



الموضوع:

Dear, Dr. Behnke

I am pleased to see your paper on the Illusion of technique & Fisheries management published in the proceedings of the desert Fisher Council. I congratulate you on that part of view.

Krupp was in Saudi Arabia working on Fisher of Saudi Arabia. I think his project is supported by NCWCD.

I discussed w. him the possibilities of sharing information about Fisher.

Now a day he is in Germany but I think he will come back to the kingdom probably at the end of the year.

I wrote two papers on conservation, one is published, the other being submitted. It is

very difficult to teach and do research but I am trying to continue my hobby as

a researcher -

Any information ~~about~~ Saudi Jists
available in USA - ?

How is your family, Colorado

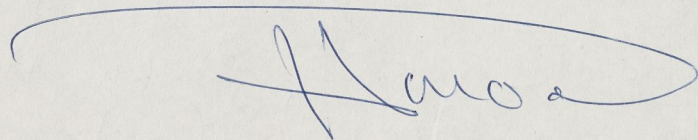
How days facing the problem of
snowing? - You think it might

happened in Arabia? - Some time

in the north of the kingdom, but
not like Colorado -

Best wishes to you
and your family -

Sincerely

A handwritten signature in cursive script, appearing to read 'Hana', enclosed within a large, thin, horizontal oval stroke.

Oct. 16 1990

Keith Bilby
6251 Ephesus Rd
Longmont, CO 80503

July 12, 1990

Dear Bob

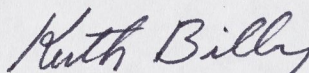
How goes the research? It seems like everytime I pick up a technical report I see your name anymore.

I volunteered to help the Nature Conservancy when they had their open house about three weeks ago. The idea was to allow 50 people to drop down into the N. Fk. of the Poudre and see for themselves what TNC had preserved. It was my job to carry a first aid kit and keep stragglers on the trail (pretty important stuff). From a cursory standpoint I found the fishery interesting and later wrangled three technical reports from the preserve manager. One of those was quite impressive in that the author whom I bet you know, Dr. Jack Stanford was able to do a very complete assessment of everything from a geologic analysis to a fairly in depth assessment of the fishery in a very limited timeframe. The Conservancy has visiting anglers fill out information sheets when they "come back up" and I've offered to compile the information and make kind of a dirtball synopsis. The population of the stream is interesting in that apparently the Brown/Rainbow ratio is essentially stable at 1-1. It seems in most "controlled" streams that the browns tend to out-compete the rainbows. I'm interested in finding out what the catch ratio vs. the actual ratio is. Obviously the rainbow will dominate but to what degree? Also I have to believe as the stream works it's way down from Halligan Reservoir and warms the 1-1 ratio must be altered. Using the catch ratio vs. the known actual ratio I believe a algorithm could be designed to determine the anticipated change in the "mix", i.e., brown vs. rainbow relative to a warming of the water. Then again maybe it won't show anything. If I get my hands on the reports and it looks like a phenomena exists, I'll send you what I have and you can give me your interpretation. You wrote a letter to me in Sept 88' following my letter to you in which I mentioned my catching the large Golden. In your letter you made reference to your Hutchinson Lk "find".

While in the N. Fork canyon I got to talking to a Mr. Paul Rubel of Loveland who stated that Hutchinson was his favorite lake and that he knew a fellow who knew a fellow who had stocked the lakes. He called the other day and gave me the name Doyle White (442-6719) whom I called and who has the type of memory I wish I had. He fished the lake since 1964 at which time very large Cutts existed in the top lake and equally large rainbow were found in the lower lake. He took a Cutt from the upper lake which after "drying out" for 24 Hrs measured 24" and was 5.25 lbs. He said 2-3 lb rainbow were common in the lower lake until 1965 when the state stocked the lower lake with fingerling at which point the fishery seemed to deteriorate. Mr. White states that Mr. Harold Bibler, now retired and living in Scottsdale Az, stocked the lakes using fry or fingerling from the Boulder Fish and Game Club in Boulder. Another fellow who lives in Ft. Collins, Mr. Gayle

Russman (484-4841) also knew Mr. Bibler. The stocking was done in the late 50's. Thought you might find that interesting. I'm going into Montana's Beartooth Wilderness in August. While it's not the purpose of the trip I am going to seriously attempt to better the Montana record for Golden. A Mr. Mike Poore (Montana Game Fish & Parks, Management Biologist) was kind enough to furnish a friend and myself with the results of The inventory done by Pat Marcuson in the 82-83 timeframe of virtually all the lakes in the wilderness. One lake, Lightning, stands out as the lake with the potential to provide an opportunity for a new record. The description would make it seem to be the Elbow Lk (Wyo) of Montana. I told Mike that if I did in fact catch such a fish that you would probably be willing to confirm it's pureness. I went back over your letter in which you essentially said "if it looks like a duck (Golden)and walks like a duck-it's probably a duck. The most prominent zooplankton in the lake is D. shoshone- just what is that Bob? I'm going through Cody and will check on the Golden I told you about which were planted in what turns to 70 F + water in August. Their adaptability to such an environment amazes me. Well I've rambled on long enough here. Let me know about your latest projects, I'm always interested.

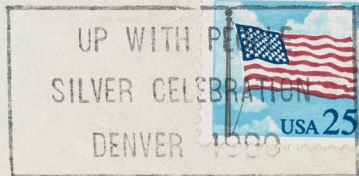
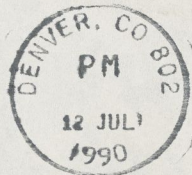
Sincerely,



Keith Bilby

Keith Bilby
6251 Ephesus Rd
Longmont, Colo 80503

Proprietel



Dr. Robert Behnke
3429 Prospect
Fort Collins, CO 80525

Gzilk Russman
484-4841
493-3076

— Phantom Canyon
Mid Hutchinson
24" 5 1/4 lb.
late 1980s
— stocked by Harold Gilbre
Boulder Fire G.
P. Shoshone
— St. Colita
Russman



United States Department of the Interior

FISH AND WILDLIFE SERVICE

3/7/90

Dear Bob,

Many thanks with help on precocity bit. When I get back to it (draft paper), I will be guided by your comments as well as those of Chapman, Becker, McDutty, Hellman, Whitney, etc. As you pointed out, the classification of chinook salmon leaves something to be desired. Even I was a little surprised how ambiguous people are about any classification. Healey, M.C. (The life-history of chinook salmon, in C. Groot and L. Margolis (ed.) Life history of Pacific salmon. Can. Bull. Fish. Aquat. Sci. [in preparation]) provides the best overall scheme that I know of. He was not wholly familiar with the literature on precocity in stream-type chinook, and about all I did with the report was to expand on precocity as a characteristic of stream-type chinook.

After 14 yrs of involvement with Pacific salmon I'm still confused, but not as naive as I originally

was. Separating chinook salmon into spring, summer, and fall runs based on run timing at dams is arbitrary in the Col R. The historical run entering the Columbia River was a continuous bell-shaped curve from April through September, with a peak generally between June 10-20, tapering off to tails in early April and late Sept. The fishery depleted the main summer segment, leaving the spring and fall segments as artifacts.

Insofar as I'm concerned a lot of people are managing a lot of hot air in most of the classifications I've seen (e.g., summer/fall runs in mid-Col). You also hear and read where newly hatched chinook descend immediately to the ocean. This is BS and it took me a lot of time to figure out that this was not the case. They may quickly leave the natal stream and take up residence in an estuary, but this is not the ocean. Apparently they are relatively tolerant of salt water at a small size, but they can't hack full strength salt water until reaching a size of 70 mm or thereabouts. Dealey has a lot to say about this.

What is important is the two life history patterns - stream and ocean types - and this is what I was trying to get across. There are a whole train load of variants to the foregoing, most of which I suspect are no more than responses to the environment.

I can't help you with the cutthroat identification, at least at this time. Your idea of introgression pretty much fits with my observations. Evidently, "black spotted" cutthroat were widely stocked in the Cascades as well as the Rocky Mts and Massachusetts. It's a wonder that we still have a Yellowstone fishery. If by chance you have never seen it, read, "The nature of heritable wildness in turkey" by Starker Leopold, *The Condor*, Vol 46 (4), July/Aug 1944.

I thought all the fish samples forwarded were double labeled (original field label and confirmation label at time of forwarding). I can't figure your "Trussis" or "Tossa" out. Check the stream catalog I forwarded relative to West Fork, Methow R. If that doesn't do it, try again, and I'll figure something out.

Best wishes,
Joni

James W. Mullan, Project Leader
U. S. Fish and Wildlife Service
Fisheries Assistance Office
Box 549
Leavenworth, WA 98826

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* A. Starter Leopold

Condor 1974 46(4)

Heritability of wildness in

Turkey



POSTAGE AND FEES PAID

Dr Robert Reimke
Dept of Fishery and Wildlife Biology
Fort Collins, Colorado 80523

Westlee
- funny fish

8 March 1990

Dear Bob,

Winter, more-or-less, is disappearing and it is getting time to think about some Lahonton cuts at Lenore. I will be going over during our spring break, the 3rd week in March.

My big plans of getting some fish last summer never came to be. My fishing trip to southern BC with Jerry Oliver fell through (bad weather turned off the fishing) so I did not get the rainbows he has for me. They were preserved, so I will get them this late May or June. I could never get ahold of Larry Brown in Wenatchee to see about collecting some of the westslopes over in the Cascades. I will do that this summer. But I do have some fish for you if you are interested. I have about 30 coastal cutts from a lake in southeastern Alaska. They were brought down here alive and used in some lab experiments by one of Ted's grad students. Would you like 15 or so of them? ✓

I was talking with a grad student, Tim Fisher (he met us at Lenore last spring). He was the student doing the IBI studies. As part of those studies, he collected in many headwater streams in the Clearwater, Salmon, etc. He noted that in some tributaries of the Little Salmon River (draining the southern part of the Seven Devils area just south of Riggins) he found only a different looking large-spotted cutthroat. These were found in upper reaches, above large barrier falls with no lakes in the drainage. They did not find any westslopes in the area. The closest westslopes were found 80 miles or so away (in the S. Fk. Salmon drainage). If these were isolated, relict populations of a large-spotted cutthroat (like the Waha cutthroat), could you distinguish them from planted Yellowstone/Henry's cutthroat? Apparently they look different enough that David Burns (USFS biologist) is going to collect some and send to Rob Leary for electrophoretic analysis. I will try to get some if you think it is worthwhile. ✓

* ?
Henry's
Yellowstone
relict
cutthroat

Hope you survived this last bit of winter that I heard hit Colorado. Sounds like it was snowy and windy.

Go. wy
AT5

Best regards,

Dick

R. Wallace



University of Idaho

Biological Sciences
006-X003
Moscow, Idaho 83843

in "Yellowstone" with
headwaters S. Salmon



Dr Robert Behrke
Dept Fisheries & Wildl. Biol
Colorado State Univ.
Fort Collins, Colorado
80523



DEPARTMENT OF BIOLOGICAL SCIENCES

UNIVERSITY OF NEVADA, LAS VEGAS
4505 MARYLAND PARKWAY • LAS VEGAS, NEVADA 89154-4004 • (702) 739-3399 • FAX (702) 739-3956

18 December, 1991

R.J. Behnke
Colorado State University
Dept. of Fishery and Wildlife Biology
Ft. Collins, CO 80523

Dear Dr. Behnke,

Please find enclosed the report you were so kind as to lend to me. I have made a photocopy for my files. Dr. Deacon brought to my attention the fact that I had not returned the report to you because he was contacted by researchers from Oregon State University who are surveying aquatic habitats at the park. I hope that returning this allows you to respond to any inquiries from them.

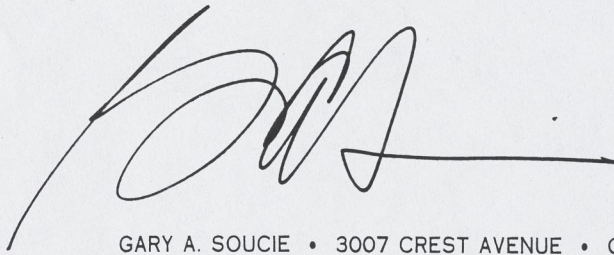
I just returned from another collecting trip to Great Basin, but, as expected, found no non-salmonid fishes. I was disappointed, but not surprised. I'll just have to collect *Rhinichthys* elsewhere!

Thank you for your assistance.

Regards,

A handwritten signature in black ink that reads "Matthew E. Andersen".

Matthew E. Andersen



GARY A. SOUCIE • 3007 CREST AVENUE • CHEVERLY, MD 20785 • TEL (301) 322-8373

1 December 1992

Mr. Thomas R. Pero
19442 Cartmill Drive
Bend, OR 97702

Dear Tom:

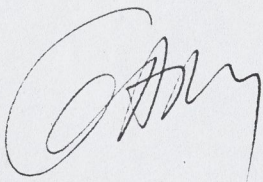
Thanks for your letter, even though it contained dreadful news. I had just heard a vague rumor that TU had dropped Trout, but was sure my informant was mistaken.

I know it's no consolation, but I do know how you feel, having been fired--along with the rest of the *Audubon* staff--last year, after 12-1/2 years. I fear for the environmental movement. It seems to have been taken over by a combination of professional technocrats, process-oriented politicrats, and MBAs. The soul is dying. You can count on my resigning from T.U. with an appropriate flurry of outraged letters. I've already called a friend in NYC who is a zealous T.U. member, and he plans to resign as well.

Yes, I do wish you well. And I will stay in touch. I still haven't been steelhead fishing, but I've done a bit of salmon fishing--in Quebec, Scotland, and Sweden, and if I can play all the cards right, I hope to cast to *Salmo salar* next year in Russia, Iceland, and Chile.

I'm really sorry to hear of the upheaval in your professional and personal life, but I know you will thrive.

Best wishes!



REJECTED

Reeling In

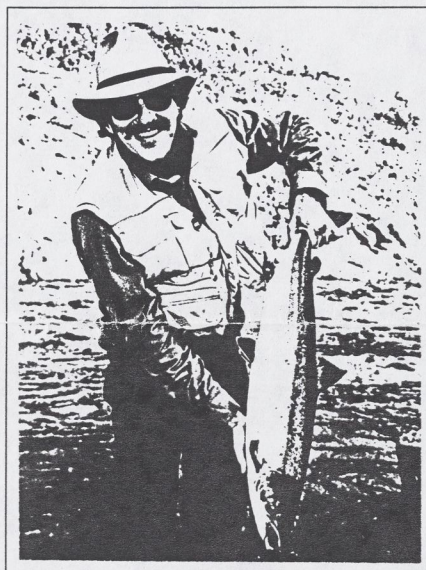
TWENTY-FIVE FISHING seasons ago, a skinny kid wearing glasses and hip boots wandered along a beech-tree-tunneled New England stream. It was early May. The leaves overhead were freshly unfurled, delicate, the soft green of half-ripe limes. It had rained the night before. The large granite boulders standing sentinel were wet, glistening in the morning sun.

Foam-flecked water gurgled from one small pool to another, the next beckoning, inky and mysterious. The kid casually tossed and reeled in his tiny spinning lure; a foot-long splash suddenly engulfed it.

The kid felt his heart pounding through his ribs. He fell to his knees. He grasped this brilliant, writhing gift, this astonishing little purple-backed, white-and-orange-finned, red-and-blue-spotted, bug-eyed slice of surprise. It was gem-like. It sparkled. It was pretty beyond

imagining. All this was magic, he was sure: the water, the rocks covered in velvet moss, the brook trout—a *real trout!*—everything that was happening. The fish flopped and the kid held it tightly to his sweatshirt, hearts beating.

And I never let go.



Thomas R. Pero

This is my last issue of *Trout*. After 16 years of editing your magazine, it's time to reel in. Departing these pages also are Jim Yuskavitch, Associate Editor, and Michelle Eastburn, Graphic Designer. Each has served with distinction for six years. We depart reluctantly, with sadness. *Trout*, we have been told recently by the new management of the Trout Unlimited national office, is changing to be "more responsive to TU's mission and the needs of its members."

•

In 1977 I was privileged to have been hired as TU's first full-time journalist. This was the thrill of my young life. I came to the position living and breathing Trout Unlimited. Several years earlier, a group of fishing friends in Massachusetts had formed a local chapter; they kindly responded to my enthusiasm for the cause by asking me, at age 18, to be their president. In years to come, I would gratefully draw on this wonderful grassroots experience to help others organize two dozen new chapters and seven councils in states across the country. I've always remembered my real TU roots.

For the first five years of my editorship, *Trout* was a slim, inward-looking, lackluster publication—it had a "clubhouse" feel. If you weren't an organization insider, you probably would not have been interested.

In 1983 we launched a new *Trout*. We added color. We increased pages. We gave the magazine a fresh, more contemporary look. Expanded coverage of trout and salmon fishing featured stories by the likes of Leon Chandler, Michael Fong, Dave Whitlock and Lee Wulff. Fisheries experts Robert A. Bachman, Robert J. Behnke and Ray J. White offered scientific substance the angling public wasn't getting anywhere else.

Our aim was to reach out to those potential supporters and encourage them to join Trout Unlimited. We wanted every longtime member to feel renewed pride in TU. Our aim was also to make the pages of *Trout* more appealing to advertisers. Their response was resoundingly enthusiastic.

These efforts reached full flower in our special, award-winning thirtieth anniversary series in 1989. Then began our most difficult editorial challenge: to

breathe life into complicated habitat and management issues influencing populations of wild salmonids. And to give these resource issues sharp focus.

An editor's number one responsibility is to keep his readers turning the pages. Articles that don't interest won't inform. With every issue, I've tried my best to imagine you plucking the new *Trout* from your mailbox. Will you be captivated? Find it visually stimulating? Intellectually exciting? Scientifically credible? Sometimes funny? Have we respected you as a reader—showcased the solid conservation projects of Trout Unlimited without descending to flimsy self-promotion? After reading *Trout*, will you be proud to be a member?

I hope I have succeeded.

If so, little of this excellence would have been possible without the inspired efforts of Jim Yuskavitch and Michelle Eastburn. No editor has enjoyed finer support. These competent, highly motivated people have invested in *Trout* with great generosity of spirit. Their dedication to Trout Unlimited's purpose as much as to their craft has allowed the organization to have a champagne publication on a beer budget. Our work has been so much more than a job.

Among his numerous contributions to *Trout*, Yuskavitch is most proud of those relating to the high caliber of photography in the magazine—and not only the images he has taken.

"When the average person looks at a superior magazine," says Jim, "he may



not realize the extraordinary effort that goes into getting all those great pictures. There's a difference between randomly running what's on hand, the same old stuff, and putting in the effort to find images that really pop out at you, photos that tell the story."

If our quality of photography has placed *Trout* apart from the typical fishing magazine, so has our elegant graphic design earned *Trout* a place on the same shelf with the best-looking titles on any subject.

Eastburn explains that she is doing more than simply wrapping up a story in a pretty package.

"I want all that I design to be innovative and intelligent," explains Michelle. "It's important that the graphics support a story's message. And it's important that each article flows smoothly—that it hangs together visually from its opening spread to its last page."

Michelle approaches the design of a magazine article in the sophisticated manner of a museum putting together an exhibit: "I try to maintain several levels of information display, so the reader may get something out of each story at whatever depth of involvement he or she chooses."

Henry A. Grunwald, former editor-in-chief at Time, Inc., was fond of comparing the role of editor to that of orchestra conductor. The editor of a magazine, he said, sets the agenda and tone. The editor decides what his orchestra should play and how. To that I would add one word: vision.

Fundamentally, I believe, a magazine is about vision. What we have tried to create in *Trout* is an aesthetic vision of the spectacle of beauty found in trout and salmon rivers, coupled strongly with a vision of stewardship—concern for the future of our rivers and their remarkable, wild inhabitants.

Jim Yuskavitch, Michelle Eastburn and I wish to thank you for allowing us to share with you our vision of *Trout*. We have given you our best. I shall deeply miss working with these talented people. And we shall miss you.



TROUT

DEDICATED TO WILD TROUT AND SALMON



Editor
Thomas R. Pero
Post Office Box 6225
Bend, Oregon 97708
503-382-2327
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Mill Creek, Washington 98012

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Facsimile: 206-483-4819

TROUT

DEDICATED TO WILD TROUT AND SALMON

Dear Bob:

It has been a real
privilege working with
you over the year.

You helped make
Trout great!

Please keep in touch.

Bert
Cory



TROUT

DEDICATED TO WILD TROUT AND SALMON

Post Office Box 6225 Bend, Oregon 97708



Dr. Robert J. Behrke
Dept of Fisheries and Wildlife Biology
Colorado State University
Fort Collins Colorado 80523



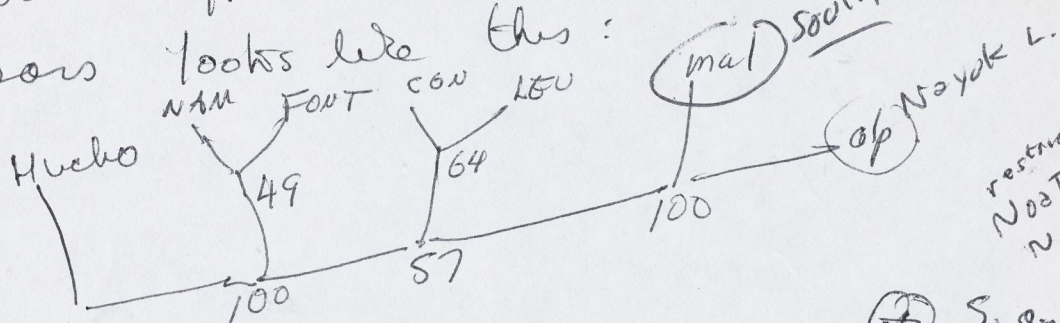
June 7, 1991

Dear Bob,

We have just completed sequence analysis of 410 base pairs from the ITS-1 for *Hucho penzance* & 6 *Selvaelonus* species.

The bootstrapped tree obtained by DNA pars looks like this:

southern form



restriction site
Nostelk R. Aic
N. malms

⊗ *S. erythrinus*

% Sequence Divergences were:

	alp	mal	nomay	fonti	leu	con
alp	—					
mal	0.27	—				
nomay	4.05	3.99	—			
fonti	4.96	4.65	5.26	—		
leu	5.15	5.14	5.80	7.37	—	
con	4.69	4.91	5.25	7.14	3.81	—
Hucho	6.95	7.31	6.39	8.69	8.44	7.63

According to the maximum likelihood programs - several other trees are equally

likely! The \pm TS-1 is about 700 bp &
the \pm TS-2 350 bp - so we will
have more data later [We had 18
informative sites in 410bp]

I hope I got enough done
in a year to get my grant
renewed. Supplies are very costly.

Will look forward to seeing
you later this month

Best wishes,

Kath Phillips

PS - I doubt if I can go to the
workshop in the USSR - it's very
expensive to fly there & September isn't
a good time to go

UNIVERSITY
OF WISCONSIN

Phillips
MILWAUKEE

Department of Biological Sciences
Electron Microscopy Laboratory
Lapham Hall
PO Box 413
Milwaukee, WI 53201



*Dr. Robert H. Behrke
Dept of Fishery & Wildlife Biology
Fort Collins, Colorado 80523*

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900

B1



UNIVERSITY of GUELPH

COLLEGE OF BIOLOGICAL SCIENCE
Department of Zoology

February 20, 1991

Chris C. Wilson
Dept. of Zoology
University of Guelph
Guelph, Ont.
Canada N1G 2W1

(519) 824-4120 xt 8356

Dear Dr. Hammar,

Thank you very much for the encouraging letter and reprints you sent me last August. I apologize for not writing sooner, but I've been busy disposing of a research backlog, writing papers from my Master's degree and a recent trip to Australia. These are now under control, and I've started analyzing the arctic charr and lake trout populations collected last summer.

As my current plans now stand, my Ph.D. research will have three components. The two main portions will be a genetic survey of arctic charr populations from across Canada using mitochondrial DNA, as well as a parallel study with lake trout. I am also hoping to be able to use this data set to reconstruct post-glacial dispersal routes of both species. The third portion will be to look for interspecific hybrids in the contact zone between the two species, as I described to you last summer. As I have promised Jim Reist to largely avoid doing allozyme analyses on arctic charr in exchange for samples, my allozyme efforts will be restricted to examining lake trout diversity, and screening for hybrids at diagnostic loci.

You may be interested to know that several lake trout/arctic charr hybrids have been detected among the fish collected last summer. I have begun running allozymes from the fish collected, using cellulose acetate electrophoresis, which has produced good resolution so far. It has also saved a great deal of time, since the running time required ranges from 15 to 30 minutes, depending on the enzyme desired. Of the eight lakes processed so far, a total of seven hybrids have been found in four lakes. I am currently running mitochondrial DNA restriction digests to determine the parentage of these fish. All of the hybrids found so far are similar to those you discovered, in that they resemble



arctic charr more than lake trout. Several of the hybrids (1 male, 2 females) appeared ready to reproduce, and electrophoretic evidence from a population near Pelly Bay suggests that backcrossing may be occurring. If you still have frozen tissue samples (especially liver) from your hybrids, I would be very interested in examining their mitochondrial DNA for parental type. I would also be interested in any other tissue samples from your 1984 collections, to see if backcrossing is occurring through reproductive hybrids.

I am hoping to present the electrophoretic and mitochondrial DNA results from part of last summer's collections as a poster at the upcoming conference in Belfast this July, showing the distribution and incidence of hybrids in lakes on the Melville Peninsula. I would be very interested in any comments or suggestions you might have. I also hope you will be attending the meeting, as I would certainly enjoy meeting and talking with you.

Sincerely,

Chris Wilson

Chris Wilson
(AC fanatic-in-training)

Feb. 21st:

- the two hybrids I've examined for mitochondrial DNA display the lake trout pattern for all diagnostic loci examined so far.



FISKERISTYRELSEN

SÖTVATTENSLABORATORIET

Institute of Freshwater Research

Johan Hammar

March 12, 1991

Dr Robert Behnke
Department of Fishery and Wildlife Biology
Colorado State University
Fort Collins
Colorado 80523
USA

Dear Bob,

Many thank you for your letter and your fast response on the Lake Vättern information. The relict food ladder of the Arctic char in Lake Vättern is quite remarkable. To make it even more interesting I can add some new information. I have gone through a few hundreds of recent char stomachs collected since 1987, and have found that another relict prey fish seem to be of great importance as well - the four-horned sculpin (both fish and eggs). I don't know if this is something people have missed before, or if it is a temporary thing. I know that eggs found during winter months have been classified as likely cisco-roe before. By analyzing fresh stomachs I could see that the eggs were bright orange, almost red. And many of the consumed sculpins were ripe with the same type and color of eggs. Some fishermen claim that the four-horned sculpin has increased again after being very scarce for some years. I have added two graphs (unpublished) which show some of the recent data on char diet in Lake Vättern. All char analyzed are larger than 400 mm (min. size in commercial catch). I am preparing a report on the significance of smelt for the presence and survival of Arctic char in southern marginal zones - the paper I presented in Japan but never got time to submit to the proceedings. Instead I was drowned by other manuscripts for referee-work!

