



NEWSLETTER

of the Introduced Fish Section,
American Fisheries Society

November 1988 Peter B. Moyle, Editor Volume 8, Number 3

FROM THE PRESIDENT/EDITOR

The Introduced Fish Section (as far as I can tell) has two main functions. The first is to provide communication among AFS members concerned with research on and management of introduced fishes. The second is to provide advice, assistance, and leadership for the parental society on policy matters relating to introduced species. The first function is accomplished by this newsletter, which I suspect is the main reason most of you have parted with \$3.00 to support the section. Editing the newsletter is actually rather fun as it provides an excuse for reading esoteric journal articles and soliciting correspondence from esoteric people (i.e., most fisheries biologists) as well as an opportunity for creative writing. There is certainly no lack of information for the newsletter, which is a reflection both of the growing problems (and opportunities) with introduced species and the growing appreciation of those problems. The second function is harder to accomplish in a meaningful way. The section has been fortunate in its past officers such as Nick Parker and Jim Clugston and can look forward to strong leadership from Paul Shafland. All I can do is bridge the gap and try to accomplish at least some of the goals I set forth in the Minutes.

MINUTES OF THE NINTH ANNUAL IFS BUSINESS MEETING 13 SEPTEMBER 1988

President Nick Parker called the Ninth Annual Business Meeting of the Introduced Fish Section (IFS) to order at 1408 hrs, 13 September 1988. Jim Clugston and Jay Stauffer were recognized as the IFS' Past Presidents who were in attendance.

In his opening remarks President Parker briefly reviewed the Section's response to North Dakota's zander introduction proposal as requested by the parent Society. This response, as printed in IFS Newsletter 8(2):5-7, stands as the Section's official position unless it is overturned at a later date. Parker noted that during the past year the lines of communication between North Dakota and other involved jurisdictions had improved and that this had significantly reduced the level of disagreement between the principals involved.

Continuing his opening remarks, President Parker relayed Carl Sullivan's request that IFS participate with the Fish Culture, Fish Health, Genetics, and Bioengineering Sections in the development of a policy statement on the genetic engineering of fishes, with the lead to be taken by the Genetics Section. President Parker concluded by mentioning that the upcoming Aquaculture-LA-89 meeting would include several sessions and papers of interest to IFS members. A final agenda for that meeting should be available soon.

A quorum of IFS members was not present and Rich Noble moved that we suspend the rules; this was seconded by Jay Stauffer and unanimously approved. The 1987 IFS Business Meeting Minutes as printed in the Newsletter 7(4):2-4 were then approved. The Treasurer's report was also approved. This report showed a balance of \$801.46, which was only a \$40.18 increase from the beginning year's balance. Discussion followed whether or not we should increase the Section's dues from \$3.00 to \$5.00 like most other Sections. No consensus existed and no action was taken on this issue.

A motion to change the terms of office for IFS officers to two years failed; only the Secretary-Treasurer may now hold office for two years. The main point of discussion dealt with the Newsletter editorship which is currently the responsibility of the President-Elect. It was argued that just as the editor got proficient at his Newsletter responsibilities, his one-year term of office was over. An alternative suggestion was to appoint a Newsletter Editor not tied to the annual election of officers. If eventually

adopted, any of these changes will require changing our by-laws.

Jim Clugston gave a brief synopsis of the IFS/Fish Genetics Section sponsored symposium, "Quantitative Effects of Introduced Fishes." Considerable interest in the symposium had been expressed by many people in Toronto, although anticipated attendance was expected to be hurt by the symposium being scheduled during the last session of the four-day meeting.

Al Zale (Membership Committee) reported that the IFS Newsletter has had a positive influence on recruitment. The membership role is growing and we are over the magic 200 mark earlier this year than last. It seems critical that the Newsletter continue to expand if the Section is to grow and become more active.

Dave Philipp informed the group that the Fish Genetics Section had revised and passed a resolution entitled "Possible Genetic Effects on Fishery Stocks and Populations by Aquaculture, Managed and Introduced Species." A preliminary draft of this resolution had been prematurely printed in our Newsletter 8(2):11. The adopted edition will be reprinted in our Newsletter as soon as it becomes available.

