Progress Report
March 2002
Project FIS 01-052

# Summary of Whitefish movement, Whitefish Lake Weir, Yukon Delta National Wildlife Refuge, Alaska, 2001

Frank G. Harris
and
Ken C. Harper

U.S. Fish and Wildlife Service
Kenai Fishery Resource Office
P.O. Box 1670
Kenai, Alaska 99611
(907) 262-9863

Wayne Morgan
and
Harry Morgan
Kuskokwim Native Association
P.O. Box 127
Aniak, AK 99557
(907) 675-4384

This project (FIS 01-052) was a cooperative project between the U.S. Fish and Wildlife Service and the Kuskokwim Native Association under Fish and Wildlife Service Agreement 701811J371. This report was created to accommodate timely reporting of recently collected information. This report has received only limited internal review, contains preliminary data, and will be finalized in more formal literature in the future. Consequently, this report should not be cited without prior approval of the authors or the Division of Fishery Resources.

*Progress Report, March 2002*

# Summary of Whitefish Movement, Whitefish Lake Weir, Yukon Delta National Wildlife Refuge, Alaska, 2001

Frank G. Harris and Ken G. Harper

*U.S. Fish and Wildlife Service, Kenai Fishery Resource Office*
*P.O. Box 1670, Kenai, Alaska 99611, (907) 262-9863*

Wayne Morgan and Harry Morgan
Kuskokwim Native Association
P.O. Box 127, Aniak, AK 99557, (907) 675-4384

A rigid weir with both an upstream and downstream trap was installed and operated at the outlet of Whitefish Lake between September 21st and October 11th, 2001. Study objectives are to enumerate daily whitefish passage into and out of Whitefish Lake, determine areas in the Kuskokwim River drainage where Whitefish Lake fish are harvested, and estimate age composition, for whitefish sampled. The study was delayed in 2001 pending signing of a land lease for the camp and weir location. Several site visits were made with personnel from the Kuskokwim Native Association and The Kuskokwim Corporation to determine the location of the site and determine land ownership. Leases were sought from two parties at the outlet of the lake, The Kuskokwim Corporation and an allotment holder. Equipment and weir materials were moved to Whitefish Lake for installation once a land lease was secured from The Kuskokwim Corporation on August 27. A land lease from the native allotment holders on the opposite side of the river was not obtained. Numerous weir modifications were made to accommodate channel morphology and boat passage, and to remain clear of the lands on the opposite side of the outlet at the lake. These modifications and camp construction delayed a fish tight operation until September 21.

All whitefish that passed through the weir were identified to species, measured to the nearest 5mm, tagged with individual numbered grey floy ***t*** bar tags, and the first 100 of each species had a genetic sample taken and archived. Approximately 5 fish from each 10mm size group had a scale taken from either the traps or from subsistence gill nets.

Humpback whitefish *Coregonus pidschian* movement through the weir was the highest of all three species of whitefish (Figure 1). A total of 143 of the 158 humpback whitefish that passed through the downstream trap were tagged, and all 4 that passed upstream were tagged (Table 1). The mean size of these fish was 357mm, while the range was 200mm to 485mm. A total of 553 humpback whitefish were sampled from subsistence fishermen gill nets. Lengths of the gill net caught fish ranged from 280 to 605 mm and averaged 442 mm (Figure 2). Females comprised 46% of the 540 humpback whitefish sampled from gill net catches. All females were ripe and ready to spawn with loose eggs and males were ripe and running milt. Scale and otolith samples have also been collected. Age data will be included in subsequent reports.
Least cisco *C. sardinella*, were the second most abundant fish moving through the weir. A total

of 64 of the 94 least cisco that passed through the downstream trap were tagged, while 3 of the 4 that moved upstream were tagged and one was a recaptured fish (Table 1). The mean size of the fish sampled from the traps was 301mm, and ranged from 195mm to 390mm. A total of 22 least cisco were caught in subsistence gill nets with a mean of 305mm, and ranged from 270mm to 385mm (Figure 3). Nineteen fish were sampled from subsistence catches and the sex composition was 68% males and 32% females. All females and males were ripe and ready to spawn. Scales from least cisco were collected from both the trap and gill nets. Ages will be included in subsequent reports.