I am very skeptical myself about the experiment with salmon in Lake Vättern. I believe that we have reason to expect a conflict between char and salmon in terms of the diet, as well as their choice of habitat. Char larger than 45 cm feed entirely on cisco, just like salmon. Further more my research on Arctic char and landlocked salmon in Red Indian Lake and several other "ponds" in Newfoundland, during my stay on the rock 1984-85, revealed both predation from the salmon and competition between the two species. In lakes with both char and salmon the char seem to be lacking in the upper pelagic layers. You would thus expect some kind of conflict to appear between the two species also in Lake Vättern. Gunnar's basic idea is that the salmon is replacing the very large downstream spawning trout that once existed in Lake Vättern.

According to Gunnar his use of the scientific names on the whitefish of Lake Vättern were revised and have been "in use" since his 1979 paper.

I have forwarded your regards to the Drottningholm members and they want me to return their greetings. At the moment Lennart is off duty for three months, doing two contract jobs on fish conservation strategy for FAO, and for Swedish WWF. During the first six weeks he will be in California. I think San Francisco will be his base, although he plan to spend some time together with the conservation group in San Diego as well.

At the moment there is no research on mt DNA in char in Sweden. We did some early experiments, but the results were very confusing. Today I have been told that I shouldn't pay too much attention to these experiments, because they were not professionally performed. One of my colleagues, Olle Ring, however, is testing the technique with nuclear DNA and "Fingerprinting" on salmon, especially the River Gullspång stock of Lake Vänern, where the conservation program has been very controversial in terms of what is left of the original gene pool. I know that researchers in Finland is in to mt DNA (see enclosed abstract from a mini-workshop in Enonkoski 1989) and have found interesting differences between the two char forms/populations in Lake Inari as well as between the autumn and spring spawning populations of cisco in Lake Kajaanjärvi. From your continent I have got requests from Irv Kornfield / Fred Kircheis of Maine for tissue sample on Swedish char for mt DNA analyses (which they have got). Also Chris Wilson of University of Guelph (see enclosed letter) is starting up a mt DNA project on Canadian char and especially the alpinus x namaycush hybridization problem. Further more Brian Dempson told me that Willy Davidson of Memorial University in St. Johns, Nfld, is comparing mt DNA analyses from both Canadian (Labrador + Nfld) and European (UK) populations. I consider myself an ecologist using electrophoresis only as a genetic tool in my evolutionary research. If I would start with DNA techniques I would have to focus my time entirely on the genetic part, and I do not have that kind of time.

At the moment all my 24 hours per day are spent on trying to get a final report on the transport of Chernobyl-Cs-137 through the food webs in northern char populations ready for publication. After that I want to focus on the fascinating results I have found in Lake Korsvattnet, where the allopatric Arctic char is demonstrating a combined lifehistory strategy, similar to what Skreslet found in Lake Nordlaguna, Jan Mayen. Further more the young char spawn early and shallow, the old cannibals late and deep. This could mean the ultimate evidence against sympatric speciation in Swedish char lakes. What about that boot, Dr Behnke?

I have enclosed the three first volumes of the ISACF Information Series.

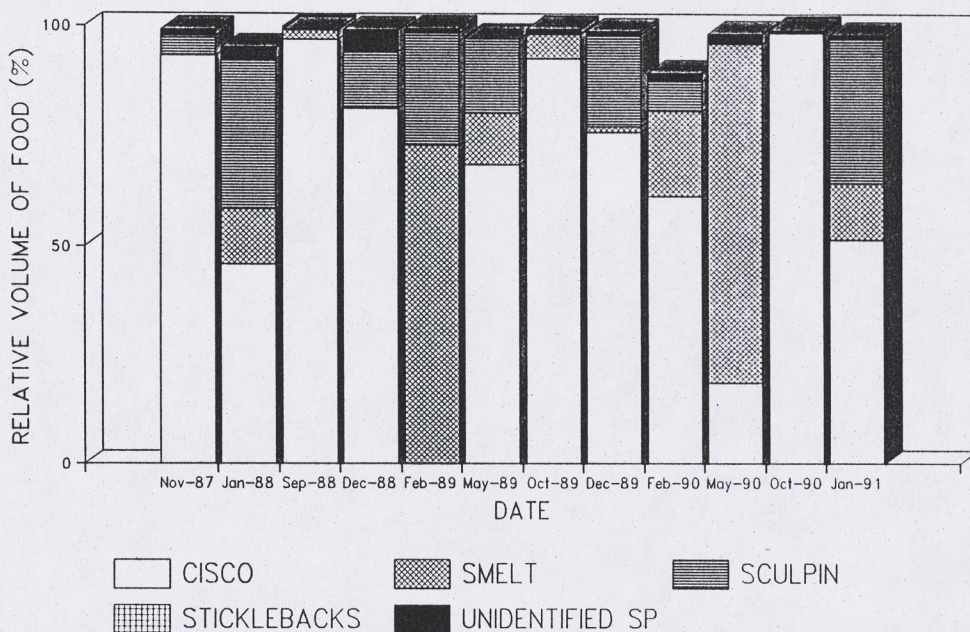
Best regards from a Drottningholm with fresh signs of spring. Very early spring flowers around the entrance, bird songs, the ice is breaking up outside our dock, and I do not have to fill my bird feeder every day anymore.

Sincerely

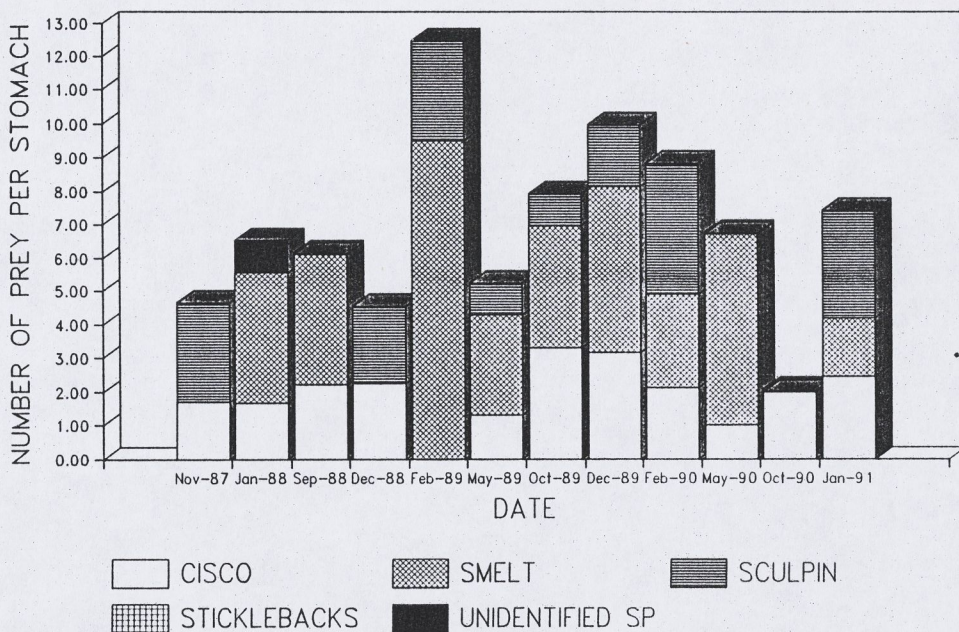


Johan Hammar

PROPORTIONS OF PREY SPECIES
ARCTIC CHAR - LAKE VÄTTERN



NUMBER OF PREY PER PREDATOR
ARCTIC CHAR - LAKE VÄTTERN



Maun H.

Symposium on
Management of Lakes by Fish Stocking

organized in connection
with the inauguration of

Central Fish Culture and Fisheries
Research Station for eastern Finland



Enonkoski, Finland
August 14, 1989

Management of Lakes by Fish Stocking
Enonkoski, Finland
August 14, 1989

Program

09.30 - 10.00		Coffee
10.00 - 10.40	Jorma Toivonen	Enhancement of arctic char stocks in Lake Saimaa
10.40 - 11.20	Lennart Nyman and Johan Hammar	Management of arctic char stocks in Sweden: past and present
11.20 - 13.00		Lunch
13.00 - 13.40	Juri Shustov	Management of landlocked salmon in Karelian ASSR
13.40 - 14.20	Jorma Piironen	Management of landlocked salmon and trout stocks in Vuoksi watercourse
14.20 - 14.50		Coffee
14.50 - 15.20	Eero Jutila	Restoration and restocking of salmon and trout in coastal rivers and inland waters
15.20 - 16.00	Kalervo Salojärvi	Management of whitefish stocks in inland lakes
16.00 - 16.40	Martti Hakumäki and Kirsi Partti-Pellinen	Mitochondrial-DNA characterization and its possible value in management of whitefish, grayling, char, salmon and trout
16.50 - 17.20		Discussion
18.00 -		Sauna

Wednesday

9.00 Opening of the conference with reception etc.
11.00 Registration
12.00 Lunch
12.45 Bus to Savonlinna

Mitochondrial-DNA characterization and its possible value in management of whitefish, grayling, char, salmon and trout

Martti O. K. Hakumäki and Kirsi Partti-Pellinen

Department of Physiology, University of Kuopio, Finland

The characterization of mitochondrial DNA (mtDNA) has been used for years in population genetics. It is useful tool also in mapping differences between different species, populations and subpopulations of fishes. It is maternally inherited and analyses can be done from eggs or sperm of fishes.

While distinct mtDNA morphs can be identified in some whitefishes (Coregonus muksun, C. peled, C. lavaretus, C. nasus, C. pidshian), there is some difficulty in distinguishing some species. Within identical species, one mtDNA morph normally dominates a specific population while others are less numerous whether fish are obtained from fish culture stations or natural waters. As many metabolic functions are closely connected to mitochondria, it would seem reasonable to initiate a study where growth rate and survival of different population morphs are compared. The first step would be to separate the parent fish of different morphs from each other and start the experiments with them. How well this can be done in practice is another question but it is certainly feasible.

MtDNA studies of grayling from different waterways around Finland show that this species is very monomorphic. For example only two different morphs have been detected in stocks originating from Lake Ladoga even though mtDNA has been screened with 30 different enzymes. MtDNA analyzes have been done in char Salvelinus namayachus originated from two delivery of eggs from Canada (Opeongo river) and U.S.A. (Lake Superior). These fishes are farmed in Finland by FGFRI and stocked into Lake Inari and some other large and deep lakes. Three morphs in these stocks have been identified the late. Eventhough the number of fishes analyzed is small, one morph is dominate. Whether or not these dominate fishes are the survivors of the original stocking is an

open question. In the future, eggs from as many parent fish as possible should be analyzed. In the populations of native char, Salvelinus salvelinus, and dwarf char, Salvelinus alpinus, different mtDNA morphs have been identified. In Lake Inari, there are at least two different morph of S. salvelinus. S. alpinus from Lake Kanesladdu is clearly a separate morph based on mtDNA analysis. In the future, more mtDNA analyses should be done from different populations and from different lakes to determine if the question of char systematics is as complicated as that of whitefishes.

In Salmo salar only two morphs had been detected earlier, S. salar and S. salar m. sebago. However, our preliminary results indicate that the female fishes caught at the mouth of Simojoki River in the Gulf of Bothnia have two distinct morphs. Whether or not both of these mtDNA morphs originated from Simojoki River or somewhere else is an open question. It is important to map the mtDNA morphs of these salmon because protein electrophoresis show genetically different salmon populations in the rivers in this area. An especially important project is to map the morph of parent fishes used for egg production for hatcheries all over the country and keep the eggs of different individuals separated from each other. In this way, the dominance of different morphs in different rivers and survival of the morphs can be detected.

At least two different morphs have been found in mtDNA studies in brown trout Salmo trutta. The protein electrophoresis studies support the hypothesis that there are several, genetically different populations in different Finnish rivers. The mtDNA studies would be very helpful in identifying the differences between them.

In conclusion mtDNA analysis with restriction enzymes is an useful tool in mapping populations and subpopulations of salmonid fishes. In the future, studies with protein and mtDNA electrophoresis techniques should be done simultaneously on the same individuals. Conducting these studies in the same laboratory is often difficult but co-operation between units is to be

encouraged and is certainly possible. It is obvious that commercial farming of coregonids will begin in the near future in Finland. For this reason, the questions of systematics and whether or not there are any differences in growth rate and resistance to diseases in different whitefish species and morphs is important. In salmon, mapping of all possible salmon parent fishes used for egg production for hatcheries should be done. Also studies of brown trout and char mtDNA from different areas of the country should be started. Protein and mtDNA electrophoresis studies of grayling are important. Co-operation between universities and government research and management agencies should be encouraged to maximize utilization of resources and production of useful results.

Cisco

According to mtDNA analyses
spring spawning *Coregonus albula* has a
special morph. when compared to
autumn spawning specimens. ^{Kajonjärvi}
(see Joensuu
paper)

Grayling

40 enzymes. rather monomorphic
at least 2 morphs recorded

A. char

2 morphs in L. Inari
dwarfed char different

Salmon

electrophoresis and mtDNA results
ongå handi hand

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Ignat Kiprijanov
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18650 Petrozavodsk
USSR

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wieder

 Post



Dr. R. Behnke
Colorado Coop. Fishery Unit
Col. State Univers. Fort Collins
Col. 80521
U. S. A.

Prof. Dr. Gabriele Peters

geb. Sültmann

* 29. März 1936

† 25. März 1992

Nicolaus Peters

Ernst Florey

für alle Angehörigen und Freunde

Es war ihr Wunsch, in aller Stille beerdigt zu werden.

3389 Harlan Drive
Redding, Calif. 96003
March 18, 1992
(916) 246-1708 evenings.

Dear Bob:

I thought I would get off a follow-up letter since I am heading to the post office with some other mail.

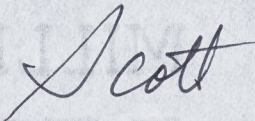
Enclosed is a film review of my salmon film, "Alaska's Ravaged Red Salmon," produced in 1976. It has some excellent wildlife sequences as well as "one of a kind" up-stream sockeye salmon footage.

When Gary Borger sends back the master I will send it off to you, so call the campus media center and see if they play a Sony U-Matic 3/4" videocassette. When the video arrives I will call first to see if you can play it back on campus.

That is about it for now, I have to run to pick up my 15 year old son and do a few other errands.

Let me know of your plans to travel to Sacramento.

Sincerely,

A handwritten signature in cursive script that reads "Scott". The signature is written in dark ink and is positioned below the word "Sincerely,".

Redding men make film on threat to red salmon

By JOHN LAWSON

The dynamic and mysterious life cycle of Alaska's teeming millions of red Sockeye salmon has often provided inspiration for writers, artists and scientists.

Several years ago the celebrated explorer, Jacques Cousteau, took his cameramen and researchers to record their epic journey from birth to death in Arctic waters.

A dramatic decline during the past several years in the red salmon fishery of Bristol Bay, Alaska, provides the theme of another film now available to viewers and the movie-going public.

Called "Alaska's Ravaged Red Salmon," the 16-millimeter, 54½-minute movie was made by Scott Carter of Redding and Carl Alto of Dunsuir. Carter is a history instructor and Alto a student of architecture at Shasta College.

They were advised by James Gregg, dean of the graduate division, and Earl Kruschke, a political science instructor at Chico State University.

Others who helped with the film are Kenneth Cooney, Shasta College English instructor, who worked on dialogue; and John Hart, Charles Boegeman, Bernie Baker and Bob Snyder, who contributed special musical effects on piano, guitar and flute.

Two years in the making, the movie was directed and produced by Carter, who also wrote the script. It takes the viewer from Fisherman's Wharf in San Francisco to old, abandoned canneries and Indian fishing villages of western Alaska; salmon fishing operations in Bristol Bay, and University of Washington research projects on the high seas.

The film attempts to document the encroachment of foreign fishermen, notably Japanese, on the rich salmon migrations out Bristol Bay to the Bering Sea near the Aleutian Islands.

A private, invitational showing was seen Wednesday night by about 40

persons, representing a cross-section of community life, in the Red Lion Motor Inn, Redding.

The movie was also shown Friday at the Sheraton Hotel on Fisherman's Wharf, San Francisco. It will be seen by a television audience for the first time Saturday on Channel 6, Eureka.

There are no plans as yet for general viewing in the Redding area. Backers are hoping that the private showings will stimulate interest in presenting it.

Alto and Carter said they actually began shooting the picture in 1970, but didn't really begin to put it together until about two years ago.

A graduate of the University of California at Berkeley and of Chico State, where he earned his master's degree, Carter said he became interested in salmon ecology while living by the Sacramento River in Redding. He also operates a resort in Trinity County.

Alto's interest is almost hereditary. His father served on the crew of the old fishing ship "Star of Alaska", now called the "Balclutha", which is tied up at Fisherman's Wharf as a tourist attraction.

Carter said the Alaskan fishery is threatened because of unrestricted access to migration routes at sea by foreign fishing fleets.

Alaska's governor, Jay Hammond, is a former Bristol Bay fisherman. He is quoted extensively in the movie. His concern is that the Japanese salmon catch is seasonally almost half the entire sea run of salmon.

Hammond and Alaska's only congressman, Rep. Don Young, a former Chico State student, are quoted as saying that the initiative lies with Washington, D.C. at the State Department and Congress.

Despite pleas by Alaskan businessmen and political leaders, only token reductions have been made in the size of foreign fishing fleets, the movie indicates. The state is powerless to prevent encroachment.

In the July, 1974 issue of Alaska magazine Carter wrote an article

detailing the effect of the high seas fishing. He said the Japanese intercepted and harvested 44 per cent of the total commercial salmon catch expected in Bristol Bay during 1973.

A 1952 treaty, outdated by discoveries that fish migrate far beyond treaty limitations, allows the Japanese to float as many as 400 boats a season, he said.

The heavy fishing pressure and several severe winters so devastated salmon runs that the Alaska board of Fish and Game took a drastic step and closed the 1974 commercial Sockeye season in Bristol Bay to preserve enough fish for spawning.

Senate and House bills to extend U.S. territorial jurisdiction over fishing rights are pending in Congress. They call for extending the 12-mile limit offshore to 200 miles.

The movie also contains interviews with Jim Beaton, a Juneau fisherman idled by poor salmon runs, and Phil Balutta, an Athabascan Indian, to stress the economic and cultural effects of smaller salmon runs.

Balutta said the declining fishery has discovered young people from staying in the villages and has contributed to the decline of the Indian culture.

The movie masterfully conveys the damp, foggy atmosphere of dockside scenes, the lonely sounds of gulls, and magnificent photographic sweeps of shoreline scenery.

It covers such events as the great salmon run of 1970, when 40 million fish were counted in Bristol Bay, and includes interesting shots of a brown bear foraging for fish, Indians drying and smoking salmon strips for winter use, and nesting eagles dependent upon the salmon fishery.

You see marvelous scenes of salmon spawning, sprawling seacliffs, wooded streams and ocean sunsets.

You will enjoy this film even if you have never seen red salmon outside of an aluminum can or been closer to Alaska than a travel brochure. It is an excellent movie for classroom use, and a good picture for entertainment viewing as well.

J. SCOTT CARTER
3389 HARLAN DRIVE
REDDING, CA 96003



Dr. Robert J. Behrke
Colorado State Univ.
Dept. of Fisheries + Wildlife Bio.
Ft. Collins, Colorado
80523



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11-12-92

Dr. Behnke:

Thanks for your time
on the phone. Here is the
article I mentioned.

Neal Emerald

...TO PRESERVE, PROTECT AND
ENHANCE THE COLDWATER FISHERY ...

Trout Unlimited

A LITTLE FRESH AIR NEVER HURT ANYONE

— EXCEPT A FISH *Unprecedented lab tests prove that exposing exhausted rainbow trout to air for as little as 30 seconds can kill them. That "photo opportunity" with a caught salmon may well lead to its death*

By Bruce Tufts

JUST HOW IMPORTANT is that moment when a fish is held out of water for a snapshot, or to extract a hook? Is it crucial or insignificant? We tried to find out by using laboratory tests, and the results were striking.

A routine procedure in my lab is to implant a small plastic tube in a fish, and then monitor blood variables such as oxygen and carbon dioxide, pH (the level of acidity or alkalinity), and lactate. Vigorous exercise produces in muscle lactic acid, which diffuses into the blood as measurable lactate and acidic protons. It's therefore possible to get a clear picture of the magnitude and length of the disturbance in a fish after it has endured strenuous exercise.

Our experiments compared this disturbance in rainbow trout, which had been exercised to exhaustion and left in the water, with that in another group of rainbows which, after the same period of exercise, were removed from the water for 60 seconds.

The fish that were merely exercised showed the same symptoms we've described for wild Atlantic Salmon ("Catch-and-Release—It Works," *Atlantic Salmon Journal*, Summer, 1991): a large increase in blood lactate, which lasted several hours, and an associated drop in blood pH. The acidic protons depressed the blood pH until the gills could excrete them. Immediately after the exercise, when the fish were too tired to maintain an adequate rate of ventilation, their blood also showed a moderate decrease in dissolved oxygen.

The air-exposed fish, however, endured devastating additional stress.

The dissolved oxygen in their blood was almost nonexistent after the 60 seconds they were out of water, and unlike the other rainbows, they suffered from a big increase in carbon dioxide. At this crucial time of exhaustion, they could not exchange oxygen or carbon dioxide with their environment, and their increase in blood lactate was double what it was in the other fish. When we returned the air-exposed trout to

the water, they looked fine, but 72 percent died within 12 hours.

Granted, we used hatchery rainbow trout, not wild salmon. Moreover, we were working in a lab, and for each sample, removed only a small amount of blood. Mortalities under such conditions are probably greater than they'd be among wild fish. Yet, there's an important message here. Sixty seconds of air exposure doubled the physiological disturbance of exercise, and I can think of no reason why the result would be much different for wild Atlantic salmon. In a second set of tests, a mere 30 seconds of air exposure, after exercise, also increased mortality. Thus, we now have experimental evidence that even brief air exposure can cause deadly stress in exhausted fish.

How important is this for wild Atlantic salmon?

Very important, but let me tell you a story.

I once enjoyed a week's angling on a classic Newfoundland river. Hot sunny days and falling water levels made the fishing challenging, and I was having trouble finding a winning combination. It didn't help that my partner, hooking everything in sight, called himself "the mop."

Then I noticed a large swirl towards the end of the pool. This was a grilse river, but that swirl was definitely not the work of a grilse. There it was, my chance to stick it to the mop. Grabbing an old rowboat, I made my way into casting range. I tied on my best-looking Thunder and Lightning, and as the fly riffled over the spot the second time, bingo, a solid take!

"I only go for the big ones," I told the mop, as my salmon cartwheeled across the pool. This was truly a wild fish. I had well over 100 yards of backing, but several times I looked down, saw the last few strands, and prayed the fish would end her run. The boat was not sturdy, and as the fish tired, I decided to net her rather than risk leaning over the side. As I held up the only large salmon we'd seen all week, I felt pretty good. She was back in the water within 30 seconds, and I gently held her in

the current until she could swim away. I saw no blood, and nothing about the release seemed unusual. She vanished in the current, and we headed back to camp for a scotch or two.

More than a year passed before I discovered her fate, but I finally learned that the day after my catch, and on the very pool where I'd netted it, our guide had found a dead salmon. Large salmon were extremely rare in this river, and the dead one was undoubtedly my fish, a female of exactly the same size. In view of our recent experiments with the rainbows, I'll always wonder what might have happened if I'd avoided bringing her into the boat. She might well have survived.

Compared to other anglers, those who pursue Atlantic salmon are conscientious about their release procedures. More and more are already minimizing air exposure, or avoiding it entirely. But the photos that fill many of our dens (mine included) and outdoors magazines suggest there's still room for improvement in the way we release fish.

Our results demonstrate that those extended photo sessions on shore or in a boat can be deadly for an exhausted fish. Is there a safe limit for air exposure? There is no simple answer. It depends on factors such as the prior condition of the fish, water temperature, the length of the fight, etc. Whatever the answer, the matter is certainly not trivial, and perhaps many of us could be more conscientious about it.

If you must have a photo, keep the fish in the water until everything is ready, grab a quick shot of your dripping fish just above the water, and immediately put it back. Better yet, use a polarizing filter to get a striking photo of a fish held barely under water. Minimizing or avoiding the stress an exhausted fish suffers while held in the air may actually enable it to survive and, one day, to spawn.

Bruce Tufts, angler and scientist, is a professor of biology at Queen's University, Kingston, Ont. His last article in the Atlantic Salmon Journal was "Catch-and-Release—It Works," Summer 1991.



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Lake Trout
 50

(misleading)
 Phony
 Can. study
 stress-out-p
 water 30 sec

Dr. Robert Behnke
 Department of Fisheries
 and Wildlife Biology
 Colorado State University
 Fort Collins, CO 80523



RECYCLED PAPER

Dear Mr Behnke,

I just read your article on Grayling in the summer issue of TROUT and thought you might be interested in this account of fishing the White River in "The old days".

It's from a book WESTERN TROUT by Sgt Mac Dowell, 1948.

Sgt knows his fish so I think these were true grayling and not white fish.

I wasn't aware that there were any native grayling in Colorado.

While I have pen in hand I might also add 2 pieces of info about native trout NOT mentioned in Pat Trotters book. The first is an account of catching yellow fin trout in Island Lake (on Grand Mesa) in the 40's. The other 2 accounts are from L B France 1890 "MR DIDE, his vacation in Colorado" it is a description of 3 different species in twin lakes. Finally a description of 2 kinds of natives in Treppers lake from

L. B. Frances' 'Mountain Trails
+ Parks in Colorado' 1988.

I have been doing
a lot of fishing in libraries
Lately.

John Bizzarro

FROM

1890

LB Francis

36

MR. DIDE: HIS VAC. IN COLO

more; toast him slowly just in sight of the cool, clear waters he had helped to almost ruin. But the government promises to establish a hatchery here and to restock the waters. When that is accomplished what more attractive spot can be found in all these mountains for a summer sojourn for wife, babies and your precious self? It can be made a headquarters, if you wish, and thence you may make easy runs farther into the wilderness. With sweet air, pure water, grand scenery and trouting, what more can mortal ask when he is tired and the baby teething?

Though injured, the lakes are by no means depleted; the fishing is not quite so gratifying as it was twenty years ago, that is all. There are three different varieties of native trout here: the red or salmon-tinted, the lighter-colored variety, and a slender, active trout, different from the denizens of any other waters in the State except, perhaps, Trapper's Lake. The back is a pale green, just the color of the water in the lake, the lateral lines are fine and black, and the spots perfectly round and smaller than the finest shot; it is a graceful fish in its contour, running to three-quarters of a pound in weight, and possessed of excellent fighting qualities.

The State has made an attempt at improving the lakes, and I met the superintendent of the State hatchery here. He said I must go a-fishing. I asked him where, and he said on the lake, if I was not disposed to take a run of a couple of miles

VACATION IN COLORADO.

37

up to the falls, where the fishing was good. I told him what I had heard, that the trouting was nothing to boast of except as the market hunter potted his game. To this he replied that when I came to the lakes I must do as the lakers do. I told him I had not had an oar in my hands for a great many years and was in no humor to be drowned. But he promised to attend to the rowing while I fished. With this assurance and to oblige him I rigged up, under his directions, four pine poles, tied on the lines and fixed up a cast of a coachman for a stretcher and a brown hackle and a gray for droppers. I persuaded him to allow me to take my bamboo, and armed with the implements of torture and my rod, like Hyperion among Satyrs, we stepped into a skiff and started for the lower end of the lake. I stuck out those pine poles with their ten feet of line, two over the stern and one out each side, and sat on the butts. The flies trailed along on the water and I had room to ply the bamboo astern beyond the annoyances floating there. After fifteen minutes of this business, I asked the skipper if he did not think a fellow who called this trouting, ought to drown and go to—sheol. He laughed; I took to praying again and in my earnestness lost one of the poles. Shortly after I had a rise to the coachman on the bamboo and hooked a trout. Inside of two minutes I could not tell whether the fish was on the hook that struck him, or the other three lines, or whether I had four trout in tow.

