

**SOUTH DAKOTA BLACK HILLS COLD STREAM SURVEY**  
**Castle Creek, Pennington County**  
**02-0071-00**  
**1999**

Table 1. Population and Biomass Estimates for Castle Creek

<b>Site Number:</b> 356	<b>Date Sampled:</b> 09/21/1999	<b>Conductivity (umhos/cm):</b>	321
<b>Site Midpoint (Latitude, Longitude):</b> 44.05717425, -103.76307493	<b>Site Length (m):</b> 114	<b>pH:</b>	9.3
<b>Survey Completed by:</b> South Dakota Game, Fish and Parks	<b>Mean Width (m):</b> 4.9	<b>Water Temperature (C):</b>	15.0
<b>Stream Classification:</b> BK1, BR1	<b>Number of Pass:</b> 4	<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)
Brook Trout	<200mm	99	105	113	99	2152	61	921	871	54.63	1482	133.2	28.4
Brook Trout	>=200mm	45	47	52	45	963	110	412	390	98.55	663	221.2	114.6
Brook Trout	All	144	153	163	144	3135	174	1342	1270	154.98	2159	160.7	55.4
Brown Trout	<200mm	153	163	173	153	3340	61	1430	1353	54.23	2301	104.6	18.2
Brown Trout	>=200mm	107	109	113	107	2234	430	956	905	383.81	1538	260.6	192.4
Brown Trout	All	260	271	281	261	5553	499	2377	2249	445.76	3825	168.8	89.9

<b>Site Number:</b> 384	<b>Date Sampled:</b> 09/20/1999	<b>Conductivity (umhos/cm):</b>	300
<b>Site Midpoint (Latitude, Longitude):</b> 44.04396904, -103.77363060	<b>Site Length (m):</b> 111	<b>pH:</b>	9.0
<b>Survey Completed by:</b> South Dakota Game, Fish and Parks	<b>Mean Width (m):</b> 4.6	<b>Water Temperature (C):</b>	10.7
<b>Stream Classification:</b> BK1, BR1	<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	76	101	133	76	2205	73	910	893	64.98	1464	136.1	33.0
Brook Trout	>=200mm	26	28	34	26	611	77	252	248	68.84	406	226.4	126.1
Brook Trout	All	102	129	158	102	2817	160	1162	1141	142.68	1870	159.1	56.7

Brown Trout	<200mm	34	39	49	34	852	15	351	345	13.17	565	105.7	17.3
Brown Trout	>=200mm	61	67	76	61	1463	408	604	592	364.31	971	284.4	278.9
Brown Trout	All	95	107	121	95	2336	431	964	946	384.44	1551	220.4	184.3

Site Number: 388

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

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK1, BR1

Date Sampled: 09/20/1999

Site Length (m): 100

Mean Width (m): 4.3

Number of Pass: 3

Conductivity (umhos/cm): 323

pH: 9.1

Water Temperature (C): 14.6

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)
Brook Trout	<200mm	78	81	86	78	1866	42	810	756	37.64	1303	117.6	22.6
Brook Trout	>=200mm	22	22	24	22	507	75	220	205	66.80	354	240.5	147.6
Brook Trout	All	103	106	111	103	2442	122	1060	989	109.23	1706	144.6	50.1
Brown Trout	<200mm	16	15	24	16	346	7	150	140	6.38	241	112.1	20.7
Brown Trout	>=200mm	53	53	54	53	1221	271	530	495	242.23	853	275.4	222.2
Brown Trout	All	69	75	84	69	1728	303	750	700	270.69	1207	237.5	175.4

Site Number: 396

Site Midpoint (Latitude, Longitude): 44.04066846, -103.77461137

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK1, BR1

Date Sampled: 09/22/1999

Site Length (m): 131

Mean Width (m): 4.7

Number of Pass: 3

Conductivity (umhos/cm): 330

pH: 9.1

Water Temperature (C): 15.1

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	109	116	125	109	2447	74	885	991	66.16	1425	131.9	30.3
Brook Trout	>=200mm	37	37	39	37	781	106	282	316	94.45	454	232.0	135.5
Brook Trout	All	146	154	163	146	3249	186	1176	1316	165.73	1891	157.3	57.1

Brown Trout	<200mm	15	19	31	15	401	18	145	162	16.44	233	154.4	45.9
Brown Trout	>=200mm	50	63	83	50	1329	305	481	538	272.57	774	275.0	229.7
Brown Trout	All	65	86	115	65	1814	344	656	735	306.96	1056	247.2	189.5

**Site Number:** 407  
**Site Midpoint (Latitude, Longitude):** 44.03301361, -103.77614426  
**Survey Completed by:** South Dakota Game, Fish and Parks  
**Stream Classification:** BK1, BR1, RB2

**Date Sampled:** 09/22/1999      **Conductivity (umhos/cm):** 307  
**Site Length (m):** 105      **pH:** 8.9  
**Mean Width (m):** 3.9      **Water Temperature (C):** 13.6  
**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	117	124	133	117	3212	57	1181	1301	50.99	1900	109.1	17.8
Brook Trout	>=200mm	53	55	59	53	1425	242	524	577	216.30	843	244.7	170.0
Brook Trout	All	171	181	191	171	4689	306	1724	1899	273.15	2774	151.4	65.2
Brown Trout	<200mm	1	1	1	1	26	2	10	10	1.57	15	191.0	68.0
Brown Trout	>=200mm	30	31	34	30	803	291	295	325	259.87	475	318.1	362.4
Brown Trout	All	32	32	34	32	829	293	305	336	261.22	490	314.0	352.9
Rainbow Trout	>=200mm	1	1	1	1	26	7	10	10	6.06	15	300.0	262.0
Rainbow Trout	All	1	1	1	1	26	7	10	10	6.06	15	300.0	262.0

**Site Number:** 411  
**Site Midpoint (Latitude, Longitude):** 44.03210666, -103.77970750  
**Survey Completed by:** South Dakota Game, Fish and Parks  
**Stream Classification:** BK1, BR3

**Date Sampled:** 09/21/1999      **Conductivity (umhos/cm):** 311  
**Site Length (m):** 118      **pH:** 8.7  
**Mean Width (m):** 5.7      **Water Temperature (C):** 11.7  
**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	112	123	135	112	2165	73	1042	877	64.86	1677	134.7	33.5

Brook Trout	>=200mm	55	55	56	55	968	153	466	392	136.29	750	238.6	157.6
Brook Trout	All	167	174	182	167	3063	228	1475	1241	203.54	2373	168.9	74.4
Brown Trout	>=200mm	1	1	2	1	18	6	8	7	5.16	14	307.0	328.0
Brown Trout	All	1	1	2	1	18	6	8	7	5.16	14	307.0	328.0

Site Number: 417

Site Midpoint (Latitude, Longitude): 44.03016917, -103.78286708

Survey Completed by: South Dakota Game, Fish and Parks

Stream Classification: BK1, BR2

Date Sampled: 09/27/1999

Site Length (m): 111

Mean Width (m): 5.9

Number of Pass: 3

Conductivity (umhos/cm): 308

pH: 9.1

Water Temperature (C): 12.3

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	72	72	74	72	1220	69	649	494	61.26	1044	167.6	56.2
Brook Trout	>=200mm	188	189	191	188	3203	579	1703	1297	517.29	2740	249.4	180.9
Brook Trout	All	260	262	265	260	4441	650	2360	1798	580.24	3798	226.7	146.3
Brown Trout	>=200mm	16	16	16	16	271	75	144	110	67.12	232	291.8	277.2
Brown Trout	All	16	16	16	16	271	75	144	110	67.12	232	291.8	277.2
Hatchery Rainbow Trout	>=200mm	1	1	1	1	17	6	9	7	5.05	14	304.0	334.0
Hatchery Rainbow Trout	All	1	1	1	1	17	6	9	7	5.05	14	304.0	334.0

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, 1989-1999

**Site 356**

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Oct 16, 1992	71	71-72	
	Oct 13, 1993	80	71-92	
	Nov 08, 1994	167	165-171	
	Sep 06, 1995	50	50-52	
	Sep 24, 1996	71	72-83	
	Sep 12, 1997	77	65-93	
	Sep 29, 1998	54	50-61	

Brook Trout <200mm	Sep 21, 1999	105	99-113	
Brook Trout >=200mm	Oct 16, 1992	3	3-3	BK2
	Oct 13, 1993	5	5-5	BK2
	Nov 08, 1994	7	7-7	BK2
	Sep 06, 1995	7	7-8	BK2
	Sep 24, 1996	8	8-10	BK2
	Sep 12, 1997	23	11-82	BK1
	Sep 29, 1998	8	8-9	BK2
	Sep 21, 1999	47	45-52	BK1
Brown Trout <200mm	Oct 16, 1992	86	84-90	
	Oct 13, 1993	58	57-61	
	Nov 08, 1994	59	59-61	
	Sep 06, 1995	21	21-22	
	Sep 24, 1996	18	14-30	
	Sep 12, 1997	123	109-138	
	Sep 29, 1998	91	80-105	

Brown Trout <200mm	Sep 21, 1999	163	153-173	
Brown Trout >=200mm	Oct 16, 1992	23	23-24	BR1
	Oct 13, 1993	25	25-25	BR1
	Nov 08, 1994	24	24-24	BR1
	Sep 06, 1995	30	30-30	BR1
	Sep 24, 1996	17	17-19	BR1
	Sep 12, 1997	14	13-19	BR2
	Sep 29, 1998	40	40-41	BR1
	Sep 21, 1999	109	107-113	BR1

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**Site 384**

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<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	
	Nov 07, 1994	81	81-83	
	Sep 05, 1995	60	59-63	
	Sep 16, 1996	30	30-32	

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Brook Trout <200mm	Sep 12, 1997	65	49-90	
	Sep 23, 1998	95	77-117	
	Sep 20, 1999	101	76-133	
Brook Trout >=200mm	Oct 14, 1992	11	11-12	BK2
	Oct 12, 1993	21	21-21	BK1
	Nov 07, 1994	12	12-13	BK2
	Sep 05, 1995	30	30-31	BK1
	Sep 16, 1996	25	25-27	BK1
	Sep 12, 1997	24	23-28	BK1
	Sep 23, 1998	38	34-46	BK1
	Sep 20, 1999	28	26-34	BK1
Brown Trout <200mm	Oct 14, 1992	13	13-14	
	Oct 12, 1993	38	37-41	
	Nov 07, 1994	10	10-10	
	Sep 05, 1995	6	6-8	
	Sep 16, 1996	4	4-5	



Brown Trout <200mm	Sep 12, 1997	28	13-95	
	Sep 23, 1998	41	29-67	
	Sep 20, 1999	39	34-49	
Brown Trout >=200mm	Oct 14, 1992	34	32-39	BR1
	Oct 12, 1993	29	29-30	BR1
	Nov 07, 1994	47	43-55	BR1
	Sep 05, 1995	43	43-45	BR1
	Sep 16, 1996	32	29-39	BR1
	Sep 12, 1997	33	27-46	BR1
	Sep 23, 1998	40	40-41	BR1
	Sep 20, 1999	67	61-76	BR1

