

EMBRACE-A-STREAM APPLICATION

This is an Operation

Research

(Research, Protect, Restore)

PROJECT LOCATION (name): Guadalupe River, Texas

SPONSOR: Texas Chapter of Trout Unlimited

(chapter, council, other)

TU PROJECT COORDINATOR: James C. Vynalek

SIGNATURE OF PROJECT COORDINATOR:

*James C. Vynalek*

SIGNATURE OF GOVERNMENT OFFICIAL:

Not applicable

(local, state, federal, if required)

Please print name, address, telephone number of above:

TU CHAPTER PRESIDENT:

Howard Itten

(512) 261-5479

name

telephone

703 Vanguard

Austin,

TX

78734

street

city

state

zip

SIGNATURE OF CHAPTER PRESIDENT:

*Howard Itten*

date

TU COUNCIL CHAIRMAN:

Not applicable

name

telephone

street

city

state

zip

1. Provide a history of the proposed project and chapter/council involvement with it (describe the problems which led to the initial difficulties, the remediation of those conditions, and a current assessment of the health of the watershed). Identify the salmonid species involved, and whether native or introduced (wild or stocked).

The Guadalupe River originates with the confluence of its north and south forks and flows east through the Edward's Plateau region of central Texas. The only major impoundment on the Edward's Plateau stretch of the Guadalupe River is Canyon Reservoir, a joint project of the U.S. Army Corps of Engineers and the Guadalupe-Blanco River Authority. The reservoir was designed for flood control, water conservation and recreation. Soon after dam construction was completed in 1963, Texas Parks and Wildlife began stocking put-and-take rainbow trout, thereby creating a tailrace fishery for a distance of about 10 miles downriver from the dam. Since 1972, hoping to establish a year-round fishery, the Texas Chapter of Trout, Unlimited has conducted periodic stockings of brown trout fingerlings. That the Guadalupe River was capable of sustaining a carry-over trout population was indicated by the capture of a 7-1/2 pound brown trout. Several events have occurred in the last few years which may have severely damaged the ecological capability of the Guadalupe River to support a carry-over trout fishery. First, the Guadalupe-Blanco River Authority has authorization to sell water to downstream customers. In filling orders little consideration was given to the effects of release rate practices on the ecology of the river. Releases varied from bottom-scouring 3,000 cfs (cubic feet per second) to lows of 50 cfs. The second major impact on the river occurred in 1987-1988. During the construction of a hydroelectric generating plant below the dam a number of emergency no-flow periods occurred (see photos). Periods of low or no-flow could have drastic effects on the macroinvertebrate populations which form the food base for trout in the river. Periods of low flow decrease available habitat and cause invertebrates to be stranded, leading to reduction in macroinvertebrate food supply to trout. At present, we do not know the status of macroinvertebrate production in the river. A study to address this question is needed to determine whether any habitat enhancement or restoration projects should be contemplated.

A copy of a letter in support of such a study by the Executive Director of Texas Parks and Wildlife is included.

2. Briefly provide a listing of project objectives; include the method you will use to evaluate whether these objectives have been met at the conclusion of the project.

The project has two main objectives:

1. A monthly quantitative assessment of macroinvertebrate abundance and diversity in the Guadalupe River above and below Canyon Reservoir.
2. A seasonal assessment of the food habits of brown and rainbow trout in the Guadalupe River.

Information generated from the proposed studies will allow assessment of the following:

- a. The effects of impoundment and construction of the hydroelectric plant can be gauged by comparison of macroinvertebrate abundance and diversity at sites above and below the dam.
- b. The quality of the Guadalupe River as a habitat that can support carry over populations of stocked trout can be determined by comparison to published studies on other rivers that have established relationships between macroinvertebrate abundance and fish production.
- c. What specific macroinvertebrate populations are important components of trout diets and are there seasonal differences?
- d. Are rainbow and brown trout exploiting different macroinvertebrate resources?

Accomplishment of the stated objectives will provide needed answers to important ecological questions concerning the quality of the macroinvertebrate food base for trout populations in the Guadalupe River. Such information is crucial in the design, planning and implementation of the contemplated habitat enhancement project since many river restoration programs are aimed at establishing a stable and viable benthic macroinvertebrate population. The data from the project will also serve as a baseline against which any future impacts on the river associated with reservoir release practices can be measured.

The results and conclusions of the project will form a major portion of a student's Master's thesis and is targeted for eventual publication in a scientific journal where support from Trout Unlimited will be acknowledged.

