

**SOUTH DAKOTA BLACK HILLS COLD STREAM SURVEY**  
**Castle Creek, Pennington County**  
**02-0071-00**  
**1993**

Table 1. Population and Biomass Estimates for Castle Creek

<b>Site Number:</b> 114	<b>Date Sampled:</b> 10/19/1993	<b>Conductivity (umhos/cm):</b> 271
<b>Site Midpoint (Latitude, Longitude):</b> 44.06352060, -103.67893886	<b>Site Length (m):</b> 96	<b>pH:</b>
<b>Survey Completed by:</b> South Dakota Game, Fish and Parks	<b>Mean Width (m):</b> 4.4	<b>Water Temperature (C):</b> 6.0
<b>Stream Classification:</b> BR2	<b>Number of Pass:</b> 3	<b>Voltage:</b> 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)
Brown Trout	<200mm	117	121	127	117	2775	42	1260	1124	37.21	2028	105.3	15.0
Brown Trout	>=200mm	8	8	8	8	183	20	83	74	18.23	134	228.8	111.3
Brown Trout	All	125	129	135	125	2959	63	1344	1198	55.94	2162	113.2	21.2
Hatchery Brown Trout	>=200mm	9	9	9	9	206	29	94	84	25.70	151	246.2	139.4
Hatchery Brown Trout	All	9	9	9	9	206	29	94	84	25.70	151	246.2	139.4

<b>Site Number:</b> 296	<b>Date Sampled:</b> 10/19/1993	<b>Conductivity (umhos/cm):</b> 250
<b>Site Midpoint (Latitude, Longitude):</b> 44.07393507, -103.74845067	<b>Site Length (m):</b> 102	<b>pH:</b>
<b>Survey Completed by:</b> South Dakota Game, Fish and Parks	<b>Mean Width (m):</b> 4.6	<b>Water Temperature (C):</b> 2.0
<b>Stream Classification:</b> BK0, BR2	<b>Number of Pass:</b> 3	<b>Voltage:</b> 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)
Brook Trout	<200mm	14	20	40	14	435	5	196	176	4.33	315	99.1	11.1
Brook Trout	All	14	20	40	14	435	5	196	176	4.33	315	99.1	11.1
Brown Trout	<200mm	112	117	124	112	2543	30	1147	1030	26.48	1846	95.3	11.7

Brown Trout	>=200mm	11	11	11	11	239	33	108	97	29.74	174	238.8	139.3
Brown Trout	All	123	128	135	123	2783	64	1255	1127	57.33	2019	108.1	23.1
Longnose Dace	All	8	8	10	8	174	1	78	70	0.82	126	83.1	5.3
White Sucker	All	1	1	1	1	22	0	10	9	0.19	16	102.0	10.0

**Site Number:** 356

**Site Midpoint (Latitude, Longitude):** 44.05717425, -103.76307493

**Survey Completed by:** South Dakota Game, Fish and Parks

**Stream Classification:** BK2, BR1

**Date Sampled:** 10/13/1993

**Site Length (m):** 100

**Mean Width (m):** 3.6

**Number of Pass:** 3

**Conductivity (umhos/cm):** 235

**pH:**

**Water Temperature (C):** 8.0

**Voltage:** 350

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	71	80	92	71	2198	46	800	890	40.85	1287	123.8	20.8
Brook Trout	>=200mm	5	5	5	5	137	14	50	56	12.71	80	214.2	103.6
Brook Trout	All	77	84	94	77	2308	61	840	935	54.11	1352	129.8	26.3
Brown Trout	<200mm	57	58	61	57	1593	50	580	645	44.53	933	137.6	31.3
Brown Trout	>=200mm	25	25	25	25	687	110	250	278	98.19	402	245.7	160.1
Brown Trout	All	82	82	84	82	2253	159	820	912	141.95	1319	170.5	70.6
Hatchery Brown Trout	>=200mm	1	1	2	1	27	5	10	11	4.12	16	250.0	168.0
Hatchery Brown Trout	All	1	1	2	1	27	5	10	11	4.12	16	250.0	168.0

**Site Number:** 384

**Site Midpoint (Latitude, Longitude):** 44.04396904, -103.77363060

**Survey Completed by:** South Dakota Game, Fish and Parks

**Stream Classification:** BK1, BR1

**Date Sampled:** 10/12/1993

**Site Length (m):** 113

**Mean Width (m):** 3.9

**Number of Pass:** 4

**Conductivity (umhos/cm):** 258

**pH:**

**Water Temperature (C):** 10.0

**Voltage:** 350

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	84	87	92	84	2219	107	770	899	95.40	1239	168.8	48.1
Brook Trout	>=200mm	21	21	21	21	536	58	186	217	52.02	299	216.0	108.8
Brook Trout	All	105	107	111	105	2730	165	947	1105	146.88	1524	178.2	60.3
Brown Trout	<200mm	37	38	41	37	969	52	336	393	46.32	541	170.0	53.5
Brown Trout	>=200mm	29	29	30	29	740	148	257	300	132.18	413	263.3	200.1
Brown Trout	All	66	67	70	66	1709	202	593	692	179.96	954	211.0	117.9

Site Number: 388

Site Midpoint (Latitude, Longitude): 44.04338453, -103.77130517

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK2, BR1

Date Sampled: 10/12/1993

Site Length (m): 100

Mean Width (m): 6.0

Number of Pass: 3

Conductivity (umhos/cm): 240

pH:

Water Temperature (C): 7.0

Voltage: 350

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	53	58	66	53	970	25	580	393	22.32	933	129.6	25.8
Brook Trout	>=200mm	14	14	15	14	234	26	140	95	23.20	225	214.3	111.0
Brook Trout	All	67	72	80	67	1204	53	720	488	47.14	1158	147.3	43.8
Brown Trout	<200mm	17	17	19	17	284	15	170	115	13.23	274	171.3	52.1
Brown Trout	>=200mm	33	33	35	33	552	144	330	223	128.27	531	286.5	260.3
Brown Trout	All	50	52	56	50	870	165	520	352	147.16	837	247.3	189.5