In the absence of Ballot Committee Chairman Mark Konikoff, President Parker announced the results of this year's election as follows: President, Peter Moyle; President-Elect, Paul Shafland; and Secretary-Treasurer, Dawn Jennings. Paul Shafland expressed the sincere apologies of President Moyle who was unable to attend the meeting due to unavoidable conflicts with his research and teaching schedules. At President Moyle's request, the Past-President's plaque was presented to Nick Parker, along with his personal thank you for a job well done.

In the year to come President Moyle (1) plans to encourage informal and informative exchanges of ideas among members through the Section Newsletter; (2) wants to reexamine AFS policies in light of the zander controversy; (3) would like to see the Section's role as an independent reviewer of purposeful introductions increased; (4) will place an emphasis on educating the general public, which is the source of most introductions (all "accidental" by definition) of aquatic organisms; and (5) hopes to encourage IFS members to write articles for aquarium and angling magazines relative to introduced species.

A resolution on the introduction of harmful organisms with the discharge of ballast water from ocean-going vessels entering the Great Lakes was submitted for discussion by

Carlos Fetterolf of the Great Lakes Fishery Commission, Ann Arbor. The resolution in essence urges "the U.S. and Canadian governments to eliminate the serious threat that ballast water introductions pose to the integrity and value of the Great Lakes fishery." The resolution was passed with slight modification and will be forwarded to pertinent governmental representatives by incoming President Moyle. Further discussion centered on directing President Moyle to pursue a similar but more generic consideration of ballast introductions on a worldwide scale during his term of office.

Lynn Starnes (USFWS) presented the preliminary results of the International Association of Fish and Wildlife Agencies' survey of State Fish and Game Agencies regarding their willingness to adopt the AFS policy statement on the introduction of aquatic species [Fisheries 11(2):39-42]. Preliminary results of the survey were generally positive. The USFWS is also exploring the possibility of establishing a specific national protocol for introducing aquatic organisms. Considerable confusion exists regarding the differentiation between "policy statements" and "protocols"; to date neither IFS nor the parent society has officially adopted a "protocol."

The meeting was adjourned about 1730 h.

--Respectfully submitted, Paul L. Shafland

YOU GOT IT? WE WANT IT!

In addition to Regional newsletter representatives, we are looking for volunteers to make regular contributions on various subjects (e.g., Chinese carps, salmonids, esocids, morones, or you tell us). Our first volunteer is JIM RAGAN who will help keep us abreast of developments involving the zander in North Dakota and BILL DEVICK who has volunteered to provide information on Hawaii's freshwater introductions, a situation which is much more important and interesting than many may realize. Anyone having information to contribute or ideas for improving the Newsletter, please send them to Paul Shafland, your new editor. Hopefully we will get enough input to expand the Newsletter, which seems to be in everyone's own best interest.

**RESOLUTION ON
INTRODUCTION OF HARMFUL ORGANISMS WITH DISCHARGE OF
BALLAST WATER FROM OCEAN-GOING VESSELS
ENTERING THE GREAT LAKES**

The following resolution was passed at the IFS business meeting in September:

Whereas, the Great Lakes constitutes a valuable resource generating economic impacts in excess of \$2 billion from recreational and commercial fishing; and

Whereas, exotic organisms, such as Chinese mitten crab, Bythotrephes cederstroemi, river ruffe, and the zebra mussel, are being introduced with discharge of ballast water from ocean-going vessels entering the Great Lakes, and such introduction of harmful organisms threaten to disrupt native ecosystems through predation, competition, infection, genetic effects, and habitat degradation; and

Whereas, in the years 1978-1987, 7,828 overseas vessels trips, 39% in full ballast, were recorded entering the Great Lakes, each carrying an average of 7,070 metric tonnes of water and thousands of live exotic organisms; and

Whereas, it is not practical to eradicate invading organisms once established in the Great Lakes;

Now, therefore, it is resolved that the Introduced Fish Section of the American Fisheries Society that met on 13 September 1988 in Toronto, Ontario, joins Great Lakes fishery agencies, the International Joint Commission, and the Great Lakes Fishery Commission in urging the U.S. and Canadian governments to eliminate the serious threat that ballast water introductions pose to the integrity and value of the Great Lakes fishery.

