEVILS GAP.

#### Parameter: Quantitative summary: Quality note:

- **SINGLE MALES:** 0  
- **SINGLE FEMALES:** 2, BOTH BANDED  
- **PAIRS:** 0  
- **JUVENILES:** 8, ALL BANDED  
- **BROODS:** 2

**Quality note:** MOUTH OF BAY

**Other observations:** TWO BROODS, EACH WITH 4 JUV., AT OR NEAR MOUTH OF BAY.  
ONE HEN WAS ALREADY BANDED; OTHERS BANDED TODAY.
Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 11
Survey site: MARTEN CREEK

Start date: 1992 05 12
Observer: GENTER, DAVID

Person hours: 2.50
Effort: SURVEYED SOUTH FORK UP TO SORREL GULCH.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 2
SINGLE FEMALES 0
PAIRS 2
JUVENILES
BROODS

Other observations: RECAPTURED MALE #27560 (BANDED IN 1991). BANDED MALE #27561.

Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 12
Survey site: MARTEN CREEK

Start date: 1992 06 01
Observer: REICHEL, JIM, et al.

Person hours: 2.00
Effort: SPOT SURVEYED CA. LOWER MILE OF NORTH FORK; WALKED UPSTREAM LOWER MILE OF SOUTH FORK.

Parameter: Quantitative summary: Quality note:
SINGLE MALES
SINGLE FEMALES
PAIRS
JUVENILES
BROODS

Other observations: NO DUCKS OBSERVED.
Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 13 Survey site: MARTEN CREEK

Start date: 1992 08 04
Observer: REICHEL, JIM; BECKSTROM, STAN

Person hours: 20.00
Effort: SURVEYED NORTH FORK UP TO CLINTON GULCH; LOWER MILE OF SOUTH FORK (STREAMS INTERMITTENT ABOVE THOSE POINTS). MOST TIME SPENT BANDING - 12 BIRDS FIRST DAY AND 3 BIRDS SECOND DAY.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0 SINGLE FEMALE IN BAY
SINGLE FEMALES 5
PAIRS 0
JUVENILES 13
BROODS 4 BROODS OF 4,4,4,1

Other observations: BROODS LOCATED AT: MOUTH OF MARTEN CREEK (2); CA. 200m UP FROM MOUTH; Sec.25 SW4SE4.
Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 05 Survey site: MARTEN CREEK

Start date: 1989
Observer:

Person hours:
Effort:

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0
SINGLE FEMALES 2
PAIRS 0
JUVENILES ?
BROODS 2

ON NORTH FORK

Other observations:

Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 04 Survey site: MARTEN CREEK

Start date: 1988-06-18
Observer:

Person hours:
Effort:

Parameter: Quantitative summary: Quality note:
SINGLE MALES ?
SINGLE FEMALES 1 + ?
PAIRS ?
JUVENILES 6
BROODS 1

NEAR DEVILS GAP

Other observations: OTHER ADULTS OBSERVED, BUT DETAILS MISSING.
Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 02
Survey site: MARTEN CREEK

Start date: 1987-06-18
Observer: ASH, E. & CROWE, E.

Person hours:
Effort: NORTH FORK SURVEY.

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<tr>
<td>SINGLE MALES</td>
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<tr>
<td>SINGLE FEMALES</td>
<td>6</td>
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<tr>
<td>PAIRS</td>
<td>0</td>
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<tr>
<td>JUVENILES</td>
<td>?</td>
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<tr>
<td>BROODS</td>
<td>3</td>
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</table>

Other observations:

Ecomonitoring Visits

Reference: EM.USMTHP2 * 1 * 03
Survey site: MARTEN CREEK

Start date: 1987-06-22
Observer: ASH, E. & CROWE, E.

Person hours:
Effort: SOUTH FORK SURVEY.

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<tr>
<td>SINGLE MALES</td>
<td>0</td>
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<tr>
<td>SINGLE FEMALES</td>
<td>3</td>
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<tr>
<td>PAIRS</td>
<td>0</td>
</tr>
<tr>
<td>JUVENILES</td>
<td>?</td>
</tr>
<tr>
<td>BROODS</td>
<td>2</td>
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</table>

Other observations: MAY BE DUPLICATION OF BROODS OBSERVED ON NORTH FORK ON 6/18.
Histrionicus histrionicus

Vermilion River (008)
MONTANA NATURAL HERITAGE PROGRAM
Element Occurrence Record

Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5  Forest Service status: SENSITIVE
State rank: S2B,SZN  Federal Status: C2

Element occurrence code: ABNJB15010.008
Element occurrence type:

Survey site name: VERMILION RIVER
EO rank: D/C
EO rank comments: 3 PAIRS PRESENT IN 1993, FEWER IN PREVIOUS YEARS.
3-4 OTHER STREAMS WITHIN 20 KM WITH TOTAL OF
9-12 PAIRS; LITTLE BOATING OR FISHING; 1/2 WITH
DIFFICULT ACCESS.

