

SOUTH DAKOTA BLACK HILLS COLD STREAM SURVEY
Spearfish Creek, Lawrence County
09-0021-00
1996

Table 1. Population and Biomass Estimates for Spearfish Creek

Site Number: 174	Date Sampled: 10/07/1996	Conductivity (umhos/cm): 295
Site Midpoint (Latitude, Longitude): 44.50196266, -103.86743501	Site Length (m): 100	pH: 8.6
Survey Completed by: South Dakota Game, Fish and Parks	Mean Width (m): 6.6	Water Temperature (C): 10.0
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	96	106	118	96	1606	23	1060	650	20.20	1706	102.3	14.1
Brown Trout	>=200mm	69	71	75	69	1076	234	710	436	209.36	1142	274.0	218.0
Brown Trout	All	165	176	187	165	2667	265	1760	1080	236.54	2832	174.1	99.3

Site Number: 190	Date Sampled: 10/09/1996	Conductivity (umhos/cm): 268
Site Midpoint (Latitude, Longitude): 44.48929462, -103.86435821	Site Length (m): 100	pH: 8.8
Survey Completed by: South Dakota Game, Fish and Parks	Mean Width (m): 7.7	Water Temperature (C): 8.0
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	174	190	204	176	2474	14	1900	1002	12.38	3057	83.7	5.6
Brown Trout	>=200mm	53	58	66	53	755	164	580	306	146.73	933	270.7	217.6
Brown Trout	All	227	249	266	232	3242	179	2490	1313	159.51	4006	127.4	55.1

Site Number: 205	Date Sampled: 10/07/1996	Conductivity (umhos/cm): 292
Site Midpoint (Latitude, Longitude): 44.47880965, -103.85669154	Site Length (m): 100	pH: 8.9

Survey Completed by: South Dakota Game, Fish and Parks

Mean Width (m): 15.1

Water Temperature (C): 9.0

Stream Classification: BK0, BR1, RB0

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	4	4	5	4	27	0	40	11	0.10	64	79.5	4.3
Brook Trout	All	4	4	5	4	27	0	40	11	0.10	64	79.5	4.3
Brown Trout	<200mm	592	1085	1364	806	7205	39	10850	2918	34.58	17458	80.5	5.4
Brown Trout	>=200mm	61	60	72	61	398	102	600	161	91.43	965	285.1	257.0
Brown Trout	All	654	1320	1710	930	8765	253	13200	3550	226.03	21239	99.6	28.9
Rainbow Trout	<200mm	6	6	7	6	40	0	60	16	0.09	97	69.2	2.7
Rainbow Trout	All	6	6	7	6	40	0	60	16	0.09	97	69.2	2.7

Site Number: 334

Date Sampled: 10/08/1996

Conductivity (umhos/cm): 282

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

Site Length (m): 104

pH: 8.9

Survey Completed by: South Dakota Game, Fish and Parks

Mean Width (m): 8.2

Water Temperature (C): 10.0

Stream Classification: BK0, BR2, RB1

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	4	4	6	4	49	0	38	20	0.22	62	82.0	5.0
Brook Trout	All	4	4	6	4	49	0	38	20	0.22	62	82.0	5.0
Brown Trout	<200mm	109	462	1501	109	5634	53	4442	2282	46.94	7148	89.5	9.3
Brown Trout	>=200mm	24	24	24	24	293	47	231	119	42.27	371	249.6	161.8
Brown Trout	All	133	212	296	133	2585	95	2038	1047	85.03	3280	118.4	36.8
Rainbow Trout	<200mm	60	93	145	60	1134	26	894	459	22.91	1439	110.3	22.6
Rainbow Trout	>=200mm	19	19	19	19	232	43	183	94	38.11	294	257.8	184.2
Rainbow Trout	All	79	93	110	79	1134	72	894	459	64.36	1439	145.8	63.6

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: 10/08/1996 **Conductivity (umhos/cm):** 288
Site Length (m): 90 **pH:** 8.9
Mean Width (m): 9.8 **Water Temperature (C):** 10.0
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	5	5	7	5	51	0	56	21	0.43	89	88.4	9.4
Brook Trout	>=200mm	2	2	3	2	20	1	22	8	1.30	36	204.5	71.0
Brook Trout	All	7	7	9	7	72	2	78	29	1.73	125	121.6	27.0
Brown Trout	<200mm	128	165	200	130	1687	22	1833	683	19.31	2950	95.4	12.8
Brown Trout	>=200mm	48	48	49	48	491	96	533	199	85.88	858	262.7	196.0
Brown Trout	All	176	199	218	180	2035	128	2211	824	114.04	3558	141.1	62.8
Rainbow Trout	<200mm	25	27	33	25	276	8	300	112	6.84	483	121.7	27.7
Rainbow Trout	>=200mm	31	34	41	31	348	61	378	141	54.28	608	253.8	174.9
Rainbow Trout	All	56	63	74	56	644	72	700	261	64.54	1126	194.8	112.2

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, 1986-1996

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	Oct 07, 1996	106	96-118	
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
	Oct 07, 1996	71	69-75	BR1

Site 190

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brown Trout <200mm	Jul 29, 1987	7	7-7	
	Nov 02, 1988	175	144-206	
	Jul 31, 1990	226	149-307	
	Sep 24, 1991	75	70-83	
	Oct 05, 1993	62	58-69	

Brown Trout <200mm	Oct 09, 1996	190	176-204	
Brown Trout >=200mm	Jul 29, 1987	26	26-26	BR3
	Nov 02, 1988	110	68-179	BR3
	Jul 31, 1990	200	187-213	BR3
	Sep 24, 1991	220	205-235	BR3
	Oct 05, 1993	209	209-211	BR1
	Oct 09, 1996	58	53-66	BR1
Rainbow Trout <200mm	Jul 29, 1987	1	1-1	

Site 205

Species/Size	Date	Pop Est.	(95% C.I.)	Stream Classification
Brook Trout <200mm	Oct 31, 1995	4	4-4	
	Oct 07, 1996	4	4-5	
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	
	Oct 07, 1996	1085	806-1364	
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
	Oct 07, 1996	60	61-72	BR1
Rainbow Trout <200mm	Nov 02, 1988	4	4-4	
	Oct 11, 1994	1	1-2	
	Oct 31, 1995	8	4-42	

Rainbow Trout <200mm	Oct 07, 1996	6	6-7	
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	
	Oct 08, 1996	4	4-6	
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	

Brown Trout <200mm	Sep 30, 1992	74	60-94	
	Oct 06, 1993	64	61-69	
	Oct 12, 1994	96	89-105	
	Oct 17, 1995	26	24-32	
	Oct 08, 1996	462	109-1501	
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
	Oct 08, 1996	24	24-24	BR2
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	Oct 08, 1996	93	60-145	
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
	Oct 17, 1995	15	15-17	RB1
	Oct 08, 1996	19	19-19	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	
	Oct 08, 1996	5	5-7	
Brook Trout >=200mm	Oct 02, 1992	6	6-9	BK2
	Oct 07, 1993	3	3-4	BK3

Brook Trout >=200mm	Oct 17, 1995	1	1-2	BK3
	Oct 08, 1996	2	2-3	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	
	Oct 08, 1996	165	130-200	
Brown Trout >=200mm	Sep 26, 1991	23	21-29	BR3
	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
	Oct 08, 1996	48	48-49	BR1
Rainbow Trout <200mm	Sep 26, 1991	75	39-166	
	Oct 02, 1992	135	104-168	