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**Site 388**

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<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	
	Nov 07, 1994	67	67-68	

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Brook Trout <200mm	Sep 05, 1995	69	63-78	
	Sep 16, 1996	41	34-54	
	Sep 16, 1997	32	32-34	
	Sep 23, 1998	88	61-128	
	Sep 20, 1999	81	78-86	
Brook Trout >=200mm	Oct 14, 1992	16	12-30	BK2
	Oct 12, 1993	14	14-15	BK2
	Nov 07, 1994	34	34-35	BK1
	Sep 05, 1995	35	35-36	BK1
	Sep 16, 1996	12	12-12	BK2
	Sep 16, 1997	16	14-23	BK2
	Sep 23, 1998	39	32-53	BK1
	Sep 20, 1999	22	22-24	BK1
Brown Trout <200mm	Oct 14, 1992	10	10-10	
	Oct 12, 1993	17	17-19	
	Nov 07, 1994	10	10-10	

Brown Trout <200mm	Sep 05, 1995	2	2-2	
	Sep 16, 1997	3	4-5	
	Sep 23, 1998	21	20-25	
	Sep 20, 1999	15	16-24	
Brown Trout >=200mm	Oct 14, 1992	27	27-28	BR1
	Oct 12, 1993	33	33-35	BR1
	Nov 07, 1994	31	31-32	BR1
	Sep 05, 1995	26	25-30	BR1
	Sep 16, 1996	22	21-26	BR1
	Sep 16, 1997	2	2-6	BR3
	Sep 23, 1998	24	24-26	BR1
	Sep 20, 1999	53	53-54	BR1

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**Site 396**

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<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Sep 17, 1996	20	19-24	
	Sep 16, 1997	61	62-73	

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Brook Trout <200mm	Sep 24, 1998	153	104-209	
	Sep 22, 1999	116	109-125	
Brook Trout >=200mm	Sep 17, 1996	31	31-32	BK1
	Sep 16, 1997	10	11-16	BK2
	Sep 24, 1998	45	43-50	BK1
	Sep 22, 1999	37	37-39	BK1
Brown Trout <200mm	Sep 16, 1997	17	18-22	
	Sep 24, 1998	39	28-63	
	Sep 22, 1999	19	15-31	
Brown Trout >=200mm	Sep 17, 1996	20	20-20	BR1
	Sep 16, 1997	13	13-14	BR2
	Sep 24, 1998	27	24-34	BR1
	Sep 22, 1999	63	50-83	BR1

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**Site 407**

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<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Sep 18, 1996	57	48-71	

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Brook Trout <200mm	Sep 17, 1997	73	59-92	
	Sep 24, 1998	126	116-137	
	Sep 22, 1999	124	117-133	
Brook Trout >=200mm	Sep 18, 1996	23	23-25	BK1
	Sep 17, 1997	15	14-19	BK2
	Sep 24, 1998	40	40-42	BK1
	Sep 22, 1999	55	53-59	BK1
Brown Trout <200mm	Sep 18, 1996	2	2-6	
	Sep 17, 1997	2	2-3	
	Sep 24, 1998	6	6-6	
	Sep 22, 1999	1	1-1	
Brown Trout >=200mm	Sep 18, 1996	21	21-23	BR1
	Sep 17, 1997	11	11-13	BR2
	Sep 24, 1998	18	18-19	BR1
	Sep 22, 1999	31	30-34	BR1
Rainbow Trout >=200mm	Sep 22, 1999	1	1-1	RB2

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Sep 06, 1995	59	50-73	
	Sep 18, 1996	57	53-64	
	Sep 17, 1997	130	58-287	
	Sep 22, 1998	92	80-107	
	Sep 21, 1999	123	112-135	
Brook Trout >=200mm	Sep 06, 1995	10	10-10	BK2
	Sep 18, 1996	14	14-14	BK2
	Sep 17, 1997	19	17-25	BK2
	Sep 22, 1998	60	58-65	BK1
	Sep 21, 1999	55	55-56	BK1
Brown Trout <200mm	Sep 06, 1995	3	3-3	
	Sep 18, 1996	1	1-1	
	Sep 17, 1997	1	1-2	
	Sep 22, 1998	3	3-4	

Brown Trout >=200mm	Sep 18, 1996	6	6-7	BR2
	Sep 17, 1997	1	1-1	BR3
	Sep 22, 1998	3	3-3	BR3
	Sep 21, 1999	1	1-2	BR3
Rainbow Trout >=200mm	Sep 22, 1998	1	1-2	RB2

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**Site 417**

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<b>Species/Size</b>	<b>Date</b>	<b>Pop Est.</b>	<b>(95% C.I.)</b>	<b>Stream Classification</b>
Brook Trout <200mm	Sep 24, 1996	31	31-32	
	Sep 18, 1997	35	27-52	
	Sep 22, 1998	142	90-209	
	Sep 27, 1999	72	72-74	
Brook Trout >=200mm	Sep 24, 1996	104	104-106	BK1
	Sep 18, 1997	112	96-130	BK1
	Sep 22, 1998	150	131-169	BK1
	Sep 27, 1999	189	188-191	BK1
Brown Trout <200mm	Sep 22, 1998	1	1-1	

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Brown Trout >=200mm	Sep 24, 1996	8	8-8	BR2
	Sep 18, 1997	8	8-10	BR2
	Sep 22, 1998	4	4-6	BR2
	Sep 27, 1999	16	16-16	BR2
Hatchery Rainbow Trout >=200mm	Sep 27, 1999	1	1-1	

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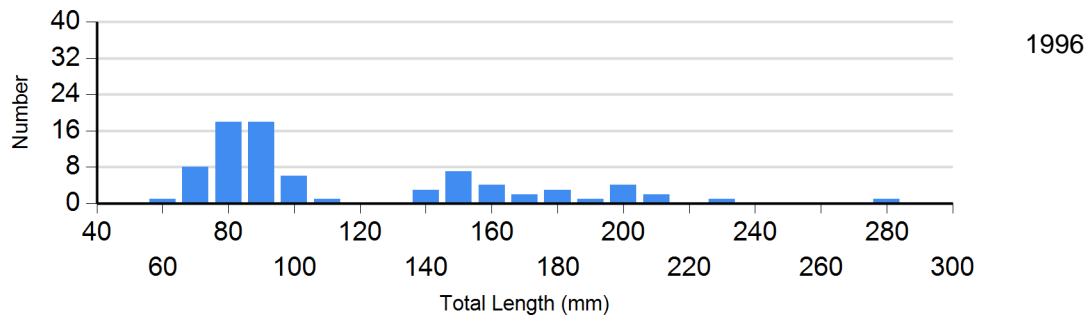
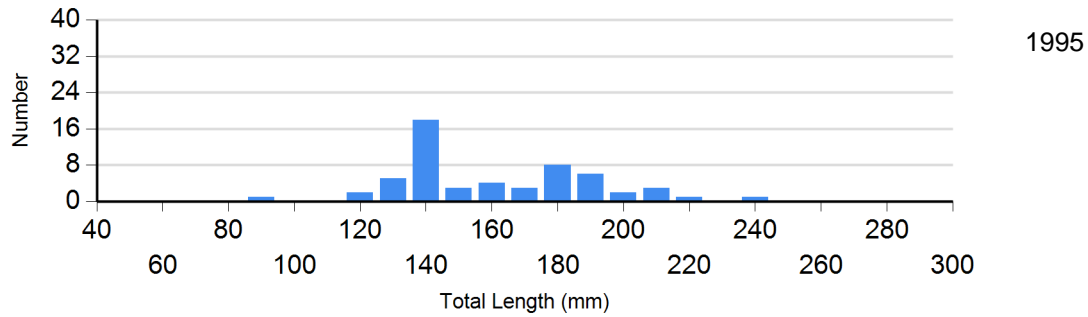
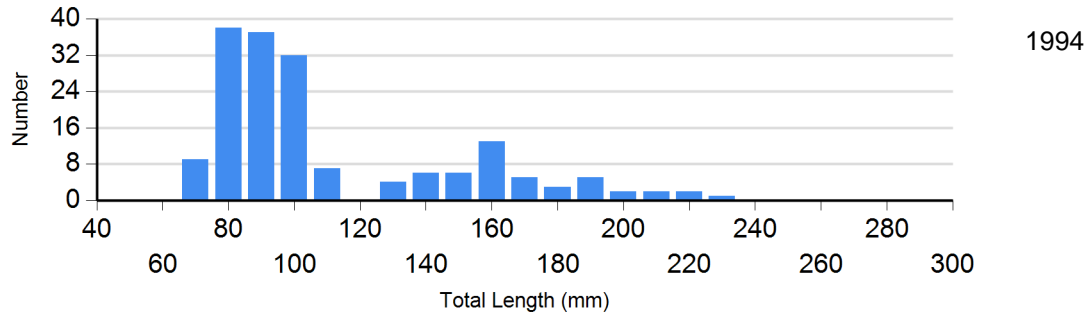


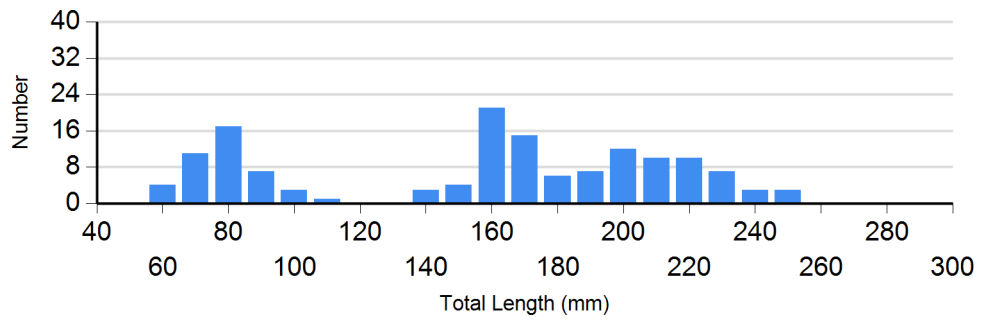
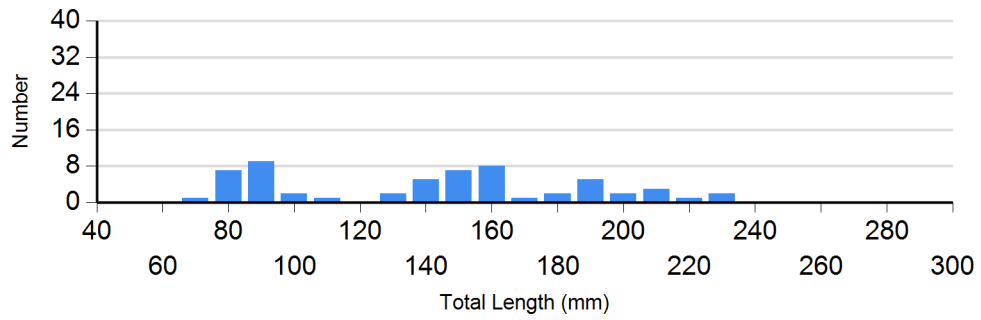
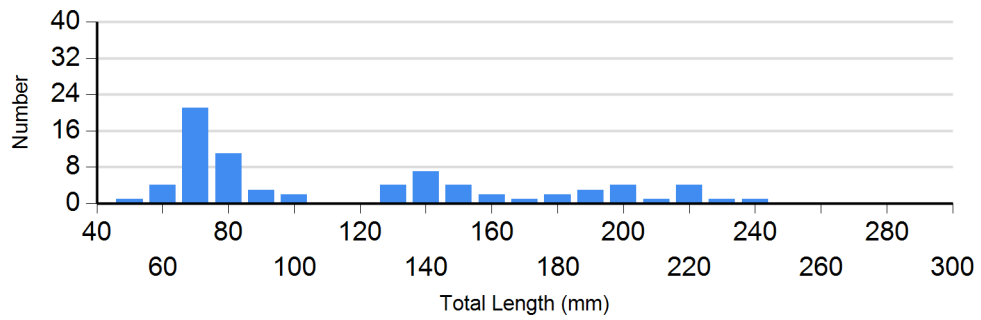
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

