

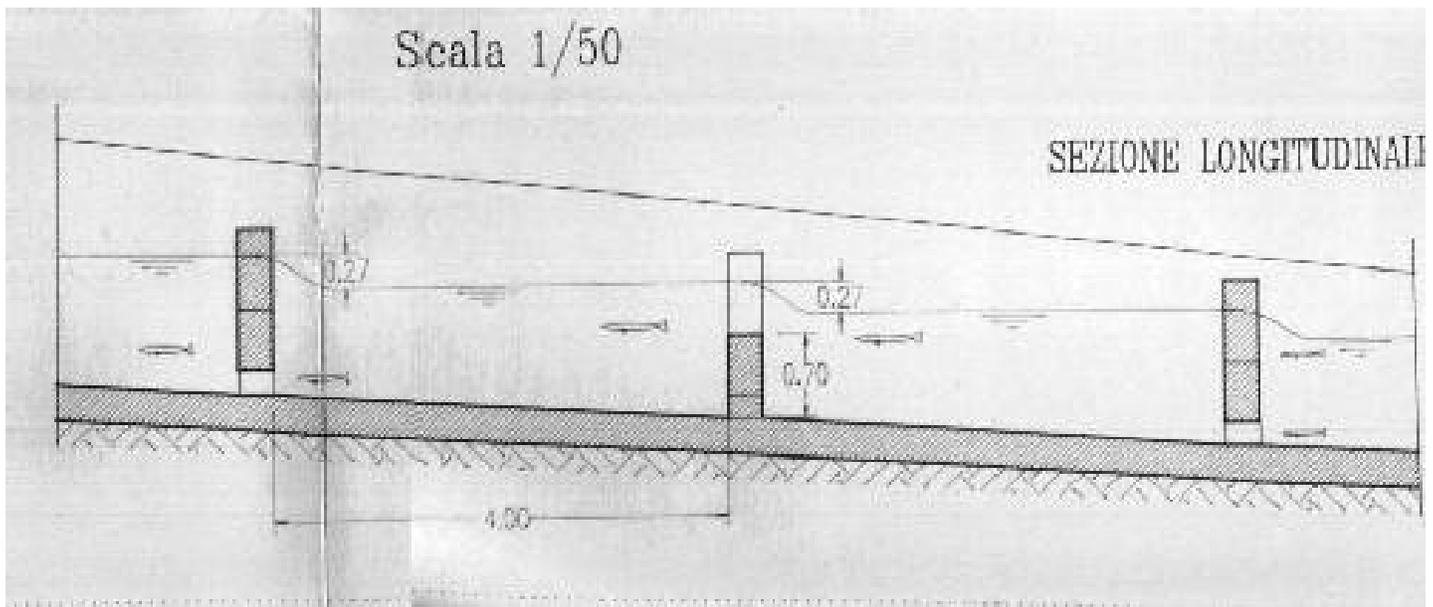
■ THE SHAD FOUNDATION'S ■

SHAD JOURNAL

“For the study, protection, and celebration of shad around the world”

*A review of the Pontic shad’s biology and fisheries
Italy “steps up” support of Ombrone River shad run*

VOLUME 3, NUMBER 4, FALL 1998



President’s Note:

The Shad Foundation has begun a new e-mail group that treats shad biology, conservation, fisheries, and education worldwide. Since its inception, about 50 members have joined the discussions and we hope you will too. To join, simply surf to the Shad Foundation’s web site (see masthead), and click the button “Join List Onelist.” Please introduce yourself to the discussion group, letting people know about your current work. Feel free to begin a discussion by posing open-ended questions on topics that interest you.

None of the discussions will be published by the Shad Foundation without explicit permission by the authors, so there is no pressure to produce publishable or conclusive material. The only requirements are that you write and think as clearly as possible, keep an open mind, and realize that the discussions are not a finished product, but the collective ideas—not always perfectly

A FISH LADDER SCHEMATIC describes a planned fishway on the Ombrone River, Italy, designed to allow the upstream spawning migration of shad (*Alosa fallax nilotica*) for the first time in 170 years. To learn more about the project, please turn to page 6.

thought out—of people working hard to understand shad and their ecosystems.

