

SOUTH DAKOTA BLACK HILLS COLD STREAM SURVEY
Spearfish Creek, Lawrence County
09-0021-00
1995

Table 1. Population and Biomass Estimates for Spearfish Creek

| | | |
|--|---------------------------------|-------------------------------------|
| Site Number: 174 | Date Sampled: 10/31/1995 | Conductivity (umhos/cm): 272 |
| Site Midpoint (Latitude, Longitude): 44.50196266, -103.86743501 | Site Length (m): 88 | pH: 8.9 |
| Survey Completed by: South Dakota Game, Fish and Parks | Mean Width (m): 7.0 | Water Temperature (C): 4.0 |
| Stream Classification: BR1 | Number of Pass: 3 | Voltage: 250 |

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|------------------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brown Trout | <200mm | 71 | 80 | 92 | 71 | 1146 | 62 | 909 | 464 | 55.61 | 1463 | 176.0 | 54.3 |
| Brown Trout | >=200mm | 73 | 74 | 77 | 73 | 1060 | 195 | 841 | 429 | 174.19 | 1353 | 263.3 | 184.0 |
| Brown Trout | All | 144 | 152 | 161 | 144 | 2178 | 261 | 1727 | 882 | 233.47 | 2779 | 220.3 | 120.1 |
| Hatchery Rainbow Trout | <200mm | 1 | 1 | 1 | 1 | 14 | 1 | 11 | 6 | 0.46 | 18 | 157.0 | 36.0 |
| Hatchery Rainbow Trout | >=200mm | 7 | 7 | 8 | 7 | 100 | 21 | 80 | 41 | 18.80 | 128 | 282.1 | 210.0 |
| Hatchery Rainbow Trout | All | 8 | 8 | 9 | 8 | 115 | 22 | 91 | 46 | 19.26 | 146 | 266.5 | 188.3 |

| | | |
|--|---------------------------------|-------------------------------------|
| Site Number: 205 | Date Sampled: 10/31/1995 | Conductivity (umhos/cm): 262 |
| Site Midpoint (Latitude, Longitude): 44.47880965, -103.85669154 | Site Length (m): 115 | pH: 8.7 |
| Survey Completed by: South Dakota Game, Fish and Parks | Mean Width (m): 9.2 | Water Temperature (C): 4.0 |
| Stream Classification: BK0, BR1, RB2 | Number of Pass: 3 | Voltage: 300 |

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|-------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brook Trout | <200mm | 4 | 4 | 4 | 4 | 43 | 0 | 35 | 18 | 0.37 | 56 | 104.5 | 9.5 |
| Brook Trout | All | 4 | 4 | 4 | 4 | 43 | 0 | 35 | 18 | 0.37 | 56 | 104.5 | 9.5 |

| | | | | | | | | | | | | | |
|---------------------------|---------|----|----|-----|----|------|-----|-----|-----|--------|------|-------|-------|
| Brown Trout | <200mm | 29 | 31 | 36 | 29 | 337 | 11 | 270 | 136 | 10.13 | 434 | 141.2 | 33.7 |
| Brown Trout | >=200mm | 68 | 68 | 69 | 68 | 739 | 133 | 591 | 299 | 119.19 | 951 | 261.4 | 180.6 |
| Brown Trout | All | 97 | 98 | 101 | 97 | 1065 | 145 | 852 | 431 | 129.56 | 1371 | 225.5 | 136.2 |
| Hatchery Rainbow Trout | >=200mm | 1 | 1 | 1 | 1 | 11 | 1 | 9 | 4 | 0.96 | 14 | 228.0 | 99.0 |
| Hatchery Rainbow Trout | All | 1 | 1 | 1 | 1 | 11 | 1 | 9 | 4 | 0.96 | 14 | 228.0 | 99.0 |
| Rainbow Trout | <200mm | 4 | 8 | 42 | 4 | 87 | 5 | 70 | 35 | 4.39 | 112 | 86.8 | 56.5 |
| Rainbow Trout | >=200mm | 1 | 1 | 1 | 1 | 11 | 2 | 9 | 4 | 1.68 | 14 | 253.0 | 173.0 |
| Rainbow Trout | All | 5 | 6 | 13 | 5 | 65 | 5 | 52 | 26 | 4.65 | 84 | 120.0 | 79.8 |

Site Number: 334

Site Midpoint (Latitude, Longitude): 44.40606069, -103.89803263

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK3, BR1, RB1

Date Sampled: 10/17/1995

Site Length (m): 100

Mean Width (m): 8.5

Number of Pass: 3

Conductivity (umhos/cm): 270

pH: 8.9

Water Temperature (C): 6.0

Voltage: 300

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|---------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brook Trout | <200mm | 3 | 3 | 5 | 3 | 35 | 1 | 30 | 14 | 0.49 | 48 | 119.3 | 15.7 |
| Brook Trout | >=200mm | 1 | 1 | 1 | 1 | 12 | 1 | 10 | 5 | 0.94 | 16 | 209.0 | 89.0 |
| Brook Trout | All | 4 | 4 | 6 | 4 | 47 | 2 | 40 | 19 | 1.43 | 64 | 141.8 | 34.0 |
| Brown Trout | <200mm | 24 | 26 | 32 | 24 | 307 | 13 | 260 | 124 | 11.26 | 418 | 155.5 | 41.1 |
| Brown Trout | >=200mm | 33 | 36 | 43 | 33 | 425 | 79 | 360 | 172 | 70.92 | 579 | 261.5 | 187.1 |
| Brown Trout | All | 57 | 64 | 75 | 57 | 755 | 95 | 640 | 306 | 84.66 | 1030 | 216.8 | 125.6 |
| Rainbow Trout | <200mm | 16 | 16 | 18 | 16 | 189 | 6 | 160 | 76 | 4.96 | 257 | 135.5 | 29.4 |
| Rainbow Trout | >=200mm | 15 | 15 | 17 | 15 | 177 | 30 | 150 | 72 | 26.69 | 241 | 250.4 | 169.0 |
| Rainbow Trout | All | 31 | 32 | 35 | 31 | 377 | 37 | 320 | 153 | 32.67 | 515 | 191.1 | 97.0 |

Site Number: 340
Site Midpoint (Latitude, Longitude): 44.40182261, -103.89476328
Survey Completed by: South Dakota Game, Fish and Parks
Stream Classification: BK3, BR1, RB1

Date Sampled: 10/17/1995 **Conductivity (umhos/cm):** 280
Site Length (m): 100
Mean Width (m): 9.1 **pH:** 8.8
Number of Pass: 3 **Water Temperature (C):** 8.0
Voltage: 300

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|---------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brook Trout | <200mm | 3 | 3 | 5 | 3 | 33 | 3 | 30 | 13 | 2.29 | 48 | 158.0 | 77.7 |
| Brook Trout | >=200mm | 1 | 1 | 2 | 1 | 11 | 1 | 10 | 4 | 0.74 | 16 | 206.0 | 75.0 |
| Brook Trout | All | 4 | 4 | 7 | 4 | 44 | 3 | 40 | 18 | 3.03 | 64 | 170.0 | 77.0 |
| Brown Trout | <200mm | 29 | 30 | 34 | 29 | 330 | 13 | 300 | 134 | 11.57 | 483 | 148.8 | 39.2 |
| Brown Trout | >=200mm | 51 | 51 | 52 | 51 | 562 | 121 | 510 | 227 | 107.60 | 821 | 272.7 | 214.5 |
| Brown Trout | All | 80 | 81 | 84 | 80 | 892 | 135 | 810 | 361 | 120.26 | 1303 | 227.8 | 151.0 |
| Rainbow Trout | <200mm | 34 | 33 | 41 | 34 | 363 | 9 | 330 | 147 | 7.70 | 531 | 105.1 | 23.7 |
| Rainbow Trout | >=200mm | 27 | 27 | 29 | 27 | 297 | 51 | 270 | 120 | 45.24 | 434 | 248.7 | 170.4 |
| Rainbow Trout | All | 61 | 82 | 112 | 61 | 903 | 80 | 820 | 366 | 71.49 | 1319 | 168.7 | 88.7 |

Site Number: 491
Site Midpoint (Latitude, Longitude): 44.32504622, -103.89405171
Survey Completed by: South Dakota Game, Fish and Parks
Stream Classification: BR1

Date Sampled: 08/30/1995 **Conductivity (umhos/cm):**
Site Length (m): 72
Mean Width (m): 5.8 **pH:**
Number of Pass: 3 **Water Temperature (C):**
Voltage:

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|-------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brown Trout | <200mm | 107 | 133 | 160 | 107 | 2303 | 28 | 1847 | 933 | 24.66 | 2972 | 86.9 | 12.0 |
| Brown Trout | >=200mm | 30 | 32 | 38 | 30 | 554 | 84 | 444 | 224 | 74.82 | 715 | 238.2 | 151.2 |
| Brown Trout | All | 137 | 167 | 194 | 140 | 2892 | 123 | 2319 | 1171 | 109.69 | 3732 | 120.0 | 42.5 |