3. Describe the procedure(s) you will use to accomplish the stated objectives. Limit this description to no more than one page. An addendum containing maps, sketches, diagrams, tables, and PHOTOGRAPHS should be included with the application.

Four sampling sites on the Guadalupe River were selected for study (see map). Site A is located on the river above Canyon Reservoir. Site A serves as a reference since its flow regime was unaffected by the construction of the hydroelectric plant therefore its macroinvertebrate communities should be representative of those that could be sustained in the river below the dam. The other three sites (B, C, D) are located at various intervals within a 10 mile reach down stream from the reservoir where water temperatures are still cool enough to allow trout survival.

3. Continued

At monthly intervals over a year a series of four bottom samples will be taken at each of the four sites. A modified Hess bottom fauna sampler will be used in the collection procedure to obtain quantitative estimates of macroinvertebrate populations. The sampler is a specially constructed cylinder ( $0.33 \text{ m}^2$ ) designed for implantation into the streambed and with an attached net to catch dislodged organisms from the sample area. After collection, each sample will be preserved for later sorting, identification, counting and weighing in the laboratory.

The second phase of the study is an analysis of the feeding habits of stocked brown and rainbow trout. This involves the identification and enumeration of macroinvertebrates in fish stomachs. Field collection of fish will be conducted by volunteers from the local chapter of T.U. Volunteers will be provided with sealable air-tight plastic bags in which stomachs of caught fish are placed. Each bag will contain a label where the time, date and location of each fish can be noted. Bags with stomachs will be placed in coolers while volunteers are on the river and later frozen. Frozen samples will be delivered to Southwest Texas State University for identification and counting of macroinvertebrates.

In addition to the biological samples, a number of physical and chemical characteristics of the river at the four sites will be taken. These include pH, dissolved oxygen, temperature and conductivity.

4. Who will provide the technical assistance with the planning and/or execution of this project? Can the T.U. national office provide help in these areas through recommendation or referral? If so, please indicate your specific needs.

The planning, execution and data analysis of this project will be conducted by Thomas L. Arsuffi (Ph.D.) and Sidne Tiemann. Arsuffi is an Assistant Professor in the Biology Department at Southwest Texas State University and has considerable research experience with macroinvertebrates (see vitae). Tiemann is a graduate student working on a Master's degree in Aquatic Biology at SWTSU.

5. Budget for Guadalupe River Project

Expenses

A. Volunteer hours by Trout Unlimited members.

1. The Texas Chapter of T.U. will provide four members to assist in the monthly collection of macroinvertebrates and physical-chemical data at four sites in the river.

Annual hourly contribution to field data collection:

$$1.5 \text{ hours/site} \times 4 \text{ sites} \times 12 \text{ months} = 72 \text{ hrs.}$$

2. The Texas Chapter will commit an additional four members to assist in laboratory processing and sorting of samples.

Annual hourly contribution to laboratory data processing:

$$2 \text{ hours/sample} \times 4 \text{ samples/site} \times 4 \text{ sites/month} \times 12 \text{ months} = 384 \text{ hours.}$$

3. Eight members of the Texas Chapter will assist in the seasonal collection of trout for analysis of numbers and types of macroinvertebrates in guts. Sixty trout per season should provide a clear picture of trout feeding habits.

Annual hourly contribution to gut analysis data collection:

$$1 \text{ hr/fish} \times 60 \text{ fish/season} \times 4 \text{ season} = 240 \text{ hrs.}$$

	Hours
Field	72
Lab	384
Gut	240
<u>Total</u>	<u>696</u>

$$696 \text{ hrs. at } \$4.50 \text{ per hour} = \$3,132.00$$

B. Cost of materials and services.

Total = \$21,049.00. See attached for itemized listing of expenses.

C. Total cost (5a & 5b) = \$24,181.00

**Arsuffi/Trout Unlimited**

DESCRIPTION	MONTHLY RATE	PER CENT-TIME	NUMBER-MON'S	BUDGET AMT
<b>NCLF/FACL</b>				
Arsuffi	\$2,853.00	100%	2	\$5,706
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Sub Total				\$5,706
<b>Clerical</b>				
				\$0
				\$0
Sub Total				\$0
<b>Student Workers</b>				
Graduate				\$0
Undergraduate				\$0
Research Assoc (confirm fringe benefits payout)				\$0
Clerical				\$0
Other				\$0
Sub Total				\$0
<b>Personnel Total</b>				\$5,706
<b>Fringe Total</b>				\$1,616
<b>Total Salary and Fringe</b>				\$7,322
<b>Consultants</b>				
<b>Stipends</b>				\$8,700
<b>Tuition &amp; Fees</b>				
<b>Room/Board</b>				
<b>Travel</b>				
Admin-In State				\$630
Admin-Out of State				
Participant Travel				
Consultant Travel				
Other Travel				
<b>Travel Sub Total</b>				\$630
<b>Operating Supplies</b>				\$750
<b>Instructional Supplies</b>				
<b>Office Supplies</b>				
<b>Printing/Duplicating</b>				
<b>Publications</b>				
<b>Telephone</b>				
<b>Postage</b>				
<b>Sub Total This Page</b>				\$17,402



