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PAPUA NEW GUINEA

**Fisheries survey of the upper Purari River.
Part 1 - Methods and Description of sampling station.**

**A report prepared for the Sepik River Fish Stock
Enhancement Project, PNG/85/001**

by

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This report was prepared during the course of the project identified on the title page. The conclusions and recommendations given in the report are those considered appropriate at the time of its preparation. They may be modified in the light of further knowledge gained at subsequent stages of the project.

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INTRODUCTION

From August 1991 to August 1992 a fisheries survey of lower order streams of the upper Purari River, Papua New Guinea, was undertaken as part of the Sepik River Fish Stock Enhancement Project. The aim of this survey was to get general information on fishes and fisheries in the upper Purari and to get information on the biology of the introduced rainbow trout.

The results and discussion of this survey are presented in Povlsen (1992a,b). This report lists sampling stations and briefly mentions the methods used.

METHODS

In general, the methods used in this work are the same as used by Van Zwieten (1989). This also applies to the biological investigations of rainbow trout specimens, i.e. calculation of condition factor, stomach content analysis and gonad stage.

Gonad development was recorded on a scale of 1 to 6 as follows (see: Van Zwieten 1989):

STAGE 1: Immature

Very small sexual organs close under the vertebral column. Ovaries and testes in fish stored in formalin were usually white or grey elongated threads or tiny sacs. Oocytes were not visible unless examined with a microscope. Gonads < 1% of body weight.

STAGE 2: Resting stage

Gonads are developed or are developing but sexual products have not yet begun to develop. Gonads are larger than in stage 1 and more sac like. Eggs of small species are usually not visible by the naked eye; small eggs are visible with the larger species but normally not through the thick ovary wall. Gonads are still < 1% of body weight.

STAGE 3: Maturation

Gonads are now larger and conspicuous. Eggs are distinguishable to the naked eye. The ovary wall is more translucent. The colour of the testes change from white to a more reddish-grey hue. Ovaries are approximately > 1% but < 5% of body weight. Testes approximately > 0.5 but < 2.5 % of body weight.

STAGE 4: Mature (ripe)

Sexual products are ripe. Large, well developed sex organs. Ovary distended and very conspicuous, often occupying more than half the volume of the body cavity. Ovaries take on the - usually yellow - colour of mature eggs. Mature eggs are clearly visible. Testes larger than stage 3 but usually smaller than ripe ovaries. Ovaries approximately > 5% of body weight. Testes approximately . 2.5% of body weight.

STAGE 5: Running ripe

Stage 4 and stage 5 are usually distinguished from each other through stripping: if eggs and sperm are fairly easily extruded through light abdominal pressure it is called stage 5. While in this investigation examination took place on fishes stored in formalin no distinction could be made between stages 4 and 5. They were combined to a stage 4/5 'ripe/running ripe'.

STAGE 6: Spent

Sexual products have been discharged and the gonads are empty. They have the appearance of deflated sacs.

Concerning sampling method, I used rotenone as described by Van Zwieten. Due to the nature of the streams in some parts of the sampling area, this method was not always optimal, especially when sampling for rainbow trout, which mainly occur in streams too big and too torrential for the rotenone method to be used. In those cases, I had to rely on trout specimens caught by villagers in addition to rotenone sampling.

The main part of the sampling stations are within the range of 600 to 1600 m.a.s.l., classified as "Lower mountain rivers" by Van Zwieten (1989) with the following general characteristics: "turbulent 'white-water' rivers, with runs and rapids and plunge pools beneath small waterfalls. Channels are often cutout in bedrock. In quiet pools alongside the main channel, there are sandy, sometimes silty substrates". The remaining stations are above 1600 m.a.s.l., and the same general characteristics apply for those streams. Below 1000 m.a.s.l. no stations were sampled.

Sampling stations are listed later.

Altitude is given in meters above sea level (m.a.s.l.); gradient is given in meters per meter (m/m); width, depth and length are given in meters; flow is given in liters per second.

SAMPLING STATIONS

1. Lamenofi River.

A tributary to Asaro River. The river surrounded by coffee plantation and grass land. Partly shadowed through a few big trees. Water very turbid and redish.