In the morning the Doctor and myself possess ourselves of an old water-soaked raft of five logs, held together in the usual way with cleats and wooden pins, and, with a couple of rough-hewn oars, we proceed to sea. It is a mystery to me why everyone escapes drowning with such craft; the storms that come sometimes knock the rickety vessels to pieces. The waters of all the mountain lakes are cold, and chill one at once, but the navigators manage by some means to crawl out, or are rescued, blue and shivering. This general immunity has a touch of comfort in it, as I find the old burden settling under our weight; but before getting into the never-fathomed depths we satisfy ourselves that she will not abandon us entirely. As the Doctor is fond of rowing, I do not object to his doing so. I find the water surpassingly transparent; in the shallow places twenty and thirty feet deep, the bottom looks as though you might touch it with the oar, and then, perhaps, it turns perfectly black, indicating deep chasms in the irregular bed. From the rocks that are visible, with the morning sun pouring a volume of light in upon them, I see a miniature forest growth; a bright green plant with a jointed stem and slender leaves, through and over which the beautiful trout are darting swiftly and temptingly.

"What are you mooning about, now?" inquires the Doctor in a tone of severity; "you had a rise to the jungle cock on the dropper — wake up!"

FROM L.B. FRANCE'S
MOUNTAIN TRAILS + PACKS IN Colo.
1886

Paying heed to his admonition, I make half a dozen ineffectual casts on the glassy surface, and then go back to my former amusement, only to be aroused again with the demand for my rod, if I "don't want to fish." I turn it over to him, he pulls in the oars, and in a few moments brings in a silver-sided trout, very much resembling some of the denizens of Twin Lakes. These seem to haunt the deeper water, are more slender than their salmon-tinted congeners, and have more courage. The Doctor soon found both varieties in the lake, and I kindly allowed him the use of the rod for half an hour and until I saw the welcome flash of a ripple coming toward us; he had his back in that direction and had caught two fish. A few moments after it reached us I began to be busy and hauled five trout upon the raft as rapidly as I could handle them. They varied scarcely a fraction of being twelve inches in length; of this uniformity we had heard, as one of the pleasures of these waters. The Doctor said not a word touching my success, but sat on his cross-bar with his hands folded, permitting the raft to drift slowly shoreward. I caught three more, and offered to surrender the rod to him. He took it with the remark that if he were as smart as I he would fall overboard and drown. I considered this a good time also to question him concerning his proposed meal of the invaluable Breckenridge. He was very eager to ex-

This is the "native" of the higher eastward slopes of mid-Rockies. In the colder streams of high country, this variety doesn't have the long growing season nor is there the volume of food to produce growth that some other types have. It rarely gets to be more than a pound in size—but it's a very good food fish. Because of the enthusiasm to have rainbow fishing in some of these streams, and with pressure to produce fish that are somewhat faster growing, many of the streams where the green-back formerly was the sole resident, are now dominantly rainbow range. Brown trout are also shoving in on territory formerly exclusive to the green-back.

Over the hump from the Arkansas and original green-back territory, is the Rio Grande trout. Jordan speculates on this trout having come into the Rio Grande from the Arkansas. The speculation has some foundation in what I have been told about the geological history of the San Luis valley where the Rio Grande heads. Here again we have another of those shifts of nature that walled off trout of one kind so they developed into another sort.

The San Luis valley is circled with mountains. The Rio Grande, well famed for its fishing, heads up in the mountains to the west of this great basin. The course of the stream as it comes out of the mountains is easterly, very close to true east.

As the river reaches the valley floor, it turns a right angle, heading south toward New Mexico. At the south end of the valley the river has cut a corridor through a considerable range of hills. But before the river probed through here, so the story goes, there was a mountain-walled lake in the valley and the spillway was through a gap in the Sangre de Cristo Mountains to the east, and from there into the Arkansas below present Pueblo. If that is the case, then some tourist trout of the Arkansas could have worked downstream in high water, then up the Huerfano River which was the former drainage route from the San Luis lake, and into that lake. Then the old pattern—the lake found an outlet southward, to make the Rio Grande River a major stream, the lake drained out, but the venturing cutthroats, green-backs originally, were caught in the Rio Grande environment.

Those who have haunted the upper Rio Grande find this particular cutthroat one of the hardest fighting of the trout. Being restricted to this basin, their fame as a particular strain of trout warriors hasn't spread as in the case of the rainbow or brown, but they are tops as game fish.

They have a rather short head, it is rather more humped than most trout, the mouth is large with the rear end of the jaw bones reaching back of a

vertical line through the eye, the scales are large, the typical black spots are more pronounced toward the rear, there is a tendency for this variety to be light colored in the Upper Rio Grande waters, and the size usually is not over two or three pounds for the largest.

Now we go over a hump again into a major river drainage and look at the Colorado River trout. I have suggested that the Colorado River black-spotted trout might have cruised the west coast to the Gulf of California when great, melting ice fields sent cooler water into the ocean's edge and made such a southward trip possible. Jordan believes that the chain of change that took place to develop this Colorado River type was from the Arkansas River green-back, to the Rio Grande type, and then this type found a way over the Continental Divide to start populating the Colorado. It's an interesting subject for speculation.

With the exception of the flashy "golden trout" which are closely related, the Colorado River blackspotted trout is probably the best-dressed fellow in the series. The typical black spots are more abundant on the rear portion of the body, and the head and "shoulders" are almost free of these markings.

This cutthroat varies in coloration and sometimes approaches a golden color. I have seen fish out of Trappers Lake in Colorado that were all dressed up for spawning time, that were streaked along the sides with a band of red as pronounced and as brilliant as any rainbow ever carried. The fins are generally an orange or golden color. It is a handsome fish, sometimes growing as large as any of the cutthroat series. Cope gave him a separate listing as a species, calling him *Salmo pleuriticus*. Maybe he rates it—but carries the cutthroat brand under his jaws.

In the yellow-fin trout we have a positive accent on the subject we have been discussing—how trout of common origin get isolated and proceed to be different. These trout were found originally only in Twin Lakes, Colorado, near the headwaters of the Arkansas River. They lived there side-by-side with green-backs, and both remained distinct types. Jordan thinks that the yellow-fin originated from some Colorado River blackspotted that again crossed the Continental Divide!

Jordan advanced the theory that the reason these closely related trout didn't cross as they lived together in these restricted waters was because (maybe) the green-backs spawned in running water such as the inlet streams, and the yellow-fins spawned in deep, rocky bottom areas of the lakes themselves.

The only place I ever caught yellow-fins has been from Island Lake on

FROM
A H. CARHART
- Fishing in the
WEST 1950

FISHING IN THE WEST

[20]

Grand Mesa in western Colorado. They are a fighting fish and beautiful, reportedly growing to large size for this genus of trout. Today, unless the base stock persists in Island Lake, they have nearly faded out of the picture.

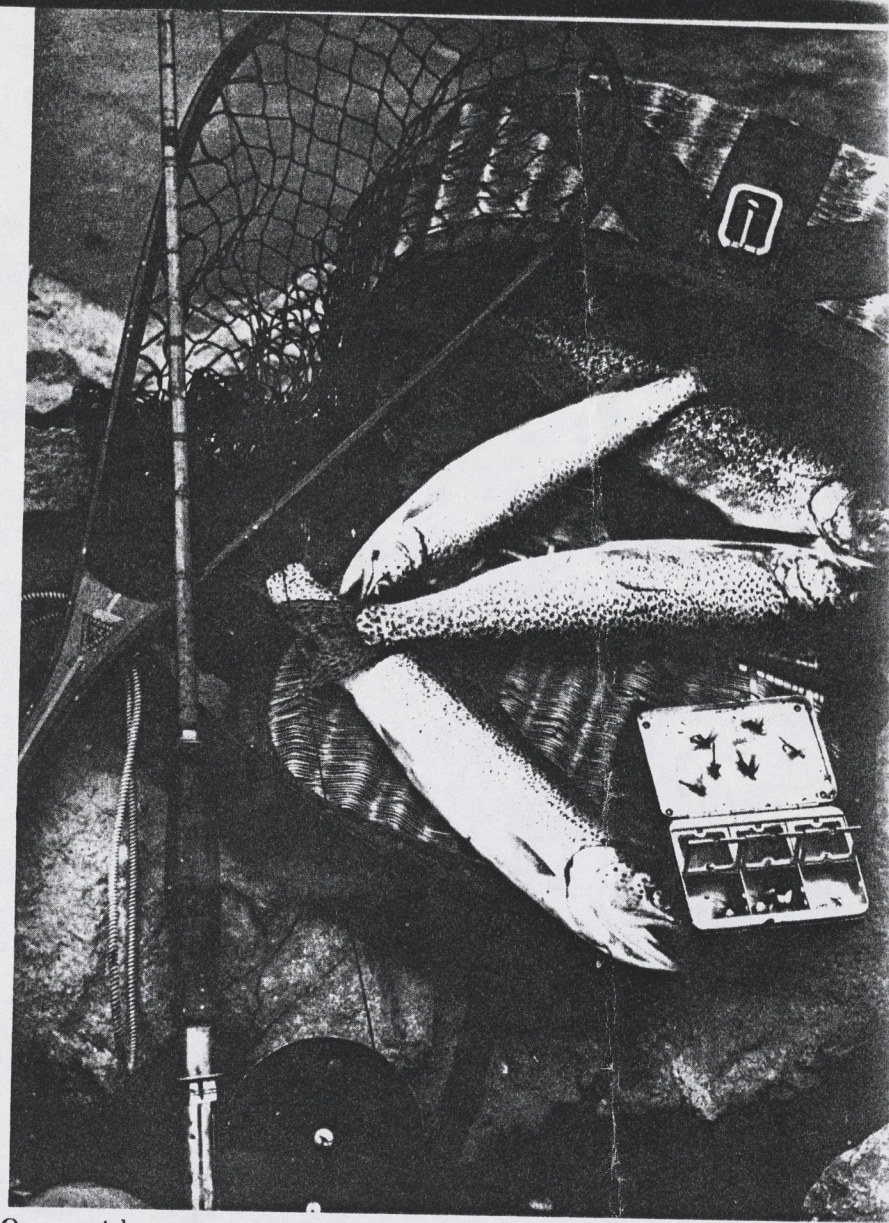
All this is background for a lot of other such divisions of the cutthroat series, illustrations of how they go vagabonding over the hills and far away. There is a trout which was found in Waha Lake, Idaho, where there is no visible surface outlet; another originally from Southerland Lake west of Puget Sound; another, the Tahoe trout of the lake bearing that name in California; still another, the Piute trout in a restricted area east of the Sierras in California.

This Piute trout is worth a bit more mention, for it is probably one of the widest variations from basic cutthroat stock. It is supposed to have stemmed from the Lake Tahoe stock. The latter is dark, heavily spotted, and a minnow-feeding, deep-water type. The Piute, limited totally in habitat to the waters of Fish Valley, above Llewellyn Falls on Silver King Creek, is spotless on the body, brilliant yellowish, spotted on the back fins and tail, red-streaked along the body, and blotched as with parr marks. It is reported as having an almost chameleon-like ability to change color, excitement giving it a greenish hue. It is so rare that the waters of Silver King Creek were closed to preserve it.

This Piute is still a cutthroat. It is probably the extreme example of how this vagabonding family of western trouts find their way across the land to new waters, and arriving there, establish residence and become individualistic as they adapt themselves to the new environment.

There is one other cutthroat which should be given a bit of space. This is the cutthroat steelhead. Not so long ago, the steelhead trout was classified as a separate species. Now it is pretty well established that steelheads are a phase of normally fresh-water trout that go skipping out to sea, become silvery in coloration when compared to their fresh-water kin, and when they return to original streams at spawning time, are full of fight and fury.

The steelhead phase of trout that take ocean-going junkets is something to cover more thoroughly in another section, but as we deal with the cutthroat series, taking note of its touring traits, we should mention right here that there are cutthroats in the west coast streams that go out into the ocean just as rainbows do, become steelheads, and show up along with the rainbows in lower portions of these coastal streams. This is just another example of the cutthroat gypsy traits.



Oregon rainbows.

WESTERN TROUT

sounded. His tail left a little whirlpool on the surface. The bottomless blue swallowed him.

I breathed again. Shaky from the tantalizing suspense, I inventoried all the things I might have done to induce that fish to take. Would a tiny twitch have turned the trick? What if I had been using a larger fly of bolder pattern? Had the Mackinaw perceived the deception of leader, so plainly visible in that clear water? Was he on the verge of a gastronomical experiment or merely curious? Until long after, the sight of him haunted me like an apparition. Twelve-inch bluebacks became absurdly insignificant.

I felt like the visiting angler who hopefully and patiently fished a piece of stream for a long time before a native took pity and approached him, saying:

"Brother, there ain't no fish in this river. Never was no fish."

The visitor glared, reeled in, and grumbled:

"Know what you've done? You've ruined my day!"

Grayling

Thymallus signifer tricolor, known as "Montana grayling," inhabits scattered locales in the cold high waters of the Rocky Mountain states.

The grayling is regarded as a member of the whiting family, which has representatives in both fresh and salt water. In form it resembles *Oncorhynchus undulatus*, the corvina of the southern California surf, and the whiting of sandy Florida shores. Far from troutlike in appearance, the grayling takes fly as readily as any *Salmo* and is a fast fighter in fast water.

The fish is long and streamlined, with a suckerlike mouth, steel-gray, black-spotted body blending to silvery belly, and

[42]

THE SIX WESTERN TROUT

displays a gorgeous ornamentation that gives it the tag-name "tricolor." It is a high, delicate, iridescent dorsal fin. This gaudy topfin distinguishes the grayling from whitefish, often miscalled grayling.

My introduction to grayling was on White River in north-eastern Colorado, during a rough camping trip in horse-and-buggy days. On the two-day journey up from Rifle, over almost roadless mountains, I managed to lose my rod, case and all. On reaching White River I was forced to the mournful expediency of buggy whip for rod, tying onto the whiplash six feet of stout leader adorned with not one, not two, but three flies.

This wholesale display might have played havoc with the graylings, but the horsey tackle fell short of casting requirements, as White River was a sizeable stream and the grayling lay in riffles midstream. So I was compelled to ply my limited equipment up a tributary, Elk Creek, while adult members of the party had a lot of fun with river graylings that ranged from twelve to about eighteen inches long—about the limit of the grayling's growth.

But I did all right with the Elk Creek rainbows, often heaving three at a time onto the bank. Trout were easily defrauded in those days, anglers few.

Not until many seasons later did I come to know grayling better, on Gallatin River in the vicinity of Yellowstone. I took them occasionally with trout. The fish is rare enough in most waters, so that they appear in mixed catches, although in Yellowstone Park is a lake given over to graylings. Hatchery production is extremely limited. The flesh is of excellent quality, white and of fine texture as it is with all whittings. Being easy to catch, they are hard to maintain.

The general opinion of the grayling is that beauty and

[43]

FROM SYL MAC DOWELL
WESTERN TROUT
1948

John Bizzarro
545 Concord Ave
Boulder, Co.
80304



R. J. Behnke
Dept. of Fisheries & Wildlife
Biology
Colo. STATE University
FT. Collins, Co.
80523

Royal Ontario Museum
Musée royal de l'Ontario

100 Queen's Park
Toronto, Ontario
Canada M5S 2C6

Tel. (416) 586-5759
FAX (416) 586-5863
romlihy@zoo.toronto.edu



August 11, 1993

Dr. Robert Behnke
Department of Fisheries & Wildlife
Colorado State University
Ft. Collins, Colorado
80523

Dear Bob:

I have mailed to you to-day, 1st class, a copy of a publication of Eugenia Dorofeyeva gave me for you. If it doesn't arrive please let me know.

I'm just back after five weeks in Russia. Four on and around Khanka Lake, the lake north of Vladivostok that is 90% Russian, 10% Chinese, and one in St. Petersburg.

I was on an expedition organized by Nina Bogutskaya as part of an interactive agreement between ZISP and ROM. We brought back 130 kg of museum specimens plus tissues from 14 Esox reicherti. The latter was my main interest.

Nina and Eugenia will probably be at ROM next July - August. I may be in touch with you when I get Eugenia's detailed list of species and specimens she wants to examine when here.

Sincerely,

Dr. E.J. Crossman
Curator
Department of Ichthyology & Herpetology

EJC/kd

Department of Ichthyology & Herpetology

Royal Ontario Museum
Musée royal de l'Ontario

100 Queen's Park
Toronto, Ontario
Canada M5S 2C6

WALDO BYTTT MAILFAST
ROM
PO BOX 2017
BUFFALO, NY 14240

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*Thanks -
Professor my obols
- why + thanks?
- Lenell
trium.*

Dr. Robert Behnke
Department of Fisheries & Wildlife
Colorado State University
Ft. Collins, Colorado
80523

Дорогой Боб,
Спешу сообщить Вам, что я получила Вашу книгу только в апреле, когда была в Москве. В это время решался вопрос о моей поездке в Канаду и я решила, что быстрее ^{arrive} дойдет мое сообщение от туда. ^{from there} Поездка, к сожалению, ^{delay} задержалась и я прибыла в Торонто только ^{yesterday} вчера (25.06.94). Спасибо большое за Вашу ^{wonderful} замечательную книгу, я ^{read} прочитала ее с большим удовольствием. ^{pleasure} ^{send} ^{to you} ^{with} ^{many} ^{regrets} *
Посылаю Вам ^{W and W} Вопросы ихтиологии (1994). К сожалению ^{not} ^{know} не знаю, получили Вы или нет ^{received} №5,6 за 1993 г. - ^{yes} (Austria)

Я буду в Торонто до 9.07.94 в ROM у E. Crossman (Tel. (416) 586-5639).

Всего Вам доброго. Жемя

(Eugenia Drogotseva)

E Mail

DEA@ZISP. SPB. SU

AIR MAIL

Dr. R. Behnke
Dept. Fishery & Wildlife Biology
Colorado State University
Fort Collins, CO 80523
USA

1ST CLASS.

VIA. E. J. CROSSMAN
R.O.M. TORONTO CANADA
M5S 2C6

E. Dorofeyeva
Zoological Institute
Academy of Sciences
199034, Leningrad, USSR

Bob.

Senia Dorofeyeva gave me this
to mail to you when I left St. P.
Aug. 6/93. Our mail man seems to
have problems. It came back to
me with the postage on it even
though I indicated it was going
out of ROM via me.

Ed Crossman

Е. Дородеева
Зоологический институт
Академии наук СССР
199034, Ленинград, СССР

5. 25 93

Dear Dr. Behnke,

I am sending you the journals from Dr. E.
Dorofeyev via Vienna.

Best regards,

^{of yours?}
Dr. N. G. Bogutskaya
Zool. Inst., S.-Petersburg

Royal Ontario Museum
Musée royal de l'Ontario

100 Queen's Park
Toronto, Ontario
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FAX: (416) 585-5863
romih@zoo.toronto.edu



July 28, 1994

Dr. R.J. Behnke
Department of Fishery
and Wildlife Biology
Colorado State University
Fort Collins, Colorado
U.S.A. 80523

Dear Bob:

A letter from you (I assume) arrived here today for Eugenia Dorofeyeva. She left for home on July 9th. I heard today by FAX that they had arrived safely without flight or customs problems.

I will forward your letter by mail. However, I suggest that if you have no response in a month that you send the details by E-mail. It is apparently non-functional just now (hence the FAX message which usually is down), but I'm sure will be operative by then. If you do not have Eugenia's E-mail address it is DEA@ZISP.SPB.SU. As I'm sure you know postal mail is the least dependable once it gets inside the Russian territory.

Yours truly,

Dr. E.J. Crossman
Curator
Department of Ichthyology and Herpetology

EJC/mr



Royal Ontario Museum
Musée royal de l'Ontario

100 Queen's Park, Toronto, Ontario Canada M5S 2C6
Ichthyology & Herpetology

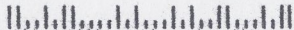
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FIRST CLASS



Academy, ST. Petersburg
E Mail

Dr. R.J. Behnke
Department of Fishery
and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80523
U.S.A.







United States Department of the Interior

FISH AND WILDLIFE SERVICE
YELLOWSTONE FISHERY ASSISTANCE
P.O. BOX 184

YELLOWSTONE NATIONAL PARK, WYOMING 82190



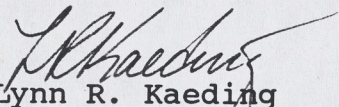
IN REPLY REFER TO:

13 January 1994

MEMORANDUM

TO: Interested persons
FROM: Acting Project Leader
SUBJECT: Annual report

Attached is the calendar year 1992 report for the Fishery and Aquatic Management Program in Yellowstone National Park. As always, we are interested in any comments that you might have on the report or our work. Please submit them to the letterhead address.


Lynn R. Kaeding

September 9, 1994

Bob Behnke
Colorado State University
Department of Fishery and Wildlife Biology
Fort Collins, Colorado 80523

Dear Bob:

Sorry for the delay in writing you about coaster brook trout. I am getting ready to retire. The wife and I build on to our house in the U.P. of Michigan last year and are finishing up the job this year. I am getting to be an expert painter, plumber, carpenter, etc. We are planning to live there until we are too old to shovel all the snow in winter. The E. Br. of the Tahquamenon flows through the property. It still has one of the best wild brook trout populations in the eastern U.S. I electrofished a 0.5 mile section a few years ago and caught 25 brooks over 12-inches long, the largest being 19.5. I don't tell many people about this stream because excessive fishing would kill it as it has the Fox, Iron and Black Rivers. A lot of private property, very bushy banks and poor access have kept fishing pressure relatively low.

Back to coasters. There are a few streams in the U.P. that still have a few large (lake run) brook trout. These fish move into the streams (presumably to spawn in the fall) beginning in late August. The Salmon Trout River and Chocoday are such streams that flow into Lake Superior. The Cedar and Ford River that flow into Green Bay of Lake Michigan have runs also.

I am not sure whether these fish are really genetically different than other wild brooks in the U.P. Maybe they are simply fish that drifted downstream, entered the big lakes where food is more abundant, grew to large size, and then returned to the coastal streams to spawn.

We plan to do some gene testing now, since we just hired a geneticist who works cooperatively with Michigan State University and us. Maybe he can determine if the lake run fish are really a different strain. I am also checking into whether commercial gill netters and Indians catch brook trout these days. If they do, it suggests to me that our coasters are just regular brook trout. The reason we don't have significant runs anymore is simply because of heavy gill net exploitation. However, if the netters are catching few brook trout, then this would suggest that the coaster is in fact a distinct strain that has likely been extirpated.

My father lived near Whitefish Bay, Lake Superior as a boy. He said coasters 12 to 20" ran all the small trout streams entering the bay in the early 1900's. He also said that a group of fisherman out of Detroit used to come up and fish in the rocks off Naeomikong Pt. just to catch large brook trout.

Bob, you are correct that wild trout strains generally do better (survival particularly, growth generally) than highly domesticated strains. Michigan's broodstock and hatchery production program is steadily going toward production of wild strain trout. Further, we do not manage most of our trout streams using hatchery plantings. We are restoring and enhancing habitat and using more restrictive regulations.

Sincerely,

Gaylord R. Alexander

Gaylord Alexander

By the way, a few words as to how I use to catch fish. For reasons of effectiveness I prefer snorkel mask, fins, a small net and depending on water temperature a diving suit to conventional fishing rods and nets.

I have reasoned doubts as to whether there are still *platycephalus* or *S.trutta* in the Zamanti River or in one of its other tributaries as reported by WHITTAL in "Trout in Turkey" (1967: Salmon and Trout Mag. 179, page 52). In this article he states to have fished a variety of brown trout in a tributary of the Zamanthe (Zamanti) River. According to his description it appears to be the same species that I have collected.

The stomachs of all specimens contained small terrestrial and aquatic insects. The pectoral appendage was present with all specimens, except for the biggest one (240 mm). By the way, I occasionally found this small papilla with specimens of *S.trutta* from both Turkey, Yugoslavia and Austria. One trout from the Neretva River (YU) had even two appendages at the base of the pectoral fin.

A potential threat to *platycephalus* could arise from fishing as in the Tohma River, which springs about 30 miles east of Pinarbasi and flows to the Euphrates, the trouts of which (*S.trutta*) are excessively captured such that the stock appears decreased. These trouts show an uncommon big adipose fin. The same phenomenon I observed with trouts from the Munzur River, another affluent of the Euphrates.

I did not observe any fishery activity by natives such that the two mentioned tributaries to the Zamanti River

are still well stocked with this species.

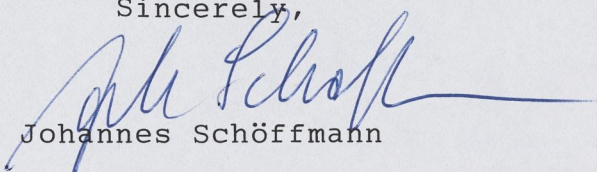
South of Pinarbasi rises the Sariz River flowing further south to the Seyhan River. I could not succeed in finding any trouts in this stream nor in one of its tributaries, though I discovered two small trouts caught by a native boy, which presumably originate therefrom. Probably these trouts were *S.trutta*.

I also found trouts (*S.tr.macrostigma*) in some other Mediterranean streams between the Ceyhan River and the town of Antalya at the southwest coast. All of them had spots.

The common features of all these populations are a short, blunt head, a thick maxillary, and a slight subterminal lower jaw, which closely resembles to the head of *Salmothymus* showing the above characteristics in a more extreme form. Maybe, this is an adaptation to their feeding behaviours. They are mainly feeding *Gammarus* which occur in abundance in the compact algae of the Mediterranean streams. Also, the average number of pyloric caeca of the trouts of southern Turkey is comparatively low (about 30).

I hope to have provided you some useful hints and would much appreciate any information about recent cognitions concerning the Mediterranean trouts of Turkey.

Sincerely,



Johannes Schöffmann

P.S.: I also would be grateful for any information about recent literature concerning the species *Brachymystax lenok*.

Dr. Robert J. Behnke,
Department of Fishery and Wildlife Biology,
Colorado State University,
Fort Collins, Colorado 80523.

Dear Dr. Behnke,

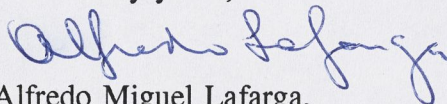
I received the application package thanks to the kindness of Dr. Richard Knight. The graduate program in fisheries biology really sounds interesting. I would like to know if you have any openings for a PhD applicant. I am interested in the areas of salmonid biology and fisheries management. At this point I would like to start the program in the Spring semester of 1995.

I have a Bachelor of Science in Biology from the University of Buenos Aires, Argentina and I am finishing my Master of Science in Fisheries here at the University of Alaska Fairbanks. I did a research project for my bachelor degree studying the growth of the rainbow trout in 16 lakes in Patagonia and my master's thesis deals with the growth of the sockeye salmon in the Egegik River, Bristol Bay, Alaska. I am digitizing adult sockeye scales at the scale lab of the Alaska Department of Fish and Game in Juneau to relate the growth with the differences in sockeye abundance in the Egegik river system in the 1960's and 1980's. My supervisor is Dr. Ole A. Mathisen.