Broad whitefish *C. nasus*, were the least numerous of the three whitefish species. Only 10 broad whitefish passed through the weir (Table 1); all 9 that passed downstream were tagged. The only broad whitefish that went upstream was a fish that was already tagged. The mean length of the fish that passed through the weir was 490mm, with a range of 370 to 630mm. Subsistence harvested broad whitefish (N=20) averaged 524 mm and ranged from 390 to 605 mm (Figure 4). Sex was determined from six of these broad whitefish passing the weir with 33% being males and 67% females. Four females sampled from the subsistence fishery were ripe and ready to spawn and most males were ripe and running milt. Scales were taken at both the weir and from the gill nets, while otoliths were taken from gill nets. Age data will be included in subsequent reports.

The weir was removed from the creek on October 12$^{th}$. All pieces were stored on the bank of the creek near camp, except for the traps and boat passage gate, which were left on the shore of the lake for ease of installation in 2002.

An added benefit of having a camp at the outlet was being able to gather subsistence catch data. Most subsistence users stopped and allowed biological data to be collected from their catch. Because most of the catch occurred during the time of the weir operation, the data on length is considered representative of the catch. Between September 1$^{st}$ and October 11$^{th}$ an estimated total of 15 subsistence fishermen made 28 sets in the lake. Catches ranged between 1 to approximately 100 fish, with the average between 40 to 70 fish.

This project (FIS 01-052) was funded under cooperative agreement 701811J371 between the U.S. Fish and Wildlife Service Office of Subsistence Management and the Kuskokwim Native Association (KNA). The Cooperative Agreement provided funding to KNA. Mr Wayne Morgan the natural resource director of KNA hired personnel, and purchased equipment and supplies for weir operations. KNA provided three personnel through this agreement, Rodney Sakar and James Kavamme who helped install the weir and build the camp and Harry Morgan who helped collect information on whitefish at the weir. Special appreciation goes to Wayne Morgan Natural Resource Director of KNA for his recruiting and support of the project.

