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Bulkley/Morice River

STOCK MONITORING REPORT
(Fisheries Improvement Unit)

PROJECT: Bulkley/Morice steelhead
stock monitoring

REGION: 6

MANAGEMENT UNIT:

LOCATION: Bulkley and Morice River systems

AIR PHOTO REFERENCE NO:

MAP REFERENCE NO:

REPORT DATE: March, 1986

DATE SURVEYED: August 1984 and 1985

PERSONS PRESENT: Regional Staff

REPORT PREPARED BY: D. Tredger

PURPOSE:

OBSERVATIONS:

PROPOSED ACTION:

PHOTOGRAPHS ATTACHED: YES ___ NO ___

AVAILABLE: YES ___ NO ___

CIRCULATE TO:

SUGGESTED CONTACTS:

COMMENTS BY:

SEE ATTACHED SHEETS: YES ___ NO ___

STOCK MONITORING - BULKLEY/MORICE

Stock monitoring was conducted at several locations in the Bulkley/Morice system by Regional staff in 1984 and 1985. Many areas were sampled for the first time, and others were repeat (annual) sample sites. Stream-specific data are appended to this general summary.

Results indicate that 1985 was a good year for steelhead fry recruitment. Of 11 major areas sampled, 7 were ranked the highest ever sampled (or tied); 4 ranked in the middle. Of the most important areas (e.g., Bulkley and Morice mainstem and major tributaries, such as Upper Bulkley, Lamprey, Owen, Canyon, and Telkwa), 6 and 7 ranked No. 1.

Unfortunately, no depth and velocity transect information was collected to calibrate the data in terms of saturation. Flows in 1985 were relatively low, as indicated at the Buck Creek gauging station. Low flows generally increase WUA for fry. Whether the high fry density reflects actually better recruitment or simply lower flows cannot be answered. The fact that fry populations were higher throughout the system suggests the former.

RECOMMENDATIONS

A more structured approach to stock monitoring should be taken on the Bulkley/Morice. In many cases, it appears that sampling was performed somewhat randomly; many sites sampled in 1981 to 1984 were not resampled in 1984 and 1985, and some new sites were added. A program should be standardized based on past reconnaissance, and undertaken in a comparable way annually. Depth, velocity, and habitat data must accompany the fish sampling results.

Table 1. Summary of steelhead fry population monitoring results from the Bulkley-Morice River system, 1985.

Stream	N	1985 Mean Density (No/M ²)	Years of Record	1985 Rank
Bulkley River	2	.41	2	1.5
Canyon Creek	1	1.19	2	1
Trout Creek	1	.78	3	3
Driftwood Creek	2	.09	2	1
Telkwa River	14 ¹	.37	3	1
Upper Bulkley	5	.91	5	1
Morice River	3	.36	5	1
Lamprey Creek	2	.72	6	1
Owen Creek	1 (4)	1.00 (.38)	6	3 (6)
Gosnell/Shea	4	.15	5	3
Thautil River	2	.04	4	3

1. Sampling by D. Bustard.

BULKLEY RIVER

The Bulkley River was sampled at 2 sites in each of 1984 and 1985 (Table B-1). At the 1 site sampled in both years, fry densities were very similar. No depth/velocity data are available to clarify these results.

CANYON CREEK

Canyon Creek was sampled at 5 sites in 1984 and 1 site in 1985 (Table C-1). Fry density at Site 1 was higher in 1985 than 1984. Depth and velocity information was not available.

DRIFTWOOD CREEK

Driftwood Creek was sampled at 3 sites in 1984 and 2 sites in 1985 (Table D-1). Results in terms of steelhead fry monitoring are poor because of sampling time. Driftwood Creek is very cold (G. Schultz, pers. comm.), and fry are just emerging in late August, when sampling was conducted. The 1985 fry densities were higher at Site 1 and roughly equal at Site 2. Flow data is not available.

TELKWA RIVER

The Telkwa River system has been sampled annually since 1983 by D. Bustard (consulting biologist). Results (Table TE-1) indicate that fry densities were higher in 1983 and 1985 than in 1984. Yearling densities were highest in 1984, followed by 1983 and 1985.

TROUT CREEK

Trout Creek was first sampled in 1983¹. Only 1 site was sampled in the 1 km of accessible stream. Results (Table T-1) suggest that steelhead fry

¹Yaworski, B.A. 1983. Trout Creek. Reconnaissance Report, Fish Habitat Improvement Section, Victoria, B.C.

Table B-1. Summary of juvenile steelhead densities in the Bulkley River, 1984 and 1985.

Site	1984			1985		
	0+	1+	2+	0+	1+	2+
1 (near Suskwa)	0.46	0.26	0	0.41	0.12	0.01
2 (near China Creek)	0.06	0.04	0	-	-	-
3 (above Smithers)	-	-	-	0.41	0.01	0.01

Table C-1. Summary of juvenile steelhead densities in Canyon Creek, 1984 and 1985.

