

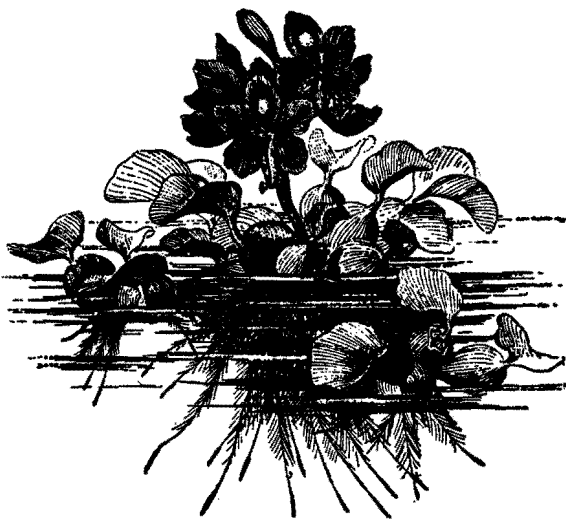
# **PROGRAM**

**THE  
AQUATIC PLANT MANAGEMENT  
SOCIETY, INC.**

**THIRTY-SECOND ANNUAL  
MEETING**

**and**

**INTERNATIONAL SYMPOSIUM  
ON THE BIOLOGY AND  
MANAGEMENT OF AQUATIC  
PLANTS**



**July 12 - 16, 1992**

**MARRIOTT HOTEL  
DAYTONA BEACH, FLORIDA, USA**

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## WELCOME!

The Aquatic Plant Management Society extends its welcome to participants of the Thirty-Second Annual Meeting and the International Symposium on the Biology and Management of Aquatic Plants. Two years ago it was suggested that the Daytona Beach meeting site would be an excellent venue for international and family participation. The organizing committees have worked hard to provide a diverse and informative program as well as educational displays and exhibits. The APMS is pleased to organize this Symposium and we hope that everyone benefits from and enjoys the meetings.

Randall K. Stocker, APMS President.

## PROGRAM SUMMARY

*Function locations in italics*

### SATURDAY, 11th JULY 1992

2:00pm APMS Board Meeting  
*Flagler A*

### SUNDAY, 12th JULY 1992

1:00pm Registration  
- 5:00 *Atlantic Avenue Corridor*  
3:30 APMS Publications Committee Meeting  
*Executive Boardroom A*  
4:30 Student Reception (by invitation only)  
*Flagler A*  
6:00 President's Reception and Exhibits  
*Halifax/Flagler B & C*  
7:30 Session Chair Meeting  
*Tomoka A*  
8:00 Field Trip Meetings  
Plant control - *Tomoka C*  
Everglades - *Tomoka B*

### MONDAY, 13th JULY 1992

7:30am Registration *Atlantic Avenue Corridor*  
- 5:00 Exhibits *Halifax/Flagler B & C*  
9:30 Call to Order; Presidential Address  
*Tomoka/Crystal Ballroom*  
10:00 Plenary Session  
12:00 Spouse/Partners' Lunch - *Coquina's*  
1:00pm Plenary Session  
3:00 Session I - General Papers  
4:30 APMS Annual Business Meeting  
6:30 Beach Party  
*Parkside Terrace*

## TUESDAY, 14th JULY 1992

6:30am APMS Local Chapter Presidents' Breakfast

*Flagler A*

- 8:00 Session IIA - Herbicide Effects  
*All Sessions A in Tomoka Ballroom*  
Session IIB - Photosynthesis and Aquatic Plants  
*All Sessions B in Crystal Ballroom*
- 10:20 Session IIIA - Utilization of Aquatic Weeds  
Session IIIB - Nutrition and Aquatic Plants
- 1:00pm Session IVA - Biocontrol Mechanisms  
Session IVB - Aquatic Macrophyte Communities
- 3:20 Session VA - Herbicide Physiology  
Session VB - Macrophyte/Algal Interactions
- 7:00 Workshops  
*Rooms TBA*

## WEDNESDAY, 15th JULY 1992

- 8:00am Session VIA - Field Trials of Herbicides  
Session VIB - Reproductive Mechanisms
- 10:20 Session VIIA - Aquatic Plant Management Programs  
Session VIIB - General Physiology
- 1:00pm Session VIIIA - General Management  
Session VIIIB - Growth and Nutrition of Aquatic Plants
- 3:30 Session IX - Poster Session  
*Flagler A*
- 6:00 Cocktail Hour  
*Atlantic Avenue Corridor*
- 7:00 Symposium Dinner  
*Tomoka/Crystal/St. Johns Ballroom*

## THURSDAY, 16th JULY 1992

- 8:30am Session XA - Mechanical Harvesting  
Session XB - International Aquatic Weed Problems
- 10:30 Session XI - Closing General Session  
*Tomoka/Crystal Ballroom*
- 11:30 APMS Business Meeting and Installation of 1992-1993 Officers
- 12:00 Adjournment of 32nd Annual Meeting
- Luncheon and Meeting of APMS Board  
*Flagler A*

## PLENARY SPEAKERS' BIOGRAPHIES

### Dr. Tomi Petr

Since 1980 Dr. Tomislav O. Petr has served in the United Nations Food and Agricultural Organization (Rome, Italy) as Fishery Resources Officer. Dr. Petr was born in Czechoslovakia and earned his M.Sc. in 1960 from Charles University in Prague and his Ph.D. degree from the University of Ghana in 1970. He pursued his research interests and lectured in limnology and fisheries in Ghana (1964-70) and Uganda (1970-73).

From 1974-77 he taught at Monash University (Australia) and worked on the salvinia and fisheries problems on the Sepik River in Papua, New Guinea (1977-80). As the UN-FAO Fishery Resources Officer, Dr. Petr identifies problem areas and opportunities for fishery production primarily in Asia, Africa, and the Pacific Basin. His major interests are fish/aquatic plant interactions, fisheries and river basin management, and vectors of water born disease.

### Dr. George Bowes

Dr. George Bowes is a professor in the Botany Department, and affiliated with the Center for Aquatic Plants, at the University of Florida in Gainesville. He was born and educated in London (UK), receiving his B.Sc. Botany (1963), Ph.D. Plant Physiology (1967), M.I. Biol. (1968), C. Biol. (1986) and Fl. Biol. (1988) from Queen Mary College, University of London.