County: SANDERS
USGS quadrangle: TROUT CREEK
SEVEN POINT MOUNTAIN
VERMILLION PEAK
MILLER LAKE

Township: 024N  Range: 031W  Section: 12  TRS comments: SW4
Precision: M
Survey date:  First observation: 1988  Slope/aspect:
Last observation: 1992-06-01  Size (acres): 0  Elevation: 2340 - 3400

Location:
FROM TROUT CREEK GO NORTH 1.5 MILES ON SR 200, RIGHT 5 MILES ON THE
BLUE SLIDE ROAD, THEN LEFT 2 MILES UP THE VERMILION RIVER ROAD.

Element occurrence data:
1988: HEN WITH 3 YOUNG OBSERVED. 1989: 2 FEMALES WITH BROODS OBSERVED,
ONE IN MAPPED LOCATION, ONE IN T24N,R30W,8 (SEVERAL MILES UPSTREAM).
[T24N,R30W,7]; MALE WAS MARKED.

General site description:
A CA. 10 MILE STREAM SEGMENT, FROM VERMILLION BAY TO VERMILLION FALLS.

Land owner/manager:
KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
corporate timberlands

Comments:
PLACER MINING IN AREA. EXTENT OF OCCUPIED BREEDING HABITAT UNKNOWN.

Information source: MILLER, VERNON E. (GENE). 850, HIGHWAY 200 WEST,
PLAINS, MT 59859.
EcoMonitoring

Name: HISTRIONICUS HISTRIONICUS
Common name: HARLEQUIN DUCK

Reference code: EM.USMTHP * 28 Survey site: VERMILION RIVER

Goals & Objectives:

Management plan: Monitoring plan: Monitoring level:

Management goals:

Monitoring goals: TRACK CHANGES IN THE POPULATION AND REPRODUCTIVE SUCCESS; DETERMINE SITE FIDELITY.

Parameter: Threshold note:
SINGLE MALES 1
SINGLE FEMALES 1
PAIRS 1
JUVENILES 1
BROODS 0

Methods: VISUAL SURVEYS, WALKING LENGTH OF EO UPSTREAM (IF POSSIBLE).

Sampling frequency: MINIMUM TWICE PER YEAR, CA. MAY & JULY/AUGUST.

Visit dates: 1993-05-12
1993-05-27
1993-07-27
1993-07-28
1993-08-01

Coordinator: REICHEL, JIM

Trends & Recommendations:

Short-term trend: UNKNOWN Long-term trend: UNKNOWN

Interpretation:

Current condition: UNKNOWN

Comments:

Management recommendations:

Monitoring recommendations:
### Ecomonitoring Visits

**Reference:** EM.USMTHP * 28 * 1  
**Survey site:** VERMILION RIVER

**Start date:** 1993-05-12  
**Observer:** REICHEL, et al

**Person hours:** 8.00  
**Effort:** FROM MOUTH TO ABOVE MILLER CREEK.

#### Parameter: Quantitative summary: Quality note:
- SINGLE MALES: 1  
- SINGLE FEMALES: 0  
- PAIRS: 2  
- JUVENILES: 0  
- BROODS: 0

**Other observations:** RIVER VERY HIGH.

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### Ecomonitoring Visits

**Reference:** EM.USMTHP * 28 * 2  
**Survey site:** VERMILION RIVER

**Start date:** 1993-05-27  
**Observer:** CASTREN

**Person hours:** 5.00  
**Effort:** .5 MI ABOVE SIMS CREEK DOWN TO MOUTH.

#### Parameter: Quantitative summary: Quality note:
- SINGLE MALES: 0  
- SINGLE FEMALES: 0  
- PAIRS: 1  
- JUVENILES: 0  
- BROODS: 0

**Other observations:**

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**Quality note:** BETWEEN LYONS & CATARACT

**Other observations:** ONE AS ABOVE; OTHER BY MILLER

**Quality note:** SIMS CREEK
Ecomonitoring Visits
Reference: EM.USMTHP * 28 * 3 Survey site: VERMILLION RIVER
Start date: 1993-07-27
Observer: REICHEL BECKSTROM
Person hours: 4.00
Effort: MOUTH TO LOWER CANYON

Parameter:
- SINGLE MALES: 0
- SINGLE FEMALES: 0
- PAIRS: 0
- JUVENILES: 1, BANDED
- BROODS

Quantitative summary: Quality note:
SINGLE MALES
SINGLE FEMALES
PAIRS
JUVENILES 1, BANDED ROE GULCH
BROODS

Other observations: NOT QUITE ABLE TO FLY.