I already finished the M.S. coursework and I am scheduled to make the thesis defense by late Spring of 1994. I include herewith a copy of my C.V., a copy of my graduate study plan at UAF and copies of my B.S. and M.S. transcripts. We use a grade scale of 1-10 in Argentina. I have a GPA of 3.00 in the M.S. program.

Thank you in advance for your kind attention.

Sincerely yours,

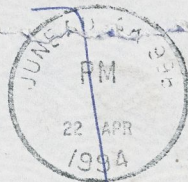


Alfredo Miguel Lafarga,
P.O.Box 210951,
Auke Bay, Alaska 99821-0951

Phone: (907) 465-6441
Fax: (907) 465-6447
E-mail: JTAML@acad1.alaska.edu
(internet)
JTAML@alaska.bitnet
(bitnet)

FROM =

ALFREDO LAFARGA
P.O. Box 210951
AUKU BAY
AK 99821-0951



TO =

DR. ROBERT J. BEHNKE,
DEPT. OF FISHERY AND WILDLIFE BIOLOGY
COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO 80523



WILEY

Publishers Since 1807

11/30/95

Prof. Belzke:

Sorry I missed you. Recently Wiley published a new book in your area by Jordan, Conservation Biology.

By now your copy should have arrived.

If it hasn't, please

contact me - my card is enclosed.

If you are considering a new book for your 555 course, I hope you will evaluate our Jordan book.

Please contact me if I may be of any assistance.

Tom

CAL POLY

CALIFORNIA POLYTECHNIC STATE UNIVERSITY
SAN LUIS OBISPO, CA 93407

COASTAL RESOURCES INSTITUTE

May 28, 1995

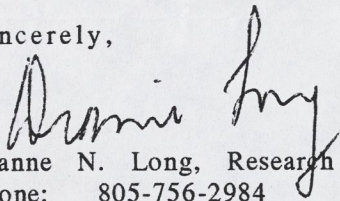
Dear Hatchery Study Advisory Group Members:

Enclosed is a copy of the minutes (to the best of my notation) for Friday, May 12. The study team has reviewed the draft, and I have made corrections. Please review these comments and let me know if you have any additions or corrections to be incorporated into the minutes.

I am also sending these comments to others identified by Trout Unlimited and other learned folks at the request of advisory group members as they become known to me. At the time of the mailout of the draft environmental document (end of June), I will prepare a listing of "consultations" which will be incorporated in the draft.

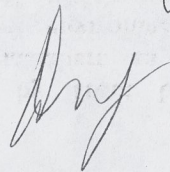
With regard to our timetable, we are seeking comments on the draft under consideration at the May 12 meeting. Should we not receive comments by June 9, we will assume there are none and will finalize the draft environmental document. I assume a 60-day period for public comment will bring us to a September final document.

Sincerely,



Dianne N. Long, Research Associate
Phone: 805-756-2984
Fax: 805-756-5748

*I am pleased
to receive your comments.*



CAL POLY

CALIFORNIA POLYTECHNIC STATE UNIVERSITY
SAN LUIS OBISPO, CA 93407

COASTAL RESOURCES INSTITUTE

ADVISORY GROUP TO THE ENVIRONMENTAL STUDY ON THE CULTURE AND STOCKING OF RESIDENT TROUT AND INLAND SALMON IN CALIFORNIA

SUMMARY OF COMMENTS - MAY 12, 1995

PRESENT:

Advisory Members:

Jim Edmondson, California Trout
Gary Gunsolly, Bishop Chamber of Commerce
Martin Strelneck, Western Outdoor News

DFG Technical Support:

Gene Fleming, DFG Inland Fisheries
Bruce Baralgrover, DFG Region 2
Bill Cox, DFG Inland Fisheries
Royce Gunter, DFG Warm Springs Hatchery
Chuck Knutson, DFG Wild Trout Project

Cal Poly Researchers:

Richard Thompson, Cal Poly Coastal Resources Institute
James Vilkitis, Cal Poly Coastal Resources Institute
Dianne Long, Cal Poly Coastal Resources Institute

DISCUSSION ON THE ROLE OF THE ADVISORY GROUP:

Dianne Long, advisory group facilitator, explained the purpose of the advisory group: to enhance impartial disclosure of issues and effects in both the study and the resulting document. To this end, the Cal Poly study team is producing a series of interim products which reflect the approach and findings to date. The final environmental document is expected to assist DFG in improving its decisions including processes regarding the management of wild trout and hatchery programs. It is anticipated that a draft document will be produced for public comment June 30, 1995 with a final document ready for delivery September 1995.

Trout Unlimited has formed a Scientific Advisory Group to provide written comments on the preliminary documents related to study on the culture and stocking of resident trout and inland salmon in California. In telephone

conversations with Trout Unlimited Attorney, Barrett McInerney the following members have been named: Terry Roelofs and Eric Loudenslager (CSU Humbolt), Peter Moyle (UC Davis), Robert Behnke (Colorado State), and Ray White (U Washington). Although these members were unable to meet with the advisory committee in face-to-face discussions, every effort will be made to invite review of the study approach and documents. Stakeholders can contact Dianne Long, CRI Research Associate, to identify others who may contribute to the study and review of documents.

ENVIRONMENTAL DOCUMENT DISCUSSION:

After introductions, James Vilkitis (Project Director) provided an overview of the project and accepted comments on the early chapters of the draft environmental document. Additional remarks may be directed to Dianne Long who will forward them to the study team. Comments are summarized in the text which follows.

1. Alternatives: A discrete set of alternatives will be used to frame the analysis. The driving forces for designing alternatives are the issues identified by TU and those derived by regional scoping meetings. The advisory group identified a need to differentiate between high use-urban areas and high use-Eastern Sierras/Tahoe. High demand areas may include SF, LA, and high use recreation areas. The alternatives may need to reflect the differences between high demand/high use in population centers (LS & SF) and high demand high use in recreation centers (Eastern Sierra & Tahoe).

2. Sustainability and efficiencies: Alternative 2 needs to look at waters which are sustainable. Different waters have different attributes for sustainability. Clarify the terms "satisfactory" and "sustainable". Additionally, alternative 3 may include discontinuing catchable stocking in streams but continuing catchable stocking in lakes and reservoirs. Trout Unlimited is said to support this position. It is important to consider growing and transporting fish as a cost of business. Decisions regarding production may be made because of lack of water and space to reproduce. Jim Edmondson recommends the team review Pennsylvania's trout management plan regarding these concepts.

3. Measuring efficiency: In terms of efficiency criteria, 50 pounds per surface acre is considered "efficient" by hatchery personnel. In the Bishop area, 150 pounds per surface acre is typical. DFG hatchery personnel indicate that a criterion of \$2 per pound is used today and was in use in 1970s as well.

4. Measuring aesthetics: The Chico study indicates that 60% of anglers fish for trout on inland waters. There is a need to identify aesthetics. A recent Texas survey looks at the quality of the fishing experience.

4 Environmental and biological impacts: The environmental and biological papers will be revised into Chapter 4. There was no comment on these papers.

8. Redrafting: The CRI research team will redraft the early chapters of the environmental document report to reflect this discussion.

PROGRAMMATIC AND ECONOMIC APPROACH

Richard Thompson, (Natural Resource Management Economist and CRI Research Associate) described the approach to the programmatic and economic assessment:

1. Approach: The economic analysis is dependent on data collection and the biological analysis. The paucity of hatchery stocking data has been a delaying factor. Stocking efficiency will consider marginal costs of hatchery activity to creel and the value to the angler. State GDP contributions will be assessed. George Goldman (Cal Coop Extension) has a database which is very general and cannot be used to determine the contributions of fisheries to local economies. There is a trout fishing paper related to Mono county (and Goldman's publication on commercial and recreational fishing in California) which may provide general or anecdotal information. (Edmondson) Also, the Sportfishing Institute may have an input-output model for state. The paucity of data may suggest the need for monitoring, ongoing research, and marketing programs. Such activity has been curtailed because of agency budget cuts.

2. Hatchery carrying capacity: Three years ago, Inland Fisheries suffered a budget adjustment of \$1 million and looked to close hatcheries to optimize product at other facilities. Decisions had been made to keep hatcheries open, but to reduce operations across the board. Some hatcheries reduced product formally 10-20%. Some are at carrying capacity now, others have a margin of carrying capacity as long as there is funding for feed, fish, water, pumping water, trucking/distribution of fish. Reductions were smaller for high demand/high need areas: Eastern Sierras, Tahoe, and urban areas of LA and SF. For example, Region V-Bishop has no decrease in production, however the Eastern Sierras had outplanting in March, so that fewer trout (up to 50%) are planted. In other areas stocking is reduced so that four out of five possible sites are stocked with a rotation on the omission. To reduce expenditures this year, hatcheries began pre-planting in mid March. Reductions were also made because of losses in people, funding and capacity to maintain operations with quality fish. Early stocking (preplants) do not meet the standard of "two fish per pound" normally used.

3. Costs of production: Edmondson noted that DFG is producing bigger fish now (verified by DFG data). The production and cost data needs to look at the size of fish as well as costs per pound. The figures are soft. The Mayo report (1989) cost data does not including distribution, trucking, planting costs. Also, fingerlings are cheap to produce by fish, because the personnel cost is less, however they appear to be more costly per pound. Distribution, planting,

transportation, spawning/collection of eggs increase costs. (See also the Goldman report which looks at 1993-1994 data.)

Edmondson will send a History of Fisheries, Fish Bulletin 150 (1980) which addresses these issues. And, an Idaho study looks at market considerations. The \$2 cost per catchable fish is often used, however surveys indicate that the first trout has more value to the angler.

The Mono Lake EIR survey provides information on angler response to value for one day of fishing (\$11), however transportation, hotel/motel, restaurant, purchases, and other costs do not appear to be factored. UC Davis (Phil Meyer) has estimated a value per angler day used in mitigation (the dollar amount was not noted.) Also, the U. S. Fish & Wildlife Tulee River Basin study estimates \$85 a day for angler expenses. However, studies may not consider the externalities of impacts to aquatic ecosystems. For example, Cal Trout is studying the upper Sacramento River where 47 miles were wiped out from a toxic spill. Receipts disappeared and later reappeared in response to recreational fishing. Values of fishing activity are real, but hard to assess. The "travel costs method" cannot capture these values well. Also, there was conjecture about large angling public in California which the literature may not acknowledge.

In the Wild Trout Program (WTP), it is important to calculate the marginal costs outside of "blue ribbon waters". The costs may escalate quickly, when considering habitat potential and impact on in situ wildlife populations, especially threatened and endangered species. The term "restoration" needs careful definition with respect to habitat potential (see "categories of waters" definitions).

The team requests comment to interpret data costs regarding spawning, production, transport, distribution, administration.

CAL POLY

Along
Polo Ln

CALIFORNIA POLYTECHNIC STATE UNIVERSITY
SAN LUIS OBISPO, CA 93407

NAJEM
P=pen

Dr. Robert Behnke
Colorado State
Dept of Fisheries +
Wildlife Biology
Wagner Bldg
FORT COLLINS CO 80523

931 SANTA BARBARA CA

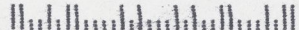


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TELECOPIER (818) 787-1384

MEMORANDUM

TO: Interested Parties

FROM: BARRETT W. McINERNEY

DATE: May 31, 1995

RE: California E.I.R. on Hatcheries & Trout Stocking

First of all, I would like to introduce myself. I am an attorney practicing in Los Angeles who volunteered to represent Trout Unlimited in a lawsuit that required the California Department of Fish and Game to prepare an unprecedented environmental impact report on the inland trout hatcheries and the catchable trout program. That process is now underway by the Coastal Resources Institute at California Polytechnic State University at San Luis Obispo under the direction of Dr. James Vilkitis and Dr. Dianne Long.

After a slow start, the CRI has begun to produce drafts of the various inter-disciplinary reports that will eventually be edited into an environmental impact report. Since this is the first objective programmatic assessment of the largest hatchery system in the world, the CRI is trying to solicit the widest range of perspectives. We are optimistically anticipating a final draft E.I.R. available for public comment by June 30, 1995.

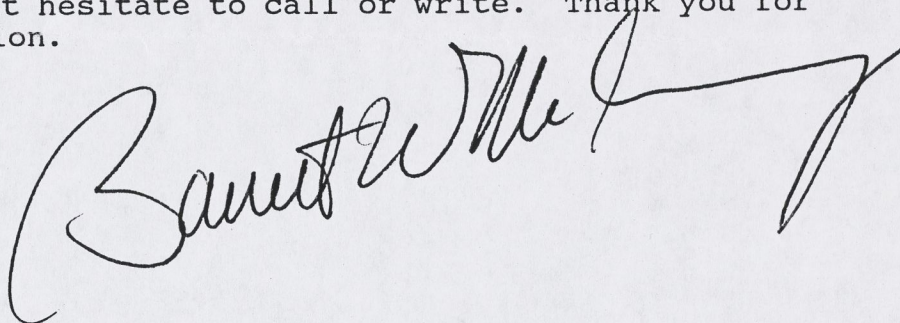
By copy of this Memo, we have asked CRI to add each of you to the mail distribution list as a member of the Scientific Advisory Group due to your experience and expertise in your field. I appreciate the many demands on your time, but this document has the potential of becoming the blueprint for hatcheries and coldwater fishery management of the next millennium. Whether the final E.I.R. has the respect and persuasive force to overcome the political inertia that inevitably resists change depends on creating an intellectually and scientifically bullet-proof document.

LAW OFFICES OF
BARRETT W. MCINERNEY

Your written comments and suggestions should be sent to the CRI and my office. Trout Unlimited will circulate all of the written comments among all of you to facilitate the greatest degree of interactive contributions.

Finally, if there are other persons whose input might be helpful in this process, please give me a call so that we can add them to the circulation list. The more good people who participate, the better the end result of the process.

Should you have any further questions or comments concerning the above, please do not hesitate to call or write. Thank you for your time and cooperation.

A handwritten signature in cursive script, reading "Barrett W. McInerney". The signature is written in dark ink and is positioned in the lower right quadrant of the page.

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BARRETT W. MCINERNEY

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Colorado State University
Fort Collins, CO 80523
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Facsimile (303) 491-5091

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Telephone (303) 249-3431

Mr. Delano R. Graff
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450 Robinson Lane
Bellefont, PA 16823
Telephone (814) 359-5154

LAW OFFICES OF
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5410 Grosevenor Lane, Suite 110
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Mr. Robert W. Wiley
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Mr. Ralph Cutter
P.O. Box 8212
Truckee, CA 96162
Telephone (916) 587-7005

July 15, 1995

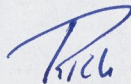
TO *Dr. Behrke*

I am very pleased to be joining Trout Unlimited as its West Coast Conservation Director. This new position in the organization is designed to coordinate and enhance TU conservation activities in Alaska, Washington, Oregon, Idaho and California. I plan to open the conservation office in Portland on or about August 1. As of that date, please contact me at my new address below. Until then, you can still reach me at the Council office during business hours or at my home.

Between now and the first of August, I will continue as Fish and Wildlife Director at the Northwest Power Planning Council. My current workload at the Council will necessarily limit my work on TU matters until I depart the Council. Nonetheless, I am anxious to be able to hit the ground running on August 1 and would therefore appreciate any assistance you can provide in the interim. In particular, I would like to begin receiving newsletters, mailings, important correspondence and other materials as you develop them. Please add me to your mailing list and send materials to the conservation office address noted below.

Thanks for the help. I am looking forward to working with you on important fisheries and watershed issues and hope to see you soon.

Sincerely,



Rick Applegate

*I've enjoyed your book
and Trout articles for some
time. Looking forward to
working with you....*

CURRENT OFFICE ADDRESS (until August 1)
Director, Fish and Wildlife Division
Northwest Power Planning Council
851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204
(800) 222-3355 or, in Portland, 222-5161

CURRENT HOME ADDRESS
1721 SE 71st Avenue
Portland, Oregon 97215
(503) 771-8450

TU OFFICE ADDRESS (August 1)
West Coast Conservation Director
Trout Unlimited
45 S.E. 82nd Drive, Suite 2000
Gladstone, Oregon 97207
Phone number: (503) 650-5412
Fax: (503) 650-5426

A:\TU\INTRO.DOC (RICK APPLGATE)

COLE & MARLEY
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1900 AVENUE OF THE STARS
LOS ANGELES, CALIFORNIA 90067
TELEPHONE
(310) 557-2288
TELECOPIER
(310) 557-1248

August 1, 1995

Dr. Robert J. Behnke
Department of Fishery and Wildlife
Colorado State University
Fort Collins, Colorado 80523

Re: Western Division AFS Meeting

Dear Bob:

It was nice meeting you at the American Fishery Society Western Division Meeting at Park City, Utah. Although those meetings are always a lot of fun, I believe there truly is a serious undercurrent concerning the ethics of ecosystem management. If scientists don't act like scientists, then lawyers may end up having to do the job.

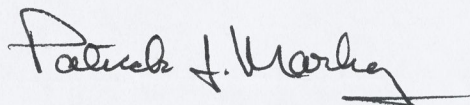
Speaking about lawyers, I received a call from Barrett McInerney warning me that there would be no more small, high protein state hatchery trout for my bass unless I treat the trout guys nicely. I can assure you I have the highest respect for the trout guys and look forward to working closely with them. If we don't work together, then the resource will lose and we will be the big losers.

Finally, I did enjoy our conversation at the luncheon and look forward to opening communications with you on other fishery concerns. Our office is presently evaluating a potential lawsuit against the U.S. Government to prevent the use of federal public land for cattle grazing since there has never been an adequate definitive current evaluation to justify the long-term leasing of our public lands for cattle grazing. The leases have a chilling effect upon public use. The lands are fenced without adequate access or adequate signage to indicate that they are public lands available for public use. Further, the underpriced leasing of public lands to a private enterprise, which is in direct competition with other similar commercial activities, is unfair competition. Finally, the degradation to the environment resulting from this misuse of public lands must be addressed. It will be a huge undertaking which may be all consumptive of our time so we are cautiously evaluating the grounds for litigation.

Dr. Robert J. Behnke
August 1, 1995
Page 2

I look forward to dining with you again some time in the future. I have enclosed a couple of my cards as per your request at the meeting.

Very truly yours,

A handwritten signature in cursive script that reads "Patrick J. Marley". The signature is written in dark ink and includes a horizontal flourish at the end.

PATRICK J. MARLEY

PJM:kl
Enclosures

cc: Barrett McInerney (via fax)

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Dr. Robert J. Behnke
Department of Fishery and Wildlife
Colorado State University
Fort Collins, Colorado 80523



Johan Hammar

October 9, 1995

Frederick W. Kircheis
Maine Department of Inland Fisheries and Wildlife
Fisheries Division, 650 State Street
Bangor, Maine, U.S.A. 04401 - 5654

On conservation of relict marginal populations of the Arctic char species complex

The Arctic char is assumed to have originated in the North Pacific. From there, the species has spread westward via Siberia and Europe to the Atlantic, and eastward via Alaska and Canada to the Northwest Atlantic coasts. Periods of glaciation and deglaciation has caused the species complex to redistribute in a north-south direction with repeated incidents of isolation and mixing in ice age refugia affecting the speciation processes further. Within the present interglacial perspective, landlocking of former anadromous and resident populations illustrate some of the ecological and genetic processes that have been significant to the speciation of the Arctic char species complex. While anadromous populations communicate genetically via straying and thus tend to reduce genetic differences, landlocked populations are isolated and thus preserve ancient genetic diversity as well as face new extreme forces of natural selection.

In comparison to more central populations of Arctic char, the marginal populations seem to illustrate more rapid adaptations to environmental restrictions. Whereas the physical environment is a barrier to northern marginal populations, biotic interactions with other species act as a barrier to southern marginal populations. Among the southern landlocked populations of Arctic char in Europe and North America, where it coexist with an increasing list of more recent colonizers, supreme predators and competition from superior zooplankton feeders are believed to cause selection for life history strategies allowing the char to attain a competitive threshold size at a lower age. In such southern multi-species fish communities, the delicate status of the Arctic char, being either a predator or a victim/prey, is governed by a long series of adapted life history traits. These may include modified juvenile risk behavior, species and size selective foraging strategies facilitating the early shift to a piscivorous diet, delayed sexual maturity in order to maximize early investment into growing, specializations in spawning behavior and choice of spawning time and habitat, as well as modified reproductive investments emphasizing on size in stead of numbers of eggs. Marginal populations of Arctic char along its southern border are consequently extremely vulnerable to environmental changes, and numerous attempts to increase their distribution have failed.

The situation in Sweden may serve as an illustration. At least 57 relict populations inhabiting lakes south of River Dalälven were registered by the beginning of this century. Today, 1995, only 18 of these populations are still vigorous, illustrating a

loss of more than 68% in just a decade (J. Hammar, unpubl. data). Among the attributed reasons for extinction, acidification is responsible for the loss of at least 6 (15%) populations, and introductions of pike or cisco for the loss of minimum 3 (8%) populations. In another four lakes, recent colonization and introductions of cisco are presently causing a rapid decline of the abundance of relict char, with the situation in one lake being extremely critical.

During the early 1900's an immense national stocking program of fish in southern Sweden, ranked the Arctic char as the species of greatest interest. Almost 4 million char fry were stocked into 122 southern lakes during 1850-1916. Only two introductions of char, however, gave rise to self-sustaining populations. Most introductions thus failed totally, although some lakes reported individual char for a number of years afterwards.

As in Maine, the serious attempts to expand the range of landlocked Arctic char in the early 1900's has failed, and so did the efforts of introducing Arctic char into multi-fish-species reservoirs in Germany. Even some of the larger alpine char lakes such as Lakes Geneva (Leman), Neuchâtel, Constance (Bodensee), and Lucerne are today stocked regularly with artificially reared Arctic char in order to prevent extinction because of severe abiotic conditions and secondary biotic interactions due to eutrophication.

The critical biotic traits responsible for the decline of marginal populations of Arctic char in southern Sweden and elsewhere, and the reasons for the low success in establishing new populations clearly illustrate the Arctic char as being extremely vulnerable to interspecific interactions and environmental changes, especially along its southern species border.

Marginal populations of Arctic char may hence demonstrate an extensive list of local adaptations highly crucial to their survival in specific habitats and in specific fish assemblages. In what way these adaptations can be identified genetically and applied as useful markers to identify resemblance is not known. Although advanced genetic tools may identify differences, we cannot still provide evidence of genome similarity.

As the information of genetic and ecological diversity given clearly shows, relict populations of Arctic char along its southern range provide good examples of how vulnerable species of great economic, ecological and genetic significance may produce viable populations outside their central distribution range. To jeopardize the conditions for these populations of relict Arctic char is thus a threat to an evolutionary unit representing the essence of local salmonid adaptation.

Johan Hammar
Research Scientist

Dec 1996

¡Hello!

With a view of
this part of the world
I give you seasons greet-
ing.

I wish you a
Merry Christmas and
the best for the coming
year.

Roberto Murcia
Valdivia, Chile
Casilla 575.



FOTO: ALEX HUBER



To: Dr Robert Behnke
Colorado State University
Dept. Fisheries and Wildlife Biology
Fort Collins, Co, 80521
USA.

RIO VALDIVIA - VALDIVIA - CHILE

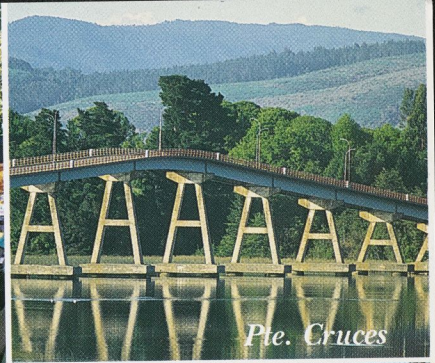
- 1.- Mercado fluvial de Valdivia.
- 2.- Puente río Cruces (1987).
- 3.- Costanera río Valdivia.

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Mercedo Fluvial



Pte. Cruces



Costanera Rio Valdivia

THE VALUE OF NATIVE COLDWATER FISH

A Conference for the Northern Rocky Mountains

The Agenda

Day One • Tuesday, February 9

- 7:30 - 9:00 Registration
- 9:00 - 9:15 Welcome
Kathy Buchner, Trout Unlimited
- 9:15 - 10:00 An Ecological Perspective-Watersheds and Native Fish Habitat Management
Paul Brouha, Associate Deputy Chief U.S. Forest Service
- 10:00 - 10:30 Salish Cultural Committee
Tony Incashola, Director
- 10:30 Break
- 11:00 - 12:00 Values Panel:
The Value of Coldwater Fish
- Scientific, *Dr. Robert Behnke Colorado State University*
- Economic, *Dr. Cindy Swanson U.S. Forest Service*
- Socio-Historical, *Dr. Stuart Knapp Montana State University*
- Recreational, *Bob Wiltshire Federation of Fly Fishers*
- 12:00 - 1:30 Lunch (on your own)
- 1:30 - 2:15 Keynote: Gary Edwards, Asst. Director for Fisheries, U.S. Fish & Wildlife Service, Fisheries & Aquatic Mngmt.
- 2:15 - 2:30 Overview of Regional Strategy for Conserving Native Coldwater Fish
Led by Ginny Tribe, Conference Facilitator
- 2:30 - 4:00 First Working Session
Goals and Roadblocks;
A Brainstorming Exercise
- 5:00 - 6:30 No-Host Mixer
- 4:00 - 8:00 Poster Session

Day Two • Wednesday, February 10

- 8:00 - 8:15 Welcome-Road Map
Christine Moffitt, President-Elect American Fisheries Society
- 8:15 - 9:00 Challenges to Meeting Goals of a Regional Native Fish Conservation Strategy
Larry Hamilton, Montana State Director Bureau of Land Management

- 9:00 - 10:30 Panel: Why Do We Get To The ESA?
Steve Mealey, Director, Idaho Fish and Game
Mike Stone, Chief of Fisheries, Wyoming Game and Fish
Larry Peterman, Chief of Fisheries, Montana Fish, Wildlife & Parks
Silas Whitman, Fisheries Director, Nez Perce Tribe
Dave Brunner, Deputy State Director, Bureau of Land Management, Idaho
Dave Wright, Forest Supervisor, Idaho Panhandle National Forest

- 10:30 - 11:00 Break
- 11:00 - 11:45 Lessons from the ESA
Tom France, Senior Staff Attorney National Wildlife Federation
- 11:45 - 1:30 Lunch (on your own)
- 1:30 - 3:00 Second Working Session
Goals and Strategies
(Also develop two key questions for agency leadership forum to address)
- 3:00 - 3:30 Break
- 3:30 - 4:30 Agency Leadership Forum:
Federal and State Agency Leaders
Setting Conservation Priorities
USFS, BLM, USFWS, MTFWP, IFG, WGF
- 6:00 - 7:00 No-Host Mixer
- 7:00 - 9:00 Banquet
Tom Kovalcky, Retired Forest Supervisor

Day Three • Thursday, February 11

- 8:00 - 8:15 Welcome-Road Map
Rob Ament, Executive Director American Wildlands
- 8:15 - 9:15 Panel: Stakeholder Review of Strategy
Jim Riley, Executive Director Intermountain Forestry Industry Assoc.
Jim Little, Member of Ranching Community
Cindy Deacon Williams, Fisheries Consultant
Gloria Flora, Supervisor, Nevada Ntl. Forests
Mike Sprague, President, Trout Headwaters, Inc.
- 9:15 - 11:00 Third Working Session
Review, Refinement, Finalization
- 11:00 - 12:00 Wrap-up; Where Do We Go From Here?
Conference Planning Committee

1996 - Re Gary Edwards
 JAX from Robin Knox

Catchable Trout
 raised in state hatcheries & etc.