Site Number: 410

Site Midpoint (Latitude, Longitude): 44.03214464, -103.77869838

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK2, BR2

Date Sampled: 10/13/1993

Site Length (m): 108

Mean Width (m): 7.1

Number of Pass: 3

Conductivity (umhos/cm): 255

pH:

Water Temperature (C): 8.0

Voltage: 350

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	99	105	113	99	1475	40	972	597	35.94	1564	131.6	27.3
Brook Trout	>=200mm	20	20	20	20	281	37	185	114	32.91	298	230.4	131.2
Brook Trout	All	119	124	131	119	1742	78	1148	705	69.60	1847	148.2	44.8
Brown Trout	<200mm	7	7	7	7	98	7	65	40	6.62	104	169.9	75.4
Brown Trout	>=200mm	10	10	10	10	140	46	93	57	41.27	149	305.5	329.1
Brown Trout	All	17	17	17	17	239	54	157	97	47.89	253	249.6	224.6
White Sucker	All	2	2	3	2	28	0	19	11	0.38	30	117.0	15.0

Site Number: 483

Site Midpoint (Latitude, Longitude): 44.02086149, -103.83725124

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK0, RB0

Date Sampled: 06/14/1993

Site Length (m): 100

Mean Width (m): 2.0

Number of Pass: 3

Conductivity (umhos/cm): 310

pH: 8.7

Water Temperature (C): 7.0

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)
Brook Trout	<200mm	68	86	110	68	4388	52	860	1777	46.72	1384	108.9	11.9
Brook Trout	All	68	86	110	68	4388	52	860	1777	46.72	1384	108.9	11.9
Creek Chub	All	2	2	2	2	102	1	20	41	1.32	32	112.5	14.5
Fathead Minnow	All	6	6	9	6	306	1	60	124	1.14	97	70.7	4.2
Hatchery Rainbow Trout	<200mm	35	40	50	35	2041	62	400	827	55.19	644	145.5	30.3
Hatchery Rainbow Trout	>=200mm	5	5	5	5	255	35	50	103	31.30	80	244.0	137.4
Hatchery Rainbow Trout	All	40	43	50	40	2194	96	430	889	85.55	692	157.8	43.7
Rainbow Trout	<200mm	11	23	82	11	1173	31	230	475	27.91	370	140.5	26.6
Rainbow Trout	All	11	23	82	11	1173	31	230	475	27.91	370	140.5	26.6

**Site Number:** 589  
**Site Midpoint (Latitude, Longitude):** 44.05753341, -103.89338116  
**Survey Completed by:** South Dakota Game, Fish and Parks  
**Stream Classification:** BK2

**Date Sampled:** 06/09/1993      **Conductivity (umhos/cm):** 325  
**Site Length (m):** 100      **pH:** 8.0  
**Mean Width (m):** 1.9      **Water Temperature (C):** 12.0  
**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	50	55	64	50	2895	78	550	1172	69.89	885	130.2	27.0
Brook Trout	>=200mm	3	3	3	3	158	16	30	64	14.38	48	202.0	102.0
Brook Trout	All	53	57	64	53	3000	94	570	1215	83.80	917	134.3	31.3

**Site Number:** 654  
**Site Midpoint (Latitude, Longitude):** 44.08612368, -103.92652858  
**Survey Completed by:** South Dakota Game, Fish and Parks  
**Stream Classification:** BK2

**Date Sampled:** 06/09/1993      **Conductivity (umhos/cm):** 278  
**Site Length (m):** 100      **pH:** 8.4  
**Mean Width (m):** 2.6      **Water Temperature (C):** 9.0  
**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)
Brook Trout	<200mm	43	44	47	43	1692	46	440	685	40.97	708	131.9	27.1
Brook Trout	>=200mm	5	5	5	5	192	23	50	78	20.47	80	214.2	119.2
Brook Trout	All	48	49	52	48	1885	69	490	763	61.77	788	140.5	36.7
Creek Chub	All	1	1	1	1	38	1	10	16	0.45	16	115.0	13.0

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	
<b>Class BR1</b>	Number of wild Brown Trout exceeds 150 per acre
<b>Class BR2</b>	Number of wild Brook Trout ranges from 25 to 150 per acre
<b>Class BR3</b>	Number of wild Brown Trout is less than 25 per acre
<b>Class BK1</b>	Number of wild Brook Trout exceeds 150 per acre
<b>Class BK2</b>	Number of wild Brook Trout ranges from 25 to 150 per acre
<b>Class BK3</b>	Number of wild Brook Trout is less than 25 per acre
<b>Class RB1</b>	Number of wild Rainbow Trout exceeds 25 per acre
<b>Class RB2</b>	Number of wild Rainbow Trout is less than 25 per acre

Table 2. Species composition and population estimates on Castle Creek, 1983-1993

**Site 114**

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brown Trout <200mm	Oct 19, 1993	121	117-127	
Brown Trout >=200mm	Oct 19, 1993	8	8-8	BR2
Hatchery Brown Trout >=200mm	Oct 19, 1993	9	9-9	

**Site 296**

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Oct 19, 1993	20	14-40	
Brown Trout <200mm	Oct 19, 1993	117	112-124	
Brown Trout >=200mm	Oct 19, 1993	11	11-11	BR2