In 1968 he became a research associate at the University of Illinois (1968-71) in the USDA Soybean laboratory. This research position was followed (1971-72) by a Carnegie research fellowship at the Carnegie Institution in Stanford, California. For the past 20 years Dr. Bowes has been in the academic rank (teaching and research) in the Botany Department, University of Florida. His primary research interests include photosynthesis, photorespiration, rubisco regulation, and general plant physiology. He discovered the oxygenase activity of rubisco and C-4 like characteristics of photosynthesis in submersed aquatic plants.

### Dr. Jan Kvet

Between 1990-1992, Dr. Jan Kvet was a member of the first freely elected Czech National Council where he served on the committee for the environment and the commission for science. Now, he is returning to his research work and will start teaching at the new University of South Bohemia at Ceské Budejovice.

# THE PROGRAM

Dr. Kvet was born in Prague, Czechoslovakia and studied botany at Charles University in Prague. After completing his Ph.D. thesis on the production of forest-floor vegetation, he became involved in ecological studies of production in wetlands and higher aquatic plants, and participated in many national and international programs.

Since 1956 he has been successively associated with three laboratories of the Czechoslovak Academy of Sciences' Institute of Botany at Pruhonice (1956-62), Brno (1964-72) and Trebon (since 1973). In 1962-63 he spent 4 terms at the Department of Agriculture at the University of Oxford on a postgraduate fellowship in plant production ecology which has remained the focus of his research interest.

Dr. Kvet is the author of some 100 scientific papers and co-editor of 6 books. He is married and has 2 daughters and 1 grandson.

## Dr. Clive Howard-Williams

Dr. Clive Howard-Williams is the Research Coordinator for Lakes and Wetlands in the New Zealand National Institute for Water and Atmosphere, and commercial manager for the Taupo Research Laboratory. He was born in Zimbabwe, Central Africa, and graduated with M.Phil. and Ph.D. degrees in plant ecology from the University of London (Imperial College and Westfield College). His early research experience was in geobotany and the use of vegetation for heavy metal prospecting.

This was followed by a six year stay in Malawi, East Africa (1968-1973) where he studied the limnology of large swamps with special emphasis on their impact on shallow lake fisheries. Two years of work at the Max Planck Institute in West Germany in 1973-74 led to research on production and decomposition of the floating vegetation of the central Amazon, and more recently oxbow lakes of Sao Paulo province in Brazil. A four year research program in coastal lake ecosystems in South Africa between 1974-78 was an introduction to management problems associated with large beds of submerged plants. This research theme has continued in New Zealand, where Dr. Howard-Williams has been for the last 13 years. His current research interests are on growth and nutrient cycling in shallow lakes, wetlands, and submerged aquatic weed beds.

## AQUATIC PLANT MANAGEMENT SOCIETY, INC. THIRTY-SECOND ANNUAL MEETING and INTERNATIONAL SYMPOSIUM ON THE BIOLOGY AND MANAGEMENT OF AQUATIC PLANTS

July 12 - 16, 1992  
MARRIOTT HOTEL  
DAYTONA BEACH, FLORIDA, USA

*This program is offered on a non-discriminatory basis, without regard to race, color, national origin, sex, handicap or age.*

*	= Student Presentation
TBA	= To Be Announced
(1)	= Paper Number
Bold	= Presenting author

The affiliation of only the presenting author is listed in the program but the affiliations of all authors will be included in the published abstracts. At back of this program there is an alphabetical listing of presenters with their paper number. This number indicates their order in the program.

SATURDAY, 11th JULY 1992, 2:00pm

2:00pm APMS Board of Directors Meeting

SUNDAY, 12th JULY 1992, 1:00 pm - 8:00 pm

1:00pm	Registration Desk, Editorial Desk,
- 5:00	Local Arrangements Desk and Exhibits Open <i>Atlantic Avenue Corridor: Halifax/Flagler B &amp; C</i>
3:30	APMS Publications Committee Meeting <i>Executive Boardroom A</i>
4:30	Student Reception (by invitation only) <i>Flagler A</i>
6:00	PRESIDENT'S RECEPTION(semi-formal dress) <i>Halifax/Flagler B &amp; C</i>
7:30	Session Chair Meeting <i>Tomoka A</i>
8:00	Field Trip Meetings Plant control - <i>Tomoka C</i> Everglades - <i>Tomoka B</i>

MONDAY, 13th JULY 1992, 7:30 am - 2:30 pm

**7:30am REGISTRATION Continued**  
**- 5:00** *Atlantic Avenue Corridor*  
**EXHIBITS on Display Until Thursday**  
*Halifax/Flagler B & C*

**9:30 CALL TO ORDER AND WELCOME:**  
APMS President Randall Stocker.  
**Announcements:** Clarke Hudson.  
*Tomoka/Crystal Ballroom*

**9:45 PRESIDENTIAL ADDRESS:**  
APMS President Randall Stocker.

**PLENARY SESSION**  
**Chair: Randall Stocker**

**10:00** Aquatic Weeds in Developing Regions. **Tomi**  
**(1)** **Petr**, Fishery Resources Officer, Food and  
Agriculture Organization of the United Nations,  
Rome, Italy.

**10:45** The Ecophysiology of Aquatic Plants. **George**  
**(2)** **Bowes**, Botany Department, University of Florida,  
Gainesville, Florida.

**11:30 Lunch**

**12:00 Spouse/Partners' Lunch - *In Coquina's; an***  
*informal luncheon for spouses, partners and*  
*children of symposium participants, with a welcome*  
*and orientation to Daytona Beach and Central*  
*Florida. Please join us!*

**Plenary Session Continued**

**1:00pm** Environmental Problems in Post-Communist  
**(3)** Central Europe. **Jan Kvet**, Czechoslovak  
Academy of Sciences, Institute of Botany, Trebon,  
Czechoslovakia.

**1:45** Ecology and Management of Submerged Aquatic  
**(4)** Weeds. **Clive Howard-Williams**, Taupo Research  
Laboratory, National Institute of Water and  
Atmospheric Research, Taupo, New Zealand.

**2:30 Afternoon Break**  
*(All breaks held in Exhibit area)*

MONDAY, 13th JULY 1992, 3:00 pm - 8:30 pm

**SESSION I**  
*Tomoka/Crystal Ballroom*  
**General Papers**  
**Chair: Clarke Hudson**

**3:00** Aquatic Plant Management - Development  
**(5)** Perspectives and Needs. **Tom Brabben**, The  
World Bank, Washington, DC.