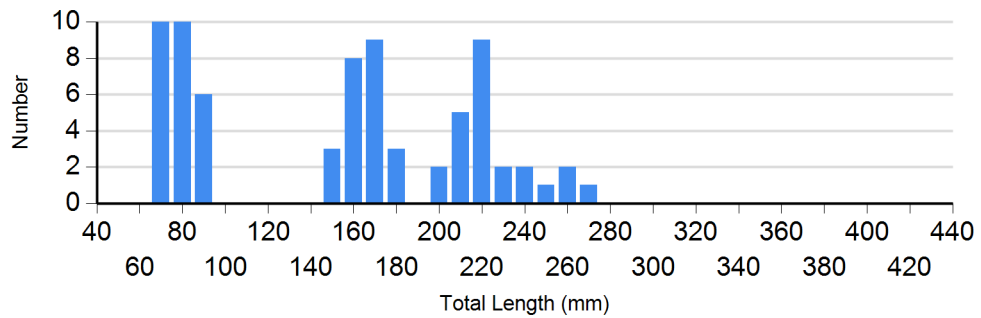
**Site:** 356

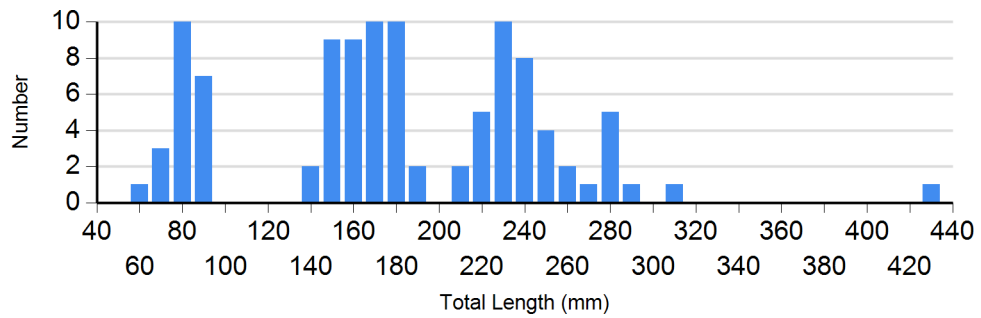
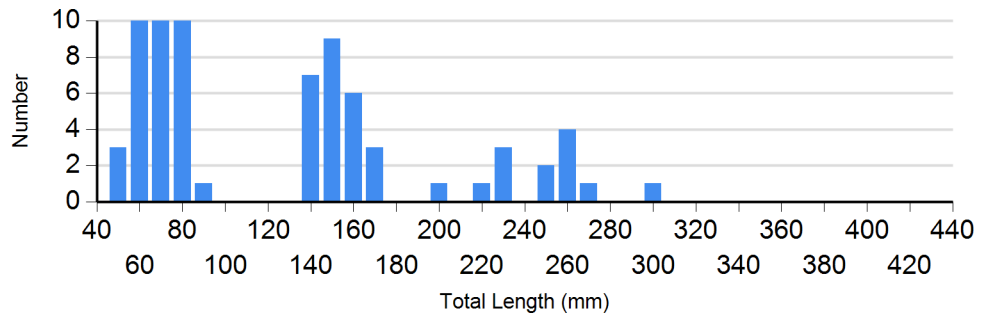
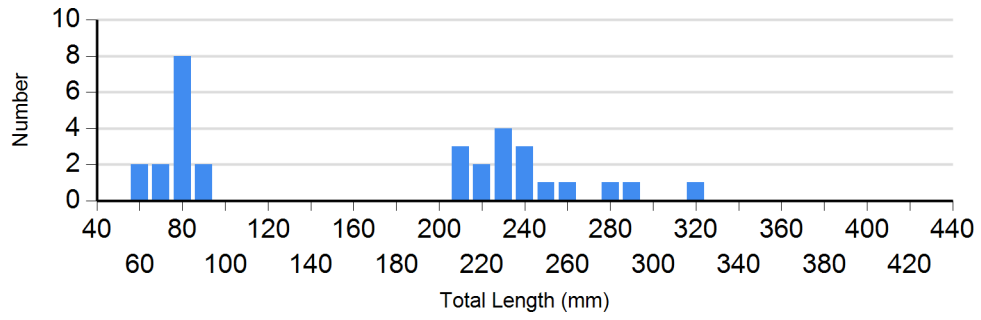
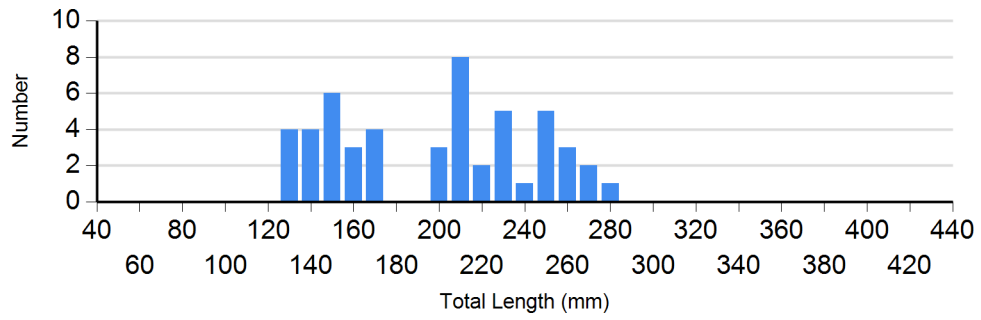
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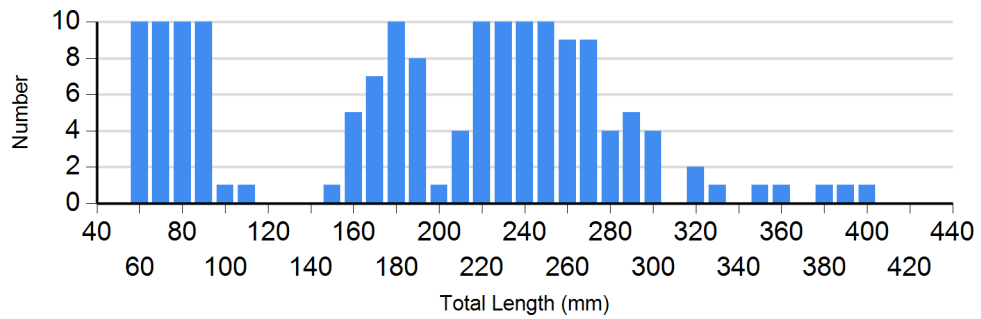




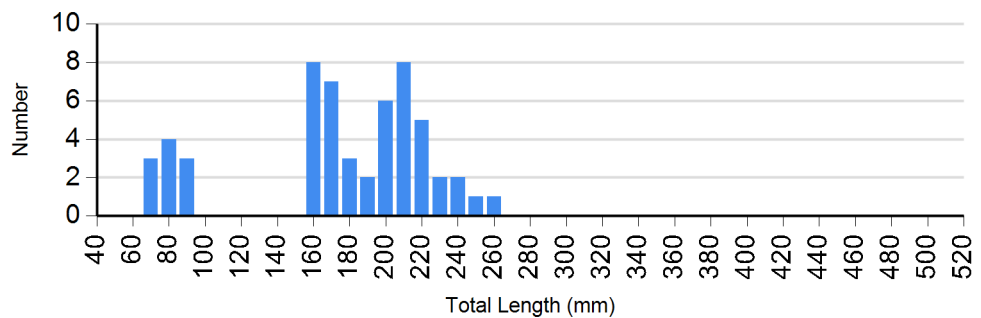
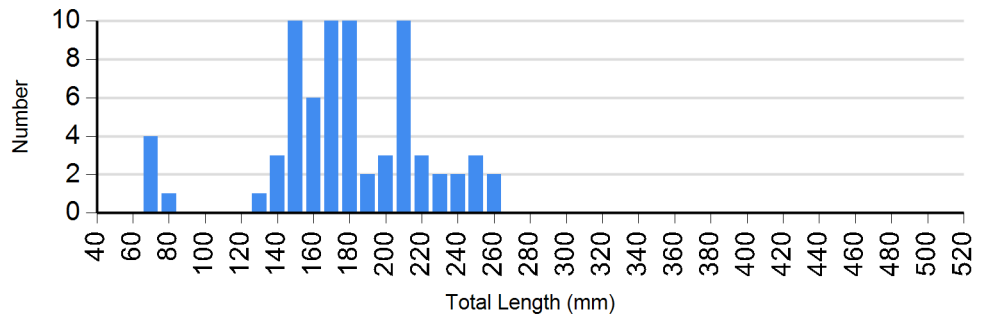
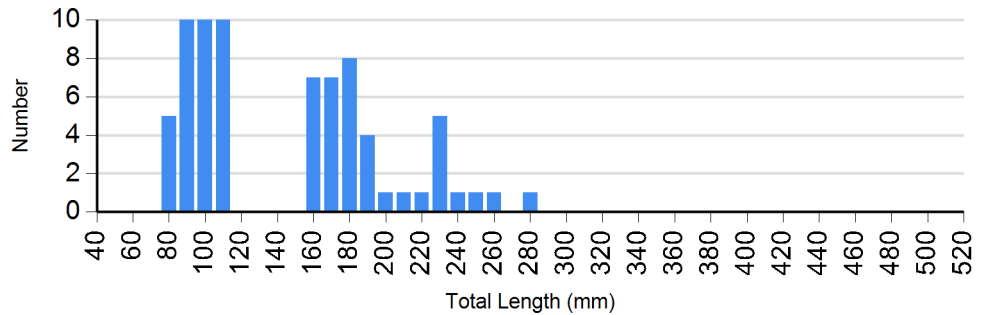
**Site:** 356  
**Species:** Brown Trout

