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APPENDICES

Appendix A

Table 1 Number of population, births, deaths, in-migrants, out-migrants, rate of population change and population density by area and district: 2001

District/Sub District	Number of population			Population density (per sq.km.)
	Total	Male	Female	
Phetchaburi Province	459,042	223,764	235,278	73.74
Municipal area	158,072	76,871	81,201	545.91
Non-municipal area	300,970	146,893	154,077	50.70

Source: National statistical office (2002)

Table 2 Number of population by age group and district 2001

Age group (years)	District/Sub District		
	Petchaburi Province	Municipal area	Non-municipal area
0-4	28,673	9,537	19,136
5-9	32,419	11,135	21,284
5-9	32,453	11,139	21,314
15-19	35,532	11,856	23,675
20-24	38,063	12,519	25,544
25-29	39,438	12,823	26,615
30-34	41,309	14,045	27,264
35-39	39,674	13,857	25,817
40-44	34,029	12,472	21,557
45-49	26,888	9,849	17,039
50-54	20,814	7,545	13,269
55-59	15,363	5,552	9,811
60-64	14,182	5,025	9,157
65-69	12,446	4,369	8,077
70-74	8,858	3,161	5,697
75-79	5,668	1,939	3,729
80-84	2,943	1,077	1,866
85 and over	2,953	1,172	1,781
Unknown/Not Thai nationality	27,337	9,000	18,337
Total	459,042	158,072	300,970

Source: National statistical office (2002)

Table 3 Number of employed persons aged 15 years and over by industry and sex
round 4 (November): 2001

Industries	Number
Agriculture, hunting and forestry	94,712
Fishing	9,095
Innging and Quarrying	2,170
Manufacture	26,840
Electricity, gas and water supply	373
Construction	13,374
Wholesale and retail trade, repair of motor vehicles motorcycles and personal and household goods	35,308
Hotel and restuarants	17,544
Transport, storage and communication	5,981
Financial intermediation	1,609
Real estate, renting and business activities	2,450
Public administration and defence, compulsory security	6,732
Education	8,265
Health and social work	2,379
Other community, social and personal service activity	9,228
Total	236,060

Source: National statistical office (2002)

Table 4 Number of households in non-municipal area by annual income class and amohoe : 2001

District/Sub District	Number of household	Annual income class (Baht)							
		under 10,000	10,000 - 19,999	20,000 - 29,999	30,000 - 49,999	50,000 - 99,999	100,000 - 499,999	500,000 and over	Unknown
Muang									
Phetchaburi	16,956	1,490	2,297	2,616	2,762	3,506	2,545	574	1,166
Kaeng Krachan	5,965	316	700	1,218	1,232	1,346	722	19	412
Khao yoi	4,538	244	511	706	1,123	1,071	603	80	200
Cha-am	4,059	95	407	398	824	1,425	700	67	143
Tha Yang	10,700	1,017	1,321	1,300	1,784	2,589	2,066	34	589
Ban LAT	10,483	594	888	1,785	2,218	2,670	1,807	85	436
Ban Laem	6,889	345	571	717	1,259	2,149	1,508	52	288
Nong YA Plong	3,249	554	848	667	545	233	150	42	210
Total	62,839	4,655	7,543	9,407	11,747	14,989	10,101	953	3,444

Source: National statistical office (2002)

Table 5 Area, distance from district to province, number of municipalities muang, municipalities tambons, sub district administrative organization, villages and dwellings by district : 2001

District/Sub District	Area (Sq.km.)	Number of dwellings
Mueang Phetchaburi District	283.901	33,222
Kaeng Krachan District	2,500.478	9,043
Khao Yoi District	305.648	10,430
Cha-am District	660.662	27,873
Tha Yang District	736.667	24,410
Ban Lat District	298.138	12,310
Banlaem District	189.885	12,948
Nong Ya Plong District	1,249.799	9,043
Total	6,225.178	139,279

Source: National statistical office (2002)

Table 6 Land utilization: 1991 – 1998

Year	Area (rai)			
	Total land	Farm holdind land	Forest Inad	Others
1991	3,890,711	667,667	1,387,656	1,835,388
1992	3,890,711	686,340	1,376,483	1,827,888
1993	3,890,711	693,646	1,367,341	1,829,724
1994	3,890,711	702,945	1,362,253	1,825,513
1995	3,890,711	711,328	1,357,185	1,822,198
1996	3,890,711	700,180	1,351,589	1,838,942
1997	3,890,711	680,910	1,346,016	1,863,785
1998	3,890,711	664,130	1,340,466	1,886,115

Source: National statistical office (2002)

Table 7 Utilization of farm holding land: 1991-1998

Year	Total (rai)	Farm holding land (rai)						
		Dwelling	Paddy field	Under field crops	Under fruit trees and tree crops	Under vegetables and flowers	Livestock farm area	Idle land and others
2534 (1991)	67,667	30,152	329,291	154,975	100,433	9,184	8,065	35,567
2535 (1992)	686,340	32,154	339,907	199,543	96,561	4,604	6,092	7,479
2536 (1993)	693,646	32,040	349,606	200,483	95,574	3,860	4,604	7,479
2537 (1994)	702,945	32,519	346,110	186,859	112,402	6,064	6,254	12,737
2538 (1995)	724,065	33,927	342,649	171,910	129,262	10,436	7,261	28,620
2539 (1996)	700,180	32,170	341,783	150,671	136,866	9,284	6,455	22,951
2540 (1997)	680,910	30,972	339,347	121,506	143,562	8,230	5,810	31,483
2541 (1998)	664,130	28,932	334,555	99,751	148,263	7,198	4,519	40,912

Source: National statistical office (2002)

Table 8 Water capacity, production, sales, water supplied for public use and leak in streams, water for system production and number of consumers by district: 2001

District/ Sub District	Water Capacity (Cu.M.)	Water production (Cu.M.)	Water sales (Cu.M.)	Water Supplied for public use and leak in streams (Cu.M.)	Water for system production (Cu.M.)	Number of consumers (Persons)
Muang Phetchaburi	14,892,000.00	11,029,696.00	5,333,951.00	4,406,448.00	-	24,268.00
Kaeng Krachan	-	-	-	-	-	-
Khao Yoi	876,000.00	811,294.00	637,874.00	173,420.00	-	2,497.00
cha-am	7,344,000.00	6,480,000.00	2,850,397.00	2,138,400.00	-	7,194.00
Tha Yang	1,752,000.00	1,102,300.00	771,610.00	330,690.00	-	3,619.00
Ban Lat	788,400.00	365,000.00	328,500.00	36,500.00	-	1,391.00
Ban Laem	-	-	-	-	-	-
Nong Ya Plong	-	-	-	-	-	-
Total	25,652,400.00	19,788,290.00	9,922,332.00	7,085,458.00	-	38,969.00

Source: National statistical office (2002)

Table 9 Number of water resources by type of water resources and district: 2001

District/Sub District	Total	Type of water resources							
		Reservoir		Concrete wire	Dam	Pond	Canal, ditch	Artesian well	Hollow well
		Medium	Small						
Mueang									
Phetchaburi	-	-	-	-	-	-	-	-	-
Kaeng Krachan	34.00	1.00	30.00	2.00	-	1.00	-	-	-
Khao Yoi	8.00	1.00	7.00	-	-	-	-	-	-
Cha-am	20.00	6.00	11.00	3.00	-	-	-	-	-
Tha Yang	19.00	3.00	14.00	2.00	-	-	-	-	-
Ban Lat	5.00	-	5.00	-	-	-	-	-	-
Ban Laem	-	-	-	-	-	-	-	-	-
Nong Ya Plong	-	-	14.00	3.00	-	-	-	-	-
Total	103.00	11.00	81.00	10.00	-	1.00	-	-	-

Source: National statistical office (2002)

Table 10 Monthly rainfall, temperature and relative humidity: 2001

Month	Rainfall (mm)	No. of rainy days	Temperature (°C)		Relative humidity (%)	
			Minimum	Maximum	Mean min.	Mean max.
January	3.3	1	19.3	32.9	65.3	85.9
February	0.3	1	21.7	35.1	61.0	86.3
March	273.4	13	21.6	34.3	73.5	90.6
April	24.2	2	25.0	35.0	64.6	84.5
May	176.7	14	24.5	34.3	67.5	85.9
June	25.0	10	24.9	36.4	60.5	82.5
July	77.2	8	23.6	35.5	61.6	82.8
August	110.9	15	23.0	36.0	63.0	86.1
September	123.7	13	23.4	36.5	64.2	88.5
October	297.3	26	22.5	34.2	71.7	93.8
November	10.7	3	18.5	33.5	55.7	85.9
December	15.6	1	17.2	33.5	57.0	84.2
Annual	1138.3	107	17.2	36.5	63.8	86.4

Source: National statistical office (2002)

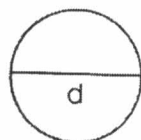
Appendix B

Finding the Biovolume of Phytoplankton

Finding the biovolume of phytoplankton (Rott, 1981) by measuring its width, length and thickness. Classification by mathematical shapes of the phytoplankton.

1. The shape of phytoplankton are spherical.

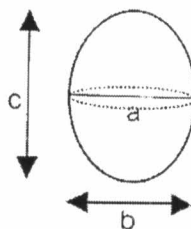
$$\text{Biovolume} = \frac{\pi d^3}{6}$$



d = Diameter

2. The shape of phytoplankton are ellipsoidal

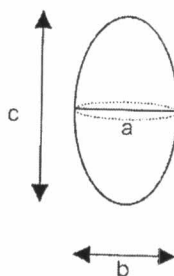
$$\text{Biovolume} = \frac{\pi \cdot c \cdot a^3}{6}$$



when $a = b$

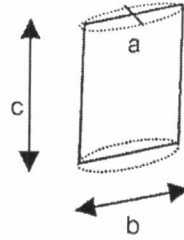
3. The shape of phytoplankton are elliptical-ellipsoid

$$\text{Biovolume} = \frac{\pi \cdot a \cdot b \cdot c}{6}$$

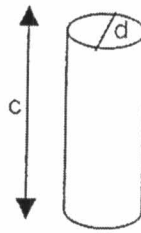


when $a \neq b$

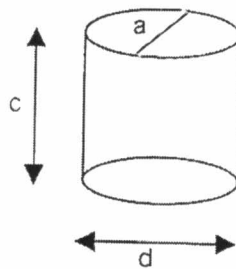
4. The shape of phytoplankton are pararelelelepipedal
 Biovolume = $a.b.c$



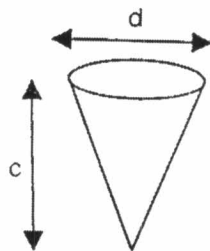
5. The shape of phytoplankton are cylindrical
 Biovolume = $\frac{\pi.c.d^3}{4}$



6. The shape of phytoplankton are elliptical-cylinder
 Biovolume = $\frac{\pi.c.d.a}{4}$

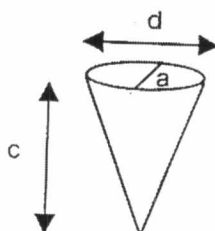


7. The shape of phytoplankton are cone
 Biovolume = $\frac{\pi.c.d^2}{12}$



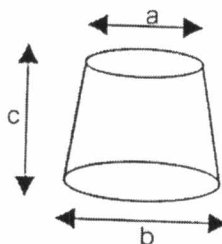
8. The shape of phytoplankton are cone-elliptic

$$\text{Biovolume} = \frac{\pi \cdot c \cdot d \cdot a}{12}$$



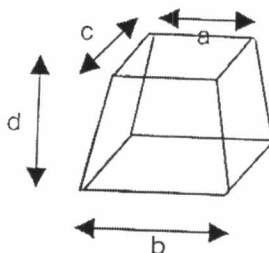
9. The shape of phytoplankton are truncated cone

$$\text{Biovolume} = \frac{\pi \cdot (a^2 + ab + b^2) \cdot c}{12}$$



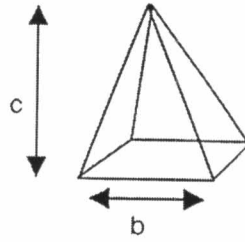
10. The shape of phytoplankton are trapezoid

$$\text{Biovolume} = \frac{1}{12} (a+b) \cdot c \cdot d$$

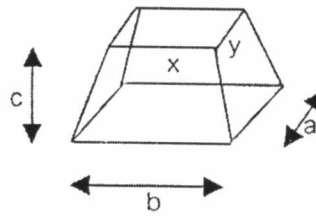


11. The shape of phytoplankton are pyramidal

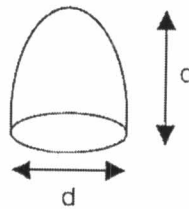
$$\text{Biovolume} = \frac{1}{3} \cdot a \cdot b \cdot c$$



12. The shape of phytoplankton are trapezoid
 Biovolume = $\frac{c(a.b+a.b.x.y+x.y)}{3}$



13. The shape of phytoplankton are parabolical
 Biovolume = $\frac{\pi.c.d^2}{8}$



แบบสอบถามเลขที่

แบบสัมภาษณ์ผู้อาศัยอยู่ในพื้นที่ลุ่มน้ำเพชรบุรี จังหวัดเพชรบุรี

แบบสอบถามนี้จัดทำขึ้น เพื่อรวบรวมข้อมูลและความคิดเห็น เพื่อนำมาประกอบการทำวิทยานิพนธ์ระดับปริญญาวิทยาศาสตรดุษฎีบัณฑิต สาขาวิชาคหศาสตร์ชีวภาพ คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย เรื่อง "แนวทางทางนิเวศวิทยาแบบผสมผสานเพื่อการจัดการลุ่มน้ำที่ยั่งยืน: กรณีศึกษาลุ่มน้ำเพชรบุรี ประเทศไทย" ซึ่งข้อมูลตลอดจนความคิดเห็นดังกล่าวจะเป็นประโยชน์ต่อการศึกษาวิจัยเท่านั้น และจะเก็บเป็นข้อมูลเฉพาะไม่เปิดเผย

ผู้วิจัยจึงขอขอบพระคุณอย่างสูงมา ณ โอกาสนี้

นางสาวชัตนารี มีสุขไช
นิสิตระดับปริญญาเอก จุฬาลงกรณ์มหาวิทยาลัย

มีนาคม 2546

ชื่อผู้สัมภาษณ์ วันเดือนปี เวลาที่ใช้ นาที

ส่วนที่ 1 : ข้อมูลทั่วไป เศรษฐกิจ และสังคม

- ชื่อผู้ให้สัมภาษณ์ ความสัมพันธ์กับครอบครัว
 หัวหน้าครอบครัว สมาชิกในครอบครัว ผู้อาศัย
- ที่อยู่บ้านเลขที่ หมู่ ตำบล

<input type="text"/> 2.1	อ.เมือง	<input type="text"/> 2.4	อ.ชะอำ	<input type="text"/> 2.7	อ.บ้านแหลม
<input type="text"/> 2.2	อ.เขาย้อย	<input type="text"/> 2.5	อ.ท่ายาง	<input type="text"/> 2.8	อ.แก่งกระจาน
<input type="text"/> 2.3	อ.หนองหญ้าปล้อง	<input type="text"/> 2.6	อ.บ้านลาด	<input type="text"/> 2.9	อ.เขาลูกช้าง
- เพศ
 3.1 ชาย 3.2 หญิง
- อายุ

<input type="text"/> 4.1	≤ 20 ปี	<input type="text"/> 4.3	31 - 40 ปี	<input type="text"/> 4.5	51 - 60 ปี
<input type="text"/> 4.2	21 - 30 ปี	<input type="text"/> 4.4	41 - 50 ปี	<input type="text"/> 4.6	60 ปี ขึ้นไป
- ระดับการศึกษา

<input type="text"/> 5.1	ประถมศึกษา	<input type="text"/> 5.4	อนุปริญญา / ปวส.	<input type="text"/> 5.7	ไม่ได้เรียน
<input type="text"/> 5.2	มัธยมศึกษาตอนต้น	<input type="text"/> 5.5	ปริญญาตรี	<input type="text"/> 5.8	อื่นๆ
<input type="text"/> 5.3	มัธยมศึกษาตอนปลาย / ปวช.	<input type="text"/> 5.6	สูงกว่าปริญญาตรี		
- สถานภาพการสมรส
 6.1 โสด (ข้ามไปข้อ 8) 6.2 แต่งงานแล้ว 6.3 ม่าย / หย่า / แยกกันอยู่
- จำนวนบุตร - ธิดา

<input type="text"/> 7.1	ไม่มี	<input type="text"/> 7.4	3 คน	<input type="text"/> 7.7	6 คน
<input type="text"/> 7.2	1 คน	<input type="text"/> 7.5	4 คน	<input type="text"/> 7.8	7 คน
<input type="text"/> 7.3	2 คน	<input type="text"/> 7.6	5 คน	<input type="text"/> 7.9	> 7 คน ระบุ คน
- จำนวนสมาชิกในครัวเรือนที่อาศัยอยู่ปัจจุบันทั้งหมด คน

<input type="text"/> 8.1	1 คน	<input type="text"/> 8.3	3 คน	<input type="text"/> 8.5	5 คน
<input type="text"/> 8.2	2 คน	<input type="text"/> 8.4	4 คน	<input type="text"/> 8.6	> 5 คน ระบุ คน
- จำนวนสมาชิกในครัวเรือนที่ทำงานแล้ว

<input type="text"/> 9.1	1 คน	<input type="text"/> 9.3	3 คน	<input type="text"/> 9.5	5 คน
<input type="text"/> 9.2	2 คน	<input type="text"/> 9.4	4 คน	<input type="text"/> 9.6	> 5 คน ระบุ คน

10. อาชีพหลักของท่าน

- | | | | | | |
|--------------------------------------|---------------------------|---------------------------------|-----------------------------|---------------------------------|----------------------------|
| <input type="checkbox"/> 10.1 | นักเรียน/นิสิต / นักศึกษา | <input type="checkbox"/> 10.5 | เกษตรกร (ไปทำ 10/1,2) | <input type="checkbox"/> 10.9 | เกษียณอายุ |
| <input type="checkbox"/> 10.2 | ข้าราชการ / รัฐวิสาหกิจ | <input type="checkbox"/> 10.6 | เก็บของป่า / เผาถ่าน | <input type="checkbox"/> 10.10 | อื่นๆ |
| <input type="checkbox"/> 10.3 | ธุรกิจส่วนตัว / ค้าขาย | <input type="checkbox"/> 10.7 | ประมง / เพาะเลี้ยงสัตว์น้ำ | | |
| <input type="checkbox"/> 10.4 | รับจ้าง / กรรมกร | <input type="checkbox"/> 10.8 | แม่บ้าน / ไม่ได้ประกอบอาชีพ | | |
| 10/1 <input type="checkbox"/> 10/1.1 | ใช้ปุ๋ยเคมีสูตร | <input type="checkbox"/> 10/1.2 | ใช้ปุ๋ยคอก | <input type="checkbox"/> 10/1.3 | ไม่ใช้ปุ๋ย |
| 10/2 <input type="checkbox"/> 10/2.1 | ใช้ยาฆ่าแมลงชื่อ | <input type="checkbox"/> 10/2.2 | ใช้ยาฆ่าหญ้า | <input type="checkbox"/> 10/2.3 | ไม่ใช้ยาฆ่าหญ้า, ยาฆ่าแมลง |