# Arsuffi/Trout Unlimited

FICA-2900	FICA-2901	UNEMP-2905	RET-2910	Hospitalization	Individ Fringe
\$433	\$355	\$43	\$485	\$300	\$1,616
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
				Sub Total:	\$1,616
\$0	\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0	\$0
				Sub Total:	\$0
<b>Rate/Hour</b>	<b>Rate/Month</b>	<b>*Hours/Month</b>	<b>Num/Students</b>	<b>*Months</b>	<b>Salary</b>
					\$0
					\$0
					\$0
					\$0
					\$0
				<b>Salary Sub Total:</b>	\$0
				<b>Student Fringe Benefits:</b>	\$0
				<b>Total Fringe Benefits:</b>	\$1,616



## **Arsuffi/Trout Unlimited**

**Note for cell E29:**

**STIPEND:**

graduate student, two months

**Note for cell K3:**

**EQUIPMENT**

dissolved oxygen meter

stream bed fauna sampler

fast bottom dredge

**Note for cell Q1:**

**HOSPITALIZATION:**

budget \$200/month/person beginning September, 1990

Income

A. Chapter contribution.

Volunteer hours \$3,132.00  
Cash 3,000.00

Total 6,132.00

B. Unspecified support for the project has been requested from the International Paper Company Foundation and the Fish America Foundation. Commitments have not been forthcoming.

C. Amount requested from the Embrace -A- Stream Program.

\$21,049.00 ----->

## BUDGET JUSTIFICATION

A major portion of the proposed budget is for salaries and associated costs. T. Arsuffi will focus his attention on gut analysis of trout; he will direct and coordinate the activities of the research and is requesting two months of summer salary. Sidne Tiemann is a graduate student in the Aquatic Biology Program and will be responsible for the macroinvertebrate collections and analysis. This work will form a significant part of the research requirement for her Master's thesis warranting support of a one year graduate stipend.

Support for travel expenses to the study site for monthly collections is also requested. The purchase of three equipment items are requested in order to carry out the proposed research. The stream bed fauna sampler and fast bottom dredge are needed for the collection of quantitative samples of macroinvertebrates. The dissolved oxygen meter is needed to measure oxygen availability at various intervals down stream from the dam. These measurements are necessary because during the warmer parts of the year the water released from the reservoir lacks oxygen.

TEXAS CHAPTER, TROUT UNLIMITED  
FINANCIAL STATEMENTS  
SEPTEMBER 30, 1989  
(UNAUDITED)

FISCAL PERIOD OCTOBER 1, 1988 - SEPTEMBER 30, 1989

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OPERATING STATEMENT:

INCOME:

Chapter dues, donations, raffles  
& misc. sources \$7,904

Total Income \$7,904

EXPENSES:

Living Brightwater Trust  
(contribution, national TU project) \$500  
Chapter stream enhancement programs \$4,532  
Chapter administration & membership \$1,585

Total Expenses \$6,617

NET INCOME: \$1,287

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BALANCE SHEET:

ASSETS:

Cash, bank accounts \$4,620

Total Assets \$4,620

LIABILITIES:

Accounts payable, current \$925  
Accounts payable, 12 months \$3,300

Total Liabilities \$4,225

NET EQUITY: \$395

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7. Fill in the following form with the names, addresses, telephone numbers, and project-related titles of the key personnel involved in your project. The first name on this list should be the project director who has overall responsibility for the project and will provide operational and financial summaries, and a final report to Trout Unlimited National Embrace-A-Stream coordinator no later than 6 months after termination date of the project.