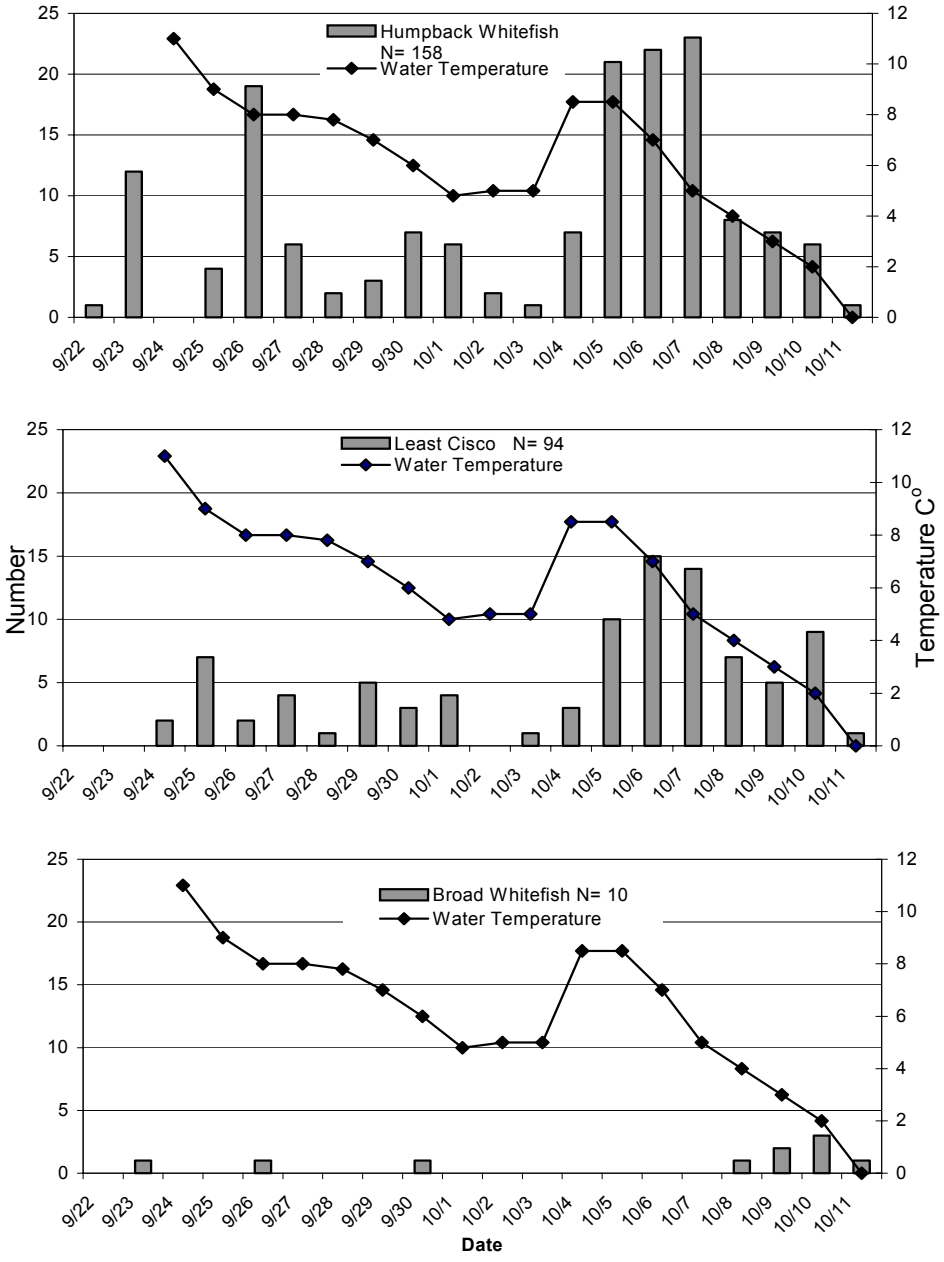


Figure 1. Temperature and downstream passage of whitefish through the Whitefish Lake weir, September 22- October 11, 2001.