11. ท่านอาศัยอยู่ในจังหวัดเพชรบุรีจนถึงปัจจุบันเป็นระยะเวลาานเท่าใด

- | | | | | | |
|-------------------------------|------------|-------------------------------|------------|-------------------------------|------------|
| <input type="checkbox"/> 11.1 | < 1 ปี | <input type="checkbox"/> 11.4 | 21 – 30 ปี | <input type="checkbox"/> 11.7 | 51 – 60 ปี |
| <input type="checkbox"/> 11.2 | 1 – 10 ปี | <input type="checkbox"/> 11.5 | 31 – 40 ปี | <input type="checkbox"/> 11.8 | 60 – 70 ปี |
| <input type="checkbox"/> 11.3 | 11 – 20 ปี | <input type="checkbox"/> 11.6 | 41 – 50 ปี | <input type="checkbox"/> 11.9 | 70 – 80 ปี |

12. ที่ดินที่ใช้ทำกินต่อครอบครัว

- | | | | | | |
|-------------------------------|---------------|-----|-------------------------------|----------------------------------|-----|
| <input type="checkbox"/> 12.1 | เจ้าของ | ไร่ | <input type="checkbox"/> 12.3 | ได้รับที่ทำกินจากรัฐจัดสรร | ไร่ |
| <input type="checkbox"/> 12.2 | เช่า | ไร่ | <input type="checkbox"/> 12.4 | อื่นๆ | ไร่ |

13. ที่ดินประกอบด้วย

- | | | | | | |
|-------------------------------|--|-----|-------------------------------|--------------------------------------|-----|
| <input type="checkbox"/> 13.1 | ที่พักอาศัย | ไร่ | <input type="checkbox"/> 13.4 | ที่ตั้งโรงงานอุตสาหกรรม | ไร่ |
| <input type="checkbox"/> 13.2 | ที่ทำการเกษตร | ไร่ | <input type="checkbox"/> 13.5 | ที่ทำการค้าขาย / ธุรกิจส่วนตัว | ไร่ |
| <input type="checkbox"/> 13.3 | ที่ทำการประมง/เพาะเลี้ยงสัตว์น้ำ | ไร่ | <input type="checkbox"/> 13.6 | อื่นๆ | ไร่ |

14. รายได้เฉลี่ยต่อเดือนของท่าน

- | | | | | | |
|-------------------------------|--------------------|-------------------------------|-------------------|--------------------------------|-------------------|
| <input type="checkbox"/> 14.1 | น้อยกว่า 3,000 บาท | <input type="checkbox"/> 14.5 | 12,001-15,000 บาท | <input type="checkbox"/> 14.9 | 24,001-27,000 บาท |
| <input type="checkbox"/> 14.2 | 3,001-6,000 บาท | <input type="checkbox"/> 14.6 | 15,001-18,000 บาท | <input type="checkbox"/> 14.10 | 27,001-30,000 บาท |
| <input type="checkbox"/> 14.3 | 6,001-9,000 บาท | <input type="checkbox"/> 14.7 | 18,001-21,000 บาท | <input type="checkbox"/> 14.11 | > 30,000 บาท |
| <input type="checkbox"/> 14.4 | 9,001-12,000 บาท | <input type="checkbox"/> 14.8 | 21,001-24,000 บาท | <input type="checkbox"/> 14.12 | ไม่มีรายได้ |

15. รายได้เฉลี่ยต่อเดือนของครอบครัวของท่าน

- | | | | | | |
|-------------------------------|--------------------|-------------------------------|-------------------|--------------------------------|-------------------|
| <input type="checkbox"/> 15.1 | น้อยกว่า 3,000 บาท | <input type="checkbox"/> 15.5 | 12,001-15,000 บาท | <input type="checkbox"/> 15.9 | 24,001-27,000 บาท |
| <input type="checkbox"/> 15.2 | 3,001-6,000 บาท | <input type="checkbox"/> 15.6 | 15,001-18,000 บาท | <input type="checkbox"/> 15.10 | 27,001-30,000 บาท |
| <input type="checkbox"/> 15.3 | 6,001-9,000 บาท | <input type="checkbox"/> 15.7 | 18,001-21,000 บาท | <input type="checkbox"/> 15.11 | > 30,000 บาท |
| <input type="checkbox"/> 15.4 | 9,001-12,000 บาท | <input type="checkbox"/> 15.8 | 21,001-24,000 บาท | | |

16. ครอบครัวของท่านมีเงินเหลือเก็บในแต่ละเดือนหรือไม่

- | | | | |
|-------------------------------|----|-------------------------------|-------|
| <input type="checkbox"/> 16.1 | มี | <input type="checkbox"/> 16.2 | ไม่มี |
|-------------------------------|----|-------------------------------|-------|

17. การดำรงตำแหน่งต่าง ๆ ในสังคม

- | | | | | | |
|-------------------------------|----------------------|-------------------------------|--|-------------------------------|-----------------------------------|
| <input type="checkbox"/> 17.1 | ไม่เคย (ไปตอบข้อ 18) | <input type="checkbox"/> 17.2 | เคยหรือกำลังอยู่ในตำแหน่ง (เลือกข้อย่อย) | | |
| | | <input type="checkbox"/> 17.3 | กำนัน / ผู้ใหญ่บ้าน | <input type="checkbox"/> 17.6 | ผู้นำชุมชน |
| | | <input type="checkbox"/> 17.4 | อบต. | <input type="checkbox"/> 17.7 | สมาชิกต่างๆ เช่น ลูกเสือ |
| | | <input type="checkbox"/> 17.5 | ผู้นำศาสนา | | ชาวบ้าน อาสาปราบปรามยาเสพติด |
| | | | | | ชุมชนรักษาน้ำเพชร ตาวิเศษ เป็นต้น |
| | | | | | อื่นๆ ระบุ |

18. ที่อยู่อาศัยของท่านมีลักษณะอย่างไร

- | | | | | | |
|-------------------------------|-------------|-------------------------------|---------------|-------------------------------|------------------------|
| <input type="checkbox"/> 18.1 | บ้านเดี่ยว | <input type="checkbox"/> 18.3 | ห้องแถว (ไม่) | <input type="checkbox"/> 18.5 | คอนโดมิเนียม / แมนชั่น |
| <input type="checkbox"/> 18.2 | ทาวน์เฮ้าส์ | <input type="checkbox"/> 18.4 | ตึกแถว | <input type="checkbox"/> 18.6 | อื่นๆ ระบุ |

19. น้ำอุปโภคและบริโภคที่ท่านใช้มาจากแหล่งใดมากที่สุด

- | | | | |
|-------------------------------|---------------------------|-------------------------------|------------------------------|
| <input type="checkbox"/> 19.1 | น้ำประปา | <input type="checkbox"/> 19.2 | น้ำฝน |
| <input type="checkbox"/> 19.3 | บ่อน้ำขุดตื้น / บ่อนบาดาล | <input type="checkbox"/> 19.4 | ซื้อจากรถขายน้ำ |
| <input type="checkbox"/> 19.5 | แม่น้ำ ลำคลอง หนอง บึง | <input type="checkbox"/> 19.6 | บริเวณเขื่อนแก่งกระจานโดยตรง |
| <input type="checkbox"/> 19.7 | อื่นๆ ระบุ | | |

20. ที่อยู่อาศัยของท่านมีการระบายน้ำทิ้งในลักษณะใด

- | | | | |
|-------------------------------|-----------------------------|-------------------------------|--|
| <input type="checkbox"/> 20.1 | ปล่อยลงท่อระบายน้ำของเทศบาล | <input type="checkbox"/> 20.2 | ปล่อยลงคลอง แม่น้ำ เขื่อน ทะเล |
| <input type="checkbox"/> 20.3 | ปล่อยลงบนพื้นดิน | <input type="checkbox"/> 20.4 | ปล่อยลงบนพื้นดินโดยมีบ่อพักกักเก็บเศษอาหาร |

21. ท่านได้รับข่าวสารด้านอนุรักษ์และการจัดการลุ่มน้ำ ต้นน้ำลำธาร ป่าไม้ ทรัพยากรธรรมชาติ แม่น้ำ ชายฝั่งทะเลและมลพิษทางน้ำจากสื่ออะไรมากที่สุด

- | | | | |
|-------------------------------|-----------------------|-------------------------------|---|
| <input type="checkbox"/> 21.1 | วิทยุ | <input type="checkbox"/> 21.5 | การประชุม / เอกสารในหมู่บ้าน ชุมชน หรือการบอกต่อๆ กัน |
| <input type="checkbox"/> 21.2 | โทรทัศน์ | <input type="checkbox"/> 21.6 | การประชุม / เอกสารจากสถานที่ทำงาน/สถานศึกษา |
| <input type="checkbox"/> 21.3 | หนังสือพิมพ์ | <input type="checkbox"/> 21.7 | วิทยุกระจายเสียงของชุมชน/หมู่บ้าน |
| <input type="checkbox"/> 21.4 | นิตยสาร / วารสารต่างๆ | <input type="checkbox"/> 21.8 | อื่นๆ ระบุ |

22. ข่าวสารต่างๆ ที่ท่านได้รับมีความถี่มากน้อยเพียงใด

- | | | | |
|-------------------------------|-----------------------------------|-------------------------------|----------------------------------|
| <input type="checkbox"/> 22.1 | เป็นประจำ (3-4 ครั้งต่อสัปดาห์) | <input type="checkbox"/> 22.3 | นานๆ ครั้ง (1-2 ครั้งต่อเดือน) |
| <input type="checkbox"/> 22.2 | บ่อยครั้ง (1-2 ครั้งต่อสัปดาห์) | <input type="checkbox"/> 22.4 | ไม่เคยได้รับข่าวสาร |

23. ท่านเคยประสบภัยธรรมชาติชนิดใดมากที่สุด (1 ข้อเท่านั้น)

- | | | | |
|-------------------------------|--------------|-------------------------------|------------------|
| <input type="checkbox"/> 23.1 | น้ำท่วม | <input type="checkbox"/> 23.4 | ดินถล่ม |
| <input type="checkbox"/> 23.2 | ไฟป่า | <input type="checkbox"/> 23.5 | มรสุมชายทะเล |
| <input type="checkbox"/> 23.3 | ความแห้งแล้ง | <input type="checkbox"/> 23.6 | อื่นๆ ระบุ |

ส่วนที่ 2 ความรู้ทั่วไปเกี่ยวกับการจัดการลุ่มน้ำ

กรุณาทำเครื่องหมาย \checkmark ในข้อที่เห็นว่า ถูก และ X ในข้อที่เห็นว่า ผิด

ข้อ	รายละเอียด	คำตอบ	หมายเหตุ
24	การจัดการลุ่มน้ำกับการจัดการแม่น้ำมีความแตกต่างกัน โดยเฉพาะอย่างยิ่งในเรื่องของขนาดของพื้นที่ กล่าวคือ พื้นที่ของการจัดการแม่น้ำมีขนาดใหญ่กว่าลุ่มน้ำ		
25	พื้นที่ป่าต้นน้ำของลุ่มน้ำเพชรบุรีส่วนใหญ่อยู่ในเขตอุทยานแห่งชาติแก่งกระจานฯ		
26	เขื่อนแก่งกระจานสร้างขึ้นขวางลำน้ำเพชรบุรีเพื่อกักเก็บน้ำไว้สำหรับผลิตกระแสไฟฟ้าและการประปาเท่านั้น		
27	หลังการประกาศตั้งอุทยานแห่งชาติแก่งกระจานขึ้น ปัจจุบันทางการฯ ยังคงมีการอนุโลมผ่อนผันให้ประชาชนทำการเกษตรกรรมบริเวณพื้นที่ต้นน้ำเหนือเขื่อนแก่งกระจานได้		
28	การใช้ปุ๋ยเคมีเพื่อการเกษตรกรรม ไม่มีผลเสียใดๆ ต่อสิ่งแวดล้อมในพื้นที่ลุ่มน้ำเพชรบุรี		
29	ปัจจุบันสัตว์น้ำ โดยเฉพาะปลาชนิดต่าง ๆ ในเขื่อนแก่งกระจานยังคงอุดมสมบูรณ์สร้างรายได้ให้กับผู้ทำอาชีพประมงได้เป็นอย่างดี ไม่แตกต่างจากช่วง 10 กว่าปีที่ผ่านมา		
30	การเกิดมลพิษในแม่น้ำเพชรบุรีบริเวณเขตเทศบาลเมืองเกิดจากสาเหตุหลักสำคัญที่สุด คือ การปล่อยน้ำทิ้งจากอาคารบ้านเรือนที่อยู่อาศัยลงสู่แม่น้ำ		
31	การอนุรักษ์และการจัดการลุ่มน้ำเพชรบุรี เป็นหน้าที่ของรัฐและคนในหน่วยงานของรัฐเท่านั้น		

ข้อ	รายละเอียด	คำตอบ	หมายเหตุ
32	ปัญหามลพิษบริเวณปากน้ำเพชรบุรีและชายฝั่งทะเล เป็นหน้าที่ของชุมชนชาวประมงที่อาศัยอยู่ในบริเวณนั้นเท่านั้นที่ต้องช่วยกันดูแลรักษาและแก้ไข		
33	การก่อสร้างใด ๆ เช่น อาคารบ้านเรือน ร้านอาหาร โรงแรม สถานที่ราชการ เป็นต้น ยื่นไปในส่วนของแม่น้ำหรือชายฝั่งทะเลถือว่าเป็นสิ่งไม่ผิดกฎหมายและสามารถกระทำได้โดยมิต้องขออนุญาตใด ๆ		
34	การดูแลรักษาและการจัดการลุ่มน้ำเพชรบุรี เป็นเรื่องที่ชาวเพชรบุรีทุกคนสามารถกระทำได้ โดยเริ่มจากการสร้างวินัยภายในครอบครัว โรงเรียน ที่ทำงาน ตลอดจนการเข้าร่วมในกิจกรรมต่าง ๆ ที่จัดขึ้นเพื่อการอนุรักษ์ลุ่มน้ำเพชรบุรี		

ส่วนที่ 3 การมีส่วนร่วมในการจัดการลุ่มน้ำเพชรบุรี

การมีส่วนร่วมของชุมชนในการจัดการลุ่มน้ำหมายถึง การมีบทบาทของประชาชนในเรื่องการจัดการน้ำให้มีเพียงพอต่อความต้องการทั้งในเรื่องคุณภาพและปริมาณของน้ำ การไหลของน้ำ ตลอดจนสภาพของแหล่งน้ำในพื้นที่ลุ่มน้ำนั้น

กรุณาทำเครื่องหมาย ✓ ในช่องที่ท่านเลือกตอบ

1. การแสดงความคิดเห็นในชุมชน พฤติกรรมปฏิบัติ		เคย	ไม่เคย	หมายเหตุ
35	เสนอปัญหาเรื่องต้นน้ำ			
36	เสนอหัวข้อกิจกรรมเพื่อการอนุรักษ์ทรัพยากรต่าง ๆ เช่น ป่าไม้ แหล่งน้ำ ดิน			
37	ชักชวนเพื่อนบ้านในการอนุรักษ์ทรัพยากรต่าง ๆ ในชุมชนของท่าน			
38	เสนอความคิดเห็นด้านการจัดการแหล่งน้ำ การแบ่งปันน้ำ การจัดการดินและป่า			
39	แสดงความคิดเห็นด้านการจัดการน้ำทิ้งและขยะมูลฝอย			
40	ชักชวนชาวบ้านในการจัดตั้งชมรมต่าง ๆ โดยมีวัตถุประสงค์เพื่อการอนุรักษ์และจัดการทรัพยากรต่าง ๆ ในลุ่มน้ำเพชรบุรี			
41	ตักเตือนผู้ทำลายทรัพยากรเมื่อพบเห็น / ได้รับความ เช่น ผู้ตัดไม้บริเวณต้นน้ำ ผู้ทิ้งขยะลงแม่น้ำ			
42	ประสานงานกับเจ้าหน้าที่ราชการเพื่อการดำเนินการต่าง ๆ สะดวกรวดเร็วขึ้น			
43	รายงานเจ้าหน้าที่เมื่อพบเห็นหรือได้รับความเดือดร้อนอันเกิดผลเสียต่อทรัพยากร เช่น การเกิดไฟฟ้า การทำลายป่า การใช้ยามาหน้ำในพื้นที่ห้ามใช้			
44	ปลูกป่าไม้ในพื้นที่ตนเอง สร้างบ่อดักน้ำทิ้งของบ้านเรือนตนเอง กำจัดขยะมูลฝอยด้วยวิธีการที่เหมาะสมหรือตามที่รัฐจัดให้			
2. กิจกรรมที่มีส่วนร่วมในการจัดการ กิจกรรม		เคย	ไม่เคย	หมายเหตุ
45	กิจกรรมเกี่ยวกับการดูแลรักษาต้นน้ำ			
46	กิจกรรมเกี่ยวกับการอนุรักษ์ป่าไม้			
47	กิจกรรมเกี่ยวกับการอนุรักษ์ดิน			
48	กิจกรรมเกี่ยวกับการดูแลรักษาแหล่งน้ำต่างๆ			
49	กิจกรรมเกี่ยวกับการดูแลรักษาทรัพยากรอื่น ๆ ในเขตลุ่มน้ำ เช่น สัตว์น้ำ ชายหาดหรือชายฝั่งทะเล			
50	กิจกรรมเกี่ยวกับการดูแลด้านมลภาวะ เช่น คุณภาพน้ำ การกำจัดขยะมูลฝอย			

กิจกรรม		เคย	ไม่เคย	หมายเหตุ
51	กิจกรรมเกี่ยวกับการพัฒนาคุณภาพน้ำในพื้นที่ให้มีสภาพที่ดีขึ้น เช่น การขุดลอกแม่น้ำบริเวณที่ต้นเขิน การปล่อยพันธุ์สัตว์น้ำ			
52	กิจกรรมเกี่ยวกับการร่วมประชุมด้านแหล่งน้ำ การใช้ที่ดิน การกำจัดสิ่งปฏิกูล			
53	กิจกรรมเกี่ยวกับการอนุรักษ์ทรัพยากรต่าง ๆ ในพื้นที่ชุมชนของตน			
54	กิจกรรมการป้องกันสิ่งแวดล้อมภายในชุมชนของตน เช่น การทำแนวป้องกันไฟฟ้า			
3. การร่วมรับผิดชอบหรือความต้องการ การมีส่วนร่วมรับผิดชอบ		ต้อง การ	ไม่ ต้องการ	หมายเหตุ
55	ต้องการดำเนินโครงการรักษาต้นน้ำลำธารร่วมกัน			
56	ต้องการเสนอโครงการรักษาต้นน้ำลำธาร แหล่งน้ำ การแบ่งปันน้ำใช้ ในเขตชุมชนของตน			
57	ต้องการดำเนินโครงการพัฒนาคุณภาพน้ำแบบผสมผสาน เพื่อการใช้ประโยชน์อย่างคุ้มค่าเหมาะสม เช่น การปลูกพืชเศรษฐกิจตามฤดูกาล การแบ่งสัดส่วนพื้นที่ถือครอง เพื่อใช้สอยในด้านต่างๆ อย่างคุ้มค่า			
58	ต้องการแก้ปัญหาพื้นที่ต้นน้ำลำธาร ป่าไม้ ดิน รวมถึงทรัพยากรอื่น ๆ ในลุ่มน้ำที่ถูกทำลายโดยชุมชน			
59	ต้องการเสนอและดำเนินโครงการกำจัดสิ่งปฏิกูล เช่น น้ำทิ้งขยะมูลฝอยอย่างถูกวิธี ร่วมกันภายในชุมชนของตน			
4. การมีส่วนร่วมด้านอื่น ๆ ในการจัดการลุ่มน้ำ ความต้องการ		ต้อง การ	ไม่ ต้องการ	หมายเหตุ
60	ความต้องการความรู้ด้านการจัดการลุ่มน้ำที่เหมาะสมถูกต้อง ทั้งในเชิงหลักการและการปฏิบัติ			
61	ความต้องการข่าวสารต่าง ๆ ที่เกี่ยวข้องกับการอนุรักษ์และจัดการในลุ่มน้ำที่ตนอาศัยอยู่			
62	ความต้องการในการร่วมลงแรงในการปฏิบัติกิจกรรมเพื่อการอนุรักษ์ลุ่มน้ำ			
63	ความต้องการเป็นผู้นำในการปฏิบัติกิจกรรมเพื่อการอนุรักษ์ลุ่มน้ำ			
64	ความต้องการติดตามผลและประเมินผลกิจกรรมต่าง ๆ ที่ร่วมกันปฏิบัติ			