Longnose Dace	Oct 19, 1993	8	8-10
---------------	--------------	---	------

White Sucker	Oct 19, 1993	1	1-1
--------------	--------------	---	-----

---

**Site 356**

---

<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Oct 16, 1992	71	71-72	
	Oct 13, 1993	80	71-92	
Brook Trout >=200mm	Oct 16, 1992	3	3-3	BK2
	Oct 13, 1993	5	5-5	BK2
Brown Trout <200mm	Oct 16, 1992	86	84-90	
	Oct 13, 1993	58	57-61	
Brown Trout >=200mm	Oct 16, 1992	23	23-24	BR1
	Oct 13, 1993	25	25-25	BR1
Hatchery Brown Trout >=200mm	Oct 13, 1993	1	1-2	

---

**Site 384**

---

<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Oct 14, 1992	127	109-146	
	Oct 12, 1993	87	84-92	

---

Brook Trout >=200mm	Oct 14, 1992	11	11-12	BK2
	Oct 12, 1993	21	21-21	BK1
Brown Trout <200mm	Oct 14, 1992	13	13-14	
	Oct 12, 1993	38	37-41	
Brown Trout >=200mm	Oct 14, 1992	34	32-39	BR1
	Oct 12, 1993	29	29-30	BR1
White Sucker	Oct 14, 1992	7	7-9	

---

**Site 388**

---

<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Oct 14, 1992	26	26-27	
	Oct 12, 1993	58	53-66	
Brook Trout >=200mm	Oct 14, 1992	16	12-30	BK2
	Oct 12, 1993	14	14-15	BK2
Brown Trout <200mm	Oct 14, 1992	10	10-10	
	Oct 12, 1993	17	17-19	
Brown Trout >=200mm	Oct 14, 1992	27	27-28	BR1

---



Brown Trout &gt;=200mm

Oct 12, 1993

33

33-35

BR1

**Site 410**

<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Oct 15, 1992	125	119-133	
	Oct 13, 1993	105	99-113	
Brook Trout >=200mm	Oct 15, 1992	14	14-15	BK2
	Oct 13, 1993	20	20-20	BK2
Brown Trout <200mm	Oct 13, 1993	7	7-7	
Brown Trout >=200mm	Oct 15, 1992	14	14-14	BR2
	Oct 13, 1993	10	10-10	BR2
White Sucker	Oct 13, 1993	2	2-3	

**Site 483**

<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Jun 14, 1993	86	68-110	
Creek Chub	Jun 14, 1993	2	2-2	
Fathead Minnow	Jun 14, 1993	6	6-9	
Hatchery Rainbow Trout <200mm	Jun 14, 1993	40	35-50	

Hatchery Rainbow Trout ≥200mm	Jun 14, 1993	5	5-5
Rainbow Trout <200mm	Jun 14, 1993	23	11-82

---

**Site 589**


---

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Jun 09, 1993	55	50-64	
Brook Trout ≥200mm	Jun 09, 1993	3	3-3	BK2

---

**Site 654**


---

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Jun 09, 1993	44	43-47	
Brook Trout ≥200mm	Jun 09, 1993	5	5-5	BK2
Creek Chub	Jun 09, 1993	1	1-1	

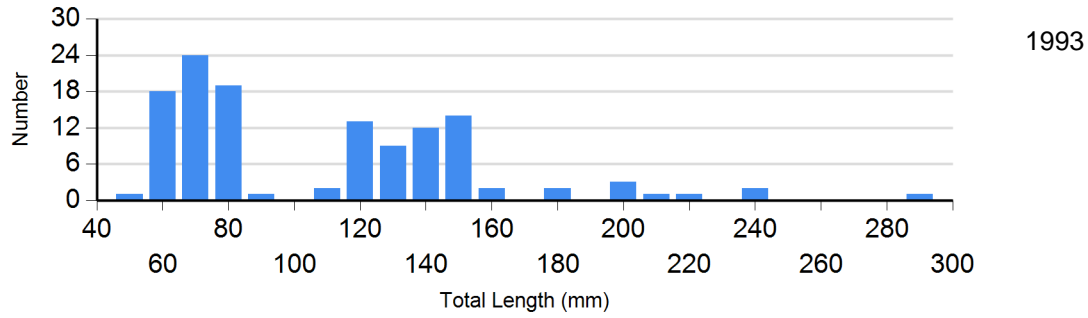
---

## Length Frequency Distribution

Length frequency histogram of species sampled by year.