**3:15** Ten Years of Information Services. **Victor**  
**(6)** **Ramey**, University of Florida, Gainesville,  
Florida.

**3:30** Nonindigenous Aquatic Nuisance Prevention and  
**(7)** Control Act of 1990; The Aquatic Nuisance  
Species Task Force. **William E. Roper**, U.S.  
Army Corps of Engineers, Washington, DC.

**3:45** The Long Water - Kissimmee River. **Charles E.**  
**(8)** **Graves**, South Florida Water Management  
District, Okeechobee, Florida.

**4:00** The Aquatic Plant Industry, an Opportunity for  
**(9)** International Cooperation. **Don Bryne**,  
Suwannee Labs, Lake City, Florida.

**4:15** Process and Progress of Aquatic Herbicide Re-  
**(10)** Registration by the USEPA. **Fred Kerpel**, U.S.  
Environmental Protection Agency, Atlanta,  
Georgia.

**4:30** **APMS Business Meeting and Local Chapter**  
**- 5:30** **Reports.**

**6:30** **BEACH PARTY. *Parkside Terrace***  
**(informal dress, volleyball, picnic)**

[NOTE: Alcoholic beverages are not allowed on  
the beach].

**8:30** **Indoor Private Bar for Symposium.**  
*Tomoka/Crystal Ballroom*

**6:30 APMS Local Chapter Presidents' Breakfast**  
*Flagler A*

**SESSION IIA**  
*Tomoka Ballroom*  
**Herbicide Effects**  
**Chair: Kurt Getsinger**

**8:00** Inhibition of Propagule Formation and Propagule  
(11) Dormancy by Mariner Herbicide in Hydrilla  
verticillata, Potamogeton nodosus: Implications  
for Long-Term Macrophyte Management. **L.W.J.**  
**Anderson**, U.S. Department of Agriculture,  
Agriculture Research Service, Davis, California.

**8:15** Hydrilla Control Trials in Florida with Mariner  
(12) (Bensulfuron Methyl) Herbicide. **Ken Langeland**,  
University of Florida, Gainesville, Florida.

**8:30** \* Use of Hollow-Fiber Dialysis Tubing for  
(13) Measurement of Diffusive Flux of Bensulfuron-  
Methyl in Sediments. **Mark D. Sytsma** and  
**L.W.J. Anderson**, U.S. Department of  
Agriculture, Agriculture Research Service, Davis,  
California.

**8:45** Efficacy of Bensulfuron Methyl on Eurasian  
(14) Watermilfoil. **L.S. Nelson**, M.D. Netherland and  
**K.D. Getsinger**, U.S. Army Corps of Engineers,  
Vicksburg, Mississippi.

**9:00** \* Sensitivity of Floating Aquatic Weeds to Imazapyr  
(15) in the Water Column. **Chad R. Coley** and  
**Stratford H. Kay**, North Carolina State University,  
Raleigh, North Carolina.

**9:15** \* The Influence of Cultural Factors and Glyphosate  
(16) on the Control of Torpedo Grass (Panicum  
repens L.). **B.E. Smith**, D.G. Shilling and W.T. H  
aller, University of Florida, Gainesville, Florida.

**9:30** \* Evaluation of Myriophyllum sibiricum in Axenic  
(17) Culture as a Bioassay for Predicting Effects of  
Pesticides on Non-Target Aquatic Plants. **Roxana**  
**D. Roshon**, Gerald R. Stephenson and Roger F.  
Horton, University of Guelph, Guelph, Canada.

**9:45** Copper Residues in the Environment - What Are  
(18) We Looking For? **Edwin F. Koldenhoven**, Griffin  
Corporation, Valdosta, Georgia.

**10:00 Morning Break**

**SESSION IIB**  
*Crystal Ballroom*  
**Photosynthesis and Aquatic Plants**  
**Chair: Mark Rattray**

**8:00** Seasonal Variation in Photosynthetic Capacity of  
(19) Eelgrass Leaves in Relation to Leaf Age,  
Chlorophyll *a* and Nutrient Content. **Jens**  
**Borum**, University of Copenhagen, Copenhagen,  
Denmark.

**8:15** \* Chlorophyll Fluorescence of Potamogeton lucens  
(20) and Elodea canadensis: The Response of  
Photosynthetic Electron Transport to Limiting  
CO<sub>2</sub> Concentrations. **Lucina C. van Ginkel**,  
**Philip R. van Hasselt** and **Hidde B.A. Prins**,  
ECOTRANS, Haren, The Netherlands.

**8:30** Morphological and Photosynthetic  
(21) Characteristics of Potamogeton obtusifolius  
**Mert. & Koch**, Grown at Different Depths. **S.C.**  
**Maberly**, Institute of Freshwater Ecology,  
Ambleside, England.

**8:45** \* Physiological Plasticity in Elodea nuttallii  
(22) (Planch.) St. John. **J.I. Jones**, **J.W. Eaton** and  
**K. Hardwick**, University of Liverpool, Liverpool,  
England.

**9:00** Inorganic Carbon Transport and the Internal  
(23) Limiting Factor for Photosynthetic Production in  
Submerged Macrophytes. **Sven Beer**, Tel Aviv  
University, Tel Aviv, Israel.

**9:15** Inorganic Carbon Constraints on Growth of  
(24) Submerged Macrophytes. **Tom Vindbaek**  
**Madsen** and **Mette Vadstrup**, Aarhus University,  
Risskov, Denmark.

**9:30** What Induces Hydrilla to Shift Between C<sub>3</sub>- and  
(25) C<sub>4</sub>-Like Photosynthesis? **J.B. Reiskind**, **M.R.**  
**Rattray** and **G. Bowes**, University of Florida,  
Gainesville, Florida.

**9:45** Ecological Significance of C<sub>4</sub>-Like Photosynthesis  
(26) in Hydrilla. **W.E. Spencer**, **R.G. Wetzel** and **J.A.**  
**Teeri**, University of Michigan, Ann Arbor,  
Michigan.