RUFFE GOING, CONTINUED

In the last issue, information was presented on the introduction of the ruffe, Gymnocephalus cernua, into the Great Lakes via ballast water. The following update was provided by BILL LEGRANDE, our faithful correspondent for the Great Lakes region:

Dennis Pratt, Wisconsin Department of Natural Resources, indicates that they have an ongoing study of the distribution

of ruffe in Lake Superior watershed. His 1988 report indicates that as many as 5 year classes may be present in more than 1500 specimens examined. They have been discovered as far west as the Apostle Islands. A Resources Report from the Ministry of Natural Resources in Ontario also discusses the ruffe and its potential for disruption of Great Lakes fisheries. This document summarizes some of the potential economic impacts on the whitefish and yellow perch fisheries. Jon Stanley, NFRC in Ann Arbor, forwarded me a copy of a letter to the Great Lakes Fishery Commission indicating that the State Department would support efforts by the Canadian delegation to a 5 September 1988 meeting of the International Maritime Organization's Marine Environmental Protection Committee to raise the issue of freshwater introductions by means of ballast water. One suggested measure is to have vessels exchange ballast water at sea, minimizing the possibility of freshwater introductions.

BC IN LAKE MICHIGAN

The following abstract, (Bythotrephes cederstroemi: its new appearance in Lake Michigan. M. S. Evans. 1988. J. Great Lakes Res. 14234-240) is from a paper that also contains a review of the biology of "BC."

Bythotrephes cederstroemi was newly found in Lake Michigan in September 1986. This predaceous cladoceran was previously detected in Lake Huron (December 1984) and subsequently dispersed into lakes Ontario and Erie (autumn 1985). It was previously known only from Europe. Entry into Lake Michigan may have occurred through the exchange of Lakes Huron and Michigan water masses in the Straits of Mackinac. Bythotrephes cederstroemi was consumed by Lake Michigan deepwater sculpins in October 1986. Since Bythotrephes is believed to be a surface-swelling species, the most probable route by which it entered the sculpin diet was through the rapid sinking of dying (and dead) animals and their subsequent ingestion by sculpins at the sediment-water interface. Bythotrephes cederstroemi exhibited allometric and cyclomorphic growth.

**NEEDED: A GENERAL POLICY STATEMENT ON BALLAST WATER
INTRODUCTIONS**

The recent alarm over the introduction of potentially harmful organisms into the Great Lakes through ballast water

has focussed attention on a growing, worldwide problem. In my own backyard, the Sacramento-San Joaquin estuary, ballast water organisms are colonizing at a dizzying pace and may be causing major alterations of foodwebs. Two exotic copepods (Sinocalanus and diatomid species) are on the increase while the native euryhaline copepod (Eurytemora) is in a decline. The latter species is an important food of larval fishes and there is some evidence that the exotic copepods are less vulnerable to predation by larval striped bass. An euryhaline clam (Corbulomya amurensis) also has exploding populations in the system and may be able to significantly reduce phytoplankton populations through its high filtration rates in shallow parts of the estuary. In my own ongoing studies of the fishes, the chameleon goby (Tridentiger trigonocephalus) from the east Pacific has become the third most abundant fish in our samples, even though it first appeared in our study area only two years ago.

All this points to the need for regulations to stop this ballast water lottery with its potentially drastic effects on fisheries. AFS should take leadership in this effort and the Introduced Fish Section should be pointing the way for AFS. I will consult with experts (e.g., James Carleton at the Oregon Institute of Marine Biology and draft a policy proposal this year. Any IFS members interested in being involved in this effort should contact me.

--Peter B. Moyle

GIANT US BULLFROGS MAKE BRITONS CRINGE

The headline above was stolen from the Sacramento Bee, May 4, 1988, as is the following story (I will not vouch for the veracity of the facts):

London.--A mass recall of pet Missouri bullfrogs is underway, prompted by fears that when they mature they may gobble up the gentler denizens of British garden ponds. Peter Barratt, who owns a garden-supply center in Newcastle, northern England, says about 200 of the 400 tadpoles he sold have been returned since he put out the recall notice. Missouri bullfrogs can grow to a foot long, raising mayhem in garden ponds four to six years from now when they reach maturity. "If you put an American bullfrog on one side of the ecological scales, everything is going to fall off the other side because it will gobble it all up," Tony Tynan, the naturalist who alerted the garden center, was quoted as telling the Daily Telegraph. At the time they went on the market, the bullfrogs seemed like no more than a novelty item--something to scare off cats or herons on the prowl for goldfish. Barratt said an outbreak of marauding Missouri

bullfrogs in Italy several years ago set off the fears. Barratt thinks people may be leaping to conclusions about the threat. So long as the bullfrogs aren't released into the wild, he doesn't see them going on the rampage. Nonetheless, he has put up signs in his store apologizing to frog-lovers for the inconvenience and offering to refund them the \$1.85 price of each tadpole.