Site Number: 492

Site Midpoint (Latitude, Longitude): 44.32447453, -103.89403375

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BR2

Date Sampled: 08/30/1995

Site Length (m): 67

Mean Width (m): 6.9

Number of Pass: 3

Conductivity
(umhos/cm):

pH:

Water Temperature (C):

Voltage:

| Species | Size Class | Total Number Captured | Est. # in site | Upper 95% CI | Lower 95% CI | # per Hectacre | Kg per Hectacre | # per Km | # per Acre | lb. per Acre | # per Mile | Mean Length (mm) | Mean Weight (grams) |
|-------------|------------|-----------------------|----------------|--------------|--------------|----------------|-----------------|----------|------------|--------------|------------|------------------|---------------------|
| Brown Trout | <200mm | 133 | 156 | 178 | 134 | 2250 | 23 | 2328 | 911 | 20.77 | 3746 | 84.0 | 10.3 |
| Brown Trout | >=200mm | 22 | 24 | 30 | 22 | 346 | 48 | 358 | 140 | 43.05 | 576 | 233.4 | 139.3 |
| Brown Trout | All | 155 | 182 | 205 | 159 | 2625 | 75 | 2716 | 1063 | 67.12 | 4371 | 105.2 | 28.6 |

Stream sites are classified based on the estimates of adult trout over eight inches that exist within the site. Estimates are derived from 3-pass backpack electrofishing surveys at 100-meter sites within streams. While all fish in the site are collected and measured, only trout species are used for classifications. Sites are numbered in accordance for the distance (m) from the stream confluence of a higher order stream/river.

| Based on number of trout in excess of eight inches | |
|--|---|
| Class BR1 | Number of wild Brown Trout exceeds 150 per acre |
| Class BR2 | Number of wild Brook Trout ranges from 25 to 150 per acre |
| Class BR3 | Number of wild Brown Trout is less than 25 per acre |
| Class BK1 | Number of wild Brook Trout exceeds 150 per acre |
| Class BK2 | Number of wild Brook Trout ranges from 25 to 150 per acre |
| Class BK3 | Number of wild Brook Trout is less than 25 per acre |
| Class RB1 | Number of wild Rainbow Trout exceeds 25 per acre |
| Class RB2 | Number of wild Rainbow Trout is less than 25 per acre |

Table 2. Species composition and population estimates on Spearfish Creek, 1985-1995

Site 174

| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|--------------------|--------------|----------|------------|-----------------------|
| Brown Trout <200mm | Jul 30, 1987 | 15 | 15-15 | |
| | Sep 13, 1990 | 77 | 75-81 | |
| | Sep 24, 1991 | 78 | 65-97 | |
| | Sep 28, 1992 | 67 | 65-71 | |
| | Oct 06, 1993 | 41 | 34-54 | |
| | Oct 11, 1994 | 54 | 48-64 | |
| | Oct 31, 1995 | 80 | 71-92 | |

| | | | | |
|--------------------------------|--------------|-----|---------|-----|
| Brown Trout >=200mm | Jul 30, 1987 | 54 | 54-54 | BR3 |
| | Sep 13, 1990 | 141 | 137-147 | BR3 |
| | Sep 24, 1991 | 84 | 60-122 | BR3 |
| | Sep 28, 1992 | 62 | 62-64 | BR1 |
| | Oct 06, 1993 | 49 | 48-52 | BR1 |
| | Oct 11, 1994 | 35 | 33-40 | BR1 |
| | Oct 31, 1995 | 74 | 73-77 | BR1 |
| Hatchery Rainbow Trout <200mm | Oct 31, 1995 | 1 | 1-1 | |
| Hatchery Rainbow Trout >=200mm | Oct 31, 1995 | 7 | 7-8 | |

Site 205

| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|---------------------|--------------|-----------------|-------------------|------------------------------|
| Brook Trout <200mm | Oct 31, 1995 | 4 | 4-4 | |
| Brown Trout <200mm | Nov 02, 1988 | 66 | 66-66 | |
| | Jul 31, 1990 | 103 | 78-137 | |
| | Sep 24, 1991 | 65 | 61-72 | |
| | Sep 30, 1992 | 55 | 54-58 | |

| | | | | |
|-----------------------------------|--------------|-----|---------|-----|
| Brown Trout <200mm | Oct 05, 1993 | 70 | 68-74 | |
| | Oct 11, 1994 | 73 | 70-79 | |
| | Oct 31, 1995 | 31 | 29-36 | |
| Brown Trout >=200mm | Jul 30, 1987 | 3 | 3-3 | BR3 |
| | Nov 02, 1988 | 56 | 56-56 | BR3 |
| | Jul 31, 1990 | 108 | 102-116 | BR3 |
| | Sep 24, 1991 | 175 | 132-219 | BR3 |
| | Sep 30, 1992 | 95 | 93-99 | BR1 |
| | Oct 05, 1993 | 99 | 98-102 | BR1 |
| | Oct 11, 1994 | 82 | 82-84 | BR1 |
| | Oct 31, 1995 | 68 | 68-69 | BR1 |
| Hatchery Rainbow Trout >=200mm | Oct 11, 1994 | 1 | 1-1 | |
| | Oct 31, 1995 | 1 | 1-1 | |
| Rainbow Trout <200mm | Nov 02, 1988 | 4 | 4-4 | |
| | Oct 11, 1994 | 1 | 1-2 | |
| | Oct 31, 1995 | 8 | 4-42 | |

| | | | | |
|-----------------------|--------------|----|-------|-----|
| Rainbow Trout >=200mm | Nov 02, 1988 | 3 | 3-3 | RB2 |
| | Jul 31, 1990 | 15 | 12-27 | RB2 |
| | Sep 24, 1991 | 11 | 11-12 | RB2 |
| | Sep 30, 1992 | 2 | 2-2 | RB2 |
| | Oct 31, 1995 | 1 | 1-1 | RB2 |

Site 334

| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|---------------------|--------------|-----------------|-------------------|------------------------------|
| Brook Trout <200mm | Sep 30, 1992 | 1 | 1-1 | |
| | Oct 06, 1993 | 1 | 1-1 | |
| | Oct 12, 1994 | 6 | 6-9 | |
| | Oct 17, 1995 | 3 | 3-5 | |
| Brook Trout >=200mm | Oct 06, 1993 | 1 | 1-2 | BK3 |
| | Oct 17, 1995 | 1 | 1-1 | BK3 |
| Brown Trout <200mm | Sep 25, 1991 | 135 | 79-224 | |
| | Sep 30, 1992 | 74 | 60-94 | |
| | Oct 06, 1993 | 64 | 61-69 | |

| | | | | |
|-----------------------|--------------|-----|---------|-----|
| Brown Trout <200mm | Oct 12, 1994 | 96 | 89-105 | |
| | Oct 17, 1995 | 26 | 24-32 | |
| Brown Trout >=200mm | Sep 25, 1991 | 123 | 116-132 | BR3 |
| | Sep 30, 1992 | 111 | 104-120 | BR1 |
| | Oct 06, 1993 | 94 | 92-98 | BR1 |
| | Oct 12, 1994 | 85 | 81-91 | BR1 |
| | Oct 17, 1995 | 36 | 33-43 | BR1 |
| Rainbow Trout <200mm | Sep 25, 1991 | 24 | 19-38 | |
| | Sep 30, 1992 | 23 | 18-37 | |
| | Oct 06, 1993 | 25 | 25-27 | |
| | Oct 12, 1994 | 78 | 66-94 | |
| | Oct 17, 1995 | 16 | 16-18 | |
| Rainbow Trout >=200mm | Sep 25, 1991 | 60 | 47-83 | RB2 |
| | Sep 30, 1992 | 44 | 43-48 | RB1 |
| | Oct 06, 1993 | 55 | 54-59 | RB1 |
| | Oct 12, 1994 | 56 | 56-58 | RB1 |