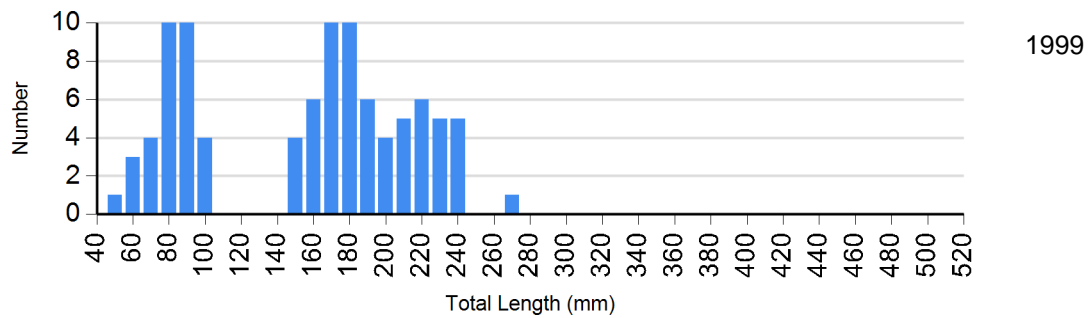
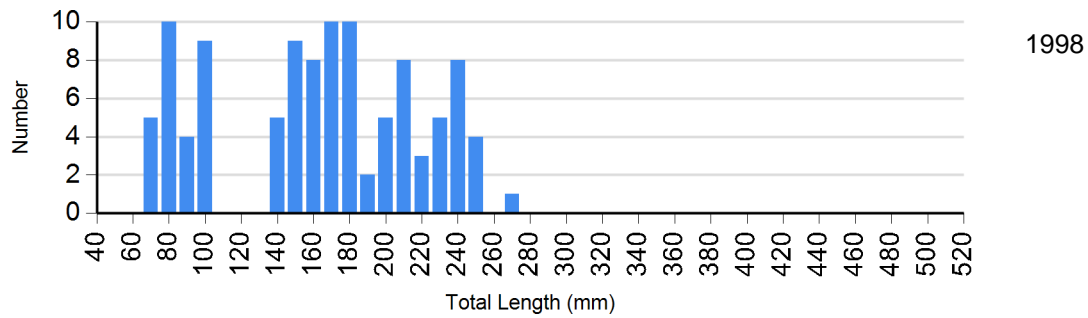
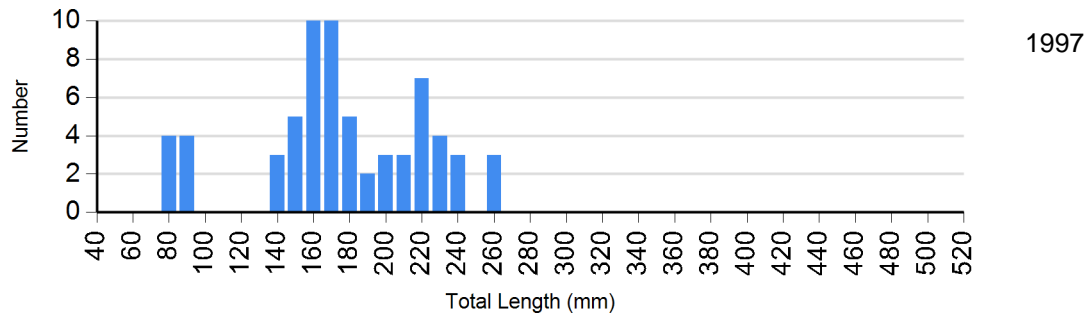




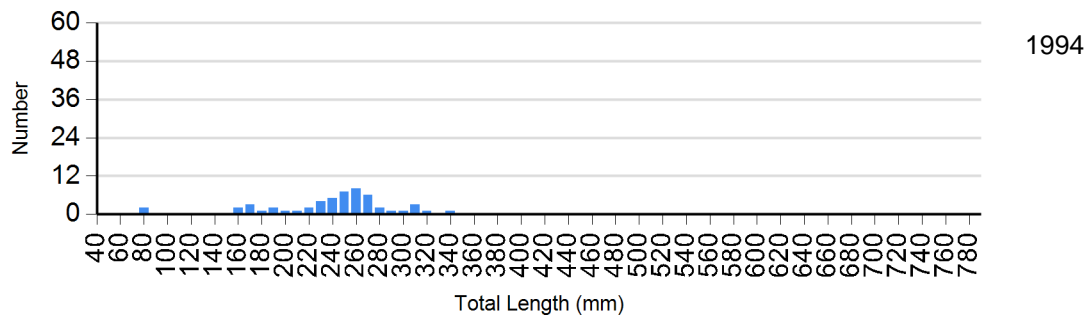


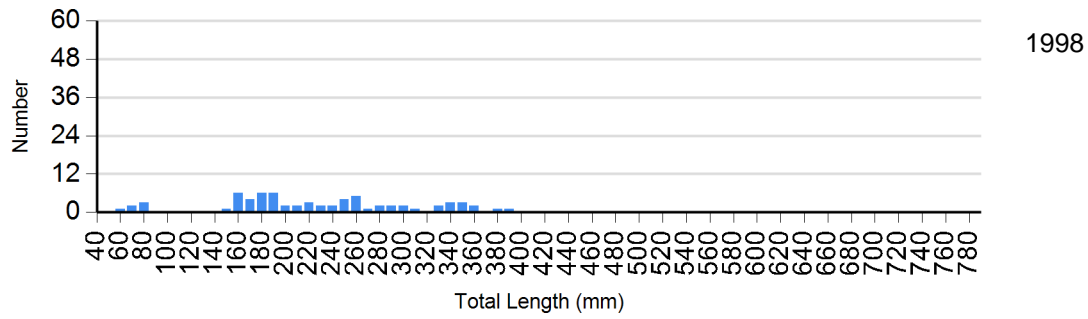
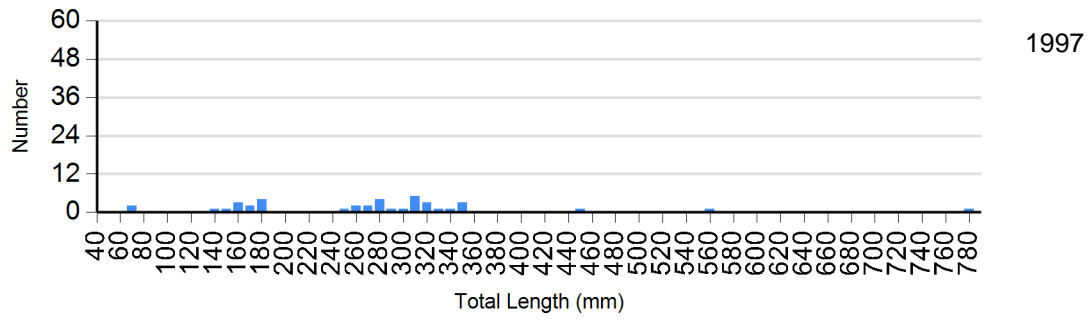
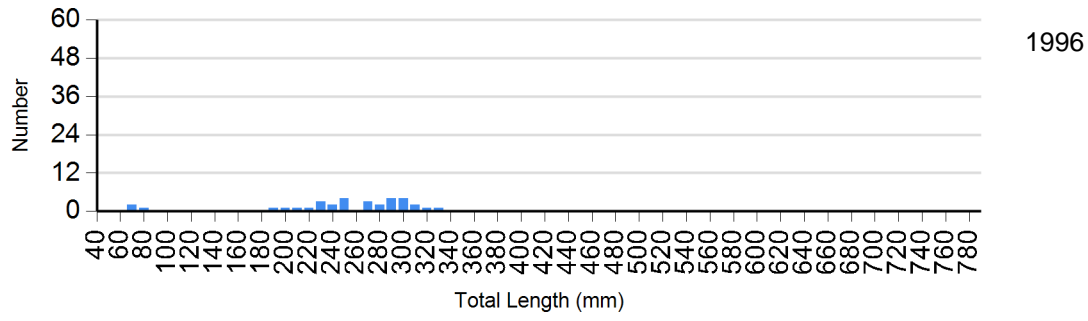
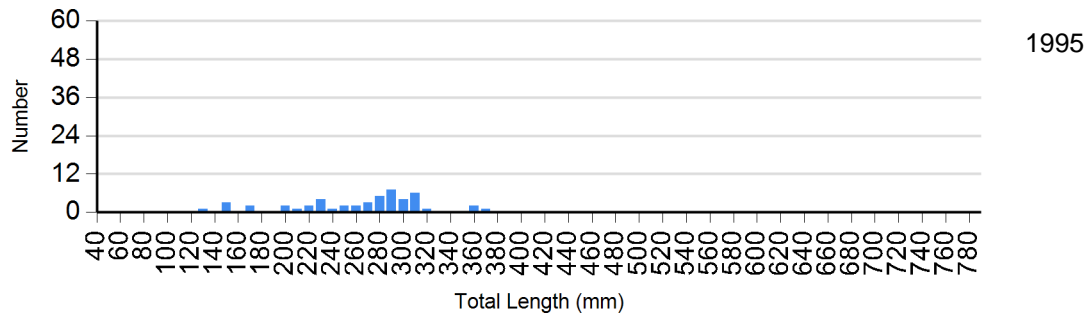
Site: 384  
Species: Brook Trout