NAME Jim Vynalek PHONE (512) 569-2496

ADDRESS HC67, Box 8C, Pleasanton, TX 78064

PROJECT RELATED TITLE Project Director/Coordinator

NAME Howard Hageman PHONE (512) 280-2489

ADDRESS P.O. Box 13041, Austin, TX 78711

PROJECT RELATED TITLE Project Co-Director/Coordinator

NAME Tom Arsuffi PHONE (512) 245-2284

ADDRESS Dept. of Biology, Aquatic Station, Southwest Texas State  
University, San Marcos, TX 78666

PROJECT RELATED TITLE Research Supervisor

NAME Sidne Tiemann PHONE (512) 245-3547

ADDRESS Dept. of Biology, Aquatic Station, Southwest Texas State  
University, San Marcos, TX 78666

PROJECT RELATED TITLE Graduate Research Assistant



Left. Photo is the Canyon Hydroelectric Plant during construction viewed from top of the dam. The Guadalupe River runs across the center. During normal release, water reaches the base of the concrete fishing platform, lower left.

Right. Upstream view of the Guadalupe River during an emergency no-flow period which occurred during plant construction.



TEXAS  
PARKS AND WILDLIFE DEPARTMENT

4200 Smith School Road Austin, Texas 78744

CHARLES D. TRAVIS  
Executive Director

COMMISSIONERS

EDWIN L. COX, JR.  
Chairman, Athens

RICHARD R. MORRISON, III  
Vice-Chairman  
Clear Lake City

March 31, 1988

BOB ARMSTRONG  
Austin

HENRY C. BECK, III  
Dallas

GEORGE R. BOLIN  
Houston

WM. L. GRAHAM  
Amarillo

CHUCK NASH  
San Marcos

BEATRICE CARR PICKENS  
Amarillo

A.R. (TONY) SANCHEZ, JR.  
Laredo

Mr. James C. Vynalek, President  
Texas Chapter, Trout Unlimited  
HC 67 Box 8C  
Pleasanton, TX 78064

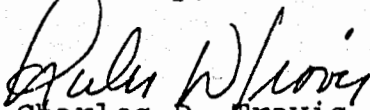
Dear Mr. Vynalek:

Thank you for your letter offering to help with the management of the Guadalupe trout fishery.

The staff shares your concern that the aquatic food organisms may be a limiting factor to the brown trout. A study where Trout Unlimited provides cooperative funds would provide extremely valuable data on this matter and form the basis of future management plans. A meeting to discuss options to accomplish this project would be appropriate at this time. Please contact Neil (Nick) Carter, Chief of Inland Fisheries, 4200 Smith School Road (512) 389-4860 to make arrangements.

I appreciate the efforts Trout Unlimited has provided to the Department's management program of trout fisheries in Texas.

Sincerely,

  
Charles D. Travis  
Executive Director

CDT:NEC:ggm

## CURRICULUM VITAE

THOMAS LEE ARSUFFI

### MAILING ADDRESS

Biology Department - Aquatic Station  
Southwest Texas State University  
San Marcos, Texas 78666

### TELEPHONE

(512) 245-3552 (office)  
(512) 245-2284 (main office)

### DISCIPLINES

Invertebrate and Fungal Ecology, Stream and Wetlands Ecology, Population and Community Ecology, Nutritional Ecology, Aquatic Entomology, Invertebrate Zoology and Decomposition

### PRESENT POSITION

Assistant Professor. Department of Biology, Southwest Texas State University. San Marcos, Texas.

### EDUCATION

Kent State University 1969-1974. B.S. , Biology

Kent State University 1974-1977. M.S. , Biology. Thesis Title: The Benthic Insect Fauna of a Small Spring-Fed Tributary of Silver Creek, Portage County, Ohio.

University of Montana, Flathead Lake Biological Station (summers 1973, 1974, 1975).

New Mexico State University 1979-1984. Ph.D. , Biology. Dissertation Title: The Effects of Aquatic Hyphomycetes on the Feeding Ecology of Caddisfly (Trichoptera) Detritivores.



## EMPLOYMENT

United Parcel Service. Loader/Sorter, Clerk. Salem, Ohio. 1967-1972.

United Parcel Service. Loader/Sorter, Clerk. Salem, Ohio. 1972-1974.

Research Assistant. Biology and Ecology of Shoreflies (Ephydriidae). University of Montana Biological Station, Flathead Lake, Montana. 1974 Summer.

Teaching Assistant. (Invertebrate Zoology, Ecology, Aquatic Entomology, General Biology I-III). Department of Biological Sciences, Kent State University, Kent, Ohio. 1974-1977.

Teaching Assistant. (Insect Ecology; 25% Lecture, 75% Lab). University of Montana Biological Station, Flathead Lake Biological Station, Flathead Lake, Montana. 1975 Summer.