			<u>Licenses</u>
CO 1996	4,532,717	10"	766,966
CO 1997	3,197,846	9.9"	747,609
AZ	1.2 mil.	9.7"	340,000
CA	7,497,560	10.8"	1,787,545
ID	2,973,704	9.5"	469,737
MT	162,824	8.6"	392,392
NV	1,674,237	8.4"	112,837
NM	1,449,604	9.8"	254,942
OR	2,476,613	9.2"	786,972
VT	1,833,982	9.7"	491,094
WA	3,324,313	9.45"	489,678
WY	684,205	8.7"	428,212
PA	5,250,000	10.5"	972,053

March 17, 1998

Dear Bob,

Thanks for your letter och the magazine Trout.

In S. Sweden eel has a commercial value, specially^a smoked. South Sweden also export eels to Holland, Germany and Japan. Japan is also a big buyer of eels from many countries in Europa.

Eastern europeans, even living in Sweden, buy live carp at X-mas and it is also a tradition to keep a live carp in a aquarium in weeks before 24 december and eat it X-mas evening. I think the tradition comes from old Czecho-Slovakia.

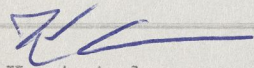
Danes still catch large quantity of Baltic salmon but not so much as Swedes.

Denmark is still stocking salmon in the west Baltic Sea. Some of these salmon arrive west Sweden which is not popular. ~~Mixed~~ Wild Atlantic salmon^v x danish baltic hatchery salmon is not a fine measurements of genetic variations in this area.

Thanks for your information about you and Mayden.

Next week I am going to N.Sweden for ice-fishing, etc, and will be back April 5.

Also best wishes for 1998


Kent Andersson

Norumshöjd 11 bv

417 45 Göteborg

Sweden



Milcael Olsson

1998

Salmo salar lake Vänern
insjö lax sweden
8,6 kilo

~~total weight 14~~



Mr Dennis Gustavsson,
Eksjö, with the
new recordsalmon

New Swedish sportfishing record for landlocked salmon - Salmo salar

Weight: 20,4 kilos - certified scales,

Total length: 110 cms

Girth: 79 cms

Day of catch: December 21, 1997

Place: Lake Vättern

Method of catch: shorefishing from land

Bait: Tubefly

Fighting time: about 30 minuters,

Hatchery fish, Gullspång type,

Angler: Mr. Dennis Gustavsson, from Eksjö (town), Sweden.

Report by: Mr. Kent Andersson AFS lifemember
Norumshöjd 11 bv
417 45 Göteborg
Sweden

Phone & fax 031-55 36 99

Sportfishing
Photography -Reporting



Norumshöjd 11 bv
417 45 Göteborg

Sweden

Phone

031-55 36 99 Private

American Fisheries Society,
European Federation of Sea Anglers.

*The stomach was full
of Myoxocephalus quadricornis*

MNC AT Univ of Neb
@ Lincoln



University of
Nebraska
Lincoln

Institute of Agriculture and Natural Resources



Department of Forestry, Fisheries and Wildlife
Nebraska Forest Service
101 Plant Industry
P.O. Box 830814
Lincoln, NE 68583-0814
Office: (402) 472-2944
FAX #: (402) 472-2964



April 24, 1996

Justin King
NPPD
P O Box 499
Columbus, NE 68602

NOTED
APR 30 1996
M. CZAFLEWSKI

copy: Jim Doyle
Jim Chadwick
Bill Miller
Bob Behrke FYI

Dear Justin:

Please find enclosed a copy of Brett Fessell's M.S. Thesis. Brett defended his research in March and is now working in Michigan. We thank you for your interest in his work on thermal tolerance of Platte River fishes and hope that this thesis will be of use to you and your organization. Brett and I are currently preparing this work for publication in either Copeia or Environmental Biology of Fishes. If you have specific comments or questions we would appreciate hearing them and you can direct them to me. Thank you again.

Sincerely,

Edward J. Peters
Associate Professor - Fisheries

December 11, 1997

Dear Bob,

The biggest S.salar in Lake Vättern this year is: 13,22 kg, 98 cm TL, so far, sportfishing 27 september 97.

Yes, there is a low catch of C. albula in Lake Vättern. There are no trawler in L. Vättern.

There are much more salmons/trouts in L. Vänern = lower price, in the region.

L Vättern do not have many salmons/trouts = higher price in the region.

- European
Sw. Hummer = lobster, saltwater. Expensive 400-600 SEK/kg, mostly.
- Sw. Havskräfta = Norwegian lobster, saltwater. Cheap, and very good. 80-200 SEK/kg.
- Sw. Flodkräfta = freshwater crayfish, "river crayfish", European crayfish. Expensive.
and rare.

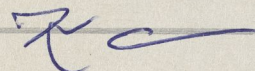
The Swedish market is supplied mainly with introduced N.Am. crayfish = signalkräfta in Swedish.

Best wishes,

Merry X-mas

and

Happy New Fishing-Year.



Kent Andersson

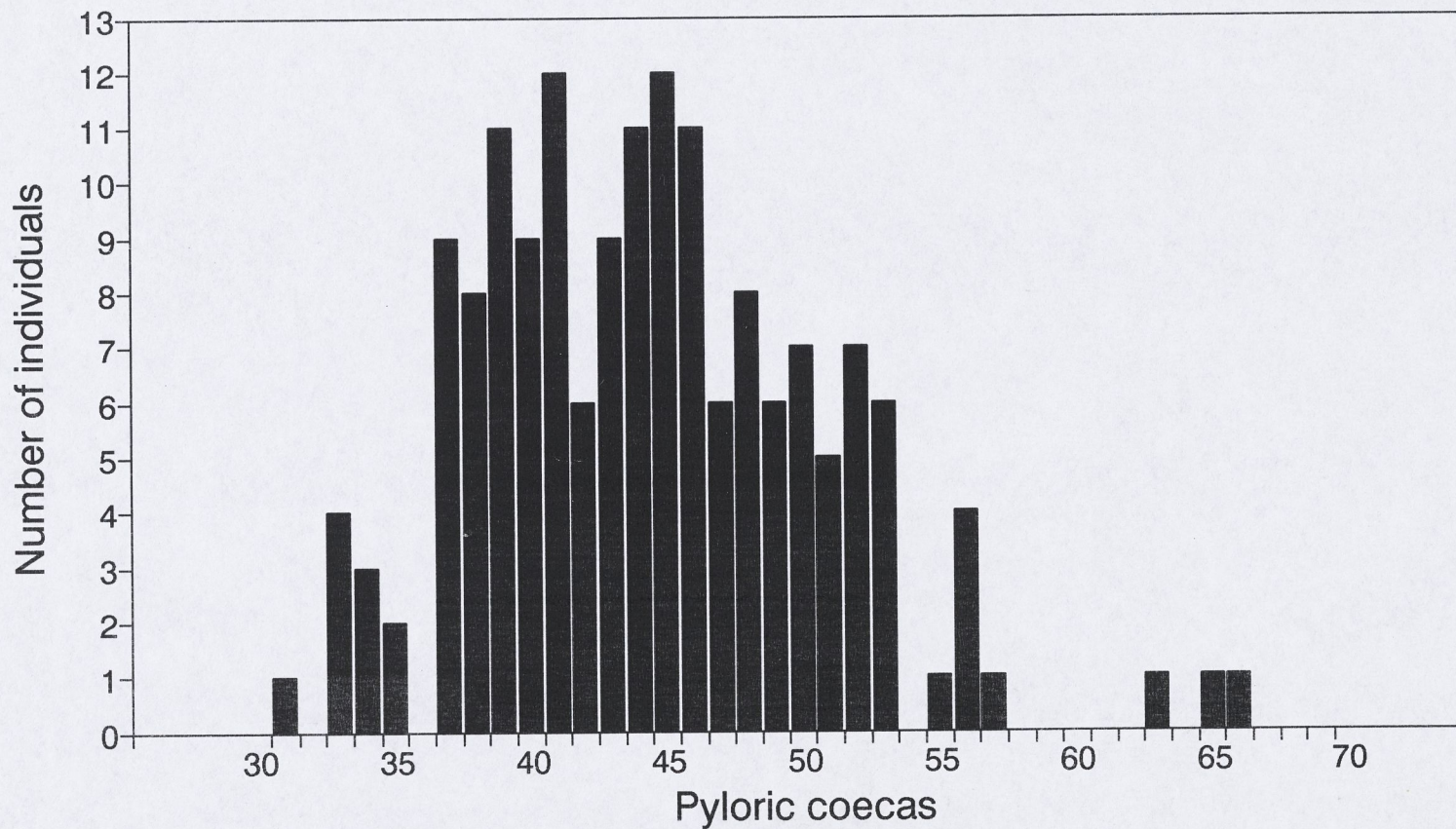
Norumshöjd 11 by

417 45 Göteborg

Sweden

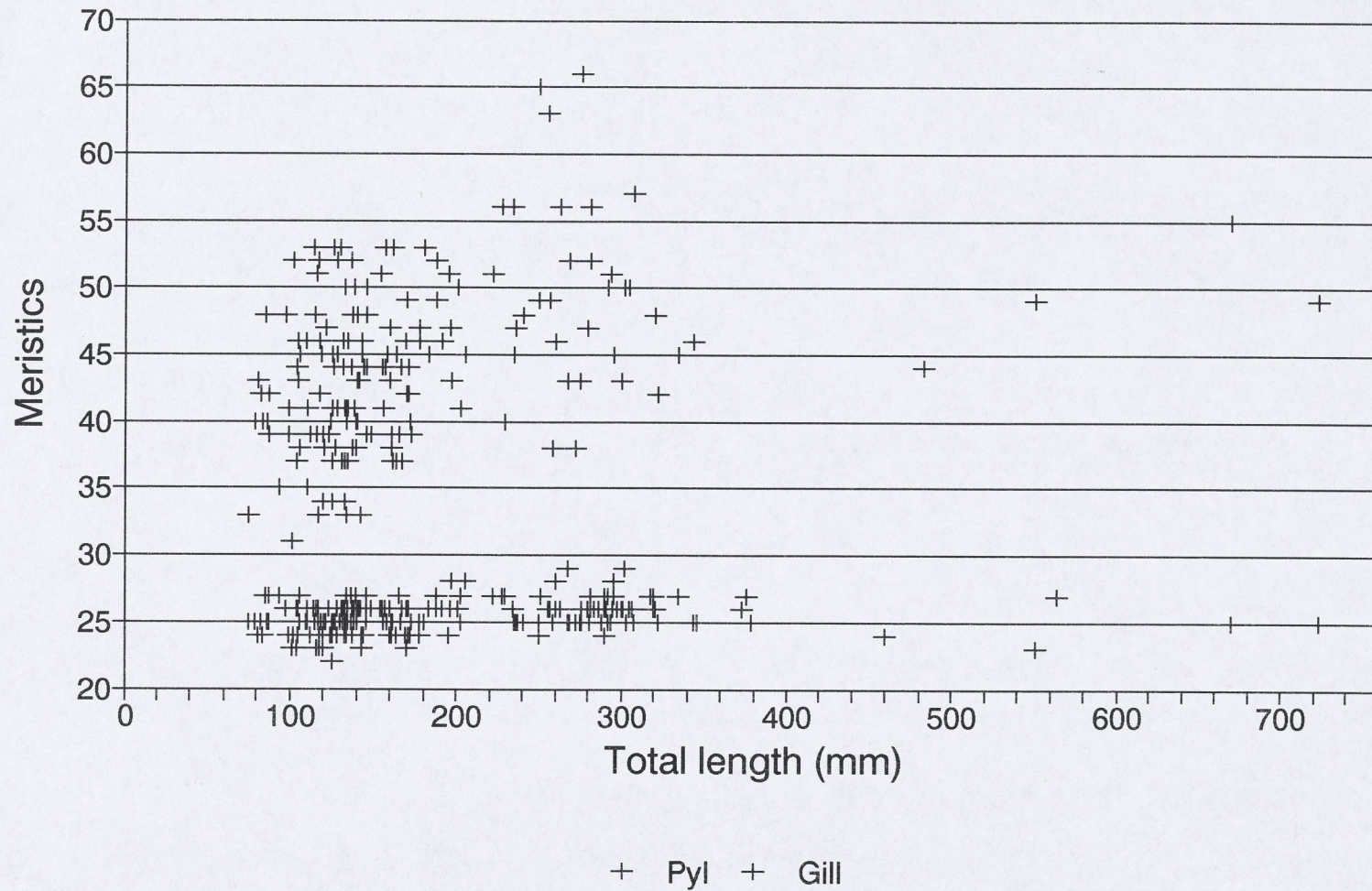
PS. Thanks for the Trout, and your article on p.50.

Lake Korsvattnet 1990-1992

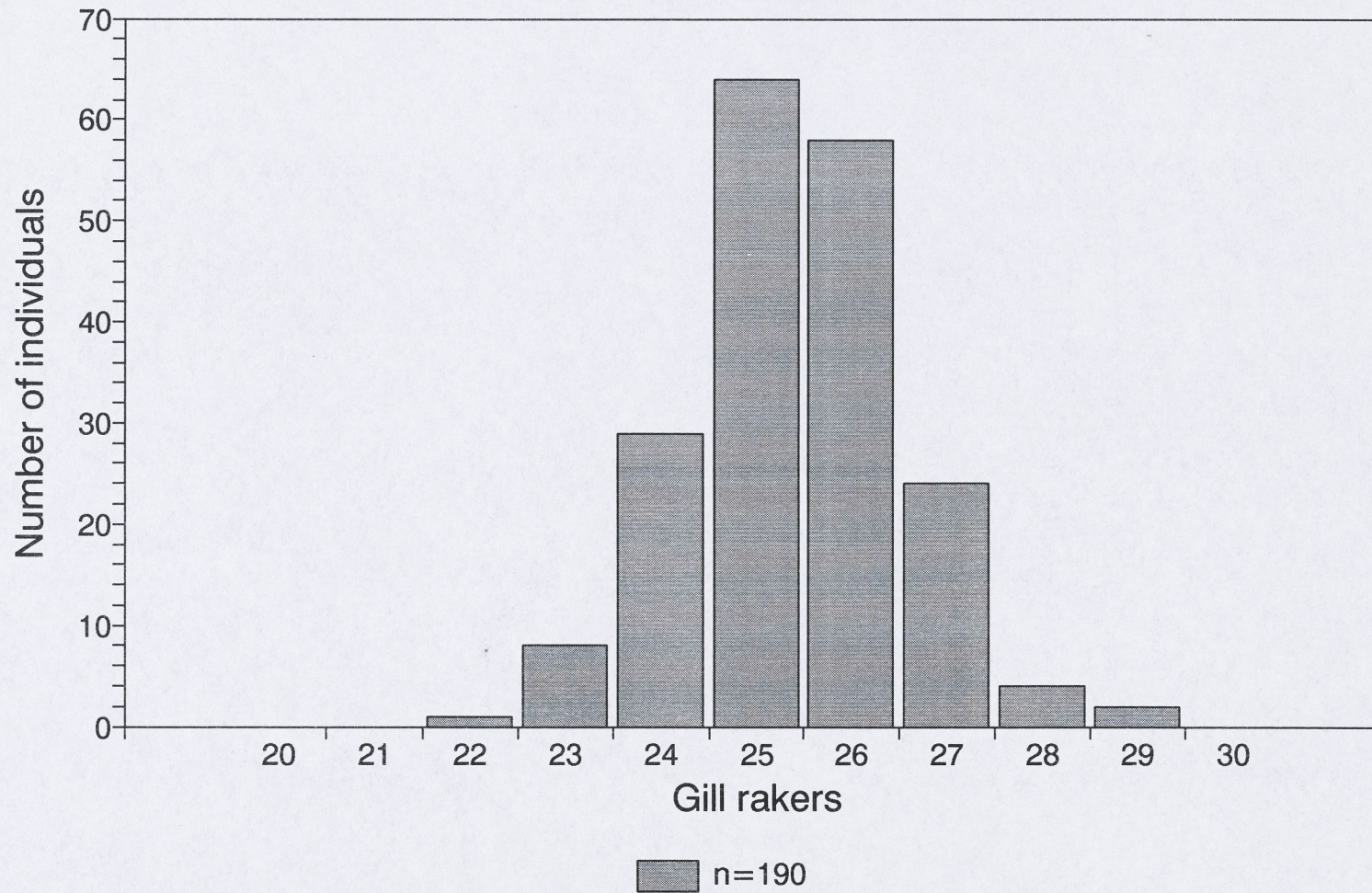


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L. KORSVATTNET, SWEDEN
1990-1992

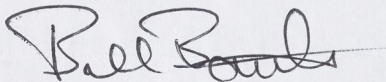


Lake Korsvattnet
1990-1992

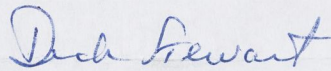


Robert Behnke
May 11, 1996
page 2

The central theme of *Fly Fish America* is management for wild fish populations. We would like to discuss the possibility of having you work with us on a regular basis as our wild fish expert. Please contact us at your first convenience by mail, by telephone at 603-356-4815, or by E-mail at: FFAEditors@flyfishamerica.com



Bill Battles, Editor
603-356-4815



Dick Stewart, Publisher
603-356-4742

Fly Fish America

A Publication of America Publishing Corporation

EDITORIAL GUIDELINES

Fly Fish America is a publication devoted to fly fishing - freshwater, saltwater, warmwater, and any other iteration which you may devise! The goal with our readers is to provide a magazine which is informative, instructive, technically accurate and fun to read. The goal with our contributors is to create professional relationships which are cordial, enduring and rewarding, and we will work with you to make that happen.

Publication Schedule

Fly Fish America is published six times per year (January, March, May, July, September and November). Print circulation is over 100,000 copies per issue. Each issue is published in seven regional editions:

Northeast: ME, NH, VT, MA, CT, RI and NY.

Mid-Atlantic: PA, NJ, DE, MD, DC, VA and WV.

Southeast: NC, SC, TN, KY, GA, AL, MS and FL.

Upper Mid-America: ND, SD, MN, IA, WI, IL, MI, IN and OH.

Lower Mid-America: NE, KS, MO, OK, AR, LA and TX.

Rocky Mountain: MT, ID, WY, NV, UT, CO, AZ and NM.

Pacific: AK, WA, OR and CA.

Fly Fish America contains both national and regional sections. As an example, a copy from Seattle has the same cover and national section as one originating in Boston, but the Boston copy contains the Northeast regional section, while the Seattle copy contains the Pacific regional section.

Internet Publication

In addition to appearing in print, every issue of *Fly Fish America* is also published on the Internet. The Internet version contains the national section and all seven regional sections, and includes 100% of the editorial and advertising content of each. The Internet version is published concurrently with the print version, and remains on the Internet for approximately two months. Our URL (Internet address) is: <http://www.flyfishamerica.com>

Editorial Content

The following is a general outline of topics we routinely address, and is not intended to limit your creativity:

- Fishing articles on any fish that will take a fly, with emphasis on the popular species.
- Instructional articles dealing with the techniques of fly fishing, casting, selection and use of equipment, entomology, fly selection, and fly tying, at both beginner and advanced levels.
- Conservation and environmental news and issues, stream and lake ecology, habitat degradation and restoration, and management for wild fish populations.
- Personality profiles of significant innovators in, and contributors to, fly fishing and fly tying.

Editorial Format

Feature Article: 2000-3000 words, illustrated with artwork and/or photographs.

Short Article: 700-1400 words, illustrated with artwork and/or photographs.

Editorial Preferences

We teach, by example, the wisdom of catch and release. Please don't submit photographs of dead or maimed fish, or fish being mishandled in the process of landing or release. We actively advocate management of our fisheries for native wild fish populations, and encourage articles dealing with the issues and benefits of wild fisheries management versus management by stocking.

Articles dealing with specific fly fishing destinations should take a "where to/how to" approach, provide

destination specific information on local fish, hatches, fishing conditions, entomology, fly patterns, fishing techniques, river flows, fly shops, lodging, etc., and be accompanied by a sketch map or topographic map (please, no road maps!) annotated by the author with sufficient information for us to produce a publication quality map.

Beginner instructional articles cover topics which are useful to the beginner, and should be understandable, instructive and enjoyable for the novice fly fisher. Advanced instructional articles cover topics which are more technical in nature, and which teach the old "moss backs" a few new tricks.

Requirements for Submissions

- **Manuscripts:** Please submit manuscripts in print (typed/double spaced) and on digital media (3.5" diskette or 100MB Zip disk). The author's name, address and telephone number should appear on the first page of the manuscript, and all pages should be numbered. Please thoroughly research and document all facts. We do not accept materials submitted simultaneously to other publications. Please indicate any materials which you want returned to you, and include sufficient return postage. We will promptly acknowledge all submissions.
- **Photographs:** The quality, composition and variety of the photos accompanying your submission can make the difference between acceptance and rejection. Color photos should be in the form of 35mm slides or publication quality (high resolution) Photo CDs. Black & white photos should be in the form of 8"x 10" glossy prints or publication quality Photo CDs. Please include a caption sheet identifying all photographs by number and author, with a credit line, and providing the species of fish or insect or the name of the water pictured. Please mark each photograph with the corresponding number.
- **Artwork:** Artwork can be submitted in print and/or on digital media. Fly-tying and similar "step by step" articles should be accompanied by illustrations or photos depicting the steps in the process.

With your first submission, please include biographical data and a good color slide of the author, together with home, work and seasonal addresses and telephone/fax/E-Mail numbers, and the best times to contact you by telephone. Please keep us advised of any changes in the foregoing.

Rights Purchased

Fly Fish America purchases first time North American print rights to all submitted materials, with the additional right to publish all materials on the Internet. We will sometimes purchase previously published materials of particular interest, with the same rights being purchased.

Fees and Payment Schedule

Payment is made for all accepted materials within 30 days of publication. Fees paid vary as a function of the professional level of the materials, the frequency of acceptance of submissions from the contributor, the quality and variety of the photographs and illustrations accompanying the submission, the length of the article, and whether the materials are selected for national or regional publication. The same criteria apply to photographs and artwork purchased separately.

Fees paid for first time publication of an article, including manuscript, artwork and photos, are as follows:

Feature article: National, \$300-\$400; Regional \$100-\$200.
Short article: National, \$200-\$300; Regional, \$75-\$150.

Fees paid for previously published articles are approximately 50% of those paid for first time publication.

Fees paid for photographs and artwork purchased separately are as follows:

Less than one-half page: \$40.
Half-page and larger: \$80.
Two page spread: \$150.
Cover: \$300.

How to Communicate with Fly Fish America

- Mail: P.O. Box 2008, North Conway, NH 03860-2008
- UPS: 126 Randell Farm Rd., North Conway, NH 03860
- Telephone/FAX: 603-356-4815
- E-Mail: FFAEditors@flyfishamerica.com

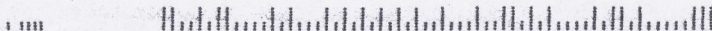


Fly Fish America

BOX 2008 • NORTH CONWAY • NEW HAMPSHIRE 03860



Robert Behnke
3429 E. Prospect Rd.
Ft. Collins, CO 80525-9739



P.O. Box 568
Bayside, CA 95524
March 2, 1997

Robert J. Behnke
Department of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado

Dear Dr. Behnke:

After reading Native Trout of Western North America, which I enjoyed very much, I am wondering about historic references to fish in northwestern California that I have collected in my research of history. Perhaps you will be kind enough to identify the fish in these references.

In the Biennial Report of the California State Board of Fish Commissioners for the years 1891-1892, W.H. Shebley reported on the egg taking operations at Shovel Creek (Klamath River tributary now just above Copco reservoir). He wrote on June 13, 1892: "The appearance and general condition of the fish this season showed plainly that they inhabited the river above the dam, and did not belong to the great run of fish that come from the ocean and the lower waters of the river during the spawning season. The fish ladder over the dam at Pokegama (this was at Klamathon below Iron Gate) is too small for a river of the size of the Klamath."

Under date of May 17, 1892, these trout were described as being "thick set and rather short, and are in good condition. They are highly colored and especially is this the case with the fins. I have noticed a few specimens that were so highly colored that it seemed unnatural. The pectoral, ventral, and anal fins were bright scarlet, tipped with white..."

He went on to say that he believed that a great many trout ran up the creek the previous winter. "For the past two months spent trout have been coming down the creek, but could not pass the corrals or traps which extended entirely across the stream. These trout would collect in the pools above by the hundred, and would die if not allowed to return to the river. These trout are silver-sided, long and slim, in good condition, but poor; the flesh is almost white..."

In the Biennial Report for 1895-1896, the report from Shovel Creek station stated that operations there in both years "were almost a failure, because the ladder on the dam in the Klamath River at Pokegama was washed out by the high water..."

Do these reports indicate that there were both resident and anadromous rainbow using Shovel Creek? Were the resident fish, the redband you identified in Klamath River tributaries below Klamath Lake and were these redband Columbia Basin fish?

The following refer to small coastal streams, most of which are tributary to Humboldt Bay. Hopefully you will identify the "speckled trout" noted in these references.

Humboldt Times (31 March 1855) Trout Fishing--Those of our clients, gentlemen of early leisure, boys, etc., who have the time, are devoting it to trout catching. The brooks and creeks emptying into the bay are filled with speckled trout, who readily bit at almost any bait and in consequence our tables are kept well supplied with the most luscious variety of fish.

Humboldt Times (27 Sept. 1856) Trout Fishing--Those who are fond of this sport possess excellent opportunities in this section to enjoy themselves, as every little creek and rivulet putting into the larger streams or into the Bay, is filled with speckled trout, similar to the New England trout...

Humboldt Times (17 April 1858) Some gentlemen of this town are forming a club for the purpose of trout fishing, the angling season for these speckled little beauties of the finned tribe having arrived.

Humboldt Times (15 May 1858) A party of gentlemen, twelve in number, went fishing one day this week to Fresh Water Creek, about three miles below this place, and caught, cleaned, cooked, and ate three hundred and eight speckled trout...

Humboldt Times (28 May 1859) Trout--These excellent fish are now quite abundant in the fresh water streams putting into the Bay. Major Hook caught about 80 one day this week out of Elk River.

Humboldt Times (7 June 1862) Large Trout--Mr. Raymond caught a trout in Elk river (tributary to Humboldt Bay)...measuring twenty-one inches in length and weighing about four pounds.

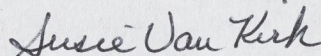
Humboldt Times (28 May 1864) Trout--Our sanctum was made glad one or two evenings since by the appearance of a fine string of genuine speckled trout, the largest of which weighed one pound and a half...

Arcata Union (1 Aug. 1903) Abe Greenwald wears the medal for having caught the big trout of Beith Creek, (a small tributary to a Humboldt Bay slough) which has been giving the fishermen so much trouble of late...The fish was a beauty, measuring twenty inches and weighing exactly two pounds and a half.

In the early days, people did not fish for salmon or steelhead in the rivers, although there were commercial net fisheries and occasionally salmon were speared. Instead, they fished in the small streams for trout. Were these coastal cutthroat or something else?

I would appreciate your help and thank you for a response.