Date: 02.08.91	
Universal grid reference: 55MCP237196	Temp.: 17°C
Latitude: 6°09'	Width: 4.5
Longitude: 145°24'	Depth: 0.6
Altitude: 1380	Length: 50
Gradient: 0.00	Flow: 375

2. Wara Ngumi.

A typical mountainous torrential stream with gravel and stones as the main bottom material. Surrounded partly by forest, partly by gardens (coffee) and village houses. Rainbow trout has been stocked at the site in 1985.

Date: 03.08.91	
Universal grid reference: 55MBP913270	Temp.: 13°C
Latitude: 6°05'	Width: 6.0
Longitude: 145°07'	Depth: 0.8
Altitude: 1760	Length: 70
Gradient: 0.16	

3. Wattabung.

A mountainous stream with riffle and pools. Some of the pools very deep. Surrounded partly by grassland partly by forest. Approximately 500 m downstream the township of Wattabung. A few rainbow trout was stocked at the site in 1985.

Date: 03.08.91	
Universal grid reference: 55MCP013272	Temp.: 13°C
Latitude: 6°05'	Width: 5.5
Longitude: 145°12'	Depth: 0.8
Altitude: 1800	Length: 60
Gradient: 0.00	

4. Sokozoi River.

Tributary to Asaro River. Riffles and pools with some of the pools very big. Water clear. Surrounded partly by grassland partly by forest. Human activity in connection with stream (e.g. washing). Village nearby. Fish (probably carp) was reported by local people further upstream.

Date: 04.08.91	
Universal grid reference: 55MCP166232	Temp.: 16°C
Latitude: 6°07'	Width: 6.5
Longitude: 145°21'	Depth: 0.5
Altitude: 1440	Length: 80
Gradient: 0.00	

5. Gendua Creek

Very small creek close to Sokozoi River. It was said to dry out during dry season. Surrounded by grassland. Water clear.

Date: 04.08.91	
Universal grid reference: 55MCP167218	Temp.: 17°C
Latitude: 6°08'	Width: 2.0
Longitude: 145°21'	Depth: 0.2
Altitude: 1320	Length: 50
Gradient: 0.13	

6. Omaigiha Creek.

A typical mountainous torrential stream. Tributary to Kutuni River. Gravel and big stones was the main bottom material. Some parts very wide and very shallow (5 cm); other parts very narrow (0,5 m). Surrounded by forest. A decline in the trout stock was reported by the villagers.

Date: 04.08.91	
Universal grid reference: 55MCP213351	Temp.: 13°C
Latitude: 6°01'	Width: 2.1
Longitude: 145°23'	Depth: 0.30
Altitude: 1840	Length: 50
Gradient: 0.08	Flow: 397

7. Kintinu.

Mountainous stream with gravel and big stones creating pools, some big. Surrounded by grassland; a few trees at the edge of the stream created some shadow. Village nearby. More fish (gobies) than the one we caught was observed. The rotenone used in this sampling may have been of poor quality (and no detergent was used).

Date: 21.08.91	
Universal grid reference: 55MCP360099	Temp.: 15°C
Latitude: 6°15'	Width: 2.0
Longitude: 145°31'	Depth: 0.4
Altitude: 1520	Length: 80
Gradient: 0.07	

8. Henganofi 1.

Small tributary to Dunantina River south of Henganofi village. Alternating gravel/stone bottom and sand/mud bottom. Some deep pools (1-1,5 m). Water clear. Surrounded by forest and village gardens. Human activity in connection with stream (washing, collecting of drinking water). Gobies and eels was reported by local people, but in decreasing numbers since the arrival of carp.

Date: 21.08.91	
Universal grid reference: 55MCP462076	Temp.: 15°C
Latitude: 6°16'	Width: 2.5
Longitude: 145°37'	Depth: 0.9
Altitude: 1480	Length: 70
Gradient: 0.05	

9. Henganofi 2.

Small tributary to Dunantina River north of Henganofi village. Typical mountainous stream with gravel bottom. Water clear. Surrounded partly by grassland/gardens partly by forest. Village nearby.