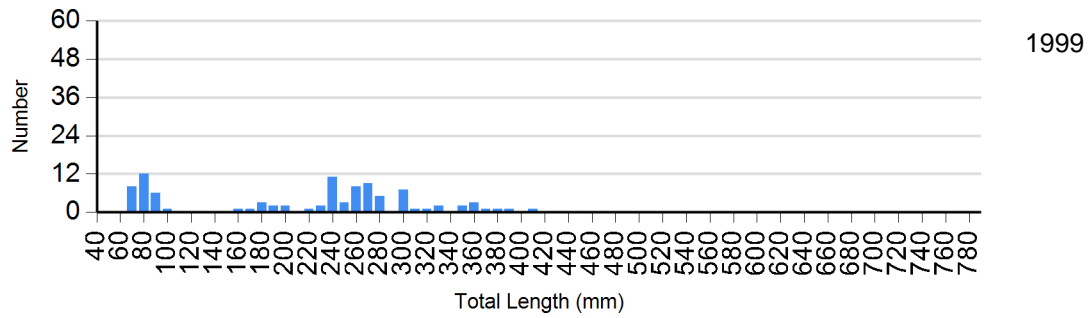




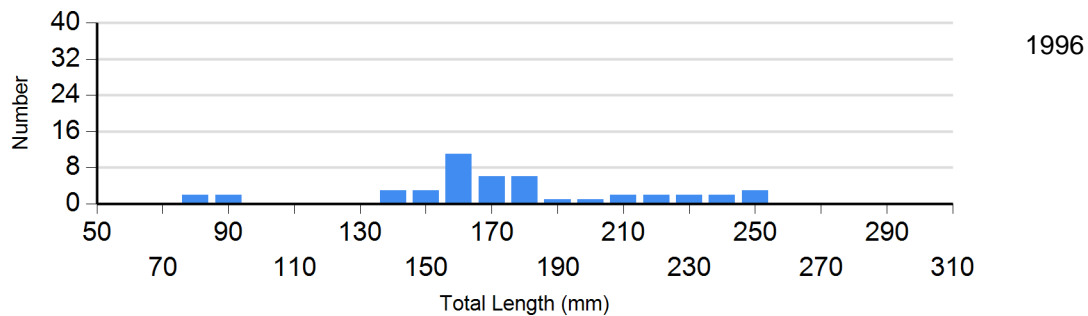
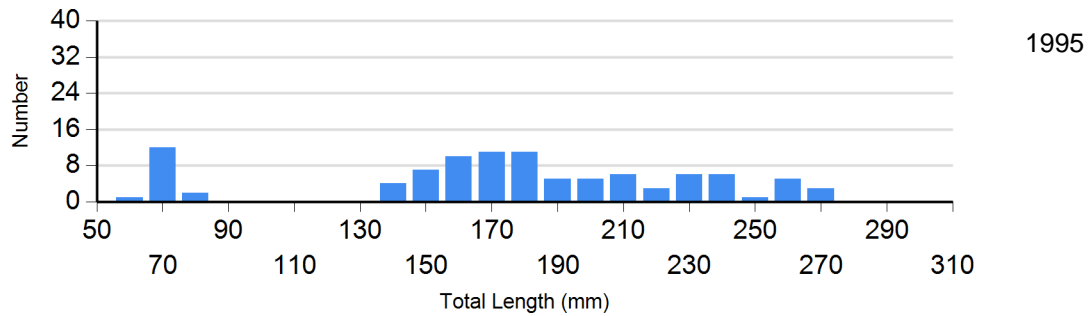
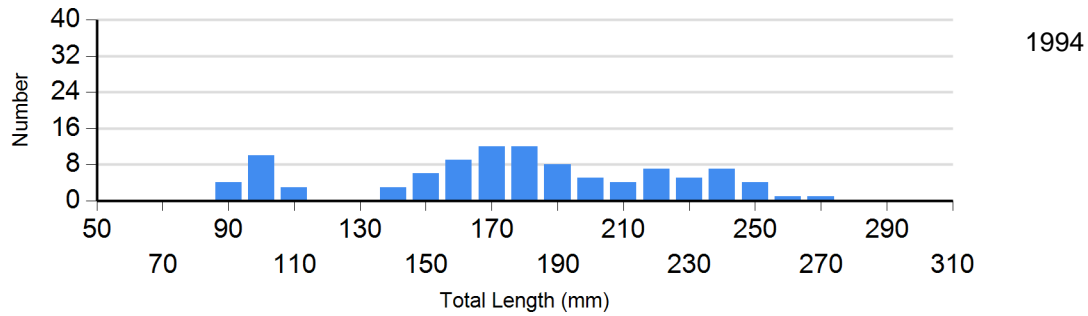
**Site:** 384  
**Species:** Brown Trout

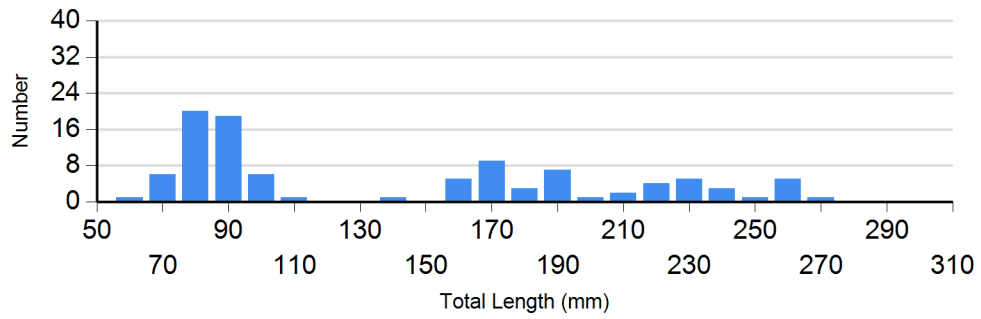
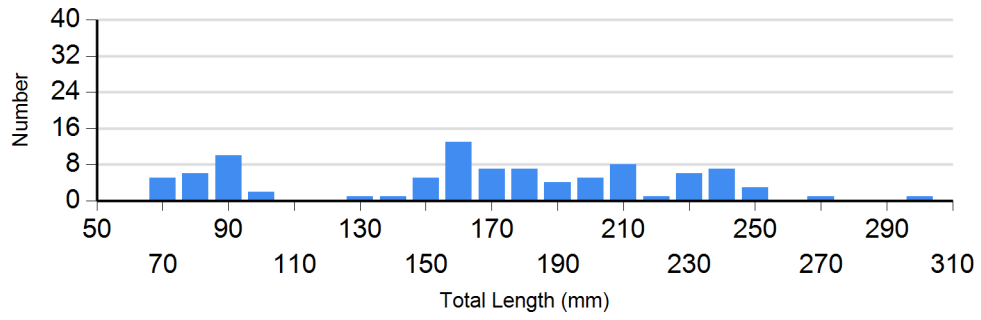
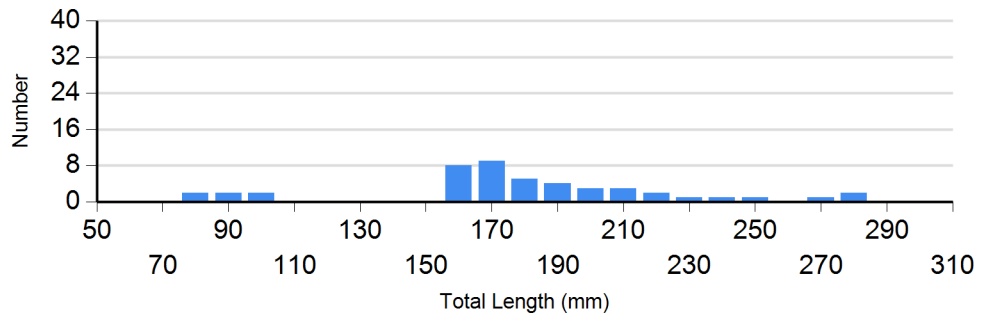




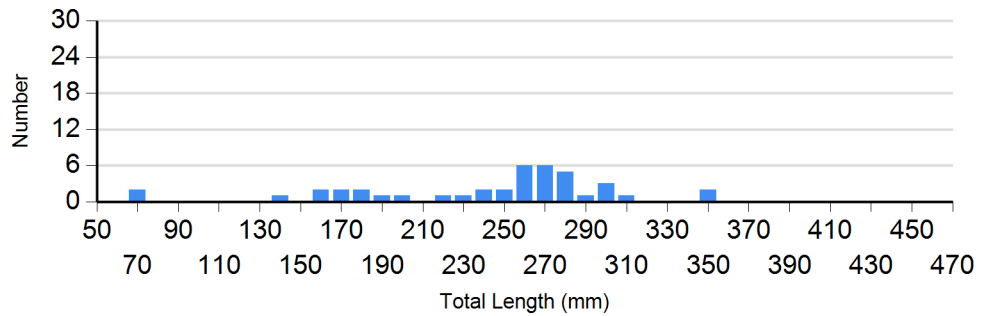


Site: 388  
Species: Brook Trout

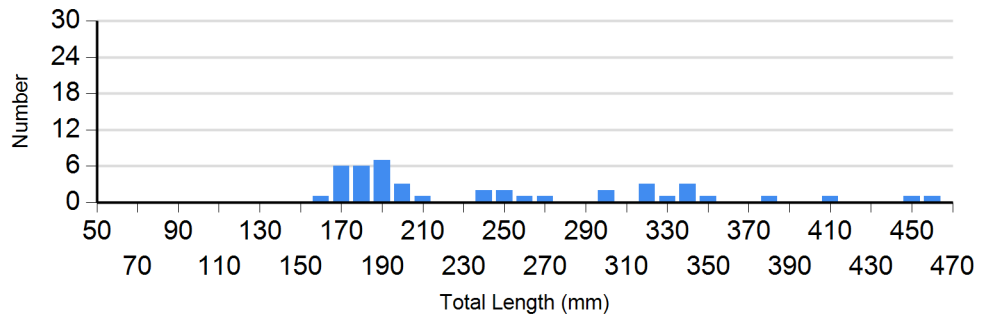
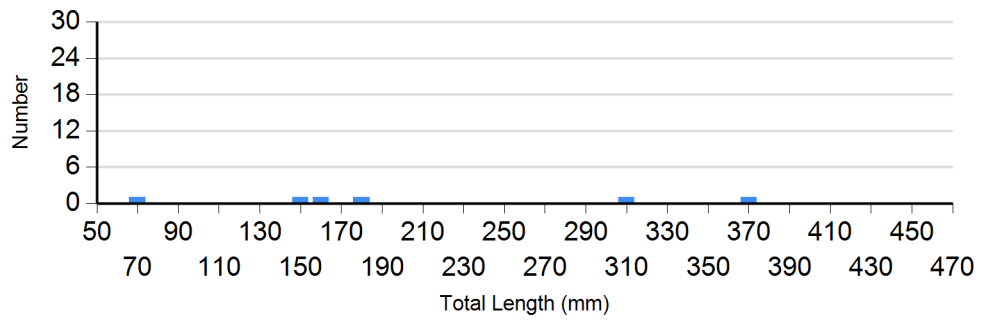
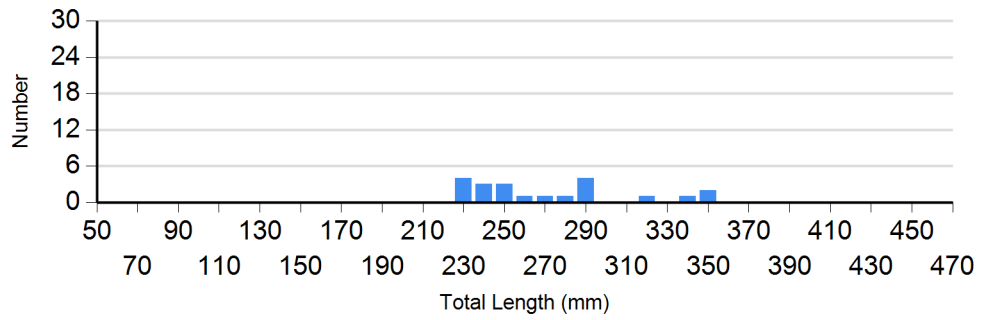
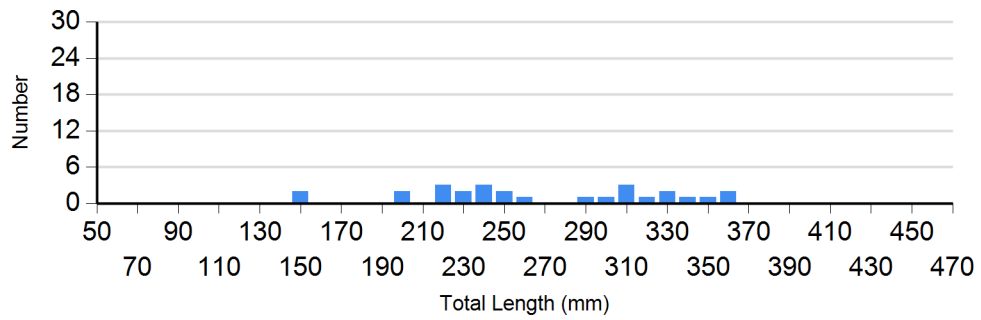