Sincerely yours,



Susie Van Kirk



National Research Council
Canada

Conseil national de recherches
Canada

Research Journals

Revue scientifiques

Ottawa, Canada
K1A 0R6

Canadian Journal of Fisheries and Aquatic Sciences

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Ottawa, Ontario K1A 0R6 *Canada*

Fax # (613) 952-7656

23 September 1994

NRC-CMRC

J12587

Dr. R. J. Behnke
Department of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80523

Dear Dr. Behnke:

● Subject: J12587 Genetic impact on two wild brown trout (Salmo trutta) populations after release of non-indigenous hatchery spawners

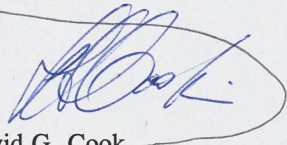
We solicit your advice on the suitability of this manuscript in the Canadian Journal of Fisheries and Aquatic Sciences as an article. If it is impracticable for you to send us a review **WITHIN THREE WEEKS**, please return the manuscript: a phone call ((613) 990-0212)) or fax ((613) 952-7656)) to the Editor informing him of your intentions and if possible suggesting alternative referees would minimize delays and be greatly appreciated.

A guide is given on the back of the enclosed form. Also, we commend the advice to referees in the CBE Style Manual (5th ed., p. 82-84).

Attention to the following may help expedite assessment: if you consider that a colleague should review it, either in your stead or jointly, please act accordingly; if the manuscript is difficult to evaluate because of inferior presentation, please indicate this on the comment form and give a brief supporting statement; if you wish to have the author(s) know you reviewed the manuscript, please say so in a covering letter or sign the comment form.

We hope you can spare the time to assess this work for us. Your comments will be valuable to us, and will be carefully considered in any decision regarding this manuscript.

Yours sincerely,


David G. Cook
Editor

→ Mailing label

Canada 

This paper concerns a most interesting and pertinent subject but contains little supporting evidence on the magnitude of negative selection on survival of the non-native trout.

The first estimates of reproductive success for the native and non-native trout lacks validity because there are no estimates of the numbers of eggs spawned by the native trout in the two sections. The genetic data showing differential native vs. non-native allelic frequencies can't be assumed to reflect true survival differences unless it can be estimated how many eggs of each form were spawned to produce the O+ age fish. The data on over-winter survival indicating negative selection on survival of non-native fish is much more substantive evidence, but firm conclusions can't be made because these are not closed populations and movement might be quite different between the native and introduced trout.

O+ "plus"

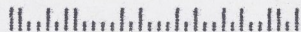
A more significant paper would include data covering several generations to monitor the fate of the non-native alleles. All that can be stated with any authority in the present paper is that, as would be assumed, the native, site-specifically adapted, fluvial trout, in its native environment, probably exhibited greater survival than the offspring from an introduced, lacustrine-adapted population.

There are two aspects to intraspecific differential survival of introduced and native fish. One concerns the effects of artificial selection in hatcheries (hatchery brood stocks selected for domestication for many generations -- natural selection vs. artificial selection); the other concerns site-specific natural selection in different environments (in the present case, fluvial vs. lacustrine). A paper by Marnell et al. 1987 (CJFAS 44:1830-39) discussed the strong negative selection apparent against non-native cutthroat trout (from Yellowstone Lake) when stocked into lakes with native cutthroat trout in Glacial National Park, evidently due to different adaptations to predators and perhaps parasites. In lakes originally barren of fish and lacking predators and parasites (where neither form had a site-specific adaptation) both forms of cutthroat, when stocked, survived well and produced hybrid swarms.

P.O. Box 568
Bayside, CA 95524

*Shovel Cnk
steelhead-resident*

Dr. Robert J. Behnke
Dept. of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80522



4/14/97

Bob -

I'm going to have to return to school - PRN or not, to re-learn new taxonomic systems.

When you return, give a call. I'll have some "real stuff" from the liquor shelves of Erbo's finest spirits dispenser.

Steve Walmsley DWR - Carson City had a good time, meeting you & friends, to make up for lousy weather conditions around Wild Horse Reservoir. I sent on to him a copy of "About Trout".

Ann is revived and ready for your return trying to fend off any headache this time.

Bill

Chilton Engineering & Surveying

NOTICE OF ANNUAL MEETING

The annual meeting of the stockholders of this corporation is called for Wednesday, April 16, 1997, at 5:30 P.M., at the Stockmen's Hotel

At this meeting, the members shall carry out election of directors, and transact other business as may properly come before it.

William A. Nisbet, secretary

WAIVER OF NOTICE

I, _____, a shareholder of the corporation, do hereby waive notice of the Annual Meeting of said corporation, to the extent that the ten-day minimum requirement preceding the meeting time shall not be necessary.

shareholder

Colorado State University

Department of Fishery and
Wildlife Biology
Fort Collins, Colorado 80523-1474
(970) 491-5020
FAX (970) 491-5091

July 28, 1997

Mr. Robert A. Woodbury
Planning and Development
P. O. Box 36
Winter Park, CO 80482

RE: Little Vasquez Creek: Factors Limiting the Production of Cutthroat Trout

Dear Mr. Woodbury:

My survey of the Little Vasquez Creek drainage on July 24 probably raised more questions than answers concerning the source and transport of fine-particle sediment in the stream channel (the primary limiting factor of trout abundance). One answer I can confidently provide, is that the proposed winter access trail will, in no way, affect the cutthroat trout or their habitat in Little Vasquez Creek. The proposed trail is a non-issue in regards to the cutthroat trout. The trees selected for cutting are well away from the stream. None play a role in shading. The understory vegetation, stumps and root system would remain. Only a snow-packed trail would be used so there would be no rutting or any initiation of sediment input into the stream. The proposed trail is in no way comparable to a typical forest logging road.

In fact, if Little Vasquez Creek held a moderately abundant population of cutthroat trout and I were asked to recommend habitat modifications to enhance abundance, I would recommend thinning of trees to allow more sunlight to reach the water to stimulate primary production (from plant photosynthesis) and raise the water temperature.

Now, most of the stream occupied by trout is under a forest canopy. From this, I surmise that most of the food web originates from organic input of terrestrial origin and bacterial decomposition is the primary energy source, ultimately giving rise to invertebrate trout food (allochthonous energy supply). Such a system is not as efficient as one driven by primary production of plants (algae in the stream) (autochthonous energy source).

Robert A. Woodbury
July 28, 1997
Page: 2
RE: Little Vasquez Creek

Water temperatures with summer daily maxima between 7-10° C (45-50° F) also limit food production and trout growth. Warming to maxima of 10-16° C (50-59° F) would benefit a cutthroat trout population (but would likely provide a greater benefit to brook trout where the two species occurred together).

Low temperatures also set limits on reproduction. Typically, from fertilization to hatching, trout embryos require in the range of 300-320° C temperature units. If the average daily water temperature is 7° C after spawning, about 45 days would be required to hatching. About another 40 days would be required before the hatched trout emerge from the redd and begin feeding. At high elevations, winter conditions may set in before the baby trout can accumulate sufficient energy reserves and few, if any, will survive until the following summer.

Although low temperatures and low primary production create conditions that would limit cutthroat trout abundance in Little Vasquez Creek, the primary limiting factor, in my estimation, is the ubiquitous heavy bed load of fine-particle sediment (sand). American Fisheries Society Monograph 7, *Sediment in Streams: Sources, Biological Effects, and Control*, provides a comprehensive review of how sediment negatively effects fish (Monograph 6, *Native Trout of Western North America* reviews taxonomy and biology of cutthroat and rainbow trout). The monograph on sediment assumes, that for "control," the sediment source is human-induced; "unnatural" sediment, whereas the sediment problem in Little Vasquez Creek appears to be completely natural, unaffected by human activities. The logging road, constructed 40-50 years ago, would be a likely suspect. I examined the terrain of the old road site and there is no evidence of slope slumping or any indication it was ever a source of sediment input into the creek. I suspect that natural erosion of the granitic cirque basin, the source of Little Vasquez Creek, is the source of the dominant sand substrate in the stream. The watershed I saw showed no signs of sediment input — well vegetated, no gullies, no point sources.

All stream sections examined lack suitable spawning substrate (predominantly of 5 to 50 mm gravels). Such particle sizes do occur, but they are imbedded in sand. Where, when, and in what microhabitat the trout are spawning is a mystery. Natural reproduction is obviously occurring or there would be no trout in the creek. All indications are that the dominant sand substrate imposes a severe restraint on the success of natural reproduction and this is the primary limiting factor on population abundance.

Robert A. Woodbury
July 28, 1997
Page: 3
RE: Little Vasquez Creek

The true abundance of cutthroat trout in Little Vasquez Creek is, undoubtedly, low, but population size is unknown. The USFS Hydrology and Fisheries reports on Little Vasquez Creek evidently are based on electrofishing a short, low gradient, meandering section above the road culvert. In 1983 and 1984, 16 trout per 100-foot section were sampled. Two trout were sampled in 1987 and 1996 and four were found in 1992. On the afternoon of July 24, 1997, we visually observed two trout in this section and more probably occurred in recesses under banks. Total population estimates have been made by extrapolating the number found in the 100-foot section above the culvert to 2.8 miles of stream (a multiplication factor of about 1500). For such an extrapolation to have even a semblance of validity, all factors must be uniform and repeatable; all stream sections must be homogeneous (which they obviously are not) and all sampling events must be uniform in gear efficiency and experience of personnel. No valid conclusions on total abundance or trends can be made on the sampling data I have seen.

There is no doubt in my mind, however, that the cutthroat trout population in the creek exists at low density. I would point out, however, that fears of "inbreeding depression" are unfounded. There is no genetic or hereditary constraints on this population expanding if environmental constraints (sand) could be overcome.

The "Summary Report 1983" (USFS Fish Biologist, Bob Stuber) lists "Potential impacts: sediment yield before Devt est. 42 tons/yr." and "Mitigations: minimize sediment yield." Is there any additional information on how sediment yield was determined, if sediment sources identified, or how to "minimize" sediment yield?

As far as enhancement measures are concerned, if my assumption is correct that the problem of fine-particle sediment is a completely natural phenomenon, then options are severely limited. Spawning gravel could be added to certain stream sections where the flow hydraulics might maintain it (for at least one year), or small side channels with introduced gravel (artificial spawning channels) could possibly be constructed. This would call for expertise and experience in fluvial hydrology (especially with small, high gradient trout streams). My observations on the drainage suggest that opportunities for physical modifications to benefit the trout are limited but not impossible.

Sincerely,

Robert Behnke, Professor of Fishery Biology



United States Department of the Interior
GRAND CANYON MONITORING AND RESEARCH CENTER

2255 N. Gemini Dr., Room 341

Flagstaff, AZ 86001

520.556-7094

OCT 11 1997

GCMR-700

ADM-10.00

Mr. Robert Behnke
Colorado State University
Dept. of Fishery & Wildlife Biology
Fort Collins CO 80523

Dear Robert:

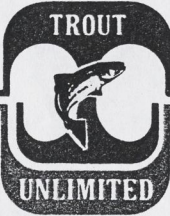
On behalf of myself, Dave Garret, Chief of the Grand Canyon Monitoring and Research Center (GCMRC), and the other program managers and GCMRC staff, I would personally like to extend our gratitude and thanks for the time and effort you put into the review process associated with GCMRC's FY98 Request for Proposals.

Your review comments were extremely valuable input to the review panel deliberations and will help ensure that the work of the GCMRC is of the highest quality and the most relevant to the stated management objectives.

Thanks once again for your efforts.

Sincerely,

Barry D. Gold
Associate Center Chief



David Nickum
Regional Conservation Director
Southern Rockies

September 19, 1997

Rich Phelps, District Ranger
Sulphur Ranger District
P.O. Box 10
Granby, CO 80446

Re: Vasquez Cirque Egress Route (1950/2720)

Dear Rich:

I was pleased to see that the Forest Service was conducting scoping on this project, albeit for a brief time. I hope that you will continue to move forward with the National Environmental Policy Act (NEPA) process for the project. The issues of concern for Trout Unlimited (TU) have already been shared with the Forest Service in previous letters (to George Edwards on 4/29/97 and Corey Wong on 7/24/97). In light of Dr. Behnke's review and my own visit to the proposed egress route, I am now comfortable that this project, *if conducted as described*, will not jeopardize the Colorado River cutthroat trout population in Little Vasquez Creek. TU remains concerned about the lack of consideration given to cutthroat trout in the environmental analysis for the master development plan. Any future trail, lift, or other resort development in the Little Vasquez basin (including the potential glading proposal) should be subject to careful environmental analysis in accordance with NEPA.

We strongly support the suggestion for enhancement of cutthroat trout habitat. From my visit to the area, stream habitat appeared to be in good condition in the meadows area near the top of the proposed egress route. In addition to (or instead of) habitat enhancement, it may be helpful to transport some cutthroat trout into this apparently unoccupied habitat. Of course, this should only take place following consultation with the Colorado Division of Wildlife.

Thank you for this opportunity to comment. We look forward to working with the Forest Service, Division of Wildlife, and Winter Park to protect and expand cutthroat trout habitat in Little Vasquez Creek.

Sincerely,

David Nickum

cc: Dr. Bob Behnke
Jake Bennett
Rocky Smith
Bob Woodbury

Trout Unlimited: America's Leading Coldwater Fisheries Conservation Organization

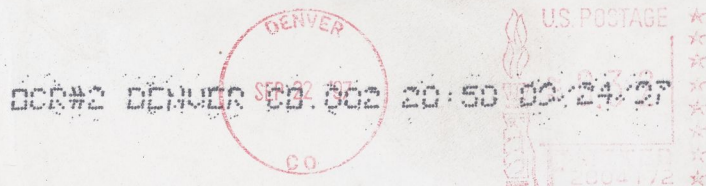
Colorado Office: 190 E. Ninth Avenue, Suite 120, Denver, CO 80203
PHONE: (303) 837-9383 FAX: (303) 837-9382 EMAIL: TURockies@aol.com

COLORADO TROUT UNLIMITED



Colorado Trout Unlimited
190 East Ninth Avenue
Suite 120
Denver, Colorado 80203

~~7200 E. Dry Creek Road
Suite G-201
Englewood, CO 80112~~



Dr. Bob Behrke
Dept. of Fish & Wildlife Biology
Colorado State University
Ft. Collins, CO 80523

Johan Hammar
Norr tullsgatan 25B
S-113 27 Stockholm, Sweden

December 14, 1997

Prof.
Robert Behnke
Colorado State University
Department of Fishery and Wildlife Biology
Fort Collins, Colorado 80523, U.S.A.

Dear Bob,

Congratulations to being immortalized by *O. clarki behnkei*, and thank you for your honest and informative letter. It confirmed what Ksenia told me. It was sad to hear that you had to go through all the processes related to finding tumors, being exposed to new questions in life, and the treatment of tumors. I sincerely hope that you feel well by now, and that the medical post treatment is "more kind" to your body than the tumors were. My wife, Eva, discovered a "tiny" tumor in one of her breast in October, two years ago. It turned out to be a malign one, measuring ca 15 mm in diameter. By November it was taken out, but the succeeding tissue analyses revealed 3 out of eight lymphatic glandes in here left armpit to be affected by daughter cells from the tumor. The experts claimed that the problem was now gone and that she shouldn't worry. Anyway, because of the "down stream migration" she had to through a 6 month procedure with cytostatica, with two treatments per month. That process was really tough, and it meant she had very little resistance to virus and bacteria causing various forms of cold and flues during the season. Then she had to go through a radiation program, and for 24 months she has now eaten pills causing the reception of oestrogen in any art part of her body to be blocked. The medicine treatment, has totally screwed up her hormone system, and she felt that a number of aging processes have accelerated. Today, she is very doubtful if she would have gone trough the medicine treatment if she had known what it would cost her, mentally. I understand that you must have gone through even worse treatment, and I sincerely hope that life is kind to you today.

Ksenia told me in an E-mail message the other day that Boris was seriously ill. Because of some major problem in connection with his kidneys, he has blood pressure problems affecting his heart and brain. He is at home at the moment, but they hope to get him into an hospital.

Your information on pyloric caeca numbers confirmed my thoughts and doubts. I will certainly try to get hold of a copy of the russian studies on the Black-Caspian-Sea clupeids' inversely correlation of pyloric caeca and gill raker number. Ksenia mentioned that Nicolsky had done some studies on the relationship between diet and number of pyloric caecas. That is what I hope to find in char as well. So far, the pattern on the number of pyloric caecas and length of fish in Lake Korsvattnet do not contradict the idea of a selection for higher numbers of caecas among cannibalistic individuals. Without any correction for length of fish, the number of rakers and caecas are positively and very weakly correlated, unfortunately.

Enclosed are some graphs showing the results so far from both gill raker and caeca numbers.

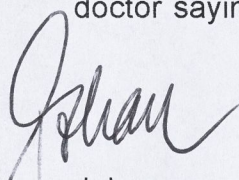
When you look at frequency distribution graphs showing characters that are exposed to short term selection, e.g. size of prey, they seem to be skewed. Among the prey species of Arctic char in Lake Vättern, the length frequency distribution of eaten smelt is skewed towards smaller fish, fourhorn sculpin seem to have a normal distribution, and cisco is skewed towards larger fish. If pyloric caeca numbers are exposed to some kind of selection from a predator (low numbers make the owner inefficient as a cannibal, meaning poorer growth and thus a larger risk of being eaten by a larger brother or sister), would this be reflected in a skewed frequency distribution. If a coregonid species demonstrate a major change in diet from zooplankton when small to piscivory when large, you would expect high gill raker numbers to be important in early age, and less important, maybe negative, at old age. Have anyone shown such a negative correlation among gill rakers and fish length (or age) among coregonids? Please, send me any reference on the issue when getting your boxes sorted.

Referring to your questions on the tables showing the commercial catches of freshwater fish, I have translated the tables which make things easier to understand. As you can see the catches and the value of cisco (vendace) included the eggs, which are sold as a delicacy in Sweden with a different price (260 kr/kg) than the mother itself (7 kr/kg). You ask why Lake Vänern is so dominant. Well it is our largest lake with 5 650 km². It is shallow (mean 27 m, largest depth 106 m) and eutrophic. Lake Vättern is only 1 912 km², it is deep (mean 39 m, largest depth 128 m) and oligotrophic. As you know, Lake Vänern has landlocked salmon, landlocked trout, no char, a complicated swarm of whitefish taxa, abundant and large-sized cisco and smelt, and lots of cyprinids. Lake Vättern is stocked annually with salmon (which cannot reproduce because of lack of appropriate tributaries), the large-sized brown trout disappeared after the construction of a dam in the outlet of lake Vättern. The char population is large, however, and so are two different taxa of large-sized whitefish. Cisco and smelt are small-sized, perfect as prey, but cisco is not harvested for eggs. The fishermen's choice of gillnets reflect an interesting dilemma. They use the same kind of mesh-sizes for both char and whitefish, but have to trade when it comes to twine diameter. They are financially depending on their catches of whitefish (use of thinner nylon thread), but make larger money on their catches of char (use of thicker nylon thread). The salmon are mostly caught in floating traps during specific periods. According to a colleague who is responsible for the assessment of the commercial fishery in the large southern lakes of Sweden, (1) the quality of salmon in Lake Vättern is superior, by size and color of flesh, (2) the fishermen in Lake Vättern sell salmon to private people and visitors (higher price), not to agents (as in Lake Vänern), and (3) the volumes and values of salmon in Lake Vättern are assessed from back-calculations from cleaned fish, which give them a higher prize per kg. In Lake Vänern the salmon are landed and weighed uncleaned.

I have enclosed a recent response to the Star Lake tragedy, my own letter to Fred Kircheis regarding the problem with Floods Pond, and some fish stamps from recent correspondence. Do you collect fish stamps. Did you get a copy of my char stamp. I remember you commented in Sapporo on my use of *S. salvelinus* as the scientific name on the southern char of Sweden. You mentioned that I was in some way correct according to rules of nomenclature.

Tomorrow, my wife and I leave for the 2 weeks in the Namib Desert and 1 week in the Okavango Delta in Botswana.

I wish you a merry christmas and all the best during 1998, and I support your doctor saying "keep on doing whatever you have been doing in life".



Johan

Catches in inland waters by professional fishermen in 1996, metric tons

Species	Vänern	Vättern	Mälaren	Hjälmaren	Remain. lakes	Total 1996	Total 1995
<i>S.salar</i> & <i>S. trutta</i>	32	16	0	0	1	49	68
<i>S.alpinus</i> sp. compl.	0	17	0	0	8	25	47
<i>C.lavaretus</i> sp. compl.	105	37	0	0	38	180	202
<i>C. albula</i>	541	0	21	0	3	568	463
<i>C.albula roe</i>	35	0	1	0	0	36	29
<i>E.lucius</i>	62	1	35	36	22	156	154
<i>S. lucioperca</i>	65	0	120	67	27	279	299
<i>P.fluviatilis</i>	61	9	40	51	13	173	216
<i>A.anguilla</i>	17	0	35	23	22	97	127
<i>Astacus</i> & <i>Pacifastacus</i>	0	1	0	4	0	6	5
Misc. sp.	88	5	6	17	99	216	317
Total 1996	1 004	90	260	199	233	1 786	
Total 1995	1 001	119	237	196	383		1 927

The yield of fisheries in inland waters by professional fishermen in 1996, thousand Sw. kr.

Species	Vänern	Vättern	Mälaren	Hjälmaren	Remain. lakes	Total 1996	Total 1995
<i>S.salar</i> & <i>S. trutta</i>	769	660	5	0	46	1 480	2 080
<i>S.alpinus</i> sp. compl.	0	815	0	0	415	1 230	2 282
<i>C.lavaretus</i> sp. compl.	2 433	727	1	1	685	3 848	3 647
<i>C. albula</i>	3 871	22	208	0	58	4 159	1 295
<i>C.albula roe</i>	9 002	0	273	0	0	9 275	7 993
<i>E.lucius</i>	725	13	446	439	301	1 925	2 156
<i>S. lucioperca</i>	2 072	0	3 716	1 906	851	8 545	9 503
<i>P.fluviatilis</i>	612	85	480	554	149	1 880	2 387
<i>A.anguilla</i>	1 029	1	2 359	1 509	1 677	6 575	8 394
<i>Astacus</i> & <i>Pacifastacus</i>	0	167	85	656	6	914	642
Misc. sp.	255	22	39	29	231	576	1 251
Total 1996	20 769	2 512	7 612	5 093	4 420	40 406	
Total 1995	17 955	3 448	6 829	5 146	8 251		41 630

Eva Sköld, 08:19 AM 12/17/19, From Johan Hammar, Stockholm

From: Eva Sköld <eva.skold@itm.su.se>
To: "Kurt D. Fausch" <kurtf@cnr.colostate.edu>
Subject: From Johan Hammar, Stockholm
Date: Wed, 17 Dec 1997 08:19:04 +0100
X-MSMail-Priority: Normal
Content-Length: 2488

Dr. Kurt D. Fausch
Dept. of Fishery and Wildlife Biology
Colorado State Univ.
Ft. Collins, CO 80523
USA
kurtf@picea.cnr.colostate.edu

M

Dear Kurt,

Thanks for your E-mail message. I hope everything is well with you. If I haven't told you before, I got enough of our new directors, and have taken a year off to finish my thesis work at Uppsala. I am supposed to be back at the beginning of May next year, but feel very hesitant. I still communicate with Gunnar Svrðson frequently, though, and thus know that he received a copy of "Mysids in fisheries" from you. I do hope he sent you some kind of acknowledgement. He has just finished his last revision of his view of coregonid speciation, and the significance of introgression in these process. I also recall that you sent a copy of the mysid book to our library, because they too have a copy now. Am I correct?

I also know that there was some kind of difficulties with sending you the money for your seminar, because of tax problems and the need of some kind of I.D. (birth number) from you. Have anyone contacted you on this? If not, please send a copy of your passport with the requested information to Eva Sers, Institute of Freshwater Research, S- 178 93 Drottningholm, Sweden. It is embarrassing that they cannot fulfil there obligations towards visiting scientists from abroad. The destructive atmosphere at the institute have slowly established a more modern kind of attitude "Why should I care, when no one else does!"

I know, that you once mentioned that you would never allow yourself to end up as a bitter scientist because of this kind of problems, words that I frequently try to live up to. To leave the institute was the best way of avoiding this kind of development.

Lets leave the subject. My work is progressing and I enjoy what I am doing! I do hope your work with the review on introductions have been successful. In what state is it?

With these few lines, I just want to say that we really enjoyed your stay with us in January (there is always a bed for you at Norrtullsgatan 25B) and we wish you and your family a long and peace-full Christmas Holiday, and all the best during 1998. Eva and I are leaving Stockholm tomorrow morning to spend the next month in the Okavango Delta in Botswana and the Namid Desert in Namibia. Her dreams are going to be fulfilled at her 50th birthday.

Ps. Tell Bob Behnke that I received his informative letter, and that my response is on its way back over the Atlantic.

Johan Hammar.

↓
Bob

- Johnson
- Tremmel
- Art. salmon
- Schuffman - DeCicco - Frelcv

- Trout II
- 7W 501
- subjects



FISKERIVERKET

Sötvattenslaboratoriet
Institute of Freshwater Research

Swedish National Board of Fisheries
Institute of Freshwater Research
S-178 93 Drottningholm
Johan Hammar

Datum

Beteckning

November 18, 1997

Ms Kathy Penney
Jacques Whitford Environment Limited
607 Torbay Road
St. John's, Newfoundland
A1A 4Y6 CANADA
Fax: 0091 709 576 2126

Thank you for sending me copies of the information on the Star Lake Fish Habitat Compensation Plan, and allowing me to comment on its contents.

Comments on the Star Lake Hydroelectric Project Fish Habitat Compensation Plan

Generation of energy still has an environmental price, whatever resources are utilized, and whatever consultant groups are contracted for impact studies. Numerous lakes and rivers have been impounded and their immense water volumes are regulated for hydro-power production. The research on the impact on various environmental components as well as on social properties, started already by the 1940s. The international scientific literature illustrating the consequences of water level regulation - the oligotrophication process, the loss of littoral invertebrates, and the indirect loss of benthic and large salmonid fish - is monumental, and the listed principles need to be acknowledged and treated as highly likely consequences in any trustworthy impact study and compensation plan dealing with such systems. The grade and quality of the environmental price is correlated with the relative amplitude, the seasonal regulation regime and the structure of the biological community. Star Lake would be considered in the category of lake ecosystems where maximal damage would be expected, because of its shallow bathymetry, its susceptible littoral invertebrates and the complicated interactions within the fish community.

In principal, water level regulation affects diversity as well as production. Some species cannot cope with the changes, other may be gained. In general, littoral invertebrates being crucial to benthic fish production are lost, as well as the fish eggs being spawned at shallow bottoms, and outlet habitats. Shallow lakes are more affected than deep lakes, and at northern latitudes the diversity, and quality of salmonid fish production is severely impaired. The actual basis for the salmonids highly advanced adaptation to be able to exploit cold and low-productive river-systems, in order to reach individual size and age being optimal to survival, is removed. Thus to state that the impoundment and regulation of the water-level of Star Lake may cause a long-term net gain in salmonid fish production is biological as well as political hypocrisy.