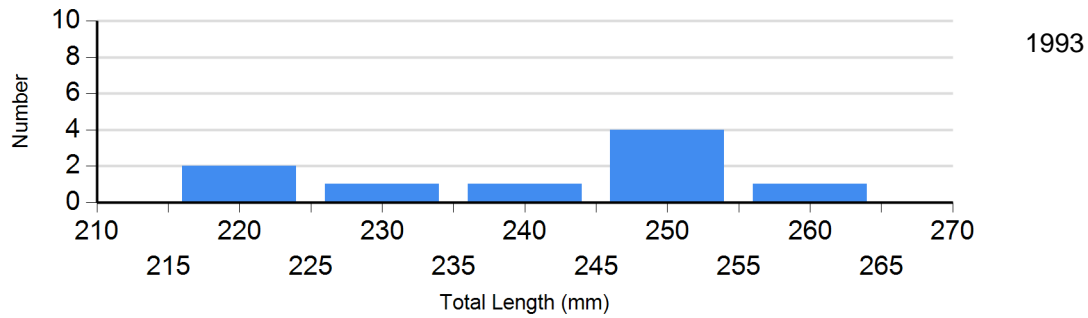
**Site:** 114

**Species:** Brown Trout



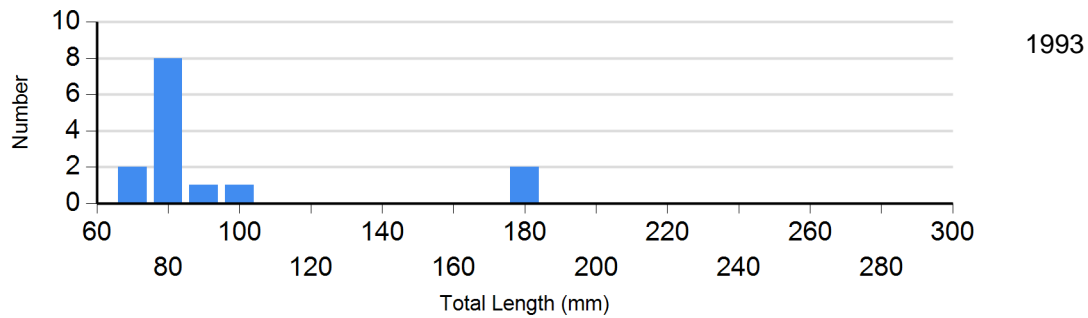
**Site:** 114

**Species:** Hatchery Brown Trout

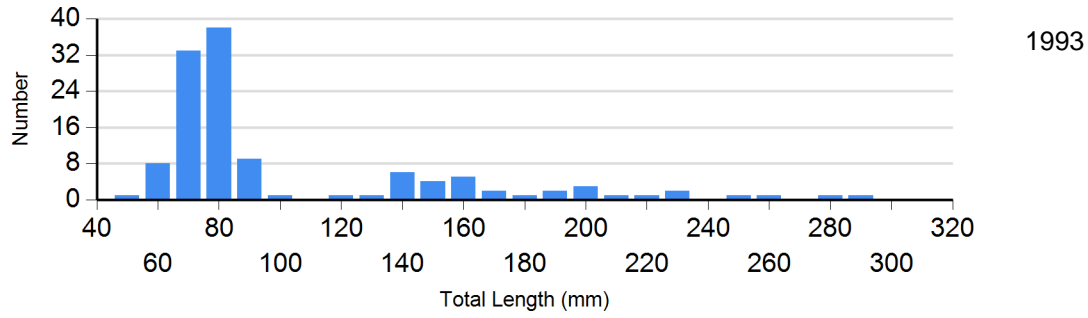


**Site:** 296

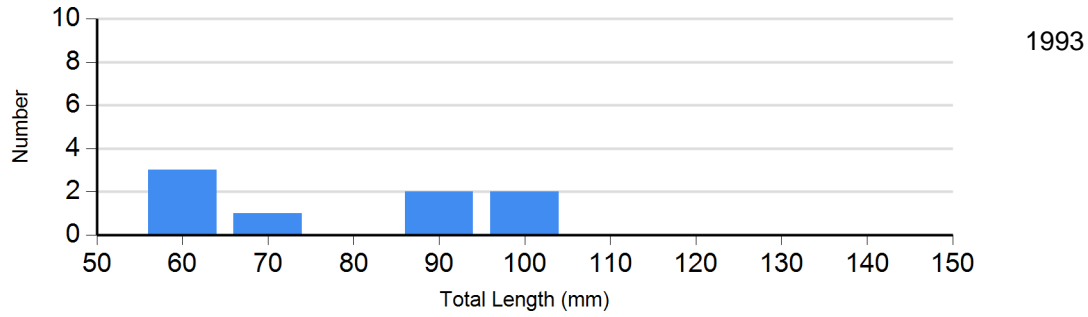
**Species:** Brook Trout



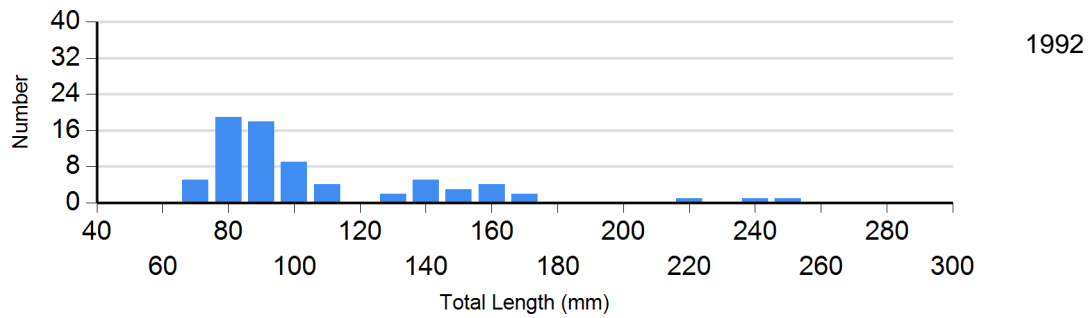
**Site:** 296  
**Species:** Brown Trout