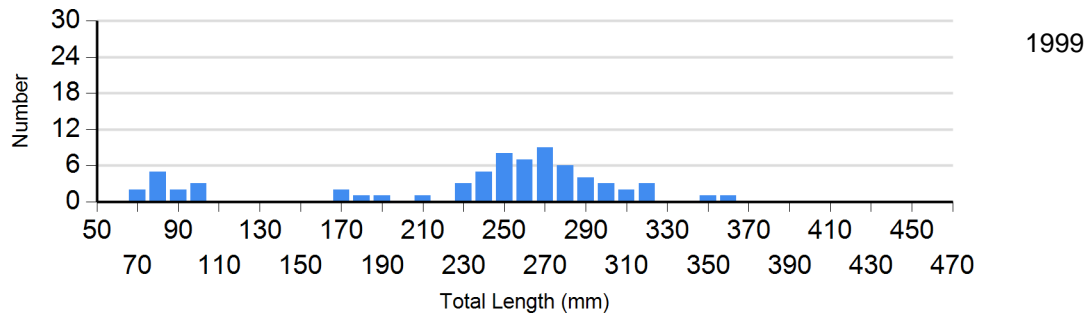


**Site:** 388  
**Species:** Brown Trout

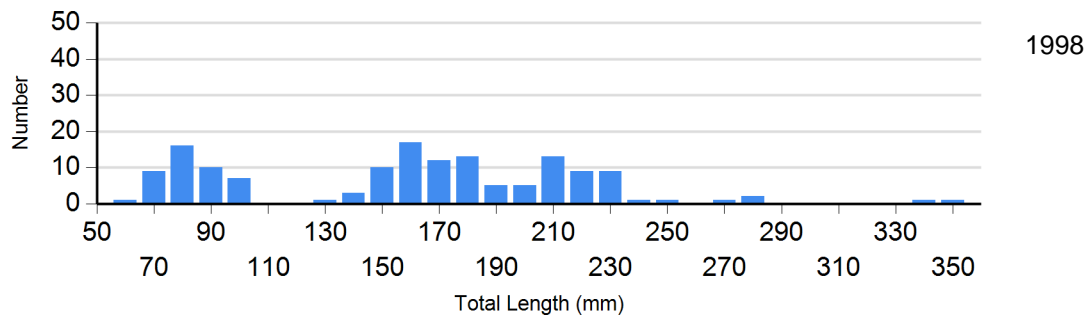
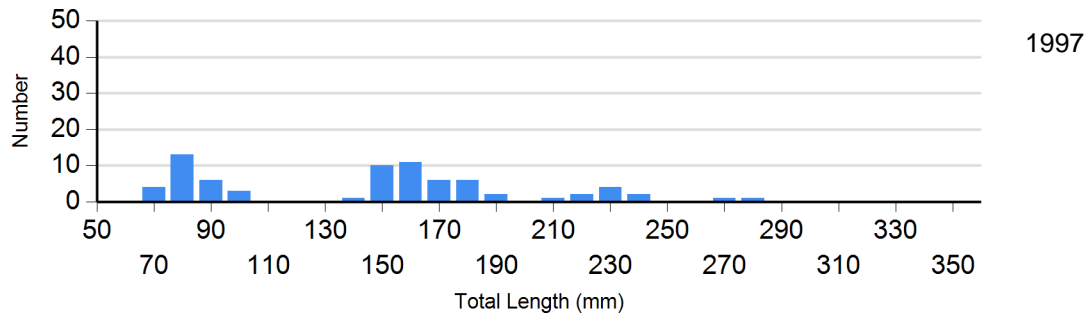
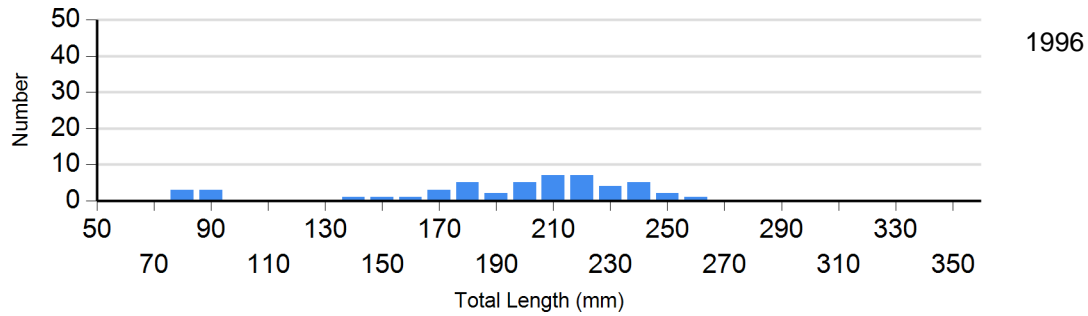


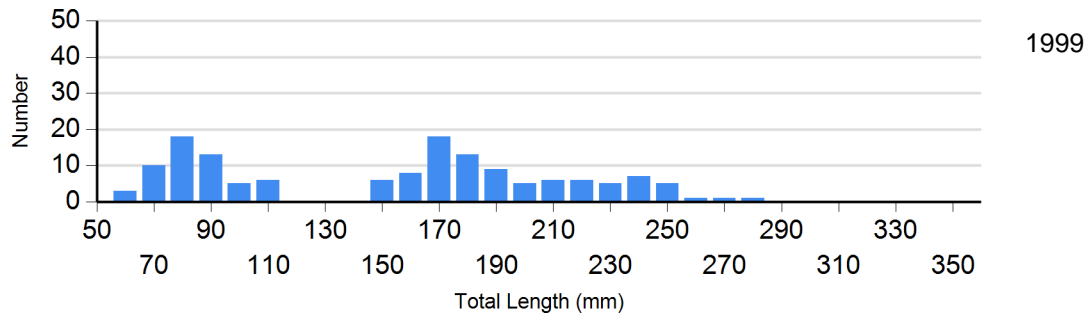




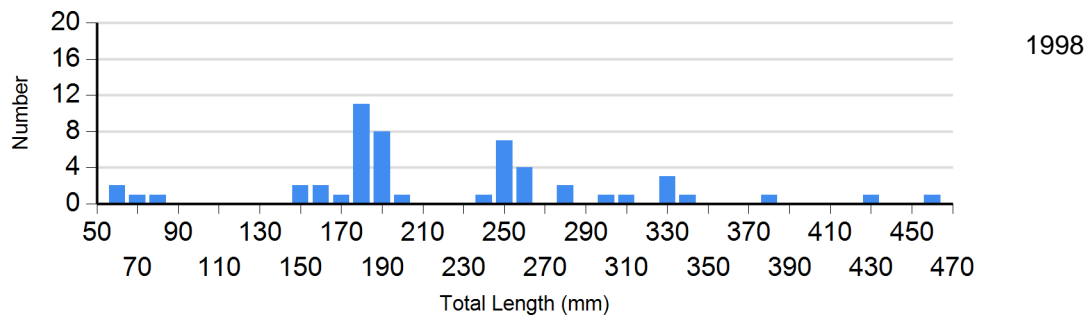
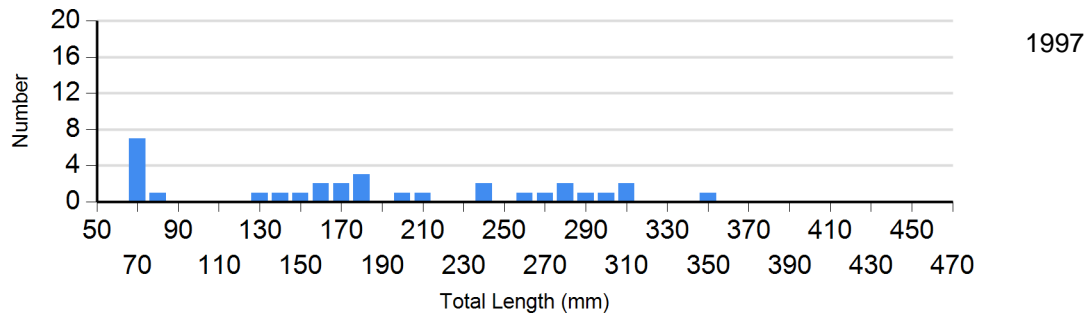
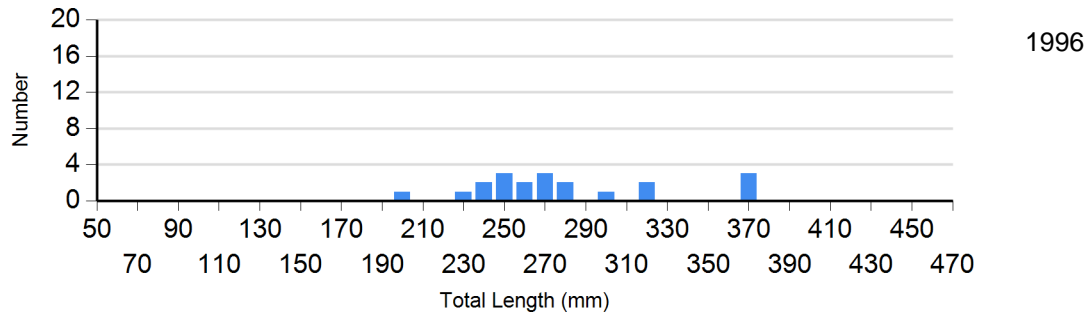