It is a political decision to decide whether the gain in power and the economic values of the locally short term income from the construction, is worth the loss of long term ecological and social values of a well functioning biological system of major significance to species diversity, food production, human recreation, and scientific research. Actually a very uncomplicated and honest comparison between values of power and values of life, with no need for lies. As I have stated in a previous review for the Newfoundland Labrador Environmental Network (NLEN), I consider the Environmental Impact Study (EIS) carried out by Jacques Whitford Environment Limited (JWE) for the fishery part of the Star Lake Hydroelectric Project as scientifically unacceptable because of its poor accomplishments, and unqualified and highly hypocritical conclusions. The statement that "*a thorough assessment of the fisheries resources has been completed*" is to me out of touch with reality. I strongly think JWE has failed to perform an objective and satisfying impact study on the fisheries part, and I recommend that the EIS should be repeated with radical changes.

With our present knowledge of the impact of water level regulation of northern shallow lakes inhabited by salmonids such as brook trout and Arctic char there is no uncertainty what so ever to what will happen to the fish community of Star Lake, if the lake is turned into a hydroelectric reservoir. There is so far no known way of fulfilling DFO's principle of a "No Net Loss" in regulated northern lakes. In addition to impoverished populations of small-sized trout and char because of depleted food conditions, the draw down of the water level in Star Lake in early spring will also have major negative consequences for recruitment of both trout and char. Apparently, the presented Compensation Plan only include measures to deal with parts of the reproduction problem for "*brook trout and then on Arctic charr*" by developing a local hatchery at the Star Lake Site, and to "*design a breeding program to maintain genetic variability in the wild population, as well as monitor all stages of the program*". Based on my opinion of the low quality of the EIS performed by JWE and the lack of scientific knowledge within the topic, I consider this responsibility to overestimate JWE's competence. The proposition of an evaluation period of ten years needs to be extended, because of the positive "damming effect" occurring within the next 10-15 years, and will thus not show characteristic features.

With the poor accomplishments in JWE's EIS, and the subsequent deficiency of basic knowledge of the ecology and systematics of the lacustrine fish community in Star Lake, a genetic program and the conservation measures you have proposed needs highly qualified information on a series of important genetic attributes. Some may still be available, others may already be lost due to the impact of the construction work that already seem to have started in the Star Lake basin.

- How are you going to identify the various gene pools of brook trout, especially the piscivorous deme, and their spawning sites?
- At what genetic level will these analyses be carried out?
- How are you going to avoid mortalities, if this was a major argument for not obtaining sufficient information in your previous EIS?

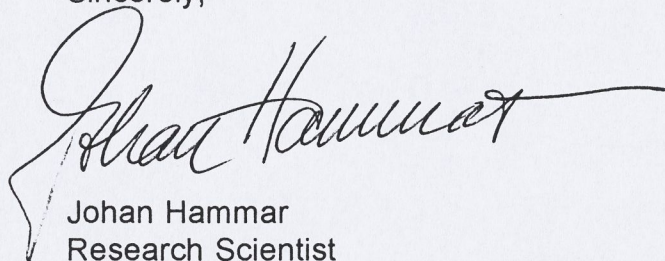
- How are you going to fulfill modern requirements of an effective population size, N_e , among parental populations, when large-sized individuals are no longer available?
- How are you going to avoid introgression between migratory, piscivorous trout and the resident small-sized brook trout found in the tributaries?
- Do you consider a long term stocking program to sustain the fish community in Star Lake with hatchery fish as sustainable and in agreement with Canada's environmental policy?

The EIS performed by JWE did not include studies of the diversity and the abundance of invertebrate organisms, zooplankton and benthos, and the expected outcome for the crucial fish-food organisms such as amphipods, ephemeropterans, trichopteran, and mollusks. In fact, besides pathogenic micro-organisms, and 4 parasite classes (Cestoda, Nematoda, Acanthocephala, Copepoda), JWE only identified 4 taxa of animals in Star Lake and Lake of the Hills, viz. brook trout (*S. fontinalis*), Arctic char (*S. alpinus*), *Leptora kindtii*, and unidentified chironomid larvae.

- In what way will the change in the littoral invertebrate community be documented?
- How will the loss of crucial invertebrates in the littoral zone be compensated? At least two species of amphipods and a series of crucial insect and mollusk taxa may be lost. What will the released hatchery fish be feeding on in the reservoir?
- How will the oligotrophication process, and the loss of nutrients be compensated?

My conclusive conviction is that public means seem to have been wasted, that the Canadian scientific community with insight into the impact of water regulation should be embarrassed by the governments' ignorance, not to mention the humiliation of the suppressed scientists working within DFO's salmonids section in St. John's. The fact that "DFO in principle has accepted the proposed Compensation Plan" and thus the paradoxical EIS, suggests that the political decision to exploit Star Lake as a reservoir and allow its unique fish community to be destroyed, was taken at an early state. Such a conclusion emphasizes JWE's EIS as an unnecessary expensive desk product, and the entire Star Lake Case a theatrical play, a comedy to some, a tragedy to most others.

Sincerely,



Johan Hammar
Research Scientist

cc: R. Pike, Abitibi-Cons.
R. Finn, DFO

Hi Bob + Sally

Aug 22, 1998

Sorry with not writing in so long
I USED to write you + some
OF MY FRIENDS EVERY SO OFTEN
when I WAS IN FLA - but now with
the computer I keep in touch with
EVERYONE by E MAIL + I don't
write letters anymore. Any way -
we left off - with Sally going to
Europe - Hope your trip WAS FUN
IF you get to your sisters in
ST. PETE, with some time to spare
some time you'll have to drive down
+ see us. I'M sending you INFO
ON Lori's house - its really great
Right next to the old mill house
OF ANIBELLS + A WATERFALL - +
POND - they go + FISH AND CANOE
ON the pond - Memorial day Bob
WAS visiting from London + we All
went to Lori's for a picnic AND
we All went CANOEING + KAYAKING
IN the little pond - Mike HAS A
LARGE ITALIAN FAMILY - AND they seem
to be there OFTEN - it's DAD had 4 brothers
so he HAS lots OF COUSINS + his sister
+ her husband spend A lot OF TIME
there too - So Ed NOT ALWAYS

thrilled with so many of
mikes relatives - But we ~~are~~
gone for Memorial Day + 4th of

July - They are all pleasant +
friendly but "so many" - they
play Bocce in the front lawn
and in general have a good time.

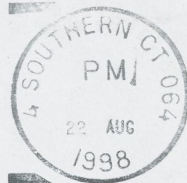
I'm sending you ^{of} copies all the
things that the BARBERS gave
Lori - its interesting that it
has so much history. Their house
is very nice with big closets
+ storage space which I envy -
it used to be the CHAUFFERS
quarters + GARAGE that is mentioned
in the 1934 article. LORI

also said she has a SOFA BED
if you want to come + visit
+ give them stories about the
AREA. she said you could play
in her pond. Mrs BARBER WAS
A Home Ec TEACHER AT STANFORD
High - she owned the main house
+ her son lived in Lori's - But was
in her family along time - she passed
away LAST year + her son ^{split up}

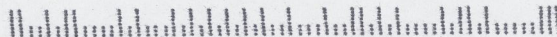
+ sold the main old house + Lori's -
we will be heading back to FLA in Oct.
I hope you are well - Love Sis



OLIVE ABBOTT
43 SLEEPY HOLLOW LN
STAMFORD CT 06907



Mrs. BOB BEHNKE
3429 E. PROSPECT RD.
FORT COLLINS, CO 80525



— chaotic 5:1

Andlyn rubble 20-20:1
hostage not now
gouish
swahil polun
vodka - 2

— fishing,

Bobby world series?

leni

ROBERT L. KENDIG, D.D.S., P.C.

September 20, 1998

Dear Bob,

I am reviewing my will. Is the World Salmonid Research Institute still intact? Is it still high on your list of conservation organizations worthy of support?

Hope you had a good summer and caught alot of fish. I had only a few fishing trips but all high quality on the Green, White, and Frying Pan.

Best regard,

ROB

825 Warren Landing
80525

Randy J. Cain
P.O. Box 1450
West Yellowstone, MT 59758
(406) 646-0059

February 4, 1998

Robert Benke
Dept. of Fisheries & Wildlife Biology
Colorado State University
Fort Collins, Co 80523

Dear Robert,

When we spoke last fall about the whirling disease research I was doing on the Madison river, you agreed to examine it then comment on it's contents. I will be sending a copy of this research paper to FERC along with all other comments by guides, fishermen and business owners. Your comments will be greatly appreciated to substantiate the biological nature of some of this research.

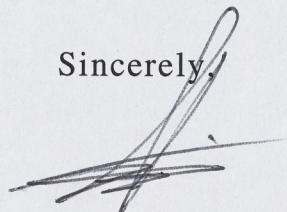
Currently I'm on a very short time line to get comments to FERC as they are due in Washington D.C. by February 20, 1998. Once you have written your comments you could fax them to me at (406) 586-2986

Enclosed is a letter of support from Charlie E. Smith, Director of the U.S. Fish & Wildlife Service, Bozeman Fish Technology Center from 1993 to 1996. Charlie is a fishery pathologist. My work includes an outline, two research papers and some of the critical source data. Also enclosed is a letter written by an outfitter that will be included in the comments to FERC. There are a number of other outfitters, guides and avid fishermen writing their own accounts of the Slide Inn experience in April, I will forward you a copy of them once they are assembled.

The Fishing Outfitters Association of Monana, a group 450 members strong is also drafting a letter in support of the projects mentioned in the outline and expanded on in the research papers. I believe the Trout Unlimited groups in Bozeman and Livingston are also drafting letters of support for the project.

Thanks for your time, call should you have any questions. 800-358-7688

Sincerely,



Randy J. Cain

**Winter Feeding and Energy Budget of Small Rainbow Trout in a Wyoming Tailwater:
Energy Deficit Contributes to Overwinter Mortality.**

Darin G. Simpkins (simpkins@uwyo.edu), Wayne A. Hubert (Wyoming Cooperative Fish and Wildlife Research Unit; Department of Zoology and Physiology; University of Wyoming; Laramie, WY 82071, 307/766-2091, whubert@uwyo.edu), and Thomas A. Wesche (Department of Rangeland Ecology and Management; University of Wyoming; Laramie WY 82071, 307/766-6109, fishsed@uwyo.edu).

The Wyoming Game and Fish Department has observed a reduction in rainbow trout Oncorhynchus mykiss abundance in the Big Horn River downstream from Boysen Reservoir, Wyoming, where reservoir releases prevent surface ice formation. Their data indicate poor overwinter survival of small rainbow trout. To obtain insight into the causes of overwinter mortality we investigated the feeding and energy budget of small fish (20-25 cm TL) during the winter of 1995-1996. Throughout the winter both recently stocked fish and naturally spawned (wild) fish continued to feed on aquatic invertebrates. The predominate prey observed in the drift and stomachs were immature and mature stages of *Baetis*, Tricorythidae, Chironomidae, Cladocera, and Copopoda. Prey availability and energy content in the drift significantly declined as winter progressed, resulting in less energy (calorific) intake by fish. Low water temperatures restricted the rate of food consumption (due perhaps to a direct effect on gastric evacuation rates or prey capture ability) which also limited energy intake. Because the derived energy from feeding was insufficient to offset the costs of feeding and maintenance metabolism, condition values (W_t) significantly decreased during the winter for both stocked and wild fish. These results suggest that metabolic deficits contributed to the loss of body reserves and the overwinter mortality of small fish. Relatively warm winter temperatures in tailwaters allow rainbow trout to remain active compared to unregulated streams and, consequently, leads to greater energy deficits than occur in colder streams.



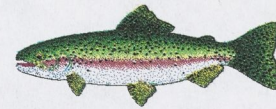
From the desk of Leon Chandler

14 Ferndale Lane

Homer, New York 13077

Phone 607-749-2324

Email: Chandler@clarityconnect.com



June 28, 1999

Dr. Robert Behnke
Dept. Of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80523-1474

Dear Bob:

It is always a pleasure for me to meet and to spend time with you at Allenberry - and last week was no exception. I am so impressed with what Inky Moore and his colleagues are doing with that program - it's the finest youth program I know - and I am always honored to be asked to participate.

As promised, I am enclosing a sample of an "ayu fly" that was given to me during one of my trips to Japan. I have several samples, all of which appear to be exactly the same size - all are snelled and with a gold bead at the head - but they vary in color and materials. I am fascinated with the ayu - and have a book (in Japanese, which I cannot read) - but which has excellent illustrations of the ayu life cycle. I understand they will take flies only during a brief period in their life cycle. Normally, anglers fish for them with "decoys" and the long "ayu poles".

The Japanese enjoy eating the ayu. The last time I was there, I was taken to a restaurant that served only ayu (it was operated by the commercial operation that owned the ayu fishing rights to the river - near Nagano) I wasn't that impressed with eating the ayu - but it was an interesting experience. I have been told that there are a million ayu fishermen in Japan, so it is important for recreation as well as a food source.

Kind regards.

Sincerely,

Leon

June 7, 1999

Ms. Kathleen Achor
The American Fly Fisher
P.O. Box 42
Manchester, VT 05254

Dear Ms. Achor:

The story on fly fishing in Japan in the spring 1999 issue makes the point that artificial flies and fly fishing has an ancient and independent origin in Japan.

The ancient form of fly fishing developed in Japan, independent of foreign influence, is known as dobutsuri. Dobutsuri flies are quite distinct from any western flies and were originally used in angling for ayu (Plecoglossus altivelis, a salmoniform fish that feeds mainly on algae).

At a symposium in Japan in 1988, I inquired with Professor Hiroya Kawanabe of Kyoto University (now retired) on the antiquity of fly fishing in Japan. He told me that an "encyclopedia" (Hontya Shokkun) written in 1697 contains a reference to "fly fishing" on the River Oi in Shizuoka Prefecture.

The mountain streams of the main island, Honshu, have landlocked masu salmon (Oncorhynchus masou), called yamame in the north, and amago (red-spotted salmon) in the south. Also a charr, Salvelinus leucomaenis, called iwana is common. Both of these species are insectivorous and are caught on flies.

In 1952-53 I fished for yamame and iwana using both western flies and dobutsuri flies. At the time, because of low cost labor, Japan was a major exporter of trout flies to the United States. I saw only imitations of western patterns and the indigenous dobutsuri flies, nothing in-between.

Ms. Achor
June 7, 1999
Page 2

A question remains if Japanese anglers built on the tradition of dobutsuri flies to originate new patterns for iwana and yamame before any influence from western angling occurred in the late nineteenth century?

Sincerely,

Robert Behnke
Professor

RB/sh

Ms. Achor
June 7, 1999
Page 2

A question remains if Japanese anglers built on the tradition of dobutsuri flies to originate new patterns for iwana and yamame before any influence from western angling occurred in the late nineteenth century?

Sincerely,

Robert Behnke
Professor

RB/sh

June 7, 1999

Ms. Kathleen Achor
The American Fly Fisher
P.O. Box 42
Manchester, VT 05254

Dear Ms. Achor:

The story on fly fishing in Japan in the spring 1999 issue makes the point that artificial flies and fly fishing has an ancient and independent origin in Japan.

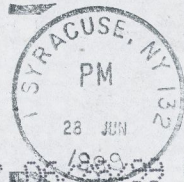
The ancient form of fly fishing developed in Japan, independent of foreign influence, is known as dobutsuri. Dobutsuri flies are quite distinct from any western flies and were originally used in angling for ayu (Plecoglossus altivelis, a salmoniform fish that feeds mainly on algae).

At a symposium in Japan in 1988, I inquired with Professor Hiroya Kawanabe of Kyoto University (now retired) on the antiquity of fly fishing in Japan. He told me that an "encyclopedia" (Hontya Shokkun) written in 1697 contains a reference to "fly fishing" on the River Oi in Shizuoka Prefecture.

The mountain streams of the main island, Honshu, have landlocked masu salmon (Oncorhynchus masou), called yamame in the north, and amago (red-spotted salmon) in the south. Also a charr, Salvelinus leucomaenis, called iwana is common. Both of these species are insectivorous and are caught on flies.

In 1952-53 I fished for yamame and iwana using both western flies and dobutsuri flies. At the time, because of low cost labor, Japan was a major exporter of trout flies to the United States. I saw only imitations of western patterns and the indigenous dobutsuri flies, nothing in-between.

Leon Chandler
14 Ferndale Lane
Homer, NY 13077

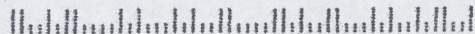


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Dr. Robert Behnke
Dept. Of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80523-1474

80523X1474



— and letter
+ comment
to Dep. of Justice
1929.

MONTE L. BEAN LIFE SCIENCE MUSEUM
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290 MLBM
PO BOX 20200
PROVO, UTAH 84602-0200
(801) 378-5052 / FAX (801) 378-3733



May 7, 1999

Robert J. Behnke, Professor
Department of Fishery and Wildlife Biology
Fort Collins, CO 80523

Dear Dr. Behnke:

I was delighted to hear from Dr. Dennis K. Shiozawa that you are willing to donate your very fine collection to the Monte L. Bean Life Science Museum at Brigham Young University. It will be a welcome addition to our already excellent collection of fish that is utilized by researchers from around the world.

I am sure that since your collection represents a major effort in your life that you are concerned about the future welfare of your specimens. I assure you that they will become an integral part of our ichthyological collection and that we will maintain and curate them in perpetuity. Since the museum has a statement of permanence directly related to the permanence of the University, and a permanent endowment to provide for animal curation, I am certain the specimens will be well cared for.

Dr. Shiozawa will contact you about the details of the transfer. On behalf of the Museum and its 200,000 annual patrons, we thank you for your benevolence. It is people like you who make it possible for so many to learn of the wonders of nature.

Sincerely,

A handwritten signature in cursive script that reads "H. Duane Smith".

H. Duane Smith, Director

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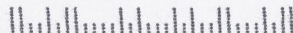
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ROBERT J. BEHNKE, PROFESSOR
DEPARTMENT OF FISHERY AND WILDLIFE BIOLOGY
FORT COLLINS, CO 80523





Colorado State University

Department of Fishery and
Wildlife Biology
Fort Collins, Colorado 80523
(970) 491-5020 FAX (970) 491 5091
<http://www.cnr.colostate.edu/FWB/>

February 5, 1999

Mr. James Hopelain
California Department of Fish and Game
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Mr. Hopelain:

Your letter of January 11 again questioned the figure in Lee (1995) that only 30% of inland angling in California is for trout (or salmonid fishes). You assumed that nonnative species (brown trout, brook trout, kokanee) were not included in the 30% estimate. I will again enclose p. 18 from Lee (1995) and call your attention to the text: "The contribution of nonnative salmonids is unknown because they are not distinguished from native species in the surveys."

You sent USFWS data for California inland angling for 1996. It can be noted that 71% of all anglers fished for trout (at least once during the year) and 56% of all angler days were for trout. I'll enclose similar statistics for 1985 when 69% of all anglers fished for trout and 52% of all angler days were for trout, according to a phone survey. There are various methods to obtain estimates of fisheries use — phone, mail, creel census. All methods have large inherent errors inversely related to sample size. Other estimates over the past 40 years give different results (30%-50% of angler days due to "trout"). Although the data are imprecise, they can be used to estimate the number of angler days generated by stocking catchable trout. There are obvious problems with the accuracy of the data, but in 1985, about 44 million angler days were estimated, and about 29 million in 1996. If there is a "standard" catch for an angler day, say 2.5 fish, then 40 million angler days catch 100 million fishes. If 50% of the angler days are for trout, then 50 million "trout" are required to average 2.5 per day. A 60% return of 10 million catchable trout yields a total catch of 6 million. That would provide 6% of the catch of all anglers or 12% of the catch of "trout" anglers. In enclosure with 1985 data I show another method that estimates 8.7% of all "trout" angler days and 4.5% of total angler days were generated by stocking 10 million catchable trout. No matter how calculations are made, it is apparent that California's catchable trout program

makes an insignificant contribution to inland angling. This is especially true in relation to costs of the program (that are yet to be accurately figured).

Also enclosed is a draft of my column for the spring issue of *Trout* magazine. You may note that in other states such as Nevada and Idaho, the catchable trout program is more out of control than in California.

It is true, of course, that most activities of a state conservation agency (to protect, enhance, restore) could not be turned over to private enterprise, but, having a complete monopoly encourages insularity and severely restricts any meaningful change coming from within an agency. Can you imagine a strategic plan for the future prepared by General Motors, Ford, or Chrysler that endorses an outdated product that costs 25%-30% of the budget but generates less than 10% of sales? In the 1920s, because of a dominant position, Henry Ford could claim that there was a "preference" for black model T's.

Sincerely,

Robert J. Behnke
Professor

Colorado State University

Department of Fishery and
Wildlife Biology
Fort Collins, Colorado 80523
(970) 491-5020 FAX (970) 491 5091
<http://www.cnr.colostate.edu/FWB/>

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Sincerely,

Robert J. Behnke
Professor



STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
P.O. BOX 944290, SACRAMENTO, CA 94244-2090
1416 9th STREET - 12th FLOOR • SACRAMENTO, CA 95814



DR. ROBERT BEHNKE
COLORADO STATE UNIVERSITY
DEPT. OF FISHERY AND WILDLIFE BIOLOGY
FORT COLLINS, CO 80523-1474

Garlic 1880

Original purpose fish culture - 1820

preservation - keep from extinct

mission
protect & enhance
future - long n

valuable sp. -
food for people

wise and efficient use

investing in future?

catches

role of hatcheries
in "resource mgmt."

Fed Aid - Fish Restoration "restored"

est. 1982 trust - most well-known - 97% put. grow
it's very popular among anglers

- all caught - some

fee for
preservation
- local base
1/2¢ -

inequality
CO2

1990 - no \$, man power
for 60 mil restoration

18 mil co
5 mil 12

- total investment
done for 1999-2000

- misplaced priorities

- WY

- Nicolz
Candia
sta...
20

Guidelines

* 4 p. 3

Develop = put and grow stocking
determine survival, growth
"pop. dynamics" (how what & how)
- strain differences !!
sp. 1

Company MA CT

- hatchery employees
- no loss jobs - but
diff. culture
- bid - st. each hatch.
new position culture/biol.



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DEPARTMENT OF FISH AND GAME

1416 NINTH STREET
P.O. BOX 944209
SACRAMENTO, CA 94244-2090



January 11, 1999

Dr. Robert Behnke
Colorado State University
Department of Fishery and Wildlife Biology
Fort Collins, Colorado 80523-1474

Dr. Behnke:

Thank you for your recent reply regarding the role of hatchery trout in California. It seems some of your conclusions are based on data that need clarification.

The most recent and best data we have indicates that 60 percent of anglers in California prefer to fish for trout ("prefer" means that is the target fish). You base part of your conclusion on information in Lee (1995). Lee's central theme was discussing the contribution of nonnative fish species to recreational angling in California. Figure 2 is somewhat confusing because it implies all salmonids are "native" species. Obviously this is not the case. The graph should depict merely native and nonnative. Note that in his discussion Lee states, "Fletcher and King (1988) indicated that the majority of anglers preferred to fish for trout and salmon . . .". I interpret this as supporting the 60 percent figure. Please contact the author (D.P. Lee, telephone: 916/654-1369) if you need further clarification regarding the statements in his paper. Other sources report 70 percent of freshwater anglers in California fish for salmonids and account for 56 percent of angler days (USFWS, 1996).

Regarding your analysis of hatchery costs, I believe you are citing material that has not been finalized or reviewed (CRI 1995). In addition, the DFG budget allocation proportions for Inland Fisheries Management you referenced have changed significantly since FY 92/93. The current (FY 98/99) Inland Fisheries Management budget allocation is \$69.3 million. Trout hatchery budgets comprise 10.0 percent (\$6.9 million) and anadromous hatchery budgets comprise 6.6 percent (\$4.6 million) of the total. While trout hatchery expenditures have remained constant during the past few years, allocations for recently established salmon and steelhead programs have risen substantially. The 1998-99 budget reflects \$21.5 million for new salmon and steelhead related programs. By comparison, the FY 96/97 Inland Fisheries Management budget totaled \$45.1 million.

I believe the statement you referenced from an unpublished CalTrout source that "8% of angler days in California were generated by stocking catchable trout" does not correctly portray angling activity in California. Although I do not have any direct data to refute this claim, Fletcher and King (1988) present two data bits that imply far greater than 8% of angler effort is directed towards catchable trout. Based on survey results that 1) 60% of anglers

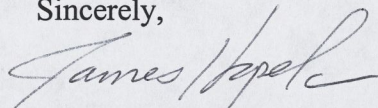
Dr. Robert Behnke
January 11, 1999
Page Two

target trout, 2) more than 96% of those surveyed recommended DFG plant more or the same amount of catchable trout (see attached), and 3) historical DFG surveys (Lal, 1979) indicating similar ratios, I concluded that considerably more than 8% of angler activity is utilizing or generated by the catchable hatchery product. In addition, after recently conducting 19 public meetings throughout California where trout management and stocking issues were discussed, I believe more than 1 out of 10 anglers-days are generated by stocking catchable trout.

I agree with you on many points and my comments above are not an argument in favor of increasing California's catchable trout production but rather an attempt to clarify the information the Department uses to manage California's resources. There is no doubt that habitat protection and restoration should be and are our long term goals for trout resource management. Some individuals have suggested shifting budget priorities from hatchery production to habitat issues. Based on past political realities and public opinions, it is far more likely that we could successfully identify additional monies for habitat and natural trout production programs than significantly reduce hatchery production (i.e., close facilities). Recent budget increases for anadromous salmonid habitat and watershed programs are examples of this approach.

Your comments will be considered as we develop the next draft of the strategic plan for trout management in California.

Sincerely,



James Hopelain
Senior Fishery Biologist

References:

- CRI. 1995. An environmental study on the culture and stocking of trout in California. Draft (not for quotation or distribution).
- Fletcher, J. E. and M. King. 1988. Attitudes and preferences of inland anglers in the State of California. A Final Report to the California Department of Fish and Game, Sacramento.
- Lal, K. 1979. California inland angling survey for 1971, through 1974. California Fish and Game 65:4-22.
- Lee, D.P. 1995. Contribution of nonnative fish to California's inland recreational fishery. American Fisheries Society Symposium 15:16-20.
- USFWS (U.S. Fish and Wildlife Service). 1998. 1996 national survey of fishing, hunting, and wildlife-associated recreation - California. USFWS, Washington, DC.