ส่วนที่ 4 ความเต็มใจในการบริจาค

พื้นที่ลุ่มน้ำเพชรบุรีเป็นแหล่งกำเนิดของแม่น้ำเพชรบุรี ซึ่งในอดีตถือเป็นลุ่มน้ำศักดิ์สิทธิ์ โดยเฉพาะอย่างยิ่งพระมหากษัตริย์หลายพระองค์ทรงเสวยน้ำซึ่งต้องนำมาจากบริเวณต้นน้ำเพชรเท่านั้น รวมถึงการนำไปใช้ประกอบในพระราชพิธีสำคัญต่างๆ นอกจากนี้แม่น้ำเพชรยังเป็นแม่น้ำสายหลักที่หล่อเลี้ยงชีวิตของชาวเพชรบุรีและบางอำเภอในจังหวัดใกล้เคียง ปัจจุบันแม่น้ำเพชรหลายบริเวณเกิดความเสื่อมโทรมลงทั้งในด้านปริมาณและคุณภาพ ตลอดจนทรัพยากรอื่นๆ เช่น สัตว์น้ำ พืชน้ำ สภาพดิน ป่าไม้ และรวมถึงชายฝั่งทะเลที่อยู่ในพื้นที่ลุ่มน้ำเพชรบุรี ดังนั้น โครงการบำบัดน้ำเสียที่แหลมผักเบี้ย จังหวัดเพชรบุรี ซึ่งเป็นหนึ่งในโครงการในพระราชดำริของพระบาทสมเด็จพระเจ้าอยู่หัว จึงได้เกิดขึ้นเพื่อฟื้นฟู ปรับปรุง และบำบัดน้ำเสียให้กลับมีสภาพที่ดีขึ้น นอกจากนี้ยังมีโครงการอื่นๆ ทั้งที่ดำเนินการโดยองค์กรของรัฐ ภาคเอกชน และประชาชนชาวเพชรบุรี เพื่อจุดมุ่งหมายในการอนุรักษ์และจัดการลุ่มน้ำเพชรบุรีให้มีสภาพดีขึ้น ซึ่งในการจัดกิจกรรมเหล่านี้ ต้องอาศัยเงินทุน แรงงาน และความร่วมมือของชาวเพชรบุรีทุกท่าน

65. ท่านเห็นด้วยหรือไม่ กับการจัดกิจกรรมต่างๆ เพื่อการอนุรักษ์และจัดการลุ่มน้ำเพชรบุรีให้มีสภาพดีขึ้น

65.1 ไม่เห็นด้วย

65.2 เห็นด้วย

คำถามต่อไปนี้มีได้เป็นการผูกมัดให้ปฏิบัติ แต่เป็นเพียงคำตอบที่ต้องการทราบถึงความตระหนักในด้านการอนุรักษ์และจัดการ
ลุ่มน้ำเพชรบุรีของท่าน โดยกรณีสมมติ กล่าวคือ

“แม้ว่าทางภาครัฐจะรับผิดชอบในเรื่องงบประมาณในการดำเนินกิจกรรมเหล่านี้บางส่วนหนึ่งแล้ว แต่อย่างไรก็ตามยังคงไม่เพียงพอทั้งด้านทรัพยากรและแรงงาน ดังนั้น**สมมติ**ว่าการประกอบกิจกรรมใดๆ และต้องการความช่วยเหลือในด้านการบริจาคเงินและแรงงานเพิ่มเติมจากชาวเพชรบุรี เพื่อให้สามารถดำเนินกิจกรรมอย่างมีประสิทธิภาพและบรรลุวัตถุประสงค์”

66. หากมีกิจกรรมเกี่ยวกับการอนุรักษ์ลุ่มน้ำเพชรบุรี มาขอความช่วยเหลือในการบริจาคจากท่าน ท่านยินดีหรือไม่ที่จะร่วม
บริจาคเพื่อสมทบกองทุนการอนุรักษ์ลุ่มน้ำเพชรบุรี
- 66.1 ไม่ยินดีบริจาค (ตอบข้อ 67) 66.2 ยินดีบริจาค (ตอบข้อ 68)
67. ไม่ยินดี เนื่องจาก
- 67.1 ฐานะทางครอบครัวไม่อยู่ในสภาพที่พร้อมจะบริจาค
- 67.2 มีความเห็นว่าการดำเนินการต่างๆ เพื่ออนุรักษ์และจัดการลุ่มน้ำเพชรบุรี เป็นหน้าที่และความรับผิดชอบ
ของรัฐและหน่วยงานของรัฐเท่านั้น ทั้งในด้านเงินทุนและแรงงาน
- 67.3 ไม่เคยได้รับข่าวสารข้อมูลเกี่ยวกับเรื่องนี้มาก่อน จึงไม่แน่ใจว่าจะประสบความสำเร็จตามวัตถุประสงค์
- 67.4 เคยได้รับทราบข่าวสารข้อมูลเหล่านี้ แต่มีความเห็นว่า กิจกรรมต่างๆ ไม่ประสบความสำเร็จตามวัตถุประสงค์
- 67.5 ไม่เห็นว่าจะได้รับประโยชน์ใดๆ จากการบริจาค
- 67.6 อื่นๆ
68. กรณียินดีบริจาค (ตามสถานภาพทางการเงิน) ท่านมีความประสงค์จะบริจาคด้วยวิธีใดมากที่สุด (เลือกตอบ 1 ข้อเท่านั้น)
- 68.1 แรงงาน (ตอบข้อ 69) 68.2 เงิน (ตอบข้อ 70) 68.3 อื่นๆ
69. ท่านยินดีร่วมบริจาคเป็นแรงงานเพื่อกิจกรรมต่างๆ
- 69.1 เป็น ครั้งเดียวต่อปี เป็นจำนวน วัน/ปี
- 69.2 เป็น ประจำทุกเดือน เป็นจำนวน วัน/เดือน รวมเป็นจำนวน วัน/ปี
- 69.3 อื่นๆ
70. ท่านยินดีร่วมบริจาคเงินในลักษณะใด
- 70.1 บริจาคสมทบกองทุนเป็น แบบครั้งเดียวต่อปี เป็นจำนวนเงิน บาท/ปี
- 70.2 บริจาคสมทบกองทุนเป็น แบบประจำทุกเดือน เป็นจำนวนเงิน บาท/เดือน
- 70.3 อื่นๆ
71. สาเหตุที่สำคัญที่สุดในขณะนี้ ที่ทำให้ท่านตัดสินใจร่วมบริจาค
- 71.1 เพราะเห็นความสำคัญและประโยชน์ของกิจกรรมเพื่อการอนุรักษ์ลุ่มน้ำเพชรบุรีอย่างแท้จริง และเห็นว่า
กิจกรรมต่างๆ จะบรรลุวัตถุประสงค์ได้เป็นอย่างดี
- 71.2 เพราะเห็นว่าเป็นการร่วมทำบุญ-ทำกุศล แต่ไม่แน่ใจในความสำคัญและประโยชน์ของกิจกรรม รวมถึง
ประสิทธิภาพของการดำเนินโครงการ
- 71.3 เพราะเห็นว่าปัจจุบันกระแสอนุรักษ์กำลังอยู่ในความสนใจของคนทั่วไป ดังที่มีให้เห็นตามสื่อต่างๆ โดยทั่วไป
- 71.4 อื่นๆ
72. ข้อเสนอแนะเพิ่มเติมที่ท่านต้องการให้มีขึ้นในลุ่มน้ำเพชรบุรีของท่าน
- 72.1
- 72.2

ขอขอบพระคุณเป็นอย่างสูง

Appendix D

Table 1 Average values of ecological parameters at station P1 (The primitive area at head water, Phetchaburi River) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	.80	5.20	2.6500	1.75577
Transparency depth	.30	1.40	.8075	.37031
Temperature	23.40	27.00	24.8500	1.36947
pH of water	6.90	7.70	7.2500	.28123
Dissolved Oxygen	7.20	8.80	8.1167	.49879
Suspended solid	.800	20.200	12.68333	7.743750
NH3-N	.000	5.356	1.69989	2.261123
NO2-N	.688	2.065	1.35025	.442109
NO3-N	3.513	110.062	47.46481	44.040820
PO4-P	.000	14.912	6.67892	5.440366
Silica	4.047	13.344	10.04933	3.301275
Chlorophyll a	.346	2.799	1.33400	.917030
Phytoplankton density	314050000	14920000000.	5043340855	4744167713

Table 2 Average values of ecological parameters at station P2 (agricultural area at the downstream, Mae Pradon Subwatershed, from December 2001 to October 2002)

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	3.95	6.45	5.1125	1.03246
Transparency depth	.70	1.65	1.2333	.32427
Temperature	25.00	32.00	27.9417	2.30827
pH of water	6.40	7.30	6.6583	.32322
Dissolved Oxygen	5.40	7.20	6.5667	.64291
Suspended solid	1.000	12.600	5.45000	4.028772
NH3-N	.000	9.760	6.33136	3.217761
NO2-N	.459	3.316	2.22297	.867596
NO3-N	2.792	105.409	30.98389	36.062597
PO4-P	.000	26.842	9.70572	10.123199
Silica	3.754	14.154	9.79156	4.048897
Chlorophyll a	.720	17.492	5.90900	6.423572
Phytoplankton density	32650000	18111666667	7473403983	7045391056



Table 3 Average values of ecological parameters at station P3 (agricultural area at the upstream, Phetchaburi River) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	6.80	15.50	11.3667	2.81210
Transparency depth	.90	1.85	1.3833	.30251
Temperature	24.50	30.60	28.2167	1.84136
pH of water	7.20	7.90	7.5083	.21515
Dissolved Oxygen	7.30	8.30	7.8417	.38009
Suspended solid	.600	14.200	6.06667	5.495695
NH3-N	.000	6.315	2.25617	2.468952
NO2-N	.229	1.741	1.00161	.489850
NO3-N	.348	21.286	6.76733	6.727124
PO4-P	.000	5.965	2.66272	2.239568
Silica	2.779	12.101	9.04275	3.380351
Chlorophyll a	3.337	20.854	9.76717	5.217599
Phytoplankton density	6959700000	6484443300000	1481579276765	2364885729833

Table 4 Average values of ecological parameters at station P4 (Kaeng Krachan Reservoir) from December 2001 to October 2000

	Minimum	Maximum	Mean	Std. Deviation
Water depth	8.00	37.00	18.9722	7.71079
Transparency depth	.90	2.50	1.5489	.48154
Temperature	23.80	32.00	28.0352	2.02440
pH of water	7.00	8.50	7.8713	.36890
Dissolved Oxygen	4.80	8.20	7.0046	.90589
Suspended solid	.100	12.700	4.39259	3.523605
NH3-N	.000	47.024	5.70853	9.013018
NO2-N	.000	2.238	1.11932	.536913
NO3-N	.000	34.022	4.90866	7.184782
PO4-P	.000	10.439	2.19664	2.885637
Silica	1.804	13.503	8.70093	3.776793
Chlorophyll a	7.277	42.403	15.70503	8.501475
Phytoplankton biovolume	1559480000000	36252300000000	6868448395062	6662390058488

Table 5 Average values of ecological parameters at station P5 (downstream of Phetchaburi River from Kaeng Krachan Reservoir) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	.70	3.55	1.8717	.97435
Transparency depth	.70	2.85	1.4300	.74168
Temperature	24.80	28.10	26.3500	1.31737
pH of water	6.00	7.90	6.8000	.60151
Dissolved Oxygen	5.70	8.40	6.9500	.98857
Suspended solid	.200	6.400	3.63333	2.784720
NH3-N	.917	37.888	16.82589	13.563237
NO2-N	.515	12.618	3.13708	4.281209
NO3-N	6.441	126.425	54.33211	43.838454
PO4-P	.000	11.987	4.36444	4.786832
Silica	2.535	12.209	8.46608	3.624976
Chlorophyll a	.360	3.110	1.42111	.756475
Phytoplankton density	238874200	3655000000	20252762683	13869941837

Table 6 Average values of ecological parameters at station P6 (downstream of Huai Pak Subwatershed from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	1.50	3.30	2.1500	.61311
Transparency depth	.85	2.55	1.5083	.57873
Temperature	24.00	30.50	27.1000	1.94375
pH of water	6.00	7.90	6.7500	.67890
Dissolved Oxygen	5.10	8.10	7.2667	1.00845
Suspended solid	.500	7.800	3.41667	2.766526
NH3-N	.000	25.259	10.55450	9.096649
NO2-N	.515	14.224	3.57181	4.817498
NO3-N	14.713	136.522	79.82981	54.887483
PO4-P	.000	20.977	6.19650	7.215425
Silica	3.023	12.263	8.62053	3.544872
Chlorophyll a	.346	2.099	1.01356	.549820
Phytoplankton density	1238200000	167386000000	32132134722	62283090260

Table 7 Average values of ecological parameters at station P7 (downstream of Mae Prachan Subwatershed) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	.35	2.00	.8083	.59880
Transparency depth	.25	1.00	.5667	.26996
Temperature	27.00	33.00	29.6667	2.06016
pH of water	6.70	7.90	7.1542	.42075
Dissolved Oxygen	4.70	9.80	7.0250	1.35185
Suspended solid	.300	28.000	19.37143	12.389204
NH3-N	2.678	60.332	23.28483	19.741882
NO2-N	1.880	20.613	7.22967	6.590839
NO3-N	9.205	132.976	44.09742	41.477982
PO4-P	.000	29.825	17.30978	11.313632
Silica	4.576	24.928	14.36356	7.189685
Chlorophyll a	1.308	5.183	3.31689	1.316061
Phytoplankton density	269900000	50181450000	13948306358	19152773297

Table 8 Average values of ecological parameters at station P8 (agriculture area at the downstream, Phetchaburi River) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	1.80	3.65	2.6667	.63687
Transparency depth	.60	1.55	.9292	.29807
Temperature	25.00	31.60	28.6250	2.08812
pH of water	6.00	7.40	6.7833	.53400
Dissolved Oxygen	5.50	7.50	6.4833	.67667
Suspended solid	1.200	11.600	7.01667	3.684789
NH3-N	.000	25.730	10.38956	9.213796
NO2-N	1.175	3.901	2.17553	.821545
NO3-N	14.666	136.300	54.44019	44.435423
PO4-P	.000	22.369	12.48369	7.597440
Silica	2.145	11.993	8.45900	3.779954
Chlorophyll a	.350	2.799	1.34522	.819999
Phytoplankton density	877500000	27890000000	7470639444	9668842953

Table 9 Average values of ecological parameters at station P9 (domestic and industrial areas, Amphoe Maung, Phetchaburi Province) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	1.70	3.00	2.3083	.56320
Transparency depth	.35	1.60	.9617	.41158
Temperature	25.00	33.00	29.3500	2.56107
pH of water	6.10	7.40	6.7167	.52541
Dissolved Oxygen	6.30	7.40	6.7583	.38248
Suspended solid	.200	10.700	5.03333	3.524580
NH3-N	1.833	73.641	19.96892	23.485397
NO2-N	1.741	12.160	4.10089	3.685478
NO3-N	8.003	143.158	54.20847	51.108503
PO4-P	.000	59.381	28.53300	20.461385
Silica	2.048	12.426	8.35794	3.901954
Chlorophyll a	.360	2.799	1.53772	.852816
Phytoplankton density	1649500000	21378000000	8196798148	6893088613

Table 10 Average values of ecological parameters at station P10 (aquaculture area at the Ban Lam Estuary) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	1.90	4.05	3.0250	.71367
Transparency depth	.20	.60	.3083	.12762
Temperature	21.50	34.00	29.5750	3.85523
pH of water	5.90	7.80	6.7167	.63497
Dissolved Oxygen	3.00	7.80	5.3000	1.33775
Salinity	1.00	26.00	15.0417	7.43364
Suspended solid	33.400	130.600	61.53333	26.795635
NH3-N	.844	124.761	24.36274	43.555324
NO2-N	.043	33.462	13.63939	9.140148
NO3-N	5.740	199.195	77.67333	59.313840
PO4-P	18.786	128.197	84.70193	34.983725
Silica	.372	12.127	3.83843	4.635972
Chlorophyll a	30.214	123.063	66.46853	24.700987
Phytoplankton density	843333333	579857000000	188143508039	238356318317

Table 11 Average values of ecological parameters at station P11 (aquaculture area at the Bang Taboon Estuary) from December 2001 to October 2002

	Minimum	Maximum	Mean	Std. Deviation
Maximum depth	2.20	5.80	3.3833	1.23663
Transparency depth	.25	.75	.4667	.12873
Temperature	23.50	34.00	30.1583	2.99360
pH of water	6.30	7.70	6.8833	.44595
Dissolved Oxygen	2.80	7.00	5.1306	.83542
Salinity	5.00	27.00	17.2083	5.14011
Suspended solid	13.100	181.400	40.89722	26.624516
NH3-N	.422	166.759	29.53783	56.672094
NO2-N	.043	87.625	19.33807	21.775069
NO3-N	.000	157.054	62.90237	51.872716
PO4-P	27.230	132.518	88.96662	29.184916
Silica	.477	14.344	4.61056	5.320240
Chlorophyll a	12.245	82.244	44.35488	18.335823
Phytoplankton density	354204000	148675000000	30786443826	40805280315

Appendix E

Table 1 Comparison of ecological parameters among months in station P1 (The primitive area at head water, Phetchaburi River)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	33.870	5	6.774	1016.100	.000
	Within Groups	.040	6	.007		
	Total	33.910	11			
Transparency depth	Between Groups	1.501	5	.300	255.553	.000
	Within Groups	.007	6	.001		
	Total	1.508	11			
Temperature	Between Groups	20.030	5	4.006	40.060	.000
	Within Groups	.600	6	.100		
	Total	20.630	11			
pH of water	Between Groups	.860	5	.172	103.200	.000
	Within Groups	.010	6	.002		
	Total	.870	11			
Dissolved Oxygen	Between Groups	2.707	5	.541	108.267	.000
	Within Groups	.030	6	.005		
	Total	2.737	11			
Suspended solid	Between Groups	299.828	5	59.966		
	Within Groups	.000	0			
	Total	299.828	5			
NH3-N	Between Groups	176.509	5	35.302	434.945	.000
	Within Groups	2.435	30	.081		
	Total	178.944	35			
NO2-N	Between Groups	6.570	5	1.314	145.348	.000
	Within Groups	.271	30	.009		
	Total	6.841	35			
NO3-N	Between Groups	67882.981	5	13576.596	145372.232	.000
	Within Groups	2.802	30	.093		
	Total	67885.783	35			
PO4-P	Between Groups	1026.691	5	205.338	667.830	.000
	Within Groups	9.224	30	.307		
	Total	1035.916	35			
Silica	Between Groups	380.628	5	76.126	2797.433	.000
	Within Groups	.816	30	.027		
	Total	381.445	35			
Chlorophyll a	Between Groups	28.327	5	5.665	153.639	.000
	Within Groups	1.106	30	.037		
	Total	29.433	35			
Phytoplankton density	Between Groups	3825382078787	5	765076415757431	11067.207	.000
		1550000.000		0000.000		
	Within Groups	8295604214157	12	691300351179778		
		3300.000		0.000		
Total	3826211639208	17				
		57100000.000				