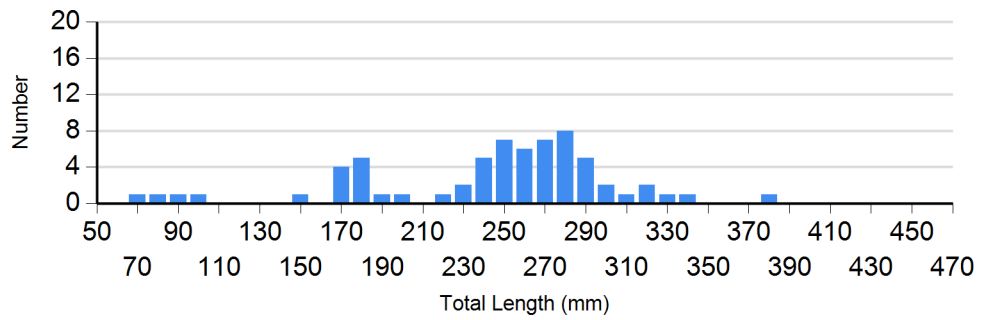
Site: 396  
Species: Brook Trout



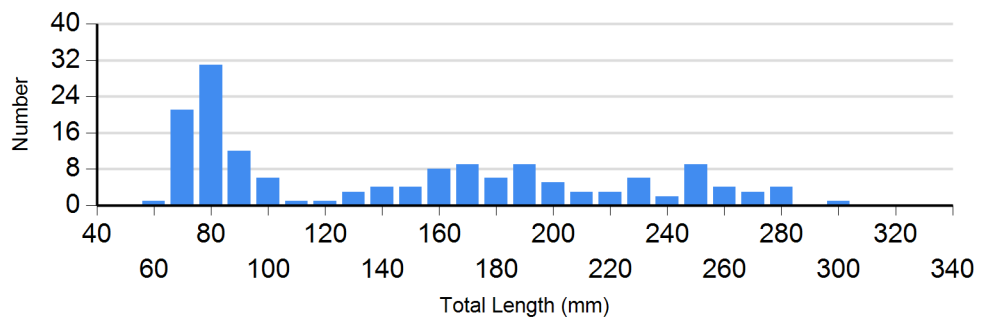
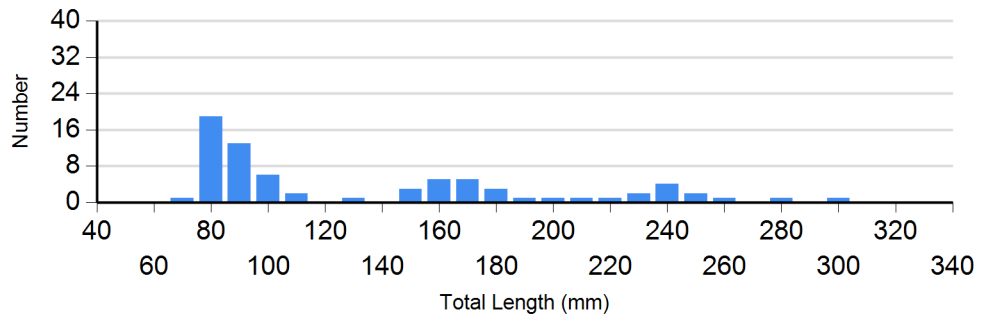
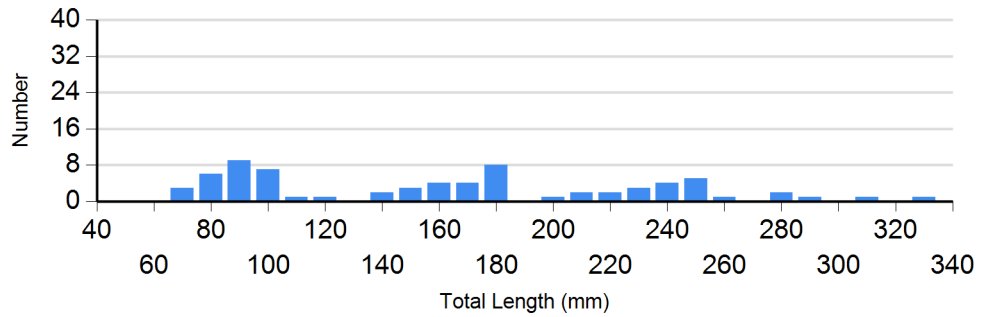


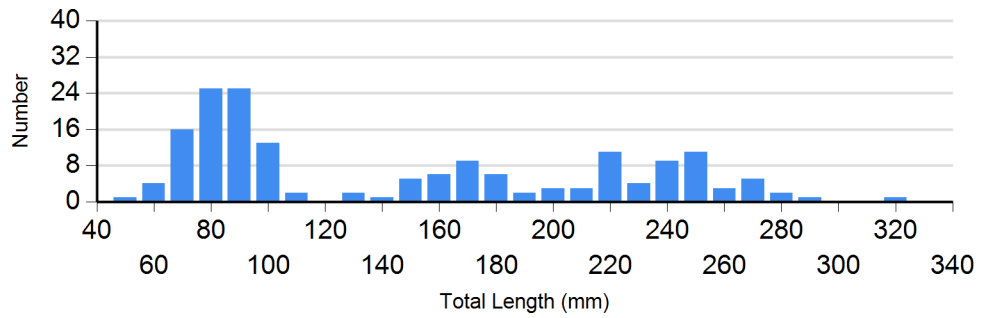
Site: 396  
Species: Brown Trout



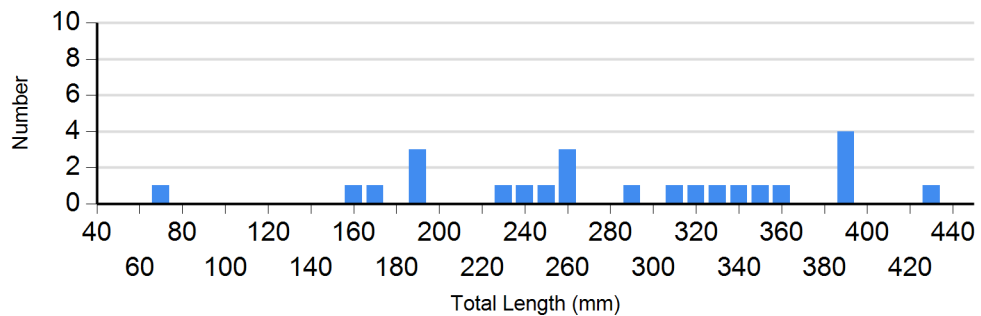
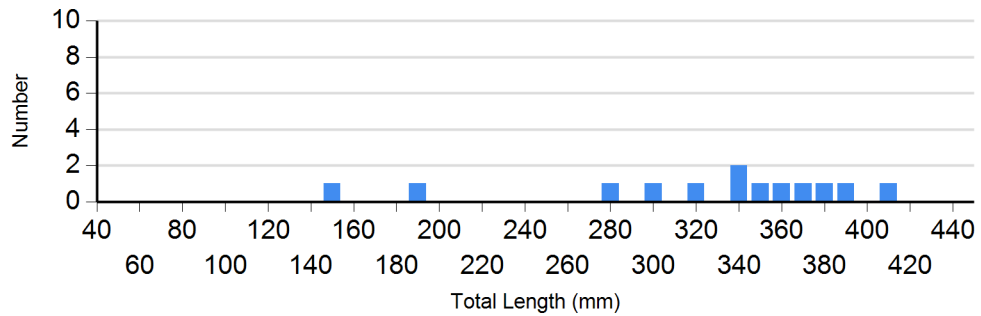
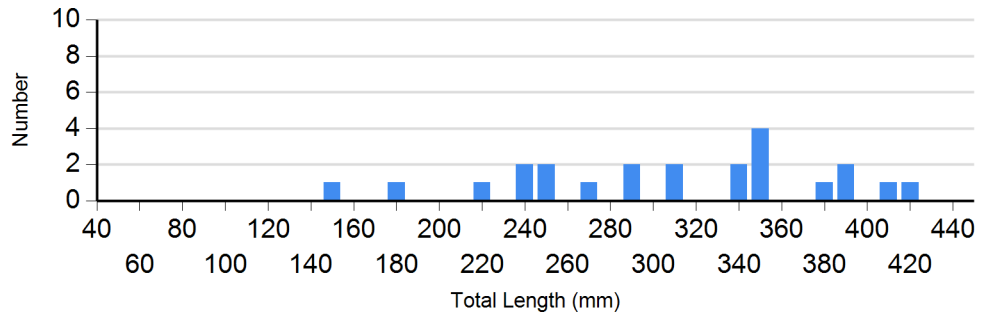


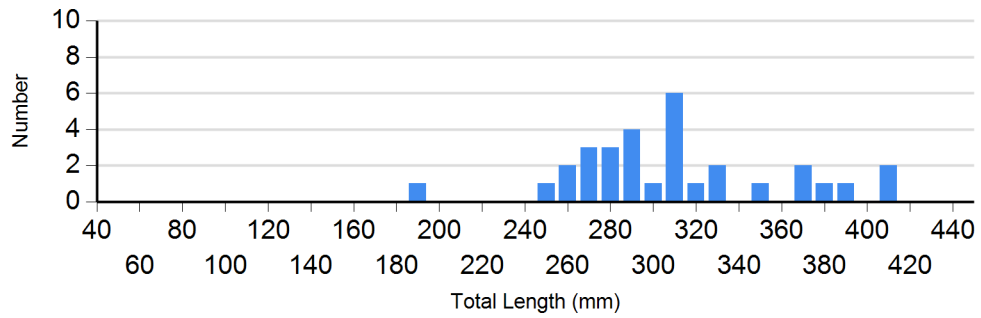
**Site:** 407  
**Species:** Brook Trout