Ecomonitoring Visits
Reference: EM.USMTHP * 28 * 4 Survey site: VERMILLION RIVER
Start date: 1993-07-28
Observer: REICHEL BECKSTROM
Person hours: 12.00
Effort: LOWER CANYON TO DIVIDE CREEK.

Parameter:
- SINGLE MALES: 0
- SINGLE FEMALES: 2, 2 BANDED
- PAIRS: 0
- JUVENILES: 6, 6 BANDED
- BROODS: 2

Quantitative summary: Quality note:
SINGLE MALES
SINGLE FEMALES 2, 2 BANDED
PAIRS
JUVENILES 6, 6 BANDED
BROODS

Other observations: FEMALE WITH 4 JUV. AT TOP OF LOWER CANYON; FEMALE WITH 2 JUV. JUST ABOVE GROUSE CREEK.
Ecomonitoring Visits

Reference: EM.USMTHP * 28 * 5  
Survey site: VERMILION RIVER

Start date: 1993-08-01
Observer: BECKSTROM

Person hours: 3.00
Effort: WILLOW CREEK TO MILLER CREEK.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0
SINGLE FEMALES 0
PAIRS 0
JUVENILES 0
BROODS 0

Other observations:
Histrionicus histrionicus

Swamp Creek (011)
Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5  Forest Service status: SENSITIVE
State rank: S2B,SZN  Federal Status: C2

Element occurrence code: ABNJB15010.011
Element occurrence type:

Survey site name: SWAMP CREEK
EO rank: D
EO rank comments: 1-2 PAIRS PRESENT. 3-4 OTHER STREAMS WITHIN 20 KM WITH TOTAL OF 9-12 PAIRS; NO BOATING, LITTLE FISHING; DIFFICULT ACCESS.

County: SANDERS
USGS quadrangle: GOAT PEAK
NOXON RAPIDS DAM
Township: 025N  Range: 031W  Section: 16  TRS comments: W2; 4,9,17,19,20
Precision: M
Survey date: 1989  Elevation: 2700 -
First observation: 1989  Slope/aspect:
Last observation: 1993-08-02  Size (acres): 0

Location:
FROM SR 200 JUST NORTH OF CABINET RANGER STATION, TAKE COUNTY ROAD AND FS ROAD #1119 NORTH TO SWAMP CREEK TRAILHEAD; THEN WALK UPSTREAM CA. 0.5 MILE.

Element occurrence data:
SPORADIC SIGHTINGS SINCE 1989; PROBABLY 1 OR 2 BROODS GENERALLY PRODUCED EACH YEAR. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
STREAM REACH WITH NESTING/REARING HABITAT; EXTENDS CA. 4 MILES UPSTREAM FROM LOCATION MAPPED.

Land owner/manager:
KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:
NONE.

Information source:
MILLER, V. E. 1989. FIELD SURVEY REPORT, HARLEQUIN DUCK (HISTRIONICUS HISTRIONICUS): LOWER CLARK FORK RIVER DRAINAGE, WEST-CENTRAL MONTANA. UNPUBLISHED. 47 PP.
EcoMonitoring

Name: HISTRIONICUS HISTRIONICUS
Common name: HARLEQUIN DUCK

Reference code: EM.USMTHP * 1 Survey site: SWAMP CREEK

Goals & Objectives:

Management plan: Monitoring plan: Monitoring level:
Management goals: Monitoring goals: TRACK CHANGES IN THE POPULATION AND REPRODUCTIVE SUCCESS; DETERMINE SITE FIDELITY.
Parameter: Threshold note:
SINGLE MALES 1
SINGLE FEMALES 1
PAIRS 1
JUVENILES 1
BROODS 0

Methods: VISUAL SURVEYS, WALKING LENGTH OF EO UPSTREAM (IF POSSIBLE).