Site	1984			1985		
	0+	1+	2+	0+	1+	2+
1a	0.61	0.24	0	-	-	-
1b	0.93	0.23	0	-	-	-
1 mean	0.77	0.24	0	1.19	0.14	0
2	0.38	0.19	0.02			
3	0	0.09	0			
4	0	0.03	0.05			

Table D-1. Summary of juvenile rainbow densities (No/m²) in Driftwood Creek, 1984 and 1985.

Stream	Site	1984				1985			
		0+	1+	2+	3+	0+	1+	2+	3+
Driftwood	1	0	0.11	0.08	0.04	0.14	0.09	0.08	0.01
	2	0.06	0	0	0	0.03	0	0	0
	3	0	0.01	0	0	-	-	-	-

Table TE-1. Summary of juvenile steelhead densities in the Telkwa River system, 1983 to 1985 (Adapted from D. Bustard's data).

Year	0+	1+	2+
1983	0.35	0.06	0.03
1984	0.16	0.09	0.03
1985	0.37	0.04	0.04

Table T-1. Summary of juvenile steelhead densities at Site 1 in Trout Creek, 1983 to 1985.

Stream	Site	1983			1984			1985		
		0+	1+	2+	0+	1+	2+	0+	1+	2+
Trout	1	1.22	0.04	0	2.26	0.13	0.04	0.78	0.17	0

density was lowest in 1985 in comparison to 1983 and 1984 data. While depth and velocity data are not available, it appears that flows were lower in 1985, suggesting greater WUA. This being the case, then densities were actually lower in 1985 and not simply a product of less suitable habitat conditions.

UPPER BULKLEY

The Upper Bulkley has been sampled annually since 1981. Sample sites include the Upper Bulkley (1), Buck Creek (1, 2, 3, and 5), and McQuarrie Creek (1). Results of 1984 and 1985 sampling are summarized in Table UB-1, and compared to 5 consecutive years of sampling in Table UB-2. The following results are indicated:

In 1985, mean density was the highest ever sampled at 0.91 fry/m². Buck Creek was very high, while McQuarrie Creek was low. Stream discharge was very low during the 1985 sampling period (approx. 0.15 m³/S, 3% of the M.A.D. of 4.41 m³/S). Rough transect data were collected at 1985 sites, allowing estimates of WUA to be calculated (Table 1). Adjusted mean density (to a WUA of 1.00) was 1.62 fry/m² in 1985.

MORICE RIVER

The Morice River was sampled at 5 sites in 1984 and 3 sites in 1985 (Table M-1). Mean fry density was much higher in 1985 compared to 1984 and in comparison to all years of sampling data (1980 - 1982, 1984). These results cannot be confirmed with depth and velocity data.

HOUSTON TOMMY CREEK

Houston Tommy Creek has been sampled in 1982, 1984, and 1985 at 3 annual sample sites. Wild steelhead fry have only been found in the accessible

Table UB-1. Summary of juvenile rainbow densities in the Upper Bulkley River system, 1984 and 1985. Weighted usable area and adjusted fry density are included for 1985 data.

Stream	Site	1984			85			WUA	Adj. 0+
		0+	1+	2+	0+	1+	2+		
McQuarrie	1	.94	.17	0	.65	.17	.01	.40	1.62
Buck	1	.17	.08	0	.79	.25	0	.92	.86
	2	.13	.37	.02	1.18	.52	.06	.60	1.97
	3	.13	.14	.05	1.85	.32	.09	.73	2.53
	5	-	-	-	1.12	.02	.02	1.00	1.12
U. Bulkley	1s	.01	0	0	0	0	0	-	-
	1e	.02	.11	0	.07	.01	0	-	-
								.73	1.62

Table UB-2. Comparison of rainbow fry densities at 5 index sites in the Upper Bulkley River system, 1981 to 1985.

Site	1981	1982	1983	1984	1985
U. Bulkley	0	.08	.06	.02	.07
Buck	1	.13	.17	.26	.79
	3	.63	.14	.35	1.18
	5	.09	.18	.61	1.85
McQuarrie	1	1.89	.89	.94	.65

Table M-1. Summary of juvenile steelhead densities in the Morice River in 1984 and 1985.

Site	1984			1985		
	0+	1+	2+	0+	1+	2+
Morice West	0	0	0	-	-	-
32 mile	.08	.02	0	-	-	-
21 mile	.08	.04	0	-	-	-
Lamprey	.19	.02	0	.44	.02	0
Aspen	.36	.07	0	.43	.08	.01
Aspen "a" ¹	-	-	-	.22	.12	.02
mean ²	.14	.03	0	.36	.07	.01

¹Aspen "a" is same site as Aspen, but sampled after hatchery fry stocking. Tabulated value represents wild fry only.

²Mean values for fry density: 1980 = 0.14; 1981 = 0.29; 1982 = 0.16

portion of the stream in 1 year, 1982, and were at low density (0.02 fry/m²). These data suggest that Houston Tommy Creek is not a preferred area for steelhead spawning.