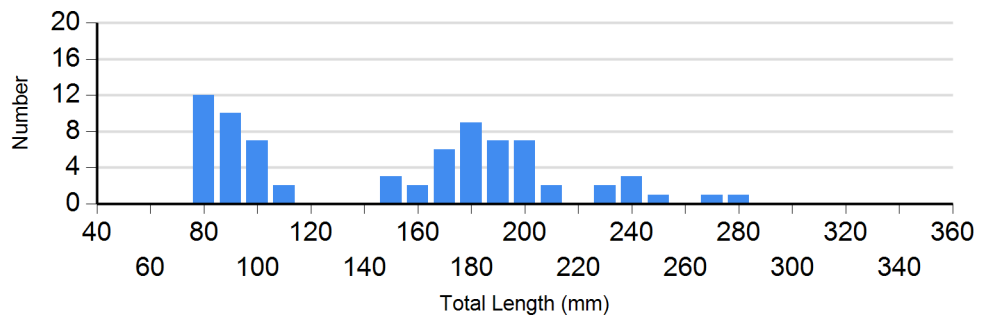
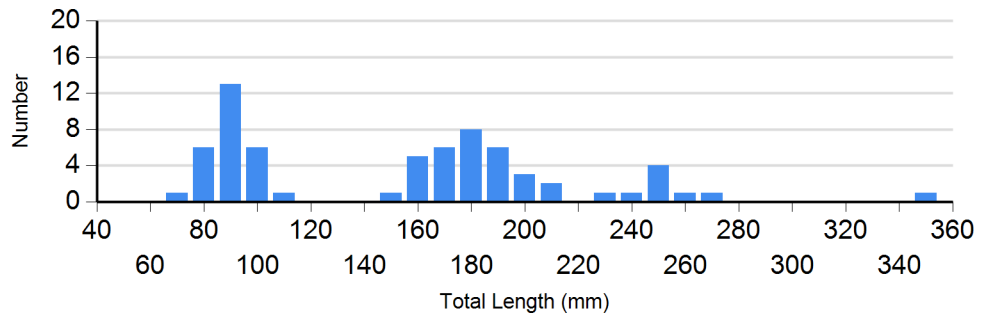
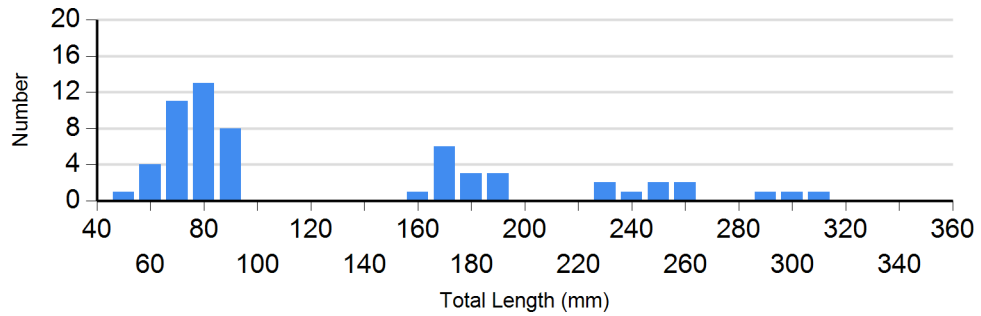


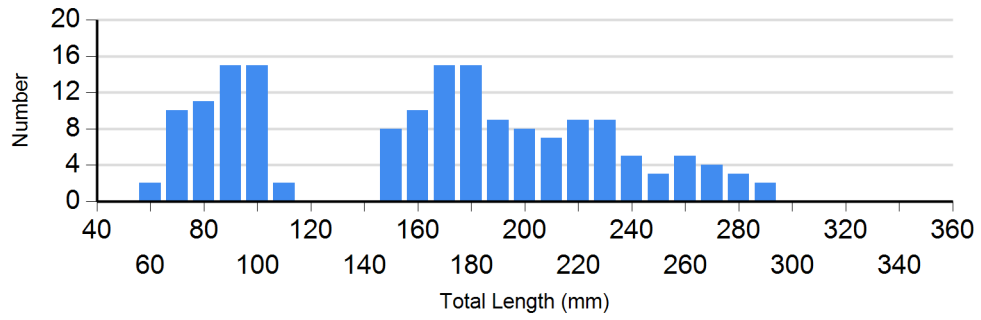
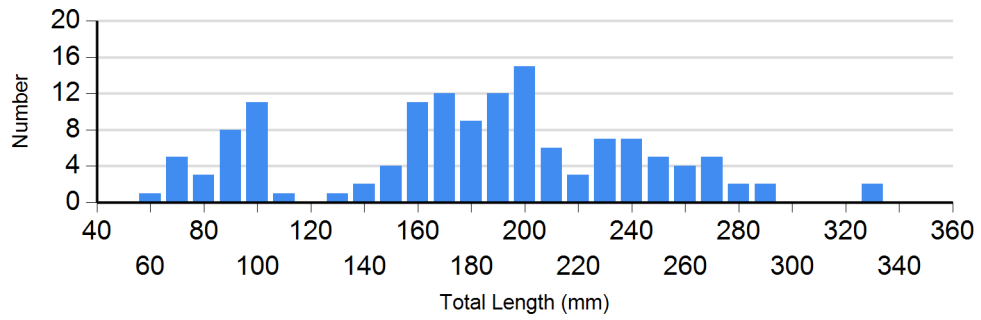
Site: 407  
Species: Brown Trout



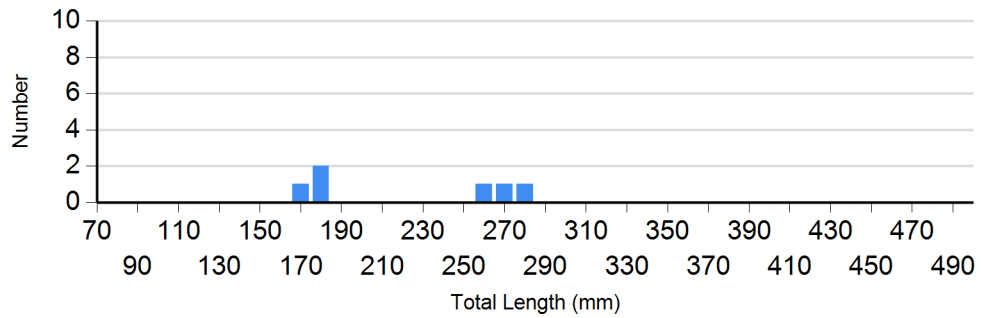
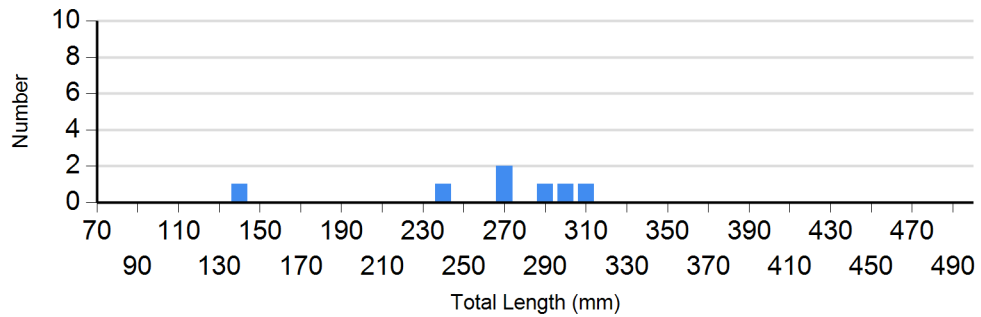


Site: 411  
Species: Brook Trout

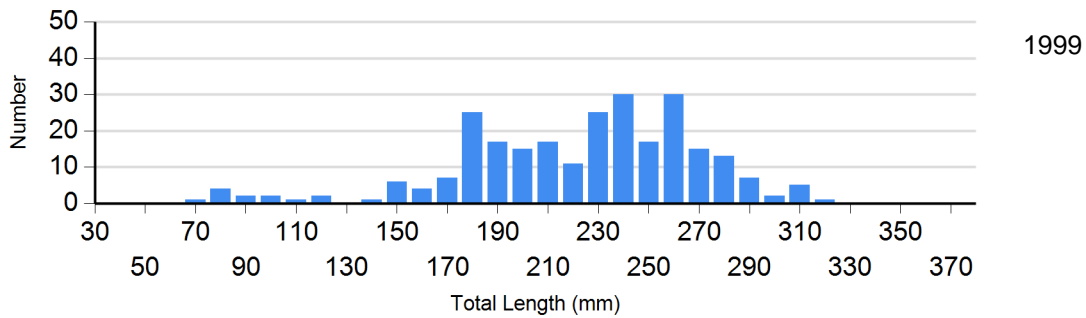
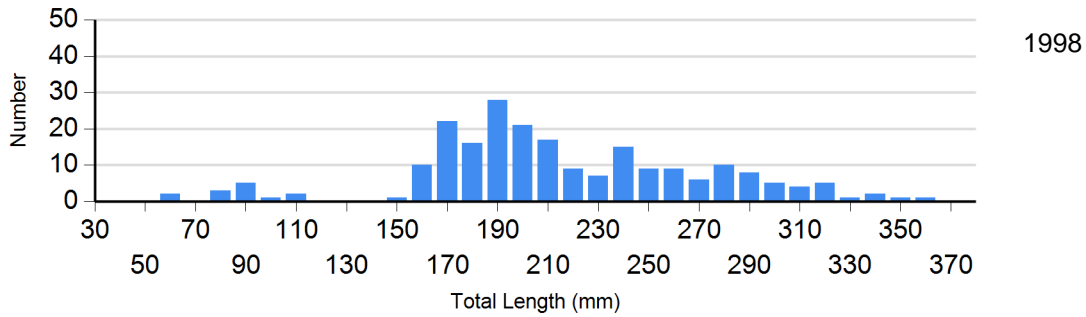
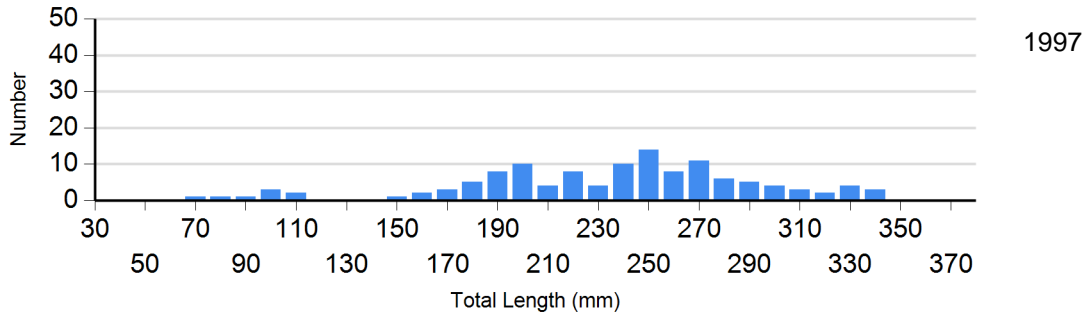
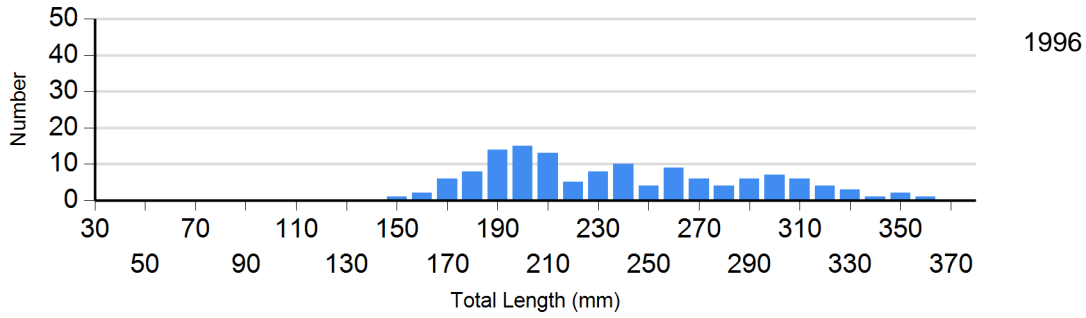




**Site:** 411  
**Species:** Brown Trout



Site: 417  
Species: Brook Trout





Site: 417  
Species: Brown Trout