Invertebrate Zoologist for a five week course titled: Biological Field Studies in Mexico. Dr. Alan Graham, Coordinator. Department of Biological Sciences, Kent State University, Kent, Ohio. 1977 Summer. Responsibilities Included field lectures, collection and identification of invertebrates from a variety of Mexico's biomes and habitats (deserts, mountains, tropical rain forests, and rocky and sandy marine shores).

Instructor. Course Lectures and Lab Coordinator for Invertebrate Zoology. Department of Biological Sciences, Kent State University, Kent, Ohio. 1977 Fall.

United Parcel Service. Loader/Sorter. Akron, Ohio. 1977-1979.

Research Assistant. Litter decomposition studies at the Waste Installation Pilot Project at Carlsbad, New Mexico; Ecology of detritus-based trophic interactions in streams. Department of Biology, New Mexico State University. Las Cruces, NM. 1979-1984.

Postdoctoral Fellow. Department of Biology, New Mexico State University, Las Cruces, NM. 1984-1986.

Postdoctoral Research Associate. University of Georgia Marine Institute, Sapelo Island, Georgia. 1986-1989.

Postdoctoral Associate. Department of Biology, Mount Allison University, Sackville, New Brunswick, Canada. 1989 Summer.

### SPECIAL APPOINTMENTS

Teaching Assistant Selection Committee. Department of Biology, New Mexico State University, Las Cruces, NM. 1984-1986.

### PUBLICATIONS

McElravy, E., T.L. Arsufo and B.A. Foote. 1977. New records of caddisflies (Trichoptera) for Ohio. Proceedings of the Entomological Society of Washington. 79:599-604.

Arsuffi, T.L. and F.C. Reed. 1977. Diel periodicities of invertebrates. In: Ecological Lab Experiences: An Ideas Forum. L.B. Crowder (ed.) Michigan State University Press. East Lansing. pp. 145-151.

Kennedy, R.F., F.C. Reed and T.L. Arsufo. 1977. Soil solution Interactions. In: Ecological Lab Experiences: An Ideas Forum. L.B. Crowder (ed.) Michigan State University Press. East Lansing. pp. 165-172.

Suberkropp, K., T.L. Arsufo and J.P. Anderson. 1983. Comparison of the growth, enzymatic activity and palatability of aquatic hyphomycetes grown on leaf litter. Applied and Environmental Microbiology 46: 237-244.

Arsuffi, T.L. and K. Suberkropp. 1984. Leaf processing capabilities of aquatic hyphomycetes: Interspecific differences and influence on shredder feeding preferences. Oikos 42:144-154.

Suberkropp, K. and T.L. Arsufo. 1984. Degradation, growth and changes in palatability of leaves colonized by six of aquatic hyphomycete species. Mycologia 76:398-407.

Arsuffi, T.L. and K. Suberkropp. 1985. Selective feeding by caddisfly (Trichoptera) detritivores on leaves with fungal-colonized patches. Oikos 45:50-58.

Arsuffi, T.L. and K. Suberkropp. 1986. Growth of two stream caddisflies (Trichoptera) on leaves colonized by different fungal species. *Journal of the North American Benthological Society*. 5:297-305.

Newell, S.Y., T.L. Arsuffi and R.D. Fallon. 1988. Fundamental procedures for ergosterol analysis of decaying plant material by liquid chromatography. *Applied and Environmental Microbiology*. 54:1876-1879.

Arsuffi, T.L. and K. Suberkropp. 1988. Effects of fungal mycelia and enzymatically degraded leaves on feeding and performance of caddisfly (Trichoptera) larvae. *Journal of the North American Benthological Society* 7:205-211.

Findlay, S.L. and T.L. Arsuffi. 1989. Microbial growth and detritus transformations during decomposition of leaf litter in a stream. *Freshwater Biology*. 21:261-269.

Arsuffi, T. L. and K. suberkropp. 1989. Selective feeding by shredders on leaf-colonizing stream fungi: Comparison of macroinvertebrate taxa. *Oecologia* 79:30-37.

Baerlocher, F., T.L. Arsuffi and S.Y. Newell. 1989. Digestive enzymes of the saltmarsh periwinkle Littorina irrorata (Mollusca:Gastropoda). *Oecologia*. In Press.

Baerlocher, F. S.Y. Newell and T.L. Arsuffi. 1989. Digestion of Spartina alterniflora Loisel. material with and without fungal constituents by the periwinkle Littorina irrorata Say (Mollusca:Gastropoda). *Journal of Marine and Experimental Marine Biology and Ecology*. In Press.