Table 2 Comparison of ecological parameters among months in station P2 (Agricultural area at Mae Pradon Subwatershed, Phetchaburi Watershed)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	11.684	5	2.337	339.909	.000
	Within Groups	.041	6	.007		
	Total	11.726	11			
Transparency depth	Between Groups	1.137	5	.227	68.200	.000
	Within Groups	.020	6	.003		
	Total	1.157	11			
Temperature	Between Groups	58.584	5	11.717	2812.040	.000
	Within Groups	.025	6	.004		
	Total	58.609	11			
pH of water	Between Groups	1.134	5	.227	90.733	.000
	Within Groups	.015	6	.002		
	Total	1.149	11			
Dissolved Oxygen	Between Groups	4.517	5	.903	180.667	.000
	Within Groups	.030	6	.005		
	Total	4.547	11			
Suspended solid	Between Groups	81.155	5	16.231		
	Within Groups	.000	0			
	Total	81.155	5			
NH3-N	Between Groups	359.574	5	71.915	766.325	.000
	Within Groups	2.815	30	.094		
	Total	362.389	35			
NO2-N	Between Groups	25.635	5	5.127	216.434	.000
	Within Groups	.711	30	.024		
	Total	26.345	35			
NO3-N	Between Groups	45515.268	5	9103.054	104473.127	.000
	Within Groups	2.614	30	.087		
	Total	45517.882	35			
PO4-P	Between Groups	3580.814	5	716.163	3607.199	.000
	Within Groups	5.956	30	.199		
	Total	3586.770	35			
Silica	Between Groups	573.330	5	114.666	7735.937	.000
	Within Groups	.445	30	.015		
	Total	573.775	35			
Chlorophyll a	Between Groups	1442.960	5	288.592	7096.787	.000
	Within Groups	1.220	30	.041		
	Total	1444.180	35			
Phytoplankton density	Between Groups	8435291184631	5	168705823692638	6552.132	.000
	Within Groups	93000000.000	12	500000.000		
	Total	3089788126721	17	257482343893494		
		93300.000		40.000		
		8438380972758				
		65000000.000				

Table 3 Comparison of ecological parameters among months in of station P3
(Agricultural area at upstream, Phetchaburi River)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	83.867	5	16.773	32.256	.000
	Within Groups	3.120	6	.520		
	Total	86.987	11			
Transparency depth	Between Groups	.967	5	.193	29.000	.000
	Within Groups	.040	6	.007		
	Total	1.007	11			
Temperature	Between Groups	36.577	5	7.315	60.961	.000
	Within Groups	.720	6	.120		
	Total	37.297	11			
pH of water	Between Groups	.504	5	.101	121.000	.000
	Within Groups	.005	6	.001		
	Total	.509	11			
Dissolved Oxygen	Between Groups	1.534	5	.307	33.473	.000
	Within Groups	.055	6	.009		
	Total	1.589	11			
Suspended solid	Between Groups	151.013	5	30.203	.	.
	Within Groups	.000	0			
	Total	151.013	5			
NH3-N	Between Groups	210.362	5	42.072	422.304	.000
	Within Groups	2.989	30	.100		
	Total	213.350	35			
NO2-N	Between Groups	8.328	5	1.666	708.416	.000
	Within Groups	.071	30	.002		
	Total	8.398	35			
NO3-N	Between Groups	1582.407	5	316.481	6373.135	.000
	Within Groups	1.490	30	.050		
	Total	1583.897	35			
PO4-P	Between Groups	169.616	5	33.923	171.551	.000
	Within Groups	5.932	30	.198		
	Total	175.548	35			
Silica	Between Groups	399.536	5	79.907	5972.498	.000
	Within Groups	.401	30	.013		
	Total	399.937	35			
Chlorophyll a	Between Groups	948.763	5	189.753	1404.083	.000
	Within Groups	4.054	30	.135		
	Total	952.817	35			
Phytoplankton density	Between Groups	950753986412922000 00000000.000	5	1901507972825845 0000000000.000	958274.079	.000
	Within Groups	238116590804461600 000.000	12	1984304923370513 0000.000		
	Total	950756367578831000 00000000.000	17			

Table 4.1 Comparison of ecological parameters among months in station P4 (Kaeng Krachan Reservoir)

		Sum of Squares	df	Mean Square	F	Sig.
Water level	Between Groups	.000	5	.000	.000	1.000
	Within Groups	216.000	318	.679		
	Total	216.000	323			
Water depth	Between Groups	364.556	5	72.911	1.274	.301
	Within Groups	1716.417	30	57.214		
	Total	2080.972	35			
Transparency depth	Between Groups	5.510	5	1.102	12.688	.000
	Within Groups	2.606	30	.087		
	Total	8.116	35			
Temperature	Between Groups	366.416	5	73.283	103.688	.000
	Within Groups	72.090	102	.707		
	Total	438.506	107			
pH of water	Between Groups	8.962	5	1.792	32.649	.000
	Within Groups	5.599	102	.055		
	Total	14.561	107			
Dissolved Oxygen	Between Groups	16.924	5	3.385	4.871	.000
	Within Groups	70.884	102	.695		
	Total	87.808	107			
Suspended solid	Between Groups	562.193	5	112.439	56.311	.000
	Within Groups	95.844	48	1.997		
	Total	658.037	53			
NH3-N	Between Groups	18208.533	5	3641.707	144.213	.000
	Within Groups	8030.210	318	25.252		
	Total	26238.743	323			
NO2-N	Between Groups	70.455	5	14.091	197.767	.000
	Within Groups	22.658	318	.071		
	Total	93.113	323			
NO3-N	Between Groups	6380.386	5	1276.077	39.423	.000
	Within Groups	10293.228	318	32.369		
	Total	16673.614	323			
PO4-P	Between Groups	2105.314	5	421.063	229.169	.000
	Within Groups	584.275	318	1.837		
	Total	2689.590	323			
Silica	Between Groups	4466.886	5	893.377	2022.915	.000
	Within Groups	140.438	318	.442		
	Total	4607.324	323			
Chlorophyll a	Between Groups	20375.235	5	4075.047	436.375	.000
	Within Groups	2969.612	318	9.338		
	Total	23344.847	323			
Phytoplankton biovolume	Between Groups	3513211760914702000 00000000	5	70264235218294 000000000000	30.170	.000
	Within Groups	3633166287006481000 00000000	156	23289527480810 780000000000		
	Total	7146378047921180000 00000000	161			

Table 4.2 Comparison of ecological parameters among substations (P4a, P4b, P4c) in station (Kaeng Krachan Reservoir)

		Sum of Squares	df	Mean Square	F	Sig.
Water level	Between Groups	.000	2	.000	.000	1.000
	Within Groups	216.000	321	.673		
	Total	216.000	323			
Water depth	Between Groups	1080.222	2	540.111	17.810	.000
	Within Groups	1000.750	33	30.326		
	Total	2080.972	35			
Transparency depth	Between Groups	.627	2	.314	1.382	.265
	Within Groups	7.489	33	.227		
	Total	8.116	35			
Temperature	Between Groups	1.651	2	.826	.198	.820
	Within Groups	436.855	105	4.161		
	Total	438.506	107			
pH of water	Between Groups	.767	2	.384	2.921	.058
	Within Groups	13.794	105	.131		
	Total	14.561	107			
Dissolved Oxygen	Between Groups	9.987	2	4.994	6.738	.002
	Within Groups	77.820	105	.741		
	Total	87.808	107			
Suspended solid	Between Groups	14.827	2	7.414	.588	.559
	Within Groups	643.210	51	12.612		
	Total	658.037	53			
NH3-N	Between Groups	208.017	2	104.009	1.283	.279
	Within Groups	26030.726	321	81.093		
	Total	26238.743	323			
NO2-N	Between Groups	2.374	2	1.187	4.200	.016
	Within Groups	90.738	321	.283		
	Total	93.113	323			
NO3-N	Between Groups	63.035	2	31.517	.609	.544
	Within Groups	16610.579	321	51.746		
	Total	16673.614	323			
PO4-P	Between Groups	51.165	2	25.582	3.112	.046
	Within Groups	2638.425	321	8.219		
	Total	2689.590	323			
Silica	Between Groups	5.258	2	2.629	.183	.833
	Within Groups	4602.066	321	14.337		
	Total	4607.324	323			
Chlorophyll a	Between Groups	44.507	2	22.253	.307	.736
	Within Groups	23300.340	321	72.587		
	Total	23344.847	323			
Phytoplankton biovolume	Between Groups	38636663631616090 000000000	2	1931833181580 8040000000000	.432	.650
	Within Groups	71077413842895600 00000000000	159	4470277600182 1180000000000		
	Total	71463780479211800 00000000000.	161			

Table 5 Comparison of ecological parameters among months in station P5 (Downstream of Phetchaburi river from Kaeng Krachan Reservoir)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	10.432	5	2.086	1159.130	.000
	Within Groups	.011	6	.002		
	Total	10.443	11			
Transparency depth	Between Groups	6.046	5	1.209	1451.040	.000
	Within Groups	.005	6	.001		
	Total	6.051	11			
Temperature	Between Groups	19.030	5	3.806	380.600	.000
	Within Groups	.060	6	.010		
	Total	19.090	11			
pH of water	Between Groups	3.950	5	.790	158.000	.000
	Within Groups	.030	6	.005		
	Total	3.980	11			
Dissolved Oxygen	Between Groups	10.620	5	2.124	98.031	.000
	Within Groups	.130	6	.022		
	Total	10.750	11			
Suspended solid	Between Groups	38.773	5	7.755		
	Within Groups	.000	0			
	Total	38.773	5			
NH3-N	Between Groups	6418.132	5	1283.626	1876.958	.000
	Within Groups	20.517	30	.684		
	Total	6438.649	35			
NO2-N	Between Groups	641.237	5	128.247	14286.986	.000
	Within Groups	.269	30	.009		
	Total	641.506	35			
NO3-N	Between Groups	67251.021	5	13450.204	32720.455	.000
	Within Groups	12.332	30	.411		
	Total	67263.353	35			
PO4-P	Between Groups	797.131	5	159.426	985.927	.000
	Within Groups	4.851	30	.162		
	Total	801.982	35			
Silica	Between Groups	458.614	5	91.723	2113.030	.000
	Within Groups	1.302	30	.043		
	Total	459.916	35			
Chlorophyll a	Between Groups	19.448	5	3.890	200.919	.000
	Within Groups	.581	30	.019		
	Total	20.029	35			
Phytoplankton density	Between Groups	32684278005474660 00000.000	5	6536855601094 93000000.000	4018.413	.000
	Within Groups	19520708144170030 00.000	12	1626725678680 83600.000		
	Total	32703798713618820 00000.000	17			

Table 6 Comparison of ecological parameters among months in station P6 (downstream of Huai Pak Subwatershed)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	4.110	5	.822	197.280	.000
	Within Groups	.025	6	.004		
	Total	4.135	11			
Transparency depth	Between Groups	3.664	5	.733	219.850	.000
	Within Groups	.020	6	.003		
	Total	3.684	11			
Temperature	Between Groups	40.430	5	8.086	42.935	.000
	Within Groups	1.130	6	.188		
	Total	41.560	11			
pH of water	Between Groups	5.060	5	1.012	607.200	.000
	Within Groups	.010	6	.002		
	Total	5.070	11			
Dissolved Oxygen	Between Groups	11.147	5	2.229	334.400	.000
	Within Groups	.040	6	.007		
	Total	11.187	11			
Suspended solid	Between Groups	38.268	5	7.654	.	.
	Within Groups	.000	0	.		
	Total	38.268	5			
NH3-N	Between Groups	2883.424	5	576.685	1352.497	.000
	Within Groups	12.792	30	.426		
	Total	2896.216	35			
NO2-N	Between Groups	811.850	5	162.370	11075.629	.000
	Within Groups	.440	30	.015		
	Total	812.290	35			
NO3-N	Between Groups	105427.103	5	21085.421	41749.580	.000
	Within Groups	15.151	30	.505		
	Total	105442.255	35			
PO4-P	Between Groups	1817.332	5	363.466	2247.757	.000
	Within Groups	4.851	30	.162		
	Total	1822.183	35			
Silica	Between Groups	438.691	5	87.738	2343.695	.000
	Within Groups	1.123	30	.037		
	Total	439.814	35			
Chlorophyll a	Between Groups	10.275	5	2.055	201.526	.000
	Within Groups	.306	30	.010		
	Total	10.581	35			
Phytoplankton density	Between Groups	65946114835963500	5	1318922296719	87245513.9	.000
	Within Groups	000000.000	12	2700000000.000		
	Total	1814083823965185	17	1511736519970		
		65946116650047300		98	70	
		000000				

Table 7 Comparison of ecological parameters among months in station P7 (Downstream of Mae Prajan subwatershed)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	3.944	5	.789		
	Within Groups	.000	6	.000		
	Total	3.944	11			
Transparency depth	Between Groups	.797	5	.159	191.200	.000
	Within Groups	.005	6	.001		
	Total	.802	11			
Temperature	Between Groups	46.667	5	9.333	2800.000	.000
	Within Groups	.020	6	.003		
	Total	46.687	11			
pH of water	Between Groups	1.946	5	.389	1868.200	.000
	Within Groups	.001	6	.000		
	Total	1.947	11			
Dissolved Oxygen	Between Groups	18.098	5	3.620	10.831	.006
	Within Groups	2.005	6	.334		
	Total	20.103	11			
Suspended solid	Between Groups	920.954	5	184.191		
	Within Groups	.000	1	.000		
	Total	920.954	6			
NH3-N	Between Groups	13627.211	5	2725.442	5944.085	.000
	Within Groups	13.755	30	.459		
	Total	13640.967	35			
NO2-N	Between Groups	1519.201	5	303.840	7795.131	.000
	Within Groups	1.169	30	.039		
	Total	1520.371	35			
NO3-N	Between Groups	60196.049	5	12039.210	19256.747	.000
	Within Groups	18.756	30	.625		
	Total	60214.805	35			
PO4-P	Between Groups	4474.003	5	894.801	4522.011	.000
	Within Groups	5.936	30	.198		
	Total	4479.940	35			
Silica	Between Groups	1808.694	5	361.739	21243.501	.000
	Within Groups	.511	30	.017		
	Total	1809.205	35			
Chlorophyll a	Between Groups	59.563	5	11.913	338.033	.000
	Within Groups	1.057	30	.035		
	Total	60.621	35			
Phytoplankton density	Between Groups	6236076239032	5	12472152478065	1238385.968	.000
	Within Groups	58000000.000	12	17000000.000		
	Total	1208555601109	17	10071296675909		
		1280.000		40.000		
	Total	6236088324588				
		590000000.000				

Table 8 Comparison of ecological parameters among months in station P8 (Agricultural area at downstream, Phetchaburi River)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	4.387	5	.877	70.187	.000
	Within Groups	.075	6	.012		
	Total	4.462	11			
Transparency depth	Between Groups	.961	5	.192	70.969	.000
	Within Groups	.016	6	.003		
	Total	.977	11			
Temperature	Between Groups	47.938	5	9.588	2301.000	.000
	Within Groups	.025	6	.004		
	Total	47.963	11			
pH of water	Between Groups	3.137	5	.627	.	.
	Within Groups	.000	6	.000		
	Total	3.137	11			
Dissolved Oxygen	Between Groups	5.017	5	1.003	301.000	.000
	Within Groups	.020	6	.003		
	Total	5.037	11			
Suspended solid	Between Groups	67.888	5	13.578	.	.
	Within Groups	.000	0	.		
	Total	67.888	5			
NH3-N	Between Groups	2964.691	5	592.938	2695.260	.000
	Within Groups	6.600	30	.220		
	Total	2971.291	35			
NO2-N	Between Groups	22.999	5	4.600	221.150	.000
	Within Groups	.624	30	.021		
	Total	23.623	35			
NO3-N	Between Groups	69100.099	5	13820.020	54258.414	.000
	Within Groups	7.641	30	.255		
	Total	69107.740	35			
PO4-P	Between Groups	1994.778	5	398.956	470.079	.000
	Within Groups	25.461	30	.849		
	Total	2020.238	35			
Silica	Between Groups	499.651	5	99.930	6956.530	.000
	Within Groups	.431	30	.014		
	Total	500.082	35			
Chlorophyll a	Between Groups	22.668	5	4.534	157.056	.000
	Within Groups	.866	30	.029		
	Total	23.534	35			
Phytoplankton density	Between Groups	1589207544127	5	3178415088255	60192.812	.000
	Within Groups	616000000.000	12	23100000.000		
	Total	6336467773418	17	5280389811182		
		5100.000		090.000		
	Total	1589270908805	17			
		350000000.000				

Table 9 Comparison of ecological parameters between wet and dry seasons of station P9
(Domestic and industrial areas, Amphoe Muang, Phetchaburi Province)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	3.474	5	.695	277.933	.000
	Within Groups	.015	6	.003		
	Total	3.489	11			
Transparency depth	Between Groups	1.830	5	.366	66.151	.000
	Within Groups	.033	6	.006		
	Total	1.863	11			
Temperature	Between Groups	72.150	5	14.430		
	Within Groups	.000	6	.000		
	Total	72.150	11			
pH of water	Between Groups	3.017	5	.603	181.000	.000
	Within Groups	.020	6	.003		
	Total	3.037	11			
Dissolved Oxygen	Between Groups	1.564	5	.313	41.711	.000
	Within Groups	.045	6	.008		
	Total	1.609	11			
Suspended solid	Between Groups	62.113	5	12.423		
	Within Groups	.000	0			
	Total	62.113	5			
NH3-N	Between Groups	19275.448	5	3855.090	3948.941	.000
	Within Groups	29.287	30	.976		
	Total	19304.735	35			
NO2-N	Between Groups	475.081	5	95.016	9043.288	.000
	Within Groups	.315	30	.011		
	Total	475.396	35			
NO3-N	Between Groups	91415.612	5	18283.122	76634.686	.000
	Within Groups	7.157	30	.239		
	Total	91422.769	35			
PO4-P	Between Groups	14609.157	5	2921.831	1981.693	.000
	Within Groups	44.232	30	1.474		
	Total	14653.389	35			
Silica	Between Groups	532.426	5	106.485	6974.531	.000
	Within Groups	.458	30	.015		
	Total	532.884	35			
Chlorophyll a	Between Groups	24.542	5	4.908	161.310	.000
	Within Groups	.913	30	.030		
	Total	25.455	35			
Phytoplankton density	Between Groups	8077424993145	5	161548499862	280896.678	.000
	Within Groups	17000000.000	12	903400000.000		
	Total	6901405921185	17	575117160098		
		180.000		765.000		
	Total	8077494007204	17			
		38000000.000				

Table 10 Comparison of ecological parameters among months in station P10 (Aquacultural area at Ban Laem Estuary)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	5.518	5	1.104	77.894	.000
	Within Groups	.085	6	.014		
	Total	5.603	11			
Transparency depth	Between Groups	.174	5	.035	41.800	.000
	Within Groups	.005	6	.001		
	Total	.179	11			
Temperature	Between Groups	330.075	5	66.015	100.958	.000
	Within Groups	11.770	18	.654		
	Total	341.845	23			
pH of water	Between Groups	8.833	5	1.767	72.273	.000
	Within Groups	.440	18	.024		
	Total	9.273	23			
Dissolved Oxygen	Between Groups	39.185	5	7.837	71.426	.000
	Within Groups	1.975	18	.110		
	Total	41.160	23			
Suspended solid	Between Groups	5600.537	5	1120.107	2.925	.112
	Within Groups	2297.530	6	382.922		
	Total	7898.067	11			
NH3-N	Between Groups	134553.162	5	26910.632	12819.871	.000
	Within Groups	138.543	66	2.099		
	Total	134691.705	71			
NO2-N	Between Groups	5284.541	5	1056.908	107.821	.000
	Within Groups	646.963	66	9.802		
	Total	5931.504	71			
NO3-N	Between Groups	248256.066	5	49651.213	2140.032	.000
	Within Groups	1531.276	66	23.201		
	Total	249787.342	71			
PO4-P	Between Groups	86755.510	5	17351.102	8261.077	.000
	Within Groups	138.623	66	2.100		
	Total	86894.133	71			
Silica	Between Groups	1525.103	5	305.021	23816.080	.000
	Within Groups	.845	66	.013		
	Total	1525.949	71			
Chlorophyll a	Between Groups	38959.364	5	7791.873	117.937	.000
	Within Groups	4360.490	66	66.068		
	Total	43319.853	71			
Phytoplankton density	Between Groups	198640001773184 600000000	5	397280003546 36930000000	5728.102	.000
	Within Groups	208068912859003 7000000	30	693563042863 34500000		
	Total	198848070686043 600000000.000	35			