So far, we have been introduced to several e-mail list members, learning about their research and interests. Among them are researchers from France, Spain, Portugal, Kuwait, Romania, United States, Italy, United Kingdom, and China. We have recently begun discussion on shads as keystone species. I hope you sign up today and join in.

In this issue, we will hear from Marco Sammiceli, coordinator of the fishery conservation and management sector of the Toscana chapter of Legambiente—an Italian conservation organization. He and a group of volunteers hope to bring shad

back to the Ombrone River—which drains the famous Chianti wine country—with Italy’s first fishway for anadromous fish.

We will also hear from Ion Năvodaru, from Romania, who has written a review of Pontic Shad (*Alosa pontica*) and their fisheries.

-R. Hinrichsen

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SHAD FORUM

In the "Shad Forum" department, we publish letters and comments on issues surrounding shad and their fisheries. Your contributions are welcome.

China and U.S. Scientific Exchange Program

To the Editor:

In March 1997, United States Fish and Wildlife Service and the Chinese Ministry of Forestry and Agriculture reached agreement on a series of scientific exchanges for 1997-1998 which were formalized in Annex 7 of the Nature Conservation Protocol between China and USA. Included among these was a proposal to exchange shad information on restoration, protection and culture. The shad exchange program was executed in 1998.

During 8 May to 6 June 1998, a Chinese shad group, Han-Ping Wang and Jia-Bo Mai, visited the United States. In America, Chinese shad experts investigated the Susquehanna River shad restoration program headed by Richard St. Pierre and worked in all phases of American hatchery operation including egg collection and disinfection, incubation, feeding, marking, and stocking at the Van Dyke Hatchery in Pennsylvania. Wang and Mai visited with Dr. Bonnie Brown at the Virginia Commonwealth University to discuss and review shad genetics analysis using microsatellite and mitochondrial DNA.

The Chinese shad group also traded information on shad restoration and protection at the headquarters of U. S. Fish & Wildlife Service, Northeast Fishery Center, Shad Foundation, ten research and management units, and fish passage facilities (Bonneville Dam fish ladders on the Columbia, for example).

To learn more about Chinese shad status and protection, U.S. delegates, Richard St. Pierre and Dr. Bonnie Brown, visited China from 10 to 28 of October 1998. They visited Fisheries Bureau of Chinese Ministry of Agriculture and Chinese Academy of Fishery Sciences (CAFS) in Beijing, Yangtze River Fisheries Resource Management Committee in Shanghai, Zhejiang Fisheries Bureau in Hanzhou, Freshwater Fisheries Research Center of CAFS in Wuxi, Yangtze River Fisheries Institute,

CAFS in Jingzhou, Guangdong Ocean and Fisheries Bureau in Guangzhou and the Shad Culture Station in Dongguan. American experts investigated shad status in Qiantang, Yangtze and Pearl rivers, the effect of hydroelectric projects on shad, and the cause of the decline of Chinese shad.

American experts were interested in the restoration of Reeves shad in the Qiantan River—which is very similar to the Susquehanna River in area, dam constructions and pattern of decline of shad in 1970s. We are exploring the possibility of establishing a hatchery in the upstream reach of the river by collecting eggs from the Pearl River and the shad culture station where shad were domesticated and introduced to spawn.

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First Conference On European Shads

To the Editor:

I am pleased to inform you about the First Conference on European Shads. The main aim of the conference is to synthesize the biological knowledge of shad (genus *Alosa* sp.) populations present in the Eastern Atlantic ocean, and the Mediterranean, Black, and Caspian seas. The program will focus on distribution and status, systematics and phylogeny, life history, ecology and population dynamics, genetics, exploitation, enhancement, and conservation.

The conference will be held from 23 to 26 May 2000 in Bordeaux (Aquitaine Region, France). The scientific sessions will occur during the first three days and will include oral and poster sessions. Official languages will be French and English (simultaneous translation). A tour to the Bordeaux surroundings (Gironde-Garonne-Dordogne System, shad fisheries, Caves à vin), is planned for the fourth day.

The conference is open to scientists and managers interested in shads. Those who wish to attend the conference or to contribute with communications or posters, are invited to complete and send the

pre-registration form, which may be found at the web site <http://agro.roazhon.inra.fr> [and on the back cover of this issue].

Prospective participants will receive further details and announcements with final registration forms and guidelines. Registration fees will be indicated in the 2nd announcement.