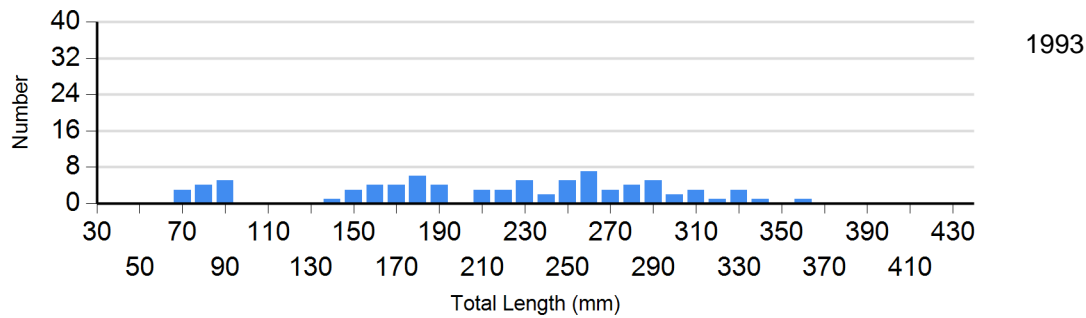
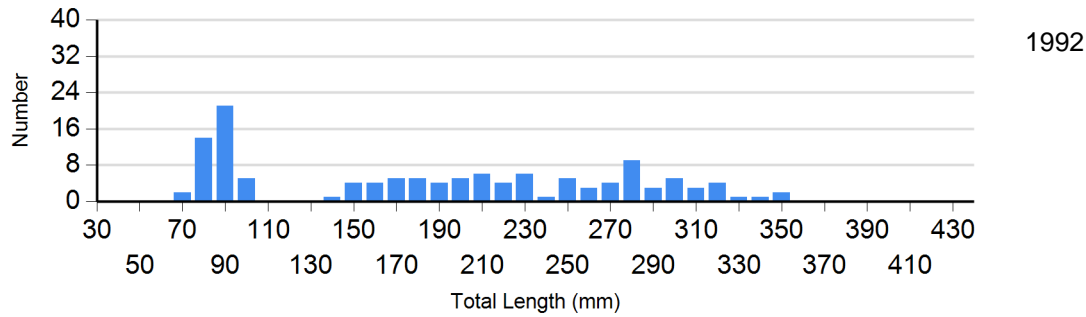
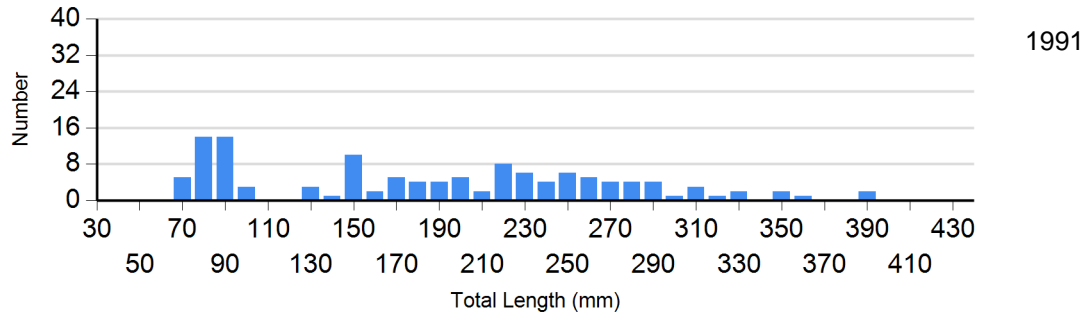
Rainbow Trout <200mm	Oct 07, 1993	52	50-56	
	Oct 12, 1994	137	88-200	
	Oct 17, 1995	33	34-41	
	Oct 08, 1996	27	25-33	
Rainbow Trout >=200mm	Sep 26, 1991	26	23-34	RB2
	Oct 02, 1992	43	41-48	RB1
	Oct 07, 1993	48	48-49	RB1
	Oct 12, 1994	38	37-42	RB1
	Oct 17, 1995	27	27-29	RB1
	Oct 08, 1996	34	31-41	RB1

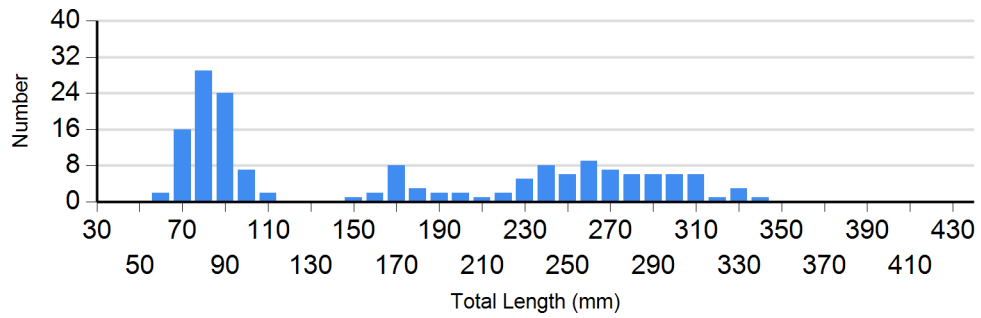
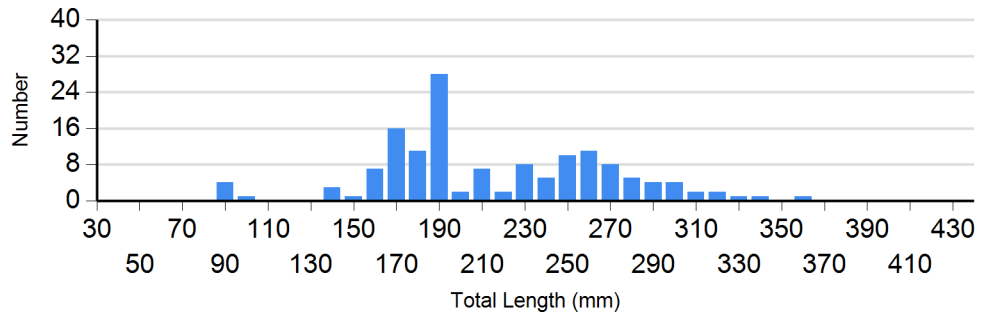
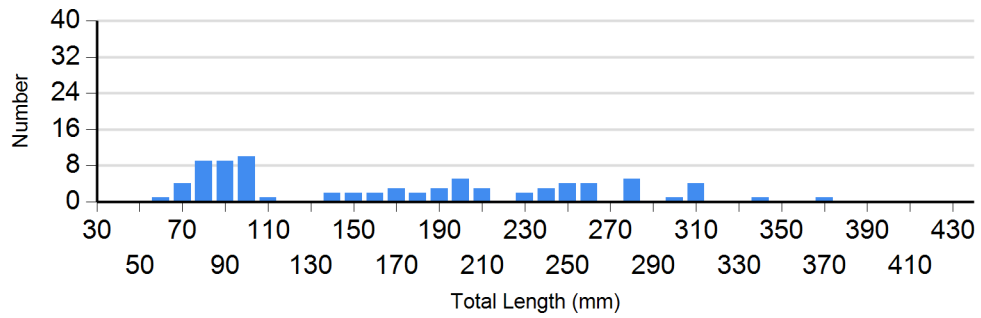
Length Frequency Distribution

Length frequency histogram of species sampled by year.