Upper Houston Tommy Creek, above the falls, has been stocked with steelhead fry since 1983. In 1985, the area below the falls was stocked as well⁴. The 1984 and 1985 sampling results are given in Table HT-1. Mean hatchery yearling captures, within the stocking areas, ranged from 0.09/m² in 1984 to 0.15/m² in 1985. If sampling was representative, fry to yearling survival rates of 45% and 100% were achieved for 1983-1984 and 1984-1985, respectively. These rates are clearly too high, suggesting sampling was done at good sites, and perhaps some wild rainbow (or cutthroat) were present. More sample sites are required for a proper assessment.

LAMPREY CREEK

Index site sampling has been conducted in Lamprey Creek since 1981. In 1984, 3 sample sites were conducted, while in 1985 only 2 sites were sampled. Table L-1 summarizes steelhead fry densities at paired sites from 1980 to 1985. The 1985 densities rank highest when taken as the mean of paired sites. The exclusion of Pimpernel Creek from 1985 sampling may have altered the rank somewhat. No depth and velocity data was collected. As 1985 was a low flow year (e.g., Buck Creek 3% of M.A.D. when sampled), the WUA values may have been very high in 1985. While raw density values indicate high fry recruitment in 1985, the lack of habitat casts some doubt on their absolute reliability.

⁴1983 - 40,000 stocked (0.2 fry/m²) above the falls.
1984 - 30,000 stocked (0.15 fry/m²) above the falls.
1985 - 19,000 stocked (0.1 fry/m²) above the falls,
21,000 (0.12 fry/m²) below the falls.

Table HT-1. Summary of juvenile steelhead densities (No/M²) in Houston Tommy Creek, 1984 and 1985 (W = wild/H = hatchery).

Site	1984				1985			
	0+	1+	2+	3+	0+	1+	2+	3+
1 (below falls)	0	.03W	0	0	0	.20W	0	0
2 (above falls)	.24H	.13H	0	0	0	.24H	0	0
3 (above falls)	0	.05H	0	0	0	.06H	.04H	0

Table L-1. Summary of steelhead fry densities at Lamprey Creek sample sites, 1980 to 1985 (rank in brackets).

Site	1980	1981	1982	1983	1984	1985
1. Pimpernel	.51	-	.97	1.30	.99	-
2. Lamprey 1	.32	.18	.08	.26	.06	.23
3. Lamprey 5	.50	.92	.29	.38	.66	1.21
mean 1,2+3	.44 (4)	-	.45 (3)	.65 (1)	.57 (2)	-
mean 2+3	.41 (3)	.55 (2)	.19 (6)	.32 (5)	.36 (4)	.72 (1)

OWEN CREEK

Owen Creek was sampled at 1 site only in 1985 by Regional staff. Federal Fisheries sampled at 3 additional sites, attempting to duplicate past Fisheries Branch index stations. Results are summarized in Table 0-1.

Fry density values indicate that 1985 was the lowest year on record. Unfortunately, these results may be unreliable, as Federal sampling was conducted August 11, perhaps too early in terms of fry emergency. The one Fisheries Branch site suggests a moderate density (No. 3 of 6).

GOSNELL/SHEA CREEKS

The Gosnell Creek-Shea Creek system has been sampled annually since 1980 (excluding 1983). In 1984 and 1985, 4 sample sites were conducted (Table G-1) in the accessible areas of the system. Results indicate that fry density in 1985 was third highest among the 5 years of sampling. Significant variation is apparent for Shea Creek data. No depth or velocity data are available to improve overall data resolution.

THAUTIL RIVER

The Thautil River was sampled at 2 sites in 1981, 1982, 1984, and 1985 (Table TH-1). Results indicate fry densities were low in 1985 or third lowest in 4 years of data. Again, no depth and velocity information is available to validate these results.

Table 0-1. Summary of steelhead fry densities (No/m²) in Owen Creek, 1980 to 1985.

Site	1980	1981	1982	1983	1984	1985
1	.78	1.73	1.14	.73	.88	1.00
3	.78	2.57	2.18	.54	.58	(.30)
6 (5)	(.16)	(.71)	.14	2.11	.32	-
7	.41	.99	.57	.69	.35	(.20)
9	1.05	1.66	.31	.20	1.17	(.02)
mean	.64	1.53	.87	.85	.66	.38

Table G-1. Summary of steelhead fry densities (No/m²) in the Gosnell/Shea system, 1980 to 1985.

Site	1980	1981	1982	1984	1985
Gosnell 1 (below Shea)	.18	0	.13	.39	.11
Gosnell 2 (above Shea)	.02	.02	0	.11	.11
Gosnell 3 (upper)	-	-	-	.02	.03
Shea 1 (below falls)	.06	.05	.74	.07	.22
mean ¹	.09	.02	.29	.19	.15

Table TH-1. Summary of steelhead fry densities in the Thautil River system, 1981 to 1985.

Site	1981	1982	1984	1985
1 lower	.04	.20	.01	.06
2 upper	.12	0	.05	.03
mean	.08	.10	.03	.045