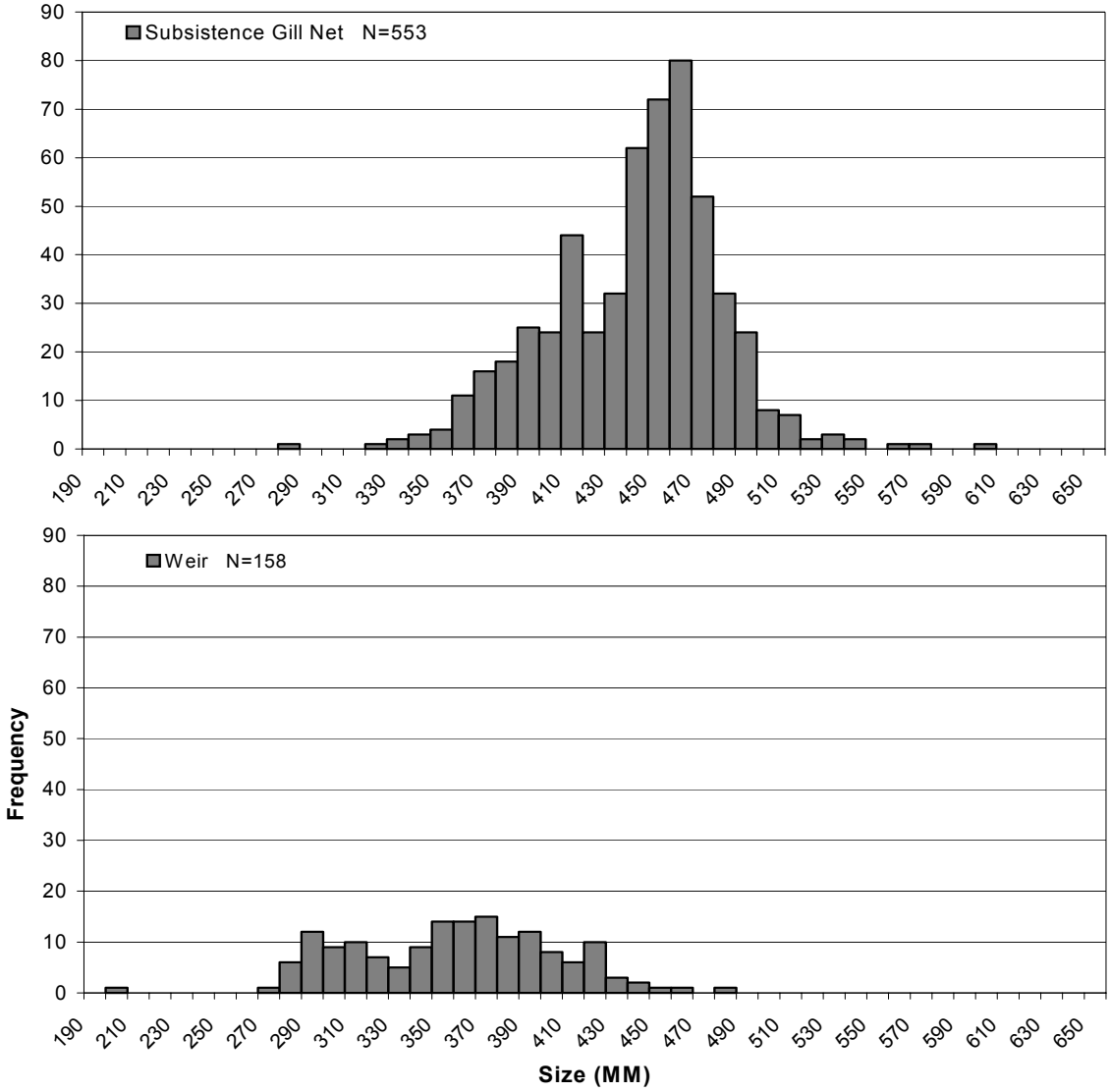


Figure 2. Length frequency of humpback whitefish passed through Whitefish Lake weir and sampled from subsistence gill nets set in Whitefish Lake, September 22- October 11, 2001.