**10:00 Morning Break**

**SESSION IIIA**

*Tomoka Ballroom*

**Utilization of Aquatic Weeds**

**Chair: Steve de Kozlowski**

- 10:20 \* Yield and Nutritive Value of Leaf Protein of Aquatic Weeds from North India. V.N. Pandey, University of Gorakhpur, Gorakhpur, India.  
(27)
- 10:35 The Use of Dry Water Hyacinth (Eichhornia crassipes (Mart.) Solms) as a Substratum for Growing Plants on the Raft. Rajanee Virabalin, Chulalongkorn University, Bangkok, Thailand.  
(28)
- 10:50 Effects of Aquatic Plants on the Environment: The Use of Water Hyacinths and Other Aquatic Plants for Nutrient Reduction in Lakes. David L. Haselow, John R. Shuman and William F. DeBusk, Aquatic Plant Technology, Cocoa, Florida.  
(29)
- 11:05 Nutrient Removal Potential of Several Aquatic Weeds. Yoko Oki and Akihide Fushimi, Okayama University, Okayama, Japan.  
(30)
- 11:20 Leaf Protein Concentrate from Water Hyacinth (Eichhornia crassipes (Mart.) Solms). Boonthida Kositsup, Rajanee Virabalin and Hunsu Punnapayak, Chulalongkorn University, Bangkok, Thailand.  
(31)
- 11:35 Use of Aquatic Weeds for Pollution Control and Wastewater Treatment Under Jamaican Conditions. P.V. Devi Prasad, The University of the West Indies, Kingston, Jamaica.  
(32)
- 11:50 Control and Utilization of Cattail (Typha latifolia L.). M. Siriworakul and P. Benyasut, Royal Irrigation Department, Nonthaburi, Thailand.  
(33)

12:05 Lunch

**SESSION IIIB**

*Crystal Ballroom*

**Nutrition and Aquatic Plants**

**Chair: Kenneth Mantai**

- 10:20 Injection of Nutrients Into a Sand Rooting Media for Culture of Dioecious Hydrilla. David L. Sutton, University of Florida, Ft. Lauderdale, Florida.  
(34)
- 10:35 Interrelationships Between Rooting Depths of Submersed Macrophytes and Sediment Nutrient Availability. Dwilette G. McFarland and John W. Barko, U.S. Army Corps of Engineers, Vicksburg, Mississippi.  
(35)
- 10:50 \* The Role of Hydrosol in Recolonization of Native Macrophytes. Arthur W. Dunn and John H. Rodgers, Jr., University of Mississippi, University, Mississippi.  
(36)
- 11:05 \* Effects of Eutrophication on Ranunculus penicillatus subsp. pseudofluitans (Syme) S. Webster and Potamogeton pectinatus L.: An Experimental Study. A.J. Spink, K.J. Murphy, S.M. Smith and D.F. Westlake, University of Glasgow, Glasgow, Scotland.  
(37)
- 11:20 Responses of Aquatic and Marsh Plants to Hypereutrophic Conditions in Central European Fishponds. J. Pokorny, J. Kvet and S. Husak, Czechoslovak Academy of Sciences, Trebon, Czechoslovakia.  
(38)
- 11:35 \* Nutrient and Aquatic Plant Status of Freshwater Lochs in the Shetland Islands. M. Hennessy and K.J. Murphy. University of Glasgow, Glasgow, Scotland.  
(39)
- 11:50 Nutritional Ecology of Submersed Macrophytes. John W. Barko, U.S. Army Corps of Engineers, Vicksburg, Mississippi.  
(40)

12:05 Lunch

**SESSION IVA**

*Tomoka Ballroom*

**Biocontrol Mechanisms**

**Chair: Wendy Forno**

- 1:00** Managing Filamentous Algae Growth Using  
(41) Grass Carp and Algicides. Richard Couch, Oral Roberts University, Tulsa, Oklahoma.
- 1:15** Capture of Grass Carp From Vegetated Lakes.  
(42) S.A. Bonar, S.A. Vecht, C.R. Bennett, G.B. Pauley and G.L. Thomas. University of Washington, Seattle, Washington.
- 1:30** Procedures for Introducing Biocontrol Agents of  
(43) Noxious Plants Into the U.S. Alfred F. Cofrancesco, Jr., U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- 1:45** Impact of Early-Season Migrations of  
(44) Alligatorweed Stemborers on Alligatorweed Populations in North Carolina. Stratford H. Kay, North Carolina State University, Raleigh, North Carolina.
- 2:00** Biological Control of Pistia stratiotes: Impacts of  
(45) Neohydronomus affinis and Spodoptera pectinicornis. Ted D. Center and F. Allen Dray Jr., U.S. Department of Agriculture, Agriculture Research Service, Fort Lauderdale, Florida.
- 2:15** Rearing and Releasing Hydrellia pakistanae and  
(46) Hydrellia balciunasi, Biological Control Agents of Hydrilla verticillata. Jan Freedman, U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- 2:30** Effect of Australian Insects on the Growth of the  
(47) Paperbark Tree, Melaleuca quinquenervia, A Serious Wetland Weed in Florida, USA. Joe Balciunas, U.S. Department of Agriculture, Agriculture Research Service, Townsville, Australia.
- 2:45** Attachment and Infection of Fungal Pathogens on  
(48) Submersed Aquatic Plants. Edwin A. Theriot, U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- 3:00** Afternoon Break

**SESSION IVB**

*Crystal Ballroom*

**Aquatic Macrophyte Communities**

**Chair: Moshe Agami**

- 1:00** Assessment of Vegetation in Two Rivers  
(49) Entering Lake Superior Using Low Altitude Aerial Infrared and Color Photography Coupled with Image Analysis. P.F. Lee, Lakehead University, Thunder Bay, Canada.
- 1:15** Changes in Plant Community Structure  
(50) Following Liming of an Acidified Adirondack Lake. P.A. Bukaveckas, E.R. Weiher and C.W. Boylen. Institute of Ecosystem Studies, Millbrook, New York.
- 1:30** Changes in the Plant Community of Chautauqua  
(51) Lake, N.Y., Between 1937 and 1991. Janice Alm Bowman and Kenneth E. Mantai, State University of New York, Fredonia, New York.
- 1:45** \* Seasonality of Community Composition and  
(52) Biomass for Selected Submersed Aquatic Macrophytes, Lake Okeechobee, Florida. Margaret S. Hopson and Paul V. Zimba, University of Florida, Gainesville, Florida.
- 2:00** \* Environmental Factors Affecting Submerged  
(53) Macrophyte Communities in Regulated Waterbodies in Egypt. M.M. Ali, A. Hamad, I. Springuel and K.J. Murphy, University of Glasgow, Glasgow, Scotland.
- 2:15** \* The Distribution, Ecology and Conservation of  
(54) Luronium natans (L) Raf. in Britain. N.J. Willby and J.W. Eaton, University of Liverpool, Liverpool, England.
- 2:30** Potential for Re-Establishment of Macrophytes  
(55) in a Shallow Coastal Lagoon in New Zealand. P.J. Gerbeaux and K.F. O'Connor, Lincoln University, Christchurch, New Zealand.
- 2:45** Ecological Differentiation of Populations of  
(56) Utricularia minor L. and Utricularia intermedia Hayne. P. Kosiba and J. Sarosiek, Wroclaw University, Wroclaw, Poland.
- 3:00** Afternoon Break