ROTENONE I

Rotenone is a piscicide frequently used to rid waters of unwanted introduced species. Although it has long been known to be non-toxic to vertebrates without gills and to degrade rapidly in the environment, the fact it is a pesticide (poison) means that its application to public waters can be controversial. For example, the main objections to an attempt by the California Department of Fish and Game (CDFG) to eradicate brook trout in some headwater streams in order to reestablish native cutthroat trout came from people concerned about pesticides in their drinking water.

Two recent publications should be useful in helping to alleviate some of that fear. "Rotenone residues in water following application to Kaweah River and Tulare Lake Basin, California" (CDFG Environmental Div. Admin. Rpt. 88-1 by J. M. Harrington and B. J. Finlayson, CDFG, 1701 Nimbus Rd., Rancho Cordova, CA 95670) discusses the degradation times of rotenone and the inert ingredients applied with it in natural waters. Rotenone was degraded to nondetectable levels within 15 days. "Oral toxicity of rotenone to mammals" (1988, USFWS Investigations in Fish Control 94:1-5, by L. L. Marking) shows that "even unusually high treatment rates of rotenone do not cause tumors or reproductive problems in mammals."

A WELCOMME PUBLICATION

Robin L. Welcomme has once again produced a very useful compendium of information. This one is International introductions of inland aquatic species (1988, FAO Fish. Tech. Paper 294: 318 pp.) that not only lists what species have been introduced where, but is accompanied by a very thoughtful analysis of the information. Inquiries about this paper should be addressed to Dr. Welcomme at FAO Fisheries Department UN FAO, Via delle Terme di Caracalla, 00100, Rome, Italy. His official summary is as follows:

A total of 1,354 introductions of 237 species into 140 countries are analyzed. The number of introductions carried out rose from the middle of the last century until the 1960s and have lessened since then. Introductions have been made for aquaculture, management of inland water fisheries, ornament, and control of unwanted organisms. Many introductions have been made for purposes unknown or by accident. The introduction of new species of aquatic organisms involves a number of risks including degradation of the host environment, disruption of the host community, genetic degradation of the host stock, introduction of diseases and socio-economic effects. Major risks of damage to native environments and fish communities are associated with introductions of species which stunt and with major predators. It is concluded that the introduction of new species is a valuable management tool but, because of the risks to the host community, any further introductions should be made only after careful consideration on any impacts.

An updated register of known international introductions is presented.

ROTENONE II: A NIGHTMARE?

The following is condensed from an October 7 article in The Arizona Republic by B. Burkhart. We obviously will have to follow up on this one.

A joint conservation project between the U.S. Fish and Wildlife Service and Utah Department of Wildlife Resources ended up poisoning as much as 60 miles of the Virgin River in Arizona, Utah, and Nevada. There is no official estimate of how many fish were killed in last week's accident, and officials disagree over the extent of the damage. Many of the fish killed were native species, including the endangered woundfin, the threatened Virgin River spinedace, and the Virgin River roundtail chub that has been proposed for the federal endangered-species list.

Biologists lost control of the toxic agent rotenone, an organic chemical used in fisheries research throughout the world. According to an environmental assessment issued on the project, the goal was to treat a 22-mile stretch of water with rotenone in three steps to rid it of red shiners, an exotic species introduced from the Midwest, and open that water to the three threatened or endangered species, which can't compete with the shiners.

According to USFWS biologist Dan Archer, biologists overestimated the volume of water coming down the river and released too much rotenone. Only 16 miles of river was to have been treated, but a feeder station for the neutralizer, potassium permanganate, wasn't set up before the chemical was released. Reportedly, the rotenone passed the proposed neutralizing site seven hours before it was expected. Because no provisions were made to add the potassium permanganate, the rotenone traveled downstream unchecked, killing fish in its path.