Date: 22.08.91	Temp.: 15°C
Universal grid reference: 55MCP462087	Width: 2.5
Latitude: 6°15'	Depth: 0.15
Longitude: 154°37'	Length: 82
Altitude: 1560	Flow: 150
Gradient: 0.04	

10. Kurungka creek.

Tributary to Dunantina River at Highlands Highway bridge in Henganofi. Sand and gravel constitute the main part of bottom material. Water clear. Surrounded by gardens, grassland and swamps, with a few big trees. A lot of human activity around the stream. Gobies reported by local people; but they were said to have disappeared after the arrival of carp.

Date: 22.08.91	Temp.: 16°C
Universal grid reference: 55MCP473078	Width: 3.6
Latitude: 6°16'	Depth: 0.15
Longitude: 145°37'	Length: 56
Altitude: 1480	Flow: 202
Gradient: 0.00	

11. Keglsugl.

Small tributary to Simbu River close to Keglsugl. Typical mountainous riffle & pool stream with alternating gravel and sand bottom. Water clear. Surrounded mainly by forest.

Date: 11.09.91	Temp.: 10°C
Universal grid reference: 55MBP897548	Width: 2.0
Latitude: 5°50'	Depth: 0.5
Longitude: 145°06'	Length: 70
Altitude: 2300	
Gradient: 0.27	

12. Mondia Bridge.

A typical mountainous torrential stream with gravel/stone bottom. Width and depth very varied. Water clear. Surrounded by forest and gardens. Human activity around the stream. Trout reported.

Date: 11.09.91	Temp.: 10°C
Universal grid reference: 55MBP898535	Width: 7.5
Latitude: 5°51'	Depth: 0.5
Longitude: 145°06'	Length: 80
Altitude: 2320	
Gradient: 0.06	

13. Simbu River.

A site where Simbu River splits into two branches for about 75 m. Typical mountainous. Surrounded by gardens and grassland. Village nearby, and therefore a lot of human activity around the stream. Trout reported.

Date: 11.09.91	
Universal grid reference: 55MBP899537	Temp.: 10°C
Latitude: 5°51'	Width: 6.5
Longitude: 145°06'	Depth: 0.5
Altitude: 2320	Length: 50
Gradient: 0.06	

14. Gembogl River.

Mountainous river at Gembogl. Surrounded by forest and open land with no vegetation (caused by construction activities). Water slightly turbid. Trout reported.

Date: 11.09.91	
Universal grid reference: 55MBP894489	Temp.: 11°C
Latitude: 5°53'	Width: 7.0
Longitude: 145°06'	Depth: 0.7
Altitude: 2200	Length: 60
Gradient: 0.40	

15. Kuragamba River.

Mountainous stream with varied width and depth. Bottom consists of gravel/stones. A few big pools. Water clear. Surrounded by steep slopes of grassland and sparse scrub/tree vegetation. No human activity to be seen around the sampling site (relatively remote area).

Date: 12.09.91	
Universal grid reference: 55MBP916497	Temp.: 10°C
Latitude: 5°53'	Width: 6.2
Longitude: 145°07'	Depth: 0.48
Altitude: 2280	Length: 50
Gradient: 0.06	Flow: 1746

16. Pamba Creek.

Clearwater stream surrounded by a tea plantation. Bottom consists of sand/gravel/stones. Sampling site downstream a dirtroad bridge.

Date: 20.09.91	
Universal grid reference: 55MBP014503	Temp.: 14°C
Latitude: 5°52'	Width: 4.5
Longitude: 144°18'	Depth: 0.5
Altitude: 1640	Length: 70
Gradient: 0.04	

17. Rur Creek.

Turbid stream surrounded by grassland and village gardens. Bottom consists of sand/gravel. Human activity around the stream (probably the reason for the turbid stream).

Date: 20.09.91

Universal grid reference: 55MBP013498

Latitude: 5°52'

Longitude: 144°18'

Altitude: 1640

Gradient: 0.06

Temp.: 14°C

Width: 4.0

Depth: 0.5

Length: 60

18. Munga Creek.

Turbid stream surrounded by grassland. Sampling site downstream Highlands Highway bridge. Bottom consists of mud/sand/gravel. Human activity around stream.

Date: 21.09.91

Universal grid reference: 55MBP366534

Latitude: 5°51'

Longitude: 144°37'

Altitude: 1500

Gradient: 0.00

Temp.: 15°C

Width: 5.4

Depth: 0.30

Length: 87

Flow: 329

19. Kwiena Creek.

Small clearwater mountainous stream along the road from Banz to Tabibuga. Bottom consists of gravel/stones. Surrounded mainly by forest. Fish reported by local people (gobies).