Rainbow Trout >=200mm

Oct 17, 1995

15

15-17

RB1

Site 340

| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|---------------------|--------------|-----------------|-------------------|------------------------------|
| Brook Trout <200mm | Oct 02, 1992 | 10 | 10-12 | |
| | Oct 07, 1993 | 6 | 6-8 | |
| | Oct 12, 1994 | 7 | 7-9 | |
| | Oct 17, 1995 | 3 | 3-5 | |
| Brook Trout >=200mm | Oct 02, 1992 | 6 | 6-9 | BK2 |
| | Oct 07, 1993 | 3 | 3-4 | BK3 |
| | Oct 17, 1995 | 1 | 1-2 | BK3 |
| Brown Trout <200mm | Sep 26, 1991 | 67 | 66-70 | |
| | Oct 02, 1992 | 84 | 66-108 | |
| | Oct 07, 1993 | 77 | 47-133 | |
| | Oct 12, 1994 | 49 | 44-58 | |
| | Oct 17, 1995 | 30 | 29-34 | |
| Brown Trout >=200mm | Sep 26, 1991 | 23 | 21-29 | BR3 |

| | | | | |
|-----------------------|--------------|-----|---------|-----|
| Brown Trout >=200mm | Oct 02, 1992 | 67 | 67-69 | BR1 |
| | Oct 07, 1993 | 73 | 73-74 | BR1 |
| | Oct 12, 1994 | 40 | 39-43 | BR1 |
| | Oct 17, 1995 | 51 | 51-52 | BR1 |
| Rainbow Trout <200mm | Sep 26, 1991 | 75 | 39-166 | |
| | Oct 02, 1992 | 135 | 104-168 | |
| | Oct 07, 1993 | 52 | 50-56 | |
| | Oct 12, 1994 | 137 | 88-200 | |
| | Oct 17, 1995 | 33 | 34-41 | |
| Rainbow Trout >=200mm | Sep 26, 1991 | 26 | 23-34 | RB2 |
| | Oct 02, 1992 | 43 | 41-48 | RB1 |
| | Oct 07, 1993 | 48 | 48-49 | RB1 |
| | Oct 12, 1994 | 38 | 37-42 | RB1 |
| | Oct 17, 1995 | 27 | 27-29 | RB1 |

| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|---------------------|--------------|----------|------------|-----------------------|
| Brown Trout <200mm | Jun 23, 1992 | 75 | 67-87 | |
| | Oct 26, 1992 | 213 | 195-231 | |
| | Aug 30, 1995 | 133 | 107-160 | |
| Brown Trout >=200mm | Jun 23, 1992 | 30 | 28-36 | BR3 |
| | Oct 26, 1992 | 60 | 60-62 | BR3 |
| | Aug 30, 1995 | 32 | 30-38 | BR1 |

Site 492

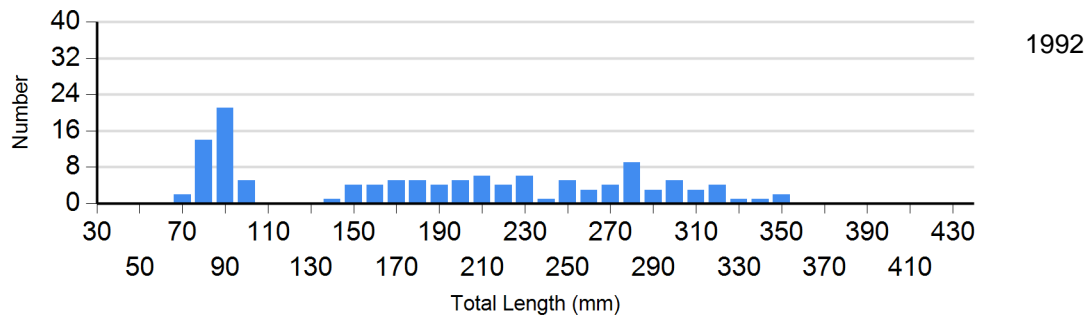
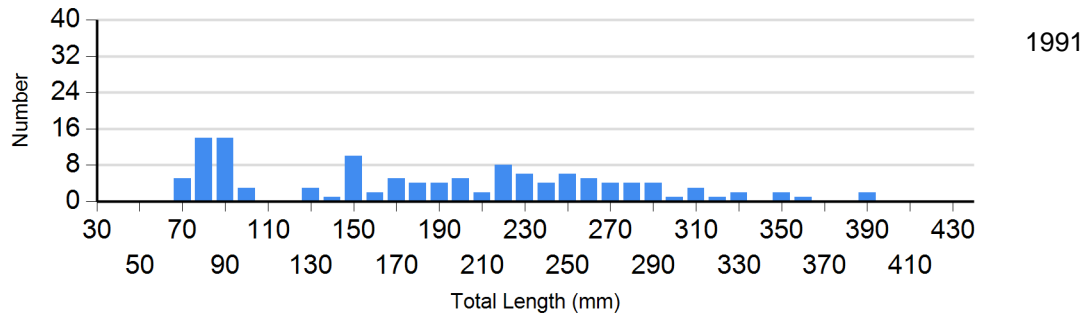
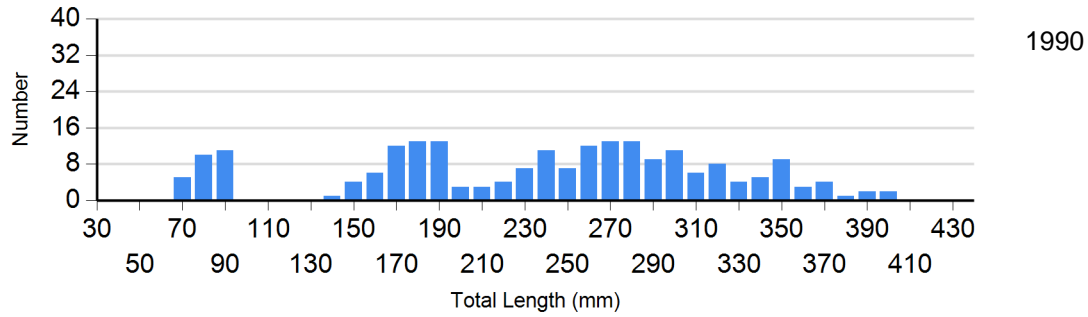
| Species/Size | Date | Pop Est. | (95% C.I.) | Stream Classification |
|---------------------|--------------|----------|------------|-----------------------|
| Brown Trout <200mm | Jun 23, 1992 | 111 | 81-148 | |
| | Oct 27, 1992 | 227 | 204-250 | |
| | Aug 30, 1995 | 156 | 134-178 | |
| Brown Trout >=200mm | Jun 23, 1992 | 30 | 30-31 | BR3 |
| | Oct 27, 1992 | 30 | 30-31 | BR3 |
| | Aug 30, 1995 | 24 | 22-30 | BR2 |

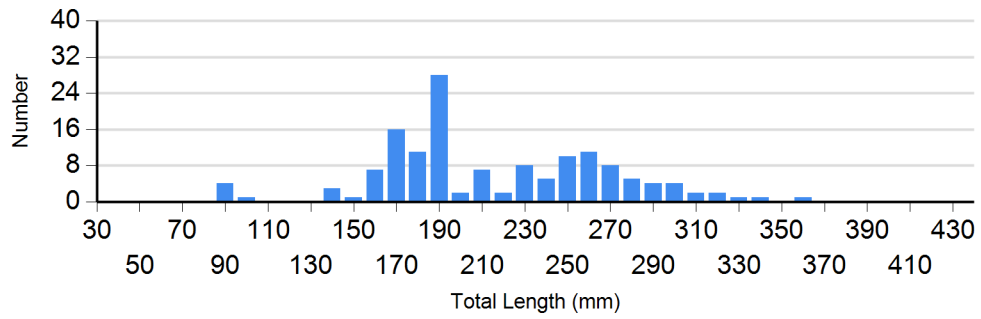
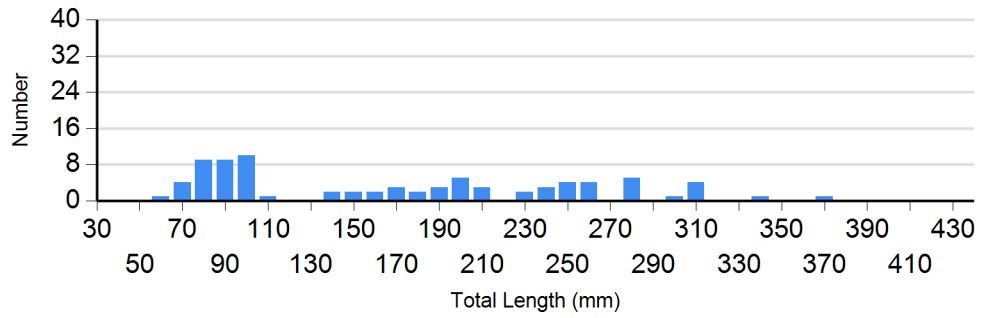
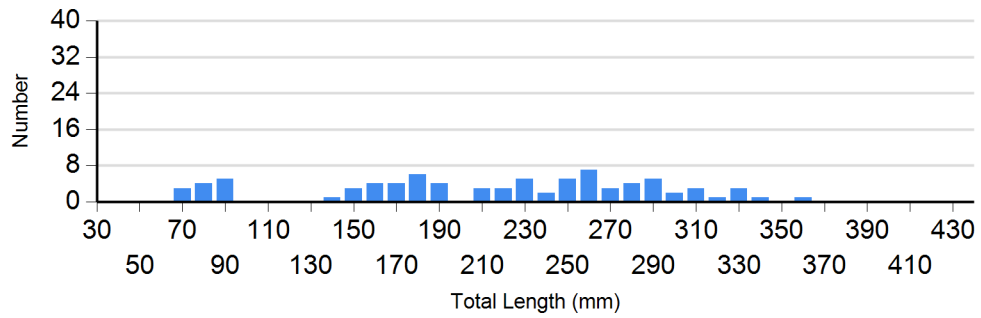
Length Frequency Distribution

Length frequency histogram of species sampled by year.