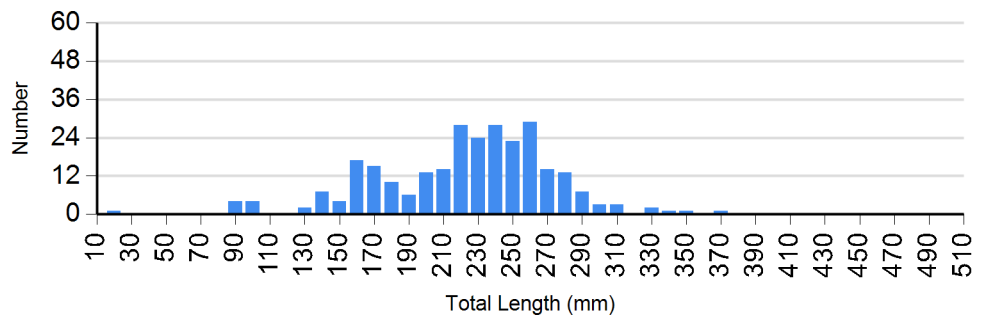
Site: 174

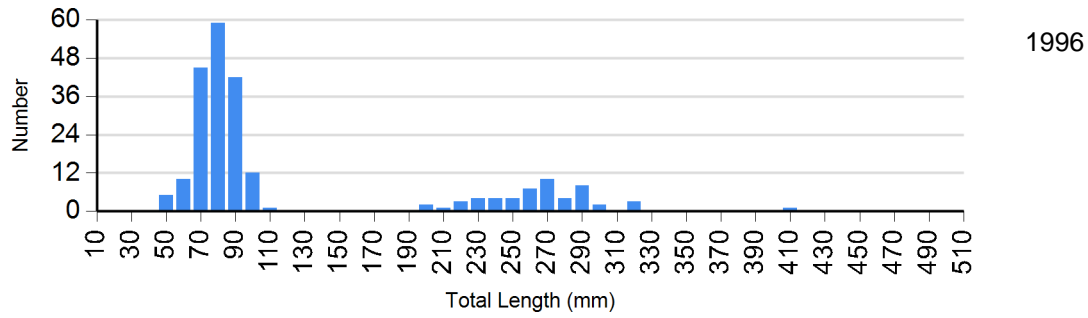
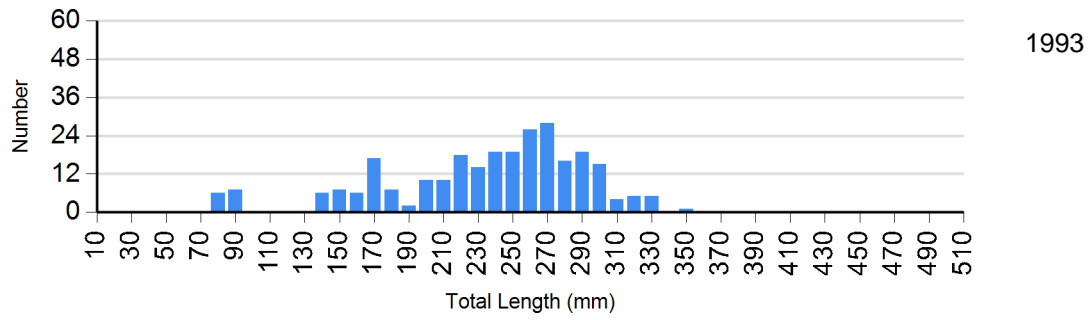
Species: Brown Trout



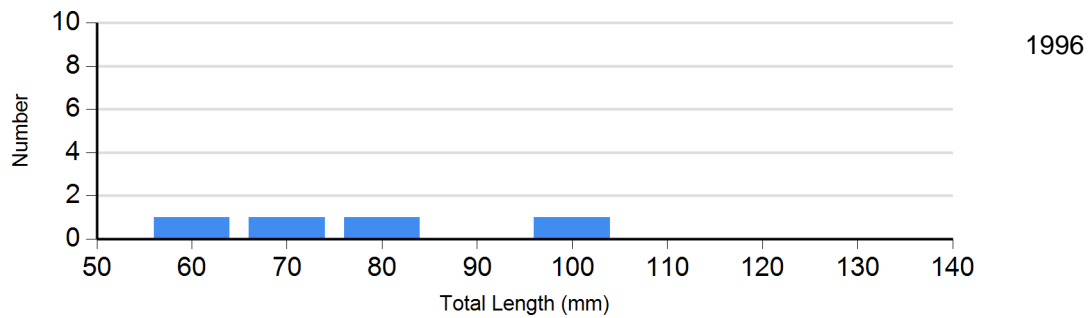
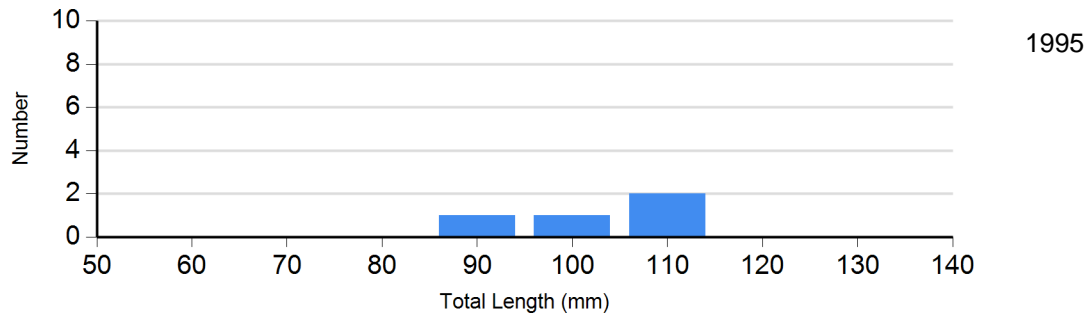


Site: 190
Species: Brown Trout

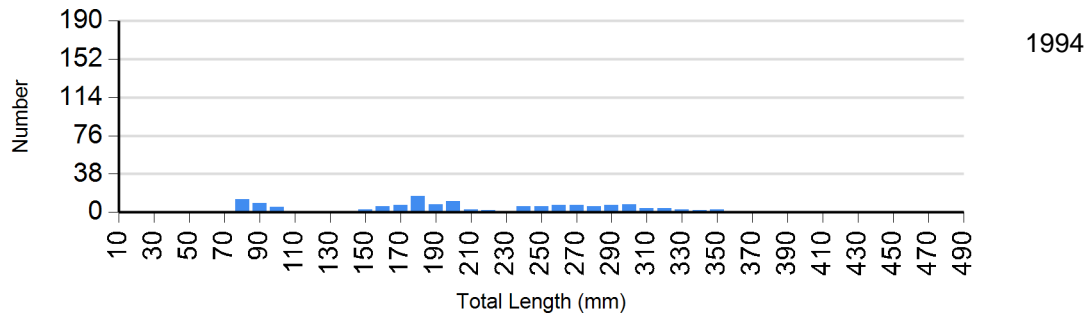
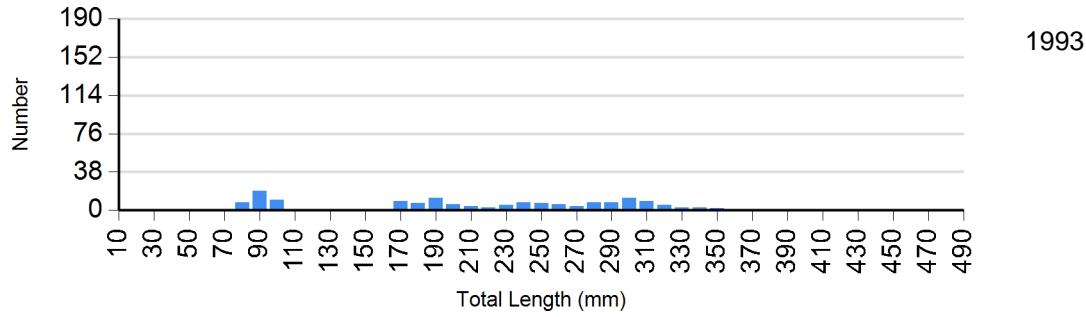
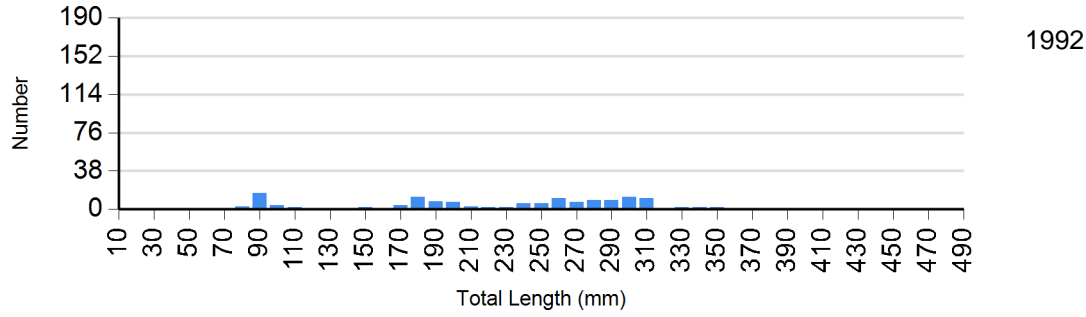
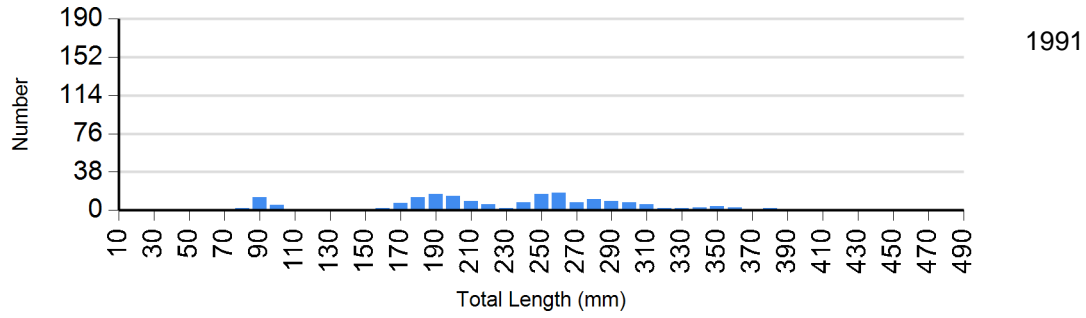


