Bibliography of Remote Sensing Techniques Used in Wetland Research

by Janet L. Lampman
The following two letters used as part of the number designating technical reports of research published under the Wetlands Research Program identify the area under which the report was prepared:

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<tr>
<td>CP</td>
<td>Critical Processes</td>
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<td>DE</td>
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Bibliography of Remote Sensing Techniques Used in Wetland Research

by Janet L. Lampman
Environmental Laboratory
U.S. Army Corps of Engineers
Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

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Remote Sensing Applications for Wetlands

Bibliography of Remote Sensing Techniques Used in Wetland Research (TR WRP-SM-2)

ISSUE:
Remote sensing techniques have proven to be cost-effective methods for inventorying the present condition of a wetland, and for detecting changes in a wetland using historical remote sensing data. The extensive research conducted in this area is valuable when remote sensing applications are being considered for use in further wetland research.

RESEARCH:
The Bibliography of Remote Sensing Techniques Used in Wetland Research provides listings of some of the published works available for reference. This bibliographical search was conducted as part of a WRP work unit on characterizing changes to wetlands. The results were used to guide research efforts on the use of remote sensing technology for wetland change detection and assessment.

SUMMARY:
The bibliography will aid in literature reviews conducted on the past uses of remote sensing techniques in wetland research. All of the citations are in three listings organized by wetland type, sensor type, and author.

AVAILABILITY OF REPORT:
The report is available on Interlibrary Loan Service from the U.S. Army Engineer Waterways Experiment Station (USAEWES) Library, telephone (601) 634-2355.

To purchase a copy, call the National Technical Information Service (NTIS) at (703) 487-4650. For help in identifying a title for sale, call (703) 487-4780.

NTIS report numbers may also be requested from the WES librarians.

About the Author:
The bibliography was compiled by Ms. Janet L. Lampman, a physical scientist at the WES Environmental Laboratory. Point of contact is Ms. Lampman, USAE Waterways Experiment Station, ATTN: CEWES-EN-C, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, Phone: (601) 634-3962.

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Preface

The work described in this report was authorized by the Headquarters, U.S. Army Corps of Engineers (HQUSACE), as part of the Stewardship and Management Task Area of the Wetlands Research Program (WRP). The work was performed under Work Unit 32762, "Techniques for Characterizing Changes to Wetlands." Principal Investigator was Mr. Mark R. Graves of the Environmental Laboratory (EL), U.S. Army Engineer Waterways Experiment Station (WES). Ms. Denise White (CECW-ON) was the HQUSACE WRP Technical Monitor for this work.

Mr. Jesse A. Pfeiffer, Jr. (CERD-C), was the WRP Coordinator at the Directorate of Research and Development, HQUSACE; Dr. William L. Klesch (CECW-PO) served as the WRP Technical Monitor's Representative; Dr. Russell F. Theriot, WES, was the Wetlands Program Manager. Mr. James W. Teaford, Wetlands Branch, EL, was the Task Area Manager.

This report was prepared by Ms. Janet L. Lampman, under the general supervision of Mr. H. Wade West, Chief, Environmental Characterization Branch, Mr. J. L. Decell, Acting Chief, Natural Resources Division, and Dr. John Harrison, Director, EL, and under the direct supervision of Dr. M. Rose Kress.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Leonard G. Hassell, EN.

This report should be cited as follows:

1 Introduction

The Wetlands Research Program (WRP) is a critical part of the U.S. Army Corps of Engineers' commitment to wetland research. The WRP is divided into five task areas, each with its own specific mission in an important part of wetland research. A work unit under the Stewardship and Management Task Area, "Techniques for Characterizing Changes to Wetlands," is investigating the application of remote sensing technology for detecting changes in wetland environments.

This report documents a bibliographical search conducted as part of the "Techniques for Characterizing Changes to Wetlands" work unit on applications of remote sensing techniques in wetland research. The search was conducted as the initial step in examining the evolution of this technology in terms of sensor and platform development and the refinement of data processing and analysis techniques. It is a nonexhaustive search of publications from 1968 to 1990. Results were used to guide research efforts on the use of remote sensing technology for wetland change detection and assessment. The search was conducted through the WES Research Library.
2 Bibliography Organization

The citations are presented in three appendixes. Appendix A organizes citations by the following wetland types: (1) tidal salt marsh; (2) tidal freshwater marsh; (3) mangrove; (4) inland freshwater marsh; (5) northern peatland; (6) southern deepwater swamp; (7) riparian wetlands; (8) submerged aquatic vegetation; (9) regional wetland mapping; and (10) general information. Citations that could not be categorized based on the available information were placed in the group "Unknown Wetland Type."

Appendix B groups the citations by sensor type: (1) black-and-white photography; (2) true-color photography; (3) false-color infrared photography; (4) Landsat Multispectral Scanner (MSS); (5) Landsat Thematic Mapper (TM); (6) Satellite Pour l'Observation de la Terre (SPOT); (7) radar; (8) aircraft multispectral; (9) ground-based radiometer; (10) general information; and (11) other. Citations that could not be categorized based on the available information were placed in the group "Unknown Sensor Type."

Appendix C organizes the citations alphabetically by author. Within Appendixes A and B, a citation may appear in more than one category. The numbers of citations in each category in each appendix are summarized in Table 1.