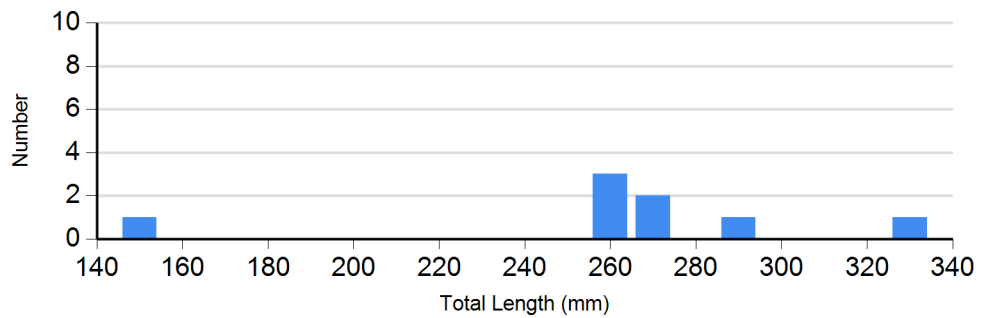
Site: 174

Species: Brown Trout

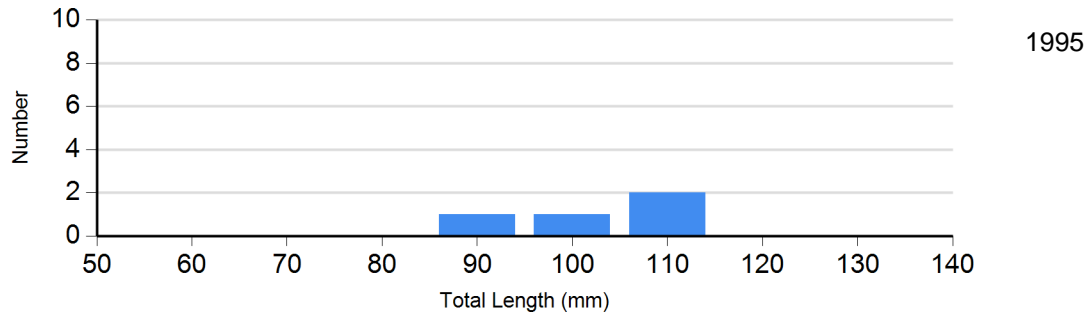




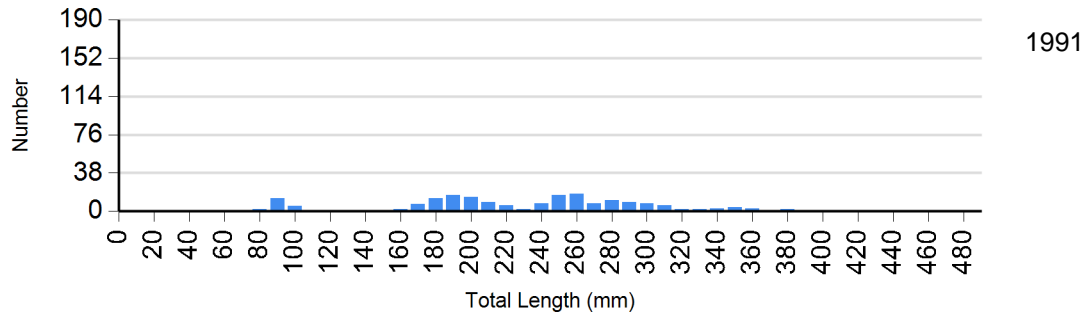
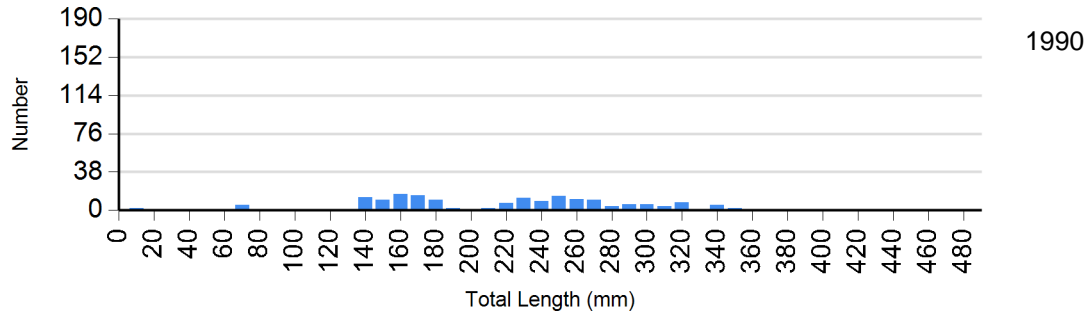
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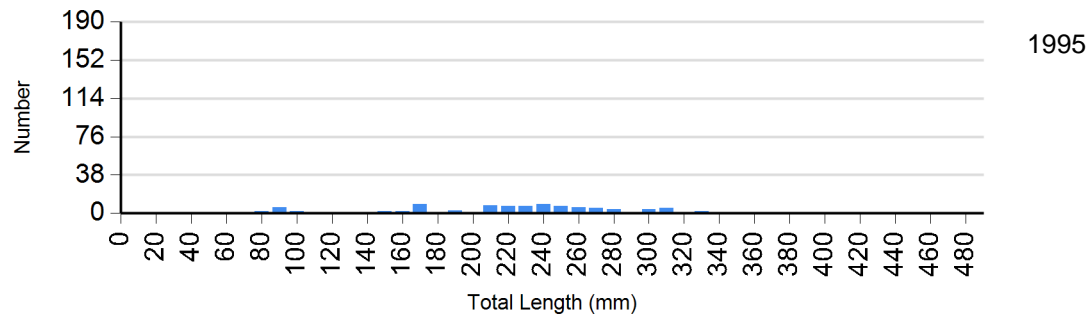
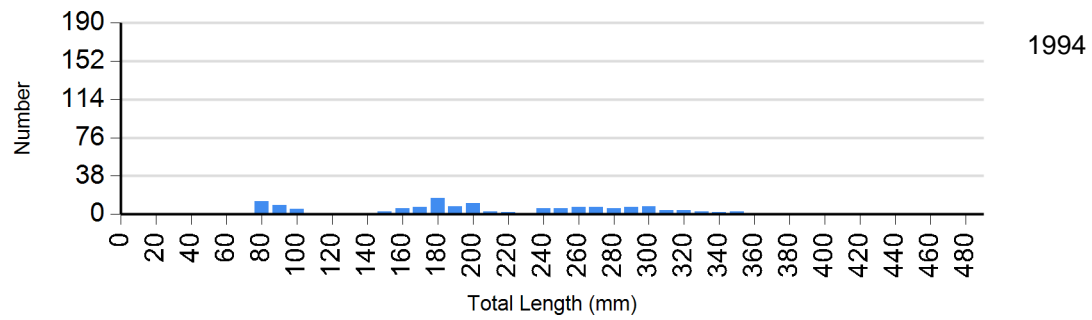
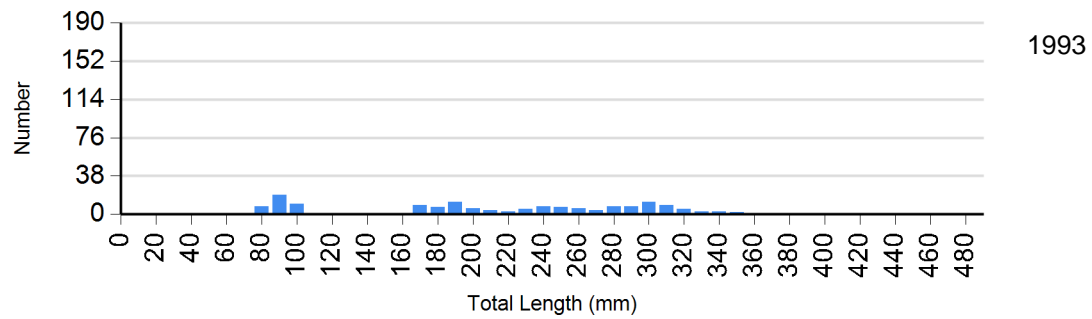
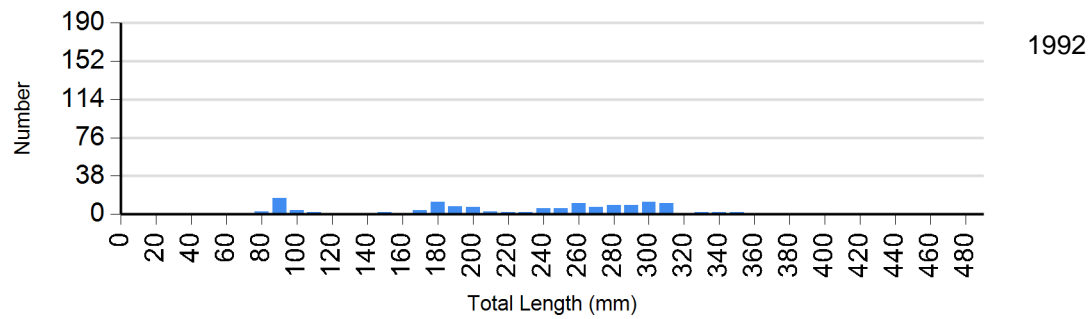