OFFICIAL AFS POLICY STATEMENT ON INTRODUCED AQUATIC SPECIES

What follows is the official policy statement of our parent society on introductions, which is part of a longer document (with supporting information) by C. C. Kohler and W. R. Courtenay, Jr. It is presented here for your review. Do you think it is adequate? Does it need revision? PLEASE SEND PRESIDENT MOYLE YOUR COMMENTS. If necessary, we can propose revisions to AFS.

It is recommended that the policy of the American Fisheries Society be:

1. Encourage fish importers, farmers, dealers, and hobbyists to prevent and discourage the accidental or purposeful introduction of aquatic species into their local ecosystems.
2. Urge that no city, county, state, province, or federal agency introduce, or allow to be introduced, any species into any waters within its jurisdiction which might contaminate any waters outside its jurisdiction without official sanction of the exposed jurisdiction.
3. Urge that only ornamental aquarium fish dealers be permitted to import such fishes for sale or distribution to hobbyists. The "dealer" would be defined as a firm or person whose income derives from live ornamental aquarium fishes.
4. Urge that the importation of fishes for purposes of research not involving introduction into a natural ecosystem, or for display in public aquaria by individuals or organizations, be made under agreement with responsible government agencies. Such importers will be subject to investigatory procedures currently

existing and/or to be developed, and species so imported shall be kept under conditions preventing escape or accidental introduction. Aquarium hobbyists should be encouraged to purchase rare ornamental fishes through such importers. No fishes shall be released into any natural ecosystem upon termination of research or display.

5. Urge that all species considered for release be prohibited and considered undesirable for any purposes of introduction into any ecosystem unless that species shall have been evaluated upon the following bases and found to be desirable:
 - a. **RATIONALE.** Reasons for seeking an import should be clearly stated and demonstrated. It should be clearly noted what qualities are sought that would make the import more desirable than native forms.
 - b. **SEARCH.** Within the qualifications set forth under **RATIONALE**, a search of possible contenders should be made, with a list prepared of those that appear most likely to succeed, and the favorable and unfavorable aspects of each species noted.
 - c. **PRELIMINARY ASSESSMENT OF THE IMPACT.** This should go beyond the area of **RATIONALE** to consider impact on target aquatic ecosystems, general effect on game and food fishes or waterfowl, on aquatic plants and public health. The published information on the species should be reviewed and the species should be studied in preliminary fashion in its biotope.
 - d. **PUBLICITY AND REVIEW.** The subject should be entirely open and expert advice should be sought. It is at this point that thoroughness is in order. No importation is so urgent that it should not be subject to careful evaluation.
 - e. **EXPERIMENTAL RESEARCH.** If a prospective import passes the first four steps, a research program should be initiated by an appropriate agency or organization to test the import in confined waters (experimental ponds, etc.).
 - f. **EVALUATION OR RECOMMENDATION.** Again publicity is in order and complete reports should be circulated amongst interested scientists and presented for publication.

- g. **INTRODUCTION.** With favorable evaluation, the releases should be effected and monitored, with results published or circulated.

Because animals do not respect political boundaries, it would seem that an international, national, and regional agency should be involved at the start and have the veto power at the end. Under this procedure there is no doubt that fewer introductions would be accomplished, but quality and not quantity is desired and many mistakes might be avoided.

NANFA NICKS AFS-IFS

The North American Native Fishes Association (NANFA) is an organization of aquarium hobbyists interested in native fishes. It should be a natural ally to those of us interested in halting the spread of unwanted introduced species. Bruce Gebhardt, president of NANFA, was understandably upset over a comment of mine in the March Newsletter that "fish are also being moved around by aquarists, especially those with an interest in North American fishes." I should have been more careful in my wording, as I really was expressing a fear rather than anything based on hard facts. There is a growing interest in keeping native fishes, and aquarists do trade fish with one another or collect them from local waterways. My fear is that someone who gets tired of keeping a tank of native fish may dump them into the nearest waterway to which the species may not, in fact, be native. Drainages separated by only a few miles may have very different fish faunas and introduction of new species may have drastic consequences to the real natives. The following editorial by Mr. Gebhardt, reprinted from **AMERICAN CURRENTS**, the official NANFA publication, indicates that we should be doing a better job of working with such organizations.