Sampling frequency: MINIMUM TWICE PER YEAR, CA. MAY & JULY/AUGUST.

Visit dates: 1993-05-11
1993-07-30

Coordinator: REICHEL, JIM

Trends & Recommendations:

Short-term trend: UNKNOWN Long-term trend: UNKNOWN
Interpretation:

Current condition: UNKNOWN
Comments:

Management recommendations:

Monitoring recommendations:
Ecomonitoring Visits

Reference: EM.USMTHP * 1 * 1  Survey site: SWAMP CREEK

Start date: 1993-05-11
Observer: REICHEL CASTREN

Person hours: 8.00
Effort: HWY 200 TO WILDERNESS BOUNDARY.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0 T26,R31,S19 SE4SE4 LOCATION
SINGLE FEMALES 0
PAIRS 1
JUVENILES
BROODS

Other observations:

Ecomonitoring Visits

Reference: EM.USMTHP * 1 * 2  Survey site: SWAMP CREEK

Start date: 1993-07-30
Observer: REICHEL BECKSTROM

Person hours: 14.00
Effort: CENTER SEC.20 UP TO ABOVE WILDERNESS BOUNDARY.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0
SINGLE FEMALES 1, BANDED SEC.9 JUST BELOW SEC.4 LOCATION
PAIRS 0
JUVENILES 1, BANDED
BROODS 1

Other observations: HEN PREVIOUSLY BANDED (8/92) ON MARTEN CREEK. JUV. BANDED 7/30/93; THEN SEEN 8/2/93 CA. 1 MI FURTHER UPSTREAM.
Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5  Forest Service status: SENSITIVE
State rank: S2B,SZN  Federal Status: C2

Element occurrence code: ABNJB15010.018
Element occurrence type:

Survey site name: MIDDLE FORK FLATHEAD RIVER
EO rank:
EO rank comments:

County: FLATHEAD
USGS quadrangle: NIMROD

Township: 028N  Range: 015W  Section: 19  TRS comments:

Precision: M  Elevation: 4050 -

Survey date:  First observation: 1990  Slope/aspect:
Last observation: 1993-08-02  Size (acres):

Location:
ALONG THE MIDDLE FORK FLATHEAD RIVER, CA. 5 MILES BY TRAIL UPSTREAM (SOUTH) OF US 2.

Element occurrence data:
PROBABLY 1 TO 4 BROODS PRODUCED IN A CA. 5 MILE SECTION AROUND SPRUCE PARK. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:

Land owner/manager:
GREAT BEAR WILDERNESS
FLATHEAD NATIONAL FOREST, HUNGRY HORSE RANGER DISTRICT

Comments:
1992 SIGHTING BY SARAH SIGLER (USFS).


Observation summary:
[Table of observations with details for each date and location]
Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5 Forest Service status: SENSITIVE
State rank: S2B,SZN Federal Status: C2

Element occurrence code: ABNJB15010.019
Element occurrence type:

Survey site name: TRAIL CREEK
EO rank: C/B
EO rank comments: 4-6 PAIRS PRESENT; NO FISHING OR BOATING; ACCESS MODERATE TO DIFFICULT EXCEPT TO LANDOWNERS BELOW FLATHEAD NF. MAY BE PART OF A LARGER COMPLEX WITH KISHENEHN CREEK EO#28. DUCKS HAVE ALSO BEEN REPORTED ON RED MEADOW AND WHALE CREEKS WITHIN 20 KM.

County: FLATHEAD

USGS quadrangle: TRAILCREEK MOUNT HEFTY

Township: Range: Section: TRS comments:
037N 022W 30 SE4NE4

Precision: M
Survey date:
First observation: 1990
Last observation: 1993-08-13
Elevation: 3800 - 4280
Slope/aspect:
Size (acres):

Location:
TAKE THE NORTH FORK FLATHEAD ROAD PAST POLEBRIDGE TO FS ROAD #114, THEN CA. 3 MILES WEST.

Element occurrence data:
PROBABLY 2 TO 4 BROODS PRODUCED EACH YEAR. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
A CA. 7 MILE SEGMENT OF MOUNTAIN STREAM, SECTIONS OF WHICH ARE INTERMITTENT DURING LATE SUMMER.

Land owner/manager:
FLATHEAD NATIONAL FOREST, GLACIER VIEW RANGER DISTRICT
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)
STATE LAND - UNDESIIGNATED

Comments:
EXTENT OF OCCUPIED BREEDING HABITAT UNKNOWN.