#### MANUSCRIPTS SUBMITTED

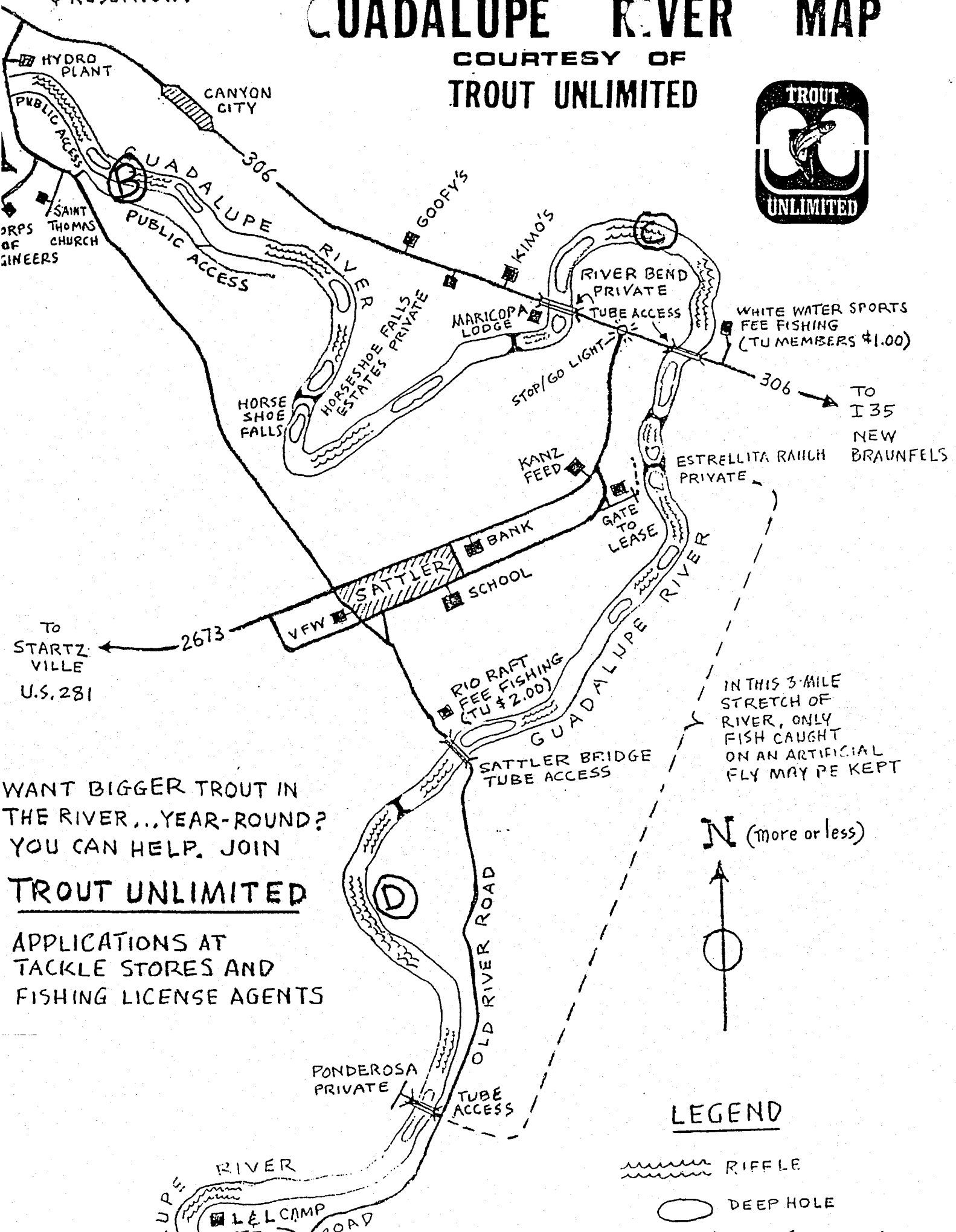
Arsuffi, T.L. and K. Suberkropp. Reproductive patterns of leaf-colonizing stream fungi: Effects of propagule size and resource quality. submitted to *Oecologia*.

Newell, S.Y., T.L. Arsuffi, P.F. Kemp and L.A. Scott. Factors affecting the water potential of standing-dead shoots of an intertidal grass. submitted to *Oikos*.