Site: 205
Species: Brook Trout

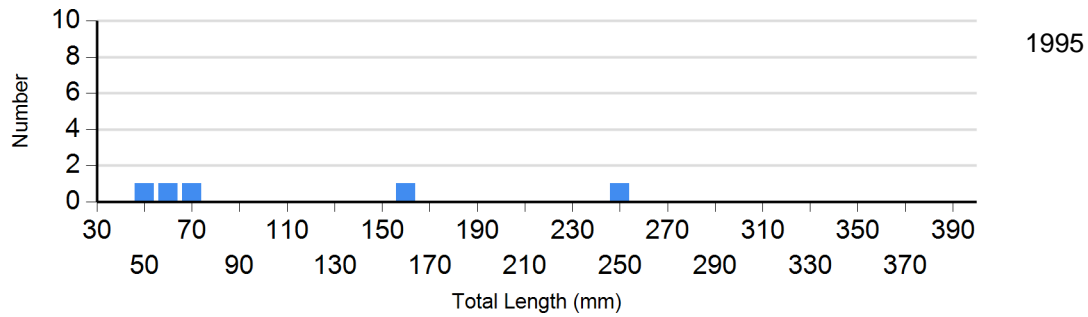
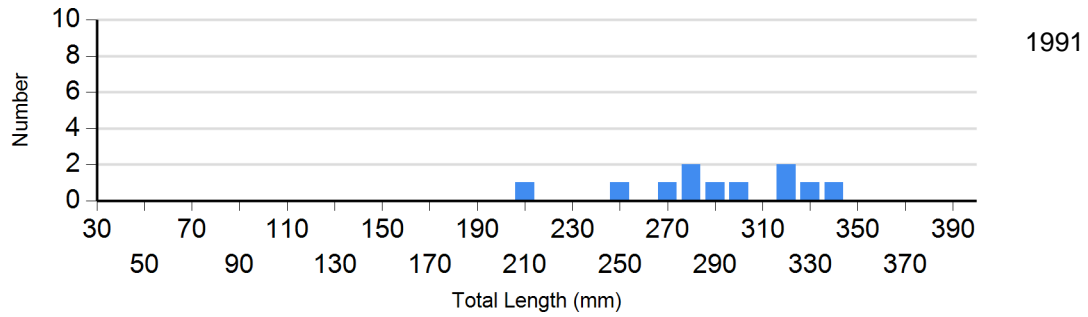
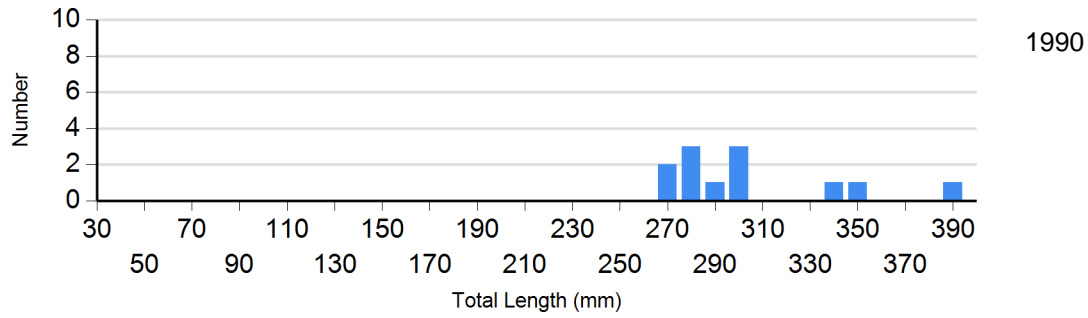


Site: 205
Species: Brown Trout

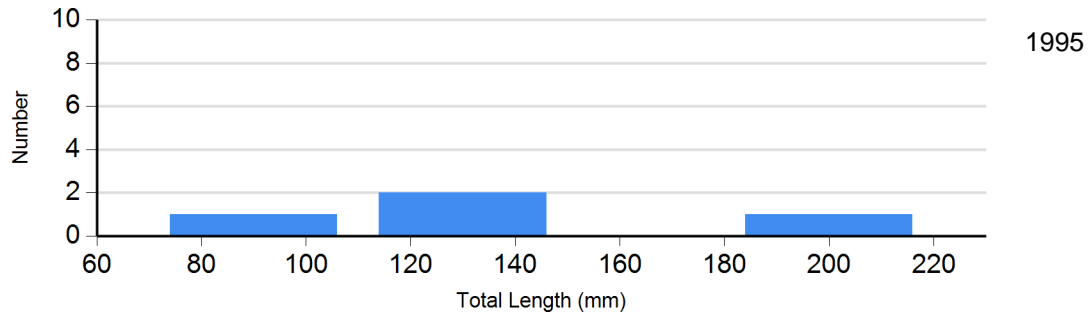
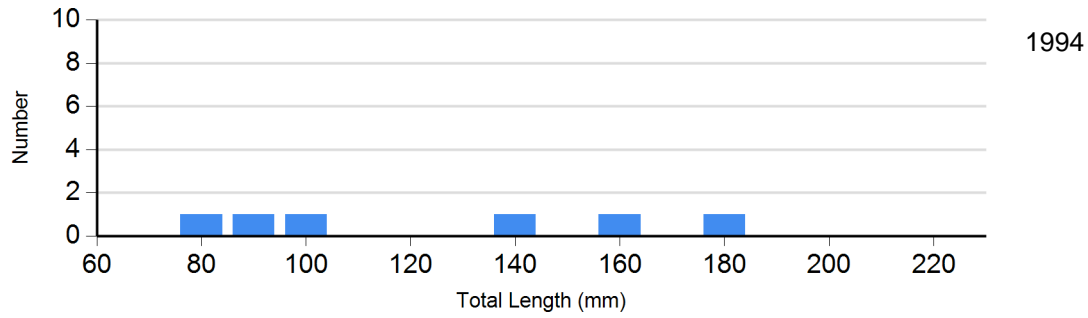




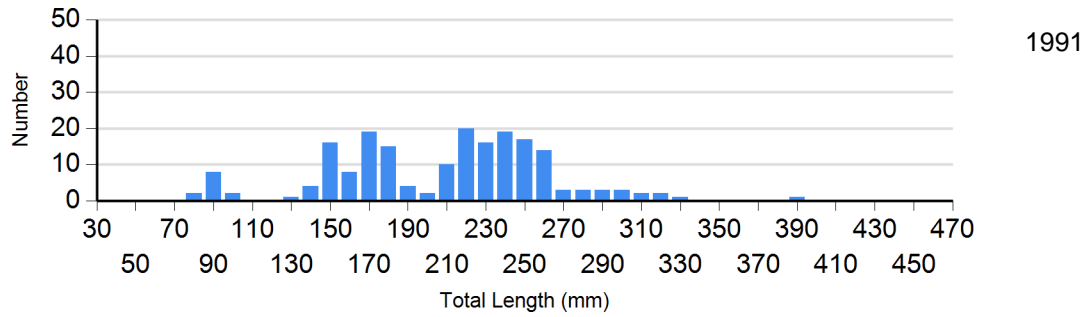
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Species: Rainbow Trout