Table 11 Comparison of ecological parameters among months in station P11 (Aquacultural area at Bang Taboon Estuary)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	16.687	5	3.337	148.326	.000
	Within Groups	.135	6	.023		
	Total	16.822	11			
Transparency depth	Between Groups	.443	5	.089	19.463	.000
	Within Groups	.137	30	.005		
	Total	.580	35			
Temperature	Between Groups	626.610	5	125.322	855.794	.000
	Within Groups	9.665	66	.146		
	Total	636.275	71			
pH of water	Between Groups	11.462	5	2.292	56.913	.000
	Within Groups	2.658	66	.040		
	Total	14.120	71			
Dissolved Oxygen	Between Groups	33.669	5	6.734	27.981	.000
	Within Groups	15.883	66	.241		
	Total	49.553	71			
Suspended solid	Between Groups	4164.091	5	832.818	1.210	.328
	Within Groups	20646.178	30	688.206		
	Total	24810.270	35			
NH3-N	Between Groups	688371.881	5	137674.376	13451.845	.000
	Within Groups	2149.268	210	10.235		
	Total	690521.149	215			
NO2-N	Between Groups	83138.259	5	16627.652	185.687	.000
	Within Groups	18804.769	210	89.547		
	Total	101943.028	215			
NO3-N	Between Groups	519340.473	5	103868.095	368.595	.000
	Within Groups	59176.936	210	281.795		
	Total	578517.408	215			
PO4-P	Between Groups	171023.952	5	34204.790	593.426	.000
	Within Groups	12104.301	210	57.640		
	Total	183128.253	215			
Silica	Between Groups	6030.730	5	1206.146	4619.203	.000
	Within Groups	54.834	210	.261		
	Total	6085.564	215			
Chlorophyll a	Between Groups	34796.201	5	6959.240	38.985	.000
	Within Groups	37487.314	210	178.511		
	Total	72283.515	215			
Phytoplankton density	Between Groups	158338427437238	5	3166768548744	162.938	.000
	Within Groups	90000000.000	102	778000000.000		
	Total	198241590287434	107	1943545002817		
		50000000		98600000		
		178162586465982	107			
		300000000				

Table 12 Comparison of ecological parameters among months in Subsystem I (Upstream of the watershed)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	48.072	5	9.614	.507	.769
	Within Groups	569.185	30	18.973		
	Total	617.257	35			
Transparency depth	Between Groups	2.458	5	.492	4.396	.004
	Within Groups	3.355	30	.112		
	Total	5.813	35			
Temperature	Between Groups	87.441	5	17.488	4.644	.003
	Within Groups	112.968	30	3.766		
	Total	200.410	35			
pH of water	Between Groups	1.446	5	.289	1.538	.208
	Within Groups	5.640	30	.188		
	Total	7.086	35			
Dissolved Oxygen	Between Groups	1.759	5	.352	.449	.811
	Within Groups	23.528	30	.784		
	Total	25.288	35			
Suspended solid	Between Groups	389.527	5	77.905	2.787	.068
	Within Groups	335.433	12	27.953		
	Total	724.960	17			
NH3-N	Between Groups	330.088	5	66.018	7.609	.000
	Within Groups	885.002	102	8.676		
	Total	1215.090	107			
NO2-N	Between Groups	30.539	5	6.108	15.754	.000
	Within Groups	39.545	102	.388		
	Total	70.084	107			
NO3-N	Between Groups	63775.299	5	12755.060	15.986	.000
	Within Groups	81384.419	102	797.886		
	Total	145159.718	107			
PO4-P	Between Groups	3201.327	5	640.265	26.168	.000
	Within Groups	2495.650	102	24.467		
	Total	5696.977	107			
Silica	Between Groups	1300.265	5	260.053	355.681	.000
	Within Groups	74.576	102	.731		
	Total	1374.841	107			
Chlorophyll a	Between Groups	766.790	5	153.358	5.315	.000
	Within Groups	2942.852	102	28.851		
	Total	3709.642	107			
Phytoplankton density	Between Groups	31540731652914 940000000000	5	6308146330582 980000000000	3.377	.011
	Within Groups	89655045960672 500000000000	48	1867813457514 011000000000		
	Total	12119577761358 750000000000	53			

Table 13 Comparison of ecological parameters among months in in Subsystem III
(downstream of the watershed)

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	16.835	5	3.367	3.156	.012
	Within Groups	83.217	78	1.067		
	Total	100.053	83			
Transparency depth	Between Groups	4.543	5	.909	3.260	.009
	Within Groups	28.433	102	.279		
	Total	32.976	107			
Temperature	Between Groups	972.723	5	194.545	63.820	.000
	Within Groups	457.249	150	3.048		
	Total	1429.971	155			
pH of water	Between Groups	25.740	5	5.148	45.839	.000
	Within Groups	16.846	150	.112		
	Total	42.586	155			
Dissolved Oxygen	Between Groups	67.574	5	13.515	10.887	.000
	Within Groups	186.205	150	1.241		
	Total	253.779	155			
Salinity	Between Groups	1410.974	5	282.195	3.505	.005
	Within Groups	12076.769	150	80.512		
	Total	13487.744	155			
Suspended solid	Between Groups	5689.838	5	1137.968	1.376	.243
	Within Groups	60360.519	73	826.856		
	Total	66050.357	78			
NH3-N	Between Groups	462582.350	5	92516.470	99.383	.000
	Within Groups	430079.299	462	930.908		
	Total	892661.649	467			
NO2-N	Between Groups	50558.482	5	10111.696	55.362	.000
	Within Groups	84382.363	462	182.646		
	Total	134940.845	467			
NO3-N	Between Groups	758408.555	5	151681.711	137.396	.000
	Within Groups	510034.787	462	1103.971		
	Total	1268443.342	467			
PO4-P	Between Groups	126412.214	5	25282.443	14.775	.000
	Within Groups	790566.122	462	1711.182		
	Total	916978.336	467			
Si	Between Groups	5309.860	5	1061.972	48.519	.000
	Within Groups	10112.045	462	21.888		
	Total	15421.905	467			
Chlorophyll a	Between Groups	39318.502	5	7863.700	10.097	.000
	Within Groups	359829.101	462	778.851		
	Total	399147.603	467			
Phytoplankton density	Between Groups	6844974644853	5	1368994928970	13.028	.000
		82000000000		76400000000		
	Within Groups	2395890183430	228	1050829027820		
	Total	614000000000		44500000000		
	Total	3080387647915	233	997000000000		

Table 14 Matrix of product moment correlation between ecological parameters in station P1 (December 2001-October 2002)

Correlations

		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	-.727**	1											
	Sig. (2-tailed)	.007	.											
	N	12	12											
Temperature	Pearson Correlation	-.635*	.564	1										
	Sig. (2-tailed)	.027	.056	.										
	N	12	12	12										
pH of water	Pearson Correlation	-.438	.920**	.437	1									
	Sig. (2-tailed)	.154	.000	.156	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	.115	-.243	-.607*	.382	1								
	Sig. (2-tailed)	.721	.446	.036	.220	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.816*	-.541	-.871*	-.292	.601	1							
	Sig. (2-tailed)	.047	.267	.024	.575	.207	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.193	.072	-.026	.285	.379	.427	1						
	Sig. (2-tailed)	.547	.825	.937	.369	.225	.398	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	.345	-.406	.051	-.305	-.280	.242	.369*	1					
	Sig. (2-tailed)	.273	.191	.874	.336	.377	.643	.027	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.349	-.672**	-.785**	-.735**	.183	.458	-.433**	-.003	1				
	Sig. (2-tailed)	.265	.017	.002	.007	.569	.361	.008	.988	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	.626*	-.143	-.310	.136	.285	.598	.191	.491**	.031	1			
	Sig. (2-tailed)	.029	.659	.327	.673	.370	.210	.265	.002	.857	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	.648*	-.014	-.462	.280	.480	.587	.084	-.172	.054	.693**	1		
	Sig. (2-tailed)	.023	.966	.131	.378	.114	.221	.624	.316	.754	.000	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.881**	.901**	.717**	.731**	-.014	-.721	.125	-.152	-.674**	-.157	-.319	1	
	Sig. (2-tailed)	.000	.000	.009	.007	.965	.106	.469	.375	.000	.360	.058	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	-.678	.226	.828*	-.037	-.755	-.883*	-.268	-.086	-.367	-.748**	-.813**	.371	1
	Sig. (2-tailed)	.138	.666	.042	.945	.082	.020	.283	.736	.134	.000	.000	.130	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 15 Matrix of product moment correlation between ecological parameters in station P2 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	.622*	1											
	Sig. (2-tailed)	.031	.											
	N	12	12											
Temperature	Pearson Correlation	-.350	-.572	1										
	Sig. (2-tailed)	.265	.052	.										
	N	12	12	12										
pH of water	Pearson Correlation	-.701*	-.168	.027	1									
	Sig. (2-tailed)	.011	.602	.934	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	.228	-.014	.348	-.769**	1								
	Sig. (2-tailed)	.476	.966	.267	.003	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.755	.857*	-.691	-.271	-.041	1							
	Sig. (2-tailed)	.082	.029	.128	.603	.938	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.274	-.375	.085	-.805**	.664*	-.190	1						
	Sig. (2-tailed)	.388	.230	.794	.002	.019	.718	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	.717**	.444	.053	-.185	-.176	.526	-.328	1					
	Sig. (2-tailed)	.009	.148	.871	.564	.584	.284	.051	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.348	-.194	-.120	-.503	.071	-.173	.563**	-.094	1				
	Sig. (2-tailed)	.268	.545	.709	.095	.825	.743	.000	.587	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	.377	.084	-.003	-.264	-.116	-.083	.113	.236	.840**	1			
	Sig. (2-tailed)	.227	.795	.992	.407	.720	.875	.511	.166	.000	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	.030	.247	-.160	-.066	-.015	-.159	-.155	-.149	.525**	.743**	1		
	Sig. (2-tailed)	.926	.440	.620	.840	.962	.764	.367	.385	.001	.000	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.157	.391	-.519	.734**	-.785**	.457	-.797**	.239	-.565**	-.374*	-.213	1	
	Sig. (2-tailed)	.625	.209	.084	.007	.002	.363	.000	.160	.000	.025	.212	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.011	-.087	.057	.166	.008	.300	-.028	.220	-.689**	-.825**	-.962**	.393	1
	Sig. (2-tailed)	.983	.870	.915	.754	.988	.563	.914	.380	.002	.000	.000	.107	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 16 Matrix of product moment correlation between ecological parameters in station P3 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	-.792*	1											
	Sig. (2-tailed)	.002	.											
	N	12	12											
Temperature	Pearson Correlation	.445	-.190	1										
	Sig. (2-tailed)	.148	.553	.										
	N	12	12	12										
pH of water	Pearson Correlation	-.560	.603*	-.689*	1									
	Sig. (2-tailed)	.058	.038	.013	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	-.473	.746**	-.221	.462	1								
	Sig. (2-tailed)	.120	.005	.491	.130	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	-.135	.091	-.592	.741	.019	1							
	Sig. (2-tailed)	.799	.863	.216	.092	.971	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.146	.305	.062	.523	.365	.303	1						
	Sig. (2-tailed)	.651	.335	.849	.081	.244	.559	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	-.351	.521	-.418	.877**	.320	.640	.794**	1					
	Sig. (2-tailed)	.264	.082	.176	.000	.311	.171	.000	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	-.176	.102	.132	.242	-.436	.561	-.009	.277	1				
	Sig. (2-tailed)	.585	.753	.683	.448	.157	.247	.959	.102	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	-.227	-.239	-.074	-.479	-.413	-.388	-.904**	-.672**	-.126	1			
	Sig. (2-tailed)	.477	.455	.819	.115	.182	.447	.000	.000	.464	.			
	N	12	12	12	12	12	6	36	36	36	36			
SilicaSiO2	Pearson Correlation	-.286	-.164	-.064	-.216	-.557	.116	-.821**	-.439**	.548**	.712**	1		
	Sig. (2-tailed)	.368	.611	.842	.500	.060	.827	.000	.007	.001	.000	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.090	.220	.273	.241	-.131	.470	.182	.290	.893**	-.411*	.296	1	
	Sig. (2-tailed)	.780	.492	.391	.450	.684	.347	.287	.086	.000	.013	.079	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.050	.037	.327	.045	-.460	.421	-.064	.119	.968**	-.110	.528*	.890**	1
	Sig. (2-tailed)	.926	.944	.527	.933	.359	.405	.801	.637	.000	.664	.024	.000	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 17 Matrix of product moment correlation between ecological parameters in station P4 (December 2001-October 2002)

		Correlations												
		Water depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton biovolume
Water depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	36												
Transparency depth	Pearson Correlation	-.063	1											
	Sig. (2-tailed)	.716	.											
	N	36	36											
Temperature	Pearson Correlation	-.169	-.334*	1										
	Sig. (2-tailed)	.324	.046	.										
	N	36	36	108										
pH of water	Pearson Correlation	.317	-.413*	.327**	1									
	Sig. (2-tailed)	.060	.012	.	.									
	N	36	36	108	108									
Dissolved Oxygen	Pearson Correlation	-.240	-.157	.277**	-.027	1								
	Sig. (2-tailed)	.158	.359	.004	.784	.								
	N	36	36	108	108	108								
Suspended solid	Pearson Correlation	.113	.197	-.750**	-.192	-.109	1							
	Sig. (2-tailed)	.656	.433	.000	.165	.434	.							
	N	18	18	54	54	54	54							
NH3-N	Pearson Correlation	.293	-.092	-.300**	.303**	-.087	.230	1						
	Sig. (2-tailed)	.083	.594	.002	.001	.372	.095	.						
	N	36	36	108	108	108	54	324						
NO2-N	Pearson Correlation	-.043	.488**	-.326**	-.159	-.200*	.468**	-.060	1					
	Sig. (2-tailed)	.803	.003	.001	.101	.038	.000	.280	.					
	N	36	36	108	108	108	54	324	324					
NO3-N	Pearson Correlation	.287	-.128	-.308**	-.072	-.328**	.440**	-.031	.264**	1				
	Sig. (2-tailed)	.089	.455	.001	.460	.001	.001	.575	.000	.				
	N	36	36	108	108	108	54	324	324	324				
PO4-P	Pearson Correlation	.015	-.082	-.198*	.236*	.153	.147	.774**	-.236**	-.010	1			
	Sig. (2-tailed)	.932	.635	.039	.014	.114	.288	.000	.000	.859	.			
	N	36	36	108	108	108	54	324	324	324	324			
SiO2	Pearson Correlation	.205	-.101	.055	.045	.201*	-.006	.021	-.464**	.033	.275**	1		
	Sig. (2-tailed)	.230	.559	.569	.646	.037	.965	.700	.000	.555	.000	.		
	N	36	36	108	108	108	54	324	324	324	324	324		
Chlorophyll a	Pearson Correlation	.176	-.446**	.219*	.267**	-.125	.127	-.266**	.137*	.231**	-.274**	.439**	1	
	Sig. (2-tailed)	.305	.006	.023	.005	.197	.358	.000	.013	.000	.000	.000	.	
	N	36	36	108	108	108	54	324	324	324	324	324	324	
Phytoplankton biovolume	Pearson Correlation	.301	-.418	.369**	.318**	-.013	-.124	-.231**	.078	.089	-.179*	.218**	.657**	1
	Sig. (2-tailed)	.224	.084	.006	.019	.926	.377	.003	.325	.259	.022	.005	.000	.
	N	18	18	54	54	54	53	162	162	162	162	162	162	162