RESERVOIR

# CUADALUPE RIVER MAP

COURTESY OF  
TROUT UNLIMITED

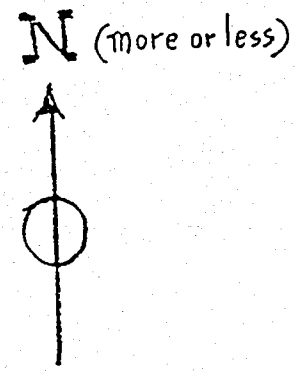


WANT BIGGER TROUT IN THE RIVER...YEAR-ROUND? YOU CAN HELP. JOIN **TROUT UNLIMITED** APPLICATIONS AT TACKLE STORES AND FISHING LICENSE AGENTS

WHITE WATER SPORTS FEE FISHING (TU MEMBERS \$1.00)

RIO RAFT FEE FISHING (TU \$2.00)

IN THIS 3-MILE STRETCH OF RIVER, ONLY FISH CAUGHT ON AN ARTIFICIAL FLY MAY BE KEPT



## LEGEND

- RIFFLE
- DEEP HOLE

## MANUSCRIPTS IN PREPARATION

Arsuffi, T.L., P.F. Kemp, S.Y. Newell and R.D. Fallon. Within and between marsh comparisons of seasonal variation in standing crop and vertical distribution of live versus dead biomass of Spartina alterniflora L. in Sapelo Island, Georgia salt marshes. To be submitted to the Journal of Ecology.

Arsuffi, T.L. and K. Suberkropp. Factors affecting the reproductive ecology of leaf-colonizing stream fungi: Interactions between resource quality and interspecific competition. To be submitted to Ecology.

Newell, S.Y., T.L. Arsuffi, P.F. Kemp and R.D. Fallon. Wetting frequencies of standing-dead Spartina alterniflora L. in three Georgia salt marshes: Seasonal variation in the relative contribution of tides, rain, dew and relative humidity. To be submitted to Ecology.

Arsuffi, T.L., S.Y. Newell, C.S. Hopkinson and R.D. Fallon. Patterns of decomposition and dynamics of microbial populations associated with standing-dead leaves of Spartina alterniflora L.: Effects of detritus quality, water availability, and the detritivorous marsh periwinkle, Littorina irrorata Say. To be submitted to Ecological Monographs.

## PAPERS SUBMITTED AT PROFESSIONAL MEETINGS

Arsuffi, T.L. and B.A. Foote. 1974. Observations of two Ephydrid species inhabiting an alkaline pond. Annual Meeting. Entomological Society of America. Minneapolis, Minnesota.

Arsuffi, T.L. and B.A. Foote. 1975. Movements of immature insects in streams. Annual Meeting. Entomological Society of America. New Orleans, Louisiana.

Arsuffi, T.L. and B.A. Foote. 1977. Movements of nymphs of Epemerella doddsi (Needham). Annual Meeting. North American Benthological Society. Roanoke, Virginia.

Reed, F.C., A.M. Gaydos and T.L. Arsuffi. 1978. A temporary woodland pool ecosystem in Ohio. Annual Meeting. North American Benthological Society. Winnipeg, Manitoba.

Arsuffi, T.L., F.C. Reed and A.M. Gaydosh. 1978. Structure and function of Ohio temporary pools: A theoretical ecosystem approach. Annual Meeting. Ecological Society of America. Athens, Georgia.

Reed, F.C. and T.L. Arsuffi. 1978. Leaf decomposition in a woodland temporary pool. Annual Meeting. Ecological Society of America. Athens, Georgia.

Arsuffi, T.L. and K. Suberkropp. 1980. Trophic interactions between aquatic hyphomycetes and invertebrates in a stream environment. Annual Meeting. Mycological Society of America. Tucson, Arizona.

Suberkropp, K. and T.L. Arsuffi. 1980. Dynamics of the decomposition of desert shrub leaf litter in an arid environment. Annual Meeting. Ecological Society of America. Tucson, Arizona.

Arsuffi, T.L. and K. Suberkropp. 1981. Influence of life history characteristics of aquatic fungi on the feeding ecology of invertebrate detritivores. Annual Meeting. North American Benthological Society. Provo, Utah.

Suberkropp, K. and T.L. Arsuffi. 1981. Influence of life history characteristics of aquatic hyphomycetes on leaf litter decomposition. Annual Meeting. North American Benthological Society. Provo, Utah.

Arsuffi, T.L. and K. Suberkropp. 1982. Selective feeding by aquatic detritivores on leaves with fungal-colonized patches. Annual Meeting. Ecological Society of America. State College, Pennsylvania.