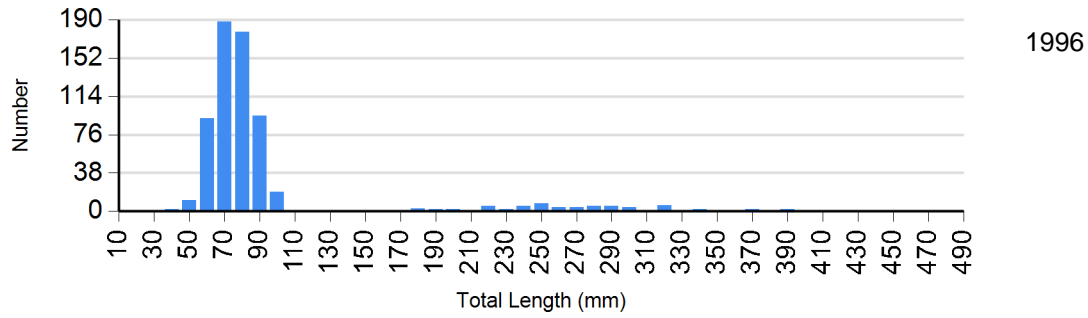
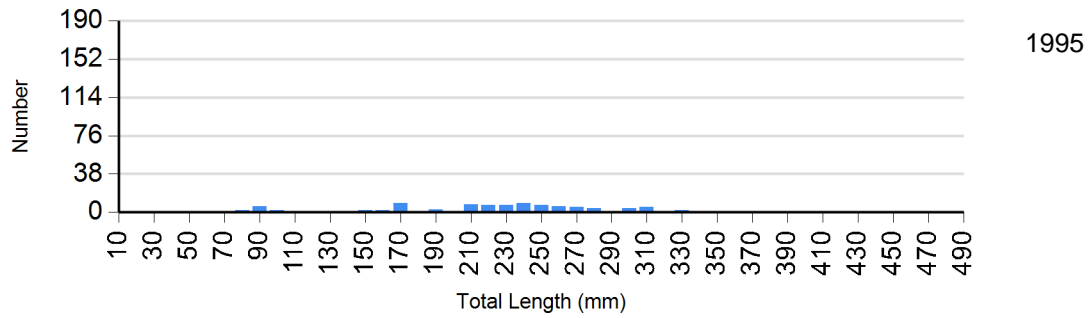


Site: 205
Species: Brook Trout

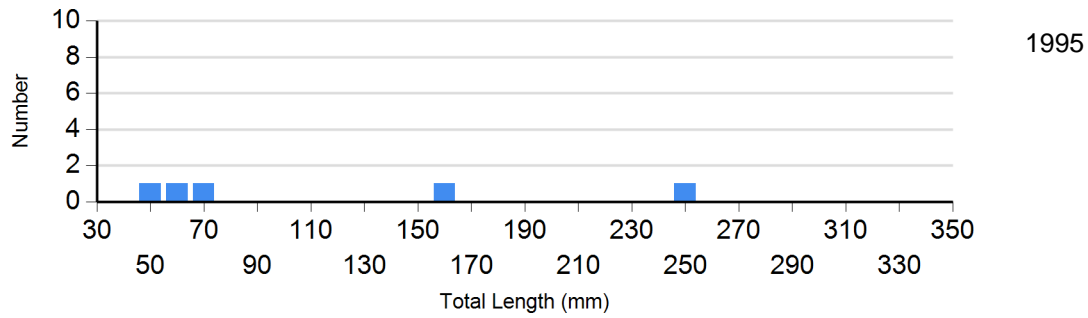
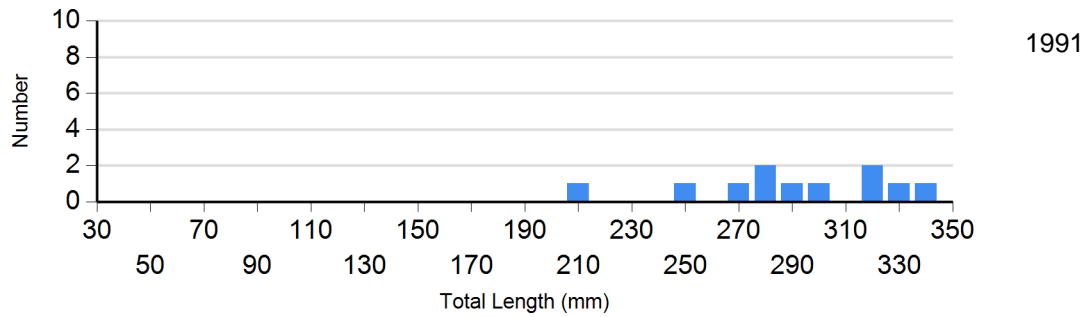


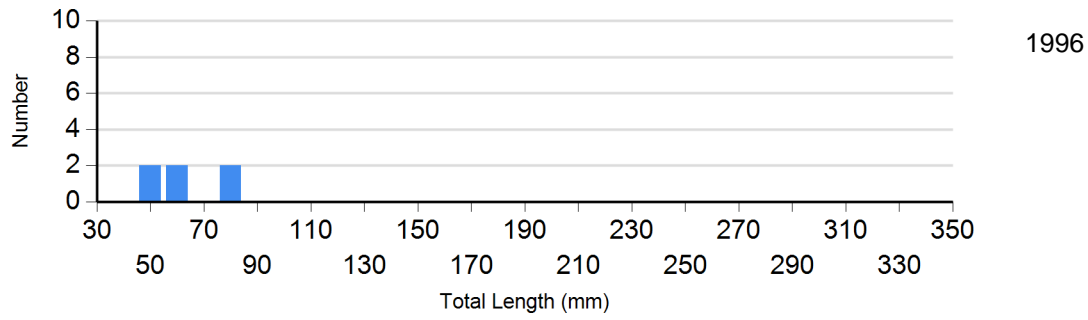
Site: 205
Species: Brown Trout



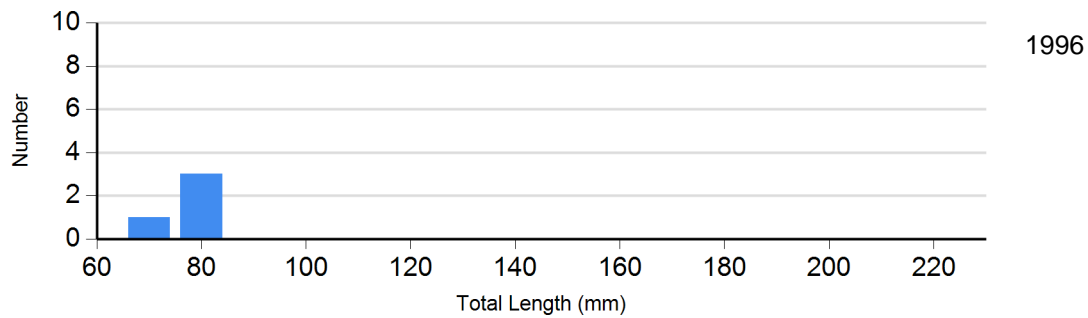
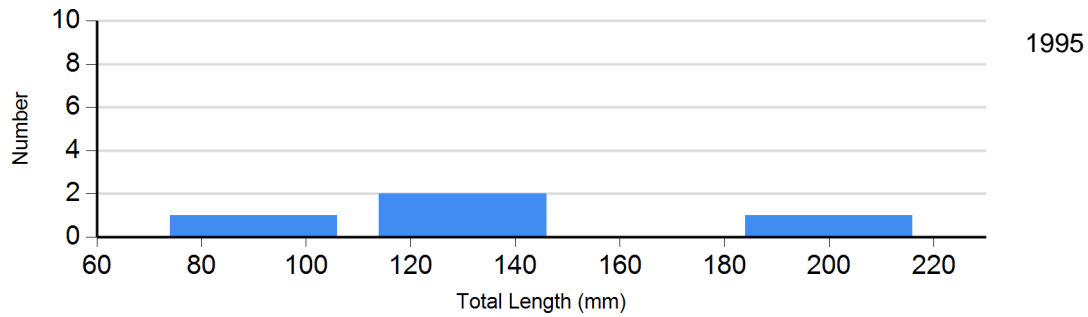
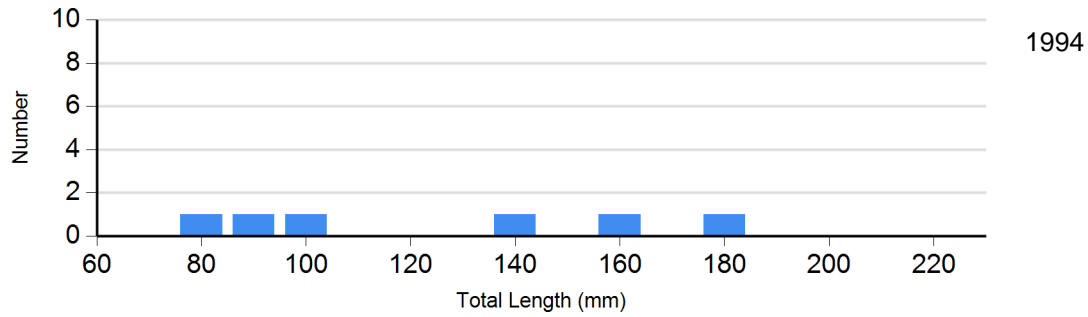