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 18 Matrix of product moment correlation between ecological parameters in station P5 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	.644*	1											
	Sig. (2-tailed)	.024	.											
	N	12	12											
Temperature	Pearson Correlation	.102	-.289	1										
	Sig. (2-tailed)	.752	.362	.										
	N	12	12	12										
pH of water	Pearson Correlation	.595*	.417	-.508	1	.414								
	Sig. (2-tailed)	.041	.178	.092	.	.181								
	N	12	12	12	12	12								
Dissolved Oxygen	Pearson Correlation	.870**	.418	.050	.414	1								
	Sig. (2-tailed)	.000	.176	.878	.181	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.434	.086	.612	.192	.176	1							
	Sig. (2-tailed)	.389	.871	.196	.716	.738	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.256	-.012	.474	-.525	.528	-.122	1						
	Sig. (2-tailed)	.421	.970	.120	.080	.078	.819	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	-.060	.177	.619*	-.466	-.368	.281	.108	1					
	Sig. (2-tailed)	.854	.582	.032	.127	.240	.590	.529	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.771**	.124	.424	.451	.607*	.476	.261	.102	1				
	Sig. (2-tailed)	.003	.701	.169	.142	.036	.340	.124	.555	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	.053	-.338	.877**	-.324	-.135	.479	.256	.685**	.565**	1			
	Sig. (2-tailed)	.871	.283	.000	.304	.675	.336	.131	.000	.000	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	-.345	-.488	.436	-.042	-.579*	.572	-.506**	.379*	.097	.597**	1		
	Sig. (2-tailed)	.272	.107	.157	.897	.048	.236	.002	.023	.572	.000	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.168	.350	-.604*	-.200	.075	-.726	.329*	-.311	-.589**	-.704**	-.839**	1	
	Sig. (2-tailed)	.602	.265	.037	.534	.817	.103	.050	.064	.000	.000	.000	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.084	-.206	.970**	-.562	.041	.657	.511*	.567*	.260	.713**	.393	-.402	1
	Sig. (2-tailed)	.874	.695	.001	.246	.938	.156	.030	.014	.297	.001	.106	.099	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 19 Matrix of product moment correlation between ecological parameters in station P6 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	.551	1											
	Sig. (2-tailed)	.063	.											
	N	12	12											
Temperature	Pearson Correlation	-.497	-.402	1										
	Sig. (2-tailed)	.100	.195	.										
	N	12	12	12										
pH of water	Pearson Correlation	.526	.595*	-.193	1									
	Sig. (2-tailed)	.079	.041	.548	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	.487	.507	.183	.135	1								
	Sig. (2-tailed)	.108	.093	.570	.675	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.856*	.479	-.164	.760	.551	1							
	Sig. (2-tailed)	.030	.337	.756	.080	.257	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.303	.239	-.450	-.220	.517	.165	1						
	Sig. (2-tailed)	.339	.454	.142	.492	.085	.755	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	.010	.369	.220	-.175	.236	-.215	-.322	1					
	Sig. (2-tailed)	.976	.238	.491	.587	.461	.682	.056	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.811**	.484	-.402	.063	.492	.459	.251	.473**	1				
	Sig. (2-tailed)	.001	.111	.195	.846	.104	.360	.141	.004	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	.011	-.057	.284	-.398	.047	-.265	-.414*	.876**	.495**	1			
	Sig. (2-tailed)	.972	.859	.371	.200	.884	.612	.012	.000	.002	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	-.112	-.451	.649*	-.043	-.179	-.005	-.795**	.330*	-.035	.608**	1		
	Sig. (2-tailed)	.728	.141	.023	.894	.578	.993	.000	.050	.839	.000	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	.429	.330	-.590*	.793**	-.257	.523	.037	-.524**	.037	-.631**	-.385*	1	
	Sig. (2-tailed)	.164	.295	.044	.002	.421	.287	.833	.001	.829	.000	.020	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.339	-.492	.018	-.437	.223	.174	.318	-.180	.450	.198	.234	-.233	1
	Sig. (2-tailed)	.511	.322	.973	.386	.670	.742	.198	.476	.061	.432	.350	.353	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 20 Matrix of product moment correlation between ecological parameters in station P7 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	.640*	1											
	Sig. (2-tailed)	.025	.											
	N	12	12											
Temperature	Pearson Correlation	-.138	-.430	1										
	Sig. (2-tailed)	.670	.162	.										
	N	12	12	12										
pH of water	Pearson Correlation	.936**	.662*	-.428	1									
	Sig. (2-tailed)	.000	.019	.165	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	-.078	-.157	-.212	.109	1								
	Sig. (2-tailed)	.810	.626	.508	.735	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.369	.176	-.548	.506	.671	1							
	Sig. (2-tailed)	.415	.705	.203	.246	.099	.							
	N	7	7	7	7	7	7							
NH3-N	Pearson Correlation	-.408	-.132	-.627*	-.074	.377	.102	1						
	Sig. (2-tailed)	.188	.683	.029	.820	.227	.827	.						
	N	12	12	12	12	12	7	36						
NO2-N	Pearson Correlation	.238	.200	-.209	.218	-.778**	-.401	.048	1					
	Sig. (2-tailed)	.457	.533	.514	.496	.003	.372	.779	.					
	N	12	12	12	12	12	7	36	36					
NO3-N	Pearson Correlation	-.256	.129	-.319	-.213	-.712**	-.500	.273	.809**	1				
	Sig. (2-tailed)	.422	.689	.312	.505	.009	.254	.107	.000	.				
	N	12	12	12	12	12	7	36	36	36				
PO4-P	Pearson Correlation	.353	.043	-.593*	.539	.632*	.980**	.236	-.258	-.452**	1			
	Sig. (2-tailed)	.260	.894	.042	.070	.028	.000	.166	.129	.006	.			
	N	12	12	12	12	12	7	36	36	36	36			
SiO2	Pearson Correlation	-.061	-.419	-.150	-.031	-.440	-.127	.174	.742**	.565**	.073	1		
	Sig. (2-tailed)	.851	.175	.642	.924	.153	.786	.311	.000	.000	.673	.		
	N	12	12	12	12	12	7	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	.195	.656*	.218	.092	-.080	-.272	-.377*	-.171	-.071	-.523**	-.756**	1	
	Sig. (2-tailed)	.544	.021	.496	.776	.806	.554	.024	.318	.679	.001	.000	.	
	N	12	12	12	12	12	7	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	-.446	-.750	.091	-.455	.317	.487	-.047	-.386	-.266	.399	.277	-.687**	1
	Sig. (2-tailed)	.375	.086	.864	.365	.541	.327	.854	.113	.285	.101	.266	.002	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 21 Matrix of product moment correlation between ecological parameters in station P8 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	-.747**	1											
	Sig. (2-tailed)	.005	.											
	N	12	12											
Temperature	Pearson Correlation	-.552	.543	1										
	Sig. (2-tailed)	.063	.068	.										
	N	12	12	12										
pH of water	Pearson Correlation	-.029	-.082	-.397	1									
	Sig. (2-tailed)	.930	.799	.201	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	.281	-.671*	-.503	-.021	1								
	Sig. (2-tailed)	.376	.017	.095	.948	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.516	-.425	-.898*	.682	.265	1							
	Sig. (2-tailed)	.295	.400	.015	.135	.612	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.602*	-.742**	-.538	-.424	.772**	.189	1						
	Sig. (2-tailed)	.038	.006	.071	.170	.003	.719	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	.895**	-.653*	-.590*	-.327	.368	.444	.810**	1					
	Sig. (2-tailed)	.000	.021	.043	.299	.239	.378	.000	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.450	-.120	-.245	-.693*	-.032	-.010	.567**	.683**	1				
	Sig. (2-tailed)	.142	.711	.443	.012	.922	.986	.000	.000	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	.713**	-.576	-.873**	.042	.309	.713	.609**	.824**	.641**	1			
	Sig. (2-tailed)	.009	.050	.000	.898	.329	.112	.000	.000	.000	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	.516	.056	-.023	.083	-.640*	.294	-.252	.317	.309	.334*	1		
	Sig. (2-tailed)	.086	.863	.943	.799	.025	.571	.137	.060	.067	.047	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.132	.111	-.528	.396	.467	.489	.197	.077	-.220	.043	-.395*	1	
	Sig. (2-tailed)	.683	.730	.078	.202	.126	.325	.248	.655	.197	.803	.017	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.570	-.262	.039	-.818*	-.029	-.266	.590**	.636**	.888**	.465	.280	-.509*	1
	Sig. (2-tailed)	.237	.616	.942	.047	.956	.611	.010	.005	.000	.052	.260	.031	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 22 Matrix of product moment correlation between ecological parameters in station P9 (December 2001-October 2002)

		Correlations												
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1												
	Sig. (2-tailed)	.												
	N	12												
Transparency depth	Pearson Correlation	-.677*	1											
	Sig. (2-tailed)	.016	.											
	N	12	12											
Temperature	Pearson Correlation	.034	.170	1										
	Sig. (2-tailed)	.916	.597	.										
	N	12	12	12										
pH of water	Pearson Correlation	-.016	-.061	-.352	1									
	Sig. (2-tailed)	.961	.851	.262	.									
	N	12	12	12	12									
Dissolved Oxygen	Pearson Correlation	-.564	.325	-.643*	-.231	1								
	Sig. (2-tailed)	.056	.303	.024	.469	.								
	N	12	12	12	12	12								
Suspended solid	Pearson Correlation	.039	-.409	-.896*	.306	.631	1							
	Sig. (2-tailed)	.942	.421	.016	.556	.179	.							
	N	6	6	6	6	6	6							
NH3-N	Pearson Correlation	.490	-.444	-.123	-.660*	.099	.014	1						
	Sig. (2-tailed)	.106	.148	.704	.020	.760	.980	.						
	N	12	12	12	12	12	6	36						
NO2-N	Pearson Correlation	-.184	.536	.098	-.510	.434	-.080	-.028	1					
	Sig. (2-tailed)	.567	.072	.761	.090	.158	.881	.870	.					
	N	12	12	12	12	12	6	36	36					
NO3-N	Pearson Correlation	.214	-.001	-.404	-.630*	.570	.266	.728**	.540**	1				
	Sig. (2-tailed)	.504	.998	.193	.028	.053	.611	.000	.001	.				
	N	12	12	12	12	12	6	36	36	36				
PO4-P	Pearson Correlation	-.295	.257	-.748**	.053	.841**	.721	-.116	.521**	.522**	1			
	Sig. (2-tailed)	.352	.420	.005	.871	.001	.106	.499	.001	.001	.			
	N	12	12	12	12	12	6	36	36	36	36			
SiO2	Pearson Correlation	.815**	-.348	-.071	-.015	-.273	.165	.240	.336*	.371*	.117	1		
	Sig. (2-tailed)	.001	.268	.827	.962	.391	.755	.159	.045	.026	.495	.		
	N	12	12	12	12	12	6	36	36	36	36	36		
Chlorophyll a	Pearson Correlation	-.471	.231	-.401	.872**	.104	.326	-.712**	-.369*	-.541**	.242	-.406*	1	
	Sig. (2-tailed)	.122	.470	.196	.000	.748	.528	.000	.027	.001	.155	.014	.	
	N	12	12	12	12	12	6	36	36	36	36	36	36	
Phytoplankton density	Pearson Correlation	.336	-.230	.118	-.862*	.119	-.214	.943**	.171	.719**	-.172	.139	-.825**	1
	Sig. (2-tailed)	.515	.661	.824	.027	.823	.684	.000	.498	.001	.495	.582	.000	.
	N	6	6	6	6	6	6	18	18	18	18	18	18	18

*. Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 23 Matrix of product moment correlation between ecological parameters in station P10 (December 2001-October 2002)

		Correlations													
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Salinity	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1													
	Sig. (2-tailed)	.													
	N	12													
Transparency depth	Pearson Correlation	.721**	1												
	Sig. (2-tailed)	.008	.												
	N	12	12												
Temperature	Pearson Correlation	-.367	-.849**	1											
	Sig. (2-tailed)	.241	.000	.											
	N	12	12	24											
pH of water	Pearson Correlation	.291	.049	.281	1										
	Sig. (2-tailed)	.360	.879	.184	.										
	N	12	12	24	24										
Dissolved Oxygen	Pearson Correlation	.523	.074	.157	-.063	1									
	Sig. (2-tailed)	.081	.820	.462	.770	.									
	N	12	12	24	24	24									
Salinity	Pearson Correlation	.807**	.335	.032	.187	.449*	1								
	Sig. (2-tailed)	.002	.287	.882	.382	.028	.								
	N	12	12	24	24	24	24								
Suspended solid	Pearson Correlation	.356	.556	-.697*	.132	-.405	.156	1							
	Sig. (2-tailed)	.488	.251	.012	.684	.191	.628	.							
	N	6	6	12	12	12	12	12							
NH3-N	Pearson Correlation	-.029	.104	.073	.705**	-.044	-.170	.105	1						
	Sig. (2-tailed)	.928	.747	.736	.000	.839	.428	.746	.						
	N	12	12	24	24	24	24	12	72						
NO2-N	Pearson Correlation	.345	.400	-.411*	-.324	-.350	-.094	.246	-.675**	1					
	Sig. (2-tailed)	.272	.198	.046	.122	.093	.664	.441	.000	.					
	N	12	12	24	24	24	24	12	72	72					
NO3-N	Pearson Correlation	-.700*	-.288	-.193	-.621**	-.361	-.847**	-.128	-.330**	.381**	1				
	Sig. (2-tailed)	.011	.365	.366	.001	.083	.000	.691	.005	.001	.				
	N	12	12	24	24	24	24	12	72	72	72				
PO4-P	Pearson Correlation	.127	.667*	-.577**	.059	-.664**	-.100	.614*	.294*	.110	.012	1			
	Sig. (2-tailed)	.695	.018	.003	.785	.000	.641	.034	.012	.358	.918	.			
	N	12	12	24	24	24	24	12	72	72	72	72			
SiO2	Pearson Correlation	-.246	.173	-.613**	-.559**	-.066	-.644**	.179	-.217	.372**	.813**	.060	1		
	Sig. (2-tailed)	.442	.591	.001	.005	.759	.001	.578	.068	.001	.000	.615	.		
	N	12	12	24	24	24	24	12	72	72	72	72	72		
Chlorophyll a	Pearson Correlation	-.059	-.376	.354	.861**	.105	.147	.099	.829**	-.607**	-.538**	-.042	-.443**	1	
	Sig. (2-tailed)	.856	.228	.090	.000	.625	.492	.759	.000	.000	.000	.727	.000	.	
	N	12	12	24	24	24	24	12	72	72	72	72	72	72	
Phytoplankton density	Pearson Correlation	.289	-.116	.297	.746**	.527	.244	-.119	.723**	-.667**	-.615**	-.335*	-.381*	.858**	1
	Sig. (2-tailed)	.579	.826	.348	.005	.078	.445	.714	.000	.000	.000	.046	.022	.000	.
	N	6	6	12	12	12	12	12	36	36	36	36	36	36	36

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 24 Matrix of product moment correlation between ecological parameters in station P11 (December 2001-October 2002)

		Correlations													
		Maximum depth	Transparency depth	Temperature	pH of water	Dissolved Oxygen	Salinity	Suspended solid	NH3-N	NO2-N	NO3-N	PO4-P	SiO2	Chlorophyll a	Phytoplankton density
Maximum depth	Pearson Correlation	1													
	Sig. (2-tailed)	.													
	N	12													
Transparency depth	Pearson Correlation	.683*	1												
	Sig. (2-tailed)	.014	.												
	N	12	36												
Temperature	Pearson Correlation	-.773**	-.509**	1											
	Sig. (2-tailed)	.003	.002	.											
	N	12	36	72											
pH of water	Pearson Correlation	.487	.404*	-.279*	1										
	Sig. (2-tailed)	.108	.014	.018	.										
	N	12	36	72	72										
Dissolved Oxygen	Pearson Correlation	.119	-.401*	.240*	-.168	1									
	Sig. (2-tailed)	.712	.015	.043	.158	.									
	N	12	36	72	72	72									
Salinity	Pearson Correlation	.126	.460**	-.082	.276*	-.114	1								
	Sig. (2-tailed)	.696	.005	.496	.019	.340	.								
	N	12	36	72	72	72	72								
Suspended solid	Pearson Correlation	.273	-.421	-.366*	.156	.036	.069	1							
	Sig. (2-tailed)	.601	.082	.028	.364	.836	.690	.							
	N	6	18	36	36	36	36	36							
NH3-N	Pearson Correlation	.003	-.039	.023	.639**	-.072	-.188	.075	1						
	Sig. (2-tailed)	.994	.822	.851	.000	.548	.113	.664	.						
	N	12	36	72	72	72	72	36	216						
NO2-N	Pearson Correlation	-.357	.431**	.122	-.021	-.432**	.339**	-.177	-.409**	1					
	Sig. (2-tailed)	.255	.009	.306	.864	.000	.004	.301	.000	.					
	N	12	36	72	72	72	72	36	216	216					
NO3-N	Pearson Correlation	.323	-.269	-.436**	-.433**	.039	-.628**	.057	-.212**	-.424**	1				
	Sig. (2-tailed)	.306	.113	.000	.000	.748	.000	.741	.002	.000	.				
	N	12	36	72	72	72	72	36	216	216	216				
PO4-P	Pearson Correlation	.683*	.525**	-.488**	.648**	-.091	.545**	.147	.256**	-.128	-.293**	1			
	Sig. (2-tailed)	.014	.001	.000	.000	.448	.000	.391	.000	.061	.000	.			
	N	12	36	72	72	72	72	36	216	216	216	216			
SiO2	Pearson Correlation	.196	-.056	-.515**	-.388**	-.114	-.611**	.079	-.275**	-.160*	.900**	-.405**	1		
	Sig. (2-tailed)	.542	.746	.000	.001	.340	.000	.649	.000	.019	.000	.000	.		
	N	12	36	72	72	72	72	36	216	216	216	216	216		
Chlorophyll a	Pearson Correlation	-.302	-.429**	.142	.421**	.189	.002	.063	.657**	-.405**	-.118	.157*	-.294**	1	
	Sig. (2-tailed)	.339	.009	.234	.000	.112	.988	.716	.000	.000	.084	.021	.000	.	
	N	12	36	72	72	72	72	36	216	216	216	216	216	216	
Phytoplankton density	Pearson Correlation	-.023	-.071	.215	.545**	.127	-.175	.092	.831**	-.366**	-.265**	.077	-.302**	.654**	1
	Sig. (2-tailed)	.966	.779	.209	.001	.461	.306	.592	.000	.000	.006	.426	.001	.000	.
	N	6	18	36	36	36	36	36	108	108	108	108	108	108	108

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 25 Comparison of ecological parameters with the input and output of the three subsystems in the watershed

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	5058.457	4	1264.614	88.072	.000
	Within Groups	789.738	55	14.359		
	Total	5848.195	59			
Transparency depth	Between Groups	18.745	4	4.686	66.480	.000
	Within Groups	5.569	79	.070		
	Total	24.314	83			
Temperature	Between Groups	353.741	4	88.435	11.074	.000
	Within Groups	1205.822	151	7.986		
	Total	1559.563	155			
pH of water	Between Groups	33.726	4	8.431	44.798	.000
	Within Groups	28.420	151	.188		
	Total	62.146	155			
Dissolved Oxygen	Between Groups	214.641	4	53.660	76.023	.000
	Within Groups	106.582	151	.706		
	Total	321.222	155			
Suspended solid	Between Groups	33369.796	4	8342.449	18.265	.000
	Within Groups	33341.536	73	456.733		
	Total	66711.332	77			
NH3-N	Between Groups	63189.822	4	15797.456	8.712	.000
	Within Groups	839589.329	463	1813.368		
	Total	902779.151	467			
NO2-N	Between Groups	32644.266	4	8161.066	35.016	.000
	Within Groups	107909.131	463	233.065		
	Total	140553.397	467			
NO3-N	Between Groups	375416.080	4	93854.020	48.109	.000
	Within Groups	903253.844	463	1950.872		
	Total	1278669.925	467			
PO4-P	Between Groups	798873.273	4	199718.318	339.453	.000
	Within Groups	272407.272	463	588.353		
	Total	1071280.546	467			
Si	Between Groups	2393.864	4	598.466	27.505	.000
	Within Groups	10074.073	463	21.758		
	Total	12467.938	467			
Chlorophyll a	Between Groups	192207.252	4	48051.813	175.687	.000
	Within Groups	126633.962	463	273.507		
	Total	318841.214	467			
Phytoplankton density	Between Groups	1.66972E+27	4	4.174E+26	64.403	.000
	Within Groups	1.48427E+27	229	6.482E+24		
	Total	3.15399E+27	233			

Multiple Comparisons

LSD

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Maximum depth	1	3	-8.7167(*)	1.54698	.000	-11.8169	-5.6165
		4	-23.9333(*)	1.54698	.000	-27.0335	-20.8331
		10	-.3750	1.54698	.809	-3.4752	2.7252
		11	-.7333	1.54698	.637	-3.8335	2.3669
	3	1	8.7167(*)	1.54698	.000	5.6165	11.8169
		4	-15.2167(*)	1.54698	.000	-18.3169	-12.1165
		10	8.3417(*)	1.54698	.000	5.2415	11.4419
		11	7.9833(*)	1.54698	.000	4.8831	11.0835
	4	1	23.9333(*)	1.54698	.000	20.8331	27.0335
		3	15.2167(*)	1.54698	.000	12.1165	18.3169
		10	23.5583(*)	1.54698	.000	20.4581	26.6585
		11	23.2000(*)	1.54698	.000	20.0998	26.3002
	10	1	.3750	1.54698	.809	-2.7252	3.4752
		3	-8.3417(*)	1.54698	.000	-11.4419	-5.2415
		4	-23.5583(*)	1.54698	.000	-26.6585	-20.4581
		11	-.3583	1.54698	.818	-3.4585	2.7419
	11	1	.7333	1.54698	.637	-2.3669	3.8335
		3	-7.9833(*)	1.54698	.000	-11.0835	-4.8831
4		-23.2000(*)	1.54698	.000	-26.3002	-20.0998	
10		.3583	1.54698	.818	-2.7419	3.4585	
Transparency depth	1	3	-.5758(*)	.10839	.000	-.7916	-.3601
		4	-.7975(*)	.10839	.000	-1.0132	-.5818
		10	.4992(*)	.10839	.000	.2834	.7149
		11	.3408(*)	.08850	.000	.1647	.5170