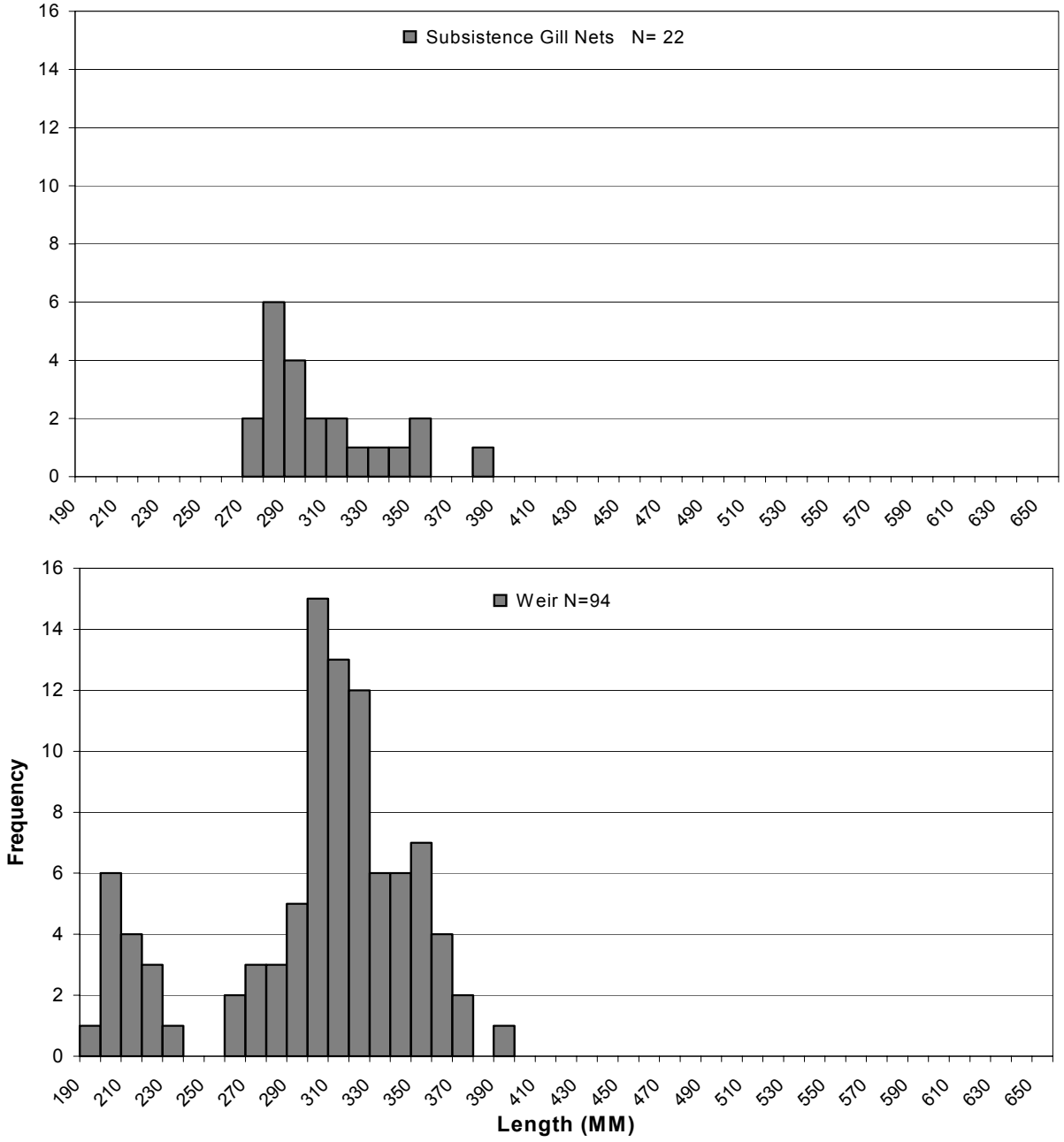


Figure 3. Length frequency of Least Cisco passed through Whitefish Lake weir and sampled from subsistence gill nets set in Whitefish Lake, September 22 - October 11, 2001.