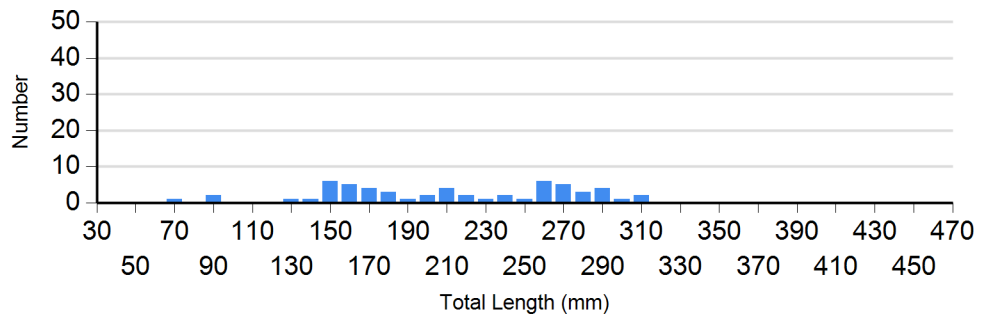
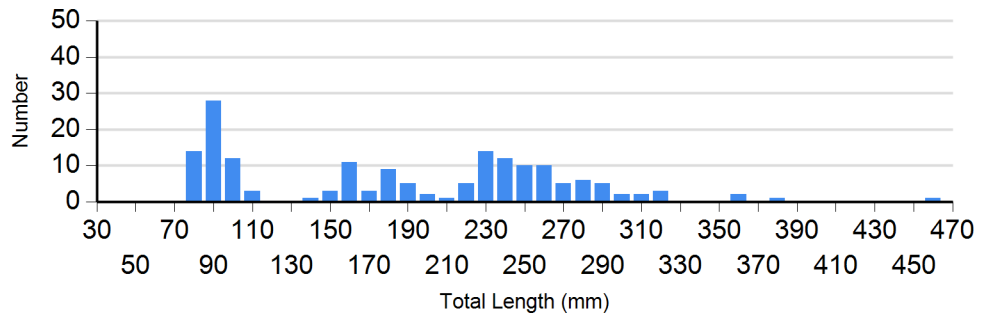
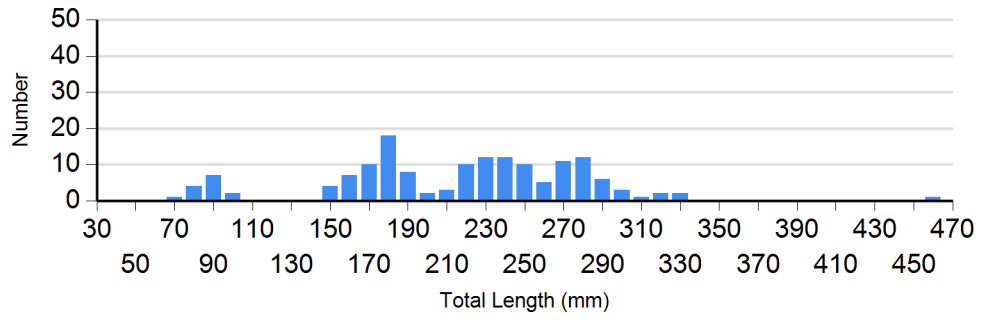
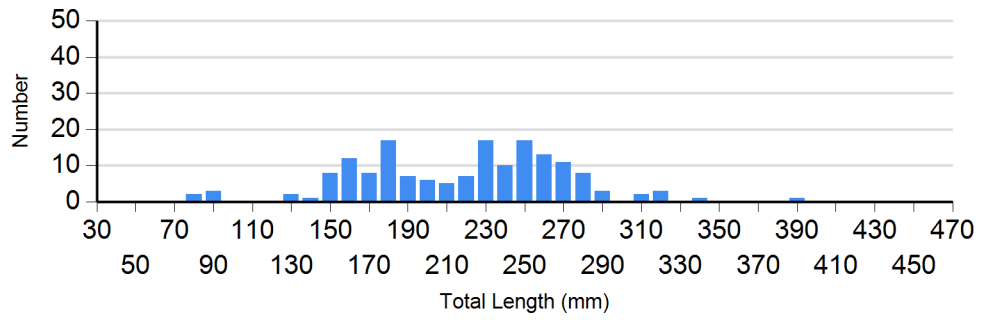


Site: 334
Species: Brook Trout

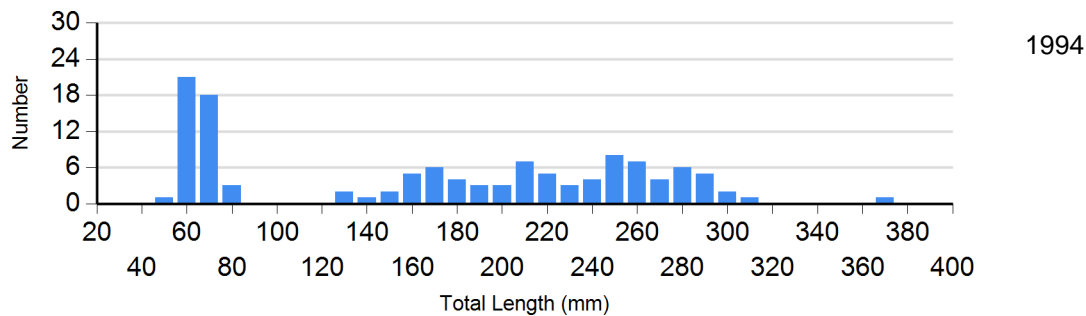
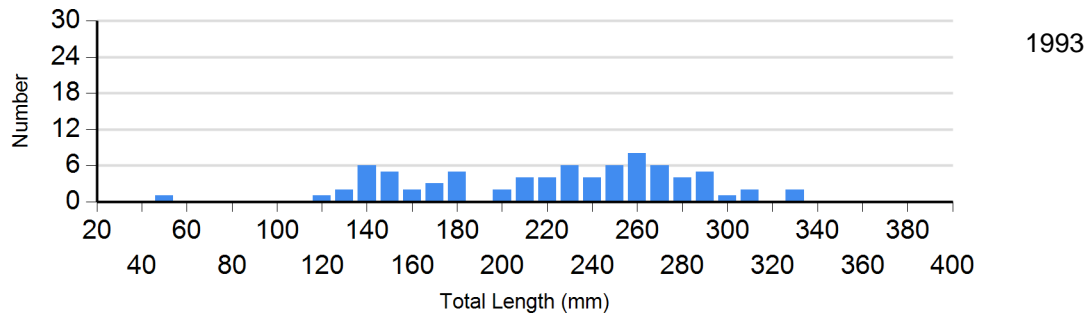
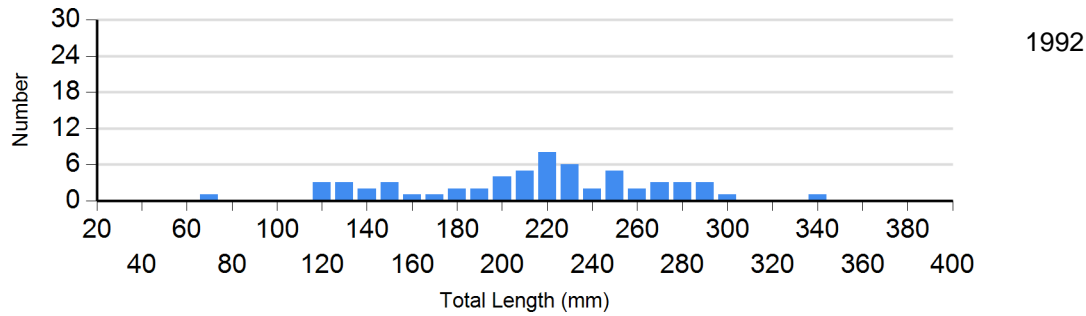
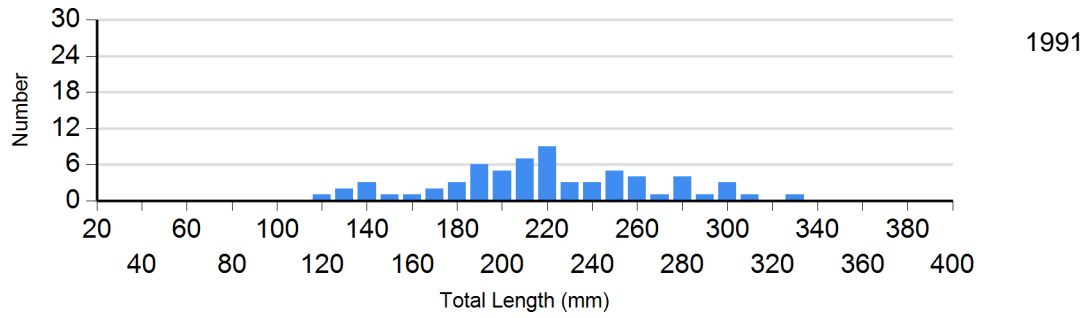