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### Table 1
**Number of Citations by Category**

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<td><strong>Appendix C—By Author</strong></td>
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</table>

Chapter 2 Bibliography Organization
Appendix A
Citations Organized by Wetland Type

Tidal Salt Marsh


Conrod, A. C. 1973. Digital data processing of ERTS-1 imagery of Delaware Bay. Symposium on significant results obtained from the Earth Resources Technology Satellite-1; March 5-9, 1973; New Carrollton, Maryland. Greenbelt, Maryland: Goddard Space Flight Center, National Aeronautics and Space Administration; 1973: 1641-1647.


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Nayak, S., Gupta, M. C., Chauhan, H. B. et al. 1986. The application of Landsat data for coastal zone monitoring: a case study on the west coast of India. Proceedings of the regional seminar on the application of remote sensing techniques to coastal zone management and environmental monitoring; November 18-26, 1986; Dhaka, Bangladesh. 320-327.


Rousseau, J. 1984. Remote sensing applications for coastal/marine planning and management in developing countries. Proceedings of the eighteenth meeting of the Association of Island Marine Laboratories of the Caribbean; August 13, 1984; St. James, Trinidad. 3.


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Tidal Freshwater Marsh


Conrod, A. C. 1973. Digital data processing of ERTS-1 imagery of Delaware Bay. Symposium on significant results obtained from the Earth Resources Technology Satellite-1; March 5-9, 1973; New Carrollton, Maryland. Greenbelt, Maryland: Goddard Space Flight Center, National Aeronautics and Space Administration. 1641-1647.


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Mangrove


Inland Freshwater Marsh


Jensen, J. R., Hodgson, M. E., Christensen, E. J. et al. 1984. Multispectral remote sensing of inland wetlands in South Carolina: selecting the appropriate sensor. Tenth international symposium on machine processing of remotely sensed data with special emphasis on Thematic Mapper data and geographic information systems; June 12-14, 1984; Purdue University. West Lafayette, Indiana: Purdue University. 144-152.


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Southern Deepwater Swamp


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Riparian Wetland


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Submerged Aquatic Vegetation


Regional Wetland Mapping


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Appendix B
Citations Organized by Sensor Type

Black-and-White Photography


Keller, M. 1983. The application of remote sensing to wetland delineation for the planning function and regulatory functions in the Memphis District. US Army Corps of Engineers remote sensing symposium; November 7-9, 1983; Reston, Virginia. 437-438.


True-Color Photography


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Appendix B Citations Organized by Sensor Type


Landsat Multispectral Scanner (MSS)


Chase, P. E., Reed, L., and Smith, V. E. 1973. Utilization of ERTS-1 data to monitor and classify eutrophication of inland lakes. Symposium on significant results obtained from the Earth Resources Technology Satellite-1; March 5-9, 1973; New Carrollton, Maryland. Greenbelt, Maryland: Goddard Space Flight Center, National Aeronautics and Space Administration. 1597-1604.


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Cooper, S., Buckelew, T. D., McKim, H. L. et al. 1977. Landsat follow-on investigation no. 22510: the use of the Landsat data collection system and imagery in reservoir management and operation. Greenbelt, Maryland: Goddard Space Flight Center, National Aeronautics and Space Administration.


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Nayak, S., Gupta, M. C., Chauhan, H. B. et al. 1986. The application of Landsat data for coastal zone monitoring: a case study on the west coast of India. Proceedings of the regional seminar on the application of remote sensing techniques to coastal zone management and environmental monitoring; November 18-26, 1986; Dhaka, Bangladesh. 320-327.


Sadowski, F. G. 1981. Alternative approaches for utilizing Landsat data to address forest and range applications. Proceedings of the seventh international symposium on machine processing of remotely sensed data; Purdue University. West Lafayette, Indiana: Purdue University. 19.


Sellman, B. 1973. Land resources survey for the state of Michigan. Proceedings of the symposium on significant results obtained from the Earth Resources Technology Satellite-1; March 5-9, 1973; New Carrollton, Maryland. Greenbelt, Maryland: Goddard Space Flight Center, National Aeronautics and Space Administration. 1083-1090.


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**Landsat Thematic Mapper**


Jensen, J. R., Hodgson, M. E., Christensen, E. J. et al. 1984. Multispectral remote sensing of inland wetlands in South Carolina: selecting the appropriate sensor. Tenth international symposium on machine processing of remotely sensed data with special emphasis on Thematic Mapper data and geographic information systems; June 12-14, 1984; Purdue University. West Lafayette, Indiana: Purdue University. 144-152.


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Richardson, K. A. 1984. Wetlands classification using Landsat Thematic Mapper data unsupervised classification approach. Proceedings of the tenth international symposium on machine processing of remotely sensed data with special emphasis on Thematic Mapper data and geographic information systems; June 12-14, 1984; Purdue University. West Lafayette, Indiana: Purdue University. 154-158.


Satellite Pour l’Observation de la Terre (SPOT)


Radar


Aircraft Multispectral


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### 13. Abstract (Maximum 200 words)

Within the Wetlands Research Program, a work unit under the Stewardship and Management Task Area, "Techniques for Characterizing Changes to Wetlands," is investigating the application of remote sensing technology for detecting changes in wetland environments. This report documents a bibliographic search conducted as part of that work unit on applications of remote sensing techniques in wetland research. Results were used to guide research efforts on the use of remote sensing technology for wetland change detection and assessment. The citations are presented in three appendixes, organized by wetland type, sensor type, and author.

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