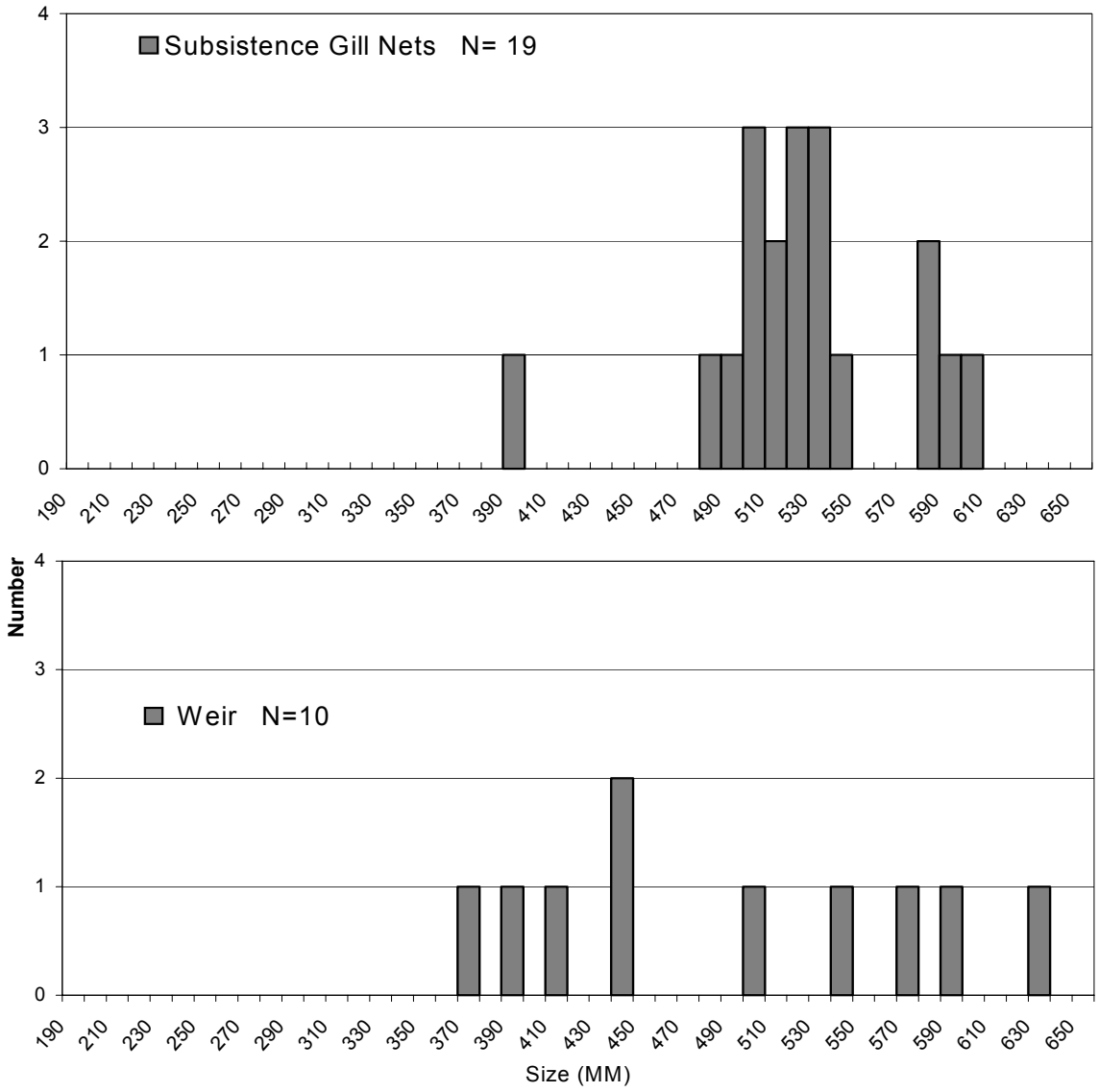


Figure 4. Length frequency of Broad Whitefish passed through Whitefish Lake weir and sampled from subsistence gill nets set in Whitefish Lake, September 22, October 11, 2001.

