



Additional Materials Generated by the Project

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A.1 Introduction

In this section, we outline additional materials generated by the project, including publications, presentations at meetings, organization of conferences,

outreach work, theses and dissertations completed, and student internships.

A.2 Publications

Badiey, M., J. Simmen, and S. Forsythe. 1997. Frequency dependence of broadband propagation in coastal regions, *J. Acoust. Soc. Am.*, 101 (6), 3361-3370.

Badiey, M., J. Simmen, and X. Tang. 1997. Shallow-water coherence of broadband signals. In *High Frequency Acoustics in Shallow Water*, eds. N. G. Pace, E. Pouliquen, O. Bergem, and A. P. Lyons, 914. NATO SACLANTCEN Conference Series, CP-45.

Badiey, M., and K.-C. Wong. 1998. Recent observations of physical parameters in Delaware Bay using broadband acoustic waves, *EOS Trans. Amer. Geophys. Union*, 79 (1), OS39.

Badiey, M., and K.-C. Wong. 1998. Long-term measurements of physical parameters in Delaware Bay using broadband acoustic signals, *EOS Trans. Amer. Geophys. Union*, 79 (17), S129.

C. Birkett, J. Chanton, T. Dunne, gentlemen. Estes, M. Finlayson, L. Fresco, B. Gopal, L. Hess, T. Hollis, W. Junk, V. Klemas, et al., 1998. *Global Wetlands Distribution and Functional Characterization: Trace Gases and the Hydrologic Cycle*, IGBP Report 46 from the Joint Workshop, Santa Barbara, CA 16-20 May 1996, 92 pp.

Chen, H., X.-H. Yan, P.-T. Shaw and Q. Zheng. 1996. A numerical simulation of wind stress and topographic effects on a jet, *J. Phys. Oceanogr.*, 26(9):1769-1802.

Clemente-Colón, P., W. Pichel, and X.-H. Yan. 1997. *Evolution of oil slick patterns as observed by SAR off the coast of Wales*, Proc. of the European Geophysical Union Annual Meeting, 2:1-5.

The Coastal Courier, Spring 1996. University of Delaware Sea Grant College Program.

The Coastal Courier, Spring 1998.. University of Delaware Sea Grant College Program.

Keiner, L. and X.-H. Yan. 1996. Sea surface chlorophyll and sediments from Thematic Mapper imagery using a neural network model, *EOS Trans.* 77, p. S45.

Keiner, L. and X.-H. Yan. 1997. An examination of empirical orthogonal function analysis and sea surface temperature patterns in Delaware Bay, *IEEE Transactions on Geosciences and Remote Sensing*, 35(5):1299-1306.

Keiner, L. and X.-H. Yan. 1998. *A neural network model for estimating sea surface chlorophyll and sediments from Thematic Mapper Imagery, Remote Sensing of Environment*, in press.

Klemas, V. 1998. Remote Sensing of Coastal Environment and Resources, In *Physical Processes in the Coastal Zone: Computer Modelling and Remote Sensing*, (eds. A.P.

Cracknell and E.S. Rowan), 49th Scottish Universities Summer School on Physics, Dundee, August 1997, 389 pp

Liu, Y. and X.-H. Yan. 1996. The wind-induced wave growth rate and the spectrum of the gravity-capillary waves, *J. Phys. Oceanogr.* 25(12):3196-3218.

Liu, Y., X.-H. Yan, and T. Liu. 1997. The probability density function of ocean surface slopes and its effects on radar backscatter, *J. Physical Oceanogr.*, 27(5):782-798.

Valentine, V. and R. Knecht and A. Miller. 1998. *Geographically Based Technologies: The Application of GIS and Remote Sensing to Coastal Issues*, Proc. of GIS/Remote Sensing Workshop, University of Delaware, Newark, Delaware.

Wong, K.-C. 1996. On the tidal variability at the mouth of Delaware Bay and its effect on residual salt transport, *EOS Trans. Amer. Geophys. Union*, 76 (3), OS177.

Wong, K.-C. 1998. The seasonal and subtidal variability in the source region of the Delaware coastal current, *Est. Coast. Shelf. Sci.*, 47, 1-19.

Wong, K.-C., and J. E. Moses-Hall. 1998. The tidal and subtidal variations in the transverse salinity and current distributions across a coastal plain estuary, *J. Mar. Res.*, 56, 489-517.

Wong, K.-C., and J. E. Moses-Hall. 1998. On the relative importance of remote and local wind effects to the subtidal variability in a coastal plain estuary, *J. Geophys. Res.*, 103 (C9), 18393-18404.