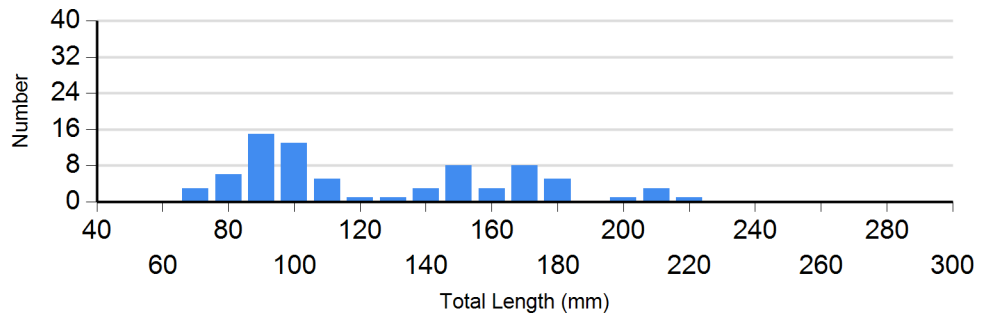


**Site:** 296  
**Species:** Longnose Dace

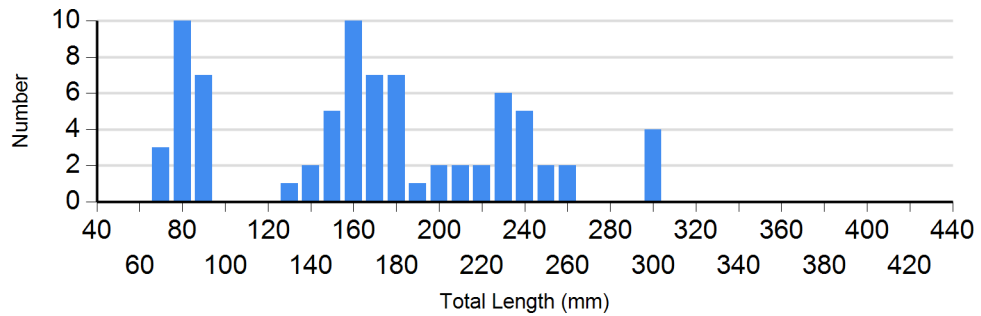
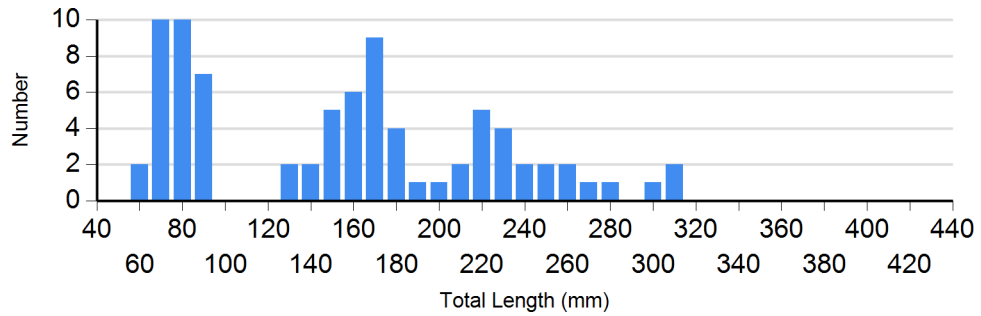


**Site:** 356  
**Species:** Brook Trout

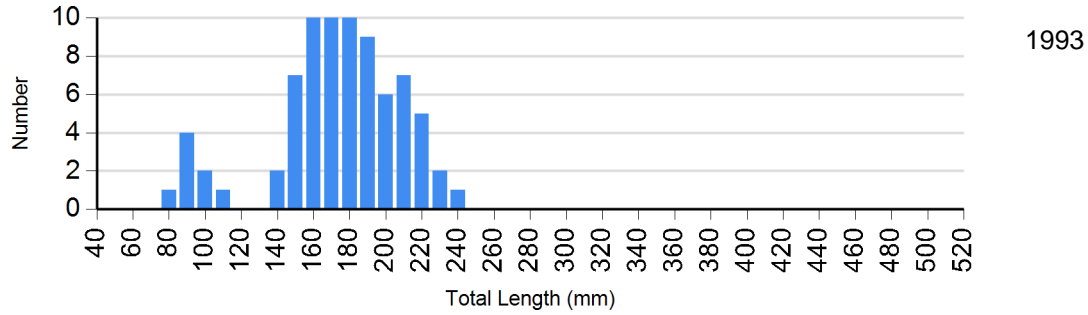
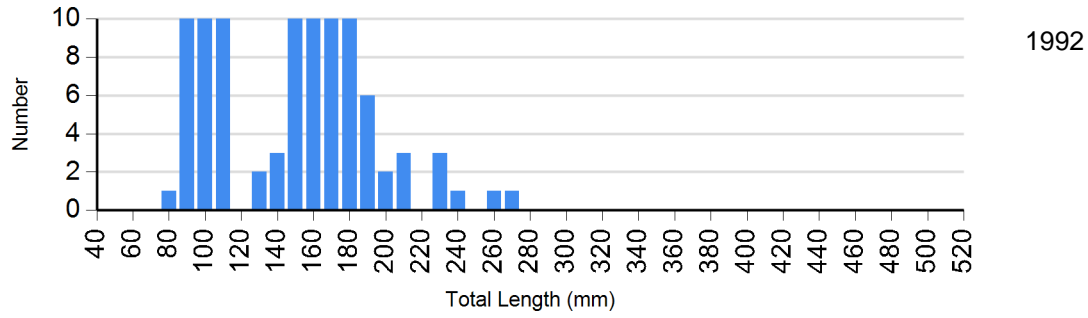