Table 1. Whitefish tag numbers in fish tagged at the Whitefish Lake weir, Yukon Delta National Wildlife Refuge 2001.

| Tag # | Species | Length | Date | Tag # | Species | Length | Date |
|---|---|---|---|---|---|---|---|
| 1 | Humpback W.F. | 390 | 9/23 | 55 | Least Cisco | 340 | 9/30 |
| 2 | Humpback W.F. | 280 | 9/23 | 56 | Humpback W.F. | 400 | 9/30 |
| 3 | Least Cisco | 325 | 9/23 | 57 | Humpback W.F. | 320 | 9/30 |
| 4 | Humpback W.F. | 340 | 9/23 | 58 | Least Cisco | 340 | 9/30 |
| 6 | Least Cisco | 335 | 9/24 | 59 | Humpback W.F. | 335 | 9/30 |
| 7 | Humpback W.F. | 345 | 9/25 | 60 | Humpback W.F. | 320 | 9/30 |
| 8 | Humpback W.F. | 455 | 9/25 | 61 | Humpback W.F. | 380 | 9/30 |
| 9 | Humpback W.F. | 340 | 9/25 | 62 | Humpback W.F. | 425 | 9/30 |
| 10 | Humpback W.F. | 370 | 9/25 | 63 | Humpback W.F. | 370 | 9/30 |
| 14 | Humpback W.F. | 370 | 9/26 | 64 | Least Cisco | 290 | 10/1 |
| 15 | Humpback W.F. | 360 | 9/26 | 65 | Humpback W.F. | 295 | 10/1 |
| 16 | Humpback W.F. | 405 | 9/26 | 66 | Humpback W.F. | 285 | 10/1 |
| 17 | Humpback W.F. | 410 | 9/26 | 67 | Least Cisco | 340 | 10/1 |
| 18 | Broad W.F. | 390 | 9/26 | 68 | Least Cisco | 320 | 10/1 |
| 19 | Humpback W.F. | 360 | 9/26 | 69 | Least Cisco | 325 | 10/1 |
| 20 | Humpback W.F. | 310 | 9/26 | 70 | Humpback W.F. | 315 | 10/1 |
| 21 | Humpback W.F. | 360 | 9/26 | 71 | Humpback W.F. | 410 | 10/1 |
| 22 | Humpback W.F. | 395 | 9/26 | 72 | Humpback W.F. | 425 | 10/1 |
| 23 | Humpback W.F. | 370 | 9/26 | 73 | Humpback W.F. | 330 | 10/1 |
| 24 | Humpback W.F. | 310 | 9/26 | 74 | Humpback W.F. | 390 | 10/2 |
| 25 | Humpback W.F. | 325 | 9/26 | 75 | Humpback W.F. | 360 | 10/2 |
| 26 | Humpback W.F. | 370 | 9/26 | 76 | Humpback W.F. | 355 | 10/3 |
| 27 | Humpback W.F. | 380 | 9/26 | 77 | Least Cisco | 300 | 10/3 |
| 28 | Humpback W.F. | 370 | 9/26 | 78 | Humpback W.F. | 375 | 10/4 |
| 29 | Humpback W.F. | 290 | 9/26 | 79 | Least Cisco | 300 | 10/4 |
| 30 | Humpback W.F. | 300 | 9/26 | 81 | Humpback W.F. | 380 | 10/4 |
| 31 | Humpback W.F. | 400 | 9/26 | 82 | Humpback W.F. | 360 | 10/4 |
| 32 | Humpback W.F. | 390 | 9/26 | 83 | Humpback W.F. | 355 | 10/4 |
| 33 | Humpback W.F. | 370 | 9/26 | 84 | Humpback W.F. | 365 | 10/4 |
| 34 | Humpback W.F. | 400 | 9/27 | 85 | Least Cisco | 310 | 10/4 |
| 35 | Least Cisco | 320 | 9/27 | 86 | Humpback W.F. | 410 | 10/4 |
| 36 | Humpback W.F. | 395 | 9/27 | 87 | Humpback W.F. | 345 | 10/4 |
| 37 | Humpback W.F. | 350 | 9/27 | 88 | Least Cisco | 305 | 10/5 |
| 38 | Humpback W.F. | 300 | 9/27 | 89 | Humpback W.F. | 295 | 10/5 |
| 39 | Least Cisco | 330 | 9/27 | 90 | Least Cisco | 305 | 10/5 |
| 40 | Least Cisco | 315 | 9/27 | 91 | Humpback W.F. | 430 | 10/5 |
| 41 | Humpback W.F. | 340 | 9/27 | 92 | Least Cisco | 275 | 10/5 |
| 42 | Humpback W.F. | 290 | 9/27 | 93 | Humpback W.F. | 375 | 10/5 |
| 43 | Least Cisco | 290 | 9/27 | 94 | Humpback W.F. | 385 | 10/5 |
| 44 | Humpback W.F. | 355 | 9/28 | 95 | Humpback W.F. | 420 | 10/5 |
| 45 | Humpback W.F. | 315 | 9/28 | 96 | Humpback W.F. | 380 | 10/5 |
| 46 | Least Cisco | 305 | 9/29 | 97 | Least Cisco | 330 | 10/5 |
| 47 | Least Cisco | 305 | 9/29 | 98 | Humpback W.F. | 415 | 10/5 |
| 48 | Least Cisco | 300 | 9/29 | 99 | Humpback W.F. | 355 | 10/5 |
| 49 | Humpback W.F. | 330 | 9/29 | 100 | Humpback W.F. | 370 | 10/5 |
| 50 | Humpback W.F. | 325 | 9/29 | 102 | Humpback W.F. | 360 | 10/5 |
| 51 | Humpback W.F. | 365 | 9/29 | 103 | Humpback W.F. | 355 | 10/5 |
| 52 | Least Cisco | 320 | 9/29 | 107 | Humpback W.F. | 435 | 10/5 |
| 53 | Broad W.F. | 445 | 9/30 | 108 | Least Cisco | 360 | 10/5 |
| 53 | Broad W.F. | 445 | 9/30 | 109 | Least Cisco | 265 | 10/5 |
| 54 | Least Cisco | 350 | 9/30 | 110 | Humpback W.F. | 410 | 10/5 |