Yan, X.-H. and P. Clemente-Colón. 1997. The maximum similarity shape matching (MSSM) feature tracking method applied to an oil spill observed in SAR imagery, *J. Marine Tech. Soc.*, 31(2):8-15.

Yan, X.-H., Q. Zheng, Y. He, C. Ho and W.T. Liu. 1997. Centroid rotation of the western Pacific warm pool for the recent three El Niño events, *J. Phys. Oceanogr.*, 27(5):837--845.

Yan, X.-H. 1996. *Using MSSM method to observe oil spill features in SAR imagery*, Proc. of NASA Workshop on Coastal Environmental Hazards, Vol. 1: 21-29.

Yan, X.-H. and P. Clemente-Colón. 1997. *The maximum similarity shape matching method applied to oil spill feature tracking observed in SAR remote sensing imagery*, Proc. of 4th International Conference on Remote Sensing for Marine and Coastal Environments, Vol. 1:11-24.

Zheng, Q., V. Klemas, and X.-H. Yan, 1996. Geometric correction and Fourier analysis of space shuttle coastal ocean photographs, *Int. J. Remote Sensing*, 18(1):197-211.

Zheng, Q., X.-H. Yan, C. Ho, and V. Klemas. 1998. ERS-1 SAR image interpretation of solitary lee waves, *J. of Geophys. Research*

Zheng, Q., X.-H. Yan, N. Huang, V. Klemas and J. Pan. 1997. The effects of water temperature on radar scattering from the water surface: An X-band laboratory study, *The Global Atmospheric and Ocean System*, 5:273-294.

Zheng, Q., X.-H. Yan, V. Klemas, Z. Wang, C.-R. Ho, and N.-J. Kuo. 1997. *Solitary coastal lee waves observed from space*, *Ocean Optics XIII*, Proc. of Society of Photo-Optical

Instrumentation Engineers (SPIE), 22-25 Oct. 1996, Halifax, Nova Scotia, Canada, Vol. 2963:898-903.

Zheng, Q., X.-H. Yan, V. Klemas, and Z. Wang. 1997. *Solitary coastal lee waves observed from space*, Proc. of AMS Conference, Phoenix, AZ, in press.

Zheng, Q., V. Klemas, X.-H. Yan, Z. Wang. 1996. Dynamic analysis of oceanic internal waves observed by space shuttle photography, *EOS Trans.* 76(3)96.

Zheng, Q., V. Klemas, X.-H. Yan, Z. Wang. 1998. Observations of ocean internal waves in Arabian Sea using space shuttle photography, *EOS Trans.*, 79(1):0S3.

A.3 Meeting Presentations

Badiy, M. and Simmen, J. Acoustic fluctuations in Delaware Bay, 4th European Conference on Underwater Acoustics, Rome, Italy, September 21-25, 1998

Badiy, M. and K.-C. Wong. Tidal measurements in Delaware Bay using high frequency acoustics, Middle Atlantic Bight Physical Oceanography and Meteorology Workshop, Newark, Delaware, October, 1996.

Badiy, M. Frequency dependence of broadband acoustic propagation in coastal regions, 3rd Joint Meeting of Acoustical Societies of America and Japan, Hawaii, December, 1996.

Badiy, M., and K.-C. Wong. Recent observations of physical parameters in Delaware Bay using broadband acoustic waves, AGU Ocean Sciences Meeting, San Diego, California, February, 1998.

Badiy, M. Recent observations of high-frequency acoustic wave propagation in the Delaware Bay, 16th ICA/135 ASA Conference in Seattle, Washington, May, 1998.

Klemas, V., 1997. Applications of GIS and Remote Sensing to Coastal Management, Fifth World Bank Conference on Environmentally Sustainable Development, Washington, D.C. October 8, 1997.

Klemas, V., 1998. Application of Remote Sensing to Baltic Sea Pollution Problems, Vilnius University, Lithuania.

Klemas, V., 1998. Using Remote Sensing Techniques to Characterize Coastal Environments, USGS and University of Puerto Rico, San Juan, March 19, 1998.

Klemas, V., 1998. Space Station Potential for Observing Oceanographic Features, 27th Internl. Symp. On Remote Sensing of Environment, Tromso, Norway, June 8-12, 1998.

Knecht, Robert W., "The Application of Advanced Remote Sensing and GIS Technologies to Coastal Ecosystem Health," CZ97, Boston, Mass., July 1997.