**SESSION VA**

*Tomoka Ballroom*  
**Herbicide Physiology**  
 Chair: Max Wade

- 3:20 \* Conductivity: A Measure of Membrane Injury of  
 (57) Aquatic Plants. Paul G. Fader and John H. Rodgers, Jr., University of Mississippi, University, Mississippi.
- 3:35 \* Methods for Evaluating the Activity of Aquatic  
 (58) Herbicides. G.E. MacDonald, D.G. Shilling, T.A. Bewick and W.T. Haller, University of Florida, Gainesville, Florida.
- 3:50 Interactive Effects of Photoperiod and Fluridone  
 (59) on *Hydrilla verticillata*. D.G. Shilling, G.E. MacDonald, R.L. Doong and W.T. Haller, University of Florida, Gainesville, Florida.
- 4:05 Effects of Fluridone on Carotenoids, Chlorophyll  
 (60) and Anthocyanins in *Hydrilla verticillata*. R. L. Doong, G.E. MacDonald and D.G. Shilling, University of Florida, Gainesville, Florida.
- 4:20 AHAS, A New Enzyme Target in Aquatic Plant  
 (61) Herbicide Control. M.R. Rattray, G.E. MacDonald, D.G. Shilling and G. Bowes, University of Florida, Gainesville, Florida.
- 4:35 Peroxidase Levels as Indicators of Herbicide-  
 (62) Induced Stress in Aquatic Plants: Techniques for Analysis. S.L. Sprecher, A.B. Stewart and J.M. Brazil, ASci Corporation, Vicksburg, Mississippi.
- 4:50 Leaf Disk/Shoot Section Contaminant Bioassay  
 (63) Systems for Aquatic Macrophytes. D.A. Francko, Miami University, Oxford, Ohio.
- 5:05 End of Session

**SESSION VB**

*Crystal Ballroom*  
**Macrophyte/Algal Interactions**  
 Chair: Joseph Caffrey

- 3:20 Macrophyte Stands as a Habitat: Environmental  
 (64) Factors and Structure. U. Wyckera, R. Zoufal, P. Christoff-Dirry, and G.A. Janauer, Institute of Plant Physiology, Vienna, Austria.
- 3:35 Change in Submerged Macrophytes and  
 (65) Filamentous Algae in Green Lake, Wisconsin, from 1921. Mary Jane Bumby, Green Lake Sanitary District, Green Lake, Wisconsin.
- 3:50 Seasonal Relationship Between Southern Naiad  
 (66) and Associated Periphyton. Ernesto Lasso de la Vega, J.R. Cassani and H. Allaire, Lee County Hyacinth Control District, Fort Myers, Florida.
- 4:05 \* Relationships Between Submerged Macrophytes  
 (67) and Algae in Freshwater Lochs of Differing Trophic Status. S.J. Marrs, K.J. Murphy and P.J. Dominy, University of Glasgow, Glasgow, Scotland.
- 4:20 Aquatic Macrophytes versus Phytoplankton in  
 (68) Lakes: A Practical Management Guide. Mark V. Hoyer and Daniel E. Canfield, Jr., University of Florida, Gainesville, Florida.
- 4:35 Relations of *Myriophyllum* and Other  
 (69) Macrophytes to Sediment Characteristics in Backwaters of the R. Danube (Lobau-Area, Vienna). G.A. Janauer, P. Christoff-Dirry, U. Wyckera and R. Zoufal, Institute of Plant Physiology, Vienna, Austria.
- 4:50 Productivity of Submerged Macrophytes and  
 (70) Associated Eiphytes, Lake Okeechobee, Florida. P.V. Zimba, University of Florida, Gainesville, Florida.
- 5:05 End of Session

7:00 -

**WORKSHOPS**

1. Evaluation of Invasions and Declines of Submersed Aquatic Macrophytes.
2. Carbon Fixation and Concentrating Mechanisms.
3. New Frontiers in Biocontrol.
4. Distribution and Spread of Aquatic Plants.

*Workshop rooms to be announced*

- John Barko, Craig Smith and Pat Chambers.
- George Bowes and Tom Madsen.
- Al Cofrancesco and Wendy Forno.
- Randy Westbrooks and Don Schmitz.

**SESSION VIA**

*Tomoka Ballroom*

**Field Trials of Herbicides**

**Chair: Don Riemer**

- 8:00 Evaluations of Fluridone Concentration and  
(71) Exposure Time Requirements for Control of Hydrilla and Eurasian Watermilfoil. M.D. Netherland, K.D. Getsinger and E.G. Turner, U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- 8:15 Concentration/Exposure Relations of Fluridone  
(72) Associated with Hydrilla Management in the Withlacoochee River, Florida. Alison M. Fox, W.T. Haller and D.G. Shilling, University of Florida, Gainesville, Florida.
- 8:30 Impacts on Wetland Vegetation from a Large  
(73) Scale Sonar™ Application. Terence M. McNabb and Thomas Clingman, Resource Management/Aquatics Unlimited, Kent, Washington.
- 8:45 Effects of Rodeo™ on Different Densities of  
(74) Eichhornia crassipes. Eric D. Gutierrez Lopez. Instituto Mexicano de Tecnologia del Agua, Mexico City, Mexico.
- 9:00 Chemical Control of Emergent Aquatic Weeds in  
(75) the Irrigation System in the Sudan. H. Abdel Gadir, Agricultural Research Corporation, Wad Medani, Sudan.
- 9:15 Fate and Persistence of Herbicides for Control of  
(76) Hydrilla verticillata and Myriophyllum spicatum in Guntersville Reservoir. John H. Rodgers, Jr., Arthur W. Dunn, Earl Burns, A. Leon Bates and David Webb, University of Mississippi, University, Mississippi.
- 9:30 Efficacy of Bensulfuron-Methyl on Aquatic  
(77) Macrophytes in Two Central California Ponds. Stuart D. Perry and J. Robert C. Leavitt. University of California, Davis, California.
- 9:45 Label Update on RENOVATE and SONAR and  
(78) Recent Sonar Research Results. David P. Tarver, DowElanco, Tallahassee, Florida.