Table 1. Continued

| Tag # | Species | Length | Date | Tag # | Species | Length | Date |
|---|---|---|---|---|---|---|---|
| 113 | Humpback W.F. | 370 | 10/5 | 166 | Least Cisco | 305 | 10/7 |
| 114 | Least Cisco | 300 | 10/5 | 167 | Least Cisco | 300 | 10/7 |
| 116 | Humpback W.F. | 385 | 10/5 | 168 | Humpback W.F. | 400 | 10/7 |
| 117 | Humpback W.F. | 305 | 10/5 | 169 | Humpback W.F. | 315 | 10/7 |
| 118 | Humpback W.F. | 370 | 10/5 | 170 | Humpback W.F. | 425 | 10/7 |
| 119 | Humpback W.F. | 385 | 10/5 | 171 | Humpback W.F. | 335 | 10/7 |
| 120 | Least Cisco | 350 | 10/5 | 172 | Humpback W.F. | 360 | 10/7 |
| 121 | Humpback W.F. | 315 | 10/5 | 173 | Humpback W.F. | 290 | 10/7 |
| 122 | Humpback W.F. | 325 | 10/5 | 174 | Humpback W.F. | 365 | 10/7 |
| 123 | Least Cisco | 295 | 10/6 | 175 | Least Cisco | 335 | 10/7 |
| 124 | Humpback W.F. | 390 | 10/6 | 176 | Humpback W.F. | 340 | 10/7 |
| 125 | Humpback W.F. | 460 | 10/6 | 177 | Least Cisco | 370 | 10/7 |
| 126 | Least Cisco | 305 | 10/6 | 178 | Humpback W.F. | 420 | 10/7 |
| 127 | Humpback W.F. | 400 | 10/6 | 179 | Humpback W.F. | 330 | 10/7 |
| 128 | Humpback W.F. | 340 | 10/6 | 180 | Humpback W.F. | 300 | 10/7 |
| 129 | Least Cisco | 345 | 10/6 | 181 | Humpback W.F. | 370 | 10/7 |
| 130 | Humpback W.F. | 390 | 10/6 | 182 | Humpback W.F. | 360 | 10/7 |
| 131 | Humpback W.F. | 375 | 10/6 | 183 | Humpback W.F. | 390 | 10/7 |
| 132 | Least Cisco | 320 | 10/6 | 184 | Least Cisco | 390 | 10/7 |
| 133 | Least Cisco | 340 | 10/6 | 185 | Humpback W.F. | 300 | 10/7 |
| 134 | Humpback W.F. | 355 | 10/6 | 186 | Humpback W.F. | 285 | 10/7 |
| 135 | Humpback W.F. | 350 | 10/6 | 187 | Humpback W.F. | 380 | 10/8 |
| 136 | Least Cisco | 285 | 10/6 | 188 | Humpback W.F. | 420 | 10/8 |
| 137 | Humpback W.F. | 290 | 10/6 | 189 | Least Cisco | 345 | 10/8 |
| 138 | Humpback W.F. | 385 | 10/6 | 190 | Least Cisco | 300 | 10/8 |
| 139 | Humpback W.F. | 355 | 10/6 | 191 | Humpback W.F. | 390 | 10/8 |
| 140 | Humpback W.F. | 275 | 10/6 | 192 | Humpback W.F. | 280 | 10/8 |
| 141 | Least Cisco | 295 | 10/6 | 193 | Humpback W.F. | 320 | 10/8 |
| 142 | Humpback W.F. | 400 | 10/6 | 194 | Humpback W.F. | 420 | 10/8 |
| 143 | Humpback W.F. | 350 | 10/6 | 195 | Least Cisco | 280 | 10/8 |
| 144 | Humpback W.F. | 365 | 10/6 | 196 | Least Cisco | 360 | 10/8 |
| 145 | Humpback W.F. | 300 | 10/6 | 197 | Broad W.F. | 410 | 10/8 |
| 146 | Humpback W.F. | 305 | 10/6 | 198 | Humpback W.F. | 315 | 10/8 |
| 147 | Humpback W.F. | 390 | 10/6 | 199 | Least Cisco | 310 | 10/8 |
| 148 | Humpback W.F. | 350 | 10/6 | 200 | Least Cisco | 320 | 10/8 |
| 149 | Least Cisco | 285 | 10/6 | 201 | Least Cisco | 320 | 10/8 |
| 150 | Least Cisco | 295 | 10/6 | 202 | Humpback W.F. | 325 | 10/8 |
| 151 | Least Cisco | 320 | 10/6 | 203 | Humpback W.F. | 420 | 10/9 |
| 152 | Humpback W.F. | 390 | 10/6 | 204 | Least Cisco | 310 | 10/9 |
| 153 | Humpback W.F. | 390 | 10/6 | 205 | Humpback W.F. | 410 | 10/9 |
| 154 | Humpback W.F. | 380 | 10/6 | 206 | Least Cisco | 325 | 10/9 |
| 155 | Humpback W.F. | 300 | 10/7 | 207 | Broad W.F. | 545 | 10/9 |
| 156 | Humpback W.F. | 295 | 10/7 | 207 | Broad W.F. | | 10/9 |
| 157 | Humpback W.F. | 310 | 10/7 | 208 | Least Cisco | 350 | 10/9 |
| 158 | Humpback W.F. | 340 | 10/7 | 209 | Humpback W.F. | 435 | 10/9 |
| 159 | Least Cisco | 310 | 10/7 | 210 | Humpback W.F. | 310 | 10/9 |
| 160 | Least Cisco | 310 | 10/7 | 211 | Least Cisco | 315 | 10/9 |
| 161 | Least Cisco | 310 | 10/7 | 212 | Humpback W.F. | 375 | 10/9 |
| 162 | Humpback W.F. | 295 | 10/7 | 213 | Humpback W.F. | 360 | 10/9 |
| 163 | Humpback W.F. | 290 | 10/7 | 214 | Humpback W.F. | 425 | 10/9 |
| 164 | Least Cisco | 310 | 10/7 | 215 | Broad W.F. | 570 | 10/10 |

Table 1. Continued

| Tag # | Species | Length | Date |
|---|---|---|---|
| 165 | Humpback W.F. | 290 | 10/7 |
| 216 | Broad W.F. | 500 | 10/10 |
| 217 | Humpback W.F. | 290 | 10/10 |
| 218 | Least Cisco | 350 | 10/10 |
| 219 | Least Cisco | 360 | 10/10 |
| 220 | Humpback W.F. | 350 | 10/10 |
| 221 | Least Cisco | 270 | 10/10 |
| 222 | Least Cisco | 365 | 10/10 |
| 223 | Humpback W.F. | 365 | 10/10 |
| 224 | Least Cisco | 315 | 10/10 |
| 225 | Humpback W.F. | 290 | 10/10 |
| 226 | Humpback W.F. | 445 | 10/10 |
| 227 | Least Cisco | 325 | 10/10 |
| 228 | Broad W.F. | 630 | 10/10 |
| 229 | Least Cisco | 350 | 10/10 |
| 230 | Humpback W.F. | 440 | 10/10 |
| 231 | Least Cisco | 300 | 10/10 |
| 232 | Broad W.F. | 590 | 10/11 |
| 234 | Least Cisco | 330 | 10/11 |
| 235 | Humpback W.F. | 420 | 10/11 |