Arsuffi, T.L. and K. Suberkropp. 1982. Shredder growth responses to leaf detritus differentially conditioned by aquatic fungi. Annual Meeting. North American Benthological Society. Ann Arbor, Michigan.

Suberkropp, K. and T.L. Arsuffi. 1982. Degradation and conditioning of leaf litter by aquatic fungi. Annual Meeting. North American Benthological Society. Ann Arbor, Michigan.

Arsuffi, T.L. and K. Suberkropp. 1982. Interactions between fungi and invertebrates on leaf patches. Annual Meeting. New Mexico Branch of the American Society of Microbiology. Las Cruces, New Mexico.

Arsuffi, T.L. and K. Suberkropp. 1983. Selective feeding on stream fungi: comparison of detritivore taxa. Annual Meeting. Ecological Society of America. Grand Forks, North Dakota.

Arsuffi, T.L. and K. Suberkropp. 1984. Effects of fungal palatability on growth and consumption of leaf detritus by a stream caddisfly (Trichoptera) detritivore. Annual Meeting. North American Benthological Society. Raleigh, North Carolina.

Arsuffi, T.L. and K. Suberkropp. 1985. Interspecific differences in patterns of reproduction by stream fungi: effects of leaf type and interspecific competition. Annual Meeting. Ecological Society of America. Minneapolis, Minnesota.

Arsuffi, T.L. and K. Suberkropp. 1985. Effects of leaf type and interspecific competition on the reproductive success of stream fungi. Annual Meeting. North American Benthological Society. Corvallis, Oregon.

Arsuffi, T.L. and K. Suberkropp. 1986. Selective feeding on leaf-colonizing stream fungi: comparison of shredder taxa. Annual Meeting. North American Benthological Society. Lawrence, Kansas.

Findlay, S.G. , T.L. Arsuffi and H.K. Austen-Gill. 1986. Bacterial growth on particulate detritus in two freshwater ecosystems. Winter Meeting. American Society of Limnology and Oceanography. San Francisco, California.

Arsuffi, T.L. and S.G. Findlay. 1987. Microbial transformations of decomposing leaf litter in a freshwater stream. Annual Meeting. Ecological Society of America. Columbus, Ohio.

Scott, L.A., T.L. Arsuffi, P.F. Kemp and S.Y. Newell. 1988. Seasonal changes in the vertical distribution of living versus dead biomass of Spartina alterniflora: comparison of three Sapelo Island, Georgia marshes. Spring Meeting. Southeastern Estuarine Research Society. Folly Beach. South Carolina.

#### INVITED SYMPOSIA

Suberkropp, K. and T.L. Arsuffi. 1982. Role of fungi in stream detritus communities. Symposium on the role of fungi in decomposition. Annual Meeting. Mycological Society of America. State College, Pennsylvania.

Suberkropp, K. and T.L. Arsuffi. 1984. Ecology of stream fungi on leaf litter: interactions with detritivores. Symposium on aquatic fungal ecology. Annual Meeting. American Society for Microbiology. St. Louis, Missouri.

Arsuffi, T.L., F. Baerlocher and K. Suberkropp. 1988. Relationships between leaf conditioning, microbial composition and detritivore feeding. Symposium on interactions and processes in benthic microbial communities. Annual Meeting. North American Benthological Society. Tuscaloosa, Alabama.

### INVITED SEMINARS

The effects of aquatic hyphomycetes on the feeding ecology of stream macroinvertebrate detritivores. Department of Biological Sciences, Kansas State University. Manhattan, Kansas.

Interactions among decomposers in stream detritus communities. (1) Marine Institute, University of Georgia. Sapelo Island, Georgia. June 1985. (2) Institute of Ecosystem Studies, Cary Arboretum. Millbrook, New York. July 1986. (3) Department of Biology, Clarkson University. Pottsdam, New York. September 1986. (4) Savannah River Ecology Lab. Aiken, South Carolina. April 1986.

### AWARDS

Cary Summer Research Fellow. 1986. The New York Botanical Garden. Institute of Ecosystem Studies. Millbrook, New York.

### GRANTS

Sigma Xi, Research Grant-in-aid. Selective feeding by detritivores for species of stream fungi colonizing leaf detritus: comparison of macroinvertebrate taxa. 1983. \$300.



## JOURNAL REVIEWS

Oikos, Canadian Journal of Botany, Journal of the North American Benthological Society, Holarctic Ecology.

## PROFESSIONAL SOCIETIES

North American Benthological Society  
Ecological Society of America  
Sigma Xi