Site: 205
Species: Rainbow Trout

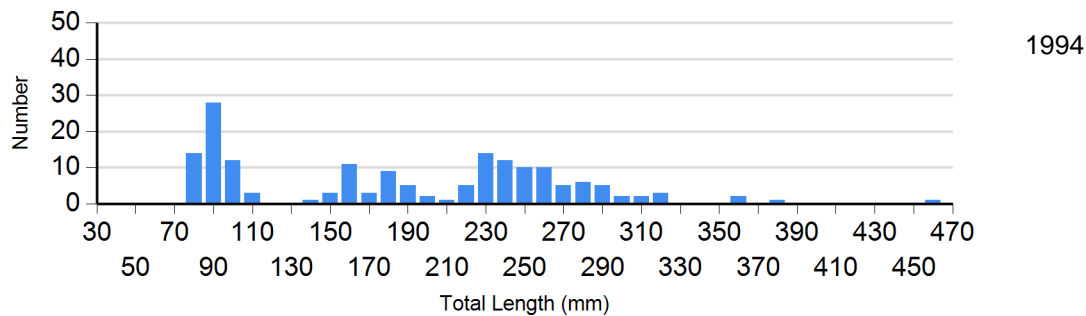
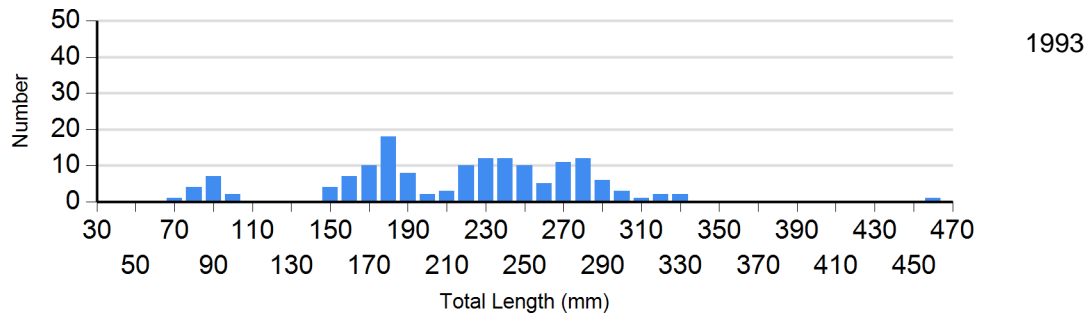
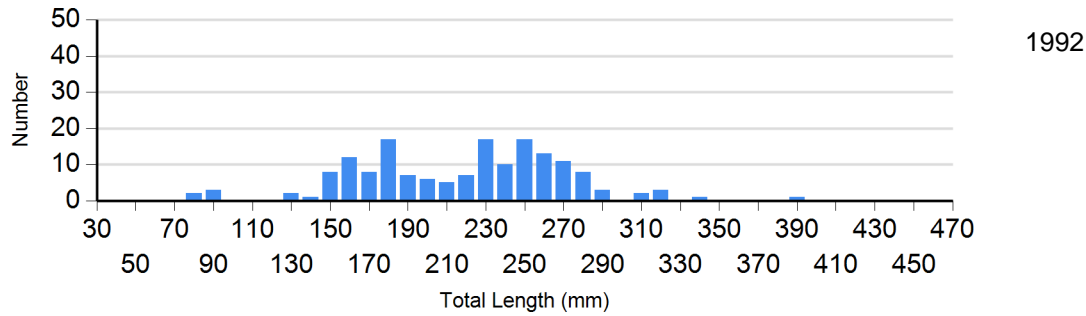
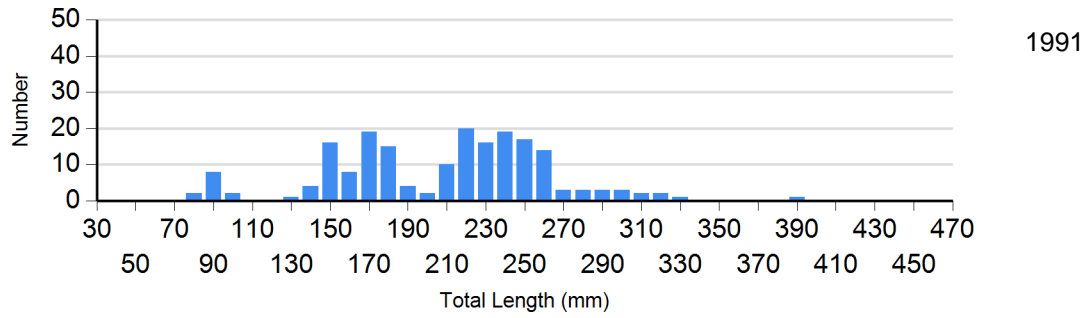


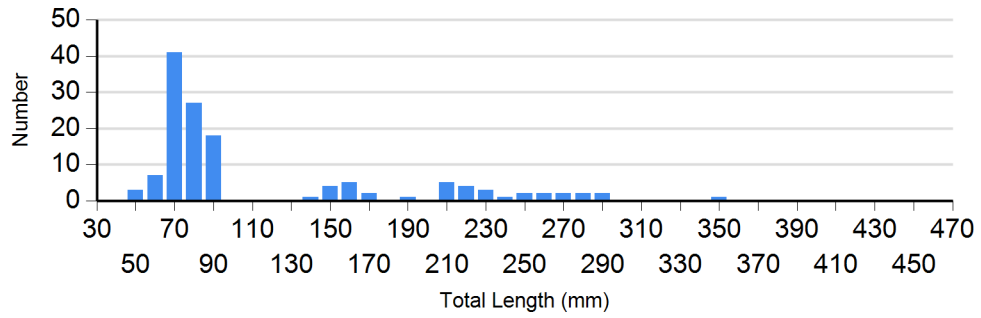
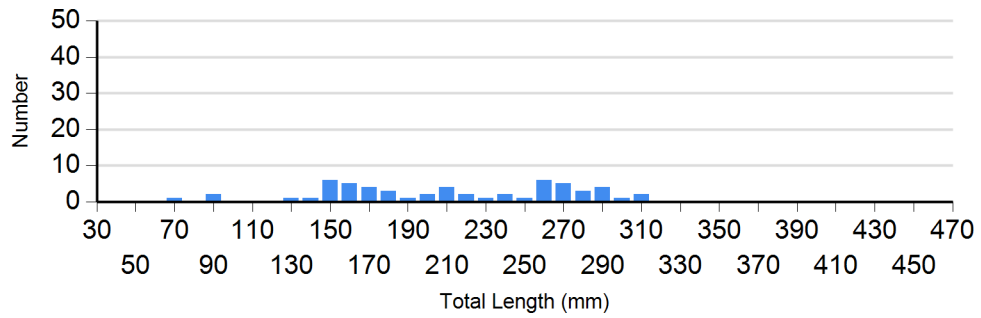