10:00 Morning Break

**SESSION VIB**

*Crystal Ballroom*

**Reproductive Mechanisms**

**Chair: Georg Janauer**

- 8:00 Seed Production in Monoecious and Dioecious  
(79) Populations of Hydrilla. Kerry K. Steward, U.S. Department of Agriculture, Agriculture Research Service, Fort Lauderdale, Florida.
- 8:15 \* Mechanisms of Coexistence of Submerged  
(80) Macrophytes in Temporary Marshes. Role of the Seed Bank and the Regeneration Phase. Anne Bonis, Patrick Grillas and Jacques Lepart, Station Biologique Tour du Valat - CEFE-CNRS, Montpellier, France.
- 8:30 Germination, Growth and Development of Two  
(81) Nymphaea Species Conserved at the Botanic Gardens of Tel Aviv University. Moshe Agami and Malgorzata Walczak, Tel Aviv University, Tel Aviv, Israel.
- 8:45 \* The Significance of Germination Behaviour of  
(82) Typha subulata on Weed Management. Maria T. Sobrero, Osvaldo A. Fernandez and Mario R. Sabbatini, University of Glasgow, Glasgow, Scotland.
- 9:00 Vegetation, Seed Banks and Seedling  
(83) Establishment in Two Softwater Lakes: Obligate Sexual Reproducers Dominate. John Titus and Gary Sullivan, State University of New York, Binghamton, New York.
- 9:15 Potamogeton pectinatus L. Propagule Growth  
(84) and Approaches for Modelling Survival of Submerged Macrophytes. Gerda M. van Dijk and Jan H. Janse. National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands.
- 9:30 Water Management Practices Influence Plant  
(85) Reproduction and Macrophyte Community Composition in a Northern California Irrigation Canal. David Spencer and Greg Ksander, U.S. Department of Agriculture, Agriculture Research Service, Davis, California.
- 9:45 \* Turion Production by Hydrilla. J.D. Miller,  
(86) W.T. Haller and M.S. Glenn. University of Florida, Gainesville, Florida.

10:00 Morning Break

**SESSION VIIA**

*Tomoka Ballroom*

**Aquatic Plant Management Programs**

**Chair: Fred Nibling**

- 10:20** Exotic Aquatic Plant Management in Florida;  
(87) History and Status. **Jeffrey D. Schardt**, Florida Department of Natural Resources, Tallahassee, Florida.
- 10:35** An Overview of the Aquatic Plant Control  
(88) Operations Support Center. **Wayne T. Jipsen**, William C. Zattau, and Catherine A. Robbins, U.S. Army Corps of Engineers, Jacksonville, Florida.
- 10:50** Review of Benefits of the British Columbia  
(89) Aquatic Plant Management Program. **P.R. Newroth** and M.D. Maxnuk, British Columbia Ministry of Environment, Victoria, Canada.
- 11:05** Aquatic Plant Control in the Kissimmee River: A  
(90) Ten Year History. **Jacqueline C. Jordan** and L. Mitchum, Florida Department of Natural Resources, Royal Palm Beach, Florida.
- 11:20** The Invasion of South Florida by Melaleuca  
(91) quinquenervia (Cav.) Blake. **Dan Thayer** and Francois Laroche, South Florida Water Management District, West Palm Beach, Florida.
- 11:35** Water Related Projects of the Imperial Irrigation  
(92) District. **Randall K. Stocker**, Imperial Irrigation District, Imperial, California.
- 11:50** The Influence of Vegetation Pre-dredging on the  
(93) Post-dredging Community. **P. Max Wade**, Loughborough University, Loughborough, England.
- 12:05** Lunch

**SESSION VIIB**

*Crystal Ballroom*

**General Physiology**

**Chair: Stephen Maberly**

- 10:20** Growth and Tuber Production of Monoecious  
(94) and Dioecious Hydrilla in the United States. **Thai K. Van**, U.S. Department of Agriculture, Agriculture Research Service, Fort Lauderdale, Florida.
- 10:35** Internal Gas Transport in Emergent Aquatic  
(95) Macrophytes. **Hans Brix** and Brian Sorrell, Aarhus University, Risskov, Denmark.
- 10:50** Oxygen Exchange by Entire Root Systems of  
(96) Emergent Plants. **Brian K. Sorrell**, Philip T. Orr and Hans Brix, Murray-Darling Freshwater Research Centre, Albury, Australia.
- 11:05** \* Effects of Metabolic Products of Cellulose-  
(97) Utilizing Organisms on Hydrilla verticillata Royle. **Brenda L. Pompey** and Dean Martin, University of South Florida, Tampa, Florida.
- 11:20** Crust Composition on Leaves of Three  
(98) Submerged Angiosperms. **Y. Waisel**, A. Stahel and J. Oertli, Tel Aviv University, Tel Aviv, Israel.
- 11:35** Acute Toxicity of Plant Growth Regulators  
(99) Using in vitro Cultures of Myriophyllum spicatum. **Kimon Bird**, University of North Carolina, Wilmington; North Carolina.
- 11:50** Growth Regulator Effects on in vitro shoot  
(100) regeneration of Crassula helmsii. **Michael E. Kane**, Nancy L. Philman and Carolyn A. Bartuska, University of Florida, Gainesville, Florida.
- 12:05** Lunch