Knecht, Robert W., "An Interdisciplinary Approach to Studying Coastal Ecosystem Health," presentation at Sea Grant Week, Madison, Wisconsin, August 1997.

Wong, K.-C. The lateral salinity variability in a coastal plain estuary, AGU Spring Meeting, Baltimore, Maryland, May, 1996

Wong, K.-C. The wind-driven variability in lower Delaware Bay, AGU Fall Meeting, San Francisco, California, December, 1996.

Wong, K.-C. The formation of tidal fronts in a coastal plain estuary, AGU Spring Meeting, Baltimore, Maryland, May, 1997.

Wong, K.-C. The transverse variability in the exchange between a coastal plain estuary and the adjacent continental shelf, 14th Estuarine Research Federation International Conference, Providence, Rhode Island, October, 1997.

Dynamic Analysis of Oceanic Internal Waves Observed by Space Shuttle Photograph, AGU 1996 Ocean Science Meeting, San Diego, CA, 2/16/96.

Using MSSM Method to Observe Oil Spill Features in SAR Imagery, NASA Workshop on Coastal Environment Hazard, Baton Rouge, LA, 2/22/96.

Infrared Remote Sensing for Oceanographic and Atmospheric Coupling Research, National Academy of Thermology, 1996 Annual Meeting, Las Vegas, NV, 3/29/96.

Sea Surface Chlorophyll and Sediments from Thematic Mapper Imagery Using a Neural Network Model, 1996 AGU Spring Meeting, Baltimore, MD, 5/23/96.

Solitary Coastal Lee Waves Observed from Space, 1996 Optical Remote Sensing Conference, Halifax, Canada, 10/21/96.

The Maximum Similarity Shape Matching Method Applied to Oil Spill Feature Tracking Observed in SAR Remote Sensing Imagery, 4th International Conference on Remote Sensing for Marine and Coastal Environment, Orlando, FL, 3/13/97.

Evolution of Oil Slick Patterns As Observed by SAR Off the Coast of Wales, 1997 European Geophysical Union Meeting, Florence, Italy, 6/19/97.

Solitary Coastal Lee Wave Observed from Space, 1998 AMS Annual Meeting, Phoenix, AZ, 1/12/98.

Observation of Ocean Internal Waves in Arabian Sea Using Space Shuttle Photograph, 1998 AGU Ocean Science Meeting, San Diego, CA, 2/9/98.

Remote Sensing Application to Monitor Delaware Bay Ecosystem, Delaware Workshop for Remote Sensing/GIS sponsored by Sea Grant National Office, 5/98.

A.4 Outreach Work

Coastal Ecosystem Health Managers' Advisory Committee

- Sarah Cooksey, Delaware Coastal Management Program Manager DNREC, Division of Soil and Water
- Bruce Richards, Executive Director Center for the Inland Bays
- Bob Zimmerman, Environmental Program Administrator DNREC
- John Schneider, DNREC, Division of Water Resources
- Rick McCorkle, Delaware Estuary Program U.S. Fish and Wildlife Service
- Kevin Donnelly, Environmental Program Administrator, DNREC, Division of Soil and Water Conservation
- Nancy Goggin, Nonpoint Source Coordinator DNREC, Division of Soil and Water Conservation
- Stephen Williams, P.G., Whole Basin Coordinator DNREC, Office of the Secretary
- Paul Petrichenko, Natural Resource Conservation Service
- Constance C. Holland, Director Kent County Department of Planning
- Kevin F. Coyle, Assistant Director Kent County Department of Planning

Managers' Advisory Committee Meetings

1. November 13, 1996 Managers' Advisory Committee meeting held in Dover, Delaware
2. August 29, 1996 Managers' Advisory Committee meeting held in Dover, Delaware
3. September 10, 1997 Managers' Advisory Committee meeting held in Dover, Delaware
4. May 5, 1998 Managers' Advisory Committee meeting held in Dover, Delaware

Preliminary Assessment of the Needs of Managers for Ecosystem Health Information

A series of interviews with state agency staff conducted by Joe Farrell, Marine Advisory Service Agent (University of Delaware) and Stephanie Poole (Master's student, University of Delaware), November-December, 1995.

Research Presentation and Question-and-Answer Session with Delaware State Agencies

On November 29, 1995, at the Department of Natural Resources and Environmental Control (DNREC) in Dover, Vic Klemas and Oliver Weatherbee made presentations on the Delaware NERR and Coastal Ecosystem Health project to representatives of state and federal agencies involved in regional environmental programs. Among the 26 attendees were ecosystem specialists and data managers from DNREC, the U.S. Fish and Wildlife Service, EPA, the Delaware Estuary Program, and the Center for the Inland Bays. The presentations were followed by a vigorous discussion of data requirements and processing needs.