Site: 334
Species: Brook Trout

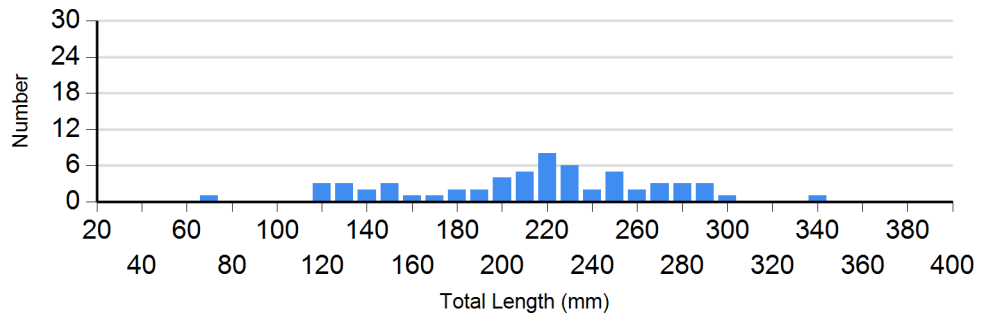
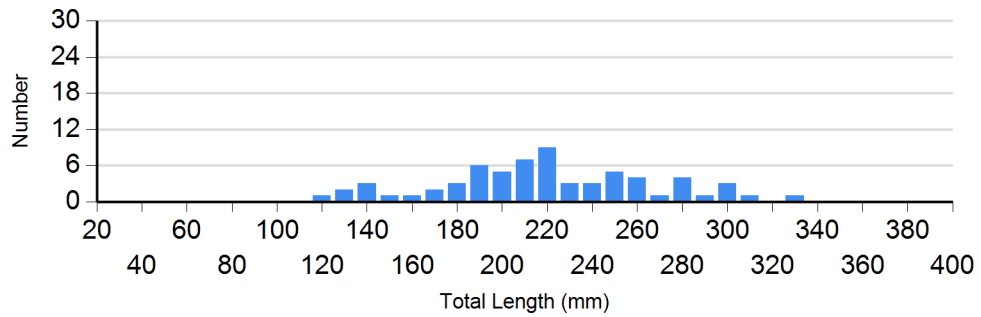


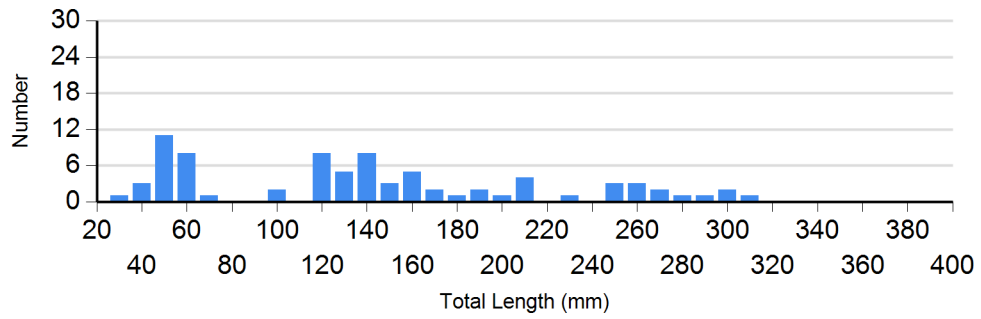
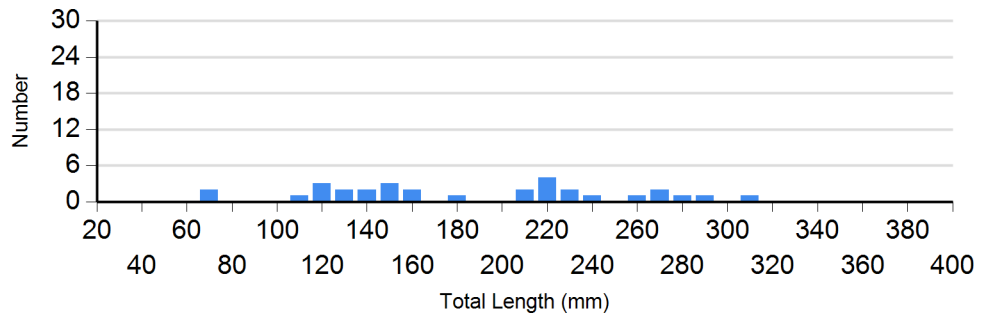
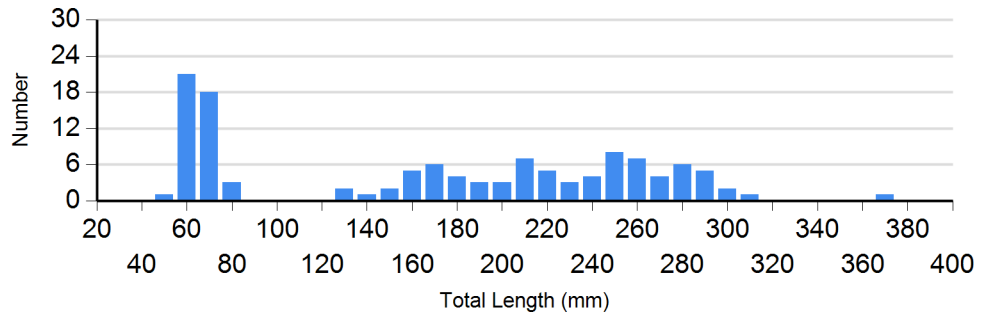
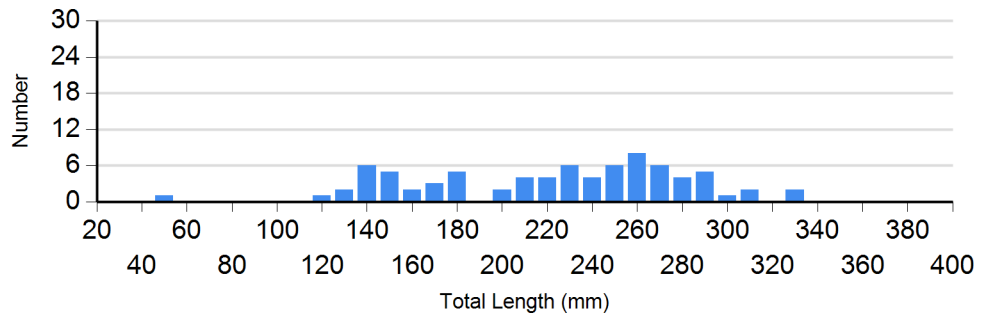
Site: 334
Species: Brown Trout