Member Eric Isaacson of Los Angeles has called our attention to the fact that there is an introduced-fishes section in the American Fisheries Society. Frankly, I think it ironically appropriate, since AFS members are responsible for most of the inappropriate introductions. The AFS idea, however, has merit; we ought to do the same. Let's have an introduced species committee. A principal function would be to monitor introductions proposed by, among others, members of AFS.

An interesting conceit of some of the members of this section is that native-fish traders and keepers may be responsible for introductions. If native fish aquarists each put up \$100 to introduce piranhas into American

waters, they would do one-billionth of one-billionth of the damage resulting from inappropriate introductions by people "who ought to know better." An article in this section's recent newsletter advocates stocking the Colorado with Rainbow Smelt!

Maybe it's time somebody pointed that out, and started doing so to other conservationists and the media. Maybe NANFA ought to do it.

Meanwhile, readers who know AFS members as skeptical about introduced exotics as NANFA has learned to be should urge them to join us.

Thanks to ERIC ISAACSON for calling this to the editor's attention.

QUEBEC NEEDS INFO ON INTRODUCED FISH CONTROL

The following is the text of a letter received from Michèle Lapointe (Laboratoire de recherche sur les communautés aquatiques, Dépt. de chimie-biologie, Université du Québec à Trois-Rivières, CP 500, Trois-Rivières, Quebec, Canada G9A 5H7). Please write to the laboratory if you have information on fish control or would like a copy of their results.

The Quebec Government has requested Dr. Pierre Magnan and his group at the Université du Québec à Trois-Rivières to 1) review the methods on control of undesirable or harmful freshwater fish, and 2) investigate the possibilities of controlling these species in charr lakes.

The brook charr is the main exploited fish (sportfishing) in Quebec. In the past, most of our rook charr populations were allopatric, but 30 or 50 years ago,, sportfishermen introduced bait fish in many lakes so that today almost 60% of the brook charr populations live in sympatry with other species. After 10 years of research in our laboratory, it has been found that competition with species such as white sucker and some cyprinids resulted in yield decreases ranging from 30 to 60%.

Presently, the only techniques available to control undesirable fish are: 1) the reclamation of charr lakes with rotenone and 2) the setting up of dams at tributaries. These measures are costly and inefficient in the long term, taking into account the fact that

reclamation also eliminates indigenous charr populations. We are then searching for an alternative solution and this is the object of this letter.

My mandate is to survey the measures used for the control of undesirable fish species elsewhere in Canada, in the United States, and in Europe. Any method is of interest to us, whether it is successful or not.

Since we are short of time for the first part of this work, it would be kind of you to send us all available information as soon as possible. If you are interested in receiving the results of our survey, please indicate your complete address with your sending.

ELECTRONIC BULLETIN BOARD AVAILABLE TO ALL AFS MEMBERS

Every AFS member with a computer terminal and a modem can have immediate access to important Society news. Rather than waiting for printed matter to arrive by mail or suffering the frustrations of playing "telephone tag" with a colleague, you can connect to the American Fisheries Society's Computer User Section electronic bulletin board and read bulletins, announcements, and public and private mail as soon as they are posted. The Board has been running as a service to Section members since January 1988. In response to the identified need for the Society to have access to rapid information exchange, the Computer User Section decided at the annual meeting in Toronto to open up use of the board to the entire AFS membership.

The Board is available by dialing (313) 996-1456 with your computer modem and signing on. If you have problems connecting, voice help is available from SYSOP Tony Frank weekdays at (313) 994-3331 from 8 am to 4 pm (Central Time). There is a questionnaire for new users to fill out online, and then you are free to explore the board, read and respond to messages, or to download files. Help is available at any juncture by typing H at the prompt. Welcome to the system, log on, and use it! An upcoming issue of FISHERIES will feature full instructions in moving around the board, but with help readily available online, the board is easy to explore on your own.

Any AFS subunits who wish to open a conference area should contact the SYSOP. This offers the opportunity for a private conference, away from the main traffic areas, to conduct Excom, Division, or Section business.

--Phyllis Barney, Newsletter Editor, AFSCUS