Name: HISTRIONICUS HISTRIONICUS
Common name: HARLEQUIN DUCK

Reference code: EM.USMTHP * 2       Survey site: TRAIL CREEK

Goals & Objectives:

Management plan:       Monitoring plan:       Monitoring level:
Management goals:
Monitoring goals: TRACK CHANGES IN THE POPULATION AND REPRODUCTIVE SUCCESS;
DETERMINE SITE FIDELITY.

Parameter:       Threshold note:
SINGLE MALES       1
SINGLE FEMALES     1
PAIRS             1
JUVENILES         1
BROODS            0

Methods: VISUAL SURVEYS, WALKING LENGTH OF EO UPSTREAM (IF POSSIBLE).

Sampling frequency: MINIMUM TWICE PER YEAR, CA. MAY & JULY/AUGUST.

Visit dates: 1993-05-08
             1993-08-13

Coordinator: REICHEL, JIM

Trends & Recommendations:

Short-term trend: UNKNOWN       Long-term trend: UNKNOWN

Interpretation:

Current condition: UNKNOWN

Comments:

Management recommendations:

Monitoring recommendations:
Ecomonitoring Visits

Reference: EM.USMTHP * 2 * 1 Survey site: TRAIL CREEK

Start date: 1993-05-08
Observer: CASTREN REICHEL

Person hours: 14.00
Effort: SURVEYED SEC. 30 DOWN TO SEC. 34. BOATED CREEK ON 8TH, BOATED & MARKED DUCKS ON 9TH.

Parameter: Quantitative summary: Quality note:
SINGLE MALES 3, 1 BANDED SEC. 30
SINGLE FEMALES 0
PAIRS 6, 2 PAIRS BANDED
JUVENILES 0
BROODS 0

Other observations: ONE PAIR & ONE FEMALE PREVIOUSLY (1992?) MARKED. DUCKS FOUND FROM CENTER SEC. 30 TO SEC. 33-34 LINE.

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Ecomonitoring Visits

Reference: EM.USMTHP * 2 * 2 Survey site: TRAIL CREEK

Start date: 1993-08-13
Observer: REICHEL BECKSTROM CASTREN

Person hours: 7.00
Effort:

Parameter: Quantitative summary: Quality note:
SINGLE MALES 0
SINGLE FEMALE 2, 2 BANDED
PAIRS 0
JUVENILES 8, 7 BANDED
BROODS 2

Other observations: BOTH BROODS IN ONE GROUP; LOCATION NOT INDICATED.
Histrionicus histrionicus  Spotted Bear River (029)
Scientific Name: HISTRIONICUS HISTRIONICUS
Common Name: HARLEQUIN DUCK

Global rank: G5  
State rank: S2B,SZN  
Element occurrence code: ABNJB15010.029

Survey site name: SPOTTED BEAR RIVER
EO rank: D
EO rank comments: NO RECORDS OF MORE THAN 2 PAIRS PRESENT. SOME FISHING AND BOATING. RELATIVELY EASY ACCESS AFTER THE ROAD OPENS (USUALLY AFTER JULY 1). MAY BE PART OF A LARGER SOUTH FORK FLATHEAD RIVER EO.

County: FLATHEAD
USGS quadrangle: WHITCOMB PEAK

Township: 025N  
Range: 014W  
Section: 14  
TRS comments: 13

Precision: M  
Survey date: 1992-08-13
First observation: 1992-08-13
Last observation: 1993-08-15

Elevation: 4050 - 4200
Slope/aspect: -/-
Size (acres):

Location:
FROM HUNGRY HORSE, GO UP EAST SIDE OF RESERVOIR TO SPOTTED BEAR RIVER (CA. 50 MILES), THEN UP SPOTTED BEAR RIVER TO BEAVER CREEK CAMPGROUND.

Element occurrence data:
PROBABLY 1 OR 2 BROODS PRODUCED EACH YEAR. (SPECIFIC OBSERVATION DATA ON FILE AT MTNHP.)

General site description:
STREAM REACH OF CA. 2 MILES.

Land owner/manager:
FLATHEAD NATIONAL FOREST, SPOTTED BEAR RANGER DISTRICT

Comments:
EXTENT OF OCCUPIED BREEDING HABITAT UNKNOWN. NOTE REPORT OF SINGLE FEMALE AT DEAN FALLS, CA. 10 MILES UPSTREAM OF WHITCOMB CREEK, ON 8/4/93.