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Transparency Depth (Cont.)	4	4	-.2217(*)	.10839	.044			
		10	1.0750(*)	.10839	.000	-.4374	-.0059	
		11	.9167(*)	.08850	.000	.8593	1.2907	
	10	1	.7975(*)	.10839	.000	.7405	1.0928	
		3	.2217(*)	.10839	.044	.5818	1.0132	
		10	1.2967(*)	.10839	.000	.0059	.4374	
	11	11	1.1383(*)	.08850	.000	1.0809	1.5124	
		1	-.4992(*)	.10839	.000	-.9622	1.3145	
		3	-1.0750(*)	.10839	.000	-.7149	-.2834	
	Temperature	1	4	-1.2967(*)	.10839	.000	-1.2907	-.8593
			11	-.1583	.08850	.077	-1.5124	-1.0809
			1	-.3408(*)	.08850	.000	-.3345	.0178
		3	3	-.9167(*)	.08850	.000	-.5170	-.1647
			4	-1.1383(*)	.08850	.000	-1.0928	-.7405
			10	.1583	.08850	.077	-1.3145	-.9622
	4	3	-3.3667(*)	1.15366	.004	-.0178	.3345	
		4	-3.1611(*)	.94196	.001	-5.6461	-1.0873	
		10	-4.7250(*)	.99910	.000	-5.0222	-1.3000	
11		-5.3083(*)	.88112	.000	-6.6990	-2.7510		
1		3.3667(*)	1.15366	.004	-7.0493	-3.5674		
4		.2056	.94196	.828	1.0873	5.6461		
10	10	-1.3583	.99910	.176	-1.6556	2.0667		
	11	-1.9417(*)	.88112	.029	-3.3324	.6157		
	1	3.1611(*)	.94196	.001	-3.6826	-.2007		
10	3	-.2056	.94196	.828	1.3000	5.0222		
	10	-1.5639(*)	.74468	.037	-2.0667	1.6556		
	11	-2.1472(*)	.57683	.000	-3.0352	-.0925		
	1	4.7250(*)	.99910	.000	-3.2869	-1.0075		
					2.7510	6.6990		

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Temperature (Cont.)	11	3	1.3583	.99910	.176	- .6157	3.3324	
		4	1.5639(*)	.74468	.037	.0925	3.0352	
		11	-.5833	.66607	.383	-1.8993	.7327	
	pH of water	1	1	5.3083(*)	.88112	.000	3.5674	7.0493
			3	1.9417(*)	.88112	.029	.2007	3.6826
			4	2.1472(*)	.57683	.000	1.0075	3.2869
		10	10	.5833	.66607	.383	-.7327	1.8993
			3	-.2583	.17711	.147	-.6083	.0916
			4	-.6917(*)	.14461	.000	-.9774	-.4059
			11	.5333(*)	.15338	.001	.2303	.8364
3			11	.3667(*)	.13527	.007	.0994	.6339
			1	.2583	.17711	.147	-.0916	.6083
			4	-.4333(*)	.14461	.003	-.7191	-.1476
	10		.7917(*)	.15338	.000	.4886	1.0947	
	4		11	.6250(*)	.13527	.000	.3577	.8923
			1	.6917(*)	.14461	.000	.4059	.9774
		3	.4333(*)	.14461	.003	.1476	.7191	
		10	1.2250(*)	.11433	.000	.9991	1.4509	
		11	11	1.0583(*)	.08856	.000	.8834	1.2333
			1	-.5333(*)	.15338	.001	-.8364	-.2303
3			-.7917(*)	.15338	.000	-1.0947	-.4886	
4			-1.2250(*)	.11433	.000	-1.4509	-.9991	
10			11	-.1667	.10226	.105	-.3687	.0354
			1	-.3667(*)	.13527	.007	-.6339	-.0994
	3		-.6250(*)	.13527	.000	-.8923	-.3577	
	4		-1.0583(*)	.08856	.000	-1.2333	-.8834	
	11		10	.1667	.10226	.105	-.0354	.3687



Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Dissolved Oxygen	1	3	.2750	.34299	.424	-.4027	.9527
		4	.8806(*)	.28005	.002	.3272	1.4339
		10	2.8167(*)	.29704	.000	2.2298	3.4035
	3	11	2.9861(*)	.26196	.000	2.4685	3.5037
		1	-.2750	.34299	.424	-.9527	.4027
		4	.6056(*)	.28005	.032	.0522	1.1589
	4	10	2.5417(*)	.29704	.000	1.9548	3.1285
		11	2.7111(*)	.26196	.000	2.1935	3.2287
		1	-.8806(*)	.28005	.002	-1.4339	-.3272
	10	3	-.6056(*)	.28005	.032	-1.1589	-.0522
		11	1.9361(*)	.22140	.000	1.4987	2.3735
		1	2.1056(*)	.17149	.000	1.7667	2.4444
	11	1	-2.8167(*)	.29704	.000	-3.4035	-2.2298
		3	-2.5417(*)	.29704	.000	-3.1285	-1.9548
		4	-1.9361(*)	.22140	.000	-2.3735	-1.4987
	3	11	.1694	.19802	.394	-.2218	.5607
		1	-2.9861(*)	.26196	.000	-3.5037	-2.4685
		3	-2.7111(*)	.26196	.000	-3.2287	-2.1935
Suspended solid	1	4	-2.1056(*)	.17149	.000	-2.4444	-1.7667
		10	-.1694	.19802	.394	-.5607	.2218
		3	6.61667	12.338738	.593	-17.97440	31.20774
	3	4	8.47222	10.074537	.403	-11.60630	28.55075
		10	-48.85000(*)	10.685661	.000	-70.14649	-27.55351
		11	-28.21389(*)	9.423867	.004	-46.99563	-9.43215
	11	1	-6.61667	12.338738	.593	-31.20774	17.97440
		4	1.85556	10.074537	.854	-18.22297	21.93408
		10	-55.46667(*)	10.685661	.000	-76.76316	-34.17018
		11	-34.83056(*)	9.423867	.000	-53.61230	-16.04882

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Suspended solid (Cont.)	4	1	-8.47222	10.074537	.403	-28.55075	11.60630
		3	-1.85556	10.074537	.854	-21.93408	18.22297
		10	-57.32222(*)	7.964621	.000	-73.19569	-41.44876
		11	-36.68611(*)	6.169369	.000	-48.98165	-24.39058
	10	1	48.85000(*)	10.685661	.000	27.55351	70.14649
		3	55.46667(*)	10.685661	.000	34.17018	76.76316
		4	57.32222(*)	7.964621	.000	41.44876	73.19569
	11	11	20.63611(*)	7.123774	.005	6.43845	34.83377
		1	28.21389(*)	9.423867	.004	9.43215	46.99563
		3	34.83056(*)	9.423867	.000	16.04882	53.61230
		4	36.68611(*)	6.169369	.000	24.39058	48.98165
NH3-N	1	10	-20.63611(*)	7.123774	.005	-34.83377	-6.43845
		3	-.55628	10.037064	.956	-20.28012	19.16757
		4	-5.01799	8.195229	.541	-21.12244	11.08646
	3	10	-22.66285(*)	8.692353	.009	-39.74420	-5.58150
		11	-27.83794(*)	7.665934	.000	-42.90227	-12.77361
		1	.55628	10.037064	.956	-19.16757	20.28012
		4	-4.46171	8.195229	.586	-20.56616	11.64274
	4	10	-22.10657(*)	8.692353	.011	-39.18792	-5.02522
		11	-27.28166(*)	7.665934	.000	-42.34600	-12.21733
		1	5.01799	8.195229	.541	-11.08646	21.12244
		3	4.46171	8.195229	.586	-11.64274	20.56616
		10	-17.64486(*)	6.478897	.007	-30.37654	-4.91317
	10	11	-22.81995(*)	5.018532	.000	-32.68187	-12.95803
		1	22.66285(*)	8.692353	.009	5.58150	39.74420
		3	22.10657(*)	8.692353	.011	5.02522	39.18792
4		17.64486(*)	6.478897	.007	4.91317	30.37654	
11		-5.17509	5.794902	.372	-16.56266	6.21247	

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
NH3-N (Cont.)	11	1	27.83794(*)	7.665934	.000		
		3	27.28166(*)	7.665934	.000	12.77361	42.90227
		4	22.81995(*)	5.018532	.000	12.21733	42.34600
		10	5.17509	5.794902	.372	12.95803	32.68187
NO2-N	1	3	.34864	3.598341	.923	-6.21247	16.56266
		4	.10998	2.938033	.970	-6.72246	7.41974
		10	-12.28914(*)	3.116255	.000	-5.66355	5.88351
		11	-17.98782(*)	2.748279	.000	-18.41289	-6.16538
	3	1	-.34864	3.598341	.923	-23.38847	-12.58718
		4	-.23866	2.938033	.935	-7.41974	6.72246
		10	-12.63778(*)	3.116255	.000	-6.01219	5.53487
		11	-18.33646(*)	2.748279	.000	-18.76153	-6.51402
	4	1	-.10998	2.938033	.970	-23.73711	-12.93582
		3	.23866	2.938033	.935	-5.88351	5.66355
		10	-12.39912(*)	2.322719	.000	-5.53487	6.01219
		11	-18.09781(*)	1.799171	.000	-16.96350	-7.83474
	10	1	12.28914(*)	3.116255	.000	-21.63336	-14.56225
		3	12.63778(*)	3.116255	.000	6.16538	18.41289
		4	12.39912(*)	2.322719	.000	6.51402	18.76153
		11	-5.69869(*)	2.077503	.006	7.83474	16.96350
11	1	17.98782(*)	2.748279	.000	-9.78119	-1.61618	
	3	18.33646(*)	2.748279	.000	12.58718	23.38847	
	4	18.09781(*)	1.799171	.000	12.93582	23.73711	
	10	5.69869(*)	2.077503	.006	14.56225	21.63336	
NO3-N	1	3	40.69747(*)	10.410658	.000	1.61618	9.78119
		4	42.96506(*)	8.500266	.000	20.23948	61.15546
		10	-30.20853(*)	9.015894	.001	26.26118	59.66895
		11	-15.43756	7.951271	.053	-47.92567	-12.49139
	3	1	-40.69747(*)	10.410658	.000	-31.06261	.18749
						-61.15546	-20.23948

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
NO3-N (Cont.)	4	4	2.26759	8.500266	.790			
		10	-70.90600(*)	9.015894	.000	-14.43629	18.97147	
		11	-56.13503(*)	7.951271	.000	-88.62314	-53.18886	
	10	1	-42.96506(*)	8.500266	.000	-71.76008	-40.50998	
		3	-2.26759	8.500266	.790	-59.66895	-26.26118	
		10	-73.17359(*)	6.720051	.000	-18.97147	14.43629	
	11	11	-58.40263(*)	5.205329	.000	-86.37917	-59.96802	
		1	30.20853(*)	9.015894	.001	-68.63162	-48.17363	
		3	70.90600(*)	9.015894	.000	12.49139	47.92567	
	PO4-P	1	4	73.17359(*)	6.720051	.000	53.18886	88.62314
			11	14.77097(*)	6.010596	.014	59.96802	86.37917
			1	15.43756	7.951271	.053	2.95954	26.58239
		3	3	56.13503(*)	7.951271	.000	-1.8749	31.06261
			4	58.40263(*)	5.205329	.000	40.50998	71.76008
			10	-14.77097(*)	6.010596	.014	48.17363	68.63162
	PO4-P	1	3	4.01619	5.717190	.483	-26.58239	-2.95954
			4	4.69136	4.668066	.315	-7.21866	15.25105
			10	-78.02301(*)	4.951231	.000	-4.48186	13.86458
3		11	-82.28770(*)	4.366576	.000	-87.75268	-68.29334	
		1	-4.01619	5.717190	.483	-90.86846	-73.70694	
		4	.67517	4.668066	.885	-15.25105	7.21866	
4		10	-82.03921(*)	4.951231	.000	-8.49805	9.84839	
		11	-86.30389(*)	4.366576	.000	-91.76888	-72.30954	
		1	-4.69136	4.668066	.315	-94.88466	-77.72313	
		3	-6.7517	4.668066	.885	-13.86458	4.48186	
		10	-82.71437(*)	3.690430	.000	-9.84839	8.49805	
		11	-86.97906(*)	2.858595	.000	-89.96644	-75.46231	
10	1	78.02301(*)	4.951231	.000	-92.59649	-81.36163		
	3	82.03921(*)	4.951231	.000	68.29334	87.75268		
					72.30954	91.76888		

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
PO4-P (Cont.)	11	4	82.71437(*)	3.690430	.000	75.46231	89.96644
		11	-4.26469	3.300821	.197	-10.75113	2.22176
	4	1	82.28770(*)	4.366576	.000	73.70694	90.86846
		3	86.30389(*)	4.366576	.000	77.72313	94.88466
	1	4	86.97906(*)	2.858595	.000	81.36163	92.59649
		10	4.26469	3.300821	.197	-2.22176	10.75113
	3	3	1.00658	1.099451	.360	-1.15395	3.16712
		4	1.44822	.897698	.107	-.31584	3.21229
	10	10	6.21090(*)	.952152	.000	4.33983	8.08198
		11	5.43877(*)	.839719	.000	3.78864	7.08890
	4	1	-1.00658	1.099451	.360	-3.16712	1.15395
		4	.44164	.897698	.623	-1.32243	2.20571
	10	10	5.20432(*)	.952152	.000	3.33324	7.07539
		11	4.43219(*)	.839719	.000	2.78205	6.08232
	11	1	-1.44822	.897698	.107	-3.21229	.31584
		3	-.44164	.897698	.623	-2.20571	1.32243
	10	10	4.76268(*)	.709692	.000	3.36806	6.15730
		11	3.99055(*)	.549725	.000	2.91028	5.07081
	11	1	-6.21090(*)	.952152	.000	-8.08198	-4.33983
		3	-5.20432(*)	.952152	.000	-7.07539	-3.33324
11	4	-4.76268(*)	.709692	.000	-6.15730	-3.36806	
	11	-.77213	.634768	.224	-2.01952	.47525	
Si	11	1	-5.43877(*)	.839719	.000	-7.08890	-3.78864
		3	-4.43219(*)	.839719	.000	-6.08232	-2.78205
	4	4	-3.99055(*)	.549725	.000	-5.07081	-2.91028
		10	.77213	.634768	.224	-.47525	2.01952

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Chlorophyll a	1	3	-8.43317(*)	3.898058	.031	-16.09324	-.77309	
		4	-14.82981(*)	3.182751	.000	-21.08424	-8.57539	
		10	-65.13453(*)	3.375818	.000	-71.76835	-58.50071	
		11	-43.02088(*)	2.977191	.000	-48.87136	-37.17040	
	3	1	8.43317(*)	3.898058	.031	.77309	16.09324	
		4	-6.39665(*)	3.182751	.045	-12.65108	-.14222	
		10	-56.70136(*)	3.375818	.000	-63.33518	-50.06754	
	4	11	-34.58771(*)	2.977191	.000	-40.43819	-28.73723	
		1	14.82981(*)	3.182751	.000	8.57539	21.08424	
		3	6.39665(*)	3.182751	.045	.14222	12.65108	
	10	10	-50.30471(*)	2.516186	.000	-55.24927	-45.36015	
		11	-28.19106(*)	1.949029	.000	-32.02110	-24.36103	
		1	65.13453(*)	3.375818	.000	58.50071	71.76835	
	11	3	4	56.70136(*)	3.375818	.000	50.06754	63.33518
			11	50.30471(*)	2.516186	.000	45.36015	55.24927
		1	11	22.11365(*)	2.250545	.000	17.69110	26.53620
			3	43.02088(*)	2.977191	.000	37.17040	48.87136
			4	34.58771(*)	2.977191	.000	28.73723	40.43819
10			28.19106(*)	1.949029	.000	24.36103	32.02110	
Phytoplankton density	1	10	-22.11365(*)	2.250545	.000	-26.53620	-17.69110	
		3	-1476535935909.27700	848627760405.049000	.083	-3148652797010.97400	195580925192.41960	
		4	-6476212029514.81000(*)	692901664851.076000	.000	-7841489729515.95000	-5110934329513.67000	
		10	-183100167183.33330	734933198867.466000	.803	-1631195846993.69900	1264995512627.03200	
	3	11	-25743102970.53704	648150158149.498000	.968	-1302843450772.28500	1251357244831.21100	
		1	1476535935909.27700	848627760405.049000	.083	-195580925192.41960	3148652797010.97400	
		4	-4999676093605.53000(*)	692901664851.076000	.000	-6364953793606.67000	-3634398393604.40000	

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Phytoplankton density (Cont.)	4	10	1293435768725.94400	734933198867. 466000	.080	-154659911084.42110	2741531448536.30900
		11	1450792832938.74000(*)	648150158149. 498000	.026	173692485136.99260	2727893180740.48800
	10	1	6476212029514.81000(*)	692901664851. 076000	.000	5110934329513.67000	7841489729515.95000
		3	4999676093605.53000(*)	692901664851. 076000	.000	3634398393604.40000	6364953793606.67000
	11	10	6293111862331.48000(*)	547786863863. 009000	.000	5213765069671.56000	7372458654991.39000
		11	6450468926544.27000(*)	424313880202. 524800	.000	5614410495993.42000	7286527357095.12000
	10	1	183100167183.33330	734933198867. 466000	.803	-1264995512627.03200	1631195846993.69900
		3	-1293435768725.94400	734933198867. 466000	.080	-2741531448536.30900	154659911084.42110
	11	4	-6293111862331.48000(*)	547786863863. 009000	.000	-7372458654991.39000	-5213765069671.56000
		11	157357064212.79630	489955465911. 644000	.748	-808040055660.78000	1122754184086.37300
	11	1	25743102970.53704	648150158149. 498000	.968	-1251357244831.21100	1302843450772.28500
		3	-1450792832938.74000(*)	648150158149. 498000	.026	-2727893180740.48800	-173692485136.99260
	11	4	-6450468926544.27000(*)	424313880202. 524800	.000	-7286527357095.12000	-5614410495993.42000
		10	-157357064212.79630	489955465911. 644000	.748	-1122754184086.37300	808040055660.78000

* The mean difference is significant at the .05 level.