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The Shad Foundation is a Washington State non-profit corporation that was established in 1996 to promote a greater understanding of shad for the purpose of restoration where depleted, or their responsible use where sufficiently abundant.

Trustees: Richard A. Hinrichsen, *Hinrichsen Consulting, Seattle, Washington*; Curtis Ebbesmeyer, *Evans-Hamilton, Inc., Seattle, Washington*; Richard St. Pierre, *U.S. Fish & Wildlife Service, Harrisburg, Pennsylvania*.

Submissions. The editors welcome submission of articles on any aspect of shad. The Journal publishes letters, commentaries, histories, scientific articles, interviews, reviews, and philosophical and methodological items related to shad the world over. (Please see back cover.)

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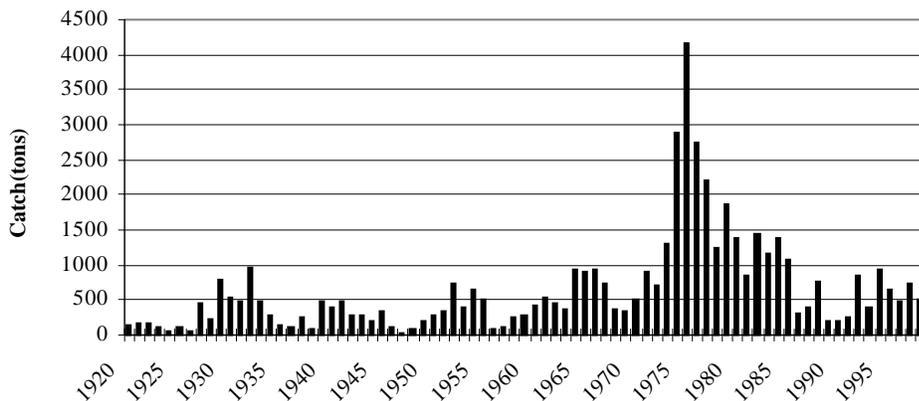
ciated with fishing of the migratory breeding stock and high natural mortality of the juveniles.

Fishery

The Pontic shad fishery is a river-intercept fishery of the lower Danube River. Nearly 5,000 fishermen belonging to four countries (Romania, Ukraine, Bulgaria and Serbia) depend economically on the lower Danube River fishery. Lately, the fishing effort has increased and the Pontic shad stock may be overexploited. The fishing success decreases from Danube Delta river mouths to upstream locations, and upstream of river kilometer 500, the catch is almost zero.

Catch follows a cyclical pattern over time (common in the Clupeidae fish family) with large limits of variation—between 200-5,000 tons per year. Most of this catch, approximately 70 percent, belongs to Romania.

The main constraints for an accurate fish stock assessment are poor catch statistics and lack of fishing effort data for all countries which share the resource. While each country has historical data on the de-



PONTIC SHAD STOCK ABUNDANCE, reflected by catch statistics of Romania.

mographic structure of migratory stock (age, sex, size, fecundity), less is known about the natural and fishing mortality rates. Thus, scientists have just a few elements needed for a stock assessment which is sorely needed to advise managers on the sustainable use of shad. Unfortunately, the biological information in hand does not allow us to estimate the population dynamics model presented in the figure on page 4. Under these conditions, the main regulation is to protect the breeders

escaping to the spawning locations by closing the fishery during the peak of the spawning run.

Nowadays, when most fish species are threatened and stocks overexploited, it seems that the Pontic shad has not yet been adversely affected by human activities and obstructions. Despite barrages, pollution, and exploitation, the Pontic shad have persisted, and continue their economic and cultural value for the Lower Danube River system.

The Author



ION NĂVODARU is a senior scientist at the Danube Delta Research and Design Institute in Romania. He specializes in fishing, fish culture, fish ecology, anadromous migratory fishes in the Danube River, Danube Delta fisheries, stock assessment, and fisheries management.

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The author wishes to thank Iulia Orlatan for the English revision of the article.