**SESSION VIIIA**

*Tomoka Ballroom*

**General Management**

**Chair: Joe Zolczynski**

- 1:00**  
**(101)** Clever Aliens. Kathleen H. Bowmer, G. McCorkelle and G.R. Sainty, Center for Irrigation and Freshwater Research, Griffith, Australia.
- 1:15**  
**(102)** Aquatic Plant Community Response (Percent Composition and Biomass Estimates) to the 1990 Extreme Drawdown, Muck Removal and Discing Project on East Lake Tohopekaliga, Florida. Mikel W. Hulon, Edwin J. Moyer, Robert S. Butler and Robert W. Hujik, Florida Game and Freshwater Fish Commission, Kissimmee, Florida.
- 1:30**  
**(103)** Lime Additions in the Control of Aquatic Macrophyte Growth in Hardwater Lakes. P.A. Chambers and E.E. Prepas, National Hydrology Research Institute, Saskatoon, Canada.
- 1:45**  
**(104)** Harbor Regional Park-Machado Lake Bulrush Harvest/Mosquito Control Project. Thomas J. McNabb and David Attaway, Aquatics Unlimited, Martinez, California.
- 2:00**  
**(105)** The Control of Algae by Decomposing Barley Straw. J.R. Newman and P.R.F. Barrett, AFRC Long Ashton Research Station, Reading, England.
- 2:15**  
**(106)** Possibilities of Utilizing an Exotic Weed Lantana camara to Control the Growth of Water Hyacinth. Manjula K. Saxena (nee Kulshrestha), University of Rajasthan, Jaipur, India.
- 2:30**  
**(107)** Aquatic Weeds and Their Effect on the Hydraulic Efficiency of Open Channels. Fakhry Khattab, Water Research Center, Cairo, Egypt.
- 2:45**  
**(108)** Weed and Silt Control in Mosquito Ditches. Jonas Stewart, East Volusia Mosquito Control District, Daytona Beach, Florida.
- 3:00** Afternoon Break

**SESSION VIIIB**

*Crystal Ballroom*

**Growth and Nutrition of Aquatic Plants**

**Chair: Peter Lee**

- 1:00**  
**(109)** Root System Characteristics in Sympatric Floating-Leaved Macrophytes, Nymphaea tetragona Georgi and Brasenia schreberi J.F. Gmel. Hidenobu Kunii, Shimane University, Matsue, Japan.
- 1:15**  
**(110)** Growth and Allocation Patterns in a Developing Mat of Waterhyacinth (Eichhornia crassipes). John D. Madsen, U.S. Army Corps of Engineers, Lewisville, Texas.
- 1:30**  
**(111)** Growth Responses of Alligator Weed to Temperature and Photoperiod. P.J.M. Sale and K.H. Bowmer, Center for Irrigation and Freshwater Research, Griffith, Australia. Presented by G.R. Sainty.
- 1:45**  
**(112)** Nutrient Composition of Two Emergent Aquatic Plants. Anjana Dewanji and Shyam Matai, Indian Statistical Institute, Calcutta, India.
- 2:00** \*  
**(113)** Variation in Nutrient Limitation and Storage Capacity of Marine Algae Representing Different Growth Forms. M.F. Pedersen, University of Copenhagen, Copenhagen, Denmark.
- 2:15**  
**(114)** Qualitative and Quantitative Changes in Nitrogen During Sprouting of Hydrilla Turions. Frederick J. Ryan and Deborah L. Holmberg, U.S. Department of Agriculture, Agriculture Research Service, Davis, California.
- 2:30**  
**(115)** Deep Water Aquatic Plant Communities in an Oligotrophic Lake: Physiological Responses to a Variable Light Climate. Anne-Maree Schwarz and Clive Howard-Williams, Taupo Research Laboratory, Taupo, New Zealand.
- 2:45**  
**(116)** The Role of Macrophytes in Heavy Metal Circulation in Shallow Coastal Areas. Maria Greger and Lena Kautsky, Stockholm University, Stockholm, Sweden.
- 3:00** Afternoon Break

SESSION IX

Flagler A

3:30 - 5:00 Poster Session

- (117) \* Strategy Analysis of Euhydrophyte Communities in European Riverine Wetlands. V.J. Abernethy and K.J. Murphy, University of Glasgow, Glasgow, Scotland.
- (118) U.S. Army Corps of Engineers Environmental Resources Research and Assistance Programs. Robert C. Gunkel, U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- (119) Evaluation of an Interstitial Water Sampler for Analysis of Nutrients in Containers Used for Culture of Hydrilla. William G.H. Latham and David L. Sutton, University of Florida, Fort Lauderdale, Florida.
- (120) Genetic Variation in the Freshwater Angiosperm Myriophyllum alterniflorum DC. S.C. Maberly, S.A. Harris and R.J. Abbott. University of St. Andrews, St. Andrews, Scotland.
- (121) \* The Ecology of the Exotic Aquatic Plant Trapa natans Including Growth Habits and Seed Production. B.A. Methe, R.J. Soracco, J.D. Madsen and C.W. Boylen, Rensselaer Polytechnic Institute, Troy, New York.
- (122) \* A Physiological Basis for the Distribution of Aquatic Plants in Florida. M.J. Moon, M.R. Rattray, J. Reiskind and G. Bowes, University of Florida, Gainesville, Florida.
- (123) Carbonic Anhydrase Activity in Photosystem-Deficient Mutants of Chlamydomonas reinhardtii. N.A. Pronina, Russian Academy of Sciences, Moscow, Russia.
- (124) Chemical Ecology of Potamogeton pectinatus L. J. Sarosiek and P. Kosiba, Wroclaw University, Wroclaw, Poland.
- (125) Aerobic Biofermentation and Vermicomposting of Harvested Aquatic Plants From Lakes. John R. Shuman, David L. Haselow and Orville C. Thompson, St. Johns River Water Management District, Palatka, Florida.

6:00 Cocktail Hour - (cash bar; informal dress representing your business, college or nation).

7:00 SYMPOSIUM DINNER  
Awards.

- (126) \* Internal CO<sub>2</sub> Transport and Photosynthesis in the Emergent Aquatic Macrophytes Scirpus lacustris and Cyperus papyrus. Alon Singer and Sven Beer, Tel Aviv University, Tel Aviv, Israel.
- (127) Assessing the Potential of Sediments for Supporting the Growth of Rooted, Submersed Aquatic Plants. R. Michael Smart, U.S. Army Corps of Engineers, Lewisville, Texas.
- (128) Applications of Simulation Procedures in Aquatic Plant Management. R. Michael Stewart, U.S. Army Corps of Engineers, Lewisville, Texas.
- (129) Nitrogen Fixing Aquatic Plant Azolla sp. Hybrid as Biofertilizer for Rice Crop. R. S. Sundaram and S. Kannaiyan, Tamil Nadu University, Coimbatore, India.
- (130) Isoetid Population Demography Over a Disturbance Gradient. Jozef Szmaja, University of Gdansk, Gdansk, Poland.
- (131) The Effect of Sulphide and Ferrous Iron on the Growth of Potamogeton pectinatus L. C. van Wijk, C.J. De Groot and P. Grillas, Station Biologique Tour du Valat, Arles, France.
- (132) The Impact of Temperature on the Development of Hydrellia pakistanae Life Stages. Ramona H. Warren, U.S. Army Corps of Engineers, Vicksburg, Mississippi.
- (133) \* pH-Associated Plasticity and Local Adaptation in Three Isoetid-Form Aquatic Plants. Evan R. Weiher and Charles W. Boylen, Rensselaer Polytechnic Institute, Troy, New York.
- (134) Chemical Composition of Submersed Aquatic Vegetation, Lake Okeechobee, Florida (1990). Paul V. Zimba, Margaret S. Hopson and Doug Colle, University of Florida, Gainesville, Florida.