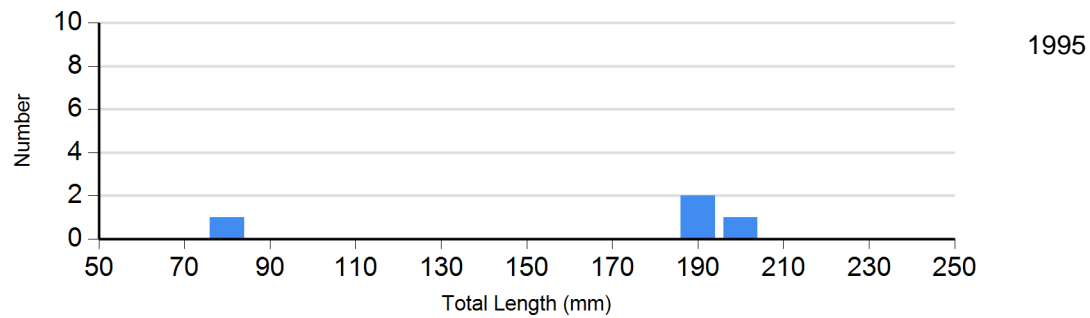
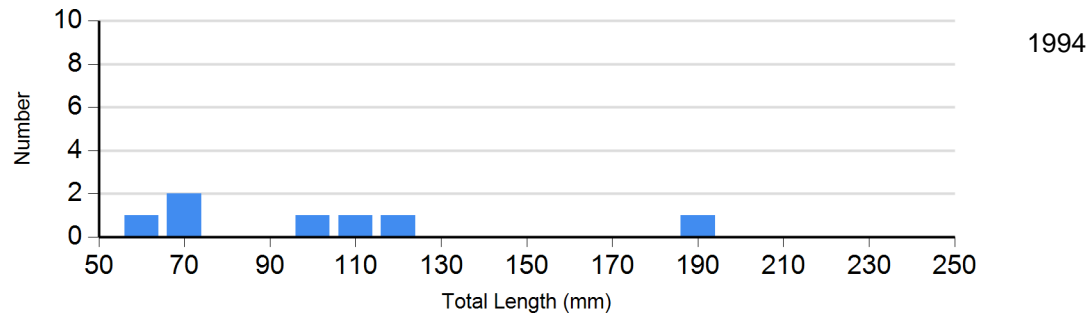
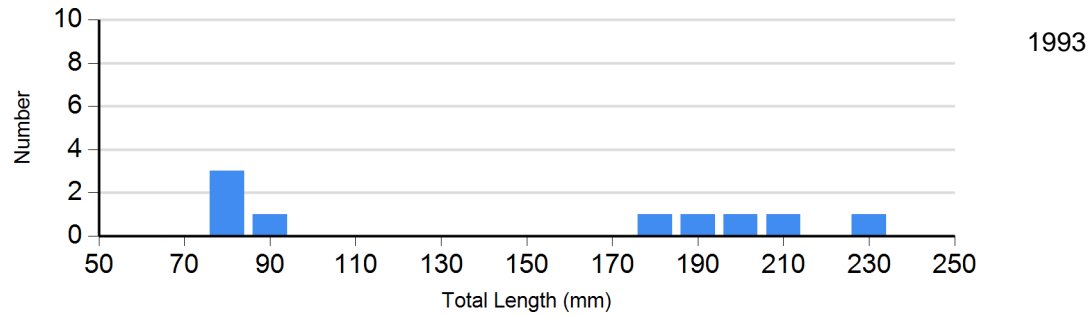
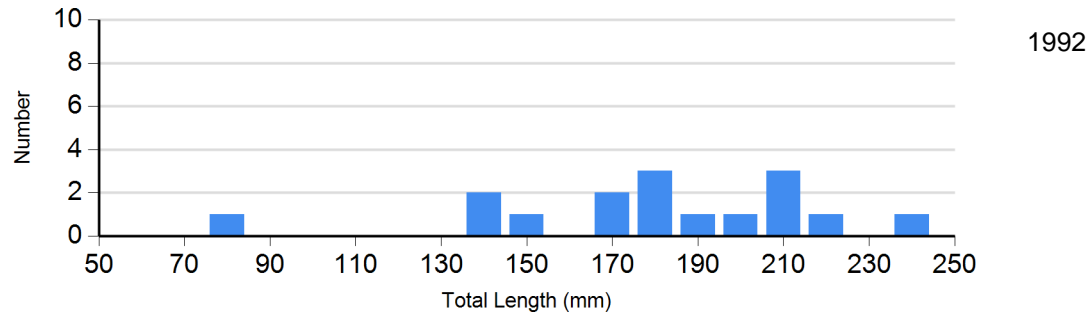


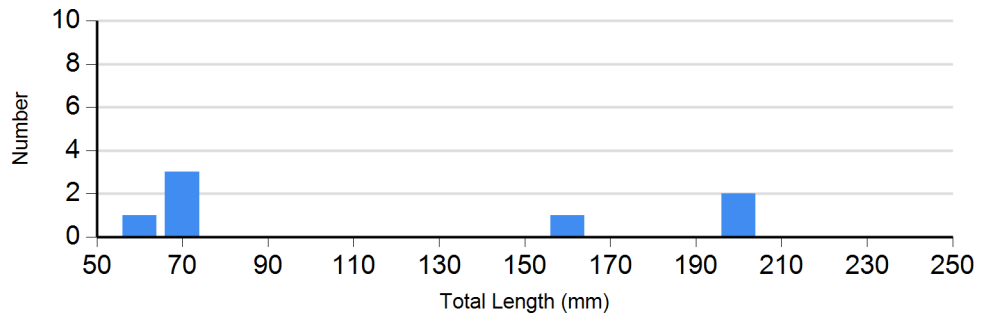
Site: 334
Species: Rainbow Trout



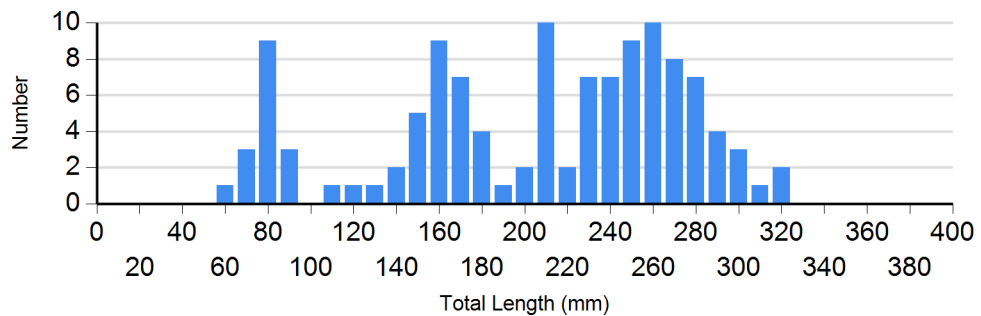
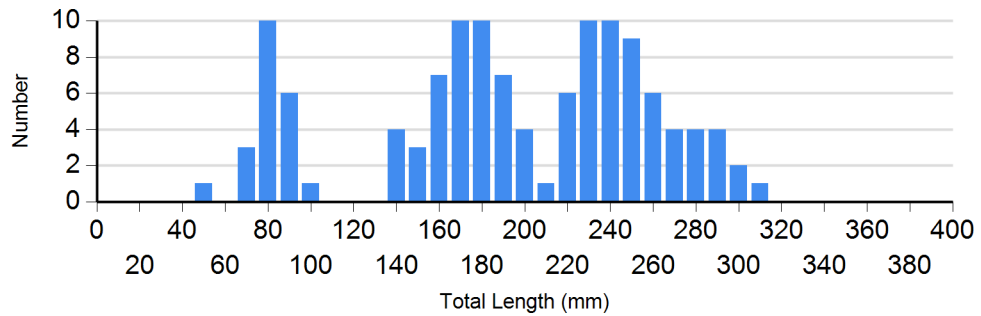
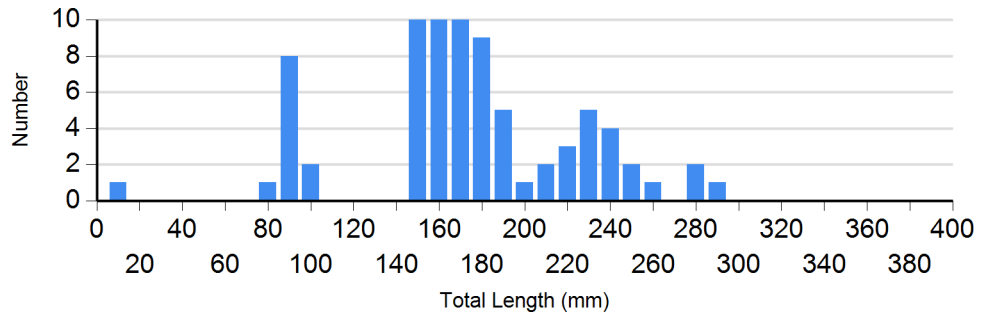