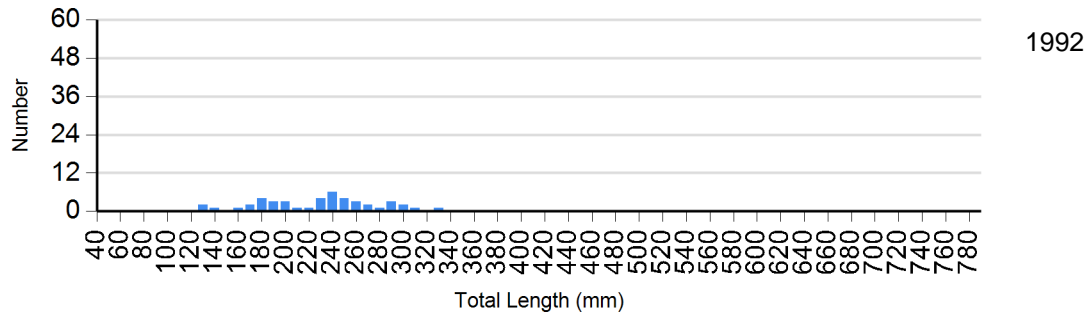
Site: 356  
Species: Brown Trout

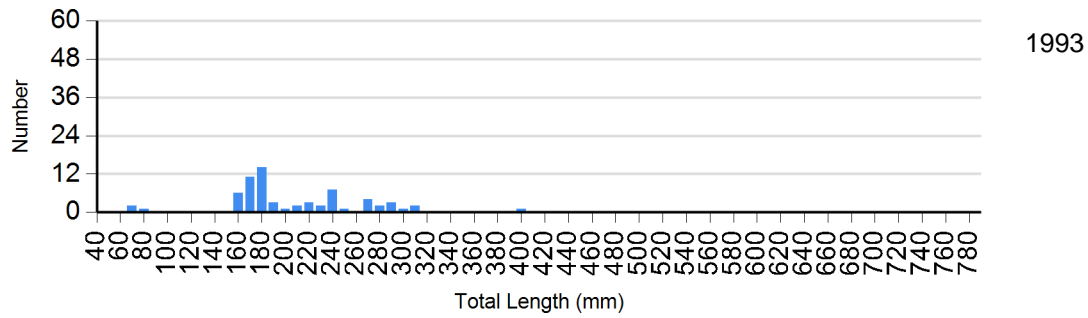


Site: 384  
Species: Brook Trout

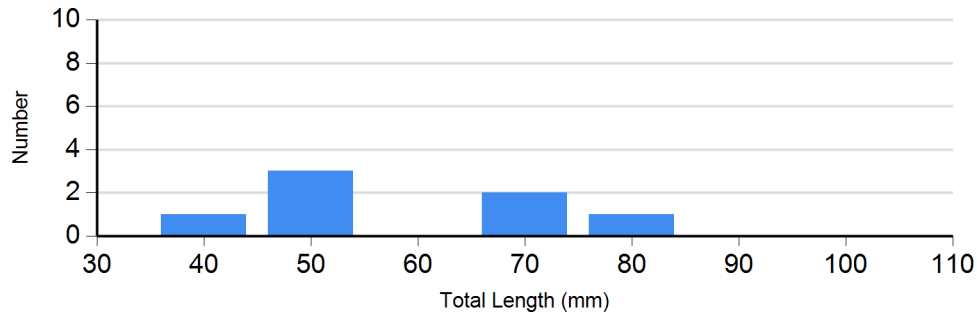


Site: 384  
Species: Brown Trout

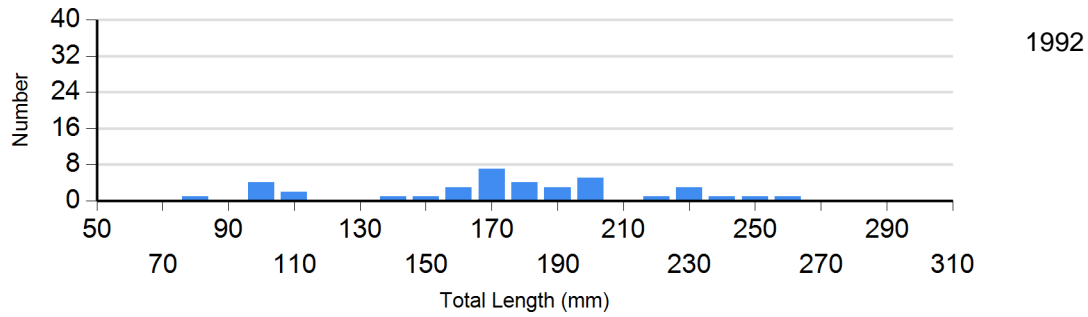


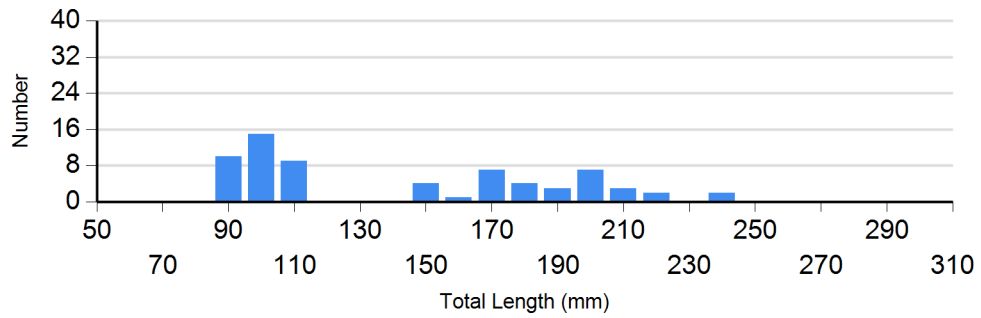


**Site:** 384  
**Species:** White Sucker

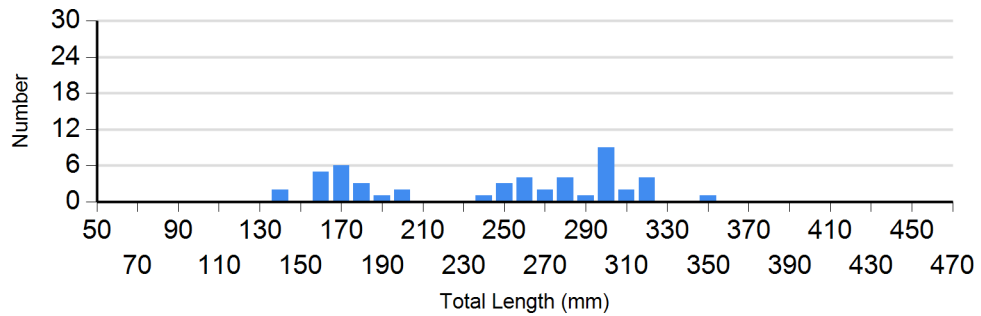
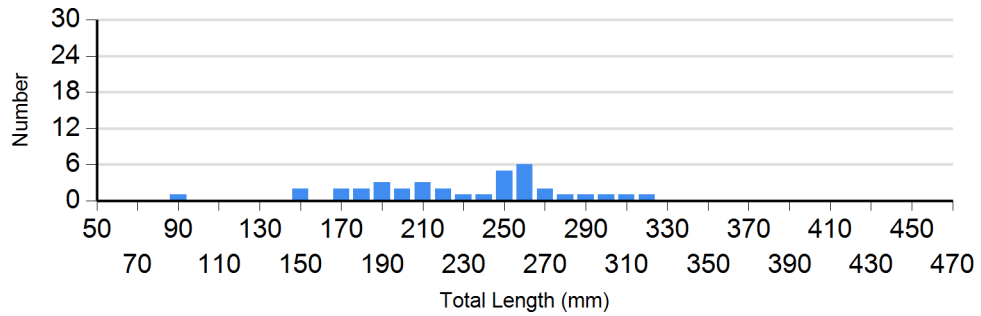