Date: 21.09.91

Universal grid reference: 55MBP396642

Latitude: 5°45'

Longitude: 144°39'

Altitude: 1880

Gradient: 0.10

Temp.: 13°C

Width: 3.0

Depth: 0.4

Length: 60

20. Aparip Creek.

Small clearwater mountainous stream along the road from Banz to Tabibuga. Bottom consists of gravel/stones. Surrounded mainly by forest. We had to stop sampling after approx. 1 hour due to onset of heavy rainstorm.

Date: 22.10.91

Universal grid reference: 55MBP392613

Latitude: 5°46'

Longitude: 144°39'

Altitude: 1720

Gradient: 0.10

Temp.: 13°C

Width: 3.9

Depth: 0.30

Length: 75

Flow: 110

21. Kora Creek.

Turbid, redish stream. Bottom consists of silted gravel. Surrounded by tea plantation and village gardens. According to local people there were eels in the stream.

Date: 23.10.91

Universal grid reference: 55MBP200643

Latitude: 5°45'

Longitude: 144°28'

Altitude: 1560

Gradient: 0.00

Temp.: 14°C

Width: 2.8

Depth: 0.4

Length: 70

Flow: 240

22. Yu Creek.

Mountainous tributary to Nebilyer River. Surrounded mainly by grassland. Sampling site downstream Highlands Highway bridge. According to local people there were fish (trouts) in the stream earlier, but not anymore.

Date: 24.10.91

Universal grid reference: 55MAP812536

Latitude: 5°50'

Longitude: 114°07'

Altitude: 1800

Gradient:

Temp.: 13°C

Width: 8.0

Depth: 0.7

Length: 90

23. Asaro Village.

Turbid tributary to Asaro River running through Asaro Village. Surrounded by village gardens and grassland. Reports from local people were a bit contradictory. Some said that there were no fish, others that there were plenty.

Date: 25.10.91

Universal grid reference: 55MCP127357

Latitude: 6°00'

Longitude: 145°18'

Altitude: 1560

Gradient: 0.1

Temp.: 15°C

Width: 6.0

Depth: 0.7

Length: 70

24. Colese Creek.

Small, mountainous creek at Bomai, Simbu Province. Rocky and stony bottom, surrounded by forest. The stream was sampled in both 1991 and 1992.

Date: 27.11.91 and 16.05.92

Universal grid reference: 55MBN378943

Latitude: 6°23'

Longitude: 144°38'

Altitude: 1000

Gradient: 0.03

Temp.: 22°C

Width: 2.5

Depth: 0.30

Length: 40

Flow: 90

25. Karenda River.

Mountainous, clearwater-stream on the northern side of Mount Giluwe. Sampling site upstreams bridge on the old Mendi-Hagen road. Fish were reported by villagers (gudgeons?, trouts).

Date: 08.04.92

Universal grid reference: 54MZU023326

Latitude: 6°02'

Longitude: 143°44'

Altitude: 2220

Gradient: 0.08

Temp.: 11°C

Width: 8.0

Depth: 0.6

Length: 70

26. Anggura River.

Big, mountainous stream at the Mendi-Hagen road. The river was not rotenone-sampled (too big), but villagers nearby were asked to catch rainbow trout.

Date: 09.04.92 and 12.08.92

Universal grid reference: 54MZU133090

Latitude: 6°15'

Longitude: 143°50'

Altitude: 1760

Gradient: 0.05

Temp.: 13°C

Width: 30 - 35

Depth: 0.5 - 1

27. Ambili River.

Very turbid stream with muddy bottom flowing through a swampy area at Erave, Southern Highlands Province. Surrounded by forest (Pandanus)/grassland.

Date: 14.08.92

Universal grid reference: 54MZT194676

Latitude: 6°37'

Longitude: 143°53'

Altitude: 1040

Gradient: 0.00

Temp.: 22°C

Width: 5.4

Depth: 0.80

Length: 40

Flow: 287

28. Pendo Creek.

Small mountainous creek north of Erave (tributary to Erave River). Clear water and rocky/stony bottom. Surrounded by rainforest.