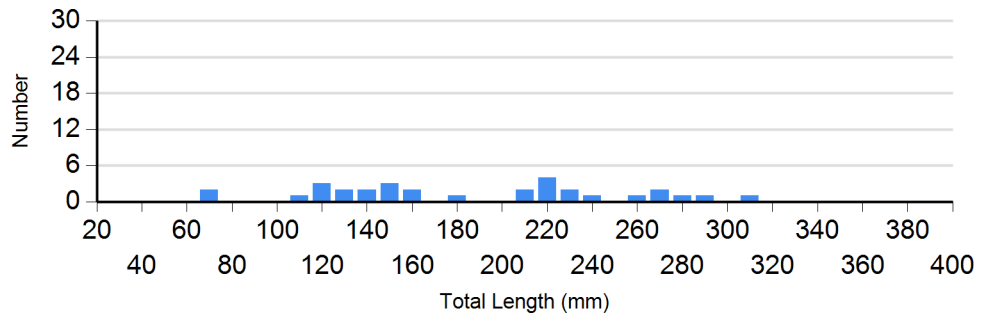
Site: 334
Species: Brown Trout



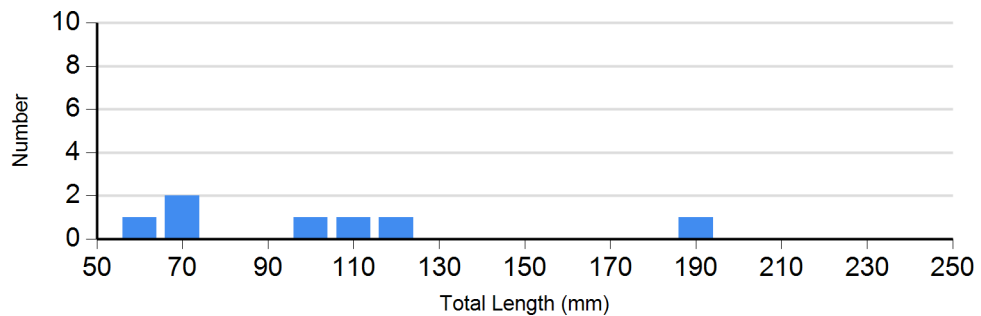
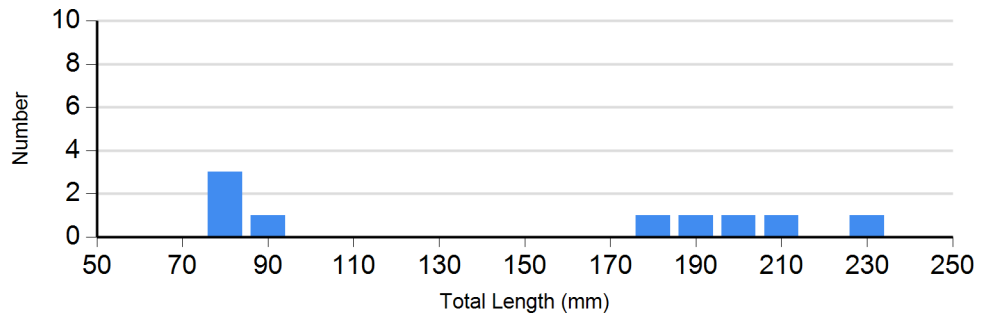
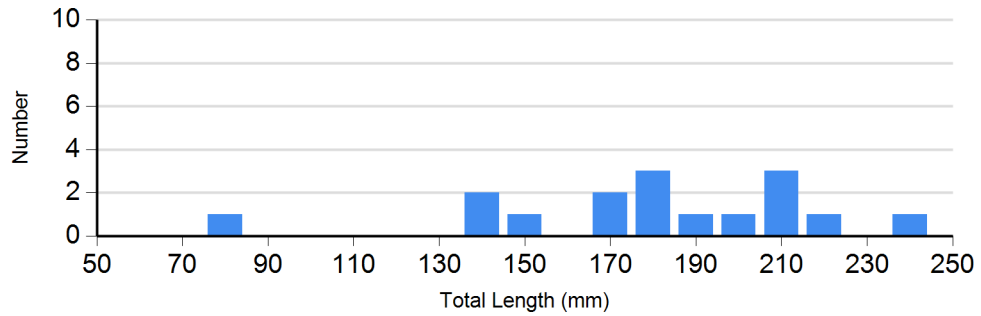


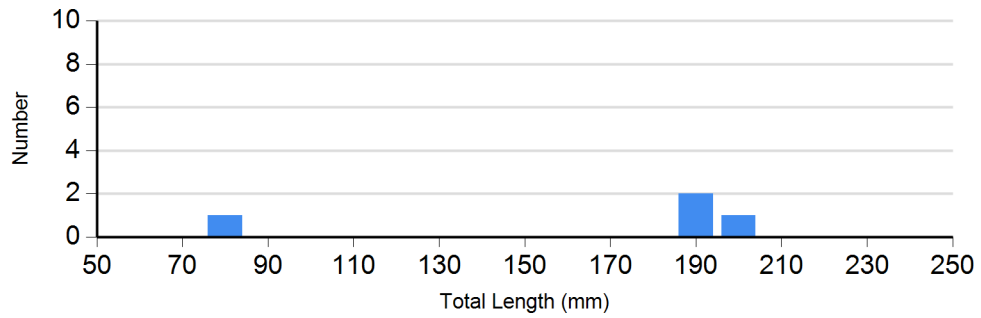
Site: 334
Species: Rainbow Trout



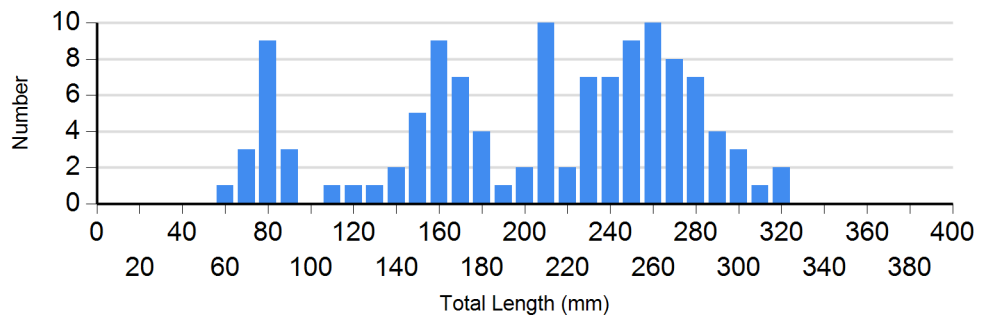
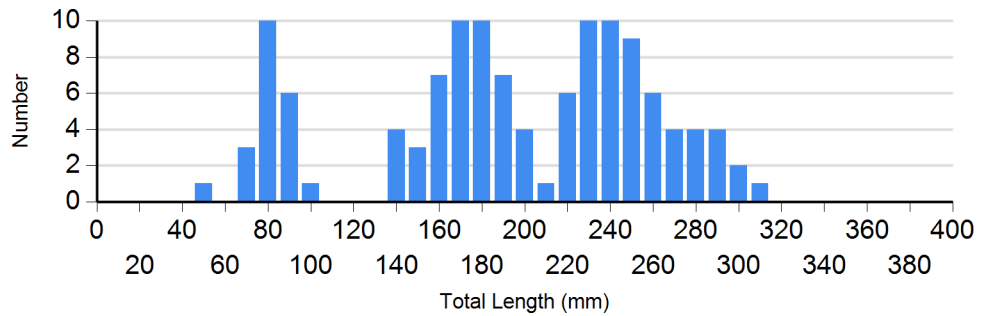
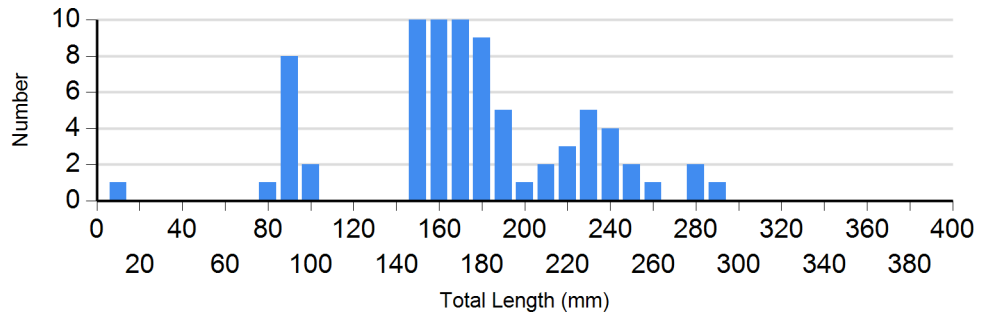


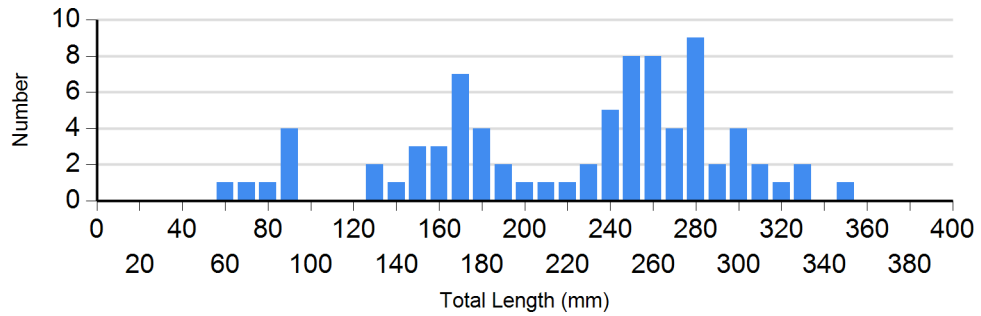
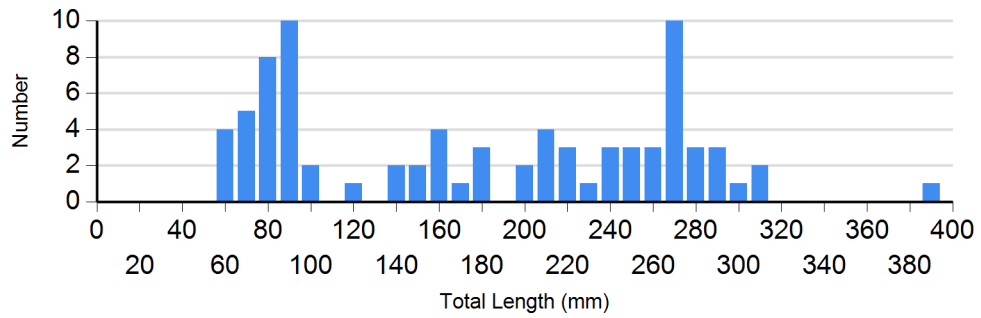
Site: 340
Species: Brook Trout