**Site:** 388  
**Species:** Brook Trout



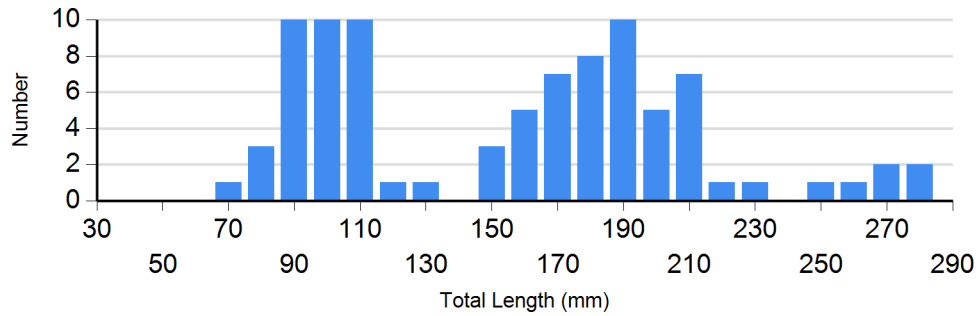
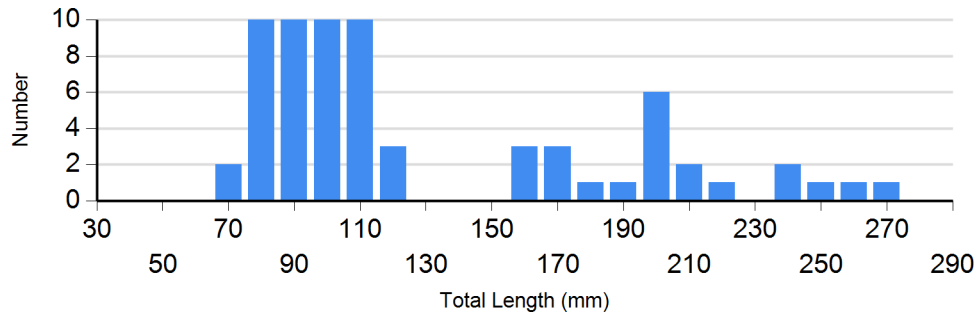


Site: 388  
Species: Brown Trout

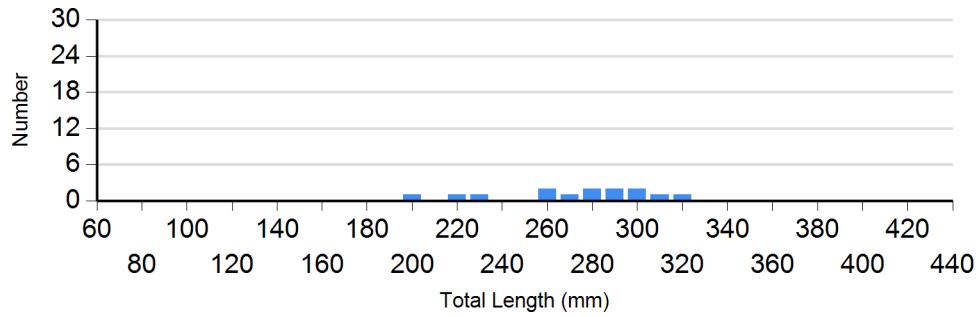


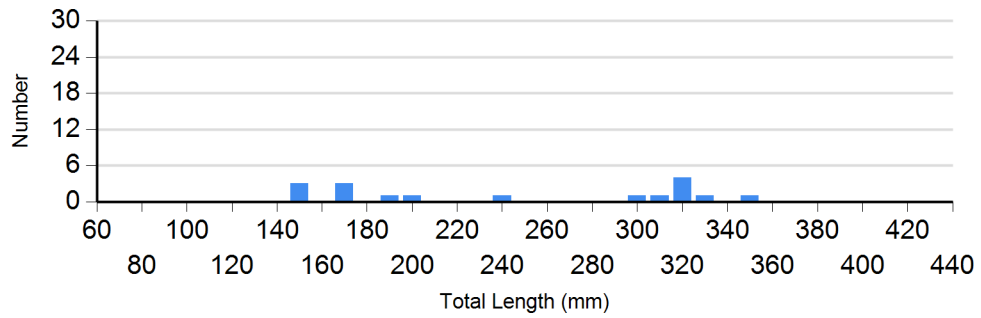


**Site:** 410  
**Species:** Brook Trout



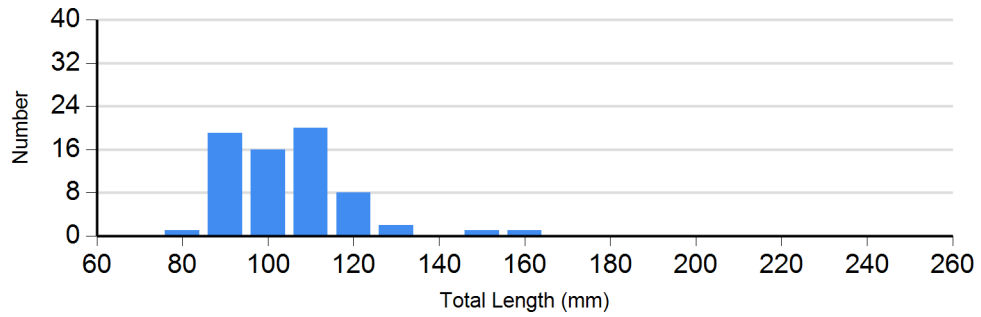
**Site:** 410  
**Species:** Brown Trout