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Italy Pays Homage to the Ombrone River Shad

Italian citizens plan Italy's first fish ladder to help restore the Ombrone River shad run

by Marco Sammicheli

The Ombrone River flows through southern Toscana (west central Italy), a land famous for its medieval history, the arts, and beautiful wooded hills, the Chianti area (known for its Italian wine) and Montalcino (the hills of Brunello wine). The Ombrone flows from the Chianti hills and the ancient spent volcano, Monte Amiata, to the Maremma coast and the provinces of Siena and Grosseto (see Figure). The basin extends over 3,000 square kilometers and the total length of the river is 877 kilometers. The Ombrone River valley has a very low population density compared to the rest of Italy; it has only 50 people per square kilometer versus a national average of 190. The river has a typical Mediterranean flow regime with large differences between winter and summer.

Dam Fills Swamp, Blocks Shad

In the early years of the 19th century, a big project was undertaken to reclaim the malarial marsh north of Grosseto and gain fields for cultivation. A channel was constructed connecting the marsh with the Ombrone and a diversion dam was built near the city of Grosseto to feed the channel. Over time, the marsh was slowly filled by sediments suspended in the diverted waters of the Ombrone during high flow events. The dam, named "La Steccaia," remains a beautiful, historical structure, but it has had a negative impact on the fish fauna, including a population of anadromous shad (*Alosa fallax nilotica*).

Since 1829, shad have been unable to reach their native spawning areas in the upper basin during their spring (March-June)

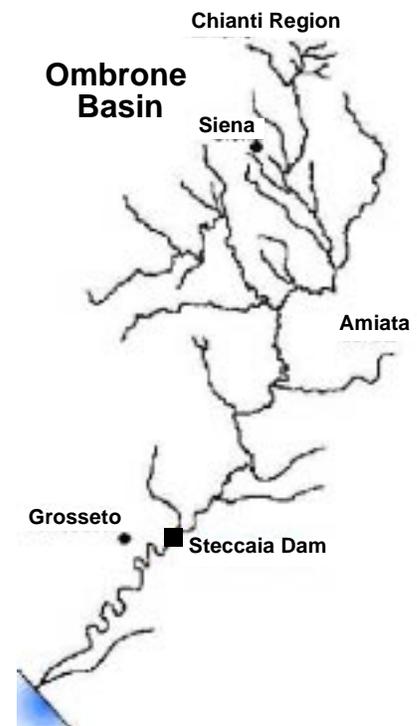
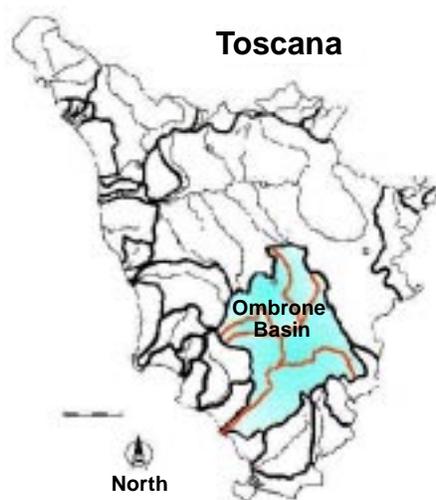
spawning run. Only rarely, when exceptional spring floods raise the water levels sufficiently at the dam, is shad passage possible. The last time this occurred was 1967-1973. Shad spawning has continued in the 20 kilometers between the dam and the sea, but at very low levels compared to that which could be achieved by a spawning run into the upper basin.

Traditional and Modern Shad Fishing

In the old days, when fishing for shad, peasant people of the lower Ombrone country stood in riffle areas, holding a bottomless wicker basket over the current,

waiting for shad to pass below. As the shad swam past their feet, the fishermen plunged the basket into the current, trapping the fish. This is an unusual fishing method and shows how abundant the shad once were.

In the years after WWII, the traditional subsistence fishing of the local people was replaced by net fishing at the foot of the dam, where shad tended to congregate. This new technique was very efficient and harvested great quantities of shad. Much of the catch was used for making animal feed. This suggests, however, that until the nets were used, the shad population was large despite the fact that spawning was re-



stricted to the lower part of the river. Although this destructive fishing was eventually banned, pollution began to adversely affect the shad population and in the past few decades there have been some very poor shad runs. Some tributaries had no pollution, but shad were unable to reach them.