Date: 15.08.92

Universal grid reference: 54MZT207697

Latitude: 6°36'

Longitude: 143°54'

Altitude: 1120

Gradient: 0.20

Temp.: 21°C

Width: 2.2

Depth: 0.20

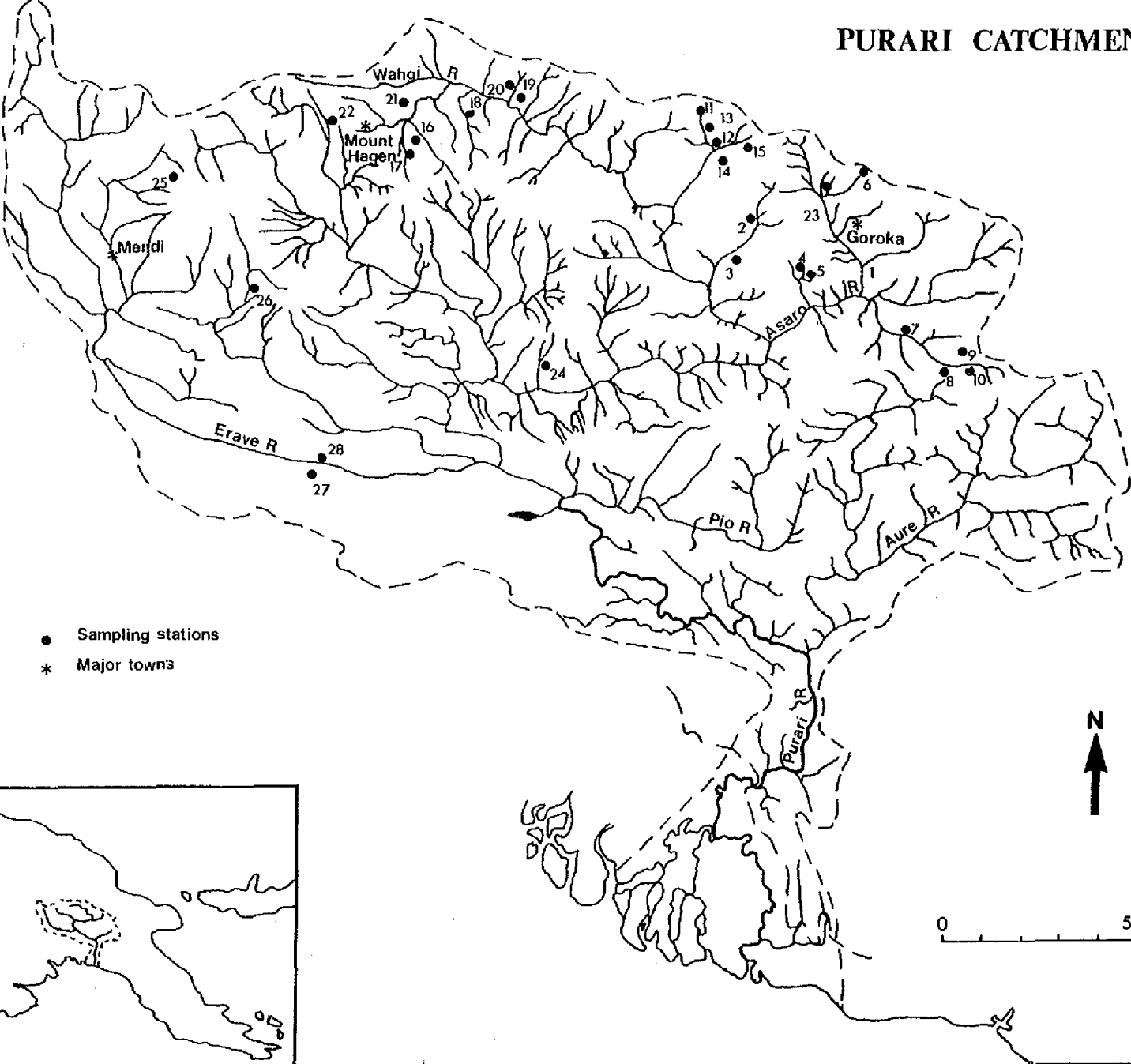
Length: 20

Flow: 35

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PURARI CATCHMENT



- Sampling stations
- * Major towns



0 50km