Enclosures

cc: Mr. D. P. Lee, CDFG, Sacramento

ATTITUDES AND PREFERENCES OF INLAND ANGLERS

IN THE STATE OF CALIFORNIA

Final Report

Conducted February 21 - March 21, 1988

by

The Survey Research Center
University Foundation
California State University, Chico

for

Department of Fish and Game
State of California
Sacramento, California

Principal Investigators:

James E. Fletcher, Ph.D.
Associate Professor of Recreation and Parks Management

Michael King, Ph.D.
Professor of Psychology

Consultants:

Jon Ebeling, Ph.D., Professor of Political Science

James Gregg, Ph.D., Professor of Political Science

Jon Hooper, Ph.D., Professor of Recreation and Parks Management

William Allen, Computer Consultant

Barbara Alderson, Production Manager

Susan Cradle, Data Collection Supervisor

TABLE 103

PREFERRED MANAGEMENT ACTIVITIES FOR THE CALIFORNIA
DEPARTMENT OF FISH AND GAME

Management Activity	Should Fish & Game Do:		
	More	About the Same	Less
Improve fish habitat	922 (75.0%)	291 (23.7%)	17 (1.3%)
Raise and plant catchable trout	786 (64.2%)	393 (32.1%)	45 (3.7%)
More catch and release	582 (48.3%)	521 (43.3%)	101 (8.4%)
Provide information on where to fish	593 (48.1%)	550 (44.7%)	89 (7.2%)
Restrict certain waters	577 (47.5%)	398 (32.8%)	240 (19.7%)
Improve & increase public access	572 (46.1%)	401 (32.3%)	268 (21.6%)
Raise size limits & reduce bag limits	352 (28.8%)	764 (62.6%)	105 (8.6%)

1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

California



FHW/96-CA
Issued March 1998



U.S. Department of the Interior
Bruce Babbitt, Secretary

FISH AND WILDLIFE SERVICE
Jamie Rappaport Clark, Director



U.S. Department of Commerce
William M. Daley, Secretary
Robert L. Mallett, Deputy Secretary

Economics and Statistics Administration
Lee Price, Acting Under Secretary
for Economic Affairs

BUREAU OF THE CENSUS
James F. Holmes, Acting Director

Table 6. Freshwater Anglers and Days of Fishing, by Type of Fish: 1996
 (Population 16 years old and older. Numbers in thousands)

Anglers and days of fishing	Activity in-state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
ANGLERS						
Total, all types of fish	2,175	100	2,053	94	122	6
Crappie.....	*70	*100	...	...	...	...
Panfish.....	*184	*100	*177	*96	...	...
White bass, striped bass, striped bass hybrids ..	246	100	238	97	...	...
Black bass.....	653	100	623	96	*29	*4
Catfish, bullheads.....	441	100	424	96	...	...
Steelhead.....	*73	*100	...	...	...	...
Trout.....	1,526	100	1,466	96	60	4
Salmon.....	226	100	*215	*95	...	...
Anything ¹	*220	*100	*195	*89	...	...
Other freshwater fish.....	*99	*100	*87	*88	...	...
DAYS OF FISHING						
Total, all types of fish	28,987	100	28,232	97	755	3
Crappie.....	*999	*100	...	...	...	...
Panfish.....	*1,457	*100	*1,450	*99	...	...
White bass, striped bass, striped bass hybrids ..	3,269	100	3,221	99	...	...
Black bass.....	7,162	100	6,924	97	*238	*3
Catfish, bullheads.....	3,972	100	3,895	98	...	...
Steelhead.....	*1,116	*100	...	...	...	...
Trout.....	16,292	100	15,938	98	354	2
Salmon.....	1,968	100	*1,940	*99	...	...
Anything ¹	*733	*100	*704	*96	...	...
Other freshwater fish.....	*639	*100	*606	*95	...	...

* Estimate based on a small sample size. ... Sample size too small to report data reliably.

¹ Respondent identified "Anything" from a list of categories of fish.

Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.

Handwritten calculations and percentages:

- 29 | 163
 | 145
 | 180
- 56%
- 71%
- 53 | 2175 | 152600
 | 15225
- 69%
- 306 | 2110
 | 2142
 | 1836
 | 2740
- 1985
- 52%

July 29, 2000

Dr. Robert Behnke
Colorado State University
Fishery & Wildlife Department - 1474
Fort Collins, Colorado 80523

Dear Dr. Behnke,

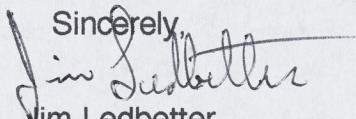
First, I'd like to thank you for taking the time to look at the pictures.

The fish came from a small headwaters creek in the Wenatchee Mountains north of Ellensburg, WA. This area was not scoured by glaciers, during the last ice age, like the Cascade Mountains were. There were virtually no lakes in the vicinity until Interstate 90 was constructed and left borrow pits close to the freeway. Which, I feel, is one of the reasons this area was left out of the state's earliest stocking programs. There are some stocking records that go back to 1912 but they are primarily on the west side of the cascades.

The Washington Department of Fish & Wildlife has utilized West Slope CT, Lahotnan CT, Coastal CT, and, from the 1920's thru the early 1940's, Yellowstone CT in their stocking programs. But, the pictured fish look nothing like any of the above CT to me.

I certainly hope you can identify them. And, in the event more investigations are required I do have a carcass in the freezer.

Sincerely,



Jim Ledbetter
8029 - 36 NE
Seattle, WA 98115



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Yakima cutts - big spots
(for downstream - Wenatchee
Mtns)

Dr. Robert Behnke
Colorado State University
Fishery & Wildlife Department - 1474
Fort Collins, Colorado 80523



Jerry Kustich
Box 432
Twin Bridges, MT 59754
(406) 684-5563

August 14, 2000

Dear Dr. Behnke,

I have long appreciated your efforts to inform those of us interested in the life history of all the salmonids. In fact, some of your work inspired parts of the book I recently wrote and published with my brother Rick Kustich entitled *Fly Fishing for Great Lakes Steelhead: An Advanced Look at an Emerging Fishery*. For 16 years I have built fly rods for the Winston Rod Company in Montana.

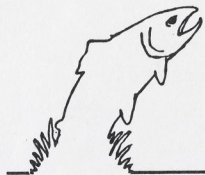
A few weeks ago I booked into a camp with a group of lure casters on Victoria Island in the territory of Nunavut to pursue Arctic char. I was the only fly fisherman there. I mention this because everyone there didn't seem to notice or care what he was catching just as long as it took a spoon about the size of a fender. On the other hand, I tried to observe the uniqueness of the untainted populations of native fish. And during the course of a week, I landed a handful of char and numerous lake trout of many sizes. In fact, some lakera seemed distinctly different from others. One type had oversized fins that were blood red. Others lakera were the standard gray color. Then I caught the beautifully patterned fish in the enclosed photo, it was so different from the rest that even the guide was puzzled. When I questioned the camp's owner about this mystery fish, he shrugged it off by saying "they" catch a lot of strange looking fish in the High Arctic.

This particular fish came out of the Hadley Bay drainage in the northeastern part of the Island. I was hoping you could give me some insight as to what it might be.

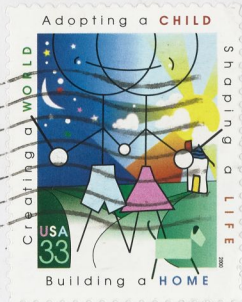
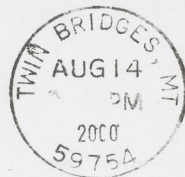
Thank you very much.

Best wishes,



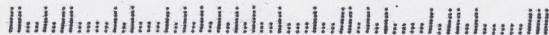


Jerry Kustich
Box 432
Twin Bridges, MT 59754
(406) 684-5563



Dr. Robert Behnke
3429 East Prospect St.
Fort Collins,
CO 80525 -9739

80525+9739



Date: Mon, 24 Jan 2000 21:34:07 -0800
From: Ad Bertens / Soledad Zorzano <zortens@entelchile.net> ← To
Organization: ProPatagonia Ltda: P.O. Box 421, Coyhaique, Chile. phone/fax (56) 67 233429
X-Mailer: Mozilla 3.0 (Win95; I; 16bit)
To: fwb@cnr.colostate.edu
Subject: email for Dr. Robert Behnke

Dear DR. Behnke, here we go again. Hope this time you get the all two pages.

It's quite a pleasure to hear from you again. First of all, receive our best wishes now and ever. I quit at my post in the gov't in 1996, moved to the local salmon farmers association and now my husband and me created a consultancy company on management, aquaculture and fishing subjects. It's not easy but shall be better.

Right now we are working on a government-sponsored project that aims at improving the conditions (habitat, food web) of silver, brook and brown trout in a 9 km stretch of the river Risopatrón, dewater the lake Risopatrón (9 km), amidst a very abundant vegetation of evergreens (but no conifers) in its first three kilometers that offer a variety of conditions. The next six kilometer are more homogeneous, more open to sunlight and have a more regular patron of pools and riffles. The idea is to make some very careful interventions to improve fish habitat but the biggest challenge however is the food web and to find some way to improve it in a mostly natural way.

Normal discharge (however, it is difficult to speak about normal discharge in the Pacific mountain area) is from 2 m³/second at the head of the river to 8 m³/second at 9 km. Of course in summertime discharge can reach critically low levels. River width is from 9 to 20 meters. Precipitation is close to 3.000 mm/year
It is an oligotrophic (or ultraoligotrophic?) system according the following data:
Conductivity: 35 microSiemens
Nitrate-N: 10.5 microgram/l (0.75 micromol/l)
Phosphate-P: 2.5 microgram/l (0.075 micromol/l)
If the ideal atomic N:P relation is 16:1 then N is the limiting factor.

In order to prevent misunderstandings: this project is not about restoration because there has been no intervention whatsoever but rather improvement of habitat and food web.

What sounded to us as the most appropriate and quick strategy is a combination of inorganic fertilization in spring and summer to take advantage of the higher photosynthetic capacity and organic fertilization (leaves, twigs and other organic material) all year round when the conditions are appropriate and the the river substrate has the capacity of retention. However, we are having troubles with the authority for inorganic fertilization; if it doesn't finally workout, we'll have to deal with another possibility, such as taking out some fishes for allowing to grow faster the remaining ones.

Meanwhile we have to take care that there are enough habitats for fish and its food-organisms. Woody debris, boulders and other material that is readily available should be used. All these interventions (trophic and habitat) have to be performed in such a way that the river maintains its natural look, no traces of intervention should be visible.

In synthesis, the idea is to help nature to augment the standing stock of brown, brook and silver trout up to the point that those variables that cannot be intervened (temperature, water flow, etc.) are the limiting factors.

Some key-questions are:

If we are allowed to, can we use urea as a source of nitrogen? Per unit of N it is by far the cheapest. What are the most indicated variables for monitoring the effects? (chlorophyll "a"?)

If we aren't allowed, we still can try three other ways, so far: organic fertilization, which will probably take longer; reinforce fish ability to survive better in winter time by giving them pellets in autumn, or try to introduce in the river food founded mainly in the lake: snails, mytilus and small crustaceans from the Aegla family. We founded in the river too, but too few. We are thinking in moving a bunch from lake to river to see if they colonize. The third way could be removing fishes to accelerate growth in the remaining ones, supposing that won't be major changes in the food availability in the short term.

Electrical fishing for stating structure of fish population hasn't been succesfull because of low conductivity, so we'll be introducing salt as well as diving for visual estimation and calibration with fishing. The problem with the river is that doesn't have ponds or small affluents to work with; all of them are steppy and fast, fishes don't go there. They remain in the lake or the river itself. There's another way to make standing stock and stock assessment?

My feeling is that would be useful to interact in these specific issues and meet if you come by. We tell you what we find out and you support tuning the results. Let me know your point of view as well as your fees of if Claudio may support us in case you can't.

Thanking you very much for your attention. Cheers,

Soledad Zorzano

e-mail to ---

fm. R. Behnke ---

I have reservations on the practicality of fertilizing rivers ^{except for very} ~~of~~ ~~small~~ streams with tiny flow volumes. It's a matter of dilution. You might calculate the amount of urea necessary ~~to~~ to increase ~~the~~ nitrogen concentration by one microgram/l with any given volume of water. Attached is a copy of a letter discussing the uncertainties of fertilization.

Are there opportunities to increase the aquatic-terrestrial interfaces? For example, making small channels to connect the river to ~~swamps~~ wetlands in the flood plain. This would greatly increase food supply, especially of terrestrial insects. I believe I ~~left~~ left a copy of my monograph on western trout with you (Carlos Munoz should also have a copy). Chapter 3 on trout biology and management, especially sections on habitat, food, and feeding should be informative.

Claudio Meier is returning to Chile next month and plans to visit Carlos Munoz in March. Claudio and I are part of a team to advise ↓

Carlos on improving fishing in the
Rio Paloma. Ask Carlos when
Claudio will be in Coyhaique and
arrange for him to visit the Rio
Risopatron. I expect to make
a trip to Chile this year, but ~~to~~
first have Claudio look over
your waters.

Sincerely

Robert Behnke

Dr. Behnke:


Thank you for
the loan of Minckley.

I now have my own
copy. Those cyprinids
we looked at the other
day are still unidentified

- They are not lake chubs
and although similar in
appearance to the creek chub
have too many D+A rays (9),
a different mouth, lack the D spot
and etc. Any more ideas?
Daniel

OUTDOOR WRITER / PHOTOGRAPHER

BERNIE TAYLOR



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BERNIE TAYLOR
Outdoor Writer / Photographer

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Newberg, Oregon 97132

Wednesday, January 03, 2001

Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523

Dear Dr. Behnke:

It was a pleasure speaking with you yesterday about my book-in-progress. I would be grateful if you were able to review the attached drafts of the Introduction and Chapters I & II. Based on your book *Native Trout of Western North America*, you are probably one of the more knowledgeable people in this field and I believe that such a review would be of great value.

Thank you for you continued cooperation and support.

Sincerely,



Bernie Taylor

ENC



BERNIE TAYLOR
Outdoor Writer / Photographer

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orangler@aol.com
13940 NE Kuehne Rd.
Newberg, Oregon 97132

Friday, January 12, 2001

Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523

Dear Dr. Behnke:

Thanks for you reviewing the drafts and for providing the supporting papers. I am also pleased that you provided the latest on the steelhead/rainbow genetics. I have a bit of reviewing before I come back with follow-up questions. But maybe you could help me with one that I have been trying to figure out.

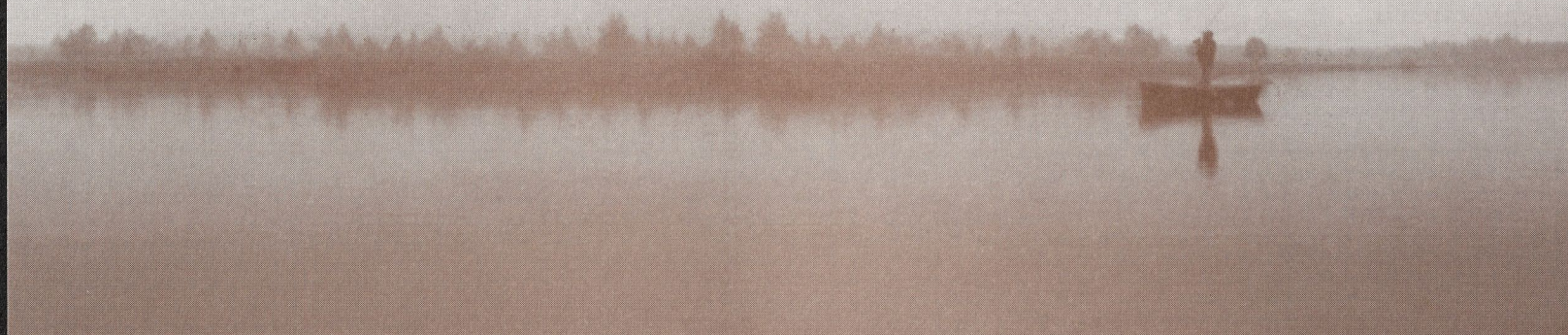
There is a rainbow trout group that inhabits Lake Iliamna in Alaska and migrates up the feeder rivers to feed and spawn (i.e. Kvichak River). These fish go up to 20 lbs. Is this a redband, coastal rainbow or something else? Then there are rainbow trout that inhabit the rivers of Alaska (i.e. Alagnak River) that rarely go above 10 lbs. Are these redband, coastal rainbows or something else?

Thank you for your continued cooperation and support.

Sincerely,



Bernie Taylor



Bernie Taylor
Outdoor Writer / Photographer
13940 NE Kuehne Rd.
Newberg, Oregon 97132



Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523



1/3

Saturday, January 13, 2001

Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523

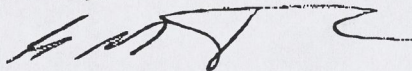
Dear Dr. Behnke:

Thanks for you reviewing the drafts and for providing the supporting papers. I am also pleased that you provided the latest on the rainbow trout genetics. I just reviewed your comments and added them to my draft manuscript. I have attached the papers that support my data on the growth rates of rainbow trout in Lake Pend Orielle. I reran the number and came up with the same. Note that these trout feed almost entirely on kokanee before they reach 4.5 years of age. In Quensel Lake (BC), fishery biologists found that the trout preferred to feed on kokanee at about 1/3 third their size. That would be about 5 inches for a 4.5 year old trout. Perhaps the largemouth bass are not feeding on food sources of this length, preferring to feed on sticklebacks (about 4 inches) and other smaller spined prey fish. I am not a fishery biologist and only guessing.

There is a rainbow trout group that inhabits Lake Iliamna in Alaska and migrates up the feeder rivers to feed and spawn (i.e. Kvichak River). These fish go up to 20 lbs. I am assuming that this is a coastal rainbow (*O. m. irideus*) and that those rainbow trout that are resident of the Alaskan rivers (i.e. Alagnak River) that rarely go above 10 lbs are the same.

Thank you for your continued cooperation and support.

Sincerely,



Bernie Taylor

213

(Source: Population Estimates, Food Habits and Estimates of Consumption of Selected Predatory Fishes in Lake Pend Orielle, Idaho by Dmitri Vidergar, Graduate Student at the University of Idaho.

Age	Avg. Length (inches)	Avg. Weight (lbs)	Estimated Abundance	Percent by Age
4.5*	15.98	4.41 lbs	4452	30.47
5	19.48	6.24 lbs	3335	22.83
6	23.34	6.69 lbs	2498	17.10
7	26.61	8.17 lbs	1871	12.80
8	28.93	14.51 lbs	1401	9.59
9	32.12	19.40 lbs	1050	7.18
Total			14607	100

* adjusted based on predatory size.

Often the super trout, such as the Gerrards, originate from unproductive waters where the secondary consumers, such as crayfish, predatory insects, small forage fish (see Pyramid B), are at a minimum and the trout have learned to delay their sexual maturation until they can feed on the primary consumers, such as kokanee, tui chubs, alewives, _____, _____ and _____. Rainbows are not the only super trout. There are races of brook trout that also mature later in life and reach larger sizes as a result. Most are within the "Assinica" strain. The most famous are the Coaster brook trout of the

Table 1.2. Estimated population abundance (\hat{N}) and mean length and weight for cohorts of kamloops, bull trout, and lake trout (≥ 406 mm), and northern pikeminnow (≥ 315 mm), including length and weight for each age cohort, Lake Pend Oreille, Idaho, 1997 - 1998. Population abundance was not estimated for northern pikeminnow.

Kamloops						Lake trout			
Age	Length (mm)	Mean weight (g)	\hat{N}	%		Age	Length (mm)	Mean weight (g)	\hat{N}
4.5*	406	2000	4452	30.47		6.75*	406	934	849
5	495	2832	3335	22.83		7	427	1180	456
6	593	3036	2498	17.10		8	493	2235	246
7	676	3954	1871	12.80		9	564	2917	132
8	735	6586	1401	9.59		10	627	3808	71
9	816	8804	1050	7.00		11	700	4527	38
165 14607									

Bull trout				Northern pikeminnow		
Age	Length (mm)	Mean weight (g)	\hat{N}	Age	Length (mm)	Mean weight (g)
6	406	150	4347	6	315	114
7	475	540	2876	7	356	284
8	550	1050	1903	8	392	397
9	618	1583	1259	9	427	624
10	686	2222	833	10	450	851
11	754	2861	551	11	501	1076
12	822	3500	365			

* Adjusted based on predatory size.

0.002205

0.41

H. LENOX H. DICK, M. D.

PHYSICIAN - INTERNAL MEDICINE

3214 SE Biddle Road
Vancouver, WA 98683

2/2/2001

Dear Bob:

Roger Bachman my partner gave the copy of "Native Trout", I write a column for "Salmon, Trout and Steelhead" called "INTERESTING FISH FACTS". I take articles from various scientific fish journals put the abstract at the head of the column then explain the article with comments. I am delighted to have your book. I know about your excellent work

Roger and I were delighted that you could use ^{the cabin} I guess in an emergency. We have had others do the same thing. I would like to know how it all happened. How about coming back next summer and fish with us

Tight lines

Len

Fax 1-360-256-9730

Friday, March 02, 2001

Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523

Dear Dr. Behnke:

Through my research I have found the following:

(1) When given the opportunity, trout feed until they are full and then rest and digest. All of the surveys that I have seen show that the trout never have a half full/partially digested stomach. These are usually eutropic waters where there is a lot of food or for the trout in oligotrophic waters where they are feeding on a large prey fish. These are also the waters where we find big trout. In both of these waters, the trout get in a rhythm of feeding under low illumination during the diel insect drifts or zooplankton diel vertical migration on either the insects or the smaller prey fish that feed on them. I have angling statistics over a 20-year period that show definite patterns of more concentrated low illumination feeding. The position of these fish in the water column has them in feeding zones or resting/digesting zones unless threatened by a predator. When feeding, fishery biologists who electrofish for them can get much closer versus when they are resting.

(2) When not given the opportunity, trout feed over longer periods of time, and in those waters they do not grow big. This is common of oligotrophic lakes for the trout that do not have the ability to feed on large prey fish and in oligotrophic streams, as Robert Bachman noted in his work on Spruce Creek in PA, the trout appear to be continually feeding.

(3) In both (1) and (2) the trout seem to key-in-on a prey food (size, color or movement) until the trout is satiated or the prey food is no longer available.

=====

I recently viewed a television program about Homo neanderthal. It is believed that this early man had a domain specific mentality such that his separate intelligences were not linked. Thus while making a spearhead he couldn't think about the weather. He had super intense concentration.

My theory is that trout are somewhat like Homo neanderthal. The patterns above lead me to believe that the trout can only do/think of one thing at a time. Thus,

(A) They do not know when to stop feeding. They feed until they are full.

(B) Additionally, trout are not selective out of choice. They do not have the ability change between different food items (size, movement and color) in an instant and thus they are not selective feeders. They key-in-on a food item until it is no longer available or they are full.

(C) When the trout are feeding they are much easier to approach as they are concentrated on this activity and not concerned about predator avoidance.

Your comments would be appreciated.

Sincerely,



Bernie Taylor

focus on the 7th

BERNIE TAYLOR
Outdoor Writer / Photographer

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Friday, May 04, 2001

Dr. Robert Behnke
Colorado State University
Fort Collins, CO 80523

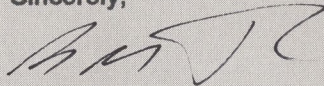
Dear Dr. Behnke:

I am sorry that you were not able to come out this way. We need to figure out how we can get together for a chat or time on the water. There is an upcoming Trout Unlimited National Conference in August of this year to be held in Portland, OR. Will you be attending it? If so, please drop me a line and we can set up something.

I am still at work on the book and it coming along well. Most of the chapters are well developed and I am in the process of cleaning it up. Attached is a draft of chapter II with a bibliography. There are a few theories in here that you may find of interest. Any comments would be appreciated. The sketches are fairly rough. The Lyons Press will have one of their illustrators redraw them.

I have also enclosed a slide that was taken on Pend Oreille a few weeks ago. The model was my guide and the fish about 17 lbs. Thank you for your continued cooperation and support.

Sincerely,

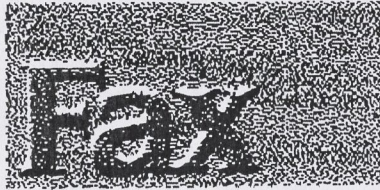


Bernie Taylor

ENC.



1/5



Date: Monday, May 07, 2001

To: Colorado State University
Dr. Robert Behnke
Phone: 970-491-5320
Fax: 970-491-5091

From: The B. Taylor Group L.L.C.
Bernie Taylor
Phone: 503-550-7892
Fax: 503-537-2547

Pages: 5 (including this one)

Subject: Draft

Last Friday I mailed you a draft of my chapter II that looks at the physiology of trout and how the fish hunts. Please use these pages on the hearing senses in instead of the ones I mailed.

Thanks,

5/5

Contor, C.R. and J.S. Griffith. 1995. Nocturnal emergence of juvenile rainbow trout from winter concealment relative to light intensity. *Hydrobiologia* 299:179-183.

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Chapter VII

3

By Bernie Taylor

Match your equipment to your intended prey

Bob:

I notice in reading through your paper on the Rio Grande cutthroat that little or nothing had been done on cutthroat in the Pecos drainage in New Mexico.

For what its worth I had a friend who lived in Las Vegas, N. M. who liked to fish. When I visited him in 1948 we took a pack trip west out of Mora, N. M. and south of Truchas Peak to the headwaters of a stream he called the Mora Pecos.

We caught many cutthroat in the 10"-12" size range. As we progressed downstream they began to be mixed w/ brown trout - no brooks or rainbow at that time.

Twenty two years is a long time ago, but I suspect there are still cutthroats there as it was a good 10 mile pack from the nearest road.

Rex Morrison

Wayne

Int. Amphipods in Saltm Sea
1988
+ Bull. Calif. Acad. Sci. 67(4): 219-232.

Oct. 67
Forest. Hist.
13(3)
Timber Christian on West. Am.
Cannon Mt. Ar.
Orange Baldy
Also reported

Ms. Annette Jones
Star Route Box 20204
Fairbanks, AK 99701

Dear Ms. Jones:

I was thrilled by the surprise package containing the specimen of a new species of charr. The timing was indeed appropriate as I am in the process of revising a manuscript on charr for the proceedings of the international charr symposium. I did not have a copy of the 1981 publication describing the new species, ~~and~~ I would like to acknowledge the person(s) donating the specimen and literature, but I will ask you, based on ~~of~~ what you learned during ~~the~~ your recent visit, if I should make acknowledgements in a publication and/or personally, or not at all? Several years ago, I began an exchange of reprints with Viktorovsky, Glubokovsky, and Chereshev. This led to Chereshev initiating an active exchange of information in letters and an exchange of fish specimens with myself and other Americans and Canadians. ^{From my} long experience with Soviet scientists I had learned that acts of friendship and goodwill beyond reprint exchange occur only at the top level of authority in the Soviet system. A junior scientist, such as Chereshev, would be suspect and considered "rebellious" by such actions. Also, the Magadan group of ichthyologists research led them to ~~so~~ fully agree with my published position on the evolution and classification of Far Eastern charrs, in direct contradiction to a University of Moscow group's published opinions. This, undoubtedly, caused friction.

In any event, ~~two~~ three years ago, C. C. Lindsey, Univ. British Columbia, was invited by Chereshev to visit and exchange specimens during Lindsey's visit to the Far East. When Lindsey arrived at the laboratory

Chereshnev was not there and no one could or would not explain his absence. None of Chereshnev's North American correspondents have heard from him during the past two or three years. Last year I met with V. V. Barsukov, head of the ichthyology division of the Soviet Academy of Sciences, and an old friend of mine, who assured me that nothing had happened to Chereshnev-- although he was likely warned about his active communication with foreigners.

Thus, if you can fill me in on the circumstances and names of people leading to the donation of the specimen and literature, I can decide on the propriety of acknowledgements.

Sincerely,
My Many Thanks for your participation,
Sincerely,

OFFICE MEMO

TO: Steve

Date

FROM: Bob Belunke

SUBJECT: Copy Ahmad's Thesis

REMARKS: - There are some typos and minor corrections still to be made (this is 3rd draft), but it's essentially complete. Ahmad wants to return to Saudi Arabia in early June, and if we can have final exam about Thur or Fri. (May 22-23) we can give him all ~~final~~ corrections to be made and he can deliver thesis to Grad School the next week.

Taxonomic section is boring unless one is actively involved in taxonomy of these species, but this is first time all of this data has ever been presented, so we can excuse a bit of 'overdoing'. - Plate 1 is an oversize map for orientation to geographical areas discussed in text.