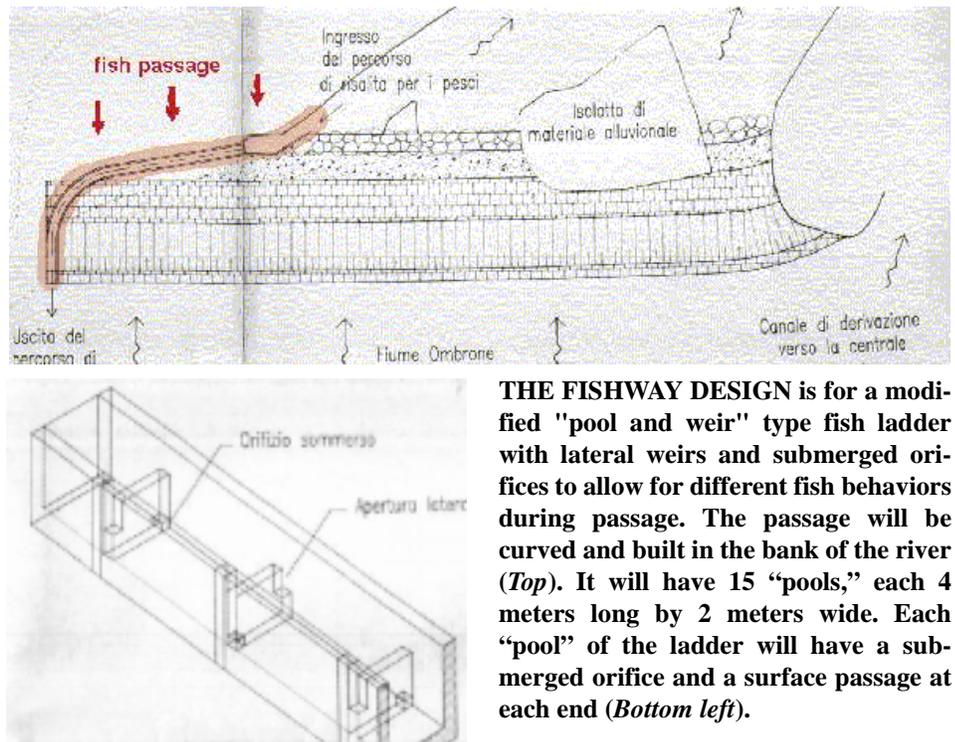
With over-fishing, the dam, and pollution, there were fears that shad would completely disappear from the basin. However, year after year the shad have continued to return to the river and pollution is now greatly diminished thanks to water treatment plants. Unfortunately, we can't discuss numbers of shad present or shad biology because of the lack of scientific data and research. We also have questions about systematics. *Alosa fallax nilotica* is reported to be the only species of shad in our geographic area, but fishermen report catches of shad specimens up to 3-4 kilograms, exceeding the maximum reported size reached by the *nilotica* subspecies. Most likely, we only have *nilotica*, but specific research would be of great interest.

More Casualties

Other fish species also suffer from the impact of the dam. Freshwater species include many Cyprinidae (chub, barb, carp and others). The Ombrone is a warm water river that also has small populations of hatchery-raised brown trout in the tributaries of the upper basin. Other fish that migrate from the sea are also present at the dam. These include eel (*Anguilla anguilla*), mullet (*Mugil* spp., *Liza* spp.), lamprey (*Petromyzon marinus*), and bass (*Morone*, *Labrax*). Only eels can surmount the dam—they are found in the whole basin—but even they could benefit from the construction of a fish passage. Until the last century, sturgeon (*Acipenser sturio*) also inhabited the lower stretch of the river, but they have disappeared and are now very rare throughout the Tyrrhenian Sea.

A Shad Fishway

Since 1976, some fishermen and conservation associations have requested that a fish passage facility be built at the dam. Unfortunately, various factors have thwarted this request. Many disparate interests linked to water and land use, and numerous administrative difficulties, have



THE FISHWAY DESIGN is for a modified "pool and weir" type fish ladder with lateral weirs and submerged orifices to allow for different fish behaviors during passage. The passage will be curved and built in the bank of the river (Top). It will have 15 "pools," each 4 meters long by 2 meters wide. Each "pool" of the ladder will have a submerged orifice and a surface passage at each end (Bottom left).

posed great problems. Italian bureaucracy has shown its worst side. Public officials have worked to satisfy particular interests without thought to the problem and without the will to solve it. Waiting for authorizations and financing, 30 years have passed without results!