Table 26 Comparison of ecological parameters with the four subwatersheds of the Phetchaburi Watershed

		Sum of Squares	df	Mean Square	F	Sig.
Maximum depth	Between Groups	116.424	3	38.808	31.789	.000
	Within Groups	53.715	44	1.221		
	Total	170.139	47			
Transparency depth	Between Groups	6.412	3	2.137	13.151	.000
	Within Groups	7.151	44	.163		
	Total	13.563	47			
Temperature	Between Groups	144.279	3	48.093	12.634	.000
	Within Groups	167.486	44	3.806		
	Total	311.765	47			
pH of water	Between Groups	3.081	3	1.027	5.000	.005
	Within Groups	9.036	44	.205		
	Total	12.117	47			
Dissolved Oxygen	Between Groups	15.226	3	5.075	5.789	.002
	Within Groups	38.573	44	.877		
	Total	53.798	47			
Suspended solid	Between Groups	1033.344	3	344.448	5.397	.007
	Within Groups	1340.206	21	63.819		
	Total	2373.550	24			
NH3-N	Between Groups	9297.729	3	3099.243	25.406	.000
	Within Groups	17078.516	140	121.989		
	Total	26376.245	143			
NO2-N	Between Groups	724.777	3	241.592	14.296	.000
	Within Groups	2365.847	140	16.899		
	Total	3090.624	143			
NO3-N	Between Groups	46486.305	3	15495.435	7.774	.000
	Within Groups	279060.724	140	1993.291		
	Total	325547.028	143			
PO4-P	Between Groups	2844.457	3	948.152	12.150	.000
	Within Groups	10924.808	140	78.034		
	Total	13769.265	143			
Si	Between Groups	683.796	3	227.932	9.959	.000
	Within Groups	3204.238	140	22.887		
	Total	3888.034	143			
Chlorophyll a	Between Groups	548.594	3	182.865	16.572	.000
	Within Groups	1544.814	140	11.034		
	Total	2093.408	143			
Phytoplankton density	Between Groups	809835906126831 0000000	3	26994530204 22771000000	2.501	.067
	Within Groups	734086642358326 00000000	68	10795391799 38715000000		
	Total	815070232971010 00000000	71			

Multiple Comparisons

LSD

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Maximum depth	1	2	-2.4625(*)	.45107	.000	-3.3716	-1.5534
		6	.5000	.45107	.274	-.4091	1.4091
		7	1.8417(*)	.45107	.000	.9326	2.7507
	2	1	2.4625(*)	.45107	.000	1.5534	3.3716
		6	2.9625(*)	.45107	.000	2.0534	3.8716
		7	4.3042(*)	.45107	.000	3.3951	5.2132
	6	1	-.5000	.45107	.274	-1.4091	.4091
		2	-2.9625(*)	.45107	.000	-3.8716	-2.0534
		7	1.3417(*)	.45107	.005	.4326	2.2507
	7	1	-1.8417(*)	.45107	.000	-2.7507	-.9326
		2	-4.3042(*)	.45107	.000	-5.2132	-3.3951
		6	-1.3417(*)	.45107	.005	-2.2507	-.4326
Transparency depth	1	2	-.4258(*)	.16458	.013	-.7575	-.0941
		6	-.7008(*)	.16458	.000	-1.0325	-.3691
		7	.2408	.16458	.150	-.0909	.5725
	2	1	.4258(*)	.16458	.013	.0941	.7575
		6	-.2750	.16458	.102	-.6067	.0567
		7	.6667(*)	.16458	.000	.3350	.9984
	6	1	.7008(*)	.16458	.000	.3691	1.0325
		2	.2750	.16458	.102	-.0567	.6067
		7	.9417(*)	.16458	.000	.6100	1.2734
	7	1	-.2408	.16458	.150	-.5725	.0909
		2	-.6667(*)	.16458	.000	-.9984	-.3350
		6	-.9417(*)	.16458	.000	-1.2734	-.6100

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Temperature	1	2	-3.0917(*)	.79650	.000	-4.6969	-1.4864
		6	-2.2500(*)	.79650	.007	-3.8552	-.6448
		7	-4.8167(*)	.79650	.000	-6.4219	-3.2114
	2	1	3.0917(*)	.79650	.000	1.4864	4.6969
		6	.8417	.79650	.296	-.7636	2.4469
		7	-1.7250(*)	.79650	.036	-3.3302	-.1198
	6	1	2.2500(*)	.79650	.007	.6448	3.8552
		2	-.8417	.79650	.296	-2.4469	.7636
		7	-2.5667(*)	.79650	.002	-4.1719	-.9614
	7	1	4.8167(*)	.79650	.000	3.2114	6.4219
		2	1.7250(*)	.79650	.036	.1198	3.3302
		6	2.5667(*)	.79650	.002	.9614	4.1719
pH of water	1	2	.5917(*)	.18501	.003	.2188	.9645
		6	.5000(*)	.18501	.010	.1271	.8729
		7	.0958	.18501	.607	-.2770	.4687
	2	1	-.5917(*)	.18501	.003	-.9645	-.2188
		6	-.0917	.18501	.623	-.4645	.2812
		7	-.4958(*)	.18501	.010	-.8687	-.1230
	6	1	-.5000(*)	.18501	.010	-.8729	-.1271
		2	.0917	.18501	.623	-.2812	.4645
		7	-.4042(*)	.18501	.034	-.7770	-.0313
	7	1	-.0958	.18501	.607	-.4687	.2770
		2	.4958(*)	.18501	.010	.1230	.8687
		6	.4042(*)	.18501	.034	.0313	.7770
Dissolved Oxygen	1	2	1.5500(*)	.38224	.000	.7796	2.3204
		6	.8500(*)	.38224	.031	.0796	1.6204
		7	1.0917(*)	.38224	.007	.3213	1.8620

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Dissolved Oxygen (Cont.)	2	1	-1.5500(*)	.38224	.000	-2.3204	-.7796
		6	-.7000	.38224	.074	-1.4704	.0704
		7	-.4583	.38224	.237	-1.2287	.3120
	6	1	-.8500(*)	.38224	.031	-1.6204	-.0796
		2	.7000	.38224	.074	-.0704	1.4704
		7	.2417	.38224	.531	-.5287	1.0120
	7	1	-1.0917(*)	.38224	.007	-1.8620	-.3213
		2	.4583	.38224	.237	-.3120	1.2287
		6	-.2417	.38224	.531	-1.0120	.5287
	Suspended solid	1	2	7.23333	4.612278	.132	-2.35842
6			9.26667	4.612278	.058	-.32509	18.85842
7			-6.68810	4.444503	.147	-15.93094	2.55475
2		1	-7.23333	4.612278	.132	-16.82509	2.35842
		6	2.03333	4.612278	.664	-7.55842	11.62509
		7	-13.92143(*)	4.444503	.005	-23.16428	-4.67858
6		1	-9.26667	4.612278	.058	-18.85842	.32509
		2	-2.03333	4.612278	.664	-11.62509	7.55842
		7	-15.95476(*)	4.444503	.002	-25.19761	-6.71191
7		1	6.68810	4.444503	.147	-2.55475	15.93094
		2	13.92143(*)	4.444503	.005	4.67858	23.16428
		6	15.95476(*)	4.444503	.002	6.71191	25.19761
NH3-N	1	2	-4.63147	2.603303	.077	-9.77834	.51540
		6	-8.85461(*)	2.603303	.001	-14.00148	-3.70774
		7	-21.58494(*)	2.603303	.000	-26.73182	-16.43807
	2	1	4.63147	2.603303	.077	-.51540	9.77834
		6	-4.22314	2.603303	.107	-9.37001	.92373
		7	-16.95347(*)	2.603303	.000	-22.10034	-11.80660

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
NH3-N (Cont.)	6	1	8.85461(*)	2.603303	.001	3.70774	14.00148
		2	4.22314	2.603303	.107	-.92373	9.37001
		7	-12.73033(*)	2.603303	.000	-17.87720	-7.58346
	7	1	21.58494(*)	2.603303	.000	16.43807	26.73182
		2	16.95347(*)	2.603303	.000	11.80660	22.10034
		6	12.73033(*)	2.603303	.000	7.58346	17.87720
NO2-N	1	2	-.87272	.968931	.369	-2.78835	1.04291
		6	-2.22156(*)	.968931	.023	-4.13719	-.30593
		7	-5.87942(*)	.968931	.000	-7.79505	-3.96379
	2	1	.87272	.968931	.369	-1.04291	2.78835
		6	-1.34883	.968931	.166	-3.26446	.56680
		7	-5.00669(*)	.968931	.000	-6.92232	-3.09106
	6	1	2.22156(*)	.968931	.023	.30593	4.13719
		2	1.34883	.968931	.166	-.56680	3.26446
		7	-3.65786(*)	.968931	.000	-5.57349	-1.74223
	7	1	5.87942(*)	.968931	.000	3.96379	7.79505
		2	5.00669(*)	.968931	.000	3.09106	6.92232
		6	3.65786(*)	.968931	.000	1.74223	5.57349
NO3-N	1	6	16.48092	10.523231	.120	-4.32408	37.28591
		2	-32.36500(*)	10.523231	.003	-53.16999	-11.56001
		7	3.36739	10.523231	.749	-17.43760	24.17238
	2	1	-16.48092	10.523231	.120	-37.28591	4.32408
		6	-48.84592(*)	10.523231	.000	-69.65091	-28.04092
		7	-13.11353	10.523231	.215	-33.91852	7.69146
	6	1	32.36500(*)	10.523231	.003	11.56001	53.16999
		2	48.84592(*)	10.523231	.000	28.04092	69.65091
		7	35.73239(*)	10.523231	.001	14.92740	56.53738

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
NO3-N (Cont.)	7	1	-3.36739	10.523231	.749	-24.17238	17.43760
		2	13.11353	10.523231	.215	-7.69146	33.91852
		6	-35.73239(*)	10.523231	.001	-56.53738	-14.92740
PO4-P	1	2	-3.02681	2.082124	.148	-7.14328	1.08967
		6	.48242	2.082124	.817	-3.63405	4.59889
		7	-10.63086(*)	2.082124	.000	-14.74733	-6.51439
	2	1	3.02681	2.082124	.148	-1.08967	7.14328
		6	3.50922	2.082124	.094	-.60725	7.62569
		7	-7.60406(*)	2.082124	.000	-11.72053	-3.48758
	6	1	-.48242	2.082124	.817	-4.59889	3.63405
		2	-3.50922	2.082124	.094	-7.62569	.60725
		7	-11.11328(*)	2.082124	.000	-15.22975	-6.99681
7	1	10.63086(*)	2.082124	.000	6.51439	14.74733	
	2	7.60406(*)	2.082124	.000	3.48758	11.72053	
	6	11.11328(*)	2.082124	.000	6.99681	15.22975	
Si	1	2	.25778	1.127618	.820	-1.97158	2.48714
		6	1.42881	1.127618	.207	-.80056	3.65817
		7	-4.31422(*)	1.127618	.000	-6.54358	-2.08486
	2	1	-.25778	1.127618	.820	-2.48714	1.97158
		6	1.17103	1.127618	.301	-1.05833	3.40039
		7	-4.57200(*)	1.127618	.000	-6.80136	-2.34264
	6	1	-1.42881	1.127618	.207	-3.65817	.80056
		2	-1.17103	1.127618	.301	-3.40039	1.05833
		7	-5.74303(*)	1.127618	.000	-7.97239	-3.51367
	7	1	4.31422(*)	1.127618	.000	2.08486	6.54358
		2	4.57200(*)	1.127618	.000	2.34264	6.80136
		6	5.74303(*)	1.127618	.000	3.51367	7.97239

Dependent Variable	(I) Sampling station	(J) Sampling station	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Chlorophyll a	1	2	-4.57500(*)	.782957	.000	-6.12295	-3.02705
		6	.32044	.782957	.683	-1.22750	1.86839
		7	-1.98289(*)	.782957	.012	-3.53084	-.43494
	2	1	4.57500(*)	.782957	.000	3.02705	6.12295
		6	4.89544(*)	.782957	.000	3.34750	6.44339
		7	2.59211(*)	.782957	.001	1.04416	4.14006
	6	1	-.32044	.782957	.683	-1.86839	1.22750
		2	-4.89544(*)	.782957	.000	-6.44339	-3.34750
		7	-2.30333(*)	.782957	.004	-3.85128	-.75539
	7	1	1.98289(*)	.782957	.012	.43494	3.53084
		2	-2.59211(*)	.782957	.001	-4.14006	-1.04416
		6	2.30333(*)	.782957	.004	.75539	3.85128
Phytoplankton density	1	2	-2430063127.77778	10952113849.434200	.825	-24284666047.80211	19424539792.24655
		6	-27088793866.66667(*)	10952113849.434200	.016	-48943396786.69090	-5234190946.64234
		7	-8904965502.61111	10952113849.434200	.419	-30759568422.63544	12949637417.41322
	2	1	2430063127.77778	10952113849.434200	.825	-19424539792.24655	24284666047.80211
		6	-24658730738.88889(*)	10952113849.434200	.028	-46513333658.91320	-2804127818.86456
		7	-6474902374.83333	10952113849.434200	.556	-28329505294.85766	15379700545.19100
	6	1	27088793866.66667(*)	10952113849.434200	.016	5234190946.64234	48943396786.69090
		2	24658730738.88889(*)	10952113849.434200	.028	2804127818.86456	46513333658.91320
		7	18183828364.05556	10952113849.434200	.101	-3670774555.96877	40038431284.07988
	7	1	8904965502.61111	10952113849.434200	.419	-12949637417.41322	30759568422.63544
		2	6474902374.83333	10952113849.434200	.556	-15379700545.19100	28329505294.85766
		6	-18183828364.05556	10952113849.434200	.101	-40038431284.07988	3670774555.96877

* The mean difference is significant at the .05 level.

Appendix F

Table 1 Classification of surface water.

Classification	Objectives/Condition & Beneficial Usages
Class 1	Extra clean fresh surface water resources used for : (1) conservation not necessary pass through water treatment processes require only ordinary process for pathogenic destruction
Class 2	(2) ecosystem conservation where basic organisms can breed naturally
Class 3	Very clean fresh surface water resources used for : (1) consumption which requires ordinary water treatment processes before use (2) aquatic organism of conservation (3) fisheries (4) recreation
Class 4	Medium clean fresh surface water resources used for : (1) consumption, but passing through an ordinary treatment process before using
Class 5	(2) agriculture Fairly clean fresh surface water resources used for : (1) consumption, but requires special water treatment process before using (2) industry The resources which are not classification in class 1-4 and used for navigation

Source: Pollution control department, 1997

Table 2 Surface Water Quality Standards.

Parameter	Unit	Statistic	Standard Value for Class***				
			1	2	3	4	5
1. Color,Odor and Taste	-	-	N	n	n	n	-
2. Temperature	°C	-	N	n'	n'	n'	-
3. pH value	-	-	N	5-9	5-9	5-9	-
4. Dissolved Oxygen	mg/l	P20	N	6	4	2	-
5. BOD (5 day, 20 °C)	mg/l	P80	N	1.5	2.0	4.0	-
6. Coliform Bacteria							
- Total Coliform	MPN/ 100 ml	P80	N	5,000	20,000	-	-
- Fecal Coliform	MPN/ 100 ml	P80	N	1,000	4,000	-	-
7. NO -N	mg/l	Max. allowance	N	5.0	5.0	5.0	-
8. NH ₃ -N	"	"	N	0.5	0.5	0.5	-
9. Phenols	"	"	N	0.005	0.005	0.005	-
10. Cu	"	"	N	0.1	0.1	0.1	-
11. Ni	"	"	N	0.1	0.1	0.1	-
12. Mn	"	"	N	1.0	1.0	1.0	-
13. Zn	"	"	N	1.0	1.0	1.0	-
14. Cd	"	"	N	0.005*	0.005	0.005	-
					*	*	
				0.05**	0.05*	0.05*	-
					*	*	
15. Pb	"	"	N	0.05	0.05	0.05	-
16. Organochlorine Pesticides (total)	mg/l	"	N	0.05	0.05	0.05	-
17. DDT	µg	"	N	1.0	1.0	1.0	-

Note : P = Percentile value

N = naturally

n' = naturally but changing not more than 3 C

* = when water hardness not more than 100 mg/l as CaCO₃

** = when water hardness more than 100 mg/l as CaCO₃

*** = Water Classification

Source: modified from Pollution control department, 1997

Table 3 General Ranges of Primary Productivity of Phytoplankton and Related Characteristics of Lakes of Different Trophic Categories.

Trophic type	Mean Primary Productivity (mg C m ⁻² Day ⁻¹)	Phytoplankton density (cm ³ m ⁻³)	Phytoplankton Biomass (mgC m ⁻³)	Chlorophyll a (mg m ⁻³)	Dominant phytoplankton	Light Extinction coefficients (nm ⁻¹)	Total Organic Carbon (mg litter ⁻¹)	Total P (mg litter ⁻¹)	Total N (mg litter ⁻¹)	Total Inorganic Solids (mg litter ⁻¹)
Ultraoligotrophic	< 50	< 1	< 50	0.01-0.5		0.03-0.8		<1-5	<1-250	2-15
Oligotrophic	50-300		20-100	0.3-3	Chrysophyceae,	0.05-1.0	<1-3			
Oligomesotrophic		1-3			Chrysophyceae, Dinophyceae, Bacillariophyceae			5-10	250-600	10-200
Mesotrophic	250-1000		100-300	2-15		0.1-2.0	<1-5			
Mesoeutrophic		3-5						10-30	500-1100	100-500
Eutrophic	> 1000	>10	>300	10-500	Bacillariophyceae,	0.5-4.0	5-30	30-30	500-15000	400-60000
Hypereutrophic					Cyanobacteria, Chlorophyceae, Euglenophyceae			>5000		
Dystrophic	< 50-500		<50-200	0.1-10		1.0-4.0			<1-500	5-200

Source: Wetzel, 2001

Table 4 Characteristics of Common Major Associations of the Phytoplankton in Relation to Increasing Lake Fertility.

General lake trophy	Water characteristics	Dominant algae	Other commonly
Oligotrophic	Slightly acidic; very low salinity	Desmids <i>Staurodesmus</i> <i>Staurostrum</i>	<i>Sphaerocystis</i> , <i>Gloeocystis</i> <i>Rhizosolenia</i> , <i>Tabellaria</i>
Oligotrophic	Neutral to slightly alkaline; nutrient poor lakes	Diatoms, especially <i>Cyclotella</i> and <i>Tabellaria</i>	Some <i>Asterionella</i> spp., some <i>Melosira</i> spp., <i>Dinobryon</i>
Oligotrophic	Neutral to slightly alkaline; nutrient poor lakes or more productive lakes at seasons of nutrient reduction	Chrysophycean <i>Oocystis</i> , especially <i>Dinobryon</i> , some <i>Mallomonas</i>	Other chrysophytes, (e.g. <i>Synura</i> and <i>Uroglena</i>); diatom <i>Tabellaria</i>
Oligotrophic	Neutral to slightly alkaline; nutrient poor lakes	Chlorococcal <i>Oocystis</i> or Chrysophycean <i>Botryococcus</i>	Oligotrophic diatoms
Oligotrophic	Neutral to slightly alkaline; Generally nutrient poor; common in shallow Arctic lakes	Dinoflagellates, especially some <i>Peridinium</i> and <i>Ceratium</i> spp.	Small chrysophytes, cryptophytes, and diatoms
Mesotrophic or eutrophic	Neutral to slightly alkaline; Annual dominants or in eutrophic lakes at certain seasons	Dinoflagellates, some <i>Peridinium</i> and <i>Ceratium</i> spp.	<i>Glenodium</i> and many other algae
Eutrophic	Usually alkaline lakes with nutrient enrichment	Diatoms, much of year, especially <i>Asterionella</i> spp., <i>Fragilaria</i> <i>crotonensis</i> , <i>Synedra</i> , <i>Stephanodiscus</i> , and <i>Mesosira granulata</i>	Many other algae, especially greens and cyanobacteria during warmer periods of year; desmids if dissolved organic matter is fairly high
Eutrophic	Usually alkaline; nutrient enriched; common in warmer periods of temperate lakes or perennially in enriched tropical lakes	Cyanobacteria, especially <i>Anacytis</i> (= <i>Microcystis</i>), <i>Aphanizomenon</i> , <i>Anabaena</i>	Other cyanobacteria; euglenophytes if organically enriched or polluted

Source: Wetzel, 2001

Table 5 Typical phytoplankton species dominating lakes of different trophic states

Oligotrophic	Mesotrophic	Eutrophic
<i>Staurastrum</i> , <i>Cosmarium</i> , <i>Staurodesmus</i> (desmids)	<i>Staurastrum</i> , <i>Closterium</i> (desmid)	<i>Melosira</i> , <i>Asterionella</i> , <i>Stephanodiscus</i> (diatom)
<i>Taellaria</i> , <i>Cyclotella</i> , <i>Melosira</i> , <i>Rhizosolenia</i> (small diatom)	<i>Cyclotella</i> , <i>Stephanodiscus</i> , <i>Asterionella</i> (diatom) <i>Pediastrum</i> , <i>Eudorina</i> (green algae)	<i>Scenedesmus</i> , <i>Eudoria</i> (Green algae)
Dinobryon (Chrysophyte)	<i>Peridinium</i> , <i>Ceratium</i> (dinoflagellate)	<i>Aphanizomenon</i> , <i>Microcystis</i> , <i>Anabaena</i> (cyanobacterial)

Source: Reynolds, 1980 cited in Harper, 1992

Table 6 Ranges of the indicator variables as given for the trophic classes in temperate lakes

Variable	Oligotrophic	Mesotrophic	Eutrophic	Hyperentrophic
Total phosphorus ($\mu\text{g.l}^{-1}$)	5-10	10-30	30-100	> 100
Chlorophyll a ($\mu\text{g.l}^{-1}$)	0.3-3	3-10	10-100	> 100
Biovolume ($\text{mm}^3.\text{m}^{-3}$)	40-2000	2000-5000	> 5000	

Source: Lampert and Sommer, 1993 cited in Yuwadee Peerapornpisal, 1996

BIOGRAPHY

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