Conferences

"Geographically Based Technologies: The Application of GIS and Remote Sensing to Coastal Issues" held at the University of Delaware, May 11-12, 1998. Sponsored by The University of Delaware Sea Grant Program, the University of Wisconsin Sea Grant Program, NOAA Coastal Services Center, Charleston, SC and the NOAA National Sea Grant Office. Conference was hosted by the Delaware Sea Grant Program, the Center for the Study of Marine Policy, and the Center for Remote Sensing, University of Delaware. Organized by Professor Robert Knecht (University of Delaware) and Professor Al Miller (University of Wisconsin). (See Valentine, Knecht and Miller, 1998.)

"Delmarva's Coastal Bay Watersheds" held in Ocean City, Maryland on March 8-9, 1996. Kent Price (University of Delaware) served as Co-Chair of the planning committee for the conference which was attended by citizens, elected and appointed officials, and special-interest representatives and decision-makers.

"*Pfiesteria Briefing*" held October 3, 1997 at the University of Delaware Lewes campus. The briefing for local governmental officials was hosted by Professor Kent Price and was given at the request of Congressman Mike Castle.

Work with the Center for Inland Bays

Professor Kent Price, the Director of the Marine Advisory Service (MAS), Delaware Sea Grant Program serves as chair of the Delaware Inland Bays Scientific and Technical Advisory Committee (STAC) and was also reelected to a third term as chair of the legislatively-created Center for the Inland Bays. As chair of the Board of Directors for the Center for the Inland Bays, Professor Price has been deeply involved in establishing operations for the Center. He also serves as a member of the Advisory committee for the Delaware/Maryland Coastal Bays Joint Assessment Program and as a member of the Maryland Coastal Bays STAC.

The marine recreation agent/specialist, James Falk is co-chair of the STAC and the coastal resource management agent/specialist, Joseph Farrell, is treasurer of the Citizens Advisory Committee (CAC) and supervises the citizens' monitoring and water quality education program for the inland bays.

Dissertations/Theses Generated

Bailey, A. 1997. Detecting and Monitoring Phragmites Invasion of Coastal Wetlands: A Comparison of Remote Sensing Techniques. Master's Thesis. Graduate College of Marine Studies, University of Delaware.

Darby, F. 1998. Pathways and Management of Aquatic Nonindigenous Species in Delaware. Master's Thesis. Graduate College of Marine Studies, University of Delaware

Donahue, S., Policy Options for the Control of Agricultural Non-Point Source Pollution in Delaware: An Analysis, Master's Thesis. Graduate College of Marine Studies, University of Delaware.

Poole, S. 1997. Assessing National Estuary Programs (NEP): Improving the NEP Process Through Development of Evaluation Criteria. Master's Thesis. Graduate College of Marine Studies, University of Delaware.

Louis E. Keiner, Ph.D. Dissertation: The Satellite Remote Sensing of Environment Processes in Delaware Bay, Summer 1997. Graduate College of Marine Studies, University of Delaware.

Valentine, V. Remotely Sensed Landscape Indicators for Sea Level Change in Delaware. Ph.D. Thesis. Graduate College of Marine Studies, University of Delaware. In preparation.

Weatherbee, O. An Analysis of Land-use, Land Cover Change in Delaware. Ph.D. Dissertation. Graduate College of Marine Studies, University of Delaware. In preparation.

Student Internships

Deborah Goldstein, Delaware Nature Society internship involving preparations for the 1997 Piedmont Basin Forum conducted by Delaware Department of Natural Resources and Environmental Control (DNREC). The forum's goal was to gain feedback from citizens about issues affecting the basin and its watersheds.

Deborah Goldstein, internship with Coastal Management Program, DNREC, spring 1996.

James Poling, Delaware Nature Society internship in 1997 involving the Wilmington Riverfront Revitalization Project focusing on the economic redevelopment of the land surrounding the Christina and Brandywine rivers while improving the quality of each respective watershed.

Forbes Darby, National Estuarine Research Reserve System (NERRS) fellowship in 1997 investigating management challenges associated with exotic species.

Vinton Valentine, National Estuarine Research Reserve System (NERRS) Graduate Research Fellowship in 1997-98 examining response of wetland transition communities in tidal rivers to relative sea level changes and associated human impacts.

Stephanie Poole, internship with Center for Inland Bays, summer 1997.