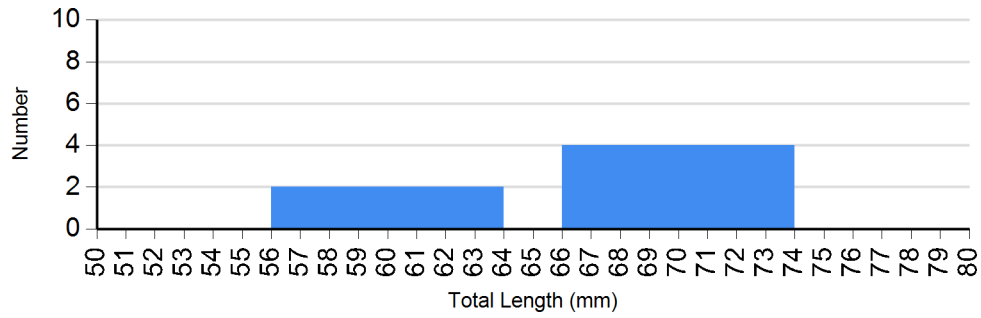
1993

**Site:** 483  
**Species:** Brook Trout



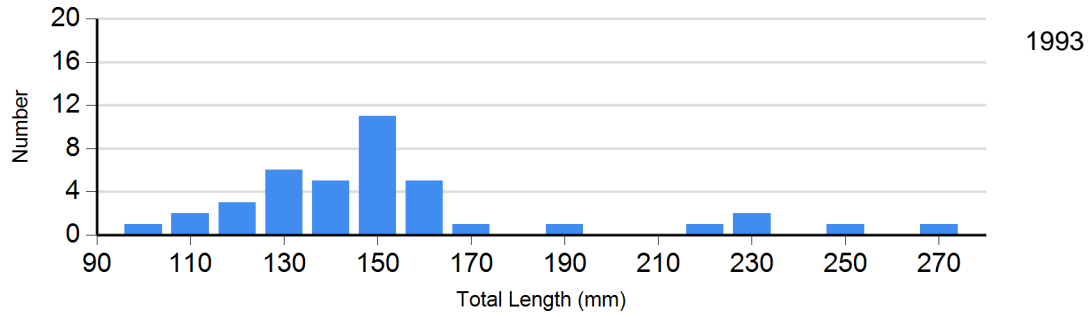
1993

**Site:** 483  
**Species:** Fathead Minnow

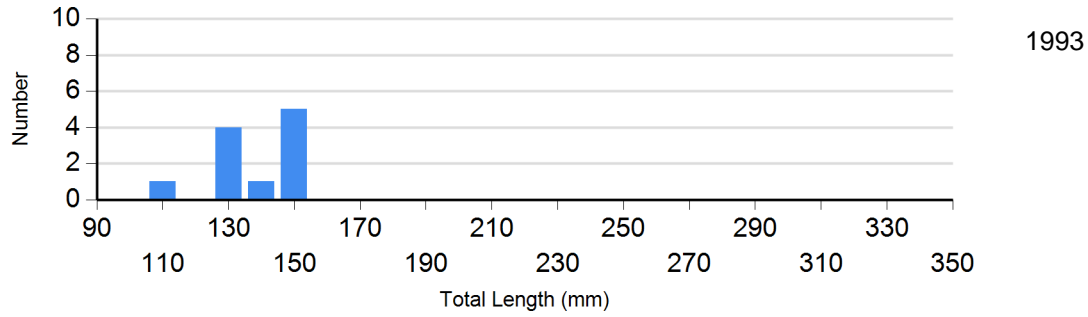


1993

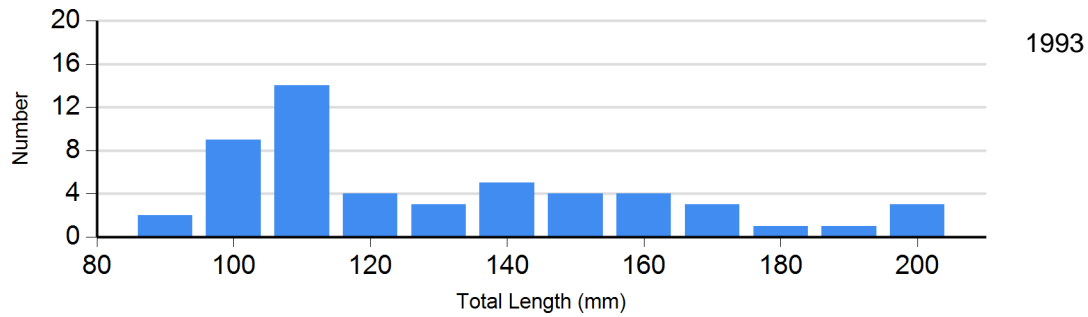
**Site:** 483  
**Species:** Hatchery Rainbow Trout



**Site:** 483  
**Species:** Rainbow Trout



**Site:** 589  
**Species:** Brook Trout



Site: 654  
Species: Brook Trout