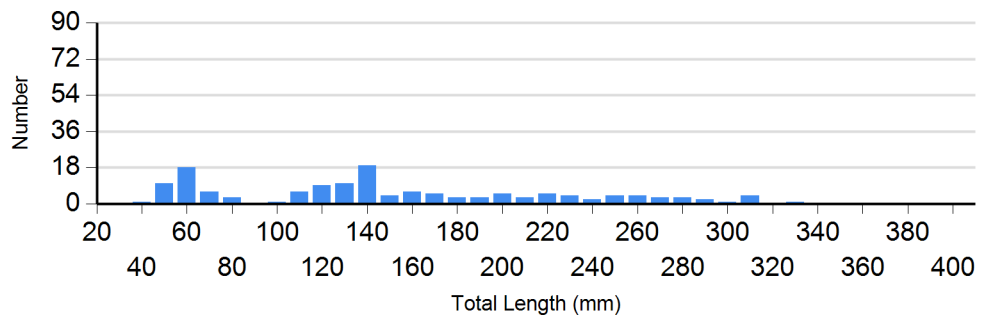
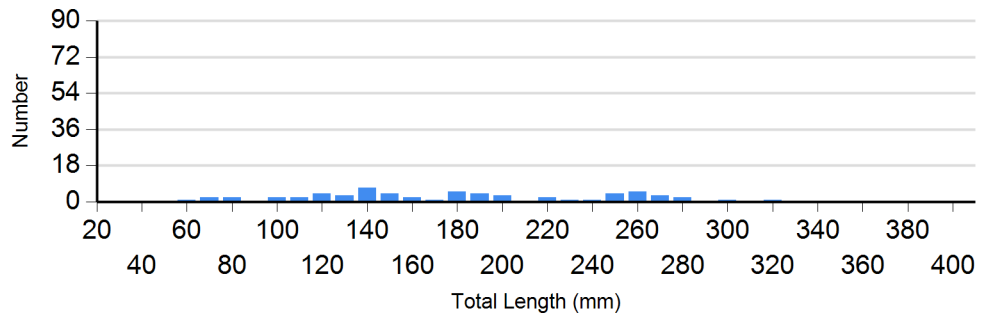


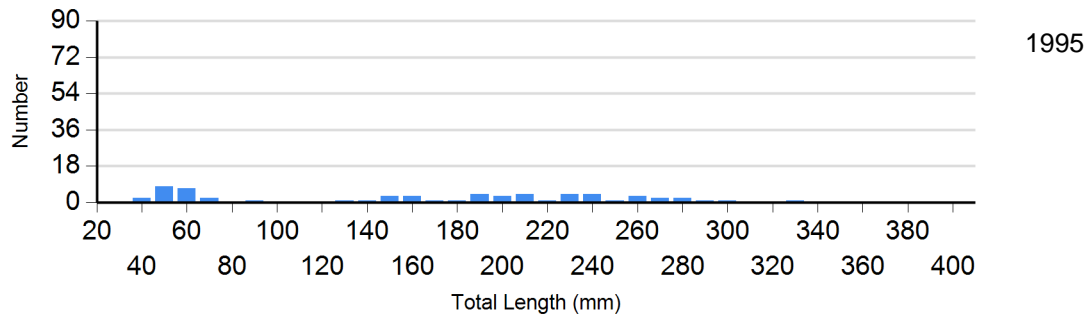
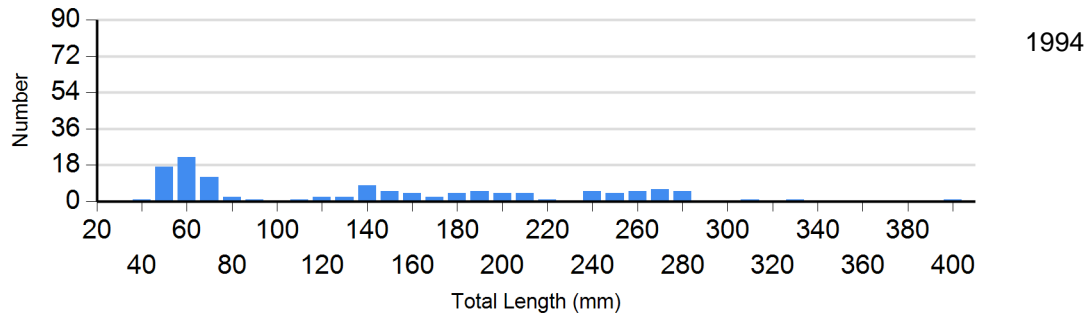
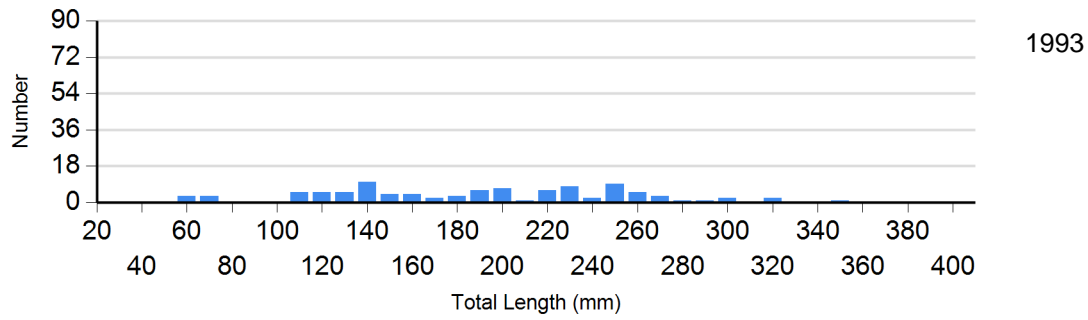
Site: 340
Species: Brown Trout



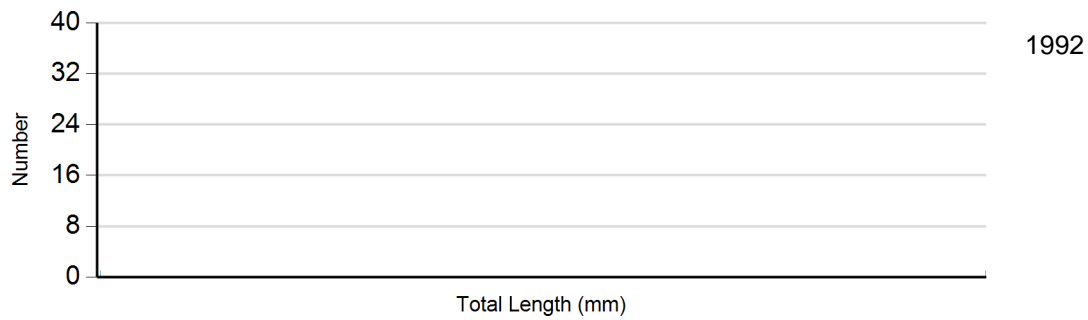


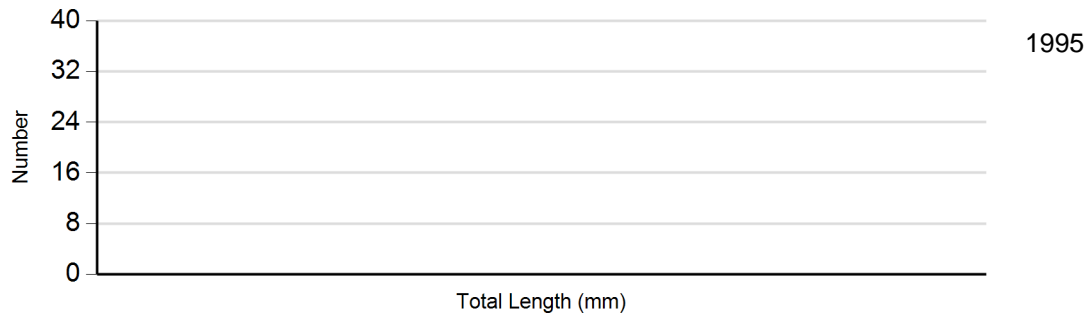
Site: 340
Species: Rainbow Trout





Site: 491
Species: Brown Trout





Site: 492
Species: Brown Trout