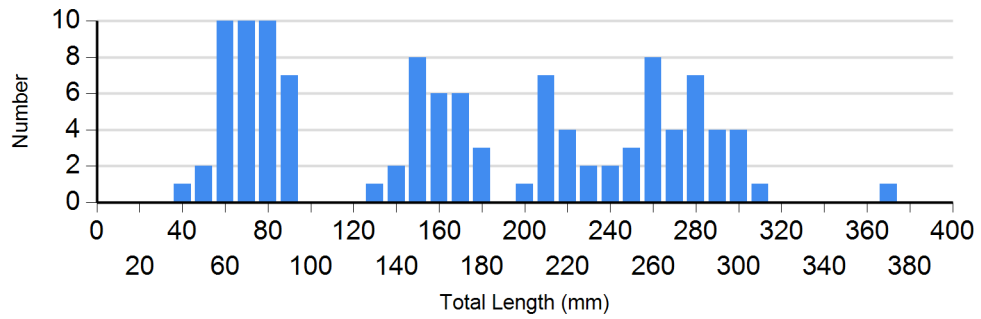
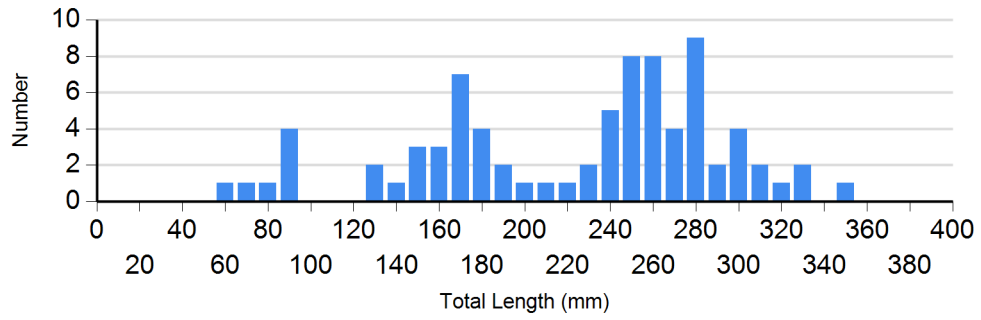
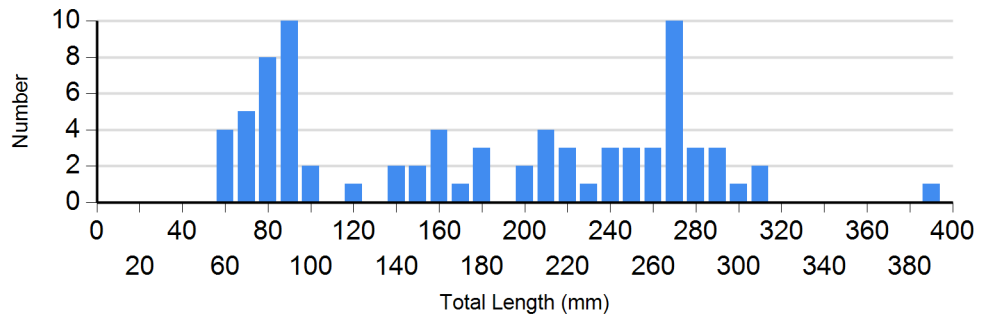
Site: 340
Species: Brook Trout



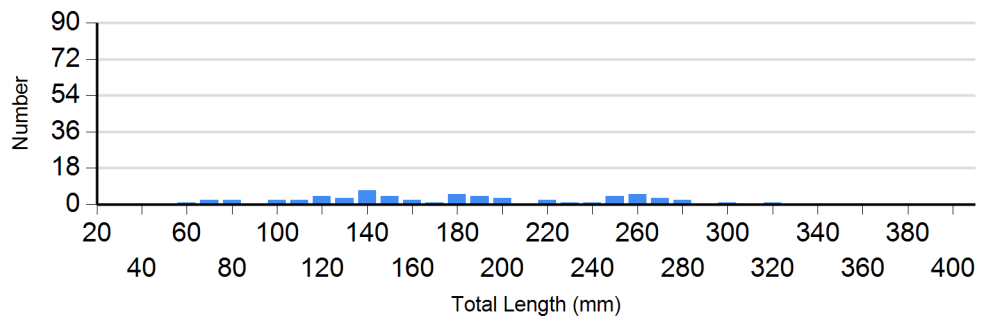


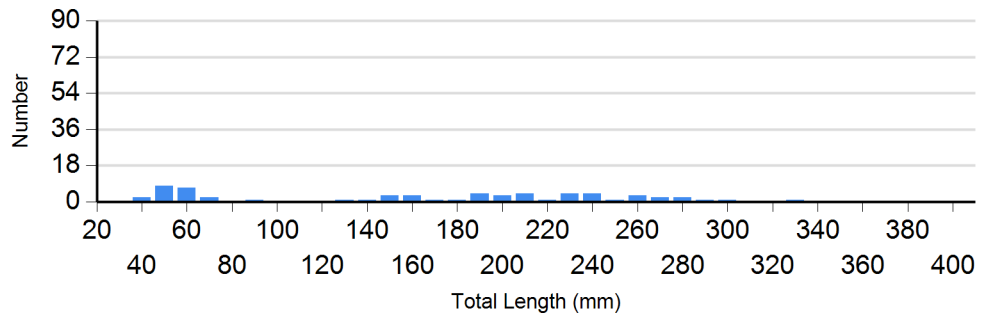
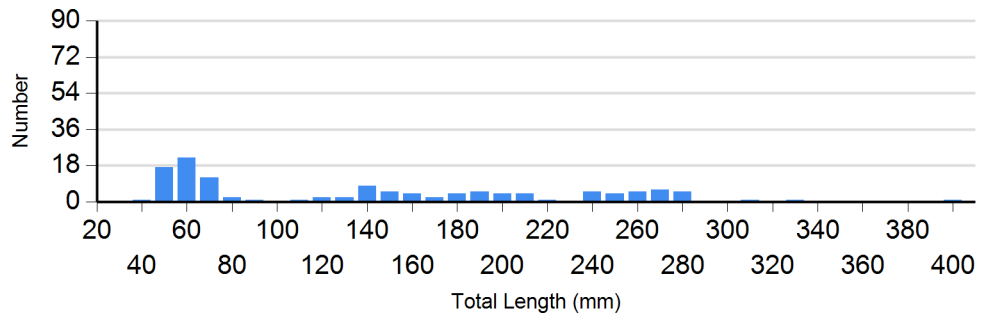
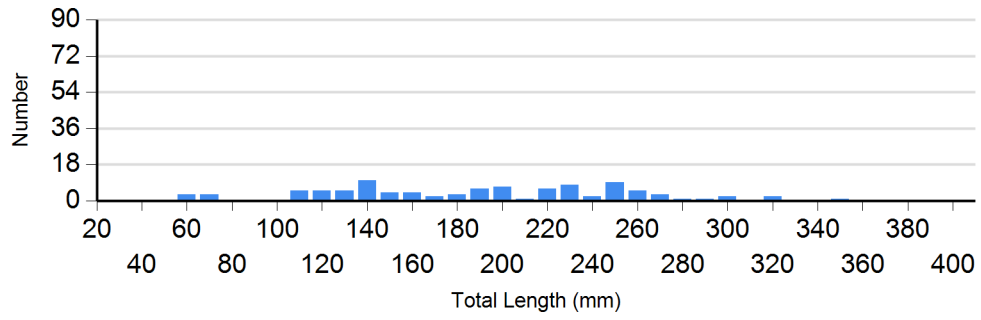
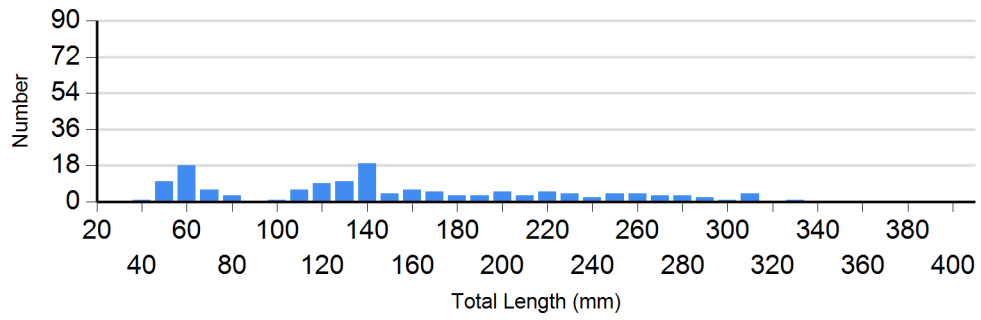
Site: 340
Species: Brown Trout

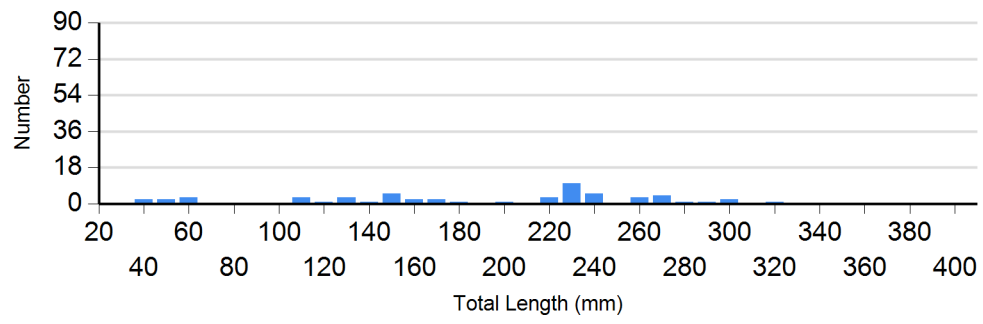




Site: 340
Species: Rainbow Trout







1996