In 1997, the regional chapter of Legambiente—a popular Italian conservation association—presented to the public agencies a new proposal for a fish passage facility. The project was designed by engineers Claudio Lombardi, Liciano Lotti and Gaetano Zanchi. Zanchi has worked hard for fish passage at the dam and has undertaken the project without pay. The design is for a modified "pool and weir" type fish ladder with lateral weirs and submerged orifices to allow for different fish behaviors during passage (see Figure). The complex process of authorization and financing is now progressing well and we hope that in the summer of 1999 the fish ladder will be built. The regional administration financed the project in July 1998 and the cost will be about \$85,000 (U.S.).

Now the major problem is receiving authorization from the many interests—particularly agriculture and hydropower—that hold rights to the dam and the river. If things go right, we will have our first new shad run in the Ombrone's upper basin in the spring 2000. We are also working for public financing of scientific research to

monitor the shad run, and we strongly believe that such research must begin in the first year of activity of the fish passage. The Zanchi project at the Steccaia Dam is the first example in Italy of a fish passage facility dedicated to anadromous fish and its success will be very important at a national level.

The Author

MARCO SAMMICHELI is coordinator of the fishery conservation and management sector of the regional chapter (Toscana region) of Legambiente, an Italian conservation organization. He was born in Siena, Italy in 1961 and continues to live there. He is an enthusiastic fly fisherman and holder of several International Game Fish Association world records, including the all tackle record for mediterranean shad—*Alosa fallax nilotica*—which he caught in the Ombrone River with fly fishing tackle. For further information, please see his web page, <http://www.comune.siena.it/levigamb/stec.htm> or contact the author via E-mail at levigamb@comune.siena.it

Special thanks is due Shad Foundation member Jill Leonard for editing and reviewing this article.

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Naugatuck River To Regain Health

The Connecticut Department of Environmental Protection (D.E.P) in partnership with Trout Unlimited and civic groups plans a \$4.5 million (U.S.) restoration project on the Naugatuck—a river once regarded as Connecticut's most polluted. The river, which has traditionally been home to American shad, alewives, and herring, was damaged in the 18th and 19th centuries, when dams were built and towns and factories began dumping sewage and other wastes into its waters.

The project involves habitat restoration, dam removal and re-vegetation and opening up 32 miles of free-flowing river for spawning for the first time since 1800. The D.E.P. hopes to see annual runs of 23,000 American shad returning to the Naugatuck, which would make it the third largest American shad sport fishery in Connecticut. The D.E.P. is also considering restoring an additional eight miles of river in 2001.

The project involves partial removal of two dams (Anaconda Dam and Platts Mill Dam), and full removal of three dams (Freight Street Dam, Plume-Atwood Dam, and Union City Dam). Also, three fishways will be constructed. The first (at Kinneytown Dam) has been completed, and the two others will be located at Tingue Dam and Brays Buckle Dam on the Mad River.

Information sources: The New York Times, Sunday March 14, 1999, Section 14, Connecticut D.E.P.

For information on this conference, see letter from Richard Sabatie in the Shad Forum.

Submissions

Contributions should be double-spaced. Submissions via e-mail or on disk are encouraged. Direct your contributions to Editor-In-Chief, SHAD JOURNAL, P.O. Box 21748, Seattle, WA 98111-3748 or to the e-mail address: hinrich@accessone.com.

Letters to the Editor and Articles. The Journal publishes letters, commentaries, histories, scientific articles, interviews, reviews, and philosophical and methodological items related to shad the world over. There are no page limits but authors are asked to edit their submissions for clarity and precision. Previously published items from other sources can be republished in the Journal if the contributor obtains permission of the author and the copyright holder, and identifies the original publication.

Please do not include footnotes or references in the text. Choose four or five of the most relevant references for inclusion at the end

of the article. References may include a World Wide Web address. Write a brief biographical statement which includes your interest in shad, and current work. Please include your e-mail address, fax number, phone number, and postal address.

News Briefings (Shad Bites). Submit news articles on developments relating to shad. For upcoming meetings, submit a brief description, including title, a short paragraph on objectives and content, dates, location, registration requirements, and the meeting contact person's name, street address, and phone/FAX/e-mail address.

Obituaries. The Foundation will honor the memory of members and friends through obituaries. The obituary should describe the person's history (date and place of birth, professional address and title) and his/her involvement with shad.