- Atlantic Avenue Corridor.

- Tomoka/Crystal/St. Johns Ballroom.

**SESSION XA**

*Tomoka Ballroom*  
**Mechanical Harvesting**  
Chair: Scott Painter

- 8:30  
(135) The Impact of Mechanical Harvesting on Quality of Wetland Vegetation: A Quantitative Approach. **Elly P.H. Best**, DLO-Centre for Agrobiological Research, Wageningen, The Netherlands.
- 8:45  
(136) Vegetation Zonation Along Watercourses: Their Mutual Relationships and Implications for Mechanical Control. **R. Pot**, Advisory Group on Vegetation Management, Wageningen, The Netherlands.
- 9:00  
(137) Mechanical Harvesting Requirements and Evaluation in South Florida Flood Control Canals. **Steve Smith** and **Mike Bodle**, South Florida Water Management District, West Palm Beach, Florida.
- 9:15  
(138) Water Hyacinth Mechanical Harvesting - Lake Cidra, Puerto Rico Pilot Project. **Gerald N. Smith** and **Nancy S. Palmstrom**, Aquatic Control Technology, Inc., Northborough, Massachusetts.
- 9:30  
(139) Development of Advanced Mechanical Harvesting Equipment. **Harlan M. Stein** and **T. Amimoto**, SR Group, Inc, Houston, Texas.
- 9:45  
(140) The Suction Harvesting of Eurasian Watermilfoil and its Effect on Surrounding Native Plant Communities. **C.W. Boylen**, **R.T. Bombard**, **J.W. Sutherland** and **L.W. Eichler**, Rensselaer Fresh Water Institute, Troy, New York.
- 10:00 Morning Break

**SESSION XB**

*Crystal Ballroom*  
**International Aquatic Weed Problems**  
Chair: Alison Fox

- 8:30  
(141) Distribution of Hydrilla in China: Implications on Future Spread in North America. **Joe Balciunas** and **Chen Ping Ping**, U.S. Department of Agriculture, Agriculture Research Service, Townsville, Australia.
- 8:45  
(142) The Infestation of Water Hyacinth in the Chao Phraya River Basin, **P. Benyasut** and **S. Benyasut**, Royal Irrigation Department, Nonthaburi, Thailand.
- 9:00  
(143) Functioning of *Typha domingensis* (Pers) Kunth Stands in Cuba. **José Miguel Plasencia Fraga** and **Jan Kvet**, Science Academy of Cuba, Camagüey, Cuba.
- 9:15  
(144) Aquatic Plant Management in Relation to Irish Recreational Fisheries Development. **Joseph M. Caffrey**, Central Fisheries Board, Dublin, Ireland.
- 9:30  
(145) Status of Water Hyacinth and Control in Nigeria. **O.A. Akinyemiju**, Obafemi Awolowo University, Ile-Ife, Nigeria.
- 9:45  
(146) Aquatic Plants in Agricultural Canals in Yugoslavia. **Marija Arsenovic** and **Branko Konstantinovic**, Institute for Plant Protection, Novi Sad, Yugoslavia.
- 10:00 Morning Break

## SESSION XI

*Tomoka/Crystal Ballroom*

## Closing General Session

Chair: APMS President Randall Stocker

10:30 Has All This Research Helped Anyone? William T. Haller and A.M. Fox, University of Florida, Gainesville, Florida.

10:45 A Plant Manager's View Point. Wayne Corbin and David Girardin, St. Johns River Water Management District, Palatka, Florida.

11:00 Parting Shots. Ken Langeland, University of Florida, Gainesville, Florida.

11:15 Closing Remarks - Randall Stocker.

11:30 APMS Business Meeting and Installation of 1992-1993 Officers

12:00 Adjournment of 32nd Annual Meeting.

Luncheon and Meeting of APMS Board of Directors.

*Flagler A*

**FUTURE MEETING SITES OF THE  
AQUATIC PLANT MANAGEMENT  
SOCIETY, INC.**

1993 - Charleston, South Carolina.  
July 11-15

1994 - San Antonio, Texas.  
July 10-14

1995 - New England.

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1961	Boca Grande, Florida	Alfred S. Chipley
1962	Fort Lauderdale, Florida	T.W. Miller, Jr.
1963	Tampa, Florida	William Dryden
1964	Tallahassee, Florida	Herbert J. Friedman
1965	Palm Beach, Florida	John W. Woods
1966	Lakeland, Florida	Zeb Grant
1967	Fort Myers, Florida	James D. Gorman
1968	Winter Park, Florida	Robert D. Blackburn
1969	West Palm Beach, Florida	Frank L. Wilson
1970	Huntsville, Alabama	Paul R. Cohee
1971	Tampa, Florida	Stanley C. Abramson
1972	Miami Springs, Florida	Robert J. Gates
1973	New Orleans, Louisiana	Brandt G. Watson
1974	Winter Park, Florida	Alva P. Burkhalter
1975	San Antonio, Texas	Lou V. Guerra
1976	Fort Lauderdale, Florida	Ray A. Spirnock
1977	Minneapolis, Minnesota	Robert W. Geiger
1978	Jacksonville, Florida	Donald V. Lee
1979	Chattanooga, Tennessee	Julian J. Raynes
1980	Sarasota, Florida	William N. Rushing
1981	Jackson, Mississippi	Nelson Virden
1982	Las Vegas, Nevada	Roy L. Clark
1983	Lake Buena Vista, Florida	Emory E. McKeithen
1984	Richmond, Virginia	A. Leon Bates
1985	Vancouver, British Columbia	Max C. McCowen
1986	Sarasota, Florida	Lars W.J. Anderson
1987	Savannah, Georgia	Dean F. Martin
1988	New Orleans, Louisiana	Richard D. Comes
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1990	Mobile, Alabama	David L. Sutton
1991	Dearborn, Michigan	Joseph C. Joyce



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**U.S. DEPARTMENT OF THE INTERIOR, BUREAU  
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